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# 2015 BBRSDA Processor Survey

*Prepared for the*

**Bristol Bay Regional  
Seafood Development  
Association**

May 2016



**Northern  
Economics**

Wisdom • Trust • Relevance • Innovation

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*Prepared for*

## **Bristol Bay Regional Seafood Development Association**

**May 2016**

*Prepared by*



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## Abbreviations

ADF&G	Alaska Department of Fish and Game
BBRSDA	Bristol Bay Regional Seafood Development Association
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 2015 Bristol Bay salmon fishery. This report summarizes the results of the study.

As in prior surveys, the survey instrument consisted of a series of questions about processor operations in Bristol Bay. The 2015 survey captured raw product data, fleet information, current and expected ice production volumes, and respondents' opinions of trends and priorities within the fishery. The 2015 survey also introduced a new set of questions to collect data on the quality of chilled product. The operational questions focused on processors' purchase of chilled product and the distribution of their production among the four major product forms (i.e., canned, Head and Gut [H&G] frozen, H&G fresh, and fillet).<sup>1</sup> All of the processors who have traditionally responded to the survey responded this year.<sup>2</sup>

The 2015 Bristol Bay sockeye run was 70 percent above the average run over the last 20 years and 12 percent above the Alaska Department of Fish and Game (ADF&G) preseason forecast. ADF&G estimates the total Bristol Bay salmon harvest at 191.4 million pounds (MMLb) for 2015, 21.1 MMLb more than in 2014 (ADF&G 2014). This year's processor survey captured close to 100 percent of the ADF&G estimate, and respondent processors reported processing 191.2 MMLb of raw (round weight) product from all sources (drift and set permits) in 2015.

This year's primary conclusions are:

- The harvest in 2015 was the second largest in the last 20 years and harvesters, both set and drift, responded by chilling the largest amount of raw product ever in the history of the fishery. Product chilled prior to delivery reached 105.4 MMLb in the aggregate fishery and 87.7 MMLb in the drift net fishery. Both of these numbers are records and the drift net fleet chilled 20.3 percent more sockeye than they did during 2014's hefty run. The setnet fleet continued to increase its chilled raw product amounts (6.3 percent in 2015) even after a large jump in 2014.
- In 2015 the Bristol Bay fleets chilled 55 percent of the total product purchases; the highest percentage recorded in this survey's history. This was a positive rebound after the size and timing of the 2014 run forced the overall percentage of raw product that was chilled below 50 percent for the first time since 2011. This year's survey results indicate that even during a season with a large and late run, the Bristol Bay fleets can adapt and deliver quality chilled product.
- The amount of raw product flowing into all product forms, with the exception of canned product, increased in 2015, most notably a 26 MMLb increase in fish used for H&G frozen product and a 4.6 MMLb increase in product used for fillet. The split between canned product (37 percent), H&G frozen product (45 percent), and fillets (17 percent) remained largely the same.
- The portion of the total raw product purchases (setnet and drift) that were chilled reached a new high in 2015, with 55 percent of total raw product purchases recorded as chilled. After a slight dip in 2014, it appears processors are continuing to see an increasing trend in the percent of raw product purchases that are chilled. The percent of raw product purchases from the drift feet that were chilled also saw a slight increase after a dip in 2013 and 2014, but has yet to recover to the high level recorded in 2012. Processors also indicated improvements in the

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<sup>1</sup> The full survey instrument is contained in an appendix to this report.

<sup>2</sup> In addition, Silver Bay Seafoods also joined our seasoned group of processors that take the time to complete the survey every year.

consistency of chilling in Bristol Bay, with around 61 percent of vessels delivering chilled raw product more than 50 percent of the time.

- In 2015 the portion of raw product purchases that were chilled using RSW systems increased by 44 percent, whereas the portion of raw product purchases that were chilled using slush ice decreased by 17 percent. The increased use of RSW systems for chilling aligns well with processors' stated preference for product chilled using RSW systems, with 90 percent of processor respondents indicating that the average quality of chilled floated (RSW) product is better than the average quality of non-floated chilled (slush ice) product.
- New attitudinal questions added to the survey this year show that processors predict that there will continue to be an increasing trend in the portion of purchases that are chilled, rising to 65 percent per year over the next five years. Within the next 10 years they foresee a time when the majority of Bristol Bay processors will no longer buy unchilled product.

## 2 Raw Product Purchases and Chilling

Overall total aggregate (i.e., both set and drift fleet) raw product purchase grew in 2015 with a near 27 percent increase over 2014's above-average harvest. This amount translates into a total increase of 30.6 MMLb in raw product purchases, with chilled raw product increasing by 26.6 MMLb (34 percent) and unchilled raw product increasing by 3.9 MMLb (5 percent). The amount of chilled product purchased in 2015, just over 105 MMLb, was greater than in any year in the survey's history and likely in the history of the Bristol Bay salmon fishery, more than doubling the amount of chilled product recorded when this survey was first administered in 2008.

This year's survey results provide further insight into the chilling capacity in the region during larger salmon runs. In 2014 we saw a dramatic increase in run size and harvest that resulted in a slight decrease in the portion of the total product purchases from both drift and setnet fleets that were chilled, dropping from 54 percent in 2013 to 49 percent in 2014. In 2015 the run size and harvest exceeded that of 2014, but the portion of total product purchases that were chilled increased to 55 percent, exceeding the previous record of 54 percent in 2013 (see Table 1). Survey results also an increase in the number of boats that delivered chilled product.

**Table 1. Total Raw Product (Drift and Set) Purchases, 2008–2015**

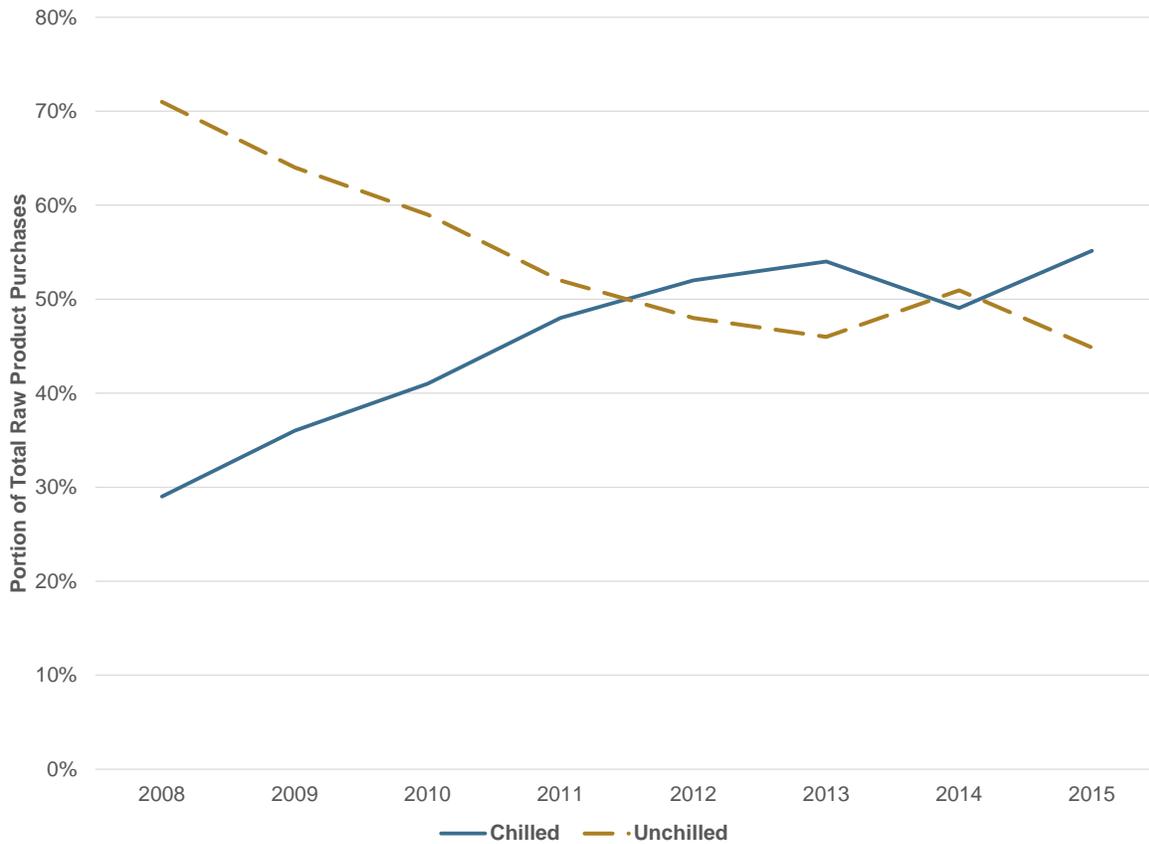
Product	2008	2009	2010	2011	2012	2013	2014	2015	Year Over Year Change	Average 2008-2015
MMLb										
Chilled	46.7	63.4	67.2	61.7	69	49.9	78.8	105.4	26.6	67.8
Unchilled	116.7	113.9	98.7	67.3	62.4	43.2	81.9	85.8	3.9	83.7
<b>Total</b>	<b>163.4</b>	<b>177.3</b>	<b>165.9</b>	<b>129</b>	<b>131.4</b>	<b>93.1</b>	<b>160.7</b>	<b>191.2</b>	<b>30.6</b>	<b>151.5</b>
%										
Chilled	29	36	41	48	52	54	49	55	34	46
Unchilled	71	64	59	52	48	46	51	45	5	54
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>19</b>	<b>100</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics, Inc. 2016.

Figure 1 displays the portion of the total raw product purchases that were chilled or unchilled. Up until 2014, both chilled and unchilled percentages followed fairly linear trends, with the percentage of chilled raw products increasing and the percentage of unchilled product decreasing. A significant increase in run size and harvest in 2014 disrupted that trend and the survey recorded the inverse, a decrease in the portion of chilled product and an increase in the portion of unchilled product. Results from the 2015 survey mark a return to an increasing trend in the portion of chilled product, returning to levels slightly above those recorded in 2013. The overarching trends in the portion of chilled product purchase displayed in Figure 1 also show that the rate of change for both the portion of chilled and unchilled product appears to be flattening out. This suggests that increasing the overall portion of chilled product had become incrementally more difficult in later years.

**Figure 1. Total Chilled and Unchilled Product**



Source: Northern Economics, Inc., 2016.

Table 2 displays the raw product purchases from the drift fleet alone and excludes the contributions to the fishery made by setnet permit holders. Total purchases from the drift fleet increased by 25 MMLb or roughly 19 percent between 2014 and 2015. Chilled purchases from the drift fleet were the highest recorded in the history of this survey at nearly 88 MMLb, a 30 percent from the previous year. The overall share of the total purchases from the drift fleet that were chilled increased from 51 percent in 2014 to 56 percent in 2015. Unchilled purchases from the drift fleet also increased in 2015 by 4.8 MMLb (7 percent), but the portion of the total product purchased from the drift feel that was unchilled decreased from 49 percent in 2014 to 44 percent in 2015.

**Table 2. Drift Fleet Raw Product Purchases, 2008–2015**

Product	2008	2009	2010	2011	2012	2013	2014	2015	Year over Year Change	Average, 2008-2015
<b>MMlb</b>										
Chilled	32.5	60.0	63.4	58.8	64.8	45.5	67.3	87.7	20.3	60.0
Unchilled	102.2	91.7	72.6	51.4	44.6	35.5	65.0	69.8	4.8	66.6
<b>Total</b>	<b>134.7</b>	<b>151.7</b>	<b>136.0</b>	<b>110.2</b>	<b>109.4</b>	<b>81.0</b>	<b>132.3</b>	<b>157.4</b>	<b>25.1</b>	<b>126.6</b>
<b>%</b>										
Chilled	24	40	47	53	59	56	51	56	30	48
Unchilled	76	60	53	47	41	44	49	44	7	52
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>19</b>	<b>100</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics, Inc. 2016.

After seeing a two consecutive years of decline in the portion of the total drift net purchases that was chilled, the results from the 2015 survey show a return to an increasing trend seen in previous years of this study. In 2014, the decrease in the portion of purchases that was chilled was attributed to the increase in run size, but it appears that the drift fleet was able to increase its chilling capacity to accommodate an even larger run in 2015.

This year saw a large increase in both drift and setnet chilled product deliveries (see Table 3). Chilled purchases from the drift fleet increased 30 percent, to 87.7 MMLb, and the amount processors purchased from setnet permit holders increased nearly 55 percent to 17.8 MMLb. This amount of chilled purchase from the setnet fleet is the highest in the survey's history and dwarfs the average annual chilled purchases from the setnet fleet, which hovers around 7 MMLb. Processors indicated ice available to processors remained unchanged or only increased marginally between 2014 and 2015, which suggests that the increase in chilled product purchases from the drift fleet was primarily driven by RSW systems.

**Table 3. Setnet and Drift Fleet Chilled Product Purchases, 2008–2015**

Product	2008	2009	2010	2011	2012	2013	2014	2015	YOY Change	Average, 2008-2015
Chilled Drift MMLb	32.5	60.0	63.4	58.8	64.8	45.5	67.3	87.7	20.3	55.6
Chilled Set MMLb	14.2	3.4	3.8	2.9	4.2	4.4	11.5	17.8	6.3	7.6
Setnet Portion	30.4	5.4	5.7	4.7	6.1	8.8	14.6	16.9	2.3	10.5

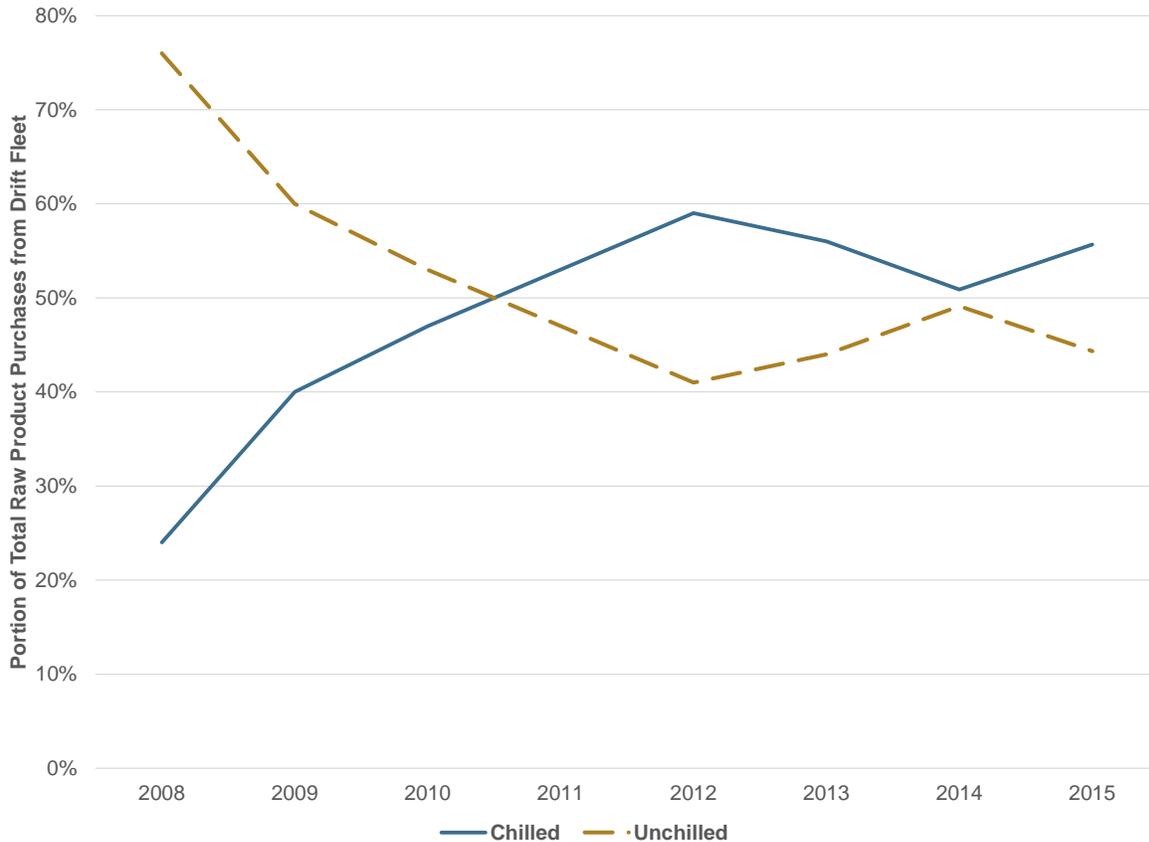
Source: Northern Economics, Inc. 2016.

Figure 2 displays the chilled and unchilled portions of the raw product purchases from the drift fleet between 2008 and 2015. During the first five years of this survey, the drift fleet was chilling an increasing share of its raw product, but between 2012 and 2014 the trend reversed and the share of raw product drift permit holders were chilling declined. The reversal of the trend of increased product chilling is not surprising, in light of our finding in 2012 that easier conversions to RSW largely had been completed and that future conversions would be limited to smaller and older vessels. The results from the 2015 survey show that the portion of chilled raw product purchased from the drift fleet increased from the previous year, but was still lower than the high of 59 percent recorded in 2012. The size of the 2014 run was thought to have been the cause of the recorded decline in the portion or raw product chilled

that year, but with the increase in the portion of chilled product 2015 after an even larger run, other factors, such as run timing, may be more closely linked to the portion of chilled product purchases.

As discussed in Section 5, the portion of permits holders that are “mostly” chilling appears to have increased slightly after three years of little to no growth.

**Figure 2. Drift Fleet Chilled and Unchilled Product**



Source: Northern Economics, Inc., 2016.

One variable that could be influencing the portion of chilled product is the chilling bonus offered by processors for delivering properly chilled raw product. This chilling bonus is a premium that is added to the base ex-vessel price of Bristol Bay salmon on a per-pound basis. Table 4 shows the number of processors that offered chilling bonuses and the average bonus per pound offered. The average chilling bonus has steadily increased since 2008 despite some variability in the average base ex-vessel price. For example, the average chilling bonus was steady at \$0.15 per pound from 2011 through 2015, but the average base price dropped from \$1.10 per pound to \$0.54 per pound during that same time period. The chilling bonus as a portion of the base ex-vessel price has significantly increased as a result. If the chilling bonus has a greater impact on the final ex-vessel price (base ex-vessel price plus the chilling bonus), there is a greater incentive for the drift fleet to deliver properly chilled product.

**Table 4. Bristol Bay Ex-Vessel Salmon Prices and Chilling Bonuses (2008-2015)**

Year	Total Processors	Processors Offering Bonus	Average Base Price/lb (\$)	Average Bonus/lb (\$)	Bonus as % of Base Price	% of Total Drift Purchases Chilled
2008	11	10	0.73	0.11	15.2	24
2009	11	9	0.72	0.10	14.0	40
2010	9	8	0.96	0.12	12.1	47
2011	10	7	1.10	0.15	13.2	53
2012	7	6	1.10	0.15	13.7	59
2013	<i>Data Not Available</i>					
2014	<i>Data Not Available</i>					
2015	9	7	0.54	0.15	27.8	56

Source: Bristol Bay Fishermen's Association, 2016.

It also should be noted that the number of processor offering chilling bonuses has decreased since 2008. It was noted in the tables provided by the Bristol Bay Fishermen's association that a chilling bonus was included in the base ex-vessel price for a few of the processors operating in the region. This suggest that chilled product is becoming more of a standard rather than an option that needs to be incentivized.

### 3 Finished Product Forms

The amount of raw product consumed by the individual product forms increased in 2015 in accordance with the higher overall harvest with the notable exception of canned product, which saw a decrease of 1.1 MMLb (about 2 percent). H&G frozen product saw the largest increase in total raw product consumed with an increase of 26 MMLb between 2014 and 2015. The 2015 survey results show that H&G frozen and fillet product forms consumed the largest amounts of raw product for each individual product form that have been recorded since this survey started in 2008 (see Table 4). There was a slight shift in the portion of the total raw product purchases for each product form in 2015 with a notable decrease in the portion used for canned product, and a corresponding increase in the portion used for H&G frozen. This mirrors the trends that we saw in the first four years of this survey after a short term reversal, with an increasing portion of product consumed by canned product, in 2012.

**Table 5. Total Raw Product Consumed by Estimated First Wholesale Product Form, 2008–2015**

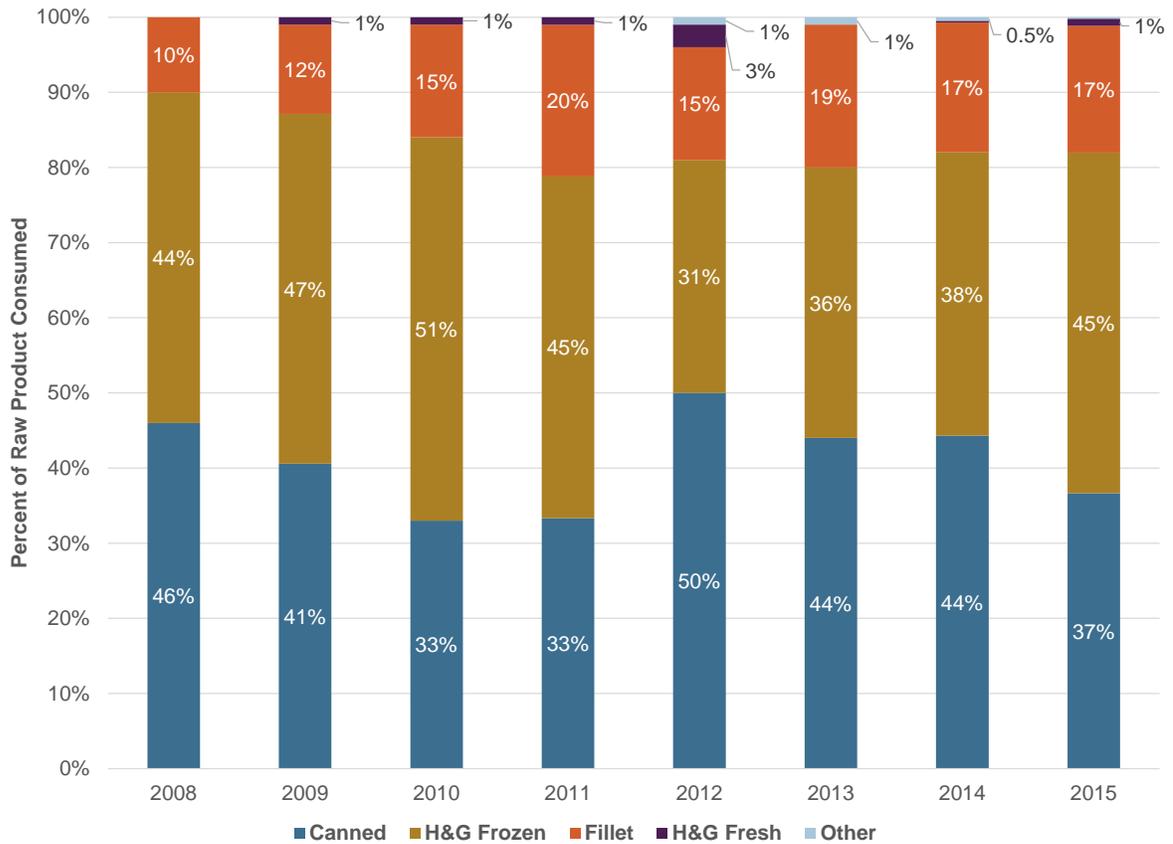
Product Form	2008	2009	2010	2011	2012	2013	2014	2015	Year over Year Change	Average, 2008-2015
MMLb										
Canned	74.6	71.9	55.0	42.9	66.0	40.8	71.2	70.1	-1.1	61.6
H&G Frozen	71.2	83.1	84.5	58.7	40.3	33.5	60.7	86.7	26.0	64.8
H&G Fresh	0.8	1.0	1.3	1.3	4.1	0.2	0.4	1.8	1.4	1.4
Fillet	16.2	20.7	24.9	25.9	20.3	17.8	27.7	32.3	4.6	23.2
Other	0.7	0.6	0.1	0.2	0.7	0.7	0.8	0.4	-0.4	0.5
<b>Total</b>	<b>163.5</b>	<b>177.3</b>	<b>165.8</b>	<b>129.0</b>	<b>131.4</b>	<b>93.0</b>	<b>160.7</b>	<b>191.2</b>	<b>30.6</b>	<b>151.5</b>
%										
Canned	46	41	33	33	50	44	44	37	-2	41
H&G Frozen	44	47	51	45	31	36	38	45	43	42
H&G Fresh	0	1	1	1	3	0	0	1	392	1
Fillet	10	12	15	20	15	19	17	17	17	16
Other	0	0	0	0	1	1	0	0	0	0
<b>Total</b>	<b>100</b>	<b>101</b>	<b>100</b>	<b>99</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>19</b>	<b>100</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics, Inc. 2016.

Over the past two years, canned and H&G frozen product forms, combined, have consistently consumed 82 percent of the total raw product purchased (see Figure 3). Fillets account for the majority of the remainder of the raw product consumed, and in 2015 roughly 17 percent of the total raw product purchased was used to produce fillets.

Figure 3. Raw Product Forms of Product Processed in Bristol Bay, 2015



Source: Northern Economics, Inc., 2016.

The changes in final product form between 2014 and 2015 mirror those exhibited among raw product forms in terms of both volume and raw product share (see Table 5). Using the responses from the processor survey, the study team estimates that 129.7 MMLb of first wholesale product was produced from the 2015 run. This is an increase of 21.8 MMLb, or a 20 percent increase from the previous year, which can be attributed to the second largest recorded run in the past 20 years. H&G frozen and fillet product forms saw the largest increases in the volume of first wholesale product produced with increases of just over 19 MMLb and 2.4 MMLb respectively since 2014. The total volume of canned first wholesale products remained relatively unchanged between 2014 and 2015, but the portion of the total first wholesale product weight attributable to canned product decreased by 2 percent. The significant increase in the run size between 2014 and 2015 paired with a relatively unchanged volume of canned product could be an indication of the overall canning capacity in region.

**Table 6. Estimated First Wholesale Product Form, 2008–2015**

Product Form	2008	2009	2010	2011	2012	2013	2014	2015	Year over Year Change	Average, 2008-2015
<b>MMlb</b>										
Canned	50	48.2	36.9	28.8	44.2	27.3	47.7	47.0	-0.7	41.3
H&G Frozen	52.7	61.5	62.5	43.4	29.8	24.8	44.9	64.1	19.3	48.0
H&G Fresh	0.6	0.8	1	1	3.1	0.2	0.3	1.3	1.1	1.0
Fillet	9.2	11.8	14.2	14.8	10.8	9.4	14.7	17.1	2.4	12.7
Other	0.7	0.6	0.1	0.2	0.4	0.4	0.4	0.2	-0.2	0.4
<b>Total</b>	<b>113.2</b>	<b>122.9</b>	<b>114.7</b>	<b>88.2</b>	<b>88.3</b>	<b>62.1</b>	<b>107.9</b>	<b>129.7</b>	<b>21.8</b>	<b>103.4</b>
<b>%</b>										
Canned	44	39	32	33	50	44	44	36	-2	40
H&G Frozen	47	50	55	49	34	40	42	49	43	46
H&G Fresh	1	1	1	1	3	0	0	1	392	1
Fillet	8	10	12	17	12	15	14	13	17	13
Other	1	0	0	0	0	1	0	0	0	0
<b>Total</b>	<b>101</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>99</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>20</b>	<b>100</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics, Inc. 2016.

The amount of raw product canned in the Bay in 2015 was the highest recorded by the processor survey to date, at 65.5 MMLb (see Table 6). The overall combined amount of canned product, both within and outside of the Bay decreased slightly between 2014 and 2015, from 71.2 MMLb to 70.1 MMLb, and a portion of the total raw product used for canning also decreased slightly between 2014 and 2015. It is possible, with the large run in 2015, that the amount of raw product used for canning was constrained by the overall canning capacity both inside and outside of the bay. This decrease in the portion of purchases used for canned product could also signal a shift in consumer preferences away from canned products and more toward fresh and frozen product forms.

**Table 7. Canning Location, 2008–2015**

Product Form	2008	2009	2010	2011	2012	2013	2014	2015	YOY Change	Average, 2008-2015
<b>Round Pounds</b>										
Reported Canned in the Bay	47.0	59.2	51.6	41.8	64.1	39.7	63.4	65.5	2.1	54.0
Assumed Canned Outside BB	27.5	12.7	3.4	1.1	1.9	1.0	7.8	4.6	-3.2	7.5
<b>Total</b>	<b>74.6</b>	<b>71.9</b>	<b>55.0</b>	<b>42.9</b>	<b>66.0</b>	<b>40.8</b>	<b>71.2</b>	<b>70.1</b>	<b>-1.1</b>	<b>61.6</b>
<b>% of Total Production</b>										
Reported Canned in the Bay	29	33	31	32	49	43	39	34	-5	32
Assumed Canned Outside BB	17	7	2	1	1	1	5	2	-2	5
<b>Total</b>	<b>46</b>	<b>41</b>	<b>33</b>	<b>33</b>	<b>50</b>	<b>44</b>	<b>44</b>	<b>37</b>	<b>-8</b>	<b>41</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics, Inc. 2016.

## 4 Product Chilled Prior to Delivery

As in previous iterations, the 2015 survey asks processors about the differences in the level of use of RSW and slush ice systems within the drift fleet. The study team estimates that 87.7 MMlb of raw product purchases from the drift fleet were chilled in 2015 using either RSW or slush ice systems. This change is a 20 percent increase from the previous year and the largest quantity of chilled raw product purchases recorded by the processor survey since its introduction in 2008.

**Table 8. Drift Fleet Chilling Methods 2008 – 2015**

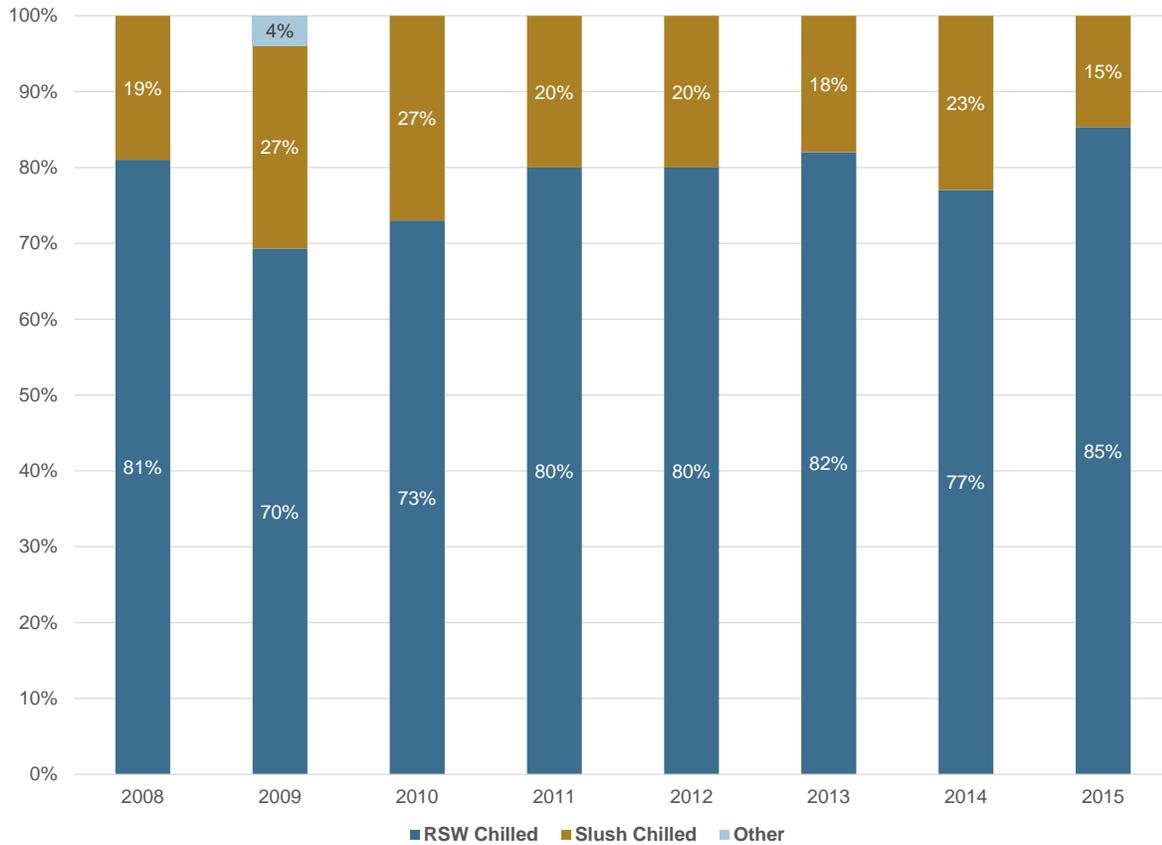
Chilling Method	2008	2009	2010	2011	2012	2013	2014	2015	Year over Year Change	Average, 2008-2015
MMlb										
RSW Chilled	26.5	41.7	46	47.2	51.6	37.5	51.8	74.8	22.9	47.1
Slush Chilled	6.1	16.1	17	11.6	13.2	8	15.5	12.9	-2.6	12.5
Other	N/A	2.2	-	-	-	-	-	-	-	2.2
<b>Total</b>	<b>32.6</b>	<b>60</b>	<b>63</b>	<b>58.8</b>	<b>64.8</b>	<b>45.5</b>	<b>67.3</b>	<b>87.7</b>	<b>20.3</b>	<b>61.9</b>
%										
RSW Chilled	81	70	73	80	80	82	77	85	44	79
Slush Chilled	19	27	27	20	20	18	23	15	-17	21
Other	N/A	4	0	0	0	0	0	0	0	1
<b>Total</b>	<b>100</b>	<b>101</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>30</b>	<b>100</b>

Notes: Not all processors could estimate the division of RSW vs. slush chilled product; 2010 round pounds by chilling method do not equal total chilled round pounds. Column totals do not sum due to rounding.

Source: Northern Economics, Inc. 2016.

After a slight decrease in 2014, the results for the 2015 processor survey fall back in line with the increasing trend in the portion of raw product purchased chilled using a RSW system, increasing from 77 percent in 2014 to 85 percent—the largest portion recorded by this survey. There was also a corresponding decrease in the portion of raw product purchases chilled using slush ice systems.

Figure 4. Chilling Methods in the Drift Fleet, 2008-2015



Source: Northern Economics, Inc., 2016.

The portion of total round pounds chilled by the drift fleet using RSW systems increased steadily between 2009 and 2015, with the exception of the slight dip recorded in 2013 and 2014 (see Table 8). The inverse can be seen in the portion of the total round pounds unchilled by the drift fleet, which has steadily decreased since 2009 with a slight uptick in 2013 and 2014. The size and timing of the 2014 run most likely impacted both the decrease in the share of RSW chilled product as well as the increase of the share of unchilled product, by exceeding the maximum chilling capacity or willingness to chill in the region. It appears that the drift fleet has expanded or adjusted their willingness and capacity to chill in the region to accommodate the even larger 2015 run.

**Table 9. Drift Fleet Chilling Methods as a Percentage of Total Drift Chilled Product, 2008-2015**

Year	Total Round Pounds	RSW		Ice Chilled		Dry (Unchilled)	
		Round Pounds	Percent of Total	Round Pounds	Percent of Total	Round Pounds	Percent of Total
2015	157.4	74.8	47	12.9	8	69.8	44
2014	132.3	51.8	39	15.5	12	65.0	49
2013	81.0	37.5	46	8.0	10	35.5	44
2012	109.4	51.6	47	13.2	12	44.6	41
2011	110.1	47.2	43	11.6	10	51.4	47
2010	136.0	46.0	34	17.0	12	72.6	53
2009	151.7	41.7	27	16.1	11	91.7	60
2008	134.7	26.5	20	6.1	5	102.2	76
<b>Total</b>	<b>722.9</b>	<b>240</b>	<b>33</b>	<b>66.7</b>	<b>9</b>	<b>413.7</b>	<b>57</b>

Note: Round pounds may not equal total pounds due to the exclusion of 'other' chilling methods.

Not all processors could estimate the division of RSW vs. slush chilled product; 2010 round pounds by chilling method do not equal total chilled round pounds.

Source: Northern Economics, Inc. 2016.

## 5 Drift Fleet Size and Chilling

The number of vessels participating in the Bristol Bay salmon run in 2015 was the second highest recorded by this survey, increasing 13 percent from the previous year to 1,485 vessels. The number of vessels in the drift fleet swelled in 2012, adding 172 vessels to the fleet to record the largest drift fleet recorded by this survey, but was followed by an even larger reduction (221 vessels) in 2013 (see Table 9).

The survey asked processors to consider a boat 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 dipped slightly in 2015 to 149 vessels per processor, but the median vessels per processor increased slightly from 143 in 2014 to 151 in 2015. Both the maximum and minimum number of vessel reported in the 2015 processor survey were lower than the responses received in 2014, and overall there was less variation among the responses received in 2015 than in the previous year. There also was a greater number of respondents that recorded 100-200 vessels in their fleets than in previous year, which resulted in an increase in the median vessels per processor.

Since the survey's inauguration, the size of the total Bristol Bay fleet has increased by nearly 28 percent and the average number of vessels per processor has increased by 53 percent, while the median has increased 54 percent.

**Table 10. Number of Vessels in the Drift Fleet, 2008-2015**

Year	Total	Percent Increase in Total	Average Vessels per Processor	Median Vessels per Processor
2015	1,485	13	149	151
2014	1,394	6	155	143
2013	1,309	-14	145	123
2012	1,530	13	153	134
2011	1,358	1	123	115
2010	1,343	3	122	115
2009	1,309	13	119	100
2008	1,162	N/A	97	98
Average	1,361	N/A	133	122

Source: Northern Economics, Inc. 2016.

As in prior iterations, the 2015 survey asked processors to categorize vessels by the percentage of times the vessel's deliveries were chilled. Categories in which deliveries were chilled greater than 25 percent of the time saw a significant increase, and categories in which deliveries were chilled less than 25 percent of the time saw a corresponding decrease in vessels (see Table 10). A portion of the increase reported in 2015 can be attributed to an increase in the number of vessels participating, as well as an increase in the total number of deliveries due to the size of the 2015 run. Since 2010, the number of vessels that deliver unchilled product has steadily decreased and 2015 is no exception, decreasing from 509 vessels delivering unchilled product in 2014 to 458 vessels in 2015.

In addition to a decreasing number of vessels delivering chilled product none of the time, the portion of total vessels that delivered unchilled product has also been decreasing from 43.2 percent recorded in 2009 to just under 31 percent of vessels in 2015. Inversely, the portion of vessels delivering chilled product at least 50 percent of the time (note this is an aggregation of the 50 to 75 percent and over 75

percent categories shown in the table) has steadily increased despite a slight dip in 2013 and 2014. The percent of vessels delivering chilled product greater than 50 percent of the time has increased from about 38 percent in 2008 to 61 percent in 2015.

**Table 11. Consistency of Chilling, 2008-2015**

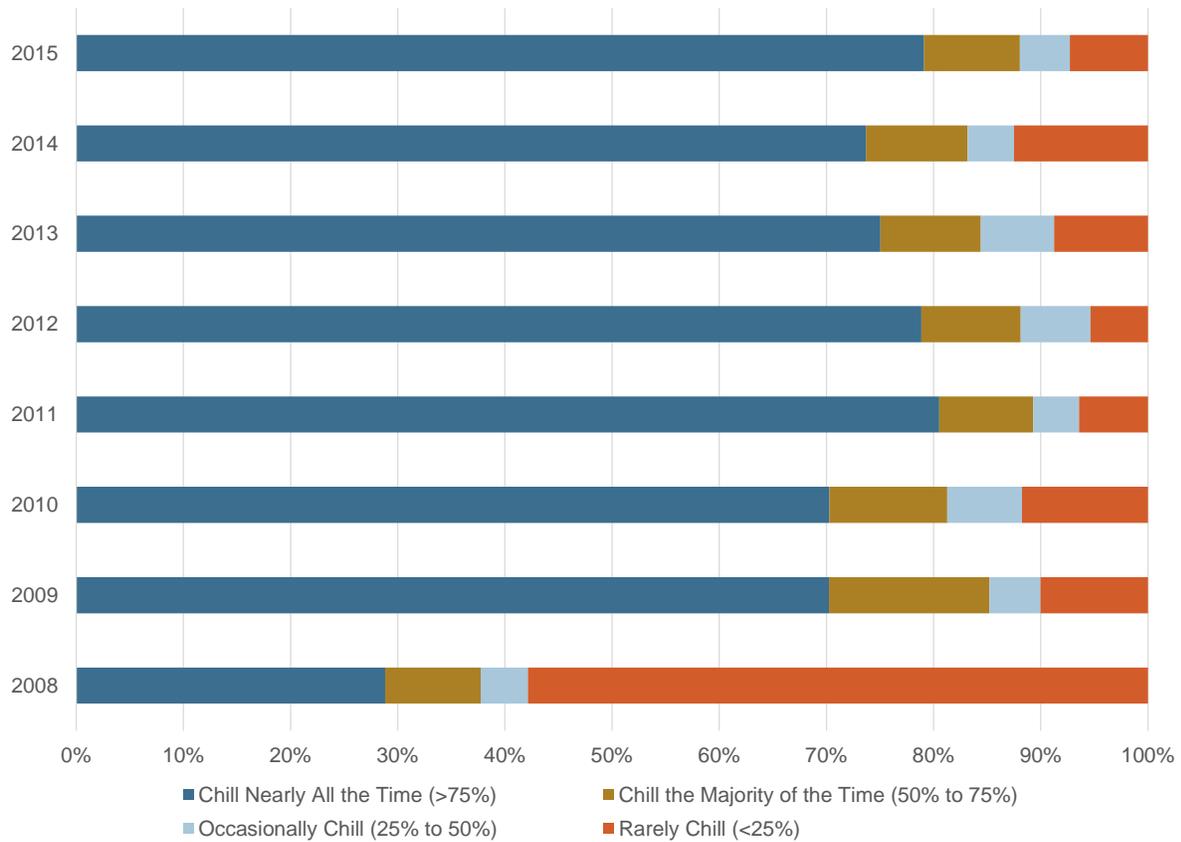
Year	Percent of Deliveries that Were Chilled				
	>75% of the Time	50 to 75% of the Time	25 to 50% of the Time	<25% of the Time	None of the Time
<b>Number of Vessels</b>					
2015	812	92	48	75	458
2014	652	84	38	111	509
2013	617	77	56	72	486
2012	741	87	61	51	589
2011	612	66	32	48	599
2010	514	81	51	87	611
2009	522	112	35	74	565
2008	335	104	51	672	N/A
<b>Percent of Vessels (%)</b>					
2015	54.7	6.2	3.2	5.0	30.9
2014	46.8	6.0	2.8	7.9	36.5
2013	47.2	5.9	4.3	5.5	37.1
2012	48.5	5.7	4	3.3	38.5
2011	45.1	4.9	2.4	3.6	44.1
2010	38.3	6	3.8	6.4	45.5
2009	39.9	8.5	2.7	5.7	43.2
2008	28.8	8.9	4.4	57.8	N/A

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

Source: Northern Economics, Inc. 2016

Figure 5 displays the distribution of the drift fleet vessels by the consistency with which they delivered chilled raw product from 2008 to 2015. With the exception of the first year of this survey (2008), the portion of vessels delivering chilled raw product that delivered chilled product consistently has remained relatively stable, with vessels delivering chilled product nearly all of the time (greater than 75 percent) hovering between 70 and 80 percent between 2009 and 2015. Results from the 2015 survey show an increase in the portion of vessels delivering chilled product greater than 75 percent of the time after a dip in 2014, but is still less than the highs recorded in 2011 and 2012. The portion of vessels delivering chilled product less consistently has also remained relatively stable and accounts for a smaller share of the vessels making chilled deliveries.

**Figure 5. Chilling Consistency among the Drift Fleet, 2008-2015**



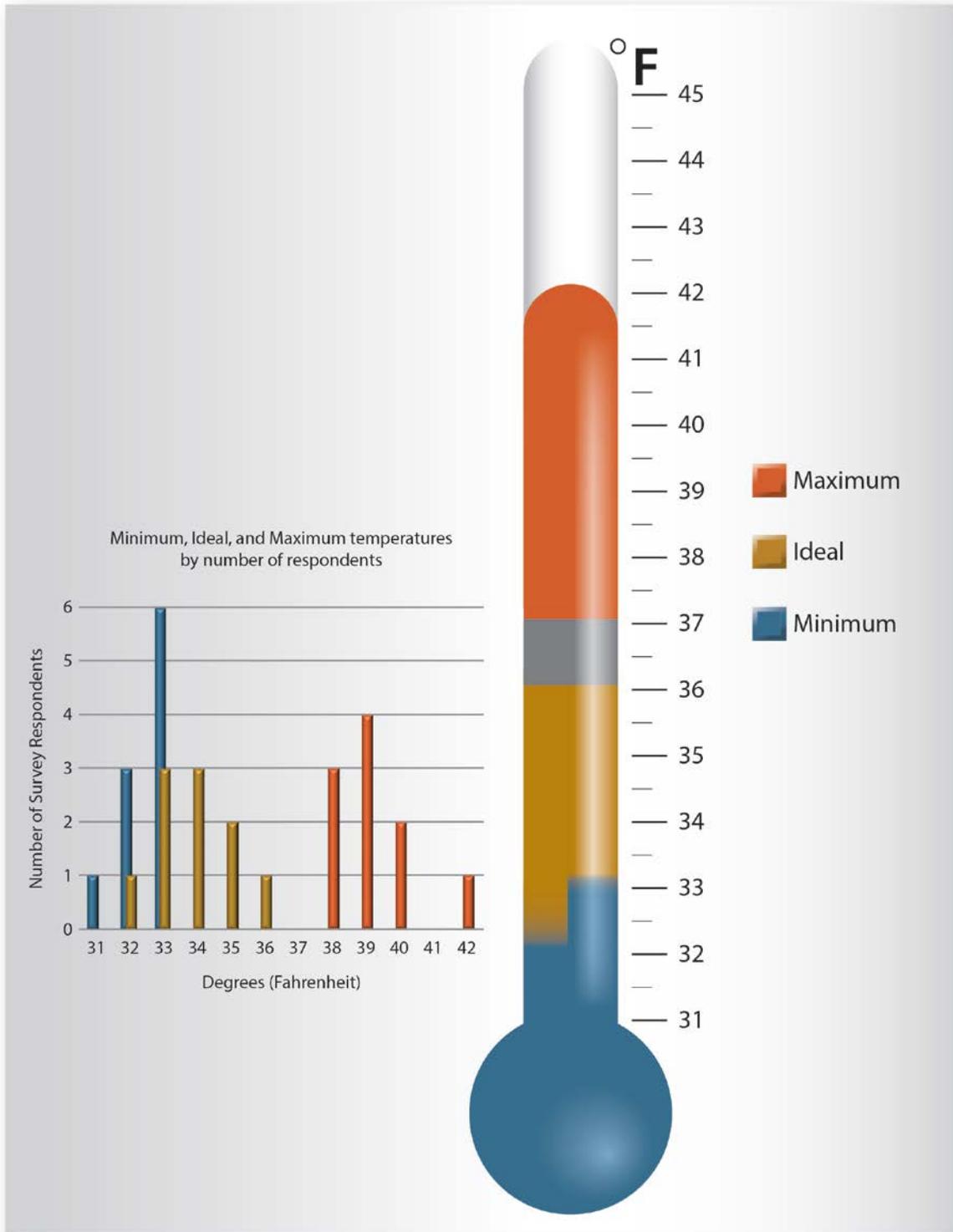
Source: Northern Economics, Inc. 2016.

## 6 Quality of Chilled Product

The 2015 survey introduced a new subset of questions aimed at capturing data on the quality of the chilled product in the Bristol Bay driftnet fishery. When asked if there are any notable quality improvements gained from chilled floated fish (RSW) compared to chilled non-floated fish (slush ice), 90 percent of respondents indicated that the quality of chilled floated fish is typically better than the quality of chilled non-floated fish. This result signals a strong preference for RSW systems from the Bristol Bay processors that participated in this survey.

A series of questions in the 2015 survey also asked processors to identify what they considered to be the maximum, ideal, and minimum allowable temperatures to qualify as a chilled product. Figure 6, on the following page, shows the number of responses received for each temperature for all three measures. While there was some variation in allowable temperatures among respondents, 90 percent said the maximum allowable temperature was between 38 and 40 degrees, 80 percent of respondents said the ideal temperature for chilled product was between 33 and 35 degrees, and 90 percent of respondents said the minimum allowable temperature for chilled product was between 32 and 33 degrees. Based on the responses received, the average allowable range to qualify as a chilled product is between 32.5 degrees and 39.2 degrees Fahrenheit. Multiple respondents also indicated that delivery time could also impact the allowable range of temperature to qualify as chilled product—the shorter the deliver time, the more lenient the processor can be with the stated allowable range.

Figure 6. Maximum, Minimum, and Ideal Chilling Temperatures (2015)

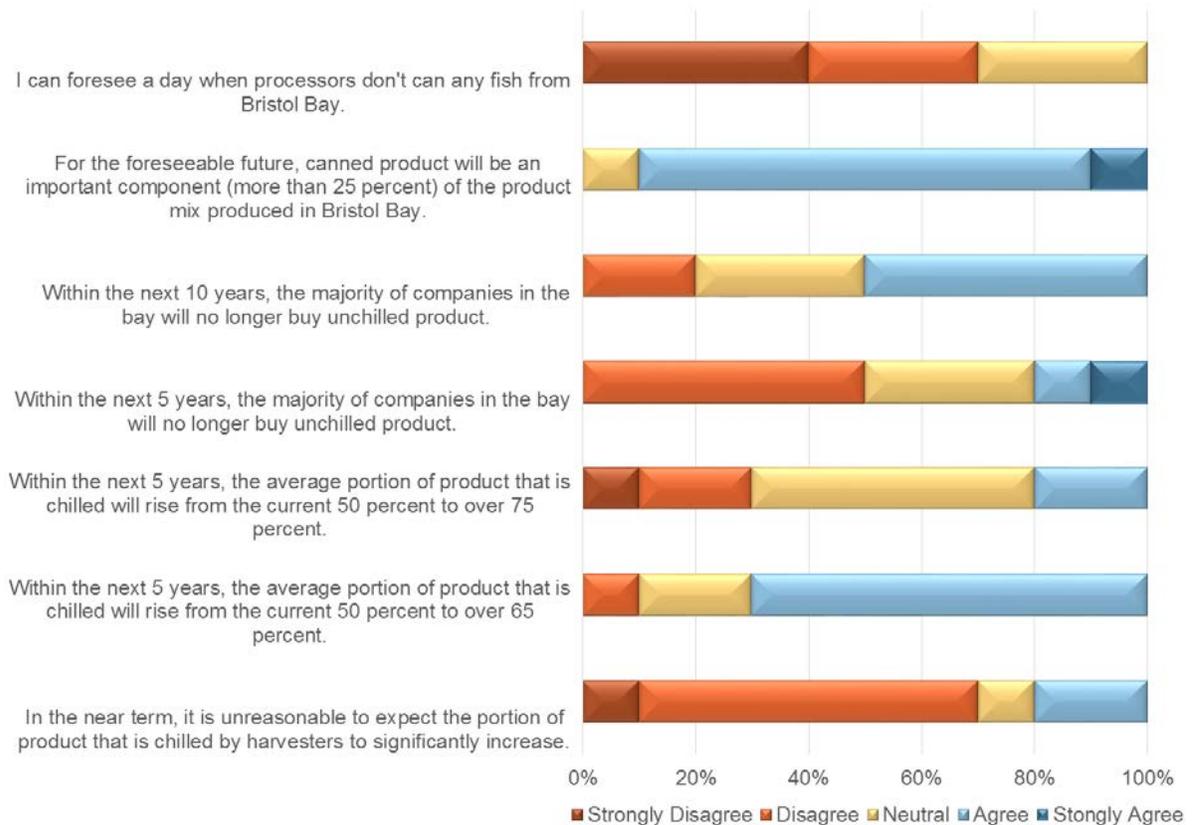


Source: Northern Economics, Inc. 2016.

We also asked processors how many fish tenders are required to sample in a delivery to determine the chilled temperature and possibly qualify for a chilling bonus. Responses ranged from 3 fish to 20 fish per delivery, with the most common response being 3 fish (60 percent of respondents).

New questions in the 2015 survey also presented processors with a set of seven statements regarding the future of product mixes and the portion of chilled product purchases in Bristol Bay and asked them to indicate if they strongly disagree, disagree, neither agree or disagree, agree, or strongly agree with each statement. Figure 7 shows the responses received from these forward-looking statements.

**Figure 7. Future of Product Mix and Chilling Trends in Bristol Bay**



Source: Northern Economics, Inc. 2016.

The majority of respondents agreed that canned product will continue to be an important component in Bristol Bay's overall product mix and that the average portion of product that is chilled will increase to over 65 percent in the next five years. Respondents also indicated that within 5 to 10 years the number of processors accepting unchilled product will become significantly reduced or non-existent. These results speak to the weight the processors put on properly chilled product and the overall value it adds to the end products produced. It is important to note that 20 percent of respondents also agreed that in the near term, it is unreasonable to expect the portion of purchases that are chilled to significantly increase. This provides some insight into the rate of change Bristol Bay processors expect to see in regards to chilled product deliveries.

## 7 Processor Ice-Making Capability

The total daily ice production by processors in 2015 was the highest on record with 975 tons, a 37 percent increase from the previous year, and the total daily ice available to permit holders also increased from 59 tons in 2014 to 113 tons in 2015. The year-over-year change in the percent of the total ice available to permit holders increased slightly from 8 to 12 percent between 2014 and 2015, but was still below the 8 year average of 15 percent. This change marks the first increase after two consecutive years of decline in processor ice production available to permit holders, including 2014, which marked the lowest amount in the survey's history.

When barge ice is added to the equation, the total amount of daily ice available increases to 211 tons per day. This is a 34 percent increase from the lowest amount of ice available to permit holders recorded by this survey in 2014, but is still slightly below the seven year average of 217 tons. The increasing use of RSW systems to chill product may have taken some of the pressure off of processors to provide their fleets with ice, but there is still a significant portion of the drift fleet that use slush ice to chill their product, about 8 percent in 2015.

**Table 12. Ice Production in Tons per Day, 2008- 2015**

	2008	2009	2010	2011	2012	2013	2014	2015	Avg
Total Ice Production Capacity	760	750	680	735	820	615	710	975	756
Available to permit holders from processors	85	89	155	130	202	85	59	113	115
Percent available to permit holders from processors	11	12	23	18	25	14	8	12	15
Barge Ice		98	98	98	98	98	98	98	98
Total ice available to permit holders		187	253	228	300	183	157	211	217

Source: Northern Economics, Inc. 2016.

After collecting data through this survey for eight years, we now have enough data to analyze the data as a time series and look at the relationship between the amount of ice available to permit holders from processors and the overall chilling rates of product purchases. Figure 8 shows a significant relationship between the two variables and analysis shows that every ten-ton increase in sold ice (on a daily average basis) increases the overall chilling rate by about 1 percent. Despite the increasing use of RSW, this relationship shows that ice availability still plays a role in the quality of product purchases in Bristol Bay, and suggests that finding ways to better distribute ice to permit holders may be the most effective strategy to reduce the portion of dry or unchilled product purchases in the Bay.

**Figure 8. Processor Ice Availability and the Portion of Chilled Product**



Source: Northern Economics, Inc. 2016.

## 8 Open-Ended Responses

Questions 22 and 23 of the 2015 survey captured processor priorities and opinions regarding the fishery. These questions asked respondents to rank in importance areas on which BBRSDA should focus to improve the overall health of the fishery, and to identify the most important projects that the BBRSDA can undertake to improve the fishery. Each is restated below (in italics), and processor responses are summarized in the following sections.

### **Question 22**

*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 to focus. Thinking back on the last 5 years, what areas are most important for BBRSDA to focus on?*

Since this question was first introduced in 2012, quality has received the highest average score each year and 2015 is no exception, with an average score of 3.9 on a 5-point scale, and 90 percent of respondents indicating that it was at or above moderate importance (see Table 12). Research has received the second highest average score since 2013, and the 2015 survey recorded an average score of 3.7 on a 5-point scale, with 90 percent of respondents thinking it was of moderate importance or greater. Quality and Research are also the areas on which processors are most likely to agree with each other, whereas infrastructure and marketing received more varied responses, with some processors indicating that they are of higher importance, and other processors saying they are less so. This difference of opinion is reflected in the data; the variances of quality improvements and research are 0.9 and 0.8 respectively, while the variances of infrastructure and marketing responses are around 1.4. A smaller variance indicates that answers are largely clustered together, while a larger variance means that answers are more spread out.

**Table 13. Prioritization of Spending Areas**

Area for Focus	Average Score 1-5 Scale				Portion At or Above Moderate Importance			
	2012	2013	2014	2015	2012	2013	2014	2015
Infrastructure	3.7	3.3	3.4	3.6	80	67	67	80
Research	3.5	4.0	4.0	3.7	80	89	100	90
Quality	4.1	4.2	4.4	3.9	80	89	100	90
Marketing	3.0	2.9	3.0	3.5	60	67	75	80

\*1= Very Low Importance, 5=Very High Importance Source: Northern Economics, Inc. 2016.

### **Question 2**

*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?*

In 2015, chilling and RSW systems were the topic of over 67 percent of the responses received for this question. Processors would like to see workshops on how to properly use RSW systems and slush ice chilling techniques, the development of RSW systems that fit into smaller platforms, and financing and loan options of vessel owners looking to install an RSW system. These open ended responses further support the focus on quality in Question 22 (Table 12) and also processors' preference for RSW systems for chilling discussed in Section 6.

Other topics that were brought up by individual processors include creating or strengthening a marketing brand for Bristol Bay seafood products, similar to what Copper River has been able to achieve. Supporting efforts to help ADF&G maintain data collection programs in the face of imminent budget and programs cuts was also brought up as a potential project for BBRSDA to focus on during the upcoming years.

## 9 References

- Alaska Department of Fish and Game (ADF&G). 2015 *Bristol Bay Salmon Season Summary*. Issued September 1, 2015. Available at <https://www.adfg.alaska.gov/static/applications/dcfnewsrelease/615370072.pdf>. Accessed on February 25, 2016.
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