

*Economic Impact of the
Prince William Sound Aquaculture
Corporation*

*Prepared for:
Prince William Sound
Aquaculture Corporation*



Research-Based Consulting

Juneau
Anchorage

April 2010

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Executive Summary

This study analyzes the impacts of the Prince William Sound Aquaculture Corporation (PWSAC) on regional and statewide economies. This is the fourth in a series of PWSAC impact reports initiated in 2001. The current report reflects data through 2008 and includes historical PWSAC data since 1990. The current document examines the impact of PWSAC activities on commercial, sport, personal use and subsistence fisheries. It also examines the market conditions for those salmon species that currently are most important to PWSAC's production.

Economic Impacts of the PWSAC Investment

PWSAC is a private nonprofit corporation established to produce hatchery-born, ocean-raised wild salmon for the commercial, sport, personal use, and subsistence fisheries of the Prince William Sound region. PWSAC operations are financed primarily by a cost-recovery program and supplemented by a salmon enhancement tax paid by commercial fishermen.

In 2008, PWSAC's modest \$6.4 million budget produced exponential economic returns to the regional and Alaska economies. Commercial harvesters (employing nearly 1,500 skippers and crew) earned \$55 million by catching 115 million pounds of PWSAC salmon. Seafood processors then generated \$202 million in first wholesale value (including ex-vessel payments to harvesters) by processing these fish in 2008. PWSAC salmon accounted for most of the region's 2008 salmon production: 68 percent of harvest volume and 70 percent of the ex-vessel value.

Total economic impacts in Alaska are even more substantial. Using Alaska economic multipliers, PWSAC salmon are estimated to have generated \$317 million in total economic output, 1,024 in direct, indirect and induced employment, and \$67 million in labor income for regional and statewide economies in 2008. Major economic benefits are widespread and accrue not only to Prince William Sound communities but to the Kenai Peninsula, Anchorage, and Mat-Su economies as well. Commercial harvesters from 35 Alaska communities earned income from PWSAC salmon. Residents of more than 40 Alaska communities harvested PWSAC sockeye for personal use and subsistence. In addition, the Prince William Sound personal sport and sport charter fisheries benefit from the Wally Noerenberg facility's coho production.

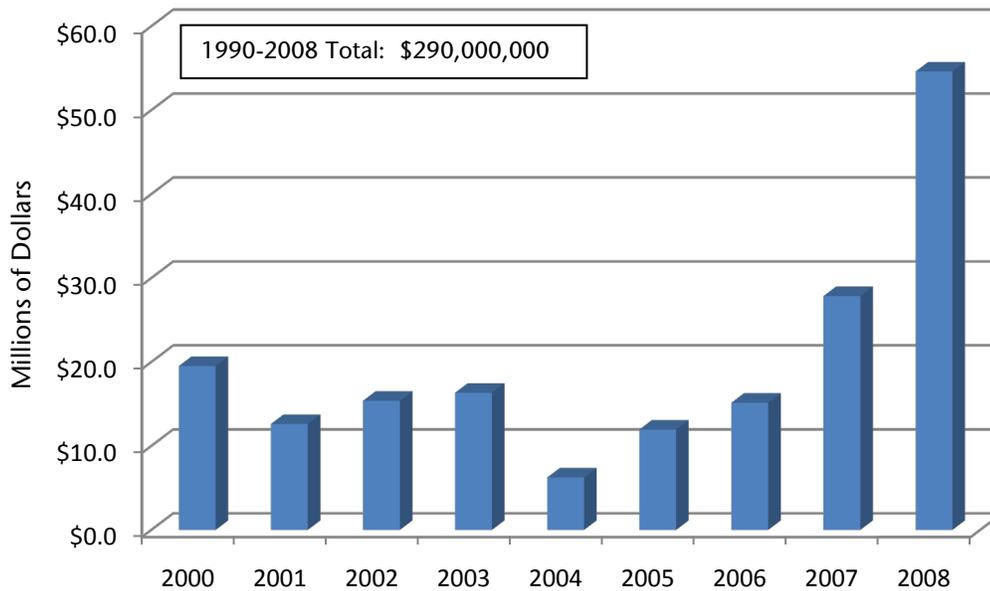
This document details PWSAC's impacts on:

- **Commercial Fisheries**
- **Seafood Processing**
- **Tax Revenue**
- **Sport Fisheries**
- **Personal Use and Subsistence Fisheries**

Commercial Fisheries Impacts

- From 1990 to 2008, commercial fishermen harvested 1.07 billion pounds of PWSAC salmon in common property fisheries with a total ex-vessel value of \$290 million.¹

Figure 1.1: Ex-Vessel Value of Common Property Commercial Harvest of PWSAC Salmon, 2000-2008



Source: ADF&G and McDowell Group estimates.

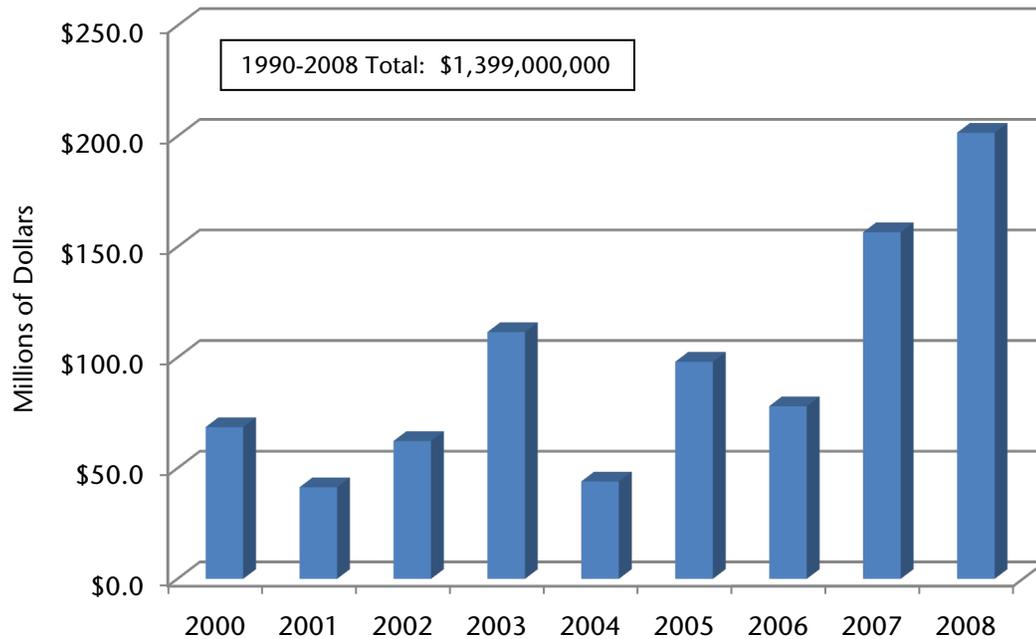
- In 2008, Prince William Sound commercial fishermen harvested 115 million pounds of PWSAC salmon from the region's common property fisheries with an ex-vessel value of \$55 million, the highest value and volume since 1990. Those figures accounted for 70 percent and 68 percent, respectively, of the total common property salmon harvest in Prince William Sound.
- The 2007 season ranked second in terms of harvest volume and value with 103 million pounds worth \$28 million to the region's fishermen.
- From 1990 to 2008, PWSAC salmon accounted for an average of 39 percent of ex-vessel value and 51 percent of total volume of the Prince William Sound common property salmon fishery.
- From 1990 to 2008, pink salmon accounted for 41 percent of the ex-vessel value of PWSAC salmon harvested, followed by sockeye (33 percent), chum (23 percent), coho (2 percent), and chinook.
- Alaska resident permit holders see most of the economic benefits of PWSAC production. In 2008, Alaska resident permit holders earned an estimated 76 percent of the total PWSAC ex-vessel value.
- Commercially harvested PWSAC fish generated an estimated 241 jobs in the Valdez-Cordova area, 100 jobs in the Kenai Peninsula area, and 74 jobs in the Anchorage/Mat-Su area.

¹ Ex-vessel value is the gross value paid to commercial fishermen for their salmon harvest.

Seafood Processing Impacts

- Between 1990 and 2008, the first wholesale value of commercial and cost recovery PWSAC salmon was \$1.4 billion, an annual average of \$73.6 million.²

First Wholesale Value of PWSAC Salmon and Roe, 1990 to 2008
(millions of dollars)



Source: ADF&G and McDowell Group estimates.

- Processors have generated \$990.9 million in gross earnings³ from processing and selling PWSAC salmon from 1990 to 2008. In 2007 and 2008 they had gross earnings of \$128.7 million and \$146.9 million respectively.
- The processing of PWSAC fish generated an estimated \$220 million in total economic output during 2008, including (directly and indirectly) \$16 million in labor income and 338 jobs.
- Of the 3,387 processing workers who processed all kinds of fish in the Sound and Cook Inlet during 2008, the study team estimates 923 were employed directly because of PWSAC salmon.⁴

² First wholesale value is the first sale of fish from a processor to a buyer outside of the processor's affiliate network.

³ Gross earnings is equal to revenue less the cost of goods sold. In this report specifically it refers to the first wholesale value (revenue) less the ex-vessel value paid to fishermen (cost of goods sold). Its important to keep in mind gross earnings is very different from net income because there are still many other expenses incurred by processors such as: labor, rent, utilities, packaging, taxes, and materials to name a few.

⁴ Most processing and harvesting workers do not work a full calendar year so the number of workers is typically much higher than the number of jobs. One job signifies twelve months of work for a single employee. In seasonal industries, such as seafood, it's important to remember the distinction between workers and jobs.

Tax Revenue Generated

- From 1990 to 2008, commercial fishermen contributed \$14.7 million in enhancement taxes in support of PWSAC. The \$290 million ex-vessel value of PWSAC salmon harvested during the same time period returned fishermen more than \$20 for every \$1 of enhancement tax invested.
- PWSAC fish have generated \$12.3 million in Fisheries Business Tax since 1990. Half of this tax money is distributed to PWS regional communities while the other half goes to the state's general fund to pay for government services.

Sport Fishery Impacts

- PWSAC-origin salmon are harvested in sport fisheries over a wide area, including the Copper River Basin and Prince William Sound.
- From 1990 to 2008, sport fishermen in the Prince William Sound area harvested 678,000 PWSAC salmon of all species.
- PWSAC coho production supports the region's sport fisheries. The Wally Noerenberg hatchery near Whittier is the only PWSAC hatchery that produces coho, and this production contributed about a fifth of the total regional coho sport harvest from 2004-2008.

Personal Use and Subsistence Fishery Impacts

- Between 1999 and 2008, Alaskans from more than 40 communities across the state harvested 403,000 PWSAC sockeye in the Copper River personal use and subsistence fisheries.
- The largest harvests of PWSAC sockeye were by residents of Fairbanks, Anchorage, Wasilla, North Pole and Copper Center.

The PWSAC Organization

- The PWSAC organization employed 71 full-time equivalent workers, with peak seasonal employment of 93 in 2008. The organization generates annual payroll and in-state expenditures in excess \$6 million.
- Eighty-four percent of PWSAC's funding was internally generated in 2008; mainly through cost recovery operations. The other 16 percent (\$1.6 million) comes from a 2 percent salmon enhancement tax levied annually on commercial landings of salmon in the Sound.
- Economic impacts of PWSAC spending include approximately \$9 million in total output, 107 jobs, and \$3.5 million in labor income and wages.

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.

PWSAC Salmon Impact on Seafood Processing. 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.

Salmon Enhancement and Fisheries Business Tax. 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.

Sport, Subsistence and Personal Use Harvest of PWSAC Salmon. The sport harvest of PWSAC salmon is addressed, including percentage of salmon attributable to PWSAC. 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.

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 (DOLWD), Alaska Department of Revenue (DOR), and Alaska Department of Fish and Game (ADF&G). 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. In these cases, estimates are based on the best available data.

Some commercial and sport harvest data were considered preliminary through 2008. Ex-vessel income for some communities and census areas was restricted due to state confidentiality laws. For this reason, the fishery average income per permit by gear type was used as a proxy to estimate ex-vessel value by community.

Commercial harvest data comes primarily from two series of ADF&G reports; the annual enhancement report and the PWS annual management report. Each report contains estimates on the number of fish which are

caught in the region's commercial fisheries. Using price and weight data from ADF&G we are able to construct an estimated volume and value attributable to the PWSAC hatchery salmon.

The methodology for estimating first wholesale value was redesigned in this report because the study team felt prior methods might be too inconsistent when applied to historical data. Underlying data on seafood processing can be very hard to blend with harvest data when it comes to processing location. Certain assumptions or caveats must be made which can change over time, adversely affecting the resulting data.

This report employs ADF&G data to estimate the product mix for each specie. Using peer reviewed data on recoveries and yields from various product types, the study team is able to estimate the volume of PWSAC salmon that end up as processed product. From there, first wholesale prices are applied to estimate the processed value of PWSAC salmon.

Sport fishery harvest figures for PWSAC chinook, coho and sockeye are based on PWSAC hatchery manager estimates reported in annual reports to ADF&G. 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 pink and chum salmon, the percentage of PWSAC pink and chum in the sport fishery is assumed to be the same as the PWSAC contribution to the commercial fishery.

The Copper River dipnet and fishwheel fisheries are important to thousands of Alaskans. Estimating where these fishermen spend their dollars 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. However, data is provided on estimated harvest per Alaska community, based on ADF&G Subsistence Division data.

Economic Modeling

The McDowell Group study team developed a set of multipliers specifically tailored to handle the aspects of Alaska's commercial seafood industry. Newer versions of econometric modeling software are ill-equipped to handle the complexities of Alaska's seafood industry. Rather than let such a model dictate the estimated employment associated with a certain amount of economic activity; the study team estimated the direct employment, total economic output, and labor income based on credible data series put out by the Commercial Fisheries Entry Commission, Alaska Department of Fish & Game, and the Alaska Department of Labor and Workforce Development. Multipliers were developed and then adjusted based on available data regarding nonresident employment and labor income. Nonresidents working in the harvesting and processing sectors are typically seasonal workers who take the vast majority of their earnings back to their home state. While they may purchase inputs locally for their plant or their boat just like any resident, their discretionary spending on things like homes, autos, and other goods is much less than a resident who lives in the community year-round.

The total economic output still considers the entire supply chain, from the harvesting of fish to the processing and finally the sale of finished goods in-and-out of state. 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. As a result, one dollar of input often results in more than one dollar of output because a portion of the dollar

circulates through the economy. Reliable data on sport fishing employment and client expenditures were unavailable, and therefore was able to be included in our economic modeling.

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. 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

The Armin F. Koernig Hatchery is located about 90 air miles west of Cordova in Sawmill Bay, on Evans Island. The site was originally a salmon cannery, but was converted to become the first PWSAC hatchery in 1974. The facility was built with monies borrowed from the State of Alaska's Fisheries Enhancement Revolving Loan Fund. Six on-site year-round staff and up to 12 seasonal staff operate the facility.

Armin F. Koernig 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 Armin F. Koernig and the Sound are still being investigated.

In 2008, Armin F. Koernig Hatchery saw estimated returns of 6.1 million pink salmon. This compares to 15.8 million pink salmon in 2007.

Wally Noerenberg Hatchery

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 Esther Island, in the South Esther Island State Marine Park. WNH is the largest salmon production facility in North America. Eight on-site year-round staff and 30 seasonal staff operate the facility.

Wally Noerenberg Hatchery returns included an estimated 8.7 million pink, 4.9 million chum salmon and 140,000 coho salmon in 2008. This compares to returns of 7.5 million pink, 3.7 million chum salmon and 124,000 coho salmon in 2007.

Cannery Creek Hatchery

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 management and operational control of the hatchery on July 1, 1988. The site is located on land managed by the U.S. Forest Service, approximately 40 miles east of Whittier, on the eastern shore of Unakwik Inlet in the northern area of Prince William Sound. PWSAC provides management and fish culture expertise at no cost to the State under a 20-year contract with the ADF&G. Six on-site, year-round staff and 14 seasonal staff operate the facility.

Cannery Creek Hatchery pink returns totaled an estimated 11.0 million fish in 2008, up substantially from 7.4 million fish in 2007.

Main Bay Hatchery

Main Bay Hatchery is also owned by the State of Alaska and situated on land managed by the U.S. Forest Service in Main Bay on the western shore of the sound, approximately 40 miles southwest of Whittier. Main Bay was built in 1981 by ADF&G FRED division as a chum salmon hatchery, but switched to a sockeye salmon enhancement program in 1986, becoming the first sockeye salmon smolt-producing hatchery in the world. PWSAC took over management and operational control on July 1, 1991. PWSAC provides management and fish culture expertise at no cost to the State under a 20-year professional services agreement with ADF&G. Six on-site, year-round staff and 8 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. Main Bay Hatchery sockeye returns totaled about 850,000 fish in 2008, down from 1,160,000 fish in 2007.

Gulkana Hatchery

The Gulkana Hatchery is located on the Gulkana River near Paxson, 250 miles northeast of Anchorage and 177 miles south of Fairbanks on the Richardson Highway. The hatchery is situated on land managed by the Bureau of Land Management. The facility and program was established by ADF&G in 1973 with streamside incubator boxes 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, the Gulkana Hatchery became the largest sockeye salmon fry production facility in North America.

PWSAC took over management and operational control of the program on July 1, 1993. PWSAC provides management and fish culture expertise at no cost to the State under a 20-year professional services agreement with ADF&G. Four on-site, year-round staff and 16 seasonal staff operate the facility.

Gulkana Hatchery sockeye returns totaled about 187,200 fish in 2008, up from 157,053 fish in 2007.

Administrative Operations

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

Salmon Market Overview

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 market performance is based on first wholesale value and product-form data published by Alaska Department of Revenue in the Alaska Salmon Price Report (ASPR) series.

PWSAC primarily produces pink and chum salmon and those species are the focus of this discussion. By volume, the five-year average of PWSAC production (2004-2008) is 70 percent pink, 23 percent chum, 6 percent sockeye and 1 percent coho.

PWSAC production of pink salmon varied substantially between 2000 and 2006. In the two years since then, production has been steady and well above average. Since 1990, no two-year period has come close to producing as much pink salmon for the commercial harvest as 2007 and 2008 (over 189 million pounds combined). In fact, Prince William Sound was Alaska's top pink-salmon-producing region in 2007 and 2008 as a direct result of PWSAC production.

With first wholesale and ex-vessel price having more than doubled since our last update in 2006, the production increase comes at a great time for commercial fishermen and processors in the Sound.

Table 2.1
Recent Harvest Composition of PWSAC Salmon by Volume

Species	2004-2008 Avg		2007		2008	
	Million lbs.	Percent	Million lbs.	Percent	Million lbs.	Percent
Pink	73.8	72%	103.6	74%	85.6	67%
Chum	22.0	22%	27.0	19%	36.8	29%
Sockeye	5.4	5%	7.8	6%	5.3	4%

Source: ADF&G Salmon Enhancement Annual Reports.

Pink Salmon

Alaska pink salmon values have seen a remarkable recovery in recent years. Product form shifts and related market dynamics drove ex-vessel price from the low point of just 9 cents per pound in 2003 to a 20-year high of 35 cents per pound in 2008. Since pink salmon accounts for half of Alaska's salmon harvest tonnage, value recovery for the species has had a substantial effect on the broader Alaska salmon industry.

Pink salmon price growth has been driven to some extent by salmon commodity value growth, but the primary driver has been product-form shift and a resulting balance of supply and demand across pink salmon product-form types.

Through 2003, most Alaska pink salmon went to market as canned product. Typical product-form composition was 75-80 percent canned and the remainder frozen products. Canned pink salmon has a relatively long shelf life and as a result of several strong harvest years, a chronic surplus-inventory situation developed. Even after low years in the two-year abundance cycle of pinks, Alaska producers often entered the

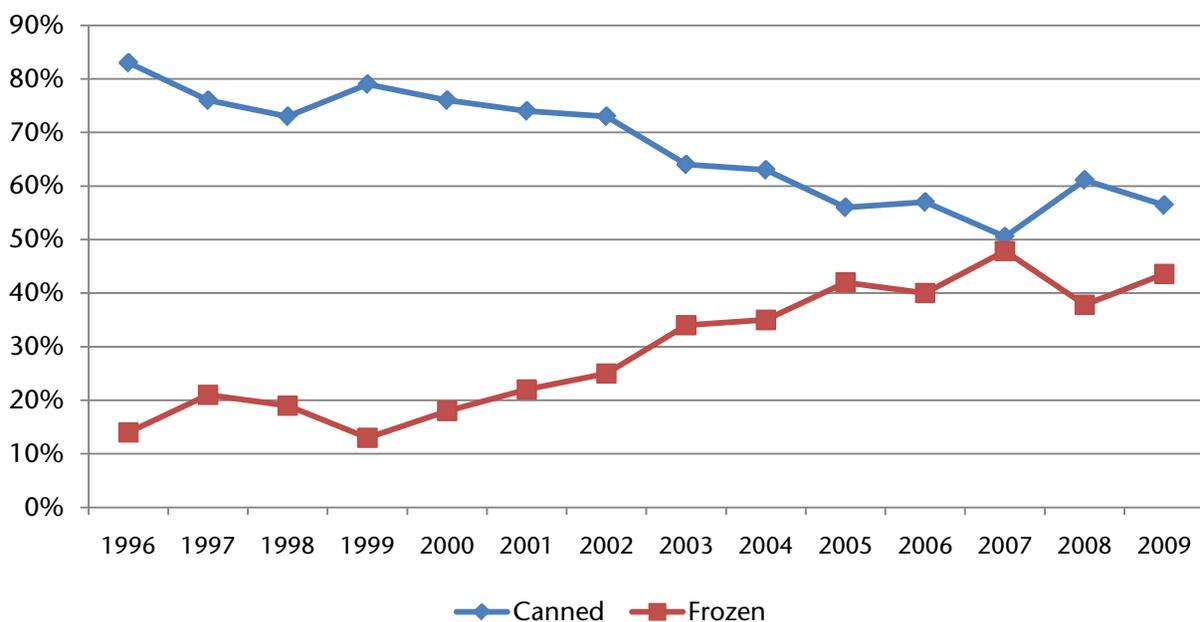
sales season with nearly two years' inventory on hand. This led to a cycle of chronically depressed wholesale prices as packers discounted heavily to move the product.

That situation began to change in 2003, as packers started to shift some pink production from canned to frozen. By 2005 the proportion was down to 60/40 canned and frozen and by 2007 canned production was only 51 percent. Canned production rose in 2008, but settled back into the mid-50-percent range in 2009.

The decreased canned pink production reduced inventory significantly and wholesale case prices began to recover. Average 48-tall case price bottomed out at \$34 in late 2003 but by 2007 had increased to \$57. That price growth continued through 2008 and in 2009, average first wholesale price of canned pink salmon was in the \$75 - \$76 range. The average first wholesale price for H&G frozen pink salmon shows similar growth, up from \$0.41 per pound in 2003 to \$0.93 per pound in 2007 and 2008.

Changes in first wholesale value of pink salmon roe are generally consistent with price patterns for chum roe. Pink roe remained in the \$6 - \$8 per pound range through 2007, then spiked to \$15 per pound in 2008, likely contributing to the 20-year-high ex-vessel price for pink salmon in 2008. Average wholesale price for pink roe settled to the \$9 range in 2009.

Figure 2.1
Pink Salmon Product Form Composition, 1996-2009



Source: ADF&G Commercial Operators Annual Report, Alaska Department of Revenue ASPR.

Chum Salmon

Statewide ex-vessel chum salmon prices have improved substantially in recent years, from \$0.19 per pound in 2003 to a 20-year high of \$0.59 per pound in 2008. The rebound in chum price is a result of generally improved market conditions for chum salmon roe and meat products and a value spike for salmon roe products in 2008.

The previous 10-year peak for Prince William Sound chum was in 2001 when ex-vessel average price for the region was \$0.40 per pound, driven by first wholesale chum roe values approaching \$10 per pound. PWS ex-vessel chum price peaked again at \$0.58 per pound in 2008, when average first wholesale chum roe value was \$15 per pound.

Prior to the roe-driven value peak of 2008, ex-vessel chum prices had been increasing steadily due to improved wholesale values for chum salmon meat products. The steady value growth has continued into 2009. Statewide average first wholesale value of frozen headed and gutted (H&G) chum has risen from the mid-40-cent range in 2003 to \$1.23 per pound in 2009. Frozen chum fillets show similar wholesale value growth, from the \$1.30-1.40 range in 2003 and 2004 to \$2.26 per pound in 2009.

The value growth of chum salmon meat products in the last several years is widely considered a function of increased consumer demand for salmon, and the ongoing success of efforts to differentiate wild salmon from farmed. More recently (2009) production declines in the farmed salmon sector have tightened salmon commodity supplies considerably and further bolstered values for most salmon products, including Alaska chum.

Sockeye Salmon

Prince William Sound sockeye are a marquee product and typically bring the highest ex-vessel value in the state. Average ex-vessel sockeye price for Prince William Sound has increased steadily for several years, from \$1.10 per pound in 2003 to \$1.70 in 2009 (up 55 percent). Ex-vessel sockeye price in the remainder of the state rose from \$0.58 in 2003 to \$0.80 in 2008 (up 38 percent).

While a significant amount of Prince William Sound (Copper River) sockeye is sold at high specialty-market prices early in the season a good deal of PWS sockeye is caught and sold in June and early July while other Alaska sockeye fisheries are producing substantial volumes of fish. Buyers of early-season PWS sockeye generally purchase the fish for reasons other than price, but for mid-season and late-season production, PWS sockeye value is more directly linked to the broader Alaska sockeye market.

Alaska has had a series of relatively strong sockeye harvests, averaging 43 million sockeye per year since 2004. However, much of the production volume (approximately 70 percent) is generated in Bristol Bay, which has well-known quality and production challenges. Accordingly, statewide average sockeye values have generally grown at a slower rate than other salmon species.

While PWS sockeye harvest is a relatively minor source of statewide sockeye volume, it accounts for 16 – 20 percent of non-Bristol-Bay Alaska sockeye production. Because of the quality and strong reputation of PWS sockeye, the product is likely better able to penetrate new or developing markets at a relatively high price point. This is reflected in the higher ex-vessel value growth rate of PWS sockeye.

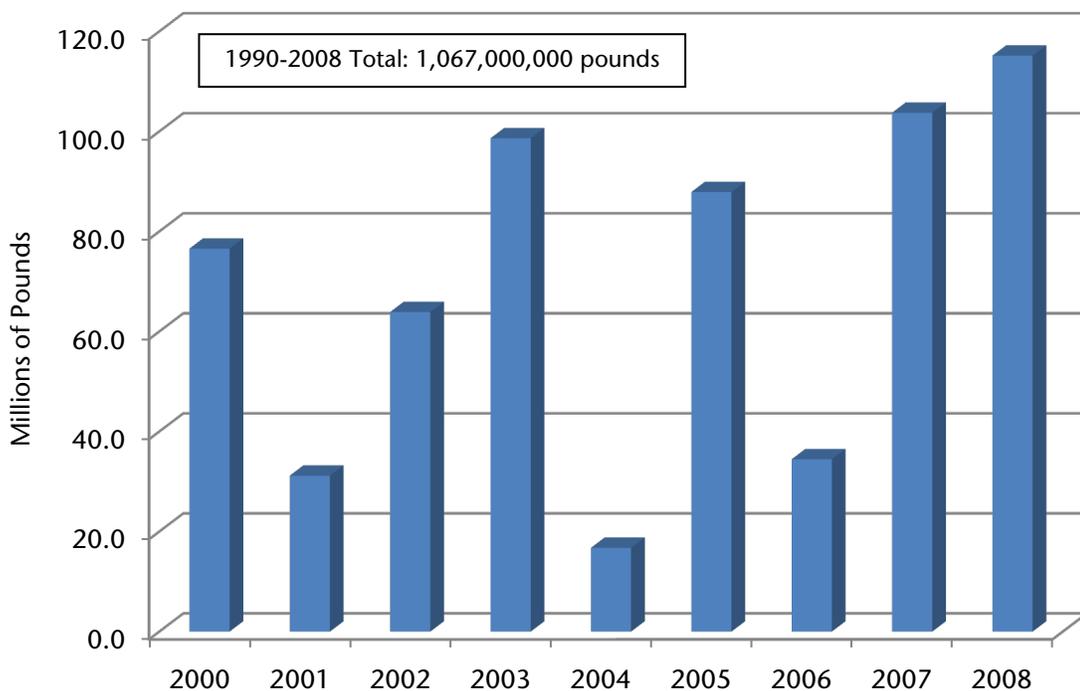
Commercial Harvest of PWSAC Salmon

Commercial Harvest and Ex-Vessel Value

From 1990 to 2008, commercial fishermen harvested over a billion pounds of PWSAC salmon in common property fisheries (see Figure 3.1). To put that in some kind of perspective, that's the same as the weight of 18,200 Boeing 737-100's⁵.

Hatchery returns exhibit significant year-to-year fluctuations. High sensitivity to ocean survival, the multi-year life cycle of salmon, predation, and disease contribute to volatile returns. Commercial harvests of PWSAC salmon have been strong over the past seven years. The 2007 and 2008 seasons were record years, in terms of the volume of PWSAC salmon harvested by commercial operators.

Figure 3.1
Total Pounds of PWSAC Salmon Harvested in
Common Property Commercial Fisheries, 2000-2008



Source: ADF&G and McDowell Group estimates. 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.

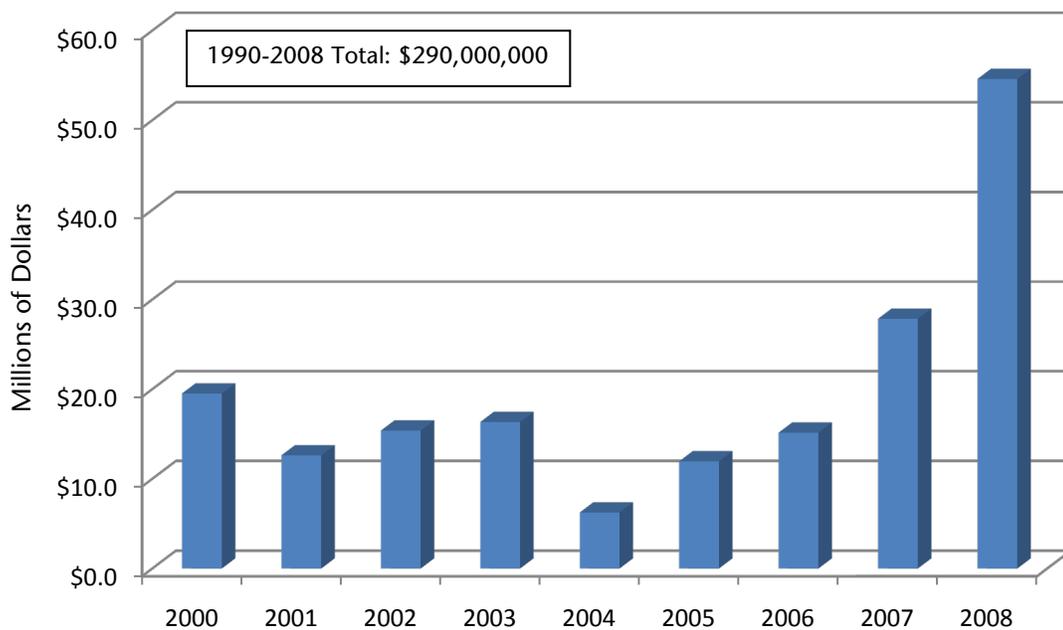
Commercial fishermen earned an estimated \$290 million in ex-vessel value from PWSAC salmon in common property fisheries from 1990 to 2008 (Figure 3.2), an average of \$15 million per year.

⁵ Empty operating weight of a Boeing 737-100 is equal to 58,600 pounds (<http://www.boeing.com/commercial/airports/acaps/737sec2.pdf>).

Buoyed by strong prices for pink, chum, and sockeye; commercial fishermen grossed an estimated \$55 million in 2008 (Figure 3.2). Strong returns and high prices for pink and chum in 2007 yielded \$28 million in ex-vessel value for commercial operators.

Figure 3.2 highlights the strong recovery in ex-vessel values since prices for pink and chum collapsed in the early-to-mid 2000's. The 2007 and 2008 seasons produced the largest ex-vessel values of PWSAC salmon since 1990.

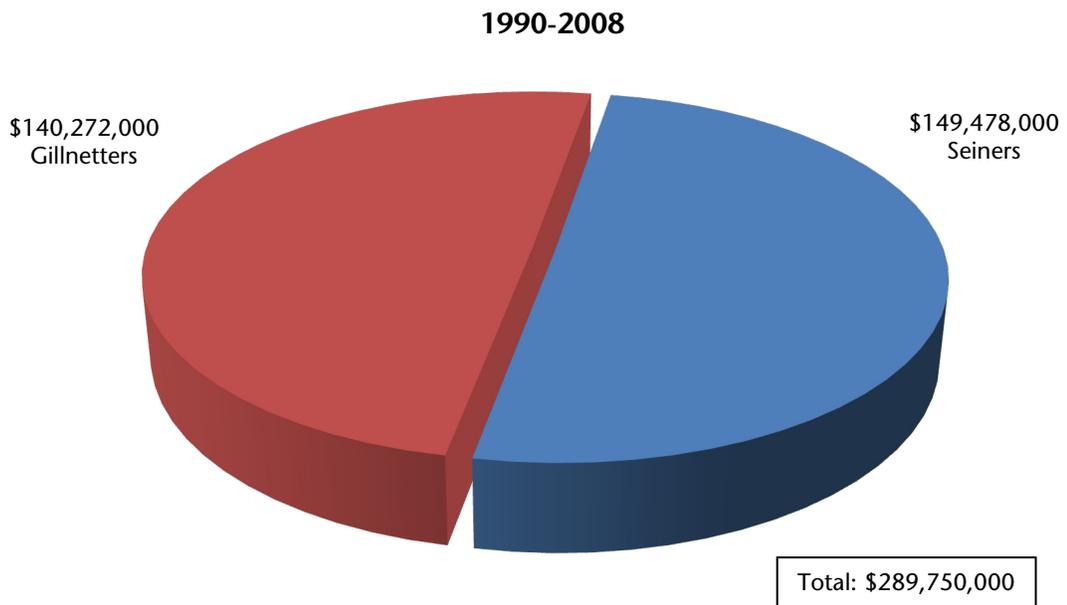
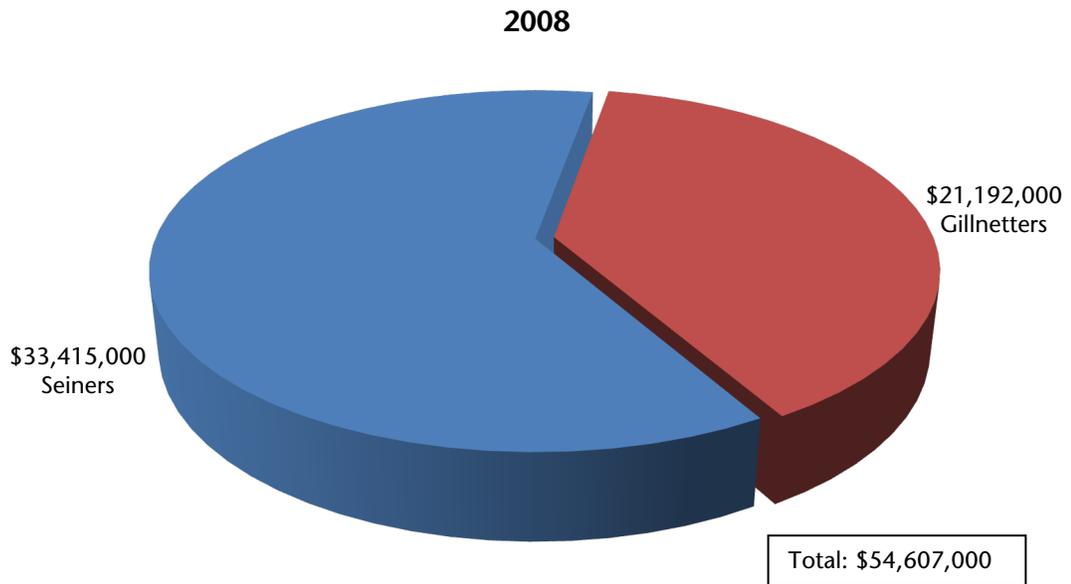
Figure 3.2
Ex-Vessel Value of Common Property Commercial Harvest of PWSAC Salmon, 2000-2008



Source: ADF&G and McDowell Group estimates.

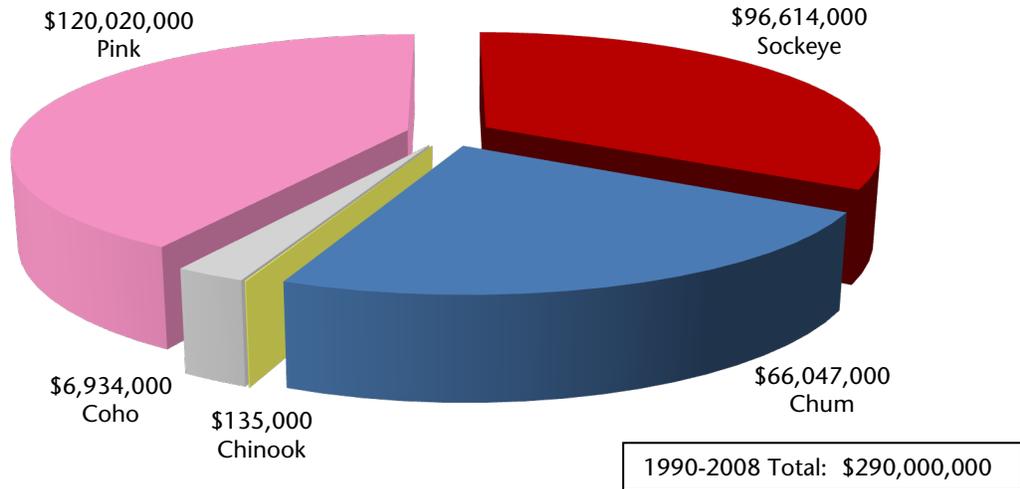
PWSAC salmon ex-vessel value totaled \$140 million to the gillnet fleet and \$149 million to the purse seine fleet between 1990 and 2008 (Figure 3.3). Pink salmon accounted for most of the ex-vessel value (\$120 million), followed by sockeye salmon (\$97 million), chum (\$66 million), coho (\$7 million) and chinook (\$135,000) (Figure 3.4).

Figure 3.3
Ex-Vessel Value of PWSAC Salmon
by Gear, 1990-2008 Total



Source: ADF&G and McDowell Group estimates. This data excludes fish used for cost recovery.

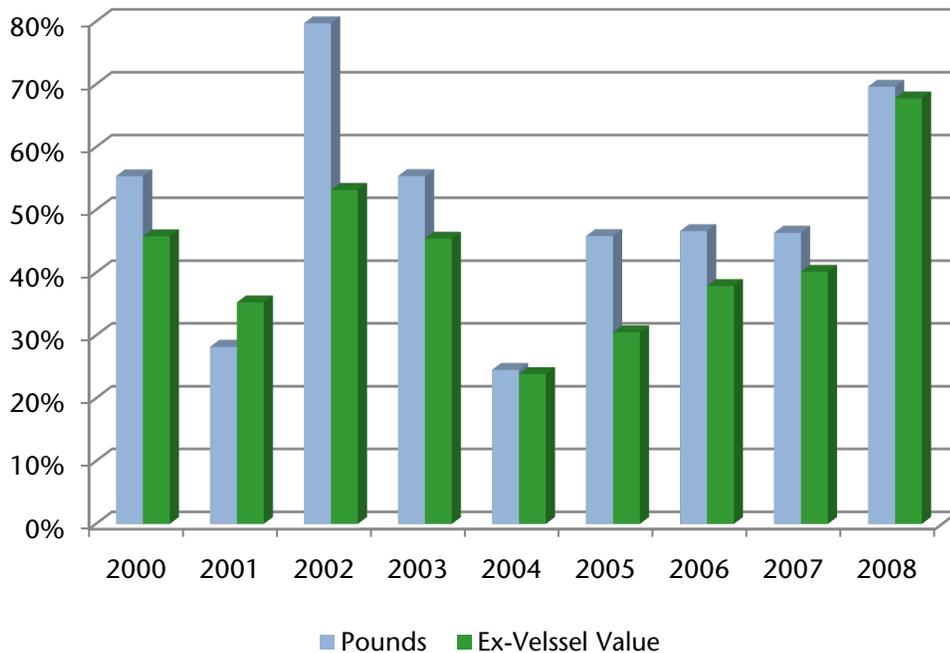
Figure 3.4
Ex-Vessel Value of PWSAC Salmon
by Species, 1990-2008 Total



Source: ADF&G and McDowell Group estimates. This data excludes fish used for cost recovery.

PWSAC salmon production is crucial to the Prince William Sound salmon fisheries. Since 1990, PWSAC salmon have accounted for, on average, 39 percent of ex-vessel value and 51 percent of volume. In 2008, PWSAC salmon made up 68% of the ex-vessel value and 70% of volume (Figure 3.5).

Figure 3.5
Ex-Vessel Value and Harvest of PWSAC Salmon as a Percent of the Prince William Sound
Commercial Salmon Harvest, 2000-2008



Source: ADF&G and McDowell Group estimates.

Distribution of PWSAC Commercial Harvest Value

The Prince William Sound salmon fisheries are dominated by Alaska residents. In 2008, Alaska residents earned an estimated 76 percent of the ex-vessel value of PWSAC salmon. The Alaska resident harvest is widely distributed, with participation by residents from Dutch Harbor to Delta Junction to Hydaburg. Residents from 35 communities harvested PWSAC salmon worth an estimated \$41.4 million in ex-vessel value in 2008.

Table 3.1 Geographic Distribution of Active PWS Permit Holders by Place of Residence, 1990 - 2008

	Fishermen Fishing Permits in PWS Salmon Fisheries: 1990 – 2008 avg.			Fishermen Fishing Permits in PWS Salmon Fisheries: 2008 ¹		
	Seiners	Gillnetters	Total	Seiners	Gillnetters	Total
Valdez-Cordova Census Area	70	275	345	59	257	316
Kenai Peninsula Borough	24	61	85	31	70	101
Municipality of Anchorage	10	45	56	12	46	58
Matanuska-Susitna Borough	4	22	25	2	32	34
Kodiak Island Borough	0	4	4	2	2	4
City and Borough of Juneau	0	2	3	1	2	3
Southeast Fairbanks Census Area	0	2	2	0	5	5
Sitka City and Borough	0	0	1	1	0	1
Yukon-Koyukuk Census Area	0	1	1	0	2	2
Aleutians East Borough	0	1	1	0	1	1
Aleutian Islands West Census Area	0	1	1	0	1	1
Prince of Wales-Outer Ketchikan Census Area	0	0	0	0	1	1
<i>Nonresidents</i>	48	78	126	91	71	162
Total Number of Active Permit Holders	149	555	704	144	543	687
Total Number of Estimated Skippers and	672	846	1,518	648	827	1,475

Source: CFEC, DOLWD, and McDowell Group Estimates.

¹ Data for 2008 is preliminary.

Table 3.2: Geographic Distribution of PWSAC Related Ex-vessel Value by Place of Residence, 1990-2008

	2006	2007	2008	1990-2008
Valdez-Cordova	\$7,405,000	\$12,958,000	\$23,770,000	\$138,336,000
Kenai Peninsula Borough	\$2,135,000	\$4,278,000	\$9,880,000	\$40,245,000
Anchorage/Mat-Su Area	\$1,825,000	\$3,472,000	\$6,302,000	\$32,275,000
Other AK Residents	\$302,000	\$415,000	\$1,473,000	\$5,490,000
<i>Nonresidents</i>	\$3,486,000	\$6,732,000	\$13,182,000	\$73,402,000

Source: CFEC, ADF&G, and McDowell Group Estimates.

Note: Dollar figures are rounded off to the nearest thousand.

The PWS salmon fisheries have employed an average of 1,518 people per year from 1990-2008 (Table 3.1). Despite the dramatic changes to the salmon industry, the current fleet size remains near long-term averages. Assuming these boats catch similar amounts of fish, on average, we estimate the Valdez-Cordova fleet earned \$23.8 million in ex-vessel value during the 2008 season. Kenai area residents earned \$9.8 million, Anchorage

and Matanuska-Susitna residents earned \$6.3 million, and other Alaska residents earned \$1.5 million (Table 3.2). All told, Alaska resident commercial fishermen have earned \$216.3 million from PWSAC fish since 1990.

From 2006 to 2008 Cordova residents harvested fish worth an estimated 52 percent of the total value of the PWSAC harvest by Alaska residents (\$38.8 million), followed by residents of Homer (15 percent, \$11.2 million), Anchorage and Valdez (6 percent and \$4.8 million each) (Table 3.3).

In all, permit holders hailing from 35 different communities around Alaska harvested salmon in the Sound during 2008. In addition to those communities listed in Table 3.3, permit holders from the following communities also participated in Prince William Sound salmon fisheries in 2008: Anchor Point, Big Lake, Chugiak, Circle City, Copper Center, Delta Junction, Dutch Harbor, Eagle River, Fort Richardson, Hydaburg, Indian, Juneau, Kenai, Kodiak, Nikolaevsk, Ninilchik, Old Harbor, Palmer, Petersburg, Sand Point, Seldovia, Sitka, Soldotna, Sutton, Tatitlek, Whittier, and Willow.

Table 3.3: Ex-Vessel Value of PWSAC Commercial Harvest by Permit Holders Area of Residence, Top Seven Communities, 2006 - 2008

Area of Residence	2006	2007	2008
Cordova	\$6,804,000	\$11,619,000	\$20,364,000
Homer	\$1,447,000	\$2,806,000	\$6,917,000
Valdez	\$456,000	\$1,155,000	\$3,205,000
Anchorage	\$927,000	\$1,398,000	\$2,490,000
Girdwood	\$348,000	\$806,000	\$1,566,000
Wasilla	\$270,000	\$740,000	\$1,108,000
Kasilof	\$120,000	\$254,000	\$496,000

Source: CFEC, ADF&G and McDowell Group estimates.

Regional Economic Impacts of PWSAC Commercial Salmon Harvest, 1990 to 2008 Total

The estimated impacts from Alaska resident PWSAC-related ex-vessel income of \$41.4 million were \$66 million in total output, 472 jobs, and \$39 million in labor income. Total resident and non-resident ex-vessel earnings of \$54.6 million resulted in \$87 million in total economic output, including \$48 million in labor income and 580 jobs (Table 3.4).

Table 3.4: Estimated Economic Impacts from Commercial Ex-Vessel Value of PWSAC Salmon, 2008

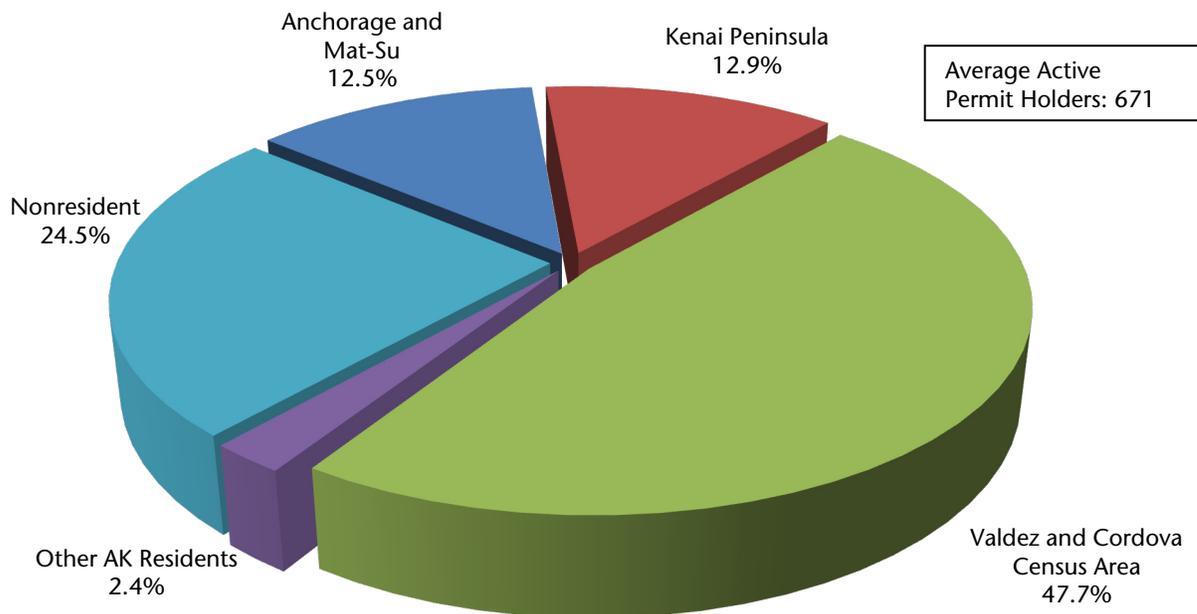
Census Area	2008 Ex-Vessel Value	Economic Output	Jobs	Payroll
All Alaska Residents	\$41,425,000	\$66,300,000	480	\$39,800,000
Valdez-Cordova	\$23,770,000	\$33,300,000	241	\$20,000,000
Kenai Peninsula	\$9,880,000	\$13,800,000	100	\$8,300,000
Anchorage/Mat-Su	\$6,302,000	\$10,100,000	73	\$6,000,000
Total	\$54,600,000	\$87,400,000	580	\$48,000,000

Source: CFEC, ADF&G and McDowell Group estimates.

- PWSAC salmon contributed \$23.8 million to Valdez-Cordova commercial permit holder ex-vessel income in 2008, resulting in an estimated total output of \$33.3 million, including 241 jobs and \$20.0 million in labor income and wages (Table 3.4).

- Permit holders from the Valdez-Cordova area harvested a total of \$138.3 million worth of PWSAC salmon from 1990 to 2008, with an average of \$7.3 million per year. About half of the active commercial fishermen in the Prince William Sound salmon fisheries (and benefitting from PWSAC operations) make their home in the Valdez-Cordova census area (Figure 3.6).
- Kenai Peninsula permit holders earned \$9.9 million in ex-vessel value from PWSAC salmon in 2008, resulting in \$13.8 million in total output, including 100 jobs and \$8.3 million in labor income.
- Kenai Peninsula fishermen earned a total of \$40.2 million, for an annual average of \$2.1 million.
- Anchorage and Mat-Su permit holders earned \$6.3 million in ex-vessel value from PWSAC salmon in 2008, resulting in \$10.1 million in total output, including 73 jobs and \$6.0 million in labor income.
- Anchorage and Matanuska-Susitna fishermen earned a total of \$32.3 million, for an annual average of \$1.7 million. Residents from the Anchorage, Matanuska-Susitna, and Kenai census areas make up about a quarter of the active fishing fleet in the Prince William Sound salmon fisheries.
- Alaska resident permit-holders hailing from other areas of the state earned a total \$5.5 million from 1990 to 2008. They made up 2.4% of the fleet from 2000 to 2008.

Figure 3.6
Active PWSAC Salmon Fishermen by Residency, 2000-2008



Source: CFEC, ADF&G and McDowell Group estimates.

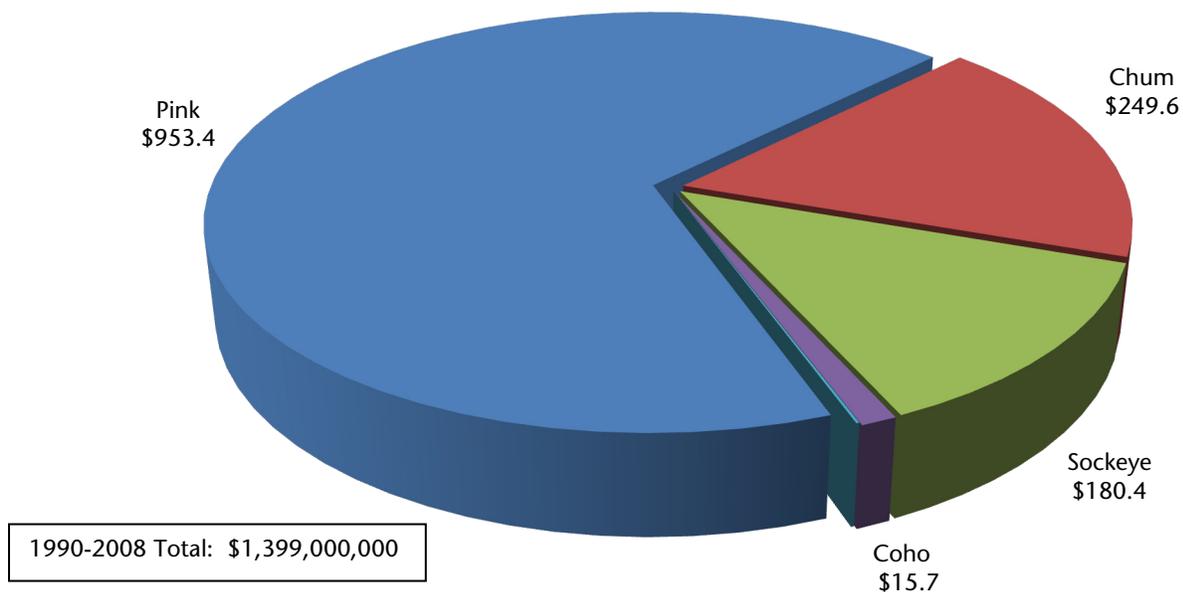
PWSAC Salmon Impact on Seafood Processing

First Wholesale Value and Gross Earnings of PWSAC Salmon

Seafood processors in Southcentral Alaska benefit greatly from the commercial harvest of PWSAC salmon, as indicated by the first wholesale value (i.e. the income received by a processor when it is sold an unaffiliated buyer for the first time). Processing plants employ hundreds of local workers and are a significant source of tax revenue.

From 1990 to 2008 processors generated a total first wholesale value of \$1.4 billion utilizing PWSAC salmon and roe harvested in commercial and cost-recovery fisheries (Figure 4.1). That works out to an estimated \$990 million in gross earnings (first wholesale value less the ex-vessel payment to fishermen) for processors over the 19 year period (Figure 4.2).

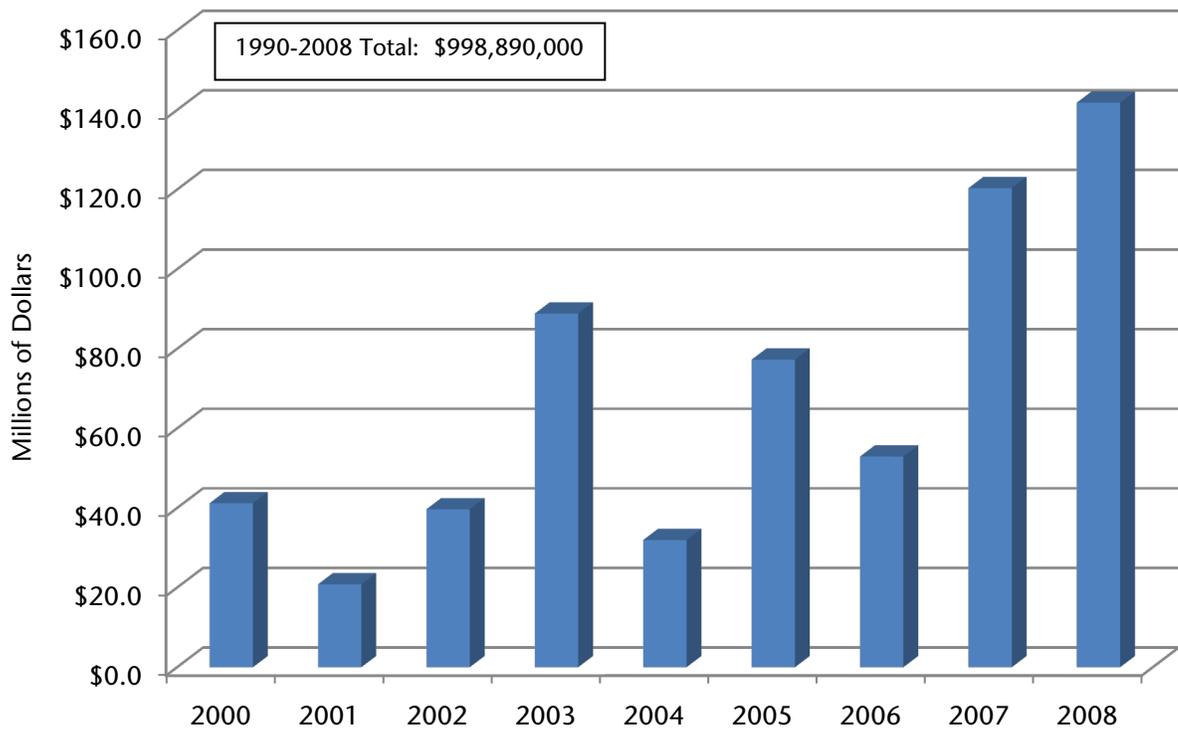
Figure 4.1
First Wholesale Value of PWSAC Salmon and Roe,
by Specie, 1990-2008
(millions of dollars)



Source: ADF&G and McDowell Group estimates. Excludes confidential values.

Pink salmon make the largest share of wholesale value (68 percent), followed by chum (18 percent) and sockeye (13 percent). Coho accounted for 1 percent of wholesale value while Chinook was less than 1 percent (Figure 4.2).

Figure 4.2
Processor Gross Earnings of PWSAC Salmon and Roe, 2000 -2008



Source: ADF&G and McDowell Group estimates.

Note: Gross earnings represent first wholesale value less the estimated ex-vessel payments to fishermen.

Processors sold a total of \$358 million worth of fish in 2007 and 2008. Less the cost of fish, they saw gross earnings of \$276 million in 2007 and 2008. Prices have trended up since the early 2000’s at the dock as well as the wholesale market. The \$92.5 million in average gross earnings attributable to PWSAC salmon and roe from 2004 to 2008 was almost double that of the previous ten year average (\$50.8 million).

Canned Salmon and Roe

PWSAC salmon production accounted for 65 percent of the commercial PWS pink salmon harvest and 95 percent of the chum harvest. Over 97 percent of the salmon canned by PWS processors is pink salmon. While fewer fish are ending up in a can, on a percentage basis, canned salmon still represented 28 percent of the first wholesale value in 2008.

Prince William Sound roe from pink and chums had a first wholesale value of \$62.1 million in 2008. PWSAC salmon accounted for roughly 74 percent of that total, or \$46.1 million.

Economic Impact of Processing PWSAC Salmon

With gross earnings of \$146.9 million coming from PWSAC fish, processors are estimated to have generated 338 jobs, \$15.9 million in labor income and wages, and \$220.5 million of total economic output. Processing plants in many Alaska communities are seasonal, and as such employ large numbers of workers for a few months at a time. The estimated 338 jobs represent an annual average, and includes jobs created indirectly.

The study team estimates processing plants employed 923 workers during 2008 season related to the processing of PWSAC salmon.

Estimating the processing impacts by locale have become problematic due to data limitations. However, available data confirms the vast majority of PWSAC salmon find their way into shoreside or floating processing plants based in ports between Seward and Cordova.

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 2008, Prince William Sound commercial salmon fishermen and processors paid an estimated \$27 million in total fisheries business tax. The tax collected on PWSAC salmon accounted for about \$12 million of this total value, including fisheries business taxes paid on PWSAC cost recovery fish.

Commercial fishermen and processors operating in Prince William Sound also pay a 2 percent Salmon Enhancement Tax to fund PWSAC operations. The return on this investment is substantial. For every dollar of enhancement tax paid over the last 19 years the tax has returned \$20 in ex-vessel value to commercial fishermen (Table 4.1). From 1990 to 2008, purse seiners derived 55 percent of their incomes from PWSAC fish. Gillnetters derived 30 percent of their incomes from PWSAC fish.

Table 4.1: PWSAC Fisheries Business Tax, Salmon Enhancement Tax, and Return on Tax Dollars, 1990 - 2008

	2006	2007	2008	1990-2008 TOTAL
Fisheries Business Tax				
Fisheries Business Tax from PWSAC Fish (3%)	\$753,000	\$1,087,000	\$1,792,000	\$12,255,000
- Fisheries Business Tax to State General Fund	\$376,000	\$544,000	\$896,000	\$6,127,000
- Fisheries Business Tax to Local PWS Governments	\$376,000	\$544,000	\$896,000	\$6,127,000
Salmon Enhancement Tax				
Salmon Enhancement Tax Paid to Hatcheries (2%)	\$1,580,000	\$1,388,000	\$1,612,000	\$14,749,000
Ex-vessel Value of PWSAC Fish	\$15,153,000	\$27,856,000	\$54,607,000	\$289,750,000
Return on \$1 of Enhancement Tax	\$19	\$20	\$34	\$20

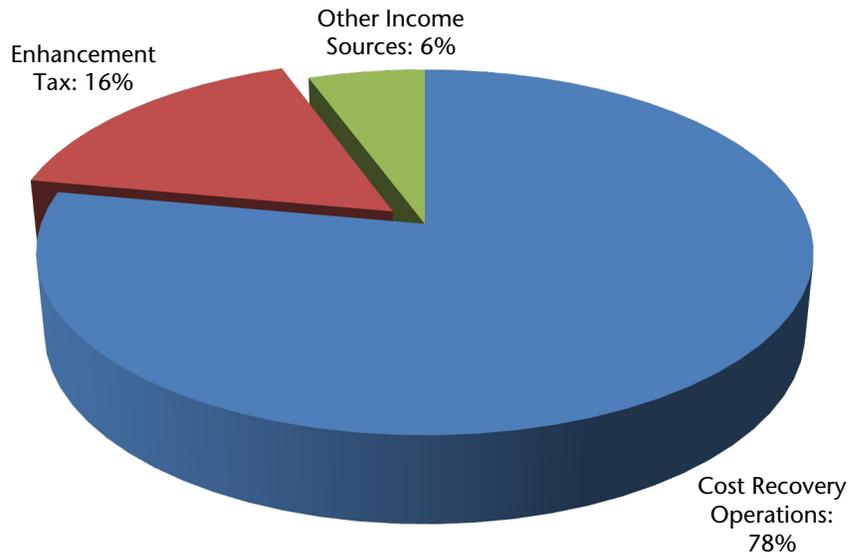
Source: ADF&G and McDowell Group estimates

PWSAC hatcheries are primarily funded through internal cost recovery operations. Hatcheries contract with commercial fishermen to catch returning hatchery fish and sell them to local processors. Cost recovery operations, along with other miscellaneous sources of income, accounted for 84 percent of PWSAC funding in 2008 (Figure 4.1 – see next page). PWSAC relied on enhancement tax proceeds for only 16 percent of their funding in 2008.

Over the past five years cost recovery operations represented 36 percent, 29 percent and 7 percent of the total harvest value for pink, chum and sockeye, respectively. That is a significant portion of the commercial

harvest for pink and chum, but during that same period PWSAC salmon accounted for 42 percent, 92 percent and 36 percent of the common property⁶ harvest for pink, chum and sockeye (respectively).

Figure 4.1: PWSAC Funding Sources, 2008



Source: PWSAC

⁶ Common property harvest is the volume, or in this case, the value of fish available to commercial fishermen. It does not include fish harvested for cost recovery purposes.

Sport, Subsistence, and Personal Use Fisheries

Sport Harvest of PWSAC Salmon

PWSAC salmon play an important role in the Prince William Sound sport fisheries, contributing 678,000 fish to the sport fishery from 1990-2008 (Table 5.1), an average of 36,000 fish annually. The PWSAC salmon sport harvest is spread over a wide area, including the entire Prince William Sound area and the Gulkana and Copper River drainages.

A significant proportion of sport fish landed in the Sound are most likely pink salmon. The study team estimates sport fishermen have caught and retained nearly 365,000 pinks since 1990. While they may not be the target specie for guides (usually that would be coho), many clients appreciate the mild taste of pink salmon.

Sport fishing for coho is serious business for many PWS residents who operate charter boats or fish recreationally. A sampling of PWS charter websites reveals an average price of roughly \$200 per person for a full day of guided fishing, not including licenses. PWSAC coho have made up 21 percent of the total regional sport harvest of coho since 2005. The Wally Noerenberg facility near Whittier is the only PWSAC facility currently producing coho.

Table 5.1: Sport Harvest of PWSAC Salmon in Numbers of Fish, 2004 - 2008

Species	2004	2005	2006	2007	2008	1990-2008 Total
Chinook*	0	1,846	0	0	0	10,234
Sockeye	1,869	3,400	1,863	500	700	51,582
Coho	4,543	22,673	46,425	24,350	20,250	226,767
Pink	3,562	18,569	8,377	15,285	19,251	364,624
Chum	1,618	688	1,795	1,154	2,154	24,489
Total	11,592	47,176	58,460	41,289	42,355	677,696

Source: ADF&G, PWSAC and McDowell Group estimates.

*PWSAC no longer produces Chinook salmon. Final returns occurred in 2002.

Subsistence and Personal-Use of PWSAC Salmon

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 harvested 403,200 PWSAC-origin sockeye from 1999 to 2008. Residents of Fairbanks harvested more of these fish than residents of any other community, followed by Anchorage, Wasilla, North Pole, and Copper Center. Residents of Palmer, Glennallen, and Eagle River also harvested large numbers of PWSAC sockeye in these fisheries.

Table 5.2: Number of PWSAC Sockeye Harvest, by Fishermen's Place of Residence, Copper River Personal Use and Subsistence Fishery, 1999 – 2008

City	2005	2006	2007	2008	1999-2008 Avg.	Grand Total
Anchorage	12,593	1,879	8,614	5,110	7,990	79,900
Barrow	134	6	22	20	54	543
Big Lake	167	51	100	90	157	1,574
Chickaloon	271	14	178	116	105	1,045
Chistochina	186	29	-	115	120	601
Chitina	758	180	702	360	496	4,956
Chugiak	832	107	480	312	547	5,474
Copper Center	4,686	533	2,415	1,430	2,573	25,729
Delta	2,973	-	-	-	1,074	10,743
Eagle River	3,294	407	1,478	930	1,779	17,789
Eielson	531	-	-	-	322	3,219
Elmendorf AFB	52	18	35	18	60	597
Ester	521	77	314	242	250	2,502
Fairbanks	17,031	2,636	11,349	7,414	8,745	87,445
Fort Richardson	90	8	32	24	64	636
Fort Wainwright	548	40	146	78	261	2,610
Gakona	2,193	222	1,065	538	1,007	10,068
Girdwood	141	22	103	32	111	1,106
Glennallen	2,964	405	1,688	585	1,846	18,455
Healy	264	22	114	69	109	1,089
Kenny Lake	-	-	-	346	170	680
Nenana	-	51	218	102	139	1,116
North Pole	5,459	757	3,423	2,036	2,640	26,402
Northway	429	9	25	23	97	876
Palmer	-	584	2,997	1,643	2,195	17,563
Salcha	565	63	214	126	232	2,316
Slana	454	70	141	258	227	2,267
Sutton	242	53	251	118	149	1,494
Talkeetna	173	16	54	25	71	713
Tazlina	-	-	-	495	194	777
Tok	1,865	179	514	248	691	6,911
Two Rivers	144	24	82	55	81	806
Valdez	2,224	386	1,429	809	1,264	12,638
Wasilla	7,647	1,074	5,332	3,246	3,872	38,721
Willow	102	41	211	109	146	1,457
Other Alaska ¹	243	575	2,016	2,313	604	12,346
Grand Total	70,900	10,700	46,400	30,200	40,330	403,200

Source: ADF&G and McDowell Group Estimates.

1. "Other Alaska" includes communities whose residents harvested 500 fish or fewer from 1999 to 2008.

PWSAC Business Expenses

The PWSAC organization has substantial impacts on the regional economy. PWSAC directly creates 71 full-time equivalent jobs. Payroll and in-state operating expenses totaled just under \$6.4 million in calendar year 2008, plus out-of-state spending for fish feed, employee health insurance and miscellaneous equipment.

In calendar year 2008, PWSAC spending was spread out among 20 Alaska communities. Spending was highest in Juneau, Anchorage, Valdez, Cordova and Whittier (Table 6.1). The bulk (\$1.49 million) of PWSAC spending in Juneau is associated with a Fisheries Revolving Loan Fund payment which is made annually to the Alaska Department of Commerce, Community and Economic Development. ADF&G offices in Juneau also perform hatchery evaluation projects.

Table 6.1: PWSAC Spending by Community, 2008

Community	Expenditures
Juneau (primarily State Government)	\$1,652,500
Valdez	\$690,900
Anchorage	\$688,500
Cordova	\$472,800
Whittier	\$179,600
Girdwood	\$48,500
Seward	\$41,100
Wasilla	\$29,700
Palmer	\$28,000
Gakona	\$28,000
Eagle River	\$27,700
Glennallen	\$27,600
Chenega Bay	\$6,100
Homer	\$5,600
Anchor Point	\$2,300
Fairbanks	\$2,200
Sitka	\$2,200
Nikiski	\$1,200
Kodiak	\$600
Two Rivers	<\$100

Source: PWSAC and McDowell Group estimates.