

Economic Benefits of the Port Armstrong Salmon Hatchery

***PREPARED FOR:
ARMSTRONG KETA, INC.***



Research-Based Consulting

Juneau
Anchorage

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The Port Armstrong Hatchery is a private non-profit salmon hatchery sited near the Southeast tip of Baranof Island and operated by Armstrong-Keta, Inc. (AKI). The hatchery currently produces pink and coho salmon and is actively developing a summer chum run and a king run. AKI contracted with the McDowell Group to provide a summary of its Port Armstrong hatchery operations and assess the present and projected economic contribution of the hatchery to commercial salmon fisheries in Southeast Alaska.

Economic Contribution to Regional Ex-Vessel Harvest Value

The Port Armstrong Hatchery receives no revenue from the 3 percent salmon enhancement tax paid by commercial salmon permit holders in Southeast Alaska. The hatchery's contribution to commercial and sport fisheries of the area accrue at no cost to permit holders.

Despite receiving no revenue from the Southeast region salmon enhancement tax, AKI makes a substantial contribution to common property salmon fisheries. In the five years between 1998 and 2002, AKI provided an estimated \$2.4 million in ex-vessel value to common property fisheries in the region, at no cost to permit holders.

- Between 1998 and 2002, AKI contributed 3.6 million pink salmon to the common-property seine fishery. Estimated ex-vessel value was \$1.6 million.
- Between 1998 and 2002, AKI contributed over 183,000 coho to common-property fisheries, valued at \$800,000. Commercial trollers were the main beneficiary of AKI coho production, taking over 160,000 (89 percent). Seiners took 15,000 Port Armstrong coho and sport fishermen caught about 6,200.

Improved Financial Stability

AKI has significantly improved the financial footing of the Port Armstrong Hatchery in the last two years.

- AKI was able to refinance its debt in 2003, taking advantage of the 40-year low interest rate. AKI currently carries a debt load of approximately \$6 million, now at 5 percent interest.
- AKI has secured \$2.1 million in grant funding to expand coho production and establish a summer chum run. The grants fully funded the capital cost of expansion, so the hatchery should realize increases to Common Property contribution and to cost recovery revenue, with no increase to its debt load.

Economic Contribution Forecast

Expanded production capacity will add about \$750,000 annually to AKI's current contribution to the common property fisheries, again at no cost to permit holders.

- By 2006, Port Armstrong is expected to provide 100,000 adult coho per year to common property fisheries, valued at \$480,000.
- By 2009, Port Armstrong is expected to provide 400,000 adult chums per year to common property fisheries, valued at approximately \$600,000.
- AKI's contribution to the common property pink fishery is expected to remain at the five-year average, approximately 730,000 pink salmon valued at \$321,000.

Economic Contribution to Regional Economy

Port Armstrong makes significant contributions to the regional economy. In 2003 these included:

- Direct employment of eight full-time and three seasonal jobs, \$238,000 in payroll.
- \$94,000 in supplies and maintenance spending, primarily in Sitka.
- Approximately \$1.4 million in capital construction spending.

Port Armstrong Salmon Hatchery Summary of Economic Benefits

	Fish	Ex-Vessel Value
Common Property Fisheries Contribution, 1998-2002		
Harvest of AKI Pink salmon	3,600,000	\$1,600,000
Harvest of AKI Coho	183,000	\$800,000
Total AKI Common Property harvest	3,783,000	\$2,400,000
Cost of AKI production to permit holders		\$0
Projected Total Contribution to Common Property Fisheries		
Annual CP coho harvest by 2006	100,000	\$480,000
Annual CP chum harvest by 2008	400,000	\$600,000
Existing annual pink contribution to CP	730,000	\$320,000
Total projected annual harvest by 2008	1,230,000	\$1,400,000
Additional Economic Benefits, 2003		
Employment	11 jobs (8 full time; 3 seasonal)	
Payroll	\$238,000	
Purchase of supplies and services	\$94,000	
2003 Capital construction projects	\$1,400,000	

Economic Contribution to Communities

Like any other basic industry in Southeast Alaska, the benefits of Port Armstrong hatchery operations extend beyond the simple measures of payroll and ex-vessel value paid to harvesters. Sitka, Petersburg, Kake, Port Alexander and other communities benefit from direct spending in support of hatchery operations and from spending of AKI employees and contractors. Communities also benefit from secondary commerce associated with basic industry, commonly expressed as *multiplier effect*.

Some examples of this commerce include tendering and buying-station activity, seafood processing and its various supporting businesses. Additional multiplier-type impacts include goods and services used by contractors and fishermen such as fuel, gear, welding and shipping of materials and products.

Calculating a multiplier for AKI's secondary impacts on individual communities like Kake and Sitka is beyond the scope of this study. However, it is important to note that secondary benefits of AKI operations are substantial contributors to their economies. The total economic benefit of the Port Armstrong hatchery is greater than is indicated by the simple measures of payroll, ex-vessel value and direct spending of AKI on supplies, services and construction.

INTRODUCTION AND METHODOLOGY

Introduction

Alaska salmon hatcheries play a vital role in maintaining the health of Alaska's salmon stocks and ensuring reliable returns for our state's common property fisheries. Armstrong-Keta, Inc. (AKI), operates the Port Armstrong salmon hatchery on the east coast of Baranof Island in Southeast Alaska. The hatchery is in the midst of major developments in its operations that will significantly increase economic contribution to local common property fisheries. At this juncture of the organization's history, it is important to establish a baseline that defines its economic benefits.

Armstrong-Keta, Inc. contracted with McDowell Group, Inc, to provide a summary of its Port Armstrong hatchery operations and assess the present and projected economic contribution of the hatchery to commercial salmon fisheries in Southeast Alaska. The McDowell Group is a research and consulting firm with 30 years of experience working in all areas of the Alaska economy. The firm has significant expertise in Alaska's seafood industry and in the economy of Southeast Alaska. The firm has calculated the economic impacts of a number of Alaska hatcheries, in addition to the seafood industry as a whole.

Methodology

Data compiled in this report are drawn from Alaska Department of Fish and Game, Division of Commercial Fisheries and AKI annual reports submitted to ADF&G. Further information was drawn from various reports and grant applications supplied to McDowell by AKI and from discussions with AKI staff.

Port Armstrong Hatchery has recently added a substantial chum salmon production program, restarted production of king salmon, and expanded existing production of coho. Expansion of these programs is obviously a point of interest, as they are expected to yield substantial economic benefits to local common property fisheries by 2006, reaching full benefit by 2009.

Accordingly, this report provides an estimate of AKI's projected contribution to common property salmon fishery value, based on the number of adult salmon available for common property harvest.

The quantity of adult salmon available for common property is drawn from AKI staff interviews. While ocean survival conditions of salmon can be highly variable, AKI staff estimates incorporate survival rates, typical interception/exploitation rates and a variety of other factors specific to rearing and release techniques being employed in the hatchery's expansions. AKI staff estimates of future common property contribution have a strong basis in practical application with known results.

SALMON INDUSTRY HISTORY

The history of Alaska's commercial salmon industry spans all of one century and parts of two more. The first salmon saltery was established in Southeast Alaska in the 1860s and the first salmon cannery established in 1878. During Alaska's Territorial era, long-term mismanagement of the resource led to a disastrous decline of salmon stocks. In fact, the desire of the Alaska Territory to control its own salmon fisheries became a major factor in the fight for statehood. Alaska achieved statehood in 1959, but that year also marked the smallest commercial salmon harvest since the turn of the century.

Fifteen years after statehood, Alaska salmon stocks remained in dismal condition. The 1967 salmon harvest of just 20 million stands as the worst of the century, according to ADF&G harvest records dating back to 1900. And the early 1970s were no better. The salmon harvest during 1973-1975 averaged just 23 million per year, comprising three of the six worst years on record. Fortunately, these conditions would not persist.

During the 1970s state and federal regulatory changes sought to restore Alaska salmon runs. Entry to salmon fisheries was limited, the Magnuson-Stevens Act established the 200-mile limit and Alaska embarked on an aggressive expansion of its hatchery system.

The Alaska legislature established the Fisheries Rehabilitation, Enhancement and Development (FRED) Division in 1971, and the state began expanding its hatchery system. During the next 10 years, the state built 16 hatcheries and issued permits for 15 Private Non-Profit (PNP) hatcheries, including the Port Armstrong hatchery. By 1981 the system had grown from five to 34 hatcheries.

The regulatory and enhancement efforts of the 1970s began to pay dividends near the end of the decade and in 1980 the Alaska salmon harvest exceeded 100 million fish for the first time in 40 years. What followed during the late 1980s and early 1990s was the most extraordinary period in the history of the Alaska salmon industry.

From the turn of the century through 1979, Alaska harvests had averaged 59 million fish per year. During the 1980s average harvest swelled to 122 million, then to 175 million during the 1990s. In fact, all of the ten largest salmon harvests on record have occurred from 1989 forward.

The burgeoning salmon harvest coincided with an economic boom in Japan, driving salmon prices to unprecedented levels. During 1987-1996, earnings of Alaska salmon fishermen averaged over half a billion dollars per year. Fishermen, processors and coastal communities prospered. But the unique market conditions that drove Alaska salmon earnings so high would ultimately bring about the end of this prosperous period.

The limited world market supply and resulting high prices stimulated aggressive development of large-scale salmon farming and by 1999, world farmed salmon production surpassed wild production. Today, farmed salmon and farmed trout account for over seventy percent of the world supply. Despite record-setting harvests, Alaska now provides only about 15 percent of world supply. The result of this massive increase in world supply has been large-scale market and price erosion for Alaska salmon.

Salmon Hatcheries and Today's Fishery

Today, Alaska salmon runs remain at near-record levels, but the economic landscape of the industry has changed. Economic attrition has thinned the ranks of active salmon fishermen, from 10,200 Alaska salmon permits fished in 1992 to just 6,600 in 2002. The remaining operators have become more efficient and competitive to combat declining prices. Salmon fishermen in many regions of the state (particularly in Southeast Alaska) now catch volumes of fish that were unheard of in the 1970s and 1980s. The state's hatcheries play an essential role in providing that volume. Alaska hatcheries released nearly 1.5 billion salmon fry in 2002 and over 49 million "enhanced" salmon returned as adults in 2002.

Salmon hatcheries represent an outstanding value for Southeast Alaska permit holders. In 2002, the Southeast salmon harvest was valued at slightly over \$50 million and hatchery salmon contributed 22 percent of the harvest, an estimated \$11.2 million in ex-vessel value. Fishermen paid a 3 percent aquaculture assessment on the value of common property harvest, approximately \$1.2 million. For every dollar they paid in enhancement tax in 2002, Southeast permit holders earned nearly \$10 from enhanced salmon.

Hatchery Contribution to Southeast Alaska Harvest Value, 2002
(\$'000's)

	King	Sockeye	Coho	Pink	Chum	Total
2002 Southeast Harvest Value	\$ 7,527	\$ 3,729	\$ 10,255	\$ 13,552	\$ 15,257	\$ 50,320
Hatchery Contribution to Southeast Harvest	13%	11%	21%	2%	49%	22%
Value of Hatchery Contribution	\$ 979	\$ 395	\$ 2,123	\$ 271	\$ 7,476	\$ 11,244

Every salmon hatchery in Southeast Alaska participates in *cost recovery* fishing to fund its operations. In simple terms, cost recovery fishing allows the hatchery to catch and sell a portion of its return to fund operations. Many hatcheries in Southeast Alaska are affiliated with one of the two regional aquaculture associations and receive salmon enhancement tax revenue to augment their cost recovery earnings. Their operations are funded by a combination of cost recovery fishing and salmon enhancement tax revenue.

Several hatcheries in Southeast Alaska are not affiliated with the regional associations. They provide salmon to the common property fisheries, but receive none of the revenue generated by the three-percent salmon enhancement tax. These hatcheries rely solely on cost recovery revenue to finance their operations. The Port Armstrong facility operated by Armstrong-Keta, Inc is one of those hatcheries.

PORT ARMSTRONG HATCHERY OPERATIONS

Overview

The Port Armstrong Hatchery is a private, non-profit facility owned and operated by Armstrong-Keta, Incorporated (AKI). The hatchery is located in Port Armstrong Bay, along Chatham Strait near the southern tip of Baranof Island. The Port Armstrong Hatchery received its PNP operating permit in February 1981.

The hatchery is currently producing self-sustaining runs of pink and coho salmon. Port Armstrong Hatchery is actively developing a king run and is in the process of establishing a large-scale run of summer chum salmon.

Hatchery capacities are expressed in terms of permitted egg take — the number of eggs a hatchery is allowed to remove from adult fish to conduct its operations. As of 2003, AKI is permitted for 85 million pink salmon eggs, 30 million chum eggs and two million each coho and king eggs.

For pink and chum, a survival rate of 90-95 percent from egg to release is considered acceptable. Coho and king salmon are held longer so typically have a lower survival rate from egg to release, often 80-90 percent.

Pink and chum are typically released to salt water as fry, after one winter in the hatchery. This makes for a high mortality rate (projected marine survival to adult is only 3 percent), but the release pattern mimics the natural life cycle of the fish. Coho and king are generally held for two winters and released as smolts, consistent with their natural life cycle. Their size makes for a higher marine survival rate of approximately 10 percent (coho).

Pink Salmon

Port Armstrong was initially permitted for a combined egg take of 11 million pink and chum. The first return of pinks to the hatchery was in 1985. Pink salmon capacity has increased over the course of several adjustments to the permit, the most recent in 1996. Port Armstrong is currently permitted to take 85 million pink salmon eggs, and the hatchery is operating at capacity for pink salmon production.

Port Armstrong Hatchery typically releases 70-85 million pink fry, generating an average return of 2.2 million adults. AKI is expected to continue operating at permitted pink salmon capacity in the foreseeable future. In 2001 and 2002 Port Armstrong Hatchery supplied approximately one million pink salmon per year to the common property seine fishery.

Pink salmon prices are currently depressed, due mostly to a chronic oversupply of canned pink salmon, the dominant product form. Alaska has chalked up a series of record-setting pink harvests in the last decade, largely due to strength of wild runs. Hatchery production accounts for only about 25-30 percent of Alaska's recent pink harvests. For perspective, consider that the statewide pink harvest exceeded 80 million only 12 times in the last century. Since 1998, the pink harvest has averaged 110 million.

Chum Salmon

Port Armstrong was originally conceived as a chum hatchery that was to focus on production of fall-run chum salmon. The hatchery initially took 2 million or fewer chum eggs annually between 1982 and 1985 under the combined pink and chum

permitted limit of 11 million eggs. Returning adults proved to be of poor flesh quality in the terminal area and prevailing roe values of the time were not sufficient to offset poor grade of the terminal-area fish. A proposal to extend the special harvest area into Chatham Strait and harvest the fish at an earlier stage proved undesirable because of the potential conflict with the existing troll fleet operating in the area. Faced with these circumstances, AKI suspended fall chum production in 1994 and the hatchery focused instead on pink salmon production.

By 2000, market value of chum salmon roe had risen dramatically, boosting ex-vessel price to attractive levels and drawing targeted effort from all three commercial gear types in the region. In 2001, AKI applied for a permit to produce up to 30 million summer-run chum fry. The request was intended primarily to supply more fish for the troll fleet in the lower Chatham/Port Alexander area. A secondary purpose was to diversify production at the Port Armstrong hatchery and provide economic stability against declining pink salmon prices.

The project was funded in 2002 through a grant from the Southeast Sustainable Salmon Fund and the first egg take of 15 million commenced on schedule in 2003. Egg take will increase to 30 million in 2004 and the first release of fry from the 2003 egg take is also scheduled for 2004. The first adult returns from the 2003 egg take are anticipated in 2006.

Chum salmon remain at sea for up to four years, so the all-age-class return of Port Armstrong chums is not expected until 2009. Port Armstrong Hatchery chum returns are expected to provide up to 400,000 adult chums to common property fisheries by 2009.

Alaska chum salmon prices are somewhat depressed, due in large part to market conditions for chum roe in Japan. Roe accounts for over half of Alaska chum salmon wholesale value and is the primary driver for chum price. Japanese demand responds to the harvest volume in the Hokkaido chum fishery, the largest in the world. The 2003 Hokkaido harvest set a new record of over 65 million chums, almost triple Alaska's record harvest of 24 million in 2000.

King Salmon

Port Armstrong Hatchery was originally permitted to take 50,000 king eggs in 1984, but the hatchery only produced a limited amount of king salmon from 1987 to 1992.

AKI restarted the king run in 2001 with an egg take from the Unuk River stock in Little Port Walter. Additional Unuk-River-stock egg takes were made in 2002 and 2003 and king salmon smolts from the 2001 brood year were released from Port Armstrong in 2003. The first mature females are expected to begin returning in 2005. At that point egg take is expected to increase and the run to become self-sustaining. At present, egg take from the Unuk River stock is limited by the small size of the Little Port Walter run to less than 200,000, well below AKI's permitted capacity of 2 million.

A self-sustaining run of all-age-class king salmon at the Port Armstrong Hatchery is not expected until 2009. However, there will be significant numbers of AKI king salmon in the area starting in 2005. It is not yet clear what the potential contribution to common-property fisheries will be.

The market outlook for king salmon is far more positive than the ex-vessel price would indicate. Harvest timing plays a major role in keeping summer king salmon values low at this time. The traditional July 1 opening date comes shortly after the harvest peak in the Western states, when U.S. market supply of fresh wild kings is at its highest. The July 2003 price for troll-caught Alaska kings was less than \$1 per pound.

When the domestic market is not oversupplied with Pacific Northwest fish, fresh kings from Alaska bring an excellent price. The winter troll fishery opens in October when there is no other significant supply of fresh wild salmon. In 2003, October prices for troll kings started at \$3 per pound and by December had exceeded \$5 per pound. This pricing is consistent with patterns from the 2002 winter troll fishery.

Any hatchery production that can enhance common-property harvest of king salmon in the off-peak months would provide a substantial benefit to the troll fleet. The benefits will be particularly significant if the fish can be caught during the winter season when ex-vessel value commonly exceeds \$50 per fish.

Coho

Initially permitted for 500,000 coho in 1988, Port Armstrong Hatchery started its coho program with eyed eggs from Medveje. Permit alterations are as follows: 1.5 million in 1992 with AKI's development of an evaluation program to determine in-season coho contributions to the CPF, and an increase to 2 million in 1996.

Until 2002, the Port Armstrong hatchery had been unable to utilize its full permitted capacity of 2 million coho eggs. AKI secured a grant in 2002 to expand rearing capacity at the hatchery. The project is mostly complete and AKI took 1.85 million eggs from hatchery brood stock in 2003. The hatchery is expected to take its full allotment of two million eggs in 2004. The resulting smolts from the initial expansion phase will be released in 2005 and are expected to return as adults in 2006.

The larger egg take represents a potential increase of over one-third in smolt released and is expected to increase the common-property contribution from about 70,000 adults in 2001 and 2002 to 100,000 in 2006.

Market conditions for coho are mixed. The trend for troll-caught coho is a modest increase in ex-vessel value for mid to late-season fish. There is growing interest from the domestic market (particularly for coho fillets) and from smokers in European Union countries.

The U.S. salmon market is the second largest in the world and is growing rapidly. The market is supplied primarily by exports, and salmon fillets comprise virtually all the growth in U.S. salmon imports. Troll-caught coho is a good candidate for fillet production, as troll-fleet chilling and handling practices virtually eliminate bruising and minimize product gaping associated with fish passing through rigor at warm temperature.

CONTRIBUTION TO COMMON PROPERTY FISHERIES

Pink Salmon

During 1998-2002, Port Armstrong Hatchery generated adult returns of 11 million pink salmon and 520,000 coho. Of these, AKI took 7.6 million fish for broodstock and cost recovery operations. An estimated 3.6 million (32 percent) AKI pink salmon were harvested in common-property seine fisheries.

Based on annual region-average price of pink salmon during 1998-2002, total value of the AKI contribution common-property pink harvest is estimated at \$1.6 million.

Port Armstrong Contribution to Common-Property Pink Harvest

Year	AKI contribution to CP Harvest	AKI Actual fish size, lbs	Region avg price/lb	AKI contribution to CP Value
1998	785,730	3.7	\$ 0.14	\$ 412,178
1999	805,200	3.1	\$ 0.14	\$ 347,879
2000	100,000	3.5	\$ 0.12	\$ 42,324
2001	1,090,049	3.3	\$ 0.14	\$ 504,518
2002	883,967	3.7	\$ 0.09	\$ 298,100
1998-2002 total	3,664,946	-	-	\$ 1,604,999
1998-2002 avg	732,989	3.5	\$ 0.13	\$ 321,000

Coho

During 1998-2002, Port Armstrong hatchery generated returns of approximately 520,000 adult coho. Of these, 183,000 (35 percent) were caught in common-property fisheries.

It should be noted that the return of Port Armstrong coho was unusually large in 2002, accounting for more than half the 1998-2002 total return. During the same season, troll-fleet effort for coho was limited by very low prices. The combination of these circumstances generated a common property contribution of just 27 percent, which under-represents AKI's contribution to the troll harvest. Interception of Port Armstrong coho by the troll fleet averaged 42 percent in the previous five years (1997-2001) and has been as high as 62 percent (1999).

Commercial trollers accounted for 89 percent of the common property harvest and seiners accounted for eight percent, about 15,000 fish. Sport fishermen caught about 6,200 AKI coho, mostly in 2001 and 2002. The sport harvest is associated with recent growth in charter and lodge operations in Port Alexander.

Based on annual region-average price of cohos, total value of the AKI contribution to common-property harvest is estimated at \$805,000.

Port Armstrong Contribution to Common-Property Coho Harvest

1998	18,312	7.9	\$ 0.60	\$ 87,194
1999	12,186	6.0	\$ 0.94	\$ 68,179
2000	7,151	7.1	\$ 0.70	\$ 35,310
2001	84,483	7.5	\$ 0.63	\$ 398,916
2002	61,431	8.4	\$ 0.42	\$ 216,135
1998-2002 total	183,563	-	-	\$ 805,735
1998-2002 avg	36,713	7.4	\$ 0.66	\$ 161,147

The operations of the Port Armstrong hatchery provide substantial economic benefits to the common property salmon fisheries of Southeast Alaska, at no cost to salmon permit holders.

Armstrong-Keta, Inc has expanded production at the Port Armstrong hatchery. By 2009 (five years from this writing), annual contribution to the common property fisheries is projected at \$1.4 million in ex-vessel value, nearly triple the hatchery's existing annual contribution to common property.

AKI has significantly improved the financial footing of the Port Armstrong Hatchery in the last two years. The hatchery's debt was refinanced at a very favorable rate in 2003. Capital cost of the production-capacity expansion was funded entirely by grants, resulting in greater contribution to common property, with no additional debt or debt service for the hatchery.

Economic benefits of the Port Armstrong hatchery extend beyond the ex-vessel value, direct spending and payroll of AKI employees detailed in this study. Operations of the hatchery produce secondary economic activity in local economies of the region, particularly in Sitka, Petersburg, Kake and Port Alexander.

Port Armstrong Hatchery makes an important economic contribution to the individuals, businesses and communities of Central Southeast Alaska. The hatchery generates direct employment, produces income for fishermen and carries a wide variety of economic activity into nearby communities.