

***Economic Impacts of the
Prince William Sound
Aquaculture Corporation:
2004 Update***

***PREPARED FOR:
PRINCE WILLIAM SOUND
AQUACULTURE CORPORATION***

PREPARED BY:



JUNEAU • ANCHORAGE

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TABLE OF CONTENTS

Executive Summary	1
Summary of Economic Impacts	1
Commercial Harvest	1
Seafood Processing.....	3
Sport Harvest.....	4
Personal Use and Subsistence Fisheries	5
PWSAC Organization	5
Introduction	6
Purpose and Scope	6
Methodology	6
PWSAC – An Overview	9
Facilities and Operations	9
Salmon Market Overview	12
Commercial Harvest of PWSAC Salmon	15
Commercial Harvest and Ex-Vessel Value	15
Geographic Distribution of PWSAC Commercial Harvest Value.....	20
Regional Economic Impacts of PWSAC Commercial Salmon Harvest.....	19
Economic Impacts of Seafood Processors	21
Regional Impacts of PWSAC Salmon Seafood Processing.....	22
Personal Use and Subsistence Fisheries	25
Recreational Fishing Industry	25
Recreational Harvest of PWSAC Salmon	25
Salmon Enhancement and Business Tax	27
Impacts of PWSAC Business Expenses	32

This study analyzes the Economic Impacts of the Prince William Sound Aquaculture corporation (PWSAC) on regional and statewide economies. This is the second update to a report issued originally in 2001. The current report reflects data through 2004; two earlier reports addressed data through 2000 and 2002, respectively. The report examines the impact of PWSAC activities on commercial, sport, personal use and subsistence harvests. It also examines the market conditions for those salmon species that currently are most important to PWSAC's production. Key findings from the analysis are noted below.

Summary of Economic Impacts

- In 2004, processors, commercial fishermen, and sport fishing service businesses earned an estimated \$23 million from PWSAC salmon. The estimated economic impacts from these earnings were \$47 million in total economic output, including \$14 million in labor income and 610 jobs¹. Impacts for each sector (commercial fishing, seafood processing, sport, personal use and subsistence harvests, and PWSAC operations) are summarized below.

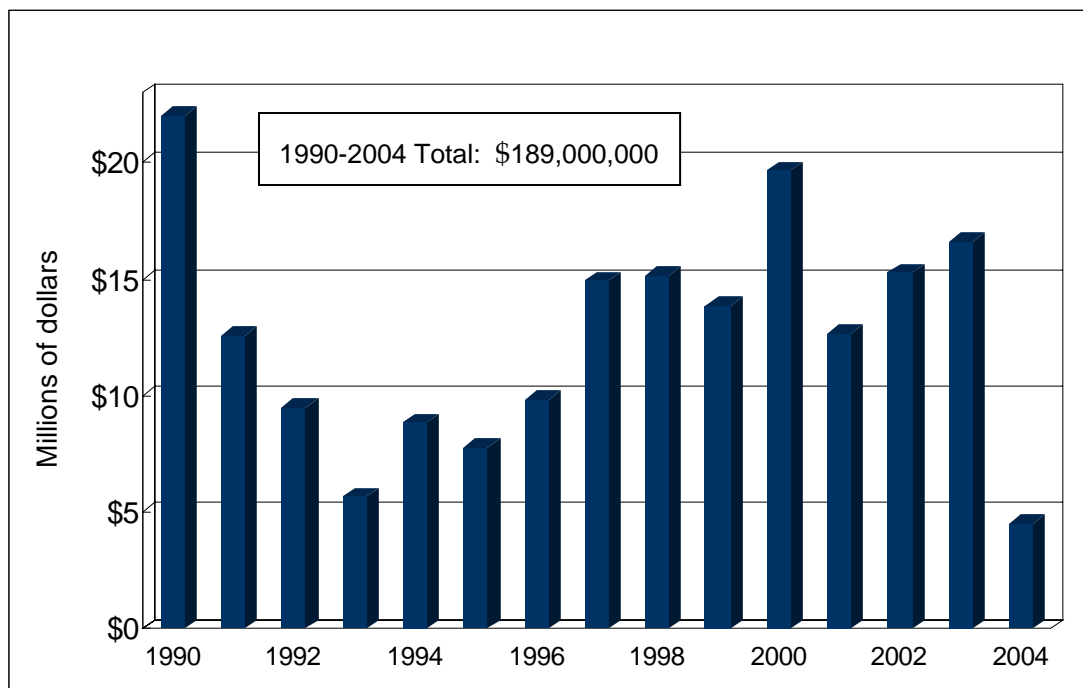
Commercial Harvest

- Between 1990 and 2004, commercial fishermen harvested 725 million pounds of PWSAC salmon with a total ex-vessel value of \$189 million.²
- From 1990 to 2004, commercial fishermen contributed \$10 million in enhancement taxes in support of PWSAC. The \$189 million ex-vessel value of PWSAC salmon harvested during the same time period returned fishermen more than \$18 for every \$1 of tax paid.
- From 1990 to 2004, PWSAC salmon accounted for an average of 36 percent of ex-vessel value and 50 percent of total volume of the Prince William Sound commercial fishery.

¹ Total output refers to all spending activity generated throughout the regional economy. An economic model, IMPLAN, was used to estimate total output. One dollar of input often results in more than one dollar of output because the dollar may circulate through many sectors in the economy.

² Ex-vessel value is the gross value paid to commercial fishermen for their salmon harvest.

Ex-Vessel Value of Common Property Commercial Harvest of PWSAC Salmon, 1990-2004



Source: ADFG and McDowell Group estimates.

- Economic impacts from \$3.4 million in resident ex-vessel earnings from PWSAC salmon harvested in 2004 resulted in an estimated \$5.5 million in total output, including \$2.3 million in labor income and 260 jobs.
- Alaska resident permit holders see most of the economic benefits of PWSAC production. In 2004, Alaska resident permit holders harvested an estimated 75 percent or \$3.4 million of the total PWSAC ex-vessel value, with the remaining 26 percent or \$1.1 million harvested by non-residents.
- From 2002 to 2004, Cordova resident permit holders earned a total of \$11 million from PWSAC fish. Anchorage residents were the next highest earners, followed by Valdez, Girdwood, Palmer, and Kasilof.

**Ex-Vessel Value of PWSAC Commercial Harvest by Permit Holders'
Area of Residence, Top Seven Communities
2002 to 2004**

	2002	2003	2004
Cordova	\$3,324,000	\$4,500,000	\$1,512,700
Anchorage	364,000	710,000	238,600
Valdez	321,000	692,000	232,700
Girdwood	306,000	496,000	166,600
Palmer	59,000	327,000	110,000
Kasilof	136,000	297,000	99,900
Wasilla	\$213,000	\$262,000	\$88,000

Source: CFEC and McDowell Group estimates.

- Regional economic impacts include an estimated 70 jobs and \$1 million in payroll in the Valdez-Cordova area, 65 jobs and \$500,000 in payroll in the Kenai Peninsula area, and 40 jobs and \$300,000 in payroll in the Anchorage area.

**Estimated Economic Output from Commercial
Ex-Vessel Value of PWSAC Salmon, 2004**

Census Area	2004 Ex-Vessel Income	Economic Output	Jobs	Payroll
Valdez-Cordova	\$1,800,000	\$2,300,000	70	\$1,000,000
Kenai Peninsula	840,000	1,100,000	65	500,000
Anchorage	448,000	700,000	40	300,000
Statewide Total	\$3,400,000	\$5,500,000	260	\$2,300,000

Source: CFEC and McDowell Group estimates.

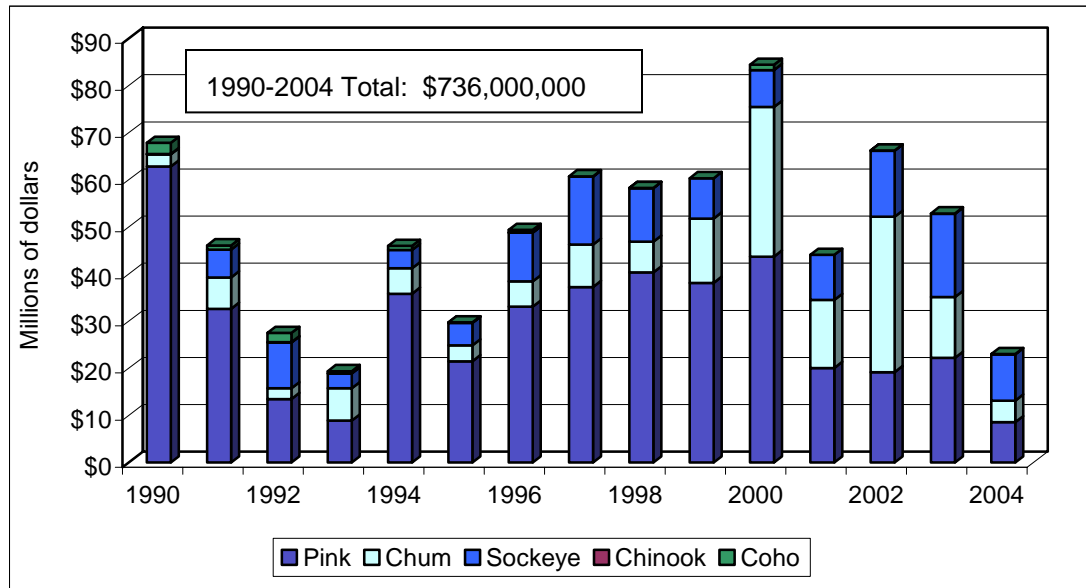
- Pink salmon accounted for 42 percent of the ex-vessel value of PWSAC salmon harvested from 1990 to 2004, followed by sockeye (36 percent), chum (20 percent), coho (2 percent), and chinook (less than 1 percent).

Seafood Processing

- Between 1990 and 2004, the total first wholesale value of commercial and cost recovery harvest of PWSAC salmon was more than \$736 million, with an annual average value of \$49 million.³
- PWSAC salmon are processed by about 20 different Alaska processors. In terms of wholesale value, most PWSAC salmon are processed in the Cordova/Valdez area and on the Kenai Peninsula.
- From 1990 to 2004, first wholesale value for Cordova/Valdez area processors was about \$503 million, followed by \$188 million to Kenai Peninsula processors, and \$45 million to processors elsewhere in the state.
- Processing of PWSAC fish generated an estimated \$29 million in total output in 2004, including \$5 million in labor income and 190 jobs.

³ First wholesale value is the first sale of fish from a processor to a buyer outside of the processor's affiliate network.

First Wholesale Value of PWSAC Salmon and Roe by Processor Region, 1990 to 2004



Source: ADFG and McDowell Group estimates. 2004 data is preliminary.

- Pink salmon accounted for the largest share of PWSAC salmon wholesale value from 1990 to 2004 (59 percent), followed by chum (22 percent), sockeye (18 percent), coho (1 percent) and chinook (less than 1 percent).

Sport Harvest

- PWSAC-origin salmon are harvested in sport fisheries over a wide area, including the Copper River Basin and Prince William Sound.
- From 1990 to 2004, sport fishermen in the Prince William Sound area harvested 228,000 PWSAC salmon.
- From 1999 to 2003 (the last year for which region-wide data is available), PWSAC salmon accounted for about 90 percent of the chum, 51 percent of the sockeye, 10 percent of the coho and 9 percent of the pink sport harvest in the Prince William Sound area.
- Economic impacts from the 2004 harvest were an estimated \$200,000 in total output, including \$100,000 in payroll and 5 jobs.
- The record harvest of PWSAC fish occurred in 2000, when anglers harvested 46,000 fish. The 2002 harvest was second at 35,000 fish.

Sport Harvest of PWSAC Salmon in Numbers of Fish, 2000 to 2004

Species	2000	2001	2002	2003	2004
Chinook	1,730	860	80	0	0
Sockeye	4,875	5,986	7,756	4,000	1,869
Coho	34,071	6,800	22,698	13,067	4,543
Pink	3,637	2,900	3,013	3,009	2,999
Chum	2,506	1,794	1,823	1,811	1,820
Total	46,819	18,340	35,370	21,887	11,231

Source: ADFG, PWSAC and McDowell Group estimates.

Personal Use and Subsistence Fisheries

- Between 1997 and 2003, Alaskans from 150 towns across the state harvested 280,000 PWSAC sockeye in the Copper River personal use and subsistence fisheries.
- The largest harvests of PWSAC sockeye production were by residents of Anchorage, Fairbanks, Wasilla, Copper Center, North Pole, Glennallen, Palmer, Eagle River and Valdez.

Copper River Personal Use and Subsistence Fishery PWSAC Sockeye Harvest, 1997-2003 Total by Place of Residence, Top Nine Communities

City	1997	1998	1999	2000*	2001	2002	2003	Grand Total
Anchorage	5,506	7,609	9,388	4,896	5,071	18,196	9,631	60,294
Fairbanks	4,266	6,082	7,333	4,614	3,829	18,274	9,603	53,997
Wasilla	1,718	2,435	3,246	2,045	1,853	8,070	4,104	23,469
Copper Center	1,287	1,862	2,209	1,253	1,255	6,468	4,173	18,506
North Pole	1,456	1,930	2,312	1,287	1,243	5,225	3,025	16,477
Glennallen	1,378	1,715	2,254	1,100	944	5,177	2,651	15,218
Palmer	1,128	1,778	2,221	1,209	1,211	5,234	2,465	15,245
Eagle River	1,174	1,706	2,352	868	1,149	4,279	2,062	13,590
Valdez	632	1,146	1,182	769	744	3,011	1,271	8,754

Source: ADFG and McDowell Group estimates.

* Reporting requirements were changed in 2000. Prior to 2000, a punch card to record each salmon harvested was required to be turned in to ADFG following each trip. Starting in 2000, harvesters recorded the date and number of fish on a form which was submitted at the end of the season.

PWSAC Organization

- The PWSAC organization creates an annual average of 74 jobs in the regional economy, and generates annual payroll and expenditures of \$7 million.
- Economic impacts of PWSAC spending include approximately \$10 million in total output, 115 jobs and \$3.5 million in labor income.

Purpose and Scope

The purpose of this study is to provide an estimate of the economic impacts of PWSAC's hatcheries in Southcentral Alaska. Analyses include:

- Commercial Harvest of PWSAC Salmon. In this section, the overall and regional economic benefits of PWSAC salmon are estimated based on ex-vessel income to permit holders in the Prince William Sound commercial fishery. In addition, regional economic effects from PWSAC salmon harvest are reported.
- Economic Impacts of the Seafood Processing Industry. This section addresses the overall and regional economic impacts of processing PWSAC salmon based on first wholesale value and indirect economic impacts on the regional economy.
- Sport Harvest of PWSAC Salmon. The sport harvest of PWSAC salmon is addressed, including economic impacts from angler spending.
- Personal Use and Subsistence Harvest of PWSAC Salmon. The Copper River dipnet and fishwheel personal use and subsistence PWSAC harvests are described, including estimated number of fish harvested by fishermen's town of residence and economic impacts of participant spending.
- Tax Payments from PWSAC Harvest. The fisheries business and enhancement tax revenue paid from the harvest of PWSAC fish are presented, including the ratio of income earned to enhancement tax paid by commercial fishermen.

Methodology

The data used in this report comes from a variety of sources, including PWSAC, Alaska Commercial Fisheries Entry Commission (CFEC), Alaska Department of Labor and Workforce Development, Alaska Department of Revenue, Alaska Department of Fish and Game (ADFG), and Alaska Department of Administration. The study utilizes recent McDowell Group research on PWSAC economic impacts in the region. However, it should be noted that available data on the economics of the region's seafood industry, sport, personal use and subsistence fisheries are limited, and in some cases non-existent. This is particularly true in areas related to personal income of commercial fishermen and the value of sport fishing activity.

Some preliminary commercial and sport harvest data was available through 2004. Some wholesale value data was unavailable from the State of Alaska due to confidentiality regulations. Therefore, wholesale values should be considered minimum estimates. Ex-vessel income for some communities was restricted due to state confidentiality laws. For these communities, the fishery average income per permit by gear type was used as a proxy.

Processor wholesale data and commercial harvest data by community of residence were available through 2003 from ADFG and CFEC. For 2004, processor wholesale data was estimated by multiplying the ratio of ex-vessel to wholesale value in 2003 by the estimated ex-vessel value for 2004, based on ADFG annual reports. The study team also assumed that the wholesale value of PWSAC salmon in 2004 was apportioned by area as it was in 2003. Ex-vessel value by community for 2004 was

assumed to be in the same proportion as for 2003, and is estimated based on ADFG annual reports. The 2004 estimates will be updated with actual CFEC data in future reports.

Wholesale value data for roe in Prince William Sound is not available. When fewer than four companies in a region process a seafood product the State of Alaska considers the data confidential, to protect the financial interests of the involved parties. The value of roe in the region was estimated from the statewide wholesale roe values, and assumed to be in proportion to the total contribution of Prince William Sound region salmon to the statewide total, by species. The wholesale value contribution of PWSAC salmon roe to the regional total was assumed to be in the same proportion as the contribution of PWSAC salmon to the regional total, by species.

Sport fishery harvest figures for PWSAC chinook, coho and sockeye are based on PWSAC hatchery manager estimates reported in annual reports to ADFG. PWSAC pink salmon and chum are not reported in PWSAC reports, but are assumed to be harvested in substantial numbers by Prince William Sound anglers. For chum salmon, the percentage of PWSAC chum in the sport fishery is assumed to be the same as the PWSAC contribution to the commercial fishery. For pink salmon, the sport harvest in the Valdez area is assumed to be entirely from the Valdez Fishery Development Association (VFDA), and not from PWSAC. Therefore, the PWSAC contribution to the pink salmon sport fishery was assumed to be the same proportion as the PWSAC contribution to the commercial fishery in the Prince William Sound area, excluding the Valdez area.

The Copper River dipnet and fishwheel fisheries are important to thousands of Alaskans. The remoteness of the fishing area means that many users travel hundreds of miles to participate. These fishers buy fuel, ice, fishing equipment and clothing to harvest their catch. Estimating where these dollars are spent would require extensive research beyond the scope of this study. Furthermore, people would travel to the fishery to dipnet salmon even in the absence of PWSAC fish. As a first order estimate of direct economic impacts of the fishery, it was estimated that each dipnetter spent about \$72 per trip for food and transportation, based on average trip length of 760 miles (Henderson, et al., 2000⁴), average of 2 permit holders per vehicle, average gasoline price of \$1.70/gallon, average of \$21 per permit holder per day spent on food (based on half of the State of Alaska per diem rate of \$42), and an average trip length of 2 days. The price per trip was multiplied by the number of trips reported from ADFG. The percentage of PWSAC fish harvested in the catch was then multiplied by the total expenditure estimate as a proxy for PWSAC's economic contribution to the fishery.

For the recreational fishery, economic impacts to the Prince William Sound region include spending for such expenses as fuel, fishing gear, repair services, bait, food, lodging, transportation, and charter fees. Based on interviews with charter operators in the region, salmon charters are about \$80 per person per day. This cost was used as a baseline cost per angler per day for both guided and unguided anglers. Using ADFG estimates of Prince William Sound angler days and this expenditure amount, the study team made an estimate of the economic impacts of the sport harvest of

⁴ Henderson, M., K. Criddle and S. Lee. 2000. *The Economic Value of Alaska's Copper River Personal Use and Subsistence Fisheries*. Alaska Fishery Research Bulletin 6(2): 63-69.

PWSAC salmon to the regional economy, similar to the methodology used to estimate impacts from the Copper River personal use and subsistence fishery.

Economic Modeling

The McDowell Group used the Impact Analysis for Planning Model (IMPLAN) to estimate the distribution of economic impacts of PWSAC salmon harvest and production throughout the economy. The IMPLAN model estimates total economic output, which reflects the entire supply chain of transactions resulting from harvest or processing of fish. For example, harvesting of fish will require purchase of a vessel, fuel, food, gear, and many other goods. This spending cycles through the regional economy. The IMPLAN model estimates the total set of such transactions. As a result, one dollar of input often results in more than one dollar of output because the dollar may circulate several times through the economy. The model also estimates employment and labor income, including total wage and salary employment as well as self-employed jobs in a region. It includes both full-time and part-time workers and is measured in annual average jobs. The IMPLAN model estimates economic impacts by census area or region. Data was grouped accordingly when assessing impacts with the IMPLAN model.

Economic impacts of PWSAC salmon to processors, sport fisheries, and personal use and subsistence fisheries are all based on an Alaska IMPLAN model. For commercial fishing impacts, an Alaska IMPLAN module is used to analyze Alaska resident income, and a U.S. module for non-resident income. For PWSAC operations, in-state salary and expenditures used the Alaska module, and out-of-state spending (primarily for fish food) used the U.S. module. McDowell Group assumed of all non-Alaskan income and business revenue was spent outside Alaska. Non-residents do spend money in Alaska on goods and services. However, to determine an accurate estimate of expenditures in Alaska would require research beyond the scope of this study.

Introduction

The Prince William Sound Aquaculture Corporation (PWSAC) is a non-profit organization formed in 1974 by a local area fishermen's group to optimize salmon production in Prince William Sound for the long term well-being of all user groups. PWSAC headquarters are located in Cordova.

The organization operates four remote hatcheries in Prince William Sound and one inland on the Gulkana River. Four species of salmon are currently produced: pink, chum, coho and sockeye. Approximately 600 million salmon fry and smolts are produced for release into Pacific waters. The returning salmon benefit the commercial, sport, personal use and subsistence fishers in the Prince William Sound area and throughout the state.

PWSAC is a private non-profit corporation. It relies on cost recovery revenues and a 2 percent tax on the regional commercial salmon harvest to fund its salmon enhancement activities.

Facilities and Operations

Armin F. Koernig Hatchery (AFK)

The Armin F. Koernig Hatchery is located about 60 air miles west of Cordova in Sawmill Bay, Evans Island, Prince William Sound. The site was originally a salmon cannery, but was converted to become the first PWSAC hatchery in 1975. The facility was built with monies borrowed from the State of Alaska's Fisheries Enhancement Revolving Loan Fund. Seven on-site year-round staff and up to 14 seasonal staff operate the facility.

AFK was the only hatchery directly affected by the Exxon Valdez Oil Spill in 1989. Although oil booms surrounded the operation to protect the out-migrating fry, the effects of the spill to AFK and the Sound are still being investigated.

In 2004, AFK saw returns of 5.2 million pink salmon. This compares to 7.1 million pink salmon and 4,881 chum salmon in 2003.

Wally Noerenberg Hatchery (WNH)

The Wally Noerenberg Hatchery was built in 1985 with monies borrowed from the State of Alaska's Fisheries Enhancement Revolving Loan Fund. It is located approximately 20 miles east of Whittier, in Lake Bay on the southern tip of Ester Island, in the South Ester Island State Marine Park. WNH is the largest pink salmon production facility in North America. Eight on-site year-round staff and 30 seasonal staff operate the facility.

WNH returns included 2.7 million pink and 2.0 million chum salmon in 2004. This compares to returns of 17.8 million pink and 3.5 million chum salmon in 2003. WNH

coho salmon returns, including releases from sites near Cordova, Whittier, and Chenega, totaled 15,000 fish in 2004.

Cannery Creek Hatchery (CCH)

The Cannery Creek Hatchery was built in 1978 by the Alaska Department of Fish and Game (ADF&G) Fisheries Rehabilitation, Enhancement and Development (FRED) division. PWSAC took over operational control of the hatchery on July 1, 1988. The site is located on Forest Service land approximately 40 miles east of Whittier on the eastern shore of Unakwik Inlet in the northern area of Prince William Sound. PWSAC funds and operates the pink salmon facility under a 20-year contract with the ADF&G. Six on-site year-round staff and 14 seasonal staff operate the facility.

CCH pink returns totaled 2.8 million fish in 2004, down from 8.1 million fish in 2003.

Main Bay Hatchery (MBH)

Main Bay Hatchery is owned by the State of Alaska and situated on Forest Service land in Main Bay on the western shore of the sound, approximately 40 miles southwest of Whittier. Main Bay was built in 1981 by the ADF&G FRED Division as a chum salmon hatchery, but switched to a sockeye enhancement program in 1986, becoming the first sockeye smolt-producing hatchery in the world. PWSAC took over operation and management on July 1, 1991. Six on-site year-round staff and 12 seasonal staff operate the facility.

At one time, up to six different sockeye salmon stocks were incubated and reared at the facility. In 1998, PWSAC decided to concentrate on just one run to improve fish culture, decrease the risk of disease, and possibly improve marine survival. MBH sockeye returns totaled about 654,000 fish in 2004, down from 1.4 million fish in 2003.

Gulkana Hatchery (GH)

The Gulkana Hatchery is located on the Gulkana River near Paxon, 250 miles northeast of Anchorage and 177 miles south of Fairbanks on the Richardson Highway. PWSAC operates the facility under a contract, which began in 1993 and runs through 2013. The facility is owned by ADFG and located on Bureau of Land Management land. Four on-site year-round staff and 12 seasonal staff operate the facility.

In 1973, the first streamside incubator box was introduced in an attempt to enhance Copper River sockeye salmon. With a survival rate of 79 percent the first year, significant enhancement opportunities were recognized along with the possibility of future expansion. By 1984, Gulkana became the largest sockeye fry production facility in North America.

GH sockeye returns totaled about 92,000 fish in 2004, down from 314,000 fish in 2003.

Cordova and Anchorage

PWSAC administration offices are located in Cordova. PWSAC owns a warehouse in Anchorage to consolidate and expedite supplies to and from the remote hatchery sites via Whittier.

Market Discussion

This section is intended as a broad overview of salmon market conditions relative to the species mix of PWSAC-origin salmon. Assessment of 2004 market performance is based on first wholesale data published by Alaska Department of Revenue in the Alaska Salmon Price Report (ASPR).

PWSAC primarily produces pink and chum salmon, which are the focus of this discussion. In 2004, chum contributed 54 percent of harvest volume and pink salmon contributed 30 percent. Sockeye made up 16 percent of PWSAC-origin harvest in 2004. Coho salmon made up less than 1 percent of the PWSAC harvest.

Table 1
Harvest Composition of PWSAC Salmon, 2003 and 2004

Species	2003		2004	
	Volume (Million Lbs.)	Percent	Volume (Million Lbs.)	Percent
Pink	82.4	84%	5.1	30%
Chum	8.7	9%	8.9	54%
Sockeye	7.4	8%	2.6	16%

Source: ADFG Salmon Enhancement Annual Reports. Data from 2004 is preliminary.

Pink and Chum Market Background

Annual first wholesale data from the Commercial Operators Annual Report (COAR) is available through 2003 as of this writing. Statewide COAR data enables comparison with past years to establish product-form and wholesale value trends. Alaska Salmon Price Report (ASPR) data on first wholesale values is available through the end of 2004.

Product-form data from the COAR is not yet available for 2004, but early indicators suggest that recent product form is trending away from canned product for pink salmon, while chum salmon continues to take advantage of the strength of fresh and frozen markets for wild salmon product.

Pink and Chum Markets: 2004

In 2004, unit value of pink and chum flesh increased, buoyed by increased market demand for wild salmon products and shifting market dynamics with the primary historical market, Japan. Roe values declined, however, particularly for chum salmon. Pink salmon harvests statewide were 16 percent short of projections, largely due to poor returns in the Prince William Sound area. Chum harvests were 22 percent below projections. Nevertheless, pink salmon harvests were on par with the five-year average harvest, while chum salmon were about 10 percent below.

Chum

Although roe has been an important component of the total value of chum salmon in recent years, the market has softened for the product. ASPR reports for 2004 show an average sale price for the product of \$7.01 per pound. This is consistent with a steady downward trend from peak prices in 2000 (\$11.00/pound). The chum roe market has been negatively impacted by a number of factors, including near-record chum harvests in Japan and competition from Alaskan pink *ikura*, which is a successful substitute for chum *ikura*.

The market outlook for chum products is fair. Markets for wild salmon, including chums, have improved modestly in recent months. This dynamic has been helped by the weakening U.S. dollar, which strengthens export markets. Outstanding market success in the differentiation of wild salmon from farmed in the domestic market is also benefiting Alaska chum salmon.

Pink

Pink salmon markets had an upswing in 2004. Canned pink salmon sales for September through December 2004 was the strongest in four years, and prices were up \$2 per case from the previous year, according to ASPR data. In addition, sales prices for canned pink salmon to the US Department of Agriculture were as much as \$10 higher than a year ago.

The salmon industry has been plagued for many years by a running inventory of canned pink salmon. That inventory has effectively disappeared, however. Low pink production in 2004, combined with high demand for frozen pink salmon for reprocessing overseas, reduced the volume of pink salmon available for canning.

Pink salmon's market position is notably improving. In particular, processing developments have made it possible to process pink roe into *ikura*. In the past, chum roe has been better suited to *ikura* processing because the relative strength of the egg casing meant the roe was able to withstand the rubbing necessary to separate the eggs from the skein. Pink salmon *ikura* is proving a successful substitute for chum. The 2004 wholesale value of pink roe (\$3.63/lb) was down from 2003, but this is primarily due to atypical production activities in Prince William Sound in 2003 that led to unusually high quality and volumes of pink salmon roe.

The outlook for the pink salmon market is positive. The increased demand for frozen product for reprocessing overseas shifts production away from canned product and alleviates some of the price pressures that have depressed that market. The ability to process pink salmon roe into *ikura* also improves the outlook for that product form. In addition, the overall improved market position for wild salmon product benefits all Pacific salmon species, including pinks.

Sockeye

Prince William Sound sockeye had the highest ex-vessel price in the state in 2004, with an average price of \$1.35 per pound, 137 percent higher than the statewide average of \$.57 per pound.

The market outlook for sockeye is strong. Enhanced domestic demand means less product is available to supply export markets, particularly Japan. This dynamic,

combined with the weakened value of the U.S. dollar, has led to increasing prices in export markets.

The 2004 Alaska commercial sockeye harvest was the eighth largest on record, with 44 million fish taken. According to ASPR data, the 48-can case price fell about \$2 during the course of 2004.

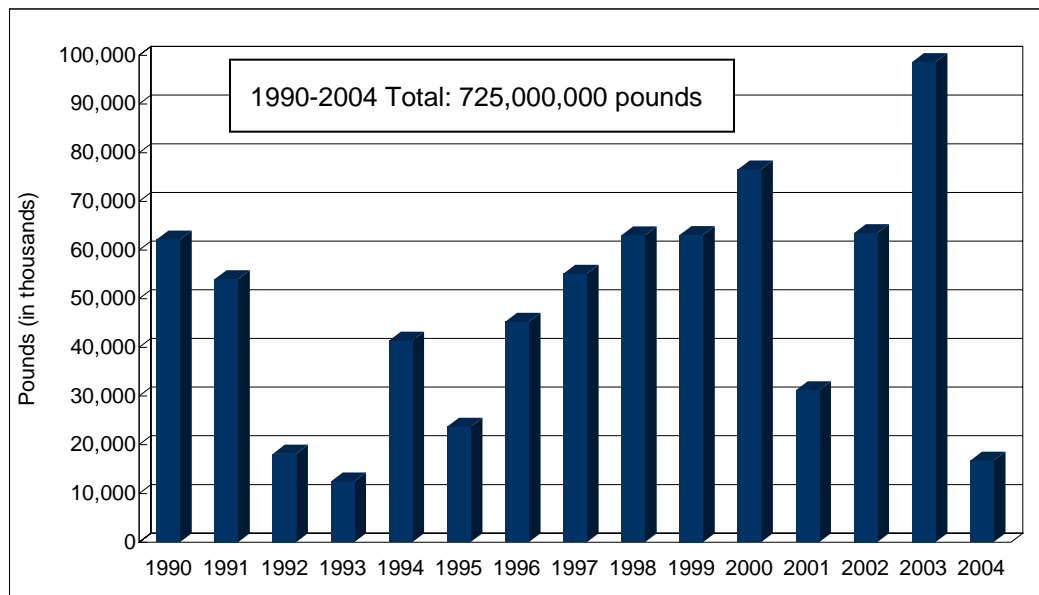
In recent years the market situation for frozen sockeye salmon has been tied to the value of farmed Chilean coho salmon in the Japanese marketplace. With high volumes of sockeye available to Japan, the fish has had to compete with the Chilean coho at commodity price levels. Decreased availability of Alaskan sockeye in the Japanese market has altered that dynamic, leading to non-commodity pricing for sockeye in Japan. Although the overall volume of sockeye salmon produced in Alaska was relatively high this year, the percentage of those fish entering the Japanese market has decreased. Of all U.S. sockeye exports in 2004, only 32 percent went to Japan, in comparison to 49 percent in 2000 and 68 percent in 1994. The overall trend is toward less reliance on the Japanese market for frozen sockeye product.

COMMERCIAL HARVEST OF PWSAC SALMON

Commercial Harvest and Ex-Vessel Value

From 1990 to 2004, commercial fishermen harvested 725 million pounds of PWSAC salmon in common property fisheries, an average of 48 million pounds annually despite very poor returns in the 2004 season (Figure 1). The 2003 harvest was a record at nearly 100 million pounds of fish.

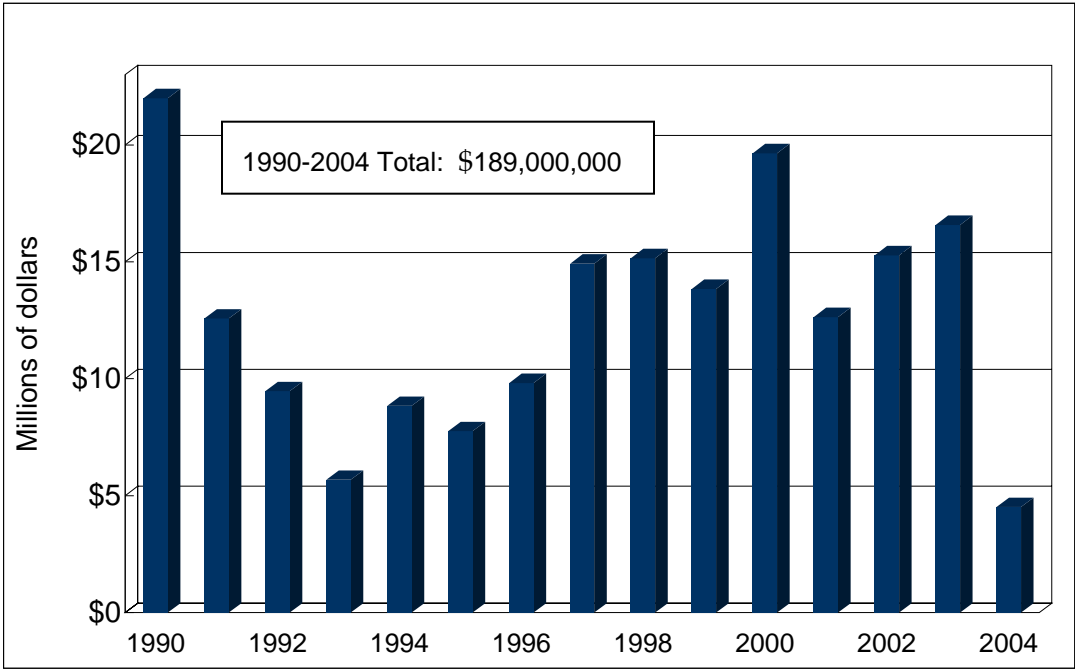
Figure 1
Total Pounds of PWSAC Salmon Harvested in
Common Property Commercial Fisheries, 1990-2004



Source: ADFG and McDowell Group estimates. 2004 data is preliminary. Number of PWSAC fish provided by Alaska Department of Fish and Game annual enhancement reports; total poundage based on average weight by species by gear type.

Commercial fishermen earned an estimated \$189 million in ex-vessel value from PWSAC salmon in common property fisheries from 1990 to 2004, an average of \$13 million annually. Earnings in 2004 were drastically lower than in the preceding decade due largely to poor pink salmon returns.

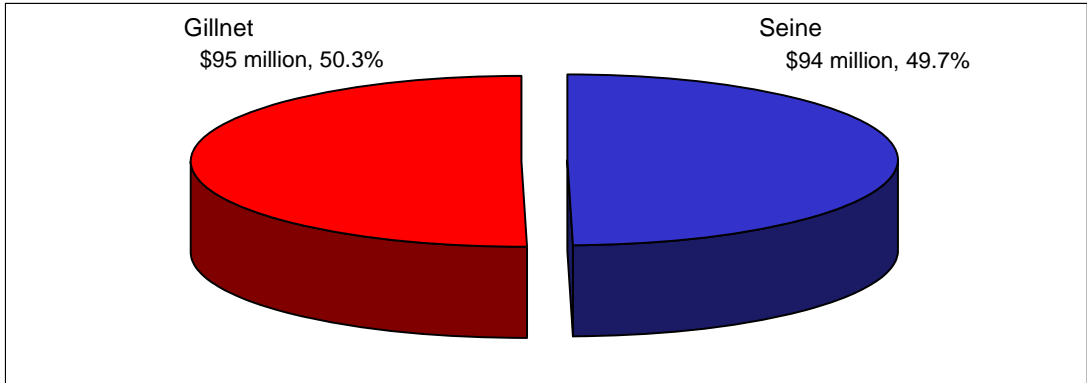
Figure 2
Ex-Vessel Value of Common Property Commercial Harvest of PWSAC Salmon, 1990-2004



Source: ADFG and McDowell Group estimates. Data for 2004 is preliminary.

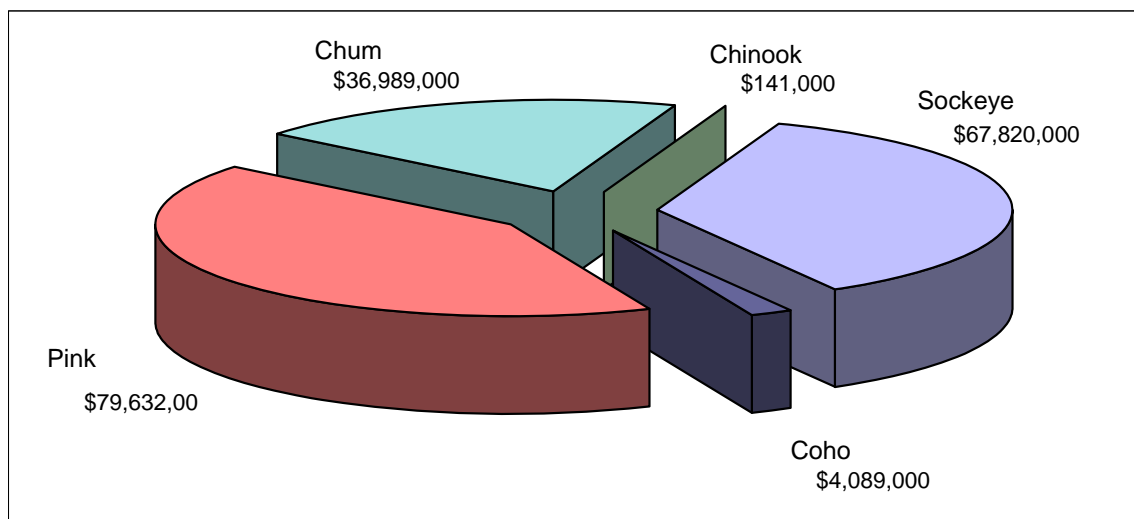
PWSAC salmon ex-vessel value totaled \$95 million to the gillnet fleet and \$94 million to the purse seine fleet between 1990 and 2004 (Figure 3). Pink salmon accounted for most of the ex-vessel value (\$80 million), followed by sockeye salmon (\$68 million), chum (\$37 million), coho (\$4 million) and chinook (\$141,000, Figure 4). In 2004 alone the harvest was worth \$4.5 million in ex-vessel value.

Figure 3
Ex-Vessel Value of PWSAC Salmon by Gear, 1990-2004 Total



Source: ADFG and McDowell Group estimates.

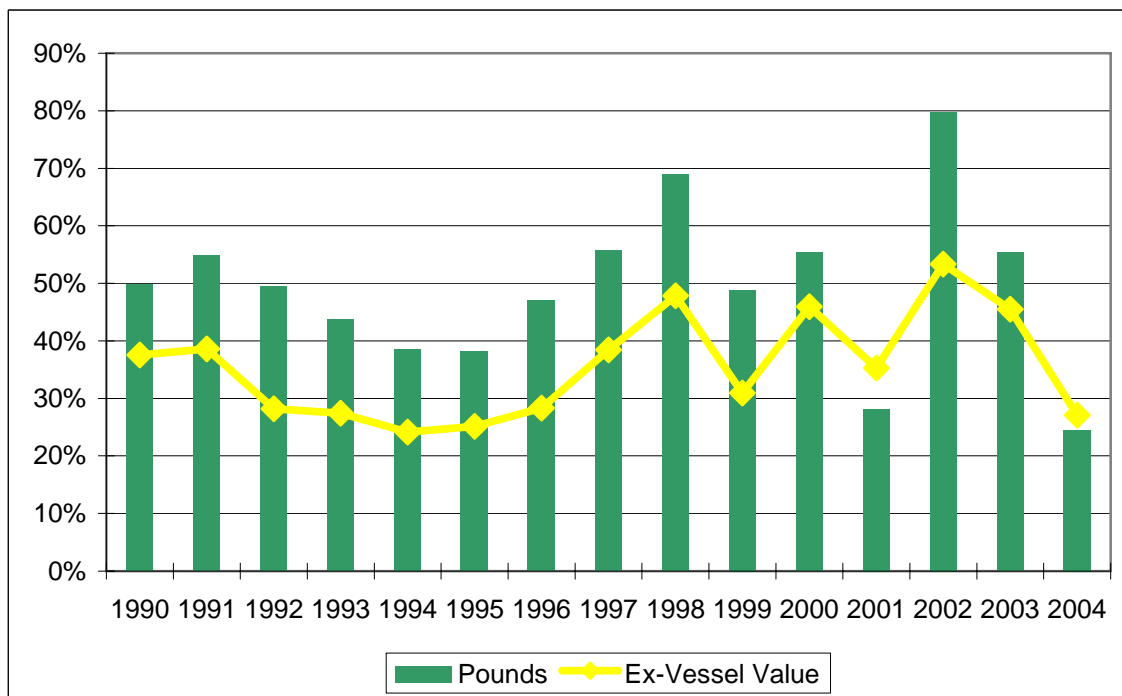
Figure 4
Ex-Vessel Value of PWSAC Salmon
by Species, 1990-2004 Total



Source: ADFG and McDowell Group estimates.

PWSAC salmon production is of major importance to Prince William Sound fisheries. Since 1990, PWSAC salmon have accounted for an average of 36 percent of ex-vessel value and 50 percent of volume (Figure 5).

Figure 5
Ex-Vessel Value and Harvest of PWSAC Salmon as a Percent of the
Prince William Sound Commercial Salmon Harvest
1990-2004



Source: ADFG and McDowell Group estimates.

Geographic Distribution of PWSAC Commercial Harvest Value

Alaska residents harvested about 75 percent of the ex-vessel value of PWSAC salmon in 2004, with non-Alaska residents harvesting the remainder. The Alaska resident harvest is widely distributed. Residents from about 40 towns harvested an estimated \$3.4 million in ex-vessel value from PWSAC fish in 2004.

Table 2
Geographic Distribution of Ex-vessel Earnings by Fishermen's Place of Residence*, PWSAC Commercial Harvest, 2002—2004

	2002	2003	2004
Anchor Point	\$64,300	\$118,800	\$39,900
Anchorage	363,600	709,800	238,600
Bethel	-	15,500	5,200
Big Lake	-	15,500	5,200
Bird Creek	7,400	15,500	5,200
Chenega Bay	7,400	15,500	5,200
Chitina	14,800	31,000	10,400
Chugiak	18,100	64,600	21,700
Circle City	7,400	15,500	5,200
Coffman Cove	-	15,500	5,200
Copper Center	14,800	31,000	10,400
Cordova	3,324,200	4,499,600	1,512,700
Delta Junction	22,100	50,100	16,900
Dutch Harbor	7,400	-	-
Eagle River	23,600	31,000	10,400
Fairbanks	20,800	49,100	16,500
Fort Richardson	-	15,500	5,200
Fritz Creek	7,400	15,500	5,200
Girdwood	306,300	495,600	166,600
Glennallen	3,300	-	-
Homer	1,265,600	1,509,100	507,300
Juneau	24,800	49,100	16,500
Kasilof	136,400	297,300	99,900
Kenai	47,900	104,200	35,000
Kodiak	50,000	31,000	10,400
Nikiski	22,100	46,500	15,600
Ninilchik	22,100	46,500	15,600
Palmer	59,000	327,100	110,000
Sand Point	7,400	15,500	5,200
Seward	180,500	230,800	77,600
Sitka	3,300	-	-
Soldotna	82,100	135,200	45,500
Talkeetna	7,400	-	-
Tatitlek	14,800	64,600	21,700
Valdez	321,100	692,100	232,700
Wasilla	212,700	261,800	88,000
Whittier	10,700	33,700	11,300
Willow	14,800	31,000	10,400
Grand Total	\$6,695,500	\$10,080,000	\$3,388,900

Source: CFEC and McDowell Group estimates. Totals may not be exact due to rounding.

*Data for some communities is unavailable due to confidentiality. For these communities the average harvest by permit type was used as a proxy.

Cordova residents took in an estimated 45 percent of the total value of the PWSAC harvest by Alaska residents (\$1.5 million), followed by residents of Homer (15 percent, \$507,000), and Anchorage and Valdez (7 percent and approximately \$230,000 each).

The estimated economic impacts from Alaska resident PWSAC-related ex-vessel income of \$3.4 million were \$5.5 million in total output, including \$2.3 million in labor income and 260 jobs. The economic impacts of non-Alaskan PWSAC-related commercial fishing ex-vessel income of \$1.1 million were an estimated \$2.7 million in total output, including \$900,000 in labor income and 40 jobs. All combined, ex-vessel earnings of \$4.5 million resulted in \$8.2 million in total output, including \$5.0 million in labor income and 300 jobs (Table 3).

Table 3
Regional Economic Output, Including Jobs and Payroll, from
Commercial Ex-Vessel Value of PWSAC Salmon, 2004

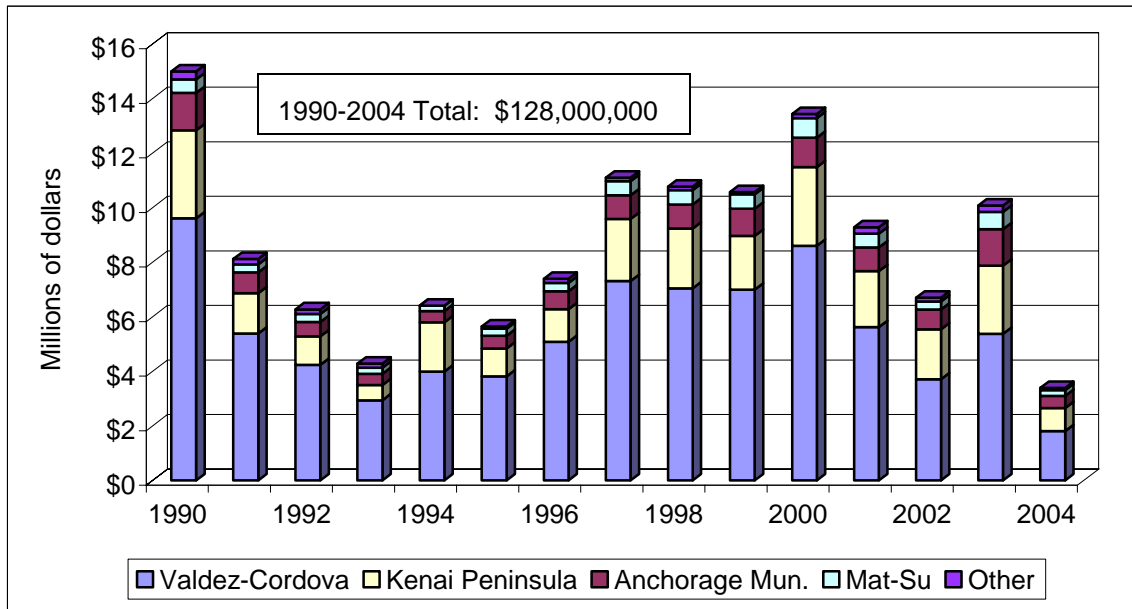
Sector	Ex-Vessel Income	Economic Output	Jobs	Payroll
Alaska Resident	\$3,400,000	\$5,500,000	260	\$2,300,000
Non-Resident	1,100,000	2,700,000	40	900,000
Total	\$4,500,000	\$8,200,000	300	\$5,000,000

Source: CFEC and McDowell Group estimates.

Regional Economic Impacts of PWSAC Commercial Salmon Harvest, 1990 to 2004 Total

- Fishermen from the Valdez-Cordova area harvested a total of \$81 million worth of PWSAC salmon from 1990 to 2004, for an average of \$5.4 million per year.
- Kenai Peninsula fishermen earned a total of \$27 million, for an annual average of \$1.8 million.
- Anchorage fishermen earned a total of \$12 million, for an annual average of \$788,000.
- Matanuska-Susitna fishermen earned a total of \$6 million for an annual average of nearly \$400,000 (Figure 6).

Figure 6. Ex-Vessel Income from PWSAC Salmon by Alaska-Resident Permit Holder, 1990 to 2004



Source: CFEC, ADFG and McDowell Group estimates.

- PWSAC salmon contributed \$1.8 million to Valdez-Cordova commercial permit holder ex-vessel income in 2004, resulting in an estimated economic output of \$2.3 million, including 70 jobs and \$1.0 million in labor income.
- Kenai Peninsula permit holders earned \$842,000 in ex-vessel value from PWSAC salmon in 2004, resulting in \$1.1 million in economic output, including 65 jobs and \$500,000 in labor income.
- Anchorage permit holders earned \$448,000 in ex-vessel value from PWSAC salmon in 2004, resulting in \$700,000 in economic output, including 40 jobs and \$300,000 in labor income.
- Statewide, resident permit holders earned \$3.4 million in ex-vessel value from PWSAC salmon in 2004, resulting in \$5.5 million in economic output, including 260 jobs and \$2.3 million in labor income.

**Table 4
Regional Economic Output, Including Jobs and Payroll, from
Commercial Ex-Vessel Value of PWSAC Salmon, 2004**

Census Area	2004 Ex-Vessel Income	Economic Output	Jobs	Payroll
Valdez-Cordova	\$1,800,000	\$2,300,000	70	\$1,000,000
Kenai Peninsula	840,000	1,100,000	65	500,000
Anchorage	448,000	700,000	40	300,000
Statewide Total	\$3,400,000	\$5,500,000	260	\$2,300,000

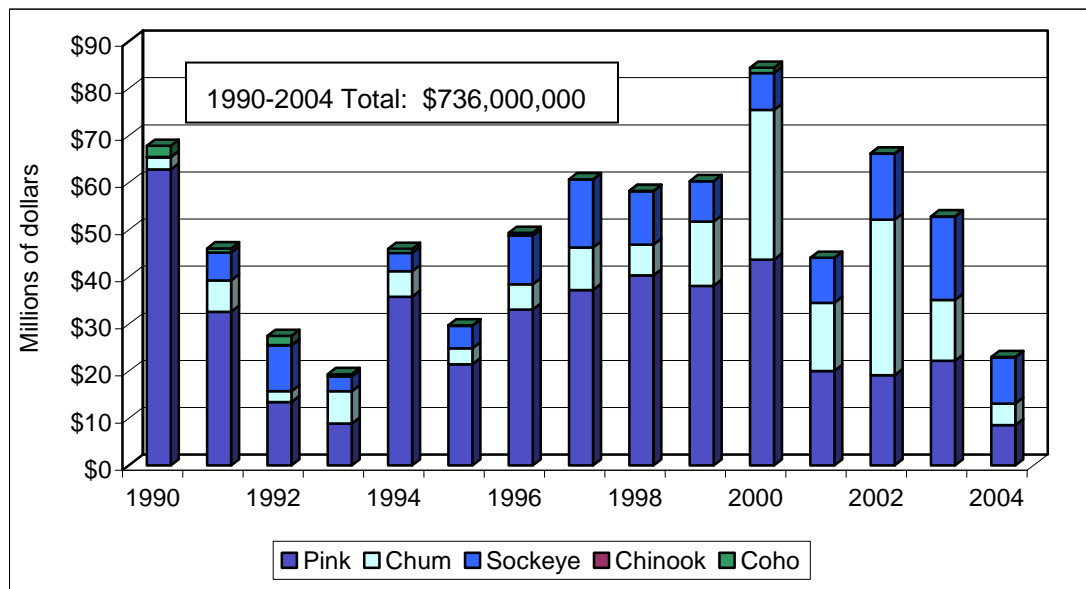
Source: CFEC and McDowell Group estimates.

ECONOMIC IMPACTS OF SEAFOOD PROCESSORS

The commercial harvest of PWSAC salmon generates significant benefits for Southcentral Alaska’s seafood processors, as indicated by the first wholesale value (i.e., the first income a processor receives for selling its product). From 1990 to 2004, the total first wholesale value of PWSAC salmon and roe harvested in commercial and cost-recovery fisheries was \$736 million, with an annual average value of about \$49 million. By species (including roe), pink salmon led with the largest share of wholesale value (59 percent), followed by chum (22 percent) and sockeye (18 percent). Coho accounted for 1 percent of value and chinook was less than 1 percent.

The estimated first wholesale value of PWSAC salmon in 2004 was \$23 million. This generated an estimated \$29 million in total output, including \$5 million in payroll and 190 jobs.

Figure 7
First Wholesale Value of PWSAC Salmon, Including Roe,
by Species, 1990-2004

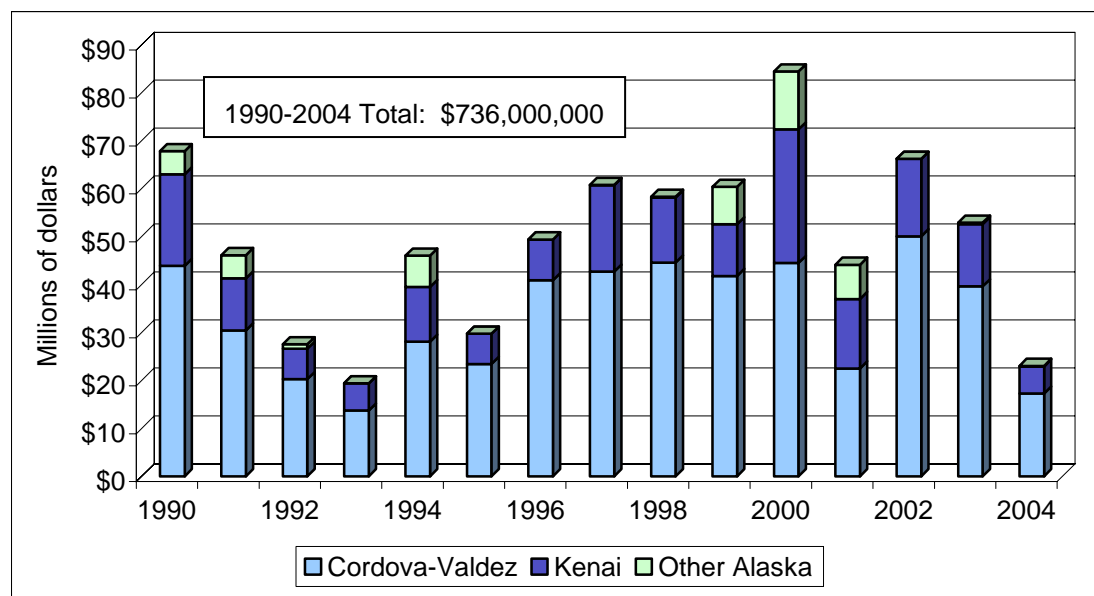


Source: ADFG and McDowell Group estimates. Wholesale value for 2004 is based on the proportion of first wholesale value to ex-vessel value in 2003.

Regional Impacts of PWSAC Salmon Seafood Processing

PWSAC salmon was processed by about 20 different Alaska processors in 2003 (the most recent year for which data is available) Processors were grouped by geographic area to estimate regional impacts. Most PWSAC wholesale value is realized in the Cordova/Valdez area, followed by the Kenai Peninsula, and other areas of Alaska. From 1990 to 2004, first wholesale value for Cordova/Valdez area processors was about \$503 million, followed by \$188 million to Kenai processors, and \$45 million to processors elsewhere in the state (Figure 8).

Figure 8
First Wholesale Value of PWSAC Salmon and Roe by Processor Region, 1990-2004



Source: ADFG and McDowell Group estimates.

Of the estimated \$23 million in first wholesale value of PWSAC salmon to Alaska processors in 2004, \$17 million went to Cordova/Valdez processors, \$6 million to Kenai processors, and less than \$1 million to processors elsewhere in the state. Processing of PWSAC fish generated an estimated 70 jobs in Cordova/Valdez, 40 jobs on the Kenai Peninsula, and 80 jobs elsewhere in the state (Table 5).

Table 5
Economic Output, Including Jobs and Payroll, from Processing of the Commercial Harvest of PWSAC salmon, 2004

Region	First Wholesale Value	Economic Output ⁵	Jobs	Payroll
Cordova/Valdez	\$17,000,000	\$18,000,000	70	\$2,700,000
Kenai Peninsula	6,000,000	6,700,000	40	900,000
Other Alaska Towns	4,000,000	4,100,000	80	1,500,000
Total (rounded)	\$23,000,000	\$29,000,000	190	\$5,000,000

Source: ADFG and McDowell Group estimates.

⁵ Economic output totals do not include output associated with ex-vessel value.

PERSONAL USE AND SUBSISTENCE FISHERIES

Alaskans travel from around the state to participate in the Copper River dipnet personal use and fishwheel subsistence fisheries. PWSAC salmon play an important role in these fisheries. Alaskans from about 150 towns harvested 280,000 PWSAC-origin sockeye from 1997 to 2003. Data for 2004 is not yet available. Residents of Anchorage harvested more of these fish than residents of any other community, followed by Fairbanks, Wasilla, Copper Center, and North Pole. Residents of Palmer, Glennallen, and Eagle River also harvested large numbers of PWSAC sockeye in these fisheries.

Dipnetters traveling to Chitina have an important economic impact on businesses all along travel routes. In 2003, estimated travel expenditures (food and fuel) by dipnetters associated with the harvest of PWSAC fish totaled \$35,000.

Table 6
Number of PWSAC Sockeye Harvest, by Fishermen's Place of Residence, Copper River Personal Use and Subsistence Fishery, 1997-2003

City	1997	1998	1999	2000	2001	2002	2003	Grand Total
Anchorage	5,506	7,609	9,388	4,896	5,071	18,190	9,634	60,294
Anderson	11	85	19	72	35	89	33	344
Barrow	43	51	76	25	35	95	90	415
Big Lake	92	199	219	84	133	387	252	1,366
Cantwell	32		46	19	25	20	16	158
Central	8	24	9	30	6	39	40	156
Chickaloon	14	44	171	38	37	96	90	491
Chitina	289	291	340	179	188	982	932	3,201
Chugiak	445	509	681	406	392	1,178	770	4,381
Clear	43	18	28	13	27	51	9	189
College	11	14	26	1	3			55
Cooper Landing	3	8	25	28	18	162	52	296
Copper Center	1,287	1,862	2,209	1,253	1,255	6,466	4,174	18,506
Copperville			64					64
Cordova			3	9	49	272	28	361
Delta	739	1,038	1,288	762	674	2,597	1,672	8,770
Denali	37	33	27	18	14	9	15	153
Dot Lake	5	16	10	8	12	24	51	126
Eagle River	1,174	1,706	2,352	868	1,149	4,278	2,063	13,590
Eielson	540	531	606	402	264	848	395	3,586
Elmendorf AFB	80	166	103	70	73	139	61	692
Ester	94	120	176	92	104	451	333	1,369
Fairbanks	4,266	6,082	7,333	4,614	3,829	18,268	9,605	53,997
Fort Richardson	81	107	72	50	53	206	80	648
Ft Wainwright	237	357	390	190	151	694	217	2,236
Gakona	835	1,023	834	888	768	1,829	1,234	7,412
Girdwood	37	52	101	54	44	358	173	819
Glennallen	1,378	1,715	2,254	1,100	944	5,175	2,652	15,218

**Table 6
continued**

City	1997	1998	1999	2000	2001	2002	2003	Grand Total
Healy	98	123	117	75	90	184	81	768
Homer	55	77	69	32	22	54	55	364
Houston	17	38	43	19	36	58		211
Indian	3	7	5	10	11	15	10	61
Juneau	9	22	45	11	17	44	49	196
Kenai	7	30	30	21	7	33	16	144
Kodiak	2	2	6	10	15	37	48	120
Kotzebue	23	5	4		1	30	11	73
Mccarthy	6	19	38	1	1	67		132
Mentasta Lake	46	101						147
Nenana	51	47	66	25	64	383	207	843
Ninilchik	15	2	17	19	15	37	18	123
Nome	3	18	10	7	7	13	30	89
North Pole	1,456	1,930	2,312	1,287	1,243	5,223	3,026	16,477
Northway	42	15	150	40	29		100	376
Other						488	47	534
Palmer	1,128	1,778	2,221	1,209	1,211	5,232	2,466	15,245
Paxson	23	19	14	7	7	15	93	179
Salcha	137	193	223	101	89	412	303	1,458
Seward	26	21	35	17	12	49	44	204
Slana	161	175	190	107	138	259	309	1,339
Soldotna	24	30	53	30	33	80	44	294
Sutton	104	136	163	49	50	342	131	975
Talkeetna	30	55	83	42	66	140	85	502
Tok	652	702	736	448	367	1,075	822	4,803
Trapper Creek	8	12	30		2			52
Two Rivers	25	61	61	32	55	198	114	546
Valdez	632	1,146	1,182	769	744	3,010	1,271	8,754
Wasilla	1,718	2,435	3,246	2,045	1,853	8,067	4,105	23,469
Willow	96	125	164	121	75	378	187	1,146
Other Alaska ²	152	180	185	83	59	273	188	1,120
Grand Total	24,000	33,200	40,300	22,800	21,700	89,100	48,500	279,600

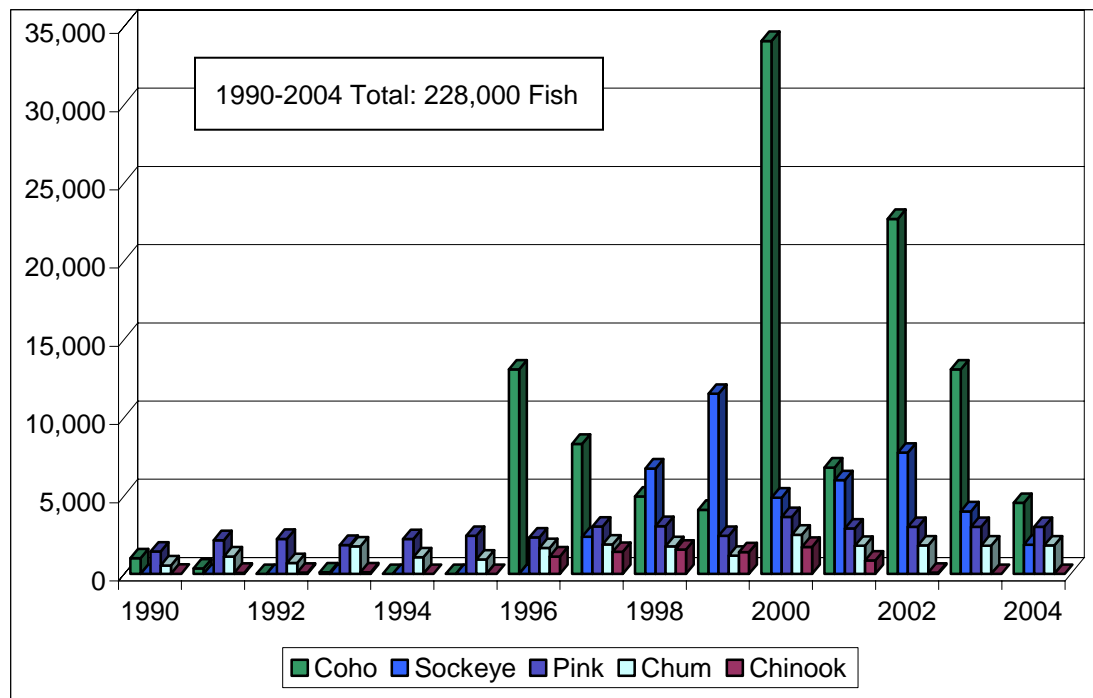
Source: ADFG.

1. Reporting requirements were changed in 2000. Prior to 2000, a punch card to record each salmon harvested was required to be turned into ADFG following each trip. In 2000, harvesters recorded the date and number of fish on a form, and did not have to submit the form until the end of the season.
2. "Other Alaska" includes 79 communities whose residents harvested 50 fish or less from 1997 to 2003.

Recreational Harvest of PWSAC Salmon

PWSAC salmon play an important role in the Prince William Sound sport fisheries, contributing 228,000 fish to the sport fishery from 1990-2004 (Figure 9). Just over half the number of fish harvested were coho, followed by sockeye (21 percent), pink salmon (15 percent). The remaining 13 percent of the harvest was chum and chinook salmon. The 2004 all-species harvest of 11,000 fish generated estimated direct expenditures of \$159,000. The estimated economic impacts of this activity are \$200,000 in total economic output, including \$100,000 in payroll and 5 jobs.

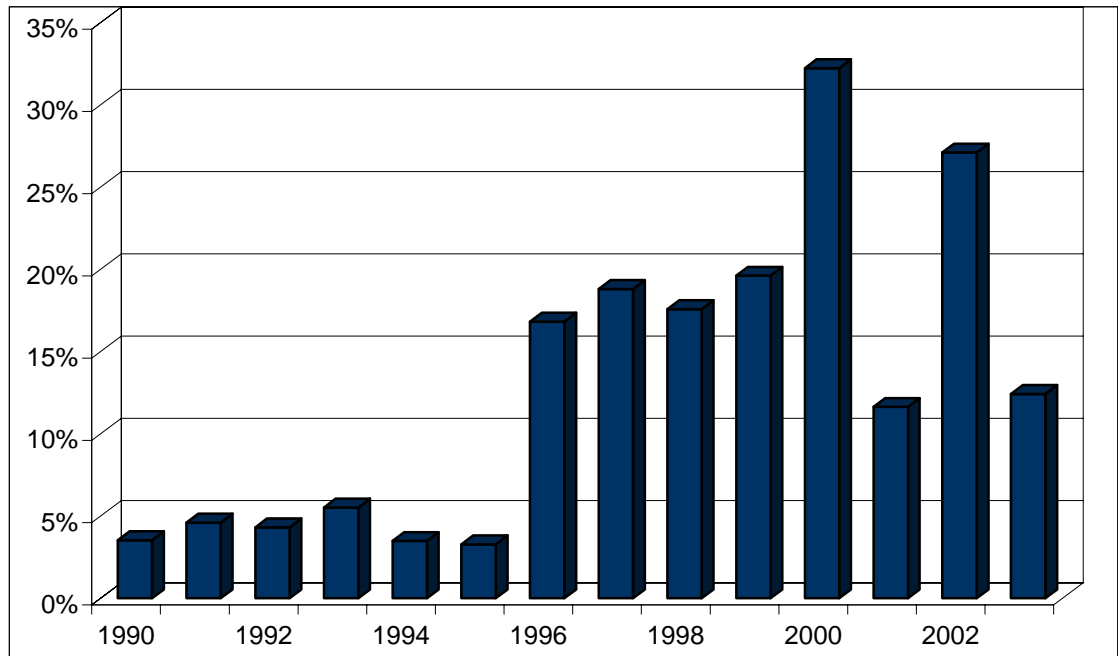
Figure 9
Recreational Harvest of PWSAC Salmon, 1990-2004



Source: ADFG and McDowell Group estimates.

The PWSAC salmon sport harvest is spread over a wide area, including the entire Prince William Sound area and the Gulkana River in the Copper River drainage. PWSAC contributions to the sport fishery in the region increased in importance from 4 percent of the total harvest in 1990 to more than 40 percent in 2003. In 2003 nearly 90 percent of the sport chum harvest was PWSAC origin fish, as was more than half the sport sockeye harvest (2003 is the last year for which region-wide data is available). Ten percent each of the coho and pink sport harvests was also PWSAC fish.

Figure 10
PWSAC Contribution to the Prince William Sound and
Gulkana River Sport Salmon Fishery, 1990-2003



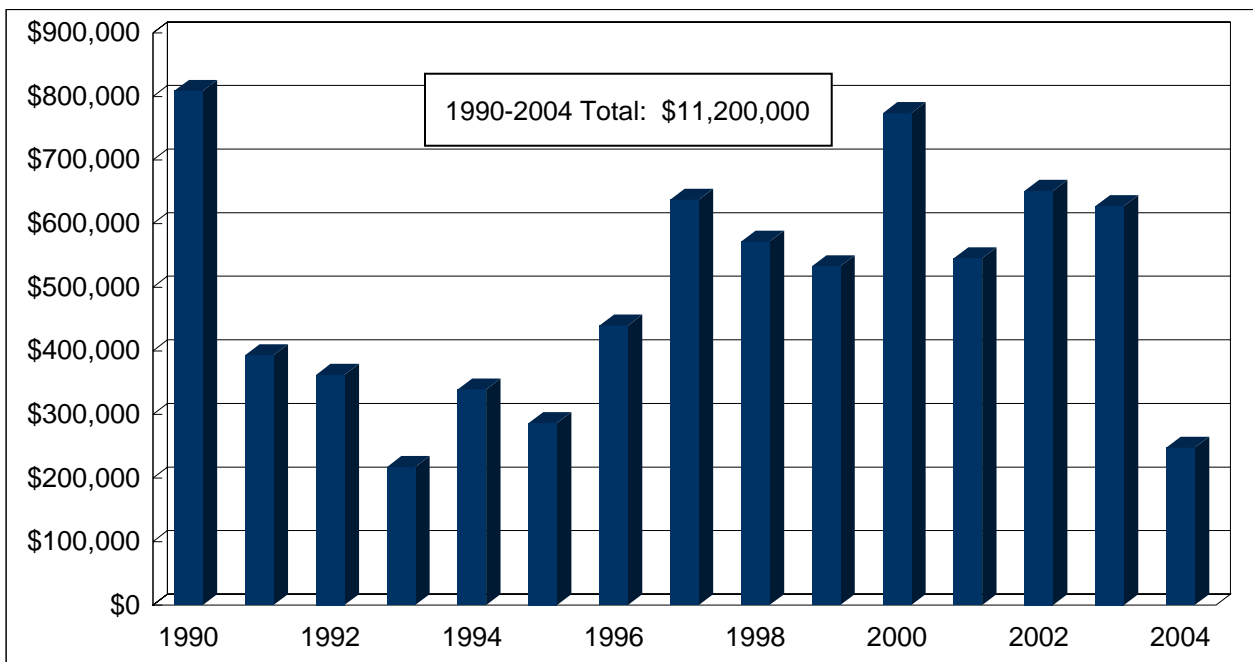
Source: ADFG

SALMON ENHANCEMENT AND FISHERIES BUSINESS TAX

As with all salmon commercially harvested and processed in Prince William Sound, PWSAC salmon are subject to a 3 percent State of Alaska Fisheries Business Tax, which is deposited into the state's General Fund.

From 1990 to 2004, Prince William Sound commercial salmon fishermen paid an estimated \$24 million in total fisheries business tax. The tax on PWSAC salmon accounted for about \$11 million of this total value, including fisheries business taxes paid on PWSAC cost recovery fish (Figure 11).

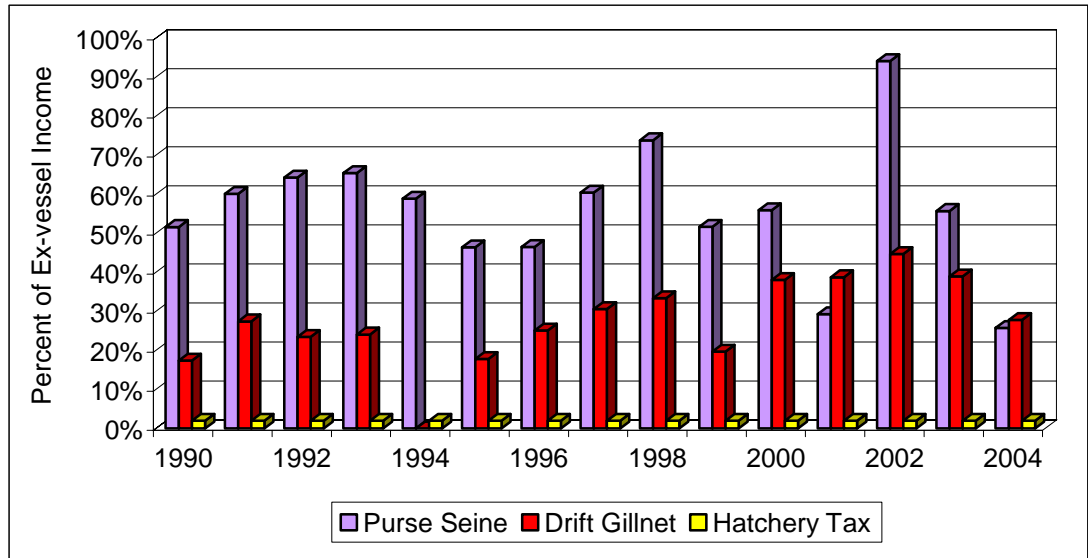
Figure 11
State Fisheries Business Taxes Paid on PWSAC Fish, 1990 to 2004



Source: ADFG and McDowell Group estimates.

Commercial fishermen fishing in Prince William Sound also pay a 2 percent Salmon Enhancement Tax to fund PWSAC operations. The return on this investment is substantial. From 1990 to 2004, purse seiners derived 54 percent of their incomes from PWSAC fish. Gillnetters derived 27 percent of their incomes from PWSAC fish (Figure 12).

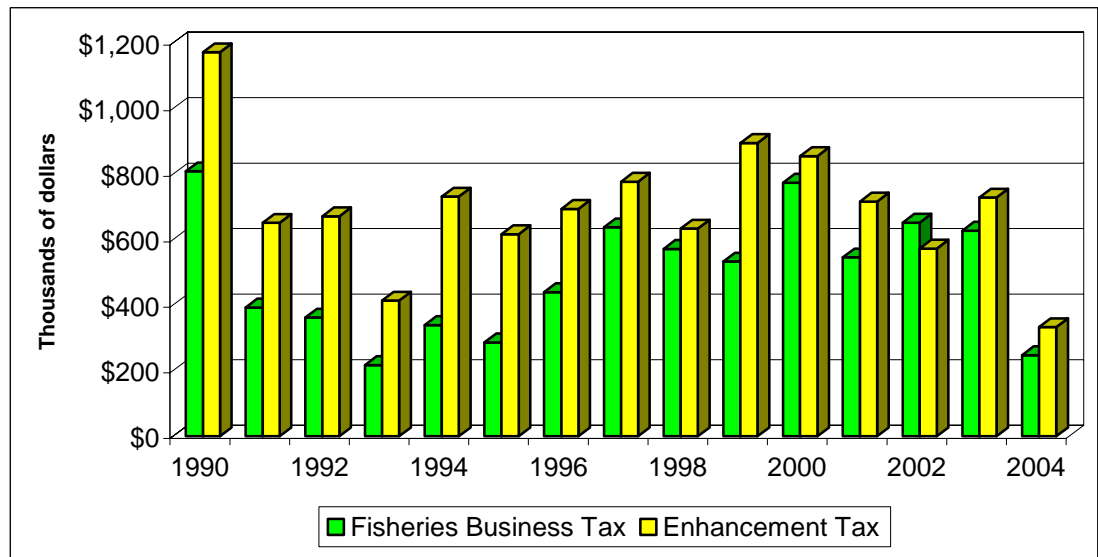
Figure 12
Percent of Ex-vessel Value for Seine and Gillnet Harvesters from PWSAC Salmon Versus the Salmon Enhancement Tax Rate 1990 to 2004



Source: ADFG and McDowell Group estimates.

From 1990 to 2004, commercial fishermen contributed \$10 million in enhancement taxes in support of PWSAC. Over the same period, PWSAC fish contributed \$189 million in ex-vessel value to the commercial fishery, a return to fishermen of \$18 for every \$1 of tax paid (Figure 13).

Figure 13
Salmon Enhancement and Fisheries Business Taxes Paid on PWSAC Fish, 1990 to 2004



Source: ADFG and McDowell Group estimates.

IMPACTS OF PWSAC BUSINESS EXPENSES

The PWSAC organization has substantial impacts on the regional economy. PWSAC directly creates 74 full-time equivalent jobs. Payroll and in-state operating expenses totaled \$7.0 million in calendar year 2004, plus out-of-state spending for fish feed, employee health insurance and miscellaneous equipment of about \$2.7 million.

In calendar year 2004, PWSAC spending was spread out among 20 Alaska communities, with purchasing the highest in Juneau, Anchorage, Girdwood, Valdez and Cordova (Table 7).

Table 7
PWSAC Spending by Community, 2004

Community	Expenditures
Juneau	\$1,762,154
Anchorage	1,731,080
Girdwood	403,028
Valdez	325,697
Cordova	325,508
Whittier	152,353
Seward	25,253
Palmer	16,496
Glennallen	13,171
Wasilla	6,918
Big Lake	5,338
Homer	4,499
Gakona	4,348
Paxson	3,862
Chugiak	1,450
Kake	505
Anchor Point	224
Ketchikan	200
Fairbanks	123
Bethel	\$13

Source: PWSAC and McDowell Group estimates.

Total economic impact of the spending includes approximately \$10 million in total output, 115 jobs and \$3.5 million in labor income.