

*Economic Impacts of  
Private Nonprofit Aquaculture Associations  
in Southeast Alaska*

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



Research-Based Consulting

Juneau  
Anchorage

*May 2010*

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# Table of Contents

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- Executive Summary ..... 1**
- Introduction and Methodology ..... 3**
  - Introduction ..... 3
  - Methodology ..... 3
  - Facilities and Operations ..... 4
- Economic Impacts of NSRAA, DIPAC and SSRAA ..... 6**
  - Commercial Harvesting Economic Impacts ..... 6
  - Seafood Processing and First Wholesale Value ..... 10
  - Tax Revenue from NSRAA, DIPAC and SSRAA Salmon ..... 11
  - Direct Impacts of Aquaculture Association Operations ..... 12
  - Charter, Sport, Personal Use, and Subsistence Fishery Contributions ..... 12

# Executive Summary

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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. Following are major findings about the combined impacts of these organizations.

## **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 \$233 million.
- In 2008, direct, indirect, and induced employment and payroll generated as a result of NSRAA, DIPAC, and SSRAA operations totaled 1,192 jobs and \$59 million in labor income. Direct employment is estimated at 821 with \$39 million in labor income in 2008, while economic multiplier impacts (indirect and induced) of the rearing, harvesting, and processing of hatchery-produced salmon added 371 jobs and \$19 million in labor income.

## **Commercial Ex-vessel Volume and Value**

- In common property fisheries from 2001 to 2008, the commercial fleet harvested 324 million pounds worth \$145 million in ex-vessel value of salmon produced by NSRAA, DIPAC, and SSRAA. Cost recovery efforts added 182 million pounds of salmon worth \$82 million.
- From 2001 to 2008, salmon reared by NSRAA, DIPAC, and SSRAA and harvested by commercial fishermen accounted for 31 percent of the volume and 24 percent of the ex-vessel value 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 (\$497 million) in first wholesale value for seafood processors. In 2008, seafood processors earned \$142 million in first wholesale value by processing hatchery-produced salmon.
- From 2001 to 2008, processors earned \$258 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 \$77 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 \$9.26 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 \$16.46 in gross processing revenues.
- In 2008, each \$1 of voluntary salmon enhancement tax paid by Southeast fishermen generated \$18.28 in ex-vessel value from common property fisheries and \$35.44 in gross processing revenues.

## **Community Revenue from Fisheries Business Tax**

- From 2001 to 2008, NSRAA, DIPAC, and SSRAA salmon generated \$6.8 million in fisheries business tax, which is split evenly between the state general fund (\$3.4 million) and the local governments (\$3.4 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

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## 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, provided the tax is 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), Alaska Department of Labor and Workforce Development (ADOLWD) and Alaska Department of Revenue (ADOR).

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 prior to 2008 are calculated using average annual prices per product form for Southeast Alaska processors, as published by ADOR. Wholesale values for 2008 are estimated by applying the ratio of ex-vessel values to first wholesale values from prior years to 2008 ex-vessel values.

Some first wholesale data is unavailable due to DOR confidentiality regulations. In these instances, McDowell Group used conservative estimates from a range of values. Therefore, wholesale values reported in this study should be considered minimum estimates.

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.

## **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 years.

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; 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 ("ikura"), which is in high demand in Japan and Eastern Europe.

# Economic Impacts of NSRAA, DIPAC and SSRAA

Between 2001 and 2008, NSRAA, DIPAC, and SSRAA contributed nearly 47 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 6.5 million fish to the commercial common property harvest, aquaculture association operations generated direct, indirect, and induced economic output worth \$233 million, employment of nearly 1,200, and income of just under \$60 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	\$61,000,000	468	\$36,600,000
Seafood Processing	\$139,300,000	545	\$15,000,000
Hatchery Operations	\$32,400,000	179	\$7,100,000
<b>Total</b>	<b>\$232,700,000</b>	<b>1,192</b>	<b>\$58,700,000</b>

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

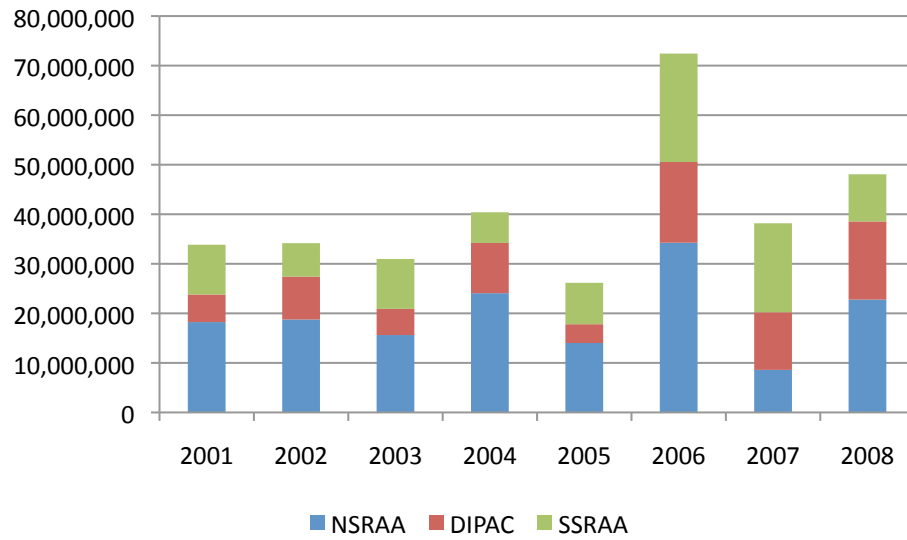
### Harvest Volume and Value

Southeast Alaska's three largest aquaculture associations produced 324 million pounds of salmon harvested by the commercial fleet in common property fisheries from 2001 to 2008. That resulted in \$145 million in ex-vessel value over those eight years. The three associations produced an annual average of more than 41 million pounds of salmon – worth \$18 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 24 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 28 percent from 2001 to 2008.

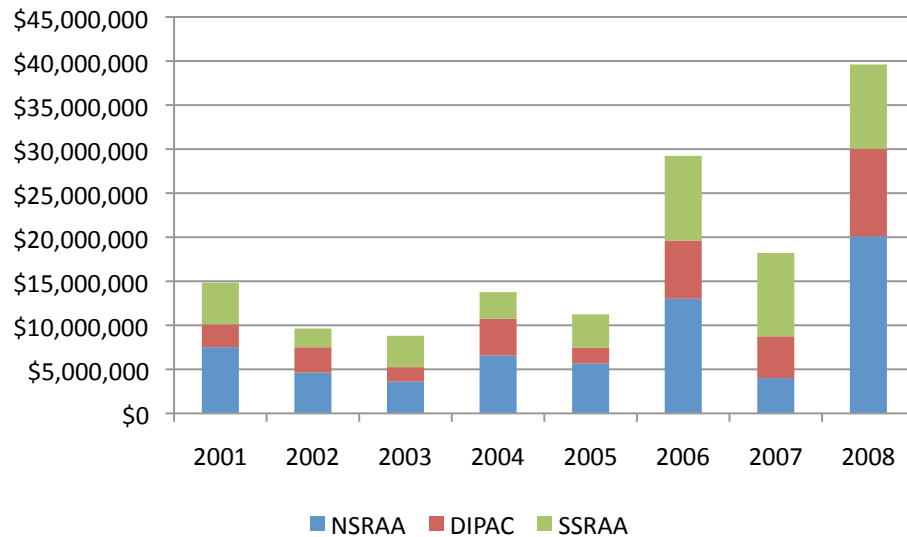
For the 2001-2008 period, NSRAA produced 45 percent of the ex-vessel value of the hatchery fish harvested by the commercial fleet, followed by SSRAA at 32 percent, and DIPAC at 24 percent. The ex-vessel value is the gross amount paid to fishermen for their catch.

**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 dollars)**

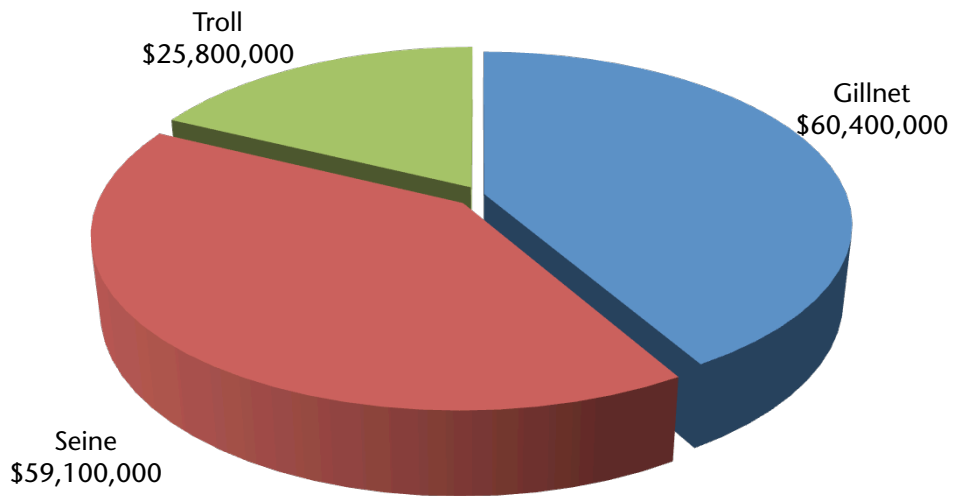


Source: NSRAA, DIPAC, and SSRAA.

## 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 more than \$64 million for the seine fleet (42 percent); more than \$60 million for gillnetters (40 percent); and almost \$26 million for trollers (17 percent).

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

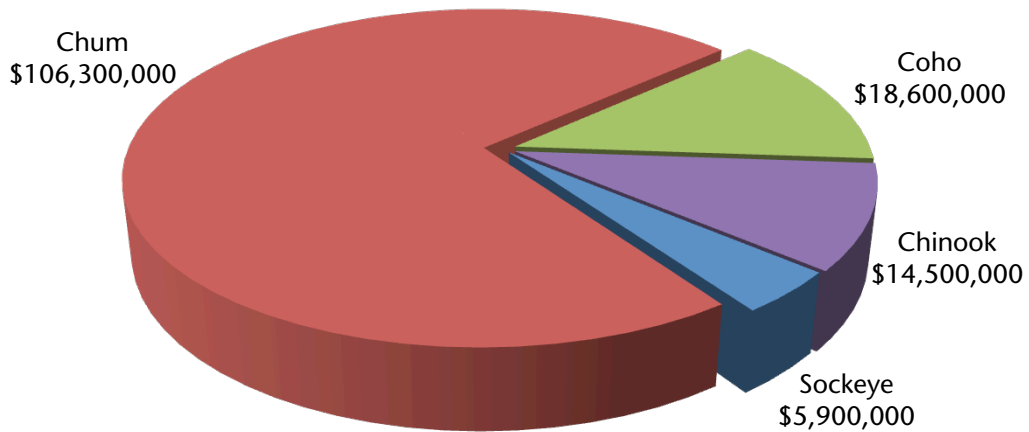


Source: NSRAA, DIPAC, and SSRAA.

## 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 91 percent of the volume of the common property harvest of NSRAA, DIPAC, and SSRAA fish. Coho accounted for 13 percent (\$18.6 million), chinook for 10 percent (\$14.5 million), and sockeye for 4 percent (\$5.9 million).

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

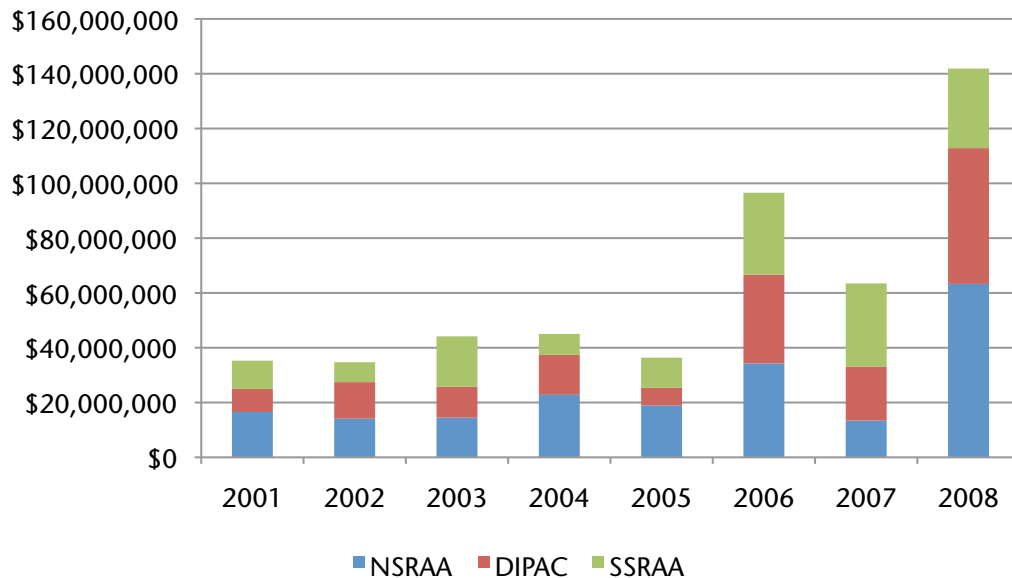


Source: NSRAA, DIPAC, and SSRAA.

## 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 (\$497 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 \$24.7 million for NSRAA, \$19.5 million for DIPAC, and \$18.0 million for SSRAA. In 2008, first wholesale value of NSRAA, DIPAC, and SSRAA salmon reached the record level of \$141 million.

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



Source: NSRAA, DIPAC, and SSRAA.

Chum accounted for 83 percent of the total combined first wholesale value, followed by coho at 12 percent, chinook at 4 percent, and sockeye at 3 percent. Chum roe, or ikura, makes up 43 percent of the hatchery chum harvest value.

From 2001 to 2008, after accounting for ex-vessel payments to fishermen, processors realized \$258 million in gross revenue.<sup>1</sup> The last three years of the study period yielded the highest gross revenue totals, with 2008 being the most lucrative year overall at \$77 million. During the entire study period, NSRAA salmon resulted in \$102 million in gross revenues, DIPAC salmon \$84 million, and SSRAA salmon \$72 million.

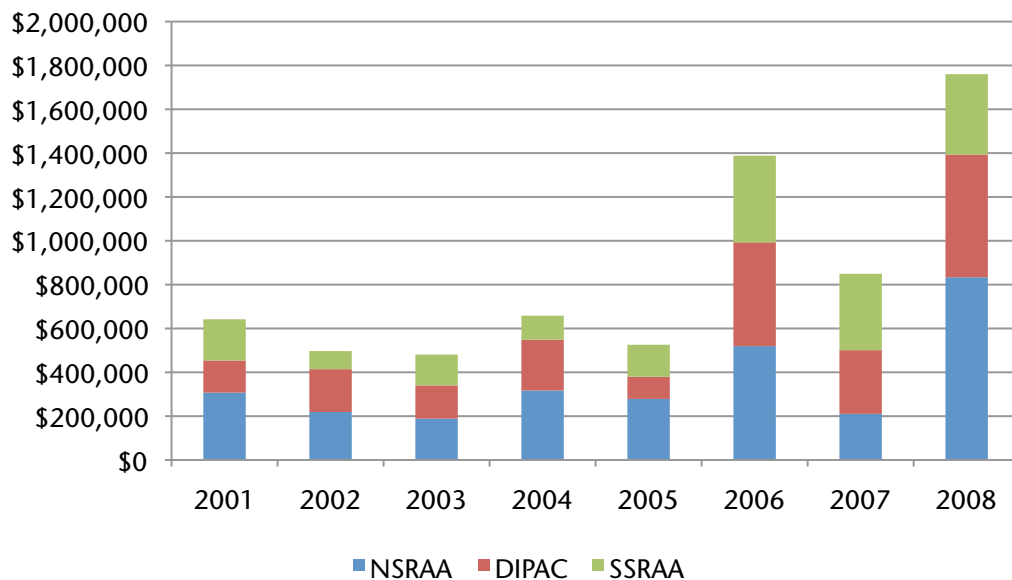
<sup>1</sup> Gross revenue is equal to the first wholesale value minus the ex-vessel value paid to fishermen for the raw fish.

## 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 \$6.8 million. One-half of this tax (\$3.4 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 – \$3.4 million – is retained by state government for general fund allocation. Fisheries business tax proceeds peaked in 2008 at \$1.8 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 \$15.7 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 \$145 million in ex-vessel harvest value to the common property fishery, a return of \$9.26 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 combined 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.

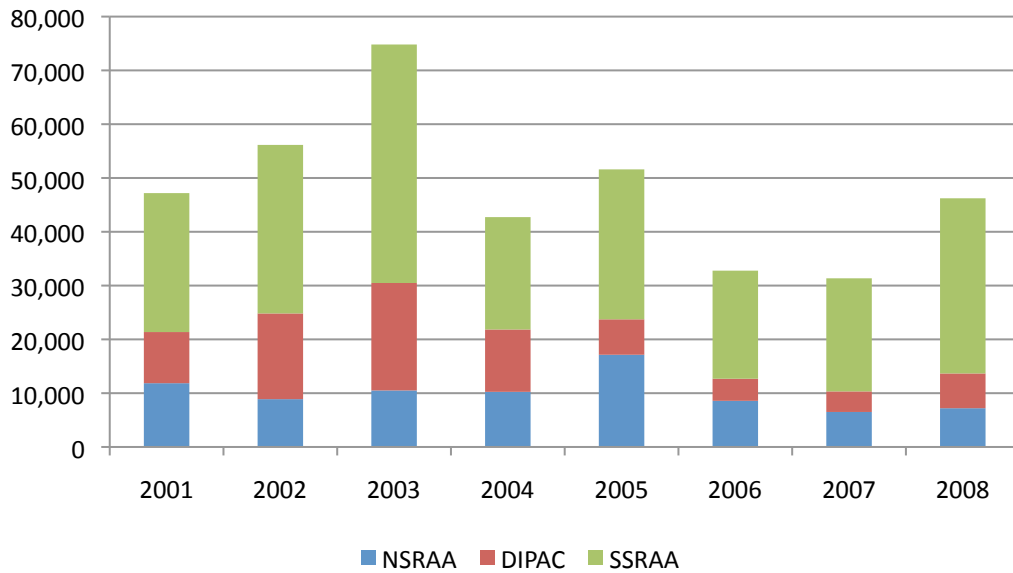
Contributions to subsistence are also important. For example, NSRAA has a policy of providing fish to anyone in need. In addition, NSRAA provides fish for cultural events and regularly give fish to smaller, more remote communities with subsistence traditions.

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.