Attachment 6.

Pink Salmon Product Development and the Role of the Prince William Sound Aquaculture Corporation

Prepared for:

Prince William Sound Aquaculture Corporation

McDowell GROUP

Research-Based Consulting

Juneau
Anchorage

February 2011

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Executive Summary

Introduction

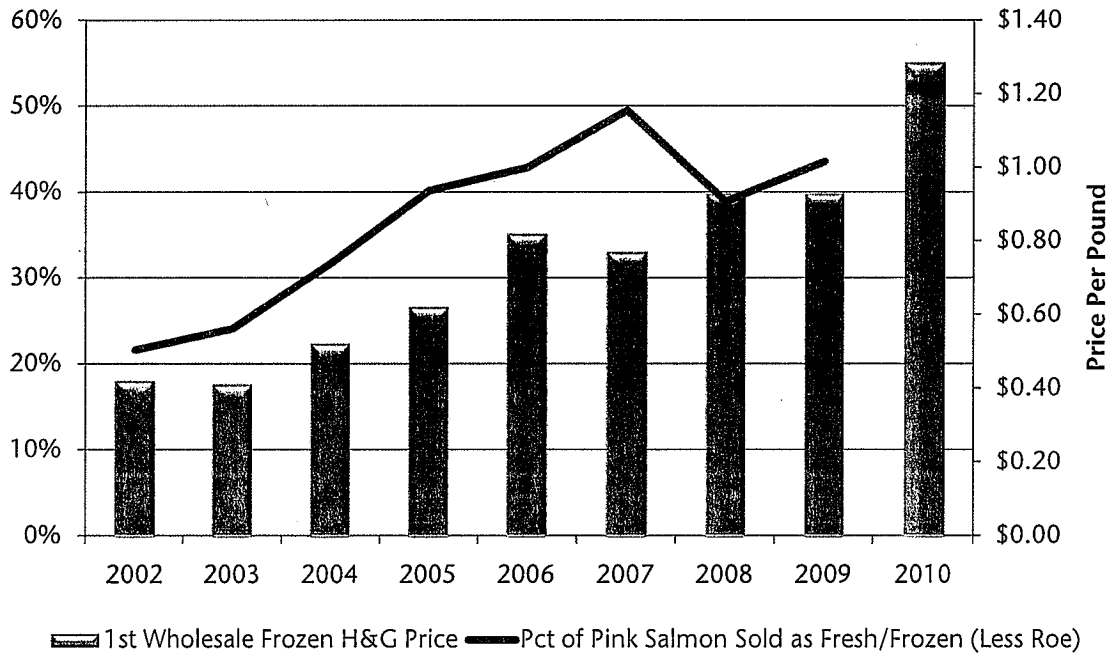
Pink salmon is the most abundant of all Alaska salmon species, typically accounting for half or more of the state's total salmon harvest tonnage. This project investigates the role of Prince William Sound Aquaculture Corporation (PWSAC) in stimulating product development within the pink salmon market.

PWSAC is the largest ocean ranching program in Alaska and was established to supplement the highly variable returns of wild salmon. As a hatchery, PWSAC was established to supplement the highly variable returns of wild salmon but is not directly involved in processing, selling or marketing fish. PWSAC offers Alaska fishermen and processors added insurance that sufficient volumes of fish will return each year. In recent years processors have used this supply, along with pink salmon from other areas of Alaska, to create new products and increase the overall value of Alaska's pink salmon harvest.

Pink Salmon Product Development

- During the late 1990s and early 2000s, an influx of imported farmed salmon and growing inventories of canned salmon drove prices for pink salmon down considerably. The industry has since rebounded significantly by creating new products, balancing supply and demand of existing products, and capitalizing on favorable trends in the marketplace.

First Wholesale and Pink Salmon Fresh/Frozen Production, 2002-2010



Notes: Production date for 2010 is not yet available. First wholesale value refers to price upon first sale by a processor to a buyer outside of their affiliate network. H&G refers to headed and gutted, the predominant frozen product form. First wholesale prices for 2010 are preliminary; current through August 2010.
Source: DOR.

- Since 2002, the percentage of Alaska's pink harvest sold fresh or frozen, as opposed to canned, has increased considerably. Canned products still account for half of Alaska pink salmon production, but the ability to profitably produce high-volume frozen product has enabled industry to balance supply and demand for canned pinks. First wholesale prices for frozen pink salmon have increased three-fold since 2002, despite a major increase in supply.

- The salmon value crisis, which gripped the industry in the early 2000's, triggered two large grant programs. Together with their own funds, processors have successfully leveraged these funds to develop new products and new markets for pink salmon.

- Alaska processors have found a profitable partner in Chinese re-processors. This has allowed them to produce affordable, value-added products such as frozen portions and salmon burgers. A large percent of frozen pink salmon is now exported to China for further processing. Contracting with Chinese firms to affordably perform value-added processing on these frozen pink salmon has increased the ex-vessel price of the fish.

- With the supply of canned salmon being brought into balance with demand, prices improved substantially – now fetching $78 per case. This price recovery, combined with product innovation, has led to a six-fold ex-vessel price increase from the low point of just $0.09 per pound in 2003.

- It was not within the scope of this project to compile specific sales data on salmon burgers or other value-added salmon entrees. However, the increase in wholesale both prices and volume for frozen pink salmon is a clear indication that demand for value-added pink products is high.

Alaska Pink Salmon Prices and PWS Seine Permit Values, 2003-2010

Year	Average Wholesale Price (48-tall case)	Average Wholesale Price/lb. (Frozen H&G)	Ex-vessel Price/lb.	PWS Seine Permit Value
2003	$35.57	$0.41	$0.09	$13,500
2004	$36.94	$0.52	$0.10	$14,000
2005	$41.00	$0.62	$0.12	$19,200
2006	$46.12	$0.82	$0.16	$26,100
2007	$56.48	$0.77	$0.19	$30,900
2008	$59.77	$0.94	$0.35	$70,200
2009	$75.93	$0.93	$0.26	$75,300
2010	$78.30	$1.27	$0.35	$100,500

Note: Data shown for 2010 is preliminary. Permit values represent a yearly average of actual sales prices.
Source: ADF&G and DOR.

Consumer Evolution and Product Development

- Several megatrends have converged in recent years which have increased the demand for wild Alaska pink salmon:

    - Aging demographics in the information age have given rise to a health-conscious public that demands healthier protein alternatives. Salmon is heralded as a heart-healthy source of omega-3 fatty acids.

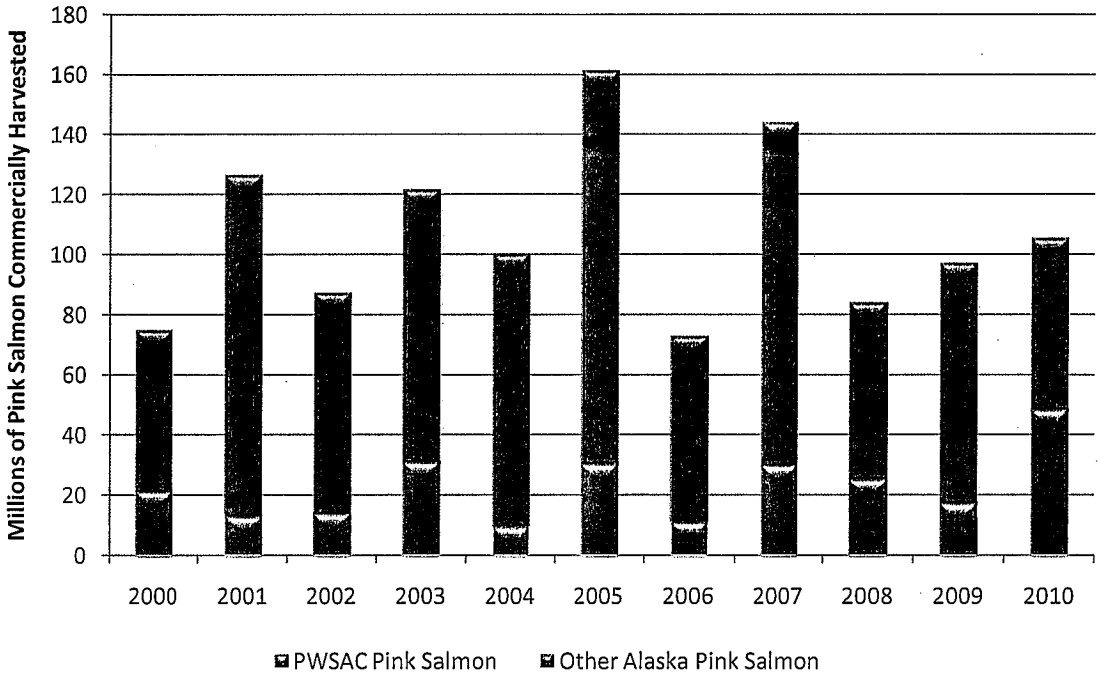
- Rising world supply of cheap, farmed salmon allowed widespread adoption of salmon as a common-place meal year-round. This helped introduce many new consumers to salmon, driving up the total demand for both the wild and farmed sectors of the salmon industry.
- The focus on additive-free foods and bad press about contaminants in farmed salmon have helped bolster demand for wild salmon. In addition, consumers have become more aware of the environmental impacts created by their spending choices – creating opportunities to add value to Alaska salmon by highlighting the state's long-standing focus on responsible and sustainable management.
- The global recession created a need for budget-friendly salmon choices. As prices increased for farmed Atlantic salmon, pink and chum salmon have been able to fill the price-point void with new frozen value-added products such as salmon burgers.

- Over 50 new products utilizing pink salmon have been created since 2000.

Prince William Sound Aquaculture Corporation's Role as a Pink Salmon Producer

- PWSAC operations produce one in four pink salmon caught in Alaska's commercial fisheries. During the past five years, PWSAC-reared pinks have accounted for 26 percent of the statewide commercial pink salmon harvest and 61 percent of pinks harvested in the Prince William Sound region.

Commercial Harvest of Alaska Pink Salmon and PWSAC Pink Salmon, 2000-2010



Note: Data for 2010 is preliminary.
Source: ADF&G.

- Prior to PWSAC's first return of pink salmon in 1977, the Prince William Sound region produced a relatively minor share of Alaska's total pink salmon harvest. The region has since become a major source of pink salmon. Wild and enhanced pink harvest in the PWS region has accounted for 43 percent of the statewide total since 2006, and Prince William Sound has been Alaska's top-producing pink salmon region in three of the last five years.

- PWSAC, together with the Valdez Fisheries Development Association (VFDA), provides fishermen and processors in the Sound with a degree of insurance against failed wild salmon runs. The region's hatcheries act as a ballast against the variable nature of salmon runs.

- Available data suggests the value of PWSAC was more evident in 2010 than ever before. A large run of hatchery pinks made up for a modest harvest elsewhere in the state, during a year when prices were strong for Alaska fishermen and processors. PWSAC salmon accounted for nearly half (46 percent) of the statewide pink harvest in 2010. More frozen pink salmon went to China than ever before and first wholesale price of frozen pinks climbed 37 percent to $1.27 per pound.

The Role of PWSAC Production

It is clear that PWSAC has played a key role in the recent economic recovery of the Alaska salmon industry. Since 2006, PWSAC has produced one in four of Alaska's commercially caught pink salmon. Large harvests of PWSAC pinks have been instrumental in providing industry with the volume and with the economies of scale needed to supply both old and new product forms.

It would not be appropriate to identify PWSAC salmon production as the sole reason behind the large-scale development of new pink salmon products that drove the value recovery. But it is clear that PWSAC pink production did play a major supporting role in facilitating these product-form shifts and the resulting value recovery of the Alaska pink salmon industry.

Introduction

Pink salmon is by far the most abundant of Alaska salmon species, accounting for half or more of the state's total salmon harvest tonnage. While pink salmon does not often makes headlines and is seldom a marketing centerpiece, the species is an essential piece of the Alaska salmon industry in terms of both volume and value.

Prior to 2004, three-quarters of the commercial pink salmon pack was canned. Since then, Alaska's seafood industry has shifted massive volumes of pink salmon into new products, such as the pink salmon burger. Sales of salmon burgers, made primarily with pink and chum salmon, have increased substantially as consumers have responded well to products that put heart-healthy salmon into familiar foods they already know how to prepare. These include salmon burgers and other new products such as re-heatable portions, ready-to-grill (pre-seasoned) products, fish stew, and sausages.

Making all these new pink salmon products while continuing to supply the venerable canned market requires more than just new equipment and an innovative sales team. It also takes fish, lots of fish. One drawback of building a high-volume industry on naturally occurring salmon runs is that raw material supply can be volatile. While Alaska's management practices prevent over-harvest of salmon stocks, natural conditions are the ultimate driver of salmon abundance.

Hatchery programs like those operated by the Prince William Sound Aquaculture Corporation (PWSAC) exist to supplement wild production. While variability of both wild and enhanced salmon returns is a fact of life, hatchery production can and does increase the volume of salmon available for harvest. Hatcheries play an especially important stabilizing role in years when natural conditions such as summer drought or extreme cold reduce riparian survival of naturally occurring runs. In those cases, the increased survival rates of hatchery-produced salmon bolster the volume of outgoing fry and substantially increase the prospects for a good return of adult salmon.

This report investigates changes in the pink salmon market and the impact of new products. Data sources used in this report confirm high prices and strong demand for frozen pink salmon, which are the basis for many value-added products. Executives with Prince William Sound processors and a seafood buyer for a major national grocery chain were also interviewed for this project.

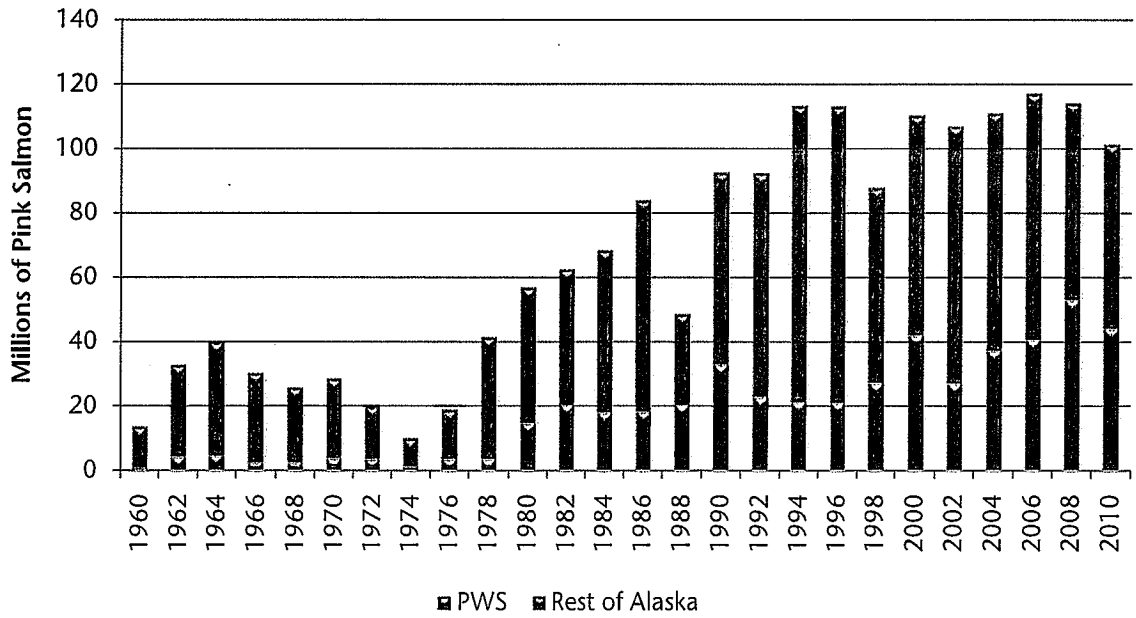
Pink Salmon Product Evolution

Canned Pink Salmon: Historical Backbone of the Industry

The canned pink salmon is a ubiquitous product familiar to millions of sandwich eaters the world over and has long been the production focus of Alaska's pink salmon processors. For over 100 years, the Alaska salmon industry has produced shiploads of canned pinks and sold the product into stable foreign and domestic markets. That began to change in the late 1990s. Alaska fishermen were catching more pinks than ever, but consumption volume of canned pink was stagnant and worldwide salmon commodity values sagged under the weight of a major supply increase in the form of farmed salmon. When Alaska pink prices bottomed out during 2001 – 2003 at ex-vessel value of just 9 cents per pound, the impact was felt throughout the industry.

Ironically, the decades-low price stemmed in part from Alaska's remarkable abundance. The 1993 – 2007 period is the most productive on record for Alaska pink salmon, encompassing nine of the ten largest pink salmon catches since the commercial industry was developed in the 1890s. For the previous 100 years, the Alaska pink harvest very rarely surpassed 70 million fish and only once exceeded 90 million. But during 1993 – 2007, the pink harvest averaged 111 million and peaked at 161 million in 2005. With the traditional production focus on canning and with the record-setting harvest volumes, canned pink production in some years of this period exceeded four million cases (48-tall equivalent).

Two Year Average Statewide & PWS Pink Salmon Harvest, 1960-2010



Source: ADF&G.

PWSAC is a key supplier of Alaska pink salmon. During the past five years, Prince William Sound (PWS) has produced 43 percent of the statewide pink salmon harvest. Returning PWSAC salmon account for 61 percent of the PWS commercial pink harvest (and 26 percent of the statewide pink harvest) during that time.

Pink salmon have a pronounced two-year cycle linked to parent-year abundance of the fish. Harvest in odd-numbered years (2001, 2003, etc) is typically much stronger than in even-numbered years, owing to abundance of the parent-year fish. The offspring of pink salmon spawned in 2001 return in 2003, their offspring return in 2005, etc. Canned pink is a durable product and when properly stored has a shelf life of several years. This makes it possible to 'carry over' unsold product from strong production years to augment supply in the weak years. When supply and demand are balanced this translates to supply stability, but during the unusually strong production period of 1993 - 2007 normal demand was insufficient to consume the surplus from strong years and a chronic, cumulative surplus developed.

For example, canned pink production in 2001 was 3.7 million cases (48-tall equivalent) but the sales season began with 1.1 million cases still on hand. This amounted to inventory of nearly five million cases, when the previous five years' average sales volume was slightly under 3.1 million. Sales from 2001 production were well above average, but carryover inventory had grown to 1.3 million cases by the time the 2002 pink harvest was running through processing lines. Despite a light pack and decent sales volume in 2002, the 2003 sales season began with nearly 900,000 cases of carryover, joined on warehouse shelves by 3.1 million cases of 2003-season production.

Canned Salmon Values Decline

With the canned pink market in this state of chronic oversupply, processors eventually resorted to discounting in order to generate sales volume and cash flow. First wholesale case prices declined from the $50-$60 range of the 1990s to just $34 per case by early 2003.

Canned pink salmon has traditionally been the single-largest volume product packed by the Alaska salmon industry. Live-weight harvest volume of Alaska pink salmon is measured in hundreds of millions of pounds, and with 75 percent or more of finished-weight pink salmon production traditionally canned, the product is among the nation's most significant domestic seafood products. In many areas of Alaska, canned pink salmon was (and still is) a foundation product that generates economies of scale needed to keep Alaska seafood plants up and running for the full spectrum of commercially important species.

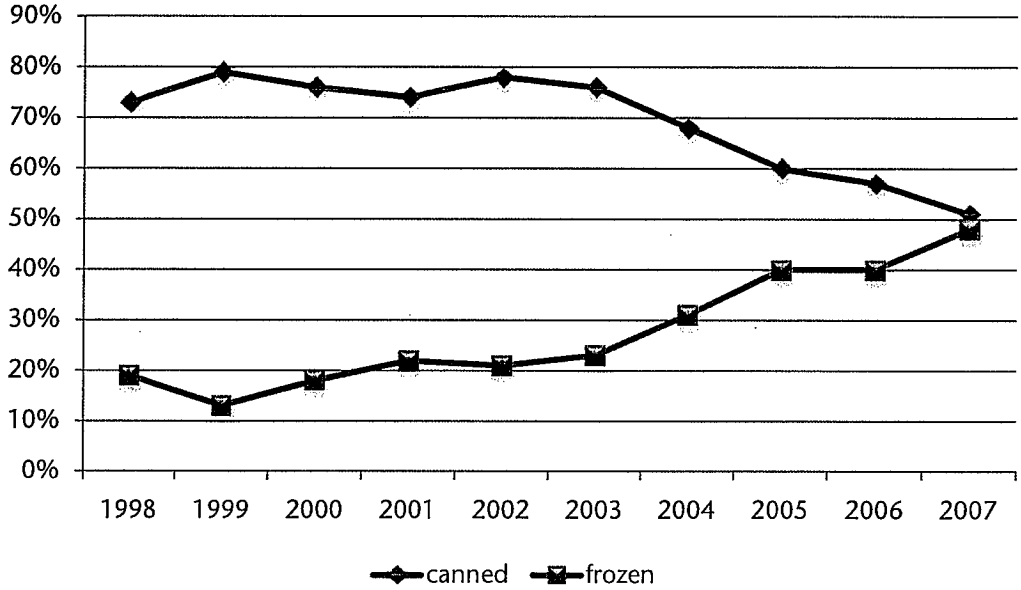
When worldwide salmon commodity values tanked in the early 2000s, Alaska's major processors came under financial pressure from price erosion of the traditional high-value salmon species (Chinook, sockeye, coho). This was exacerbated by the chronically depressed wholesale price for canned pinks, their single largest product. By the time canned pink wholesale prices hit their low point, several major processors were approaching the point of insolvency and financial consequences were rippling out to other sectors of Alaska's seafood industry.

By 2003, efforts were underway to solve the chronic surplus problem. Industry received state and federal funding for marketing and other efforts to get sales volume up, which relieved some of the immediate cash flow and price pressures and gave industry enough breathing room to begin addressing the root of the problem; product-form composition of the Alaska pink salmon pack.

The share of total pink salmon production as canned salmon had been on the order of 70 – 80 percent for many years and was 76 percent in 2003 when average wholesale case price hit its low point. That began to change in 2004, as demand for frozen pinks increased and industry began to shift some production effort

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 of pink salmon finished product weight.

Alaska Pink Salmon Product Forms, Share of Finished Product Weight 1998-2007



Source: ADF&G and DOR.

The shift in pink salmon product-form composition between 2003 and 2007 is especially significant in light of the volume involved. Alaska pink harvests in 2003 and 2007 were among the largest on record (ranking seventh and third, respectively) so the live-weight volume involved is on the order of 450 - 500 million pounds in each year.

Product innovation has occurred in the canned salmon market as well. Processors interviewed for this project noted that skinless/boneless canned salmon products are gaining market share. One source estimated that skinless/boneless products now account for as much as 10 percent of total canned pink salmon production.

Product Form Shift Raises Prices

The pink salmon product-form shift from canned to frozen had a major impact on wholesale value of pink salmon products, which in turn increased the ex-vessel price for pinks. The product-form shift helped balance supply and demand across canned and frozen product forms, contributing to a remarkable recovery in Alaska pink salmon prices; more than doubling average wholesale price and nearly quadrupling the ex-vessel price.

Alaska Pink Salmon Prices, 2003-2010

Year	Average Wholesale Price (48-tall case)	Average Wholesale Price/lb. (Frozen H&G)	Ex-vessel Price/lb.
2003	$35.57	$0.41	$0.09
2004	$36.94	$0.52	$0.10
2005	$41.00	$0.62	$0.12
2006	$46.12	$0.82	$0.16
2007	$56.48	$0.77	$0.19
2008	$59.77	$0.93	$0.35
2009	$75.93	$0.93	$0.26
2010	$78.30	$1.28	$0.35

Note: Data shown for 2010 is preliminary.
Source: ADF&G and DOR.

Canned pink wholesale prices initially showed only a modest improvement in the first years of the product-form shift, increasing 30 percent from $35/case in 2003 to $46/case in 2006. This was to be expected as the market worked through the remaining carryover inventories and canned production tapered down. Canned pink wholesale price increased more substantially after the 2006 season, when the canned production share fell to 57 percent. Average case price for calendar year 2007 rose to $56 (up 22 percent in a single year) and then to $59/case in 2008. Average wholesale price jumped to $75/case in 2009 and preliminary 2010 figures are at more than $78/case, a 25-year high.

The remarkable price recovery of canned pink salmon is widely thought to be the result of reduced supply; with the increased production of frozen pink products, there were simply less raw pink salmon available for canning and the market went from oversupply to a moderate undersupply, with predictable price results.

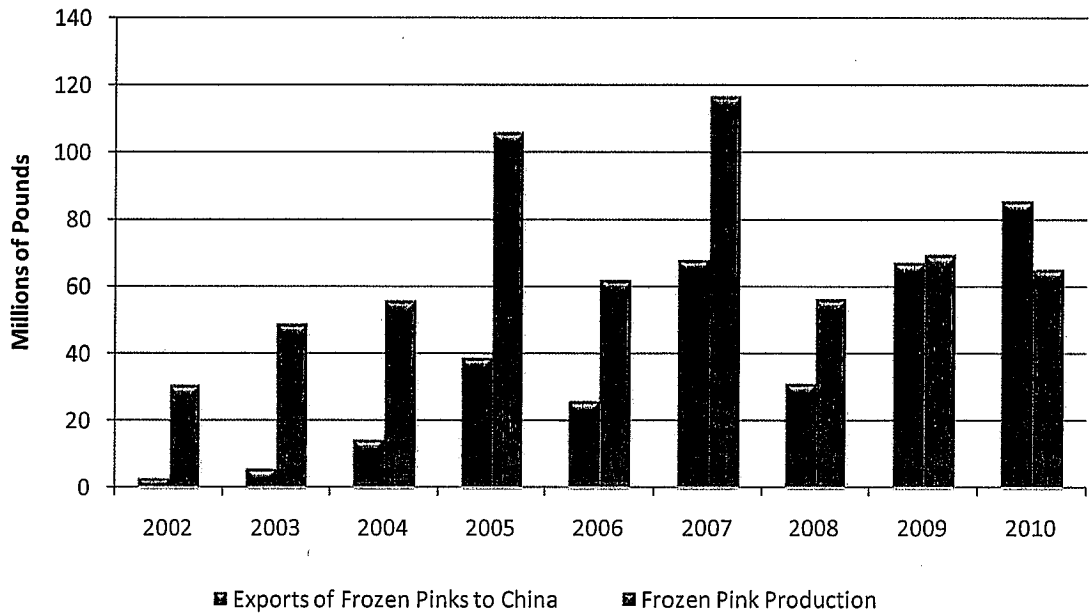
Frozen H&G pink salmon showed a more rapid price increase than did canned pink salmon, more than doubling from $.41/lb in 2003 to $.82/lb in 2006. This was followed by a modest price decrease to $.77/lb in 2007, but the volumes involved demonstrated that demand for Alaska frozen pinks had hit its stride.

Production of frozen pinks increased from 59 million to 107 million pounds between 2006 and 2007 (up 81 percent) but the price declined by only a nickel a pound, just 6 percent. This suggested quite strongly that large-scale demand for frozen pinks was now a fact of life. This was confirmed when average wholesale price increased to $.93/lb in 2008 and 2009. Preliminary frozen pink wholesale prices of $1.28/lb for 2010 suggest that demand for the product is still growing and available data suggest 2010 could be a record year for frozen pink salmon production.

Rise of China as a Processing Partner for Frozen Pinks

China has become an important re-processing market for frozen Alaska pink salmon; turning frozen H&G salmon carcasses into value-added products. Exports of frozen pink salmon have risen sharply in recent years. Available trade data for 2010 show more frozen pink salmon being shipped to China than ever before.

Frozen Pink Salmon Production and Exports to China, 2002-2010



Note: Frozen fillet data is unavailable for 2002. Data for 2010 is incomplete, as export data is current through November and production data is only available through August.
Source: DOR and NMFS.

PWSAC Pink Production

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 the largest ocean ranching program in Alaska.

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

PWSAC operates three separate pink salmon hatchery facilities; the Armin F. Koernig Hatchery (AFK), Cannery Creek Hatchery (CCH) and Wally Noerenberg Hatchery (WNH).

Armin F. Koernig Hatchery

Converted from a salmon cannery in 1974, AFK is PWSAC's longest-running hatchery. The facility, located 90 miles west of Cordova in Sawmill Bay, is named for PWSAC's first general manager, Armin Koernig, who pioneered successful salmon enhancement in Alaska. 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.

In 2007, the facility began releasing chum salmon fry after being discontinued twice before. AFK produces about 160 million pink salmon eggs. Typically the facility releases between 110 and 150 million pink salmon fry each year. AFK began releasing pink fry in 1975.

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 was tasked with operational control of the facility by the State of Alaska 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.

CCH began releasing salmon fry in 1978 and now releases 130 to 141 million pink fry per year.

Wally Noerenberg Hatchery

The Wally Noerenberg Hatchery, named for the region's long-time Fish and Game biologist, 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.

WNH produced 148 million pink salmon eggs and released 128 million pink salmon fry in 2009. Pink rearing operations began in 1985 but production ramped up very quickly; by 1987 the facility was releasing 195 million fry. In addition to pink salmon, WNH staff also culture and release chum and coho salmon.

Main Bay Hatchery

The Main Bay Hatchery was built in 1981 by ADF&G's Fisheries Rehabilitation, Enhancement and Development (FRED) Division. Staff operated a pink salmon hatchery program at Main Bay from 1982 to 1986 but discontinued the pink and chum programs to focus on sockeye. PWSAC was tasked with operational control of the facility by the State of Alaska in July of 1991. PWSAC provides management and fish culture expertise at no cost to the State under a 20-year professional services agreement with ADF&G.

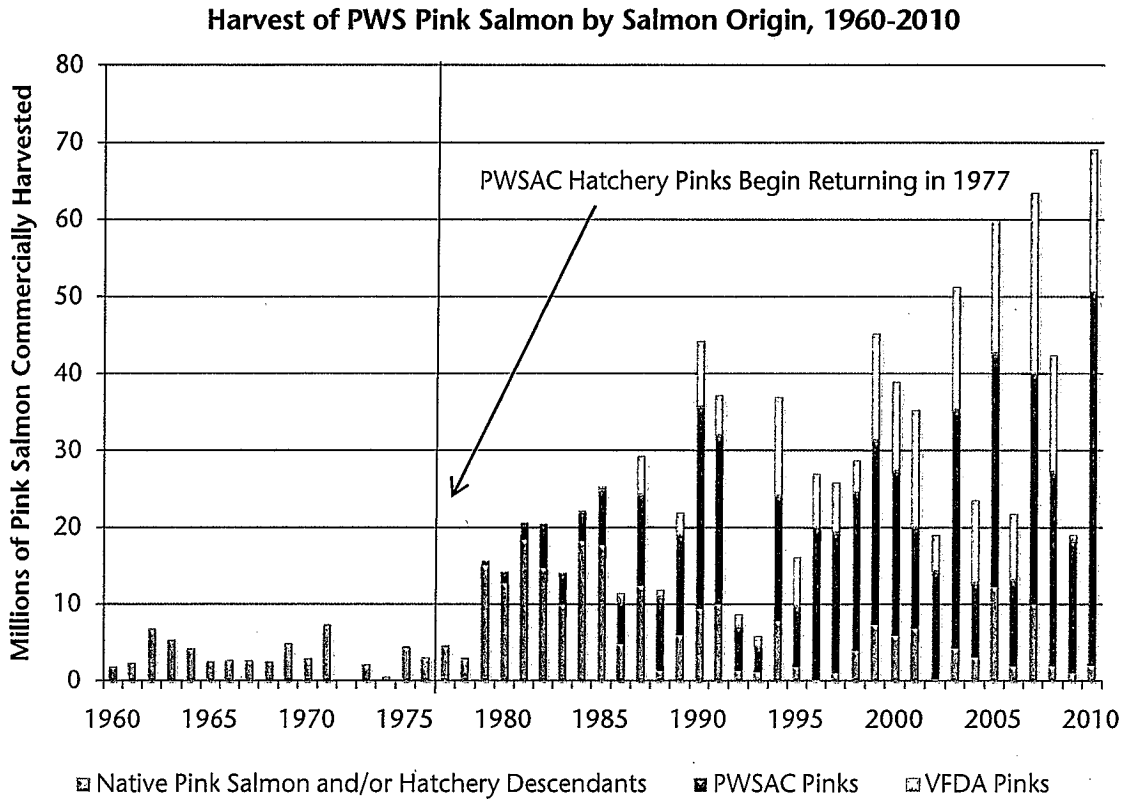
Main Bay pink salmon returns are not figured into the data shown in this section because of the short life span of the program and relatively small number of pink salmon released compared to other facilities.

Hatchery Pink Salmon in Prince William Sound

Since 1977 PWSAC has supplied Alaska's seafood industry with 479 million adult pink salmon. Since 1990, commercial fishermen have made $213 million[1] catching PWSAC pinks in the common property fishery and processors have grossed $1.1 billion[2] selling processed PWSAC pinks. Pink salmon reared by PWSAC have accounted for 49 percent of the Prince William Sound commercial harvest of pink salmon since 1977.

The region's pink salmon hatchery production has created economies of scale for the area's processors and fishermen. Without them, the volume of pink salmon harvested would be much smaller. Some plants would not exist without the hatchery production and there may be far fewer fishing boats plying the grounds. PWSAC and VFDA contribute a significant portion to the statewide supply, but in most years still account for less than 40 percent of Alaska's total pink salmon supply. Pink salmon product development has benefited from the supply of fish made possible by PWSAC and VFDA.

[1] In ex-vessel terms. This figure does not include cost-recovery fish, only those fish harvested in the common property fishery.
[2] In first wholesale terms. This figure is roughly equivalent to processing revenue, and includes the cost of buying fish.



Note: Prior to 1987, there was no statistically valid method of separating hatchery and wild stock composition in the commercial catch. Since 1988, returning hatchery salmon are identified with an otolith marking. Data in years prior to 1987 has been estimated based on presumed wild stock exploitation rates which are determined by the wild stock escapement estimate.

Source: ADF&G.

From 1960 to 1976, the commercial harvest of wild pink salmon in Prince William Sound averaged 3.3 million fish. Since 1977, the average commercial harvest of wild pinks is 6.8 million fish – double the average harvest of wild stocks before the hatchery programs began. The commercial harvest of all pinks (including hatchery-reared fish) has averaged 27.4 million fish during that time; an eight-fold increase.

PWSAC and VDFA have not just provided the Sound with more fish, they've also provided the seafood industry with some 'insurance' of stability in the pink runs. Harsh winter conditions (stream bed freezing and/or scouring from heavy freshets) and other natural factors in Prince William Sound traditionally made the local salmon runs prone to boom or bust cycles; one lost brood stock could have cascading effects for years to come. For instance, an ADF&G report shows alevin mortality was especially high in 1964 following the Good Friday earthquake that rocked Prince William Sound[3]. Smaller returns were seen in even years[4] for several generations after the quake. In the eight even-numbered years following the 1964 quake, pink salmon harvests averaged 3.4 million fish while fishermen caught an average of 5.4 million fish during the odd years.

[3] *Effect of the March 27, 1964 Earthquake on Pink Salmon Alevin Survival in Prince William Sound Spawning Streams,* Noerenberg, Wallace H.; Ossiander, Frank J., ADF&G.

[4] Pink salmon have a two-year life cycle, thus every other year represents a new generation which is linked to the generation that returned 2 years prior.

Processors interviewed for this project cited the insurance factor as an important attribute of the hatcheries. "Without the hatcheries the dips would be much larger," said one longtime processing plant manager. Another remarked, "With the hatcheries there you know there are going to be fish coming back."

That sentiment rings especially true in 2010. Industry had braced for a modest statewide pink salmon catch, with a preseason projection of only 69 million pinks. Instead, the actual pink harvest came in at 105 million, ranking as the tenth-largest on record thanks to a tremendous Prince William Sound catch of 69 million pinks. Two out of three Alaska pink salmon harvested by commercial fishermen in 2010 came from Prince William Sound, and most of those were produced by PWSAC.

An executive with a major processor interviewed for this project noted that if not for PWSAC the economics of operating a shoreside plant in Cordova would be very different and would probably not be feasible.

Trident Seafoods' plant manager Rick Isaacson was quoted in the *Cordova Times* summing up the 2010 season, "We are very fortunate to have this huge run. The Valdez Fisheries Development Association and Prince William Sound Aquaculture Corp. are doing an amazing job and industry is bringing more capacity. This year is well over forecast and we are welcome for it.'

Product Development using PWS Pink Salmon

With PWS hatcheries providing a solid supply of pink salmon, processing companies with operations around the state have partnered with companies around the world to create new products. Pink salmon is now a nutritious ingredient in a wide range of food products, compared to 10 years ago. The following list consists of products featuring pink salmon which either did not exist or were not widely distributed 10 years ago.

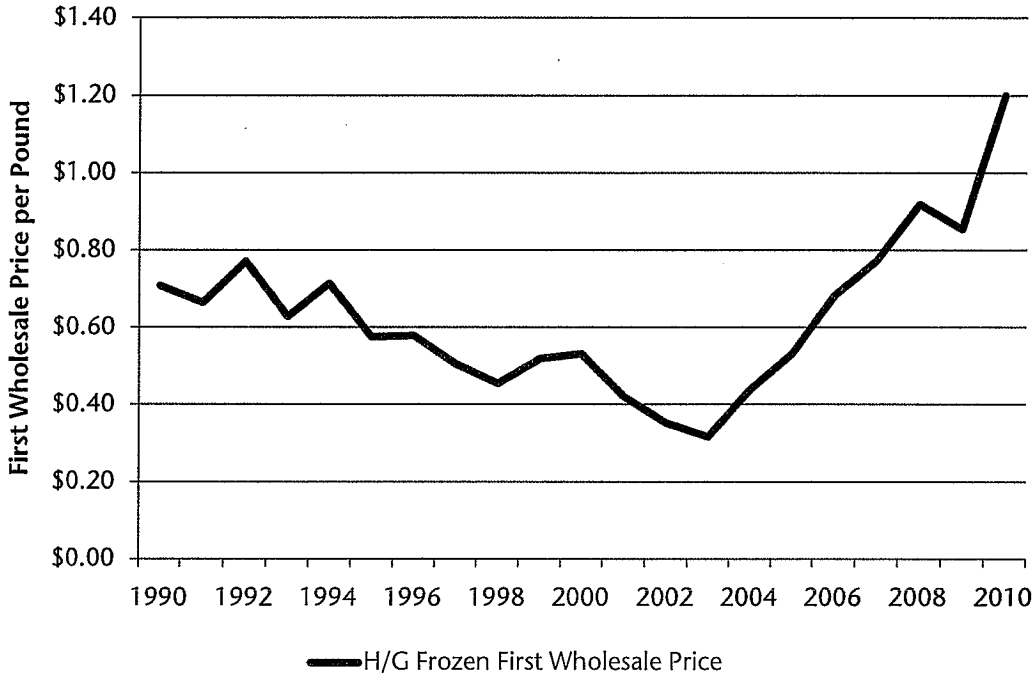
List of Selected Value-Added Pink Salmon Products

Trident Salmon Burgers	Chicken of the Sea Salmon Cups	Trident Salmon Surimi
Sea Choice Salmon Burgers	Blue Horizon Salmon Cake Bites	Trident Salmon Croquettes
LiveSmart Hearty Salmon Stew	Ocean Beauty Sea Choice Lemon Herb Salmon	Redi Grilled Alaska Salmon portions
Breaded Pink Salmon Nuggets	Trident Salmon Sausages	Alaskan Stuffed Salmon Boats
SeaPak Salmon Burgers	Salmon Source Salmon Sausages	Yummy Chummies
SeaPak Salmon Nuggets	MomoFood Wild Caught Pink Salmon Dog or Cat Treats	Organic Bistro Wild Alaskan Salmon
Soloman Falls Wild Alaska Smoked Pink Salmon Sides	Wild Alaska Brand Smoked Pink Salmon	Marx Smoked Pink Salmon
Taco-Loco Wild Alaska Salmon Wraps	Trader Joe's Wild Pacific Salmon Wrap	SeaBear Smoked Salmon Chowder
Aquastar Pacific Pink Salmon Fillets	President's Choice Wild Pacific Salmon Burgers	SeaQuest Wild Pink Salmon Fillets
Compliments Balance Wild Pacific Pink Salmon Fillets	Compliments Balance Wild Pacific Salmon Burgers	Western Family Wild Pacific Salmon Burgers
Whole Catch Wild Alaska salmon burgers	Northern Catch Pink Salmon Fillets in Serrano Chilli and Lemon Crumb	Northern Catch Pink Salmon Fillets in Lemon Sauce
Northern Catch Pink Salmon Fillets in Dill Sauce	Northern Catch Pink Salmon Fillets in Cajun Spice Sauce	Blue Horizon Wild Alaska Salmon Sticks
Henry & Lisa's Battered Wild Alaskan Salmon Fillets	Henry & Lisa's Alaskan Salmon Burgers	Sea Cuisine Pan-Sear Teriyaki Alaskan salmon with sesame and ginger
Sea Cuisine Mediterranean Crusted Salmon	Sea Cuisine Lemon and Dill Alaska Salmon	Wild Pacific Alaskan Bourbon Salmon Portions (Ocean Market)
Sea Choice Wild Alaskan Salmon Burgers (Breaded)	Pucci Foods Wasabi Ginger Wild Salmon	Pucci Foods Indian Tandoori
Sonoma Seafoods Wild Salmon Burgers (8 varieties)	Walmart Wild Alaska salmon fillets	Ocean Eclipse Marinated Pink Salmon Portions (2 varieties)
AquaStar Pacific Pink Salmon (portion)	AquaCuisine Wild Alaskan Salmon Burger	AquaCuisine Salmon Sausage (2 varieties)

Some of these products are made in Alaska, but most are produced at secondary processing plants in other parts of the world or the lower-48. Processing companies and food manufacturers have worked together to turn frozen pink salmon into commercially successful meal options.

As a result, prices have improved for Alaska pink salmon, now in demand by food manufacturers as a cost effective ingredient well-regarded by consumers. From 2003 to 2008, first wholesale prices paid to processors nearly tripled for frozen H/G pink salmon and ex-vessel prices paid to fishermen increased four-fold during that time. One PWS processor interviewed brought in four floating processors for the 2010 season, mainly for the purpose of freezing pink salmon.

Frozen PWS Pink Salmon First Wholesale Price, 1990-2010



Note: Data for 2010 is preliminary.
Source: ADF&G and DOR.

Pink salmon is primarily a commodity, and once it's frozen or canned becomes part of a homogenous market. Consumers don't distinguish between pink salmon from Kodiak or Southeast or Prince William Sound. In many ways, that's a plus for the industry because depending on run strength processors can achieve their desired product mix by canning more in one area, while freezing more in another.

In Prince William Sound, pink salmon runs can be very large and very compressed. In 2010 over 42 million fish were caught in just three weeks. Two large processors interviewed for this project indicated that canning remains the most effective way to process large volumes of fish in a short time. So in years where PWS sees a large and/or compressed return, the regional product mix tends to shift toward canned production as a simple function of throughput capacity. For large processors with operations elsewhere in the state, the practical effect is that their other plants can focus on frozen production. Thus, a large run of pinks in PWS can assure the desired production level of canned pinks while focusing on freezing operations in other regions where the pink salmon run may be less compressed.

The strategy was summed by one executive from a large PWS processors, "We freeze like crazy until the volume overwhelms us, then we have to start canning. But canning those fish allows us to meet our canned salmon production goals and pick up more frozen product elsewhere."

Government deserves some credit for the industry turnaround as well. Grant programs started in 2003 with federal and state money have helped processors market pinks, helped fishermen improve their quality, and allowed the industry to reinvent itself much quicker. In addition to grant programs, which often leveraged matching funds from recipients, the State of Alaska gave processors an incentive to invest in value-added machinery through tax credits. According to several interviewees, this allowed processors to install new equipment lines and get pink salmon into new product forms much faster since companies' yearly budget for capital improvements could be stretched further with the tax credits.

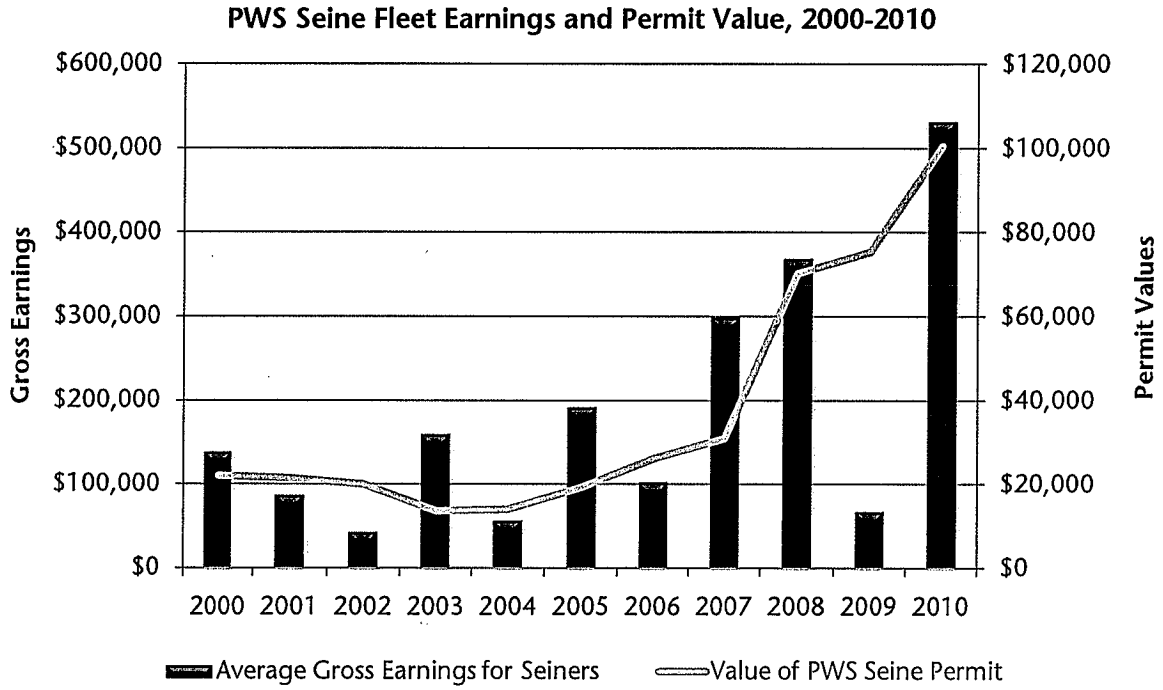
Historic Run of PWSAC Pinks Come at a Good Time in 2010

The 2010 commercial pink salmon harvest was the largest on record in Prince William Sound. The timing of such a historic run was timely, historically speaking, as both wholesale and ex-vessel prices were at or near 20-year high points. According to ADF&G, 97 percent of the large 2010 PWS pink harvest was hatchery-reared fish. The large returns were evidently driven by extraordinary ocean survival conditions in the preceding year, as hatcheries had released similar amounts of fry as in the recent past.

The unusually large worldwide harvest of pink salmon in 2009 probably strengthened markets considerably as processors were able to increase their production of value-added pink salmon portions. These products have become very popular in grocery stores and help explain why the value of pink salmon has risen four-fold since 2002. Consumers appear eager for cheap, wild salmon that can be used in ready-to-heat, pre-cooked frozen portions. The large volume of pink salmon supply in 2009 likely created more demand than could be filled by the smaller 2010 harvest. Even though the pink harvest exceeded preseason projection by 50 percent, ex-vessel and wholesale prices still went up thanks to new demand and a relatively modest world supply of pink salmon.

Not only are prices increasing because of new frozen portion products, but the venerable canned pink salmon market is strong as well. Canned pink remains an important product in the marketplace, and canned pink production remains the most effective way to handle compressed returns of pink salmon measured in hundreds of millions of pounds.

Increased ex-vessel prices and permit values for PWS seiners are the direct result of pink salmon product innovation and a better balance between supply and demand in the canned pink market. It's estimated that average gross earnings amongst seiners this year may top $500,000 per boat. Permit values have increased rapidly in recent years, a reflection of the strong earning potential in the fishery. PWS seine permits are currently selling for $138,000, a far cry from 2003 and 2004, when permits values bottomed out in the $13,000 - $14,000 range.



Note: Gross earnings estimates for 2010 are based on in-season summary reports and average harvest statistics released by ADF&G for the 2010 PWS salmon fishery. Permit values for 2010 reflect the monthly average permit value through November 2010.

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

Salmon Consumer Evolution

Enhancement programs that increase the supply of pink salmon and the efforts of processors to create innovative new product forms would all go for naught if the consumer rejected the final product. In a number of ways, farmed salmon has given the pink and chum markets the opportunity to thrive as a ubiquitous salmon ingredient in value-added, frozen products.

When farmed salmon hit the market en masse in the early 2000's it found buyers that were eager to place large fillets of fresh salmon in their display cases and on their menus. Heretofore, fresh salmon was a seasonal treat for consumers but most of it had to be flown in from distant Alaskan fishing grounds. Now consumer around the country could sauté a fresh salmon fillet for Easter dinner, long before the Alaska salmon season opened.

As the decade wore on, several major changes took hold in the salmon market and the consumer psyche to bring us to the current state of affairs.

The Rise of a Health-Conscious Public

As Americans began to realize they are becoming older and less healthy as a group, a larger focus has been placed on eating healthy. Universities, government agencies and media outlets have all thoroughly documented the significant health benefits of eating salmon, which many consumers now know is rich in omega-3's.

Consumers entering their 40's, 50's or 60's may have spent the last 25 years eating a rather unhealthy diet high in cholesterol and additives. Now they are better educated about the health benefits of salmon and nearing the point in their life where they must make dietary changes to maintain their quality of life. Others may have had healthy habits all along, but continue them by eating salmon regularly. Omega-3's can lower cholesterol, which is good for the heart. With so much inexpensive farmed salmon being imported into U.S. markets, it was initially considered a great way to get omega-3's into a diet.

Inexpensive Farmed Salmon

In 2000, farmed Norwegian salmon was being exported to markets at $1.36/pound. The same commodity index shows it now costs $2.82/pound for that same salmon. During the early part of the decade it was difficult for wild salmon to compete with farmed salmon at such a low price point, but it had an important effect on consumer behavior. Low prices got them used to seeing salmon as an affordable, commonplace meal. Combined with the health benefits, it was something they could eat that didn't hurt their wallet or their heart. Low prices for farmed fish helped introduce a lot of consumers to salmon and dramatically increased consumption

The recent climb in farmed salmon prices has created opportunities for pink and chum to enter the market at a price point significantly below farmed salmon. Grocery stores simply cannot abruptly raise their prices on the same item overnight just because their costs have changed. Instead, they look to keep customers who will buy salmon products at a $4.50 price point by substituting a different product that fits the equation.

As of late 2010, grocers are generally able to buy pink fillets for about $2.50 less per pound than farmed fillets. Obviously there are significant differences when it comes to fresh or frozen products and sizing, but it's a significant price difference that drives what the grocery stores offer. The large, fresh Atlantic salmon fillet may still be sold in the display case for $9.00/pound but stores now have glass case freezers and bunker freezers to offer frozen seafood at more affordable prices to budget conscious consumers.

Chemicals, Dyes and Hormones

The information age has resulted in more "content" being delivered to our eyes and ears than ever before. A desire to promote healthy lifestyles led to investigations into what exactly was in that stuff we put in our mouth. Also, what were those eleven-syllable words that wrapped around the 'ingredients:' list? In many cases, the public did not like what they heard and it had an effect on their buying habits.

As usual, the consumer was mostly to blame for the unhealthy foods populating grocery store shelves. After all, they had spent years voting with their stomachs about what should be given access to their food cart. Decades of data told producers that the ideal product was something cheap, tasty and easy to make. Meeting those goals requires maximizing yields by whatever means necessary (hormones, chemicals, etc).

Farmed salmon did not get a free pass on this. There has been significant, unflattering media coverage of colorants, antibiotic and chemical residues detected in farmed salmon. In independent laboratory tests, a 2003 study found that farmed salmon has 16 times the amount of PCB's[5] as wild salmon, and four times as many as beef[6]. In 2004, the journal *Science* warned consumers to only eat farmed salmon once a month (if at all), because of the contaminants found in their flesh. Widespread coverage of these problem areas created an important differentiation point for Alaska.

Alaska's image of pure water and pristine natural habitat resonates with consumers. Packaging of Alaska salmon products almost always includes multiple variations of natural, wild, Alaskan, pure, or sustainable. It's a suite of attributes that Alaskan fishermen, processors and biologists have long considered valuable. Now, those attributes serve as a very effective differentiation point between wild Alaska salmon and the bulk of the world salmon supply; farmed salmon.

Salmon farmers, like many other industries, have made expensive capital investments to produce a very particular product at a particular price. But rather quickly, many consumers decided they wanted organic, chemical-free, 'natural' foods. Most would pay a little more, but not that much more. Luckily for consumers, American capitalism is a dynamic beast and new players have rushed to fill the organic niches. Established companies are changing, but many have a great deal invested in efficient production systems requiring chemicals, hormones and antibiotics to facilitate high net-pen densities and shortened production cycles.

While farmed salmon initially created huge problems for the Alaska salmon industry in the form of near-fatal price erosion, the tables appear to be turning. The marketplace has evolved to value the wild, pure, sustainable and natural attributes of Alaska salmon, intrinsic traits Alaskan fish have always possessed. Farmed

[5] Polychlorinated biphenyls are toxic compound which has been classified as a persistent organic pollutant. PCB's have been linked to numerous health problems, including cancer.

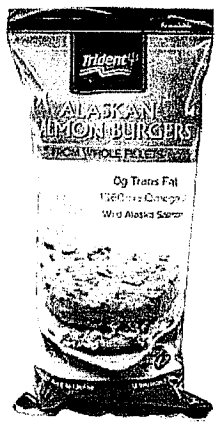
[6] "PCB's in Farmed Salmon: Results from test of store-bough farmed salmon show seven of 10 fish were so contaminated with PCB's that they raise cancer risk," EWG Research, July 2003.

salmon producers can and will eventually mimic most of those traits, but at substantial cost which is likely to drive up the commodity value of salmon and further increase price for salmon products of all types.

Easy-to-Make and Ready-to-Eat

Food companies have been trying to produce easy to eat food since before Orville Redenbacher was in grade school. Years later, his company would find success putting popcorn in a microwavable bag, even though people had been making it in pots for years. The bag is much easier, and faster.

Likewise, consumers have been using canned salmon to make delicious salmon burgers (sometimes called salmon cakes) for decades but that product is enjoying a renaissance thanks to the introduction of the pre-cooked salmon burger. Stores now offer pre-cooked, frozen burgers containing any number of food stuffs. There are burgers made out turkey, buffalo, chicken, salmon, and of course beef. There's even the garden burger, which looks like a burger but contains no meat whatsoever.



Salmon burger offerings from Ocean Beauty Seafoods and Trident Seafoods.

The salmon burger has been a smash hit because it takes a product many consumers were not familiar with, canned salmon, and turned it into something that is familiar – the burger. It's also a great way to sneak some omega-3's into a child's diet. In the 1950's mothers across the country would routinely send little Jimmy or Jenny off to school with a salmon spread sandwich. The tuna salad sandwich is more common today, but tasty burgers offer a great opportunity to re-introduce kids to salmon.

Other products are popping up too, such as microwavable, pre-seasoned fillets. While thousands of canned salmon demos done in recent years have helped canned salmon prices rebound, the high ex-vessel prices for pinks and chum have primarily been driven by newer products like the burger or portion. These products have brought in new customers who probably didn't consume a lot salmon, canned or otherwise, before.

Going Green

During the past decade, consumers have become more aware of the impact their spending choices can have on the world around them. Investigative reporting and powerful documentaries have pulled back the curtain on the industrial food complex which often looks much different than the picturesque packaging customers see in the supermarket.

In January 2010, Target announced it would no longer carry farmed salmon at any of its 1,744 stores as a gesture of the company's environmental awareness. Target will now carry only wild-caught Alaskan salmon. Target decided to pull farmed salmon because of the negative effect salmon farms can have on the surrounding eco-system. Another major retailer interviewed for this report said several chains are pulling farmed salmon from their smoked salmon offerings. A number of eco-groups exist to pass judgment on the sustainability of a product. Target worked closely with the Monterey Bay Aquarium who rate wild Alaska salmon a "best choice" because the fishery is well managed.

While many other stores still carry farmed salmon that could change. Nearly every large supermarket chain now has environmental and/or CSR[7] goals. Whereas some retailers like Whole Foods and Trader Joe's built their customer base by serving the environmentally-conscious consumer, larger retailers are becoming better stewards of the environment because their customers demand it.

[7] Corporate Social Responsibility.