
A Preliminary Look at the 2007 Season

An Addendum to

*Economic Impacts
of the Prince William Sound Aquaculture
Corporation: 2006 Update*

The Prince William Sound Aquaculture Corporation (PWSAC) regularly commissions comprehensive studies of the economic impact of its activities on the economy of the Prince William Sound region and other areas of Alaska. These reports, typically completed every two to three years, provide information on harvests of PWSAC-origin salmon by the commercial salmon fleet, by the sport fish sector, and by personal use and subsistence harvesters. They also provide information on the market conditions that contributed to the value of the commercial fishery, and the salmon processing activity and impacts that the harvests supported.

In early 2007, PWSAC commissioned a report to examine the cumulative impacts through the 2006 harvest season. Throughout Alaska, salmon harvests that rely heavily on pink salmon experience biennial abundance cycles, with every second year typically yielding a more significant return. Despite being a lower cycle year, the 2006 PWSAC impacts for commercial harvesters were estimated at \$15 million to harvesters, with an estimated wholesale value in excess of \$81 million. The total economic output in Alaska was estimated at \$135 million.

By contrast, 2007 was a year of significant abundance. Pink and chum fish returning to PWSAC hatcheries approached all-time records. Paired with strong market conditions for salmon, and pink salmon in particular, the resulting impact of the fishery in Alaska was likely significantly higher.

The Alaska Department of Fish and Game and the Commercial Fisheries Entry Commission continue to compile the complete harvest and value data from the season, and key data sets will not be available until well into 2008. While the complete economic impact methodology can not be replicated in advance of the full data availability, in-season harvest data and up-to-date market information provide a basis for considering the magnitude of the fisheries' 2007 value, as compared to the 2006 season. The complete 2006 impact analysis provides more specific information on the manner in which PWSAC's impacts flow to communities and regions, and examines product form and species trends for the seafood product in greater detail.

Prince William Sound is home to some of the most significant pink and chum fisheries in the state of Alaska. Productive salmon hatcheries and abundant wild stocks contribute to a diverse fishery with participation by commercial seiners, drift gillnetters and setnetters, as well as sport, personal use, and subsistence harvesters.

In 2007, the region enjoyed near-record harvests in multiple species, and the third largest catch overall in the history of Prince William Sound. Pink salmon typically experience a biennial peak in returns; in Prince William Sound, this peak occurs in odd-numbered years. The 2007 peak pink harvest also

corresponded with a strong chum salmon return and a strong sockeye return.

Fish produced in the PWSAC hatchery facilities around Prince William Sound contribute a significant percentage of the total harvest of salmon in the region. In a given year, PWSAC production can range from one-quarter to one-half of the commercial harvest. The organization's hatcheries are spread throughout western Prince William Sound, with some additional sockeye capacity in hatcheries on the Copper River system. Release locations are dispersed through the region.

Commercial and Sport Harvests of PWSAC Salmon

All three commercial salmon gear groups in Prince William Sound (drift gillnet, setnet, and seine) benefit from PWSAC production, with gear groups tending to focus on different species due to their particular harvesting strengths and the timing of the returns. Generally, the seine fleet harvests significant amounts of PWSAC pink and chum salmon, while the drift gillnet fleet is more focused on sockeye runs.

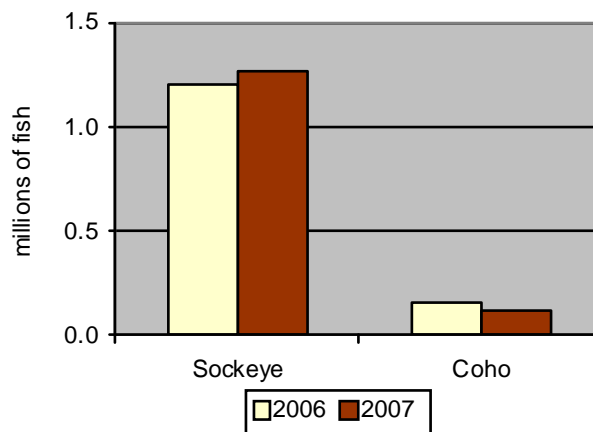
In 2007, commercial harvests of PWSAC-origin pink salmon approached 22 million fish, or nearly 74 million pounds. It was the third-highest harvest of PWSAC pink salmon on record (following 2003 and 2005). The harvest of PWSAC chum salmon was also the third-highest on record, at 2.5 million fish, or approximately 17 million pounds. Sockeye harvests were also notable, at 913,000 fish, or 5.7 million pounds.

Sport harvesters pulled 24,000 PWSAC coho from the waters and a smaller number of sockeye and coho. Personal use and subsistence harvesters took more than 34,000 sockeye salmon in systems supported by PWSAC production. These fish are primarily harvested in Interior river systems linked to the Copper River.

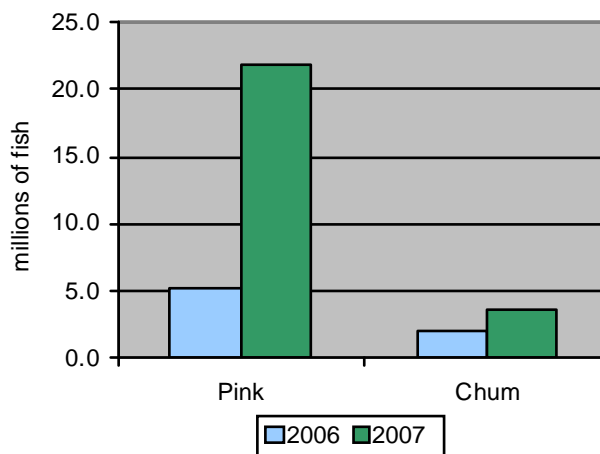
VALUE OF THE COMMERCIAL HARVEST

Based on preliminary figures, the estimated ex-vessel value of the 2007 PWSAC-origin harvest was \$26 million. This amount, paid to fishermen upon delivery of their catch, included \$11.8 million for pink salmon, \$8.5 million for sockeye salmon, and \$5.2 million for chum. The balance was for coho.

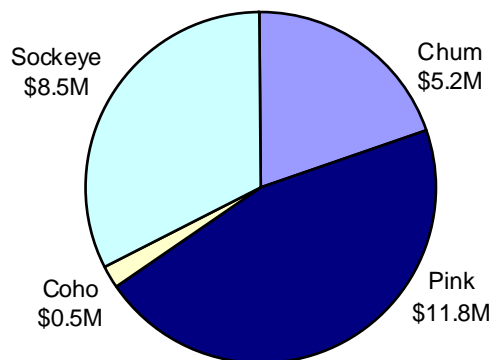
Total Returns, Sockeye & Coho, 2006-07



Total Returns, Pink & Chum, 2006-07



Ex-vessel Value, by Species, 2007



The ex-vessel value paid for a vessel's catch must cover all of the operating expenses of the harvesting activity, including the costs of crew (generally paid to crew members as a "share," or percentage of the value of the catch), fuel, food, gear, maintenance, vessel upgrades, insurance, and any other fixed or variable costs associated with the fishing operation. While datasets maintained by the State of Alaska reflect the ex-vessel value per permit holder, it is

important to recognize that the entirety of the ex-vessel value does not accrue directly to the individual. Profits by individual harvester are not available.

However to the extent that provisioning, maintenance repair work, and other vessel support expenditures occur in Alaska, those dollars can be expected to flow through the Alaska economy.

Differences in Hatchery Ownership: PWSAC and the State of Alaska

PWSAC owns and operates two hatcheries in Prince William Sound: the Armin F. Koernig Hatchery, located in the southwest corner of the Sound, near Montague Strait; and the Wally Noerenberg Hatchery, on Esther Island, near Whittier.

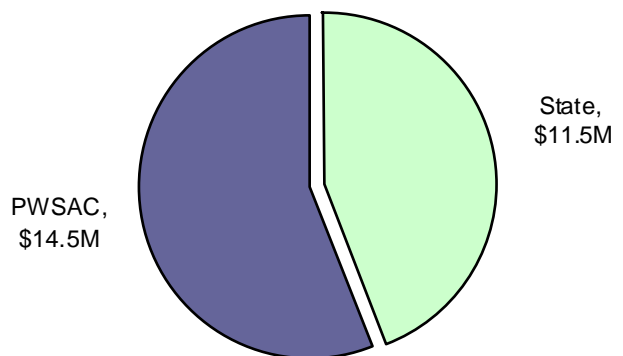
In addition, the State of Alaska contracts with PWSAC for operation of three State-owned hatcheries in the region: the Cannery Creek Hatchery in the northern part of Prince William Sound; the Main Bay Hatchery, southeast of Whittier; and the Gulkana Hatcheries, located inland on the Copper River. PWSAC has had contracts for operation of these hatcheries for as long as 20 years.

Production at the two PWSAC-owned hatcheries includes pink salmon at Armin F. Koernig, and pink, chum and coho salmon at Wally Noerenberg. In 2007, 100 percent of the organization's chum and coho salmon came from these two facilities, as well as three-quarters of the pink production.

The state-owned facilities account for all of the organization's sockeye production, with about 90 percent of the 2007 sockeye return originating from the Main Bay Hatchery outside Whittier, and the balance from the Gulkana Hatcheries on the Copper River. In addition, pink salmon from the Cannery Creek facility in northwestern Prince William Sound

contributed about one-quarter of PWSAC's total pink return in 2007.

Total 2007 Ex-Vessel Value for PWSAC Hatcheries
PWSAC-Owned and State-Owned/PWSAC-Operated



THE CASE OF CANNERY CREEK HATCHERY

PWSAC's operation of the Cannery Creek Hatchery is the longest-running of its management relationships with the State of Alaska. Since assuming operational control of the hatchery in 1988, PWSAC has overseen significant changes to the hatchery, and the successful production and return of 108 million salmon.

When PWSAC assumed control of Cannery Creek Hatchery, it implemented production increases and infrastructure developments. First, the organization roughly doubled its egg-take for pink salmon. At the same time, the infrastructure at the remote hatchery facility was improved, with an addition to

the bunkhouse and the construction of a duplex housing unit. These accommodated the increased staff size necessary to handle the higher production levels. In 1990, chum salmon production at the facility was discontinued, allowing the organization to increase the pink production once more, to the current level of 152 million eggs annually.

Hatchery technology and practices have evolved in the 20 years since PWSAC took over operation of Cannery Creek. In the early years of operation, hatchery salmon were marked with coded wire tags to differentiate them from wild stocks, a necessity for sound management of mixed wild and hatchery stocks. This practice was labor intensive, and employment levels following the 1989 production increases included 6 full-time employees and an additional 35 seasonal staff.

In 1995, funding from the Exxon Valdez Oil Spill (EVOS) Trustee Council enabled PWSAC to purchase and install a thermal otolith marking system at the hatchery. Otoliths are the small “ear” bones in fish, and controlled changes to the temperature the salmon fry’s environment result in permanent, identifiable markings on the bone. These are later retrieved by fishery managers and used as a tool for mixed stock management. This new system replaced the wire-tagging program.

In 1996, a mechanical egg-take system was added at the Cannery Creek Hatchery. The system also included an electro-anesthesia unit, which stuns the salmon prior to the egg extraction, making the process far more efficient. It also allowed the organization to reduce staffing levels to 6 full-time employees and 11 part-time seasonal. These staffing levels have remained constant ever since.

The lifestyle of hatchery workers has also changed significantly over the last two decades. Through the mid-1990s, the hatchery experience was one of remote adventure, with staff’s connection to the

outside world limited to daily radio checks with the PWSAC main office, and mail and supply barge drops every second week. In the present day, employees are far more connected to the world beyond the hatchery. The facility at Cannery Creek has cell phone coverage, satellite television, and Internet access.

Other organizations and agencies are also able to take advantage of the existence of the remote hatchery infrastructure at Cannery Creek to support programs and data collection. The National Oceanic and Atmospheric Administration (NOAA) has used the Cannery Creek Hatchery as a weather station since 1978. Additionally, the Alyeska Pipeline Service Company’s oil spill prevention and response program, SERVS (Ship Escort Response Vessel Systems), has staged equipment at the Cannery Creek Hatchery. Hatchery staff function as first-responders in the event of an oil spill in the area, and receive biennial trainings from the SERVS personnel. Since its deployment at the Cannery Creek Hatchery in 1990, this equipment has been used multiple times to respond to small spills from sinking fishing and fish tender vessels.

The commercial value of the fish produced at the Cannery Creek facility has been significant over the years, totaling approximately \$28 million in ex-vessel value since 1990, including an estimated \$3 million in 2007. In addition to these earnings by fishermen from salmon from Cannery Creek, there are earnings by PWSAC for their cost-recovery sales. In 2007, this totaled \$1 million. In total, parties that benefit from PWSAC fish include harvesters, the processing sector, which employs people to process the fish, and other portions of the economy that are indirectly affected by the fish harvesting and processing activity. Impacts ripple through a range of seafood industry support businesses, retailers, local utilities, and other parts of the general regional economy.

Processing Activity

PWSAC-origin salmon are processed in plants around the Southcentral region, with additional product moving to other areas of the state as run strength and processing capacity dictates. In 2007, processors in Prince William Sound included Bear & Wolf Seafoods, Ocean Beauty Seafoods, Copper River Seafoods, Norquest/Trident Seafoods, Great Pacific Seafoods, and Peter Pan Seafoods. On the Kenai Peninsula, Icicle Seafoods processed in Seward. In addition, with the significant volumes of salmon produced in Prince William Sound, some processing companies tendered fish to plants in Kodiak and Southeast Alaska to optimize processing capacity.

First wholesale values, by product type, are reported to the Alaska Department of Revenue through the Alaska Salmon Price Report. First wholesale is the price paid to primary processors the first time product is sold outside their primary production networks.

The estimated first wholesale value of the 2007 PWSAC harvest is \$130 million. The McDowell Group's study of the *Economic Impact of Prince William Sound Aquaculture* for the 2006 season estimates the wholesale value of the PWSAC-origin salmon at approximately \$81 million. The 2006 and 2007 estimates are based on different wholesale price data sources and cannot be compared directly

(the estimates for 2006 vary by approximately 10 percent, depending on the data source). However, it is clear that the wholesale value of product from PWSAC is up significantly, corollary to the significant increase in harvest.

Assuming profitable operation, these revenues should cover the costs of producing and selling the seafood product. These costs include the cost of purchasing the raw material (or the ex-vessel value paid to fishermen), supplying required labor (the processing workforce), providing packaging and processing materials (such as cans, boxes, labels, or other inputs), power costs, marketing and sales costs, as well as any processor profits. Depending on the level of reliance on non-Alaska goods and services, some of these expenditures result in additional economic activity in the Alaska economy.

The wholesale value of the harvest takes into account those fish processed for cost recovery purposes, as well as those taken in the common property harvest by seiners and gillnetters. Pink salmon contributed more than 68 percent of the total value, with the balance from chum (19 percent), sockeye (12 percent) and coho (1 percent). Roe products are an important component of the value picture, contributing 28 percent of the total value despite being less than 10 percent of the finished product weight.

Market Conditions for Salmon

PWSAC production is focused on pink and chum salmon with additional minimal production of coho and sockeye. Market conditions for all four species showed stable or positive price trends. At the same time, the marketplace is currently dynamic, with flux in product forms and traditional markets.

PINK SALMON

Strong market conditions have created a positive situation for Alaska pink production in recent years. With strong interest in frozen pinks for value-added processing, and decreasing carryover inventories of canned pink salmon, new harvest production is in

high demand, and is driving ex-vessel prices upward.

A chronic surplus of canned salmon suppressed pink markets for much of the last ten years, with record oversupply and holding prices down. Prices bottomed out during 2002-2004, with statewide average ex-vessel years of production adding to the prices around 9-10 cents per pound.

In 2005, values began to improve, as demand for frozen pink salmon as a value-added product ingredient grew. The Alaska product form composition shifted away from canned salmon, creating additional opportunity for inventories of canned to decline. In 2006, the low statewide pink return accelerated the shift in product forms and accompanying price increases. Wholesale prices for 48-tall canned pink salmon rebounded from the low of \$34 to \$57 per case. Ex-vessel pink prices increased to 16 cents per pound in 2006 and preliminary statewide price for 2007 is 17 cents per pound.

This product form shift is consistent with global trends in seafood production and demand, and is unlikely to change in the near future. Pink salmon will likely continue to gain traction as a raw ingredient for value-added processing.

CHUM SALMON

Statewide average chum salmon prices have improved substantially in recent years, from 19 cents per pound in 2003 to 32 cents per pound in 2006. Preliminary ex-vessel price for chums declined slightly to 30 cents in 2007, still a relatively strong price considering the 10-year average of 24 cents per pound.

Roe value has traditionally been a significant driver for the ex-vessel price of chums, but the recent

increases result from increased wholesale value of chum salmon meat products.

The previous 10-year peak for statewide chum price was 2001, when average ex-vessel price was 34 cents per pound. This was driven largely by strong wholesale values for chum roe, at or near \$11 per pound. More recently, chum roe has been selling at first wholesale prices in the \$6-7 range and has remained fairly steady at that level since 2003.

In comparison, first wholesale value of frozen headed and gutted (H&G) chum has risen steadily since 2003, from the mid-40-cent range in 2003 to \$1.09 per pound in early 2007. Frozen chum fillets show similar first wholesale value growth, from the \$1.30-1.40 range in 2003 and 2004 to \$2.00 per pound in 2006.

The improved price for chum salmon meat products are widely considered to be a function of the continued growth in broad consumer demand for salmon, and the ongoing success of efforts to differentiate wild salmon from farmed product. Post-season wholesale chum prices of 2006 may also have been buoyed by substitution activity associated with the pink salmon harvest shortfall that year.

SOCKEYE SALMON

The sockeye market generally was stable in 2007, particularly for frozen products, but flux in overall product form composition and export trends may result in long-term changes. Processing is shifting toward frozen product, including fillet, and exports to China for reprocessing have increased significantly. The traditional Japanese market has taken less of the product overall (though much of the Chinese reprocessed product is likely moving into Japan) and European buyers, fueled by the strong Euro, have purchased a greater proportion of the catch.

Price data for the first eight months of 2007 showed wholesale price for H&G frozen sockeye up 8 percent from the previous year, from \$1.86 to \$2.01 per pound. However, a good deal of the 2007 frozen sockeye pack remained unsold at that time, so these prices should be viewed only as early indicators. Fresh and frozen sockeye fillet prices dropped by 10-20 cents per pound, a decrease of less than 5 percent.

The canned salmon market is beginning to show some weakness, with consistent high production over the last four years resulting in some oversupply. Though price softening has been minor, accelerated decreases in the wholesale price may be possible.

Sockeye trends for the near future are expected to include significant increases in fillet production, particularly in Bristol Bay. As the product form mix changes, export and sales patterns are likely to continue to shift, with accompanying market adjustments.

COHO SALMON

The market position for Alaska coho salmon faces strengths and challenges at present. On the positive side, the first wholesale value of coho has increased steady since 2003, reflective of the generally increased demand for wild salmon in the marketplace. Frozen H&G coho, which makes up 55 percent of the Alaska production volume, saw increased prices from \$1.40 per pound in 2003 to \$2.35 in 2006. Prices for frozen fillets saw marked increase, as well, from \$2.70 to \$4.20. The value growth in the coho market has increased more steeply than that for sockeye. This may be due in part to the capture method for the majority of Alaska coho, which are primarily taken in troll fisheries in Southeast Alaska and in gillnet fisheries in Prince William Sound.

However, statewide coho production has been declining for three years, and 2007 harvests fell below 4 million fish for only the second time in 20 years. Though the short-term market response has been strong prices and strong demand, the risk of marketplace substitution increases as the era of low volumes continues.

Sport and Personal Use Harvest of PWSAC Salmon

Harvest of PWSAC-origin salmon extends to sport fishermen and personal use/subsistence users as well. Sport efforts are primarily focused on coho salmon, particularly in areas near Whittier, with some additional effort near Cordova and Chenega. In 2007, the sport harvest near Whittier totaled 14,300 coho salmon. Another 4,200 were taken near Cordova, and 5,900 near Chenega. When considering sport fishing activity it is important to note that actual harvest is not necessarily representative of catch or effort, as participants may release a portion of their catch, or have limited success even when targeting particular species.

Personal use harvests tend to focus on sockeye salmon, with the greatest portion of the total take coming from fisheries upriver on the Copper River system. These fish originate from the Gulkana Hatcheries, which are owned by the State of Alaska and operated by PWSAC. In 2007, 34,000 personal use sockeye were taken in these fisheries. Historically, the primary users of these personal use sockeye resources have been residents of the Railbelt region and the Richardson Highway corridor who participate in dipnet and fishwheel fisheries at Chitina and Glennallen.

The sport and personal use impacts of PWSAC's harvest represent some of the more broadly available benefits of the organization's activities. The broad range of user types, from vessel- and shore-based harvesters near Whittier or Cordova, to

the far upriver users in the Copper Valley region, mean the fishery resource is distributed broadly throughout households and communities around Alaska.

The Magnitude of the Impact

Seafood harvesting and processing changes the face of communities across Alaska on a seasonal basis. Ports, processing plants and support businesses all ramp up for intense activity. Depending on the community, summer time populations can soar with influxes of harvesters and processing workers.

Some processing facilities draw from local populations of workers to staff their processing lines during peak harvest times. Others hire people from elsewhere in the state, country, or even internationally. Similarly, permit holders for fisheries live around the country and beyond. The seasonal influx of people and earnings has effects that can be felt throughout a regional economy. Businesses ranging from restaurants to grocery stores to real estate rental to industry support trades all see changes in their business volume as a result of fishing activity.

In addition to the direct fishing and processing, the operation of the PWSAC organization itself also impacts the regional economies. With an operating budget of more than \$11 million in 2007, PWSAC's expenditures included salaries for 74 full time equivalent employees, supplies, cost recovery contracts, professional services, and other necessary business inputs.

Though data sets to support a full evaluation of the PWSAC economic impact in 2007 are not yet available, it is possible to examine the relative size of the 2007 harvest to that from 2006 and earlier years and consider the magnitude of the change. In general, the salmon return in 2007 was significantly

larger than that in 2006, with major increases in pink and chum abundance and more modest increases in sockeye. Coho experienced a moderate decrease.

In 2006, the total ex-vessel value of the harvest, excluding hatchery cost recovery fish, was estimated at \$15 million. In 2007, that estimated value increased more than 70 percent, to \$26 million. The first wholesale value of PWSAC salmon also increased, but by a slightly lower factor of approximately 60 percent.

In the 2006 update, which included a full economic impact analysis, we estimated the total statewide impact of the commercial harvest of PWSAC fish to be \$135 million. This was based on the ex-vessel value earned by Alaska resident commercial harvesters, processing activity, sport fishing, and PWSAC's own organizational expenditures. It included the downstream spending effects of these activities in communities around the state.

It is beyond the scope of this research to fully model the economic impacts of the 2007 PWSAC harvest. However, given the magnitude of the 2007 fishery as compared to 2006, it is possible that the overall economic footprint in Alaska associated with PWSAC production in 2007 could total \$175 million. It is clear from the sheer scale of the 2007 harvest and the estimated impacts of PWSAC's activities in more modest years that the 2007 PWSAC salmon returns created significant economic benefit in the State of Alaska.