APPENDIX B – ECONOMICS ANALYSIS
NAVIGATION IMPROVEMENTS
HAINES, ALASKA

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CONTENTS

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1.0 COMMUNITY PROFILE

The purpose of this section is to provide general background information pertaining to the socioeconomic composition of the study area. This information is necessary to enable planners and report reviewers to understand the community infrastructure, the level of economic activity generated from this small rural community, and the potential of the area to support the project under construction.

1.1 Location and Setting

The City of Haines is located in the northern portion of Southeast Alaska, the region of the state commonly referred to as "the panhandle". City boundaries straddle a peninsula that separates the Chilkat River Valley from Chilkoot Inlet, an embayment near the northern end of Lynn Canal. The community is situated roughly between the Coast Range, on the eastern shore of Lynn Canal, and Chilkat Range, a southeasterly extension of the Wrangell St. Elias Mountains. The area is virtually surrounded by mountains, glaciers, inlets, fjords and rugged terrain.

Haines is approximately 80 air miles northwest of Juneau and has developed as a marine, land and air transportation hub for the northern part of Southeast Alaska. This is due in part to its deep-water harbor as a terminus of the Alaska Marine Highway Ferry System, and its link to both Canada and the interior of Alaska as the southern terminus of the Haines Highway.

1.2 History

Native Alaskans who valued the area for its mild climate and abundance of food originally settled the area. The original Native name for Haines was Deishu, meaning "end of the trail". It was a trading post for both Chilkat and Interior Natives. With an oral tradition and no written history, details of Tlingit Native migrations are from stories recorded and by early ethnographers. The Tlingit are among North America's finest Native artisans. Early carving and weaving by Haines area artisans, of both the Chilkat and Chilkoot bands, were collected by early ethnographers. Many remain in the Chicago's Field Museum and the American Museum of Natural History collections. However, repatriation of Native works of art has increasingly brought these works back to their villages of origin.

The first white man to settle here was George Dickinson, who came as an agent for the North West Trading Company. The following year, S. Hall Young, a Presbyterian missionary, came into Chilkat Inlet with his friend, naturalist John Muir. They planned to build a Christian town, offering the Chilkat people a missionary and teacher. The site chosen was on the narrow portage between the Chilkat River and Lynn Canal. By 1881, with financial help from Sheldon Jackson, the mission was established. The town was named for Mrs. F. E. Haines, secretary of the Presbyterian National Committee of Home Missions, which raised funds for the new mission.

In 1884 the Haines post office was established, although the settlement was still known locally as Chilkoot. The town became an important outlet for the Porcupine Mining District, producing thousands of dollars worth of placer gold at the turn of the century. Haines also

marked the beginning of the Dalton Trail, which crossed the Chilkat mountain pass to the Klondike gold fields in the Yukon during the great Klondike gold rush of 1896-99. The Dalton Trail is now roughly the route of the Haines Highway.

Just south of Haines city center is Fort William H. Seward on Portage Cove. The U.S. government established a permanent military post there in 1904 and called it Fort William H. Seward, in honor of the Secretary of State who negotiated the purchase of Alaska from Russia in 1867. In 1922, the fort was renamed Chilkoot Barracks, after Chilkoot Inlet and the Indian tribe on the Chilkoot River. Until World War II, this was the only U.S. Army post in Alaska. Chilkoot Barracks was deactivated in 1946 and sold in 1947 to a group of enterprising U.S. veterans who had designs of creating a business cooperative on the site. Their plans were never fully realized, but a few stayed on to develop tourism in the area. In 1972, the post was designated a National Historic Site and again became Fort William H. Seward, and in 1978 its status was elevated to a National Historic Landmark. The old fort and the stately buildings serve as homes, visitor accommodations and cultural attractions.

By 1910, Haines had approximately 400 residents, 19 stores and four canneries. In a special election, local residents chose to incorporate as a first-class city for the purposes of maintaining order and improving the school system. In the 1940's and 1950's, Haines became an important transportation link with the completion of the Haines Highway and the initiation of the Alaska Marine Highway System. In the early 1950's a military fuel storage pumping facility was constructed at Tanani Point, and an 8-inch pipeline ran over 600 miles to Fort Wainwright near Fairbanks. This pipeline operated for 20 years before becoming obsolete. In 1970, Port Chilkoot merged with Haines to become a single municipality, the City of Haines.

After statehood in 1959, the Alaska Legislature began urging various occupied areas of the state to become more organized. In 1968, Haines formed a unique, third-class borough government. The borough's only mandated powers are education and taxation. The Haines Borough is Alaska's only third-class borough and the Alaska Legislature prohibited future third-class borough formation in 1985. The question to change to a different form of borough government has been before Haines voters on a number of occasions and the ballot question whether to form a single, Consolidated City and Borough government was narrowly defeated in 1998.

1.3 Topography

The Haines area lies between the Coast Range and the Chilkat Range, a southeasterly extension of the Wrangell - St. Elias Mountains. Peaks over 7000 feet in both mountain ranges can be viewed from within the city limits. The city center, located at the northern end of the Chilkat Peninsula in an area known as Deishu Isthmus, ranges from 40 to 80 feet above sea level. Steep slopes to over 1,000 feet are located in the northern part of the city, and the peak of Mt. Ripinski, located 1½ mile north of the Haines airport, looms over the town at 3,920 feet.

The Chilkat River, Johnson Creek, Mink Creek, and several unnamed creeks along the southwest side of Lutak Inlet, are the only significant drainage courses in the immediate area,

although several small intermittent creeks drain from the mountain front northwest of Haines. Much of the low area in Haines and to the west is poorly drained.

Tidal data for Haines reduced to mean values shows mean higher high water to be 16.8 feet; mean lower low water at 0.0 feet; with extreme high water level at 22.5 feet and the estimated lowest water level at –6.0 (six feet below mean lower low water).

The Peninsula is bounded on the west by the Chilkat Inlet and on the east by Lynn Canal. The Takshanuk Mountains immediately northwest of the community constitute a steep-sided ridge that rises 3,000 to 6,000 feet above the Chilkat River on the southwest and the Chilkoot River on the northeast. The Chilkat River is a broad braided river that empties into Chilkat Inlet near the southern city limits. The Chilkoot River flows into Chilkoot Lake and subsequently empties into Lutak Inlet, a northwesterly continuation of Lynn Canal.

1.4 Climate

Haines, like all of southeastern Alaska, experiences maritime weather conditions with annually moderate temperatures and high precipitation. However, because of its distance from the exposed coast, more northerly latitude, proximity to interior regions, and local mountains, Haines enjoys a climate which is characteristically drier than most of Southeast throughout the year; slightly cooler in winter, and just as warm or warmer in the summer. This trend becomes more pronounced further up the major river valleys. Moderate summers and moderately mild winters with heavy snowfall typify the climate in the Haines area. Extreme annual temperatures generally range from –17 degrees Fahrenheit to 90 degrees Fahrenheit.

Climatic data indicates that climate is not a deterring factor for development in the Haines area. Suggested minimum structural design for Haines should accommodate a wind load of about 100 mph and a snow load of about 80 psf (pounds per square foot).

The prevailing winds over Lynn Canal are northerly throughout much of the year except during the summer months when they are southeasterly, weaker and more variable. Throughout the year the prevailing winds bring relatively warm, nearly saturated air into Southeast Alaska. In winter, a high-pressure area will frequently develop over northern British Columbia and the Yukon Territory while a strong low-pressure area is centered over the western Gulf of Alaska. The resulting large pressure gradient generates extremely strong winds that blow through the mountain passes and down Lynn Canal. The funneling effect of the mountains that surround Lynn Canal causes winds to be channeled in a northerly or southerly direction. Occasionally during the winter, extremely strong down slope winds occur. These winds may blow steadily at 20 to 30 miles per hour with gusts occasionally over 50 mph. The mountains around the Chilkat-Chilkoot River valleys channel surface winds up and down river.

Annual rainfall near sea level in the Lynn Canal area varies from over 92 inches at the southern end (near Juneau) to 20 inches at the northern end (at Skagway). Mean annual precipitation in Haines is 60 inches. Mean annual snowfall for Haines is 132.6 inches. A low cloud ceiling and/or high winds may occasionally delay flights in and out of the Haines airport.

Existing air quality in Haines is excellent. There are no major industrial sources of air pollution and automobile traffic is light. Haines is classified as a Class II airshed by the Alaska Department of Environmental Conservation (ADEC) under the authority of the Federal Clean Air Act administered for all categories of air pollution.

Storm hazards exist in the form of seasonal winds that can create wind damage, wind-driven water damage, and high runoff inundation. Wind damage in the planning area is rare due to the semi-sheltered location of the community of Haines. Winds up to 40 knots can impact the community with occasional gusts to 60 knots. Water damage within the planning area is usually minor, but more frequent, especially in areas where human development has encroached into natural drainages and flood plains. During periods of high seasonal rains and storm driven high tides, the Haines area is subject to the effects of 100-year floods up to 25 feet above MLLW.

1.5 Demographics

The population of the City of Haines has been variable in the last 20 years. Over all, population inside the City boundaries appears to be growing at a rate of around 2 percent per year. Population growth in the City is 41 percent higher than the figures from the 1980 census and the population has grown 13.1 percent from the 1990 census count (table B-1). During the late 1990's, the Haines area population growth rate led the Southeast region. The March 1999 annexation of outlying Borough residents into the City limits added approximately 280 new residents to the City population, which in late 1999 were 1,775.

The historic growth time period of the Haines Census Division, which follows the Borough boundaries, was 6 percent. However, when two lumber mills were operating, and fishing in the Haines area was successful, the population growth rate exceeded the overall growth rate by 1.5 percent. The population declined in 1976 due to the significant reduction in the operations of both sawmills and a low cycle in salmon abundance.

The population of Haines fluctuates somewhat on a seasonal basis. In May of each year, the population begins to increase due to an influx of summer seasonal visitors and both transient and permanent resident populations, only to decrease proportionately with the onset of winter. Also, in the winter some of the resident population migrates out for winter work while others travel. Peak demands on the City of Haines' resources are highest during the summer months.

Population within the Borough and the City appears to be growing at a rate of around 2 percent per year. The current population of the Borough is 41.7 percent higher than the figures from the 1980 census, and the population has grown 10.7 percent since the 1990 census.

Table B-1. Population Data, 1990–1997

Year	City of Haines	Haines Borough	Southeast Region	State of Alaska
1990	1,238	2,117	68,989	550,043
1991	1,306	2,245	71,141	569,575
1992	1,304	2,220	72,217	587,605
1993	1,336	2,270	72,378	598,267
1994	1,372	2,319	72,698	602,873
1995	1,346	2,295	73,169	603,453
1996	1,400	2,373	74,118	607,800
1997	1,429	2,421	74,217	611,300

Source: Alaska Department of Labor, Research and Analysis Section, Demographics Unit

1.5.1 Population Age and Distribution

Age distribution patterns in 1990 within the City of Haines are illustrated in table B-2. Of the 1,238 residents in the City counted during the 1990 census, 859 (69.4 percent) were between the ages of 18 and 74. Individuals in that age group are most likely to be involved in operating and governing municipalities. Assuming that the age distribution patterns have not changed since the last federal census, 971 current citizens of the City are between 18 and 74 years old.

Age and Male/Female. table 2 shows the 1996 estimates by male/female and five-year age groups for the Haines Census Area. Comparisons are made between the 1996 estimates and 1990 census data. The Haines Borough Census Area has one of the lowest male/female ratios with 104 men for every 100 females.

Median Age. The median age in Alaska was 30.9 years in 1996. This compared with a median age of 29.2 in 1990 and 26.0 in 1980. The areas of Alaska with the oldest population were found in the Haines Borough (37.2).

Elder Citizens. In the State of Alaska, the percentage of persons 65 years and older was 4.9 percent in 1996. This was significantly higher than the 2.9 percent proportion in 1980. It appears that Alaska is following the nationwide trend of older persons representing an increasingly greater share of the population.

Some boroughs and census areas within the state had a larger concentration of older Alaskans than others. The Southeastern region had the greatest proportion of elder citizens, with the Haines Borough leading with 9.7 percent.

Age data do not belie the perception of new retirees. The age profile of Haines does differ significantly from the State's. The Haines population has been older than that of both the state and the southeast region. This trend continued in 1996 when the median age of Haines residents was 37.2, compared to that of Southeast, 34.5, and statewide, 30.9. However, since 1990, the region's median age increased 10 percent -- somewhat faster than Haines' increase of 9 percent. The statewide increase, at 5.8 percent, was much slower.

Table B-2. Haines Borough Population By Age and Male/Female: 1990 and 1996

Age	July 1, 1996			April 1, 1990		
	Total	Male	Female	Total	Male	Female
0-19	705	347	358	633	333	300
20-24	113	62	51	100	54	46
25-44	730	374	356	784	424	360
45-54	405	214	191	259	133	126
55-59	105	54	51	91	53	38
60-74	229	123	106	200	106	94
75+	76	31	45	46	21	25

Source: Alaska Department of Labor, Research and Analysis Section, Demographics Unit

1.5.2 Components of Population Change – 1980, 1990-1996

Components of population change in the Haines Borough are shown in table B-3. Since 1980, population has increased every year except two—1991-92 and 1994-95. Decreases in these years were due to net out migration.

Table B-3. Haines Borough Census Area Characteristics and Components of Population Change, 1980, 1990-1996

Year	Pop. End Period	Pop. Change	Births	Deaths	Natural Increase	Net Migration	Avg. Annual Rate Change (%)	Persons per m^2
1980	1,680							0.71
1980-90	2,117	437	355	79	276	161	2.3	0.90
1990-91	2,245	128	35	16	19	109	4.7	0.95
1991-92	2,220	-25	24	14	10	-35	-1.1	0.94
1992-93	2,270	50	22	15	7	43	2.2	0.96
1993-94	2,319	49	22	14	8	41	2.1	0.98
1994-95	2,295	-24	22	12	10	-34	-1.0	0.97
1995-96	2,373	78	23	10	13	65	3.3	1.01

Source: Alaska Department of Labor, Research & Analysis Section, Demographics Unit

1.5.3 Rate of Population Change

The rate of population change for the Haines Borough, South Alaska and the State is shown in table B-4.

Table B-4. Rate of Population Change

Labor Market	Change		Average (%)	Annual Rate (%)	% Change
	1995-1996	1990-1996	1995-1996	1990-1996	1980-1990
Haines Borough Census Area	78	256	3.3	2.2	2.3
Southeast Region	949	5,129	1.3	1.4	2.5
Alaska	4,347	57,757	0.7	1.9	3.1

Source: Alaska Department of Labor, Research & Analysis Section, Demographics Unit

1.6 Economy

1.6.1 Fishing

Fishing has been a primary economic activity in Haines since the first Chilkat Indians inhabited the area. The commercial fishery in Lynn Canal dates back to at least 1882 when the first cannery was established and operated by Alaska Packers Association in Pyramid Harbor in the Chilkat Inlet. At peak, four canneries operated at the turn of the century. Over harvesting and other factors resulted in a decline to one operating cannery in 1911. The last remaining cannery, Haines Packers, located at Letnikof Cove, closed its operation in 1971 due to the high cost of upgrading its facility.

Although there are no major canneries operating in the immediate vicinity of Haines today, several small fish processors currently operate in the Haines area. Most commercial harvest from waters in Lynn Canal is processed at Excursion Inlet (Haines Borough). Excursion Inlet is about 110 miles south of Haines on Icy Strait. Other major fish processing facilities in Southeast Alaska—with distance from Haines in parentheses—are at Petersburg (255 miles), Ketchikan (390 miles), Juneau (105 miles), Sitka (200 miles via Peril Strait), and Pelican (165 miles).

Natural runs of both chum and sockeye salmon are relatively weak and commercial harvest is managed to protect them. Enhancement planting of Chilkat Lake sockeye salmon occurred in 1994 and 1996 and was resumed again in 2000. As a result, this run is beginning to recover. Also, the natural run of chum salmon in the Chilkat River is recovering.

In 2000, 131 residents of the Haines area held commercial fishing permits. The current commercial fishery in the Lynn Canal includes commercial drift gillnet, subsistence drift and set gillnet, and trolling. The drift-gillnet fishery in the Lynn Canal is primarily for hatchery enhanced chum salmon. Hatchery releases of chum salmon smolt are made just to the north of Lincoln Island in the lower reach of the canal. Releases are made on both sides of the canal and are positioned so as to minimize the chances of hatchery fish mixing with natural runs. There are no remaining suitable locations in the canal at which hatchery fish could be released. Hatchery releases are currently at the maximum level allowed. Thus it would appear that the commercial fishery is currently at the limit of the resource and expansion of commercial fishing in Lynn Canal is not expected. Commercial fishers in Lynn Canal target no other species of salmon or other fish.[1]

The number of gillnet-fishers in Lynn Canal increased steadily from 1944 when the maximum number of boats fishing during any week was 17. During 1999 the peak-boat count for the hatchery-enhanced fishery was 50 boats and during 2000 it was 120 boats.[2] The salmon catch value from Lynn Canal has varied in recent years depending on strength of runs and prices offered by major processors.

The overall economic value of Alaska's salmon harvest is tied to abundance, world demand and market competition, particularly from the "farm fish" industry. In 1988, the Lynn Canal salmon harvest paid $15,000,000 to fishermen (the historical record). In the 1990's, pricing

[1] Personal conversation with Randall Bachman, Alaska Department of Fish and Game, October, 2000.

[2] Personal conversation with Randall Bachman, Alaska Department of Fish and Game, October, 2000.

competition from the worldwide growth of net-pen salmon aquaculture greatly reduced the price paid to Alaska salmon fishers. In 1991, the Lynn Canal salmon harvest value was $3,500,000 due to low prices. In the late 1990's, low Sockeye returns on the Chilkoot River, combined with generally depressed market price, have further reduced the local Salmon harvest value. The 1998 and 1999 Lynn Canal harvest were valued at $1,118,000 and $1,844,511 respectively. Despite relatively low prices for salmon in recent years the fishing industry continues to remain economically sound. Actions that have been taken within the salmon fishing and processing industry to maintain its economic viability include the following:

- Development of salmon enhancement hatcheries to supplement natural stocks;
- Development of a market for salmon roe;
- Development of low-cost processing and marketing of fresh salmon at Haines to utilize carcasses that would otherwise be wasted;
- Development of new salmon products such as salmon ham;
- And, diversification of fishing boats into other fisheries.

Because the commercial salmon fishery has operated under a limited entry system since the mid-1970s, a good indication of the future outlook of the economic viability of the salmon fishery is the value of salmon fishing permits. The Alaska Commercial Fisheries Entry Commission tracks sales of fishing permits. The latest report by the Commission (Estimated Permit Value Report, dated 2002-01-09) shows that the estimated current value (average value for 2001) of a salmon gillnet permit in SE Alaska is $41,300. The report also shows that since 1978 average permit values—sales prices—have a range of a high of $128,667 in 1989 and a low of $33,000 in 2000. The mean value/price of salmon gillnet permits over the 24-year period is $55,885. Although the value of commercial salmon fishing permits has fluctuated over time, the existence of a market value indicates that there are excess profits in the fishery. According to economic theory, the market value of a permit is the present value of the annual profit that is in excess of the profit that is required for long-term economic viability of the industry. Thus, as long as there is a market value for commercial salmon fishing permits, economic theory is that salmon fishers have determined that the industry is economically viable over the long-term.

The relative importance of the value that fishers place on the right to engage in the commercial salmon fishery in Alaska is illustrated by the assessment presented in the following table, which shows an assessment of the expected returns to commercial salmon fishers at two interest rates (5 and 7 percent) and two levels of investment in fixed capital—fishing boat and gear—($250,000 and $500,000). The assessment shows that if fishers have a fixed investment of $250,000 and an expected rate of return of 5 percent they have an expected annual return on fixed investment of $12,500. However, because the fishers had to pay an average of $55,885 for the right to fish, the actual return on investment is apparently $15,294. The actual return is higher than the expected return because it includes a 5-percent annual return on the cost of the fishing permit.

As shown in the following table, the return on investment in fishing permits represents 22 percent of the expected return on fixed capital (boat and gear) and 18 percent of the total

return. The significance of the return on the investment in the fishing permit is the same at an interest rate of 7 percent, but decreases to 11 percent (share of expected return) and 10 percent (share of total return) when the fixed capital investment is increased to $500,000. The point of this assessment is that fishers could experience a decrease in excess of 22 percent to their return on fixed investment (boat and gear) before the fishery would become uneconomical over the long-term.

A parallel to the Alaska salmon fishery exists with livestock grazing on Federal lands. Private rights to graze livestock on Federal lands were established in the late 1800's and early 1900's by the Federal government in an attempt to take control of the use of Federal grazing lands and stop the environmental and economic damage that overgrazing was causing. Grazing rights were issued to existing users and subsequently adjusted to match the number of livestock to the sustained yield of the resource. As with salmon permits, grazing rights are transferable and as with salmon permits the value of grazing rights represents the discounted present value of annual value of excess profits associated with the grazing right. In the case of grazing rights the value of the permits is based on the difference between the actual cost of grazing on private land and the cost of grazing on Federal land. A recent cursory assessment of sales of grazing rights in Utah and Oregon showed a range in value of the rights from about $500 to $1,000 per head for cattle. The value varies because of differences in the length of the grazing season on the Federal land and the ranchers out-of-pocket costs associated with using the permit. However, the underlying basis for the value is the fact that the monthly cost to graze a cow on Federal land is about $2.00 as compared with about $12.00 of private land.

From the foregoing assessment it is clear that commercial salmon fishers in Alaska, like users of Federal grazing land, believe that the industry is economically viable over the long-term. Analysis of costs and revenue to commercial salmon fishers would be required to determine the present rate of return and to establish an independent (independent from market decisions of salmon fishers) appraisal of the long-run economic viability of the industry. This type of study is beyond the scope of this feasibility study.

Illustrative Assessment of Relative Value of Salmon Fishing Permits

	Units	Scenario A1	Scenario A2	Scenario B1	Scenario B2
Fixed Investment 1/	($)	250,000	250,000	500,000	500,000
Expected rate of return 2/	(%)	5%	7%	5%	7%
Expected return on investment	($)	12,500	17,500	25,000	35,000
Annual value of permit 4/	($)	2,794	3,912	2,794	3,912
Return on total investment 5/	($)	15,294	21,412	27,794	38,912
Significance of annual value of permit 6/	(%)	22%	22%	11%	11%
Permit share of total return	(%)	18%	18%	10%	10%
Average cost of permit 3/	($)	55,885	55,885	55,885	55,885

Notes:

1/ Estimates are believed to encompass range for salmon fishing boats but are used here only for illustrative purposes.

2/ Interest rates selected for the purpose of illustrating the significance of excess profits.

3/ The average cost of a salmon fishing permit as reported by the Alaska Commercial Fisheries Entry Commission over the period 1978-2000.

4/ Represents excess profits.

5/ This is the estimated actual return on fixed investment--fishing boat and gear.

6/ Percent of expected return on investment.

1.6.2 Timber Resources

Mature stands of Sitka spruce and Western hemlock occupy the majority of commercial forestland in Southeast Alaska. The Haines State forest contains 247,000 acres of forestlands. Most state land is managed under the Haines State Forest Management Plan. Over the next 100 years, 46,353 acres of harvestable commercial forestlands are scheduled to be cut, with an estimated annual sustained yield of 8.8 million board feet. Of the total 247,000 acres in the Haines State Forest, only 38 percent (94,030) acres are considered forestland and 49 percent (46,353 acres) of the forestland is harvestable.

In addition to Spruce and Hemlock, the Haines area supports the state's largest examples of the Balsam Poplar (Cottonwood) and Alaska Paper Birch. While other regions of the state support higher volume stands of birch, the Chilkat Valley Birch, with trunk diameters of up to 22 inches, are among Alaska's highest quality hardwood resources. Hobbyists and small commercial operators manufacture a variety of high quality products from this abundant and fast growing hardwood, including: Birch syrup, turned bowls, fine furniture and carved masks.

In the early 1980's, the State of Alaska gave the Haines Borough an entitlement to 2,800 acres of state-owned lands within the Borough boundaries. Commercial timber harvest from these lands is expected to be very minimal. Land is being sold in small parcels for residential purposes. No commercial timber is available within the City limits.

Commercial timber harvest from private lands has also contributed to the harvest volume available to the local forest products industry. The private land parcels are smaller in size and owned by numerous individuals, making it difficult to analyze the amount of available commercial timber.

Approximately 3,000 acres of Native allotments have been claimed in the area. Difficulties regarding access, timber quality, environmental concerns, and ownership questions combined have slowed the timber harvest activity on Native lands.

The Tongass National Forest lands are nearby with accessible stands of commercial quality timber. Historically, the Forest Service has made timber sales available to Haines mills. However, in January 2001 an Executive Order was signed that could prevent harvest of harvestable timber in Southeast Alaska that is in areas in the Tongass National Forest that do not currently have roads. Thus the future of logging operations on federal lands in the vicinity of Haines is currently unpredictable because essentially all remaining harvestable timber is located in areas without existing roads.

1.6.3 Haines Lumber Mill Operations

The former Chilkoot Lumber Company had a major impact on the Haines economy until its closure in 1991. The mill employed over 100 workers with a monthly payroll of approximately $500,000. An additional $250,000 per month was spent on supplies and services for the mill, much of which went to the local service industry sector. The City of Haines estimates that sales tax revenues increased 17 percent as a direct result of the spending by CLC and its employees in the community. The mill closed as a result of timber supply, market, and financial problems.

Small milling operations have always existed in the area producing primarily rough cut dimensional lumber utilized locally for construction purposes and house logs. Owner operated B&D Lumber Company has been in continuous operation since the late 1970's, employing three people in 1999. Approximately six other mills, mostly of a small portable design, are currently operating on a part-time basis. The growth of value-added wood products manufacturing is considered by many as an important step toward year-round economic stability given the natural abundance of Spruce, Hemlock and Birch.

1.6.4 Tourism

With access by road, sea and air, transportation links may be Haines' greatest economic asset. Utilizing the area's strategic transportation routes and scenic setting, tourism has developed as a driving force behind the economy. Haines is one of only three Southeast Alaska communities with road access to the outside. The Haines Highway runs north through British Columbia and the Yukon Territory, connecting to the Alaska Highway, and thereby allowing access to the Alaskan Interior, Canada and the contiguous United States.

As a tourist destination, Haines has several attractions. Haines offers spectacular scenery and convenient access to three national parks, including Glacier National Park. It boasts abundant wildlife, both marine and land animals, including moose, bear and mountain goat, and in the fall and winter, the largest gathering of bald eagles in the world in the Alaska Chilkat Bald Eagle Preserve. Summer outdoor recreational activities include: hiking, birding and wildlife viewing, sport fishing, shrimping and crabbing, hunting, river rafting and kayaking. Because the winter climate is significantly drier and colder than the more southern portions of Southeast Alaska, there is a significant accumulation of snow in the Chilkat Valley. Cross-country skiing and snowmobile riding are popular winter recreational activities for local residents. Reduced commercial transportation to the area during the winter significantly restricts the number of people from outside the area that visit Haines during the winter.

As a port along the Alaska Marine Highway System, Haines is a jumping-off point in the state's several-hundred-mile-long panhandle region. Southeast residents and tourists can ferry up to Haines and take the road north or east. Likewise, Alaskans and tourists can drive to Haines and catch the ferry to other Southeast Alaska communities or on to Canada and the continental U.S.

Cruise ship based tourism since the 1970's experienced a rapid rate of growth and has now become a significant element of the local economy. During 2000 the number of cruise ship visitors to Haines was expected to exceed 150,000. The State Department of Economic and Community Development estimated that during 2000, cruise ship tourism contributed $10 million to the local economy. While the number of visitors arriving by cruise ship grew significantly thorough the late 1990's, the number of ferry passengers disembarking in Haines was down 13 percent (to just under 39,500) in 1996 compared to its 1992 peak of over 45,000. In 1998, just over 36,000 passengers disembarked in Haines, a 20 percent decline over the 1992 peak.

At the Haines airport, both passenger and freight traffic is increasing. Seasonal (summer) tourism is a significant factor in total airport use. Cruise ship passengers can tour the Inside Passage and fly home from Haines. Air and water access to Glacier Bay National Park is

available from Haines, and flightseeing tours over northern Lynn Canal and Glacier Bay National Park are popular.

1.7 Infrastructure Characteristics

The characteristics of the Haines infrastructure include port, public, and local facilities. The marine network is oriented towards commercial fishing and tourism.

1.7.1 Port Facilities

There are two docks and the small boat harbor in Portage Cove adjacent to the downtown core and Port Chilkoot. The City purchased the Port Chilkoot Dock in 1984. The dock is located on the shore of Portage Cove at the foot of Portage Street. This facility was built around 1905 by the U.S. Army to service Fort William H. Seward and has undergone substantial modification, reconstruction, and repair over the years. The most recent improvement was construction of an extension to the dock in 1995 that allows the dock to serve as the primary moorage for cruise ships visiting Haines. This dock is capable of accommodating the largest class of cruise ships visiting Alaska.

Also within Portage cove, south of the City's Port Chilkoot Dock, is a dock owned by Klukwan Incorporated and operated by Chilkats' Portage Cove Development Company. The dock was formerly used by Highland Resources Incorporated for transshipment of bulk petroleum products stored at an upland tank farm that was dismantled in 1995. The dock currently services vessels owned by Chilkat Cruises, a subsidiary of Klukwan, Incorporated that provides one of the community's two water taxi services between Haines and Skagway and docking for smaller cruise vessels.

The City of Haines Small Boat Harbor is the primary local facility for the mooring of pleasure craft, commercial and charter fishing vessels, a water-taxi enterprise and transient vessels. It is owned by the State of Alaska and is operated and maintained by the City of Haines. The facility is located in Portage Cove at the foot of Main Street, and consists of a 900-foot breakwater enclosing a 600-foot by 900-foot harbor. The float system in the harbor has 68 stalls that can accommodate 143 boats up to 86 feet in length. The harbor also has slightly more than 700 lineal feet of float for transient moorage, including the seaplane float that is 237 feet in length. Detailed information about the harbor is included in the section of this appendix on moorage demand. With rafting of boats, up to 330 boats have been accommodated in the Small Boat Harbor. The boat harbor also contains, on its north side, a concrete launching ramp and a service grid for minor boat maintenance.

1.7.2 Water System

The existing water supply system for the City of Haines consists of the Lily Lake water system with a small spring-fed satellite system in the Piedad area, and a dam and distribution main for the Lutak Dock and AMHS terminal. The water system is documented on the Haines Water Distribution map. The water system is chiefly gravity distributed, and it delivers water to metered and non-metered commercial and residential users through pipes constructed from a variety of materials between 1951 and the present.

The Lily Lake system serves the core area of the City. This lake yields an estimated 500 gpm (gallons per minute), meeting the current requirements of the City that consumes approximately 160 gpm during the winter and up to 400 gpm during the summer.

Lily Lake water is treated for color and chlorinated at the water treatment plant. The plant limits the flow through control valves to 400 gpm, and can deliver up to 950 gpm if the treatment plant is bypassed in times of emergency. The City needs to supplement the Lily Lake supply during peak demand periods in the summer**.**

Private enterprise will meet a portion of the future demand for potable water and sewer service. Crystal Cathedral Water and Sewer Systems, Inc is permitted to supply water in the 1999 western annexation areas from its privately owned well field.

The Piedad area includes 40 users outside the City limits and is served by 4-inch water mains laid in 1951 with source water from West Springs. This system is connected to the City water system; however, it is turned off during normal operations.

1.7.3 Wastewater Treatment

The City of Haines owns and operates a package wastewater treatment plant that utilizes an activated sludge process to provide primary treatment. The system was recently upgraded in 1995 with a state-funded grant. The upgraded system has a current treatment capacity of 600,000 gallons/day. The system currently services approximately 1,500 persons and can accommodate approximately 3,000. Sewer lines owned by Crystal Cathedral Water and Sewer Systems, Inc. serve the western areas annexed in 1999. The privately maintained service connects into the City's sewer system for primary treatment at the City owned plant on West Fair Drive.

Effluent is treated and discharged to tidewater at Portage Cove in an outfall at –80 feet below MLLW. With the state grant, the downtown area was completely upgraded with new sewers and manholes, correcting previous problem areas. The City sewer system is operating under a 301(h) waiver from the EPA issued in 1982. Improvements completed allow the community to handle expected community demands in the future.

1.7.4 Storm Water

Several storm drain systems exist within the city, including the Second Avenue to Main Street system that drains into Portage Cove on the east side, and a major culvert located at the ADOT & PF Maintenance yard on the west. The Fort Seward system also drains into Portage Cove, and the Mission Field system drains into a major ditch and culvert system, which empties into Portage Cove. Natural streams, drainage ditches and culverts drain the remainder of the community. During spring snow melt and heavy fall season rains, the water table can rise to the point where areas of standing water can occur and existing culverts in these areas are inadequate to handle the higher flows – especially when icing and silting of the culverts occurs.

Clearing of Sawmill Creek, the major drainage outflow to the Chilkat River tidelands, has improved high water problems, but continued analysis is required on the west side of Haines as undersized culverts and inadequate drainage routes hamper high water runoff. The City of Haines completed a Flood Plain and Hazards map which identifies problem and hazard areas, storm drain systems, ditches, culverts and major drainage routes. The Sawmill Creek Habitat

Quality and Land Use map, prepared by the Alaska Department of Fish and Game in 1998, clearly illustrates problem areas and habitat condition within the watershed.

1.7.5 Solid Waste

Haines Sanitation, a private contractor, provides solid waste collection and disposal on a City franchise once a week to residences and twice a week to businesses. Waste is collected and loaded into open-top shipping containers at the company's transfer station located on the ten-acre tract of land formerly used as a landfill. Garbage is then barged to a landfill in the lower-48.

As the local population, and the seasonal tourism industry have grown, so too has the volume of solid waste produced. The decision by the contractor to close the landfill and ship garbage to the lower-48 in the summer of 1999 was based on additional costs required to comply with stricter regulatory standards. State regulators categorize the former landfill, located approximately one-mile southeast of the City limits, as a Type 3 landfill. However, with the growing volume of solid waste, reclassification to Type 2 with more regulatory restrictions was eminent. Haines Sanitation has bought additional land adjacent to the site as a buffer. Wells to monitor leachate are located down-gradient from the closed fill and groundwater samples are monitored to ADEC specifications. To date, no leachate problems from the landfill have been identified from the analysis of the samples taken.

Solid waste disposal rates climbed annually through the late 1990's and the decision to close the landfill and ship refuse further increased customer collection charges to the point where the City appointed a committee to develop a Solid Waste Management Plan and address rate concerns. The work of the committee was short lived however due to the formation of a service area for solid waste by Haines Borough voters in the fall of 1999. The Borough, not the City, now has regulatory authority over solid waste management.

The City's Solid Waste Committee became the Borough's interim Solid Waste Service Area Board by ordinance in November of 1999, however its priority to develop a management plan for solid waste is unchanged. The scope of the plan is expected to encompass all residential communities in the Borough as well as Klukwan Indian Village.

1.7.6 Electricity and Fuel

Alaska Power Company provides electric power service to Haines and the surrounding area. The total peak-load capacity of the diesel-electric system is 6,535 KW. Alaska Power serves approximately 1,150 residential, commercial and industrial customers at an approximate cost of 10.2 cents/KWH. Rates are subsidized through the state's power cost equalization program. The system at Haines is interconnected with the diesel-electric and hydropower system at Skagway. The firm's hydropower generators are located below Goat Lake at mile four of the Klondike Highway near Skagway. The system at Skagway has a total installed capacity of 4,840 KW.[3] The submarine cable between Haines and Skagway, laid in 1998, also provides a fiber optic telecommunication line. The existing system could accommodate safely a 50 percent increase in the number of customers. Fuel oil is the main source of heat

[3] Source: Alaska Community Database, Alaska Department of Community and Economic Development, January, 2001.

for the community, although many residents heat with wood. Fuel can be purchased in bulk from two local suppliers, Petro Marine Services and Delta Western. Gasoline is available at local service stations. Fuel is delivered to Haines by barge and distributed by tanker trucks. Delta Western and Haines Propane distribute propane fuel to the community. Both have on-site fill stations and tank truck delivery. Propane is also available at two gas stations and two RV parks. Propane is not a major source of heating fuel in Haines.

1.8 Transportation

With access by road, sea, and air, transportation links may be Haines' greatest economic asset. Utilizing the area's strategic transportation routes and scenic setting tourism has developed as a driving force behind the economy. Haines is one of only three Southeast Alaska communities with road access to the outside. The Haines Highway runs north through British Columbia and the Yukon Territory, connecting to the Alaska Highway, and thereby allowing access to the Alaskan Interior, Canada and the contiguous United States.

1.8.1 Federal Highways

Access to the continental road system from SE Alaska is provided at two points in the region: from Haines via the Haines Cutoff Highway, and Skagway via the Klondike Highway. The Haines Cutoff Highway extends from Haines, 159 miles to Haines Junction in the Yukon and was constructed in 1949 for strategic purposes to link the tidewater port of Haines by road with the Alaska Highway.

Within the United States, the Haines Cutoff Highway has 44.3 miles of paved, two-lane Federal-aid primary route that carry traffic from the Lutak Dock to the City of Haines and beyond to the Alaskan and Canadian interior.

During the 1980's, the Shakwak Project, a joint venture by the United States and the Canadian Federal governments, substantially improved the Haines Cutoff Highway within Canada. Paving, straightening and widening was completed, as well as the by-pass of several steep switchbacks in the British Columbia section of the roadway. Within the United States, re-paving, roadbed, and drainage improvements have been an on-going program.

1.8.2 State Roads

The ADOT & PF maintains approximately 70 miles of unpaved roadways and approximately 60 miles of paved roads (including the Haines Airport). These state roadways are maintained by a six-person state crew from a 6.5-acre site located at Main and Union Streets within the City of Haines.

1.8.3 Private Land Transportation Services

The Alascon Express, operated by Greyline of Alaska, connects Haines to Anchorage Tuesdays and Sundays, mid-May through mid-September. RC Shuttles Departs Haines each Thursday for Fairbanks year round.

Locally, several taxi operators serve the local hotels and ferry terminal traffic year round. Approximately three additional operators provide service on a summer-only basis. Sightseeing is provided by a growing number of operators. Bigfoot Enterprises runs a fleet of buses which service the Haines Borough School District student bussing program. The local

air-carriers all use vans to service passenger transport requirements, and taxi operators provide 24-hour service to the community.

1.8.4 Tug and Barge Operations

Tug and barge operations are primarily from the Seattle marine basin. They carry substantial volumes of freight and commerce and handle the majority of the general cargo-type freight that supplies the needs of residents of SE Alaska. In addition, tug and barge companies carry a large portion of the region's fish and seafood products (frozen and canned) to the Seattle area for further distribution. Currently Haines is serviced by two freight tug and barge companies, Alaska Marine Lines and Glacier Marine Transport. Additional tug and barge operators provide petroleum products delivery and wood and forest products transshipment for Haines.

1.8.5 Alaska Marine Highway System

The AMHS is the main component of the marine transportation system in SE Alaska. This system provides surface links for passengers and vehicles to, from and within the Alaska panhandle region. Four main vessels operate between the southern road systems between Prince Rupert, B.C., and Bellingham, Washington and the northern road connections out of Haines and Skagway. These vessels provide a link for the through movement of passengers and vehicles to and from the region and within the region. Starting in 1998, ADOT&PF began using the MV Malaspina as a day-ship operating between Juneau, Skagway and Haines during the summer months.

1.8.6 Water Ports

Lutak Dock – This dock is located five miles north of downtown Haines on the Lutak inlet of Lynn Canal and is connected to the Lutak Highway. The 1,051-foot face of the Lutak Dock and its associated six-acre staging area is ¾-owned by the City of Haines (Lutak Dry Cargo Dock) and ¼ owned by the State of Alaska (AMHS ferry terminal). The US Army constructed it in the 1950's and it has a depth 36 feet below MLLW at the face. Modifications to the fender system, construction of a barge loading facility, and development of the upland lots to service the dock, make the city-owned portion of the Lutak dock one of the best deep-water port facilities in SE Alaska. The facilities of the Lutak Dock are currently capable of handling containerized cargo, transshipment of petroleum products and passenger operations. This dock is utilized commercially year-round and is operated by the City of Haines on a fee basis.

Haines Small Boat Harbors - The Haines small boat harbor, located on the downtown waterfront, and the Letnikof Cove Small Boat Harbor are central components of the fishing industry, the growing charter and water-taxi sector and provide recreational vessel moorage. The Letnikof Cove facility is ideally situated for use by smaller "eco-cruise" ventures. The State owns the harbor facilities but they operated by the City operates the facilities. In 1999, the US Army Corps of Engineers began determining the feasibility of a major program for harbor expansion and improvement of the downtown Haines Small Boat Harbor. Completion of this project is a high priority.

AMHS Ferry Terminal – The southern ¼ of the Lutak Dock is owned by the State of Alaska and operated by the AMHS. It is the largest volume passenger port in S.E. Alaska

after Juneau, as well as the third largest volume vehicle port on the entire Alaska Marine Highway System. The State also owns and maintains a concrete boat-launching ramp north of the Lutak Dock.

Federal US Army Petroleum-Oil-Lubricants (POL) Dock – This facility is located at the entrance to Lutak Inlet 1.5 miles south of the Lutak Dock on the Lutak Highway and it is attached to the Federal Tank Farm facility. The dock consists of a concrete and steel pier head with two dolphins. The large 200-acre Tank Farm uplands site includes liquid petroleum products storage tanks, maintenance shops and residential and administrative buildings. A variety of corporate, local and state entities are interested in the purchase of the facility.

Chilkoot Lumber Company Dock – This dock is located ½ mile north of the Lutak dock and used to be the site of the transshipment of forest products to Pacific Rim markets. The dock is 1,000 feet long and has an adjacent barge landing site and approximately ten acres of uplands properties. The mill has been closed and dismantled.

Port Chilkoot Dock – The Port Chilkoot Dock is located on the shore of Portage Cove at the end of Portage Street. The dock is owned and operated by the City of Haines. The original dock consists of woodpile construction. Renovation work in 1988 included re-decking, pile replacement, reinforcement of the face with steel dolphins and a system of floats with a ramp utilized as a cruise ship lightering facility. In 1994 and 1995, the City made additional improvements to the dock structure and installed mooring dolphins that allow the docking of large cruise vessels. As now configured, the dock can accommodate two cruise vessels simultaneously: one vessel on the main dock face and another small vessel on the floating dock.

Chilkat Cruises Dock – This facility is privately owned and operated by Klukwan, Incorporated. Chilkat Cruises operates the dock, the adjoining seasonal restaurant and gift shop and catamaran shuttle service between Haines and Skagway. In addition to company owned vessels, small cruise vessels touring Lynn Canal use the facility. In 1999, Chilkat Cruises accommodated 20,000 cruise passengers and 3,000 independent travelers.

1.8.7 Air Transportation

Haines Airport – The state-owned airport at Haines is located in the extreme northwestern part of the City at about mile three on the Haines Highway. The runway is paved and is 4.600 feet in length. The terminal building was constructed in 1982 by the City of Haines and was operated by the City until August 1996, when a local resident purchased it. The private owner has since re-sold the facility to Wings of Alaska, a local commuter airline that will continue to make the building available to the public through an agreement with the City.

The original runway was constructed in the territorial days and was expanded in the 1950's, increasing the size of the runway. The airport occupies a 126-acre site that is confined by a historical site, the Haines Highway, the Chilkat River and an anadromous fish stream that divides a portion of the property. The airport does not have traffic control and has a limited airport-operating certificate.

Six flying and charter services including Haines Airways, LAB Flying Service, Skagway Air, and Wings of Alaska provide scheduled air service to Haines. Skagway Air Service, Glacier

Bay Airways and Temsco Helicopters also provide charter services. All of these aircraft carriers provide flight-seeing tours from the Haines and Skagway airports.

Floatplane Base – There is also a floatplane facility in Haines. The existing floatplane facility was constructed in 1978 and is located in the small boat harbor in Portage Cove. The float is constructed to accommodate docking of transient aircraft and for loading and unloading aircraft. No tie downs are provided and the float is in good condition. The facility is also used for transient moorage of boats.

2.0 MARINE RESOURCE ASSESSMENT

The marine resource assessment explains the management and status of fishery resources in the study area: salmon, halibut, and shellfish fisheries. This analysis includes an assessment of institutional considerations, description of fisheries, harvesting methods, timing of each fishery, and current landings and value. Also included is an overview of sports fishing and an evaluation of the future conditions of the salmon and halibut fisheries. Additional information on the salmon, halibut, and shellfish fisheries is discussed in Section 4, Existing Conditions. The information presented includes fishing areas and runs, enhanced fisheries, fishing gear and vessels, the harvest and season, and vessel operating practice. Although some duplication of the data exists in this assessment, the focus here is on current and future conditions of the marine resources.

2.1 Introduction

Fishery resources play an important role in the economy of Haines. Commercial fishing is a significant part of the local economy, subsistence fishing is an important food source for residents of the Haines Borough and expenditures by visiting and local sport fishermen are important to local businesses in the retail and trade sector. Fish harvesting, particularly a local gillnet fleet, has always been an important contributor to the Haines economy. Salmon is dominant in the area.

Five species of Alaskan salmon are discussed: chinook, chum, coho, pink, and sockeye. Although the commercial shellfish and halibut fishery in Lynn Canal is limited, both fisheries contribute to the economy; therefore, they are discussed.

2.2 Fisheries Management

Management of fishery resources in Haines are shared responsibilities, divided between international, Federal, State, and quasi-governmental entities. The entities include the National Marine Fisheries Service (NMFS), the North Pacific Fishery Management Council (NPFMC), the Alaska Board of Fisheries, the Alaska Department of Fish and Game (ADF&G), the Pacific States Marine Fisheries Commission (PSMFC), and the International Pacific Halibut Commission (IPHC). Descriptions of these agencies are briefly discussed.

2.2.1 National Marine Fisheries Service

The NMFS administers the National Oceanic and Atmospheric Administration's (NOAA) programs that support the domestic and international management and harvest of marine resources. The Alaska regional office, located in Juneau, coordinates Federal and State resource management and research, and monitors and coordinates openings and closures of fisheries within the Exclusive Economic Zone (EEZ). It is responsible for planning and implementing fishery management conservation programs, including fishery management plans established by the NPFMC.

2.2.2 North Pacific Fishery Management Council

The NPFMC is a body of 11 voting members who are appointed to the council by the region's governors and the Secretary of Commerce. The NPFMC meets five times a year to

allocate resources, set management policy, hear testimony from the industry, and consider issues important to the industry that fall under the council's authority. Two major functions of the council are the development and maintenance of fishery management plans for those fisheries under its authority in need of conservation and management (NPFMC 1994). The council also has authority under the 1982 North Pacific Halibut Act to develop regulations, including limiting access, for participants in the Alaska halibut fisheries. Resource allocations are divided by species, by region, and according to the priorities of the Magnuson Act. The NPFMC has management authority from the 3-mile State boundary to the 200-mile EEZ boundary. Fisheries regulations developed by the council are required to meet numerous regulatory standards and must be approved by the Secretary of Commerce.

2.2.3 Alaska Board of Fisheries

This board accepts proposed changes to the commercial groundfish regulations on an area-wide and statewide basis, and considers any other topics related to the management, development, or conservation of the species. The Board of Fisheries allocates the allowable harvest of fish.

2.2.4 Alaska Department of Fish and Game

The ADF&G is a research and regulatory agency. The Division of Commercial Fisheries within ADF&G is charged with research and management of commercial fisheries in Alaskan waters, which covers waters within 3 nautical miles of shore. Division biologists conduct research on migratory patterns, gear types, and the relative abundance of fish stocks. The department also has the authority to open and close commercial fishing periods based on preseason catch goals and biological considerations.

2.2.5 Pacific States Marine Fisheries Commission

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

2.2.6 International Pacific Halibut Commission

The IPHC was established in 1923 by a convention between Canada and the United States for the preservation of the halibut fishery of the North Pacific Ocean and the Bering Sea. The convention was the first international agreement providing for the joint management of a marine resource. The commission's authority was expanded by several subsequent conventions, the most recent being signed in 1953 and amended by the protocol of 1979. The six-member commission meets annually to review all regulatory proposals, including those made by the scientific staff and the Conference Board, which represents vessel owners and fishers. The commission sets area quotas and seasons for the purpose of stock conservation. The measures recommended by the commission are submitted to the two governments for

approval. Upon approval, the regulations are considered Federal regulations and are enforced by the appropriate agencies of both governments.

2.2.7 Other Fishery Management Agencies

Also instrumental in data compilation, research and marketing are the Alaska Seafood Marketing Institute, the Alaska Fisheries Development Foundation, the Office of International Trade, the Commercial Fisheries Entry Commission, and the University of Alaska. Components of the University of Alaska with an interest in fisheries include the Institute of Social and Economic Research, the Alaska Center for International Business, the Fisheries Industrial Technology Center and the Marine Advisory Program.

2.3 Salmon Fishery

The Lynn Canal drift gillnet fishery operates in the waters of District 15. The district is divided into three regulatory sections: 15-A (upper Lynn Canal), 15-B (Berners Bay), and 15-C (lower Lynn Canal). The Lynn Canal drift-gillnet fishery target sockeye, summer chum, coho, and fall chum salmon. Chinook and pink salmon are taken incidentally. The combined value of all salmon in District 15 is almost $2.4 million and represents 181 boats with unique permits fished in 2000. This represents a catch of 920,732 salmon. Figure 1 shows the number of all salmon caught from 1990 to 2000.

table B-7 presents data from 1990 to 2000 on the estimated numbers of fish, boats, landings, hours, and value of the commercial drift-gillnet catch.

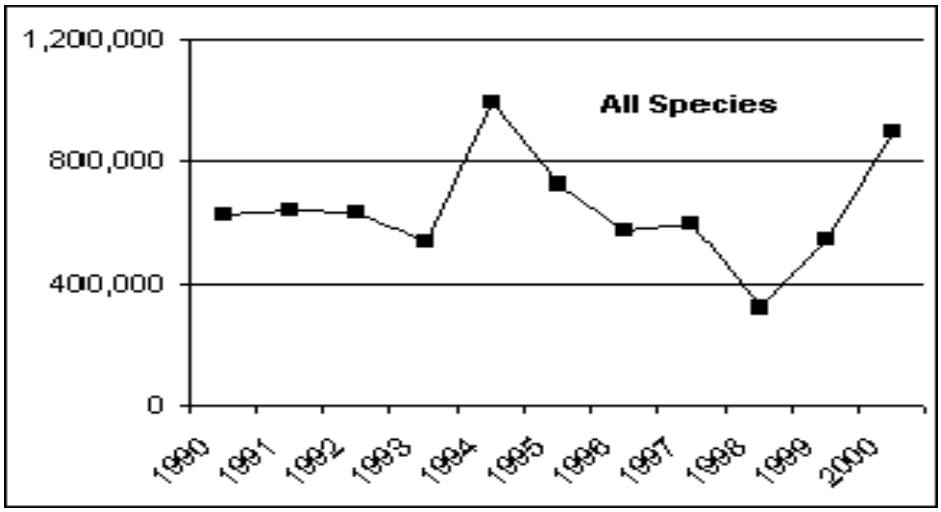

Figure 1. Commercial Drift Gillnet Salmon (All Species) Catch Lynn Canal, 1990-2000 (Source: Alaska Department of Fish and Game, Haines, AK, October 2000).

2.3.1 King (Chinook) salmon

King or Chinook (*Oncorhynchus tshawytscha*) salmon is Alaska's state fish and is one of the most important sport and commercial fish native to the Pacific coast of North America. It is the largest of all Pacific salmon, with weights of individual fish commonly exceeding 30 pounds. A 126-pound Chinook salmon taken in a fish trap near Petersburg, Alaska in 1949 is the largest on record.

The Chinook salmon has numerous local names. In Washington and Oregon, Chinook salmon are called Chinook, while in British Columbia they are called spring salmon. Other names are Quinnat, Tyee, Tule, and Blackmouth. In Alaska, it is “King” and is abundant from the southeastern panhandle to the Yukon River. Major populations return to the Yukon, Kuskokwim, Nushagak, Susitna, Kenai, Copper, Alsek, Taku, and Stikine rivers. Important runs also occur in many smaller streams.

North Pacific Chinook salmon catches during the late 1970s and early 1980s averaged more than 4 million fish per year. The United States harvested the majority of the catch followed by Canada, Japan, and the USSR. Alaska's annual harvest during this period averaged about 731,000 fish per year, or about 32 percent of the North American catches. The majority of the Alaska catch is made in Southeast, Bristol Bay, and the Arctic-Yukon-Kuskokwim areas. Fish taken commercially average about 18 pounds. The majority of the catch is made with troll gear and gillnets.

King salmon are usually the first salmon species to arrive, running mid-May through July. Prime king salmon spawning occurs outside of the area at the mouths of Little and Big Boulder creeks and in the upper Klehini, Kelsall and Tahini rivers. Figure 2 presents the drift-gillnet catch of chinook salmon in Lynn Canal from 1990 through 2000. In 2000, commercial drift gillnet fishers in the Lynn Canal caught (incidental) 467 Chinook salmon.

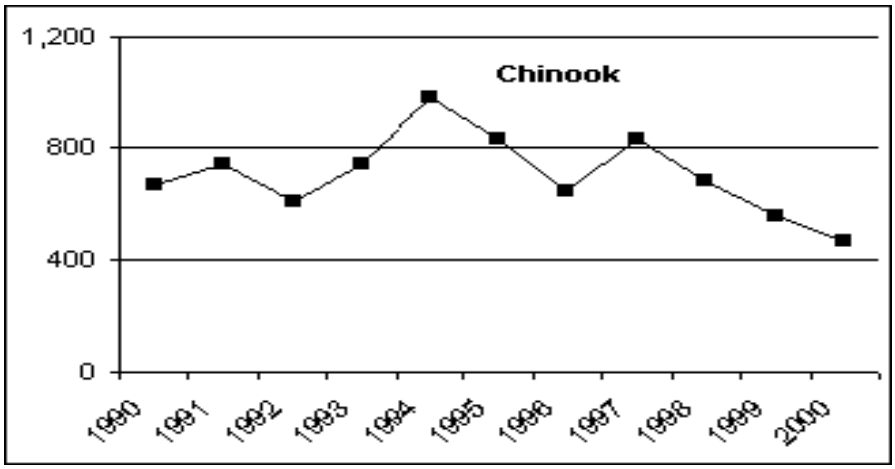

Figure 2. Chinook Drift Gillnet Catch - Lynn Canal, 1990-2000 (Source: Alaska Department of Fish and Game, Haines, AK, October 2000).

2.3.2 Chum salmon

Chum salmon (O*ncorhynchus keta*) have the widest distribution of any of the Pacific salmon. In the south they range east to the Sacramento River in California and west to the island of Kyushu in the Sea of Japan. In the north they range east in the Arctic Ocean to the Mackenzie River in Canada and west to the Lena River in Siberia. Chum salmon are the most abundant commercially harvested salmon species in arctic, northwestern, and Interior Alaska, but are of relatively less importance in other areas of the state. There they are known locally as "dog salmon" and are a traditional source of dried fish for winter use.

In the last few years an average of 11 million chum salmon, worth over $32 million, have been caught in Alaska. Most chums are caught by purse seines and drift gillnets, but fish-

wheels and set gillnets harvest a portion of the catch. In many areas they have been harvested incidental to the catch of pink salmon. The development of markets for fresh and frozen chum in Japan and northern Europe has increased their demand, especially in the last decade. The Alaska Department of Fish and Game has built several hatcheries, primarily to produce chum salmon.

In the Haines area, chum salmon enter the Chilkat, Chilkoot and Katzehin river systems in late summer and fall. The most important chum salmon spawning area is where the Tsirku (Big Salmon) River empties into the Chilkat River. Peak spawning occurs around the third week of October. Hatchery and wild summer chum salmon are harvested from late June through early August; fall chum are targeted from September through mid-October. The primary fall chum salmon stocks originate in the Klehini and Chilkat rivers. Figure 3 shows catch of chum salmon by drift gillnet fishers in the Lynn Canal from 1990 through 2000. Lynn Canal drift-gillnet fishers in 2000 caught 754,326 chum salmon.

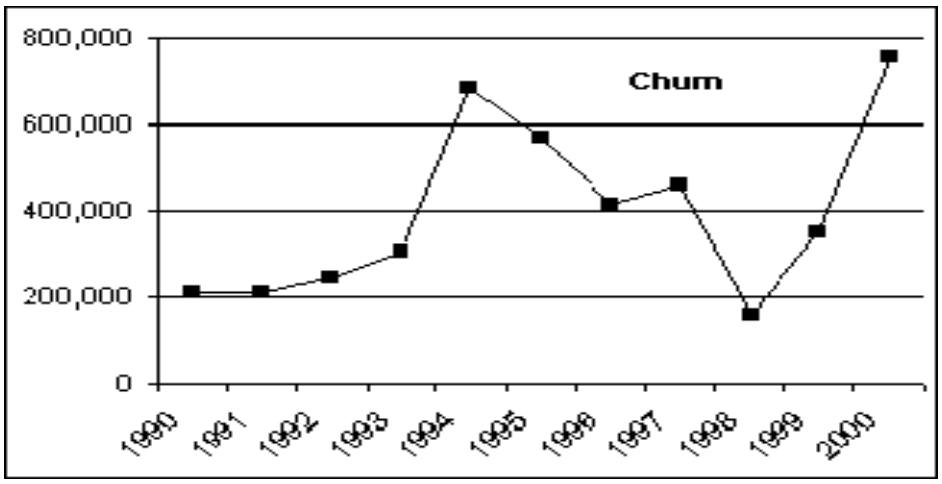

Figure 3. Chum Drift Gillnet Catch - Lynn Canal, 1990-2000 (Source: Alaska Department of Fish and Game, Haines, AK, October 2000).

2.3.3 Coho salmon

Coho salmon (O*ncorhynchus kisutch* (Walbaum)) also called silver salmon, are found in coastal waters of Alaska from Southeast to Point Hope on the Chukchi Sea and in the Yukon River to the Alaska-Yukon, Canada border. Coho are extremely adaptable and occur in nearly all-accessible bodies of fresh water-from large trans-boundary watersheds to small tributaries.

The commercial catch of Coho salmon has increased significantly from low catches in the 1960s to 6.25 million fish in 1986. About half of the catch was taken in Southeast Alaska, primarily by the troll fishery.

In the Haines area, Coho salmon occur in many portions of the Chilkat and Chilkoot systems, as well as the Katzehin and Ferebee rivers in the fall. Prime spawning areas are believed to include miles 10, 14, 20 (Klukwan), and 31 on the Haines Highway, the Big Salmon River, the Chilkat Lake/Chilkoot Lake system and the Kicking Horse River. Coho salmon are

targeted from September through mid-October; the primary Coho salmon stocks originate in the Chilkat and Berners Bay rivers.

Figure 4 presents the drift-gillnet catch of Coho salmon in Lynn Canal from 1990 through 2000. In 2000, commercial drift-gillnet fishers caught 35,466 Coho salmon in the Lynn Canal. This catch is far below the 140,764 Coho netted in 1994.

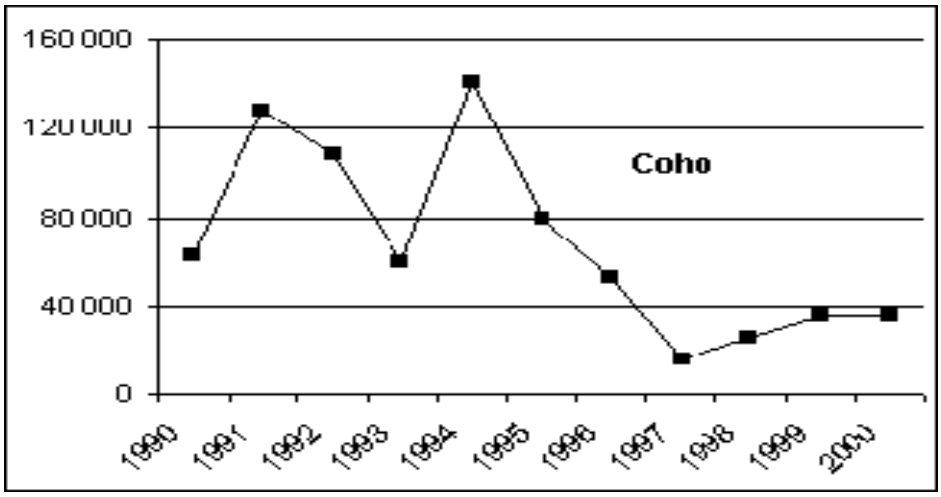

Figure 4. Coho Drift-Gillnet Catch - Lynn Canal, 1990-2000 (Source: Alaska Department of Fish and Game, Haines, AK, October 2000).

2.3.4 Pink salmon

The pink salmon (O*ncorhynchus gorbuscha*) is also known as the “humpback” or “humpy” because of its very pronounced, laterally flattened hump that develops on the backs of adult males before spawning. It is called the "bread and butter" fish in many Alaskan coastal fishing communities because of its importance to commercial fisheries and thus to local economies. Pink salmon also contribute substantially to the catch of sport anglers and subsistence users in Alaska. It is native to Pacific and arctic coastal waters from northern California to the Mackenzie River, Canada, and to the west from the Lena River in Siberia to Korea.

In the early years of commercial exploitation, fixed and floating fish traps were employed extensively to catch pink salmon; such traps were prohibited following statehood in 1959. Now most pink salmon are taken with purse seines and drift- or set-gillnets. Lesser numbers are taken with troll gear or beach seines. The average annual Alaska harvest since 1959 is 45.1 million pink salmon. The ten-year average harvest (1983-1992) is 77.4 million pink salmon. In 1991 the Alaska harvest represented about 96 percent of the total North American harvest.

Pink salmon fisheries are important in all coastal regions of Alaska south of Kotzebue Sound. Commercial canning and salting of pink salmon began in the late 1800s and expanded steadily until about 1920. Runs declined markedly during the 1940s and 1950s; however, intensive effort is being made to rebuild and enhance those runs through hatcheries, fish ladders, and improved fisheries management.

In the Haines area, the pink salmon run occurs June through mid-September in the Chilkoot and Chilkat river system, peaking in late July to mid-August. Spawning occurs primarily below Chilkoot Lake and in the lower Chilkat River's channels and sloughs.

Figure 5 presents the drift-gillnet catch of pink salmon in Lynn Canal from 1990 through 2000. In 2000, commercial drift-gillnet fishers caught (incidental) 21,008 pink salmon in the Lynn Canal. This number is far below the 1992 level when 351,562 pinks were harvested.

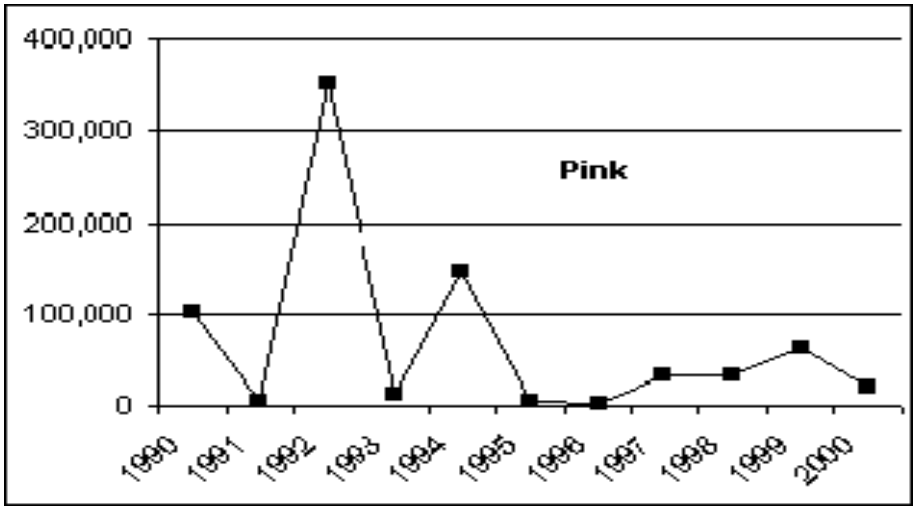

Figure 5. Pink Drift Gillnet Catch - Lynn Canal, 1990-2000 (Source: Alaska Department of Fish and Game, Haines, AK, October 2000).

2.3.5 Sockeye salmon

The sockeye salmon (*Oncorhynchus nerka*), often referred to as "red" or "blueback" salmon, occurs in the North Pacific and Arctic oceans and associated freshwater systems. This species ranges south as far as the Klamath River in California in the eastern Pacific Ocean and northern Hokkaido in Japan in the western Pacific Ocean, to as far north as far as Bathurst Inlet of the Beaufort Sea in the Canadian Arctic and the Anadyr River in Siberia (Arctic Ocean). Aboriginal people considered sockeye salmon to be an important food source and either ate them fresh or dried them for winter use. Today sockeye salmon support one of the most important commercial fisheries on the Pacific coast of North America, are increasingly sought after in recreational fisheries, and continue to be an important mainstay of many subsistence users.

The largest harvest of sockeye salmon in the world occurs in the Bristol Bay area of southwestern Alaska where 10 million to more than 30 million sockeye salmon may be caught each year during a short, intensive fishery lasting only a few weeks. Relatively large harvests of 1 million to 6 million sockeye salmon are also taken in Cook Inlet, Prince William Sound, and Chignik Lagoon in the Gulf of Alaska. All commercial Pacific salmon fisheries in Alaska are under a limited entry system, which restricts the number of vessels that are allowed to participate. Most sockeye salmon are harvested with gillnets either drifted from a vessel or set with one end on the shore, some are captured with purse seines, and a relatively small number are caught with troll gear in the southeastern portion of Alaska.

In the Haines area, adult sockeye salmon are generally present in the rivers and lakes from mid-July through September, usually arriving in two distinct peaks. Occasionally a strong sockeye run will continue into Chilkat Lake into late October. The habitat provided by Chilkoot, Chilkat, Mosquito and Bear lakes and some of the sloughs of the upper Chilkat River provide the rearing areas necessary for young sockeye salmon. Adult sockeye salmon normally spawn in the inlet creeks of these lakes, although others utilize the beach margin.

Sockeye salmon are mainly targeted from June through early September. The primary stocks originate in Chilkat and Chilkoot lakes, Berners Bay rivers, and mainstem spawning areas of the Chilkat River. Both the Chilkat and Chilkoot Lake sockeye populations have early and late-run stock components with separate escapement goals.

Figure 6 shows the drift-gillnet sockeye salmon catch in Lynn Canal from 1990 through 2000. In 2000, Lynn Canal commercial drift-gillnet fishers caught 109,465 sockeye.

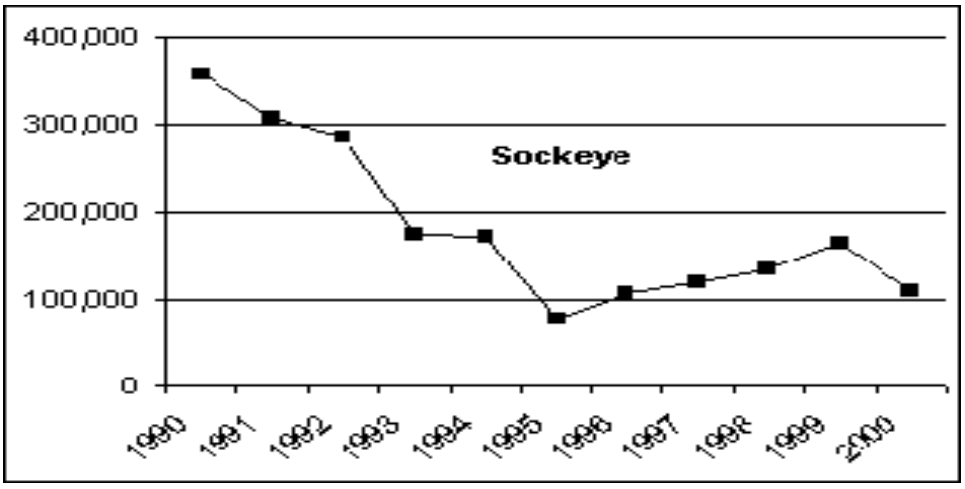

Figure 6. Sockeye Drift Gillnet Catch - Lynn Canal, 1990-2000 (Source: Alaska Department of Fish and Game, Haines, AK, October 2000).

2.4 Halibut Fishery

The halibut fishery in Lynn Canal is limited; however, the best areas are the Juneau area and Icy and Chatham Straits. Also, the outside waters (outside of the Inside Passage) of all of Southeast Alaska are good halibut fishing waters. The commercial catch limit for halibut in 2000 is 8.4 million pounds for regulatory area 2C (Southeast Alaska); however, for all regulatory areas, it is 67.5 million pounds. Figure 7 presents historical data from 1990 through 2000 on the catch limits (in thousands of pounds) for all Pacific halibut in Alaska and for the Southeast Alaska regulatory area.

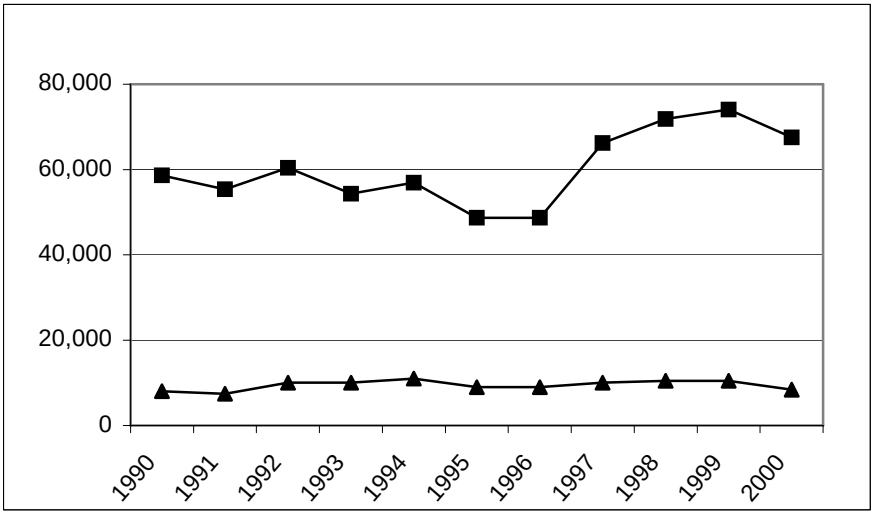

Figure 7. Halibut Catch Limits for All Regulatory Areas and Southeast Alaska, 1990-2000 (Source: Data compiled from the International Pacific Halibut Commission website).

In addition, Section 4, Existing Conditions, Subsection 4.2.2.3. Commercial Halibut Fishery presents information on the commercial halibut fishery. Discussed are the fishing areas, the fishing season, and vessel operating practices. table B-8 shows the number of deliveries of halibut to buyers in Haines by vessels that do not use Haines as their homeport. Following is a description of halibut and a brief history of the fishery.

The Pacific halibut (*Hippoglossus stenolepis*) was called "haly-butte" in Middle English, meaning the flatfish to be eaten on holy days. Halibut are more elongated than most flatfishes, the width being about one-third the length. Small scales are imbedded in the skin. Halibut have both eyes on their dark or upper side. The color on the dark side varies but tends to assume the coloration of the ocean bottom. The underside is lighter, appearing more like the sky from below. This color adaptation allows halibut to avoid detection by both prey and predator.

Commercial halibut fishing in the North Pacific probably began in 1888 when three sailing ships from New England fished off the coast of Washington state. As the industry grew, company-owned steamers carrying several smaller dories, from which the fishing was actually conducted, dominated the halibut fishery. Subsequently, smaller boats of schooner design in the 60- to 100-foot class were used in the fishery. These boats carried crews of five to eight and, specifically designed for halibut fishing, were very effective. Today, many types of boats are used in the halibut fishery. Most of the old-time halibut schooners have been replaced by more versatile craft that are also used in commercial salmon seine, troll, gillnet, and crab fisheries.

2.5 Shellfish Fishery

The commercial shellfish fishery in Lynn Canal is small but targets five major types of shellfish: Brown (golden) king crab, Dungeness crab, Red/Blue king crab, shrimp, and Tanner crab. table B-9, Section 4, Existing Conditions, Subsection 4.2.2.4. Commercial Shellfish Fishery presents commercial shellfish harvest data for District 15 (Lynn Canal,

1994-2000) for the five species of shellfish. Table B-9 presents the number of pounds, permits, estimated landings, value per pound, and ex-vessel value. Following are descriptions of shellfish species and a brief history of the fishery.

2.5.1 King Crab

King crabs have "tails," or abdomens, that are distinctive, being fan shaped and tucked underneath the rear of the shell. They also have five pairs of legs; the first bears their claws or pincers, the right claw is usually the largest on the adults, the next three pairs are their walking legs, and the fifth pair of legs are small and normally tucked underneath the rear portion of their carapace (the shell covering their back). The adult females use these specialized legs to clean their embryos (fertilized eggs) and the male uses them to transfer sperm to the female during mating.

In Alaska, there are three commercial king crab species. Red king crabs (*Paralithodes camtschaticus)* have been the commercial "king" of Alaska's crabs. It occurs from British Columbia to Japan with Bristol Bay and the Kodiak Archipelago being the centers of its abundance in Alaska. Blue king crabs (*P. platypus)* live from Southeastern Alaska to Japan with the Pribilof and St. Matthew Islands being their highest abundance areas in Alaska. Brown (golden) king crabs (*Lithodes aequispinus)* are distributed from British Columbia to Japan with the Aleutian Islands their Alaska stronghold of abundance. Red and blue kings can occur from the inter-tidal zone to 100 fathoms or more. Golden king crabs live mostly between 100–400 fathoms, but can occur from 50–500 fathoms.

2.5.2 Dungeness Crab

The Dungeness crab (C*ancer magister*) is a popular shellfish that inhabits bays, estuaries, and the near shore coast of Alaska. The Dungeness crab is named after one of its representative habitats—a shallow, sandy bay inside of Dungeness Spit on the south shore of the Straits of Juan de Fuca. It is widely distributed, however, and can be found as far north as Prince William Sound and Cook Inlet in the Gulf of Alaska and south to Magdalena Bay, Mexico. This crab supports both a commercial fishery and a personal use fishery in Alaska. Dungeness crabs are related to shrimp, lobster, and other crabs. The Dungeness crab has a broad, oval body covered by a hard chitinous shell. It has four pairs of walking legs and a pair of claws.

Dungeness crab is processed by shore based processors, catcher processors, and floating processors. The crabs are sold whole or in sections as a fresh or frozen product. Commercial fishers harvest the crabs in circular pots typically baited with herring, squid, or clams. Pots are usually about 40 inches in diameter and 14 inches high. They are constructed of 3/4-inch round, steel frames wrapped in rubber tubing then covered with stainless steel wire mesh woven in 2-inch squares. Two 4" diameter escape rings are required to be built in each pot to keep the pot from filling with undersize crabs.

The number of pots that can be set by a vessel and the fishing season varies by management area in Alaska. Throughout Alaska, only hard-shell male Dungeness crabs over 6 1/2 inches in shell width may be harvested. The sex of a Dungeness crab can be determined by examining the abdomen: the abdominal flap of a female crab is about 1 1/2 times as long as it is wide and has a much broader base than a male crab which has an abdominal flap generally twice as long as it is wide.

2.5.3 Shrimp

Five species of shrimp of various commercial values are found in the cool waters off the coast of Alaska. Pink shrimp are the foundation of the commercial trawl shrimp fishery in Alaska. Pinks are circumpolar in distribution, though greatest concentrations occur in the Gulf of Alaska. Ranging from Puget Sound to the Arctic coast of Alaska, the humpy shrimp is usually harvested incidentally to pink shrimp. In some cases, however, the humpy constitutes the primary species caught. Both pink and humpy shrimp are usually marketed as cocktail or salad shrimp. Known for its sweet flavor, the sidestripe shrimp is also caught incidentally to pinks; however, there are small trawl fisheries in Prince William Sound and Southeast Alaska that target on this deeper water species. The coonstripe shrimp is the prized target of various pot shrimp fisheries around the state. Coonstripe shrimp can be found from the Bering Sea to the Strait of Juan de Fuca while sidestripes range from the Bering Sea to Oregon. Spot shrimp is the largest shrimp in the North Pacific. Ranging from Unalaska Island in the Aleutian Islands to San Diego, California, this species is highly valued by commercial pot fishers.

The shrimp fishery in Alaska began in Southeast Alaska near Petersburg in 1915 with pink shrimp as the target species. Fisheries have occurred in the Aleutian Islands, Alaska Peninsula, Kodiak Island, Cook Inlet, Prince William Sound, and Southeast Alaska areas. Alaska shrimp landings peaked in 1976 at 129 million pounds of which 119 million pounds came from the Kodiak and Alaska Peninsula areas. Annual trawl harvests are now far below historic levels with major areas in Kodiak, the Alaska Peninsula, and Cook Inlet closed due to poor stock conditions. Pink shrimp generally comprise more than 80 percent of trawl landings. The major pot shrimp fisheries occur in Cook Inlet and Prince William Sound in South Central Alaska and in Southeast Alaska and usually total less than 500,000 pounds annually. Coonstripe shrimp are the primary target of the Cook Inlet pot fishery while spot shrimp are the primary species caught in Prince William Sound and the waters of Southeast Alaska.

2.5.4 Tanner crabs

(*Chionoecetes bairdi* and *C. opilio*) are two of the four species of Tanner crabs occurring in the eastern North Pacific Ocean and the Bering Sea. These four species form the basis of a thriving domestic fishery from southeastern Alaska north through the Bering Sea. These crabs are also marketed under their trade names: snow crab (*C. opilio*) and Tanner crab (*C. bairdi*). Tanner crabs are brachyuran (meaning short-tailed) or true crab and constitute some of the most highly specialized of all crustaceans. The body is composed mainly of a chitinous shell or carapace with a small abdominal flap. They have five pairs of legs with the first pair equipped with pincers. Tanners may live to an estimated maximum age of 14 years. Males of commercial size usually range from 7 to 11 years of age and vary in weight from 1 to 2 pounds for opilio and 2 to 4 pounds for bairdi crabs.

The Alaska Tanner crab fishery began in 1961 and has grown into fisheries of major commercial importance. Record domestic harvests amounted to over 123 million pounds in 1978 for Tanner crabs (*C. bairdi*) and 332 million pounds 1991 for snow crabs (*C. opilio*). Vessels ranging from small inshore vessels to new “super crabbers” in the Bering Sea take crabs. Fishing gear consists primarily of pots similar to those used for king crab. Most pots are baited with chopped herring and then soaked from one to three days.

2.6 Recreation Fishing

Sport fishermen in the Haines area seek all five Pacific salmon along with the Dolly Varden char and Cutthroat trout. The sport fishing season begins in April or May as a king salmon saltwater troll fishery. The popular Haines Salmon Derby is run out of Letnikof Cove in late May. Beach areas along the Chilkat Peninsula and Lutak Inlet are also popular. A limited bank and troll fishery for fall Dolly Varden and Coho salmon also exists.

Chilkoot Lake and its outlet comprise the most important sport fishery in the Haines area however angling from the banks of the Chilkat River is also significant. Sport fishing in the Haines area begins in May, peaks in July and continues with high effort for salmon through October. Summer is essentially a Dolly Varden and pink salmon fishery, while fall is a chum and coho salmon fishery. When the water level in the Chilkat River drops and becomes clearer in the fall, sport fishing for coho and chum salmon from spots along the Haines Highway is popular. Steelhead is known to run in the Chilkat River.

Most of this sport fishing use appears to be from residents of Whitehorse, Yukon Territory. Chilkat Lake is only reached by air or riverboat. However, numerous Haines and Juneau residents own houses and cabins on an island in the lake and along its eastern shore and sport fish for cutthroat trout and Dolly Varden at a moderate level. Round whitefish are also present. Rutzeback Lake (2 miles south of Mud Bay on the Chilkat Peninsula) contains stunted populations of cutthroat and brook trout. It is relatively inaccessible and receives only light local fishing use.

2.6.1 Salmon Sport Fishing

Chinook salmon is perhaps the most highly prized sport fish in Alaska and is extensively fished by anglers in the Southeast and Cook Inlet areas. The largest sport-caught Chinook salmon was a 97-pound fish taken in the Kenai River in 1986. Trolling with rigged herring is the favored method of angling in salt water, while freshwater anglers use lures and salmon eggs. The sport fishing harvest of Chinook salmon is over 76,000 annually, with Cook Inlet and adjacent watersheds contributing over half of the catch.

In the arctic, northwestern and Interior Alaska, chum salmon remain an important year-round source of fresh and dried fish for subsistence and personal use purposes. Sport fishers generally capture chum salmon incidental to fishing for other Pacific salmon in either fresh or salt water. Statewide sport harvest usually totals fewer than 25,000 chums. After entering fresh water, chums are most often prepared as a smoked product.

Coho salmon is a premier sport fish and is taken in fresh and salt water from July to September. In 1986, anglers throughout Alaska took 201,000 Coho salmon. In salt water they are taken by trolling or mooching (drifting) with herring or with flies or lures along shore. In fresh water they hit salmon eggs, flies, spoons, or spinners. Coho are spectacular fighters and the most acrobatic of the Pacific salmon, and on light tackle provide a thrilling and memorable fishing experience.

There is also a growing sport fishery for sockeye salmon throughout the state. Probably the best-known sport fishery with the greatest participation occurs during the return of sockeye salmon to the Russian River on the Kenai Peninsula. Other popular areas include the Kasilof River on the Kenai Peninsula as well as the various river systems within Bristol Bay.

2.6.2 Halibut Sport fishing

Recreation halibut fishing in Alaska is a very popular activity, with over 65 percent of the effort and harvest occurring in Kachemak Bay, Southeast Alaska, the Kodiak area, and near the mouth of Deep Creek in Lower Cook Inlet.

The halibut taken by sport anglers are generally 15 to 20 pounds in weight; however, fish over 150 pounds are frequently caught. The current Alaska state record for a sport-caught halibut is 450 pounds, and a fish must weigh at least 200 pounds to qualify for the state's trophy fish program. Anglers use stout saltwater fishing gear to harvest over 1.5 million pounds of halibut annually. The effort and the interest in catching these fish are increasing each year. In Southeast Alaska halibut is second only to king salmon in sport angler preference.

2.7 Resource Outlook

2.7.1 Salmon Fisheries

Sockeye salmon smolt production from Chilkat Lake in 1997, the dominant smolt year for the 2000 return to Chilkat Lake, totaled an estimated 1.5 million fish or 74 percent of the historical (1989-1990, 1994-1999) average. A return of about 148,500 Chilkat Lake sockeye salmon is expected in 2000, 68 percent of the 1976-1999 average. The average (1976-1999) District 15 commercial gillnet catch of Chilkat mainstem/Berners Bay sockeye is 13,000 fish. Based on this information, a high return of three-year old Chilkat mainstem sockeye salmon occurred in 1999 and an above average return of mainstem sockeye salmon is expected in 2000. At 7,200 fish, escapement of Chilkoot Lake sockeye during the dominant parental brood year (1995) for the 2000 return was the lowest number of fish on record. The annual adult return of Chilkoot Lake sockeye salmon has been well below average since 1993, a trend that is expected to continue in 2000.

Douglas Island Pink and Chum Salmon Incorporated (DIPAC) are expecting large numbers of hatchery summer chum salmon to return to the Amalga Harbor and Boat Harbor remote release sites. DIPAC has increased the number of smolt released each year to 60 million and has changed its release procedures to ease the stress on the smolt. These changes, combined with favorable ocean conditions, have resulted in record returns of adult fish to the upper Lynn Canal. Long-term forecasts are difficult to make; however these management activities indicate the intent of the fishery managers to sustain the high harvest levels of recent years.

Based on parental-year escapement counts, the wild summer chum return in 2000 is expected to be good but much lower in magnitude in comparison to forecasted returns of hatchery chum salmon.

Fall chum salmon returning to Lynn Canal are wild stocks migrating primarily to the Klehini River, Chilkat River, and several Chilkat River tributaries. The fishery performance in the dominant parental brood years (1995 and 1996) was poor. Therefore, the return of fall chum salmon stocks is expected to be poor.

Coho salmon in Lynn Canal is comprised of several stocks. The largest Coho system is the Chilkat River, followed by the Berners and Chilkoot rivers. Parental-year escapement counts were generally below the 10-year average for all systems. The District 15 gillnet catch in

1996 of 52,500 Coho was about 72 percent of the previous 10-year average. So, the Coho return is expected to be average to below average for 2000.

The spawning abundance of Chilkat River Chinook salmon, based on preseason forecast, is 4,800 fish. This 2000 projection is slightly below the 1991-1999 average but above last year's escapement of 2,300 fish.

In summary, the sockeye run at Lynn Canal is among the largest in Southeast Alaska. The Coho run to the Chikat River is among the largest in northern Southeast Alaska. Currently, Chilkat River sockeye and Lynn Canal Coho stocks are healthy. Total returns of Chilkoot Lake sockeye salmon have been below average since 1993. Fall chum stocks have not removed to historical highs of the mid-1980s because a dramatic decline beginning in 1989, although escapements in 1999 were much improved over recent years.

2.7.2 Halibut Fisheries

The 2001 staff recommendation for Southeast Alaska (Regulatory Area 2C) is 8,780,000 pounds. This is only a minor change in the assessment results for 2000. The International Pacific Halibut Commission and its staff reviewed results of the 2000 halibut stock assessment analysis. The staff recommended a 10.6 percent increase in the coast-wide quota, to 74.63 million pounds. The major change in the assessment results for 2000 came from the elimination of the downward correction in recent survey catch rates that was applied last year, to account for a suspected increase in fishing power of the surveys due to a bait change in 1993.

Experiments conducted in 2000 have shown that the precautionary adjustment is not required. The stock assessment shows only minor changes for the southern portion of the range (Areas 2A-2C). Improvements in the estimated biomass of the stock in the central Gulf of Alaska Area (Area 3A) are accounted for largely by change in the treatment of historical survey data. The IPHC continues to approach harvest from the western portions of the halibut range (Areas 3B and 4) with great caution because of the absence of an analytical stock assessment and the limited knowledge base for these areas. Sharply lower survey catch rates plus the knowledge that the biomass in these areas has accumulated from lower historical exploitation, and therefore cannot be expected to persist at these historical levels with present fisheries, contributes to our cautious approach.

Weight at age for halibut in the central portion of the range increased slightly in 2000 over the very low values of recent years. However, recruitment of year classes born between 1989 and 1993 appears to be poor. The outlook for the stock biomass over the near future is for a decline from the record high levels of recent years until increased recruitment to the stock occurs.

Because of the location of principal halibut fishing grounds, both resident and non-resident halibut vessels travel long distances to and from the fishing grounds in order to land their catch at Haines. The halibut resource potential for northern Southeast Alaska is 6,567,923 pounds. This is sum of landings in 2000 at the ports of Haines, Juneau, Hoonah, Gustavus, Pelican,Sitka, Angoon and Tenakee Springs. Although some of halibut landed at these ports is actually too far away to be diverted to Haines with the project, it suggests that an increase in landings with the project is theoretically possible.

3.0 REGIONAL BENEFITS

The evaluation of regional benefits is intended for the use and information of Haines residents, their local government, and the State government as a tool to understand the impacts of the proposed project. Under Corps of Engineers guidelines, projects are evaluated for their Federal interest. Federal interest is based on a specific approach to estimating benefits and costs under the national economic development (NED) guidelines. This is an appropriate position for the Corps of Engineers because they are interested in overall benefits to the Nation. However, communities such as Haines have their own concerns for developments such as the proposed small boat harbor expansion. Haines residents are interested in the type of employment and incomes (both direct and indirect) that are likely to result from the project.

3.1 State and Regional Economic Trends

The economy of Alaska can be characterized as a resource extraction economy. Much of the money that comes into the state is from activities that involve the removal of some natural resource in an unfinished form. The timber, fish, petroleum, metals or coal taken is exported in its natural state. Little secondary processing of these materials is done in the state so the jobs and cash created by this activity are located elsewhere. Only limited manufacturing is accomplished in Alaska and most of what occurs is for internal markets and not for export. While internal consumption re-circulates existing cash, it does not bring in new money from other areas. This resource extraction-driven state economy is controlled by competition from worldwide sources and especially pacific-rim countries.

The State of Alaska still depends on the oil industry for the majority of its revenues. The market that sets the price for the State's oil is a basic commodity market. It is subject to price swings based upon supply and demand, and by speculation. Predicting the future is difficult. Future petroleum prices will vary significantly for short periods; however, the trend in lower Alaska petroleum production is inevitable. Oil industry employment is getting weaker, but should improve as nearly half a dozen new oil prospects move into the development state. Many basic local government services, such as education, are provided with significant financial aid from the state. A decrease in state revenue, resulting in cutbacks to state support of these services, is expected.

Alaska's resource-based industries, centered on seafood and timber, will not fare as well as mining over the forecast period. Business media have gone so far as to call the Alaskan salmon industry a dying one, noting rapid declines in both price and market share. Price competition has been fierce, with new competitors constantly entering the market selling farm-reared products. While the increased competition has driven prices downward, these new entrants have also exacerbated the problem of an over-supplied market. During the forecast period, nearly 900 seafood processing jobs are expected to be lost. Of possible greater consequence to the Alaska economy, however, will be the reduced number of Alaskans finding employment on fishing boats. These workers are considered self-employed and therefore not captured in the industry employment estimates or forecasts. They have traditionally been well paid, and the income generated from seafood harvesting is very important to the economies of many Alaska communities.

Similarly, many communities in Southeast Alaska have grown on the coattails of the timber industry, and those with the greatest dependence on this industry now face some difficult times. The future of the state's sawmills may be slightly brighter, particularly if an agreement is reached to divert some of the timber previously destined for the pulp mill to sawmills. Still, many of the most easily harvested -–most profitable – timber tracts have already been cut. In addition, there has been an increasing political drive to remove more public lands from the harvestable supplies and to reduce the subsidies paid to the industry so that it can harvest economically marginal timber at a profit. These factors will continue to place additional pressures on industry employment. Geographically, the industry may spread for a few years as harvesters and mills search for new sources, but this expansion is expected to only delay what appears to be an inevitable decline.

Continued increases in population and tourism activity will help create more than 17,000 additional service industry jobs in the state. This is also the greatest percentage increase in employment for any industry over the 10-year period, up over 30 percent between 1994 and 1996 alone.

Leading service industries in employment growth will be the health care industry. While population gains in general will increase the demand for health care services, it is the projected increase in the number of older Alaskans who choose to remain in the state that will affect employment levels. Over the forecast period, the number of Alaskans 65 years and older is expected to increase by 50 percent.

The greatest gains in the industry, however, will be the result of increased tourism activity and the expansion of tourism ventures and opportunities throughout a broader geographic region. Improved accessibility to remote locations and more competition among tourist service providers should force the cost of remote Alaska vacations downward. This will spur demand for less traditional Alaska vacations, and bolster transportation services employment throughout the state.

As has already occurred in some of the larger communities in the state, competitive forces will be at work that will lead to consolidations and the demise of some smaller trade venues within the state. As some of Alaska's smaller communities reach a critical size and stability with regard to population and consumption potential, larger chain retailers will enter the market. Their entrance into a community will have a dramatic impact on the smaller shops currently serving that market, which often have difficulty competing with larger chains. Overall, there should be a net increase in employment, but jobs created by new, larger firms may be partially offset by employment declines at current smaller outlets.

Government employment will show very little growth over the next ten years -- up less than one percent. Employment patterns among the three levels of government – federal, state and local – will see changes, with the first two posting slight employment declines while local government will show employment gains. There is a trend to reduce the size of government at all levels, but particularly at the federal and state levels. The responsibility for administering government programs is being shifted to the lowest possible level of government.

Employment in southeast Alaska's traditional basic industries has either stayed steady or declined over the past decade. These included seafood processing (no growth), forest

products (66 percent decline), stage government (5 percent decline) and federal government (14 percent decline). As a group, employment in these four industries has declined by 23 percent since 1990 – a loss of nearly 3,000 jobs.

3.2 Haines Economy

Haines is a full-service, working community, providing a variety of services and conveniences not available in many other rural areas of the state. Service and retail sectors have added more jobs and an expansion occurred in hotels, amusement, recreation and membership organizations. Employment in health care and social services remains significant. Retail food stores, eating and drinking establishments and miscellaneous retail outlets have added jobs. Many of the new retail and service jobs are tourism-related.

Transportation is an important industry in the Haines Borough. Construction, the growing retiree population and tourism also boost the economy. Seafood processing and harvesting, while less significant than in the late 1980's and early 1990's, play important roles, however, low salmon prices have hurt harvesters. Construction and seasonal tourism employment grew throughout the 1990's while the influence of resource extraction industries diminished. Wood products employment is now limited to some smaller-scale logging, milling and value add enterprises.

The population increased between 1980 and 1999, resulting in new residential development and increasing demand for municipal services and infrastructure; the annexation to the city of 6.5 square miles in March of 1999 largely eliminated the need for the City to provide services outside City limits. Fortunately, residential development and annexation of new areas to the city has not diminished many of the small town values and characteristics.

With road access to the Alaska Highway, Haines bridges the waterways of Southeast and the Interiors of Alaska and Canada. This strategic location, and abundant natural resources have historically made transportation and trade strong influences on the Haines economy. Freight activity has perked as strong demand in the Alaskan Interior has increased the volume of goods transiting Haines.

The Alaska Marine Highway System's operation of the M/V Malaspina as a day-boat between Haines, Skagway and Juneau has pushed seasonal visitation to near the capacity of the current ferry system. Locally, the Haines Skagway Water-Taxi and the Portage Cove Development Corp. (a Klukwan Inc. subsidiary) owned Chilkat Cruises shuttle passengers between Skagway and Haines during the tourist season.

The increase in cruise ship visits since the mid 1990's are the most dramatic element in the local economy. Cruise ship traffic to Southeast Alaska grew continuously throughout the 1990's. Haines completed expansion of the Port Chilkoot Dock facility to accommodate larger cruise ships in the down town area in 1994. Previously, large ships had anchored in Portage Cove and ferried passengers by launch or had used the Lutak Dock facility. Cruise ship visitation begins in early May and ends in late September.

State DOT&PF construction spending in 1996 included $2.5 million for trail work in the Chilkat Bald Eagle Preserve. In 1999, $9 million was allocated for Haines Highway realignment, widening and paving. Planned state transportation improvements include: additional realignment work on the Haines Highway ($12 million in 2000 and 2001); paving

of all other unpaved state maintained roadways within the Haines Borough before 2006 (Piedad, Sawmill Creek, Comstock, Mud Bay, Lutak Roads and Front Street); and $1.7 million in improvements to mooring facilities at the Alaska Marine Highway Ferry Terminal scheduled for summer 2000.

Since 1984, wage and salary employment reached a high of 964 in 1987 and dropping to a low of 697 in 1992 following the sawmill closure. In 1996, employment climbed to 876, the third highest level in 17 years. In 1990, manufacturing firms provided over 25 percent of wage and salary employment in Haines. By 1996, manufacturing's share had dropped to under twelve percent.

These trends illustrate that the decrease in the manufacturing sector has, in part, been offset by gains in services and retail trade. The need for year-round employment remains a significant concern. In 1999, the Alaska Labor Department reported that 37 percent of Haines families were low and moderate income.

While commercial fishing declined in importance during the 1990s, seafood processing and fishery related jobs still lead the local manufacturing sector. The significant loss of revenue in the commercial salmon fishing industry from the peak years in the late 1980s and early 1990s is caused largely by lower ex-vessel prices. While fishing remains an important element in the economy, many fishers have changed occupations while others seek new seafood marketing strategies.

Like many small communities in Alaska, Haines has a variety of human resources professionals that, when considered collectively, are an important component of the local economy. The variety of services they provide include: education, medical, and mental health, alcohol and drug counseling, childcare, social work, and services for elderly and disabled persons. These services are funded through the state and local governments and private and non-profit corporations.

The City updated its Overall Economic Development Plan (OEDP) in 1999. The update identified and analyzed potential resources to be developed and constraints impeding economic growth. The OEDP committee identified the following potential development opportunities:

- Expand the State Owned Small Boat Harbor
- Lutak Dock repairs
- Port Chilkoot Dock improvements
- Designation of specific and sufficient areas for industrial land use and support of related infrastructure
- Develop a Community/Convention Center
- Upgrade telecommunication capacity
- Expand value-added seafood and wood products processing
- Develop a Small Business Incubator

3.3 Tourism and the Visitor Industry

In recent history, the Haines economy has been based on commercial fishing, timber, government, tourism and construction. Tourism is a growing industry in the area, as many independent travelers use the Alaska Marine Highway Ferry System and the Haines Highway to and from the interior of Alaska and the Continental United States. Haines also promotes the scenic beauty of its surroundings, the Chilkat Bald Eagle Preserve, its native heritage and outdoor recreation.

The Borough School District, retail trade, business and transportation services, fishing and forestry provide the majority of employment in the Borough. Tourism businesses, crafts, and the traffic Haines draws as a result of its road connection to the State Ferry have become increasingly important. Over 150,000 cruise ship passengers are expected to visit Haines this summer, and an additional 100,000 independent travelers will arrive via car, ferry or air. Cruise ships add $10 million into the local economy.

The City of Haines operates an active Convention and Visitors Bureau (CVB). The CVB and the City's tourism staff are funded by a 1 percent sales tax for tourism and these tax revenues are used to actively promote Haines as a visitor destination. Though there is year-to-year fluctuation in the strength of components of this economic sector, tourism is an important growth area of the Haines economy.

3.3.1 Alaska Marine Highway Visitation

In 1998, 36,095 State ferry passengers disembarked in Haines as compared to the 1992 peak of 45,000. A major improvement in Haines access for the 1998 and 1999 tourist seasons was the rescheduling of the M/V Malaspina as a day-boat serving Haines, Skagway and Juneau. Current state plans are to continue the day-boat concept on Lynn Canal and the City is active in promoting improved ferry service.

3.3.2 Air Traffic

The visitor industry accounts for much of the air traffic at the Haines airport. In 1995, the five commercial air carriers that used the Haines airport on a regular basis reported to the FAA that 29,812 commercial passengers boarded at the Haines airport that year. That is the equivalent of more than 12.5 boardings for each resident of the Haines Borough. This number appears to be growing.

3.3.3 Cruise Ship Visitation

Cruise ship based visitation has grown rapidly since the mid 1990s due in large part to efforts by the City. To improve access to the cruise ship market, the City owned Port Chilkoot Dock facility was expanded to accommodate large cruise vessels in 1994 and 1995. Since that time, the growth of cruise ship oriented tourism businesses has increased in importance.

table B-5 shows the growth of the industry, based on cruise passenger using all local docks, since 1994. Passenger numbers, as measured by ship capacity, tripled between 1994 and 1998. While it illustrates the growth trend, ship capacity is not a clear measure of the number of cruise passengers providing a direct input to the local economy. Many passengers aboard vessels that dock for the evening only do not disembark in Haines. Also, crewmembers, which do often disembark on shopping errands or for relaxation, are not included in

passenger numbers. The apparent decline in passengers and dockings from 1998 to 1999 might partly be offset by increases in passengers aboard the community's two water-taxi enterprises that serve Haines and Skagway.

Table B-5. Cruise Ship Port Calls (PC) and Passenger Capacity (Pax) by Year

1994	1994	1995	1995	1996	1996	1997	1997	1998	1998	1999	1999
PC	Pax	PC	Pax	PC	Pax	PC	Pax	PC	Pax	PC	Pax
112	48,740	151	75,292	181	94,643	170	105,197	242	152,230	196	148,736

3.4 Local Government, Taxation and Municipal Finances

Haines is a first-class city incorporated in 1910 with a mayor/council form of government. It is included in the Haines third-class Borough, formed in 1968, which operates the school district. The City has full powers of taxation, police and fire protection, road maintenance, waters and harbors, planning and zoning, coastal zone management and water and sewer service. The Borough has the power to tax for educational purposes. It has planning and zoning and fire protection on a service area basis.

The City of Haines provides services to its residents through a number of taxes: 4-percent (City) and 1.5-percent (Borough) sales taxes, 4-percent accommodations tax, 4-percent (all Borough) tour tax. There is also a property tax of 5.85 mills (City) and 4.5 mills (Borough). In 1999, Haines had operating revenues totaling $3,421,489 (local, $3,237,490 and outside, $183,999).

3.5 Without-Project Conditions

Without expansion of the small boat harbor, economic growth in Haines will proceed modestly, but it will be constrained by lack of infrastructure to support commercial fishing activities, chartered boat and cruise lines, tourism related businesses, and the increasing numbers of visitors that contribute to municipal tax revenues.

Haines is dependent upon sales tax revenues to fund its services. If lack of moorage in the harbor provides a constraint for growth of commercial fishing operations and visitors to Haines, there will be a direct effect on overall sales tax receipts.

3.6 With-Project Benefit Categories

Employment in Haines can best be described as seasonal with many jobs dependent on tourism, timber and fishing. The commercial fishermen operate gillnet boats, sometimes requiring an extra crewman. There is no cannery in Haines. The governments and particularly the school system employ a number of people, and the tourism and service sectors are growing. There is a thriving retail sector in Haines.

3.6.1 Direct Employment from Moorage Rental

The expansion of the Haines small boat harbor would create direct employment in the community for additional staff for the harbormaster's office. This would likely include one additional person. The estimate salary for an additional staff is $35,000 a year.

The annual dollar total for direct additional employment is estimated at $35,000 annually, not including employee benefits.

3.6.2 Indirect Employment

Employment in Haines can best be described as seasonal with many jobs dependent on tourism, timber and fishing. The commercial fishermen operate gillnet boats, sometimes requiring an extra crewman. There is no cannery in Haines. The governments and particularly the school system employ a number of people, and the tourism and service sectors are growing. There is a thriving retail sector in Haines.

Secondary jobs would also be created from operation of boat repair services, marine support services, and charter boat businesses. Without a detailed analysis of the Haines economy, it is difficult to estimate the number of secondary jobs created, but the number would be substantial.

The review of municipal revenues emphasizes the importance of harbor-related activities during the summer months. *One-third* of the assessed value for the property tax is from personal property - largely from boats moored in the harbor or stored in the community. Sales tax revenues during the port activity season provide the majority of sales tax revenues to the community.

Local businesses that would benefit from increased harbor activity and increases to the commercial fishing/recreation/tourism industry include the following:

Air Services	**Restaurants/SnackBars**
Alaska Coastal/Haines Airways	Bamboo Room Restaurant & Pioneer Bar
Alaska Mountain Flying & Travel	Bearitos
Earth Center Adventures, Inc	Bear Paw Bakery
L.A.B. Flying Service	Chilkoot Coffee Company
Skagway Air Service	Fireweed Bakery & Cafe
Wings of Alaska	Fort Seward Lodge Restaurant & Saloon
Auto and Marine Service/Parts/Rental	Grizzly Greg's Pizzeria & Deli
Alaska Travel	Halsingland Restaurant
Affordable Cars	Klondike Restaurant
Avis Rental Cars	Lighthouse Restaurant & Harbor
Bigfoot Auto Service, Inc	Mountain Market
Bushmaster Auto	Red Onion Saloon
Canal Marine	33-Mile Roadhouse
Charlie's Repair	Wild Strawberry
Eagle's Nest Car Rental	**Ship's Agent**
Parts Place	Cruise Line Agencies of Alaska
Petro Marine Service	**Shopping and Specialty Products**
Bed & Breakfasts	Alaska Indian Arts, Inc.
A Sheltered Harbor Bed & Breakfast	Alaskan Impressions
Chilkat Eagle B&B	American Bald Eagle Foundation
Fort Seward B&B	Babbling Book
Pyramid Island B&B	Bell's Store
River House Vacation Cottage	Birch Boy Products
Summer Inn B&B	Caroline's Closet
Bicycles	Charlotte's Web

Sockeye Cycle Co.	Chilkoot Gardens
Boat Manufacturer: New & Rebuilt	Curly Bear Factory & Crafts
ARTFUL Boats	The Far
Cabins	Form and Function
Bear Creek Cabins	Goldspot
Cabin Fever	Haines Saw Shop
Dalton Cottages	Helen's Shop
Camper/RV Parks	King's Store
Haines Hitch-Up RV Park, Inc.	Orca Arts & Crafts
Oceanside RV Park	Ravens' Nest
Salmon Run Campground	Roy's
Swan's Rest RV Park	Sea Wolf Gallery
Fishing Camps and Charters	Sheldon Museum Gift
Alaska's Beyond Boundaries	Trading Post
Chilkoot Lake Tours	Uniquely Alaskan Arts
Eagle Preserve Sport Fishing	Windspiri
First Out, Last In Fishing Charters	**Taxi/Transportation**
Hart's Fishing Charters	Alaska Fjordlines
Jim's Jaunts	Chilkat Cruises & Tours
McCormick Charters	Chilkat Lake Transportation
Salmon Run Charters	Haines Shuttle & Tours
Swiftwater Lodge	TLC Taxi
Weeping Trout Sports Resort	The New Other Guys Taxi & Tours
Fishing – Commercial	**Tour Operators**
F/V Chilkat	Alaska Fjordlines
Rustler Fish Company	Alaska Mountain Flying & Travel
United Southeast Alaska Gillnetters Assoc.	Alaska Mountain School
Fish Processing and Seafood	Alaska Nature Tours
Alyeska Products	Alaska Travel Adventures
Bell's Seafood	Chilkat Cruises & Tours
Dejon Delights	Chilkat Guides LTD
Haines Packing Company	Chilkat River Adventures
Freight Hauling	Chilkoot Lake Tours
Alaska Marine Lines	Deishu Expeditions
Glacier Marine Transport	Eagle Preserve Sport Fishing
Gas Stations	Glacier Bay Travel
Charlie's Repair	Gold Rush Trail
Delta Western	Haines Carriage & Trolley Company
Petro Marine Services	Haines Shuttle
Groceries	Jim's Jaunts
Alaskan & Proud Haines	Keet Gooshi Tours
Haines Quick Shop	L.A.B. Flying Service
Howsers IGA Supermarket	McCormick Charters
Mountain Market	New Other Guys Shuttle & Tours
Hotels/Motels	Out of Bounds
Captain's Choice Inc. Motel	Sockeye Cycle Co.
Eagle's Nest Motel.	Wings of Alaska
Fort Seward Condos.	Tsirku Canning Co.
Fort Seward Restaurant & Saloon	Yeshua Enterprises

Hotel Halsingland	**Travel Agents**
Mountain View Motel	Alaska Mountain Flying & Travel
Thunderbird Motel	Glacier Bay Travel
Petroleum Products	The Travel Connection
Delta Western	**Wholesale Sales**
Petro Marine Services	Alaskana
Recreation/Equipment & Sporting Goods	Northern Sales
Alaska BackCountry Outfitter	
Alaska Sport Shop	
Devil's Club Driving Range	
Outfitter Sporting Goods	
Sockeye Cycle Co.	

3.7 Increased Moorage and Sales Tax Revenues

The proposed small boat harbor expansion would provide an additional 13.3 acres of mooring basin. Based on initial estimates by the Alaska Department of Transportation and Public Facilities, a preliminary configuration of 137 permanent moorage stalls and 880.9 linear meters of transient moorage was selected. Expanding the mooring capacity at Haines would bring an immediate benefit to the community from an increase in revenue from moorage fees. Haines moorage fees are referenced in table B-6.

Table B-6. Estimate of Potential Annual Moorage Revenues, Haines Harbor Expansion

Vessel Size (ft)	Number of Slips	Float Length (ft)	Float Length (m)	Total Annual Fees ($)
<25	25	24	7.3	7,410
25–30	29	30	9.1	11,984
31–40	26	40	12.2	17,784
41–50	29	50	15.2	28,239
51–70	17	70	21.3	27,471
71–80	7	80	24.4	16,971
81–90	1	90	27.4	2,932
91–120	2	120	36.6	9,143
121–140	1	140	42.7	5,732
Total Moorage Linear feet		2,890	880.9	238,425

Rates for permanent moorage at Haines are $.95/sf annually. Short-term transient moorage is defined as less than two weeks and costs $.30 per linear foot per day while long-term storage, greater than two weeks has a rate of $3.50 per linear foot per month. There are potential discounts for transient storage based on length of time on the waiting list and for winter months. The fees shown in table 2 are not discounted.

The following assumptions are made: (1) Additional permanent moorage would be used 100 percent of the year by 137 vessels ranging in size from less than 25 to 140 ft. (2) The annual rate of $.95/sf is applied to the additional permanent moorage square footage of 134,386. Therefore the estimated increased revenue collected annually for permanent moorage fees would be: 134,386 square feet x $0.95 = $127,667. (3) The total additional transient moorage is allocated between short-term and long-term. It is estimated by harbor personnel that approximately 60 percent of the transient moorage is used for short-term while the remaining

40 percent is typically used for long-term. Therefore, of the additional 2,890 linear feet of additional transient moorage, 1,734 feet is expected to be used for short term (2,890 x .60) and 1,156 feet (2,890 x .40) for the long-term. The resulting expected increase in additional transient moorage fees is: 1,734 x $0.30 (daily fee) x 365 days = $189,873 for short term; 1,156 x $3.50 (monthly fee) x 12 months = $48,552 for long term resulting in total additional transient moorage fees of $238,425 ($189,873 + $48,552). The total expected annual revenue increase from permanent and transient moorage is $127,667 annual permanent moorage revenues + $238,425 annual transient moorage revenues = $366,092 in total additional annual moorage revenues. The increased revenue of $366,092 from additional moorage fees could be used for maintenance and improvements for the harbor.

3.8 Summary of Regional Benefits

The overall economy of Haines has been lagging behind other Southeast communities in recent years. The community had been dependent on timber harvesting for a large proportion of the overall employment until Haines largest employer was closed in 1994 as a result in timber policy and harvest levels. Lost were 225 direct jobs. With the reduction in timber available in the Tongass, the community has been devastated. The community is trying to diversify the Haines economy. There has been a growth in the number of sightseeing and fishing charters, biking tours, bus tours, walking tours, and sighting seeing tours.

New direct employment in the harbormaster's office is estimated to be $35,000 per year (plus employee benefits). Data are not available to estimate the secondary employment associated with providing goods and services to the users of the expanded harbor, but it would be a major economic boost to the community. From review of the municipal finances for Haines, it can be seen that harbor-related sales taxes during the summer provide a major component of total income to the community. It is anticipated that increased activities associated with support of the expanded boat harbor would have a similar impact.

The community of Haines receives a substantial fiscal boost from sales tax revenues for goods and services associated with harbor activities. Municipal funding will have to be shifted to other sources if growth does not continue in the visitor/tourism and other harbor-related activity.

4.0 EXISTING CONDITIONS

4.1 Status of Exiting Harbors

There are two harbors at Haines, a naturally protected seasonal harbor located about 5 miles from the city at Letnikof Cove and a breakwater protected harbor located at Portage Cove immediately adjacent to the city. The location of these facilities relative to the city is shown in figure 8.

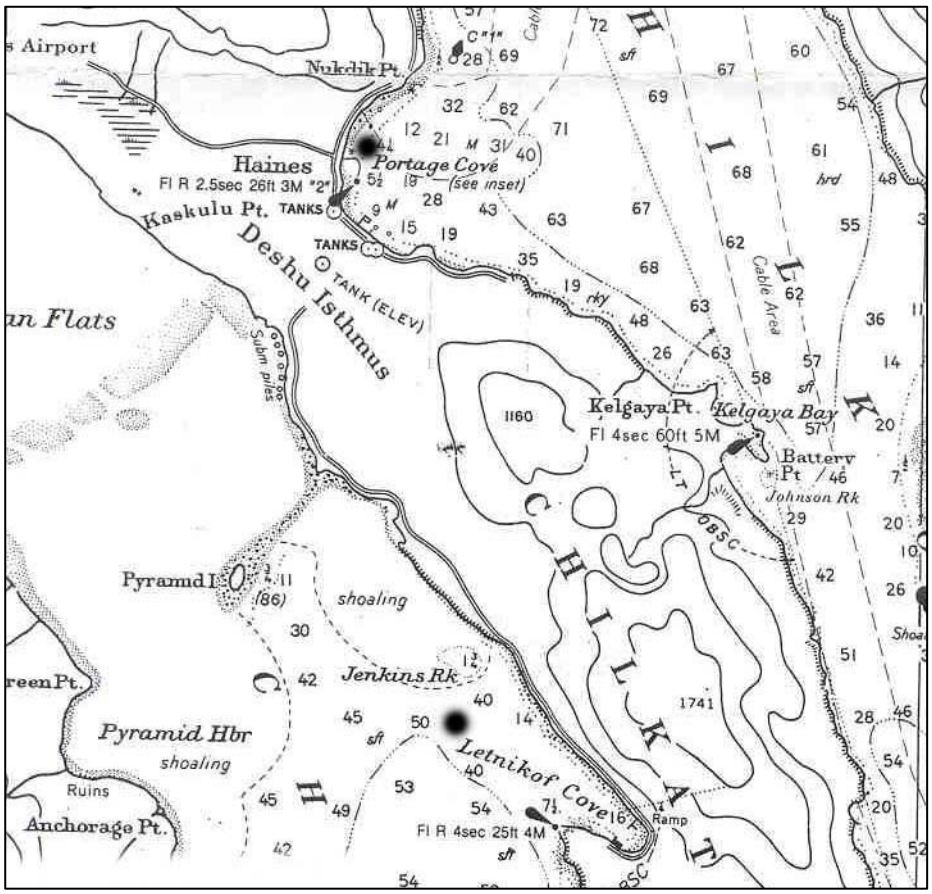

Figure 8. Harbor Locations

4.1.1 Letnikof Cove

Letnikof Cove is located about 5 miles south of the city on the west side of Chilkat Peninsula near the head of Chilkat Inlet. During the late fall and winter months (November, December, January, February and March), prevailing winds are from the west. During the remainder of the year prevailing winds are from the southeast. The location of the cove provides excellent protection from winds and associated waves from the prevailing southeast winds but only moderate protection from winds and associated waves from the west. In addition, during the winter months there are occasional strong winds that come down the Chilkat valley from the north out of Canada. These winds can exceed 80 miles per hour and make anchorage in

Letnikof Cove unsafe. Also, during the winter months there is a significant amount of ice in the cove from the Chilkat River. Because of inadequate protection from storm waves generated by prevailing west winds, no protection against storm waves generated by occasional north winds, the presence of winter ice and snowfall that can sink unattended vessels boats are not anchored in the cove during the winter.

There are two sets of seasonal floats in the cove. Because of late fall and winter wind conditions and winter ice in the area, the floats are typically deployed sometime in April and removed during October. One set is located on the western side of the cove adjacent to the Haines Packing Company dock and warehouse. This float system is owned by Haines Packing and is used exclusively by commercial salmon fishing boats and tenders that work for Haines Packing. The float system is approximately 420 feet in length and does not include stalls. Thus float is essentially used as transient moorage and boats are simply tied to the float.

The other float system is located on the eastern side of the cove and is owned by the state and operated by the city. As with the Haines Packing Company floats, this system does not include mooring stalls and is deployed each year in about April and removed from the water for winter storage during October. The float is approximately 750 feet in length and was designed for transient moorage of up to 41 vessels on a first come first served basis.

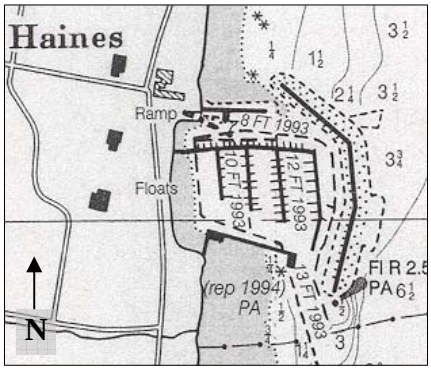

Figure 9. Haines Harbor

4.1.2 Portage Cove

Haines Harbor (see figure 9) is located in Portage Cove adjacent to the city's downtown and is protected to the east by a rubblemound breakwater and a floating breakwater at the southern end of the harbor, which includes a seaplane float. The harbor entrance is between the floating breakwater and the rubblemound breakwater at the southeast corner of the harbor. Moorage within the harbor is provided by two float systems: the primary float system that occupies most of the harbor and the floating breakwater.

The primary float system includes the following components (shown in more detail in figure 10):

A. 8' x 464' float with 20 – 24' stalls

B. 8' x 200' float with 8 – 24' stalls, permanent side moorage for a 50' vessel (water taxi), a fish cleaning station, and 130' of transient moorage

C. 8’ x 248’ float with 16 30’ stalls

D. 8’ x 288’ float with 18 30’ stalls

E. 8’ by 248’ float with 6 40’ stalls, permanent side moorage for one 66’ and one 86’ vessel, and 96’ of transient moorage

F. 8’ x 120’ float with 240’ of transient moorage

Floating Breakwater: 12’ x 237’ float with 237’ of usable transient moorage on inner side of float and a 24’ x 45’ seaplane float

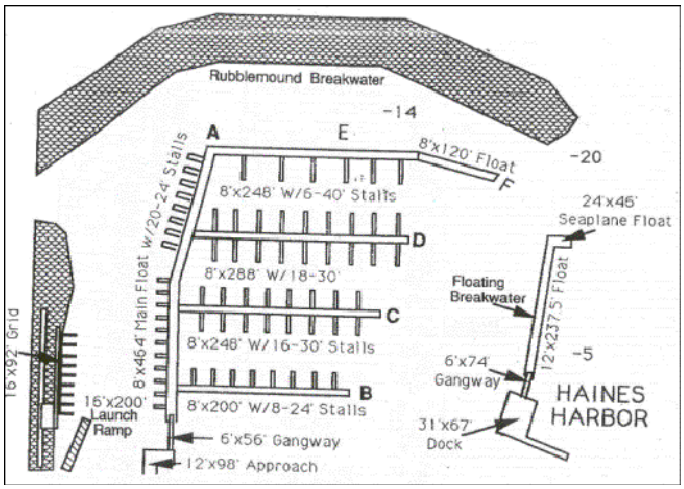

Figure 10. Haines Harbor Configuration

Table B-7 shows that the harbor is currently operated to permanently moor 143 vessels. Recent records of permanent moorage at the harbor (provided by harbormaster on 11/20/00) showed five unattended slips at the harbor. These included one 24’ slip, two 30’ slips, and one 40’ slip. It is assumed that, because vessels are on the harbor waiting list in these size categories, these slips will be filled in the spring.

Table B-7. Existing Harbor Layout, Haines Harbor

Floats	Stalls	Vessels	Max Vessel Size (ft)	Transient Moorage (ft)	Comments
Float A	20	38	24	0	
Float B	8	17	24	130	Landward side: fish cleaning deck in corner.
		1*	50		50’ vessel permanently moored, remainder is transient moorage
Float C	16	34	30		
Float D	18	38	30		
Float E	6	13	40	96	Outer side of float permanently moors 66’ and 86’
		1*	66		vessels. Remainder is available for transient moorage.
		1*	86		
Float F				240	2 Tenders take the whole float when they are in.
Seaplane Float				237	Used as transient float. Inner side usable. Outer side accessible only during high tide
Totals	68	143		703	

4.1.3 Harbor Operations

Letnikof Cove. The commercial fishing float system is operated to by Haines Packing Company to provide moorage for commercial salmon fishing boats and fish (salmon) tenders that work for the company. Moorage facilities are put in the water in about April to allow boats that are dry-docked at Letnikof Cove to be launched and prepared for the season and allow other boats to arrive and make preparations for the commercial fishing season. Following the end of the fishing season the floats are removed from the water sometime during October for winter storage. During the time the float system is in the water, the Haines Harbor harbormaster estimates that there is an average of about 20 vessels tied to it. The harbormaster estimates that peak use is around 30 vessels, depending on the time of the fishing season and where the commercial fish openings are and how well the fishing fleet is doing. During peak use, the vessels are generally rafted up 3 and 4 deep.

The state-owned/city-operated float system at Letnikof cove is operated on a first-come, first-served basis. There are no records on actual use of the floats, however, the harbormaster estimates that on average there are 12 to 14 vessels moored at the float. The harbormaster further estimates that peaks use at various times during the season amounts to around 25 vessels. Both recreational and commercial fishing vessels use the float with use being dominated by sports boats fishing for king salmon in the early summer and by commercial fisherman in later in the summer. In addition, the float is used by the harbormaster to moor transient non-fishing pleasure boats that cannot be accommodated at Haines Harbor.

Haines Harbor. Although permanent moorage is provided at Haines Harbor, most vessels are removed from the harbor during the winter months and are not launched until about March. There are a number of reasons why vessels are removed but the most important reason is that heavy snowfall at Haines (more than 130 inches on average) is sufficient to sink vessels that left in the harbor left unattended. In addition, commercial fishing activities in the area cease by the end of October. Most harbor users with permanent slips put their vessels in dry-dock for the winter. The few who wish to have access to their boats during the winter months typically relocate them to either Hoonah or Sitka, locations that do not experience heavy snowfall. Winter use of these vessels is primarily for subsistence fishing.

Commercial Fishing Vessels**.** Typically commercial fishing boats from outside of the area that use the harbor begin to arrive in March to prepare their boats for the fishing season. These non-resident users of the harbor come to Haines to prepare their boats for the fishing season because the weather in Haines is typically much better than it is at harbor further south, such as Juneau, Hoonah and Sitka. Non-resident commercial fishing boats from further south (as far away as Oregon and Washington typically prepare their boats for the season prior to departing their homeport and do not arrive until later.

Charter Boats**.** Charter boats are primarily operated to serve tourists who arrive in the Haines area on cruise ships. The first cruise ship arrives in May and the last one at the end of September. During the rest of the year these boats are either dry-docked in Haines or are taken to ports further south where they can be safely moored during the winter months.

Pleasure Boats**.** As is the case for commercial fishing and charter boats, pleasure boats with permanent moorage in Haines Harbor are not typically left in the harbor during the winter months. In addition to the concerns about the boats being sunk by heavy snowfall, another

reason for not leaving pleasure boats in the harbor is that the wind in Lynn Canal during the winter are too severe for a safe pleasure boating experience.

Harbor Management**.** The harbormaster manages the harbor to serve all of the boats the call at Haines. This is accomplished on a first-come, first-served basis and, depending on the availability of physical space at Haines Harbor and Letnikof Cove, transient vessels are directed to any available moorage, with the preference being to provide moorage at Haines Harbor if possible. Moorage for transient vessels is provided by hot-berthing transient vessels (mooring a transient vessel in a permanently leased stall that is currently unoccupied) and by rafting vessels wherever possible. According to the harbormaster only one or two vessels are actually turned away from the harbor during the year. However, there are a number of instances during the summer months that the harbormaster believes pleasure boats (cruisers) bypass Haines because the harbor is full or simply unacceptably overcrowded. According to the harbormaster, captains of these vessels learn that the harbor is full or overcrowded by simply listening to radio traffic between the harbor and vessels operators in the area. It would be impossible to place an estimate on the number of times that this occurs. From a regional perspective these vessels that bypass Haines because the harbor is full or overcrowded represent a loss of potential revenue to the harbor and businesses in the City of Haines.

4.2 Fleet Characteristics

4.2.1 Resident Fleet

The resident fleet at Haines Harbor consists of commercial fishing boats and fish tenders, charter boats, other types of commercial boats and pleasure boats. The number of resident vessels—including those on the waiting list for permanent moorage—by type is shown in table B-8. The exact type of all commercial boats was not available from data that was available for this study. Transient users of the harbor are not included in table B-8 unless they happen to be on the waiting list for a permanent moorage stall. In general, both resident and transient vessels are seasonal users of Haines Harbor and the mooring systems at Letnikof Cove (mooring float systems at Letnikof Cove are taken out in of the water for the winter). The primary reason for this is the relatively heavy snowfall at Haines (in excess of 130 inches on average). Thus, Haines Harbor is almost empty during the winter months, beginning in October and continuing into March. Because vessels cannot be safely moored at Haines Harbor unattended, many transient summer users of the harbor do not desire permanent moorage.

Table B-8. Make-up of Resident Fleet by Size and Type of Vessel

Type of Vessel	Number by Size Category (ft)				
	0–28	29–39	40–50	51–Up	Total
Vessels with Permanent Moorage Stalls					
Commercial Fishing	2	50	8	2	62
Other Commercial	3	0	1	0	4
Charter	2	6	0	0	8
Pleasure/Subsistence	48	15	5	0	68
Sub-Total	55	71	14	2	142
Waiting List for Permanent Moorage Stalls					
Commercial Fishing	0	18	20	11	49
Other Commercial	1	0	1	14	16
Charter	0	2	1	1	4
Pleasure/Subsistence	46	14	6	2	68
Sub-Total	47	34	28	28	137
Totals by Type of Vessel					
Commercial Fishing	2	68	28	13	111
Other Commercial	4	0	2	14	20
Charter	2	8	1	1	12
Pleasure/Subsistence	94	29	11	2	136
Totals, All Vessels	102	105	42	30	279

Source: Haines Harbor harbormaster, February 2001

4.2.2 Fleet Operating Characteristics

Current operating characteristics of the existing fleet during the year are discussed briefly in this section and potential costs savings that would result from expansion of the harbor are discussed in Section 5.0 (Analysis of NED Benefits). Vessel operating characteristics are discussed by type of vessel. Commercial fishing vessels that fish for Wards Cove generally operate from company owned seasonal moorage facilities located in Letnikof Cove and are, therefore, excluded from the analysis. Operations of commercial fishing vessels are divided into three categories—salmon fishing vessels, salmon tenders and halibut fishing vessels. Other commercial vessels are divided into two categories—small cruise ships and other. Charter boats are discussed as a single category and Pleasure boats are divided into two categories—non-trailer and trailer boats.

Sources of Information

Information for this section of the report and the analysis of benefits was obtained primarily from three sources—First, a survey of transient and other users of the harbor that was conducted by Tetra Tech, Inc., a consultant to the Corps, in cooperation with the Haines harbormaster; second, interviews with the harbormaster; and, third, interviews with representatives of the commercial fishing and fish processing and cruise ship industries. In addition, vessel data obtained from the primary sources was supplemented by information developed by an ad hoc group of local harbor users directed by the harbormaster. Information developed by the group included average vessel operating and other costs related to the existing harbor, including delays and damages to vessels and harbor facilities. Finally,

information on the fishing area, commercial harvest and seasons was obtained from the Alaska Department of Fish and Game.

The survey that was sent to transient and resident harbor users is included in this report as Technical Exhibit A. The survey was sent to approximately 95 transient and resident harbor users (from records of the harbormaster as of November 2000). A total of 31 useable completed surveys were returned for a return rate of about 14 percent. In addition to this survey, vessel owners who deliver salmon and halibut to fish buyers located in Haines were contacted by telephone, primarily to obtain information on the need for moorage and the effect of additional moorage on salmon and halibut landings at Haines.

Commercial Salmon Fishery

Commercial Salmon Fishing Area**.** Commercial salmon fishing areas in Lynn Canal are areas 15A, North Lynn Canal and 15C, Lower Lynn Canal. These areas are subdivisions of statistical area 115 that includes all of Lynn Canal north of Little Island. Area 15A is the northern that extends northward up the canal from Point Sherman. Area 15C is the southern portion of statistical area 115 that extends southward down the canal from Point Sherman to Little Island. The limits of these sub-areas and statistical area 115 are shown in Figure B-4.

Enhanced Chum Salmon Fishery**.** The principal commercial salmon fishery in Lynn Canal is the hatchery enhanced chum salmon fishery that is centered in the Boat Harbor area of Area 15C where there is a remote chum salmon rearing site. The rearing site for chum salmon is the Boat Harbor site that is shown in Figure B-5 (No. 2 in the list included in Figure B-5). There is also a salmon enhancement project at Chilkat Lake (No. 1 in the list included in Figure B-5). Releases of hatchery fish are made on both sides of the canal and are positioned so as to minimize the chances of hatchery fish mixing with natural runs. There are no remaining suitable locations in the canal at which hatchery fish could be released. Also, hatchery releases are currently at the maximum level allowed. Therefore, there is not expected to increase in the size of the fishery in the future.

Figure 11. Fishery Area 115

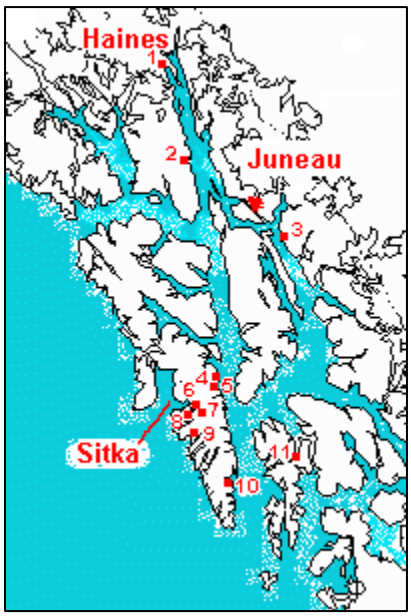

Figure 12. Salmon Enhancement Project Locations, SE Alaska

(1) Chilkat Lake – Haines area projects. Sockeye lake stocking, chum & sockeye incubation boxes, chum spawning channels	(7) Green Lake – Chinook rearing site
(2) Boat Harbor – Remote chum rearing site	(8) Deep Inlet – Remote chum rearing site
(3) Limestone Inlet – Remote chum rearing site	(9) Shamrock Bay – Remote coho rearing site
(4) Hidden Falls Hatchery – Chum, chinook, coho incubation & rearing	(10) Deer Lake – Coho lake rearing project
(5) Takatz Bay – Remote chum rearing site	(11) Port Camden – Chum incubation boxes
(6) Medvejie Hatchery – Chum, chinook, coho incubation & rearing	

Natural Run Salmon Fishery**.** The commercial salmon fishery in Area 15A primarily targets natural chum stocks and sockeye. The chum salmon principally originates from the Chilkat River that drains into Lynn Canal to the west of Haines and the sockeye run originates principally from natural and enhanced stocks from Chilkat Late that lies to the northeast of Haines. In addition to these species, the commercial fishery also includes Chinook, coho and pink salmon and steelhead.

Fishing Gear and Vessels**.** The commercial salmon fishery in Lynn Canal is limited to drift-gill nets. The enhanced chum fishery is closely regulated to protect natural runs of other species. During the 2000 season a total of 181 different vessels participated in the fishery, with a vessel count of 122 during the peak week. According to a representative of the Alaska Department of Fish and Game, vessels that participate in the Lynn Canal salmon fishery are almost exclusively from Haines and Juneau. However, the actual number of vessels that participates in the fishery and their port of origin are not known. Furthermore, since drift gillnet salmon vessels are permitted to fish throughout SE Alaska, the number of vessels that fish Lynn Canal varies significantly during the season and from year to year. Data available for this study on "type" of vessel from the harbormaster and other sources was limited to "commercial fishing". Thus, the number of resident salmon vessels at Haines is included with all other types of commercial fishing vessels as shown above in table B-8. Determination of the gear fished by each vessel in the resident fleet would require interviews

with each vessel owner. This level of detail of analysis is beyond the scope of this study and is not considered necessary for the NED benefits analysis.

Salmon Harvest. Harvest of enhanced chum salmon occurs principally in the southern portion of the canal (Area 15-C) while the harvest of the natural runs occurs in the northern portion of the canal (Area 15-A). During the 2000 season the total harvest of salmon amounted to about 921,000 fish, of which, chum salmon accounted for about 754,000 fish or about 82 percent of the total. Enhanced chum salmon accounted for about 88 percent of all chum salmon harvested in the canal. Catch data for all species of salmon and steelhead for Lynn Canal for the years 1990 through 2000 are shown in table B-9.

Commercial Salmon Season. In general, the Lynn Canal (fishery District 115) drift gillnet fishery is managed to protect early and late stocks of Chilkoot Lake sockeye salmon. In northern portion of the canal (Area 15-A) the fishery is further managed to protect natural runs of Chilkat River Chinook. This is accomplished by delaying the first opening of the season by about two weeks. Area 15-A is managed in the fall (beginning about the third week in August) to protect the natural fall chum salmon and late sockeye runs. Subject to these and other management goals, the commercial salmon fishing season typically starts the last Sunday in June and ends when closed by emergency order (commonly September 21). The harvest of enhanced chum salmon that occurs in Area 15-C, the southern portion of Lynn Canal, extends from about the third weekend in June through the end of July. During the season there is typically one three-day open fishing period per week. According to a representative of ADF&G, openings always start at noon on Sunday and normally end at noon on Wednesday, for total of 72 hours during each three-day period. While three-day fishing openings are typical, the length of the openings as well as the length of the season is always subject to change, depending on the strength of the returns of each of the managed stocks of salmon.

Vessel Operating Practices. Vessels that fish Lynn Canal typically begin to arrive in the Haines area as early as mid- to late March to prepare for the season. However, the Haines Harbor does not become crowded until May. According to the harbormaster, the size of the fleet that uses Haines Harbor during the season is self-limited to the maximum capacity of the harbor with rafting. Since there is no safe anchorage in the Haines area, vessels that exceed the capacity of the harbor use an alternate harbor, typically Auke Bay where there is an extensive transient moorage system. Most vessels fish for tenders and sell their catch in the round but there is an increasing number of vessels that process their catch onboard to extract the roe and then deliver the processed catch—roe, carcasses and waste—to buyers located in Haines.

In recent years, the success of hatchery enhancement of the chum fishery in lower Lynn Canal has resulted in a significant increase in harvest. To take advantage of the increased harvest, Haines Fisheries, Inc. (Stan Woods) has developed a market in Vancouver, BC and the Seattle area. The fish are landed at Haines and are shipped fresh and frozen over the Alaska Highway to these markets. Truck transportation allows the fish to be in the Seattle market within three days of being caught. As stated above, prior to landing, the fish are processed to remove the head and guts and roe, with only the fresh carcasses being shipped by truck to the Vancouver and Seattle areas. The roe is sold to the Asian market and the head and guts are processed into catfish food

Fish delivered to Haines and is sold through, Inc. sells for at least two times what it sells for if sold to tenders that service traditional cannery operations, including Wards Cove. For example, during 2000 Ward Cove paid about 20 cents per pound while Haines Fisheries paid 40 cents. Haines fisheries charges 10 cents per pound for transportation and marketing.

Table B-9. District 115 (Lynn Canal) Estimated Numbers of Fish, Boats, Landings, Hours and Value ($) of the Commercial Drift Gillnet Catch, 1990-2000

Year	Chinook	Jack	Sockeye	Coho	Pink	Chum	Steelhead	Value	Unique permits (Boats)	Days	Landings
1990	670	0	357,418	63,072	101,099	210,542	5		189	30	3,736
1991	745	0	307,811	128,365	5,472	210,189	6	1,868,659	166	45	3,677
1992	610	0	286,035	108,753	351,562	245,247	6	2,636,652	172	56	3,683
1993	741	0	173,113	59,952	11,336	306,566	0	1,389,347	161	63	2,669
1994	980	0	171,729	140,764	147,277	685,449	6		148	62	3,565
1995	831	0	76,426	79,949	5,799	568,368	10		131	49	2,947
1996	642	0	106,385	52,658	2,358	415,547	13	2,069,138	132	41	2,491
1997	834	0	118,348	15,572	32,962	461,614	0	1,763,467	145	40	2,655
1998	679	0	134,937	26,118	32,351	160,669	0	1,328,363	125	48	2,104
1999	553	0	163,530	35,330	62,737	350,894	0	2,085,932	158	51	2,503
2000	467	0	109,465	35,466	21,008	754,326	0	2,370,995	181	42	3,101
1990-2000 Avg.	705	-	182,291	67,818	70,360	397,219	4	1,939,069	155	48	3,012

NOTES

Peak vessel count (week), 2000 season = 122

Total number of unique permits (boats) fished during 2000 = 181

Total number days for 2000 is 42

Chum run is about 88 percent hatchery fish (2000)—releases started in 1988 and the first commercial harvest was in 1990

The summer chum season normally runs from third weekend in June through the end of July, with an average three-day opening each week

(Sunday noon to Wednesday noon).

Source: Alaska Department of Fish and Game, Haines, AK, October 2000

Commercial Halibut Fishery

Commercial Halibut Fishing Areas. There is only a very limited halibut fishery in Lynn Canal. Data from the ADF&G shows that the Juneau area and Icy and Chatham Straits are the best areas for halibut. Also, the outside waters (outside of the Inside Passage) of all of southeast Alaska are good halibut fishing waters.

Commercial Halibut Fishing Season. The season for fishing for halibut extends from about 15 March through 15 November. However, since halibut is fished under an international quota system with the Alaska quota being allocated to individual boats, the season for individual boats ends as soon as the boat's quota has been filled. To avoid bad weather conditions, most halibut fisherman attempt to fill their quota by 1 October.

Vessel Operating Practices. Although there is only a very weak halibut fishery in Lynn Canal favorable marketing conditions at Haines that are made possible by highway access to the lower 48 states and southwestern Canada there are a significant number of halibut vessels

that deliver their catch to Haines. These vessels deliver to Haines because buyers at Haines can offer a higher price than buyers without highway access to major fresh fish markets in southwestern Canada and northwestern of the lower 48 states. For the past several years, Haines Fisheries paid an average of 25 cents per pound above prices offered by buyers at locations without highway access to fresh fish markets. Annually about 35 vessels with homeports other than Haines deliver halibut to Haines. A summary of the number of vessels, by homeport, that delivered to Haines Fisheries during 1998 and the number of deliveries that were made is shown in table B-10. Information as to the number of vessels that homeport in Haines and fish halibut is not known. As with resident commercial salmon vessels the number of these vessels is included in a single commercial fishing category (see table B-8). A representative of Haines Fisheries, Inc. reports that the volume of halibut landed at Haines each year in the range of one million pounds to 600,000 pounds.

Because of the location of principal halibut fishing grounds, both resident and non-resident halibut vessels travel long distances to and from the fishing grounds in order to land their catch at Haines. For vessels fishing outside waters, a trip to Haines is about 400 miles longer than a trip that ends and the catch is sold at Sitka. Even though buyers at Haines are able to offer a higher price, moorage space at Haines is essential to attracting halibut vessels to Haines. In addition to Sitka, alternative moorage sites are Juneau and Hoonah.

Table B-10. Deliveries of Halibut to Haines by Vessels That Do Not Use Haines As Their Homeport, 1998

Homeport	No. Vessels	No. Deliveries
Juneau	11	17
Hoonah	2	4
Wrangell	3	4
Seattle, WA	4	5
Petersburg	7	14
Sitka	5	8
Blaine, WA	1	1
Gustavus	1	1
Pelican	1	1
Totals	35	55

Source: Haines Fisheries, Inc., Haines, AK, November, 2000.

Commercial Shellfish Fishery

Commercial Shellfish Areas. The commercial shellfish fishing grounds that impacts the resident and transient fleet that uses Haines Harbor is Lynn Canal (Statistical Area 115, see Figure B-4.

Commercial Shellfish Season, Number of Vessels and Harvest. There is a relatively small commercial shellfish fishery in Lynn Canal. According to the harbormaster there at least eight vessels that use Haines Harbor that participate in the fishery. Because of the limited size of the fishery it is unlikely that any non-resident or transient vessels participate in this fishery and call at Haines Harbor. Officially, the season extends year-around but residents of Haines indicated at a workshop on the expansion of Haines Harbor that was held in October 2000 that the shrimp fishery actually runs from about the first of October through February

and again for six weeks during May and June. Shellfish harvest data, including the number of vessels, by season, species, volume and value for the period 1994 through 2000 is shown in table B-11.

Table B-11. Commercial Shellfish Harvest Data for District 115 (Lynn Canal), 1994-2000

Species	Season	Pounds	Permits	Est. Landings	Value/lb ($)	Ex-vessel Value ($)
Brown King Crab	Oct 1994 - Sep 95	888	2	4	3.50	3,108
Brown King Crab	Oct 1997 - Sep 98	566	1	2	3.25	1,839
Brown King Crab	Oct 1998 - Sep 99	2,140	2	7	3.25	6,855
Dungeness Crab	Apr 1994 - Mar 95	57,890	13	121	1.75	101,307
Dungeness Crab	Apr 1995 - Mar 96	75,318	17	98	1.75	131,806
Dungeness Crab	Apr 1996 - Mar 97	126,909	14	81	0.95	120,563
Dungeness Crab	Apr 1997 - Mar 98	165,421	19	230	2.00	
Dungeness Crab	Apr 1998 - Mar 99	98,586	21	209	2.00	197,172
Dungeness Crab	Apr 1999 - Mar 00	31,616	14	96	1.67	52,798
Dungeness Crab	Apr 2000 - Mar 01	12,987	11	36	1.67	21,688
Red/Blue King Crab	Sep 1994 - Aug 95	6,665	14	24	7.00	46,655
Red/Blue King Crab	Sep 1995 - Aug 96	6,901	5	14	7.00	48,307
Red/Blue King Crab	Sep 1996 - Aug 97	5,139	3	7	4.30	22,097
Red/Blue King Crab	Sep 1997 - Aug 98	8,034	5	11	4.30	34,546
Shrimp	May 1994 - Apr 95	3,395	2	5	3.25	11,033
Shrimp	Oct 1994 - Sep 95	8,928	12	181	3.25	29,016
Shrimp	Oct 1995 - Sep 96	10,102	21	163	3.25	32,831
Shrimp	Oct 1996 - Sep 97	22,156	11	214	3.25	72,007
Shrimp	Oct 1997 - Sep 98	20,669	9	167	3.00	62,007
Shrimp	Oct 1998 - Sep 99	22,704	10	158	3.00	68,112
Shrimp	Oct 1999 - Sep 00	22,731	10	153	3.00	68,193
Tanner Crab	Sep 1994 - Aug 95	47,941	5	7	3.65	174,984
Tanner Crab	Sep 1995 - Aug 96	23,055	3	3	2.10	48,415
Tanner Crab	Sep 1996 - Aug 97	45,084	6	7	2.00	90,168
Tanner Crab	Sep 1997 - Aug 98	73,238	6	11	2.00	146,476
Tanner Crab	Sep 1998 - Aug 99	36,706	5	6	2.00	73,412
Tanner Crab	Sep 1999 - Aug 00	88,029	9	11	2.16	190,142
94-99 Average	Value Per Season					80,980

Source: Alaska Department of Fish & Game, October 2000.

Cruise Ships

Description of Operations at Haines. Cruise ships began calling at Haines during the 1970's. According to the Haines City Manager, calls at Haines are managed so that there are never more than two large ships in port at any given time. Docking facilities at the port are only provided for one vessel to dock at a time. If a second vessel is in port, the second vessel must

anchor in Portage Cove and shuttle passengers ashore using the ship's lifeboats. The majority of the community does not wish to see any further increase in the number of large cruise ships—those more than about 300 feet in length—calling at Haines at the same time. Accordingly, the City does not have any plans for providing any additional docking facilities for large cruise ships. However, the City recognizes a need for additional moorage facilities for small cruise ships (for the purposes of this study, those less than about 300 feet OAL). One cruise line (Alaska Sightseeing—Cruise West) has placed itself on the waiting list for seven stalls for vessels ranging in size from 95 to 217 feet in length. However, because a representative of the cruise line has stated that there would never be more that two of these vessels at Haines at the same time, it has been determined that transient moorage for two vessels would be sufficient. To insure that there are no conflicts between the large cruise ships and other vessels that use Haines Harbor and Portage Cove, the harbormaster does not allow transient vessels to anchor in Portage Cove.

Schedule of Calls for 2000. During the 2000 cruise season, 13 vessels representing nine different cruise ship lines made a total of 156 calls at Haines. The cruise season begins the last week in April and extends into the last week in September. A listing of the vessels and the number of scheduled calls, by cruise ship line is shown in table B-12.

Table B-12. Scheduled Calls by Cruise Ships by Vessel and Cruise Line, 2000

Cruise Line/Ship	OAL*	No. Pass	No. Calls
Celebrity			18
Galaxy	866	1,870	18
Clipper Cruise Line			9
Yorktown Clipper	257	138	9
Cruise West			51
Spirit of Alaska	143	78	17
Spirit of Columbia	143	78	2
Spirit of Discovery	166	84	13
Spirit of '98	192	96	19
Hapag-Lloyd Cruises			1
Hanseatic	402	184	1
Norwegian			38
Norwegian Sky	853	2,002	20
Norwegian Wind	754	1,748	18
Radisson			2
Seven Seas Navigator	na	490	2
Royal Caribbean			34
Rhapsody of the Seas	915	1,998	18
Vision of the Seas	915	2,000	16
World Explorer			3
Universe Explorer	617	731	3
Total No. Vessels & Calls	13	–	156

*OAL = Overall length (feet)

4.3 Moorage Demand

4.3.1 Introduction

This document describes the moorage demand analysis that was conducted for Haines Harbor, Alaska as part of the ongoing feasibility study of harbor improvements in Haines. The results of the moorage demand analyses provide information to support the design of harbor improvements. The analysis is based upon discussion with and records of the Haines Harbormaster, letters submitted by interested harbor users, telephone conversations with harbor users (including permanent, transient, commercial, and recreational harbor users), interviews with Haines-based fish processors, and interviews with representatives of the Cruise Ship industry. In addition, continued availability of fishery resources to support commercial fishing activities reflected in this analysis was verified with the Alaska Department of Fish and Game. Tom White and Ridge Robinson (with Tetra Tech, Inc.) conducted many of these contacts and interviews during a site visit to Haines on 10-13 October 2000.

4.3.2 Existing Harbor Configuration and Moorage

Haines Harbor (see figures 10 and 13) is protected to the east by a rubblemound breakwater. Moorage within the harbor is provided by two float systems: the primary float system that occupies most of the harbor, and a floating breakwater at the eastern end of the harbor, which includes a seaplane float. The harbor entrance is between the floating breakwater and the rubblemound breakwater at the southeast corner of the harbor.

The primary float system includes the following components (shown in more detail in figure 13):

A. 8’ x 464’ float with 20 24’ stalls
B. 8’ x 200’ float with 8 24’ stalls, permanent side moorage for a 50’ vessel (water taxi), a fish cleaning station, and 130’ of transient moorage
C. 8’ x 248’ float with 16 30’ stalls
D. 8’ x 288’ float with 18 30’ stalls
E. 8’ by 248’ float with 6 40’ stalls, permanent side moorage for one 66’ and one 86’ vessel, and 96’ of transient moorage
F. 8’ x 120’ float with 240’ of transient moorage

Floating Breakwater. 12’ x 237’ float with 237’ of usable transient moorage on inner side of float and a 24’ x 45’ seaplane float.

Table B-13 and figure 14 provide additional description of the existing harbor layout at Haines and the permanent/transient moorage breakdown as of 11/20/00.

Table B-13. Existing Layout, Haines Harbor

Floats	Stalls	Vessels	Max Vessel Size (ft)	Transient Moorage (ft)	Other
Float A	20	37	24	0	
Float	8	17	24		Landward side: fish cleaning deck in corner; 50' vessel has
B		1*	50	130	permanent moorage; and, remainder is transient moorage.
Float C	16	34	30		
Float D	18	38	30		
	6	13	40		Outer side of float permanently moors 66' and 86'
Float E		1*	66		Vessels: Remainder is available for transient moorage.
		1*	86	96	
Float F				240	Two tenders take whole float when they are in port.
Seaplane				237	Used as transient float. Inner side usable at all tides.
Float					Outer side only accessible during high tide.
Totals	68	142		703	

Table B-14 shows that the harbor is currently operated to permanently moor 143 vessels. Recent records of permanent moorage at the harbor (provided by harbor master on 11/20/00) showed five unoccupied slips at the harbor. These included one 24' slip, two 30' slips, and one 40' slip. It is assumed that, because vessels are on the harbor waiting list in these size categories, these slips will be filled in the spring.

Vessels that are longer than the slips were designed to accommodate occupy the majority of the 139 remaining slips. This information is summarized in tables B-14 and B-15. table B-14 shows a breakdown of permanently moored vessels by length. table B-15 shows the percentage of vessels that are longer than their designated slip. Figure B-8 provides a photograph of the harbor taken during the October 2000 site visit.

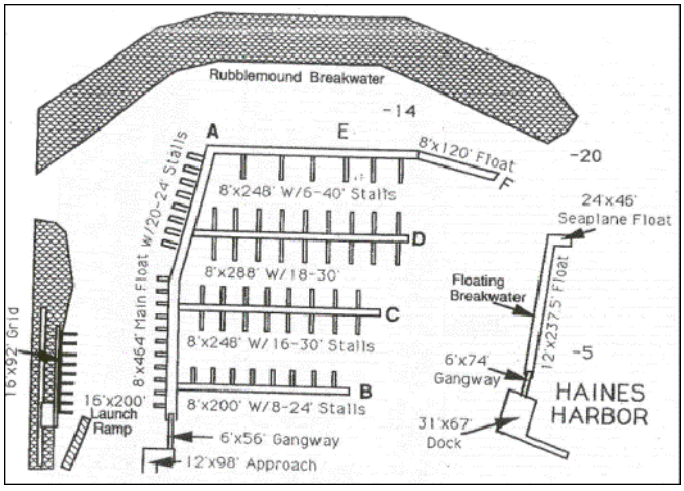

Figure 13. Haines Harbor Configuration

Table B-14. Number of Vessels with Current Moorage by Size Range[4]

Length of Vessels (ft)							
<25	25–30	31–40	41–50	51–70	71–100	>100	Total
37	28	68	4	1	1	0	139

Table B-15. Number of Vessels Longer Than Slip Design Length[5]

Slip Design Length (ft)	No. Occupied Slips	No. Vessels longer than Design Size	% of Vessels longer than Design Size
24 Stalls	54	18	33
30 Stalls	70	58	83
40 Stalls	12	5	42
>40	3	3	100
TOTAL	139	84	60

Figure 14. Haines Harbor 10/11/00

Table B-15 shows that 33 percent of vessels occupying 24-foot stalls are longer than 24 feet; 83 percent of vessels occupying 30-foot stalls are longer than 30 feet; and 42 percent of vessels occupying 40-foot stalls are longer than 40 feet. Additionally, three permanent moorages are assigned on transient floats to accommodate vessels greater than 40 feet. Across the harbor, 60 percent of vessels are longer than the design size of their slip. In conducting interviews of harbor users, a common problem identified in the Harbor is overcrowding resulting from oversized boats in undersized slips. These statistics demonstrate that demand for permanent moorage at Haines Harbor is typically for slips larger than those that currently exist.

4.3.3 Permanent Moorage Demand

There is no recorded or published data that could be used directly as an estimate of moorage demand for Haines Harbor. Records kept by the harbormaster, including the waiting list for

[4] Excludes three vessels that are permanently moored on transient docks. Including these three vessels increases the number of vessels with permanent moorage to 142, as shown in Table B-8.

[5] Does not include people on the "Seniority Waiting List" who currently have a permanent stall but desire a large stall for a larger boat. As of February 2001 there were 17 people on this list.

moorage, reflect only demand for space in the existing harbor (including the size of moorages) and the operation of the existing harbor. Thus the waiting list was used as the starting point for developing an estimate of permanent moorage demand and was adjusted based upon the results of research, interviews, and assumptions. Research and interview activities employed to develop data needed to estimate moorage demand included:

- The current waiting list was obtained from the harbormaster and reviewed to identify people desiring permanent moorage and determine the size of stall desired. To confirm the information on the waiting list and to obtain information on current moorage practices and desired moorage an attempt was made to contact all of the people on waiting list. As of November 2000 there were 133 people on the waiting list. Of this number valid addresses and telephone numbers were obtained for 95 people (two people were deceased). Of the 95 people for whom addresses and telephone numbers were obtained, researchers were successful in contacting a total of 54 individuals. Of these, 52 individuals were willing to respond to questions about their interest in permanent moorage at Haines. These 52 individuals who were willing provide information were asked to confirm their interest in remaining on the waiting list and to specify the length of stall they desire. Thirteen of these 52 people indicated a desire for a larger slip than what they had indicated on the waiting list (25 percent). Of the remained, Two people withdrew their names from the waiting list in frustration, saying that they found moorage elsewhere although they prefer to be at Haines Harbor. Two people indicated that they would be putting their names on the waiting list again for additional moorage. The remaining 35 individuals confirmed their desire to obtain permanent moorage at Haines and confirmed that the length of stall shown on the waiting list is correct.
- Transient moorage records from Haines Harbor for 1999 were obtained and transient users contacted to assess their desire to be added to the waiting list. Information on the estimated frequency of transient moorage demand was also obtained.
- To supplement transient records from Haines Harbor, records of vessel owners who delivered Halibut and Salmon in 1998-1999 to Haines Fisheries, a local fish processing enterprise were obtained and an attempt was made to contact these individuals. A total of 20 individuals were identified. Of these, seven already have permanent moorage in Haines Harbor. Researchers were successful in contacting six of the 13 individuals without permanent moorage in Haines Harbor. None of this six expressed an interest in permanent moorage at Haines and only one individual indicated that moorage expansion at Haines would increase the number of fish deliveries to Haines fish buyers. The others indicated that they expected that their use of Haines harbor would continue at the present level, even with harbor expansion.
- The harbormaster and representatives of local fish processing companies (Haines Fisheries, SEAPAK) and the cruise ship industry were contacted to obtain supplemental moorage demand data for fishing vessels, tenders, cruise ships, and recreational vessels.

- Finally, a representative of the Alaska Department of Fish and Game commercial fisheries staff stationed in Haines was contacted to confirm the continued availability of fishery resources.

The information obtained from the above described sources and contacts were used to develop adjustments to the wait list. Moorage demand as indicated by the waiting list and adjustments developed from other sources (as described above) are summarized and described in table B-16.

Table B-16. Haines Harbor Waiting List and Adjustments[6]

Description	Vessel Size (ft)							
	<25	25–30	31–40	41–50	51–70	71–100	>100	Total
Vessels on harbor waitlist	26	32	27	21	14	6	8	134
Less current harbor vacancies	(-1)	(-3)	(-1)					(-5)
Plus Chilkat Cruises vessels						2		2
Plus new water taxi with harbor					1			1
Plus new charter boats with harbor					5			5
Plus adjustment factor (10%) for assumed understated demand on waitlist for sizes not currently in harbor *				3	2	1	1	7
Move 7 small cruise ships from permanent moorage waiting list to transient demand analysis						(-1)	(-6)	(-7)
ADJUSTED WAITLIST	25	29	26	24	22	8	3	137

*All vessels are assumed to be commercial fishing vessels.

The adjusted waiting list vessel count was then added to the count of permanently moored vessels to determine the total demand for slips of each size group. The number of existing slips in each size group was subtracted from the total slip demand to determine the demand for new slips in each size group. This analysis is summarized in table B-17.

[6] Waitlist data is from information obtained from the harbormaster during February 2001. Additions of vessels for Chilkat cruises, the water taxi and charter boats are based on information obtained from representatives of the companies involved. Small cruise ships were moved to transient moorage based on information obtained from a representative of the affected company.

Table B-17. Permanent Moorage Demand, Haines Harbor

Description	Vessel Size (ft)							
	<25	25–30	31–40	41–50	51–70	71–100	>100	Total
Existing Vessels[1]	38	28	68	4	1	1	0	140
PLUS Vessels from Adjusted Waitlist (Table B-14)	25	29	26	24	22	8	3	137
Seniority List Adjustment[2]	(3)	0	(7)	7	3	0	0	0
TOTAL Slip Demand	60	57	87	35	26	9	3	277
LESS Existing Slips	55	72	13	1	1	1	0	143
DEMAND FOR NEW SLIPS	5	(15)	74	34	25	8	3	134

[1]As shown in Table B-8 there is actually a total of 142 existing vessels in the harbor. The difference is due to the use of later data to develop Table B-8. This table was not corrected due the lack of necessary data and a judgment that the difference is insignificant to the overall analysis.

[2]A total of 17 persons currently have stalls but want to upgrade to larger stalls. These persons on the seniority wait list and are given preference when the desired stall size becomes available. This adjustment deletes the stalls they now have and adds the new stalls to moorage demand. The additions and subtractions do not each equal 17 because the existing and desired stall size falls in the same size range or because a person desires to upgrade to a size that another person wishes to leave for a larger one. The net effect on total demand is zero.

In summary, the analysis of permanent moorage demand identified demand for five new slips for vessels under 25 feet in length. A surplus of 15 slips was identified for vessels from 25 t to 30 feet in length. A demand for 74 new slips was identified for vessels from 31 to 40 feet in length (the largest demand class). A demand for 34 new slips was identified for vessels from 41 to 50 feet in length. A demand for 25 new slips was identified for vessels from 51 to 70 feet in length. A demand for 8 new slips was identified for vessels from 71 to 100 feet in length. And, a demand for 3 slips was identified for vessels over 100 feet in length.

In the 71 feet to 100 feet vessel size-class the specific sizes of the vessels included 74 feet, 75 feet, 78 feet, 80 feet (2), 86 feet, and 88 feet. In the over 100 feet vessel size-class, the specific sizes of the vessels included 110 feet and 140 feet.

4.3.4 Transient Demand

Records of the daily operation of the harbor were not found to be a logical or supportable basis for an estimation of transient demand, primarily because they simply show utilization of the existing harbor. To estimate the potential transient demand for expanded harbor facilities in Haines, an analysis was conducted of salmon and halibut fishing vessel operation; cruise ship operations; and, recreational boating.

Transient Vessels Associated with Halibut Fishery. Haines Fisheries is currently the only fish processor that purchases halibut in Haines. Records of 1998 deliveries to Haines fisheries were reviewed and analyzed. The records showed that vessels with homeports other than Haines (all at distances greater than 12 hours sailing time) made 55 deliveries. Thirty-five vessels made these 55 deliveries. The vessels were of the following sizes:

- Seven 31–40 ft vessels
- Sixteen 41–50 ft vessels
- Ten 51–70 ft vessels
- Two 71–100 ft vessels

On average, each vessel made two deliveries of halibut during the season. The halibut season runs from March 15 to November 15. Haines Fisheries typically receives halibut deliveries after March 20. Based on an annual average of five deliveries each month, and assuming that vessels remain in port for one week following each delivery, it is estimated that at any given time during the season, two vessels could be expected to require transient moorage. At an average length of 60 feet (based upon delivery records of Haines Fisheries), these halibut fishing vessels require approximately 140 feet of transient moorage (including 10 extra feet per vessel for tie-down). It is assumed that halibut deliveries would continue through the enhanced chum salmon season if adequate moorage were available.

Transient Vessels Associated with Enhanced Chum Salmon Fishery. Several fish processing companies are present in Haines to take part in the Lynn Canal enhanced chum salmon fishery, which is open from the third week in June through September. This fishery is currently the result of 63 million salmon that are released into Lynn Canal annually. The Alaska Department of Fish and Game stated that there has never been a complete closure of the enhanced salmon fishery on Lynn Canal. Partial restrictions occur that include time, area, and gear restrictions, but a total closure is highly unlikely

Haines-based processing companies supporting this fishery include Haines Fisheries, SEAPAK, Ward Cove, Rainbow Glacier Seafoods and Icicle (to reenter market in 2001).[7] Analysis of delivery records of Haines Fisheries showed that in 1999, 22 percent of the vessels delivering salmon were from homeports other than Haines (at least 12 hours sailing time away). The analysis assumes that a vessel is in the harbor four days each week beginning in June and continuing through September. The Alaska Department of Fish and Game cited a peak-week boat count of 122 vessels during the 2000 enhanced chum salmon fishery in Lynn Canal.[8] The ADF&G also reported that 181 unique vessels participated in the salmon fishery in Lynn Canal during 2000 (see table B-7).

Using the 22 percent ratio for vessels having homeports other than Haines, the peak transient fishing vessel population in Lynn Canal is estimated to be 30 vessels (actually, 28 vessels—22 percent of 122 vessels—but rounded up to 30). Because of the weekly 4-day closures, all of these vessels will need harbor moorage at the same time. However, because the fishing grounds lie nearly equidistant between Auke Bay and Haines, it is further assumed that about one-half of the transient vessels will choose to go to Auke Bay rather that Haines. On the basis of these assumptions, 15 transient salmon vessels could be expected to use the harbor during the fishing season. At an average size of 50 feet or required moorage space (40-foot vessel with 5 feet in front and 5 feet in rear for tie-down), these salmon fishing vessels require approximately 750 feet of transient moorage.

Tenders support the salmon fishery. Haines Fisheries used four tenders in 2000 (85 to 165 feet in length) and expects the same in 2001. SEAPAK plans to use five tenders in 2001 (70 to 100 feet in length). Ward Cove uses one tender (86 feet in length). Rainbow Glacier Seafoods uses three tenders. Icicle plans to reenter the Haines market in 2001 and will likely

[7] Telephone conversation with a representative of Haines Fisheries, November 2000.

[8] Personal conversation with Randall Bachman, Alaska Department of Fish & Game, Haines, Alaska, October 2000.

use one tender (assumed at 86 feet in length). Table B-18 summarizes transient moorage demand information for tenders.

Table B-18. Transient Moorage Demand By Tenders

Processors	Tenders	Vessel Size (ft)				
SEAPAK	5	70	85	85	85	100
Haines Fisheries	4	165	130	130	85	
Ward Cove	1	86				
Icicle	1	86				
Rainbow Glacier	3	100	80	80		
Totals	14	507	295	295	170	100
Combined Length Of All Tenders						1,367

Adding ten feet to each vessel length for space between vessels for tie-down yields a potential transient moorage demand of 1,510 feet for tenders. Assuming that tenders are in the harbor during the 4-day weekly closures of the fishery, transient moorage would be needed for all of the vessels.

Transient Pleasure/Subsistence Vessels. Of special interest for this analysis was pleasure/subsistence moorage demand during the peak fishing season (enhanced chum salmon). During this period, an estimate of 15 pleasure/subsistence vessels per day are estimated to use Haines Harbor, including 5 vessels (35' to 45') that currently hot berth for monthly transient moorage in the harbor but do not desire permanent moorage and an average of 10 pleasure/subsistence vessels that are in the harbor on a daily basis during this summer period. The harbormaster estimates that these daily transient vessels are also in the 35- to 45-foot range, with a recent trend towards the larger vessels. With an estimated average moorage demand of 50 feet per vessel (40-foot vessel, and 10 feet added for tie-down), this yields daily transient recreational moorage demand of 750 feet.

Cruise Ship Industry. The cruise ship industry currently visits Haines daily through the summer season, which runs concurrent with the enhanced chum salmon fishery. Roy Vest Alaska has indicated that they will continue to stop in Haines daily in 2001 and beyond with their small (143-foot to 217-foot) cruise ships. The ships currently use a private dock but desire to return to the City dock when moorage becomes available. Interviews with the Small Cruise Ship Association have indicated that Haines is a highly desirable port of call for their member cruise lines. It is expected that two 217-foot cruise ships would likely dock in Haines on any given day during the summer cruise season resulting in a transient moorage demand of approximately 440 feet.

Adequate docking space is available for larger (700-foot size) cruise ships. The large cruise lines currently visit Haines throughout the summer cruise season.

Summary of Transient Moorage Demand. Transient moorage demand was evaluated for the fishing and cruise ship industries as well as recreational moorage demand. All these categories of demand were evaluated during their concurrent peak summer season. The estimated moorage demand for each category is summarized in table B-19.

Table B-19. Peak Transient Moorage Demand Summary for Haines Harbor

Vessel Category (No.)	Length of Transient Dock Needed (ft)
Enhanced chum salmon fishing vessels (15)	750
Enhanced chum salmon fishing tenders (14)	1,510
Halibut fishing vessels (2)	140
Recreational/subsistence vessels (15)	750
Small Cruise Ships (2)	440
TOTAL (48)	3,590
Existing transient moorage in harbor	700
Demand for New Transient Moorage	2,890

5.0 EVALUATION OF NED BENEFITS

5.1 Evaluation Framework and Criteria

5.1.1 Overview

The evaluation of NED (National Economic Development) benefits that could result from expansion of Haines Harbor stems from the assessments of the community, marine resources, existing conditions related to Haines Harbor and moorage demand at Haines Harbor that are presented in the preceding sections of this report. The community assessment establishes the nature of the community and its economy. The marine resource assessment establishes the basis for commercial and recreational fishing components of the economy. The assessment of existing conditions related to Haines Harbor establishes the dependency of the community's economy on the sea and its resources. Finally, the assessment of moorage demand demonstrates the level dependency of the community on the use of Haines Harbor as an engine for economic growth.

The evaluation of NED benefits that follows builds upon this basis through identification, description and comparison of conditions that are expected to exist without and with expansion of Haines Harbor. The assessment of without project conditions addresses practices that can be expected to occur as a result of current harbor conditions and causes of increased vessel and harbor operating and maintenance costs. The assessment also addresses limits that the existing harbor imposes on economic development at Haines. The assessment of with project conditions focus on identification of specific vessel and harbor costs that would potentially be reduced with expansion of Haines Harbor. It also identifies how expansion of the harbor would be expected to affect economic growth and development. Finally, the assessment of NED benefits uses Federal guidelines to quantify potential benefits--cost savings and increased production that would result from structural changes to the economy of Haines that would be made possible by expansion of the harbor. This assessment is a quantitative comparison of the without and with project scenarios.

5.1.2 Evaluation Framework

The framework for the economic evaluation in studies conducted by the Corps of Engineers is the comparison of conditions expected to exist without and with a specific course of action (project) that is proposed that the Corps undertake. This future conditions comparison framework facilitates quantification of differences in the cost producing goods and services and the volume of goods and services produced that are forecast as a result from the alternatives included in the comparison. This evaluation framework is inherently uncertain because comparisons are being made of future conditions that are not known but can be forecast based on historic trends, existing conditions and community preferences. The result of the evaluation is estimates of a theoretical willingness to pay for expected outputs/consequences associated with implementing the proposed action. In this evaluation three techniques were used to estimate willingness to pay:

Changes in Net Income. Used to estimate changes in fleet and harbor operations made possible by expansion of harbor

Market Prices. Used to estimate the value of harvest of commercial fish and expansion of commercial enterprise made possible by expansion of the harbor.

Administratively Established Values. Used to estimate the opportunity cost of time

5.1.3 Evaluation Criteria

The evaluation of benefits under NED criteria is based on increases in the value of the nation's output of goods and services, expressed in monetary units. In the case of the proposed expansion of Haines Harbor the value of the nation's output of goods and services is achieved by improving the efficiency of existing economic activities and by increasing the production of goods and services. The efficiency of existing economic activities is improved by reducing costs and/or increasing production at the same cost. In cases where the proposed action allows for new or expanded economic activity and production of goods and services, the contribution of the action to the nation's economy is measured by the gross value of the increase in goods and services. The evaluation criteria also include the following specific components:

Price Level. Prices used in the evaluation of economic benefits of expanding Haines Harbor are current prices that prevailed during 2003, the latest year for which price data was available. Therefore, the price level used in the analysis reflects that which existed in 2003.

Discount Rate. Discounting uses an administratively determined rate of interest to convert future streams of monetary values to present values from which equivalent average annual values can be computed. The current discount rate applicable to Corps projects and used in the evaluation on NED benefits is rate 5-5/8 percent.

Period of Analysis. The period of analysis represents the number of years in the future that the project is expected to produce estimated NED benefits and the time during which expected benefits should theoretically pay for the cost of the proposed project. The length of the period of analysis is based in part on the expected physical life of the proposed project and in part on administrative policy. The period of analysis used for harbor projects such as the expansion of Haines Harbor is 50 years.

5.2 Data Sources

Data for the evaluation of NED benefits was obtained from a number of sources. General sources of information are identified here and specific sources are identified in footnotes throughout the report. The general sources of information include the following:

- Representatives of the Alaska Department of Fish and Game (ADF&G) who were interviewed to obtain information about the status of fishery resources and historic and potential future harvest
- Various databases maintained by the Alaska Department of Fish and Game and the Alaska Department of Community and Economic Development that were queried to obtain historic and current information about fishery resources and regulations and the community of Haines. ADF&G collects detailed data from "fish tickets" showing transaction terms between fishermen and processors, however this data is aggregated for locations where fewer than 4 processors or vessels are involved. The databases used for this analysis contain data that has been aggregated to represent regional averages, not

site-specific deliveries, prices and quantities. The raw data is closely protected to ensure no proprietary information is revealed, and the analysts were unable to obtain the details for this study.

- The U.S. Census Bureau database that was queried to obtain population and other information
- The harbormaster of Haines Harbor and an ad hoc group of harbor users that worked with the harbormaster during the study to identify problems and needs; provide specific details about harbor and fleet operations; and, review draft of the analysis
- Representatives of the cruise ship industry who were interviewed to obtain information about their operations
- Representatives of charter boat and other commercial operators who were interviewed to obtain information about their current operations and the potential for expanded operations with expansion of Haines Harbor
- Representatives of the commercial fishing industry who were interviewed to obtain information about existing infrastructure and opportunities for expansion of the industry with expansion of Haines Harbor
- Harbor users who were interviewed and/or surveyed to obtain information about current operations, problems experienced with the existing harbor, potential benefits of expansion of Haines Harbor and their interest in obtaining moorage in the harbor.[9]

5.3 Without Project Condition

5.3.1 Definition

The without project condition is the most likely condition expected in the future in the absence of the proposed project, including any expected actions by others and changes in public policy. It includes existing resources, existing institutional arrangements and alternative actions either proposed or underway.

5.3.2 Key Elements of the Without Project Condition

Key elements of the without project condition include all components of the economy and economic activities that are directly related to a decision on the need for and economic justification of expansion of Haines Harbor. These elements include congestion and limitation of moorage in the existing harbor, commercial fishing and fish processing, cruise ship operations, charter boat and floatplane operations and pleasure boating activities. These major elements and their associated sub-elements are discussed in the following paragraphs.

Existing Harbor Congestion

The existing harbor is inadequate in terms of size and design to accommodate the needs of existing demands of resident and transient users. During the summer season, extending from June through September, the harbor is overcrowded and numerous vessels are either turned away or simply avoid the harbor because vessel captains know that the harbor is full beyond

[9] Surveys were conducted under the direction of the harbormaster.

its design capacity.[10] Alternative harbors for commercial fishing vessels are located in the Juneau area, Hoonah and Sitka. Based on interviews with commercial fishers who operate in the area, the most frequently used alternate harbor is at Auke Bay. Overcrowded conditions in the harbor result in delays in entering and maneuvering in the harbor; the practice of hot-berthing where transient vessels are moored in stalls of resident vessels that vacant; rafting of transient vessels; and, damages to vessels and harbor facilities.

Delays in Maneuvering in the Harbor. Analysis of current use of the existing harbor shows that 60 percent of the vessels with permanent moorage exceed the design length of the slips that they occupy (see table B-15). Even without vessels being rafted in the harbor this results in significant delays to vessels as they maneuver through the harbor to enter or leave. The delays are exacerbated by the occurrence of even moderate southeast winds that prevail during the summer because the vessels are required to operate broadside to the wind and at a speed that is too slow to maintain control. Vessels frequently are forced to wait as long as two hours for the wind to subside so that they can enter or leave the harbor or maneuver within the harbor with an acceptable level of risk of losing control. Estimates of the duration and cost of these delays are presented in Section 5.5 of this appendix.

Redesigning the harbor to accommodate vessels that are actually in the existing fleet could eliminate delays caused by the presence of oversized vessels in the harbor. This, however, reduce the capacity of the harbor from 139 vessels to about 90 vessels. The displaced vessels (about 50) would lose the use of the harbor. Since economic benefits of the harbor to the vessels that would be displaced are expected to greatly exceed costs associated with overcrowding, redesign of the harbor was rejected as the without project condition. Furthermore, redesign of the harbor that would result in displacement of vessels from the harbor is unacceptable to the project sponsor.

Hot-Berthing of Transient Vessels.[11] In an attempt to accommodate as many vessels as possible in the harbor, the harbormaster routinely uses assigned slips to moor transient vessels. In cases where the transient vessel leaves the harbor before the resident vessel returns, this practice does not result in delays or other inconvenience to the owner of the slip. However, in those cases where the owner of the slip returns before the transient vessel leaves, the transient vessel must be relocated to another empty slip. In these cases, delays result because of the time it takes for the harbormaster to locate the owner of the transient vessel and for the transient vessel to be assigned to and moved to another vacant slip. These delays result in increased operating costs of the vessels involved and in increased labor costs to vessel operators and the harbor staff. Occasionally, the harbormaster is unable to locate the owner of the transient vessel and must resort to moving the transient vessel with a tugboat. Estimates of delays and associated costs due to the practice of hot-berthing are presented in Section 5.5 of this appendix.

Rafting of Transient Vessels. In addition to hot-berthing, the harbormaster also allows vessels to raft in the harbor in order to provide protected moorage to as many vessels as possible. Rafting occurs during the summer months from June through September. During

[10] Personal conversation with the Haines Harbor harbormaster, Haines, AK, October 2000.

[11] It is noted that the term transient vessels, as it is used in this appendix, refers to all vessels that do not have assigned slips in the harbor, regardless of where their homeport is actually located.

September, the peak month for rafting, rafting occurs on an average of 15 days with an average of 60 vessels in rafts that average four vessels. Rafting results in delays and in damages to vessels. Estimates of rafting delays and associated costs are presented in Section 5.5 of this appendix.

Damages to Vessels and Harbor Facilities. Crowded conditions in the harbor result in numerous incidents of minor damages to vessels and harbor facilities. Estimates of cost of these damages are presented in Section 5.5 of this appendix.

Cost of Ice Loading Operations. Ice used by the salmon fleet that operates from Haines Harbor is produced at a plant located on Lutak Inlet, approximately six sea miles from the harbor. Because of the controlled openings for the salmon harvest all openings begin on Sunday and the desire of all of the vessel operators to be on the fishing grounds at the start of each opening, ice is loaded on vessels the day before the opening. The limited size of the existing harbor and the current crowded conditions force each of the fishing vessels to leave the harbor, travel to the ice plant, load ice and then return to the harbor. Estimates of the cost of this operation and costs with expansion of the harbor are presented in Section 5.5 of this appendix.

Salmon and Halibut Landings and Value

Because of the availability of truck transportation at favorable back-haul freight rates to markets in southern British Columbia, Alberta and the U.S. Pacific Northwest, fish processors and brokers in Haines are able to pay significantly higher prices for salmon and halibut than processors and brokers with access to only barge and air transport. This has resulted in a growing salmon processing and marketing industry in Haines. However, further expansion beyond levels projected for 2001 is impossible because of the lack of harbor space for fishing vessels and dock space for transferring the catch to storage facilities and to trucks for transport to Seattle, Washington via the Alaska Highway. Estimates of expected expansion of salmon and halibut landings at Haines and the resulting increase in ex-vessel value of the landings with expansion of Haines Harbor are presented in Section 5.5 of this appendix.

Cruise Ship Delays and Opportunity Costs

Congestion in Portage Cove resulting from overcrowding in the existing harbor results in delays in the docking of large cruise ships. Also, the lack of adequate moorage facilities for small cruise ships—those under about 300 feet OAL (overall length) in this study—force many of these small vessels to moor at an alternate dock located on Lutak Inlet approximately four miles from the town center.

Large Cruise Ship Delays. Congestion in Portage Cove because of the lack of adequate moorage in Haines Harbor results in large cruise ships that call at Haines being delayed in docking twice per year, on an average. The delays average about 45 minutes per delay and result in increased vessel operating costs and a reduction in the amount of time that passengers have available to go ashore to visit Haines and engage in organized and informal shore activities. Estimated vessel operating costs of large cruise ships that result from delays in docking are presented in Section 5.5 of this appendix.

Small Cruise Ships. Small cruise ships under 200 feet OAL generally moor at a private dock in Portage Cove to the south of Haines Harbor. However, this facility can handle only one vessel at a time. When more that one vessel is in port—an average of two times per year—the second vessel must moor at the municipal dock located on Lutak Inlet, approximately four miles from the town center. In addition, all vessels in this class which are 200 feet OAL or longer must moor at the municipal dock because they exceed the capacity of the private facility in Portage Cove that is used by these vessels. Moorage at the municipal dock results in a cost to passengers for transportation to town and decreases the amount of time available to engage in shore-based recreational activities. Costs associated with moorage at the municipal dock at Lutak Inlet vs. moorage at Haines Harbor, including the opportunity cost of the passengers' time are presented in Section 5.5 of this appendix.

Winter Moorage at Haines

Because the lack of moorage in Haines Harbor three local vessels—two that are 78 feet OAL and one that is 62 feet OAL—are taken to Seattle for winter storage. Potential cost savings with winter moorage in Haines Harbor are presented in Section 5.5 of this appendix.

Oil Spill Response Vessel Moorage[12]

Due to the heavy marine traffic in northern Lynn Canal, oil spill response equipment consisting of two forty-foot barges that are equipped with skiffs and other oil spill containment and cleanup equipment is moored at Haines. During an oil spill event SEAPRO, the non-profit oil spill response company responsible for cleanup of oil spills in Southeast Alaska, contracts with local boat owners to move the barges to the site of the oil spill. At present the two barges are moored at Haines Harbor during the winter months—October through March—and at a private dock on Lutak Inlet during the summer. However, moorage at the private dock is only temporary and other moorage will be required within the next two to three years. For this reason, the not-for-profit company that operates the vessel has requested moorage for a fifty five-foot oil spill response barge in Haines Harbor. The fifty five-foot barge is a planned replacement for the two forty-foot barges that are now located at Haines. SEAPRO is currently on the waiting list at Haines harbor for a permanent stall in which to moor a fifty five-foot barge—this barge is a replacement for the two existing forty-foot barges. Without expansion of Haines Harbor, however, there is virtually no chance of actually obtaining moorage and alternative moorage facilities will need to be constructed. Without expansion of Haines Harbor, SEAPRO would relocate equipment now moored at Haines Harbor to another location in Southeast Alaska and would acquire a high-speed, self-contained oil spill response vessel that would be moored in the Juneau area—most likely at Douglas Harbor. The cost of the high-speed vessel that would be required without expansion of Haines Harbor and the associated higher operating costs are presented in Section 5.5 of this appendix.

[12] Information on oil spill response equipment at Haines and the most likely action without expansion of Haines Harbor was obtained from a representative of SEAPRO during March 2001.

Water Taxi and Charter Boat Services

Because the lack of moorage and docking facilities in the existing harbor water taxis and charter boats that operate from Haines Harbor are unable to expand operations to meet current and projected demand.

Water Taxi Service. Without harbor expansion water taxi service will be limited to existing services that provide water taxi transportation between Haines and Skagway.

Charter Boat Services.[13] In 1996 there were a total of 20 to 22 charter-fishing boats that operated out of Haines Harbor. Since then the number of charter boats operating out of Haines Harbor has been reduced to a total of four that will operate during 2001. According to a representative of the industry, the principle reason for the decline is the lack of adequate moorage. In addition to the lack of adequate moorage, however, a number of secondary factors contributed to the decline in the industry. These factors are as follows:

- With implementation of individual commercial fishing quotas of halibut, the abundance and the number and size of fish caught by sport fishers in north Lynn Canal has decreased from an average catch per trip of from nine to ten fish weighing an average of 25 to 50 pounds to an average of about one fish weighing 25 pounds or more and five to ten fish weighing an average of about five pounds.
- Expansion of moorage facilities at other communities together with the increase in salmon runs as a result of hatchery enhancement has made charter fishing in other communities in southeast Alaska more profitable. Communities to which charter boat operators have relocated include Sitka, Elfin Cove and Juneau in southeast Alaska and Homer in south central Alaska.
- The configuration of the existing harbor has prevented charter boat operators from acquiring and using larger boats needed to travel further south in Lynn Canal to take advantage of the hatchery enhanced chum salmon runs. Without the larger vessels, charter fishing from Haines has become relatively uneconomic.

Potential expansion of charter boat services and related NED benefits with expansion of Haines Harbor is discussed in Sections 5.4 and 5.5 of this appendix, respectively. In accordance with Corps' policy, charter vessels that would not operate in the without project condition will be evaluated as recreational benefits rather than commercial (ER 1105-2-100).

Subsistence Use

Subsistence Use in Alaska. 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 economy and culture. Alaska is unique in this regard. Traditional cultures and economies co-

[13] Information on charter boat services was obtained primarily through personal conversation with Dale Mulford, a charter boat operator, March 2001.

exist with the industrial-capitalism of Alaska's urban centers. The intent of the Federal and State subsistence laws was to provide the opportunity for the traditional cultures and economies to co-exist.

Statewide, non-commercial fishing and hunting provided about 35-44 million pounds of food annually to rural areas during the 1980s. This is about 318-400 pounds per person a year or a 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 Southeast Alaska communities. 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. Southeast 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 Southeast Alaska 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.

Effect of Existing Harbor on Subsistence Harvest and Use. Congestion in the existing harbor restricts the operation of pleasure/subsistence boats and limits subsistence harvest and use of subsistence resources. The extent to which harvests are restricted is discussed in detail in a comparison of without- and with-project subsistence benefits in Section 5.5.3.15 of this appendix.

5.4 With Project Condition

5.4.1 Definition

Future conditions expected to exist when the plan is fully implemented. The with-project condition is the projection of output and production levels and the costs of production likely to be achieved with the plan.[14]

[14] Economic and Social Considerations, Appendix D, ER 1105-2-100, U.S. Army Corps of Engineers, 22 April 2000.

5.4.2 Elements of the With Project Condition

Elements of the with-project condition include economic activities at Haines that would be directly impacted by implementation of proposed improvements at Haines Harbor. Elements of the with-project condition are the same as those identified above in the discussion of expected without-project conditions. The effects of implementation of proposed improvements at Haines Harbor on these activities are briefly described in this section of this appendix and estimated benefits, including assumptions used in estimating benefits are presented in Section 5.5. The qualitative assessment of expected effects on economic activities at Haines is presented in tabular format in table B-20.

Table B-20. Summary of With-Project Effects of Expansion of Haines Harbor, Alaska.

Affected Economic Activity	Description of With-Project Effects
Vessel Operation—Rafting induced harbor delays	Rafting of commercial and pleasure/subsistence vessels at Haines Harbor will be eliminated with expansion of the harbor to meet existing moorage demand. However, if harbor expansion induces additional demand for moorage because of people relocating to Haines because of its favorable climate compared with other communities in southeast Alaska, rafting may again be required some time in the future.
Vessel Operation—Hot-berthing induced harbor delays	The need to hot-berth commercial and pleasure/subsistence vessels at Haines Harbor will be eliminated with expansion of the harbor to meet existing moorage demand. However, if harbor expansion induces additional demand for moorage because of people relocating to Haines because of its favorable climate compared with other communities in southeast Alaska, hot-berthing may again be required sometime in the future.
Vessel Operation—Oversized vessel induced harbor delays	Expansion of the harbor and redesign of the float system for the vessels that actually use the harbor and are expected to use the harbor based on the findings of the moorage demand analysis will eliminate delays in maneuvering in the harbor that currently exist. An alternative action to eliminate delays is to redesign the harbor layout. This alternative was rejected as the without project condition because while redesign of the harbor without expansion would eliminate delay costs for the vessels that could continue to use the harbor (about 90), displaced vessels (about 50) would lose the use of the harbor.
Vessel Operation—Weather induced vessel delays	Expansion of the harbor and redesign of the float system will eliminate delays currently experienced by commercial vessels in entering or leaving the harbor during windy conditions.
Vessel Operation—Overcrowding induced damages	Expansion of the harbor will eliminate overcrowding and the minor damages that occur as a result of vessels inadvertently bumping into each other as they maneuver in the harbor.
Harbor Operations—Overcrowding induced damages	Expansion of the harbor will eliminate the minor damages to harbor facilities that result from vessels operating in an overcrowded harbor.
Vessel Operation—Salmon fleet ice operations	Expansion of the harbor will allow salmon tenders to deliver ice to the salmon fleet while they are in the harbor and significantly reduce vessel operating costs by eliminating the need for each fishing vessel to travel to the ice plant on Lutak Inlet to load ice.
Salmon and halibut landings and value	Expansion of the harbor will allow expansion of landings of salmon and halibut at Haines where fishermen receive higher prices than at other communities because of the presence of the highway access to markets in southwest Canada and the Pacific Northwest of the U.S. Landings are not expected to increase without the project because there is no place for fishing boats and tenders to moor in Lynn Canal during closures that occur during the salmon season and between fishing trips for halibut. The nearest alternative harbor with moorage space available is Hoonah, which is located on the south side of Icy Strait about 100 miles south of Haines. This distance is too great for expansion of salmon and halibut landings at Haines to economically viable.

Affected Economic Activity	Description of With-Project Effects
Small Cruise Ship Operations	Expansion of the harbor and provision of moorage for small cruise ships at the harbor will eliminate the need for these ships to dock at Lutak Inlet. This will significantly reduce the distance that passengers must travel to town and the cost of transportation. By landing passengers at the harbor they will have more time to engage in shore-based recreation activities.
Large Cruise Ship Operations	Expansion of the harbor will eliminate congestion in Portage Cove and will eliminate delays in docking large cruise ships. This will reduce vessel-operating costs and will allow passengers more time to engage in shore-based recreation activities.
Winter Moorage for Local Vessels	Currently three vessels that are too large for the harbor are forced to go to Seattle for winter moorage. With harbor expansion, at least two of these vessels would remain in Haines over the winter at a significant savings in cost.
Expansion of Water Taxi Services	With expansion of the harbor water taxi services will be expanded by the addition of a vessel that will provide daily round-trip service between Haines, Skagway and Juneau. Since this vessel would not exist in the without project condition, economic benefits were evaluated as recreation benefits as is required by policy of the Corps of Engineers (ER 1105-2-100, April 2000).
Expansion of Charter Boat Services	With expansion of the harbor charter fishing boat operations would expand with the addition of a minimum of four vessels. These vessels would be larger than those that have been used in the past and are presently used to increase the average client capacity per vessel from about two to six. Also, one new wildlife sightseeing charter boat would be put into service. Since these vessels would not exist in the without project condition, economic benefits were evaluated as recreation benefits as is required by policy of the Corps of Engineers (ER 1105-2-100, April 2000).
Oil Spill Response Vessel Operations	With expansion of the harbor the oil spill response vessel that serves northern Lynn Canal will be moored at the harbor and costs associated with responding to oil spills from an alternate location in south Lynn Canal will be avoided.
Subsistence Use of Wild Resources	With expansion of the harbor congestion and delays will be eliminated. With elimination of delays pleasure/subsistence boaters will be able to increase their harvest of subsistence resources.

5.5 NED Benefits to Expansion of Haines Harbor

5.5.1 Introduction

In this section of this appendix, analyses of potential economic benefits that would be realized with expansion of Haines Harbor are presented. Each category of economic benefits that has been discussed in the foregoing sections of the appendix on without- and with-project conditions is discussed and evaluated. Sources of data used in the analysis of each benefit category are briefly described, assumptions and methodologies used in the analyses are presented and explained and the resulting estimates of benefits are presented.

5.5.2 Variable Vessel Operating Costs

Variable vessel operating costs that are used in the analyses commercial and pleasure/subsistence vessel operations with and without expansion of Haines Harbor were developed from data obtained from a sample of harbor users. Fixed costs were not considered in the analysis because these costs would remain essentially the same in the with- and without-project conditions. To obtain the data used to estimate variable vessel operating costs analysts and the harbormaster attempted to contact more than 250 resident and transient harbor users either by telephone or by mail. Useable data were obtained from a total of 13

commercial vessel operators and 18 pleasure/subsistence boat owners. Based on the composition of resident harbor users and transient users who desire permanent moorage, the sample sizes constitute approximately nine percent of the commercial users of the harbor and 13 percent of the pleasure/subsistence users. The harbormaster and an ad hoc group of harbor users then reviewed the variable operating costs developed from the survey to verify that they are representative of actual average variable vessel operating costs. Items included in variable costs are as follows—costs were developed for a "typical" commercial and pleasure/subsistence vessel:

- Crew size, including the captain
- Average hourly wage rates and the opportunity cost of time, which is based on leisure as the most likely use of time that would be saved
- Fuel consumption while operating in and around the harbor
- The average cost of fuel on a per/gallon basis
- And, non-fuel costs as a percent of fuel costs (non-fuel costs include oil and maintenance that is a function of use).

The resulting variable hourly operating costs that were used in the analyses of benefits are shown below in table B-21.

Table B-21. Variable Operating Costs for Commercial and Pleasure/Subsistence Vessels

		Commercial		Pleasure/Subsistence	
Variable Vessel Operating Costs	Units	Data	Used	Data	Used
Average crew	no.	3	3	2	2
Wage rate & value of time/hr[1, 2]	$/hr	22.92	7.64	18.60	6.20
Total wage rate & value of time/hour	$	68.75	22.92	34.34	12.40
Fuel use[3]	gals/hr	1.4	3	1.3	1.5
Fuel cost/gal	$/gal	1.60	1.60	1.69	1.70
Cost of fuel/hr	$/hr	2.32	4.80	2.18	2.55
Non fuel cost/hr as percent of fuel	%	50	100	125	125
Non fuel cost/hr	$/hr	1.16	4.80	2.73	3.19
Total cost per hour	$	72.22	32.52	39.25	18.14
Vessel Operating Cost Used	$		33.00		18.00
Estimated Weekly Earnings for Salmon Gillnetters[4]					
Item	Share (%)	Amount ($)			
Gross Vessel Earnings		7,500.00			
Owner (gross)	80	6,000.00			
Vessel	70	4,200.00			
Labor	30	1,800.00			
Crew[1]	10	750.00			
Crew[2]	10	750.00			
Total Labor Earnings[5]		3,300.00			
Average Hourly Wage[6]		22.92			

1. Value of leisure time for commercial vessels is 1/3 of the estimated average hourly earnings for commercial fishermen.
2. Value of leisure time for pleasure/subsistence boaters is 1/3 of the average of “experienced” hourly earnings for Southeast
3. Alaska workers. (Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section.)
4. Fuel use is based on a vessel operating at maneuvering speed.
5. Earnings are for a four-day fishing opening.
I6. Includes earnings of the owner and the crew.
7. Assumes crew and owner work 12 hours/day during each opening.
Source: Haines Harbor Ad Hoc Group (Dave Gross, Harbormaster), March 2001.

5.5.3 Evaluation of Benefits

Rafting Induced Harbor Delays and Costs

Both commercial and pleasure/subsistence vessels are rafted in Haines Harbor during the summer months because of the lack of moorage space. With expansion of the harbor the need to raft vessels to meet moorage demand would be eliminated. Costs that would be saved include variable vessel operating costs, including the time of the captain and crew. The analysis of rafting related delay costs determined the average number of rafted vessels, the average size of rafts and the average delay per vessel (in hours) associated with each size of raft. The analysis determined that the rafted-vessel capacity of the harbor is from 50 to 70 vessels, depending on the mix of vessels sizes. For this analysis, an average capacity of 60 vessels was used. According to the harbormaster and ad hoc group of harbor users, the full capacity of the harbor is reached only in September.

Data used in the analysis was obtained from harbor users, the harbormaster and an ad hoc group of harbor users, as described elsewhere in this appendix. Separate analyses were done for commercial and pleasure/subsistence vessels. Specific assumptions and data values used in the analysis of costs and potential benefits to harbor expansion related to commercial and pleasure/subsistence vessels are shown in table B-22 and table B-23, respectively. Costs that would be eliminated with expansion of the harbor and project benefits are as follows:

- Commercial vessels–**$33,500**
- Pleasure/subsistence vessels–**$3,800**

Table B-22. Rafting Delays and Cost for Commercial Vessels

Description	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
No. of days w/rafting[1]	0	0	0	0	8	12	12	15	0	47
Average no. of rafts	0	0	0	0	15	16	17	15	0	
Average size of rafts	0	0	0	0	3.5	3	2.5	4	0	
Avg. no. rafted vessels[3]	0	0	0	0	54	48	42	60	0	
Commercial vessels[6]	0	0	0	0	23	20	18	25	0	
Total delay entering (hrs)[4]	0	0	0	0	8	5	2	13	0	28
Total delay leaving (hrs)[5]	0	0	0	0	17	10	4	25	0	56
Total avg. delay (hrs)	0	0	0	0	204	181	63	566	0	1,014.50
Cost of delay[7ab]	-	-	-	-	6,726	5,978	2,092	18,682	-	33,479

Assumptions		**Values used in analysis**	
[1]Records show rafting occurs Wednesday through Sunday during the summer.		NA	
[2]Rafting capacity = 50-70 vessels at an average length of 36 feet.		60	
[3]Avg. portion of rafting capacity expected by month.	Jun	0.9	
	Jul	0.8	
	Aug	0.7	
	Sept	1.0	
[4]Delay entering ranges from a max of 0.05 to 0.5 hours and average ranges from 0.02 to 0.25 hours.		0.50	Raft size–4
		0.375	Raft size–3.5
		0.25	Raft size–3.0
		0.10	Raft size–2.5
[5]Delay leaving ranges from a max of 0.1 to 1.0 hours and an average of from 0.1 to 0.5 hours.		1.00	Raft size–4
		0.75	Raft size–3.5
		0.50	Raft size–3.0
		0.20	Raft size–2.5
[6]Percent commercial vessels is based on results of data obtained from harbor users.		42%	
[7a]Percent pleasure boats is based n results of data obtained from harbor users.		58%	
[7b]Commercial–Cost of delay is assumed to be the same per/hr as that used for hot-berthing delays.		33.00	$/hr
[8]Pleasure–Cost of delay is assumed to be the same per/hr as that used for hot-berthing delays.		18.00	$/hr

Note: The harbor is assumed to be essentially empty November through January.

Table B-23. Rafting Delays and Cost for Pleasure/Subsistence Boats

Description	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
No. of Days w/Rafting 1/	0	0	0	0	8	8	8	2	0	26
Average No. of Rafts	0	0	0	0	15	16	17	15	0	
Average size of raft	0	0	0	0	3.5	3	2.5	4	0	
Avg. no. rafted vessels 3/	0	0	0	0	54	48	42	60	0	204
No. Subsistence/Pleasure boats 7/	0	0	0	0	31	28	24	35	0	
Total delay entering (hrs) 4/	0	0	0	0	12	7	2	17	0	39
Total delay leaving (hrs) 5/	0	0	0	0	24	14	5	35	0	77
Total avg. delay (hrs)	0	0	0	0	35	21	7	52	0	116
Cost of delay 8/	-	-	-	-	635	376	132	941	-	3,820

Assumptions		**Values used in analysis**	
[1]Records show rafting occurs Wednesday through Sunday during the summer.		NA	
[2]Rafting capacity = 50-70 vessels at an average length of 36 feet.		60	
[3]Avg. portion of rafting capacity expected by month.	Jun	0.9	
	Jul	0.8	
	Aug	0.7	
	Sept	1.0	
[4]Delay entering ranges from a max of 0.05 to 0.5 hours and average ranges from 0.02 to 0.25 hours.		0.50	Raft size–4
		0.375	Raft size–3.5
		0.25	Raft size–3.0
		0.10	Raft size–2.5
[5]Delay leaving ranges from a max of 0.1 to 1.0 hours and an average of from 0.1 to 0.5 hours.		1.00	Raft size–4
		0.75	Raft size–3.5
		0.50	Raft size–3.0
		0.20	Raft size–2.5
[6]Percent commercial vessels is based on results of data obtained from harbor users.		42%	
[7a]Percent pleasure boats is based n results of data obtained from harbor users.		58%	
[7b]Commercial–Cost of delay is assumed to be the same per/hr as that used for hot-berthing delays.		33.00	$/hr
[8]Pleasure–Cost of delay is assumed to be the same per/hr as that used for hot-berthing delays.		18.00	$/hr

Note: The harbor is assumed to be essentially empty November through January.

Hot-Berthing Induced Harbor Delays and Costs

As has been stated previously, with expansion of Haines Harbor the practice of hot-berthing vessels could be essentially eliminated for vessels included in the moorage demand analysis. Project benefits that would result from eliminating hot-berthing are the savings in costs of waiting for hot-berthed vessels to vacate slips and the cost of moving the vessels. Included in costs variable vessel operating costs and the value of time. The evaluation of hot-berthing costs that would be saved found that costs for commercial vessels would be reduced by about **$20,300** and costs for pleasure/subsistence vessels would be reduced by about **$73,200**. Details of the analysis of costs associated with commercial and pleasure/subsistence vessels are shown in table B-24 and table B-25, respectively. Assumptions shown at the foot of these tables include values in columns headed “data” and “used.” The values in the column headed “data” were obtained from users of the harbor either through telephone interviews or responses to a survey that was mailed to selected harbor users (all transient users with known

mailing addresses). The values in the column headed "used" are the values actually used in the evaluation of hot-berthing costs. Differences in these values and those listed under "data" are due to adjustments recommended by the harbormaster and the ad hoc group of harbor users that reviewed the data and analyses.

Table B-24. Costs Associated with Practice of Hot-berthing Transient Commercial Vessels

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Totals
Arriving Vessel Costs										
No. Days w/Hot-Berthing 1/	0	0	0	8	16	16	8	4	0	52
Avg. No. Vessels 2/	0	0	0	3	6	6	3	2	0	20
No. Vessels Delays 1/	0	0	0	24	47	47	24	12	0	154
Length of Delays (hrs)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Cost of Delays	-	-	-	1,950	3,900	3,900	1,950	975	-	12,674
Moored Vessel Move Costs										
No. of Vessel Moves by crew 3/	0	0	0	21	43	43	21	11	0	138
Cost of Crew Moves 4/	-	-	-	702	1,404	1,404	702	351	-	4,563
No. of Harbormaster Moves 3/	0	0	0	2	5	5	2	1	0	15
Cost of Harbormaster Moves 5/	-	-	-	473	945	945	473	236	-	3,073
Total Cost of Moves	-	-	-	1,175	2,349	2,349	1,175	587	-	7,635
Total Cost of Hot-Berthing	-	-	-	3,125	6,249	6,249	3,125	1,562	-	20,310

Input Assumptions	**Data 6/**	**Used**	**Comments**
No. of potentially affected vessels	134	134	No. of permanent slips
No. of transient commercial vessels			
Waitlist	69		
Non-Resident Halibut	48		
Non-Resident Salmon	10		
Total transient vessels	127	127	Sum of commercial vessels on waitlist and transient halibut & salmon vessels
No. hot-berthed	5/31	0.16	Portion of commercial transients hot-berthed and delayed
No. times/vessel	5-10	7.5	Avg. no. of times each vessel is hot-berthed during the year
Length of Delay/incident	0.5/48	2.5	Est. average length of delay--ignores delays of one day or more.

NOTES

1/ Based on weekend days May-mid-Sep & fishing closures during peak season in June & July

2/ Total is based on data from harbor users allocation by month is based on the number of hot-berthing days per month

3/ Total moves is equal to the number of vessels delayed. Assumes 90 percent moves are by crew & 10 percent by harbormaster--tug.

4/ Assumes one hour at the same cost per hour as the delayed vessel.

5/ Assumes one hour with a tug at 200/hour. Haines Harbor does not own a tug. The cost of the commercial tug used in the analysis is the average cost paid by Haines Harbor as reported by Harbormaster.

Source of Data: Unless otherwise noted, data is from interviews of harbor users.

Table B-25. Costs Associated with Practice of Hot-berthing Transient Pleasure/Subsistence Vessels

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Totals
Arriving Vessel Costs										
No. of days w/hot-berthing 1/	0	0	0	20	30	31	31	10	0	122
Percent of transient vessels hot-berthed 2/	0%	0%	0%	25%	30%	40%	40%	25%	0%	
Avg. no. vessels 3/	0	0	0	20	24	33	33	20	0	
Percent chance of delay 2/	0%	0%	0%	20%	50%	50%	50%	20%	0%	
No. of vessels delayed 4/	0	0	0	82	367	506	506	41	0	
Length of delays (hrs) 2/	1	1	1	1	1	1	1	1	1	
Cost of Delays 5/ ($)	-	-	-	1,469	6,611	9,108	9,108	735	-	27,030
Moored Vessel Move Costs										
No. of Vessel Moves by crew 6/	0	0	0	73	331	455	455	37	0	
Hours required per move 2/	1	1	1	1	1		1	1	1	
Cost of Crew Moves 7/ ($)	-	-	-	1,322	5,950	-	8,197	661	-	16,130
No. of Harbormaster Moves 6/	0	0	0	8	37	51	51	4	0	
Cost of Harbormaster Moves 8/ ($)	-	-	-	1,632	7,345	10,120	10,120	816	-	30,034
Cost of Moves ($)	-	-	-	2,954	13,295	10,120	18,317	1,477	-	46,164
Total Cost of Hot-Berthing ($)	-	-	-	4,423	19,905	19,228	27,425	2,212	-	73,194

Input Assumptions	**Data 6/**	**Used**	**Comments**
No. of potentially affected vessels	134	134	No. of permanent slips
No. of transient pleasure boats			
Waitlist	65		
2000 transients not on wait list	17		
Total transient pleasure boats	82	82	Sum of pleasure/subsistence vessels on waitlist and transients that used the harbor in 2000 but are not on the waitlist.
No. hot-berthed	1/18	2/	Portion of pleasure/subsistence transients hot-berthed
No. times/vessel	1	1	Average no. of times each vessel is hot-berthed during the year
Length of Delay/incident	1	1	Est. average length of delay--ignores delays of one day or more.

NOTES

1/ Based on weekend days May-mid-Sep & fishing closures during peak season in June & July

2/ Estimates by the harbormaster and ad hoc group of harbor users.

3/ The percent of transient boats in the harbor that are hot-berthed times the number of transient pleasure boats.

4/ No. of days w/hot-berthing times the average no. of vessels times the percent chance of delay.

5/ No. of vessels delayed times the variable cost of operation from Table B-21.

6/ Total moves is equal to the number of vessels delayed. Assumes 90 percent moves are by crew & 10 percent by harbormaster--tug.

7/ Equals the no. of vessels moves by crew times the hours per move times the variable operating costs from Table B-21.

8/ Assumes one hour with a tug at 200/hour.

Oversized Vessel Induced Harbor Delays and Costs

Analysis of current use of the existing harbor shows that 60 percent of the vessels with permanent moorage exceed the design length of the slips that they occupy (see table B-15). Even without vessels being rafted in the harbor this results in significant delays to vessels as they maneuver through the harbor to enter or leave. Economic benefits to the elimination of the presence of oversized vessels in Haines Harbor were evaluated from the standpoint of reduced vessel operating costs, including the value of time of crews of commercial vessels

and pleasure/subsistence vessel users. This category of benefits accounts solely for the cost of delays directly associated with the presence of oversized vessels. The marginal increase in delays as a result of adverse weather conditions is evaluated separately. Data used in the evaluation is based on information obtained from users of the harbor either through telephone interviews or responses to a survey that was mailed to selected harbor users (all transient users with known mailing addresses). The values actually used in the analysis reflect adjustments to the data obtained directly from harbor users by the harbormaster and an ad hoc group of harbor users.

The evaluation was done on a monthly basis and takes into account the number of vessels in the harbor, the probability that commercial vessels are actually working and the expected length of each delay, which is dependent on the number of vessels in the harbor. A critical component of the estimated cost of the delays is the number of days that a given vessel will be entering or leaving the harbor during the month. For each month, a group of harbor users estimated the number of vessels active in the fisheries during that month. The few vessels that are active for the winter fisheries will be in and out of the harbor every day, while the many vessels active in the summer salmon fishery will only be leaving the harbor for 4 openings a month. Each of these salmon opening requires 8 round trips for each vessel (one trip to load ice the day prior to the opening, then the trip to the fishing grounds on the day of the opening), so the vessels will be entering and/or leaving the harbor 8 days during the month.

Details of the analysis of costs associated with commercial and pleasure/subsistence vessels are shown in table B-26 and table B-27, respectively. The results of the evaluation show that the presence of oversized vessels in the harbor results in vessel operating costs and value of time of about **$69,400** for commercial vessels and **$16,200** for pleasure/subsistence vessels.

Table B-26. Harbor Entrance/Exit Delays and Cost to Commercial Vessels Due to Presence of Oversize Vessels

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
% of All Vessels in Harbor 1/ (%)	44	44	44	70	90	100	100	90	70	44	44	44	
Avg. No. Vessels in Harbor	62	62	62	99	128	142	142	128	99	62	62	62	
Avg. No. C Vessels in Harbor 2/	11	11	7	19	56	74	74	74	74	37	11	11	
% chance vessel is working (%)	100	100	77	67	52	27	26	26	27	52	100	100	
Avg. No. Trips/Mo/Vessel 3/	31	28	24	20	16	8	8	8	8	16	30	31	
Avg. No. C Delays/Vessel 4/	62	56	48	40	32	16	16	16	16	32	60	62	
Avg. Length of C Vessel Delay (hrs) 5/	0.15	0.15	0.15	0.15	0.2	0.25	0.25	0.2	0.15	0.15	0.15	0.15	
Cost of Delay 6/ ($)	3,407	3,077	1,758	3,663	11,722	9,768	9,768	7,814	5,861	5,861	3,297	3,407	69,402

NOTES

1/ From estimates developed by the harbormaster and harbor user ad hoc group.

2/ Estimate developed by the harbormaster and an ad hoc group of harbor users. The vessels are primarily commercial fishing (more than 95%) and the analysis is based on costs for commercial fishing vessels. The winter fishery is primarily for shellfish.

3/ Based on vessel activity related to fishing, with the Lynn Canal salmon season extending from June through September; the Halibut season extending March through November; and, the shellfish season extending year-around. The salmon fishery typically has one three-day opening per week, shellfishers typically make daily trips; and, halibut fishers typically make multi-day trips. Thus, vessel activity is determined largely by salmon fishers during June through September and by shellfish and halibut fishers during the other months.

4/ Double the number of turns. Resident and transient vessels are delayed but the number of delays is assumed to be limited by the number of commercial slips.

5/ The average length of vessel delay was estimated by the harbormaster based his experience in managing the harbor. Records of actual delays do not exist.

6/ Computed as follows: [(variable hourly vessel operating cost)*(No. delays per vessel)*(length of delay)*(No. of vessels)]

Table B-27. Harbor Entrance/Exit Delays and Cost to Pleasure/Subsistence Boats Due to Presence of Oversize Vessels

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Totals
Percent of All Vessels in Harbor 1/	20%	40%	70%	90%	100%	100%	90%	70%	20%	
Avg. No. Vessels in Harbor 2/	28	57	99	128	142	142	128	99	28	142
Avg. No. P Boats in Harbor 2/	14	27	48	61	68	68	61	48	14	68
Avg. No. Turns/Mo. 3/	2	2	4	6	10	10	8	6	2	
Avg. No. Delays/Vessel 4/	4	4	8	12	20	20	16	12	4	
Avg. Length of P Boat Delay (hrs) 5/	0.1125	0.1125	0.1125	0.15	0.1875	0.1875	0.15	0.1125	0.1125	
Cost of Delay 6/	110	220	771	1,983	4,590	4,590	2,644	1,157	110	16,175

NOTES

1/ From estimates developed by the harbormaster and harbor user ad hoc group.

2/ Assumes a consistent proportional mix of commercial and pleasure vessels in the harbor at all times.

3/ Estimated number of exit and entrance combinations per vessel during the month. Number of turns is based on weekends plus an allowance for mid-week use.

4/ Double the number of turns. Resident and transient vessels are delayed but the number of delays is assumed to be limited by the number of commercial slips.

The number of delays per vessel exceeds the number of times a vessel is used because a vessel can be delayed twice each time it is used – once when it exits the

harbor and again when it returns to the harbor.

5/ Assumed to be 75 percent of the delay for commercial vessels because pleasure boats are generally smaller.

6/ See note 5 in Table B-26

Input:

Delay as percent of commercial = 75%

Weather Induced Harbor Delays and Costs

The evaluation of economic costs associated with weather induced delays to vessels attempting to enter or leave the harbor or simply maneuver within the harbor is based on the same vessel operating costs and value of time as the categories of costs that involve delays. Since weather delays would be eliminated with expansion of the harbor, delay costs are an economic benefit to harbor expansion. Information developed by the harbormaster and harbor users ad hoc group showed that only commercial vessels are delayed because of weather. Pleasure/subsistence boaters do not experience delays because they typically do not leave the harbor during adverse weather conditions that are severe enough to cause a delay. According to the harbormaster and an ad hoc group of harbor users, expansion and redesign of the float system would eliminate all weather delays. Also, according to the harbormaster and the ad hoc group of harbor users, weather conditions in Lynn Canal are never severe enough to prevent commercial fishing vessels from fishing, provided that they can get out of the harbor.

The evaluation was done on a monthly basis and a critical component of the estimated cost of the delays is the probability that a given vessel will be delayed on any given day during the month. For each month, a group of harbor users estimated the number days with weather delays and the number of vessels that are active during that month. Vessel activity is driven by the fisheries that are open, and the presence of vessels in the harbor will be determined by trip duration. The few vessels that are active for the winter fisheries will be in and out of the harbor every day, while the many vessels active in the summer salmon fishery will only be leaving the harbor for 4 openings a month. Each of these salmon opening requires 8 round

trips for each vessel (one trip to load ice the day prior to the opening, then the trip to the fishing grounds on the day of the opening), so the vessels will be leaving the harbor 8 days during the month. The number of trips determines the probability that a vessel will be trying to enter the harbor on any given day during the month. According to the user group, even on windy days there is only a 50% chance that the active vessels will be delayed. Half of the time they will be able to maneuver their way into the harbor without extensive delay. When these factors are combined, the resulting calculation determines the number of vessel delays during each month of the year. The number of delays can then be multiplied by the hourly variable operating cost to determine the monthly cost of weather delays. The variable vessel operating costs are explained in table B-21. The value of leisure time is estimated at 1/3 of the applicable wage rate as required by policy of the Corps of Engineers (ER 1105-2-100).

Details of the analysis including assumptions are presented in table B-28. The results of the evaluation show that because of the design of the existing harbor adverse weather conditions result in operating costs and value of time of about **$132,150** for commercial vessels.[15]

[15] The conditions that cause weather related delays are explained in the notes included in Table B-28, as are the frequency and length of delays. Pleasure/subsistence boats are not delayed because the analysis assumes that pleasure/subsistence boaters do not go out during adverse weather conditions. Transient pleasure boats that might be out during an adverse weather event cannot seek shelter at Haines because of the existing overcrowded condition of the harbor.

Table B-28. Weather Delays and Costs for Commercial Vessels, Haines Harbor

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Avg. no. days with delays 1	10	10	5	10	13	10	15	15	20	15	15	15	113
% C-vessels using harbor 2 (%)	15%	15%	10%	25%	75%	100%	100%	100%	100%	50%	15%	15%	
No. C-vessels using harbor	11	11	7	19	56	74	74	74	74	37	11	11	
% chance vessel activity 3 (%)	100%	100%	77%	67%	52%	27%	26%	26%	27%	52%	100%	100%	
% chance vessel delayed 4 (%)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	
No. expected delays 5/	55.5	55.5	14.3	61.7	186.2	98.7	143.2	143.2	197.3	143.2	83.3	83.3	1043.4
Length of each delay (hrs) 6/	5	5	3	2	2	2	2	2	3	5	5	5	
Total delays (hrs)	277.5	277.5	43.0	123.3	372.4	197.3	286.5	286.5	592.0	716.1	416.3	416.3	4,005
Cost delay ($/hr)	$33	$33	$33	$33	$33	$33	$33	$33	$33	$33	$33	$33	$33
Total cost delay ($)	$9,158	$9,158	$1,418	$4,070	$12,289	$6,512	$9,453	$9,453	$19,536	$23,632	$13,736	$13,736	$132,150

Input Assumptions	**Data Range**	**Values Used**	**Basis for data range and values used**
Total no. of resident vessels	142	142	From Table B-8
% of vessel that are commercial	52	52	Calculated from Table B-8.
Cost of Delay:			
Variable operating cost adjusted for value of time.		33.00	From Table B-21

NOTES

1/ Delays from October through April (winter) are usually caused by north to northwest winds, while delays during the summer (May through September) are caused by south winds. The source of data is anecdotal because actual wind data for Haines is not available.

2/ Estimate developed by the harbormaster and an ad hoc group of harbor users. The vessels are primarily commercial fishing (more than 95%) and the analysis is based on costs for commercial fishing vessels. The winter fishery is primarily for shellfish.

3/ Based on vessel activity related to fishing, with the Lynn Canal salmon season extending from June through September; the Halibut season extending March through November; and, the shellfish season extending year-around. The salmon fishery typically has one three-day opening per week; shellfishers typically make daily trips; and, halibut fishers typically make multi-day trips. Thus, vessel activity is determined largely by salmon fishers during June through September and by shellfish and halibut fishers during the other months.

4/ Assumes an even chance of being delayed on a windy day, as determined by the harbormaster and an ad hoc group of harbor users.

5/ Computed as follows: [(Avg. no. of days with delays)*(No. of C-vessels using harbor)*(Percent chance of vessel activity)*(Percent chance vessel is delayed)] Note: delays and associated costs are only computed for entering the harbor.

6/ Estimates developed by the harbormaster and an ad hoc group of harbor users on the basis of historic experience in the harbor.

Overcrowding Induced Vessel Damages

Economic benefits to harbor expansion from elimination of damages caused by overcrowding in the existing harbor from the presence of oversized vessels and the practice of rafting transient vessels were evaluated based on the number of resident and transient vessels that use the harbor, the probability of a vessel actually being damaged and the average cost of damage per incident. Damages generally are limited to scratches and other minor hull damage and damage to rollers on the gillnet vessels. The cost of damage repair per incident is relatively small with estimated averages of just $300 for commercial vessels and $100 for pleasure/subsistence vessels. Details of the evaluation of damages for both commercial and pleasure/subsistence vessels are shown in table B-29. As shown in table B-29 annual damages to commercial and pleasure/subsistence vessels average about **$37,100** and **$1,700**, respectively. [Note: The last column in Table B-29, "Total Damage ($)" is the product of the preceding three columns: i.e., "No. Vessels", "Chance Damage (%)" and,

"Damage/Incident ($)".] The harbormaster and the ad hoc group of harbor users estimate that all of these damages would be prevented with expansion of the harbor.

Table B-29. Commercial and Pleasure Vessel Damages Due to Overcrowding (Oversized Vessels and Rafting)

Type of Vessel	No. Vessels	Chance Damage1 (%)	Damage/Incident ($)	Total Damage ($)
Commercial				
Resident	74	62	300	13,662
Transient--wait list	69	62	300	12,738
Transient	58	62	300	10,708
Total	201			37,108
Pleasure/Subsistence				
Resident	68	11	100	756
Transient--wait list	65	11	100	722
Transient	17	11	100	189
Total	150			1,667

1/ Chance of damage and cost/incident are based on data obtained from a sample of resident and transient harbor users and estimates from the ad hoc group that on average vessels that are damaged are damaged twice per year.

Overcrowding Induced Damages to Harbor Facilities

Overcrowding in Haines Harbor results in relatively minor damage to harbor facilities, primarily to electrical systems, floats, float connection hardware and mooring cleats. Due to the relatively minor extent of the damages, records of repairs are not kept. The estimate used in the analysis was provided by the current and former harbormasters on the basis of their memory of repairs. The harbormaster estimates that these damages would be eliminated with harbor expansion. Details on damages to harbor facilities that would be prevented with expansion of the harbor are shown in table B-30. As shown in table B-30 preventable damages amount to an estimated **$5,000** annually.

Table B-30. Annual Damages to Harbor Facilities Due to Overcrowding (Oversized Vessels and Rafting)

Type of Damage	No. of Incidents/yr	Damage/Incident ($)	Total Damage ($)
All types 1/	na 2/	na 2/	5,000.00

NOTES

1/ Types of damage include damage to electrical boxes, floats, float connection hardware, mooring cleats, etc.

2/ The number of incidents per year vary and records necessary to document the actual number of incidents, the type of damage and the cost of repairs that result from each incident is not available.

Source: Harbormaster, Haines Harbor based on annual expenditures for repair of damage over the past 10 years (March 2001).

Transportation Cost of Salmon Fleet Ice Operations:

In the without project condition, salmon boats travel from the harbor to the dock at Lutak Inlet to load ice the day before each salmon fishing opening. In the with project condition, salmon tenders could deliver ice from the dock at Lutak Inlet to the fishing fleet in the

harbor. The result would be a significant reduction in the total number of trips made to the dock at Lutak Inlet for ice. The economic benefit related to this change is the difference between variable transportation costs of the salmon fleet without the project and with the project. Transportation costs are based on hourly operating costs from table B-21 and the time required for each vessel to travel to the ice plant on Lutak inlet without the project compared with the cost and time required for ice to be delivered to the harbor by tenders in the with project scenario. Labor cost savings are based on the opportunity cost of labor, which is the value of leisure time. The without and with project scenarios were developed in coordination with a representative of the company the supplies ice to the salmon fleet and were reviewed by the harbormaster and the ad hoc group of harbor users. Details of the analysis, including key assumptions and input values, are presented in table B-31. Under Without-project conditions, the monthly cost incurred by salmon fishers to obtain ice is the product of the “number of vessels”, “trips/month”, “time required/trip” and, the hourly operating cost ($33/hour). In the with-project condition, ice would be delivered from the Lutak dock to fishing vessels in the harbor by salmon tenders. The cost of this operation is the sum of the cost for each month, which is the product of “number of fishing openings”, “number of trips per opening”, the time required per trip (hours)” (one hour plus 0.15 hours per vessel serviced), and the variable hourly operating cost of the tenders (1.5 times the variable operating cost of a fishing vessel, which is $33 per hour). The results of the analysis show that transportation costs without the project are $52,500 compared with $9,100 with the project. The savings is an economic benefit to the project of about **$43,400**.

Table B-31. Transportation Costs of the Salmon Fishing Fleet to Obtain Ice Without and With Harbor Expansion

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Totals
Without Project Costs 1/										
Percent of Vessels Active	3%	5%	10%	30%	100%	100%	90%	60%	30%	
Number of Vessels 2/	2	4	9	26	87	87	78	52	26	87
Trips/mo./vessel to obtain ice 3/	0	0	0	0	4	4	3	2	1	
Total vessel trips	0	0	0	0	348	348	234.9	104.4	26	1,061
Time required per vessel trip (hrs)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Cost of Trips 7/	-	-	-	-	17,226	17,226	11,628	5,168	1,292	$52,539
With Project Costs 4/										
Number of fishing openings	0	0	0	0	4	4	3	2	1	
Number of trips per opening	0	0	0	0	2	2	2	1	1	
Trips by Tender to Harbor/mo.	0	0	0	0	8	8	6	2	1	
Time required/trip 5/	0	0	0	0	7.5	7.5	6.9	8.8	4.9	
Cost of Trips 6/	-	-	-	-	2,980	2,980	2,041	874	243	$9,118
Potential Project Benefits										$43,421

NOTES

1/ All vessels travel to Lutak Dock to load ice and return to the harbor the day before each salmon opening. Ice used for other fisheries are obtained on the way

to the fishing grounds.

2/ Maximum number is limited to the capacity of the harbor with rafting (87--62 plus 25) others are assumed to obtain ice and leave the area.

3/ Round trip to and from Lutak dock.

4/ With the project ice would be delivered to the harbor by a tender with capacity to service 50 vessels per trip.

5/ Time required is round-trip time of one hour plus 0.15 hr/vessel serviced.

6/ Tender operating costs are estimated at 150 percent of average commercial vessel costs.

7/ Variable operating cost adjusted for value of time. Unit/$/hr, Cost/33, from table B-21

Expansion of Salmon and Halibut Landings and Value:

With expansion of Haines Harbor landings of salmon and halibut at Haines are expected to increase from about 4.0 million pounds to 5.8 million pounds and from 0.8 million pounds to 1.0 million pounds, respectively (see Table B-32). The increase in landings is expected to occur because of the strategic location of Haines on the Alaska Highway system, which provides low-cost truck transportation to Seattle, Washington where the fish are packaged and distributed to markets throughout the lower-48 states. The location of the highway system that connects Haines to the Alaska Highway that connects to the lower-48 states through Canada is shown on the map below (Figure 15). The map clearly shows that Haines and Skagway are the only communities in SE Alaska that are connected with the highway system that links Alaska with the lower-48 states.

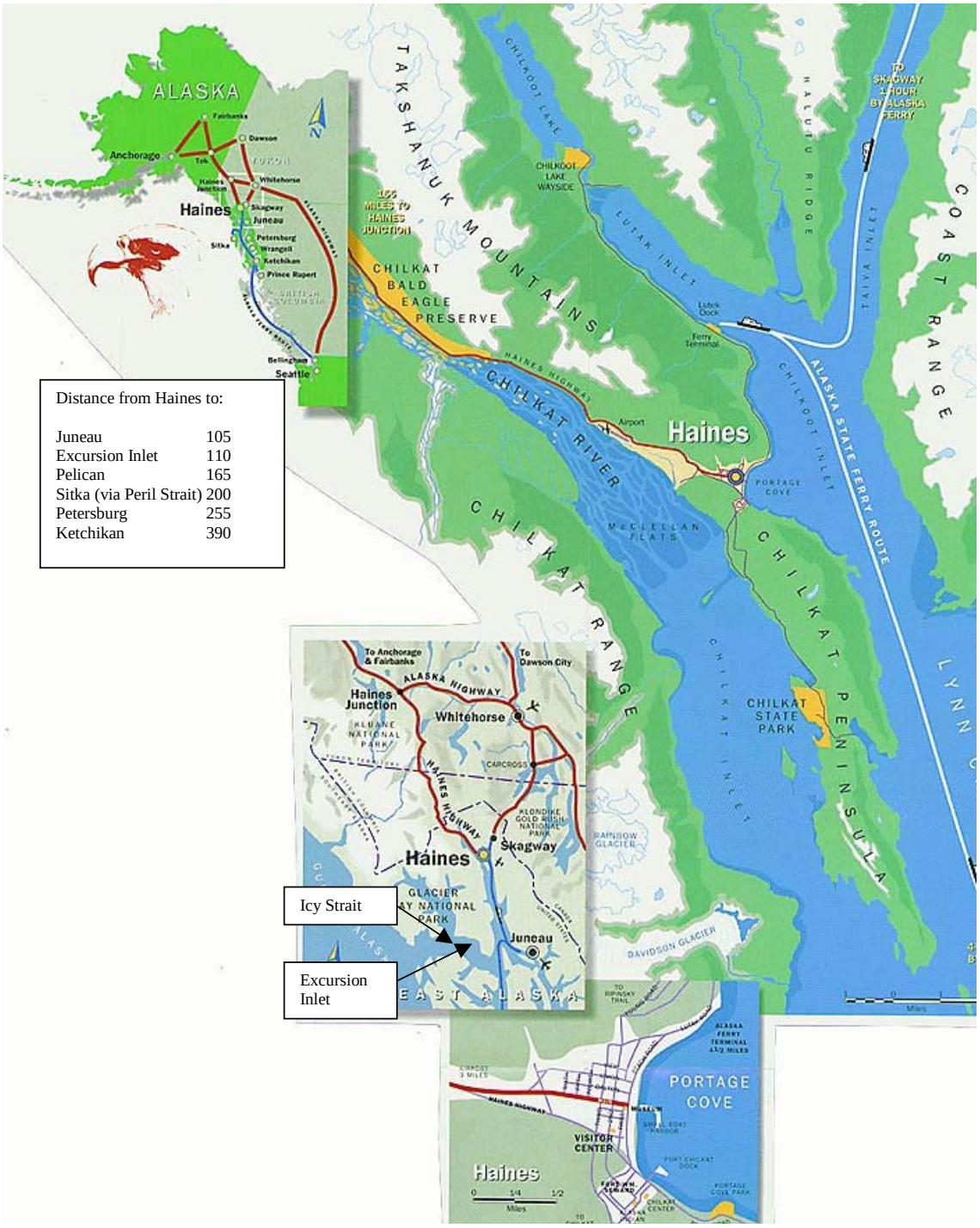

Figure 15. Haines Location Map

The only other community in SE Alaska with connection to the Alaska Highway system is Skagway (see map above), which is located about 16 miles from Haines at the north end of Lynn Canal. Skagway is not an alternative fish handling port for salmon and halibut for a number of reasons. First, there are no existing fish buying/handling/processing businesses located in Skagway. Second, harbor facilities Skagway are inadequate to handle the fishing

fleet. And, third, during the salmon fishing season the harbor and the community are overcrowded with tourists. Skagway is the primary destination for cruise ships that visit Alaska's Inside Passage and there are frequently as many as five cruise ships at Skagway at a time. In the final analysis, Skagway is not an alternative to Haines as a fishing port because it is a tourist town, not a fishing town.

Fish processing/handling facilities are also located at Excursion Inlet and at Hoonah. These facilities are not alternatives to the facilities at Haines because they produce different products than are produced at Haines. At Haines the product is fresh salmon, halibut and other fish—including black cod and rock fish—that is packed in ice in 1,000-pound tote boxes and shipped by truck to Seattle where it is packaged and shipped to buyers in Canada, Asia and throughout the lower-48 states. The fish processing facility at Excursion Inlet primarily produces canned salmon and the facility at Hoonah primarily produces frozen fish, which is shipped to Seattle by barge.

Economic benefits to expansion of Haines Harbor from expansion of salmon and halibut landings at Haines are based on the increase in landings at Haines with the project and the difference value that fishers receive from buyers in Haines. As has been stated elsewhere, higher prices are available at Haines because of the availability of road access to major markets in southwest Canada and the U.S. Pacific Northwest. The price difference at Haines for salmon is $0.20 per pound[16] and the price difference for halibut is $0.25 per pound.[17] Highway and other infrastructure required to expanded landings of salmon and halibut at Haines is now in place. In addition, planning is underway to expand salmon handling facilities to allow processing of value-added salmon products.[18] Because of uncertainties surrounding the construction of these value-added processing facilities, potential associated NED benefits were not evaluated for this study. Instead the analysis of NED benefits is based solely on the continuation of the existing business model, which consists of marketing fresh fish.. The existing business model was implemented in 1978 and has operated continuously over the past 24 years.

Salmon Market Conditions. A specific market analysis for fresh salmon and halibut was not needed for this study, because markets for the products are well established and the increase in the supply of fresh salmon and halibut represented by the projected increase in landings at Haines with the project is insignificant within the context of the total demand for fresh salmon and halibut. This project would increase deliveries of headed and gutted chum by 2 to 4 million pounds annually. Using an industry rule of thumb which states 100 pounds of fish will produce 53 pounds of fillets, the additional Haines landings would send approximately 1 to 2 million pounds of fillets to market. In 2001, over 66 million pounds (ten times the upper Lynn Canal harvest) of headed and gutted chum were produced by the Alaskan fishing industry[19]. National Marine Fisheries Service (NMFS) data show that 35 million pounds of fresh and frozen chum were exported from July – November 2001 and the primary

[16] Personal conversation with representatives of Haines Fisheries, Inc. and the Alaska Department of Fish and Game, October 2000.

[17] Personal conversation with a representative of Haines Fisheries, Inc., October 2000.

[18] Personal conversation with a representative of the Chilkoot Indian Association, which is negotiating purchase of Haines Fisheries, Inc., October 2000.

[19] Salmon Market Bulletin, April 2002

destinations were Europe (10 million pounds) and China/Thailand (12 million pounds)[20]. Although the full year data is not available, the ASMI states that 72% of exports occur between July and November[21]. Extrapolating from the 35 million pounds it is expected that nearly 49 million pounds of chum would be exported during a full 12 month reporting period and the remaining 17 million pounds would be sold on the US market. This quote from the May 2002 Salmon Market Bulletin is provided to explain the role farmed salmon play in setting market prices.

> *Regardless of the differences between farmed and wild product, imported farmed salmon sets the price of fresh and frozen salmon in the US because it makes up the vast majority of supply. The US imported 178,000 metric tons of fresh and frozen salmon in 2001, about 50% more than Alaska produced. Alaska producers with comparable quality product can reasonably expect to receive more money for their fish, based on the selling points of wild salmon.*

Landings Diverted from other Ports. With harbor expansion the diversion of salmon and halibut from other Southeast Alaska locations (primarily, Excursion Inlet and Hoonah) to Haines could actually increase beyond that which has been projected for this analysis, based on total landings of salmon and halibut in northern Southeast Alaska. Nevertheless, projections developed in coordination with fish buyers currently operating in Haines are considered consistent with the fish buying and processing infrastructure now in existence. As stated in Section 4.2.2 of this report, increased landings of salmon and halibut represent diversions from other ports rather than an increase in total catch. Roe processing would not decrease as a result of this project, it would simply be diverted to Haines.

Future Harvests. The Alaska salmon fishery is one of the most strictly monitored and regulated fisheries in the world. The top priority for the state regulators is to ensure "fixed escapement", which means that the fishery managers first ensure that a sufficient number of spawning adults "escape" harvest so that they may return to the rivers to spawn. Further, the Lynn Canal fishery is primarily an enhanced fishery that is sustained by hatchery releases, so the fishery managers control the release of chum smolt into the Canal.

The long-term sustainability of the fishery does not guarantee that harvests will remain at the 2000 level. Harvest totals are a direct result of the number of smolt originally released by the hatchery and the survival rate in the ocean. Hatchery releases were held at 40-45 million smolt from 1991-1997, then increased to 60 million after 1998. The increased release rate is largely responsible for the strong harvest in 2000 of 754,000 fish. Hatchery releases were at the maximum allowable level in 2000, therefore the 2000 harvest was expected to represent the average harvest for the future. Harvests in 2001 and 2002 for the Lynn Canal were 443,525 and 665,685, respectively. The annual average of the 2000-2002 harvest equals 621,000 fish and this will be assumed as the long-term average harvest.

Fish are delivered in a variety of conditions depending on the practices of the fishermen and processors involved in each transaction. The typical practice is for fish to be delivered whole, with the roe already stripped from the females. As previously noted in this report though, a

[20] Salmon Market Bulletin, Feb 2002

[21] ibid

growing practice in Southeast Alaska is for the fish to be headed and gutted with the roe removed from the females. In instances where the roe have been removed, the remainder of the carcass is "discarded". State law forbids the disposal at sea of these carcasses, so the fishermen deliver them to tenders or processors for processing into fish food.

The prices used in this analysis are averages of all transactions and reflect deliveries of fish in all conditions and therefore are appropriately applied to all of the tonnage used in the analysis. Estimating the appropriate tonnage is a challenge however. Deliveries include whole fish; whole fish with roe removed; and headed and gutted fish with roe removed. Therefore, in some transactions the processors may be paying for less than the average of 9.83 pounds per fish assumed in the analysis. Weights and prices paid are recorded on the "Fish Tickets" that document each transaction; however, these tickets are covered by the confidentiality rules discussed previously. Our only option is to estimate the reduction in weights assuming partial processing and roe removal from the females. It is appropriate to assume 50% of the fish are females and that they would all have the roe removed due to the high value of the roe. Given that the females would have their eggs removed and some would be partially processed (i.e. heads and guts removed), the weight of the harvest would be reduced by approximately 5%. When we reduce the weight of the harvest by 5% we arrive at an annual harvest estimate of 3,800,000 pounds under without project conditions and 5,799,209 with the project. These volumes have been used in the benefit calculations shown in Table B-32.

Transportation Distances and Costs. The salmon fishery is located in central Lynn Canal. The salmon fishing grounds are about 38 miles from Haines and about 63 miles and 69 miles from alternative ports/fish processing facilities at Hoonah and Excursion Inlet, respectively. Halibut that is delivered to Haines, including the expected increase in landings with the project, is caught primarily in Icy Strait, Cross Sound and waters of the Gulf of Alaska adjacent to Cross Sound. Lynn Canal has a very limited halibut fishery. The location of Icy Strait (the channel that connects Lynn Canal to the Gulf of Alaska) and Cross Sound (the junction of Icy Strait with the Gulf of Alaska) is shown on the above map (Figure 15). Fish handling/processing facilities at Hoonah and Excursion Inlet are located on Icy Strait (see Figure 11—Hoonah is located across Icy Strait toward the southeast from Excursion Inlet.). However, the location of the Excursion Inlet facility (owned by Ward Cove, Inc.) is irrelevant to the analysis of halibut benefits because the facility does not handle/process halibut. Delivery of halibut to Haines rather than Hoonah would increase transportation distance for the 35 vessels that are not home-ported at Haines by about 100 miles (one way). The vessels that are home-ported at Haines are not affected because these vessels typically return to Haines at the end of each fishing trip. The transportation cost savings to the salmon fishery and the transportation cost increase to a portion of the halibut fishery with the project and increased landings of salmon and halibut at Haines were not evaluated for this study. Because salmon landings represent more than 94 percent of the total increase in landings, there would be a net transportation cost savings with the project.

The increased value and NED benefit to expanding the harbor is computed as the difference in the increase in the value of salmon and halibut landings due to the presence of the harbor and amounts to about **$409,800**. Details of the evaluation including the price differences used are shown in table B-32.

The increase in landings at Haines with the project would be harvest that is diverted from other processors. However, the loss of revenue to those processors is a regional impact that is not relevant in the NED analysis. In addition, the total volume of diverted landings would not have a significant impact on the financial health of the affected companies.

Table B-32. Increased Ex-Vessel Value of Enhanced Chum Salmon and Halibut with the Harbor Expansion

Fishery/Items	w/o Project	w/Project	Change
Chum Salmon			
Lynn Canal Resource 1/	6,104,430	6,104,430	-
Number of pounds landed 2/	3,800,000	5,799,209	1,999,209
Price difference at Haines ($/lb)	$0.20	$0.20	$0.20
Difference in Value	$760,000	$1,159,842	$399,842
Halibut			
Northern SE Alaska Resource 3/	6,000,000	6,000,000	-
Number of pounds landed 4/	800,000	1,000,000	200,000
Price difference at Haines ($/lb)	$0.25	$0.25	$0.25
Difference in Value	$200,000	$250,000	$50,000
Potential Project Benefit			$449,842

NOTES

1/ With-Project is based on average harvest for 2000-2002 and an average weight per fish of 9.83 pounds. The total weight has been reduced by 5% to account for roe removal from females and heading and gutting of some fish.

2/ Estimated landings without the project is projected landings by Rainbow Glacier Seafoods, Seapak and Haines Fisheries for 2001.

3/ The sum of landings during 2000 at Haines, Juneau, Hoonah, Gustavus, Pelican, Sitka, Angoon and Tenakee Springs.

4/ Estimated landings without the project is projected landings by Haines Fisheries for 2001.

Fish Handling/Processing Infrastructure Requirements

Infrastructure for processing/handling fish at Haines is located at the Lutak Dock. Besides the city-owned dock there are no permanent structures associated with the processing/handling of fish. Existing equipment consists of two cranes, one 10-inch fish pump, two forklifts, two refrigerated storage containers, three non-refrigerated storage containers and, an ice plant. With the projected increase in fish landings at Haines with expansion of Haines Harbor the only additional equipment that would be needed is an ice machine with a daily capacity of 20 to 40 tons. The ice plant is used to produce ice for fishing vessels that deliver to Haines and to pack fresh fish for transport by truck to Seattle. The owner of Haines Fisheries, Inc., estimates that the ice plant would cost about $50,000 for a used machine and about $100,000 for a new machine.[22] This is considered to be a self-liquidating associated cost. The ice plant expansion is an investment that is tied to the with-project condition and must be in place in order to achieve the benefits. Because of the higher volume, and with other fixed costs

[22] Personal conversation with Stan Woods, Haines Fisheries, Inc., 4 October 2002.

remaining the same, the cost of an additional ice machine would not increase the marginal cost of handling/processing fish at Haines. Actually, the increased fish landings at Haines would decrease the average cost of handling fish at Haines because, except for the ice plant, the capacity of existing equipment is sufficient to handle the projected increase. Therefore, the cost would be self-liquidating from normal plant revenues.

There are no conventional (such as a cannery) fish processing facilities associated with the fish handling/processing operation at Haines because the product produced, shipped and marketed at Haines is fresh fish. It is noted, however, that salmon roe is collected and packed in 5-gallon containers by the fishers and delivered to Haines. There is no further processing of the roe at Haines before it is shipped to markets in Asia. Roe processing would not decrease as a result of this project, it would simply be diverted to Haines. Fishers also collect the heads and guts, which are sold to a separate company that operates a barge-based fish-meal processing plant. This plant operates on the fishing grounds and would not be affected by the expansion of Haines Harbor or the projected increase in salmon landings at Haines. Halibut is also headed and gutted by the fishers. As a result, the processing at the dock at Haines consists solely of off-loading the fishing vessels, packing the fish in ice in 1,000-pound tote boxes and loading the totes on trucks for transport to buyers/distributors in Seattle. Storage facilities are used for temporary storage of ice and fish packed in tote boxes. Temporary storage for the packed tote boxes is needed to enable off-loading of fishing vessels when trucks are not at the dock. Figure 16 is a photograph of the dock area and associated fish handling/processing facilities at Haines. The photo was taken in October 2002 after the end of the salmon season. As the reader can see from the photo, fish processing/handling facilities are minimal.

Trucks that are used to transport the fish are trucks that are returning from Anchorage and Fairbanks to Seattle empty. Because the trucks are returning empty to Seattle, fish buyers/shippers at Haines are able to obtain a very favorable freight rate. The rate paid during the 2002 season was $0.12 per pound. This compares with quote for airfreight from Alaska Airlines of $0.65 per pound that was obtained by Haines Fisheries in 1997. It was in that year that Haines Fisheries switched from airfreight to truck freight. From 1978 to 1997 fish were shipped by air on Delta Airlines. Delta terminated its service to SE Alaska.[23] The favorable back-haul freight rate that is now available at Haines is expected to continue throughout the life of the project because Alaska does not produce a significant amount of products that are or could be transported back to Seattle as back-haul.

[23] Ibid.

Figure 16. Fish handling/processing facilities at Lutak Dock, Haines, Alaska (Oct. 2002).

Large Cruise Ship Operating Costs

Expansion of Haines Harbor and elimination of congestion in Portage Cove would eliminate delays in docking large cruise ships that call at Haines. Economic benefits associated with the elimination of delays in docking large cruise ships are measured in terms of reduced vessel operating costs. The evaluation takes account of the number of average delays experienced per year,[24] the length the delays,[25] and variable vessel operating costs.[26] The evaluation shows that the delays result in increased costs to the cruise lines of about **$31,400** annually. The details of the evaluation including assumptions on vessel operating costs are shown in table B-33.

[24] Cruise Line Agencies of Alaska, March 2001.

[25] Cruise Line Agencies of Alaska, March 2001.

[26] Limited to the cost of fuel in this case.

Table B-33. Large Cruise Ship Benefits with Harbor Expansion

Variable Vessel Operating Costs[1]	
Number delays/year	2
Length of delay/incident (hrs)	0.75
Fuel used (mtons/hr)	70
Cost of fuel per mton	$298.81
Total Vessel Delay Costs	$31,375
NOTES	
[1]Fuel use assumptions:	
Fuel use per 24-hour day at sea (mtons) = 140	
Fuel use during delay (% of at-sea rate) = 50%	
Residual fuel cost per barrel = 42.58	
Gallons per barrel = 42.00	
Pounds per gallon = 7.60	
Pounds per mton = 2,240.00	
Gallons per mton = 294.74	
Barrels per mton = 7.02	

Source: Personal conversation with Ian Mathis, IWR, March 2001

Winter Moorage for Local Vessels

Project benefits from winter moorage of local vessels is the savings in costs that would be realized by mooring vessels in the expanded harbor compared with taking them to Seattle for winter moorage. Vessels are taken to Seattle because the existing harbor and slips are too small to accommodate these vessels. Data for the evaluation of comparative costs was obtained from the owner of the vessels. Winter moorage is required for the six months from October through March. During the balance of the year weather conditions at Haines are such that the vessels can be moored at an unprotected dock when they are not in use. At present there are three vessels that are taken to Seattle for the winter. With expansion of the harbor two of the vessels could be moored at Haines Harbor at annual cost savings and project benefit of $3,600. The third vessel would be taken to Seattle on a rotational basis for maintenance work that cannot be done at Haines. Details of the analysis including assumptions and data sources are presented in table B-34.

Table B-34. Winter Moorage of Chilkat Cruises Catamarans at Haines vs. Seattle

	w/o project	w/project
Number of vessels 1/	3	3
Number of vessels taken to Seattle 2/	3	1
Number of vessels moored in Haines	0	2
Number of months of winter storage	6	6
Cost Seattle moorage/month/vessel 3/	$500	$500
Cost of Haines moorage/month/vessel 4/	$200	$200
Total winter moorage costs	$9,000	$5,400
Benefits to Expansion of Haines Harbor		$3,600
Notes and Assumptions		
1/ Vessels sizes are 2 @ 78 and 1 @ 62 OAL with beams from 22 to 26 feet		
2/ With the project one vessel, on average, would need to be taken to Seattle for maintenance work.		
3/ Includes moorage, variable costs of vessel operation and crew transportation between Haines and Seattle.		
4/ Average of winter and regular rates ($160, winter & $240 regular).		
Sources: Personal communications with Chilkat Cruises and the harbormaster at Haines Harbor.		

Expansion of Water Taxi Services:

Harbor improvements will allow water taxi services to increase by one vessel, according to the operator of the existing water taxi service. Because the expansion of the service is induced by harbor improvements benefits are evaluated as recreation using the unit-day method as explained in the "Economic Guidance Memorandum 02-04--Unit Day Values for Recreation, Fiscal-Year 2002," 1 March 2002, U.S. Army Corps of Engineers. Estimates of vessel capacity, season of operation and monthly capacity factors used in the analysis were obtained from a representative of the company that currently provides water taxi service between Haines and Skagway and would add daily round-trip water taxi service between Haines, Skagway and Juneau with expansion of the harbor. Review of relevant data including the number of independent travelers arriving by highway at Haines and Skagway and planning work being done by the State of Alaska on the feasibility of providing fast ferry service to north Lynn Canal indicated that the estimates of demand made by the water taxi service are reasonable. Therefore, the demand for the service was not independently derived for this study.

The demand for the service is based on visits by independent travelers who come to Haines and Skagway by road and would like to spend a day or more visiting Juneau. Current data on independent travelers show that over 250,000 such travelers visit Haines and Skagway annually. At present the only transportation option for these travelers is commercial air services. During the summer (from 24 May through 9 September) the State ferry system also makes daily round-trips from Juneau to Haines and Skagway. However, travelers originating in Haines and Skagway would have to spend two nights in Juneau in order spend a day visiting the area. At least two commercial air services have schedules that would allow a visitor to travel to Juneau, spend the day and return to Haines or Skagway the same day. The cost of air transportation is approximately double the rate proposed for the water taxi service.

Details of the analysis, which was done on a monthly basis, including assumptions and sources of data are shown in table B-35. The analysis shows that NED recreation benefits from expansion of water taxi services with expansion of the harbor would total about **$51,055.**

Table B-35. Expansion of Water Taxi Services

	May	June	July	Aug	Sept
Increased no. of vessels 1/	1	1	1	1	1
Vessel capacity 1/	49	49	49	49	49
Capacity factor 2/	90%	95%	100%	100%	100%
No. of trips 1/ 4/	16	30	31	31	15
No. of passengers	706	1,397	1,519	1,519	735
Recreation day value 3/	$8.69	$8.69	$8.69	$8.69	$8.69
	$				
NED Recreation Benefits	$6,132	$12,136	$13,200	$13,200	$6,387
Total Water Taxis Services NED Benefits					$51,055
Total Projected Number of Passengers					5,875
ASSUMPTIONS					
1/ Vessel data, including fares and schedules are from data provided by a representative of a water taxi.					
2/ Capacity factor is based on relative numbers of independent travelers at Haines and Skagway during the travel season.					
3 Recreation-day values are general values from EGM 02-04, 1 March 2002. Values were determined following "Guidelines for Assigning Points for General Recreation.					
4/ Daily round-trips from Haines to Skagway to Juneau from 15 May through 15 September.					

Expansion of Charter Boat Services

With expansion of Haines Harbor charter fishing and sightseeing services existing businesses would expand their operations. On the basis of current plans, four new charter-fishing boats and one new sightseeing boat would be put into operation. Because these vessels would not operate in the without project condition, economic benefits are considered to be recreational rather than commercial (ER 1105-2-100). The expanded charter services would primarily serve visitors who arrive by large cruise ships and independent travelers who arrive at Haines and Skagway by highway (the Alaska Highway that runs from the lower-48 states through Canada to Alaska).

Analysis of projected visitation based on scheduled calls by large cruise ships at Haines and Skagway during 2001 and recent levels of visits by independent travelers shows a total of more than 650,000 potential charter boat clients (250,000 independent travelers and about 425,000 large cruise ship passengers). Success of current expansion plans by the industry requires only about 900 of these people to use the charter services. This represents just slightly more than one-tenth of one percent of the potential client population. Based on the level of charter services offered at other Southeast Alaska ports of call for the large cruise ships it is probable that the actual level of services that will be offered at Haines with expansion of the harbor will be significantly higher than is indicated by current plans. Accordingly, estimated economic benefits of harbor expansion to the charter boat industry

are considered to be representative of the minimum level of development that can be expected. At this level of development, annual economic recreation benefits to harbor expansion would amount to a total of about **$242,687** ($151,679 to sightseeing charters and $91,008 to fishing charters). Recreation-day values were estimated following “Guidelines for Assigning Points for Special Recreation" (EGM 02-04, 1 March 2002). Both charter fishing and wildlife viewing in north Lynn Canal are considered to be “specialized recreation” activities with a recreation-day value of $34.41. Details of the analysis including input values and assumptions are shown in table B-36.

Table B-36. Recreation Benefits from Expansion of Charter Boat Services

Wildlife sightseeing vessels	Apr	May	Jun	Jul	Aug	Sep	Totals
Number of vessels	1	1	1	1	1	1	
Vessel capacity 1/	40	40	40	40	40	40	
Capacity factor 2/	80%	91%	90%	90%	90%	88%	
No. of trips 1/ 3/	3	21	25	26	27	21	
No. of clients	96	768	904	936	968	736	4,408
Recreation-day value 4/	$34.41	$34.41	$34.41	$34.41	$34.41	$34.41	$34.41
Estimated Recreation Benefits	$3,303	$26,427	$31,107	$32,208	$33,309	$25,326	$151,679
Charter fishing vessels							
Number of vessels	4	4	4	4	4	4	
Vessel capacity 1/	6	6	6	6	6	6	
Capacity factor 2/	80%	91%	90%	90%	90%	88%	
No. of Trips 1/ 3/	3	21	25	26	27	21	
No. of clients	14	115	136	140	145	110	661
Recreation-day value 4/	$34.41	$34.41	$34.41	$34.41	$34.41	$34.41	$34.41
Estimated Recreation Benefits	$1,982	$15,856	$18,664	$19,325	$19,985	$15,195	$91,008
Total Charter Revenue/Benefits							$242,687

NOTES

1/ Vessel data, including fares and schedules are from data provided by a representative of a charter boat company.

2/ Capacity factor is based on the number of cruise ship passengers in northern Lynn Canal.

3/ Trips are scheduled to coincide with cruise ship calls.

4/ Recreation-day values are specialized values from EGM 02-04, 1 March 2002 Values were determined following "Guidelines for Assigning Points for Special Recreation."

Determination of Trips and Capacity Factors for Charter Vessels in Northern Lynn Canal 1

Item	Apr	May	Jun	Jul	Aug	Sep	Totals
Total number of calls	3	43	53	56	55	36	246
Number of days with calls	3	21	25	26	27	21	
No. of days with 2 or more calls	0	12	13	13	13	8	100%
Number of days with one call	3	9	12	13	14	13	80%
Weighted capacity factor	80%	91%	90%	90%	90%	88%	

NOTES

1/ Does not include consideration of the number or distribution of independent travelers throughout the year. Assumes capacity factor of 80 percent with one call by a large cruise ship and 100 percent with two or more. Cruise ship schedules were obtained from Cruise2.com, March 2001.

Oil Spill Response Vessel Operations:

Oil Spill Response Plan. Two oil spill emergency response vessels—40-foot barges with two small workboats and specialized oil spill containment and cleanup equipment—are operated from Haines under the oil and hazardous substance discharges/releases response plan for southeast Alaska. The Southeast Subarea Contingency Plan is a supplement to the *Alaska Federal/State Preparedness Plan for Response to Oil & Hazardous Substance Discharges/Releases* (commonly referred to as the Unified Plan). The Unified and the Subarea Contingency Plans represent a coordinated and cooperative effort by government

agencies and were written jointly by the U.S. Coast Guard, the U.S. Environmental Protection Agency, and the Alaska Department of Environmental Conservation. The Oil Pollution Act of 1990 (OPA 90) requires the USCG and the USEPA to prepare oil spill response plans for the State of Alaska, which is designated as an entire planning region under Federal guidelines. Alaska statute requires the ADEC to prepare a statewide master plan addressing oil and hazardous substance discharges. The Unified Plan meets those Federal and State planning requirements.

In the event of an oil spill in northern Lynn Canal, the local emergency response team would contract with vessel owners in the area who have vessels with the required horsepower to move the barges to the site of the spill. Because the majority of vessels large enough to handle the barge are fishing vessels in the event of a minor oil spill, the team would obtain the services of a fishing vessel in the size range of from 50 to 60 feet OAL for the duration of the response operation. In the event of a major oil spill equipment from throughout the region would be called in to assist in containing the spill and completing clean-up operations. Self-propelled high-speed emergency response vessels are located in Juneau and would provide initial spill containment and clean-up assistance. Other equipment would then be drawn from other areas as needed.

History and Risk of Oil Spills. Crude oil is not transported from or through southeast Alaska. The only risk of spill from transport of crude oil is the risk of spills in offshore waters. The nearest channel connecting Lynn Canal to offshore waters is Icy Strait and Cross Sound, whose entrance lies more than 80 miles south and then 60 miles west of Haines. Because Lynn Canal is a relatively long, narrow arm of the ocean (80 miles long by only about six miles wide at its mid-point) there is essentially no circulation of water into the Canal from offshore waters. For this reason the risk of an environmental hazard to northern Lynn Canal from a crude oil spill is nonexistent.

Southeast Alaska, including Lynn Canal, supports a wide variety of marine vessel traffic, from small recreational boats up to medium-sized tank ships and large cruise ships. Numerous opportunities exist for spills to occur due to the high volume of vessel traffic, the pervasive natural navigational hazards, and the large volume of oil products transported in the region.

On average, 300-500 non-persistent oil spills are reported annually in SE Alaska to the USCG or the ADEC. The majority of these spills are less than 15 gallons and result mostly from bilge pumping operations, fuel tank overflows, or mystery spills. Cleanup is usually not required or possible due to a combination of rapid natural dispersion and travel time to scene. The majority of spills in the 50-300-gallon range are from fishing vessels.

Spills larger than 500 gallons have occurred as a result of grounding of tank barges and ships, sinking of fish processor, discharges from cruise ships, and ruptures in pipelines at land storage facilities. Southeast Alaska has had 10 spills of greater than 1,000 gallons from grounding of tank barges or ships, due primarily to the navigation hazards associated with narrow channels and bedrock shoals. Response operations have generally proven ineffective in removing oil from the water due to adverse weather and ocean current conditions, the often-lengthy travel time to the incident location, and the lack of product concentration as a result of rapid natural dispersion and evaporation. The largest recorded spill in northern Lynn

Canal occurred at Skagway in 1984 as a result of a ruptured pipeline. A total of 50,000 gallons of refined petroleum product was spilled.

In July 1991, a private study conducted the State of Alaska Department of Environmental Conservation by Arthur D. Little, Inc. found that Southeast Alaska is the most spill-prone region in Alaska, but the average spill size is less than 15 gallons.

Oil Spill and Response Scenarios

- The worst-case scenario for an oil spill in Southeast Alaska is a spill of 20,000 barrels of refined product as a result of the grounding of a tank barge because of loss of by the towing vessel and adverse weather (30-mph winds). In this scenario, the response plan requires deployment of initial containment booms within 24 hours and deployment of essentially all other containment and clean-up equipment within about 72 hours. On the basis of the assumption of operating one 12-hour shift per day, nearly 600 clean-up personnel would be required. Requirements will double for 24-hour operations. Equipment requirements would include approximately 60 tugboats, barges and boom tending vessels and about 40 work skiffs. There is some possibility that this type of spill could occur in northern Lynn Canal. However, the single response vessel could do little to contain and cleanup a spill of this magnitude.
- The maximum most probable scenario for an oil spill in Southeast Alaska is a spill of 6,600 barrels of diesel and gasoline as a result of a grounding of a tank barge in Lynn Canal. Under this scenario, the towing vessel does not loose power. As in the worst-case scenario, containment booms are deployed within 24 hours and full cleanup operations are underway within 72 hours. Personnel and equipment requirements are similar to those of the worst-case scenario. Under this scenario, equipment at Haines would provide the initial response but additional equipment would need to be drawn from other areas of northern Southeast Alaska.
- The average most probable scenario for an oil spill in Southeast Alaska is a spill of approximately 1,000 gallons of refined petroleum product as a result of a fuel transfer accident. Under this scenario, local equipment would be deployed to contain the oil and adsorbent pads and snares would be used to clean up the oil. Personnel and resource requirements would be limited to a single response vessel, such as the one at Haines, and a towboat to maneuver the response vessel into place, etc.

Oil Spill Trends. The Alaska Department of Environmental Conservation reports oil spill data on a statewide basis. Data currently available cover the period from July 1995 through March 2000. During this period the number of spills is reasonably consistent from year to year a high in 1998 of about 2,500 spills and a low in 1996 and 1997 of about 2,250 spills. This data is shown in table B-37.

Table B-37. Oil Spill Trends--Number of Incidents July 1995 Through March 2000, All of Alaska

Month	1995	1996	1997	1998	1999	2000	Average
Jan		188	175	180	166	138	169
Feb		164	165	166	196	157	170
Mar		170	198	224	213	155	192
Apr		200	218	221	223		216
May		217	245	274	200		234
Jun		259	244	271	293		267
Jul	243	229	222	217	245		231
Aug	293	210	184	202	236		225
Sep	236	191	198	193	222		208
Oct	201	168	159	221	221		194
Nov	140	132	120	153	134		136
Dec	161	118	122	110	137		130
Total	1,274	2,246	2,250	2,432	2,486	450	

Source: Spill Data Quarterly Summaries, Alaska Department of Environmental Conservation, January-March 2000 Newsletter.

Oil Spill Response Strategy for Lynn Canal Without Harbor Expansion and Additional Costs. Oil spill response in Southeast Alaska, including Lynn Canal, is the responsibility of SEAPRO (Southeast Alaska Petroleum Resource Organization). SEAPRO is a not-for-profit organization that maintains and operates oil and hazardous waste spill response equipment. Historically, SEAPRO has been called on to respond to four oil spill incidence in Southeast Alaska each year, on average. Also, on average, one of these incidents can be expected to occur in Lynn Canal. In the absence of permanent moorage for response vessels at Haines, SEAPRO would most likely acquire and operate a relatively high-speed, self-propelled vessel from Auke Bay near Juneau. The additional cost of owning and operating this vessel is the basis for oil spill response benefits to expansion of Haines Harbor. The additional costs—costs that would be saved with expansion of Haines Harbor and continued moorage of a response vessel at Haines—total about **$87,700**. The additional cost includes the fixed cost of ownership of the new vessel, the variable cost of running the vessel from Auke Bay to northern Lynn Canal, and the additional cost of labor associated with the additional vessel operating time to northern Lynn Canal and back to Juneau. Costs were developed from information and data obtained from SEAPRO. The methodology and assumptions used in computing these additional costs are shown in table B-38.

Table B-38. Oil Spill Response Cost Savings with Expansion of Haines Harbor

Elements of the Evaluation	Amount
Additional Fixed Costs	
Cost of vessel	$650,000
Vessel life (yrs)	30
Interest rate (%)	8%
Interest	$52,000
Depreciation	$21,667
Maintenance & insurance	$10,833
Total Annual Fixed Costs	$84,500
Additional Variable Costs	
Assumptions:	
Increased distance (mi) 1/	95
Vessel operating speed (mph)	20
Average no. of incidents/year	1
Fuel use at running speed (gals/hr)	50
Fuel cost ($/gal)	$1.60
Variable maintenance Cost (% of fuel cost)	100%
Crew	6
Hourly wage rate for crew ($/person)	$30.00
Variable Costs	
Fuel	$760
Variable maintenance cost	$760
Labor	$1,710
Total Annual variable costs	$3,230
Total Additional Annual Costs and Project Benefits	$87,730

Note: 1/ Alternate location--Juneau (Auke Bay)

Subsistence Use Benefits

Estimating Subsistence Use Benefits. There are three major variables involved in estimating the subsistence benefit:

- Useable weight conversion
- The projected increase in subsistence harvest
- 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. 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 in table B-39.

Table B-39. Usable Weight of Selected Subsistence Harvest

Species	Useable Weight In Pounds
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	.5 per gallon
Crab	.7 - 1.6
Sea Lion, Seal, Porpoise	37 - 100
Bear, Deer, Mountain Goat	58 - 70
Ducks	.4 - 1
Canada Geese	3.6
Grouse, Ptarmigan	.7
Cormorant	2.5
Berries	4 per gallon

Sources: Alaska Department of Alaska Department of Fish and Game, Division of Subsistence, Juneau, Alaska and Economic Analysis for Navigation Improvements at Tatitlek, Alaska, by Kenneth Boire, Consulting Economist.

Economic benefits that are anticipated as a result of the navigation improvements for Haines 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, Haines is similar to many rural communities in Alaska.

The subsistence benefit depends on what changes in harvest practices and success rates villagers will realize as a result of a boat harbor. Another point of view treats the harvest as a multi-purpose resource. The rational 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, value placed on the harvest in State studies have shown between $3-$5 per pound. There is little research to support the range, however one attempt added up 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 that will result from the project in a typical benefit-cost format, we need to calculate an economic value associated with the increased subsistence production resulting from the with-project condition. 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.

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 muddled 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 does, providing overall health benefits does.

The Braund report (Stephen Braund and Associates, 1977) on subsistence activities provides a general overview of the role of subsistence. It also estimates a 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.

Basis for Value of Without- and With-Project Subsistence Harvest. There is a benefit from the proposed project: increased production of subsistence foods by the residents of Haines. The basis for the value of subsistence harvests is the cost of store items that are replaced by the subsistence harvests. Recent prices of replacement items are presented in table B-40. The average price of the meat items listed in table B-s2 of $4.61 is used in the evaluation of without- and with-project scenarios as the value subsistence harvests.

Table B-40. Prices of Meats and Related Products at Haines

Item	Weight	Unit Price ($)	Cost per lb ($)
BEEF			
beef liver	1 lb.	1.99	1.99
beef patties	1 lb.	2.49	2.49
beef tongue	1 lb.	6.99	6.99
beef #1, ground	1 lb.	1.99	1.99
beef, corn	1 lb.	2.99	2.99
chuck roast	1 lb.	2.69	2.69
short ribs	1 lb.	4.29	4.29
steak, N.Y. strip	1 lb.	7.99	7.99
steak, rib	1 lb.	7.49	7.49
steak, sirloin tip	1 lb.	3.79	3.79
steak, T-bone	1 lb.	7.49	7.49
steak, Top round	1 lb.	3.79	3.79
stew meat	1 lb.	2.99	2.99
top sirloin	1 lb.	4.49	4.49
PORK			
pork chops, center cut	1 lb.	2.99	2.99
pork chops, center cut, boneless	1 lb.	4.29	4.29
pork spareribs	1 lb.	2.49	2.49
pork steak	1 lb.	2.69	2.69
CHICKEN			
chicken breast, boneless	1 lb.	4.69	4.69
chicken patties	3 lbs.	5.99	2.00
chicken thighs	1 lb.	2.49	2.49
CANNED			
canned chicken	5 oz.	2.10	6.72
canned herring	15 oz.	3.99	4.26
canned sardines	3.75 oz.	0.93	3.97
canned sausage	5 oz.	0.83	2.66
canned SPAM	7 oz.	3.13	7.15
canned tuna	6 oz.	1.00	2.67
MISCELLANEOUS			
bacon, regular	1 lb.	4.89	4.89
bacon, Canadian	1 lb.	6.29	6.29
beef jerky	1 lb.	16.99	16.99
hot dogs	1 lb.	3.29	3.29
ox tail	1 lb.	3.59	3.59
Polish sausage-frozen	3 lbs.	5.69	1.90
Average Meat Price Per Pound			4.61

Source: Meat Department Manager at Haines, Grocery Store, January 31, 2001.

Without Project Subsistence Benefits. The annual replacement value for subsistence production of food by Haines borough residents is estimated at $1,294,422 per year. This estimate is based on the number of residents in the Haines borough (2,516) as of December 2000, the average per capita consumption of subsistence meats (111.6 pounds) and the actual replacement cost for the subsistence foods ($4.61 per pound).

Per capita consumption of subsistence food for residents of Haines was determined through analysis of data collected by the Division of Subsistence (Alaska) during a baseline harvest study in Haines in 1984 for the year 1983, and again in 1988 for the year 1987 as part of the Tongass Resource Use Cooperative Study. Survey sample selection in 1983 was non-stratified random; 147 of 660 Haines households were included in the survey sample. A stratified random sample of 62 of 608 Haines households was surveyed in 1988. Data were expanded in order to estimate community harvest levels and participation. Information in the report was reviewed and revised in January 1998. The data is shown in table B-41.

Table B-41. Summary of Haines Subsistence – 1983, 1987 and Average

	1983	1987	Average
Total pounds harvested	240,029	157,925	198,977
Mean household harvest (in pounds)	363.7	259.63	311.7
Per capita harvest (in pounds)	125.8	97.33	111.6
Percentage of households usage	96.6	92.5	94.6
Percentage of households harvesting	88.4	82.5	85.5

Source: Subsistence Resource Use Patterns in Southeast Alaska: Summaries of 30 Communities (Haines). Alaska Department of Fish and Game, Division of Subsistence, Juneau, Alaska. Revised January 1998.

Harvest levels are presented as numbers of individual resources and as pounds edible weight. Harvest level data for most resources were collected as numbers of individual resources, but also as pounds, gallons, quarts, or cords. Conversion factors reflect the usual edible weight of each resource in pounds. Mean household and per capita harvests are presented for sampled households in pounds edible weight. Household participation categories include percentage of households harvesting, giving, receiving, or using a resource. Using refers to those households giving or receiving, as well as those harvesting a resource during the study year. A summary of this information is presented below

By averaging the two years (1983 and 1987), it was determined that an average per capita harvest is 111.6 pounds per Haines resident. As shown in table B-42, salmon is the greatest quantity harvested in the community in both 1983 and 1987. In addition, population data recently revised (December 2000) by the State of Alaska, Department of Labor, Research and Analysis Section, Demographic Unit, shows the current figure at 2,516 Haines borough residents.

Table B-42. Greatest Quantity Harvested (in edible amounts)

	1983	1987
Salmon	Sockeye, Chum, Chinook	Sockeye, Chinook
Non-Salmon	Halibut, Hooligan, Trout, Char	Trout, Char, Halibut
Game	Moose	Deer, Moose
Marine Mammals	Seal	Harbor Seal
Birds and Eggs	Ducks	Upland Game Birds
Marine Invertebrates	Tanner Crab	Dungeness, Tanner Crab
Plants and Berries	Berries	Berries, Seaweed/Kelp

Source: Subsistence Resource Use Patterns in Southeast Alaska: Summaries of 30 Communities (Haines). Alaska Department of Fish and Game, Division of Subsistence, Juneau, Alaska. Revised January 1998.

With Project Subsistence Benefits. To evaluate the potential project benefits to the community residents and to the nation, this report analyzes non-market value of the additional subsistence production that would be possible in the with-project condition.

In analyzing the impact of completion of the harbor improvements requires addressing the benefit resulting to the project. Insufficient information from community residents was unable to determine the degree to which subsistence production could be expected to increase in the with-project situation. Therefore, a number of logistical steps were made as follows:

Assumption 1. All subsistence needs are not currently being met, and that an effective boat harbor constraint has restricted harvest and production of subsistence foods.

Assumption 2. Removing the constraint (with the project) would result in a direct increase in the subsistence hunting, fishing and food gathering activities.

Assumption 3. This increased effort will be rewarded by a proportional increase in subsistence harvests.

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, there is congestion and overcrowding at the small boat harbor (existing conditions) that may occur up to 30 percent of the time.

Thirty (30) percent is the maximum that is anticipated for increased subsistence harvests. The actual change in subsistence production could be lower if subsistence production rates decreased somewhat as effort was increased. On the other hand, subsistence production could actually increase more than 30 percent if uncertainty in being able to leave and return has inhibited boating (and subsistence production) to an extent greater then the actual 30 percent warrant. To accommodate uncertainty, and to ensure a conservative approach, half the 30 percent figure, a 15 percent subsistence production increases, as the with-project assumption. In a community such as Haines with very finite employment and income opportunities, the opportunity cost of the additional labor used in subsistence production can be assumed to be very low as well.

A 15-percent (111.6 to about 128.3) or about 16.7 pounds per capita increase (with project) in subsistence harvest valued at $4.61 per pound represents an annual economic value of **$194,200** (16.7 pounds x $4.61 per pound x 2,516 Haines borough residents, rounded).

Summary of Total NED Benefits:

Total estimated NED benefits that would result from expansion of Haines Harbor amount to a total of $**1,496,000** (rounded). Benefits consist of commercial benefits of **$1,202,000** (rounded) and recreation benefits **of $294,000** (rounded). A summary listing of the benefits by category is shown in table B-43.

Table B-43. Summary of Economic Benefits of Expansion of Haines Harbor, Alaska

Benefit Category--Commercial	Amount
Commercial Vessel and Harbor Benefits	
Rafting Delays	$33,479
Weather Delays	$132,150
Hot-Berthing Delays	$20,310
Oversized Vessel Delays	$69,402
Vessel Damages	$37,108
Harbor Facility Damages	$5,000
Salmon Ice Operations	$43,420
Winter Moorage Cost Savings	$3,600
Salmon & Halibut Landings	$449,842
Large Cruise Ship Delays	$31,375
Oil Spill Response	$87,730
Total Commercial Vessel Benefits	$913,416
Pleasure/Subsistence Vessel Benefits	
Rafting Delays	$3,820
Hot-Berthing Delays	$73,194
Oversized Vessel Delays	$16,175
Vessel Damages	$1,667
Subsistence Harvest	$194,163
Total Pleasure/Subsistence Benefits	$289,019
Total Commercial Benefits	$1,202,434
Benefit Category--Recreation	
Charter Boat Operations	$242,687
Water Taxi Service	$51,055
Total Recreation Benefits	$293,741
Total Project Benefits	$1,496,176

5.6 Sensitivity Analysis

Some of the assumptions made in this report are subject to complex social, economic, and natural variables and these assumptions are prone to uncertainty. Therefore, the intent of this analysis is to test the sensitivity of project justification to changes in assumptions regarding the major variables used to compute project benefits. Delay benefits and fish landings are the categories with the greatest impact on project feasibility. Table B-44 highlights the details of the sensitivity analysis.

The evaluation of delay benefits is based on information from a variety of sources: interviews with representatives of the Alaska Department of Fish and Game; the Haines harbormaster and an ad hoc group of harbor users; the cruise ship, charter boat, and commercial fishing industry; and other commercial and recreational boat operators and harbor users. Therefore, the focus of the sensitivity analysis of total delays is in the commercial aspects on the benefit categories: rafting, weather, hot-berthing, oversized vessels, and large cruise ship delays.

There are different approaches in calculating the sensitivity of a variable; however, the various methodologies are somewhat similar. For example, throughout this feasibility report, detailed spreadsheets similar to table B-28, Weather Delays and Costs for Commercial

Vessels, Haines Harbor, have presented data by month. In addition, calculations were made on the probability of an event occurring, the estimated number of vessels using the harbor, the number of days with delays, the total delay hours, the cost of delays per hour, and so forth, to arrive at the total cost of delay. To test the sensitivity of any one of these events, an assumption would need to be made for each month and per incident. Therefore, a more basic approach was employed to produce similar results.

Table B-44. Sensitivity Analysis

Benefit Category Vessel and Harbor Benefits	Amount Claimed	20% Decrease	BCR	20% Increase	BCR
Percent Decrease or Increase		-20%		20%	
Total Delay Benefits	$255,340	$204,272	1.19	$306,408	1.27
Value of Increased Fish Landings	$449,842	$359,873	1.15	$539,810	1.30
Total Benefits	$1,496,176	$1,196,941	0.98	$1,795,411	1.47
Total Annual NED Cost	$1,218,000				
Total Benefits to Cost Ratio (BCR)	1.23	0.98		1.47	
Net Annual Benefits	$278,176	- $21,059		$577,411	

Source: Data taken from Table B-44.

Table B-44 tests the sensitivity of total delays (rafting, weather, hot-berthing, oversized vessels and large cruise ship delay variables) used to generate NED benefits of expanding the Haines Harbor. A factor of 20 percent is used to test the sensitivity of the total delay variables. Therefore, the total amount claimed (benefit) was increased/decreased by 20 percent. For example, total delays claimed are $255,340. When this amount is decreased by 20 percent, then the overall BCR is reduced to 1.19 ($1,496,176 – ($255,340 - $204,272) = $1,445,108); then $1,445,108 / $1,218,000 NED costs = 1.19). Likewise, when delay benefits are increased by 20 percent, the overall BCR increases to 1.27($1,496,176+ ($306,408 - $255,340) = $1,547,244); then $1,547,244 / $1,218,000 NED costs = 1.27). Similar 20 percent changes in the Value of Fish landings would decrease or increase the BCR to 1.15 and 1.30. If all benefit categories were reduced by 20 percent, the resulting BCR would equal 0.98 and a 20 percent increase in all benefit categories would produce a BCR of 1.47.

The variable with the biggest impact to project feasibility is the pounds of chum salmon landed at Haines with the project. The pounds landed are a direct result of the production of the enhanced chum fishery in the Lynn Canal. As mentioned in the Marine Resource Assessment, the Alaska Department of Fish and Game has built several hatcheries around the state in response to demand for Chum salmon. The local effects can be seen in the increased harvest through the mid- to late 1990's as the enhanced fishery established itself. The long-term harvest is expected to remain healthy under the management of the fishery; however, there is uncertainty inherent in the annual returns of adult salmons to the Lynn Canal. A sensitivity analysis was performed to assess the project feasibility if average annual fish landings were to vary by +/- 20% of the 2000 total. If fish landings were reduced/increased by 20 percent, then the benefit of $449,842 would be reduced to $359,873 and increased to $539,810, respectively. The impacts would decrease/increase the overall BCR to 1.15 and 1.3, respectively.

A second sensitivity test was performed on salmon landings to determine the minimum annual harvest required to keep the net benefits positive. Net benefits currently equal $278,176 and salmon and halibut landing benefits equal $449,842. This indicates that net benefits would equal zero if salmon and halibut landing benefits dropped to $171,666. If halibut benefits were zero, salmon landing benefits would equal $171,666 as long as 900,000 pounds of salmon were diverted from other harbors to Haines. Under without project conditions, 4,000,000 pounds of the harvest is expected to land at Haines with the remaining harvest of 2,000,000 going to processors in other locations. The benefits calculated in the economic analysis are based on the determination that the remaining 2,000,000 of the harvest would be landed at Haines under with project conditions. As long as total annual landings remain above 4,900,000 pounds per year there will be 900,000 pounds available to divert to Haines under with project conditions, and the resulting BCR will exceed 1.0.

ADDENDUM: HARBOR USER INFORMATION

Please provide the following information to the best of your knowledge.

1. Vessel Information:

1.1 Name and address of owner:

1.2 Vessel name:

1.3 Vessel registration number:

1.4 Home port:

1.5 If Haines is not the vessels home port,

1.5.1 Why is Haines not the homeport of the vessel?

1.5.2 What portion of the year does the vessel use the Haines harbor (please list dates)?

1.5.3 What is the distance from the vessel's homeport to Haines?

1.5.4 What is the running time from the vessel's homeport to Haines?

1.5.5 If the harbor at Haines were expanded, would you use Haines as the homeport for the vessels? Yes____. No ____. If no, please explain why not.

1.6 Length of vessel (ft):

1.7 Light draft of vessel (ft):

1.8 Loaded draft of vessel (ft):

1.9 Type of vessel (e.g. commercial fishing—catcher, commercial fishing—packer/tender, pleasure/subsistence, pleasure, charter, other commercial):

2. Vessel use information:

2.1 If the vessel is a commercial fishing vessel, what fisheries is the vessel used in and what is the approximate season (show by month and day) for each fishery?

2.2 If the vessel is a pleasure/subsistence vessel:

2.2.1 What percent of the time is the vessel used for subsistence fishing or hunting?

2.2.2 How many pounds of fish or game do you harvest each year for subsistence use?

3. Vessel Operating information:

3.1 What is the vessel's fuel consumption per hour:

3.1.1 At running speed?

3.1.2 While maneuvering in the harbor?

3.1.3 What was the average per gallon cost of fuel during the past year?

3.2 What is the cost of non-fuel operating costs as a percent of the cost of fuel?

3.3 What is the vessel's speed while underway, i.e., not fishing?

3.4 What is the crew size (including the captain)—if the vessel is a commercial fishing vessel or tender/packer and crew size varies by fishery, please show the crew size for each fishery?

4. Information on problems related to the current harbor at Haines:

4.1 **Hot Berthing**: If the vessel has a permanent moorage space at Haines, does the harbormaster allow transient vessels to use your vessel's moorage slip ('hot-berth")? Yes____. No_____. If yes,

4.1.1 How many times during the year is the slip used to "hot-berth" transient vessels?

4.1.2 How many times during the year does the presence of a "hot-berthed" vessel in your slip delay your access to the slip?

4.1.3 If a "hot-berthed" vessel results in a delay in entering your slip, what is the average length of the delay?

4.2 **Rafting**: If the vessel does not have permanent moorage space at Haines, do you ever have to raft with other vessels to use the harbor? Yes____. No_____. If yes,

4.2.1 How many times during the year are you required to raft?

4.2.2 What are the maximum and average sizes of rafts (number of vessels tied side-by-side) that you have experienced at Haines? Maximum raft size _____ vessels. Average raft size _____ vessels.

4.2.3 What are the maximum and average lengths of time required to tie to a raft and get onto the dock, as compared with mooring directly to the transient dock or in a slip (please show the increase in time over that required without rafting)? Maximum increase in time to get to the dock in a rafting situation _____ (hours and tenths of hours). Average increase in time to get to the dock in a rafting situation _____ (hours and tenths of hours).

4.2.4 What are the maximum and average lengths of time required to leave a raft and get underway, as compared with mooring directly to the transient dock or in a slip (please show the increase in time over that required without rafting)? Maximum

increase in time to leave a raft and get underway in a rafting situation _____ (hours and tenths of hours). Average increase in time to get to leave a raft and get underway in a rafting situation _____ (hours and tenths of hours).

4.2.5 Does rafting ever result in damage to the vessel? Yes_____. No_____. If yes,

4.2.5.1 Briefly describe the type of damage to the vessel.

4.2.5.2 How often during a typical year does damage occur?

4.2.5.3 What is the average cost of the damage sustained during each incidence?

4.2.6 **Harbor Access During Storms**: Has the vessel ever been turned away from the Haines harbor during a storm? Yes _____. No_____. If yes,

4.2.6.1 What were the reasons for why the vessel was turned away?

4.2.6.2 How often has the vessel been turned away from the harbor since the vessel has operated in the Haines area (please state the period of time)?

4.2.6.3 If moorage is not available at Haines,

4.2.6.4 Do you go to an alternate harbor? Yes _____. No _____. If yes,

4.2.6.4.1.1 What is the name of the harbor?

4.2.6.4.1.2 How far is it from Haines?

4.2.6.4.1.3 If you do not go to an alternate harbor, briefly describe what you do.

4.2.6.4.1.3.1 What is the average duration of storm conditions that require you to take the actions described above?

4.2.6.4.1.3.2 Has the vessel ever experienced any damage during a storm because space in the harbor was not available? Yes_____. No_____. If yes,

4.2.6.4.1.3.3 How many times has the vessel been damaged (please state the period of time)?

4.2.6.4.1.3.4 What is the average cost of the damage sustained during each incidence?

4.2.7 **Potential other benefits to harbor expansion:** Briefly describe any other ways that operation of your vessel might benefit from expansion of the harbor at Haines.

4.2.7.1 Do you desire new moorage at Haines Harbor? Yes____ No_____

4.2.7.2 Do you currently have a slip at Haines Harbor? Yes____ No_____

4.2.7.3 Would you use a larger vessel if moorage were available? Yes____ No_____

4.2.7.4 Are you on the waiting list for moorage, does the list reflect the size vessel you would like to moor at Haines or a size limited by the size of slips currently at the harbor? Yes____ No_____ How many and what size vessels would you desire to moor if space was available?

5. Potential other benefits to harbor expansion. Briefly describe any other ways that operation of your vessel might benefit from expansion of the harbor at Haines.