October 2018

ECONOMIC IMPACT OF THE

Valdez Fisheries Development Association Inc.

VFDA

Prepared for
Valdez Fisheries Development Association Inc.

Prepared by
McDowell GROUP

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Summary of Key Findings

This report describes the economic impact of the Valdez Fisheries Development Association (VFDA) on the Alaska economy. VFDA is a nonprofit salmon hatchery located in Valdez. In addition to supporting significant commercial and sport harvest of salmon, the organization contributes to the development of Prince William Sound (PWS) fisheries through operation of a Fisheries Business Incubator. VFDA also processes and sells salmon products for retail and wholesale purchase. A summary of key findings are detailed below

Commercial Fishing

- VFDA salmon are harvested primarily by PWS seiners. Between 2012 and 2017, seiners harvested an annual average of 55 million pounds of VFDA-produced salmon worth $19 million annually. The VFDA-related salmon harvest had a cumulative six-year total volume of 329 million pounds worth $116 million.
- VFDA accounted for 33 percent of the total PWS seine common property harvest between 2012 and 2017. Over the six-year period seiners harvested an average of 166 million pounds of common property salmon, totaling 996 million pounds. This harvest had an annual average ex-vessel value of $58 million and total six-year value of $347 million.
- PWS seine permit holders earned an annual average of $265,000 over the 2012-2017 period. VFDA salmon accounted for about $88,000 per year for each permit holder, on average.
- The economic benefits of the PWS seine fisheries are broadly distributed. In 2017, 174 permit holders from 22 different Alaska communities harvested VFDA salmon.

Seafood Processing

- Over the 2012-2017 period, the first wholesale value of VFDA pink salmon — including both common property and cost recovery fish — averaged $63 million annually and totaled $375 million.
- VFDA salmon accounts for nearly a quarter (23 percent) of the total value of all seafood processed in PWS. Between 2012 and 2017, PWS processors sold an annual average of $272 million worth of seafood products, about $1.63 billion in the six-year period.
- According to Silver Bay Seafoods, large volumes of available VFDA-produced salmon is a primary factor underpinning its decision to invest more than $40 million into a new seafood processing plant in Valdez.
- VFDA salmon are processed into fresh, frozen, and canned salmon products, in addition to roe products.

Sport Harvest

- Salmon produced by VFDA are vital to Valdez-area sportfishing. Without VFDA salmon, the Valdez sportfishing sector would not be able to attract the annual influx of Alaska residents and non-residents who pursue coho and pink salmon on guided and unguided trips.
- More than 80 percent of all coho harvested in the Valdez Arm come from VFDA and nearly all pink salmon originated at the hatchery. Due to VFDA production, pink and coho salmon returns have increased significantly over the past decade.
- Valdez's annual salmon derbies rely on VFDA-produced salmon. These derbies attract participants from all over Alaska and the United States to harvest pink and coho salmon. The main Silver Salmon Derby sold more than 3,350 tickets in 2018. More than 500 individuals fished in a one-day women's event and more than 350 children participated in the Kid's Pink Salmon Derby.

- Many of the nearly 100,000 annual visitors (including residents and non-residents) to Valdez harvest salmon produced by VFDA. The opportunity to catch these fish is an important aspect in the quality of visitors' experience in Valdez, prompting visitors to return year-after-year.

Economic Impact

VFDA is credited with supporting an annual average of 760 jobs (including direct, indirect, and induced effects) between 2012 and 2017. VFDA's hatchery operations contributed 70 jobs to this total, along with employment in the seafood processing (345 jobs), commercial fishing (240 jobs), and sport fishing (100 jobs) sectors. Total labor income (wages and salaries) averaged nearly $34 million each year, including all multiplier effects. Total output of VFDA averaged $112 million annually, a 40 percent increase from a previous economic impact analysis of the organization. [1]

Table 1. Summary of Economic Impacts from VFDA, Annual Average 2012-2017

	Direct Impacts	Indirect and Induced Impacts	Total Impacts
Commercial Fishing			
Employment	165	75	240
Labor Income ($Million)	$11.0	$3.6	$14.5
Output ($Million)	$19.3	$12.5	$31.8
Seafood Processing			
Employment	200	145	345
Labor Income ($Million)	$7.9	$4.6	$12.6
Output ($Million)	$39.3	$26.9	$66.2
Sport Fishing			
Employment	75	25	100
Labor Income ($Million)	$2.8	$1.5	$4.3
Output ($Million)	$6.7	$2.3	$9.0
VFDA Operations			
Employment	40	30	70
Labor Income ($Million)	$1.5	$0.9	$2.5
Output ($Million)	$3.4	$1.5	$5.0
Total Impacts			
Employment	490	270	760
Labor Income ($Million)	$23.3	$10.7	$33.9
Output ($Million)	$72.2	$39.9	$112.0

Note: Figures have been rounded and may not add to total.
Source: McDowell Group estimates.

[1] Economic Impact of Valdez Fisheries Development Association, Prepared by McDowell Group, December 2013.

Purpose and Methodology

Valdez Fisheries Development Association, Inc. (VFDA) contracted with McDowell Group to quantify its economic impact on the Alaska economy. This report describes VFDA's impact throughout Alaska, including employment and wages in the commercial fishing, seafood processing, and sportfishing sectors. Additional indirect and induced (multiplier) effects are also considered. The study period for this report is 2012-2017.

Methodology

Data used and presented in this report come from a variety of sources, including VFDA, the Alaska Department of Fish and Game (ADF&G), Alaska Commercial Fisheries Entry Commission (CFEC), Alaska Department of Labor and Workforce Development (DOLWD), National Marine Fisheries Service (NMFS) and the Alaska Department of Revenue (DOR). Additionally, McDowell Group conducted interviews with key industry representatives.

McDowell Group used primary data, information from public sources, and a proprietary input-output model based on IMPLAN to estimate direct, indirect, and induced impacts of VFDA. Though IMPLAN is widely used for economic impact modeling in Alaska and elsewhere, it requires modification for analyses of some Alaska industries, including commercial fishing and seafood processing.

All photos in the report are from Franklyn Dunbar, Neil Gotschall, Jordan Nelson, the Alaska Seafood Marketing Institute, and McDowell Group.

Overview of VFDA Operations

VFDA is a non-profit organization incorporated in 1980 by a group of local residents. The organization's mission is to produce salmon for the benefit of all user groups and support development of local fisheries.

VFDA's board includes representatives of commercial fishing, sport fishing, and visitor industry sectors. The organization is not a regional aquaculture association and collects no tax revenues from local fishermen. VFDA's primary revenue source is sales of pink salmon to processors from cost recovery fisheries. To use all salmon returning to the hatchery, VFDA began processing and selling a portion of its annual cost recovery operations in 2000.

VFDA salmon are harvested primarily in the Valdez Arm by commercial seine vessels, sport anglers trolling from small vessels, and anglers fishing from shore.

Solomon Gulch Hatchery

The Solomon Gulch Hatchery was completed in 1982; VFDA's first release of smolt from the facility occurred the same year. The hatchery is located on Dayville Road south of Valdez.

ADF&G has permitted VFDA to collect and incubate 270 million pink salmon eggs, 2 million coho salmon eggs, and 300,000 Chinook eggs (the hatchery does not currently collect Chinook eggs). In 2017, VFDA released 242 million pink salmon smolt and 1.8 million coho smolt. In the same year, an estimated 14.7 million pink salmon from VFDA returned along with 72,000 coho salmon.

Between 2008 and 2017, the Solomon Gulch Hatchery supported returns of more than 160 million pink salmon and about a million coho salmon.

Salmon hatcheries require significant amounts of freshwater. VFDA receives discharge water from the nearby Solomon Gulch hydroelectric plant owned by the Copper Valley Electric Association. Water used by the hydroelectric plant comes from Solomon Lake which is not populated by salmon due to steep geography.

A portion of returning salmon come directly to the VFDA hatchery and are harvested in a raceway.

VFDA Fisheries Business Incubator

VFDA manages a small educational processing plant that was built in 2003 with funding from VFDA and a U.S. Department of Commerce Economic Development Administration grant. The primary goal of the facility is to assist direct marketers. Commercial fishermen can bring product to market without having to invest significant capital into their own facility.

The incubator can produce a wide variety of products including fresh, frozen, smoked, and cured seafood. The plant's processing equipment includes heading and gutting (H&G) equipment, fillet machines, a smoker, blast freezer, packaging equipment, and other items.

VFDA is the primary user of the facility, processing salmon for its Solomon Falls product line. Two direct marketers also currently use the facility to glaze and freeze spot prawns, among other periodic users.

Solomon Falls Seafood

VFDA produces smoked salmon and caviar products from surplus raceway coho and pink salmon at the Fisheries Business Incubator. These products have met with success. In 2009, VFDA's smoked pink salmon won the Symphony of Seafood Award for best smoked product. VFDA has developed techniques and markets for several value-added salmon products, including hot smoked coho, black pepper coho, teriyaki coho fillets, and ikura-style salmon caviar, among others. Solomon Falls products can be purchased online and in stores around Alaska.

VFDA Cold Storage Facility

VFDA maintains and operates a modular cold storage facility which can store about 300,000 pounds of product at temperatures to -10 degrees. Supported in part by funding from the U.S. Department of Commerce Economic Development Administration, the facility was completed in 2012.

The cold storage facility supplements the capacity and scope of VFDA's Fisheries Business Incubator. Space in the facility is leased by local businesses. Users include local seafood processors, non-profits, sportfish custom processors, shippers handling perishable packages, and local outfitters storing bait.

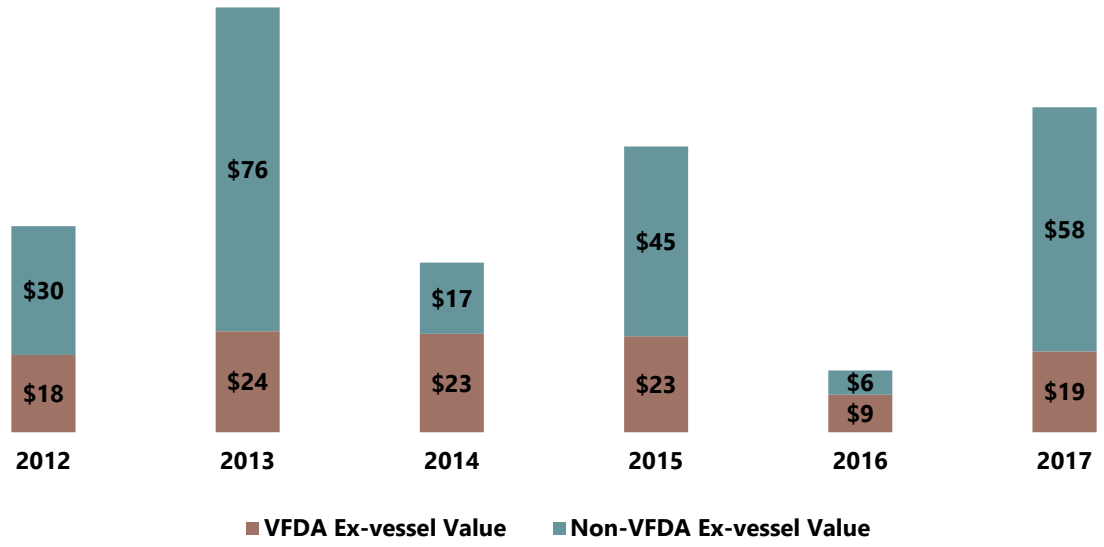
VFDA Administrative Offices

VFDA's administrative offices are located at 1815 Mineral Creek Loop Road in Valdez, in the same facility as the processing plant.

VFDA Salmon in Commercial Fisheries

VFDA salmon are harvested primarily by the Prince William Sound (PWS) seine fleet. Between 2012 and 2017, PWS seiners harvested 996 million pounds of common property salmon worth $347 million – an annual average of 166 million pounds worth $58 million. Of this total, VFDA salmon contributed an estimated $116 million in value or 33 percent of total earnings, averaging $19 million per year.

Figure 1. Value of Prince William Sound Common Property Salmon Harvest by Source ($Million), 2012-2017



Note: Non-VFDA sources include wild and hatchery salmon from Prince William Sound Aquaculture Association.
Source: ADF&G, McDowell Group estimates.

Throughout this period, the number of permits/vessels participating in the PWS seine fishery ranged from 210 in 2013 and 2016 to 230 in 2017, or between 79 and 86 percent of the 267 available permits. Participation has trended higher in recent years: in 2005, just 101 vessels participated.

A captain (often the permit holder) and three to four crew members work on the typical PWS seine vessel. The maximum length for a seine vessel in Alaska is 58 feet.

Earnings of PWS seine vessels totaled $1.6 million on average over the 2012-2017 period, or $265,000 annually. Harvest of VFDA salmon contributed 33 percent of this amount, totaling $529,000 over the period or about $88,000 per year.

PWS seine permit prices ranged from a high of $204,600 in 2014 to a low of $147,900 in 2016. Permit prices generally track the recent harvest value of the fishery, rising during or after a strong season and declining during or after a poor season.

Table 2. Prince William Seine Common Property Fishery, 2012-2017

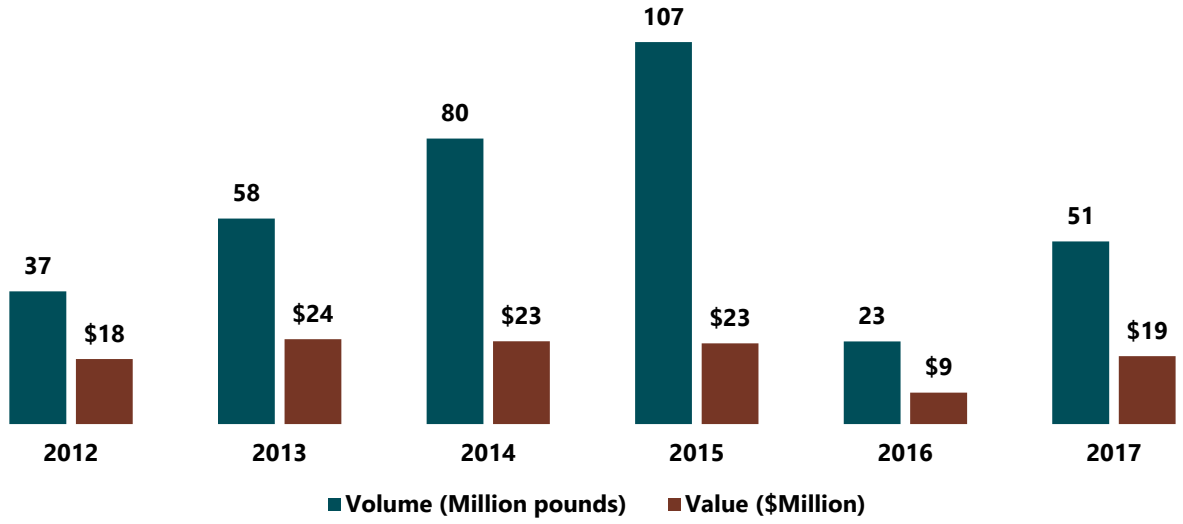
	2012	2013	2014	2015	2016	2017
Ex-vessel Value ($Million)	$48.6	$100.1	$40.0	$67.4	$14.5	$76.6
Ex-vessel Volume (millions of lbs.)	95.5	243.8	130.8	306.1	36.1	183.2
Permits Fished	224	210	222	216	210	230
Percent of Permits Fished	84%	79%	83%	81%	79%	86%
Average Earnings Per Permit	$216,742	$476,738	$179,982	$311,815	$69,272	$332,975
Percent of Ex-vessel Earnings from VFDA	38%	24%	58%	34%	61%	25%
Average Earnings per Permit from VFDA	$81,303	$113,281	$104,457	$104,723	$42,000	$82,744
Average Permit Prices	$168,700	$168,000	$204,600	$186,700	$147,900	$154,500

Note: Reflects data for S 01E fishery; 2017 data is preliminary.
Source ADF&G, CFEC, PWSAC, and McDowell Group estimates.

Commercial Harvest of VFDA Salmon

Between 2012 and 2017, an annual average of 59 million pounds of VFDA-produced pink and coho salmon were harvested in common property harvests. The largest annual return of VFDA salmon was 2015's 107-million-pound harvest; the most valuable harvest ($24 million) took place in 2013.

Figure 2. Ex-vessel Volume and Value of VFDA Common Property Harvest, 2012-2017



Source: ADF&G, McDowell Group estimates.

Pink Salmon

The PWS seine fleet is the sole gear type commercially targeting VFDA pink salmon. During the 2012-2017 period, 354 million pounds of VFDA-produced pink salmon were harvested in common property fisheries, worth $114 million. The annual VFDA pink salmon harvest averaged 59 million pounds worth $19 million. Seine-harvested pinks in PWS averaged 3.6 pounds over the study period; ex-vessel prices fluctuated between $0.20 and about $0.50 per pound.

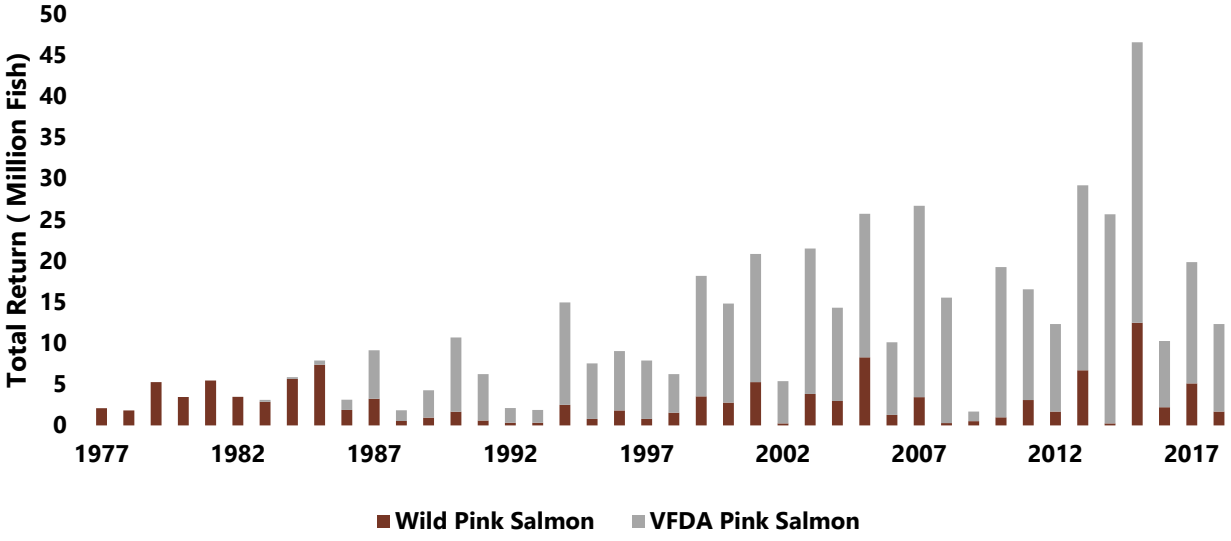
PWS typically produces about 40 percent of the annual Alaska pink salmon harvest. After PWS, Southeast usually produces about a third and Kodiak is the next largest contributor. Areas outside these three regions usually account for less than 10 percent of the annual pink production.

Alaska pink salmon have a two-year life-cycle with even-year populations and harvests generally smaller than those in odd years. This dynamic is observed statewide and is usually the case for VFDA pink salmon. However, the 2014 VFDA pink salmon harvest was about 17 percent larger than the prior, odd year.

VFDA hatchery operations have significantly increased the annual return of pink salmon to the Eastern District of PWS. Prior to VFDA production in the early 1980s, the annual return was generally less than 10 million fish; the 2008-2017 average return of pink salmon was nearly 18 million fish.

In 2015, more than 45 million pink salmon returned to the Eastern District, including a record-breaking 34 million VFDA salmon along with a record-breaking wild return of more than 12 million pinks.

Figure 3. Historical Pink Salmon Returns to PWS Eastern District, 1977-2017



Note: Data presented are best available information. Includes sport and commercial harvest, brood stock and other hatchery harvest, and stream escapements.
Source: ADF&G.

Coho Salmon

While VFDA produces coho primarily for sport harvest, a small commercial harvest occurs. Between 2012 and 2017, a cumulative total of 1.6 million pounds of VFDA-produced coho were harvested worth $1.6 million. The largest harvest occurred in 2013 when 1.2 million pounds of coho were harvested worth $1.2 million.

Geographic Distribution of Commercial Harvest

In 2017, 174 permit holders from 22 different Alaska communities harvested common property salmon worth $58 million in the PWS seine fishery. VFDA-sourced fish contributed about $19 million to this total, or 33 percent.

- Kenai Peninsula Borough residents harvested more than $22 million, including $7.4 million in VFDA salmon. Homer residents earned $16 million and Seward residents harvested $3.0 million worth of salmon. Ten permit holders from seven other Kenai Peninsula communities also generated earnings from the fishery.
- Residents of Cordova were the most active of any Alaska community, with 65 residents earning $18 million. Valdez residents earned $3.9 million. VFDA salmon harvested by residents of these two communities were valued at $7.3 million.
- Residents of the Municipality of Anchorage earned a total of $9.9 million, including an estimated $3.3 million from VFDA fish. Girdwood was represented by 10 residents who earned $6.2 million; nine Anchorage residents earned $2.4 million. Five residents of Chugiak and Eagle River also participated.

Table 3. Residency of PWS Salmon Seine Fleet with Ex-vessel Earnings, 2017

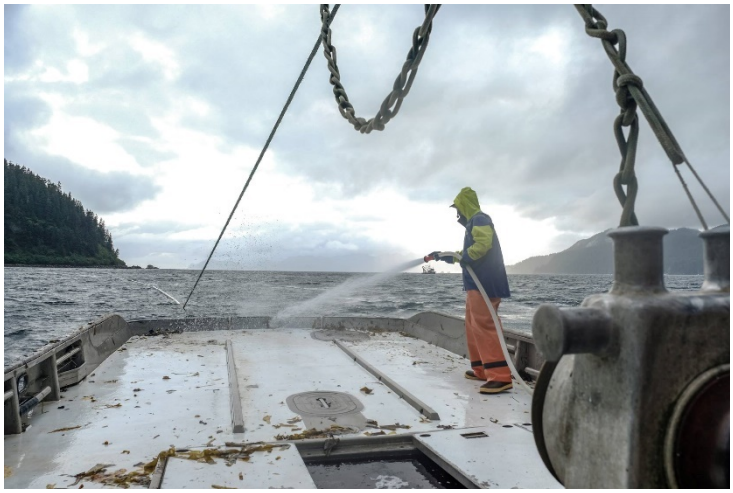
Location	Permits Fished	Total Common Property Earnings
Kenai Peninsula Borough	**55**	**$22,283,155**
Homer	36	$16,000,502
Seward	9	$2,960,571
Kasilof	3	-
Kenai	2	-
Anchor Point	1	-
Nikolaevsk	1	-
Ninilchik	1	-
Soldotna	1	-
Sterling	1	-
Valdez/Cordova Census Area	**78**	**$22,203,966**
Cordova	65	$18,310,197
Valdez	13	$3,893,769
Municipality of Anchorage	**24**	**$9,901,634**
Girdwood	10	$6,224,356
Anchorage	9	$2,394,606
Chugiak	3	-
Eagle River	2	-
Mat-Su	**5**	**$1,039,610**
Wasilla	4	-
Sutton	1	-
Other Alaska	**12**	**$1,964,499***
Kodiak	7	$1,964,499
Juneau	2	-
Dillingham	1	-
Hoonah	1	-
Petersburg	1	-
Alaska Resident Total	**174**	**$58,402,372**

*Subtotal excludes confidential values. (-) indicates values are withheld.
Note: Figures reflect S 01E PWS purse seine fishery.
Source: ADF&G.

- Five residents of the Matanuska-Susitna Borough earned slightly more than a million dollars.
- Residents from other Alaska communities generated earnings from the PWS seine fishery, including Kodiak (7 permit holders), Juneau (2), Dillingham (1), Hoonah (1), and Petersburg (1).

Residents of other states participate in the PWS seine fishery. Washington is home to the largest group of non-Alaska commercial fishermen: in 2017, 35 residents earned slightly more than $11 million. Nearly 20 residents from California, Oregon, and other states earned more than $5.0 million.

Fisheries Business Tax Revenue



VFDA salmon are subject to the State of Alaska Fisheries Business Tax — a 3.0 percent levy on the ex-vessel value of the fish. Half of revenue generated from this tax is retained by the State and the other half is shared with the community and/or borough where the salmon are landed.

Between 2012 and 2017, an estimated $3.5 million was generated from taxation of VFDA salmon. The state received $1.7 million and local government received an equal amount. Cordova, Valdez, and Whittier received most of the local component. VFDA salmon landed in Seward results in tax revenue to both the City of Seward and the Kenai Peninsula Borough.

Because Fisheries Business Tax revenue is based on ex-vessel value, tax receipts can fluctuate significantly year-to-year. VFDA-supported revenue totaled $678,000 in 2015; the following year it declined to $264,000 and rebounded to $570,000 in 2017.

Table 4. Estimated Fisheries Business Tax Revenue from VFDA Salmon by Component, 2012-2017

	2012	2013	2014	2015	2016	2017	Total	Average
State	$273,000	$357,000	$348,000	$339,000	$132,000	$285,000	$1,734,000	$289,000
Local	$273,000	$357,000	$348,000	$339,000	$132,000	$285,000	$1,734,000	$289,000
Total	**$546,000**	**$714,000**	**$696,000**	**$678,000**	**$264,000**	**$570,000**	**$3,468,000**	**$578,000**

Source: McDowell Group estimates based on ADF&G and DOR data and information.

VFDA Salmon in Seafood Processing

Salmon produced by VFDA and harvested commercially are processed into a variety of products. This processing activity adds significant value to VFDA salmon and supports additional employment and associated economic activity. Hatchery-produced salmon supplement wild-stock returns and helps stabilize the annual harvest. VFDA salmon are processed primarily in Valdez and Cordova; some volume is landed in Seward, Whittier, and other Alaska ports.

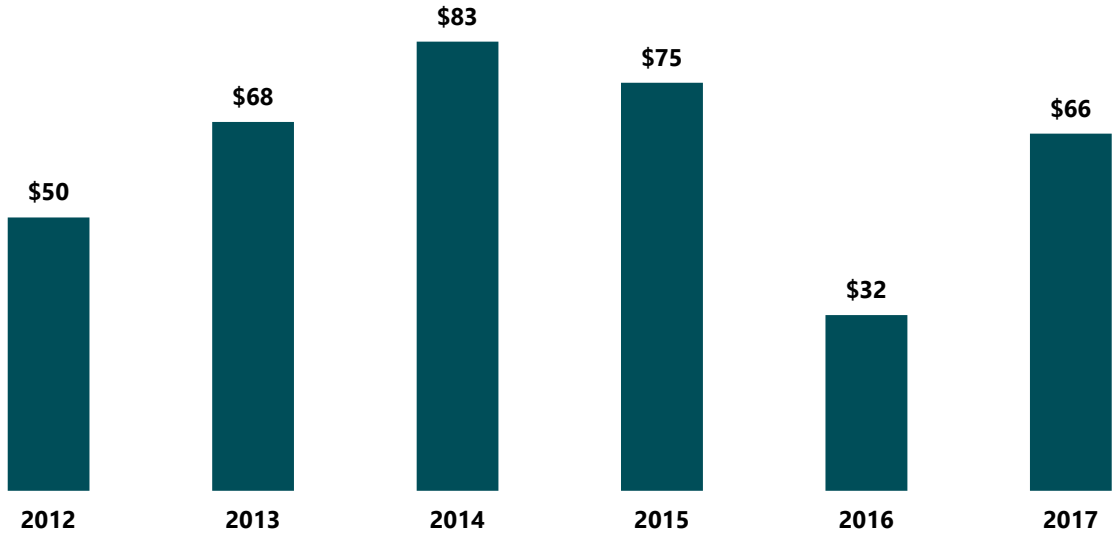
The primary product form for pink salmon is frozen headed and gutted (H&G), which is shipped out of Alaska to undergo additional reprocessing. A declining portion of pink salmon are canned. In 2012, about half of all Alaska pink salmon were canned; in 2017, this proportion had declined to about a quarter. Coho generally receive additional value-add processing such as filleting before being frozen for shipment. A material portion of Alaska's annual coho production goes to market in a fresh form.

Over the 2012-2017 period, the first wholesale value of VFDA pink salmon — including both common property and cost recovery fish — averaged $63 million annually and totaled $375 million. First wholesale value describes the value of seafood products after processing activity such as H&G, filleting, canning, or other processes. The highest value ($83 million) over this period was observed in 2014.

The first wholesale value of VFDA-produced coho totaled $5.9 million during this six-year period.

Another way to consider VFDA's contribution to the Alaska processing sector is to examine the gross margin provided by the organization's fish, or the value remaining after payment to fishermen. After paying harvesters $116 million for salmon, PWS processors earned an estimated gross margin of $265 million from VFDA salmon. This figure is not to be confused with profit margin as processors incur significant costs handling and producing salmon products.

Figure 4. First Wholesale Value of VFDA Pink Salmon Products ($Million), 2012-2017



Note: The cumulative first wholesale value of VFDA-produced coho products over this period was about $5.9 million. Figures include cost recovery volume. Values have been rounded.
Source: ADF&G, McDowell Group estimates.

Seafood Processing in Prince William Sound

PWS processors sold $1.63 billion worth of seafood products between 2012 and 2017. In addition to a relatively small amount of halibut, sablefish, Pacific cod, and other species, salmon was the largest component by far, contributing $1.58 billion or 97 percent of the total. VFDA-sourced salmon contributed an estimated 23 percent to the total PWS first wholesale valve over the study period.

Seward, Valdez, and Cordova have onshore private seafood processing facilities run by the following companies: Copper River Seafoods, Silver Bay Seafoods, Whittier Seafood, Ocean Beauty Seafoods, Peter Pan Seafoods, Prime Select Seafoods, Trident Seafoods, and Wild by Nature. These facilities produce fresh, frozen, and canned salmon products, in addition to roe products. Additionally, VFDA processes limited amounts of raceway surplus salmon for cost recovery, producing H&G and roe for its Solomon Falls label.

Due to the compressed season of salmon harvesting activity, most processing workers are seasonal. A significant number of these workers are not Alaska residents. However, local residents employed in the region's processing sector tend to be employed year-round and earn substantially more than seasonal workers.

Seafood processing plants also contribute to the property tax base in PWS communities. Silver Bay Seafoods and Peter Pan Seafoods are among the largest non-oil property tax payers in Valdez. Nearly $250,000 in Cordova property taxes were paid to the City of Cordova in 2018 by Trident Seafoods, Ocean Beauty Seafoods, and Copper River Seafoods.

Silver Bay Seafoods

VFDA salmon production contributed in-part to attracting Silver Bay Seafoods to PWS. In 2010, Silver Bay Seafoods purchased an aging seafood processing plant in Valdez. After significant investment in land, new buildings, and manufacturing machinery, the company now operates one of the most modern and capable seafood processing facilities in Alaska. The plant is valued at more than $40 million, can process 2.7 million pounds of salmon per day, and employs a peak workforce of 450 individuals. [2]

[2] Personal Communication, Tommy Sheridan, External Affairs Officer, Silver Bay Seafoods, 9/28/2018.

Salmon produced by VFDA are vital to Valdez-area sportfishing. Without VFDA salmon, the Valdez sportfishing sector would not attract the annual influx of Alaska residents and non-residents who pursue coho and pink salmon on guided and unguided trips.

VFDA's sportfish program is funded by sales of pink salmon (through cost recovery harvest) and operations grants from the City of Valdez.

Sport fishing activity in Valdez supports many seasonal and year-round businesses. These businesses include hotels, outfitters, charter operators, fishing gear retailers, and boat rental companies. They also include businesses that process, pack, and ship sport-caught fish. Visiting anglers also support local restaurants, gift shops, coffee shops, grocery stores, accommodations, and gas stations.

During the summer of 2016, 71,000 non-Alaska resident visitors traveled to Valdez, according to the Alaska Visitors Statistics Program (AVSP).[3] AVSP indicates about 15 percent of these travelers sport fished while in Valdez. Of these 10,650 non-resident anglers, about half report engaging in a guided trip. Other research conducted by McDowell Group estimates that about 26,500 Alaska residents traveled to Valdez in the summer of 2016.[4] About two-thirds of these Alaska residents reported sport fishing; most did not use a guide.

North Gulf Coast/PWS Sport Salmon Fishery

Between 2012 and 2016 (data are not yet available for 2017), sport fishermen harvested an annual average of 123,000 coho and pink salmon in the North Gulf Coast/PWS (NGC/PWS) region which included Seward, Whittier, Valdez, Cordova, and other communities. The average annual coho harvest of 104,000 coho was the largest component; 18,000 pink salmon were harvested annually.

Table 5. Sport-caught Harvest in North Gulf Coast/PWS, 2012-2016

	Coho	Pink	Combined Total
2012	63,000	21,000	84,000
2013	157,000	15,000	172,000
2014	97,000	15,000	113,000
2015	164,000	22,000	186,000
2016	41,000	17,000	58,000
Annual Average	**104,000**	**18,000**	**123,000**
Total	**522,000**	**91,000**	**613,000**

Note: Values have been rounded and may not add to total.
Source: ADF&G.

[3] Alaska Visitor Statistics Program 7, prepared by McDowell Group for Alaska Department of Commerce, Community, & Economic Development, 2017; http://www.alaskatia.org/marketing/alaska-visitors-statistics-program-avsp-vii
[4] Valdez Visitor Market Profile, prepared for the City of Valdez by McDowell Group, 2017.

Salmon harvested in the NGC/PWS region include both hatchery and wild salmon. Between 2012 and 2016, it is estimated that VFDA salmon accounted for about one-in-four coho harvested in the region and nearly nine-of-ten pink salmon.

For sport fishermen harvesting fish in the Valdez Arm, including shoreside at Allison Point or in the City of Valdez and trolling in the area, VFDA salmon is the primary source of salmon.

Between 2012 and 2016, an annual average of 28,000 coho were caught within or near the Valdez Arm.[5] Assuming nearly all VFDA coho are harvested in the same area, more than 80 percent of these coho came from VFDA. Similarly, it is assumed that VFDA is the source for nearly all pink salmon harvested in this area.

Sport Harvest of VFDA Salmon

Over the 2012-2017 period, anglers harvested 240,500 coho and pink salmon produced by VFDA, or about 40,100 fish annually. Nearly all VFDA salmon harvested by the sportfishing sector occurs in the Valdez Arm.

Coho are the largest component of the annual VFDA-supported sport harvest. Over the study period, an annual average of 24,600 were harvested, or 147,700 total fish. Even-year returns in 2012, 2014, and 2016 were significantly below the long-term average.

Compared to other salmon species, coho are one of the largest, often weighing 8-12 pounds. VFDA pink salmon harvested by anglers totaled 92,800 fish between 2012 and 2017, or 15,500 fish annually. Pink salmon is the smallest salmon species, averaging about four pounds per salmon.

Table 6. Sport-caught VFDA Salmon, 2012-2017

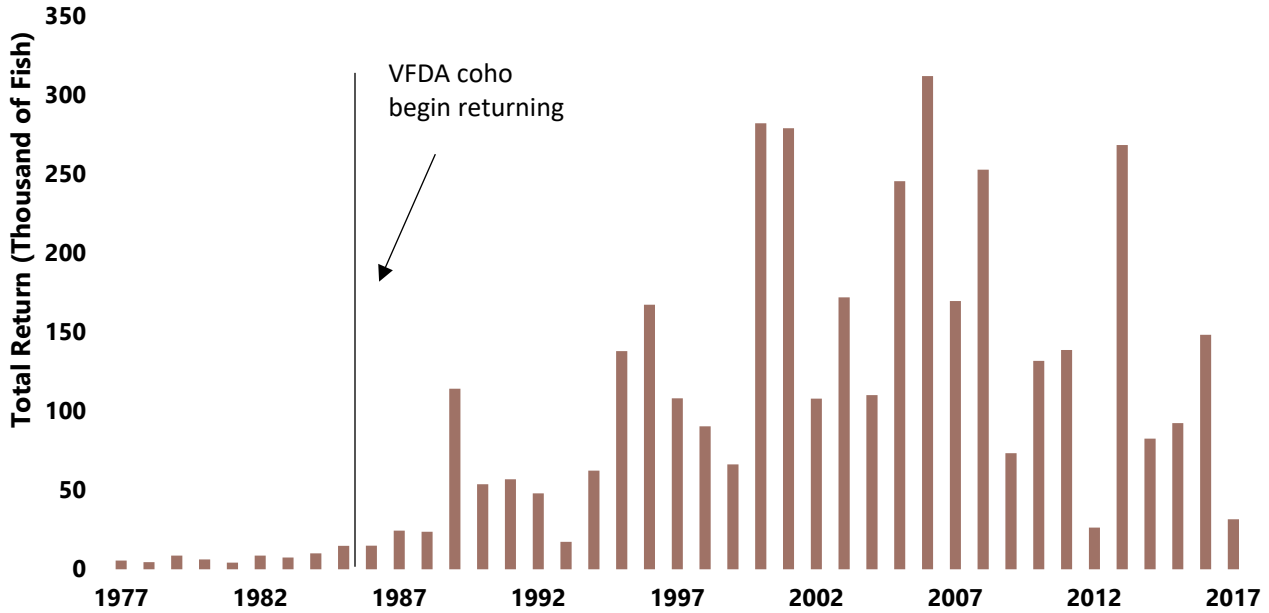
	Coho	Pink	Combined Total
Annual Average	24,600	15,500	40,100
Cumulative Total	147,700	92,800	240,500

Source: ADF&G.

[5] Alaska Sport Fishing Survey, Alaska department of Fish & Game, http://www.adfg.alaska.gov/sf/sportfishingsurvey/index.cfm?ADFG=area.home.

Prior to VFDA supplementing PWS wild coho production with hatchery fish, few returned to the area. While total coho returns totaled less than 10,000 fish before VFDA began releasing coho in the early 1980s, recent returns have regularly exceeded 100,000 fish.

Figure 5.Historical Coho Salmon Returns to PWS Eastern District, 1977-2017



Note: Data presented are best available information. Comprehensive data on coho returns to the Eastern District are not available. Includes sport and commercial harvest, brood stock and other hatchery harvest, and stream escapements
Source: ADF&G.

Charter Fleet Harvest of VFDA Salmon

Charter fishing is an important part of the Valdez visitor industry and VFDA is a key source of fish harvested by the fleet. In 2014 (the most recent data available), 27 charter businesses operated 31 vessels out of Valdez. These vessels made 732 trips with 4,060 anglers. Valdez charter fishing operators generally charge approximately $190-225 per client for a half-day (4-hour) trip, and $250-$400 for a full-day trip. Pricing does not include purchase of a fishing license, tips, or other charges. In addition to salmon, Valdez charter vessels target halibut, ling cod, and rockfish.

Limited and sporadic data prevent a robust understanding of the number of salmon harvested by charter boat vessels. In 2011, ADF&G logbook data show 10,850 coho were landed on charter vessels in Valdez.[6] The most recent data from 2014 show less than 1,000 coho were landed. However, Valdez charter operators report that there can be significant year-to-year variation for coho harvest. Additionally, operators report coho salmon — as a component of their business — has maintained its importance over the years. Some operators indicate the importance of salmon has increased as restrictions limit halibut harvest.

[6] Participation, Effort, and Harvest in the Sport Fish Business/Guide Licensing and Logbook Programs, 2014; Alaska Fish & Game; http://www.adfg.alaska.gov/FedAidPDFs/FDS16-02.pdf

Non-Alaska residents typically are the most valuable customer of the Valdez charter fishing fleet. In 2014, 55 percent of angler days for the fleet were credited to non-Alaska residents.

An estimated $1.8 million was spent annually to fish for salmon (primarily coho) from charter vessels in Valdez. This amount was spent primarily with charter operators, but also includes expenditures on meals, tips, gear, and other supplies. VFDA coho is credited with supporting 80 percent ($1.4 million) of this spending.

Valdez Salmon Derbies

After the VFDA hatchery was opened in 1982 and large numbers of salmon started returning to the waters around Valdez, city leaders saw an opportunity to market Valdez as a destination for world-class sport fishing.

Three salmon derbies are held annually in Valdez: the Silver Salmon Derby, the Kid's Pink Salmon Derby, and Women's Silver Salmon Derby. Anglers compete to catch the largest fish and prizes are awarded for catching the heaviest silver (coho) or pink salmon. Thousands of Alaskans and non-Alaska residents participate annually in these derbies.

The Valdez Silver Salmon Derby has occurred annually since 1952 and typically runs from late July to early September. In 2018, 3,355 tickets and 523 season passes were sold for the derby. Derby tickets are sold for $10 per day or $50 for the season per species. First prize was $10,000, with thousands of dollars in additional daily and other prizes awarded during the tournament.

The all-women, one-day Women's Silver Salmon Derby was added in 2005 and happens annually in August. In 2018, 501 women participated from all over Alaska and the nation—the winner was from Utah.

A Kids' Pink Salmon Derby was launched in 2008. It's a free one-day tournament for children ages 5 through 16. More than 350 kids participated in 2018.

The VFDA hatchery provides most of the salmon caught in these derbies and therefore, accounts for much of the economic activity generated by the derbies.

Shoreside harvest of VFDA Salmon

Many residents and non-residents come to Valdez to fish coho and pink salmon from the shore, including Allison Point and nearby shoreline, from the City Dock, and even at the harbor. The availability of salmon from VFDA helps maintain Valdez as a multi-activity destination for both Alaskans and other travelers. Anecdotal sources indicate these anglers spend money in Valdez with the visitor and hospitality industry, outfitters, and other businesses. Many shoreside anglers traveling to Valdez come each year; some bring motor homes for extended vacations in the area.

Economic Impact

VFDA has a broad economic impact in Alaska and the PWS region, supporting employment and wages in the commercial fishing, processing, and sport fishing sectors. Additional economic activity is supported when employees from these sectors, as well as businesses that supply VFDA, circulate money in the Alaska economy.

Many individuals and businesses are impacted by economic activity generated and supported by VFDA. For example, the mechanic hired to fix a commercial fishing vessel that harvests VFDA salmon is supported indirectly by VFDA. The city worker paid in part by tax revenue generated when VFDA salmon are landed in Valdez owes a portion of her employment to VFDA, and the waiter who serves breakfast to anglers on their way to catch VFDA salmon can be economically connected to the organization.

The economic impact estimates reported below reflect the total amount of employment and labor income related to VFDA — summing up direct impacts as well as indirect and induced jobs and labor income. It is important to note that the total number of workers earning some part of their income from VFDA salmon is far larger than the annualized employment figures shown in this section. Employment figures in this section are presented in fulltime equivalent (FTE) terms.

Commercial Fishing

Between 2012 and 2017, commercial fishermen generated average gross revenues (ex-vessel income) of $19 million per year harvesting VFDA salmon in common property fisheries. Labor income (gross revenues less expenses) for permit holders and crew derived from harvesting VFDA salmon is estimated to be $11.0 million per year. VFDA salmon directly generated the annual equivalent of 165 commercial fishing jobs for permit holders and crew, on average, per year during the six-year study period. Income earned from harvest of VFDA salmon was earned predominantly by Alaska residents living in Prince William Sound, the Kenai Peninsula, or the Anchorage/Mat-Su area.

In addition to this direct employment, an annual average of 75 jobs in the support sector are dependent on VFDA salmon. These jobs accounted for $3.6 million in annual wages.

Combining direct and indirect impacts, the harvest of VFDA salmon supported an annual average of 240 jobs with $14.5 million in wages between 2012 and 2017.

Table 7. Economic Impact on Alaska's Economy from Harvesting VFDA Salmon, Annual Average 2012-2017

	Direct	Indirect and Induced	Total
Employment	165	75	240
Wages ($Million)	$11.0	$3.6	$14.5

Note: Figures have been rounded.
Source: McDowell Group estimates.

Economic Impact from Processing VFDA Salmon

Between 2012 and 2017, regional processors earned estimated average gross margins of $44 million per year from the sale of VFDA salmon. For the purposes of this study, gross margin is equal to sales revenue (payments received for selling processed fish) less the cost of that fish (payments to fishermen for their catch or hatcheries for cost recovery fish).

Over the study period, processing of VFDA salmon helped directly accounted for 200 annual-average jobs with total wages of $7.9 million per year. Additional impacts occur when these wages are spent locally, and as processors purchase goods and services locally. These multiplier effects total an additional 145 jobs and $4.6 million in wages.

Combined, processing of VFDA salmon supported a total of 345 jobs with $12.6 million in annual wages.

Table 8. Economic Impact on Alaska's Economy from Processing VFDA Salmon, Annual Average 2012-2017

	Direct	Indirect and Induced	Total
Employment	200	145	345
Wages ($Million)	$7.9	$4.6	$12.6

Note: Figures have been rounded.
Source: McDowell Group estimates.

Economic Impact from Non-Resident Sport Fishing

Both quantitative and qualitative information show that VFDA supports significant sportfishing activity in Valdez. Of the nearly 100,000 Alaska resident and non-resident visitors to Valdez each year, about one-in-four go sport fishing; many of these anglers end up catching salmon from VFDA.

The total amount of sport fishing-related spending in Valdez is unknown; however, a reasonable estimate would place total spending by non-resident sport anglers at approximately $10 million. This includes spending on charters, lodging, fishing gear, food, fuel and other miscellaneous expenditures. VFDA is conservatively credited with about two-thirds of this spending activity as the organization provides significant amounts of fish harvested by these anglers.

Based on McDowell Group modeling, this spending supports approximately 100 jobs and $4.3 million in labor income annually, including direct, indirect and induced effects.

Table 9. Economic Impact on Alaska's Economy from Sport Harvest of VFDA Salmon, Annual Average 2012-2017

	Direct	Indirect and Induced	Total
Employment	75	25	100
Wages ($Million)	$2.8	$1.5	$4.3

Note: figures have been rounded.
Source: McDowell Group estimates.

Economic Impact of VFDA Business Operations

Significant economic impact is supported by VFDA operations. Each year, the organization employs about 50 people, spends millions of dollars on goods and services in Alaska communities, and periodically invests in large capital projects. Over three-quarters of VFDA's budget is spent within the state of Alaska and the majority of that spending occurs within Valdez and Anchorage.

In a typical year, VFDA employs a core group of about 19 year-round employees. During the summer months, up to 40 additional seasonal workers are hired. Jobs at VFDA include hatchery staff, maintenance workers, administration personnel, and seafood processing workers.

In 2017, VFDA's spending in Alaska totaled about $3.4 million, including about $1.9 million in spending with Alaska organizations and $1.5 million in wages to Alaska residents. VFDA purchases a wide variety of supplies and services from organizations located in Valdez, Anchorage, and other Alaska communities. In a typical year, wages and salaries, medical insurance, fish food, and utilities are among VFDA's largest expenses. Other operating expenses include packaging, fuel, insurance, and maintenance. Alaska resident VFDA employees live primarily in Valdez.

Over the study period, VFDA accounted for an annualized average of 40 jobs with wages of about $1.54 million. Indirect and induced employment associated with VFDA totaled 30 additional workers with wages of $0.93 million — the result of VFDA employees and suppliers of goods and services to the hatchery circulating money in the Alaska economy.

In sum (including direct, indirect, and induced impacts), VFDA operations supported an annual average of 70 jobs with total annual wages of about $2.5 million.

Table 10. Economic Impact on Alaska's Economy VFDA Operations, Annual Average 2012-2017

	Direct	Indirect and Induced	Total
Employment	40	30	70
Wages ($Million)	$1.5	$0.9	$2.5

Note: Figures have been rounded.
Source: McDowell Group estimates.

Summary of VFDA Economic Impacts

Between 2012 and 2017, VFDA hatchery operations supported the annual equivalent of 760 jobs with $33.9 million in annual labor income. VFDA directly supported 490 jobs with $23.3 million in labor income. Additional indirect and induced (multiplier effects) employment of 270 workers and $10.7 million in labor income also resulted from VFDA activities and production. Total economic output, including direct, indirect, and induced effects, averaged $112 million annually.

While the figures represented in these estimates include jobs located around the state, most of these impacts are concentrated in Valdez, Cordova, Anchorage, Homer, and Seward.

Table 11. Summary of Economic Impacts from VFDA, Annual Average 2012-2017

	Direct	Indirect and Induced	Total
Commercial Fishing			
Employment	165	75	240
Labor Income ($Million)	$11.0	$3.6	$14.5
Output ($Million)	$19.3	$12.5	$31.8
Seafood Processing			
Employment	200	145	345
Labor Income ($Million)	$7.9	$4.6	$12.6
Output ($Million)	$39.3	$26.9	$66.2
Sport Fishing			
Employment	75	25	100
Labor Income ($Million)	$2.8	$1.5	$4.3
Output ($Million)	$6.7	$2.3	$9.0
VFDA Operations			
Employment	40	30	70
Labor Income ($Million)	$1.5	$0.9	$2.5
Output ($Million)	$3.4	$1.5	$5.0
Total Impacts			
Employment	490	270	760
Labor Income ($Million)	$23.3	$10.7	$33.9
Output ($Million)	$72.2	$39.9	$112.0

Note: Figures have been rounded.
Source: McDowell Group estimates.

Salmon Market Summary

A primary source of funding for VFDA are cost recovery sales of pink salmon. This market summary focuses on historical trends for Alaska pink salmon values and factors impacting these values for both fishermen and processors. A brief overview of smoked salmon trends is also included.

Trends in Pink Salmon Markets

Myriad issues impact pink salmon markets including key factors described below.

Russian Supply of Pink Salmon

Russia is the world's largest producer of pink salmon with an annual average harvest of 570 million pounds between 2008 and 2012, including 937 million pounds in 2009.[7] Russia government press releases indicate a record-breaking 1.4 billion pounds of salmon have been harvested in 2018 — with pink salmon accounting for much of the volume, in addition to chum salmon. The Unites States (primarily Alaska) is the second largest producer of pink salmon, followed by Canada and Japan.

Because Russia supplies such a large proportion of pink salmon to the world market, a weak or strong harvest in the country can impact values for Alaska and PWS pink salmon.

Growth in World Population and Wealth

World population is expected to grow to 8.6 billion by 2030 and 9.8 billion by 2050.[8] As population and per capita wealth increases, so too will the demand for protein, including salmon.

Asian countries (China in particular) are expected to contribute heavily to future seafood demand. A presentation on the future of aquaculture given by Rabobank (a Dutch financial services company) states (referring to Asia), "The most rapidly expanding middle class in the world also has the highest preference for seafood consumption."[9]

In a scenario of slowly increasing demand for food, Alaska pink salmon is well positioned as an affordable high-quality source of protein.

Aquaculture

Researchers at the World Bank and United Nations have forecasted an expansion of global aquaculture production in the coming decades. The volume of seafood (including all species) produced from the global

[7] NPAFC Catch Statistics: North Pacific Anadromous Fish Commission (NPAFC). 2018. NPAFC Pacific salmonid catch statistics (updated 31 July 2018). North Pacific Anadromous Fish Commission, Accessed 9/26/2018.
[8] https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html
[9] http://2018.intrafishevents.com/sif_may_2016/pres/3_KEYNOTE-RABOBANK.pdf

aquaculture industry is projected to roughly double by 2030. [10] Over the same period, volume from wild capture fisheries is anticipated to increase slightly.

There is evidence these projections may be accurate. The U.S. Department of Commerce's strategic plan includes increased aquaculture production as a strategic objective. Their Strategic Plan for 2018 to 2022 states:

> "Aquaculture is the fastest growing form of food production in the world. Marine aquaculture in the United States contributes to seafood supply, supports commercial fisheries, and has great growth potential. We will help it grow faster by reducing regulatory burden and driving aquaculture research. A strong U.S. marine aquaculture industry will serve a key role in U.S. food security and improve our trade balance with other nations. [11]

Concurrently, interest surrounding land-based farming of salmon is increasing. Atlantic Sapphire, an aquaculture company, is building a facility in Florida with a planned annual production capacity of nearly 200 million pounds of Atlantic salmon.[12] Another land-based salmon-producing facility is in the planning phase.[13] Owned by Nordic Aquafarms, trade press is reporting the facility will have annual production of about 60 million pounds.[14]

Wild-harvest pink salmon are typically priced less on world markets than farmed Atlantic salmon. While most pink salmon are frozen or canned, farmed salmon is often able to serve a fresh market. Although the two species are not often directly competing, significant increases in farmed salmon production (accompanied by a reduction in farmed salmon prices) would likely contribute to lower pink salmon prices. However, pink salmon could benefit from its position as a low-cost alternative, especially for consumers with a preference for wild fish over farmed fish.

Trade Disruptions

Ongoing trade disputes between the U.S. and China (and other countries) have the potential to disrupt established supply chains or markets for Alaska pink salmon.

In 2017, nearly 220 million pounds of Alaska pink salmon worth $290 million was exported to countries around the world.[15] China is the largest trading partner for pink salmon, accounting for about 135 million pounds of exports worth more than $170 million in the same year. Most pink salmon exported from Alaska to China is reprocessed and re-exported.

In summer 2018 China enacted additional import tariffs on domestic seafood from the United States, including pink salmon originating in Alaska. However, U.S. product brought into China for purposes of reprocessing and reexport are currently excluded from additional tariffs.

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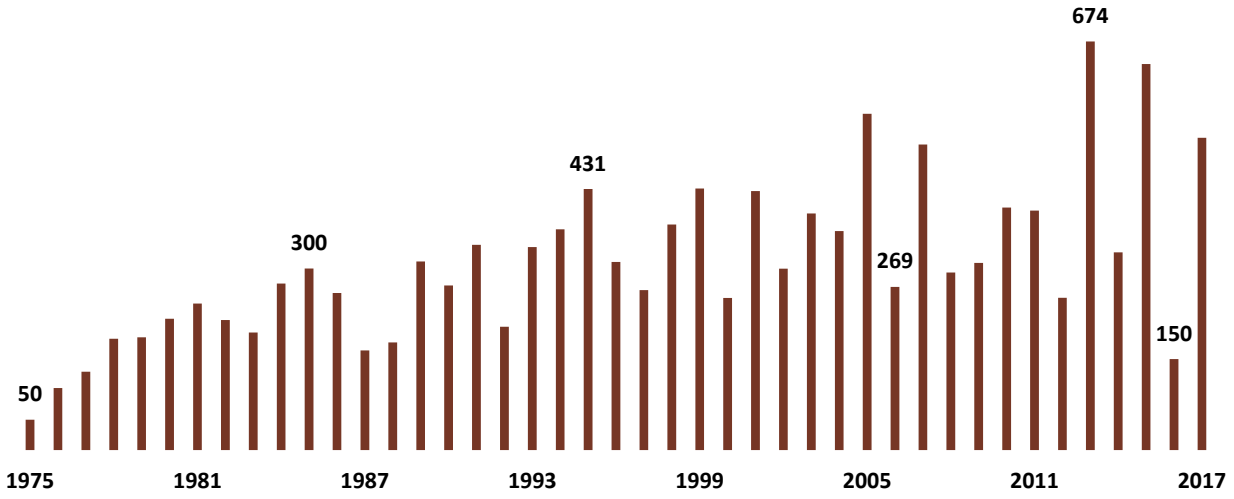
[10] http://www.fao.org/docrep/019/i3640e/i3640e.pdf
[11] https://www.commerce.gov/sites/commerce.gov/files/us_department_of_commerce_2018-2022_strategic_plan.pdf
[12] http://atlanticsapphire.com/about-us
[13] https://www.cityofbelfast.org/DocumentCenter/View/2138
[14] https://www.undercurrentnews.com/2018/02/22/us-aquaculture-industry-still-buzzing-about-nordics-maine-salmon-farm/
[15] McDowell Group estimate based on NMFS trade data.

Historical Alaska Pink Salmon Production

The Alaska pink salmon harvest is increasing, along with its volatility. Between 1975 and 2007, the annual harvest of pink salmon averaged 284 million pounds. This averaged increased to 395 million pounds between 2008 and 2017, including the record-breaking harvest of 674 million pounds in 2013.

Figure 6. Alaska Commercial Pink Salmon Harvest Volume (Million Pounds), 1975-2017



Source: ADF&G.

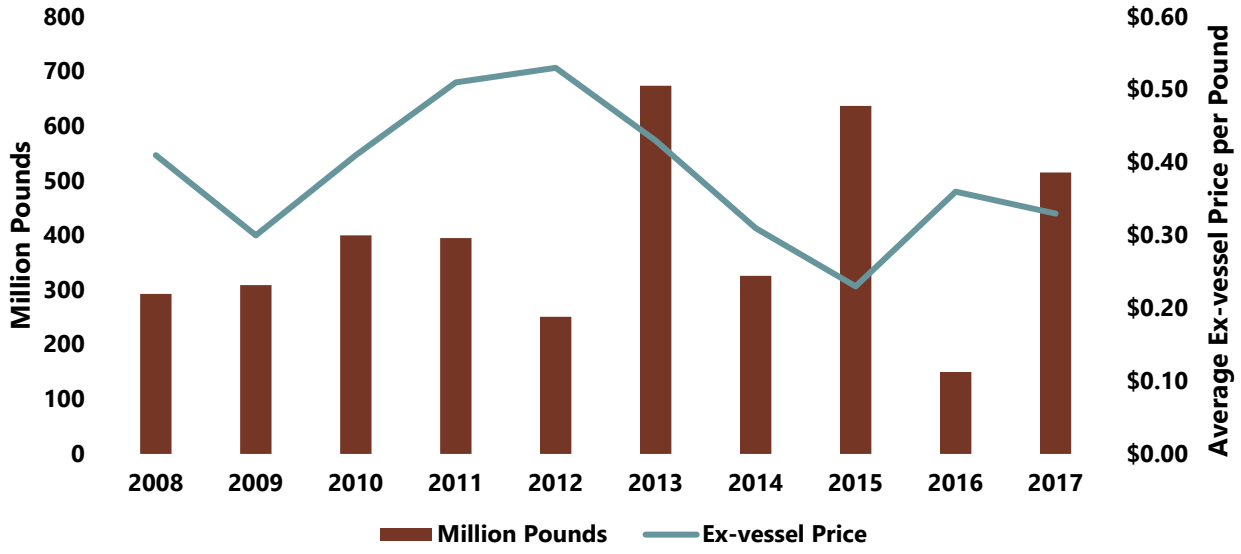
Pink salmon harvests are larger in odd-years because of the species' two-year life cycle. Due to the strength of odd year harvests, the year to year difference has increased compared to historical averages. Between 1977 and 2007, odd year harvests were 27 percent larger than the previous even year. This percentage has expanded to 102 percent over the last decade (2008-2017) due primarily to record setting runs in 2013, 2015, and 2017.

The overall increase in supply of Alaska pink salmon has benefited harvesters and processors alike, but significant variation year-to-year makes planning difficult for both sectors. Harvesters need to be diligent in saving during large years to offset weak years. For processors, it can be difficult balancing capacity for large years with having that capacity sitting unused in low-volume years.

Harvest volume and ex-vessel prices over the last decade were connected, but loosely. In a strict supply and demand model, increased supply would cause prices to decline and vice versa. This was not the case in 2009 and 2010 when prices rose along with volume. However, record harvests in 2013 likely depressed prices in 2014 and possibly 2015.

(*see figure on following page)*

Figure 7. Alaska Commercial Pink Salmon Harvest Volume and Value, 2008-2017



Note: Prices are adjusted for inflation.
Source: ADF&G.

Pink Salmon First Wholesale Product Values

Between 2008 and 2017, the price of all pink salmon products averaged $1.86 per pound in real first wholesale value. A peak of $2.41 per pound was observed in 2012, when a relatively small harvest (and other market factors) supported a high price. The lowest average first wholesale price of $1.37 per pound was observed in 2015 which saw the second-largest pink salmon harvest on record.

The largest annual first wholesale volume and value observed during this ten-year period was in 2013 when Alaska processors produced 446 million pounds of pink salmon products worth $834 million. Production in 2016 was the lowest of this period, measured by value and volume.

Table 12. First Wholesale Volume and Value of Alaska Pink Salmon, 2008-2017

Year	Value ($Million)	Volume (Million Pounds)	Average Price per Pound
2008	$369	174	$2.12
2009	$319	183	$1.75
2010	$519	260	$2.00
2011	$521	261	$1.99
2012	$400	166	$2.41
2013	$834	446	$1.87
2014	$386	229	$1.68
2015	$561	410	$1.37
2016	$179	112	$1.60
2017	$583	329	$1.77

Note: Monetary values are inflation-adjusted.
Source: ADF&G.

Between 2008 and 2017, H&G pink salmon products from Alaska increased in value; roe values fluctuated significantly; and canned values peaked mid-period before returning the 2008-price level.

H&G prices averaged $1.27 per pound, peaking in 2011 ($1.57 per pound), with a low of $1.03 per pound in 2009. Roe prices averaged $7.09 per pound, starting the period with a high of $10.56 and registering a period-low of $3.44 in 2015.

Canned prices peaked in 2012 at $2.62 per pound, averaging $2.16 for the period; the 2015 value of $1.80 per pound marking the low-point.

Table 13. First Wholesale Value of Key Alaska Pink Salmon Products per Pound, 2008-2017

Year	H&G	Roe	Canned
2008	$1.10	$10.56	$2.02
2009	$1.03	$5.12	$2.05
2010	$1.45	$5.41	$2.16
2011	$1.57	$4.73	$2.22
2012	$1.31	$9.86	$2.62
2013	$1.07	$8.44	$2.23
2014	$1.30	$7.83	$2.30
2015	$1.15	$3.44	$1.80
2016	$1.34	$6.62	$2.22
2017	$1.41	$8.91	$2.03
Average	**$1.27**	**$7.09**	**$2.16**

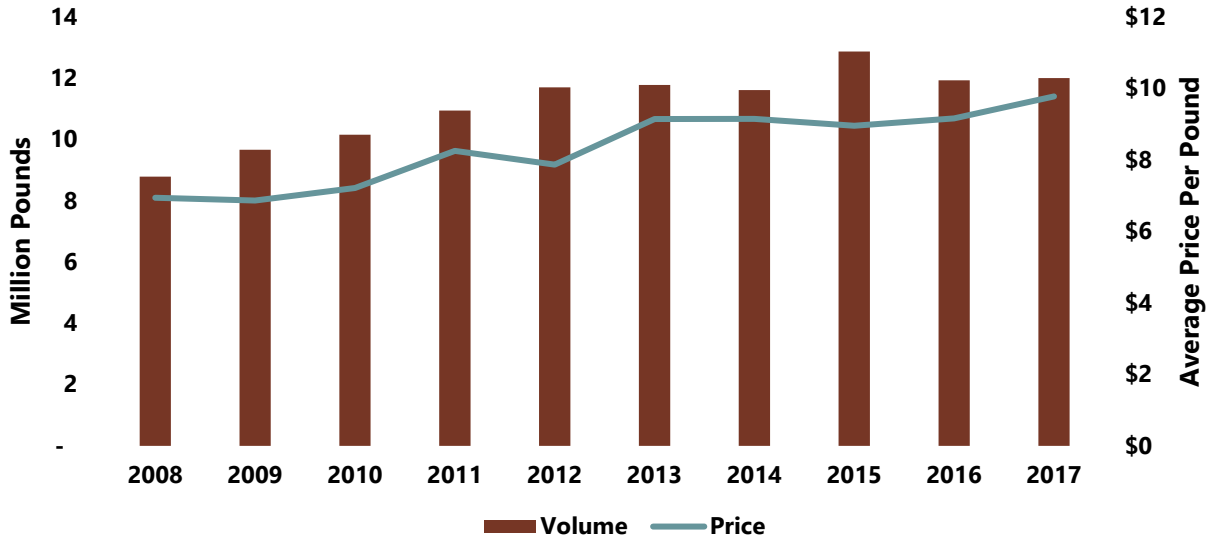
Note: Values are inflation-adjusted.
Source: ADF&G; DOR (Alaska Salmon Price Report).

Smoked Salmon

VFDA has successfully produced and marketed smoked salmon products on a modest scale in recent years. This production is somewhat unique as little salmon is commercially smoked in Alaska. Instead, processors including Ocean Beauty Seafoods and Trident Seafoods smoke salmon in facilities located outside Alaska. Smoked Alaska salmon is also produced by outside companies who purchase salmon from processors.

Minimal data is available on the volume or value of smoked salmon products in the United States. However, the value of imported smoked salmon products offers some perspective on price trends. Since 2008, the average (inflation adjusted) imported value of these products has steadily increased, from about $7.00 per pound to near $10.00 per pound in 2017. This trend suggests demand for smoked salmon has increased in the U.S. – and is likely a positive market factor impacting Alaska smoked salmon.

Figure 8. Import Value and Volume of Smoked Salmon Products, 2008-2017



Note: Price adjusted for inflation.
Source: NMFS.

Table 14. VFDA Pink Salmon Egg Take, Juveniles Released, and Total Returns, 1981-2019

Brood Year	Egg Take	Release Year	Juveniles Released	Return Year	Total Returns
1981	9,976,112	1982	7,400,000	1983	95,137
1982	8,410,837	1983	5,600,000	1984	170,633
1983	12,930,976	1984	8,390,000	1985	566,112
1984	66,652,369	1985	51,263,063	1986	1,239,901
1985	96,850,000	1986	54,630,942	1987	5,744,564
1986	64,102,894	1987	59,739,413	1988	1,126,998
1987	161,444,846	1988	130,990,000	1989	3,438,764
1988	152,448,556	1989	128,414,000	1990	11,019,426
1989	142,826,728	1990	122,243,663	1991	6,121,820
1990	159,448,601	1991	131,295,094	1992	2,223,766
1991	202,964,624	1992	86,902,414	1993	1,732,416
1992	208,785,744	1993	141,868,041	1994	13,349,529
1993	231,689,083	1994	149,369,505	1995	6,826,714
1994	219,246,433	1995	205,371,130	1996	7,475,945
1995	239,905,524	1996	223,088,327	1997	7,255,673
1996	208,516,783	1997	188,862,094	1998	4,631,811
1997	237,873,766	1998	195,162,063	1999	14,924,284
1998	231,898,941	1999	213,906,642	2000	12,350,666
1999	238,669,980	2000	195,763,690	2001	16,126,545
2000	235,296,253	2001	203,897,201	2002	5,265,239
2001	227,602,657	2002	202,573,328	2003	17,344,831
2002	236,394,947	2003	206,397,607	2004	11,139,932
2003	236,959,373	2004	222,457,568	2005	18,108,491
2004	233,816,098	2005	222,218,569	2006	9,059,582
2005	239,049,159	2006	216,921,213	2007	23,907,806
2006	235,082,985	2007	220,408,302	2008	14,853,852
2007	233,033,709	2008	199,639,850	2009	1,292,305
2008	237,013,056	2009	226,202,598	2010	18,377,038
2009	236,027,724	2010	223,083,753	2011	13,357,040
2010	236,161,533	2011	222,603,439	2012	10,628,608
2011	236,705,144	2012	214,526,737	2013	22,482,149
2012	232,324,195	2013	218,276,748	2014	25,399,252
2013	231,495,782	2014	219,936,541	2015	34,094,094
2014	231,647,939	2015	223,410,919	2016	8,046,516
2015	236,199,755	2016	226,063,710	2017	14,723,649
2016	251,908,491	2017	241,542,706	2018	n/a
2017	253,331,519	2018	n/a	2019	n/a

Source: VFDA.