Spring 2016

Sockeye Market Analysis

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PREPARED FOR:

BRISTOL BAY
REGIONAL SEAFOOD DEVELOPMENT ASSOCIATION

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).

Cover images courtesy of Alaska Seafood Marketing Institute.

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Spring 2016

Prepared for:

BBRSDA

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June 2016

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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, discuss impacts on Bristol Bay fishermen and examine historical trends. Key findings are listed below:

Summary of Key Findings

- Bristol Bay sockeye prices are expected to increase somewhat in 2016 due to a smaller forecast and improving market conditions for Alaska sockeye producers (fishermen/processors) relative to last spring. However, analyses conducted for this report and expert interviews suggest it is unlikely that prices will jump back to pre-2015 levels this year.
- Cash flow was a major consideration for processors entering last year. Increasing sales revenue and lower ex-vessel payments in 2015 have improved processors' financial position, but the processing sector is still recovering from two poor years (calendar years 2014-2015). (See pages 24-27).
- Most supply and inventory factors also support an outlook for higher sockeye prices this year (with the notable exception of canned inventory):
    - Bristol Bay's sockeye forecast is down 27 percent (from last year's forecast). Sockeye forecasts in other parts of Alaska suggest a combined harvest similar to last year. Sockeye fisheries in Russia's Kuril Islands, Canada, and the Pacific Northwest are likely to be closed this year.
    - Atlantic salmon production is expected to decline by 6 percent in 2016 and Chilean coho production is expected to decline by 24 percent, primarily due to a deadly algal bloom that killed over 20 million salmon in Chile.
    - Frozen sockeye inventories are (reportedly) minimal compared to the last couple years; however, larger canned sockeye inventories persist.
- Wholesale prices for frozen flesh products were steady to higher late in 2015, halting a downward trend extending back to late 2013. Prices of farmed Atlantic salmon have jumped in recent months due to culling in Chile following the algae-related die off. Urner Barry's Fresh Farmed Salmon (Price) Index is up 37 percent since January. Canned sockeye prices continue to trend downward, but canned sales volumes are improving. (See pages 12-23).
- Low sockeye prices and successful promotions at retail (ASMI in-store demos) and foodservice (Red Lobster sockeye) have increased demand heading into the 2016 season; the big question is how well demand will hold up if/when prices increase.
- After a couple years of dramatic currency shifts that hurt Alaska seafood producers, the U.S. dollar has weakened considerably versus the Japanese yen and slightly versus the euro over the past twelve months. All things equal, a weaker U.S. dollar is good for Alaska salmon producers. (See pages 32-33).

Market Conditions: Better but Not Great

Despite some positive developments, fishermen should have tempered expectations about sockeye market conditions heading into the 2016 season. While the loss of production in Chile, a weaker U.S. dollar (vs. the yen/euro), and less expected sockeye supply will improve pricing prospects this year, most market factors are still far from the levels that produced high sockeye prices just a few years ago. The table below illustrates historical ex-vessel prices for Bristol Bay sockeye versus key pricing factors:

Table 1. Historical Bristol Bay Sockeye Prices vs. Key Pricing Factors

Harvest Yr.	BB Sockeye EV Price/lb.	BB Sockeye Forecast[1]	Sockeye Supply[2]	U.S. ($$) Index[3]	Canned Red Price[4]	Farmed Salmon Index[5]	Previous Avg. Net Processing Revenue[6]
2009	$0.80	24.0	326	84.7	$72.77	$3.92	$156
2010	1.07	30.5	373	81.9	67.13	5.15	181
2011	1.17	28.5	337	73.0	78.71	5.29	202
2012	1.18	21.8	329	78.8	91.73	4.05	208
2013	1.61	16.6	301	83.3	103.32	5.00	190
2014	1.34	17.9	379	79.5	122.67	5.06	156
2015	0.63	40.5	397	94.8	89.35	3.50	110
2016	???	29.5	N/A	93.0	*69.13*	5.24	*139*

[1] In millions of fish.
[2] In millions of pounds. Data for 2015 is preliminary.
[3] Closing DXY index as of April during each harvest year, a lower number indicates a weaker U.S. dollar which is good for Alaska sockeye producers. Higher index figures are bad for Alaska sockeye producers.
[4] Average first wholesale price of canned red halves per 48-count case sold during the first trimester in each harvest year. Data for 2016 represents average price for the most recent available period (Sep-Dec 2015).
[5] Urner Barry Farmed Salmon Price Index in May of each harvest year.
[6] Average net processing revenue for Bristol Bay sockeye during the previous two annual sales cycles in $millions, 2016 figure has been estimated due to lack of data available for final trimester during the 2015 sales cycle.
Note: All figures are shown in nominal terms (i.e. not adjusted for inflation).
Sources: ADF&G, FAO, NPAFC, PACFIN, Urner Barry Comtell, ADOR, and McDowell Group estimates.

Retail Pricing Analysis

Average U.S. retail prices on sockeye fillets fell 9 percent to $9.98/lb. during the 2015 sales cycle (May 2015 – April 2016). Much of the decline in retail pricing has been driven by an expansion in discounts and promotions. The volume of sockeye fillets sold at retail for a discount increased 18 percent during the 2015 sales cycle, and the price of discounted sockeye fillets fell $1.20/lb. The average price of undiscounted product declined $0.79/lb. during the 2015 sales cycle. However, some stores have likely kept everyday prices constant, while choosing to offer more frequent and/or steeper discounts on sockeye fillets – a strategy which still results in a lower average retail price.

U.S. retailers have passed on most of the savings from lower raw material (i.e. ex-vessel) prices, though not all. Retail sockeye fillet prices fell approximately $1.03/lb. during the 2015 sales cycle (compared to the previous cycle). Meanwhile, the cost of raw material (i.e. ex-vessel cost) included in a one-pound sockeye fillet fell from approximately $2.89 to $1.52 – a difference of $1.36/lb. However, this type of retail pricing behavior is not uncommon. Retail meat/fish prices tend to lag behind changes in prices for the underlying commodity. Further, retailers tend to pass on less of the savings from lower raw material costs but also pass on less of the additional cost when commodity prices for meat/fish increase. This makes retail prices less volatile from the consumers' perspective.

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 Development Corporation
EV	Ex-Vessel terms
COAR	Commercial Operators Annual Report (published by Alaska Dept. of Fish and Game)
CY	Calendar Year
DFO	Canadian Department of Fisheries and Oceans
FAO	United Nations Fisheries and Aquaculture Organization
FW	First wholesale terms
H&G	Headed and gutted
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 a processor to an entity outside of their affiliate network. Typically refers to the value of product as it leaves Alaska.
Round Weight	The weight of a whole fish as it is delivered to the processor in an uncut and unprocessed state.
Annual Sales Cycle	Refers to the approximate period following a salmon harvest season when most salmon product is sold by processors to wholesale markets. Since data from the ASPR is released and aggregated into four-month periods (trimesters), the sockeye sales season runs from May of the harvest year through April of the following year. The majority of sockeye products produced during the harvest year are sold in the first wholesale market during this period (reflecting sales in trimesters two and three of the harvest year, and the first trimester 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.
Net Processing Revenue	The difference between first wholesale revenue earned by primary processors during the annual sales cycle, less ex-vessel payments to fishermen during the corresponding period. Also referred to as gross processing profit in previous reports.

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. This is the sixth report in the series.

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 16 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 and video materials prepared at the direction of BBRSDA Board and staff. The project tracks important 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). Point-of-purchase (POP) data was purchased from IRI, Inc. to inform the retail market analysis. McDowell Group also conducted several executive interviews with industry contacts.

Findings in this report rely heavily on public data sources, compiled from published sources and custom data requests. Ex-vessel value data are drawn primarily from fish tickets, which document transactions between fishermen and processors. First wholesale data is not based on individual transactions, but is self-reported by processors in an aggregated form to state and federal agencies. These submissions are cross-checked against each other to find potential errors, omissions, and other outliers; however, a comprehensive audit of first wholesale data is not feasible due to a lack of comparable data and budgetary constraints. Although first wholesale data represents self-reported information, McDowell Group found general trends in first wholesale volume, value, and pricing are consistent with trends observed in other data sources such as export data, trade press reports, and subscription-based pricing services. Further, comparisons of harvest volume and ex-vessel value also suggests first wholesale data pertaining to Alaska salmon collected by State agencies provides an accurate depiction of market conditions in the first wholesale market.

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 2014 is used as a supplementary information source in this sockeye market analysis.

The COAR reports 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, publically 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-purchase 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.

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.

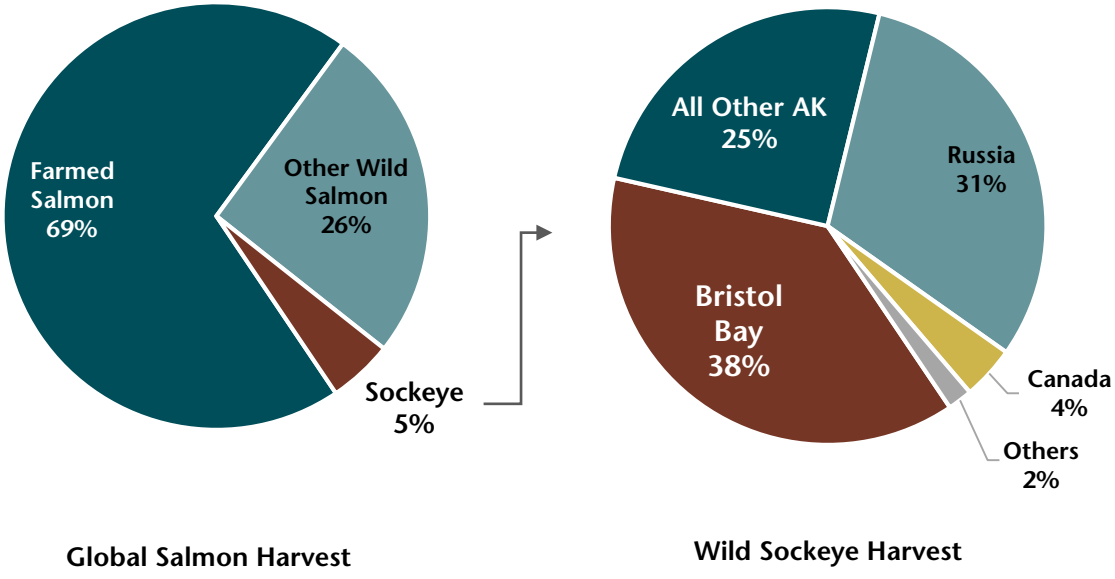
KEY FINDINGS:

- Sockeye production is expected to decline, due to lower forecasts in Alaska.
- Farmed Atlantic production is projected to decline 6 percent, and Chilean coho production is expected to be down 20 to 30 percent – primarily due to a toxic algae bloom in Chile.

Sockeye

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 13 to 20 percent of wild salmon harvests. Between 2011 and 2014, sockeye accounted for 5 percent of the world's salmon harvest by volume and 16 percent of the world's wild salmon harvest.

Figure 1. Global Salmon Harvest and Sockeye Harvest by Region, 2011-2014 Average



Source: ADF&G, FAO, and PACFIN.

Bristol Bay accounted for 38 percent of global sockeye production between 2011 and 2014. However, over the past 25 years, the Bay produced 44 percent of the world's sockeye harvest (based on available data). 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 40 million pounds range once every four years, with the last large harvest occurring in 2014.

Global sockeye harvests fell to 301 million pounds in 2013, the lowest figure since 2003. Harvests increased 78 million pounds in 2014 (based on final harvest data), the largest production figure since the mid-1990s. The sudden shift in supply during 2014, in addition to other factors, dramatically affected market conditions and led to lower prices. Preliminary estimates suggest sockeye harvests increased by approximately 18 million pounds in 2015, with Bristol Bay accounting for nearly half of worldwide sockeye production.

Table 2. Global Sockeye Harvest by Major Region, Millions of Pounds, 2010-2015

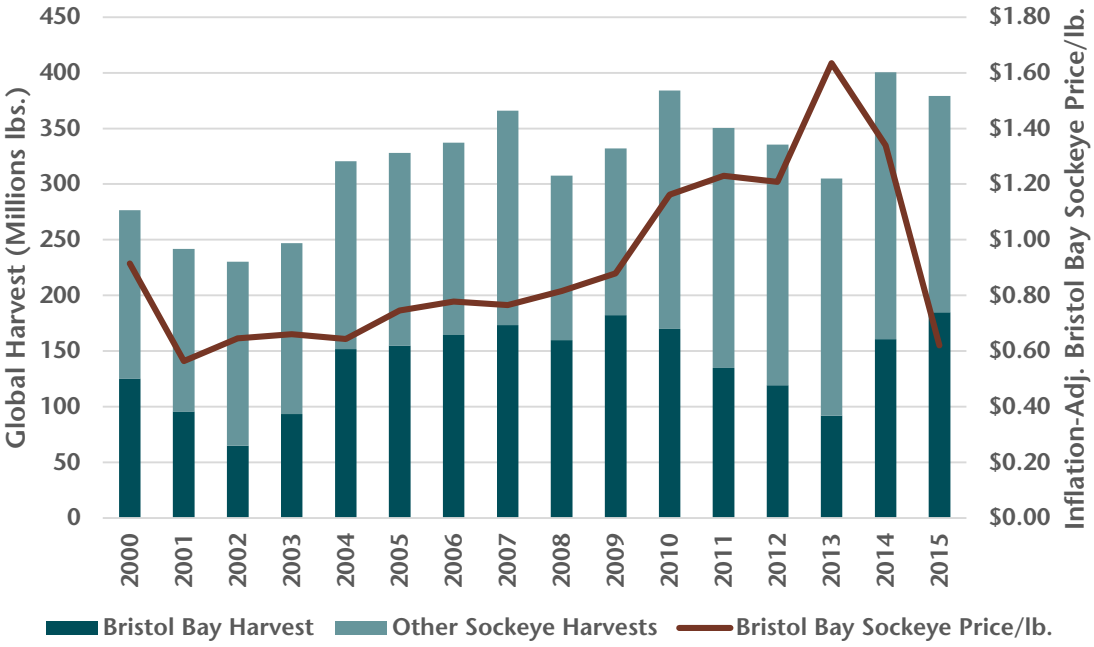
	2010	2011	2012	2013	2014	2015P
Alaska Total	238	239	212	178	242	288
Bristol Bay	177	136	126	100	161	192
Other AK Areas	61	104	85	78	81	96
Other U.S. States	11	2	1	0	3	0
Russia	80	90	112	122	92	103
Canada	44	7	5	1	42	6
Total	**373**	**337**	**329**	**301**	**379**	**397**
Bristol Bay Pct.	**48%**	**40%**	**38%**	**38%**	**42%**	**48%**
Bristol Bay Sockeye Average Ex-Vessel Price	**$1.02**	**$1.15**	**$1.13**	**$1.51**	**$1.35**	**$0.63**

Note: Data for 2015 is preliminary.
Source: ADF&G, FAO, NPAFC, and PACFIN.

Sockeye supply clearly has an impact on ex-vessel pricing (see Table 2 above and Figure 2 on the following page). Bristol Bay sockeye prices generally show a strong inverse correlation to sockeye supply in recent years. Prices spiked from 2010 through 2013 as Bristol Bay harvests and global production generally declined. Sockeye prices were also aided during this period by a weaker dollar. Bristol Bay sockeye prices have fallen dramatically since then as harvests have increased in Bristol Bay driving global production higher. The U.S. dollar has become much stronger since 2013 as well, putting additional downward pressure on Bristol Bay sockeye prices (see page 31 for more information).

See figure on following page.

Figure 2. Global Sockeye Harvests and Bristol Bay Ex-Vessel Sockeye Prices, 2000-2015



Note: Prices include bonuses and other supplementary payments. Final prices for 2015 have been estimated.
Source: ADF&G, FAO, and McDowell Group estimates.

Global sockeye production is expected to decline in 2016, due to lower projected harvest in Alaska. Early projections for Russian sockeye production suggest an increase, though probably not enough to offset the forecasted downturn in Alaska harvests (assuming the forecast is met). Canada is expected to see poor sockeye returns, even by "off-year" standards for the Fraser River system.

Other Salmon Species

Sockeye salmon products compete with other various salmon species in the marketplace. Therefore, supplies of farmed Atlantic salmon, farmed/wild coho salmon, and wild pink salmon also influence the value of Bristol Bay sockeye. Notable supply-related developments of key competing species are discussed below.

Farmed Atlantic Salmon

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

Kontali Analyse estimates farmed Atlantic salmon production will contract by 6 percent in 2016, primarily due to a toxic algae bloom in Chile that killed more than 100,000 metric tons of salmon in early March.[1] Lost production from the algal bloom is equal to 12 percent of Chile's estimated annual production, and production

[1] http://www.seafoodnews.com/Story/1010142/Toxic-Algae-Bloom-Deepens-Impact-on-Chile-Salmon-Will-Push-Down-This-Years-Production-13-percent-

could decline further later in the year according to experts interviewed for this report. Chilean producers are expected to lose $800 million worth of production (of all salmon species).

Atlantic production was expected to contract even prior to the "red tide" event in Chile, due to a reduction in Norwegian biomass as producers attempt to mitigate impacts from sea lice.

A top Nordic Bank said 2016 will bring a "global supply shock" following the "massive" salmon mortalities in Chile.[2] As if the March algae bloom wasn't enough, Chilean producers are taking additional losses due to a fishermen's strike and a new algae bloom in the country's largest salmon producing region.[3]

Any decrease in Atlantic salmon production tends to have significant ramifications on the salmon market as farmed production has generally increased each year outside of an ISA outbreak in Chile during the late 2000s. Atlantic salmon production increased by an average of 8.7 percent per year between 2010 and 2015. However, Nordea Bank expects Atlantic salmon production to be flat over the next five years. Various estimates for 2017 suggest flat to lower production.

The Chilean algal bloom and sea lice issues in Norway are expected to contain Atlantic salmon production growth for the foreseeable future, resulting in higher price projections for farmed salmon. Nordea Bank recently stated, "We expect the effect (of global supply shocks) will be a massive re-pricing, first for Chilean salmon in the US and Brazil, and then in Europe, bringing prices not seen since the 1980s." However, these estimates refer to the price of salmon denominated in other currencies (primarily the Norwegian kroner). If the U.S. dollar remains strong versus currencies of key buyers and competing producers, the effect of increasing prices for farmed salmon could be muted when translated into U.S. dollars.

Farmed Coho Salmon

Chile produced 159,000 metric tons (350 million lbs.) of farmed coho salmon in 2014, representing the vast majority of global farmed coho production. Chilean coho compete directly with Alaska sockeye in Japanese markets and other niche markets around the world. Coho production is trending down due to multiple natural disasters in Chile.

According to Salmonex, a company that operates a futures exchange on salmon in Chile, the country is expected to lose 24 percent of its coho production (82 million lbs.).[4] Exports of Chilean coho into Japan have remained high, but are expected to decline later in the year as production declines transition to the wholesale market. This development comes on the heels of a volcano eruption which led to lost coho production last year.

Wild Pink Salmon

Canned pink salmon influences the value of canned sockeye salmon products. Pink harvests in Alaska were extraordinarily large in 2013 and 2015, leading to a substantial increase in canned pink production. Pink

[2] https://www.undercurrentnews.com/2016/03/11/nordea-global-supply-shock-on-chile-salmon-mortalities-will-see-prices-skyrocket/
[3] http://www.intrafish.com/news/article1439972.ece
[4] http://www.seafoodnews.com/Story/1011092/Salmonex-says-Chile-Algae-Bloom-will-Depress-Harvests-Through-2018-Upside-Seen-with-Higher-Prices

harvests tend to be larger in odd years, and this year's "off-year" forecast suggests a significant drop in harvest volume for Alaska pink salmon compared to 2015.

ADF&G's salmon forecast predicts this year's pink salmon harvest will be slightly larger than recent even-year harvests. However, an analysis of recent forecasts versus actual harvests suggests there may be upside potential in this year's pink forecast. In four of the previous six years, the pink salmon forecast was below the actual harvest. On average, actual pink salmon harvests have exceeded preseason forecasts by 32 percent over the past six years. The tendency to under-forecast is particularly stark for even-year harvests of PWS pink salmon. Forecasts for Southeast Alaska and the Alaska Peninsula and Aleutian Islands region are significantly above the previous ten year average harvest.

Wholesale Sockeye Market Analysis

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:

- Lower supply expectations for sockeye and farmed salmon has led to rising prices in recent months
- Unit values for frozen H&G, frozen fillet, and roe increased slightly in the final 2015 trimester compared to the previous trimester
- The U.S. dollar has weakened versus the yen and euro since last spring

These factors suggest wholesale prices for frozen product forms will likely improve in the near future, though canned sockeye prices continue to trend down. Current market conditions, relative to last spring, suggest an improving outlook for Bristol Bay sockeye ex-vessel prices.

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 3. Major Bristol Bay Product Forms and Markets

Product Form	Major Markets	Pct. of First Wholesale Value - 2014
Frozen H&G	Japan, Europe, and North America	42%
Canned Salmon	UK, Canada, U.S., and Australia	32%
Frozen Fillets	U.S.	21%
Roe	Japan	5%

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

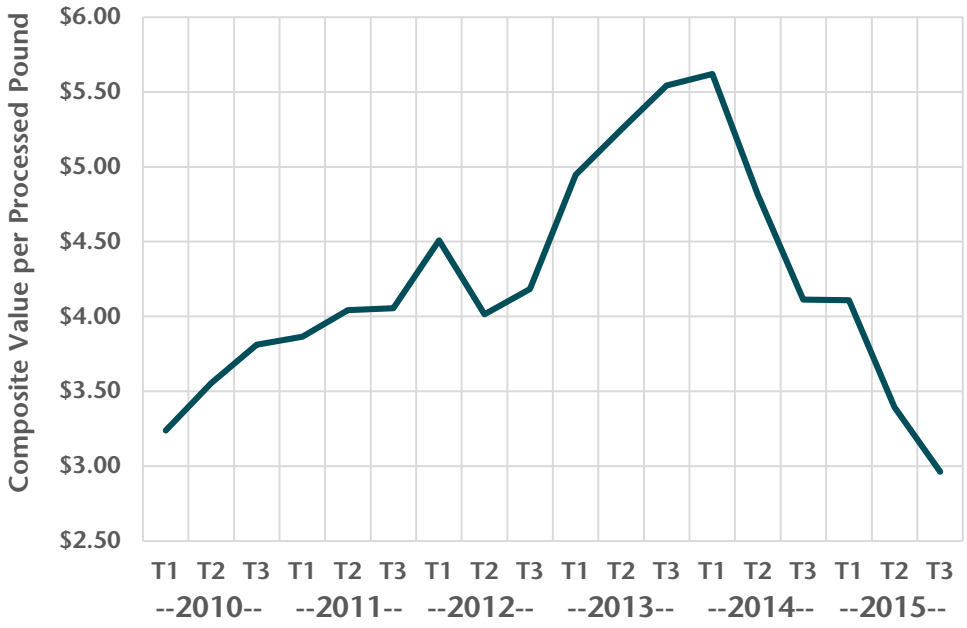
Wholesale Market Analysis for Key Sockeye Products

Wholesale prices for all key sockeye products remain well below peak prices witnessed during late 2013, but market conditions are improving for Alaska sockeye processors. Prices for frozen product forms increased slightly during the most recent trimester with available data, and although canned prices continue to trend lower canned sales volumes are up in 2015 (even after accounting for the large purchase by USDA).

Lower prices on sockeye products have expanded demand in recent years, setting up a potential mismatch between supply and demand in 2016 due to a lower Alaska sockeye forecast and expectations of less competing supply from farmed Atlantic and coho salmon.

Although prices for frozen products improved during the last trimester in 2015, the average value per pound of all major processed sockeye products declined due to lower canned prices (see Figure 3). Ex-vessel prices tend to track movements of average first wholesale prices. The average first wholesale value per pound across all product forms is down 38 percent from the peak while ex-vessel prices of Alaska sockeye fell 47 percent in 2015 compared to the prior year.

Figure 3. Average First Wholesale Value per Pound, All Major Alaska Sockeye Products, by Trimester, 2010-2015



Final Ex-Vessel Price for Alaska Sockeye (Average)

2010	2011	2012	2013	2014	2015
$1.20	$1.31	$1.31	$1.78	$1.54	$0.81

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

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 substantial discount to medium and larger sized product. Therefore, an increase in the number of small sockeye (as there was during 2014/2015) 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

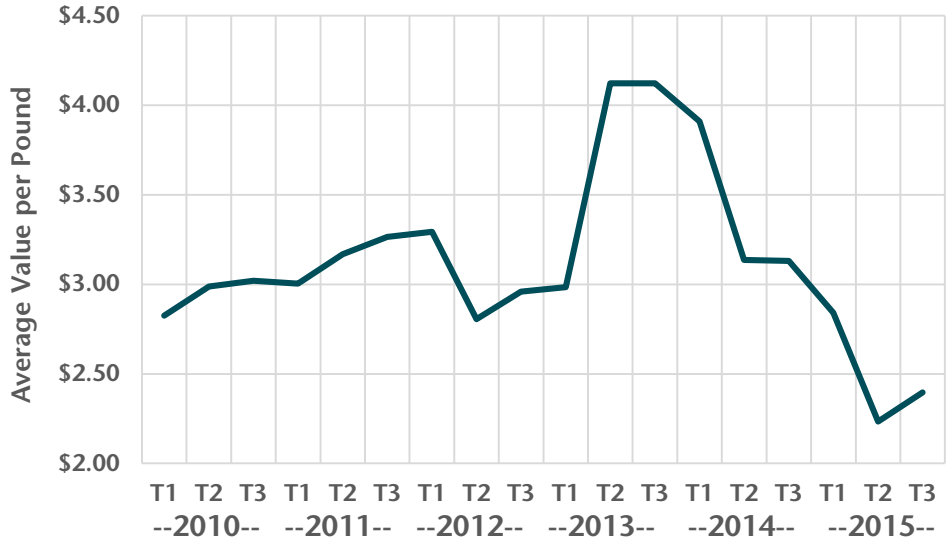
KEY MARKETS: JAPAN, EUROPE, AND NORTH AMERICA
PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2014): 42 PERCENT

Prices for frozen H&G Bristol Bay sockeye are likely to increase during the 2016/2017 sales season due to reversals in several key market conditions compared to this time last year:

- Supplies of frozen sockeye and competing products are expected to tighten as 2016 progresses
- The U.S. dollar has weakened substantially versus the yen (13.4%) and weakened slightly versus the euro (2.0%) – a weak dollar benefits Alaska seafood producers
- Inventory positions are lower heading into 2016 season
- Sockeye promotions are up, particularly in the U.S.
- Average retail prices (after including sales of discounted product) are down
- More Alaska sockeye production will have MSC certification in 2016, providing broader market access in Europe.

Frozen sockeye prices increased sharply from early 2013 through early 2014, due to smaller harvests and a weak dollar. Harvest volumes increased significantly in 2014/2015 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. However, unit values ticked up during the most recent trimester, based on available data (T3-2015) – the first increase in over two years.

Figure 4. Average First Wholesale Value per Pound, Frozen H&G Alaska Sockeye, by Trimester, 2010-2015



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

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

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

First wholesale pricing data available through the Alaska Department of Revenue's Alaska Salmon Price Report contains sales data through December 2015. Sales data for the January-April 2016 trimester will be released in mid-June, and as such was not available for this report. However, an online wholesale marketplace called Tradex Live provides some visibility on recent pricing activity for frozen H&G sockeye. Prices on the most common 4-6 lb. category have generally been flat since December 2015.

Tradex data can also be used to show average prices of various frozen H&G sockeye sizes. Table 4 provides average prices for the three major size categories. Over the last six months (mid-November through mid-May) prices on smaller frozen H&G sockeye averaged $2.53/lb. – a 20 percent discount over the 4-6 lb. category. Larger fish (above 6 lbs.) averaged $3.78/lb. – 19 percent premium over the 4-6 lb. category. While informative, these price offerings represent only a small sample of total frozen H&G sales and volumes likely do not reflect the relative volume of product available for each size category.

Due to lower fish sizes for Bristol Bay sockeye, the percentage of smaller sized product is likely much greater than suggested by Tradex data. Anecdotal reports suggest the vast majority of smaller frozen sockeye are exported to Japan. Japan imported 35.1 million pounds of frozen sockeye between July 2015 and March 2016 (the most current month of export data available). These exports were valued at $2.16/lb., on average. For context, Alaska processors produced 111.9 million pounds of frozen H&G sockeye during the 2015 season and sales made between May 2015 through December 2015 to all markets averaged $2.33/lb. It should be noted that Tradex data may not be comparable to ASPR data as offers may come from secondary wholesalers and are generally listed as FOB Seattle, whereas ASPR data reflects the value of salmon as it leaves Alaska. Product incurs additional storage, shipping, and sales costs as it moves through the wholesale segment of the supply chain.

Table 4. Average Frozen Alaska H&G Sockeye Price of Product Offered on Tradex Live, Last 6 Months

	Avg. Price	Pounds Offered
Under 4 lbs.	$2.53	96,220
4-6 lbs.	$3.18	1,201,000
Above 6 lbs.	$3.78	204,900

Source: Tradex Live, compiled by McDowell Group.

First wholesale sales volumes are up significantly in recent months (see Table 5). Sales were somewhat delayed in 2014, as a result of the large Fraser river harvest in Canada. In comparison, frozen H&G production sold faster during the second and third trimesters in 2015. Frozen H&G export volumes and U.S. retail sales of sockeye fillets are increasing as well. If these trends continue, the increase in sales volume should result in lower inventories of frozen H&G sockeye heading into the 2016 season.

Table 5. First Wholesale Sales Volume of Frozen H&G Alaska Sockeye, by Trimester, Millions of Pounds, 2010-2015

	2010	2011	2012	2013	2014	2015	Pct. Change YoY
Trimester 1 (Jan.-Apr.)	8.4	7.8	6.6	3.0	3.4	10.5	+207%
Trimester 2 (May-Aug.)	50.3	36.5	26.1	18.3	13.8	38.9	+182%
Trimester 3 (Sep.-Dec.)	24.6	33.2	29.3	17.5	29.6	54.6	+84%

Source: ADOR (ASPR).

Canned Alaska Sockeye

KEY MARKETS: UK, CANADA, U.S., AND AUSTRALIA
PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2014): 32 PERCENT

Factors influencing sales volume and pricing for canned Alaska sockeye:

- Inventory expanded between 2013 and 2015, as large runs and run timing led to substantial production increases of canned product forms
- USDA's $30 million purchase of 879,200 cases of half-can product was a major sales driver in late 2015
- Sales volume of canned salmon tends to expand/contract slower than frozen product forms

Unit values of canned Alaska sockeye are down 33 percent from the peak in early 2014 (see Figure 5). Bristol Bay typically produces at least two-thirds of the state's total canned red salmon pack, and in some years accounts for more than three quarters of total production. As a result, the region has more exposure to the canned red salmon market than other sockeye fisheries.

Figure 5. Average First Wholesale Value per Pound, Canned Alaska Sockeye – Half Cans, by Trimester, 2010-2015

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

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

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

Figure 6 on the next page compares canned sockeye production with first wholesale sales volume over the ensuing 12-month period (except 2015, which represents 8 months of data). Canned sockeye production spiked in 2014 due to the surprisingly large Bristol Bay run. Despite a larger sockeye harvest in 2015, canned production declined as processors directed more production to frozen product forms.

Sales data for the 2015 sales cycle[5] only includes 8 months of data as the January-April trimester is not available until mid-June. However, canned sockeye sales are up through the first 8 months of the Alaska salmon sales cycle. Canned sales volumes during the first 8 months of the 2015 sales season posted a 73 percent increase (compared to the same period in 2014). Much of the 2015 sales increase was driven by a 10 million pound, $30 million purchase by the USDA to supply food aid programs. Not including the federal purchase, May-December sales posted a 5 percent gain compared to the same period in the prior year. This adjustment paints a less rosy picture of canned sockeye sales trends but the fact that sales increased at all outside of the big federal purchase is still encouraging. Alaska processors need to sell more volume, to any type of buyer, in order to reduce inventories which spiked following the 2014 season.

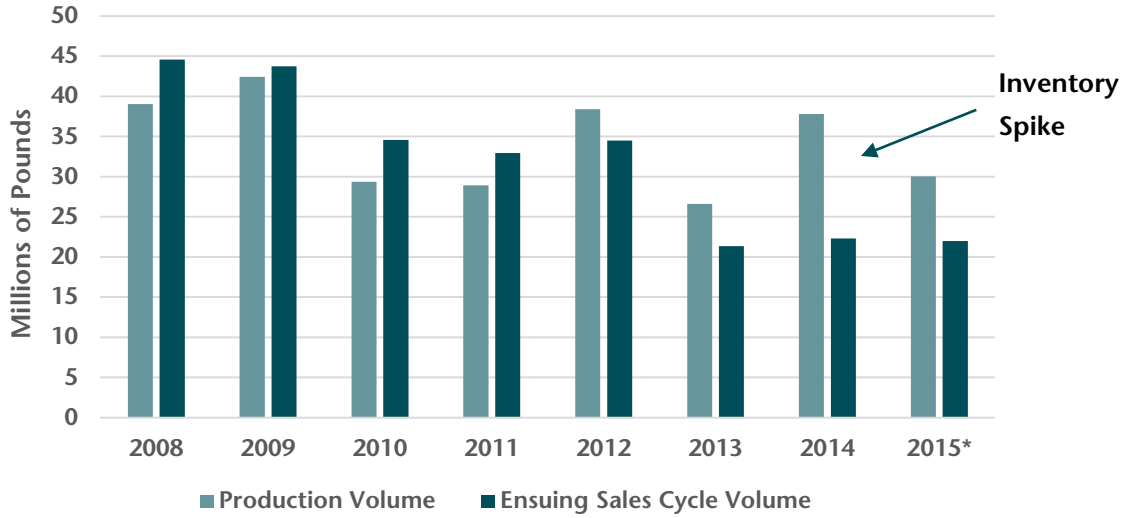
Table 6. First Wholesale Sales Volume of Canned Sockeye, by Trimester, Millions of Pounds, 2010-2015

	2010	2011	2012	2013	2014	2015	Pct. Change YoY
Trimester 1 (Jan.-Apr.)	17.1	11.8	9.1	10.3	7.0	11.7	+69%
Trimester 2 (May-Aug.)	10.1	7.6	4.9	4.4	5.4	8.8	+62%
Trimester 3 (Sep.-Dec.)	17.6	20.0	25.4	15.0	9.1	16.3	+79%

Note: Figures include product listed as "other thermal", which is primarily non-standard can sizes or specifications (e.g. skinless/boneless).
Source: ADOR (ASPR).

Prior to 2014, canned sockeye production generally matched sales volumes ahead of the next season. Not coincidentally, canned sockeye prices peaked in early 2014 and fell precipitously following the larger-than-expected 2014 harvest. Most of the increase in 2014 production consisted of talls.

Figure 6. Canned Alaska Sockeye Production and First Wholesale Sales Volume, Tall and Half Can Sizes, Millions of Pounds, 2008-2015 Sales Cycles



Note: Sales data for 2015 is incomplete, as it includes only 8 months of the 12 month sales cycle. Sales data for all other years includes sales made between May of the harvest year through April of the following year.
Source: ADOR (ASPR).

[5] Refers to the 12 month period extending from May of the harvest year through April of the following year.

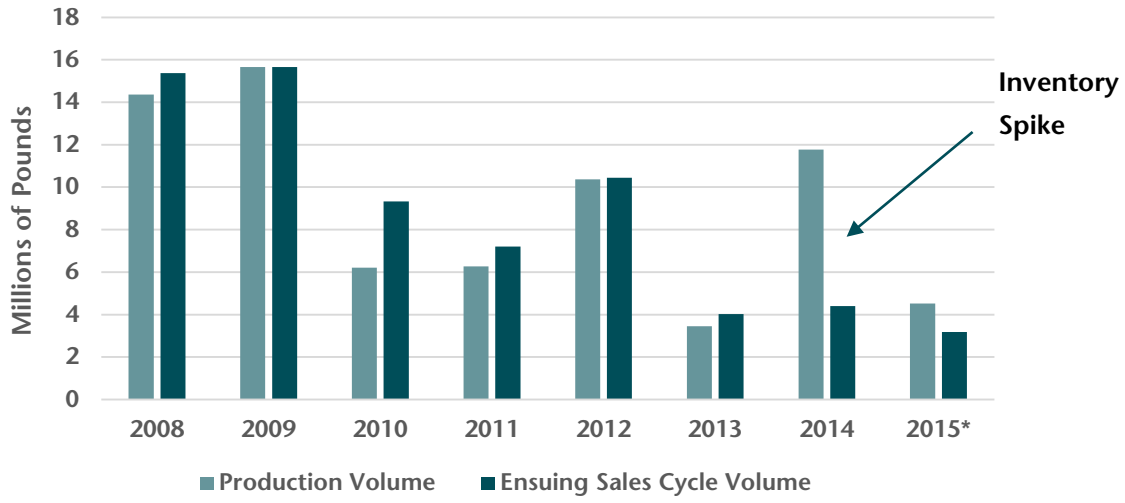
TALL RED CANS: PROBLEMS FOR A FADING PRODUCT FORM

The difference between production and sales volume in 2014 was most pronounced for tall can sizes. Again, prior to 2014 production and sales volumes of tall canned sockeye were generally in balance but the 2014 season led to a 241 percent increase in tall production. At recent sales volumes, 2014 produced approximately 3 years worth of tall canned supply. As of December 2015, it estimated that Alaska packers held approximately 1.5 years worth of inventory.

Tall red cans were once the dominant product form generated by the Bristol Bay fishery, but its importance is fading. Talls accounted for less than 20 percent of Alaska's total canned sockeye production over the past five years. Half can sizes are the now the dominant canned product form in the Bay. Sales of tall red cans accounted for 14 percent of total revenue generated from all major Alaska sockeye salmon product forms during the 2014 sales cycle – down from 23 percent during the 2006 sales cycle.

Although prices for talls (and halves) were high entering 2014, processors didn't target such a large production figure for tall reds. Tall production spiked because the actual run was far above the forecast. In order to maintain plant throughput, process the rush of fish, and minimize fishing limits; many processors opted for tall cans as they provide the largest daily processing capacity of any sockeye product form (for most Bristol Bay processors). While it is discouraging for both fishermen and processors that tall red cans are still needed to absorb surprisingly large sockeye runs in Bristol Bay, tall production in 2014 was still well below historical figures during years with similar harvest volumes. In 2015, processors notched one of the lowest tall production figures on record despite the largest harvest in over 20 years – actively seeking to avoid making inventory positions worse in the tall red market.

Figure 7. Canned Alaska Sockeye Production and First Wholesale Sales Volume, Tall Can Sizes Only, Millions of Pounds, 2008-2015 Sales Cycles



Note: Sales data for 2015 is incomplete, as it includes only 8 months of the 12 month sales cycle. Sales data for all other years includes sales made between May of the harvest year through April of the following year.
Source: ADOR (ASPR).

Although talls have become a less significant product form compared to total Bristol Bay production, the situation bears monitoring as the tall inventory may be difficult to move. Many stores in key markets have either

reduced shelf space for tall red cans or stopped selling them altogether. The fading importance of tall reds is evident by examining first wholesale sales figures. Between the 2009 and 2014 sales cycles, sales volumes of tall reds declined 72 percent compared to 36 percent for half can sizes. Despite the shelf space conundrum, some stores in the U.K. utilize tall cans in their deli sections to make salmon spreads. Tall cans also make for a nearly ideal food aid protein source.

Frozen Alaska Sockeye Fillets

KEY MARKETS: U.S.
PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2014): 21 PERCENT

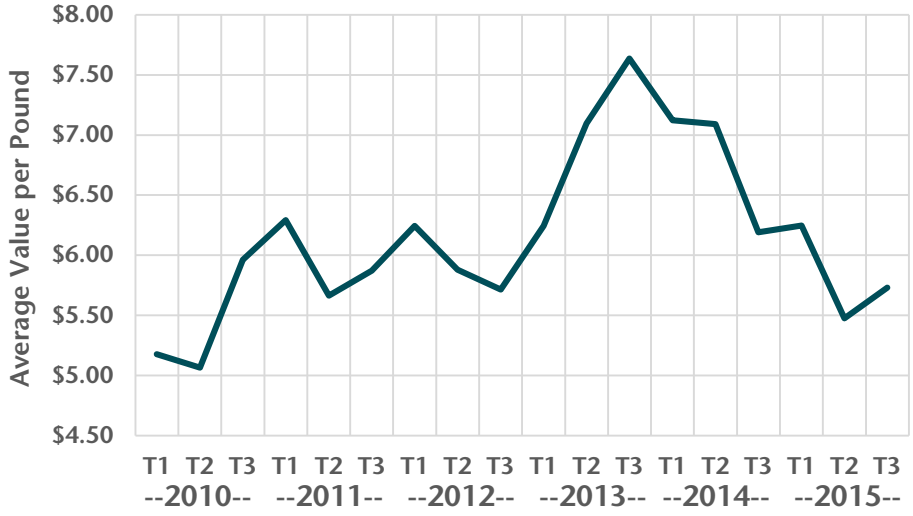
Factors influencing sales volume and pricing for frozen Alaska sockeye fillets:

- Fillet market follows trends in the frozen H&G market, which are often used to produce chilled fillets
- Sales and production data suggests little carryover inventory heading into the 2016 season
- Prices increased 4.7 percent during the third trimester in 2015

Alaska processors produced 20.8 million pounds of frozen sockeye fillets in 2015. Frozen sockeye sales totaled 20.2 million pounds between May 2015 and December 2015, suggesting Alaska's processors have little carryover inventory heading into the 2016 season. While it is possible that some fillets are still being held as inventory by wholesalers or retailers, it is likely that increasing promotional activity has moved most of the frozen fillet inventory out of the supply chain in advance of the 2016 season.

Unit values of frozen Alaska sockeye fillets are down 25 percent from the peak in late 2013, but increased in the third trimester of 2015 for the first time in two years (see Figure 8). Average fillet prices have not declined as much as frozen H&G sockeye unit values. This is most likely due to the fish size issue, which has less of an impact on fillet pricing. The sales data shown below mostly applies to once-frozen fillets. These fillets are often sold at grocery stores in the U.S. as either frozen or thawed/chilled products.

Figure 8. Average First Wholesale Value per Pound, Frozen Alaska Sockeye Fillets, by Trimester, 2010-2015



Source: ADOR (ASPR).

Bristol Bay frozen fillet production was split approximately 60/40, between frozen/IQF or other formats and vacuum packed products in 2014. The latter almost always sells for a higher price, but costs more to produce both in terms of dollars and time.

Frozen Alaska Sockeye Roe

KEY MARKET: JAPAN
PCT. OF BRISTOL BAY SOCKEYE FIRST WHOLESALE VALUE (2014): 5 PERCENT

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

- Increased salmon roe supply due to large harvests of Alaska pink and sockeye salmon in recent years
- Russian embargo and Ukrainian economic turmoil has effectively closed key alternative salmon roe markets (these were important pink salmon roe markets)
- Yen remains weak versus the dollar, but the currency situation has improved since last spring.

Table 7 contains first wholesale information about Alaska sockeye roe sales corresponding with harvest years (not necessarily calendar year sales). Most of Alaska's salmon roe is exported to foreign markets, primarily Japan, either during or soon after the harvest season. Roe tends to account for 5 to 6 percent of total first wholesale revenue; however, due to lower prices the category is expected to make a smaller contribution to total revenue during the 2015 sales cycle.

Alaska sockeye roe prices are affected by many factors, but the yen/USD exchange rate and production volume have the most influence 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, Alaska sockeye roe sales tend to produce consistent sales revenue each year, often between $30 and $35 million. However, roe revenue generated from the 2015 harvest year will likely fall short of previous years based on current prices and the volume of unsold sockeye roe.

Table 7. Alaska Sockeye Roe Sales Value and Unit Value, 2008-2015

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	4.7%	3.81	123.3 (weak yen)
2016	N/A	N/A	N/A	N/A	108.7**

*Sales data only includes product sold between May 2015 and December 2015.
**Mid-May 2016 exchange rate.
Source: ADOR (ASPR) and OANDA.com, compiled by McDowell Group.

Over 95 percent of Alaska sockeye roe is typically sold by December of the year it was produced; however, production/sales data suggests processors entered the 2016 calendar year with approximately 1 million pounds of unsold sockeye roe in inventory. This is an unusually high figure, but anecdotal reports of limited roe inventories in Japan combined with a lower than expected Japanese chum harvest and stronger yen should benefit Alaska processors in selling the inventory ahead of the 2016 season.

Roe data shown on the prior page includes all product types, consisting primarily of green roe (frozen, unsalted salmon roe skeins) and sujiko (frozen, salted 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. However, the production value of green roe outpaced sujiko by 31 percent in 2014 and 17 percent in 2015. The larger than expected 2014 harvest and large 2015 harvest are probable explanations for the increase in green roe production, as processors sought to maximize throughput leaving less capacity to produce sujiko.

Market Conditions for Competing Products

Farmed Salmon

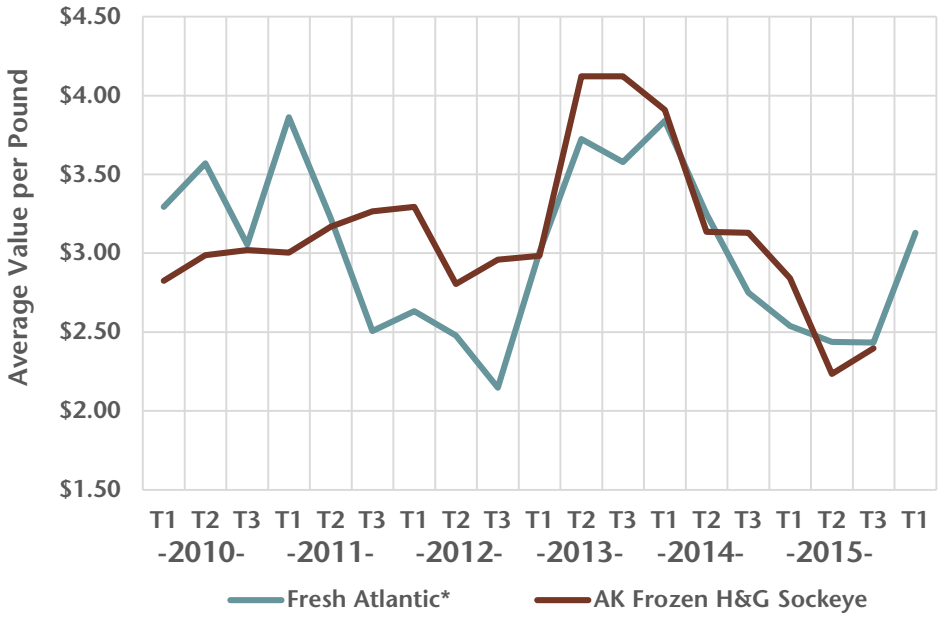
Factors influencing pricing for farmed salmon products:

- Lower production figures due to an algal bloom in Chile and sea lice in Norway
- Russian embargo has pushed large volumes of Norwegian salmon to other markets
- Weak currencies for Norway and Chile

Wholesale prices of fresh farmed Chilean salmon increased by approximately 30 percent between the third trimester in 2015 and the first trimester in 2016 (see Figure 9 on the following page). This is an encouraging sign for H&G and fillet sockeye product forms. Alaska sockeye tends to fetch a slight premium to farmed Chilean Atlantics in the U.S. market, though various market factors sometimes result in higher prices for Chilean salmon relative to sockeye. Sockeye pricing data for the first 2016 trimester is not yet available.

U.S. wholesale prices of sockeye and farmed salmon followed the same trend from mid-2013 through 2015. Lower prices for farmed Atlantic salmon were primarily the result of a stronger U.S. dollar and the Russian import ban on Norwegian salmon. The stronger dollar made it easier for foreign exporters to accept lower prices due to more favorable exchange rates, and Russia's actions pushed large volumes of Norwegian salmon into European and U.S. markets. Prior to the embargo, Russia was the largest importer of Norwegian salmon.

Figure 9. Average Wholesale Price per Pound of Atlantic and Sockeye Salmon, by Trimester, 2010-2016



*Fresh, wholefish (Head-on, gutted), Atlantic salmon, Chilean origin, 10-12 lbs., FOB Los Angeles.
Source: Urner Barry and ADOR (ASPR).

Large downward shifts in sockeye and coho wholesale prices negatively impacted many Alaska fishermen in 2015. Bristol Bay sockeye experienced one of the biggest declines in ex-vessel price. However, the silver lining for Bristol Bay fishermen is that many were able to partially offset the sting of lower prices by catching more fish. Outside of Prince William Sound seiners, this was not the case for Alaska salmon fishermen in many regions.

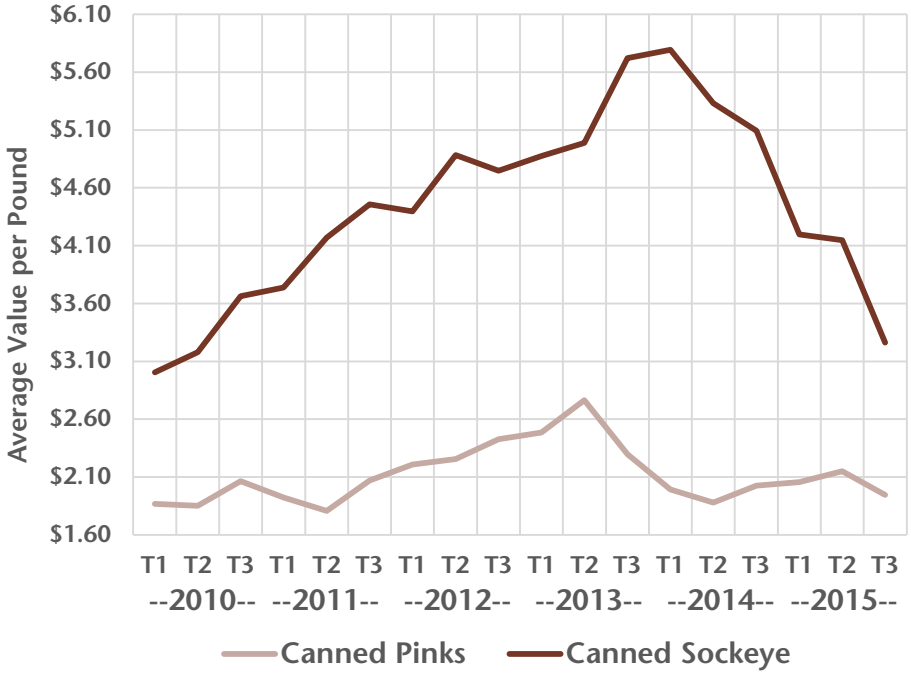
Canned Pink Salmon

Factors influencing pricing for canned pink salmon:

- Record harvests in Alaska led to substantial increases in supply since 2013
- Some buyers began turning to pink salmon when the difference in red/pink prices widened in 2014
- The price differential between canned sockeye and pink salmon has declined significantly since late 2014, leading to increasing demand for sockeye

Canned salmon buyers tend to stick with either sockeye or pink depending on historical preferences in that market. However, retailers and consumers will change their behavior depending on price. The record 2013 pink salmon harvest in Alaska pushed canned pink prices lower. Not long afterwards, prices for canned sockeye stalled out and began to fall even before the surprisingly large 2014 sockeye harvest (see Figure 10 on the following page). Recently, the price premium for sockeye has declined leading to a rebound in demand and increasing sales volumes for canned sockeye and a decline in sales volumes for canned pinks. In fact, canned sockeye sales volumes increased 72 percent during calendar year 2015 compared to the prior year, while canned pink sales fell 21 percent.

Figure 10. Average First Wholesale Price per Pound of Canned Pink and Sockeye Salmon, by Trimester, 2010-2015



Source: ADOR (ASPR).

Ex-Vessel and First Wholesale Cash Flow Analysis

This section analyzes cash flows in the processing sector by tracking first wholesale and ex-vessel sales of Bristol Bay sockeye. Trends in cash flow have a direct bearing on ex-vessel prices and the competitiveness of the fishery.

KEY FINDINGS:

- Net processing revenue[6] has improved since early last year, providing more capital for Bristol Bay processors heading into the 2016 season
- The collective net processing revenue of Bristol Bay processors declined significantly between 2012 and 2014
- Processors exited the 2014 sales cycle with significant inventories and while this product is eventually converted to revenue the timing of cash flows and costs associated with carrying inventory has an impact on ex-vessel prices.

Ex-vessel sockeye prices are primarily driven by supply, wholesale price trends, competition and capacity in the processing sector, and the financial health of processors. When the balance sheets of processors are in poor shape, there is less capital available to bid up the price of fish regardless of what direction the market is headed. When wholesale prices are trending down and working capital is restricted - as was the case heading into the 2015 season – there is less incentive to pay more for fish. Last season's sales are this season's payments to fishermen. Therefore, monitoring cash flows through the processing sector can provide some clues about processors' appetite for raw material.

Mechanics of the Analysis

Analyzing processing sector cash flows using ex-vessel and first wholesale data requires a few adjustments and conventions:

1. In this chapter we focus on a calculated statistic called **Net Processing Revenue**, which is an estimate of revenue earned by Bristol Bay processors for selling products made in the region, less the ex-vessel cost of fish (i.e. payments to fishermen).

2. First wholesale sales are compiled according to a customized "sales cycle" intended to better imitate the actual wild salmon sales season. Because first wholesale data is generally broken into trimesters and most commercial salmon fisheries start up in May/June, we treat the period of May through April as one 12-month "sales cycle." For example, salmon caught in July 2014 and sold by Alaska processors in February 2015 would be part of the 2014 sales cycle. Compiling the sales data in this manner, as opposed to a calendar year basis, allows for a better comparison to ex-vessel figures.

[6] First wholesale value less all ex-vessel payments to fishermen. This figure is not equal to net processing profits, as processors have many other costs in addition to buying fish. Previous reports referred to net processing revenue as gross processing profit, but they are the same thing.

The following section examines Bristol Bay processors' net processing revenue back to 2008. The 2015 sales cycle is still incomplete, as ASPR first wholesale data for January-April 2016 will not be out until mid-June. Therefore, we present an account of net processing revenue based on 8-months of the sales cycle through 2015, and the full 12-month cycle through 2014.

Processing Sector Cash Flow Analysis

Net processing revenue declined from $208 million in 2011 to $79 million in 2014, based on a full 12 month sales cycle. Data needed to complete the 2015 sales season is not yet available, but net processing revenue has increased significantly through the first 8 months of the sales cycle. Part of this increase can be explained by processors selling 2014 inventory during the 2015 sales season. Anecdotal reports suggest that frozen products also sold much faster in 2015. In the past, when years with larger net processing revenues coincided with declining harvest forecasts, ex-vessel prices increased.

Table 8. Net Processing Revenue, Ex-Vessel Value, and Sales Velocity, Bristol Bay Sockeye, 2008-2015

Sales Cycle	First Wholesale Sales Revenue ($Millions)	Ex-Vessel Value ($Millions)	Net Processing Revenue ($Millions)	Next Year's Ex-Vessel Value ($Millions)	Pct. of Production Volume Sold
First 8 Months of Sales Cycle (May-December)					
2008	$230	$118	$112	$142	77%
2009	270	142	128	177	77%
2010	328	177	151	155	85%
2011	307	155	153	140	86%
2012	257	140	117	149	83%
2013	242	149	93	210	75%
2014	215	210	5	121	51%
2015	262	121	141	*N/A*	69%
Full 12 Month Sales Cycle (May of Harvest Year – Following April)					
2008	$283	$118	$165	$142	93%
2009	338	142	196	177	95%
2010	384	177	207	155	99%
2011	363	155	208	140	99%
2012	311	140	172	149	98%
2013	289	149	140	210	89%
2014	289	210	79	121	69%

Note: Figures apply to Bristol Bay sockeye and products made from Bristol Bay sockeye. Figures are not adjusted for inflation.
Source: McDowell Group analysis, based on ADF&G (COAR) and ADOR (ASPR) data.

Even if all the canned inventory from 2013/2014 was sold at current prices, it would not be enough to push net processing revenues above the $200 million threshold seen during the 2010-2011 period. In addition, the decline in net processing revenue is compounded by the pressures of inflation.

In summary, a reversal in the trend of net processing revenues is a positive sign for the entire industry. However, processors will likely remain conservative with ex-vessel pricing until inventories decline, wholesale prices improve, and financial positions are fully recovered.

Ghosts of 2014 Continue to Haunt Fishery

The events of the 2014 season continue to impact the fishery. Our spring 2014 report noted the potential for trouble, but nobody could have foreseen the string of unfortunate events that would follow. Several processors have candidly summed up 2014 and the subsequent market events by saying, "We paid too much for fish in 2014… and then everything else went wrong." A closer look reveals the depth of that statement.

More than any recent year, the 2014 season has the potential to produce major ripple effects in future years. Several factors have combined to increase risk for processors from both the buying and selling side of the business this year.

-Spring 2014 Sockeye Market Report

ADF&G forecasted a harvest of 16.9 million sockeye in Bristol Bay for 2014.[7] Processors committed to a base price of $1.20/lb ahead of the season, which would have yielded a preliminary ex-vessel value of approximately $129 million. The previous year produced lackluster net processing revenues and the Fraser River sockeye fishery was looming with a big forecast, but a new major processor had entered the Bay, the forecast was relatively small, and wholesale prices for most sockeye products were high.

The Bristol Bay sockeye run was far larger than expected and when the final fish was counted, the 2014 harvest exceeded 29.2 million fish with an unusually high percentage of small fish. The cost of base ex-vessel payments for Bristol Bay sockeye was $193 million in 2014, more than $70 million higher than originally projected by pre-season prices and harvest forecasts. Even worse, prices in the wholesale market imploded with the large volume. Frozen buyers generally waited until after the Fraser River fishery to buy, and the dollar strengthened significantly versus the yen, euro, and currencies of competing suppliers.

Table 9. Projected vs. Actual Ex-Vessel Value of Bristol Bay Sockeye, 2010-2015

Harvest Year	Pre-Season Harvest Projection (Millions Fish)	Avg. Base Price/lb.	Projected Preliminary Ex-Vessel Value ($Millions)	Actual Base Ex-Vessel Value ($Millions)	Value Difference ($Millions)
2010	30.53	$0.95	$174	$149	$25
2011	28.52	$1.00	$171	$136	$35
2012	21.76	$1.00	$131	$118	$13
2013	16.59	$1.50	$149	$138	$11
2014	16.86	$1.20	$121	$193	($71)
2015	38.51	$0.50	$116	$92	$23

Note: Projected preliminary value is based on an assumed average of six pounds per sockeye. Forecasts figures do not include projected harvest in South Peninsula area.
Source: McDowell Group analysis, based on ADF&G data and regional reports.

The events of 2014 and subsequent sockeye market fallout directly led to low prices for Bristol Bay fishermen in 2015. Perhaps the most encouraging sign is that no major Bristol Bay processor went out of business or left

[7] Not including forecasted harvest for the South Peninsula area.

the region. According to a sales executive for a major processor, Alaska's salmon processing sector entered this crisis in better financial health and with more diversified products and markets than the last salmon crisis, because of that the belief is that this downswing will be shorter and shallower than the downturn witnessed in the early 2000s. Market conditions are improving and it appears that the industry has passed the bottom of the pricing trough, but ASPR sales data suggests processors still have a ways to go before balance sheets are rebuilt after a couple of very difficult years.

Implications of Current Sockeye Market Issues

As a group of commercial fishermen with no finished product to market, many market issues are beyond BBRSDA's control. However, the association and its members can have a positive effect on the fishery's quality and consumer awareness. These efforts, combined with other actions, can enhance the value of the region's sockeye resource.

Market issues which could be addressed by BBRSDA are discussed below.

Bristol Bay Sockeye Often Lack Unique Identity in the Marketplace

Bristol Bay sockeye are typically marketed to consumers as "Alaska sockeye" or simply "sockeye salmon". It is possible that by differentiating Bristol Bay sockeye from other sockeye/salmon varieties, value could be added to the product. BBRSDA has already committed to testing this hypothesis by funding a branding pilot project in Boulder, Colorado.

Potential Role for BBRSDA: Offer an umbrella "Bristol Bay Sockeye" brand and related assets/services which salmon marketers could use to market Bristol Bay sockeye.

Develop Robust Domestic Market for Refreshed and Frozen Fillets

Export markets contain important buyers, but most sales professionals interviewed for this series agree the U.S. fresh/frozen market has the most potential. Americans already buy sizable volumes of fresh and refreshed imported Atlantic salmon, and the Bristol Bay story and attributes resonate with American consumers. Sockeye is unlikely to ever compete with Chilean Atlantics on price alone, but the American salmon consumer base is certainly capable of developing a premium niche large enough to absorb frozen Bristol Bay production. This market development prospect becomes more important the more canned sales fade.

Potential Role for BBRSDA: Educate consumers through social media, traditional media, and branding efforts. Continue to make quality improvement literature available to the fleet.

Maintaining and Improving Quality, Despite Greater Supply

The quality of Bristol Bay sockeye has improved significantly over the past decade, according to virtually every sales manager interviewed for this report series. Maintaining and improving that quality will be important in terms of retaining value, but more importantly - retaining consumers. Lower price points are an opportunity to introduce new buyers to the product. Producing quality fish is a big part of converting new consumers into life-long sockeye fans.

Potential Role for BBRSDA: Continue to work with the fleet to improve fish handling and promote products which improve quality (e.g. fish slides, deck mats, etc.). Continue to fund quality development programs and work with the fleet to increase, to an optimal level, the number of operators chilling fish.

Attracting New Consumers to Canned Sockeye Salmon

The average canned salmon consumer is aging quickly as younger and middle-aged consumers are generally not big buyers of the product. Canned salmon is a venerable product that may appear out of place in the modern, presentation-first food culture. However, canned salmon has many attributes increasingly demanded by consumers, such as high omega-3 content, high protein, no-carb, and no chemical additives. Canned product is still a foundational element of Bristol Bay's fishery and so dealing with this generation gap is one of the biggest long-term issues facing the industry.

Potential Role for BBRSDA: Fund projects that 1) introduce canned sockeye to health-conscious consumers, 2) create greater awareness about the product's health benefits, or 3) study what product alterations or marketing approaches would connect best with younger consumers. BBRSDA's canned sockeye research project underway with the New Amsterdam market in New York City is an excellent example of a project that can lead to expanded canned sockeye sales.

Other issues impacting sockeye markets which are outside of BBRSDA's control include:

- Strong U.S. Dollar: makes Bristol Bay sockeye more expensive from a foreign buyer's perspective, decreasing that buyer's purchasing power.

- Russian embargo on U.S. food products and the Ukrainian conflict: has led to weaker demand for salmon roe.

Difference in Ex-Vessel Price and Value by Region

Key Finding: Ex-vessel prices for Bristol Bay sockeye were significantly lower, relative to other Alaska regions, in 2014 and 2015. Much of this difference can be attributed to larger Bristol Bay harvests during the last two seasons. The total ex-vessel value of Bristol Bay sockeye increased more than any other major Alaska sockeye-producing region in 2014 and 2015, compared to figures from the prior two years.

Ex-Vessel Price in Other Alaska Sockeye Fisheries

Bristol Bay sockeye prices generally declined more than sockeye prices in other areas of Alaska in 2014 and 2015. In 2014, Bristol Bay sockeye were worth $0.57 per pound less than the weighted average price of other Alaska sockeye. That differential fell to $0.54 per pound in 2015, but is still well above levels seen prior to 2014.

Table 10. Ex-Vessel Price of Bristol Bay Sockeye versus Other Regions, 2011-2015

Region	2011	2012	2013	2014	2015
Average Ex-Vessel Price/lb.					
Prince William Sound	$1.86	$1.82	$2.45	$2.42	$1.98
Cook Inlet	1.42	1.46	2.18	2.11	1.54
Kodiak	1.53	1.47	1.82	1.83	0.93
Alaska Peninsula	1.24	1.26	1.66	1.41	0.74
Other Alaska Sockeye Avg.	**$1.47**	**$1.49**	**$1.96**	**$1.91**	**$1.17**
Bristol Bay	**$1.17**	**$1.18**	**$1.61**	**$1.34**	**$0.63**
Difference with Bristol Bay					
Prince William Sound	$0.69	$0.64	$0.84	$1.08	$1.35
Cook Inlet	0.25	0.28	0.57	0.77	0.91
Kodiak	0.36	0.29	0.21	0.49	0.30
Alaska Peninsula	0.07	0.08	0.05	0.07	0.11
Other Alaska Sockeye Avg.	**$0.30**	**$0.31**	**$0.35**	**$0.57**	**$0.54**

Note: All prices represent the final average price including bonuses and other additional payments to fishermen.
Source: ADF&G (COAR).

Even though Bristol Bay sockeye garnered lower prices than other areas in recent years, price alone does not reflect the whole story. In addition to general market factors, regional prices are highly dependent on regional harvest volume. Bristol Bay sockeye harvests increased 75 percent in 2014 and another 16 percent in 2015, compared to a decline of 1 percent and an increase of 13 percent, respectively, for all other Alaska sockeye fisheries combined. Given the difference in regional harvest volume, market destination, and product forms, a widening gap in ex-vessel price compared to other regions is understandable, though still unfortunate.

Ex-Vessel Value of Other Alaska Sockeye Fisheries

Table 11 summarizes the total ex-vessel value of Alaska sockeye from key producing areas. The 2014 season represented a relative windfall for Bristol Bay fishermen, relative to sockeye fishermen in other areas of the state.

Prince William Sound and Kodiak also had a good season in 2014, but the increase in Bristol Bay volume and value was a significant market event driving prices and total value lower for all regions in 2015. Ex-vessel value fell further in Bristol Bay than all other regions combined during 2015, but each of Alaska's other major sockeye producing areas still saw significant declines. Despite the steep drop in Bristol Bay's 2015 ex-vessel value, the decline compared to the previous four-year average was in line with ex-vessel movements of all other Alaska sockeye.

Table 11. Ex-Vessel Value of Bristol Bay Sockeye versus Sockeye from Other Alaska Regions, 2011-2015

Region	2011	2012	2013	2014	2015	'14 YoY Pct. Change	'15 YoY Pct. Change	'15 Pct. Change from 4-yr. Avg.
Total Ex-Vessel Value ($Millions)								
Pr. William Sound	$39.4	$45.4	$34.0	$47.5	$35.5	40%	-25%	-15%
Cook Inlet	50.1	32.2	37.4	32.8	22.9	-12%	-30%	-40%
Kodiak	20.5	18.3	26.9	31.1	13.9	16%	-55%	-42%
Alaska Peninsula	20.9	20.5	28.4	26.8	23.5	-6%	-12%	-3%
Other AK Sockeye	**$157.7**	**$134.4**	**$163.8**	**$159.8**	**$112.4**	**-2%**	**-30%**	**-27%**
Bristol Bay	**$154.7**	**$139.7**	**$148.7**	**$209.6**	**$121.2**	**41%**	**-42%**	**-26%**

Note: All figures represent the final ex-vessel value including bonuses and other additional payments to fishermen.
Source: ADF&G (COAR).

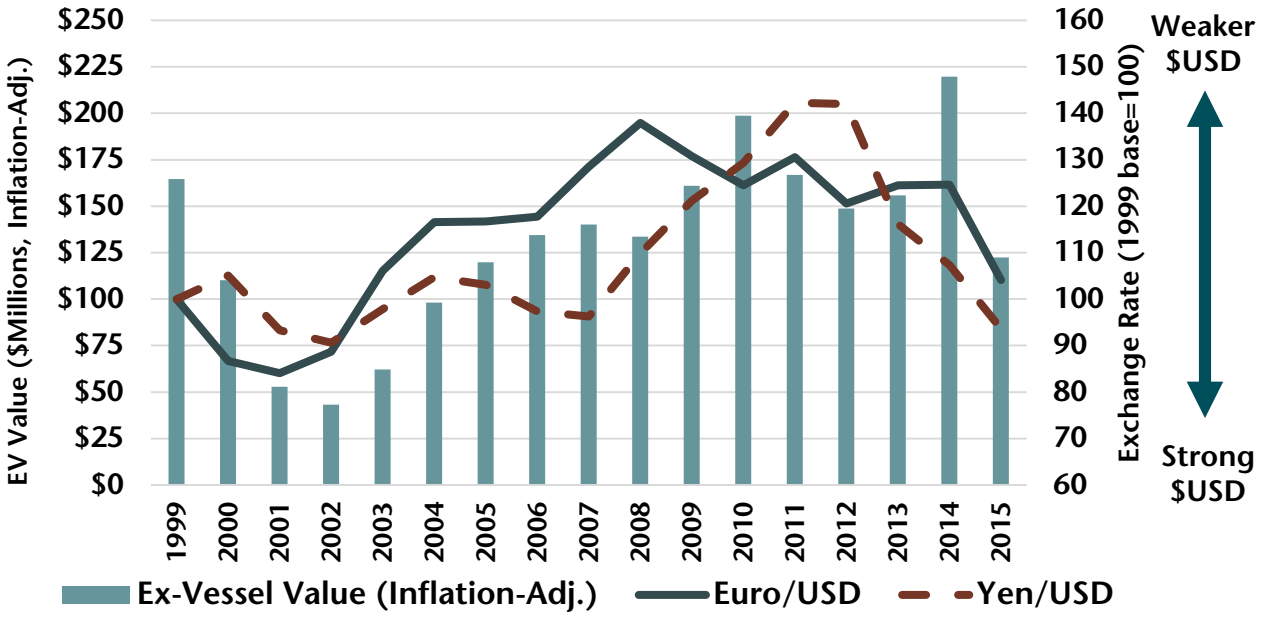
Comparing ex-vessel prices of Bristol Bay sockeye to those received by Canadian or Russian fishermen is not possible for two reasons. First, Fraser River sockeye production in Canada varies greatly from year to year and occurs after the Bristol Bay fishery. Canadian ex-vessel prices are highly impacted by regional harvest volume and by Bristol Bay production volume, obscuring the actual premium for Canadian sockeye which tend to be sold into North America markets as fresh product. Second, Russian sockeye are primarily harvested using fish traps at sites owned or leased by processing companies. Here the fishermen are employees of the processor and there is no ex-vessel transaction.

Exchange Rate Implications

Alaska seafood producers sell products to customers around the world, and compete primarily with seafood produced in other countries. As a result the value of the U.S. dollar, relative to the currencies of buyers and competitors is a key variable affecting the ex-vessel value of Alaska seafood, including Bristol Bay sockeye. When the value of the U.S. dollar is low, or weak, relative to other currencies Alaska's seafood products are less expensive from a foreign buyer's perspective and are more competitive with products from other countries. All things being equal, a weak U.S. dollar is good for Alaska seafood producers while a strong U.S. dollar is bad (because it takes more foreign currency to buy Alaska seafood).

A review of historical ex-vessel values for Bristol Bay sockeye versus yen and euro exchange rates underscores the influence of exchange rates. In general, when the U.S. dollar is weak, Bristol Bay sockeye harvests tend to be worth more and are worth less when the U.S. dollar is strong. Unfortunately, the U.S. dollar has strengthened significantly in recent years. The strong U.S. dollar, in addition to other variables, was a major driver in lower prices/values in 2015. During 2015, the U.S. dollar had not been in such an unfavorable position since 2003 – a year which produced one of the lowest ex-vessel values for Bristol Bay sockeye in modern history.

Figure 11. Ex-Vessel Value of Bristol Bay Sockeye vs. Key Exchange Rates, 1999-2015



Source: ADF&G (COAR) and OANDA.com, compiled by McDowell Group.

Exchange Rate Movements

Exchange rates have generally improved relative to the currencies of key buyers but the U.S. dollar has continued to get stronger versus the currencies of key competitors since last year (see Table 12 on the following page).

Even if prices did not change at all in 2016 in U.S. dollar terms, Alaska seafood products would be about 2 percent less expensive from the perspective of European buyers and about 10 percent less expensive for Japanese buyers. In reality, prices are impacted by a wide range of factors but the fact that purchasing power has increased in these key markets is good news.

Currencies of major competitors continue to weaken versus the U.S. dollar, which is bad news for Alaska seafood producers. However, competitors' prices are also impacted by supply. In general, competing supply is expected to decline this year which is likely to offset the impacts of weaker currencies in those countries to some extent.

Table 12. Exchange Rate Movements of Key Currencies vs. U.S. Dollar, Foreign Currency per $1 U.S. Dollar, 2011-2015

Currencies	2011	2012	2013	2014	2015	May 2015	May 2016	Pct. Change May 2015 vs. May 2016
Key Buyers								**Change in U.S. Dollar Value**
Euro	0.719	0.778	0.753	0.754	0.901	0.896	0.881	-1.7%
Japanese Yen	79.7	79.8	97.6	105.9	121.1	120.7	108.3	-10.3%
Canadian Dollar	0.99	1.00	1.03	1.1	1.28	1.22	1.29	5.7%
Key Competitors								
Russian Ruble	29.4	31.2	31.9	38.6	61.2	50.7	65.9	30.0%
Norwegian Kroner	5.6	5.8	5.9	6.3	8.1	7.6	8.2	7.9%
Chilean Peso	485	488	496	571	654	608	685	12.7%

Note: An increase in the U.S. dollar value relative to other currencies is generally bad for Alaska seafood producers.
Source: OANDA.com.

Sockeye Market Commentary

We spoke with sales executives from multiple Bristol Bay processing companies, as well as people who work in other parts of the supply chain and independent market analysts. Respondents had the following comments about sockeye markets or related issues:

"It's not a pretty picture for canned sockeye. We thought there might be more interest from our large buyers but demand has been pretty lackluster. Our sales are still pretty slow."

"Tall reds have lost a lot of shelf space, both domestically and overseas (in the U.K.). The export differential between domestic and export sales is about $20/case lower in the export market. We only saw one facing of tall reds when we went over to visit customers."

"We don't intend to pack talls this year. I don't think many companies wanted to pack them last year, but they didn't want to put their fishermen on limits (with larger harvests, talls are the often the best option to maximize processing capacity)."

"Less reliance on the canned market will drive a need for better quality."

"Looks like most of the older inventories are depleted. Which is good, so we're not competing against older, cheaper product this year."

"Things do look better this year, compared to last year. Despite the improvement, conditions are still far from perfect. Plus, processors lost so much money from 2013 through early 2015, we need to recoup some of those losses and work our way back. Still, we are cautiously optimistic about pricing this year, but it's important to understand market conditions and the processing sector is still pretty far from where it was a few years ago."

"We have had a lot of advance interest in frozen sales this year, which is a good sign for demand. Some of that is buyers wanting to take advantage of low prices and maybe avoid being caught short on product from Chile. However, I'm less optimistic that demand will still be strong if prices increase too much."

"We are watching to see if Great Britain leaves the European Union. Our customers think it will be a close vote. The British pound would likely lose value if Britain leaves the EU, which would be bad for the canned sockeye business."

"There's certainly been a trend towards more frozen fillet production, but we are taking a different tack and focusing more on frozen H&G to supply (domestic retail) refresh programs."

"The roe market is okay. The Russian embargo hasn't helped. It has forced more supply to the Japanese market."

"The canned (red) business isn't going to disappear overnight, but I doubt it can be revived. It's not what younger consumers want. There's such a huge difference in the appearance and reaction to a fillet versus opening a can of salmon. But it's not just canned salmon. Canned tuna sales are down and same with canned fruits and vegetables. More people are buying frozen or fresh options."

"Tall pinks are in an okay position for us, tall reds have been a disaster though. Market (for tall reds) is disappearing because they've lost so much shelf space."

"Cash flow has increased recently, which is good, but 2014 and most of 2015 were really bad (for processors)! Nobody is making any money on salmon."

"Weak competitors with inventory are a big risk, because they can't wait out the market. They need the cash flow and can be forced to sell cheap. Sometimes loan covenants force your hand. It becomes a balance sheet problem. The value of canned inventory gets marked at $0 after two years, frozen generally after a year, and inventory held in China by U.S. processors can't be counted as an asset for borrowing purposes."

"Many U.S. salmon processors are confident that harvests will correlate closely with pre-season estimates."

"Several U.S. vendors alluded to a surge in demand for chum salmon in the aftermath of the Chilean Atlantic salmon culling. Chum salmon demand has been somewhat stagnant with carryover inventories in abundance. This since has picked up, indicating pricing jumps on the horizon."

"One vendor speculated sockeye prices would be on the rise due to fishermen seeking more money for their catch, lower harvest forecasts, and lower inventories heading into the 2016 season. Buyers should expect wild salmon prices to jump during the fresh period, as gaps are filled in the void of farmed salmon."

"Across the ocean, European sockeye demand is rising and loads are booking quickly. A few packers in China confirm strong European interest in sockeye due to a substantial pricing drop. Skinless sockeye portions are down nearly 20 percent from last year at 7.20/lb. (CFR European main ports) but that is expected to rise when the new season starts."

"Sockeye demand is strong in Europe, but that's primarily for larger and medium sizes. That's not really as much of an issue."

"In Canada, Fraser River (sockeye) estimates are dismal at best this year. Even after last year's bust, pre-season sockeye estimates for 2016 are still 36 percent less than last year. Canada's Department of Fisheries and Oceans (DFO) reports that lower spawning productivity and warmer water temperatures are contributing to increasingly variable salmon stocks. One DFO official said it was unlikely for there to be any commercial fishing opportunities on Fraser River sockeye this year. The Johnson Strait is also a gamble whether there will be a (commercial) opening or not. All indicators point towards another disappointing year for salmon in British Columbia as we all play the waiting game during record low levels of snow pack."

"Instability and volatility in the farmed salmon sector has to be trying the patience of retailers. This might lead more of them to take a closer look at wild salmon, or may it lead them to put less of a focus on salmon. Either way, wild salmon will probably get more attention from retailers this summer compared to past years."

"Imports of fresh farmed fillets are still up, year-on-year. So the Chilean production shortfall hasn't really hit yet. Looks like the algae bloom might be felt the most later in the year, maybe fourth quarter. It's possible there might not be a hole in farmed supply at all, if retailers just run fewer promotions. That could bring sales volumes down and smooth things."

Branding Bristol Bay Sockeye

Bristol Bay sockeye are often marketed generically as simply as "sockeye" or "Alaska sockeye". This approach to marketing commoditizes Bristol Bay sockeye and limits the connection consumers have to the product. Most current sockeye marketing strategies do not maximize the amount of potential consumer value available, resulting in lower prices and sales volumes throughout the supply chain, than might otherwise be possible.

To address this problem BBRSDA is funding a pilot project that will create a new brand identity in a test market for the region's most prolific salmon species. The hope is that by building a branded identity, the Bristol Bay can insulate itself somewhat from the greater commodity market for salmon as other regions and farmed salmon brands have done, such as Copper River Salmon, Skuna Bay Salmon, and Verlasso Salmon.

The Bristol Bay sockeye branding project will provide retailers, food service operators, and distributors with marketing tools, employee training materials, and consulting services in order to leverage the positive attributes of the region's sockeye. Marketing tools include a brand logo, messaging, photographic/video assets, and other materials which sellers can utilize as part of a customized marketing approach integrated into their business. The project is being executed by the Alaska-based public relations firm Rising Tide and the Resiliensea Group, a consulting firm based in San Francisco.

BBRSDA and its contractors have chosen Boulder, Colorado as the location for this pilot project where local retailers will be given the opportunity to use customized marketing tools and consulting services free of charge during the summer and fall of 2016. Boulder was selected as a test market due to its location as a relatively confined market with favorable demographics, including above-average incomes, a higher percentage of millennial consumers, and a thriving "foodie" culture.

The goal of the project is to create a branded product and marketing approach that can be used by any business that sells Bristol Bay sockeye. Nielsen has been contracted to track retail sales activity. The plan is to document how selling branded Bristol Bay sockeye can generate better sales performance. The project was designed to be affordably scalable at a much broader level, outside of the test market. Absorbing the costs associated with coordinating promotions at a national level would have been too expensive, but it is reasonable to assume that if the project creates successful results in Boulder, operators in other markets will incorporate the brand into their business. And in fact, some retail partners have already asked if they could implement the program across a broader region.

Another aspect of the project is to define a list of best practices for sockeye sellers. Partner retailers will use refreshed product, which is the trade term for frozen H&G sockeye that have been thawed and filleted into whole sides. This secondary processing usually occurs at a separate facility near the retailer. The chilled sides are then shipped in small lots to retailers who sell them as portioned fillets or whole sides. Product sold as part of this pilot project must meet quality and handling specifications, in order to assure a reasonable level of quality is consistent across all participating retailers.

BBRSDA's will be releasing a report in December summarizing the results of the pilot marketing project.

The base price of Bristol Bay sockeye fell 58 percent, going from $1.20/lb. to $0.50/lb. in 2015. Many fishermen might be wondering why grocery store prices on sockeye fillets appear to remain unchanged. This section addresses this question.

KEY FINDINGS ABOUT RETAIL SOCKEYE PRICING:

- The amount of ex-vessel cost (after adjusting for roe values) in sockeye fillets was equal to approximately 25 percent of the average retail price over the past five years.
- Growth in retail sales volumes of sockeye outperformed farmed/other salmon varieties through the first four months of 2016, but sales of competing products grew much faster between 2011 and 2015.
- Average retail prices for sockeye fillets have declined due to an increase in sockeye promotions/sales, but most stores have likely kept everyday prices on sockeye the same or near past levels.
- Retailers have passed on some – though certainly not all - costs savings to consumers due to lower raw material costs for sockeye.
- Retail and wholesale margins tend to increase when commodity prices fall, and vice versa when they rise. This pattern is common in the beef and pork industry, and likely many food commodity industries as well.

General Supply Chain Economics

Commodities prices can be volatile, be it crude oil, wheat, beef, or wild salmon. This is especially true of the latter. Retail prices, meanwhile, are much less volatile for several reasons.

First, raw material (i.e. ex-vessel cost of fish) is but one component of all costs and margins included in a retail price. In the case of sockeye fillets, the ex-vessel cost of fish has accounted for approximately 25 percent of the average retail price over the last five years. Therefore, even if ex-vessel sockeye prices decline by 40 percent and all savings are passed on to consumers, retail prices would fall by just 10 percent.

Second, operating costs in the wholesale and retail segments are fairly consistent, regardless of raw material prices. Therefore, when commodity prices decline there is no cause or incentive for wholesalers/retailers to give their buyers an additional discount (outside of passing on lower raw material costs in order to compete with other sellers). Whether round sockeye cost $0.50/lb. or $1.50/lb., other operating costs in the supply are fairly similar.

Third, the dynamics of supply and demand blunt the effects of commodity price volatility. As shown in the examples above, retailers tend to pass on less additional cost due to raw material price hikes and keep a portion of the savings when raw material prices decline. This was true of sockeye sales in 2015, but the same behavior was observed in pricing for beef and pork products.

Sockeye Supply Chain Analysis: Retail Sockeye Fillets

McDowell Group acquired point of purchase data from a retail sales data vendor. The data purchase consisted of all random-weight sales of sockeye and general salmon from most major U.S. grocery chains in four-week increments back to 2011. Random-weight sales are those which do not have a fixed weight (e.g. canned salmon) and are priced by the pound. The vast majority of random-weight U.S. salmon sales consists of fillets/sides. See Appendix 3 for more detailed sales figures.

Sockeye Retail Sales Performance

Sockeye retail sales revenues increased 40 percent between 2013 and 2015, compared to a 22 percent gain for all other salmon varieties (mostly farmed salmon). Sockeye sales growth is still outpacing other salmon – sockeye revenues are up 10 percent through the first 16 weeks of 2016 compared to a 6 percent gain for other varieties. Despite the growth, sockeye remain a niche in the overall retail salmon complex. Sockeye sales accounted for 16 percent of total salmon sales revenue in 2015, and 13 percent of random-weight sales volume. However, the percentage of U.S. grocery chains carrying sockeye has increased in recent months.

Table 13. Retail Sales Performance of Sockeye and Other Salmon Varieties, Random-weight Products, Calendar Years 2011-2015

	Sockeye $Millions	Sockeye Millions lbs.	Sockeye Price/lb.	Non-Sockeye $Millions	Non-Sockeye Millions lbs.	Non-Sockeye Price/lb.
CY 2011	$146	15.8	$9.26	$655	81.4	$8.05
CY 2012	$156	16.3	$9.56	$779	110.9	$7.03
CY 2013	$143	13.4	$10.69	$836	110.5	$7.57
CY 2014	$182	16.4	$11.15	$911	110.6	$8.23
CY 2015	$201	19.6	$10.28	$1,020	133.8	$7.62
CY 2014/2015 Pct. Change	**10%**	**20%**	**-8%**	**12%**	**21%**	**-7%**
2015 (1st 16 weeks)	$51	4.8	$10.58	$308	39.1	$7.88
2016 (1st 16 weeks)	$56	5.9	$9.37	$326	45.2	$7.21
YTD 2016 Pct. Change	**10%**	**24%**	**-11%**	**6%**	**16%**	**-8%**

Note: Retail sales data includes random weight salmon sales at most major U.S. grocery chains, but does not include sales data from mass merchandisers such as Walmart or Target.
Source: IRI (Random Weight Sockeye salmon sales data).

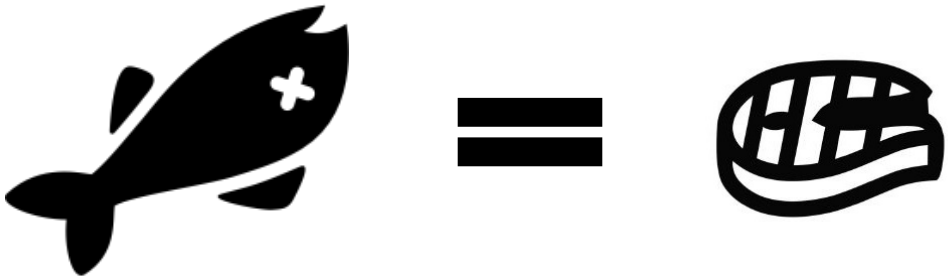
Price spreads between sockeye and all other salmon varieties have fallen since 2013, as sockeye prices declined at a faster pace. In 2013, sockeye sold for a $3.12/lb. premium, on average, compared to all other salmon varieties. The spread has steadily declined to $2.16/lb. through the first 16 weeks of 2016. Despite the decline, the retail sockeye premium is still nearly double what it was in 2011.

Table 14. Retail Sockeye Price Premium

	Sockeye-Other Spread/lb.
CY 2011	$1.20
CY 2012	$2.53
CY 2013	$3.12
CY 2014	$2.92
CY 2015	$2.66
2015 (1st 16 weeks)	$2.70
2016 (1st 16 weeks)	$2.16

Retail vs. Ex-Vessel Pricing Analysis

It takes approximately two pounds of whole/round sockeye to produce one-pound of sockeye fillets. Depending on the type of fillet, a fillet could require slightly more or less round-weight fish. When considering the amount of additional costs and markups added to product, the loss of weight is a critical factor as fishermen are paid in round weight terms while retail buyers generally buy and sell product based on its processed weight. As a result of different weight bases, the spread between ex-vessel and retail prices overstates the actual difference.



2 lbs. of Round Sockeye
Avg. Statewide Ex-Vessel Cost
(2011-2015 Harvest Years): $1.28/lb.
Cost of 2 lbs.: $2.56

1 lb. Sockeye Fillet
Avg. U.S. Retail Price
(2011-2015 Sales Cycles): $10.23/lb.
Raw Material Cost Included: 25%

This is a simplified example. In reality, fishermen who produce fish for the U.S. retail market tend to get slightly higher prices than the average statewide ex-vessel sockeye price and processors generate additional revenue from selling roe and ancillary products (approximately 6 percent more, on average). Meanwhile, retailers often lose between 3 and 10 percent of product due to spoilage or other types of shrinkage. Despite these caveats, the depiction above is a close approximation of raw material costs relative to retail prices for Alaska sockeye fillets.

Sockeye prices are often cyclical, rising and falling due to changes in supply, exchange rates, or other factors. Different segments of the supply chain benefit during different points in the pricing cycle. Collectively, fishermen tend to realize a higher percentage of total retail value when ex-vessel prices are high, and receive a lower percentage when ex-vessel prices fall. Retailers and processors benefit less when ex-vessel prices are high, but tend to realize a higher net share of the value when ex-vessel prices fall (see Table 15). Over the past five years, fishermen's ex-vessel earnings made up approximately a quarter of the retail value of fillets sold at U.S. retailers. Fishermen realized a higher share in 2013 when ex-vessel prices spiked, and a much lower percentage in 2015 when they fell sharply.

Table 15. Ex-Vessel Price of Alaska Sockeye versus Retail Sockeye Prices, by Annual Sales Cycle, 2011-2015

	2011	2012	2013	2014	2015
AK Sockeye Ex-Vessel Price/lb.	$1.31	$1.31	$1.78	$1.54	$0.81
Raw Material Cost in 1-lb. Fillet	$2.46	$2.47	$3.34	$2.89	$1.52
Avg. Retail Price/lb. of Sockeye Fillets	$9.39	$9.86	$10.91	$11.01	$9.98
Pct. Raw Material Cost in Retail Price	**26%**	**25%**	**31%**	**26%**	**15%**

Source: IRI (Random Weight Sockeye salmon sales data), ADF&G (COAR), and McDowell Group estimates.

Table 16 shows trends in retail pricing and discounting, versus the cost of raw material over time. Retail prices declined by $1.03/lb. during the 2015 sales cycle, in response to lower ex-vessel prices. Prices for both discounted and undiscounted product fell, and the amount of product sold at a discount increased. However, these data suggest retailers/processors did not pass on all the savings of lower raw material costs to consumers. As the next section explains, this type of supply chain pricing behavior is not confined to sockeye.

Table 16. Raw Material and Retail Prices for Sockeye Salmon, by Annual Sales Cycle, 2011-2015

Annual Sales Cycle	Avg. Raw Material Cost/lb.	Avg. Total Retail Price/lb.	Avg. Undiscounted Retail Price/lb.	Avg. Discounted Retail Price/lb.	Pct. of Sales Volume Sold at Discount
2011	$2.46	$9.39	$9.74	$8.93	43%
2012	$2.47	$9.86	$10.19	$9.30	37%
2013	$3.34	$10.91	$11.17	$10.49	39%
2014	$2.89	$11.01	$11.52	$10.37	44%
2015	$1.52	$9.98	$10.72	$9.17	48%
2014/2015 Difference	**$1.36**	**$1.03**	**$0.79**	**$1.20**	**+4%**

Note: Retail sales data includes random weight sockeye sales at most major U.S. grocery chains, but does not include sales data from mass merchandisers such as Walmart or Target.
Source: IRI (Random Weight Sockeye salmon sales data), ADF&G (COAR), and McDowell Group estimates.

Retail Pricing Behavior Not Unique to Sockeye

Other food commodities exhibit a similar pattern, with regard to spreads between retail and commodity prices over time. Increasing retail margins during periods of falling commodity prices is not unique to sockeye.

When commodity prices rise, retail prices usually increase as well – though typically by a smaller amount than the underlying commodity price. In this situation, retail margins decline because the cost of raw material is greater but competitive forces generally limit the amount of additional cost which can be passed on to consumers. When commodity prices decline, the situation is reversed. Retailers pass on some of the savings to consumers, but margins tend to increase for both retailers and wholesalers.

Table 17 on the following page uses USDA data on beef and pork commodity prices and price spreads between farm, wholesale, and retail supply chain segments. When commodity prices increase, wholesalers/packers and retailers tend to see declining margins. This likely occurs because buyers throughout the supply chain resist higher prices, and will often buy less product at higher prices or turn to lower quality substitutes. As a result, wholesalers/packers and retailers usually absorb some of the increase in raw material costs. When commodity prices decline, these segments of the supply chain often do much better. McDowell Group research on net processing revenue and retail pricing behavior of sockeye suggests that margins in the sockeye supply chain follow a similar pattern as beef and pork.

Table 17. Prices Spreads for Beef and Pork Products During Periods of Increasing/Decreasing Commodity Prices

Commodity	Increasing Commodity Prices	Decreasing Commodity Prices
Beef (Choice)	**Jul'13 - Nov'14**	**Nov'14 - Dec'15**
Commodity Price Change/lb.	$1.19	($0.94)
Wholesale Spread Change/lb.[1]	($0.23)	$0.17
Retail Spread Change/lb.[2]	$0.01	$0.43
Retail Price Change/lb.	$0.97	($0.33)
Pork	**Mar'13 - Jul'14**	**Dec'13 - Jul'14**
Commodity Price Change/lb.	$0.69	($1.05)
Wholesale Spread Change/lb.[1]	($0.03)	$0.14
Retail Spread Change/lb.[2]	($0.30)	$0.56
Retail Price Change/lb.	$0.37	($0.28)

[1] Difference between wholesale price and the raw material price (paid to the farmer), adjusted to a retail weight basis.
[2] Difference between retail price and wholesale price.
Note: Data reflects the change in the price of products at the farm, wholesale, and retail level. Prices have been adjusted by USDA to a "retail weight equivalent" for consistency in comparing supply chain segments.
Sources: USDA (Meat Price Spreads), compiled by McDowell Group.

The graph below provides a visual representation of how cattle farmers' share of retail value behaves in relation to underlying commodity prices. When commodity prices for beef cattle increase, cattle farmers received a higher percentage of the final retail price – similar to sockeye fishermen. When commodity prices fell, the farmers received a lower share of the retail price.

Figure 12. Net Farm Value vs. Raw Material Cost as Pct. of Retail Beef Price, 2012-2015

Note: Commodity prices have been adjusted by USDA to a "retail weight equivalent" for consistency in comparing supply chain segments.
Sources: USDA (Meat Price Spreads), compiled by McDowell Group.

The figures above do not address the issue of volume. Typically, sales volumes throughout the supply chain increase when prices fall and constrict when prices rise. Since retailers tend to fare better when commodity prices decline, expanding retail spreads generally have the added benefit of being multiplied by increasing sales volumes. Commodity producers, as a group, tend to get higher prices during periods of lower production. Essentially, the volume multiplier favors the retail side of the supply chain. This occurs because commodity supply tends to be more volatile than demand for those materials.

Appendix 1: Bristol Bay Sockeye Ex-Vessel and First Wholesale Value

The data below shows the combined first wholesale sales value/price of primary Bristol Bay sockeye products by annual sales cycle, and the corresponding ex-vessel value/price for each harvest year.

Table 188. Ex-Vessel and First Wholesale Values and Average Prices, 2001-2015

Harvest Year & Annual Sales Cycle	FW Value $Millions	EV Value $Millions	EV Pct. of FW	Avg. FW Price/lb.	Avg. EV Price/lb.
2001	$117.4	$39.1	33%	$2.06	$0.40
2002	139.9	32.5	23%	2.36	0.47
2003	123.4	47.8	39%	2.14	0.49
2004	175.6	77.6	44%	1.99	0.49
2005	193.8	97.9	51%	2.24	0.59
2006	241.7	113.3	47%	2.25	0.62
2007	265.1	121.4	46%	2.45	0.64
2008	283.3	120.2	42%	2.95	0.72
2009	338.3	144.4	43%	2.97	0.77
2010	384.2	181.1	47%	3.37	1.02
2011	362.9	156.8	43%	3.99	1.15
2012	311.3	142.7	46%	4.01	1.13
2013	288.9	151.8	53%	5.31	1.51
2014	288.7	217.3	75%	4.06	1.35
2015	Incomplete	121.2	N/A	2.98	0.63

Note: All prices represent the final average price including bonuses and other additional payments to fishermen. FW data represents the value of product sold during the corresponding sales cycle. All figures are in nominal terms.
Source: ADOR (ASPR) and ADF&G (COAR).

Appendix 2: Bristol Bay Sockeye Ex-Vessel and First Wholesale Production/Sales

The data below shows first wholesale production volume of primary Bristol Bay sockeye products by year, the corresponding harvest volume, and sales volume for each harvest year. A sales-to-production ratio of approximately 1.00 or higher generally indicates that virtually all of that harvest year's production was sold during the corresponding sales cycle. A ratio of less than 0.95 suggests the year resulted in carryover inventory.

Table 199. Harvest Volume and First Wholesale Production and Sales Volume, Millions lbs., 2001-2015

Harvest Year & Annual Sales Cycle	Harvest Volume	FW Production	FW Sales	Processing Yield	Sales to Production Ratio
2001	95.6	63.4	57.1	66%	0.90
2002	65.0	44.8	59.4	69%	1.33
2003	93.4	65.8	57.7	70%	0.88
2004	151.7	91.9	88.2	61%	0.96
2005	155.0	97.0	86.4	63%	0.89
2006	164.5	106.0	107.4	64%	1.01
2007	173.3	109.2	108.3	63%	0.99
2008	159.9	103.1	96.0	64%	0.93
2009	182.3	119.5	113.8	66%	0.95
2010	169.8	115.2	113.9	68%	0.99
2011	134.7	91.8	91.0	68%	0.99
2012	119.2	79.1	77.6	66%	0.98
2013	92.0	61.3	54.4	67%	0.89
2014	160.6	103.4	71.1	64%	0.69
2015	192.1	126.7	Incomplete	66%	N/A

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

Appendix 3: Retail Sales Data Detail

The data below shows point of purchase retail sales data purchased for this project. The data includes random-weight sales of general salmon and sockeye products across most U.S. grocery stores.

Table 20. Retail Sockeye Sales, Random-Weight Products, 2011-2016

4-Week Period	Sales Volume	Sales Value	Avg. Price/lb.	Pct. Stores Selling Sockeye	Volume Sold on Discount
4 Weeks Ending 01/30/2011	720,465	$6,283,251	$8.72	32.2%	41.0%
4 Weeks Ending 02/27/2011	955,590	$8,255,405	$8.64	37.8%	42.0%
4 Weeks Ending 03/27/2011	1,125,178	$9,578,089	$8.51	39.1%	48.4%
4 Weeks Ending 04/24/2011	1,297,113	$10,622,020	$8.19	38.2%	44.0%
4 Weeks Ending 05/22/2011	1,205,044	$10,502,139	$8.72	39.1%	25.7%
4 Weeks Ending 06/19/2011	2,375,127	$23,022,026	$9.69	52.3%	47.6%
4 Weeks Ending 07/17/2011	2,338,379	$23,521,248	$10.06	64.3%	53.8%
4 Weeks Ending 08/14/2011	2,533,123	$23,860,748	$9.42	65.1%	40.2%
4 Weeks Ending 09/11/2011	668,151	$6,889,530	$10.31	52.2%	31.9%
4 Weeks Ending 10/09/2011	453,604	$4,146,899	$9.14	25.9%	36.8%
4 Weeks Ending 11/06/2011	748,543	$6,701,727	$8.95	29.8%	42.4%
4 Weeks Ending 12/04/2011	682,068	$6,288,219	$9.22	32.3%	26.8%
4 Weeks Ending 01/01/2012	715,823	$6,727,414	$9.40	31.9%	20.6%
4 Weeks Ending 01/29/2012	1,083,871	$9,608,682	$8.87	36.4%	52.9%
4 Weeks Ending 02/26/2012	1,000,474	$9,172,167	$9.17	36.1%	39.4%
4 Weeks Ending 03/25/2012	1,230,140	$10,613,054	$8.63	37.0%	52.1%
4 Weeks Ending 04/22/2012	1,068,271	$9,828,851	$9.20	37.9%	38.2%
4 Weeks Ending 05/20/2012	1,082,513	$9,637,113	$8.90	35.8%	46.0%
4 Weeks Ending 06/17/2012	2,202,049	$23,311,369	$10.59	55.1%	37.3%
4 Weeks Ending 07/15/2012	2,298,006	$23,330,799	$10.15	58.0%	42.8%
4 Weeks Ending 08/12/2012	2,821,032	$26,953,593	$9.55	60.2%	48.9%
4 Weeks Ending 09/09/2012	694,158	$7,107,932	$10.24	52.2%	37.3%
4 Weeks Ending 10/07/2012	552,878	$5,267,964	$9.53	29.3%	39.5%
4 Weeks Ending 11/04/2012	750,780	$6,710,034	$8.94	29.4%	54.1%
4 Weeks Ending 12/02/2012	749,713	$6,943,714	$9.26	32.3%	30.6%
4 Weeks Ending 12/30/2012	758,000	$7,240,150	$9.55	32.0%	22.0%
4 Weeks Ending 01/27/2013	938,834	$8,930,216	$9.51	34.6%	25.8%
4 Weeks Ending 02/24/2013	862,130	$8,192,825	$9.50	34.8%	33.0%
4 Weeks Ending 03/24/2013	805,578	$7,949,623	$9.87	34.3%	22.4%
4 Weeks Ending 04/21/2013	875,495	$8,820,099	$10.07	34.7%	31.9%
4 Weeks Ending 05/19/2013	719,514	$7,419,514	$10.31	31.9%	18.5%
4 Weeks Ending 06/16/2013	1,399,420	$17,301,076	$12.36	42.8%	47.9%
4 Weeks Ending 07/14/2013	2,233,502	$24,543,569	$10.99	58.7%	69.8%
4 Weeks Ending 08/11/2013	2,339,328	$25,276,527	$10.81	59.3%	42.5%

4 Weeks Ending 09/08/2013	551,338	$6,163,412	$11.18	41.3%	37.3%
4 Weeks Ending 10/06/2013	475,007	$5,066,026	$10.67	21.3%	25.6%
4 Weeks Ending 11/03/2013	682,258	$7,281,501	$10.67	25.3%	41.2%
4 Weeks Ending 12/01/2013	762,622	$8,216,967	$10.77	29.3%	26.9%
4 Weeks Ending 12/29/2013	778,710	$8,314,386	$10.68	30.9%	21.9%
4 Weeks Ending 01/26/2014	1,000,327	$10,900,215	$10.90	32.3%	32.2%
4 Weeks Ending 02/23/2014	998,514	$10,736,524	$10.75	33.7%	22.1%
4 Weeks Ending 03/23/2014	1,008,611	$10,666,107	$10.58	35.0%	26.4%
4 Weeks Ending 04/20/2014	968,736	$10,231,094	$10.56	34.7%	22.4%
4 Weeks Ending 05/18/2014	962,250	$9,773,406	$10.16	34.4%	26.6%
4 Weeks Ending 06/15/2014	1,629,746	$22,277,222	$13.67	52.8%	27.6%
4 Weeks Ending 07/13/2014	2,301,317	$26,796,426	$11.64	62.3%	74.1%
4 Weeks Ending 08/10/2014	2,438,508	$26,959,389	$11.06	62.9%	49.6%
4 Weeks Ending 09/07/2014	1,760,579	$18,442,628	$10.48	55.7%	41.3%
4 Weeks Ending 10/05/2014	1,043,383	$10,960,011	$10.50	44.4%	30.3%
4 Weeks Ending 11/02/2014	760,441	$8,114,353	$10.67	35.8%	40.6%
4 Weeks Ending 11/30/2014	699,509	$7,759,129	$11.09	31.5%	23.3%
4 Weeks Ending 12/28/2014	786,188	$8,791,377	$11.18	34.2%	15.6%
4 Weeks Ending 01/25/2015	1,016,321	$11,090,562	$10.91	35.5%	40.1%
4 Weeks Ending 02/22/2015	1,175,472	$12,612,140	$10.73	39.5%	39.3%
4 Weeks Ending 03/22/2015	1,276,512	$13,241,922	$10.37	44.0%	41.2%
4 Weeks Ending 04/19/2015	1,306,802	$13,585,089	$10.40	43.4%	45.9%
4 Weeks Ending 05/17/2015	1,528,313	$14,516,481	$9.50	43.8%	54.3%
4 Weeks Ending 06/14/2015	1,738,454	$22,186,322	$12.76	53.8%	35.0%
4 Weeks Ending 07/12/2015	2,356,016	$25,847,261	$10.97	63.3%	76.0%
4 Weeks Ending 08/09/2015	3,727,832	$35,683,188	$9.57	68.3%	63.9%
4 Weeks Ending 09/06/2015	1,296,826	$13,502,928	$10.41	59.6%	30.6%
4 Weeks Ending 10/04/2015	741,330	$7,379,586	$9.95	35.8%	34.7%
4 Weeks Ending 11/01/2015	1,033,272	$9,650,233	$9.34	41.3%	48.0%
4 Weeks Ending 11/29/2015	1,201,155	$10,918,579	$9.09	44.1%	43.1%
4 Weeks Ending 12/27/2015	1,175,055	$10,922,423	$9.30	43.1%	41.8%
4 Weeks Ending 01/24/2016	1,368,297	$12,942,663	$9.46	48.1%	41.9%
4 Weeks Ending 02/21/2016	1,480,699	$13,642,202	$9.21	47.6%	45.0%
4 Weeks Ending 03/20/2016	1,561,582	$14,574,936	$9.33	49.8%	35.7%
4 Weeks Ending 04/17/2016	1,533,414	$14,524,727	$9.47	50.6%	30.4%

Note: Retail sales data includes random weight sockeye sales at most major U.S. grocery chains, but does not include sales data from mass merchandisers such as Walmart or Target.
Source: IRI (Random-weight salmon retail sales data).