



Economic Impacts of Private Nonprofit Aquaculture Associations in Southeast Alaska

*Prepared for:
Northern Southeast Alaska Regional
Aquaculture Association, Douglas Island
Pink and Chum, Inc., and Southern Southeast
Regional Aquaculture Association*



Research-Based Consulting

Juneau
Anchorage



June 2010

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Executive Summary

Southeast Alaska's three largest hatchery associations have contributed millions of pounds of fish to commercial, charter, sport, personal use, and subsistence fisheries, resulting in the injection of hundreds of millions of dollars into the regional and state economies. This study quantifies the economic impacts of Northern Southeast Regional Aquaculture Association (NSRAA), Douglas Island Pink and Chum, Inc. (DIPAC), and Southern Southeast Regional Aquaculture Association (SSRAA) from 2001 to 2008. Major findings about the combined impacts of these organizations follow:

Total Economic Impacts

- In 2008, hatchery operations and the commercial harvesting and processing of salmon produced by NSRAA, DIPAC, and SSRAA generated total direct, indirect, and induced economic output of \$171 million.
- In 2008, direct, indirect, and induced employment and payroll generated as a result of NSRAA, DIPAC and SSRAA operations totaled 971 jobs and \$50 million in labor income. Direct employment is estimated at 662 with \$33 million in labor income in 2008, while economic multiplier impacts (indirect and induced) of the rearing, harvesting, and processing of hatchery-produced salmon added 309 jobs and \$17 million in labor income.

Commercial Ex-vessel Volume and Value

- In common property fisheries from 2001 to 2008, the commercial fleet harvested 326 million pounds worth \$130 million in ex-vessel value of salmon produced by NSRAA, DIPAC, and SSRAA. Cost recovery efforts added 210 million pounds of salmon worth \$88 million.
- From 2001 to 2008, salmon reared by NSRAA, DIPAC, and SSRAA and harvested by commercial fishermen accounted for 30 percent of the ex-vessel value and 25 percent of the volume of the total Southeast Alaska salmon harvest.

Processors' First Wholesale Value and Gross Revenue

- From 2001 to 2008, the first wholesale value (meaning the value of the products processed in Alaska before export) of processed salmon produced by these aquaculture organizations totaled nearly one-half billion dollars (\$374 million) in first wholesale value for seafood processors. In 2008, seafood processors earned \$ 98 million in first wholesale value by processing hatchery-produced salmon.
- From 2001 to 2008, processors earned \$162 million in gross revenues (meaning the first wholesale value, less the ex-vessel price paid to fishermen) as a result of processing NSRAA, DIPAC, and SSRAA salmon. In 2008, seafood processors earned \$40 million in gross revenue by processing hatchery-produced salmon.

Direct Impacts of Aquaculture Association Operations

- In 2008, the three associations contributed nearly \$21 million in payroll and expenditures on goods and services to the regional economy. They employed an annual average of 115 employees earning \$4.6 million in payroll. NSRAA, DIPAC and SSRAA also spent \$16.3 million on goods and services, the majority of it with local Alaska companies.

Harvesters' Enhancement Tax Return on Investment

- From 2001 to 2008, each \$1 of voluntary salmon enhancement tax paid by harvesters returned \$8.22 in ex-vessel value from the common property fisheries (excluding cost recovery fisheries).
- From 2001 to 2008, each \$1 of voluntary salmon enhancement tax paid by harvesters returned \$10.27 in gross processing revenues (first wholesale value less ex-vessel value).
- In 2008, each \$1 of voluntary salmon enhancement tax paid by Southeast fishermen generated \$12.97 in ex-vessel value from common property fisheries and \$14.78 in gross processing revenues.

Community Revenue from Fisheries Business Tax

- From 2001 to 2008, NSRAA, DIPAC and SSRAA salmon generated \$6.5 million in fisheries business tax, which is split evenly between the state general fund (\$3.3 million) and the local governments (\$3.3 million) of the communities where the salmon were landed.

Charter, Sport, Personal Use, and Subsistence Contributions

- From 2001 to 2008, charter and other sport fishermen harvested 383,000 NSRAA, DIPAC and SSRAA Chinook (king) and coho salmon.
- Salmon from NSRAA, DIPAC and SSRAA contribute significantly to the sport, personal use, and subsistence fisheries of residents of the region.

Introduction and Methodology

Introduction

In 1974, the Alaska Legislature authorized the creation of private nonprofit (PNP) hatcheries for ocean ranching in Alaska for the purpose of rehabilitating and enhancing fish stocks. The Legislature also approved the formation of regional associations comprised of representatives from local communities and authorized to operate hatcheries and conduct other enhancement activities that benefit fisheries resources. These associations are authorized to collect a tax on commercial landings for stock enhancement, provide the tax was voluntarily approved by a majority of commercial permit holders in the region.

Two regional associations were created in Southeast Alaska: the Northern Southeast Regional Aquaculture Association (NSRAA), headquartered in Sitka, and the Southern Southeast Regional Aquaculture Association (SSRAA), based in Ketchikan. These organizations were funded through a salmon enhancement tax (of 3 percent), as well as what is referred to as “cost-recovery” income, which comes through the harvest and sale of a portion of returns to the terminal hatchery areas after passing through the common property fisheries.

Other PNP hatcheries also emerged, the largest of which is Douglas Island Pink and Chum, Inc. (DIPAC), based in Juneau. DIPAC is funded by its cost recovery program and state contracts. While other smaller hatcheries also produce salmon, this report focuses on Southeast’s three major hatcheries: NSRAA, DIPAC and SSRAA.

Methodology

The data presented in this report comes from a variety of sources, including the aquaculture associations, Alaska Department of Fish and Game (ADF&G), Alaska Commercial Fisheries Entry Commission (CFEC), and Alaska Department of Labor and Workforce Development (ADOLWD).

Volume and ex-vessel value estimates of PNP salmon harvested in commercial fisheries are based on the most recent data provided by the aquaculture associations, ADF&G, and CFEC. First wholesale values of hatchery salmon is calculated in proportion to the volume of hatchery salmon harvested in the region’s commercial fisheries, using ADF&G data on the region-wide first wholesale value of all salmon processed in Southeast Alaska.

Sport fishing harvest estimates are based on data provided by the hatcheries and ADF&G.

McDowell Group employed economic multipliers to estimate the indirect and induced economic impacts related to PNP operations. Direct impacts were calculated based on the pro-rata share of hatchery fish moving through the commercial fishing and seafood processing industries in Southeast Alaska. The model linked ADOLWD employment and payroll data, ex-vessel volume and value data, first wholesale value data and other information to generate estimates of average annual employment, income, and total economic output related to hatchery-produced salmon.

Errata note: This document dated June 2010 supersedes a previous report document of the same name dated May 2010. A previously undetected database merging complication related to statistical spreadsheet formulas resulted in a modest overstatement of summary values in the May 2010 version. All data in the June 2010 report are verified and constitute the final findings of this research.

Facilities and Operations

Northern Southeast Regional Aquaculture Association

Established in 1978, Northern Southeast Regional Aquaculture Association produces chum, sockeye, chinook, and coho salmon.

Its Medvejie Hatchery, on Baranof Island south of Sitka, has operated for nearly 30 years. Although chum account for the largest returns from Medvejie, the hatchery doubled its chinook production in recent years. It also launched a zero-check chinook program in which smolts are released after only one year of rearing instead of the traditional two.

The state built the Hidden Falls Hatchery on Baranof Island on Chatham Strait in 1978 and operated it until 1988. Since taking over the hatchery, NSRAA has more than doubled its chum production, tripled chinook production, and launched a coho program.

NSRAA also runs a coho rearing program at Deer Lake, on southeastern Baranof Island. In 2009, the association doubled the number of fry in its net-pen system to increase its adult returns by 180,000 to 200,000 coho per year. In addition, NSRAA has three spawning channels and remote incubation boxes near Haines.

Douglas Island Pink and Chum, Inc.

Douglas Island Pink and Chum, Inc. was established in 1976 and operates the Macaulay Salmon Hatchery in Juneau, as well as the state-owned Snettisham Hatchery, 40 miles south of the capital.

The Juneau hatchery, in operation for over 20 years, produces chum, chinook, and coho salmon. The facility also houses the Ladd Macaulay Visitor Center, which maintains an assortment of aquariums and draws more than 100,000 visitors each year. Next to the hatchery is a public dock that is popular among shoreside anglers and children.

In 1996, DIPAC took over management of the Snettisham Hatchery, previously operated by the Alaska Department of Fish and Game. This hatchery, located between Juneau and Petersburg, produces sockeye for local fisheries and the U.S.-Canada Salmon Treaty enhancement programs.

DIPAC does not receive tax revenue from commercial harvests and instead relies primarily on cost-recovery harvests of chum, sockeye, and coho. It also maintains contracts with the state to fund its chinook and transboundary sockeye programs.

Southern Southeast Regional Aquaculture Association

The Southern Southeast Regional Aquaculture Association began operation in 1978 and is based in Ketchikan. Its four hatcheries produce chum, coho, sockeye, and chinook salmon.

SSRAA's hatcheries are at Whitman Lake in Ketchikan; in Neets Bay, about 40 miles north of Ketchikan; Burnett Inlet, 25 miles south of Wrangell; and Crystal Lake, 20 miles south of Petersburg. The association also operates remote sites in Kendrick Bay, Nakat Inlet, Anita Bay, Bakewell Lake, and Neck Lake. In addition, it has wild salmon stock restoration projects at Hugh Smith Lake and McDonald Lake.

SSRAA is funded by a 3 percent ex-vessel tax on landed salmon within its operation area and a cost recovery program, selling a portion of returns to terminal areas after the fish pass through common property fisheries. While other hatchery programs contract processors to purchase their cost-recovery fish, SSRAA is unusual in that it markets its own. The association's cost recovery income is derived from chum salmon flesh, products such as smoked salmon, and from roe, or "ikura," which is coveted in Japan and Eastern Europe.

Economic Impacts of NSRAA, DIPAC and SSRAA

Between 2001 and 2008 NSRAA, DIPAC and SSRAA contributed nearly 65 million salmon to commercial fisheries in Southeast Alaska, plus another 400,000 chinook and coho to the charter and other sport fisheries. In 2008, as the result of contributing 5.4 million fish to the commercial common property harvest, aquaculture association operations generated direct, indirect and induced economic output worth \$171 million, employment of nearly 971, and income of just over \$50 million. These calculations employ economic modeling and include direct economic impacts of aquaculture association operations and the harvesting and processing of the salmon they produce. Also included are the economic multiplier (indirect and induced) impacts of these activities as the impacts circulate throughout the regional economy.

Total Direct, Indirect, and Induced Economic Impacts of NSRAA, DIPAC and SSRAA, 2008

Industry	Economic Output	Employment	Income
Commercial Fishing	\$54,600,000	419	\$32,700,000
Seafood Processing	\$84,100,000	373	\$10,300,000
Hatchery Operations	\$32,400,000	179	\$7,100,000
Total	\$171,100,000	971	50,100,000

Source: NSRAA, DIPAC, SSRAA, ADOLWD, ADF&G and McDowell Group estimates.

In addition, NSRAA, DIPAC and SSRAA salmon represent a significant share of the charter and other sport fish harvests. However, accurately estimating the direct, indirect, and induced impacts of sport, personal use and subsistence fisheries is beyond the scope of this study.

Commercial Harvesting Economic Impacts

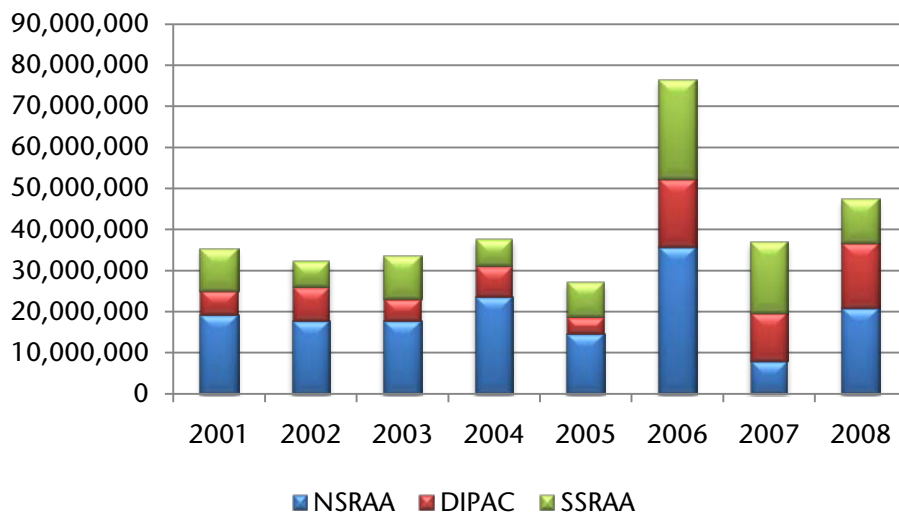
Harvest Volume and Value

Southeast Alaska's three largest aquaculture associations produced 326 million pounds of salmon harvested by the commercial fleet in common property fisheries from 2001 to 2008. That resulted in \$130 million in ex-vessel value over those eight years. The three associations produced an annual average of 41 million pounds of salmon – worth \$16 million – harvested by commercial fishermen each year.

NSRAA fish accounted for the greatest portion of the commercial catch of hatchery fish, producing 48 percent of the volume. Since the previous decade, however, the portions of the commercial harvest coming from DIPAC and SSRAA fish have increased. DIPAC accounted for 15 percent of the 1990-2000 harvest volume, increasing to 23 percent in the 2001-08 period. Similarly, SSRAA produced 12 percent of the 1990-2000 harvest volume, but increased its portion of the commercial catch to 29 percent from 2001 to 2008.

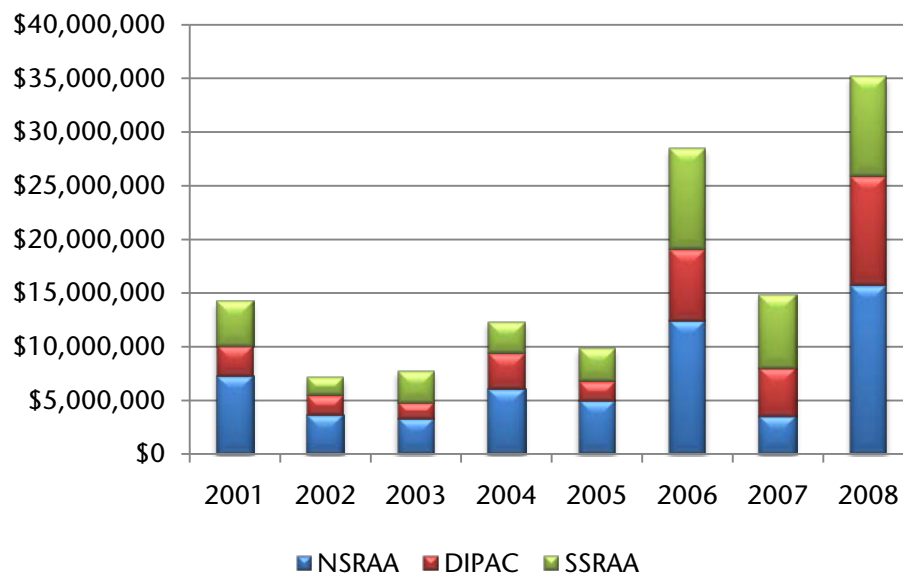
For the 2001-2008 period, NSRAA produced 44 percent of the ex-vessel value of the hatchery fish harvested by the commercial fleet, followed by SSRAA at 31 percent, and DIPAC at 25 percent. The ex-vessel value is the gross amount paid to fishermen for their catch.

Commercial Harvest Volume of NSRAA, DIPAC and SSRAA Salmon 2001 – 2008 (in pounds)



Source: NSRAA, DIPAC and SSRAA

Commercial Harvest Ex-vessel Value of NSRAA, DIPAC and SSRAA Salmon, 2001 – 2008 (in \$)

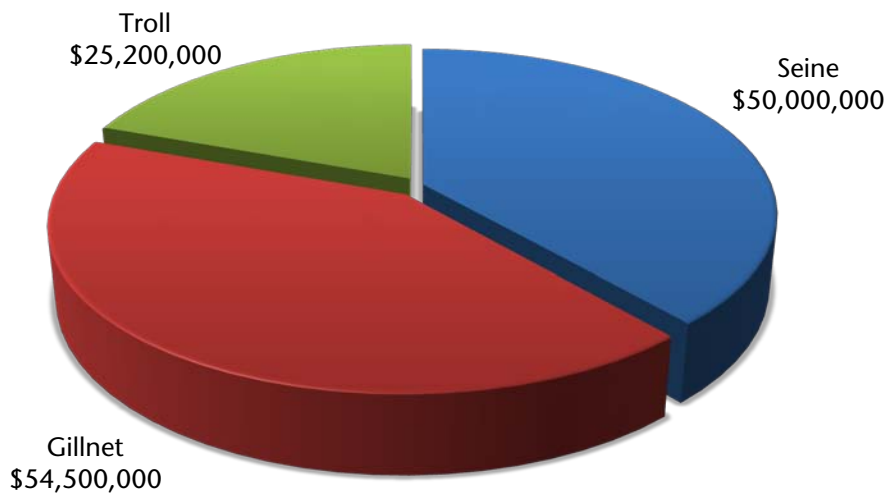


Source: NSRAA, DIPAC and SSRAA

Harvest Value by Gear Group

All three commercial gear groups – seiners, gillnetters, and trollers – reap benefits from the hatchery-produced salmon. From 2001 to 2008, the ex-vessel value of hatchery-produced fish totaled 50 million for the seine fleet (39 percent); more than \$55 million for gillnetters (42 percent); and almost \$25 million for trollers (19 percent).

**Ex-vessel Value of NSRAA, DIPAC and SSRAA
Salmon by Gear Group ,2001 - 2008**

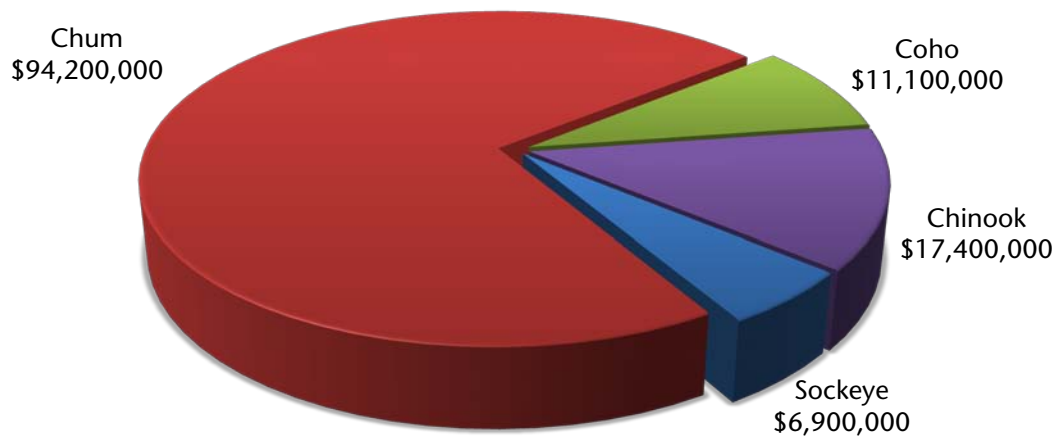


Source: NSRAA, DIPAC and SSRAA

Harvest Value by Species

Chum is the most important salmon species for Southeast hatcheries in terms of both volume and value. From 2001 to 2008, chum salmon accounted for 73 percent of the total ex-vessel value and 90 percent of the volume of the common property harvest of NSRAA, DIPAC and SSRAA fish. Coho accounted for 13 percent (\$17.4 million), chinook at 9 percent (\$11.1 million), and sockeye at 5 percent (\$6.9 million).

Ex-vessel Value of NSRAA, DIPAC and SSRAA Common Property Salmon by Species, 2001 - 2008

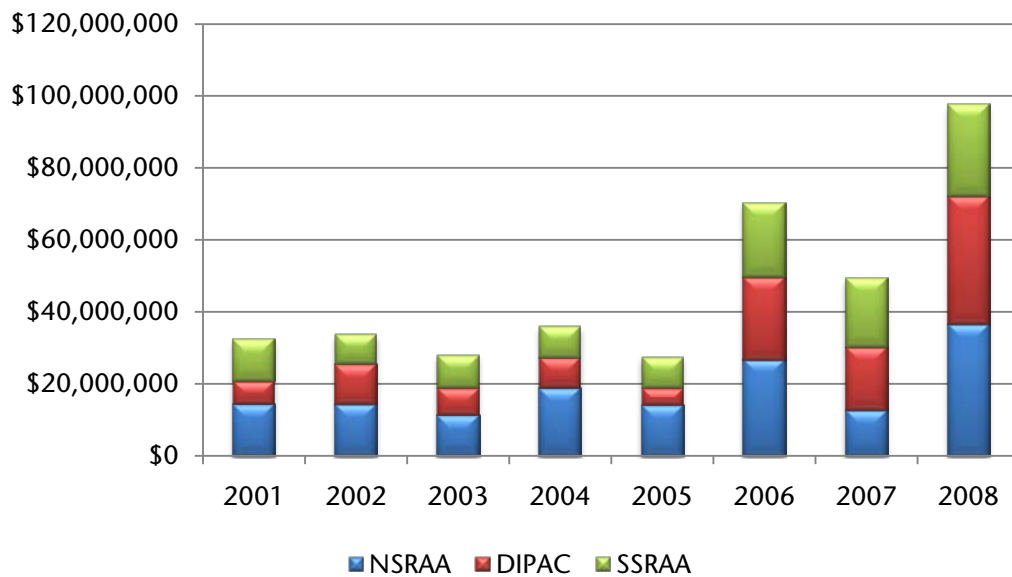


Source: NSRAA, DIPAC and SSRAA

Seafood Processing and First Wholesale Value

In addition to yielding economic benefits to commercial fishermen, NSRAA, DIPAC and SSRAA salmon generate substantial income to seafood processors as they process these fish in the Southeast region before shipping to markets in the U.S., Europe, Asia, and elsewhere. From 2001 to 2008, the salmon produced by the three major aquaculture associations resulted in nearly one-half billion dollars (\$374 million) in first wholesale value of processed fish. First wholesale value is the amount received by processors for the initial sale of processed product outside their affiliate network. From 2001 to 2008, the average annual first wholesale value of hatchery-produced salmon was \$18.5 million for NSRAA, \$14.3 million for DIPAC, and \$14.0 million for SSRAA. In 2008, first wholesale value of NSRAA, DIPAC and SSRAA salmon reached a record level \$98 million.

First Wholesale Value of NSRAA, DIPAC and SSRAA Salmon in Southeast Alaska, 2001 - 2008



Source: NSRAA, DIPAC and SSRAA

Chum accounted for 75 percent of the total combined first wholesale value, followed by coho at 14 percent, chinook at 7 percent, and sockeye at 4 percent.

From 2001 to 2008, after accounting for ex-vessel payments to fishermen, processors realized \$162 million in gross processing revenue¹. The last three years of the study period yielded the highest gross revenue totals, with 2008 being the most lucrative year overall at \$40 million. During the entire study period, NSRAA salmon resulted in \$66 million in gross processing revenues, DIPAC salmon \$45 million, and SSRAA salmon \$46 million.

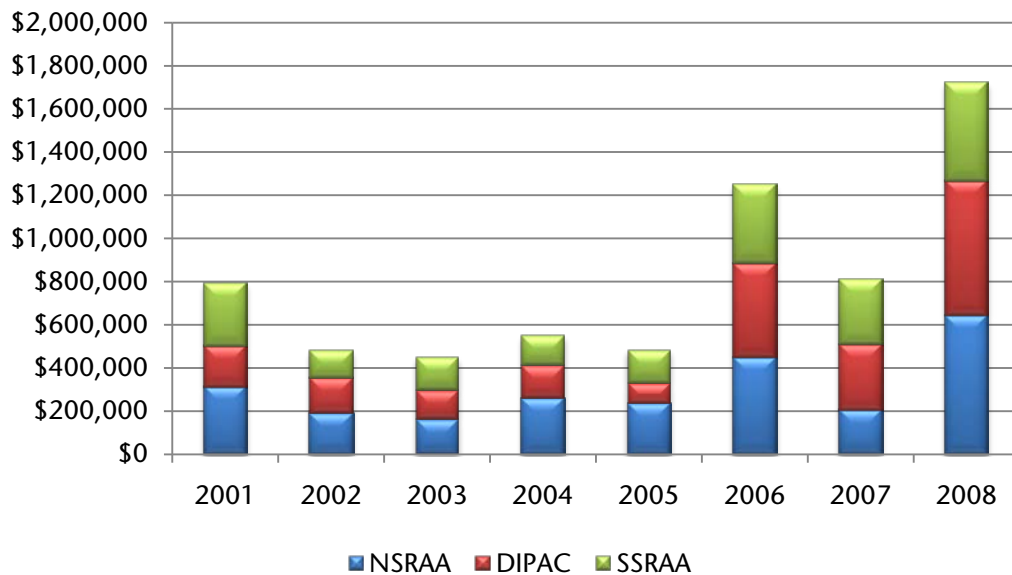
¹ Gross revenue is equal to the first wholesale value minus the ex-vessel value paid to fishermen for the raw fish.

Tax Revenue from NSRAA, DIPAC and SSRAA Salmon

From 2001 to 2008, the State of Alaska Fisheries Business Tax proceeds directly related to NSRAA, DIPAC and SSRAA salmon totaled \$6.5 million. One-half of this tax (\$3.3 million) is returned directly to the local governments of the communities in which the salmon are landed. The other one-half of the Fisheries Business Tax – \$3.3 million – is retained by state government for general fund allocation. Fisheries business tax proceeds peaked in 2008 at \$1.7 million.

NSRAA and SSRAA funding, which primarily relies on cost recovery efforts, is supplemented by a voluntary Salmon Enhancement Tax paid by the commercial salmon fleet of the region. This tax required a vote of the majority of the region’s salmon permit holders. DIPAC does not receive this tax, as it is not a regional PNP. The commercial fleet paid \$15.8 million in Salmon Enhancement Tax (the tax rate is 3 percent of harvesters’ ex-vessel income from salmon in common property fisheries) during the study period. This investment returned \$130 million in ex-vessel harvest value to the common property fishery, a return of \$8.22 for every \$1 of tax levied.

Fisheries Business Tax Proceeds from Hatchery-Produced Salmon, 2001-2008



Source: McDowell Group Estimates

Direct Impacts of Aquaculture Association Operations

Southeast Alaska's three largest aquaculture associations inject millions of dollars into the state and regional economies each year via payroll and payments to vendors for goods and services. In 2008, for instance, the associations provided nearly \$21 million in payroll and expenditures on goods and services. Local businesses receive the majority of these expenditures; in 2008 the three hatcheries combine spent \$8.4 million on goods and services in Southeast Alaska in addition to \$4.6 million in payroll.

In 2008, the associations provided annual average employment of 115. While peak employment is in the summer, aquaculture association operations provided year around employment as well. DIPAC employed an average of 42 people per month, NSRAA, 36, and SSRAA, 37.

Charter, Sport, Personal Use, and Subsistence Fishery Contributions

NSRAA, DIPAC and SSRAA salmon add considerably to the charter, other sport, personal-use, and subsistence harvests in Southeast Alaska. Direct economic impacts include spending on guided fishing tours, boat rentals, fishing gear, food, lodging, and fuel. Some charter boat operators have stated hatchery salmon are a large part of their clients' catch and others said they would not be in business without these fish.

From 2001 to 2008, NSRAA, DIPAC and SSRAA contributed 383,000 chinook and coho salmon to the total Southeast Alaska sportfish harvest, an average annual contribution of 48,000 fish.

DIPAC salmon accounted for an average of 15 percent of the coho harvest and 24 percent of the chinook catch by Juneau-area anglers from 2001 to 2008. Similarly, NSRAA fish made up about 7 percent of the Juneau and Sitka sport harvests of coho and Chinook. SSRAA produced the largest amount of Chinook and coho for sport fisheries during the study period. From 2001 to 2008 SSRAA contributed 8,755 chinook and 23,803 coho to sport fisheries in southern Southeast Alaska.

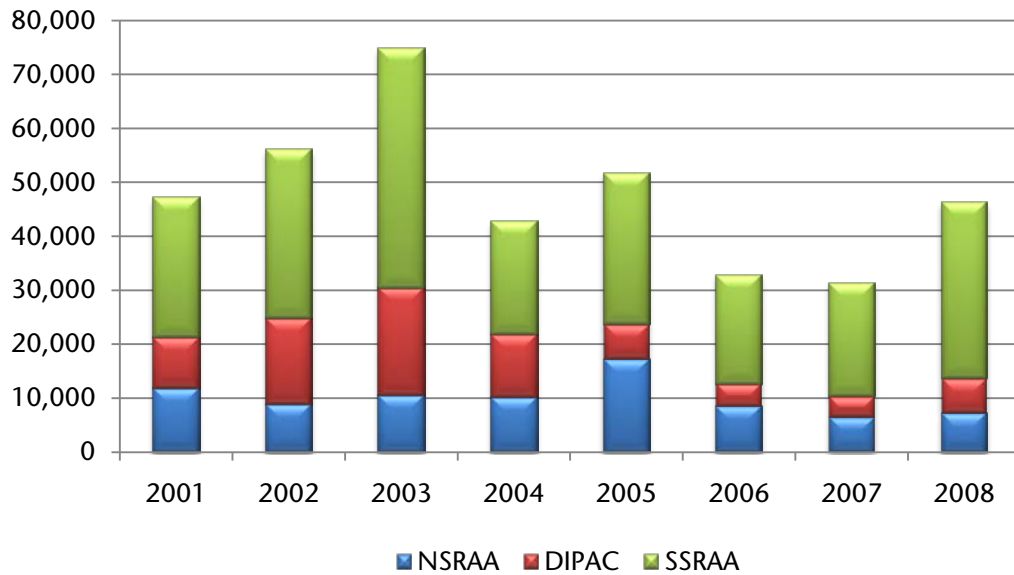
Contributions to subsistence are also important. For example, NSRAA has a policy of providing fish to anyone in need. In addition, NSRAA provides fish for cultural events and regularly give fish to smaller, more remote communities with subsistence traditions.

Assessing the full scope and impact of NSRAA, DIPAC and SSRAA salmon on the region's sport fishing industry is beyond the scope of this brief report. However, the available data and anecdotal evidence suggest hatchery operations are an important element. According to ADF&G about 630 professionally guided boats made at least one salmon fishing trip during 2008 in Southeast Alaska. All told, over 122,000 anglers participated in Southeast sport fisheries during 2008. Fees from the sale of sport fishing licenses help fund agencies that manage Alaska's fisheries for continued sustainability.

NSRAA, DIPAC and SSRAA contribute considerably to the region's fishing derbies. For example, chinook from NSRAA's Medvejie hatchery account for about one-third of the chinook entered into the Sitka Salmon Derby. DIPAC contributed an average of 11 percent of the chinook harvest and 12 percent of the coho harvest in

Juneau's Golden North Salmon Derby from 2001 to 2007. DIPAC's contribution was even greater previously, accounting for up to 30 percent of the overall derby catch, until the event dates were shifted in 2005.

Charter and Other Sport Harvest of Hatchery Salmon in Southeast Alaska, 2001 - 2008



Source: NSRAA, DIPAC and SSRAA