

# 2021 BBRSDA Processor Survey

*Prepared for*

**Bristol Bay Regional Seafood  
Development Association**

February 2022



**Northern  
Economics**

Wisdom • Trust • Relevance • Innovation



# 2021 BBRSDA Processor Survey

*Prepared for*

**Bristol Bay Regional Seafood Development Association**

**February 2022**

*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](http://www.northerneconomics.com)

**PROFESSIONAL CONSULTING SERVICES IN APPLIED ECONOMICS AND SOCIAL SCIENCES**

**Principals:**

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

**Consultants:**

Raniyah Bakr, B.A.  
Leah Cuyno, Ph.D.  
Melissa Errend, M.S.  
Don Schug, 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

Email: [mail@norecon.com](mailto:mail@norecon.com)  
[www.northerneconomics.com](http://www.northerneconomics.com)

## Preparers

Team Member	Project Role
Marcus Hartley	Project Manager
Melissa Errend	Principal Author, Analyst
Terri McCoy	Technical Editor

**Please cite as:** Northern Economics, Inc. 2021 BBRSDA Processor Survey. Prepared for Bristol Bay Regional Seafood Development Association. February 2022.

# Contents

<b>Section</b>	<b>Page</b>
<b>Abbreviations</b> .....	<b>ii</b>
<b>Introduction and Summary Conclusions</b> .....	<b>1</b>
<b>Raw Product Purchases and Chilling</b> .....	<b>4</b>
Aggregate Trends in Purchasing and Chilling .....	4
Drift Net Fleet Trends in Purchasing and Chilling.....	7
Set Net Fleet Trends in Purchasing and Chilling.....	7
<b>Drift Product Chilled Prior to Delivery</b> .....	<b>9</b>
<b>Drift Fleet Size and Chilling</b> .....	<b>11</b>
<b>Processor Ice-Making Capability</b> .....	<b>14</b>
<b>Comparing Chilling Practices and Product Quality</b> .....	<b>15</b>
<b>Aggregate Quality of Chilled Raw Product</b> .....	<b>19</b>
<b>Finished Product Forms</b> .....	<b>22</b>
<b>References</b> .....	<b>26</b>
<b>Appendix: Survey Instrument</b> .....	<b>28</b>

<b>Table</b>	<b>Page</b>
Table 1. Total Raw Product (Drift and Set) Purchases, 2012–2021.....	6
Table 2. Comparison of Driftnet and Setnet Chilled Product Purchases, 2012–2021.....	7
Table 3. Drift Fleet Raw Product Purchases, 2012–2021 .....	7
Table 4. Set Net Fleet Raw Product Purchases 2012–2021 .....	8
Table 5. Drift Fleet Chilling Methods 2011–2020.....	9
Table 6. Number of Vessels in the Drift Fleet, 2011–2021.....	11
Table 7. Consistency of Chilling, 2009–2021.....	12
Table 8. Ice Production in Tons per Day, 2012–2021 .....	14
Table 9. Bristol Bay Ex-Vessel Sockeye Salmon Prices and Chilling Bonuses (2008–2021) .....	16
Table 10. Sampling Methods used for Quality Assurance and Chilling Bonuses.....	19
Table 11. Quality Assurance on Tender Vessels.....	19
Table 12. Processed Product Pounds from Bristol Bay Production, 2011–2020.....	22
Table 13. Processed Product Wholesale Revenue from Bristol Bay Production, 2011–2020.....	23
Table 14. Total Raw Product Consumed by First Wholesale Product Form, 2011–2020.....	25

Figure	Page
Figure 1. Percent of Chilled Raw Product Purchased from the Drift Fleet.....	2
Figure 2. Chilled Raw Product Purchases, Bristol Bay Sockeye Run Size, and Bristol Bay Sockeye Commercial Harvest, 2008–2021 .....	5
Figure 3. Total Chilled and Unchilled Drift and Set Net Product, 2008–2021 .....	6
Figure 4. Chilling Methods in the Drift Fleet, 2008–2021 .....	10
Figure 5. Chilling Consistency among the Drift Fleet, 2009–2021 .....	13
Figure 6. Drift Fleet and Setnet Chilled Deliveries with Trend Lines, 2009–2021 .....	15
Figure 7. Proportion of Raw Product Purchases by Grade, 2018–2021 .....	18
Figure 8. Average Score of Best Practices Impacting the Quality of Delivered Product, 2018–2021 .....	20
Figure 9. Average Score of Best Practices Impacting the Quality of Delivered Drift and Setnet Fish in 2021 .....	21
Figure 10. Bristol Bay Commercial Operator Sockeye Salmon Annual Net Weight Production by Form, 2000–2020 .....	23
Figure 11. Bristol Bay Commercial Operator Sockeye Salmon Wholesale Revenue by Product Form, 2000–2020 .....	24
Figure 12. Raw Product Forms of Product Processed in Bristol Bay, 2008–2020 .....	25

## Abbreviations

ADF&G	Alaska Department of Fish and Game
BBEDC	Bristol Bay Economic Development Corporation
BBFA	Bristol Bay Fishermen’s Association
BBRSDA	Bristol Bay Regional Seafood Development Association
COAR	Commercial Operator’s Annual Report
H&G	Head and Gut
MMlb	Million pounds
RSW	Refrigerated Sea Water

# 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 2021 Bristol Bay salmon fishery. This report summarizes the results of the study and is the fourteenth iteration of the Processor Survey Report.

As in prior surveys, the survey instrument consisted of a series of questions about processor operations in Bristol Bay. The 2021 survey captured raw product data, fleet information, ice production volumes, chilling methods, and respondents' opinions of quality practices and priorities within the fishery.<sup>1</sup> The survey response rate remained consistent with what has been observed in prior years, with eight total processors participating in the 2021 survey.

This report provides information from the 2021 survey along with information from previous surveys as well as historical data reported by the Alaska Department of Fish and Game (ADF&G) and other sources. In general, tables in this document will report information back 10 years (i.e., from 2012–2021), although there are a few exceptions. Figures provided in this report will generally provide information back through the entire 14-year history of the BBRSDA processor survey, or back through all the years for which data for the particular issue are available. It is also noted that the authors of this report regularly refine and update information from past reports. One example is that rather than relying on preliminary data from ADF&G or other sources, we provide fishery-wide data that have been updated to reflect the best available information. Examples of this include the reporting of historic run sizes, harvests, and prices. To the extent that information is available, we use data from the most recently published ADF&G management reports and online data, rather than data reported during the season or immediately after the season.

The 2021 survey collected a seventh 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 fifth year of responses to a question about floating practices that was added to the 2017 survey. The 2021 survey also collected a fourth year of responses to 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.

The 2021 analysis once again includes Commercial Operator Annual Report (COAR) data, first added to this report in 2018, which include production and wholesale value by product. The COAR data confirm observations from the processor survey and also provide information on product value, which is not collected in the survey. In a change from 2020, the survey did not ask processors about total Bristol Bay sockeye production volume by product form. In the past, this was used for a forecast analysis; instead, we rely on the COAR reports for the best available information about product types up until 2020, as an indicator of likely product trends into 2021.

The 2021 Bristol Bay sockeye run, the largest on record, was 60 percent above the average run over the last 20 years and 32 percent above the ADF&G preseason forecast (ADF&G 2021a). ADF&G (2021b) estimates the total Bristol Bay salmon harvest was 200.1 million pounds (MMLb). This year's processor survey captured 95 percent of the ADF&G estimate as respondent processors reported processing 187.9 MMLb of raw (round weight) product from all sources (drift and set permits) in 2021.

## **This year's key takeaways are:**

- In 2021, surveyed processors purchased 187.9 MMLb of raw product, up 2.4 MMLb from 2020's 185.5 MMLb, but still down from 2019 levels (207.1 MMLb in 2019.) Even though the total weight

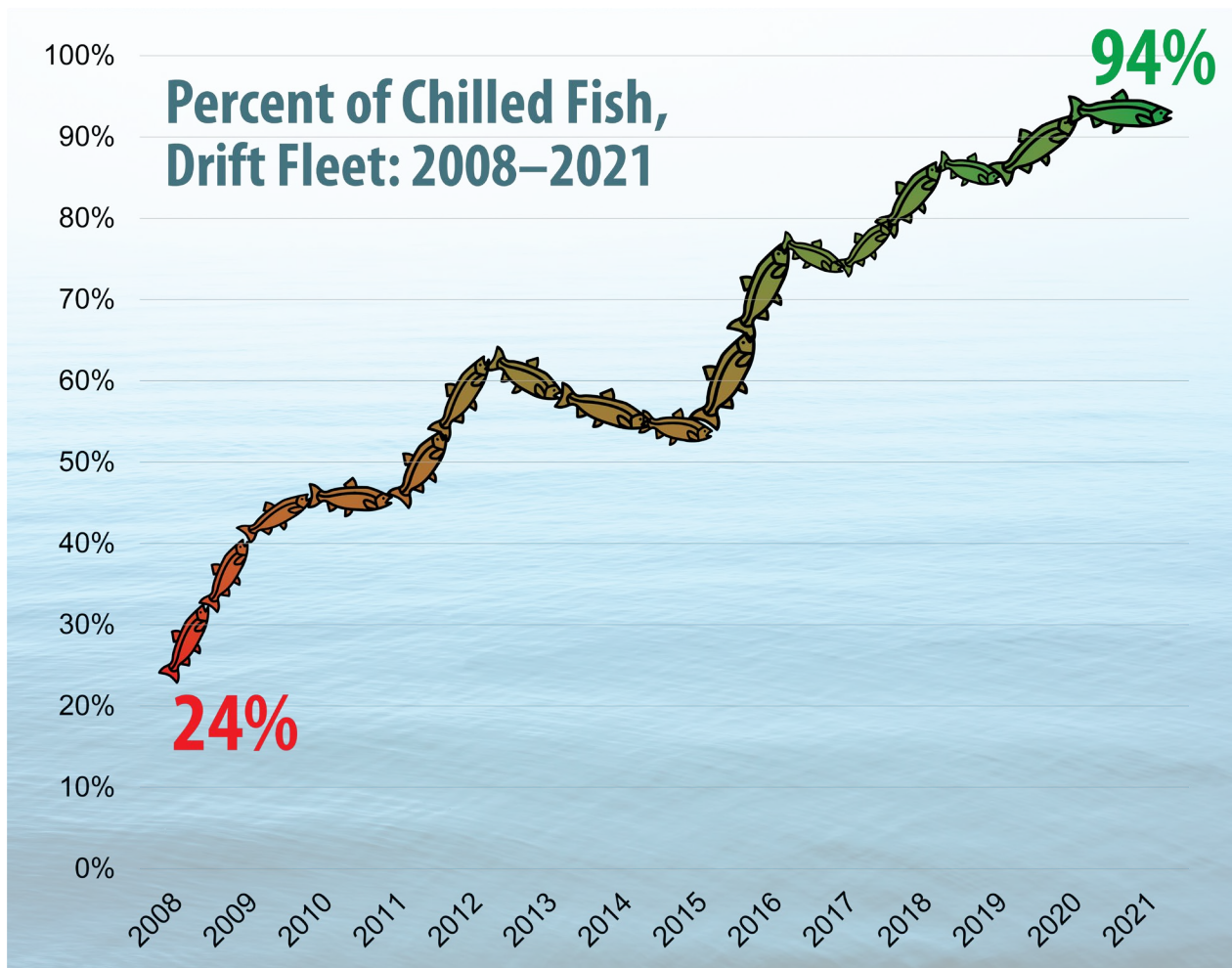
---

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

of chilled product purchased remained down, the percent of total chilled purchases remained at record high levels at 84.3 percent, an increase of 0.1 percent from 2020.

- Product chilled prior to delivery totaled 158.5 MMLb in the aggregate fishery, with 145.9 MMLb in the drift net fishery and 12.6 MMLb in the setnet fishery (Table 4).
- Total drift net chilled product volume decreased slightly from 146.7 MMLb. Despite this, the amount of drift fleet chilled product purchases represents a fourth year of consistently high volumes of chilled product (Table 3).
- Chilled fish purchases from setnetters increased to 12.6 MMLb, up from 9.6 MMLb in 2020, but remained 9 percent lower than 2019 levels (13.9 MMLb, Table 4).
- While total drift net chilled product volume decreased between 2020 and 2021, the fleet maintained its high chilling rate at 94 percent of the total raw product volume. This year’s survey highlights the dramatic shift in chilling practices over the past 14 years with chilled purchases from the drift fleet growing from 24 percent in 2008 to 94 percent in 2020 and 2021 (Figure 1).

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





- Based on COAR data, the trend in the distribution of raw product flowing into each product form appears to have shifted in 2020. This may be related to issues with the COVID-19 pandemic and with a relatively large jump in the amount of Bristol Bay salmon that was reported in the survey to have been transported outside of the Bay for primary processing (from 1.4 percent in 2019 to 8.8 percent in 2020, Table 14). Preliminary results from the 2021 survey indicate that the amount transported outside of Bristol Bay for processing decreased some between 2020 and 2021, but remains higher than average at 5.77%. The results of the COAR analysis indicate that both canned and fillet production increased while fresh and frozen H&G production decreased (Figure 12). It is not known if these trends in product forms continued into 2021, but available data indicate that frozen H&G production likely rebounded in 2021.
- In 2021, refrigerated sea water (RSW) systems chilled 129.2 MMLb of fish, or 87.1 percent of the drift fleet's total deliveries—the highest portion of RSW chilled fish recorded by the survey. This increase is a result of a decrease in the proportion chilled with slush ice and no change in the proportion of unchilled product from 2020. In 2021, slush ice chilled 6.5 percent of total drift deliveries and the remaining 6.4 percent were dry (unchilled, Table 5).

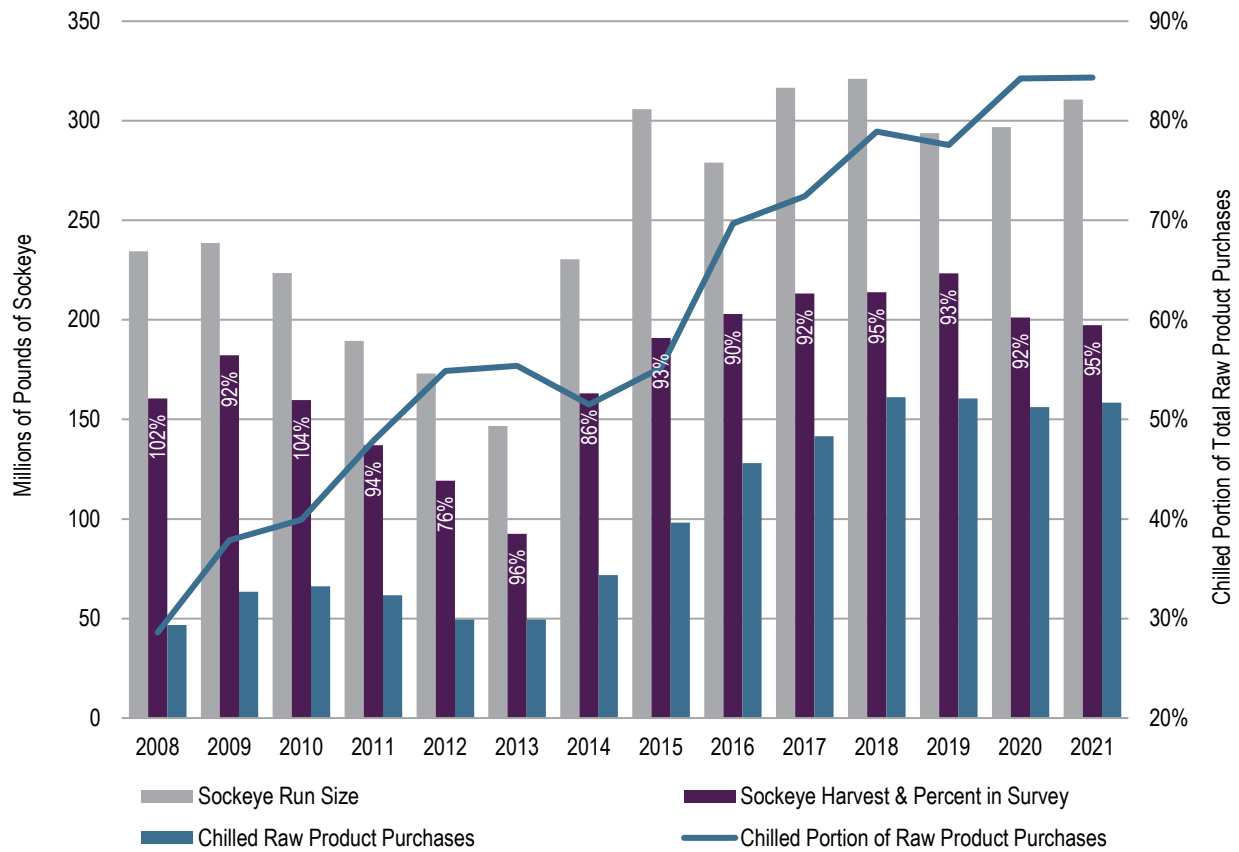
## Raw Product Purchases and Chilling

### Aggregate Trends in Purchasing and Chilling

Since 2008, sockeye run sizes have been variable over time, but have been relatively high since 2014, varying from an estimated 279 MMLb in 2015 to 321 MMLb in 2018 (Figure 2). As a result, total product purchases captured by the survey were also generally higher in those years, and on average the survey has captured approximately 93 percent of the total Bristol Bay harvest volume. In 2014, a significant increase in run size, relatively high base prices compared to bonuses, and compressed run timing were thought to have caused the decrease in the portion of chilled raw product purchases recorded by the survey that year. Since then, it appears that the region has been able to adjust to the larger run sizes. This suggests that the size of the run may have less of an impact on the portion of raw product purchases that are chilled. In fact, in almost every year since 2014, the proportion of total raw product purchases that were chilled has increased—from 52 percent in 2014 to 94 percent in 2021 (Figure 2).

In 2021, the Bristol Bay sockeye run size increased relative to 2020, but the total estimated commercial harvest declined from approximately 201.2 MMLb to 197.4 MMLb. The lower harvest levels in 2021 may have contributed, at least partly, to the increase in the portion of chilled raw product purchases recorded in this year's survey. It is also possible that other variables, such as run timing or duration and intensity (which vary among fishing districts), have significant impacts on the chilling practices in a given year within the region.

**Figure 2. Chilled Raw Product Purchases, Bristol Bay Sockeye Run Size, and Bristol Bay Sockeye Commercial Harvest, 2008–2021**



Note: In 2019–2021, the Bristol Bay sockeye run size and harvests are derived from the ADF&G Season Summaries (e.g., ADF&G 2021a) by multiplying the number of fish in the Bristol Bay sockeye run by the sockeye average weight for the year. For 2011–2018, run size and harvest are taken from the 2018 Bristol Bay Area Annual Management Report (ADF&G, 2020). Chilled raw product purchases and the chilled portion of raw product purchases are recorded by the processor survey and are represented in Table 1.

The combined raw product purchases (chilled and unchilled) from the set and drift net fleets for 2021 increased slightly from 2020 levels, from 185.5 MMLb to 187.9 MMLb (see Table 1). 2021 chilled raw product purchases increased by 2.3 MMLb and unchilled raw product purchases increased by 0.2 MMLb in 2021. The entire increase in chilled product volume came from product from the set net fleet, due to a bump in overall chilling rates within the setnet fleet (33 percent in 2020 to 39 percent in 2021, Table 4), compared to the consistently high rate of chilling practices within the drift fleet between 2020 and 2021 (94 percent, Table 3). Chilled raw product purchases from the set net fleet increased by 3 MMLb, to 12.6 MMLb in 2021, while total chilled raw product purchases from the drift net fleet decreased by 0.8 MMLb (Table 3). Due to these small relative changes, the overall proportion of chilled and unchilled product purchases was similar to 2020—a 0.1 percent change (Figure 3).

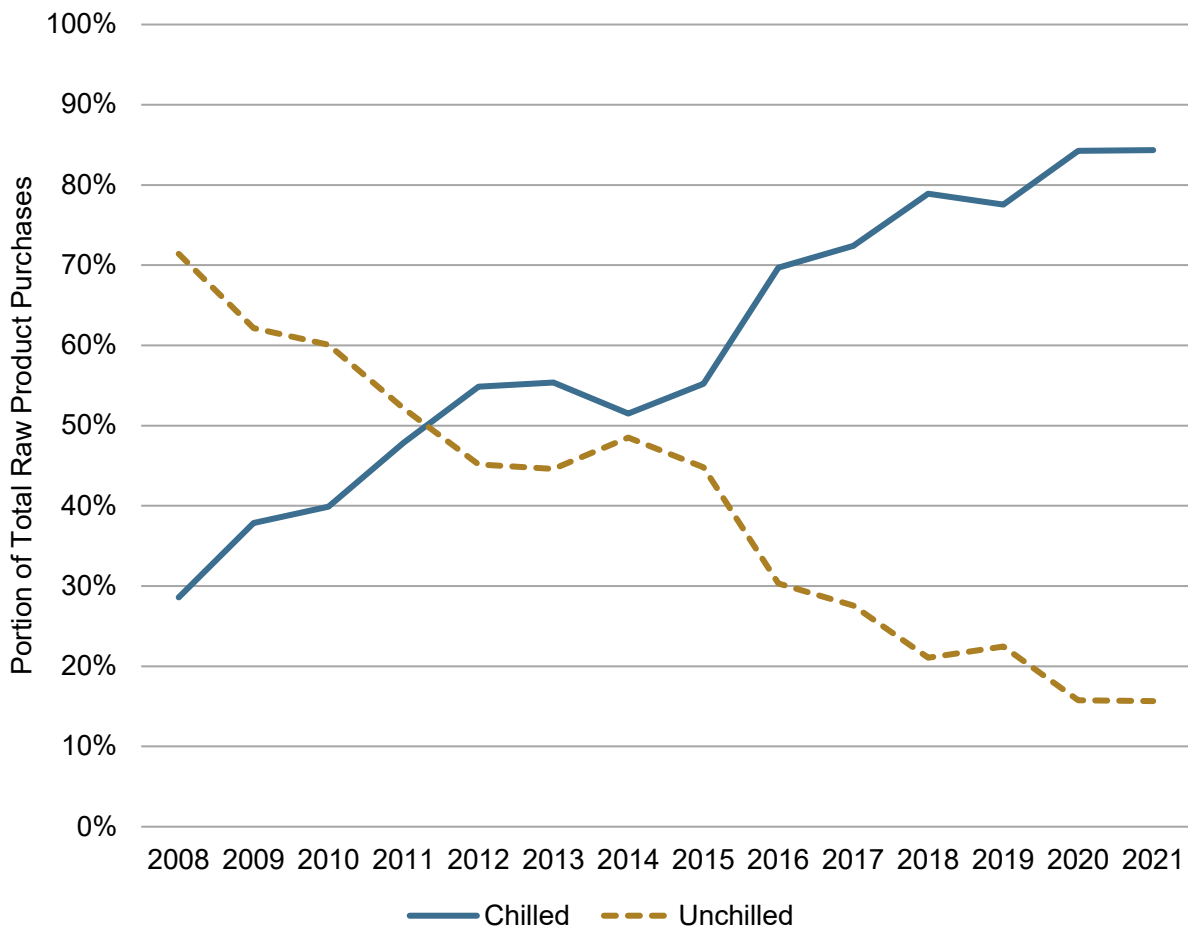
**Table 1. Total Raw Product (Drift and Set) Purchases, 2012–2021**

Catch	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Year-over-Year Change	Average, 2012–2021
<b>Round Weight (MMlb)</b>												
Chilled	49.4	49.5	71.8	98.1	128.0	141.6	161.2	160.6	156.2	158.5	2.3	117.5
Unchilled	40.7	39.9	67.7	79.6	55.7	54.0	43.1	46.5	29.2	29.4	0.2	48.6
<b>Total</b>	<b>90.1</b>	<b>89.3</b>	<b>139.5</b>	<b>177.7</b>	<b>183.7</b>	<b>195.6</b>	<b>204.2</b>	<b>207.1</b>	<b>185.5</b>	<b>187.9</b>	<b>2.4</b>	<b>166.1</b>
<b>Percent of Round Weight</b>												
Chilled	54.9%	55.4%	51.5%	55.2%	69.7%	72.4%	78.9%	77.6%	84.2%	84.3%	0.1%	68.4%
Unchilled	45.1%	44.6%	48.5%	44.8%	30.3%	27.6%	21.1%	22.4%	15.8%	15.7%	-0.1%	31.6%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>N/A</b>	<b>N/A</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics analysis

**Figure 3. Total Chilled and Unchilled Drift and Set Net Product, 2008–2021**



Source: Northern Economics analysis

**Table 2. Comparison of Driftnet and Setnet Chilled Product Purchases, 2012–2021**

Catch	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Year over Year Change	Average 2012-2021
Chilled Driftnet MMLb	45.1	45.4	64.3	80.3	118.1	124.6	151.6	146.7	146.7	145.9	-0.8	106.9
Chilled Setnet MMLb	4.2	4.0	7.6	17.8	9.9	17.0	9.5	13.9	9.6	12.6	3.0	10.6
Setnet Portion (%)	9%	8%	11%	18%	8%	12%	6%	9%	6%	8%	2%	9%

Source: Northern Economics analysis

## Drift Net Fleet Trends in Purchasing and Chilling

In 2021, trends in raw product purchases from drift net vessels were overall very similar to 2020, with no major changes in total purchased volume or in purchases of chilled and unchilled raw products (Table 3). Between 2020 and 2021, total purchases of raw product (chilled and unchilled) from the drift fleet declined slightly by approximately 700,000 pounds, most of which was due to a decrease in chilled product (down approximately 800,000 pounds) and decreased by a small increase in unchilled product (up less than 50,000 pounds). These changes in volume represent negligible changes in the proportion of chilled products and unchilled products; the overall portion of chilled fish purchases from the drift fleet remained roughly the same between 2020 and 2021 at 94 percent.

**Table 3. Drift Fleet Raw Product Purchases, 2012–2021**

Catch	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Year over Year Change	Average 2012-2021
<b>Round Weight (MMLb)</b>												
Chilled	45.1	45.4	64.3	80.3	118.1	124.6	151.6	146.7	146.7	145.9	-0.8	106.9
Unchilled	27.4	32.9	52.0	66.2	38.6	43.8	24.1	27.0	10.0	10.0	0.0	33.2
<b>Total</b>	<b>72.5</b>	<b>78.4</b>	<b>116.3</b>	<b>146.5</b>	<b>156.7</b>	<b>168.4</b>	<b>175.7</b>	<b>173.7</b>	<b>156.7</b>	155.9	-0.7	140.1
<b>Percent of Round Weight</b>												
Chilled	62%	58%	55%	55%	75%	74%	86%	84%	94%	94%	-0.04%	73.77%
Unchilled	38%	42%	45%	45%	25%	26%	14%	16%	6%	6%	0.04%	26.23%
<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>100%</b>	<b>100%</b>	<b>N/A</b>	<b>N/A</b>

Note: Column totals may not sum due to rounding.

Source: Northern Economics analysis

## Set Net Fleet Trends in Purchasing and Chilling

Total reported raw product purchases from the setnet fleet increased between 2020 and 2021 (Table 4). The total volume increased from 9.6 MMLb to 12.6 MMLb, a 23 percent increase over the 10-year average raw product purchase volume. The majority of raw product purchases were composed of unchilled fish (61 percent), consistent with the 10-year average proportion of unchilled product from the set net fleet (60 percent). These trends in set net products and chilling practices are likely not representative. Typically, setnetters catch around 20 percent of Bristol Bay's sockeye harvest (ADF&G 2020). Although the composition of this processor survey has not changed significantly through time, it has not typically included most setnet fish caught. This "missing" volume was likely bought and processed by processors which focus more predominantly on setnet salmon and have not historically been included in this survey. In contrast, in

this years' survey, 17% of reported the product volume was purchased from setnetters—much closer to the average composition of catch in Bristol Bay.

**Table 4. Set Net Fleet Raw Product Purchases 2012–2021**

Catch	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Year over Year Change	Average 2012-2021
<b>Round Weight (MMlb)</b>												
Chilled	4.2	4.0	7.6	17.8	9.9	17.0	9.5	13.9	9.6	12.6	3.0	10.6
Unchilled	13.3	6.9	15.7	13.4	17.0	10.2	19.0	19.4	19.3	19.4	0.2	15.4
<b>Total</b>	<b>17.5</b>	<b>11.0</b>	<b>23.2</b>	<b>31.2</b>	<b>26.9</b>	<b>27.2</b>	<b>28.5</b>	<b>33.4</b>	<b>28.8</b>	<b>32.0</b>	<b>3.2</b>	<b>26.0</b>
<b>Percent of Round Weight</b>												
Chilled	24%	37%	32%	57%	37%	62%	33%	42%	33%	39%	6.09%	39.74%
Unchilled	76%	63%	68%	43%	63%	38%	67%	58%	67%	61%	8.57%	60.26%
<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>100%</b>	<b>100%</b>	<b>N/A</b>	<b>N/A</b>

*Note: Column totals may not sum due to rounding.*

*Source: Northern Economics analysis*

## Drift Product Chilled Prior to Delivery

As in prior years, the 2021 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 145.9 MMLb of raw drift net product in 2021, a decrease of 800,000 pounds from 2020 (see Table 5). Despite this decrease in chilled volume, the proportion of product chilled with RSW increased from 82.5 percent in 2020 to 87.1 percent, the highest proportion recorded in the last 10 years. At the same time, the proportion chilled using slush ice or other means hit a 10-year low at 6.5 percent. Total purchases of dry fish and the overall proportion of dry fish were nearly identical to 2020 at 10 MMLb and 6.4 percent of total drift net purchases.

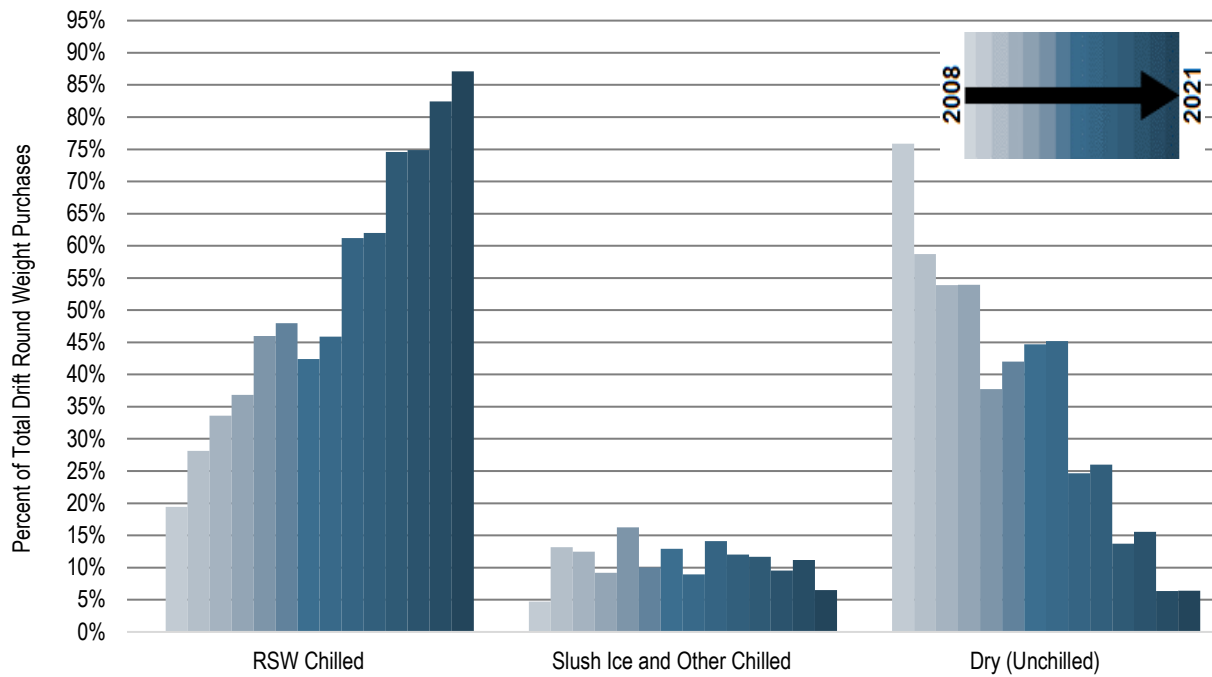
**Table 5. Drift Fleet Chilling Methods 2011–2020**

Chilling Method	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Year-over-Year Change	Average, 2012–2021
<b>Round Weight (MMLb)</b>												
RSW Chilled	33.4	37.6	49.3	67.2	95.9	104.4	131.1	130.1	129.2	135.8	6.6	91.4
Slush Chilled and Other	11.8	7.8	15.0	13.1	22.1	20.2	20.5	16.6	17.5	10.1	-7.4	15.5
Dry (Unchilled)	27.4	32.9	52.0	66.2	38.6	43.8	24.1	27.0	10.0	10.0	0.0	33.2
<b>Total</b>	<b>72.5</b>	<b>78.4</b>	<b>116.3</b>	<b>146.5</b>	<b>156.7</b>	<b>168.4</b>	<b>175.7</b>	<b>173.7</b>	<b>156.7</b>	<b>155.9</b>	<b>-0.7</b>	<b>140.1</b>
<b>Percent of Round Weight</b>												
RSW Chilled	46%	48%	42%	46%	61%	62%	75%	75%	82.5%	87.1%	5%	62%
Slush Chilled and Other	16%	10%	13%	9%	14%	12%	12%	10%	11.2%	6.5%	-5%	11%
Dry (Unchilled)	38%	42%	45%	45%	25%	26%	14%	16%	6.4%	6.4%	0%	26%
<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>100.0%</b>	<b>100.0%</b>	<b>0%</b>	<b>100%</b>

Source: Northern Economics analysis

Overall, the survey results still show that the portion of fish deliveries chilled with RSW has increased consistently between 2008 and 2021 (Figure 4). 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 during the large run in 2014, but results from the 2015, 2016, 2017, and 2018 surveys directly contradict that perceived trend. Processors and permit holders have commented 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. In addition, BBEDC offers two grant programs to help defray the costs of both purchasing RSW systems and the costs of maintenance, eligible to Bristol Bay residents. The maintenance grant program provides up to \$1,000 per year for RSW maintenance (BBEDC 2021). In 2018, 17 residents took advantage of this program and in 2019 this increased to 25 (BBEDC 2019, 2020a). The RSW Purchase Program provides up to \$22,000 towards the purchase of new systems and was awarded to 10 residents in 2018 and 8 residents in 2019 (BBEDC 2019, 2020a). Such programs may be incentivizing the adoption and continued use of RSW for chilling, particularly among local fishermen.

Figure 4. Chilling Methods in the Drift Fleet, 2008–2021



Source: Northern Economics analysis



## Drift Fleet Size and Chilling

The number of vessels in the drift fleet fishing for surveyed Bristol Bay processors in 2021 increased by 16 vessels to 1,320, a rebound from the decrease observed in 2020 (see Table 6). Per processor, there was a record number of vessels per processor, 165 on average, compared to the 10-year mean of 144. 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. It is important to note that the data reported here are only representative of the respondents to the survey and therefore should not be taken to be an estimate of the total number of active vessels in the fishery since not all processors are covered by the BBRSDA survey.

**Table 6. Number of Vessels in the Drift Fleet, 2011–2021**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Year over Year Change	Average 2012-2021
Total Vessels in Survey Processors' Drift Fleets	1,076	1,253	1,251	1,397	1,258	1,327	1,328	1,337	1,304	1,320	16	1,285
Percent Change in Survey Processors' Fleet Size from Previous Year	-21%	+16%	-0%	+12%	-10%	+5%	+0%	+1%	-2%	+1%	NA	NA
Average Vessels per Surveyed Processor	135	157	156	155	140	147	148	149	130	165	35	144

Source: Northern Economics analysis

As in prior years, the 2021 survey asked processors to categorize vessels by the portion of the vessel's deliveries that were chilled. The total number of drift vessels in the fleets of surveyed processors that chilled more than 75 percent of their deliveries reached 1,207, the largest number ever to be recorded in this category, and consistent with an increasing trend over time (Table 7). The number of vessels that delivered chilled raw product 50–75 percent of the time decreased significantly from 120 vessels in 2019 to just 48 in 2021, and the number of vessels that delivered chilled raw product 25-50 percent of the time also decreased from 22 in 2020 to 10 in 2021. Additionally, there were also increases in the number of vessels not chilling or chilling less than 25 percent of their deliveries. Between 2020 and 2021, the number of vessels chilling less than 25 percent of the time increased from 3 to 4 vessels and the number of vessels chilling none of the time increased from 45 to 47 vessels. Overall, the majority of drift vessels are chilling at least 75 percent of their deliveries (91 percent of vessels in 2021), a steep increase from 55 percent in 2015.

The data suggest 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 and distribution network 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.

Table 7. Consistency of Chilling, 2009–2021

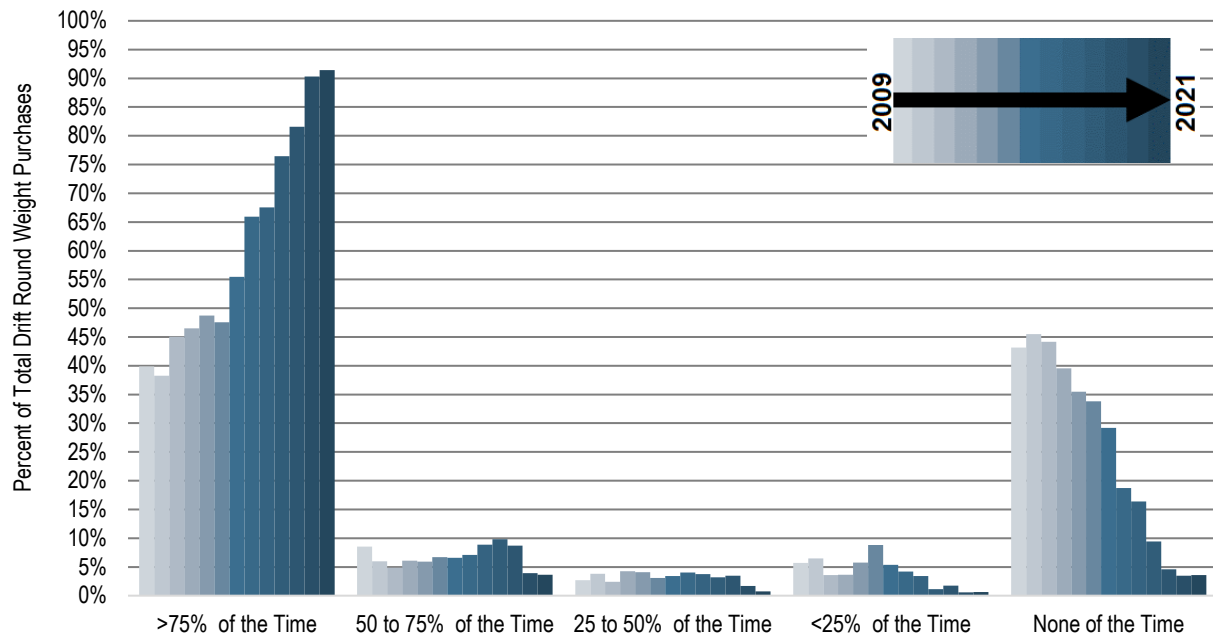
Year	Percent of Deliveries that Were Chilled				
	>75% of the Time	50 to 75% of the Time	25 to 50% of the Time	<25% of the Time	None of the Time
<b>Number of Vessels</b>					
2009	522	112	35	74	565
2010	514	81	51	87	611
2011	612	66	32	48	599
2012	500	66	46	39	425
2013	611	74	51	72	445
2014	595	84	38	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
2019	1,091	116	46	23	61
2020	1,178	51	22	7	45
2021	1,207	48	10	8	47
<b>Percent of Vessels</b>					
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	66.0%	7.1%	4.0%	4.2%	18.7%
2017	67.6%	8.9%	3.8%	3.4%	16.4%
2018	76.5%	9.8%	3.2%	1.1%	9.4%
2019	81.6%	8.7%	3.5%	1.7%	4.6%
2020	90.3%	3.9%	1.7%	0.6%	3.5%
2021	91.4%	3.6%	0.7%	0.6%	3.6%

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

Source: Northern Economics analysis

In 2021, 95 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 7), which represents the most consistent chilling practices recorded by this survey to date (Figure 5). The portion of vessels who chilled their deliveries less consistently (less than 50 percent of the time) decreased in 2021 to just 4.9 percent—down from 5.8 percent in 2020. This is the lowest portion of vessels making unchilled or dry deliveries recorded by the survey.

Figure 5. Chilling Consistency among the Drift Fleet, 2009–2021



Source: Northern Economics analysis

## Processor Ice-Making Capability

Total ice production capacity of processors rebounded slightly between 2020 and 2021, from 638 tons per day to 650 tons per day, yet the available ice to vessels continued to decline (Table 8). The amount of ice available to permit holders from processors declined from 119 tons per day in 2020 to 101 tons per day in 2021, representing the fourth consecutive year of declines in ice availability. Barge ice production comes from two vessels operated and subsidized by BBEDC, and production capacity has varied between a low of 8.5 tons in 2013 and a high of 34 tons in 2014. We note that the survey data indicate that there are sizeable year-over-year changes in the amount of ice available to harvesters from individual processors.

When barge ice is included in the calculation, the total amount of daily ice available to permit holders fell from 145 tons per day in 2020 to 115 tons per day in 2021, caused by a drop of ice availability from both processors and barges. It is not known why there is a consistently large difference in the total ice production capacity of processors and the amount available to vessels, indicating a possible need for an additional question to be added in future surveys. While the increased use of RSW systems to chill product may take some pressure off processors to provide their fleets with ice, 6.5 percent of the raw product delivered by the drift fleet was still chilled using slush ice and 6.4 percent of raw product delivered by the drift fleet was unchilled in 2021 (Table 5).

**Table 8. Ice Production in Tons per Day, 2012–2021**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
Total Ice Production Capacity (tons per day)	645	535	635	775	705	665	732	865	638	650	685
Available to vessels from processors (tons per day)	137	27	59	113	104	149	199	187	119	101	119
Processor ice % available to vessels	21%	5%	9%	15%	15%	22%	27%	22%	19%	16%	17%
Daily Barge Ice Production (tons)	15.8	8.5	34.0	30.8	31.0	27.2	23.8	29.9	25.8*	13.5	24
<b>Total ice available to vessels (tons per day)</b>	<b>153</b>	<b>36</b>	<b>93</b>	<b>143</b>	<b>135</b>	<b>176</b>	<b>222</b>	<b>217</b>	<b>145</b>	<b>115</b>	<b>143</b>

Note: \*2020 barge ice production is estimated using the average daily production from 2008-2019.

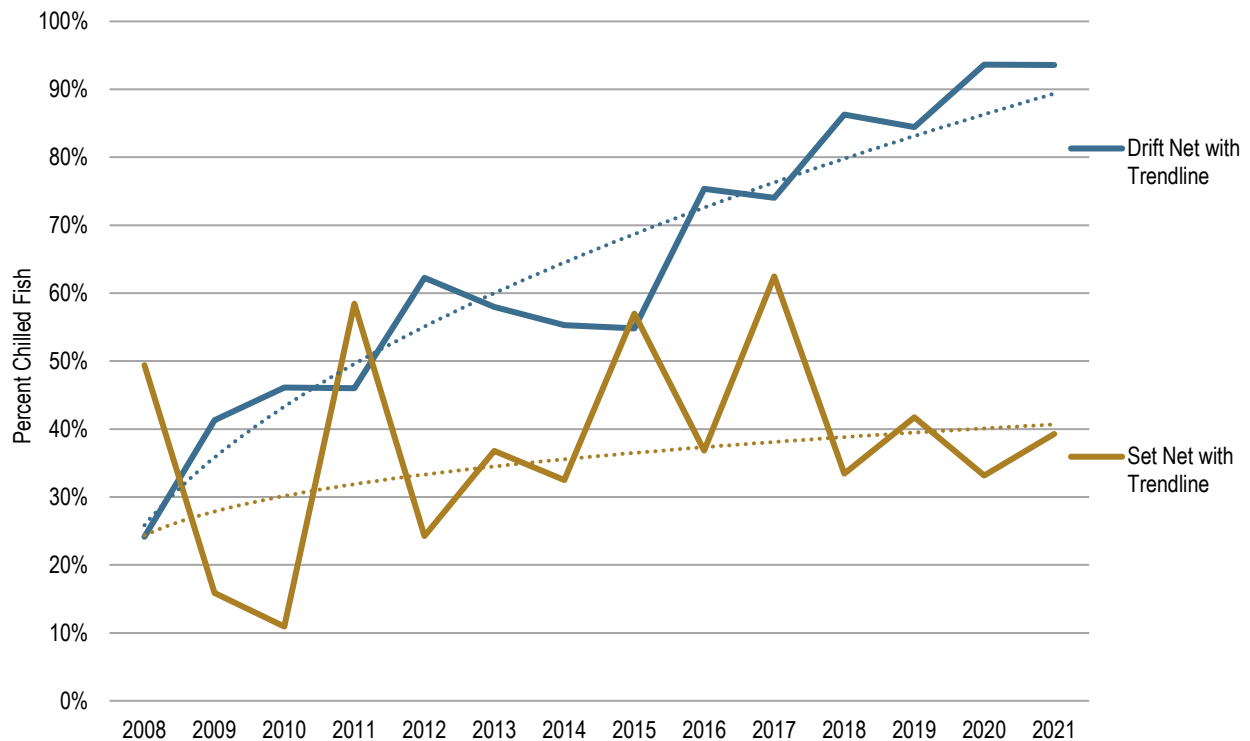
Sources: 2008-2019 estimates of barge ice: BBEDC (2019), 2021 barge ice production provided by BBRSDA. All other figures from Northern Economics analysis.

## Comparing Chilling Practices and Product Quality

Recent years' chilling practices vary dramatically across the drift and setnet fleets. Over the last handful of years, the vast majority of drift net raw product purchased were chilled, with over 80 percent chilled on average since 2018, while setnet raw purchases were mostly unchilled (Figure 6). During the early years of this survey, the portion of chilled drift net purchase consistently increased, but in 2013 and 2014 the trend reversed. Since 2015, the drift fleet has returned to its initial upward trend with over 90 percent of the drift fleet's landings chilled in both 2020 and 2021.

Percentages of setnet landings that are delivered chilled have bounced up and down considerably over the years in which the survey has been conducted. While since 2008 there appears to be an upward trend in chilling by setnet permit holders, the apparently upward trend is mostly an artifact of the low chilling percentages in 2009 and 2010. Since 2011, the proportion of chilled product has stayed the same or decreased, on average, ranging from a low of 24 percent in 2012 to a high of 62 percent in 2017. Over the last three years, the proportion has hovered around 40 percent.

**Figure 6. Drift Fleet and Setnet Chilled Deliveries with Trend Lines, 2009–2021**



Source: Northern Economics analysis

An incentive that is likely 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, aligning with BBRSDA’s stated mission.

Table 9 shows the range of chilling bonuses that were offered each year, as well as the differences between average base and final prices received by Bristol Bay fishermen. The range of chilling bonuses during the fishing year is taken from Bristol Bay Fishermen’s Association (BBFA) newsletters (BBFA 2021). Chilling bonuses have ranged from 7 to 36 percent of the base prices. The base prices shown in the table are taken from ADF&G Season Summary data, published at the end of the fishing season (ADF&G 2021a). The final prices for the years 2008–2020 are taken from COAR Buying data (ADF&G, 2021d) and in theory report the final prices after all bonuses have been paid. Note that the final price for 2021 is a preliminary estimate by Northern Economics using the BBFA bonus and the price per pound from the ADF&G Season Summary. We estimate that the likely final price is around \$1.45, if we apply the average chilling bonus (\$0.20) to the 2021 base price (\$1.20), however, this may be an underestimate. The final price may have been higher—closer to \$1.65—based on preliminary final price data and recent year trends for a subset of Bristol Bay processors (Wink, 2022).

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 39 cents in 2020 and may have been similarly high in 2021—our low-end estimate is \$0.20 based on the average BBFA chilling bonus data, but could have been \$0.39, based on preliminary final price data and recent trends. Since 2015, bonuses have been 21 to 22 percent of the base prices with the exception that in 2019, reflecting in part higher base prices.

**Table 9. Bristol Bay Ex-Vessel Sockeye Salmon Prices and Chilling Bonuses (2008–2021)**

Year	Chilling Bonus Range (\$)	Base Price \$/lb	Final Price \$/lb	Bonus (\$Final – \$Base)	Bonus as % of Base Price
2008	\$0.10–\$0.13	\$0.69	\$0.75	\$0.06	8%
2009	\$0.10–\$0.10	\$0.70	\$0.80	\$0.10	13%
2010	\$0.10–\$0.16	\$0.95	\$1.07	\$0.12	11%
2011	\$0.12–\$0.15	\$1.00	\$1.17	\$0.17	15%
2012	\$0.15–\$0.15	\$1.00	\$1.18	\$0.18	15%
2013	\$0.15–\$0.15	\$1.50	\$1.61	\$0.11	7%
2014	\$0.10–\$0.15	\$1.20	\$1.35	\$0.15	11%
2015	\$0.15–\$0.15	\$0.50	\$0.64	\$0.14	22%
2016	\$0.15–\$0.25	\$0.76	\$0.96	\$0.20	21%
2017	\$0.15–\$0.20	\$1.02	\$1.31	\$0.29	22%
2018	\$0.10–\$0.23	\$1.26	\$1.60	\$0.34	21%
2019	\$0.15–\$0.25	\$1.35	\$1.54	\$0.19	12%
2020	\$0.05–\$0.30	\$0.70	\$1.09	\$0.39	36%
2021*	\$0.15–\$0.30	\$1.25	\$1.45	\$0.20	14%
<b>Data Source:</b>	*BBFA Newsletters, 2008–2021	**ADF&G 2008–2021 Season Summaries	***ADF&G Ex-Vessel Price data	Calculation	Calculation

Note: None of the prices or bonuses in the table have been adjusted for inflation. \*For 2021, the last three columns “Final Price”, “Bonus” and “Bonus as % of Base Price” are estimated by Northern Economics.

Sources: \*BBFA (2021) \*\*ADF&G (2021a), \*\*\*ADF&G (2021d) for 2008–2020 prices and Northern Economics for 2021 price

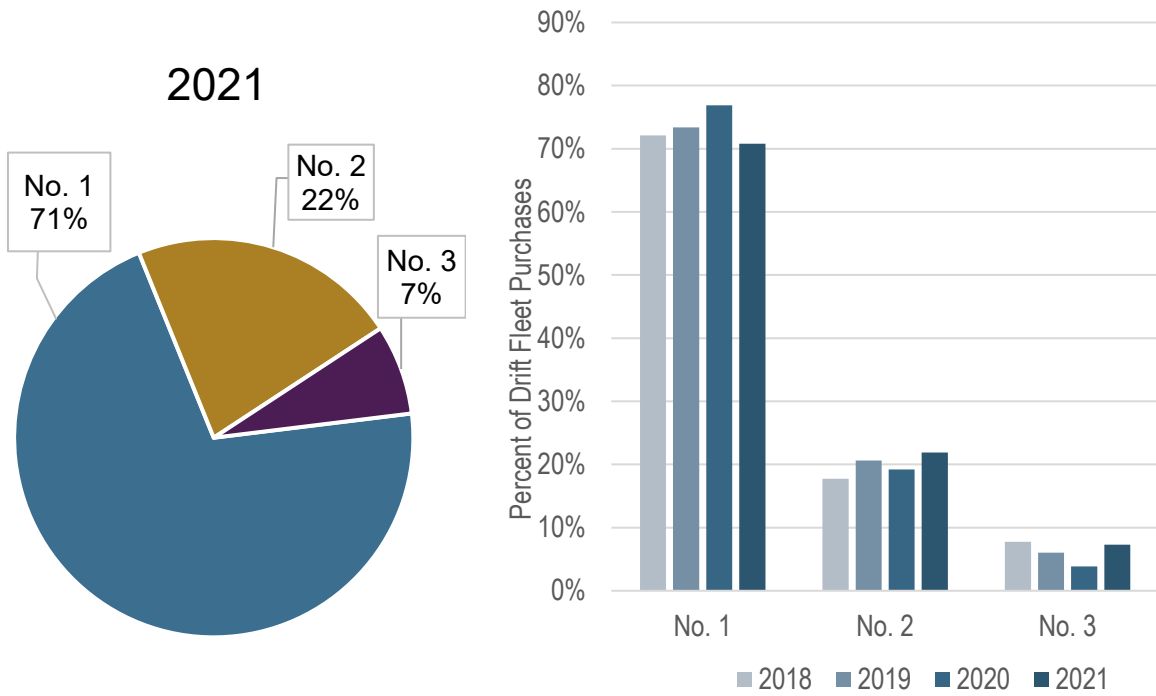
Since 2018, a question about the quality of fish purchased in Bristol Bay has been included in the survey. Respondents are asked to estimate their proportional purchases of number 1, 2, 3, and “other” grade fish.

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 the “Grade C” category (Buckley 2017; Alaska Seafood Marketing Institute 2015). In 2021, number 1 grade fish made up most of the purchases at 71 percent, followed by number 2 grade fish at 22 percent (Figure 7). The 2021 purchases represent the first decrease in the proportion of number 1 grade fish since 2018 and a notable decrease from the 2020 survey, which reported 77 percent number 1 grade fish. This decrease in product quality represents an increase in the proportion of both the number 2 and number 3 grades; number 2 grade fish increased from 19 percent to 21 percent while number 3 fish increased from 4 percent to 7 percent. Part of this increase may be explained by the increased use of long-haul tenders, shifts in fishing/handling practices, or changes in environmental factors that affect product quality. It appears less likely that changes in chilling practices would be driving changes in fish quality, since overall chilling practices were similar to, or better than in 2020.

Processors were also asked to provide an estimate of the hypothetical revenue increases that could result if 100 percent of the fish were considered to be Number 1s. In 2021, four processors provided responses indicating that total revenue could increase from between 20 to 33 percent. Processors were also asked to indicate why they think that Number 3s are occurring and how the percentage of Number 3 could be reduced. The list below summarizes several recurring themes:

- Both gear groups contribute to number 3 fish due to smaller fish, rough handling, or by sitting on the deck too long.
- Seal bites and natural causes also lead to decreased quality.
- Shallow sets, towing over shallows, or round hauls may lead to number 3 fish.
- For set net fish, dry fish lead to number 3 fish.
- For drift net fish, towing nets lead to number 3 fish.

Figure 7. Proportion of Raw Product Purchases by Grade, 2018–2021



Note: In 2018 the percentages in the column chart on the right sum only to 98% because a total of 2% of reported purchases were classified as “other” quality.

Source: Northern Economics analysis



## Aggregate Quality of Chilled Raw Product

New to the 2017 survey and continued in the 2018–2021 surveys were questions about processor employment of third-party quality assurance contractors, and best practices that have the biggest impact on the quality of delivered raw product.

Since 2015 the survey has included a question about the sample size used to determine chilling bonuses. In 2020 and 2021, however, the question was divided into two parts consisting of a) the sample and b) the number of fish per sample. In 2021, six respondents indicated that they required a sample from each delivery. Unlike previous years, there was a lot more consistency across processors in terms on sampling methods, with the majority (five of the six) sampling 3 fish per delivery, as shown in Table 10.

**Table 10. Sampling Methods used for Quality Assurance and Chilling Bonuses**

Responses	
Sample the chilled water	4 fish per delivery
10 fish per brailer	3 fish/delivery (5 responses)

Six survey respondents provided answers to questions regarding quality assurance (QA) on tender vessels and whether their own staff or third-party contractors were used. Responses are summarized in Table 11.

**Table 11. Quality Assurance on Tender Vessels**

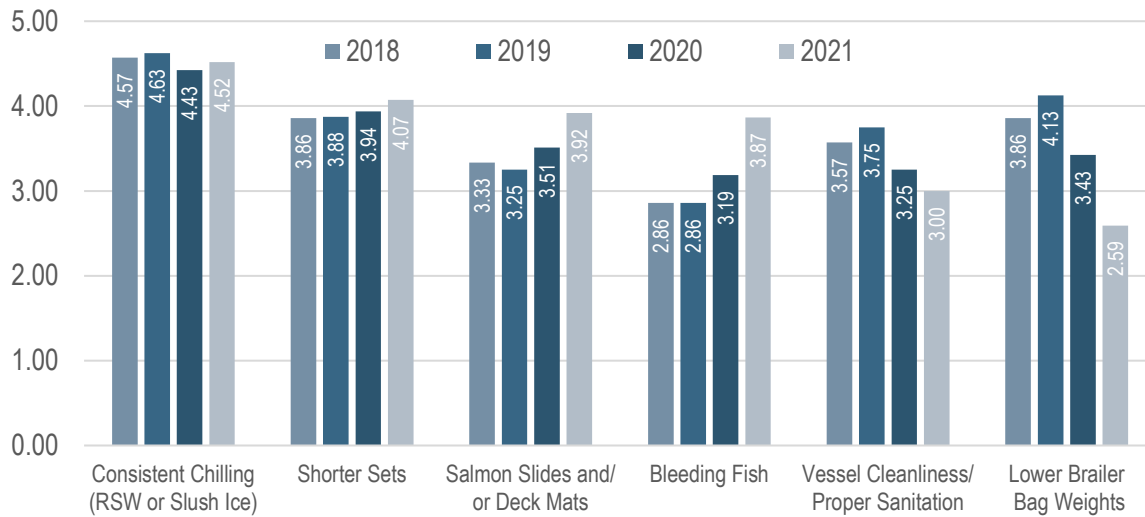
Responses		
Our own QA staff and 3rd party contractors on 25% of tender trips.	Before COVID, used a 3 <sup>rd</sup> party and company QA, now none.	3rd-party QA contractors on 100% of tender trips.
Our own QA staff and 3 <sup>rd</sup> party contractor on 75 % of tender trips.	Our own QA staff on 50% of tender trips.	Our own QA staff on 33% of tender trips

The 2021 survey was the fifth 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. New for 2020 and 2021, the question was modified to ask respondents to rate the practices for both the drift fleet and setnetters separately. 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)
- vessel cleanliness/proper sanitation

Figure 8 summarizes the average scores received for each practice since 2018, noting that we've included only the score for the drift fleet in this comparison with other years. Consistent chilling scored the highest of the "best practices" in all four years. The ranked order among the other five practices shifted from 2020 to 2021, with shorter sets ranked #2, salmon slides and/or deck mats ranked #3, bleeding fish ranked #4, and vessels cleanliness ranked #5. Lower brailer bag weights ranked sixth for the first time; in past years it has been one of the most important practices. The importance of vessel cleanliness has also seen a decline over time. In contrast, bleeding fish was ranked relatively low from 2018 to 2020, and has been ranked with increasing importance since 2020, similar to the trend for using salmon slides and/or deck mats.

Figure 8. Average Score of Best Practices Impacting the Quality of Delivered Product, 2018–2021



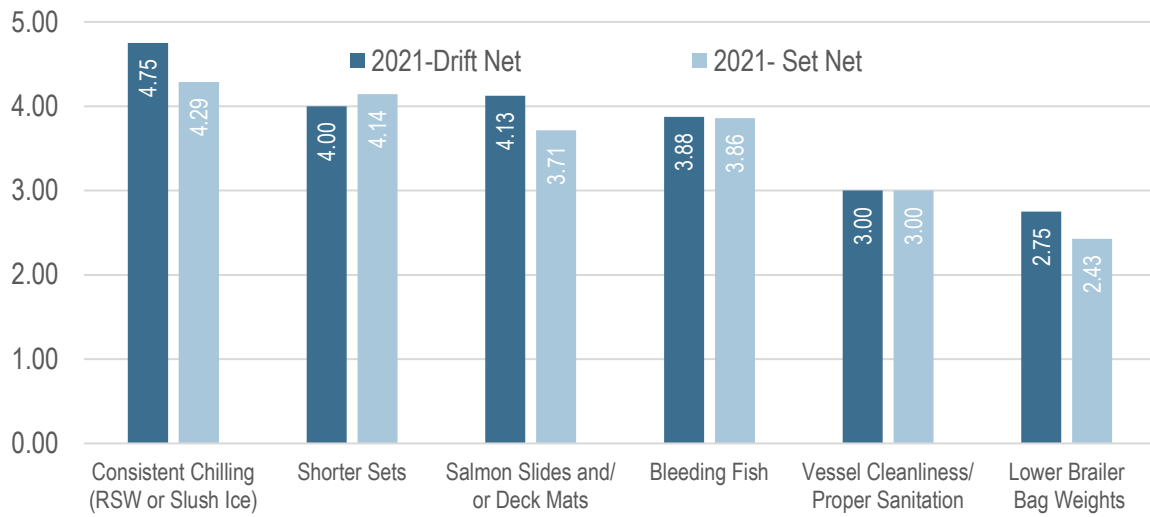
Note: 1=no impact, 5= maximum impact

Source: Northern Economics analysis

Figure 9 shows the differences between best practice ratings for the drift and setnet deliveries. For both harvest methods, consistent chilling is the top-ranked practice, though it was ranked much lower for setnet fish (4.29) than for drift fish (4.75). There are other important differences in the ranking between drift and setnet fish, for drift, salmon slides and/or deck mats was ranked higher than shorter sets as the second and third most important practices, but for setnet fish the second and third highest rankings went to shorter sets and bleeding fish. Both vessel cleanliness and lower brailer bag weights were ranked similarly low, in 5<sup>th</sup> and 6<sup>th</sup> place, for both operations.

Respondents to the drift and setnet best practices questions were also asked two open-ended questions of what the single most important thing each gear type can do to improve quality. Overall, responses were very similar to 2020. For the drift fleet, the most common responses had to do with proper handling and chilling. For setnet harvesters, it is clear that processors would like to see them pick their fish sooner and deliver fish more often.

**Figure 9. Average Score of Best Practices Impacting the Quality of Delivered Drift and Setnet Fish in 2021**



Note: 1=no impact, 5= maximum impact

Source: Northern Economics analysis

## Finished Product Forms

Historical sockeye salmon production and revenue data are available by request through the Commercial Operator's Annual Reports (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 for a longer time period and provide validity to the survey estimates as well as revenue information for products.

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.

Table 12 summarizes 2011–2020 COAR data in terms of net-weight product pound (millions) of production. Figure 10 on the following page provides a longer time series.

Table 13 summarizes COAR wholesale revenue data by product form from 2011–2020, and unlike the previous year's report, does not attempt to forecast data based on the survey responses from this year. Figure 11, which follows the table, provides a 20-year summary of wholesale revenues by product from COAR Data (ADF&G 2021c). 2020 COAR data indicate a drop in overall processed product pounds from 2019 to 2020, and the lowest product volume since 2014 at 129.4 MMLb. Drops in production were observed across all product forms except canned, which increased by 0.5 MMLb. Despite decreases, the production level of most product forms still was above the 10-year average. The COVID-19 pandemic may have had significant impacts on processing in 2020, due to market impacts, quarantine and testing requirements for workers, plant closures, and other restrictions at processing plants (Hagenbuch 2020; O'Malley 2020). It is unclear to what extent these impacts continued to occur in 2021 as well, though comparison of available price data by product type between 2020 and 2021 indicate that it is likely that the volume and value of frozen H&G products likely increased considerably, while fillets likely decreased (Alaska Department of Revenue 2022a, 2022b).<sup>2</sup>

**Table 12. Processed Product Pounds from Bristol Bay Production, 2011–2020**

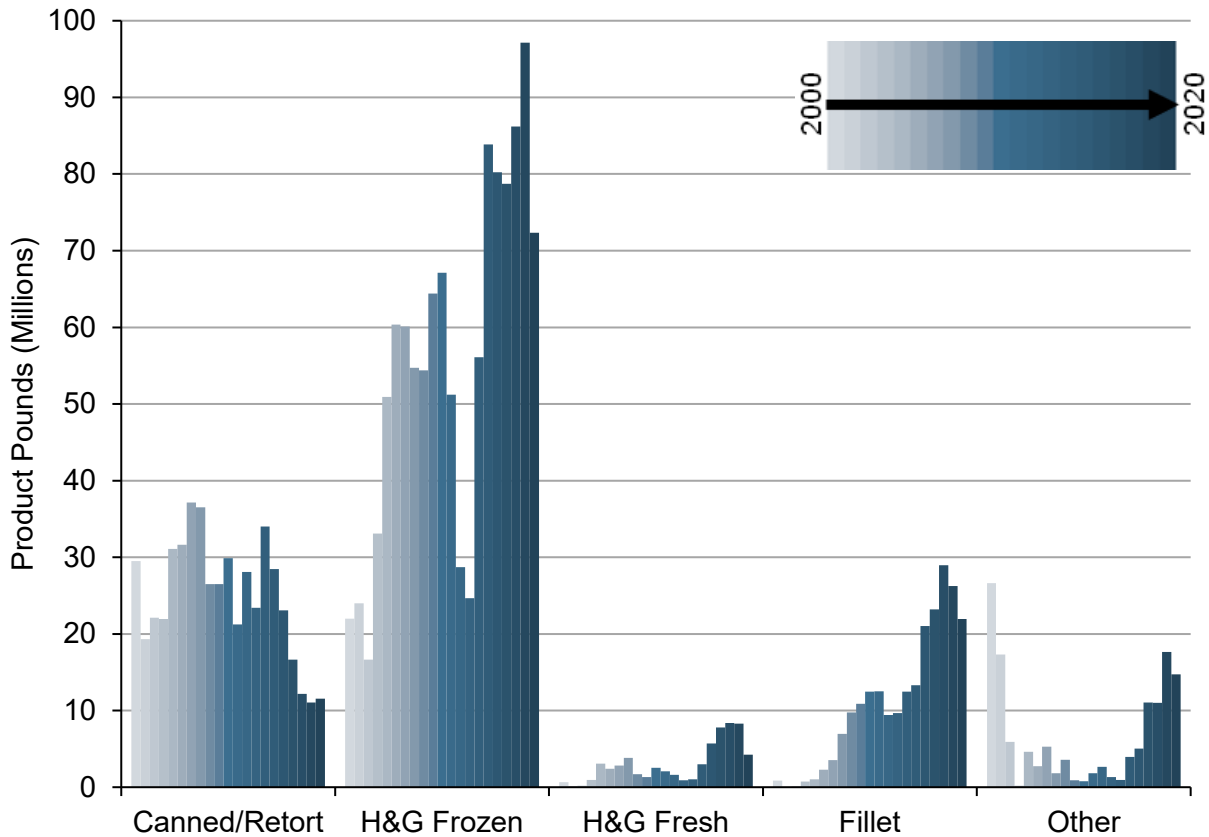
Product Form	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Year-over-Year Change	Average, 2011–2020
<b>Product Weight (MMLb)</b>												
Canned	21.3	28.1	23.4	34.0	28.4	23.1	16.7	12.2	11.1	11.5	0.49	21.0
H&G Frozen	51.2	28.7	24.7	56.1	83.9	80.2	78.7	86.2	97.1	72.4	-24.78	65.9
H&G Fresh	2.1	1.6	0.9	1.0	3.0	5.7	7.8	8.4	8.3	4.2	-4.06	4.3
Fillet	12.5	9.4	9.7	12.5	13.3	21.0	23.2	29.0	26.2	21.9	-4.30	17.9
Roe	3.2	2.5	2.3	3.2	4.7	5.5	5.1	5.5	5.2	4.6	-0.60	4.2
Other	1.8	2.6	1.3	1.0	4.0	5.0	11.1	11.0	17.7	14.7	-2.94	7.0
<b>Total</b>	<b>92.1</b>	<b>72.9</b>	<b>62.3</b>	<b>107.8</b>	<b>137.3</b>	<b>140.6</b>	<b>142.6</b>	<b>152.2</b>	<b>165.6</b>	<b>129.4</b>	<b>-36.19</b>	<b>120.3</b>

*Notes: Other includes ancillary products such as trim, meal, and oil, and may possibly include some minor primary products such as dressed, head-on fish. Fish purchased in Bristol Bay but shipped out the bay for primary processing are not included...*

*Sources: ADF&G (2021c)*

<sup>2</sup> ADR data were not quantitatively used to inform our understanding of product form trends due to the inability to reconcile differences in the data, so instead were used to qualitatively understand broad trends.

Figure 10. Bristol Bay Commercial Operator Sockeye Salmon Annual Net Weight Production by Form, 2000–2020



Note. In this figure “Other” includes primary products such as whole and dressed head-on fish, as well as ancillary products such as roe, fillet trim, meal, and oil.

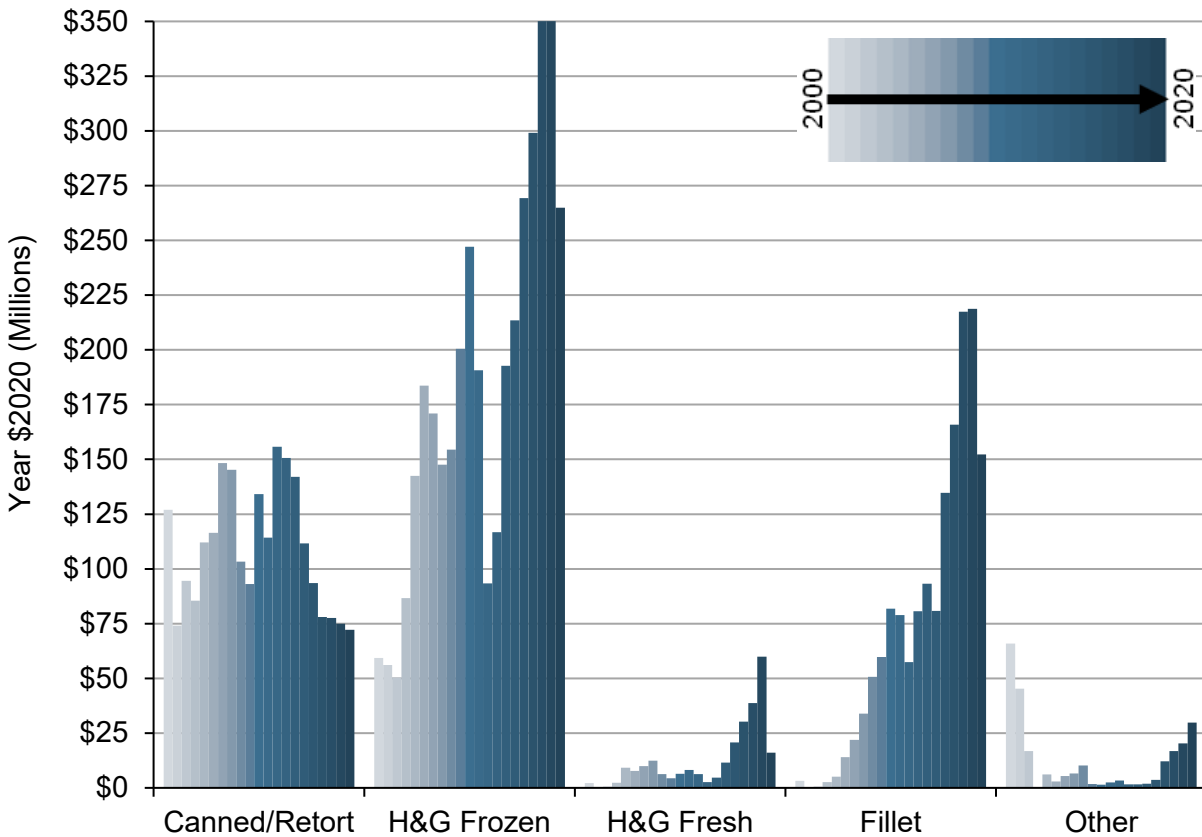
Source: ADF&G (2021c)

Table 13. Processed Product Wholesale Revenue from Bristol Bay Production, 2011–2020

Product Form	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Year-over-Year Change	Average, 2011–2020
<b>First Wholesale Product Revenue (2021\$, Millions)</b>												
Canned	\$114	\$156	\$151	\$142	\$112	\$94	\$78	\$78	\$75	\$78	\$3	\$108
H&G Frozen	\$191	\$93	\$117	\$193	\$213	\$269	\$299	\$374	\$372	\$277	-\$95	\$240
H&G Fresh	\$8	\$6	\$3	\$5	\$12	\$21	\$30	\$39	\$60	\$31	-\$29	\$21
Fillet	\$79	\$57	\$81	\$93	\$81	\$135	\$166	\$217	\$219	\$183	-\$36	\$131
Roe	\$23	\$22	\$23	\$22	\$20	\$34	\$39	\$48	\$29	\$25	-\$3	\$28
Other	\$2	\$3	\$2	\$2	\$2	\$4	\$12	\$17	\$20	\$17	-\$3	\$8
<b>Total</b>	<b>\$417</b>	<b>\$338</b>	<b>\$375</b>	<b>\$456</b>	<b>\$440</b>	<b>\$556</b>	<b>\$624</b>	<b>\$773</b>	<b>\$775</b>	<b>\$611</b>	<b>-\$163</b>	<b>\$537</b>

Notes: Other includes ancillary products such as trim, meal, and oil, and may possibly include some minor primary products such as dressed, head-on fish. Fish purchased in Bristol Bay but shipped out the bay for primary processing are not included.

Source: ADF&G (2021c).

**Figure 11. Bristol Bay Commercial Operator Sockeye Salmon Wholesale Revenue by Product Form, 2000–2020**

Source: ADF&G (2021c)

Table 14 provides estimates of the percentage of total round weight purchases processed within Bristol Bay by primary product forms for 2011 to 2020 along with an estimate of the percent of raw fish purchases that were transported out of Bristol Bay for processing in 2021. In 2021 we did not ask processors to estimate their product form purchases, due to issues with this in past years, so we do not provide estimates for this for 2021 and instead only present data for which COAR data are available. Figure 12 shows estimates back through 2008. The table and figure include the percentage of raw fish purchases from survey respondents that were shipped out of the Bay before any primary processing occurred. There are noticeable changes that go against recent trends:

- 1) Raw fish processed into cans appears to have increased for the first time since 2012.
- 2) Raw fish processed into H&G products appears to have decreased to levels not seen since 2014.
- 3) Raw fish processed into fillets appears to have remained the same as 2019.
- 4) The proportion of raw product processed outside of Bristol Bay is estimated to have reached a 10-year high in 2020, at 9 percent. Preliminary data from the 2021 survey indicate that this proportion decreased some in 2021, to 5.8 percent.

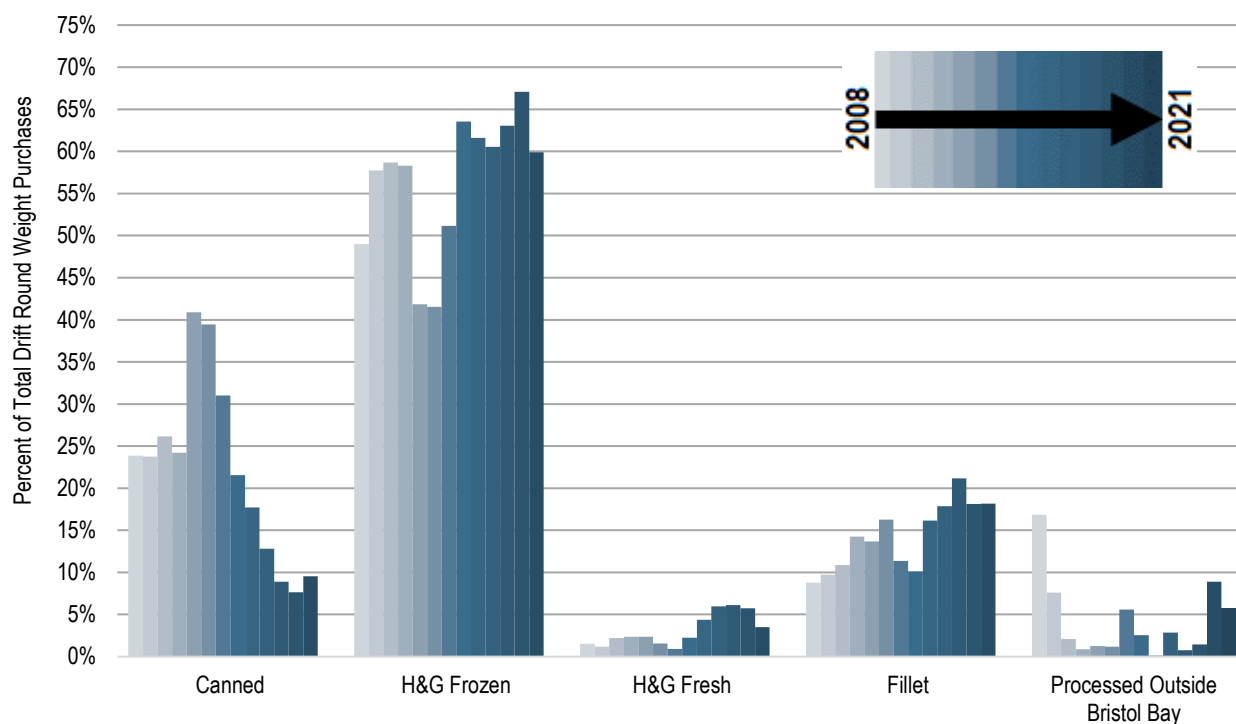
**Table 14. Total Raw Product Consumed by First Wholesale Product Form, 2011–2020**

Product Form	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2019-2020 Change	Average, 2011–2020
<b>Percent of Total Round Weight Purchased</b>													
Canned	24%	41%	39%	31%	22%	18%	13%	9%	8%	10%	NA	1.9%	21.4%
H&G Frozen	58%	42%	42%	51%	64%	62%	61%	63%	67%	60%	NA	-7.2%	56.9%
H&G Fresh	2%	2%	2%	1%	2%	4%	6%	6%	6%	4%	NA	-2.2%	3.5%
Fillet	14%	14%	16%	11%	10%	16%	18%	21%	18%	18%	NA	0.0%	15.7%
Processed outside of Bristol Bay	1%	1%	1%	6%	3%	0%	3%	1%	1%	9%	6%	7.5%	2.5%
<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>100%</b>	<b>100%</b>	<b>NA</b>	<b>NA</b>	<b>100%</b>

Notes: Other includes ancillary products such as trim, meal, and oil, and may possibly include some minor primary products such as dressed, head-on fish. Fish purchased in Bristol Bay but shipped out the bay for primary processing are not included. In 2021 we did not ask processors to estimate finished product form percentages and COAR data was only available for 2020, so only an estimate of the amount processed outside of Bristol Bay is provided for 2021.

Sources: ADF&G (2021c), Northern Economics analysis

**Figure 12. Raw Product Forms of Product Processed in Bristol Bay, 2008–2020**



Notes: In 2021 we did not ask processors to estimate finished product form percentages and COAR data are only available for 2020, so only an estimate of the amount processed outside of Bristol Bay is provided for 2021. From 2008–2020 percentages are adjusted from ADF&G COAR data to account for purchases transported outside of Bristol Bay, as reported in the survey.

Sources: ADF&G (2021c), Northern Economics analysis

## References

- ADF&G (Alaska Department of Fish and Game). 2020. *Bristol Bay Area Annual Management Report. Fishery Management Report* No. 21-16. June 2021. <https://www.adfg.alaska.gov/FedAidPDFs/FMR21-16.pdf> . Accessed on February 2, 2022.
- ADF&G. 2021a. *2021 Bristol Bay Salmon Season Summary*. Document Series 2008–2021. <http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/1337414316.pdf>. Accessed on December 21, 2021.
- ADF&G. 2021b. *2021 Preliminary Alaska Commercial Harvest and Exvessel Values*. Document Series 2008–2021. [https://www.adfg.alaska.gov/Static/fishing/pdfs/commercial/2021\\_preliminary\\_salmon\\_summary\\_table.pdf](https://www.adfg.alaska.gov/Static/fishing/pdfs/commercial/2021_preliminary_salmon_summary_table.pdf) Accessed on December 21, 2021.
- ADF&G. 2021c. 1990–2020 COAR Production for Bristol Bay Sockeye salmon by category. Provided on request from Andy Wink. October 19, 2021.
- ADF&G. 2021d. *Commercial Salmon Fishery Ex-vessel Prices by Area and Species (Bristol Bay, Sockeye)*. [https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch\\_exvessel](https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyfisherysalmon.salmoncatch_exvessel). Accessed on March 29, 2021.
- Alaska Department of Revenue. 2022a. Alaska Department of Revenue–Tax Division. Alaska Salmon Price Report 5/1/2020- 8/31/2020. <http://tax.alaska.gov/programs/programs/reports/annual/TriannualSalmon.aspx?ReportDate=8/31/2020>. Accessed February 3, 2022.
- Alaska Department of Revenue. 2022b. Alaska Department of Revenue–Tax Division. Alaska Salmon Price Report 5/1/2021- 8/31/2021. <http://tax.alaska.gov/programs/programs/reports/annual/TriannualSalmon.aspx?ReportDate=8/31/2021>. Accessed February 3, 2022.
- Alaska Seafood Marketing Institute. 2015. *Alaska Salmon Quality Specifications and Grades – Fresh and Frozen*. <https://uploads.alaskaseafood.org/2015/10/Alaska-Salmon-Quality-Specifications-and-Grades1.pdf>. Accessed on February 2nd, 2022.
- BBEDC (Bristol Bay Economic Development Corporation). 2019. *BBEDC 2018 Annual Report*. [http://www.bbedc.com/wp-content/uploads/2019/09/BBEDC-2018-AR\\_WEB.pdf](http://www.bbedc.com/wp-content/uploads/2019/09/BBEDC-2018-AR_WEB.pdf). Accessed on February 2<sup>nd</sup> 2022.
- BBEDC. 2020a. *BBEDC 2019 Annual Report*. <https://www.bbedc.com/wp-content/uploads/2020/09/BBEDC-2019-AR-ALLWEB.pdf>. Accessed on February 2<sup>nd</sup> 2022
- BBEDC. 2020b. Bristol Bay Ice web page. [http://www.bbedc.com/?page\\_id=495](http://www.bbedc.com/?page_id=495). Accessed on March 20, 2020.
- BBEDC. 2021. Bristol Bay RSW Support Program web page. [https://www.bbedc.com/?page\\_id=328](https://www.bbedc.com/?page_id=328). Accessed on February 2<sup>nd</sup> 2022.
- BBFA (Bristol Bay Fishermen’s Association). 2021. Bristol Bay Ex-Vessel Prices, 2021. [http://www.bristolbayfishermen.org/fishermans\\_prices.html](http://www.bristolbayfishermen.org/fishermans_prices.html). Accessed on December 20th, 2021.
- Buckley, M.K. 2017. *Quality Determinants of Gillnet-Caught Alaska Salmon*. *Journal of Aquatic Food Product Technology* 10: 1157-1165. <https://www.tandfonline.com/doi/abs/10.1080/10498850.2014.987861?journalCode=wafp20&>. Accessed on May 17, 2018.



- Hagenbuch, Brian. 2020. *Coronavirus strains preparations for 2020 sockeye season in Bristol Bay, Alaska*. Seafood Source. <https://www.seafoodsource.com/news/supply-trade/coronavirus-strains-preparations-for-2020-sockeye-season-in-bristol-bay-alaska>. Accessed February 3, 2022.
- O'Malley, Julia. 2020. *How Covid-19 Is Threatening Alaska's Wild Salmon Fishing Season*. The New York Times. <https://www.nytimes.com/2020/06/23/dining/alaska-salmon-coronavirus.html>. Accessed February 3, 2022.
- Wink, Andy. 2022. Executive Director, BBRSDA. Personal communication with Northern Economics. February 11, 2022.

## Appendix: Survey Instrument

## Introduction

**Welcome to the 2021 Bristol Bay Salmon Fishery Processing Survey! We're glad to be conducting this survey again after successful 2008-2020 surveys. The 2021 survey continues to build on the data in prior surveys and will allow you to see aggregate changes in the fishery that have occurred between 2008 and 2021.**

**As with the prior surveys:**

**The purpose of the survey is to collect information on the chilling of fish by fishermen and the quality practices used in the fishery.**

**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 (Round Weight) Purchases

**This section asks questions about a processor's purchase of raw product (round weight fish) in 2021. Please ensure that all answers are for the 2021 season.**

**Please note that some questions refer to ALL of your operations in 2021 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 DOES NOT ADD TO 100 OR IF A % SYMBOL IS INCLUDED IN THE ENTRY.**

6. In 2021, how many pounds of raw product (round weight fish) did your company purchase from the Bristol Bay salmon fishery?

2021 Raw Product Weight

7. In 2021, how many pounds of chilled and unchilled raw product (did your company purchase from the DRIFT NET fleet)?

Pounds of Chilled Raw Product from DRIFT fleet

Pounds of Unchilled Raw Product from DRIFT fleet

8. In 2021, how many pounds of chilled and unchilled raw product (did your company purchase from SETNETTERS)?

Pounds of Chilled Raw Product from SETNETTERS

Pounds of Unchilled Raw Product from SETNETTERS

9. What percentage of your TOTAL 2021 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. What percentage of the raw product your company purchased from the DRIFT NET fleet in 2021 was from each of the following categories? The total of your answer should be 100. *Note: Fish delivered from a boat that uses an RSW system that is temporarily non-functional should be counted with the RSW.*

Chilled with RSW

Chilled with Slush or Flake Ice

Unchilled

## Your Fleet

**This page asks questions about DRIFT NET boats that you consider to be part of "your fleet."**

11. In 2021, 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 2021.

12. 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 2021 deliveries were chilled

50% to 75% of their 2021 deliveries were chilled

25% to 50% of their 2021 deliveries were chilled

1% to 25% of their 2021 deliveries were chilled

None of their 2021 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 2021 and its availability to your fleet.**

13. In 2021, 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)

14. What percentage of your 2021 daily ice making capacity located in Bristol Bay is available for use by your drift net fleet? Please exclude any ice produced by the BBEDC ice barges.

Portion Available to Your Drift Boat Fleet (%)

15. Which statement do you think best describes the amount of ice available to DRIFT NET permit holders in comparison to demand for 2021? Please check one box.

- There was an excess of ice-making capacity available.
- The right amount of ice was available to meet the needs of the fleet to always deliver chilled fish.
- There was not enough ice to meet the needs of the fleet to always deliver chilled fish.

## Quality of Chilled Product

**This section of the survey asks about the quality of the chilled product purchased in the Bristol Bay salmon fishery during the 2021 season.**

16. When tenders take a sample to determine the chilled temperature and possibly qualify for a chilling bonus, how do you conduct your sample (e.g. fish per brailer, fish per delivery, etc.)?

17. How many fish are required in each sample?

Number of fish required

18. 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
- a combination of both or other (please specify)

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

Percentage of tenders

20. 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 2021 season?

Percentage of tenders



21. Thinking specifically about the DRIFT FLEET, 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"/>

22. What is the most important thing DRIFT fishermen can do to improve quality?

23. Thinking specifically about SETNETTERS, 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"/>



## 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.**

29. 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"/>

30. 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 2022. BBRSDA will email a copy of the results to you using the contact information you provided with the survey.**