Spring 2017

Sockeye Market Analysis

PREPARED FOR

BRISTOL BAY Regional Seafood Development Association

PREPARED BY

McDowell GROUP

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Acknowledgements

The study team would like to express its appreciation to members of the industry and government agencies that provided valuable information and insight for this project, especially Michael Kazmac (Alaska Department of Revenue) and Jennifer Shriver (Alaska Department of Fish and Game).

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Executive Summary

Bristol Bay Regional Seafood Development Association (BBRSDA) is tasked with increasing the value of Bristol Bay sockeye and has contracted with McDowell Group to produce bi-annual sockeye market reports. These reports analyze market conditions for sockeye products, investigate market issues, examine historical trends, and discuss impacts on Bristol Bay fishermen. Key findings are listed below:

Less expected sockeye supply, high farmed salmon prices, and growing demand in the U.S. market are expected to result in higher sockeye prices in 2017. Wholesale sockeye prices could increase significantly in 2017, particularly if early sockeye fisheries underperform.

Summary of Market Conditions

- Alaska sockeye harvests are expected to decline 23 percent in 2017 and the Bristol Bay forecast is down 27 percent from the prior year's harvest. Bristol Bay is projected to produce a harvest of 27.5 million sockeye, slightly below the previous 10-year average of 27.8 million fish.
- The combined sockeye forecast for Alaska and Russia is down 18 percent, or approximately 71 million lbs. Sockeye production from other fisheries, including Canada's Fraser River, is expected to be minimal in 2017.
- Farmed Atlantic salmon production declined by an estimated 10 percent in 2016, the largest decrease in supply in decades. Farmed salmon industry analysts expect Atlantic production to grow more slowly in coming years. Farmed salmon prices reached record levels in January 2017 and while falling off since then remain higher than at any point prior to 2017.
- First wholesale prices for all major Alaska sockeye product forms increased in each trimester in 2016.
- Anecdotal reports suggest inventories are virtually bare heading into the new season. This suggests that demand has grown substantially, as the last two seasons produced the largest Alaska sockeye harvests in 20 years.
- Price spreads between canned and frozen sockeye have tightened significantly over the past three years. At least one major canned processor will not operate its canning lines in Bristol Bay this year, and canned production is expected to be minimal overall in 2017. Fresh and frozen sockeye prices are far more dependent on quality than canned product forms, so the emphasis on procuring quality product will likely increase even further this year.
- Major Bristol Bay processors increased quality incentives/payments in 2016. Four large processors increased bonuses for chilled fish in 2016, from 15 cents/lb. to 22.5 or 25 cents/lb. Two large processors that require chilling issued profit sharing checks equal to 15 to 19 cents/lb. Bonuses for bleeding and using salmon slides added 5 to 10 cents/lb. Although the base price was 75 cents/lb. last year, many fishermen received prices of $1.05/lb. or more via quality and production bonuses, an increase of 40 percent (or more in some cases). *Note: this price/bonus data was supplied by Bristol Bay Fishermen's Association (BBFA) and was not verified by BBRSDA or McDowell Group.*

- The percentage of chilled fish delivered by Bristol Bay driftnet boats increased from 24 percent in 2008 to 71 percent in 2016, despite a 27 percent larger harvest.
- "Incentives matter" is a common phrase used by economists. Chilling mandates issued by major processors and larger quality bonuses appear to be altering behavior in the Bristol Bay driftnet fleet. The number of "dry" boats is down 41 percent since 2014, and now comprises just 22 percent of the fleet.
- The optimal, value-maximizing percentage of chilled fish was estimated to be 82 percent in 2015 (based on findings from McDowell Group's Fall 2016 report). With canned production expected to decline, the optimal percentage of chilled fish will likely increase in 2017. Although great strides have been made towards chilling more fish in recent years, there is still room to add value through chilling more fish.
- The estimated market value of Bristol Bay salmon driftnet permits is up 35 percent, or approximately $35,000, on a year-over-year basis (through April 2017).

Ex-Vessel Pricing Scenarios for 2017

Bristol Bay driftnetters averaged gross earnings of approximately $90,000 per active permit since 2010. Assuming static levels of fishery participation, base sockeye prices would need to be about $1.00/lb. to produce an "average" year for Bristol Bay driftnet fishermen based on the preseason forecast of 27.5 million fish.

It is likely that 2017 will provide more upside potential with regard to average gross earnings and ex-vessel prices if the forecast is reached, given more favorable market conditions. Page 31 contains a table of various prices corresponding with a range of average gross earnings of $80,000 to $130,000 per active Bristol Bay driftnet permit, assuming the regional harvest is equal to the pre-season forecast. For example, a base price of $1.20 would yield average gross earnings per active permit of approximately $108,500, or 21 percent above the $90,000 average.

Building a "Cool" Brand with High Quality Fish

Last year BBRSDA completed a pilot project to test the feasibility of launching a Bristol Bay Sockeye brand. The effort resulted in increased sales of 8-14 percent for promotional partners, and provided valuable insights and marketing assets.

Building a brand with a loyal customer base is a long-term process, but the dogged efforts of BBRSDA and its contractors have supplied a solid foundation. Continued quality improvement through best handling practices and chilling will play a critical role in the brand's development.

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ALASKA'S SOCKEYE SALMON

Glossary of Terms and Abbreviations

Abbreviations and Acronyms

ADOR	Alaska Department of Revenue
ADF&G	Alaska Department of Fish and Game
ASMI	Alaska Seafood Marketing Institute
ASPR	Alaska Salmon Price and Production Reports (published by ADOR)
BBRSDA	Bristol Bay Regional Seafood Development Corporation
BBFA	Bristol Bay Fishermen's Association
EV	Ex-Vessel terms
COAR	Commercial Operators Annual Report (published by Alaska Dept. of Fish and Game)
DFO	Canadian Department of Fisheries and Oceans
FAO	United Nations Fisheries and Aquaculture Organization
FW	First wholesale terms
H&G	Headed and gutted
HY	Harvest year cycle
MSC	Marine Stewardship Council
NMFS	National Marine Fisheries Service
PACFIN	Pacific Fisheries Information Network

Glossary of Terms

Ex-Vessel Value/Price	The value or price paid to fishermen by a processor for whole fish.
First Wholesale Value	The value (or average price) of processed product sold by processors to entities outside of their affiliate network. Typically refers to the value of product as it leaves Alaska.
First Wholesale Volume	The weight of processed product sold by processors to entities outside of their affiliate network. Also referred to as production volume.
Harvest Year Cycle	Refers to the 12 month period when most sockeye are caught and sold into the wholesale market. The harvest year cycle runs from May of the harvest year through April of the following year. Aligning the data by sales season, as opposed to calendar year provides a better basis for comparing first wholesale data to ex-vessel data. This period is also referred to as the annual sales cycle.
Refreshed Sockeye	Refers to frozen H&G product which has been thawed out and filleted. This is usually done at secondary processing plants near final consumer markets by local seafood distribution companies. Processed, chilled sides are then delivered to retailers and restaurants.
Round Weight	The weight of a whole fish as it is delivered to the processor in an uncut and unprocessed state.

Introduction and Data Sources

The Bristol Bay Regional Seafood Development Association (BBRSDA) has commissioned McDowell Group, Inc. to analyze sockeye markets and report findings bi-annually since 2013.

In business since 1972, McDowell Group is Alaska's most experienced research and consulting firm. McDowell Group has served as a market-research contractor for the Alaska Seafood Marketing Institute for the past 19 years and has conducted market research, feasibility studies, and other seafood industry-related projects for public and private sector clients throughout Alaska and elsewhere in North America.

Study Purpose and Scope of Work

BBRSDA represents the world's largest group of sockeye fishermen and is tasked with increasing the value of Bristol Bay salmon (principally sockeye). In addition to bi-annual reports, the *Sockeye Market Analysis* project includes summary presentations at the direction of BBRSDA Board and staff. The project tracks market trends affecting sockeye salmon to help BBRSDA direct promotional efforts, inform its members, and react effectively to emerging issues and trends.

Past analyses can be viewed or downloaded from BBRSDA's website (www.bbrsda.com) or requested by contacting McDowell Group staff at seafood@mcdowellgroup.net.

Methodology and Data Sources

McDowell Group compiled data from government agencies, including the Alaska Department of Fish and Game (ADF&G), the Alaska Department of Revenue (ADOR), and export data from the National Marine Fisheries Service (NMFS).

Specific data sources used in this report are summarized below:

ADF&G Fish Ticket Data

Bristol Bay fish tickets often contain no documentation of ex-vessel price or value for salmon. However, in cases where ex-vessel price has been omitted from fish tickets an average price is applied to the harvest volume based on information collected by fishery biologists in each region. More information about ADF&G fish tickets can be found at: http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.fishtickets.

ADF&G Commercial Operators Annual Report (COAR)

The first buyer of raw fish, persons who catch and process fish, and persons who catch and have fish processed by another business are required to file an annual report of their purchasing and processing activities. This report is called the Commercial Operator's Annual Report (COAR) and is due by April 1 of the following year. Historical COAR data extending through 2015 is used as a supplementary information source in this sockeye market analysis.

COAR contain data on seafood purchasing, processed production volume, and both ex-vessel and wholesale values of seafood products. The buying information from COAR is reported by species, area of purchase, condition of fisheries resources at the time of purchase, type of gear used in the harvest, pounds purchased, and ex-vessel value. The ex-vessel value in COAR includes any post-season adjustments or bonuses paid after the fish was purchased. Production information from COAR is reported by species, area of processing, process type (frozen, canned, smoked, etc.), product type (fillets, surimi, sections, etc.), net weight of the processed product, and the first wholesale value. More information about COAR data can be found at: http://www.adfg.alaska.gov/index.cfm?adfg=fishlicense.coar.

ADOR Alaska Salmon Price and Production Reports (ASPR)

The Alaska Salmon Price Report (ASPR) covers first wholesale volume and value - by species and area - for six key Alaska salmon products. First wholesale is defined as the value and volume at the point when product is sold to an entity outside of the processor's affiliate network. The data set includes all processors that sold more than one million pounds of processed salmon products in the previous calendar year, which includes the majority of Alaska's wholesale production of salmon products. The ASPR is a major data source for salmon market analysis. ASPR reports are available on the ADOR website at:

http://www.tax.alaska.gov/programs/programs/reports/index.aspx?60624

Data from these sources have been structured to provide information applicable to Bristol Bay sockeye to the fullest extent possible. Where the timing of data releases by the agencies causes gaps, McDowell Group has developed estimates based on historical ratios and other relationships.

Limitations of Data and Analysis

Commercial fishing is a heavily regulated business and government agencies collect data on a wide range of variables, from harvest to price to participation. As wild fish move closer to the consumer, publicly available data diminishes. For instance, there is no readily accessible public data on the average retail price of canned salmon or the amount of sockeye fillets sold by individual retailers. This data gap has been addressed, to the extent practical, by purchasing point-of-sale information and interviewing sockeye buyers. McDowell Group also maintains subscriptions to most major trade press outlets and was able to use trade-press data to supplement the public information and provide additional context.

Legal Disclaimer

The views expressed herein do not necessarily represent those of the Bristol Bay Regional Seafood Development Association.

Quality Improvement & Branding Efforts

This section examines quality improvement in the Bristol Bay driftnet fleet and summarizes the results of BBRSDA's sockeye branding efforts. Key findings are provided below:

KEY FINDINGS:

- The quality of Bristol Bay sockeye has improved dramatically over the past decade, based on both anecdotal reports from buyers and quantitative analysis of fishery statistics. The percentage of salmon chilled by the Bristol Bay driftnet fleet increased from 24 percent in 2008 to 71 percent in 2016.
- Processors are increasingly mandating fishermen chill their catch. With dry (unchilled) boats comprising the exception, the fishery is rapidly approaching a point where chilled fish is a requirement rather than a preference.
- BBRSDA's pilot branding project was largely successful, but underscores the role quality plays in brand development. BBRSDA is pursuing brand development efforts in more markets.

Quality Improvement

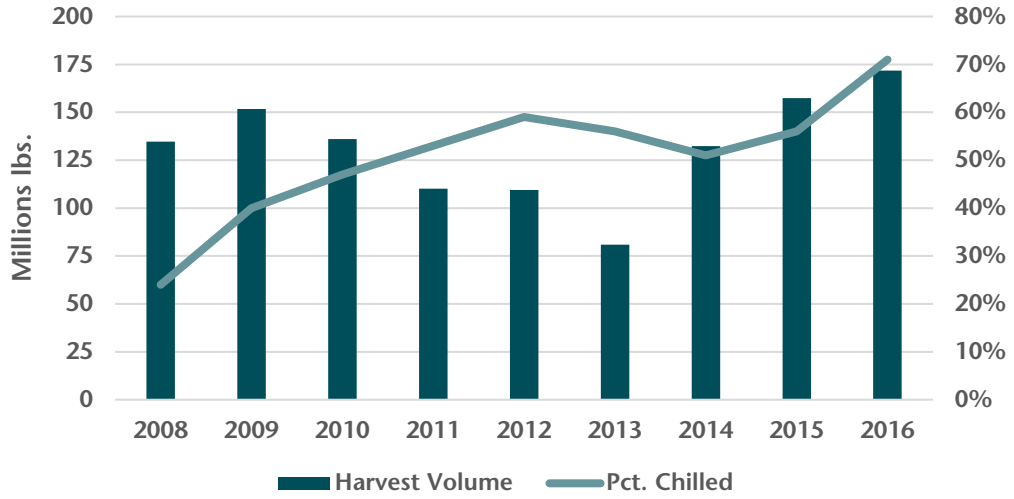
Fish quality cannot be improved once a fish is caught, it can only be preserved. The speed with which quality deteriorates has a substantial impact on value and the available product forms. Eventually, even frozen fish has no value. Chilling fish drastically improves meat quality by maximizing shelf life. Gently handled sockeye chilled to 0°C immediately after harvest have an average maximum (fresh) shelf life of 12 days. Storing fish in dry (unchilled and/or uninsulated) holds can drastically reduce that shelf life, draining value from the fish.

BBRSDA and other groups have promoted quality programs in Bristol Bay for many years, and results of these collective efforts are remarkable. The BBRSDA Processor Survey collects data on the prevalence and manner of chilling fish in Bristol Bay. In 2008, the Bristol Bay driftnet fleet caught 135 million pounds of salmon but only 24 percent of the harvest was chilled. In 2016, the driftnet fleet caught 172 million pounds and chilled 71 percent of the catch.

Refrigerated seawater (RSW) is generally regarded as the most efficient method of chilling fish, and accounted for 82 percent of all chilled fish in 2016. The remaining 18 percent were chilled using slush ice, which is typically distributed by ice barges (partially funded by BBRSDA) and tenders. RSW units are more costly, but provide fishermen greater flexibility and result in fewer unchilled deliveries. On occasion, slush ice fishermen choose to forgo chilling due to a variety of factors. Nearly 80 percent of Bristol Bay driftnet boats chill their salmon at least part of the time, and almost two-thirds chill their catch over 75 percent of the time.

Processors are generally pessimistic about the future of canned product forms. The 2016 survey found that 60 percent of Bristol Bay processors agreed with the statement "I can foresee a day when processors don't can any fish from Bristol Bay." The message to fishermen is clear, chill the fish or risk losing your market.

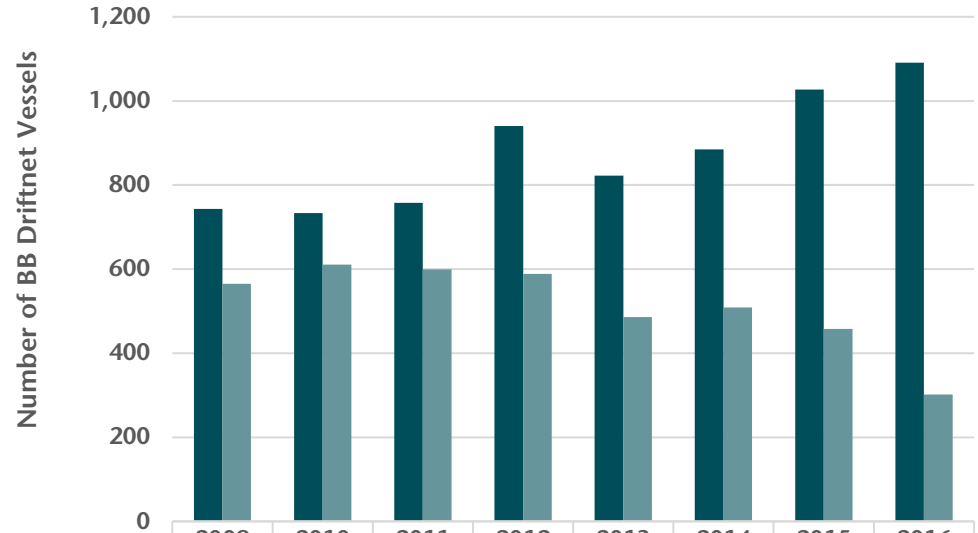
Figure 1. Percentage of Bristol Bay Salmon Chilled by Driftnet Fleet, 2008-2016



Source: Northern Economics *2016 BBRSDA Processors Survey.*

The number of dry boats has declined significantly in recent years, likely in response to several processors either requiring chilling or proclaiming they will soon buy only chilled fish. As recently as 2014, 509 driftnet boats did not make any deliveries with chilled fish. That number declined 41 percent from 2014 to 2016, despite virtually no change in total fleet size and a 30 percent larger harvest in 2016 (see Appendices section for chart).

Figure 2. Chilling in Bristol Bay Driftnet Fleet, 2009-2016



	2009	2010	2011	2012	2013	2014	2015	2016
Chilling	743	733	758	940	822	885	1,027	1,091
Not Chilling	565	611	599	589	486	509	458	302

Source: Northern Economics *2016 BBRSDA Processors Survey.*

Chilling fish is a great way to improve the value of Bristol Bay sockeye, but it comes at a cost. RSW systems can easily cost more than $30,000. However, most processors either pay bonuses for chilled fish, or require chilling and pay higher base prices. These price adjustments generally create an attractive payback scenario. Fishermen can calculate their own projected return on an RSW unit by using the "Chilling Investment Calculator" on the BBRSDA website (http://www.bbrsda.com/quality).

Quality Fish Handling Practices

Chilling fish is important, but the investment can be negated if fish are not handled with care. A 2012 study found that implementing best handling practices resulted in 87 percent #1 quality fish, while the worst handled fish only produced 46 percent #1 quality fish. Discounts and other losses for lesser quality fish can often exceed 25 percent, resulting in a tremendous loss in resource value. For example, a boat producing 100,000 round pounds with poor handling would yield approximately $70,000 less than a boat using best practices (assuming a 25 percent quality discount). Initially, this loss is born by the processor, but over time it is added to or subtracted from the fleet. Best handling practices are as follows (see the back cover for a more detailed explanation):

- Harvesting: bleed fish and keep sets short
- Handling: handle with care and limit brailer weights
- Holding: chill fish quickly with RSW system or ice, optimize fish holds, clean all fish contact surfaces regularly.

Quality and Volume Yields Higher Prices

All Bristol Bay processors had an effective base sockeye price of $0.75/lb. in 2016. However, final prices vary depending on fishing performance and processor incentive or profit sharing programs. At the very top end, fishermen could earn final prices up to 55 percent above the base price (excluding late season fish). The average final price for all Bristol Bay sockeye was $0.93/lb. in 2016, or $0.18/lb. greater than the base price. Chilling (RSW) bonuses offered by several processors increased in 2016 from $0.22/lb. to $0.25/lb. Chilling bonuses increased fishermen's prices 20 to 33 percent in 2016 (for boats that chill). These bonuses have increased over the past decade. From 2008 to 2010, chilling bonuses were generally in the range of $0.10/lb. to $0.12/lb. *Note: this price/bonus data was supplied by BBFA and was not verified by BBRSDA or McDowell Group.*

The Bristol Bay Sockeye Brand

Branding has long been considered as a means of raising the value of Bristol Bay sockeye. The Copper River fishery has reaped significant benefits from its brand, and BBRSDA recently invested in creating a brand of its own for the world's largest sockeye fishery.

BBRSDA funded a pilot project in 2016 to develop a distinctive, consumer-facing brand for Bristol Bay sockeye. The project yielded a sleek logo design, branded point-of-sale materials (e.g. fish wrapping paper, aprons, recipe cards, posters, etc.), photo assets, a consumer-oriented website, social media content, a retail training program, and a retail partnership framework. Boulder, Colorado was selected as a test market for the pilot project, due to its favorable demographics. The project

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was focused on promoting high quality, refreshed (i.e. previously frozen) sockeye at retail outlets.

The branding/marketing pilot project showed encouraging results. Retail sales increased between 8-14 percent for participating retailers in Boulder and follow up analysis showed that point-of-sale materials and retail staff training efforts were generally successful. The pilot project was also able to identify things that worked and those which could be improved upon. Creating a brand and retail sales program from scratch is a very difficult undertaking, so implementing feedback mechanisms to inform BBRSDA about how future promotions could be improved was a critical part of the project.

Obtaining consistently acceptable quality was a challenge during the project. Quality was inconsistent for a variety of reasons, but the pilot project underscores the critical role quality plays in building a successful seafood brand. Branded materials and messaging efforts were found to be effective and engaging; however, taste, quality, and value will ultimately drive brand loyalty in the long term. Continuing to improve quality, creating attainable quality specifications, and coordinating promotions with the supply chain are fundamental parts of building the Bristol Bay sockeye brand. In any industry, brands thrive because the quality of their products is exceptional and deserving of greater consumer attention.

BBRSDA's Board, staff, and contractors dedicated substantial time and resources to the branding project over the past year. These efforts have created an effective brand platform that greatly enhances the identify of Bristol Bay sockeye, which until recently has simply been referred to as "sockeye" or maybe "Alaska sockeye." With valuable assets and lessons learned in hand, coupled with improving quality, future growth prospects for the Bristol Bay Sockeye brand are encouraging.

BBRSDA members can learn more about the Bristol Bay Sockeye brand from the following links:

Bristol Bay Sockeye website.
Social Media: Facebook, Instagram, Twitter
Branding Pilot Project report.

Supply Analysis

Supply and production forecasts for sockeye and other competing salmon species have a significant impact on future ex-vessel and first wholesale prices. This chapter examines recent production trends and the outlook for future supply.

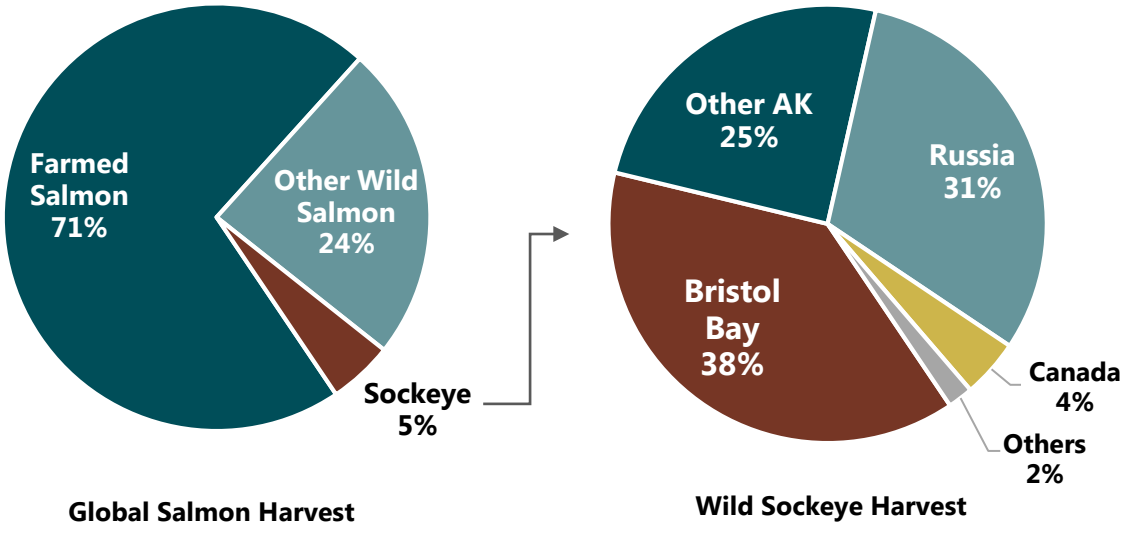
KEY FINDINGS

- Sockeye harvests in Alaska and Russia are projected to decline a combined 18 percent in 2017, compared to 2016. It is expected that Alaskan and Russian sockeye production will decline by 71 million lbs. in 2017.
- The Bristol Bay sockeye forecast is down 26 percent, to 27.5 million fish.
- Sockeye harvests pale in comparison to farmed salmon production. After years of production growth, farmed salmon supply declined 10 percent in 2016 and is expected to remain below 2015 levels for several years. Wholesale prices of farmed salmon have spiked as a result.

Sockeye Supply

Compared to global salmon production, sockeye are relatively rare creatures. Like other wild salmon species, sockeye harvests fluctuate but generally comprise 4 to 7 percent of global salmon production and 10 to 30 percent of wild salmon harvests. Between 2012 and 2015, sockeye accounted for 5 percent of the world's salmon harvest by volume and 17 percent of the world's wild salmon harvest.

Figure 3. Global Salmon Harvest and Sockeye Harvest by Region, 2012-2015 Average



Source: ADF&G, FAO, and PACFIN.

Bristol Bay accounted for 38 percent of global sockeye production between 2012 and 2015. However, over the past 25 years, the Bay produced 44 percent of the world's sockeye harvest. Russia is the next largest sockeye producer. All other regions in Alaska combined generally produce less sockeye than Bristol Bay, but still account for more than a quarter of global production. Canada and Japan are the only other notable sockeye producers. Canada's harvests tend to jump to the 20 to 50 million pound range once every five years, with the last large harvest occurring in 2014. The next large Canadian sockeye harvest is not expected to take place until 2018.

Global sockeye harvests fell to 301 million pounds in 2013, the lowest figure since 2003. Harvests increased 78 million pounds in the following year posting the largest production figure since the mid-1990s. The sudden shift in supply during 2014, in addition to a strengthening dollar and other factors, led to much lower sockeye prices in 2015. Sockeye supply remained steady in 2015, as larger harvests in Alaska and Russia offset the lower Canadian harvest.

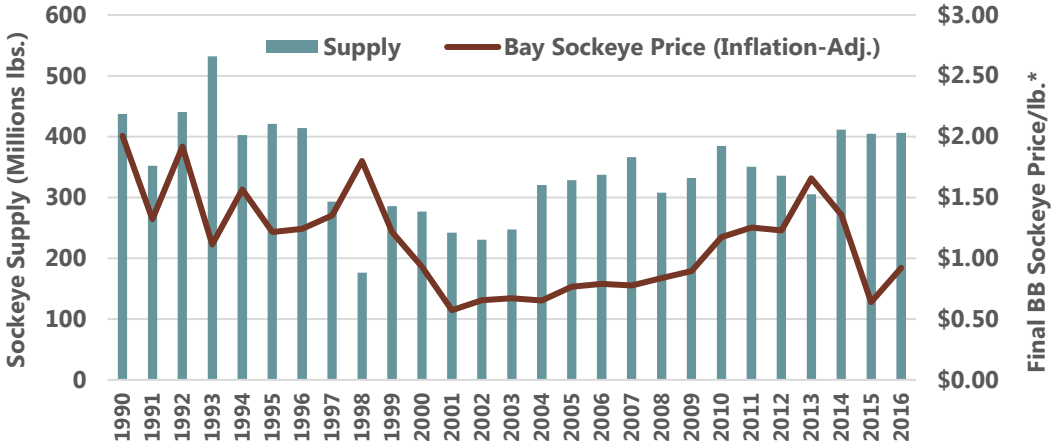
Global sockeye supply was steady in 2016 at 406 million pounds, based on available data and preliminary harvest estimates. Bristol Bay fishermen again netted a bumper harvest, in an otherwise dismal Alaska salmon fishing season. Russian sockeye exports were up slightly in 2016, but Russian harvest statistics showed a slight decline.

Table 1. Global Sockeye Harvest by Region, Millions of Pounds, 2010-2016

Category	2010	2011	2012	2013	2014	2015	2016P
Alaska Total	243	249	214	178	245	280	286
Bristol Bay	**170**	**135**	**119**	**92**	**161**	**185**	**202**
Other AK Areas	73	114	95	86	85	96	85
Other U.S. Areas	11.6	1.8	0.9	0.2	4.3	0.5	0.1
Russia	80	90	112	122	104	113	112
Canada	44	7	5	1	52	6	3
Japan	6	4	5	5	6	6	5
Total	**384**	**351**	**335**	**305**	**411**	**405**	**406**
Bristol Bay Pct.	**44%**	**38%**	**36%**	**30%**	**39%**	**46%**	**50%**
Bristol Bay Sockeye Base Price/lb.	**$0.95**	**$1.00**	**$1.00**	**$1.50**	**$1.20**	**$0.50**	**$0.76**

Notes: 2016 figures are preliminary. Base prices do not include supplemental payments (e.g. bonuses, etc.).
Source: ADF&G, PACFIN, FAO, DFO, Russia FFA, and McDowell Group estimates.

Figure 4. Global Sockeye Supply versus Bristol Bay Sockeye Price, 1990-2016



*Historical prices are adjusted for inflation and are shown in 2016 dollars. Final 2016 price is estimated.
Note: 2016 supply figures are preliminary estimates.
Source: ADF&G (COAR) and McDowell Group estimates.

Supply Expectations for 2017

Sockeye harvests in Alaska and Russia are projected to decline 18 percent, or 71 million pounds, in 2017. After two years of above average harvests, Bristol Bay sockeye harvests are expected to decline 27 percent (53 million lbs.). The Russian sockeye forecast is down 5 percent (approximately 6 million lbs.). Supply from Canada and other areas are expected to be relatively minor; however, Canadian harvests will likely increase substantially next year if the Fraser River abundance cycle continues to produce large harvests once every four years.

The expectation of less supply in 2017, combined with higher farmed salmon prices and strong demand for sockeye, should result in higher prices for Alaska sockeye. In addition, lower sockeye prices in recent years have expanded demand for sockeye products. Whereas sockeye were relatively plentiful in 2014-2016, demand is expected to be significantly higher than supply for the first time since 2013. However, a stronger dollar, compared to 2013, will likely limit upward price potential.

Table 2. Sockeye Harvests and Forecasts for Key Producers, Millions of Pounds, 2013-2017

Category	2013	2014	2015	2016P	2017F	Forecast 2017 YoY Change
Alaska Total	178	245	280	286	221	-23%
Bristol Bay	**92**	**161**	**185**	**202**	**148**	**-27%**
Other AK Areas	86	85	96	85	72	-15%
Russia	122	104	113	112	106	-5%
Key Producer Total	**299**	**349**	**393**	**398**	**327**	**-18%**

Notes: 2016 figures are preliminary.
Source: ADF&G, FAO, Russia FFA, and McDowell Group estimates.

Farmed Salmon Supply

Although a growing number of consumers differentiate between farmed and wild salmon, the price and availability of farmed Atlantic and coho salmon still have a meaningful impact on values for sockeye and other wild salmon species in North American and European markets.

Atlantic salmon production increased 66 percent between 2010 and 2015, adding 2.1 billion lbs. of annual production. According to Bank Nordea, an Icelandic investment bank that covers the farmed salmon industry, Atlantic salmon production is expected to grow slower in coming years. From 2016 to 2020, the bank projects Atlantic production will increase 14 percent, or 683 million lbs. If these forecasts prove accurate, it will have important ramifications for both farmed salmon and wild sockeye. Over the past 10 years with available data (2006-2015), Atlantic salmon production increased by an average of 6.8 percent per year. Global supply chains have generally factored in rising production expectations. With Atlantic salmon demand growing at 5 to 7 percent per year, the prospect of sub-5 percent growth in the near term will likely result in higher Atlantic prices which will push buyers to seek alternative products/species.

Farmed coho production also declined sharply from 2014 through 2016. Chile produces the vast majority of farmed coho salmon. Most of it is sold to Japan, where it competes with Alaska sockeye.

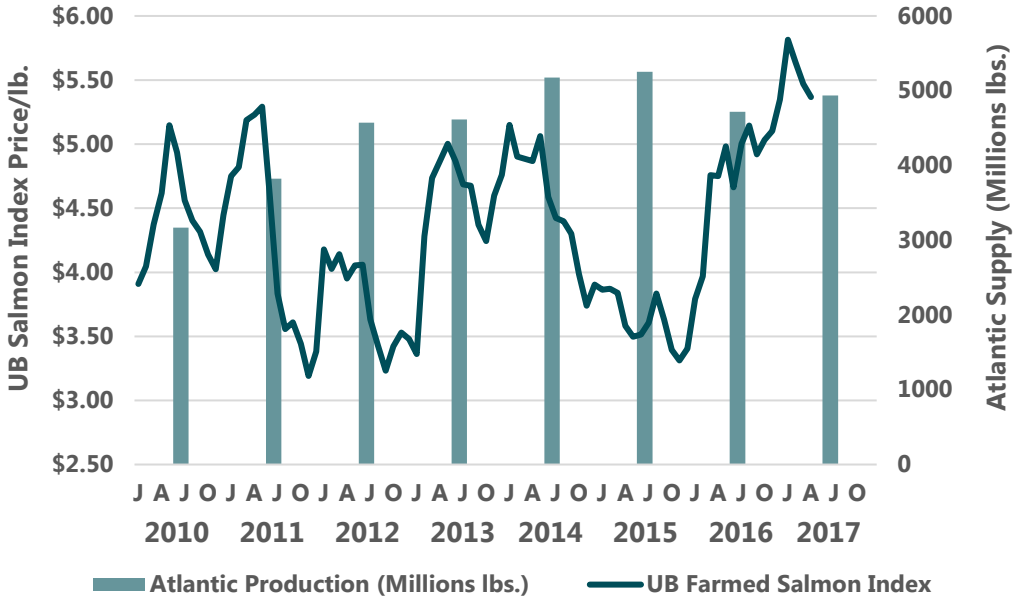
Table 3. Farmed Salmon Production & Price, in Thousands of Metric Tons, 2010-2020F

Year	Atlantic Salmon	Farmed Coho	UB Atlantic Salmon Index Price/lb.
2010	1,437	138	$4.26
2011	1,735	160	$5.01
2012	2,074	172	$4.08
2013	2,094	157	$4.28
2014	2,348	172	$4.95
2015	2,382	141	$3.78
2016P	2,140	125	$4.34
2017F	2,240	130	$5.58*
2018F	2,270	N/A	-
2019F	2,340	N/A	-
2020F	2,450	N/A	-

*Average index price through 5/1/17.
Note: The UB Atlantic Salmon Index represents a weighted-average proxy of wholesale prices on fresh farmed salmon fillets sold in the U.S.
Source: FAO, Groundfish Forum (Coho production), Bank Nordea (Atlantic production), and Urner Barry (Salmon index).

Atlantic salmon production declined 10 percent in 2016 due to an algal bloom that killed more than 100,000 metric tons of salmon in Chile, and sea lice issues in Norway. As a result, the average wholesale price of fresh farmed salmon in the U.S. is up 48 percent since 2014. These shifts in price clearly show that demand has outgrown supply in recent years.

Figure 5. Farmed Salmon Pricing and Supply, 2010-2017F



Note: 2016 and 2017 production figures are preliminary estimates.
Source: Urner Barry Salmon Index, FAO (2010-2015 supply), and Groundfish Forum (2016-2017).

Bristol Bay Sockeye Forecast by District

The total Bristol Bay sockeye run is projected to be 41.5 million fish in 2017, yielding an expected harvest of 27.5 million fish. The Naknek-Kvichak district is projected to have the largest run, followed by Egegik which is projected to produce the largest harvest of any district. The Egegik run is projected to contain relatively larger numbers of age-5 fish compared to other districts. The Naknek-Kvichak, Nushagak, and Ugashik areas are expected to produce relatively larger numbers of younger fish.

Table 4. Bristol Bay Sockeye Forecast by District, 2017

Category	Total Run (Millions fish)	Harvest (Millions fish)	Age-3	Age-4	Age-5
Naknek-Kvichak	16.07	8.29	37%	57%	7%
Egegik	10.65	8.56	7%	75%	18%
Ugashik	5.46	4.09	31%	61%	9%
Nushagak	8.62	6.06	41%	57%	1%
Togiak	0.66	0.48	18%	77%	3%
Bristol Bay Total	**41.47**	**27.47**	**29%**	**62%**	**8%**

Note: Totals may not sum due to rounding.
Source: ADF&G.

Wholesale prices have a direct impact on future ex-vessel prices. This section examines trends in the wholesale market for major sockeye products as well as competing salmon products.

KEY FINDINGS:

- Demand for Alaska sockeye products is strong, reflected by rising prices for all major product forms in recent months
- Farmed salmon prices reached record levels in early 2017 and remain at elevated levels, despite a relatively strong U.S. dollar
- Fillet and H&G production is expected to be prioritized in 2017
- A smaller Alaska sockeye forecast and rising prices could lead to higher volumes of Russian sockeye being imported in the U.S. market in 2017

Key Products and Markets for Bristol Bay Sockeye

The table below summarizes key product forms and related markets. Understanding the relative size of each product form and market is necessary to evaluate the importance of changes in those markets. For a more detailed analysis of product/market composition and the entire Bristol Bay sockeye supply chain, please see the *Spring 2015 Sockeye Market Report*.

Table 5. Major Bristol Bay Sockeye Product Forms and Markets

Product Form	Major Markets	Estimated Pct. of First Wholesale Value - 2015
Headed/Gutted	Japan, Europe, and North America	50%
Canned Salmon	UK, Canada, U.S., and Australia	25%
Frozen Fillets	U.S.	20%
Roe	Japan	3%

Source: ADF&G (COAR), ASPR, NMFS trade data, Global Trade Atlas, industry interviews, and McDowell Group estimates.

Sockeye Market Outlook for 2017

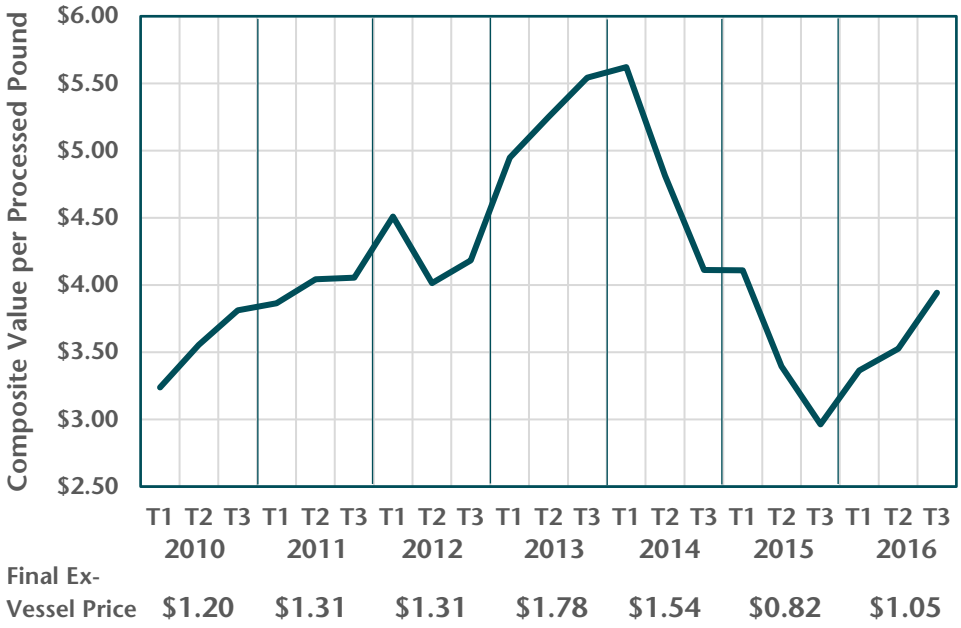
A lower sockeye forecast, high farmed salmon prices, and growing demand in the U.S. market are expected to result in higher sockeye prices in 2017. Wholesale sockeye prices could jump significantly higher in 2017, particularly if early sockeye fisheries perform poorly. Processors are expected to prioritize fillets and H&G products over cans this season. Fresh sales are also expected to remain a point of emphasis, given lower forecasts in Copper River and Bristol Bay.

Wholesale Market Analysis for Key Sockeye Products

Collectively, first wholesale sockeye prices are up since late 2015, and average prices for sockeye products sold during the final trimester of 2016 are up 33 percent from the same period in the prior year (see Figure 6). Prices for every major sockeye product form have increased during the most recent trimester, based on available data (September-December 2016).

Ex-vessel prices tend to track movements of average first wholesale prices. Ex-vessel and first wholesale prices fell substantially from 2014 through 2015. Both prices rebounded in 2016.

Figure 6. Average First Wholesale Value per Pound, All Major Alaska Sockeye Products, by Trimester and Average Final Ex-Vessel Price for Alaska Sockeye, 2010-2016



Source: ADOR (ASPR), ADF&G (COAR), and McDowell Group estimates.

Market conditions for major product forms are summarized in following sections.

Note: Charts in the following section represent unit values per processed pound. Unit values are equal to the first wholesale revenue divided by the number of pounds sold for each product form. This average price (i.e. unit value) is not a perfect proxy for product form prices because sizing and other specifications can change from year to year. For example, smaller frozen sockeye sell for a discount to medium and larger sized product. Therefore, an increase in the number of small sockeye (as there was during 2014, 2015, and 2016) can drag down average price for frozen H&G sockeye – even if prices for each size did not change. Regardless of this technicality, unit values are an important measure of value over time because they track how much revenue is being generated from each pound of frozen sockeye production. As such, they are a better indicator for value trends than prices for individual sizes.

Frozen H&G Sockeye

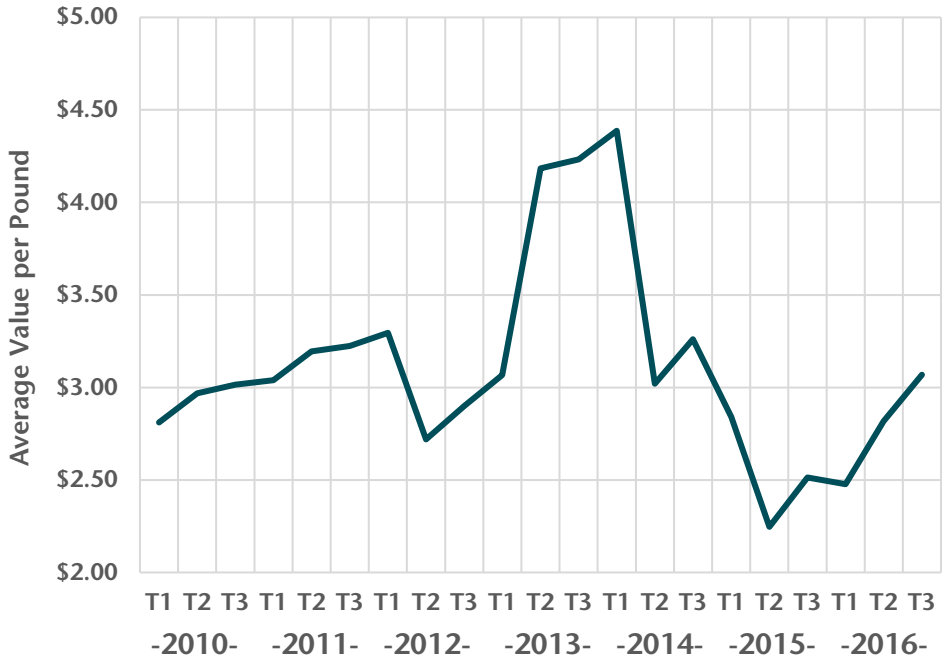
KEY MARKETS: JAPAN, EUROPE, AND NORTH AMERICA
ESTIMATED PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2015): 50 PERCENT

Key market developments for frozen sockeye are as follows:

- Frozen H&G sockeye prices went up 28 percent during the third trimester in 2016, compared to the same period in 2015, an increase of 67 cents per pound
- Sales of frozen sockeye have turned over faster in 2016 compared to prior years, suggesting strong demand

Frozen sockeye prices increased sharply from early 2013 through early 2014, due to smaller harvests and a weak dollar. Harvest volumes increased significantly in 2014 and 2015 and the percentage of smaller sockeye increased as well. This coincided with an extraordinary shift in exchange rates that led to a stronger U.S. dollar. These events resulted in a sharp decline for frozen sockeye prices.

Figure 7. Average First Wholesale Value per Pound, Frozen H&G Bristol Bay Sockeye, by Trimester, 2010-2016



Final Ex-Vessel Price for Bristol Bay Sockeye (Average)

2010	2011	2012	2013	2014	2015	2016
$1.07	$1.17	$1.18	$1.61	$1.34	$0.63	$0.92*

*Final price for 2016 is estimated.
Source: ADOR (ASPR), ADF&G (COAR), and McDowell Group estimates.

Prices for frozen Bristol Bay H&G sockeye have increased since early 2016. Prices averaged $3.07/lb. in the final trimester of 2016, but December 2016 sales averaged $3.27/lb. Sales made between July-December 2016 averaged $2.93/lb. Sales data for the first trimester of 2017 will not be available until mid-June, after this report has been published, but as sales volume during these months are significantly lower it should not affect the

2016 seasonal average that much. Based on typical sales volumes made during the first trimester and current price levels, it is expected that frozen H&G Bristol Bay sockeye produced during the 2016 season will sell for an average price of approximately $3.00/lb.

Obviously 2017 frozen H&G sockeye prices are speculation at this point; however, fishermen may be able to gain some visibility on potential ex-vessel price movement by projecting frozen H&G prices for the upcoming season. As the Alaska sockeye forecast is 23 percent lower than the prior year, prices could be expected to rise by a similar percentage. We project frozen H&G Bristol Bay sockeye prices to be in the $3.30/lb. to $3.75/lb. range for the 2017 season, but this projection has some important caveats. A larger or smaller harvest in Bristol Bay or other sockeye producing regions, changes in the value of the U.S. dollar, and/or farmed salmon prices could alter the market and result in different pricing.

Frozen H&G sockeye pricing is highly dependent on fish size. Frozen H&G sockeye are generally categorized into three sizes: 2-4 lbs., 4-6 lbs., 6-9 lbs. (based on the processed H&G weight). The 4-6 lb. medium size is historically the most common size category; however, as sockeye size has declined in recent years the percentage of 2-4 lb. product has increased. Wholesale prices for 2-4 lb. fish are generally about 20 percent less than the 4-6 lb. size. Prices on 6-9 lb. fish are generally about 20 percent above the 4-6 lb. size.

Different size categories also have different markets. Smaller frozen sockeye primarily go to Japan, where consumers are more price sensitive and Japanese dishes lend themselves better to smaller, thinner fillets. Larger fish (6-9 lbs.) tend to be sold to European markets, where many of the fish are smoked. Although Japan and Europe also buy some 4-6 lb. fish, the U.S. is the key market for medium-sized fish. Frozen sockeye are generally sold to retail and wholesale distributors who thaw out the product and sell fillets to consumers and restaurants.

First wholesale sales of frozen H&G sockeye occurred relatively faster in 2016, compared to 2014 and 2015. Sales of frozen H&G sockeye increased 38 percent during the second trimester in 2016, which primarily consists of new season product. This indicates that despite increasing prices, wholesale buyers were very active early in the wholesale buying season. ASPR sales data is not yet available for the first trimester of 2017; however, anecdotal market reports suggest there is virtually no frozen sockeye inventory left heading into the 2017 season.

Table 6. First Wholesale Sales Volume of Frozen H&G Alaska Sockeye, by Trimester, Millions of Pounds, 2011-2016

	2011	2012	2013	2014	2015	2016	Pct. Change YoY
Trimester 1 (Jan.-Apr.)	7.8	6.6	3.0	3.4	10.5	10.8	+3%
Trimester 2 (May-Aug.)	36.5	26.1	18.3	13.8	38.9	53.6	+38%
Trimester 3 (Sep.-Dec.)	33.2	29.3	17.5	29.6	54.6	38.2	-30%
Annual Production	86.8	61.4	56.0	77.6	111.9	111.9	-
BBay Harvest Volume	134.7	119.2	92.0	160.6	184.8	201.6	9%

Source: ADOR (ASPR).

Canned Sockeye

KEY MARKETS: UK, CANADA, U.S., AND AUSTRALIA
ESTIMATED PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2015): 25 PERCENT

Key market developments for canned sockeye are as follows:

- Canned sockeye production has trended down in recent years, despite larger harvests
- Canned prices increased in every 2016 trimester, but the spread between canned prices and frozen H&G product remains very tight.
- Due to tight pricing spreads between frozen H&G and canned product, Bristol Bay processors will likely prioritize H&G and fillet production in 2017. Coupled with a lower forecast, the 2017 season could produce one of the smallest canned red packs in modern history.
- In the short term, a small canned pack will likely exert upward pressure on canned prices. However, if canned prices get too high or supply is inadequate, the product could lose more shelf space at retail.

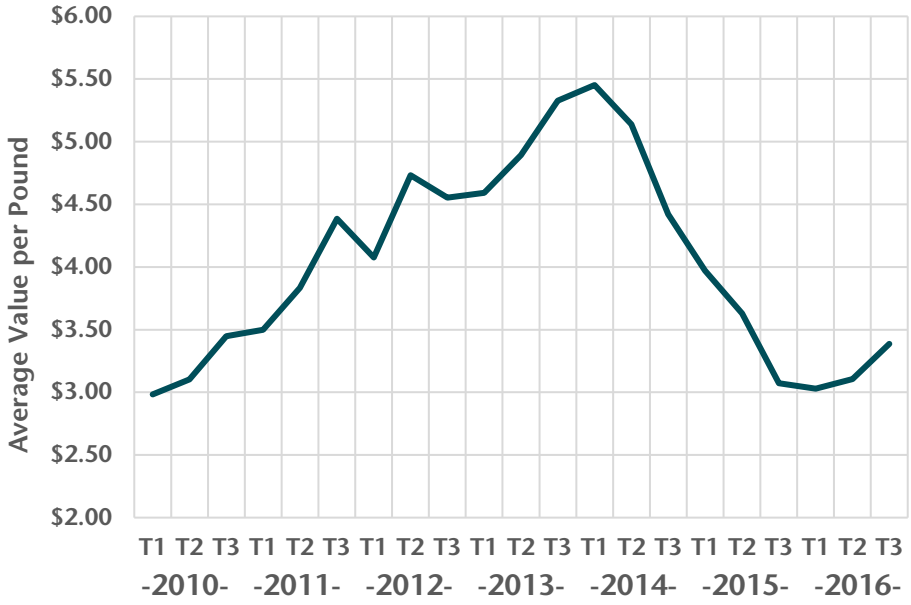
Bristol Bay typically produces at least two-thirds of the state's total canned red salmon pack, and often accounts for more than three quarters of statewide production. As a result, the region has more exposure to the canned salmon market than other sockeye fisheries.

High canned sockeye prices, currency fluctuations, and demographic shifts have changed the market considerably. Many retailers reduced the amount of shelf space allocated to canned sockeye from 2012 to 2014, as retail prices for talls often exceeded $9.00 per can. Once shelf space and product facings are reduced, it can take years to regain their prominence on grocery store shelves. In addition, canned salmon consumers tend to be older, and as a result the product category is not seen as a growth-oriented product – making the prospect for regaining shelf space even more difficult. Finally, although canned sockeye prices are still down considerably in U.S. dollar terms, the equivalent price has not fallen as much for UK and Canadian buyers due to weaker currencies in those countries.

Despite these recent trends, canned remains an important product form for a couple reasons. First, canning sockeye allows processors to greatly extend the shelf life of the resource well beyond a single year. This allows packers to even out production despite variations in harvest volume, and spread out sales during large or lean years. Secondly, processing plants have historically used canning lines as a means of increasing plant throughput. Canning lines provide a "release valve" to deal with high volume days that exceed the plant's freezing capacity. This is becoming less of a factor in processors' product form decision making process, as processors have expanded freezing capacity and efficiency. However, there are exceptions to this, both in terms of specific plants and in terms of circumstance. For example, in 2014 canned prices were high and the run was much larger than originally forecast. These factors led to a spike in canned production during that year, and unfortunately created excess canned inventory, which exacerbated price declines.

Canned prices trended up in 2016 after two years of lower canned production volumes (despite larger harvests). Currently, canned sockeye prices are near early-2011 levels.

Figure 8. Average First Wholesale Value per Pound, Canned Alaska Sockeye – Half Cans, by Trimester, 2010-2016



Source: ADOR (ASPR).

Alaska sockeye harvest volumes increased 17 percent from 2014 through 2016, but canned sockeye production declined 35 percent. Much of the shift away from canning during the past few years can be explained by pricing behavior.

In 2014, canned prices were much higher than frozen H&G prices. So even after accounting for the fact that frozen H&G offers a higher yield (more volume, by about 5-7%), processors could make more money canning fish than freezing them. Currently, there is more parity between canned and frozen prices. In fact, at current prices (3rd trimester, 2016) the wholesale revenue derived from one round pound of sockeye is the same whether it was canned or sold as a frozen H&G product (adjusting for differences in yield).

Table 7. Canned Sockeye Price vs. Frozen H&G Price and Production Trends, 2010-2016

Year	2nd Trimester Frozen H&G Sockeye Price/lb.	2nd Trimester Canned Half Sockeye Price/lb.	Price Spread	AK Canned Production (Millions lbs.)	AK Sockeye Harvest (Millions lbs.)	Canned to Harvest Volume Pct.*
2010	$2.99	$3.10	$0.12	31.7	242.6	13%
2011	$3.17	$3.83	$0.66	31.4	248.7	13%
2012	$2.81	$4.73	$1.93	41.2	213.8	19%
2013	$4.12	$4.89	$0.77	29.2	177.7	16%
2014	$3.14	$5.14	$2.00	44.5	245.4	18%
2015	$2.23	$3.63	$1.40	33.2	280.4	12%
2016	$2.82	$3.11	$0.28	29.1	286.2	10%

*Canned production volume divided by Alaska sockeye harvest volume.
Source: ADOR (ASPR).

However, frozen H&G product has a few advantages. It is typically sold faster, so processors get paid earlier and have lower inventory costs. Fillets are cuts from H&G fish and fillet pricing tracks the H&G market, so what holds true for frozen H&G generally holds true for frozen fillets. Given enough time, processors prefer to produce fillets because they can realize additional revenue from other parts of the fish and reduce shipping costs. In

days and areas with large harvests, it is not always possible to fillet as much as processors would like. For these reasons, processors are expected to prioritize fillet and H&G production this year. One large Bay processor is not even planning on operating their canning lines this year.

Sockeye Fillets

KEY MARKETS: U.S. AND CANADA
ESTIMATED PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2015): 20 PERCENT (FRESH & FROZEN)

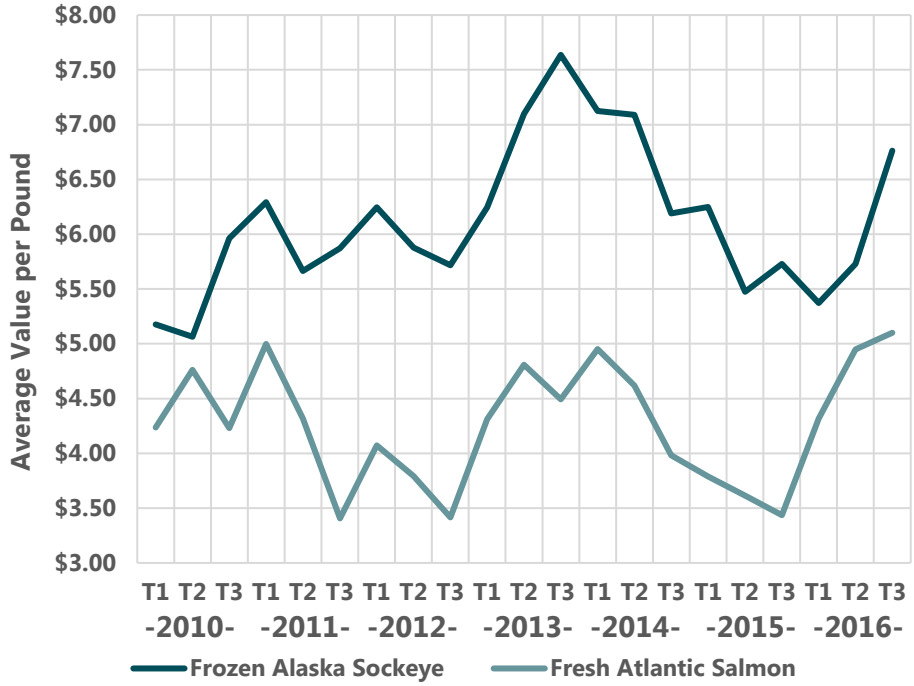
Factors influencing sales volume and pricing for frozen Alaska sockeye fillets:

- Fillet market follows trends in the frozen H&G market, which are often used to produce refreshed fillets
- Frozen fillet prices increased substantially (+18 percent) in the third trimester of 2016, compared to the previous trimester
- The spread between fillet price and frozen H&G price has generally increased in recent years
- Record production of frozen sockeye fillets produced in 2016

Bristol Bay processors cut and froze 20.5 million pounds of sockeye fillets last season – a record volume. Fillet production was obviously a point of emphasis last year. Despite a large harvest, processors allocated more time and resources to producing fillets, which typically produce the highest revenue per round pound of any product form. Bristol Bay processors will likely seek to maximize fillet production again this year, given the relatively large spread in fillet/H&G prices and the lower forecast.

The average price of frozen sockeye fillets shot up during the most recent trimester in the Alaska Salmon Price Report series, going from $5.73/lb. to $6.76/lb. Rising sockeye fillet prices are likely a reflection of two trends. First, farmed salmon prices have increased substantially since late 2015 (see Figure 9). Sockeye is typically a more valuable fillet product than Atlantic salmon, so as farmed salmon prices rise and the spread between farmed salmon and sockeye becomes smaller, sockeye fillets become a relatively better value. Secondly, demand for sockeye was simply more robust following the 2016 season. Despite an increase in fillet production in 2016, demand increased even more and resulted in higher prices.

Figure 9. Average First Wholesale Value per Pound, Frozen Alaska Sockeye Fillets vs. Fresh Farmed Salmon, by Trimester, 2010-2016



Note: Fresh Atlantic salmon prices utilize the Urner Barry Fresh Salmon Index, which reflects the estimated average wholesale price of fresh Atlantic salmon fillets sold in the U.S. market.
Source: ADOR (ASPR) and Urner Barry.

Sockeye fillet prices for early 2017 will not be released until mid-June, but there is good reason to expect fillet prices will remain high or even increase. Fresh farmed salmon wholesale prices averaged $5.57/lb. during the first trimester of 2017, according to the Urner Barry Farmed Salmon Index – a $0.47/lb. increase from the previous trimester. Anecdotal reports suggest strong demand for Alaska sockeye and little high-quality inventory leftover from the 2016 season. This author can attest to these claims. A recent visit to a large Midwest grocery chain with an excellent reputation for high quality and reasonable prices, found relatively lower quality Alaska sockeye being sold at a price of $15.99/lb. This same retailer ran sockeye promotions for $9.99/lb. during the 2017 lent season, with better quality. There is simply little high quality sockeye product currently left in the supply chain (as of May 2017) so retailers are trying to sell out lower quality product ahead of the 2017 season.

This situation underscores the continued importance of implementing quality handling practices across the entire Bristol Bay salmon fleet. All sockeye product forms across the entire quality spectrum are eventually consumed. Consumers are unaware of the supply/demand forces that move the wholesale salmon market. They generally expect to receive higher quality when paying higher prices for sockeye, regardless of how much farmed salmon fillets cost. Low quality fillets sold into a tight salmon market late in the sales season can damage the reputation and future demand of Alaska sockeye. Therefore, it is important that fishermen and processors strive to maximize the quality of as many fish as possible each year, in order to minimize the number of negative consumer experiences. As one retailer interviewed for this market report series said, "Consumers remember negative experiences for a long time, but quickly forget high prices if the quality is top notch." Higher values are obviously the goal for Alaska sockeye producers and Alaska seafood marketing organizations, but higher prices also raise consumers' expectations about quality.

Sockeye Roe

KEY MARKET: JAPAN
ESTIMATED PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2015): 3 PERCENT

Factors influencing sales volume and pricing for frozen Alaska sockeye roe:

- Poor Alaska pink salmon harvest reduced the expected supply of salmon roe following the 2016 season
- Poor Hokkaido chum harvest and a below average Alaska chum harvest have reduced supplies of high-end roe products
- Mixed results in currency markets, the Japanese yen is weaker year-on-year (bad for Alaska producers) while the Russian ruble is stronger (good for Alaska producers)

Roe typically accounts for 5 to 6 percent of sockeye's total first wholesale revenue; however, the category made up a smaller contribution to total revenue during the 2015 sales cycle due to lower prices. Although roe is a small part of the sockeye's total first wholesale value, roe prices can have a significant impact on processors' profitability and the willingness to pay higher ex-vessel prices. For example, one round pound of Alaska sockeye produced about 20 cents of roe value in 2013 when prices were near peak levels. Roe generated only about 9 cents per round sockeye pound in 2015, as roe prices were 49 percent lower than 2013. Roe prices have a greater impact on pink and chum salmon, where the value of roe comprises a higher percentage of total wholesale value. Lower roe prices are the primary reason Alaska pink salmon prices declined sharply between 2013 and 2015.

Table 9 provides first wholesale information about Alaska sockeye roe sales corresponding with harvest years (not necessarily calendar year sales). Most of Alaska's sockeye roe is exported to Japan soon after the harvest season.

Alaska sockeye roe prices are affected by many factors, but the yen/USD exchange rate and production volume usually have the largest impact on first wholesale prices. Roe prices tend to be higher when the Japanese yen is strong and lower if the yen is weak, as the product is more expensive from the buyer's perspective in the latter situation. Despite the impact of exchange rates, harvest volume is often the biggest driver for roe pricing. Alaska sockeye roe sales tend to produce consistent sales revenue each year, often between $30 and $35 million.

Sockeye roe revenue and average first wholesale prices increased 50 percent and 33 percent, respectively compared to the prior year. However, 2015 was a poor year for sockeye roe, both in terms of total value and average prices (see Table 9).

See table on following page.

Table 8. Alaska Sockeye Roe Sales Value and Unit Value, 2008-2016

Harvest Year	Sales Volume (Millions lbs.)	Sales Value ($Millions)	Pct. of Total Sales Value	Average First Wholesale Value/lb.	August Yen/USD Exchange Rate
2008	4.4	$29.8	6.5%	$6.72	109.4
2009	5.9	29.9	5.5%	5.06	95.0
2010	5.8	29.7	5.0%	5.11	85.6
2011	5.8	34.4	5.1%	5.89	77.1 (strong yen)
2012*	4.8	34.7	5.6%	7.19	78.7
2013	4.6	35.0	6.1%	7.53	97.9
2014	5.4	33.0	5.8%	6.07	102.9
2015*	6.4	24.6	3.8%	3.81	123.3 (weak yen)
2016*	7.3	37.0	N/A	5.08	101.3

*Sales data only includes product sold between May and December, sales made between January and April of the sales cycle were withheld for confidentiality reasons but were likely relatively minor compared to first two trimesters in the sales cycle.
Source: ADOR (ASPR) and OANDA.com, compiled by McDowell Group.

Roe data shown in the table above includes all roe product types, consisting primarily of sujiko (frozen, salted salmon roe skeins) and green roe (frozen, unsalted salmon roe skeins). Sujiko takes longer for processors to produce, since it must be salted according to exact specifications. As a result of the additional processing, sujiko is more valuable than green roe, selling for a premium of 50 to 60 percent per pound in most years.

The roe production mix in Bristol Bay tends to be fairly consistent from year to year. Processors often produce more green roe but the production value of each product type is usually similar due to sujiko fetching higher prices.

Farmed Salmon Market Conditions

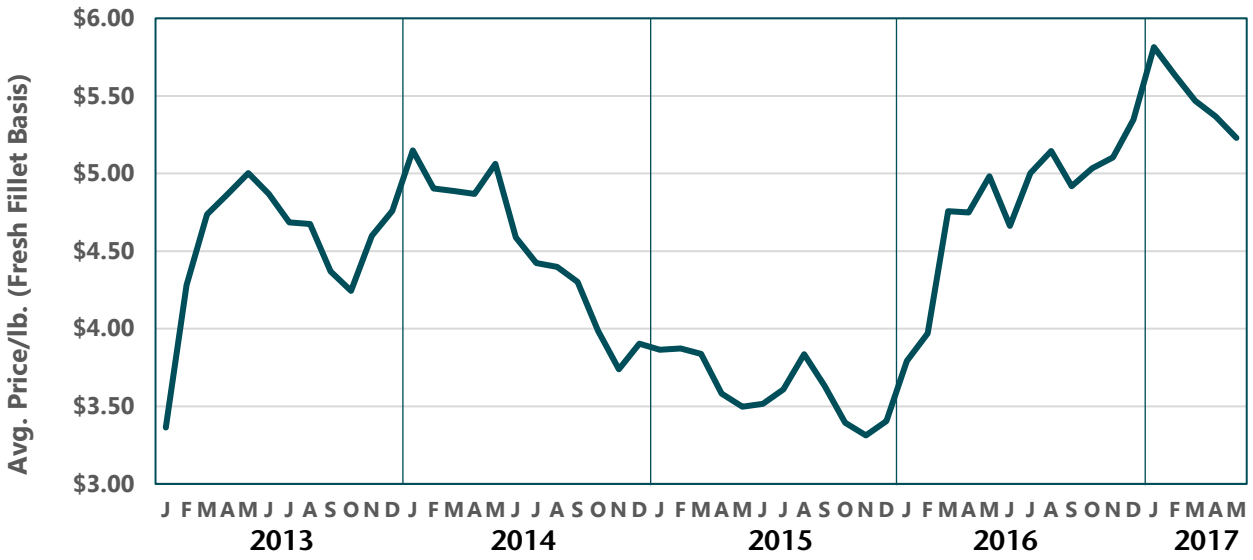
Factors influencing pricing for farmed salmon products:

- Less farmed salmon production in 2016 has led to higher wholesale prices in recent months
- Farmed production expected to grow slowly for several years

Farmed salmon prices have risen dramatically over the past 18 months, according to the Urner Barry Fresh Farmed Salmon Index (see Figure 10). The index represents a trade-weighted proxy for the wholesale price of fresh farmed salmon fillets sold in the U.S. market. This is good news for Alaska's salmon industry.

U.S. wholesale prices peaked in January 2017, when farmed salmon index reached $5.81/lb. – 53 percent greater than January 2016. Prices have declined since January, but remain higher than last year's prices. The index figure was $5.23 as of May 2, 2017.

Figure 10. Urner Barry Fresh Farmed Salmon Index, by Month, January 2013 – May 2017



Note: Prices are current through May 2, 2017.
Source: Urner Barry.

Farmed Atlantic salmon production typically grows with each passing year, averaging 6.7 percent growth per year from 2000 to 2015. However, farmed industry analysts estimate production fell 10 percent in 2016, primarily due to an algal bloom in Chile that killed over 20 million farmed salmon. Farmed salmon production is projected to grow slower in coming years, which would generally benefit competing wild salmon producers like Alaska.

Although many consumers differentiate between wild and farmed salmon, many major buyers still react to pricing differences. As farmed salmon production dwarfs the supply of wild salmon, farmed product creates a natural baseline for wild salmon prices. In the U.S. and Japan, sockeye prices generally slot in above farmed salmon prices. This generally leads to greater interest in sockeye when farmed salmon prices increase.

Russian Sockeye

Increasing prices on Alaska sockeye and farmed salmon, coupled with the lower 2017 forecast, could provide an opportunity for Russian sockeye in the U.S. market. Historically, the volume of Russian sockeye imported into the U.S. is relatively small. However, when Alaska sockeye harvests were poor in 2013, the U.S. imported 3.6 million pounds of Russian sockeye. That volume declined in 2014 and 2015 as Alaska sockeye harvests increased and prices declined. Last year, imports of Russian sockeye spiked to 1.7 million pounds despite a large harvest in Alaska, suggesting that some buyers are at least experimenting with selling Russian sockeye in the U.S.

See table on following page.

Table 9. U.S. Imports of Russian Sockeye, 2010-2016

Year	Volume (000s lbs.)	Value ($000s)	Alaska Sockeye Harvest (Millions lbs.)	Avg. Alaska Sockeye Frozen H&G Price/lb.
2010	59	$466	243	$2.98
2011	10	$77	249	$3.19
2012	133	$1,053	214	$2.93
2013	3,609	$29,589	178	$4.03
2014	865	$7,001	245	$3.19
2015	462	$3,147	280	$2.38
2016	1,654	$11,710	286	$2.87

Source: NMFS Trade Data.

Although Russian waters produce the same salmon species as those caught in Alaska, the primary harvest method is very different. Russian salmon producers typically use fish traps located near the mouths of rivers. Trap sites are leased by salmon processors, who employ laborers to harvest, transport, and process salmon. Due to the differences in harvest gear, Russian salmon companies are capable of producing high quality sockeye. However, interviews with buyers report that historically Russian sockeye quality varies widely from company to company.

Developing a broader U.S. market for Alaska sockeye is an important goal for the Alaska seafood industry; however, it could also provide an opportunity for buyers to substitute Alaska product with Russian salmon. Branding and marketing efforts undertaken by BBRSDA, ASMI, and the Copper River/Prince William Sound RSDA are critical to creating consumer loyalty for Alaska salmon products. Since affluent consumers primarily base their seafood purchases on quality and taste, it is also important that Bristol Bay sockeye products offer comparable or superior quality.

Large Scale Mining in Bristol Bay

The Environmental Protection Agency (EPA) has settled an ongoing lawsuit with the Pebble Limited Partnership, making it possible for the company to eventually begin the lengthy and comprehensive federal mining permitting process that would be required for mine development in the Bristol Bay watershed. Link.

Increasing Focus on Antibiotic-Free Seafood, Meat, & Poultry

Global public health organization NSF International has developed an independent certification protocol called *Raised Without Antibiotics* in response to growing consumer support for antibiotic free meat products. A 2016 survey conducted for NSF International found that 59 percent of consumers prefer products from animals raised without antibiotics. In 2015, Costco drastically reduced farmed salmon purchases from Chile over growing antibiotic concerns. Salmon farmers have increasingly turned to antibiotics to control sea lice in recent years but the pushback from buyers could mean risking costs and increased risk of production losses in coming years. Link.

New Chilean Salmon Marketing Council Targeting U.S. Market

Chilean salmon producers launched the Chilean Salmon Marketing Council at the March 2017 North American Seafood Expo in Boston. The organization will focus on marketing Chilean salmon in international markets, but is expected to focus on the U.S. market. Link.

U.S. Military Exercises in Gulf of Alaska

Alaska Senator Lisa Murkowski responded to concerns from coastal residents, fishermen, and others by the U.S. Navy to move its biennial Northern Edge training exercise in the Gulf of Alaska to the fall. Military exercises are scheduled to run from May 1-12, 2017, coinciding with Alaska salmon spawning migrations. Alaska stakeholders are concerned about the potential impact on marine mammals and fish species; however, the effort to move the drills proved unsuccessful. Link.

Global Seafood Sustainability Initiative (GSSI) Gains Wider Acceptance

Walmart has become the latest retailer to support GSSI. The world's largest retailer plans to source all its seafood from suppliers with third-party certification using the Marine Stewardship Council (MSC) or Best Aquaculture Practices (BAP), or certified by a program which follows the FAO Guidelines and is recognized by the GSSI. Alaska's Responsible Fisheries Management certification program was the first sustainability program to be recognized by GSSI. Link.

Farmed Salmon Omega-3 Levels Down 50 Percent

A recent study from Stirling University in the UK showed the amount of omega-3 oils present in farmed Atlantic salmon declined by approximately 50 percent over a five-year period. The decline in farmed salmon omega-3 levels is connected to changing feed formulations. Today's salmon feed contains less fish oil and fishmeal than

it did in the past due to rising costs and tighter supplies. Salmon feed producers have turned to cheaper, more abundant terrestrial meal/oil sources; however, these ingredients do not support omega-3 fatty acid growth like marine-based meals and oils. Link.

U.S. Withdraws from Trans-Pacific Partnership (TPP)

On his fourth day in office, President Trump signed an executive order withdrawing the U.S. from the TPP trade deal. The agreement crafted under the Obama administration was never passed by Congress, so nothing changes from a practical standpoint other than it is now clear that the TPP's trade policies will not be implemented anytime in the near future. The TPP would have benefitted the Alaska seafood industry by reducing or eliminating tariffs on U.S. seafood exports to Japan and several other countries. Sockeye producers in particular stood to benefit, as the 3.5 percent tariff on U.S. sockeye exports to Japan (which is primarily comprised of Bristol Bay fish) was set to be eliminated. Link.

Global Seafood Market Conference 2017 Summary

The Global Seafood Market Conference, an annual event coordinated by the National Fisheries Institute (NFI), brings together professionals from throughout the supply chain to discuss seafood market trends. The event was held in San Francisco in mid-January this year. Intrafish, a seafood trade press outlet, had several reporters on hand who compiled a fantastic blog of the event. A selection of comments and takeaways from the event are provided below:

> A seafood purchasing director at a U.S. restaurant chain said his guests always ask the origin of their seafood. Andrew Young, senior VP of global sales at Cooke Aquaculture (which recently acquired Icicle Seafoods) added, "There's going to be pushback on products produced in China. Where products are being made is more important in consumer minds than certifications."
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> "This (wild salmon) growth in the U.S. market is really coming from that consumer demand, they want us to have both available so they can make that choice. Consumers are increasingly happy to pay a premium price, as well. For fresh sockeye in-season, consumers have no problem moving to that $12-$13/lb. price point without hesitation," said a representative for a major retail chain. He also said he gets 10-15 emails a day that are anti-aquaculture.
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> Consumer survey research firm Dataessentials noted that the term "Alaska" is almost synonymous with sustainability. Consumers think if the word Alaska is there, it must be sustainable.
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> Salmon panel experts do not expect the farmed salmon industry to continue growing at its historic 6-8 percent clip. Global farmed salmon supply is projected to increase just 3 percent next year.
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> Wells Fargo agricultural economist Michael Swanson predicted the U.S. dollar will get stronger going forward.
>
> The U.S. imports more seafood than all other proteins combined. Seafood makes up 80 percent of U.S. protein exports to China and all of the U.S. protein imports from China. American Seafoods

Ron Rogness said seafood will be impacted the most depending on what happens with the US-China trade relationship under the Trump administration.

Salmon is taking over the States. The 12 months through September 2016 showed that a shocking 10.6 million additional salmon meals were served in casual dining restaurants, according to NPD's Warren Solochek. He also noted growth for to-go meals and meal delivery services in the foodservice industry.

One major retail buyer said salmon buyers face a bleak choice in today's pricing environment. "You either raise your prices or compress your margins – those are your options. But it's really hard to lose that volume," he said. The executive expects to see a 15-20 percent decline in volume as prices get pushed up to the $10.99 and $11.99 price.

"We feel there are way too many (eco-labels) out there. There's a proliferation and we feel it can confuse the consumers so we endorsed GSSI to benchmark these labels so we know what's a legitimate label," said one retail seafood manager. He added, "There's a brainwashing that happens with some of the eco-labels that are out there. Look at Iceland and Alaska. When they moved away from MSC, there was not a lot of impact on the marketplace."

Ex-Vessel Pricing Scenarios for 2017

Key Finding: Bristol Bay driftnetters averaged approximately $90,000 in gross earnings per year since 2010. Assuming static levels of fishery participation, base sockeye prices would need to be about $1.00/lb. to produce an "average" year for Bristol Bay driftnet fishermen based on the preseason forecast of 27.5 million fish. Improving on the average gross earnings from 2016 would require a base price at or above $1.12/lb.

Historical Bristol Bay Driftnet Fishery Value and Sockeye Pricing

Base Bristol Bay sockeye prices have varied from $0.50/lb to $1.50/lb. since 2010, but the collective ex-vessel value of the regional driftnet fishery has been more stable. The average Bristol Bay driftnet permit has generally produced gross earnings between $77,000 to $102,000, outside of 2014-2015 which witnessed a drastic swing in value that averaged out to $93,031 between the two years. Since 2010, Bristol Bay driftnet fishermen have averaged gross earnings of $89,785 (per active permit). These figures include all salmon species caught in Bristol Bay fisheries, but sockeye accounts for 98 percent of the ex-vessel value.

Table 10. Harvest Value and Volume in Bristol Bay Salmon Driftnet Fishery and Sockeye Prices, 2010-2016

Year	BB Driftnet Harvest (Millions lbs.)	BB Driftnet Value ($Millions)	Avg. Earnings per Permit Fished	Base BB Sockeye Price/lb.	Final BB Sockeye Price/lb.
2010	147	$134	$89,784	$0.95	$1.07
2011	114	$132	$86,325	$1.00	$1.17
2012	104	$118	$77,954	$1.00	$1.18
2013	84	$128	$85,687	$1.50	$1.61
2014	140	$182	$118,241	$1.20	$1.34
2015	165	$105	$67,885	$0.50	$0.63
2016	170	$158*	$102,620*	$0.76	$0.93

*McDowell Group estimates (final data not yet available).
Note: 2016 data is preliminary/estimated. Driftnet values are final totals, including bonuses and supplemental payments.
Source: CFEC, ADF&G, and McDowell Group estimates.

Potential 2017 Ex-Vessel Pricing Matrix

Ex-vessel sockeye prices are dependent upon many factors and are historically not determined in Bristol Bay until salmon fishing is well under way. However, the average gross earnings in the region's driftnet fishery has been relatively steady which provides a reasonable basis for forward-looking price/value analysis. With the expectation of lower harvests and higher prices, the critical question for fishermen is how much do prices need to rise in order to offset a lower harvest volume?

Table 12 calculates a range of Bristol Bay sockeye prices required to produce various levels of average driftnet fishery earnings, assuming 1,540 active permits and a harvest volume equal to the pre-season forecast.[1] Given the outlook for rising wholesale prices, it is highly unlikely that average driftnet earnings will fall below $80,000 if the forecast harvest volume is reached in 2017, so the $80,000 mark was chosen as a low end for the expected pricing range. Given the assumptions about active permits and harvest volume, fishermen would need to receive a base price of approximately $0.85/lb. to produce $80,000 in gross earnings per active driftnet permit. If the base price is $1.00/lb. in 2017, driftnet fishermen would be expected to average over $90,000 in gross earnings. A base price of $1.12/lb. would put the fleet on par with last season's gross earnings. Final average sockeye prices, including bonuses and other supplemental payments, are historically $0.12/lb. to $0.18/lb. greater than the base price. Estimated base/final Bristol Bay sockeye prices for average gross earnings levels between $80,000 and $130,000 are shown in the table below.

Table 11. Ex-Vessel Sockeye Prices Required to Produce Assumed Level of Average Ex-Vessel Earnings per Active Permit in Bristol Bay Driftnet Fishery, 2017

Potential Avg. Driftnet Earnings Levels per Active Permit*	Estimated Base Sockeye Price	Estimated Final Avg. Sockeye Price
$80,000	$0.84	$1.02
$90,000	$0.96	$1.14
$100,000	$1.09	$1.27
$110,000	$1.22	$1.40
$120,000	$1.35	$1.53
$130,000	$1.47	$1.65

*Assuming 1,540 active driftnet permits and a driftnet sockeye harvest of 118.7 million lbs. Final price calculation example: Final price at $80,000 avg. = ($80,000 * 1,540 permits * 0.98 to account for other salmon species) / 118.67 million lbs.

It is important to note that these calculations are not a reflection of what ex-vessel price will be in 2017. The estimates only represent the ex-vessel price required to produce a given range of average driftnet gross earnings based on assumptions about fishery participation and harvest volume. Actual 2017 ex-vessel prices will be a reflection of wholesale market conditions and processors' willingness to bid up the price of fish.

This framework can also be used to translate predications about 2017 base price into the average gross earnings per active permit. This average can be compared to previous years to estimate how much better or worse ex-vessel earnings will be in 2017 versus previous years (the average ex-vessel earnings per active permit since 2010 is $89,785). The formula for calculating the projected average gross earnings per active permit, given an expected 2017 base price, is as follows:

Avg. gross earnings per active permit = (118,670,000 lbs. * (2017 Base Price + $0.18)) / (1,540 permits * 0.98)

[1] 27.47 million sockeye * 5.4 lbs. per sockeye * 80 percent caught by driftnet fleet = 118.7 million lbs. of sockeye

Relationship between Ex-Vessel Price & Other Factors

Key Finding: Ex-vessel prices for Bristol Bay sockeye generally exhibit an inverse relationship to harvest volume, but are also affected by other factors. Entering the 2017 season, Alaska sockeye supply is projected to decline 27 percent likely resulting in a higher ex-vessel price. Prices for farmed salmon have largely increased since last spring, which should also be supportive for Bristol Bay sockeye prices. On the downside, the U.S. dollar remains strong versus other currencies, which makes Alaska seafood products relatively more expensive for consumers.

Historical Pricing Factors

Bristol Bay is unique, as fishermen are typically not aware of the ex-vessel price until the season is mostly over. Regardless, ex-vessel prices generally represent the intersection between the highest price most processors are able and willing to pay and the lowest price fishermen are willing to accept. Processors' demand for raw product is driven by demand from retailers, distributors, and traders. Demand from these buyers is a function of supply, the value of the U.S. dollar, prices/supply for competing product, and projected changes in consumer demand. Therefore, these are the factors which will move ex-vessel pricing in 2017.

Unsurprisingly, ex-vessel prices in Bristol Bay have historically peaked during periods of low forecasts and declined during years with larger forecasts. Harvest volume has been the most reliable predictor of ex-vessel price in recent years; however, other factors can also impact pricing. For example, the 2010 forecast was roughly equal to the previous year's harvest but the base ex-vessel price increased $0.15 as farmed prices increased 35 percent. In 2015, more competing sockeye supply, lower farmed prices, and a stronger dollar led to a sharp decline in ex-vessel price in 2015. Entering the 2017 season, the Bristol Bay sockeye harvest and global sockeye supply is expected to decline. Farmed salmon prices are up marginally year-on-year, but remain near record levels. Similarly, the U.S. dollar is up slightly but remains at very strong levels compared to the past five years.

Table 12. Historical Bristol Bay Sockeye Ex-Vessel Price vs. Market Factors, 2007-2017

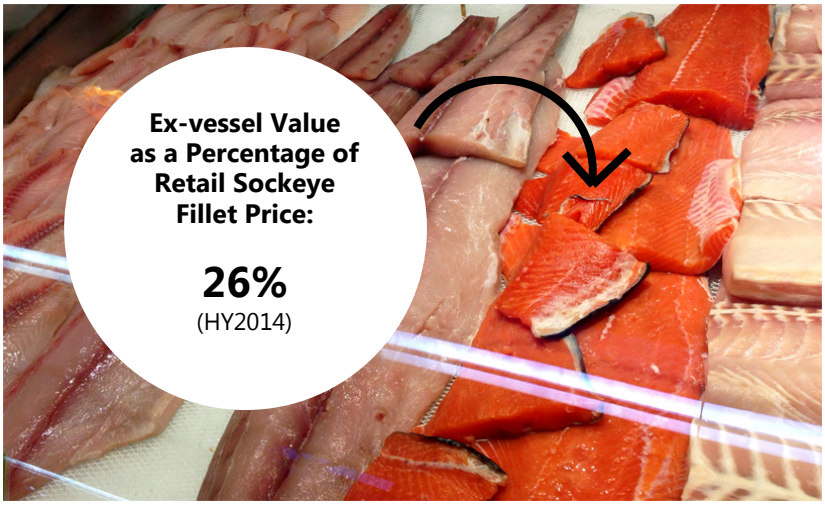
Year	Base Price	BBS Forecast[1]	BBS Harvest[1]	Global Sockeye Harvest[2]	Farmed Salmon Price[3]	U.S. Dollar Index	BBS Frz. H&G Price[4]
2007	$0.62	26.3	29.7	366	$4.10	82.3	$2.02
2008	$0.68	31.4	27.6	308	$4.14	73.0	$2.38
2009	$0.70	24.0	30.8	332	$4.23	79.4	$2.54
2010	$0.95	30.5	29.0	384	$5.73	86.7	$2.99
2011	$1.00	28.5	22.1	351	$5.74	74.7	$3.21
2012	$1.00	21.8	20.9	335	$3.91	83.1	$2.83
2013	$1.50	16.6	15.4	305	$5.45	83.4	$4.22
2014	$1.20	17.9	29.1	411	$5.78	80.4	$3.10
2015	$0.50	40.5	36.2	405	$4.11	96.8	$2.41
2016	$0.76	29.5	37.6	406	$5.98	95.9	$2.93
2017	???	27.5	???	340 (F)	$6.05	98.7	???

[1] Figures in millions of sockeye.
[2] Figures in millions of pounds. 2017 global sockeye harvest represents a rough estimate of available forecasts.
[3] Average price for Atlantic salmon from Chile, D-trim fillets, 2-3lbs., FOB Los Angeles.
[4] Average price of frozen H&G Bristol Bay sockeye during harvest year cycle. 2016 data is incomplete.
Source: ADF&G, Urner Barry, Investing.com, and ADOR.

Explaining Retail vs. Ex-Vessel Pricing Movements

The connection between ex-vessel and retail price is often a point of confusion. This section explains why retail prices are generally more stable than those of the underlying commodity. Despite the differences in retail and ex-vessel pricing changes, the majority of commodity price changes are reflected in retail prices.

Ex-vessel sockeye prices are typically far more volatile than retail prices. However, this phenomenon is not unique to sockeye or even fish in general. The same situation applies to virtually all commodities. The underlying reason for the difference in price volatility between commodities and finished products is due to the fact that commodity value is just one component of retail prices for finished products.



Manufacturing, distribution, and retail costs are more stable than commodity prices. In general, the cost to transform raw materials into finished goods is relatively fixed over time. For example, the cost to produce/sell gasoline is similar whether crude oil costs $30/barrel or $130/barrel. These costs can change over time if particular segments of the supply chain become more or less efficient, but competitive forces are constantly working to ensure that production costs and profits are minimized in relation to the product's value to consumers.

One pound of round sockeye typically produces about a half pound of skin-on fillets. So if Alaska sockeye prices fall 46 percent from $1.53/lb. to $0.82/lb., as they did from 2014 to 2015, retail prices would be expected to fall by $1.33/lb. (($1.53/0.5 – $0.82/0.5)*.94 to account for shrink). If sockeye fillets are sold at retail for $11.00/lb. following the 2014 season, then retail prices would be expected to decline approximately 12 percent to $9.67/lb. An analysis of retail sales data for previous reports showed that the average retail price of sockeye fillets fell by $1.03/lb. The difference between expected and actual retail price decline could be explained by limitations with retail sales data, an increase in unsaleable product, or simply an increase in retail/wholesale margins.

This still doesn't explain why retail sockeye prices never change at some stores, even by one or two dollars. Everyday retail prices are often very different than the actual average price retailers receive, due to the frequency of discounting. Many grocery stores will keep everyday prices constant regardless of wholesale price fluctuations and use discounts to move more or less product. Discounts can have a significant effect on average pricing. During the 2015 sockeye sales season, 48 percent of sockeye fillets were sold at discounted prices.

Difference in Ex-Vessel Value and Price by Region

Key Finding: Price differentials between Bristol Bay sockeye and other Alaska sockeye generally improved in 2016, due to higher Bay prices compared to price movements in the Alaska Peninsula and Cook Inlet regions. Total ex-vessel sockeye value increased 54 percent in the Bay in 2016, but increased slightly for all other areas, collectively.

Ex-Vessel Price in Other Alaska Sockeye Fisheries

Bristol Bay sockeye prices increased relative to the average ex-vessel price of all other Alaska sockeye. The price differential between Bristol Bay reds and all other Alaska sockeye narrowed from 53 cents in 2015 to 40 cents in 2016. However, as the regional sockeye harvest composition changes, it is generally more instructive to examine pricing on a region vs. region basis.

Bristol Bay sockeye fishermen typically receive the lowest price of any region. Prince William Sound and Cook Inlet fishermen are paid the highest sockeye prices in Alaska. Kodiak sockeye prices are generally $0.20 to $0.50 per pound above Bristol Bay, while Alaska Peninsula prices tend to be within a dime of Bristol Bay prices.

The Bristol Bay sockeye price differential increased compared to Prince William Sound and Kodiak sockeye, but declined compared to sockeye from Cook Inlet and Alaska Peninsula. Bristol Bay's price differential with Prince William Sound has increased significantly since 2011 and 2012; however, it is important to note that the Sound's 2016 harvest volume was less than half of 2011 and 2012 harvests. Sockeye price in any region is dictated by market factors, but generally responds to harvest volumes in those areas as well. Smaller harvests usually mean a relatively higher price, and vice versa. As a result, it is important to consider both price and volume. Table 14 provides historical sockeye harvest volume by region.

Table 13. Ex-Vessel Price of Bristol Bay Sockeye versus Other Regions, 2011-2016

Region	2011	2012	2013	2014	2015	2016
Average Ex-Vessel Price/lb.						
Bristol Bay	**$1.17**	**$1.18**	**$1.61**	**$1.35**	**$0.64**	**$0.93**
Prince William Sound	$1.86	$1.82	$2.45	$2.42	$1.98	$2.33
Cook Inlet	1.42	1.46	2.18	2.11	1.54	1.51
Kodiak	1.53	1.47	1.82	1.83	0.93	1.30
Alaska Peninsula	1.24	1.26	1.66	1.41	0.75	0.99
Other Alaska Sockeye Avg.	**$1.47**	**$1.49**	**$1.96**	**$1.91**	**$1.17**	**$1.33**
Difference with Bristol Bay						
Prince William Sound	$0.69	$0.64	$0.84	$1.08	$1.34	$1.40
Cook Inlet	0.25	0.28	0.57	0.77	0.90	0.58
Kodiak	0.36	0.29	0.21	0.49	0.29	0.37
Alaska Peninsula	0.07	0.08	0.05	0.07	0.11	0.07
Other Alaska Sockeye Avg.	**$0.30**	**$0.31**	**$0.35**	**$0.57**	**$0.53**	**$0.40**
Other Alaska Sockeye as Pct. of Alaska Harvest	**46%**	**44%**	**48%**	**35%**	**33%**	**30%**

Note: Final prices, including bonuses and other supplemental payments.
Source: ADF&G.

Table 14. Harvest Volume of Bristol Bay Sockeye versus Other Regions, in Millions of Pounds, 2011-2016

Region	2011	2012	2013	2014	2015	2016
Bristol Bay	**134.7**	**119.1**	**92.3**	**161.7**	**192.6**	**200.9**
Prince William Sound	21.6	24.8	14.2	19.5	17.3	10.4
Cook Inlet	36.2	22.2	17.7	15.8	15.0	15.0
Kodiak	13.4	12.4	14.8	17.0	15.0	10.6
Alaska Peninsula	16.8	16.4	17.3	19.1	33.3	33.8
Other Alaska Sockeye Total	**114.0**	**94.6**	**85.7**	**84.8**	**95.6**	**86.6**

Note: 2016 is preliminary.
Source: ADF&G.

Ex-Vessel Value of Other Alaska Sockeye Fisheries

Even though Bristol Bay sockeye prices remained low, compared to Prince William Sound and Cook Inlet, the difference in total ex-vessel value is an important consideration. Although sockeye prices in Bristol Bay generally fell by a larger percentage from 2013 to 2015, total ex-vessel value has generally been higher in Bristol Bay compared to other regions. Larger harvests in Bristol Bay have helped maintain total value in the Bay, while other areas have not harvested enough sockeye to keep pace despite relatively higher prices.

Table 16 summarizes the total ex-vessel value of Alaska sockeye from key producing areas. Bristol Bay fared better than other sockeye producing areas in 2016. Sockeye value increased 54 percent in the Bay during 2016, compared to the previous year. Meanwhile, the collective value of other Alaska sockeye fisheries increased marginally in 2016. This is primarily due to lower sockeye harvests in Prince William Sound and Kodiak.

Table 15. Ex-Vessel Value of Bristol Bay Sockeye versus Sockeye from Other Alaska Regions, in $Millions, 2011-2016

Region	2011	2012	2013	2014	2015	2016
Pr. William Sound	$39.4	$45.4	$34.0	$47.5	$35.5	$24.2
Cook Inlet	50.1	32.2	37.4	32.8	22.9	22.6
Kodiak	20.5	18.3	26.9	31.1	13.9	13.8
Alaska Peninsula	20.9	20.5	28.4	26.8	23.5	33.5
Other AK Sockeye	**$157.7**	**$134.4**	**$163.8**	**$159.8**	**$112.4**	**$115.0**
Bristol Bay	**$154.7**	**$139.7**	**$148.7**	**$209.6**	**$121.2**	**$186.9**

Note: Final values, including bonuses and other supplemental payments. Data for 2016 is estimated.
Source: ADF&G and McDowell Group estimates.

Although Bristol Bay fishermen typically receive lower sockeye prices than other regions, the average gross earnings per active permit is generally closer than the price differentials between the fisheries due to larger harvest volumes in Bristol Bay. Over the past five years with available data (2011-2015), Bristol Bay's driftnet fishermen had average earnings below those of the Prince William Sound and Alaska Peninsula driftnet fishermen, but well above Cook Inlet driftnet fishermen and Kodiak setnetters.

Table 16. Ex-Vessel Value of Bristol Bay Driftnet Fishery versus Other Alaska Sockeye Fisheries, Average Gross Earnings per Active Permit, 2011-2015

Region	2011	2012	2013	2014	2015	2011-2015 Avg.
Pr. William Sound (S03E)	$97,774	$115,502	$99,087	$104,137	$72,747	$97,849
Cook Inlet (S03H)	65,753	61,586	50,868	44,148	20,158	48,503
Kodiak (S04K)	32,200	55,591	62,797	61,369	30,862	48,564
Alaska Peninsula (S03M)	79,766	85,071	109,085	124,388	83,262	96,314
Bristol Bay (S03T)	**$86,325**	**$77,954**	**$85,687**	**$118,241**	**$67,885**	**$87,218**

Note: Final values, including bonuses and other supplemental payments. Final data for 2016 was unavailable.
Source: CFEC.

Table 17. Performance in Bristol Bay Salmon Driftnet Fishery, 2000-2016

Year	Harvest Volume (Millions lbs.)	Active Permits	Ex-Vessel Value ($Millions)	Average Gross Earnings per Active Permit	Final Average Sockeye Price
2000	104.7	1,823	$68.4	$37,527	$0.67
2001	80.6	1,566	32.4	20,699	0.42
2002	54.2	1,184	25.4	21,480	0.49
2003	78.5	1,424	38.0	26,685	0.51
2004	131.2	1,411	65.7	46,541	0.51
2005	135.6	1,447	80.6	55,673	0.62
2006	153.5	1,475	96.1	65,128	0.66
2007	153.9	1,468	98.1	66,836	0.67
2008	139.1	1,469	100.1	68,169	0.75
2009	156.5	1,444	122.0	84,492	0.80
2010	147.2	1,494	134.1	89,784	1.07
2011	114.3	1,524	131.6	86,325	1.17
2012	103.8	1,513	117.9	77,954	1.18
2013	84.4	1,488	127.5	85,687	1.61
2014	140.5	1,541	182.2	118,241	1.35
2015	165.0	1,545	104.9	67,885	0.63
2016*	169.7	1,538	157.8	102,620	0.93

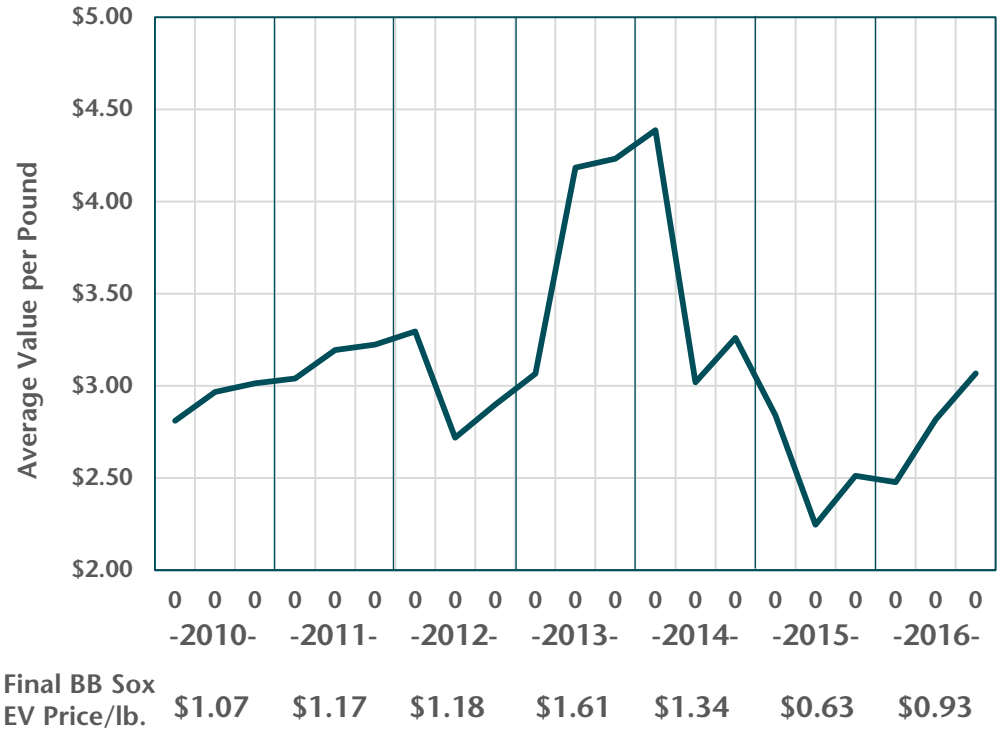
*2016 figures are preliminary.
Sources: CFEC, ADF&G, and McDowell Group estimates.

Table 18. Estimated Market Value of Bristol Bay Salmon Driftnet Permits, 2014-2017

Month-Year	Estimated Market Value
January 2014	$133,000
February 2014	133,900
March 2014	140,400
April 2014	144,700
May 2014	148,400
June 2014	148,600
July 2014	148,400
August 2014	148,200
September 2014	156,400
October 2014	165,500
November 2014	164,200
December 2014	162,400
January 2015	166,100
February 2015	168,100
March 2015	169,900
April 2015	163,000
May 2015	156,800
June 2015	150,500
July 2015	145,000
August 2015	145,100
September 2015	136,300
October 2015	122,000
November 2015	114,600
December 2015	112,500
January 2016	109,000
February 2016	104,200
March 2016	96,100
April 2016	98,800
May 2016	103,600
June 2016	110,000
July 2016	113,900
August 2016	117,100
September 2016	120,200
October 2016	122,400
November 2016	123,000
December 2016	132,200
January 2017	130,900
February 2017	131,100
March 2017	131,700
April 2017	133,700

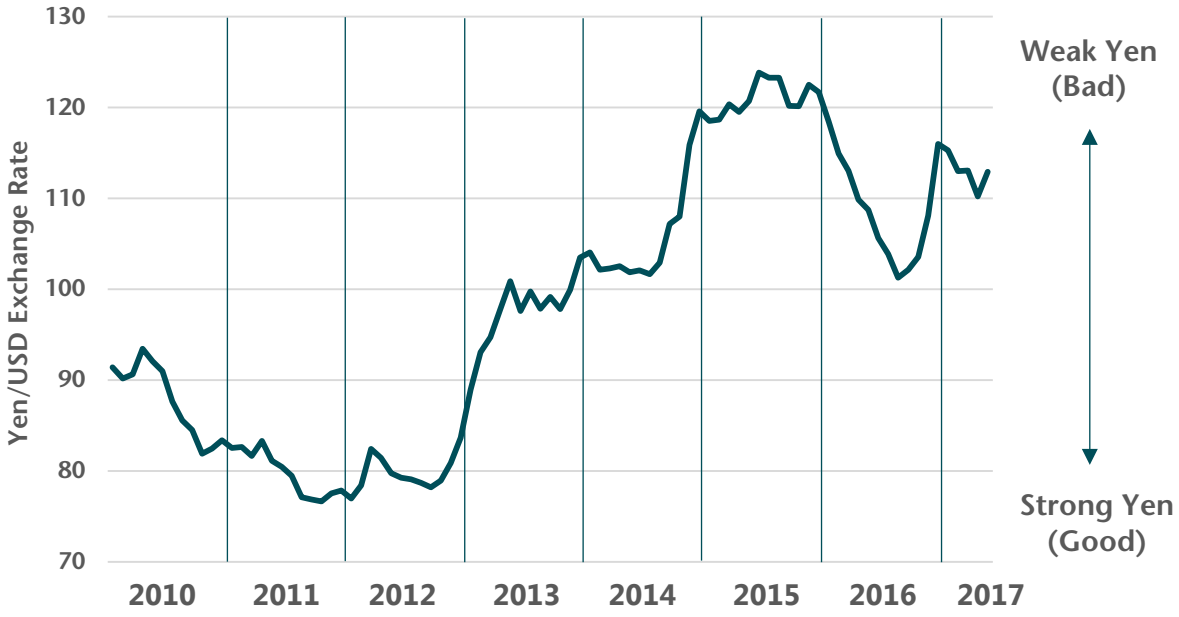
Source: CFEC.

Figure 11. Average First Wholesale Value per Pound of Bristol Bay Frozen H&G Sockeye, by Trimester and Average Final Ex-Vessel Price for Bristol Bay Sockeye, 2010-2016

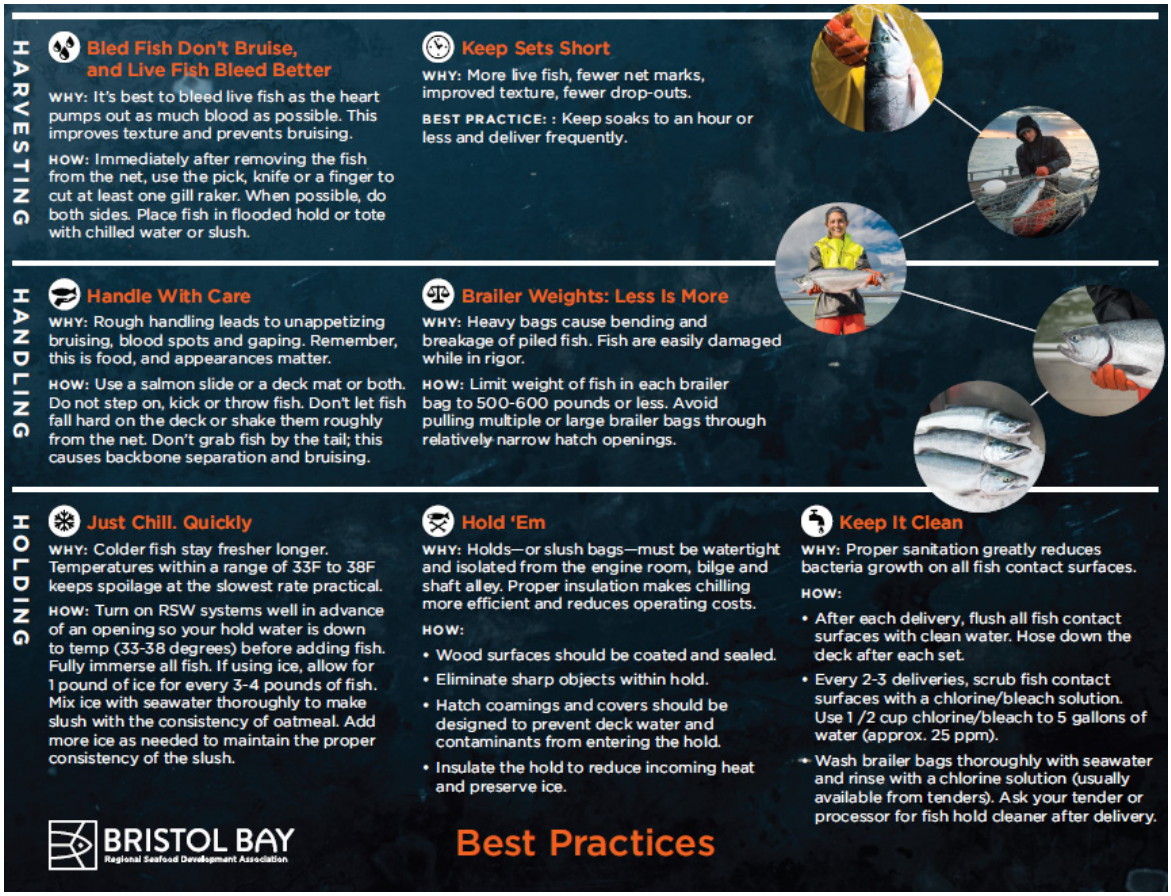


Source: ADOR (ASPR) and ADF&G (COAR).

Figure 12. Japanese Yen to U.S. Dollar Exchange Rate, 2010-2017



Source: OANDA.com.



Outreach material developed as part of BBRSDA's 2017 Quality Campaign promoting best practices to the fleet.