

2018 BBRSDA Processor Survey

Prepared for

Bristol Bay Regional Seafood Development Association

May 2019

Prepared by



Anchorage

800 E Dimond Boulevard
Suite 3-300
Anchorage, Alaska 99515-2049
Phone: 907.274.5600
Fax: 907.290.2464

Seattle

1455 NW Leary Way
Suite 400
Seattle, WA 98107
Phone: 206.747.8475

www.northerneconomics.com

PROFESSIONAL CONSULTING SERVICES IN APPLIED ECONOMICS AND SOCIAL SCIENCES

Principals:

Patrick Burden, M.S. – Chairman
Marcus L. Hartley, M.S. – President
Michael Fisher, MBA – Vice President
Diane Sauer – Office Manager

Consultants:

Leah Cuyno, Ph.D.
Michael Downs, Ph.D.
Brock Lane, M.S.
Don Schug, Ph.D.
Katharine Wellman, Ph.D.

Administrative Staff:

Terri McCoy, B.A. – Editor



800 E Dimond Blvd., Suite 3-300
Anchorage, Alaska 99515
Phone: 907.274.5600
Fax: 907.290.2464

1455 NW Leary Way, Suite 400
Seattle, WA 98107
Phone: 206.747.8475
Email: mail@norecon.com
www.northerneconomics.com

Preparers

Team Member	Project Role
Marcus Hartley	Principal and Project Manager
Brock Lane	Lead Analyst
Emilie Franke	Lead Author
Terri McCoy	Technical Editor

Please cite as: Northern Economics, Inc. 2018 BBRSDA Processor Survey. Prepared for Bristol Bay Regional Seafood Development Association. May 2019.

Contents

Section	Page
Abbreviations	ii
1 Introduction and Summary Conclusions.....	1
2 Raw Product Purchases and Chilling	4
3 Finished Product Forms	9
4 Product Chilled Prior to Delivery	14
5 Quality of Chilled Raw Product.....	16
6 Drift Fleet Size and Chilling	18
7 Processor Ice-Making Capability	21
8 References.....	22
Appendix: Survey Instrument.....	23

Table	Page
Table 1. Total Raw Product (Drift and Set) Purchases, 2009–2018	4
Table 2. Drift Fleet Raw Product Purchases, 2009–2018	6
Table 3. Set Net and Drift Fleet Chilled Product Purchases, 2009–2018.....	6
Table 4. Bristol Bay Ex-Vessel Salmon Prices and Chilling Bonuses (2008–2018).....	8
Table 5. Total Raw Product Consumed by First Wholesale Product Form, 2009–2018	11
Table 6. First Wholesale Product Form of Product Processed in Bristol Bay, 2009–2018.....	13
Table 7. Canning Location, 2009–2018	13
Table 8. Drift Fleet Chilling Methods 2009–2018.....	14
Table 9. Number of Vessels in the Drift Fleet, 2009–2018	18
Table 10. Consistency of Chilling, 2009–2018	19
Table 11. Ice Production in Tons per Day, 2009–2018	21

Figure	Page
Figure 1. Percent of Chilled Raw Product Purchased from the Drift Fleet.....	2
Figure 2. Total Chilled and Unchilled Product.....	5
Figure 3 Drift Fleet Chilled and Unchilled Product	7
Figure 4. Proportion of Raw Product Purchases by Grade, 2018.....	8
Figure 5 Bristol Bay Commercial Operator Sockeye Salmon Annual Production by Form.....	9
Figure 6 Bristol Bay Commercial Operator Sockeye Salmon Wholesale Values by Product Form	10
Figure 7. Raw Product Forms of Product Processed in Bristol Bay, 2009–2018	12
Figure 8. Chilling Methods in the Drift Fleet, 2009–2018	15
Figure 9. Proportion of Drift Fleet Raw Product Chilled and/or Floated, 2018	16
Figure 10. Average Score of Best Practices Impacting the Quality of Delivered Product, 2018	17
Figure 11. Chilling Consistency among the Drift Fleet, 2009–2018.....	20

Abbreviations

ADF&G	Alaska Department of Fish and Game
BBEDC	Bristol Bay Economic Development Corporation
BBRSDA	Bristol Bay Regional Seafood Development Association
COAR	commercial operator annual report database
H&G	Head and Gut
MMlb	Million pounds
RSW	Refrigerated Sea Water

1 Introduction and Summary Conclusions

The Bristol Bay Regional Seafood Development Association (BBRSDA) contracted with Northern Economics, Inc. to conduct a survey of processors who operated in the 2018 Bristol Bay salmon fishery. This report summarizes the results of the study—the eleventh iteration of the Processor Survey Report.

New to the 2018 survey was a question that asked for the proportion of processor purchases by fish grade. This question supplements the analysis by relating chilling practices, and other handling methods to product quality. Also new in the 2018 analysis is the inclusion of Commercial Operator Annual Report (COAR) data which includes production and wholesale value by product. The new data source confirms observations from the processor survey and also provides information on product value, which is not collected in the survey.

As in prior surveys, the survey instrument consisted of a series of questions about processor operations in Bristol Bay. The 2018 survey captured raw product data, fleet information, ice production volumes, chilling methods, and respondents' opinions of quality practices and priorities within the fishery. The 2018 survey collected a fourth year of responses to a series of questions introduced in 2015 to collect data on the quality of chilled raw product and preferred chilling practices as well as a question about floating practices that was added to the 2017 survey. The operational questions focused on processors' purchases of chilled raw product and the distribution of their raw product purchases among the four major product forms (canned, head and gut [H&G] frozen, H&G fresh, and fillet).¹ All of the processors who have traditionally responded to the survey responded this year.

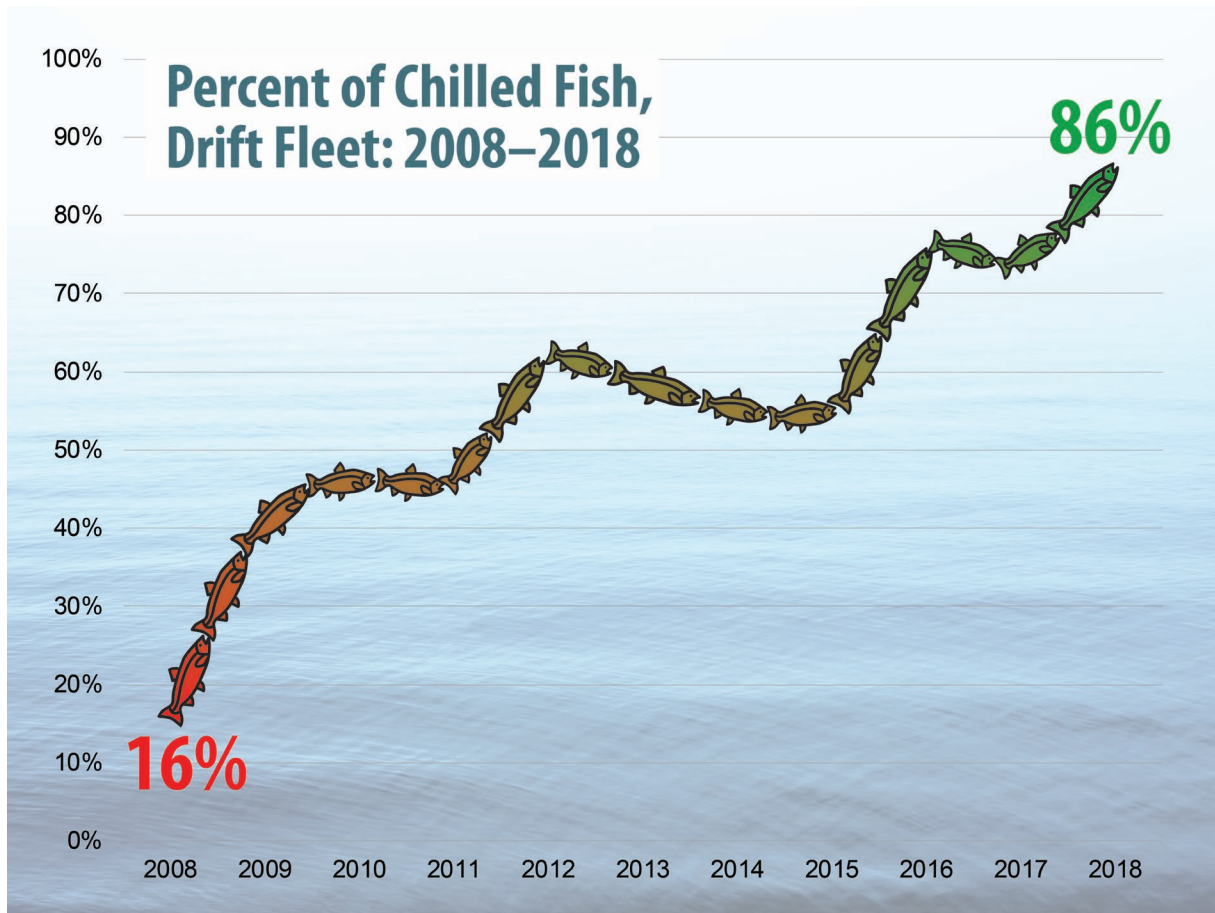
The 2018 Bristol Bay sockeye run, the largest on record, was 69 percent above the average run over the last 20 years and 21 percent above the Alaska Department of Fish and Game (ADF&G) preseason forecast (ADF&G 2018). ADF&G estimates the total Bristol Bay salmon harvest at 232.7 million pounds (MMLb) for 2018, 13.4 MMLb more than in 2017, and the largest harvest recorded since 1995. This year's processor survey captured 88 percent of the ADF&G estimate as respondent processors reported processing 204 MMLb of raw (round weight) product from all sources (drift and set permits) in 2018.

This year's key takeaways:

- The harvest in 2018 was the largest in the last 23 years and harvesters responded by chilling the largest amount of raw product ever in the history of the survey. Product chilled prior to delivery reached 161.2 MMLb in the aggregate fishery, 151.6 MMLb in the drift net fishery, and 9.5 MMLb in the set net fishery. While the set net fleet chilled 44 percent less than in 2017, the drift net fleet chilled 22 percent more to reach a record high amount of chilled raw product.
- The total volume of drift fleet chilled purchases surpassed the previous record of 124.6 MMLb with a new record of 151.6 MMLb of chilled product. Overall, 86 percent of drift fleet deliveries were chilled, up from 74 percent in 2017 (Figure 1). After another record-setting year in terms of run size and portion of chilled product delivered, this year's survey continues to illuminate the chilling capacity in Bristol Bay. This year's survey results also reemphasize the drastic shift in chilling practices over the past 11 years, with chilled purchases from the drift fleet growing from 16 percent in 2008 to 86 percent in 2018. These increases in chilling percentage and poundage appear to be driven by new processor requirements and bonuses for chilled fish, supported by efforts from BBRSDA, BBEDC, and the processors themselves to make sure that permit holders are supported in this transition.

¹ The full survey instrument is contained in an appendix to this report.

Figure 1. Percent of Chilled Raw Product Purchased from the Drift Fleet



- The distribution of raw product flowing into each product form continued to evolve in 2018, with a continued shift away from canned product and more of a focus on fillet and H&G fresh/other products. The portion of raw product purchases used to produce fillets (28 percent) increased to the highest level recorded by this survey. Additionally, raw product purchases for combined H&G fresh/other products increased by more than 5 percent in 2018. Conversely, the portion of raw product purchases used to produce H&G frozen products decreased by about 14 percent in 2018.
- Processors also reported improvements in the consistency of chilling practices among the drift fleet, with 76.5 percent of vessels making chilled deliveries over 75 percent of the time. Conversely, the portion of vessels delivering chilled product none of the time (dry deliveries) dropped to 9.4 percent in 2018, less than a quarter of the portion of vessels making dry deliveries in 2009. Both of these marks set new records since 2009.
- In 2018, Refrigerated Sea Water (RSW) systems chilled 132.8 MMLb of fish, or 75.6 percent of the drift fleet's total deliveries. Slush ice chilled 10.7 percent of total drift deliveries and the remaining 13.7 percent were dry (unchilled). When asked if there are any notable quality improvements gained from chilled floated fish (RSW) compared to chilled non-floated fish (slush ice), 94 percent of respondents indicated that the quality of chilled floated fish is typically better.

- The 2018 survey asked respondents to score six best practices in terms of their impact on the quality of delivered product, for the second year since introduction in 2017. Those practices included: consistent chilling (RSW or slush ice), fish bleeding, shorter sets, salmon slides and/or deck mats, lower brailer weights (500–600 lb or less per brailer bag), and vessel cleanliness/proper sanitation. Consistent chilling was again the practice that scored as having the biggest impact on quality. Vessel cleanliness/proper sanitation and the use of lower brailer weights scored second and third in this year’s survey.

2 Raw Product Purchases and Chilling

The combined raw product purchases from the set and drift net fleets increased by 4.4 percent to 204.2 MMLb—the largest total purchase amount recorded by this survey (see Table 1). The 8.6 MMLb increase in raw product purchases in 2018 continues a five-year trend of increasing harvests in Bristol Bay. Chilled raw product purchases increased by 19.5 MMLb (14 percent) while unchilled raw product decreased by 11 MMLb (20 percent). This pushed the percent of total aggregate chilled raw product in 2018 to 79 percent. The 2018 survey also recorded the lowest portion of unchilled total raw product purchases (21 percent), and the third lowest volume of unchilled raw product purchases (43 MMLb).

The 2018 survey continues to highlight the growth of chilling capacity within the region. As noted in previous reports, years with a significant increase in run size and harvest are likely to experience decreases in the portion of total raw product purchases that are chilled. However, the 2018 survey builds on milestones of the 2016 and 2017 surveys—recording an increase both in overall raw product purchases and in the portion of the raw product purchases that were chilled. This continues to suggest that the chilling capacity in the region is greater than previously assumed, and/or that the size of the run now has less of an impact on the portion of raw product purchases that are chilled. It also is possible that other variables, such as run timing or duration and intensity, have significant impacts on the chilling practices in a given year within the region.

It is also worth noting that the portion of total raw product purchases that were chilled from both the set and drift net fleets has increased in every year except 2014, with an average increase of 11 percent per year. As a result, the portion of total aggregate raw product being chilled has more than doubled from 38 percent in 2009 to 79 percent in 2018. This is a clear indication of a shift in chilling practices and a resulting increase in the quality of raw product purchases in the region.

Table 1. Total Raw Product (Drift and Set) Purchases, 2009–2018

Catch	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Year-over-Year Change	Average, 2009–2018
Round Weight (MMLb)												
Chilled	63.4	66.2	61.7	49.4	49.5	71.8	98.1	128.0	141.6	161.2	19.5	89.1
Unchilled	104.0	99.7	67.3	40.7	39.9	67.7	79.6	55.7	54.0	43.1	-10.9	65.1
Total	167.4	165.9	129.0	90.1	89.3	139.5	177.7	183.7	195.6	204.2	8.6	154.2
Percent of Round Weight (%)												
Chilled	37.9	39.9	47.9	54.9	55.4	51.5	55.2	69.7	72.4	78.9	13.8	57.8
Unchilled	62.1	60.1	52.1	45.1	44.6	48.5	44.8	30.3	27.6	21.1	-20.2	42.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		

Note: Column totals may not sum due to rounding.

Figure 2 displays the portion of the total raw product purchases that were chilled or unchilled from 2009 through 2018. Apart from 2014, the survey has recorded year-over-year increases in the percentage of chilled raw product purchases, and a corresponding decrease in the percentage of unchilled raw product purchases. Both the chilled and unchilled percentages follow somewhat linear trends. A significant increase in run size, relatively high base prices compared to bonuses, and a compressed run timing in 2014 are thought to have caused the temporary disruption in that trend, with the survey recording a decrease in the portion of chilled product and an increase in the portion of

unchilled product. It appears that the region has been able to adjust to the larger run sizes seen in recent years. Results from the 2018 survey show a continuation of an increasing trend in chilled raw product, pushing the previous record for highest portion of chilled raw product purchases set in 2017 to a new record in 2018.

Figure 2. Total Chilled and Unchilled Product

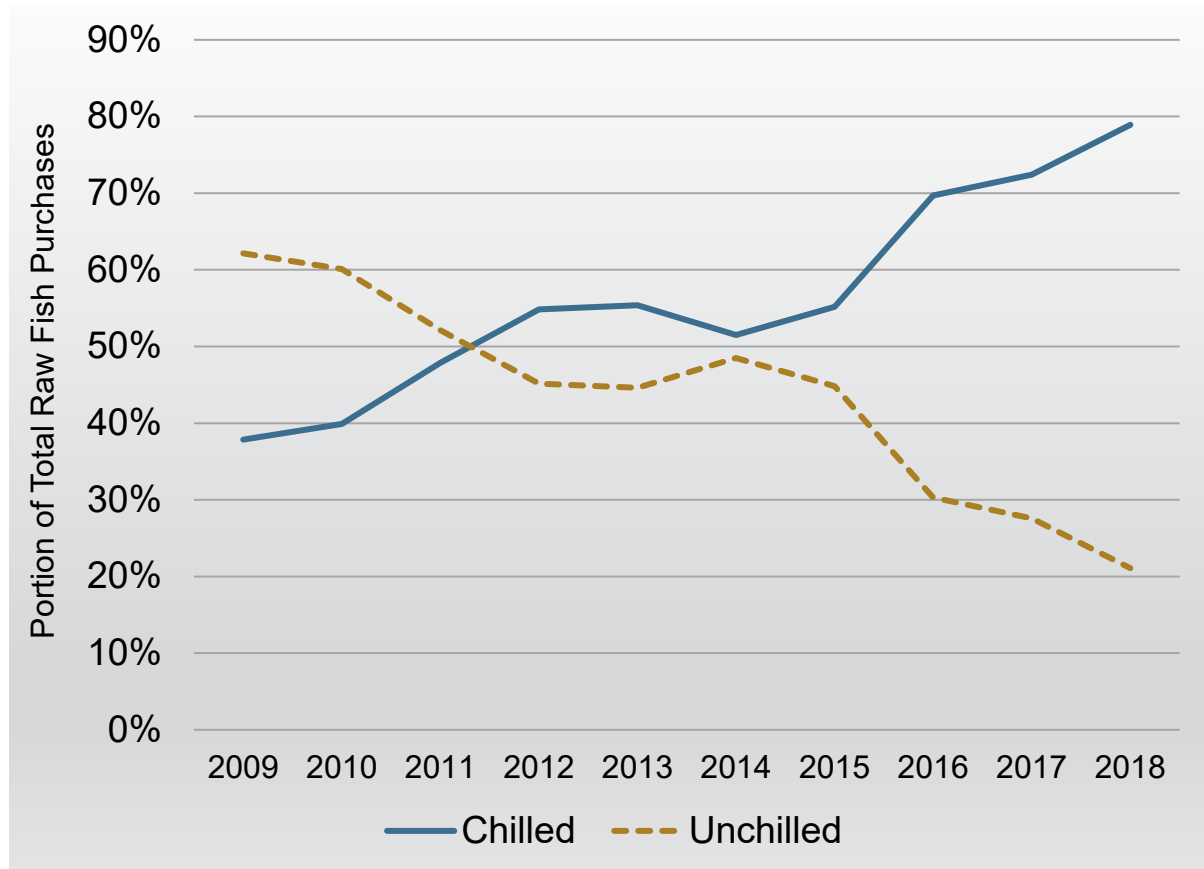


Table 2 displays the raw catch purchases from the drift fleet alone and excludes the contributions to the fishery made by set net permit holders. Total purchases of raw product from the drift fleet increased by roughly 7 MMLb, or 4 percent, in 2018 to 175.7 MMLb. Chilled raw product purchases from the drift fleet increased by roughly 22 percent, from the previous record high of 124.6 MMLb in 2017, to 151.6 MMLb in 2018—a new record in the history of the survey. The overall share of the total purchases from the drift fleet that were chilled increased from 74 percent in 2017 to 86.3 percent in 2018—again, setting the record for the highest portion of chilled drift fleet raw product purchases recorded by the survey.

The total volume, and portion, of unchilled raw product purchases from the drift fleet fell again in 2018. Processors reported a total of 24.1 MMLb of unchilled raw product purchases from the drift fleet, accounting for only 13.7 percent of the total drift fleet raw product purchases. This marks the lowest portion of unchilled raw product purchases from the drift fleet recorded by this survey. The total portion of the total drift net purchases that were chilled in 2018 increased 11 percent from the previous record set in 2016, with chilled purchases accounting for 86.3 percent of all purchases from the drift fleet. While the decrease in the portion of purchases that were chilled in 2014 was attributed to a significant

increase in run size, it appears that the drift fleet was able to increase its chilling capacity to accommodate even larger runs in 2015, 2016, 2017 and 2018.

Table 2. Drift Fleet Raw Product Purchases, 2009–2018

Catch	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Year-over-Year Change	Average, 2009–2018
Round Weight (MMlb)												
Chilled	59.8	63.0	50.7	45.1	45.4	64.3	80.3	118.1	124.6	151.6	27.0	80.3
Unchilled	85.0	73.6	59.4	27.4	32.9	52.0	66.2	38.6	43.8	24.1	-19.7	50.3
Total	144.8	136.6	110.1	72.5	78.4	116.3	146.5	156.7	168.4	175.7	7.3	130.6
Percent of Round Weight (%)												
Chilled	41.3	46.1	46.0	62.2	58.0	55.3	54.8	75.3	74.0	86.3	21.7	61.5
Unchilled	58.7	53.9	54.0	37.8	42.0	44.7	45.2	24.7	26.0	13.7	-45.0	38.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		

Note: Column totals may not sum due to rounding.

While the drift fleet continued to set new records for delivering chilled raw product, processors reported a 44 percent decrease to 9.5 MMlb of total chilled raw product purchases coming from the set net fleet in 2018, which was 6.3 percent of total chilled raw product purchases (see Table 3). The portion of chilled raw product coming from the set net fleet has fluctuated since 2009, peaking at about 22 percent in 2011 and 2015, and with lows of about 5 to 6 percent in 2009, 2010, and 2018. Despite the decrease in chilled product purchases from the set net fleet in 2018, the portion of total raw product purchases that was chilled from both fleets increased to a record high of 79 percent (see Table 1).

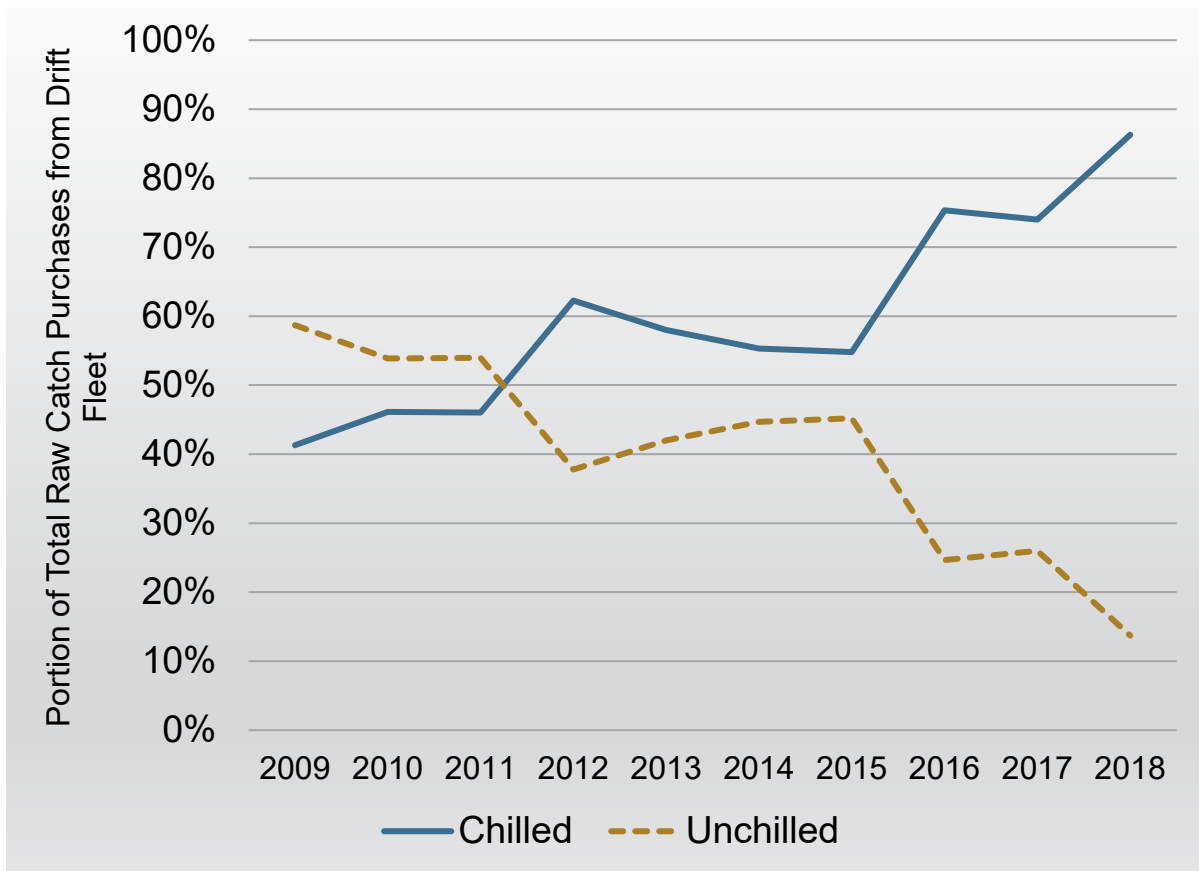
Table 3. Set Net and Drift Fleet Chilled Product Purchases, 2009–2018

Catch	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Year-over-Year Change	Average, 2009–2018
Chilled Drift MMlb	59.8	63.0	50.7	45.1	45.4	64.3	80.3	118.1	124.6	151.6	27.0	80.3
Chilled Set MMlb	3.6	3.2	11.0	4.2	4.0	7.6	17.8	9.9	17.0	9.5	-7.5	8.8
Set Net Portion (%)	6.0	5.1	21.8	9.4	8.9	11.8	22.2	8.4	13.6	6.3		

Figure 3 displays the chilled and unchilled portions of the raw product purchases from the drift fleet between 2009 and 2018. During the first five years of this survey, the portion of chilled drift net purchase consistently increased, but in 2013 and 2014 the trend reversed and the share of raw product that drift permit holders were chilling declined. The reversal of the trend was not surprising, considering the 2012 BBRSDA survey finding that easier conversions to RSW largely had been completed and that future conversions would be limited to smaller and older vessels.

Since 2015, the drift fleet has returned to its initial upward trend, with the portion of chilled raw product purchases from the drift fleet increasing or staying about the same in the last three consecutive years. During the 2018 season, 86.3 percent of drift fleet purchases were chilled, surpassing the previous survey record set in 2016 by 11 percent.

Figure 3 Drift Fleet Chilled and Unchilled Product



An incentive that is undoubtedly influencing the drift fleet's chilling practices is ex-vessel price bonuses offered by processors. The bonuses can include quality premiums like chilling, bleeding, and mat bonuses; production bonuses; and retro-payments. These incentives reinforce the importance and value placed on high quality raw product purchases, which in turn allow processors the flexibility to direct raw product to the most profitable product forms. Permit holders and processors appear to be collaborating to ensure that all the stakeholders in the system (i.e., permit holders, processors, the community, and state government) maximize the value of the fishery.

Table 4 shows the differences between average base and final prices received by Bristol Bay fishermen, as well as the range of chilling bonuses that were offered each year. Chilling bonuses, as reported in Bristol Bay Fishermen's Association (BBFA) newsletters, have remained relatively constant, with many processors offering an additional 15 cents per pound each year. The highest chilling bonus was 25 cents per pound, offered in 2017, followed by a 20 cents per pound bonus in 2018. Nominal differences between the average final and base prices account for all bonuses, including those which were retroactively paid to fishermen after adjustments at the end of the season. The largest difference to date was 29 cents in 2017, which was 28.4 percent of the \$1.26 per pound base price. Bonus incentives were also strong in 2015 and 2016, especially compared to 2013 where the difference was only about seven percent of the base price. Generally, the differences between adjusted final prices and base prices have increased over time which is consistent with the observed improvement in chilling practices and a shift away from canned products.

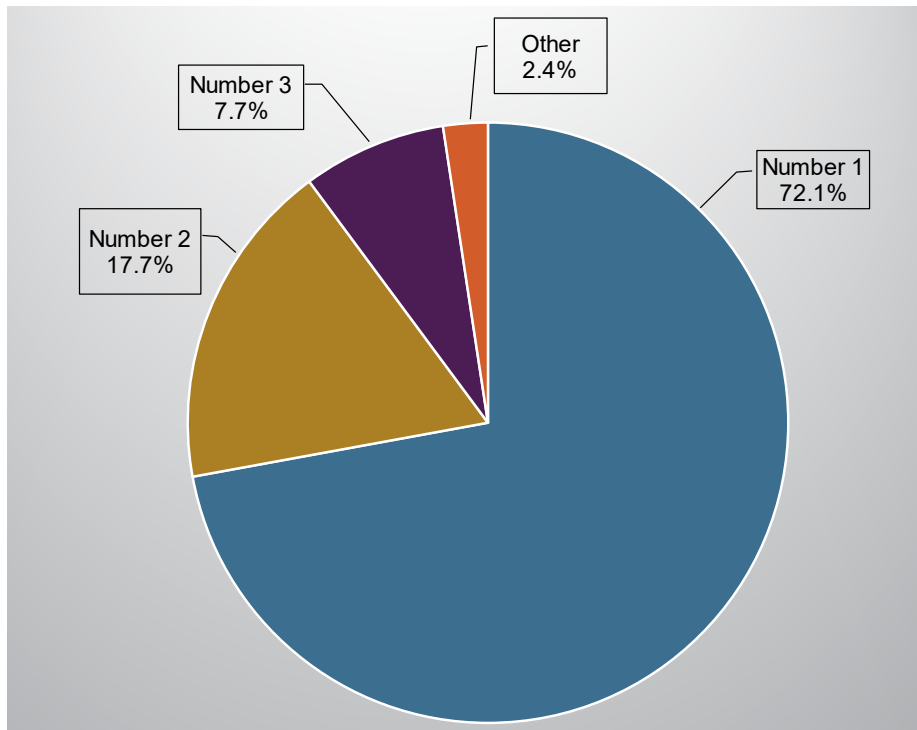
Table 4. Bristol Bay Ex-Vessel Salmon Prices and Chilling Bonuses (2008–2018)

Year	Average Nominal Base Price \$/lb	Average Nominal Final Price \$/lb	Nominal Difference (\$Final-\$Base)	Difference as % of Base Price	Nominal Chilling Bonus Range (\$)	% of Total Drift Purchases Chilled
2009	0.70	0.80	0.10	14.3	\$0.10 - \$0.13	41.3
2010	0.95	1.07	0.12	12.6	\$0.10	46.1
2011	1.00	1.17	0.17	17.0	\$0.10 - \$0.16	46
2012	1.00	1.18	0.18	18.0	\$0.12 - \$0.15	62.2
2013	1.50	1.61	0.11	7.3	\$0.15	58
2014	1.20	1.35	0.15	12.5	\$0.15	55.3
2015	0.50	0.64	0.14	28.0	\$0.10 - \$0.15	54.8
2016	0.76	0.96	0.20	26.3	\$0.15	75.3
2017	1.02	1.31	0.29	28.4	\$0.15 - \$0.25	74
2018	1.26	N/A	N/A	N/A	\$0.15 - \$0.20	86.3
Data Source:	*ADFG Season Summary	**ADFG COAR data	Calculation	Calculation	***BBFA Newsletter	Processor Survey

Sources: *ADF&G 2019a; **ADF&G 2019c; ***Bristol Bay Fishermen’s Association, 2009-2018.

In the 2018 survey a new question was introduced to gauge the quality of fish purchased in Bristol Bay. Respondents were asked to estimate their proportional purchases of number 1, 2, 3, and “other” grade fish. Number 1 grade fish made up most of the purchases at 72 percent, followed by number 2 grade at 18 percent (Figure 4). Number 1 quality grade in Bristol Bay includes the Alaska Seafood Marketing Institute’s “Premium Grade” and “Grade A” salmon categories, number 2 quality grade is the “Grade B” category, and number 3 quality grade is “Grade C” category (Buckley 2017; ASMI 2015).

Figure 4. Proportion of Raw Product Purchases by Grade, 2018

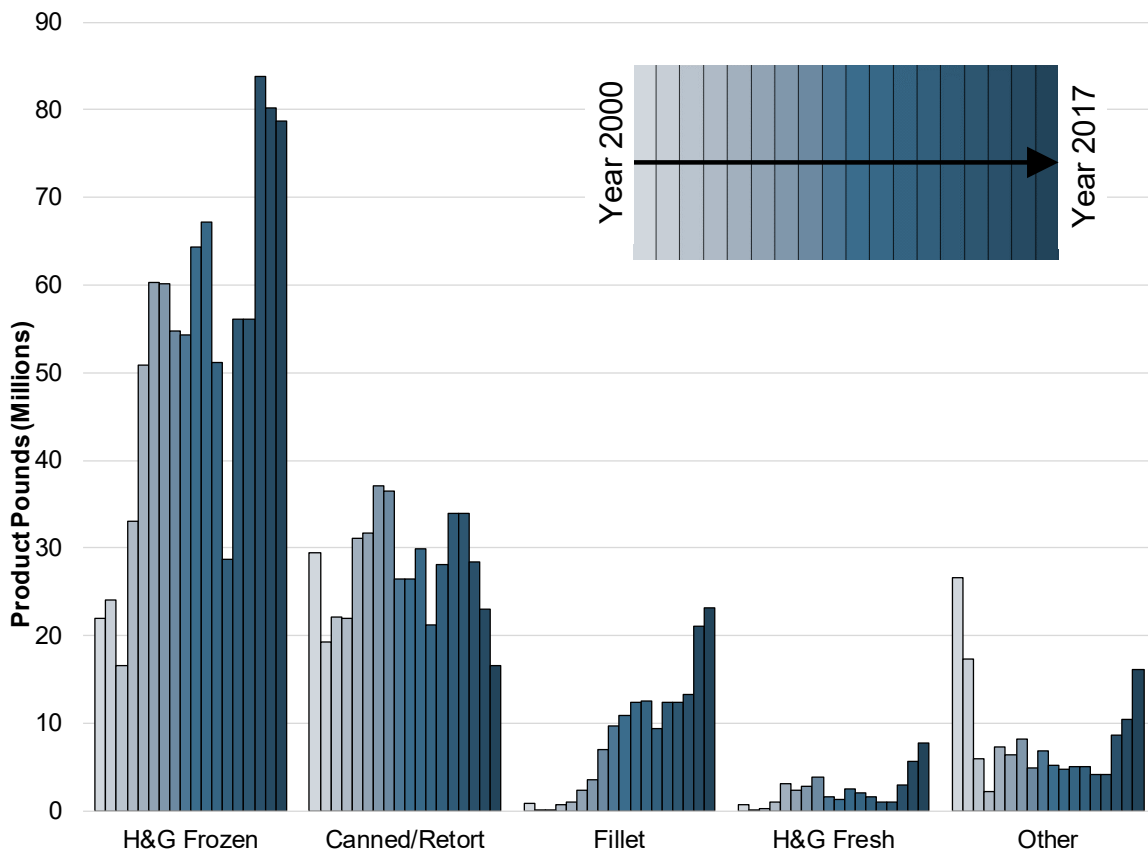


3 Finished Product Forms

Historical sockeye salmon production and revenue data are available by request through the commercial operator annual report (COAR) database maintained by ADF&G. While our survey captures a detailed sample of the activity in the fishery, the COAR data represent total production over all Bristol Bay processors and provide validity to the survey estimates. COAR data can be used to supplement the survey analysis by providing a longer data series and comparing trends in production to revenue, which is not collected through the survey. Collection of COAR data by ADF&G from processors occurs in the spring, so COAR data will always lag one year behind the BBRSDA Survey. From this perspective, the survey provides a one year forecast of industry trends not yet available in public data. In 2017, COAR data show that the quantity of fillets and fresh products continued to increase, at the expense of lower canned salmon production levels (Figure 5). H&G frozen production also decreased a small amount for the third year in a row.

Consecutive increases in production of the “other” product category from 2015 to 2017 could be related to new markets. As an example, Northline Seafoods has converted a barge into a floating processor of flash-frozen whole salmon. The owners claim that growth of markets in China create demand for fish heads, skins, bones, and roe that can be reasonably preserved by freezing fish whole (KDLG 2017). In 2017, they announced plans to operate in Bristol Bay in 2018 with an expected processing capacity of about 300,000 pounds per day. Alternative product forms like whole fish could develop into a larger share of the market, if parts of salmon that are normally ground up as waste can be sold overseas.

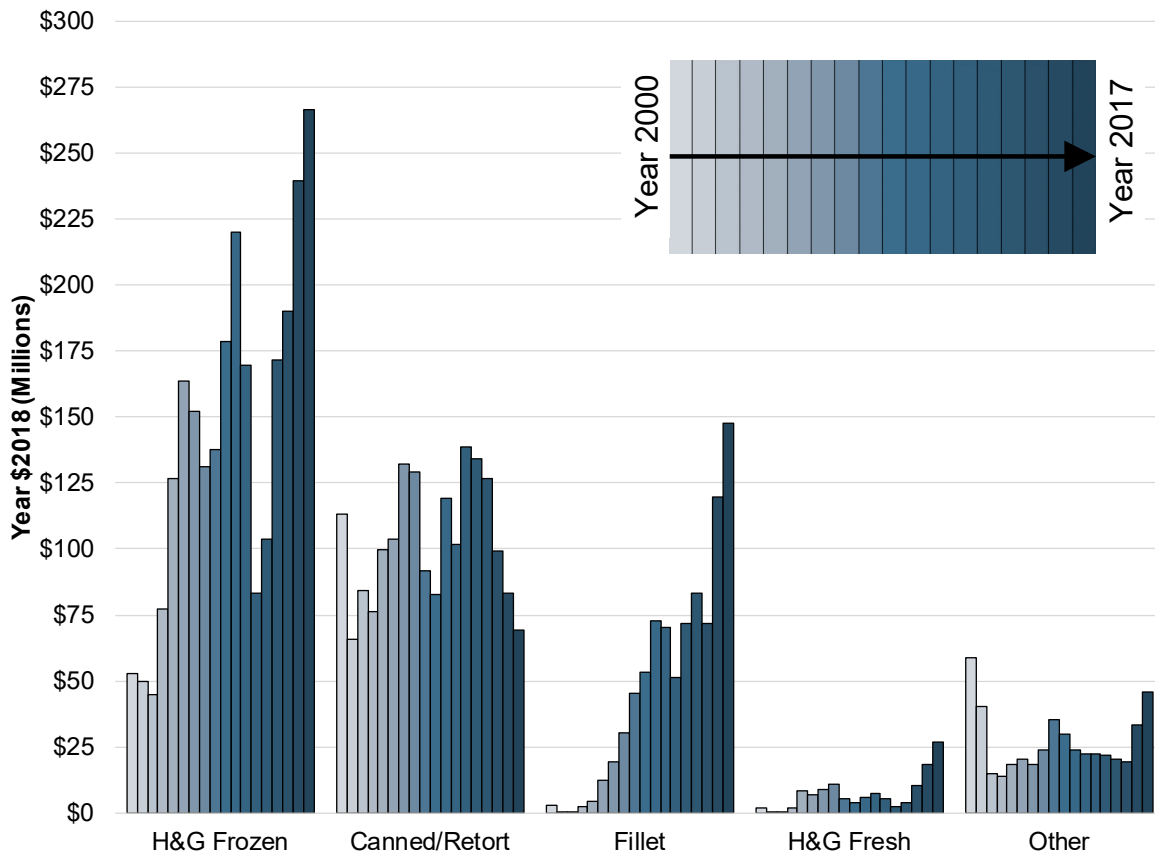
Figure 5 Bristol Bay Commercial Operator Sockeye Salmon Annual Production by Form



Source: ADF&G, 2019b

Despite the decrease in H&G frozen production quantity, product value within the COAR Data increased in 2017 for the sixth consecutive year (Figure 6). Wholesale value from production of fillets also increased significantly, along with smaller increases from H&G fresh and other product forms. From 2000 to 2017, the product mix became increasingly diverse and the industry shifted away from canned salmon to raw consumer products that benefit more from improved chilling practices.

Figure 6 Bristol Bay Commercial Operator Sockeye Salmon Wholesale Values by Product Form



Source: ADF&G, 2019b

Table 5 contains COAR data for years 2009 to 2017 and provides an estimate of purchase weight by product form in the 2018 season. Since the survey does not capture all sockeye purchases in Bristol Bay, the estimates are proportionally inflated using the total catch volume from the ADF&G 2018 post season summary. The survey data analysis shows that the observed shift in product mix continued in 2018. Most notably, the portion of raw product purchases used to produce fillets (28 percent) increased to the highest levels recorded by this survey. Conversely, raw product purchases used to produce H&G frozen products decreased by an estimated 13.7 MMLb. The portion of raw product purchases used for canned products fell to a record low of 14 percent.

Additionally, the portion of raw product purchases used to produce “other” and H&G fresh products, which includes fresh or frozen head-on fish, increased from 14.7 to 15.7 percent in 2018—a 1.6 MMLb year-over-year increase from 2017. These categories were reported separately in the 2017 report, but the 2018 response values had to be combined to protect confidential responses from the survey. The 2017 values were also combined into a single group to allow for calculation of a year-over-year change

(Table 5). An increase in the production of H&G fresh and other products is observed in both the COAR data and the survey results, which suggests that the trend may continue in the future.

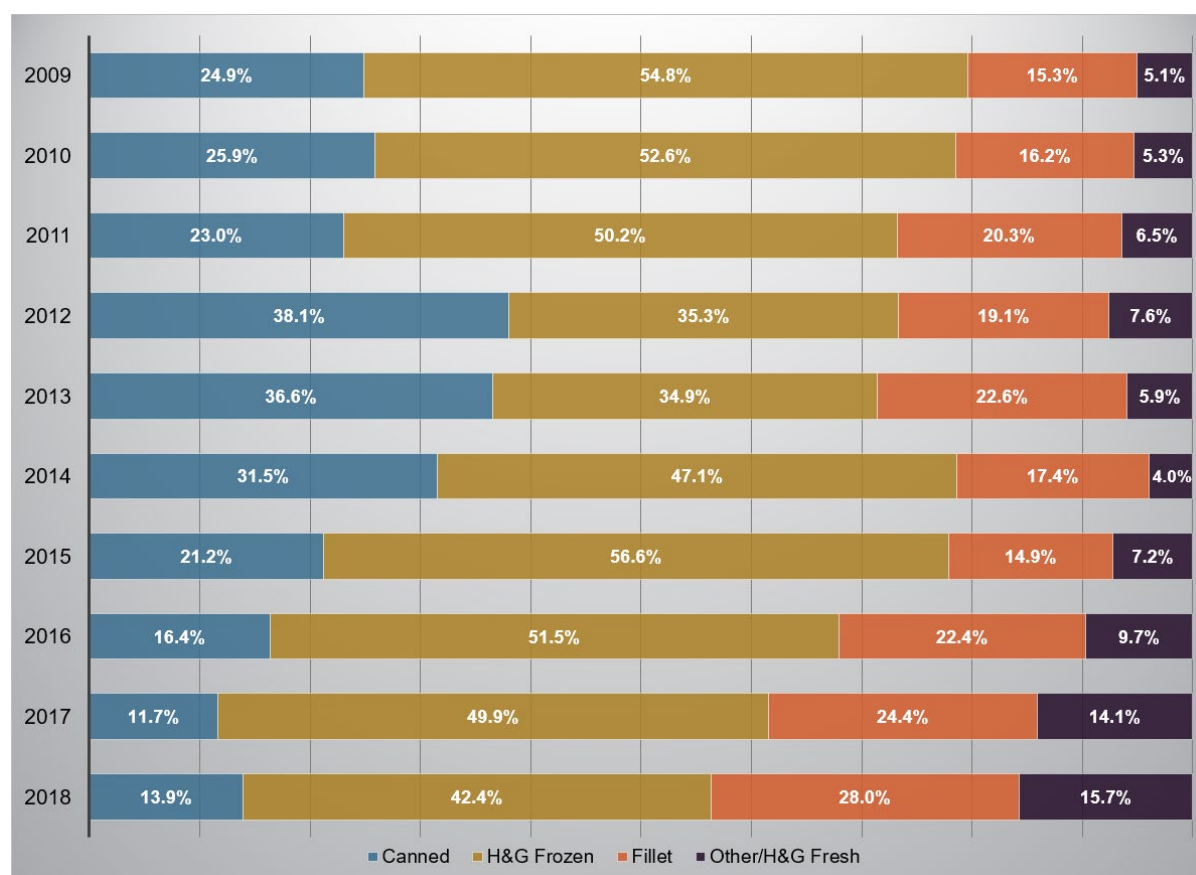
Table 5. Total Raw Product Consumed by First Wholesale Product Form, 2009–2018

Product Form	2009	2010	2011	2012	2013	2014	2015	2016	2017	*2018 Estimate	Year- over- Year Change	Average, 2009– 2018
Round Weight (MMlb)												
Canned	39.6	44.6	31.7	41.9	34.9	50.8	42.5	34.4	24.9	30.4	5.6	37.6
H&G Frozen	87.0	90.7	69.2	38.8	33.3	75.8	113.3	108.4	106.4	92.7	-13.7	81.6
H&G Fresh	1.8	3.4	2.8	2.2	1.2	1.4	4.0	7.7	N/A	N/A	N/A	3.1
Fillet	24.3	27.9	28.1	21.1	21.6	27.9	29.8	47.1	52.0	61.1	9.2	34.1
Other	6.3	5.7	6.1	6.1	4.4	5.1	10.4	12.7	N/A	N/A	N/A	7.1
Other/H&G Fresh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	30.0	34.4	5.4	167.8
Total	158.9	172.3	137.9	110.1	95.6	160.9	200.1	210.4	213.2	218.6	5.4	167.8
Percent of Total Round Weight (%)												
Canned	24.9	25.9	23.0	38.1	36.6	31.5	21.2	16.4	11.7	13.9	2.3	24.3
H&G Frozen	54.8	52.6	50.2	35.3	34.9	47.1	56.6	51.5	49.9	42.4	-7.5	47.5
H&G Fresh	1.1	2.0	2.0	2.0	1.3	0.8	2.0	3.7	N/A	7.6	N/A	2.5
Fillet	15.3	16.2	20.3	19.1	22.6	17.4	14.9	22.4	24.4	28.0	3.6	20.1
Other	3.9	3.3	4.4	5.6	4.6	3.1	5.2	6.0	N/A	8.1	N/A	4.9
Other/H&G Fresh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14.1	15.7	1.6	14.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		

Note: Column totals may not sum due to rounding. *Estimates derived from survey data and ADF&G, 2019a.
Sources: ADF&G, 2019a; ADF&G, 2019b; DCCED, 2019; Northern Economics estimates

During the 2018 season, it appears that processors continued to reallocate resources previously used for canned products to produce a greater volume of fresh and frozen product forms (see Figure 7). From 2009 to 2011, the portion of raw product turned into canned products remained relatively consistent, averaging about 25 percent. After an increase to 38.1 percent in 2014, the percent of canned product has generally decreased over time. Raw product previously being allocated for canned product now appears to be used to produce higher quantities of fresh H&G, fillets, and other products. These product forms have grown from using 21.4 percent of the raw product purchases in 2014 to using over 43 percent in 2018. The change in product mix could be the result of changing market demands and preferences, increased processing capacity for fresher products, or a more efficient supply chain that can move perishable products to market more reliably.

Figure 7. Raw Product Forms of Product Processed in Bristol Bay, 2009–2018



Sources: ADF&G, 2019a; ADF&G, 2019b; DCCED, 2019; Northern Economics estimates

The changes in final product form between 2009 and 2018 mirror those exhibited among raw product forms in terms of both volume and raw product share (see Table 6). Using COAR data, the 2018 ADF&G season summary report, and the responses from the processor survey, the study team estimates that 157.4 MMLb of first wholesale product was produced from the 2018 run. This is an increase of 14.8 MMLb or 10 percent from the previous year, which can be attributed to the increased run size, with 2018 ranking as the largest run on record. Fillet and other/H&G fresh product forms saw increases in the volume of first wholesale product produced with increases of 4.1 and 17.1 MMLb, respectively. The total volume of canned first wholesale products increased slightly to 20.4 MMLb, or about 13 percent of the total estimated first wholesale products. The combination of a larger run size and a continued low portion of canned product suggests that the region continues to support a larger processing capacity for emergence of growth in the other/H&G fresh category. It also might be a strong indication of changes in market preferences, shifting from more processed products to fresh products.

Table 6. First Wholesale Product Form of Product Processed in Bristol Bay, 2009–2018

Product Form	2009	2010	2011	2012	2013	2014	2015	2016	2017	*2018 Estimate	Year- over- Year Change	Average, 2009– 2018
Product Weight (MMlb)												
Canned	26.5	29.9	21.3	28.1	23.4	34.0	28.4	23.1	16.7	20.4	3.7	25.2
H&G Frozen	64.4	67.1	51.2	28.7	24.7	56.1	83.9	80.2	78.7	68.6	-10.1	60.4
H&G Fresh	1.3	2.5	2.1	1.6	0.9	1.0	3.0	5.7	N/A	N/A	N/A	2.3
Fillet	10.9	12.4	12.5	9.4	9.7	12.5	13.3	21.0	23.2	27.3	4.1	15.2
Other	5.2	4.7	5.1	5.1	3.7	4.2	8.7	10.5	N/A	N/A	N/A	5.9
Other/H&G Fresh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24.0	41.1	17.1	32.5
Total	108.3	116.7	92.1	72.9	62.3	107.8	137.3	140.6	142.6	157.4	14.8	113.8
Percent of Total Product Weight (%)												
Canned	24.5	25.6	23.1	38.5	37.6	31.5	20.7	16.4	11.7	13.0	1.3	24.3
H&G Frozen	59.5	57.5	55.6	39.4	39.6	52.1	61.1	57.1	55.2	43.6	-11.6	52.1
H&G Fresh	1.2	2.2	2.2	2.2	1.5	0.9	2.2	4.1	N/A	N/A	N/A	2.1
Fillet	10.0	10.7	13.6	12.9	15.5	11.6	9.7	15.0	16.3	17.3	1.1	13.3
Other	4.8	4.1	5.5	7.0	5.9	3.9	6.3	7.5	N/A	N/A	N/A	5.6
Other/H&G Fresh	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16.8	26.1	9.3	21.5
Total	100	100	100	100	100	100	100	100	100	100		

Note: Column totals may not sum due to rounding. *Estimates derived from survey data and ADF&G, 2019a.

Sources: ADF&G, 2019a; ADF&G, 2019b; DCCED, 2019; Northern Economics estimates

The amount of raw product canned in Bristol Bay was 28.2 MMlb in 2018, a slight increase of 1.1 MMlb from 2017 but still a 32 MMlb decrease from the survey record in 2014 (see Table 7). The amount of raw product canned outside the Bay decreased in 2018 to 0.2 MMlb. In terms of the percent of total production, raw product canned within the Bay accounted for only 14 percent of total production and raw product canned outside the Bay accounted for less than 1 percent. The results of the 2018 survey show a continued overall shift away from canned products, with a smaller portion of raw product purchases being allocated towards canning within the region.

Table 7. Canning Location, 2009–2018

Product Form	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Year- over- Year Change	Average, 2009– 2018
Round Weight (MMlb)												
Reported Canned in the Bay	59.2	51.6	42.2	40.9	40.3	60.2	59.3	49.5	27.1	28.2	1.1	45.9
Assumed Canned Outside the Bay	4.9	1.1	0.4	0.5	0.5	3.6	1.6	0.1	0.8	0.2	-0.6	1.3
Total	64.0	52.7	42.6	41.5	40.8	63.8	60.8	49.6	27.9	28.4	0.6	47.2
Percent of Total Production (%)												
Reported Canned in the Bay	35	31	33	45	45	43	33	27	14	14	13	30
Assumed Canned Outside the Bay	3	1	0	1	1	3	1	0	0	0	-7	1
Total	38	32	33	46	46	46	34	27	14	14	6	31

Note: Column totals may not sum due to rounding.

4 Product Chilled Prior to Delivery

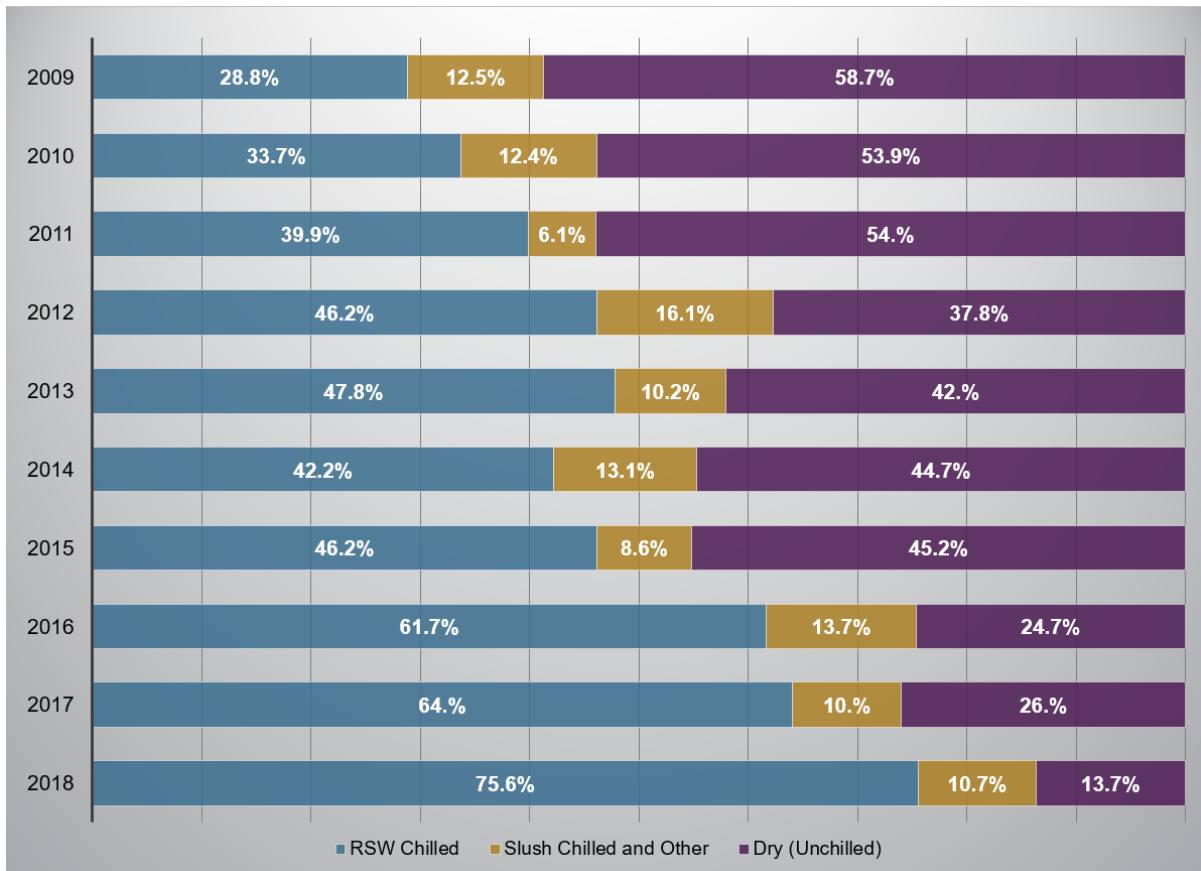
As in previous iterations, the 2018 survey asked processors about the use of RSW and slush ice systems within the drift fleet. RSW and slush ice systems were used to chill an estimated 151.6 MMlb of raw product in 2018, the largest volume of chilled raw product recorded by the survey to date (see Table 8). The majority of raw product, about 75 percent, was chilled using RSW systems and 10.7 percent was chilled using slush ice. The remaining 13.7 percent was unchilled.

Table 8. Drift Fleet Chilling Methods 2009–2018

Chilling Method	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Year-over-Year Change	Average, 2009–2018
Round Weight (MMlb)												
RSW Chilled	41.7	46.0	44.0	33.5	37.5	49.1	67.6	96.7	107.9	132.8	25.0	65.7
Slush Chilled and Other	18.1	17.0	6.7	11.6	8.0	15.2	12.7	21.4	16.8	18.8	2.0	14.6
Dry (Unchilled)	85.0	73.6	59.4	27.4	32.9	52.0	66.2	38.6	43.8	24.1	-19.7	50.3
Total	144.8	136.6	110.1	72.5	78.4	116.3	146.5	156.7	168.4	175.7	7.3	130.6
Percent of Round Weight (%)												
RSW Chilled	28.8	33.7	39.9	46.2	47.8	42.2	46.2	61.7	64.0	75.6	12	49
Slush Chilled and Other	12.5	12.4	6.1	16.1	10.2	13.1	8.6	13.7	10.0	10.7	1	11
Dry (Unchilled)	58.7	53.9	54.0	37.8	42.0	44.7	45.2	24.7	26.0	13.7	-12	40
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		

While the portion of raw product purchases that were chilled using slush ice is relatively stable, the survey results show that the portion chilled with RSW has more than doubled between 2009 and 2018 (Figure 8). In the first several years of the survey it appeared that the run size impacted the chilling method, with the portion of raw product chilled by RSW systems decreasing on years that saw larger runs but results from the 2016, 2017, and 2018 surveys directly contradict that perceived trend. Processors and permit holders have told us that steady and consistent run intensity allows more time for chilling fish as they are harvested. Thus, run intensity appears to be a factor as well as the size of the run.

Figure 8. Chilling Methods in the Drift Fleet, 2009–2018



The 2018 survey recorded an increase in the portion of raw product chilled by the drift fleet using RSW systems for the fourth consecutive year. Except for the slight dip in 2014, the survey has consistently recorded year-over-year increases in the percent of total drift fleet chilled product that was chilled using an RSW system. The inverse can be seen in the portion of the raw product that was unchilled by the drift fleet, which has steadily decreased since 2009 except for 2013–2015, which recorded slight increases. In 2018, only 13.7 percent of total drift fleet purchases were unchilled, the lowest portion recorded by the survey and a 76 percent decrease from the data collected in 2009. Over the life of the survey, the portion of the total raw product purchased from the drift fleet being chilled with slush ice has remained relatively stable, ranging between 6 and 16 percent, and it appears that the increase in raw product chilled by RSW systems is really driving the overall change in chilling practices in the region.

The data collected by this survey show a distinct shift in the chilling practices in Bristol Bay, from most of the drift fleet delivering unchilled raw product in 2009 (58.7 percent unchilled), to the majority of the drift fleet delivering chilled raw product in 2018 (86.3 percent chilled).

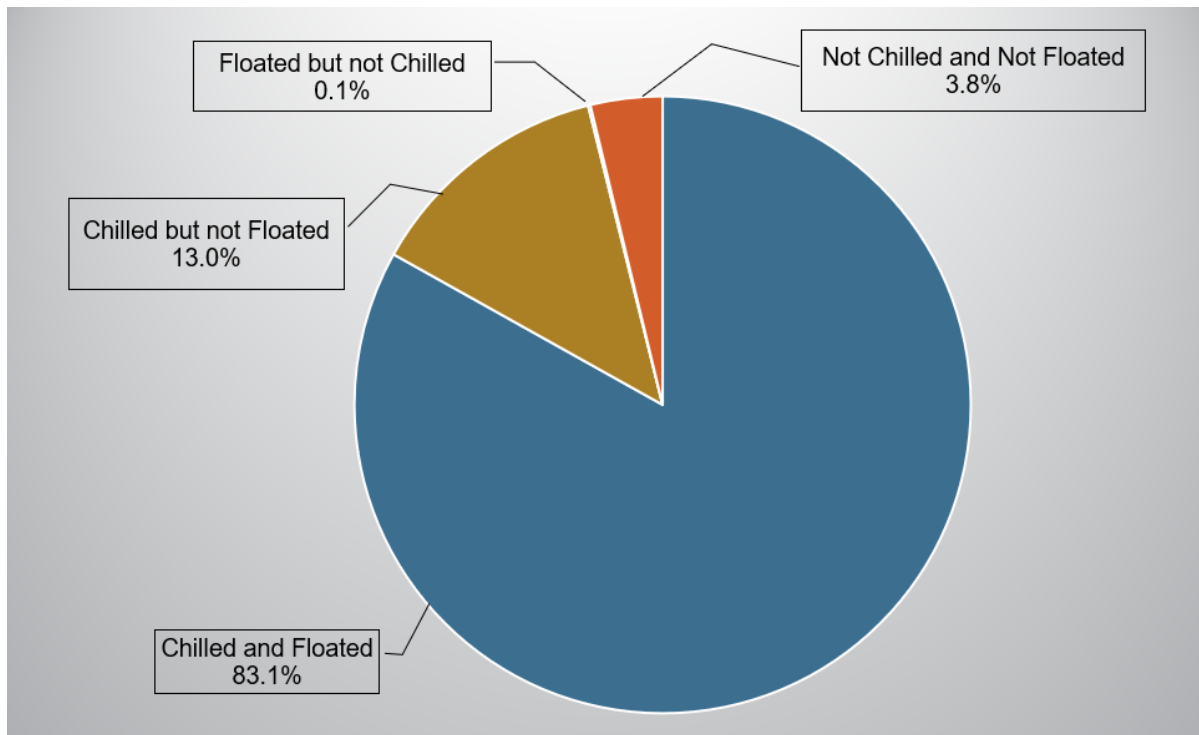
5 Quality of Chilled Raw Product

Questions pertaining to the quality of chilled raw product in the Bristol Bay drift net fishery changed in 2017, building on feedback provided in previous surveys to ask new and more refined questions. New to the 2017 survey and continued in the 2018 survey were questions inquiring about the percentage of raw product being purchased from the drift net fleet that is chilled and/or floated, processor employment of third part quality assurance contractors, and best practices that have the biggest impact on the quality of delivered raw product. Conversely, the 2017 survey removed a series of questions asking about the maximum, minimum, and ideal temperatures of chilled raw product, and the 2018 survey removed a question asking about the future of product mixes and future portions of chilled product purchases.

To capture data on the quality of chilled raw product in the Bristol Bay drift net fishery, the 2018 survey collected a fourth year of data using the same questions to start to identify trends or changes in the preferred practices and shifting attitudes towards the predicted quality of raw product delivered in Bristol Bay moving forward—almost all respondents (94 percent) reported that the quality of chilled floated RSW fish is better than the quality of slush chilled, non-floated fish. Two respondents reported that the quality is not different. The degree to which the quality of chilled floated RSW fish is better was split, with just over half answering that chilled floated RSW fish is ‘significantly better’ while just under half reported it is only ‘slightly better’.

The 2017 and 2018 surveys asked respondents to further breakdown total raw product purchased from the drift fleet into four categories of fish: floated chilled (RSW), chilled but non-floated (slush ice), floated and not chilled, and non-floated/non-chilled. The breakdown of total raw product purchases made from the drift fleet in 2018 is shown in Figure 9, indicating that over 83 percent of chilled raw product purchased from the drift fleet was floated.

Figure 9. Proportion of Drift Fleet Raw Product Chilled and/or Floated, 2018



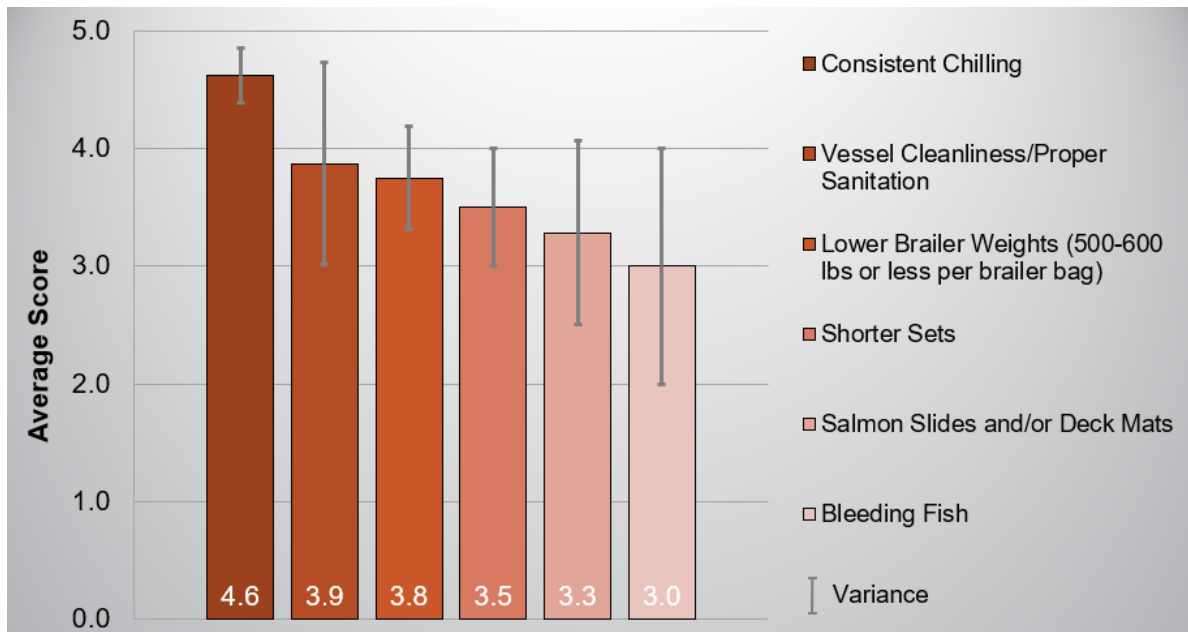
The survey also asked processors how many fish their tenders are required to sample in a delivery to determine the chilled temperature and possibly qualify for a chilling bonus. Of respondents who tested their fish, samples ranged from 3 to 30 fish per delivery, with the most common response being 3 fish (50 percent of respondents) and an average of about 6 fish. The 2018 survey also included two questions regarding the hiring of quality assurance contractors: 1) Do you employ a third-party quality assurance contractor for your tender fleet? and 2) If you did employ a third-party quality assurance contractor, what percentage of your tenders had a third-party quality assurance contractor on board during the 2018 season?

Five processors reported having hired a third-party quality assurance contractor in 2018 and of those five processors, the average percentage of tenders that had a contractor on board was 75 percent.

The 2018 survey was the second year that included a question asking respondents to score six best practices based on the magnitude of impact the practice has on the quality of the delivered raw product. Respondents were asked to score the practices from 1 to 5, with 1 having no impact on quality and 5 having maximum impact. The practices included: consistent chilling (RSW or slush ice), fish bleeding, shorter sets, salmon slides and/or deck mats, lower brailer weights (500–600 lb. or less per brailer bag), and vessel cleanliness/proper sanitation. Consistent chilling scored the highest, as it did in 2017. The fact that chilling has long been the principal focus of the survey may have some influence on its being of uppermost importance to respondents. It is also possible that chilling scored the highest because without that practice, many of the other best practices would have less effect.

Going forward, especially considering the great gains made in chilling, BBRSDA may want to study the benefit of other improvements. For example, vessel cleanliness/proper sanitation and the use of lower brailer weights scored closely for second and third highest in providing higher quality to raw product delivered, while shorter sets, salmon slides and/or deck mats, and bleeding fish all scored lower respectively (Figure 10). It is also worth noting that the variance among scores was relatively small (less than or equal to 0.5) for the highest score (consistent chilling), the third score (lower brailer weights), and the fourth score (shorter sets). However, variance for the other three best practices was between 0.78 to 1.0, indicating less consensus about the importance of those practices.

Figure 10. Average Score of Best Practices Impacting the Quality of Delivered Product, 2018



Note: 1=no impact, 5= maximum impact

6 Drift Fleet Size and Chilling

The number of vessels in the drift fleet fishing for surveyed Bristol Bay processors in 2018 increased by only one vessel to 1,328 (see Table 9). This represents a slightly higher number of vessels than the average reported since 2009 (1,290). The survey asked processors to consider a boat as part of their fleet if it was contractually obligated to deliver to them or if they felt that it made more than 50 percent of its deliveries to them. The average vessels per processor increased slightly in 2018 to 148 vessels per processor. It is important to note that the data reported here should not be taken to be an accurate estimate of the total number of active vessels in the fishery—not all processors are included in the BBRSDA survey.

Table 9. Number of Vessels in the Drift Fleet, 2009–2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Year-over-Year Change	Average, 2009–2018
Total Vessels in Survey Processor's Drift Fleets	1,309	1,343	1,358	1,076	1,253	1,251	1,397	1,258	1,327	1,328	1.0	1,290
Average Vessels per Surveyed Processor	119	122	123	135	157	156	155	140	147	148	1	140

As in prior iterations, the 2018 survey asked processors to categorize vessels by the portion of the vessel's deliveries that were chilled. The total number of vessels in the drift fleets of survey processors that chilled more than 75 percent of the time reached 1,015, the largest number ever to be recorded in this category (Table 10). The increase in vessels coincides with increases reported for vessels delivering chilled raw product more than 50 percent of the time. Inversely, the number of vessels delivering chilled raw product less than 50 percent (or none of the time) decreased. The number of vessels that delivered chilled raw product none of the time dropped from 217 vessels in 2017 to 125 in 2018. This suggests that conversions from dry vessels to vessels with RSW systems are still occurring or that the drift fleet is using slush ice to properly chill product more consistently. As more vessels convert to RSW systems, there is also less pressure on the ice supply in Bristol Bay, and more ice is available to permit holders who choose to chill their product deliveries using slush ice. The shift in chilling practices could soon be approaching a tipping point where delivering chilled product is no longer seen as a preference, but rather a requirement in Bristol Bay. There are already multiple processors operating in Bristol Bay that mandate raw product deliveries be chilled, and pay a higher price per pound, but do not offer icing bonuses.

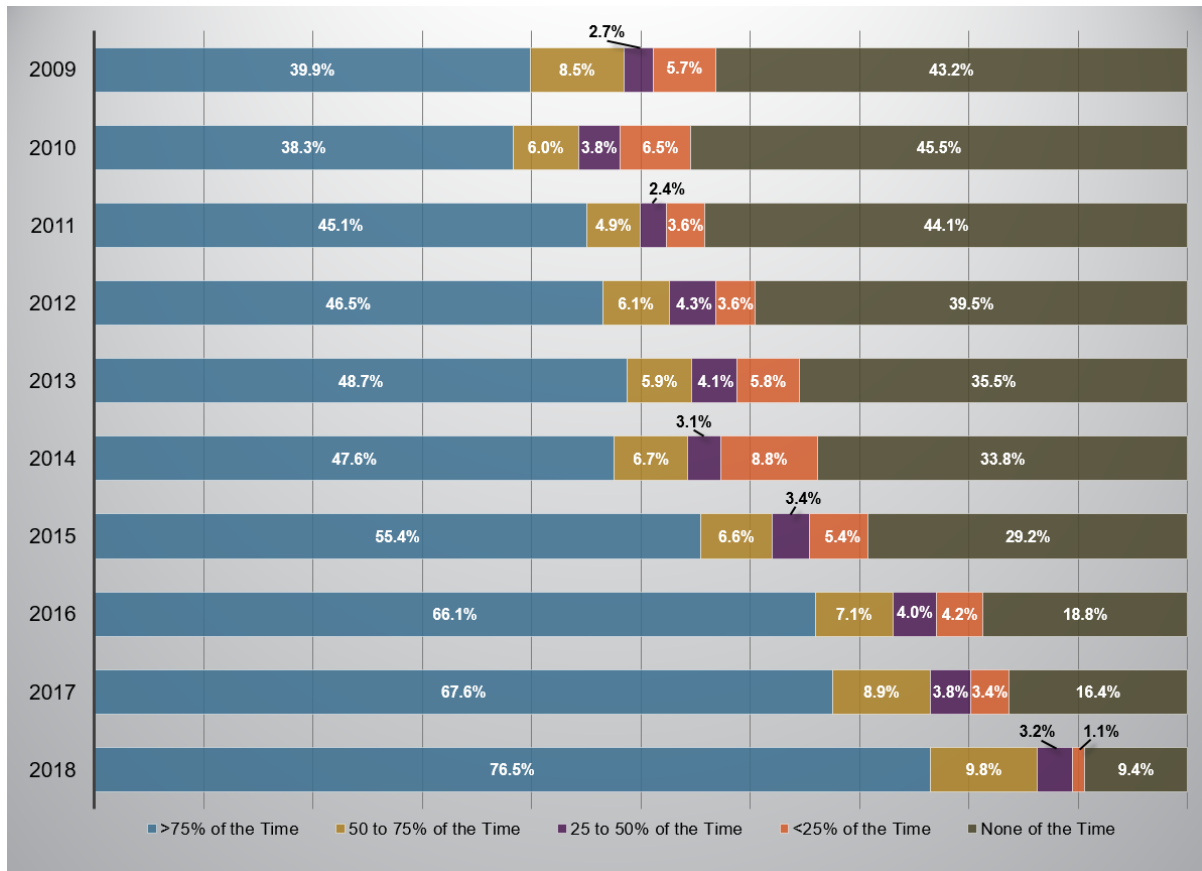
Table 10. Consistency of Chilling, 2009–2018

Year	Percent of Deliveries that Were Chilled				
	>75% of the Time	50 to 75% of the Time	25 to 50% of the Time	<25% of the Time	None of the Time
Number of Vessels					
2009	522	112	35	74	565
2010	514	81	51	87	611
2011	612	66	32	48	599
2012	500	66	46	39	425
2013	611	74	51	72	445
2014	595	84	38	111	423
2015	775	92	48	75	408
2016	831	89	51	53	236
2017	896	118	50	45	217
2018	1,015	130	42	15	125
Percent of Vessels (%)					
2009	39.9	8.5	2.7	5.7	43.2
2010	38.3	6.0	3.8	6.5	45.5
2011	45.1	4.9	2.4	3.6	44.1
2012	46.5	6.1	4.3	3.6	39.5
2013	48.7	5.9	4.1	5.8	35.5
2014	47.6	6.7	3.1	8.8	33.8
2015	55.4	6.6	3.4	5.4	29.2
2016	66.1	7.1	4.0	4.2	18.8
2017	67.6	8.9	3.8	3.4	16.4
2018	76.5	9.8	3.2	1.1	9.4

Note: Totals may not match the table above because of rounding.

In 2018, 86.3 percent of vessels delivered chilled raw product more than 50 percent of the time (note that this is an aggregation of the 50 to 75 percent and over 75 percent categories shown in Table 10), the most consistent chilling practices recorded by this survey to date (Figure 11). The portion of vessels who chilled their deliveries less consistently, less than 25 percent or none of the time, also decreased in 2018 to just 10.5 percent. This is the lowest portion of vessels making unchilled or dry deliveries recorded by the survey.

Figure 11. Chilling Consistency among the Drift Fleet, 2009–2018



7 Processor Ice-Making Capability

Total ice production capacity increased in 2018 by 10 percent to 732 tons per day (Table 11). The amount of ice available to permit holders from processors increased from 149 tons in 2017 to 199 tons in 2018—a 33 percent increase. These 2018 levels are above the average reported over the last nine years of the survey. Barge ice production comes from two vessels operated and subsidized by BBEDC, and production capacity has remained constant at about 200 tons per day.

When barge ice is included in the calculation, the total amount of daily ice available to permit holders increased to 399 tons per day, a roughly 14 percent increase from the previous year. The increase in ice being made available to permit holders from processors signifies the responsiveness of processors in providing ice to the drift fleet, as well as the importance of ice to the drift fleet’s chilling practices. And while the increased use of RSW systems to chill product may have taken some of the pressure off processors to provide their fleets with ice, the portion of the drift fleet that uses slush ice to chill their product remained steady in 2018, with just over 10 percent of chilled deliveries using slush ice (see Figure 8).

Table 11. Ice Production in Tons per Day, 2009–2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
Total Ice Production Capacity	570	775	735	645	535	635	775	705	665	732	677
Available to permit holders from processors	89	250	130	137	27	59	113	104	149	199	126
Percent available to permit holders from processors	16	32	18	21	5	9	15	15	22	27	18
Barge Ice	200	200	200	200	200	200	200	200	200	200	200
Total ice available to permit holders	289	450	330	337	227	259	313	304	349	399	326

Source: BBEDC, 2019

8 References

- Alaska Department of Commerce Community and Economic Development (DCCED). 2019. Recovery Rates and Yields from Pacific Fin Fish and Shell Fish. Available at <https://www.commerce.alaska.gov/web/ded/DEV/FisheriesDevelopment/SeafoodProcessingRecoveryRatesYields.aspx>. Accessed on April 4, 2019.
- Alaska Department of Fish and Game (ADF&G). 2019a. *Bristol Bay Salmon Season Summary, 2009-2018*. Accessed on April 12, 2019. <https://www.ADF&G.alaska.gov/index.cfm?ADF&G=commercialbyarea/bristolbay.salmon#harvest>.
- Alaska Department of Fish and Game (ADF&G). 2019b. *1990-2017 COAR Production for Bristol Bay Sockeye salmon by category. Data requested by Andy Wink. Compiled February 25, 2019.*
- Alaska Department of Fish and Game (ADF&G). 2019c. *Commercial Fishery Exvessel Prices by Area and Species.* Available at http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch_exvessel.
- Alaska Department of Fish and Game (ADF&G). 2018. News Release, 2018 Bristol Bay Sockeye Salmon Forecast.
- Alaska Seafood Marketing Institute (ASMI). 2015. Alaska Salmon Quality Specifications and Grades – Fresh and Frozen. Available at <https://uploads.alaskaseafood.org/2015/10/Alaska-Salmon-Quality-Specifications-and-Grades1.pdf>. Accessed on April 15, 2019.
- Bristol Bay Fishermen’s Association (formerly AIFMA). 2019. Fisherman’s Prices 2009-2018 (Current Prices Available to Members). Available at http://www.aifma.org/fishermans_prices.html.
- Bristol Bay Economic Development Corporation BBEDC. 2019. Bristol Bay Ice. Web page available at http://www.bbcdc.com/?page_id=495. Accessed on April 12, 2019.
- Buckley, M.K. 2017. Quality Determinants of Gillnet-Caught Alaska Salmon. *Journal of Aquatic Food Product Technology* 10: 1157-1165. Available at <https://www.tandfonline.com/doi/abs/10.1080/10498850.2014.987861?journalCode=wafp20>.
- KDLG Public Radio for Alaska’s Bristol Bay. 2017. New Bristol Bay buyer wants to try something different: freezing whole fish fast. Published Nov 6, 2017. Available at <https://www.kdlg.org/post/new-bristol-bay-buyer-wants-try-something-different-freezing-whole-fish-fast#stream/0>.

Appendix: Survey Instrument

Introduction

Welcome to the 2018 Bristol Bay Salmon Fishery Processing Survey! We're glad to be conducting this survey again after successful 2008-2017 surveys. The 2018 survey builds on the data in prior surveys and will allow you to see aggregate changes in the fishery that have occurred between 2008 and 2018.

As with the prior surveys:

The purpose of the survey is to collect information on the chilling of fish by fishermen and the distribution of finished product among four dominant product forms (excluding roe).

Unless specifically stated and verified, all of the data reported by individual respondents will be held in confidence by Northern Economics and will only be reported in aggregate.

The aggregated survey results will be submitted to the survey sponsor, the Bristol Bay Regional Seafood Development Association (BBRSDA). Northern Economics will also distribute the same report that it delivers to BBRSDA to each participant who completes the survey.

If you experience problems while completing the survey, please call Terri McCoy at 907-274-5600.

PLEASE MAKE SURE YOU HIT NEXT AT THE BOTTOM OF EACH PAGE.

1. What is the name of your processing company?

2. What is your name?

3. What is your primary contact phone number?

4. Please enter your email so that we may send you a copy of the survey results.

5. Please list the processing facilities and/or floating processors included in your response

Raw Product

This section asks questions about a processor's purchase of raw product (round weight fish) in 2018. Please ensure that all answers are for the 2018 season.

Please note that some questions refer to all of your operations in 2018 while other questions refer specifically to the DRIFT NET fleet.

The survey form does not accept commas, \$ signs, decimals, or % symbols. Please enter whole numbers only. For example \$1,254, would be entered as 1254 while 50% would be entered as 50.

NOTE: THE PAGE WILL NOT ADVANCE IF A REQUIRED SUM TO 100 DOES NOT SUM TO 100 OR IF A % SYMBOL IS INCLUDED IN THE ENTRY.

6. In 2018, how many pounds of raw product (round weight fish) did your company purchase from the Bristol Bay salmon fishery?

2018 Raw Product Weight

7. In 2018, how many pounds of previously chilled raw product (using ice or refrigerated sea water [RSW]) did your company purchase in the Bristol Bay salmon fishery?

2018 Chilled Raw Product Weight

8. What percentage of each of the following categories came from the DRIFT NET fleet in 2018?

For example, if the DRIFT NET fleet accounted for 75% of your purchases you would enter 75 below. The survey form does not accept % symbols or decimals.

Portion of Total Raw Product from the Drift Net Fleet

Portion of Total Chilled Raw Product from the Drift Net Fleet

9. What percentage of your 2018 purchases in the Bristol Bay salmon fishery was shipped long-haul for processing at a plant outside of Bristol Bay?

Percentage Processed Outside Bristol Bay

10. Of the raw product (round weight fish) that your company purchased in 2018, and processed INSIDE Bristol Bay, please estimate the percent that your company used for each of the following product forms. The total should equal 100. ENTER ONLY NUMBERS. DO NOT ENTER PERCENT SYMBOLS (%).

Canned Product

H&G Frozen

H&G Fresh

Fillet

Other

11. If your plant produced canned sockeye in 2018, did you process chilled and un-chilled fish separately?

Always
 Never
 Sometimes

If you answered "sometimes" please indicate the conditions when you do or don't separate chilled and un-chilled fish.

12. What percentage of the chilled raw product your company purchased from drift net fleet boats in 2018 was from each of the following categories? The total of your answer should be 100.

RSW

Slush Ice

Other

13. What percentage of the raw product purchases your company purchased from the drift net fleet in 2018 were chilled and/or floated? The total of your answer should be 100.

Chilled and Floated

Chilled but not Floated

Floated but not Chilled

Not Chilled and Not
Floated

Your Fleet

This page asks questions about drift net boats that you consider to be part of "your fleet."

14. In 2018, how many drift net boats did you consider to be part of "your fleet"? A boat would be counted as part of your fleet if they were contractually obligated to deliver to your company or if you felt they made more than 50% of their deliveries to your company in 2018.

Number of Drift Fleet Vessels

15. Please estimate the percentage of the drift net boats in your fleet that fit into the following categories. Please make sure your answers sum to 100.

75% to 100% of their 2018 deliveries were chilled

50% to 75% of their 2018 deliveries were chilled

25% to 50% of their 2018 deliveries were chilled

1% to 25% of their 2018 deliveries were chilled

None of their 2018 deliveries were chilled

Processor Ice Production

This section of the survey asks about chilling in the bay including your company's production of ice in 2018 and its availability to your fleet.

16. In 2018, what was your company's total daily ice making capacity in Bristol Bay in tons? Please exclude any ice produced by the BBEDC ice barges.

Daily Ice Production Capacity (tons)

17. What percentage of your 2018 daily ice making capacity located in Bristol Bay is available for use by your drift boat fleet? Please exclude any ice produced by the BBEDC ice barges.

Portion Available to Your Drift Boat Fleet (%)

18. Which statement do you think best describes how the amount of ice available to permit holders from ALL processors in aggregate is likely to change in the next five years? Please check one box.

- Substantially more ice will be available from processors
- Marginally more ice will be available from processors
- There will be no change in the amount of ice will be available from processors
- Marginally less ice will be available from processors
- Substantially less ice will be available from processors

Quality of Chilled Product

This section of the survey asks about the quality of the chilled product purchased in the Bristol Bay driftnet salmon fishery during the 2018 season.

19. On average, are there any notable quality improvements gained from chilled floated fish compared to chilled non-floated fish?

...significantly worse... ...slightly worse... ...not different... ...slightly better... ...significantly better...

On average, the quality of chilled floated product is... than the average quality of non-floated chilled product.

20. How many fish are the tenders required to sample in a delivery to determine the chilled temperature and possibly qualify for a chilling bonus?

Number of fish required

21. Do you use any of the following quality assurance protocols for your tender fleet?

- third-party quality assurance contractor
- quality assurance staff employed by your company
- Other (please specify)

22. Please estimate the overall percentage of tender vessels trips that utilized one of the quality assurance protocols from the previous question

Percentage of tenders

23. If you employed a third-party quality assurance contractor, what percentage of your tenders had a third-party quality assurance contractor on board during the 2018 season?

Percentage of tenders

24. Please rate each of these best practices in terms of their impact on the quality of delivered product (1 = no impact on quality and 5 = maximum impact on quality).

	No Impact	Slight Impact	Moderate Impact	Considerable Impact	Maximum Impact
Consistent Chilling (RSW or Slush Ice)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bleeding Fish	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shorter Sets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salmon Slides and/or Deck Mats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lower Brailer Weights (500-600 lbs or less per brailer bag)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vessel Cleanliness/Proper Sanitation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. Please estimate the percentages of your total fish purchases for each of the following quality grades. Percentages must sum to 100.

Number 1	<input type="text"/>
Number 2	<input type="text"/>
Number 3	<input type="text"/>
Other	<input type="text"/>

BBRSDA would like your help in identifying more accurately where they should direct efforts to help fishermen who may not be providing top-quality fish. Therefore, we are requesting, FOR QUESTION 25 ONLY your permission to release your company's responses directly to BBRSDA. BBRSDA will not release data for individual companies, and will only use the data to identify areas of need regarding fish quality. If you do not authorize your company's responses' release to BBRSDA, they will only be reported in the aggregate within the summary report.

26. Authorization to release responses to Question 25 to BBRSDA.

- YES, I authorize Northern Economics to release our response to Question 25 ONLY to Andy Wink of BBRSDA.
- Do NOT release our response to BBRSDA.

If you grant permission, please restate your name and company

27. Please estimate the percentage by which the total wholesale value of your 2018 product would increase if all of the fish you purchased in 2018 were #1's.

0 Increase over expected product value for 2018 100

Please enter your estimated % here

Processor Input

BBRSDA believes that increased communication between processors and permit holders will lead to cooperative opportunities that benefit both groups. The distribution of our survey results are an example of this concept in action. BBRSDA is interested in knowing if the processing industry believes there are certain actions BBRSDA can take or promote that will benefit both groups. We're interested in knowing what you would like our role to be in the fishery.

28. BBRSDA is authorized to spend money in four areas to improve the overall health and value of the Bristol Bay salmon fishery. These areas include: Infrastructure, Research, Quality, and Marketing. BBRSDA is interested in knowing which area you think it is most important for BBRSDA's focus. Thinking back on the last 5 years of BBRSDA work, and thinking ahead to future work, what areas are most important for BBRSDA to focus on?

	1-Very Low Importance	2-Low Importance	3-Moderate Importance	4-High Importance	5-Very High Importance
Infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marketing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. Please describe what you think is the single most important project that BBRSDA could undertake in the coming year. If you were BBRSDA, what project would you undertake?

Thank You!

Thank you for completing the survey. As always, we greatly appreciate your time and efforts. A copy of the survey results will be available from BBRSDA in the first half of 2019. BBRSDA will email a copy of the results to you using the contact information you provided with the survey.