

Bristol Bay Fisheries Collaborative Annual Report, 2018

Final Report

Prepared by:



Bristol Bay Science and Research Institute
Box 1464
Dillingham, Alaska 99576

and



Alaska Department of Fish and Game
333 Raspberry Road, Anchorage, AK 99518

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Final Report

Prepared for:

Board of Directors, Bristol Bay Science and Research Institute,
Sam Cotten, Commissioner of Alaska Department of Fish and Game,

and

Bristol Bay Regional Seafood Development Association,

Twelve Bristol Bay Salmon Processors,

Bristol Bay Native Corporation,

Alaska Marine Lines and Alaska President Lines,

Bristol Bay and Lake and Peninsula Boroughs,

City of Egegik

Native Villages of Ugashik, Levelock, Curyung,

Delta Western Petroleum, Norther Air Cargo, and

Kvichak Setnetters Association.

Prepared by:

Michael R. Link¹, Jack Erickson², Jeff R. Regnart¹, and Forrest Bowers²

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¹ Bristol Bay Science and Research Institute, Dillingham, AK

² Alaska Department of Fish and Game, Anchorage and Juneau, AK

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Executive Summary

The Bristol Bay Fisheries Collaborative (BBFC) is a grass-roots initiative developed in 2016 by stakeholders in the Bristol Bay fishery to help stem the erosion of the State of Alaska's financial support for the Bay's fishery management. The 2018 season was the second season where BBFC-supported projects were used by the Alaska Department of Fish and Game (ADF&G) to manage Bay area fisheries. The Bristol Bay Science and Research Institute (BBSRI) and ADF&G work under a Memorandum of Agreement (MOA) that established a formal structure for a collaborative working relationship between the two organizations. The MOA requires a four-person Working Group (WG) to provide an annual report each year. This is the second such report since the MOA was signed in October 2016. The report provides a summary of WG activities and BBFC project results in 2018, an accounting of funds spent, and the recommended scope of the BBFC-supported "Core Program" in 2019. The Core Program is a suite of projects and activities intended to maintain high-caliber management of Bay area fisheries.

Expenditures on BBFC-supported salmon projects in 2018 (\$747,708) were ~\$67,000 less than originally forecast in December 2017 (\$815,000), and separately, the Togiak herring assessment was funded by ADF&G and not funded via BBFC. BBSRI provided 50% of the total BBFC expenditures (\$373,854); followed by the Bristol Bay Regional Seafood Development Association (BBRSDA; \$163,270), twelve Bristol Bay salmon processors (\$163,270); and collectively, \$47,315 from stakeholder organizations including the Bristol Bay Native Corporation, local boroughs, village governments, Kvichak Setnetters Association, and the shipping industry.

BBFC met its goal of maintaining a world-class management program. BBFC resurrected management capacity lost due to budget cuts in recent years. ADF&G's Bristol Bay budget was not cut for its fiscal year starting on July 1, 2018, and instead, the Legislature added \$111,000 to the budget for two Core Program components (Alagnak R. counting tower and Togiak herring assessment), thereby reducing the amount of fund raising needed by BBFC. More fish were caught, fish stocks better utilized, and important long-term datasets were maintained, all in a more coordinated manner than would have occurred without BBFC. Again in 2018, cost-recovery test fishing was not implemented. None of the funds raised were spent to administer BBFC. The sustainability of BBFC to support a world-class fishery management system during this challenging fiscal environment will depend on continued success in rebuilding ADF&G's Bristol Bay budget and on keeping BBFC simple, transparent, and not overly burdensome to any one group of stakeholders.

The scope of the Core Program for Bristol Bay in 2019 will be finalized in January and February 2019 once the new Administration and ADF&G leadership are in place. The final state budget to be signed into law in May or June 2019 will determine how much might be needed from stakeholders and whether any pledges of support materialize into commitments.

Introduction

Fishery management in Bristol Bay exemplifies the world-class approaches the State of Alaska has developed over the six decades since statehood when it took control of managing its fisheries. In recent years, the State of Alaska's fiscal challenges have eroded its ability to maintain those fishery management systems. The Bristol Bay Fisheries Collaborative (BBFC) is a grass-roots initiative developed in 2016 by stakeholders to help stem the erosion of financial support for the Bay's fishery management (www.bbsri.org/bbfc).

In October 2016, the Bristol Bay Science and Research Institute (BBSRI) and the Alaska Department of Fish and Game (ADF&G) entered into a Memorandum of Agreement (MOA) on that developed a formal structure for collaboration between the two organizations (see Link et al. 2017 for additional details and for a copy of the MOA)³. The MOA requires the formation of a working group (WG) that is charged with providing an annual report each year. This is the second annual report since the MOA was signed.

The four-person technical WG of the BBFC is charged with identifying projects and staffing levels that will help sustain a world-class fishery management system in Bristol Bay. The scope of projects and staffing identified by the WG constitutes the Core Program of the BBFC. The WG has two technical experts from each of ADF&G and BBSRI.

This report fulfils a requirement of the MOA to inform its principals, benefactors, and the public of the BBFC activities, project results, and an accounting of funds raised. In addition, the annual report provides an opportunity to review the scope of the Core Program. The report will be first distributed as a draft for comment in November 2018 and finalized after a meeting of BBFC's WG in December 2018.

Working Group Meetings

The WG of BBFC formally met twice in 2018. On February 22, 2018, the WG met via teleconference with the principals to the MOA – the Commissioner of ADF&G and the BBSRI Board of Directors. This annual meeting of the principals is set out as a requirement in the MOA and its purpose is to:

"...review the agreement, the Work Group performance and appointees, and discuss, identify, and coordinate the various activities pursuant to the MOA, or to discuss, identify and coordinate future opportunities that fall within the area of common benefits and interests."

Appendix A provides a summary of the meeting notes from the meeting of the principals.

The Working Group met informally in Anchorage in October and November. Topics included:

³ The 2017 annual report is available at www.bbsri.org/bbfc

- Outcomes from the 2018 projects
- Review an early draft of the annual report
- Discuss the possible scope of the 2019 Core Program
- Discuss possible outcomes from the state budget process to identify fund raising needs.

In January or February 2019, the WG will meet to approve the scope of the Core Program in 2019. The meeting will likely be held in Anchorage and will be open to the public. The meeting will provide an opportunity for contributors and others to ask questions and provide input to the Working Group. Finally, the annual meeting of the principals to the MOA will likely occur in February 2019, once a new Commissioner has been appointed and has settled in.

Overview, Goals, and Scope of the Core Program

The overarching goal of BBFC was to reintroduce and maintain monitoring projects and management capacity to reestablish the State's ability to manage Bay fisheries that was present prior to recent deep budget cuts to ADF&G.

BBFC is not a research consortium, nor are any of the projects it promotes new to Bristol Bay. The suite of projects reestablished by BBFC's Core Program in 2016 represent the evolution of the management system from statehood to the present. Its scope is less than what was done in the mid-1980s and is similar to the "Basic Program" described in the most recent Bristol Bay program review (Clark 2005).

BBFC addresses needs of management in a coordinated and less *ad hoc* manner than had been developing in recent years. As budgets and the Bay program were cut over successive years, ADF&G relied more and more on cost-recovery test fishing to generate revenue, and industry was asked more often to support projects that had been cut (e.g., Togiak and Igushik towers in 2016). Many stakeholders saw cost-recovery fishing in the Bay in its recent format as an inefficient means to raise money for management. In 2016, and prior to BBFC, fishermen and several processors stepped up to give money to ADF&G to eliminate cost-recovery fishing that season.

Many stakeholders see *ad hoc* fund raising as inefficient and potentially damaging because their support has the potential to embolden further budget cutting by the Administration or the Legislature. Solicitations for funding for projects that had been cut was often done in isolation, and the relative merit and value among projects was not clear, making donors weary of ongoing and unrelated requests. Working together, BBSRI and ADF&G developed BBFC to provide a rigorous approach for stakeholders to provide funding with less fear of further cuts and/or some projects receiving support over more valuable projects.

BBFC is not intended to be a permanent source of funding for ADF&G. Organizations that provide funding via BBFC, including BBSRI, believe that Bristol Bay fisheries warrant financial support by the State of Alaska commensurate with the scope of the Core Program. All who support BBFC see it as a relatively short-term bridge to the State rebuilding its commitment via its operating budget (see more at www.bbsri.org/bbfc).

Keeping it Simple and Overhead to a Minimum

Given an overarching goal of resurrecting ADF&G's capacity to manage the fishery with projects that had been done in the past, stakeholders and ADF&G looked to create a simple process that would incur little indirect costs to administer. The goal was to apply all funds raised directly to projects fishery managers need to better manage the fishery. Toward this end, BBSRI does not charge for indirect costs associated with orchestrating BBFC, including financial administration, fund raising activities, and participation in the WG. Similarly, ADF&G charges no administrative overhead to participate in the WG activity and does not charge overhead on non-labor project costs. It reduced its indirect cost on labor to 10% for BBFC projects. BBSRI charged a 5% overhead rate on the one BBFC project it operated in 2018.

Goals of Core Program

Four goals of a Core Program and the scope of projects to achieve them are summarized below and outlined in greater detail in the 2017 annual report (Link et al. 2017). Many of the projects described below as part of the Core Program are still within ADF&G's annual General Fund (GF) budget; those components that are not in the GF budget are characterized as BBFC-supported projects and represented 28% of the entire Core Program cost of \$2.693 million (Table 1).

1. ***A team of professionals to collect and interpret information on the status of the fish stocks and regulate fishing effort*** (45%). The cornerstone of ADF&G's management is the team of professionals who have the appropriate knowledge and experience to prosecute the fishery.
2. ***Protect weak stocks while exploiting productive stocks to the extent possible*** (36%). A Core Program provides managers and industry with tools to prosecute the fishery in a manner that distributes effort and harvests across time within and among seasons to the greatest extent possible. This is done with field projects, historical datasets, and analytical tools that help managers to predict the remaining run so that escapement goals can be met, and harvests can be distributed through time. This goal represents effort greater than simply providing a "sustained yield"; it includes effort to maintain the economic health of the fishery.
 - a. ***Port Moller Test Fishery*** – Provides indices of abundance and genetic-based stock composition estimates from a sampling project 6-9 days travel from the inshore fishing districts. This allows managers additional time to protect weak stocks and exploit abundant stocks before fish have passed the fishing districts. The information is also used by fishermen and processors to determine how to position harvesting and tendering capacity, including haul-out tenders.
 - b. ***District test fishing, in-river test fishing, and aerial surveys*** – Managers recruit commercial fishermen to conduct test fishing within districts and department employees operate in-river test fishing projects just upstream the fishing districts on the Ugashik, Egegik, and Kvichak rivers. Managers regularly fly the districts and river systems to gauge run strength prior to enumeration at upstream

enumeration sites. Aerial surveys are used to determine the overall herring biomass, as well as the threshold biomass to open the season.

- c. **Salmon escapement enumeration** – The Core Program includes towers on the Togiak, Igushik, Wood, Kvichak, Alagnak, Naknek, Egegik and Ugashik rivers, and the Portage Sonar project on the Nushagak River.
3. **Maintain all existing stock-specific brood tables** (8%) – Much of the data for this comes from projects listed in #2 above. This category represents the additions and marginal costs to maintain brood tables. These datasets, many of them covering six decades, enable us to track the health and productive capacity of all major salmon and herring stocks in the Bay. The data also provide the information to evaluate escapement goals, a fundamental cornerstone of fisheries management in the Bay. Finally, these data provide inputs to annual preseason forecasts, which assist fishery management and industry planning. In addition to escapement monitoring projects, the following are required to maintain brood tables:
- a. **AWL sampling**– Biological sampling at all enumeration projects and in the commercial salmon and herring catches.
 - b. **Catch apportionment to Stock** – Age composition and genetic-based assignment of district salmon catches to river of origin.
4. **Provide modest support for program evaluation and investment in tools to lower program costs and expand and/or improve the value of fishing opportunities** (5%). The Core Program should invest in regular review of the performance, cost effectiveness, and overall value of the specific monitoring projects.

BBFC Scope and Project Results, 2018

The Core Program, including state-funded projects and BBFC-funded projects and associated budgets are provided in Table 1 below. Appendix B summarizes the methods and results from the BBFC-supported projects in 2018.

Table 1. Scope and cost of the BBFC Core Program by project and funding source, 2018, in thousands of dollars.

Program Component	Funding Source, 2018	
	ADF&G	BBFC
ADF&G funded		
<u>General Fund (GF)</u>		
Program Mgt Eastside	347.2	
Fishery Monitoring Eastside	59.8	
Kvichak River Tower	46.9	
Naknek River Tower	51.7	
Egegik River Tower	52.7	
Ugashik River Tower	54.6	
Alagnak River Tower (State funded after July 1)	37.6	
Bristol Bay Research	388.8	
Program Management Westside	459.5	
Fishery Monitoring Westside	37.8	
Wood River Tower	33.9	
Nushagak River Sonar	90.2	
Catch Allocation, Genetics	99.8	
Port Moller In-season Genetic Stock ID	79.2	
Togiak River Tower	60.0	
Igushik River Tower	50.0	
Subtotal (ADF&G, 2018)	1,950	
2018 Core Projects supported by BBFC		Thousands \$
Unfunded portion of Nushagak River Sonar		53.0
Kvichak River Inside Test		42.9
Egegik River Inside Test		54.9
Ugashik River Inside Test		52.1
District Catch Sampling		142.3
Port Moller Test Fishery		249.4
Alagnak River tower (prior to July 1)		12.4
Kvichak, Naknek post-season aerial surveys		14.6
Management Biologist/Trainee, Westside		54.9
Nushagak River Sonar Coho/Pink		71.1
Subtotal		747.708
10% Indirect fee applied to ADF&G labor included above		-
Grand total, BBFC, 2018		747.708
Total, State funded and BBFC funded		2,697.3
BBFC as a % of total expenditures		28%

Summary of Expenditures in 2018

Actual expenditures on the BBFC salmon projects in 2018 were \$747,708, which was \$67,192 (8.2%) less than originally forecast in the 2017 annual report (\$814,900; Table 2). Sixty percent of this difference was attributed to the addition of the Alagnak River Tower to State budget, which began supporting the project on July 1. BBFC funds were used to fund the mobilization and first ~7 days of the operation of the tower project in late June. Note also that the herring assessment was funded by ADF&G in 2018, and a budget increment has been put in place for the 2019 assessment; the herring budget is not shown in Table 2.

Table 2. Summary of forecasted and actual BBFC expenditures for salmon by project, 2018.

	Operator	Budget (\$)	Expenditures by Organization			Difference
			ADF&G	BBSRI	Total	
Port Moller Test Fishery	ADFG/BBSRI	266,500	112,020	137,388	249,408	17,092
Kvichak R. inriver test fishery	ADFG	43,040	42,890	-	42,890	150
Egegik R. inriver test fishery	ADFG	50,390	54,941	-	54,941	-4,551
Ugashik R. inriver test fishery	ADFG	49,340	52,096	-	52,096	-2,756
District catch sampling	ADFG	136,700	142,296	-	142,296	-5,596
Unfunded Nushagak sonar (June/July)	ADFG	53,730	53,009	-	53,009	721
Nushagak sonar, pink and coho (July/Aug)	ADFG	81,500	71,100	-	71,100	10,400
Alagnak R. tower (only pre-July 1 ops funded)	ADFG	53,000	12,399	-	12,399	40,601
Post-season aerial surveys (Naknek, Kvichak)	ADFG	14,700	14,627	-	14,627	73
Management Trainee	ADFG	66,000	54,942	-	54,942	11,058
Totals		814,900	610,320	137,388	747,708	67,192
Percent of Original Budget			610,320		91.8%	8.2%

Financial Contributors to BBFC in 2018

BBSRI solicited support from all who had contributed to BBFC in 2017. Those who had carry-forward contributions from 2017 committed to apply those to the 2018 program (all but the BBRSDA, which did not have a carryover). Table 3 provides an inclusive list of all organization that provided financial support to BBFC in 2018, either with a carryover from their 2017 contribution, or a combination of any 2017 carryover and an additional contribution in 2018 (Table 4).

Table 3. List of organizations that contributed money to support BBFC projects in 2018.

<u>Fishermen</u>	<u>Regional Native Corporation</u>
Bristol Bay Regional Seafood Dev. Association (Driftnetters)	Bristol Bay Native Corporation
Kvichak Setnetters Assoc.	<u>Shippers</u>
Individual driftnet fishermen	Alaska Marine Lines (AML)
	American President Lines (APL)
<u>Processors</u>	DeltaWestern
Alaska General Seafoods	Northern Air Cargo
Big Creek Fisheries	
Copper River Seafoods	<u>Boroughs/Villages</u>
E&E Seafoods	Lake and Peninsula Borough
Ekuk Fisheries	Bristol Bay Borough
Icicle Seafoods	City of Egegik
Leader Creek Fisheries	Levelock Village Council
North Pacific Seafoods	Curyung Village Council
Ocean Beauty Seafoods	Ugashik Traditional Village
Peter Pan Seafoods	
Silver Bay Seafoods	
Trident Seafoods	

Application of Carry Forward Funds from 2017 and 2018 Contributions by Organization

In 2017, contributions to BBFC were made prior to the end of the season and knowing the actual expenditures. Actual expenditures came in under budget and excess contributions were carried over to apply to 2018 costs (\$63,962 plus BBSRI’s match of that amount). Table 4 shows how the carryover was applied to the 2018 costs, and the amounts of “new” contributions among organizations. (The BBRSDA did not have a carryover from 2017 as their contribution covered their share of the *actual* 2017 expenditures, not the forecasted expenditures.)

Table 4. Application of carry-forward funds from 2017 and resulting “new” contributions made in 2018 among organizations to raise the \$743,748 for BBFC project expenditures in 2018.

<u>Contributor</u>	Share of entire 2018 (\$)	Percent of Total	Overage from 2017 to Apply	"New"/2018 Contribution
Bristol Bay RSDA (1,860 Driftnetters)	163,270	21.84%	n/a	163,270
Processors (12)	163,270	21.84%	38,897	124,373
Others				
Bristol Bay Native Corporation	14,984	2.00%	5,984	9,000
Shippers (AML, APL, DeltaWestern)	10,937	1.46%	4,937	6,000
Bristol Bay Borough	2,992	0.40%	2,992	0
Lake and Peninsula Borough	7,992	1.07%	2,992	5,000
City of Egegik	2,992	0.40%	2,992	0
Levelock Village Council	1,496	0.20%	1,496	0
Curyung Village Council	1,496	0.20%	1,496	0
Ugashik Traditional Village	898	0.12%	898	0
Northern Air Cargo	748	0.10%	748	0
Kvichak Setnetters Association	2,699	0.36%	449	2,250
Individual fishermen	81	0.01%	81	0
Subtotal, Others	47,315	6%	25,065	22,250
Total (Processors/RSDA/Others)	373,854	50.0%		332,142
BBSRI Match	373,854	50.0%	25,065	332,142
Total \$ for 2018 Projects	747,708			

Proposed Scope and Cost of the Core Program, 2019

The Working Group will meet in January and February 2019 to review and approve the scope of the Core Program for 2019. The Working Group is considering expanding the scope of the Port Moller Test Fishery to include a second vessel for part of the 2019 season to extend the spatial (farther offshore) and temporal (from July 10 to ~July 15) coverage by the test fishery. In addition, budgets are being reexamined by ADF&G and they are exploring ways to extend the duration of counting tower projects to more fully enumerate the escapement. It is not known at this time whether this will add to the BBFC funding needs.

Pledging Support for 2019

For ADF&G to deliver the Core Program in 2019, they need pledges of support to BBFC by **mid-February**. Like last year, all such pledges of support would be contingent on no further cuts to the ADF&G budget during the 2019 legislative session. Ideally, a Cooperative

Agreement between BBSRI and ADF&G outlining the scope expected to be supported by BBFC would be executed by early March 2019 so that ADF&G can proceed with critical-path commitments to ensure deployment of projects and personnel for the 2019 salmon season should the state budget survive intact. Should outcomes from the legislative session or the new Administration be unfavorable, projects and funding via BBFC will be changed prior to the season.

Conclusions

The second year of BBFC was a success. Stakeholders via BBFC funded 28% of the total cost of managing the record 2018 Bristol Bay salmon run. The goal of BBFC to resurrect management capacity lost due to budget cuts in recent years was again met in 2018. More Fish were caught, stocks were better utilized, and important long-term datasets were maintained, all in a more coordinated manner than would have occurred without BBFC. Other highlights of this effort include the following.

- A total of \$747,708 was contributed by industry, communities, BBSRI, and other regional stakeholders. None of these funds were spent to administer BBFC; all funds will be spent on projects to assist managers with managing the fishery.
- ADF&G's Bristol Bay budget was not cut but instead expanded to include the Alagnak River counting tower and Togiak herring assessment for its fiscal year starting on July 1, 2018.
- Cost recovery test fishing was not implemented in 2018.
- The size and impacts of budget cuts on ADF&G's ability to manage the fishery are better understood among many stakeholders.
- The largest datasets on sockeye salmon productivity in the world were maintained, providing a knowledge base that provides for better preseason forecasts and evaluation of escapement goals.

The sustainability of BBFC to support a world-class fishery management system during this challenging fiscal environment will depend on continued success in rebuilding ADF&G's Bristol Bay budget and on keeping BBFC simple, transparent, and not overly burdensome to any one group of stakeholders.

Literature Cited

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Appendix A. Meeting notes from a meeting between the Commissioner of ADF&G and the BBSRI Board of Directors, February 2018.

Annual meeting of principals to the MOA between ADF&G and BBSRI, Bristol Bay Fisheries Collaborative, Feb. 22, 2018

Meeting notes from a teleconference among people in Anchorage, Dillingham, Juneau.

ADF&G: Commissioner Sam Cotten, Director Scott Kelley, Regional Supervisor Bert Lewis, Research Coordinator Jack Erickson, Management Coordinator Aaron Poetter

BBSRI: Chairman Robin Samuelsen; Directors: Ted Angasan, Robert Heyano, Hattie Albecker, Gerda Kosbruk, MaryAnn Johnson, Victor Seybert. Staff: Michael Link (Exec. Dir.), Jeff Regnart (Tech. Advisor)

BBEDC: Norm Van Vactor (CEO), Helen Smeaton (COO), Gary Cline (Reg. Fish. Dir.), Chris Napoli (CAO)

This annual meeting stems from the BBFC MOA, in part, it specifies:

“...5. Meetings between the Parties Leadership’, the BBSRI Board of Directors (or its designate) and the Commissioner of ADF&G (or his/her designate) will be held at least annually to review the agreement, the Work Group performance and appointees, and discuss, identify, and coordinate the various activities pursuant to this MOA, or to discuss, identify and coordinate future opportunities that fall within the area of common benefits and interests.”

Topics discussed

Process

- The four-person Working Group functions well. BBSRI recommended not increasing its size any.
- HQ representation on the WG is valuable/essential – i.e. the Director
 - Commissioner can be more readily/easily kept in the loop
 - Several topics associated with BBFC that are of HQ interest
 - Cost-recovery fishing/receipt authority
 - Interaction with the Legislative budget process
- The BBFC process has been labor intensive for the parties and the initial high level has not abated as quickly as was hoped, especially pertaining to engagement/solicitation of funding from a wide range of players. *Signs on the horizon this may improve.*
 - The current fund-raising goal for salmon and herring (\$876k) is at the limits of sustainability; annual increments to the State’s budget of \$75-100k have huge positive impact on the sustainability of stakeholder funding.

- Provides a demonstration of progress to address concern this could become a permanent tax
- With little progress in this area, interest and contributions will likely wane in the future.
- Aspect of process to clarify – in the event a shortfall in funds for the Core Program is encountered due to insufficient stakeholder commitments, it is the *Working Group* that specifies 1) the scope of projects supported by funds raised (i.e., which projects could be dropped), and 2) the level of alternative fund raising to attempt in place of shortfalls in pledges (e.g., via cost recovery fishing or other sources). Of course, ADF&G/the State has to approve/sanction cost recovery fishing and the WG can only identify/recommend levels to pursue. *Agreed.*

Planning, clarifying a position on Core Program, and future opportunities

- BBSRI sought clarification/confirmation – ADF&G’s perspective on the Core Program - does it believe that it these components belong in the operating budget? *Yes.*
- We had considered a legislative tour in 2017 among BBSRI/SOA/Processors to help engage some key legislators on the magnitude of the fishery, the benefit:cost ratio of money spent on the Core Program, etc. The legislature was too occupied in 2017. Should we consider doing this in 2018? What are the Commissioner’s and others’ thoughts?
 - *These sorts of things can be helpful.*
 - *BBSRI should (again) first talk with legislative delegation (Hoffman, Edgmon) about possibility and potential invitees.*
 - *Being an election year might add some complexity to such an effort.*
 - *BBSRI to approach the legislative delegation for additional thoughts.*

Funding in 2019

- Are there things BBSRI can do about FYE20 in coming 9 months, and prior to the Governor’s budget release in December 2018?
 - *BBSRI could consider a letter to OMB raising the awareness about BBFC and the need for ongoing rebuilding the state budget to ensure continued success. Regnart, Link, Kelley can follow up on some ideas.*

Appendix B. BBFC Project Results in 2018.

ADF&G compiles a thorough summary of its management, including results of monitoring activities, for the Bristol Bay salmon and herring fisheries in its Bristol Bay Area Management Reports (AMRs), which are available online⁴. This appendix is not intended to replicate to any extent the type of information contained within the 2018 AMR (Salamone et al., in prep). The purpose of project summaries below is to provide the scope of effort to support the financial expenditures via BBFC.

Port Moller Test Fishery (PMTF)

Methods and results from the Port Moller Test Fishery are provided in the annual report (Raborn and Link 2018)⁵. The executive summary from the report is provided here.

In 2018, the PMTF operated from June 10 to July 11 and caught 3,104 sockeye salmon. For the first time in the history of the project a second vessel, the F/V *Icelander*, fished outer stations (as far out as Station 24 on some days) during June 15-22. This narrow glimpse of the portion of fish migrating offshore of stations fished historically provided key information and motivation for sampling further offshore in 2018 with the R/V *Pandalus* from June 23 onward. The greater test fishing coverage across stations provided fishery managers and industry with a clearer and more accurate picture of the developing run. Industry responded by better positioning its assets in the path of arriving fish, thus providing a larger harvest than would have occurred without a second-vessel effort.

Using a second vessel in 2018 to sample the entirety of the test fishing transect even for a few days confirmed that a second mode of fish were migrating offshore. This information was unknowable based on historical data and could not have been modeled if only Stations 2-10 or even Stations 2-12 had been fished, which would likely have happened based the standard decision rule for adaptive sampling. Not even fishing out to Station 14 would have produced the peak catch on multiple days.

The discovery of a large second mode of fish migrating past Port Moller further offshore calls into question the comparison of PMTF results across years. The bimodal nature of the catch indices across the fishing transect observed in 2018 demonstrated that if the test fishery continues to rely solely on adaptive sampling and modeling the outer “tail” with a single vessel, then a biased depiction of run development may result. Some of the tails in past years were likely the beginning of modes beyond the stations fished.

The 2018 run was the largest inshore run on record coming in at 62.3 million (similar but likely larger than the 1980 run), and run timing was estimated to be 3-4 days late. The magnitude and lateness of the 2018 run was similar to those from recent years (2015-2017), although the stock composition differed substantially. This year, an unprecedented 33.5 million fish returned to the Nushagak District.

The run forecasts by district released on July 7 (Interpretation #4) proved to be more or less

⁴ <http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.salmon#management>

⁵ Available: www.bbsri.org/port-moller-test-fishery

accurate. The run was projected to build inshore through July 12 and begin tapering on July 13-14; the run turned out to reach its crescendo on July 11 before declining on July 12. Again, using catches from the outer stations increased accuracy of the inshore pattern predicted from Port Moller. Likewise, the seasonal trend in stock composition estimates from Port Moller aligned reasonably well with those based on catch and escapement lagged backwards to the test fishery.

In-river Test Fisheries on the Egegik, Kvichak, and Ugashik rivers

All three test fisheries are operated in a similar manner and have been for ~50 years. Two-person crews set 25-fathom gillnets from a skiff for soak times of 5 to 15 minutes duration daily at the same stage of the two tides. Catches and effort is used to compute test indices for each tide that are standardized into units of “fish per 100 fathom hours”, which can be thought of as the estimated number of fish that would have been captured if the net had fished similarly well for one hour. Managers compare daily test indices to current-year observations: 1) the number of fish above the test fishery as observed from aerial surveys, and 2) the number of fish observed at upstream counting towers 2-6 days later. From these relationships, managers can use the information from in-river test fisheries to estimate the number of fish upstream of the fishing district and the downstream of the counting towers (i.e., “Estimated River Fish”, or ERF).

Egegik In-river Test operated near Wolverine Creek, approximately 2 miles above the commercial district, from June 18 to July 11. A total of 184 sets were made and 1,963 fish captured in 2018.

The travel time for fish from the Egegik fishing district to the counting tower is 1-3 days. This travel time and sometimes very large movements of fish into Egegik River on a single tide or day makes the information from the in-river test fishery a critical piece of information for prosecuting the fishery and meeting the escapement goal. In 2018, the Egegik ERF peaked on July 5-6 with an estimated 120,000 fish between the district and the counting tower (Figure B-1). Figure B-2 gives a sense how few fish were entering the Egegik River in late June despite what was a good overall return, and the rapid change in detected by the test fishery (Figure B-1) compared to the recent average entry pattern. The annual management report provides details on how the fishery was prosecuted in response to this challenging entry pattern.

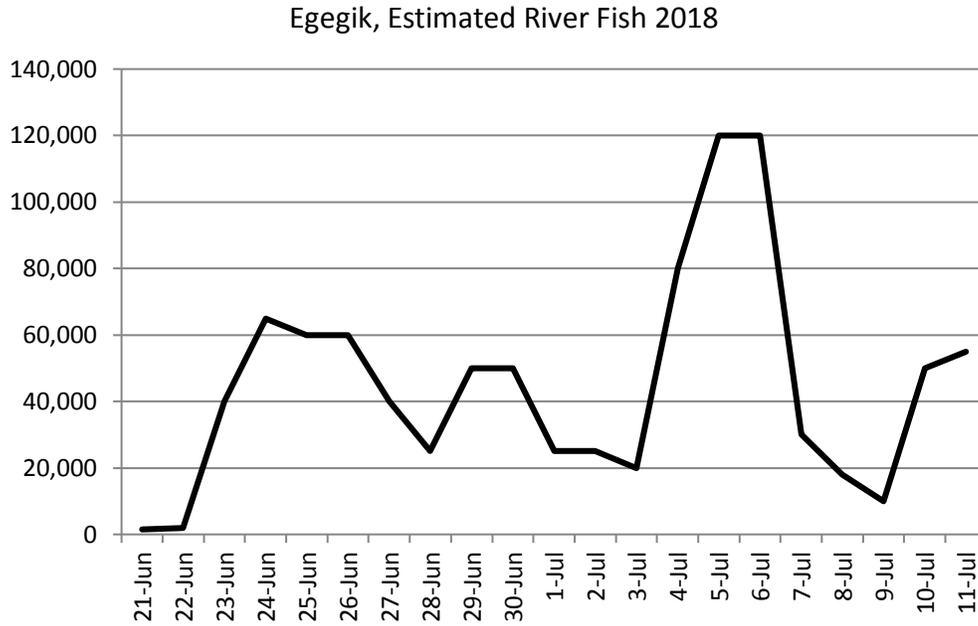


Figure B-1. Daily Estimated River Fish in the Egegik River in 2018 based on the in-river test fishery funded by BBFC.

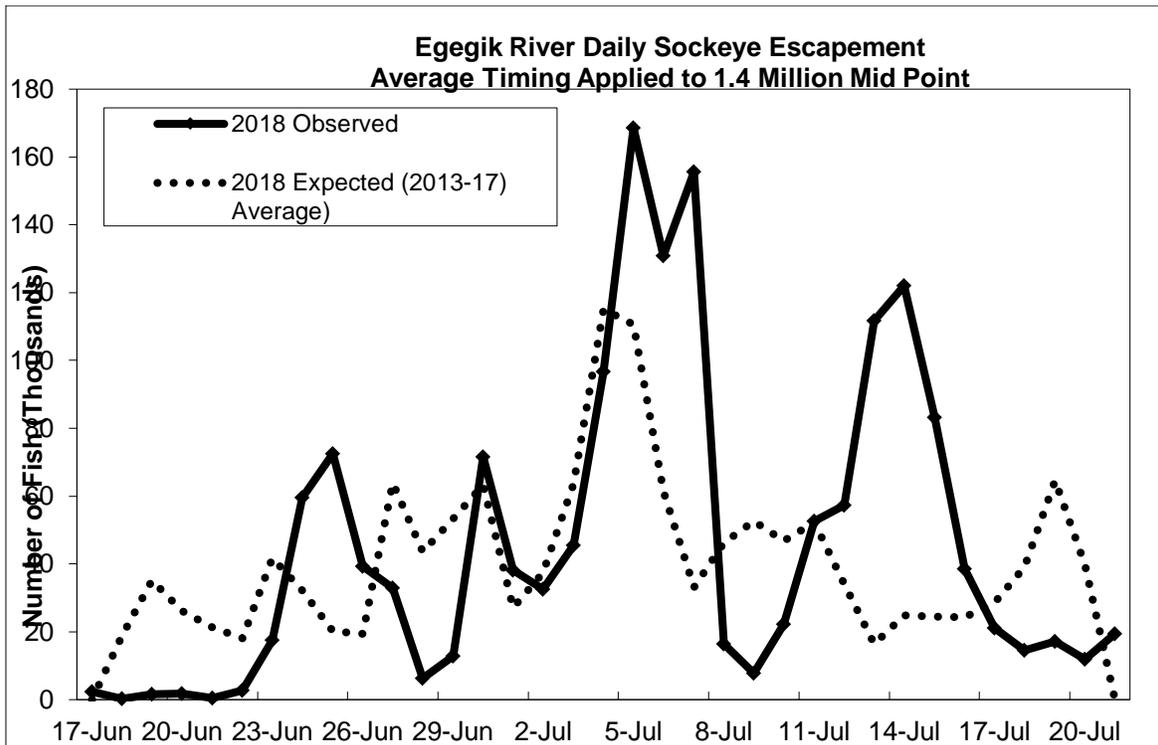


Figure B-2. Daily Egegik River escapement at the tower compared to a recent average run timing applied to the recent 5-year escapement timing.

Ugashik In-river Test operated at the usual site approximately 4 miles upstream from Ugashik Village from June 24 to July 17. A total of 191 sets were made and 1,936 fish captured. The travel time for fish from the Ugashik fishing district to the counting tower is 3-7 days. In 2018, the Ugashik ERF peaked on July 13 with an estimated 250,000 fish between the district and the counting tower (Figure B-3). The time delay from the commercial fishing district to the counting tower makes the information from the in-river test fishery one of the major factors in how fishing was permitted in the Ugashik District in 2018.

As in all years, the insight provided by this project in 2018 was important because it allowed the manager to evaluate the results from the fishing district on a tide-by-tide basis, which allowed the manager to react to fish moving into the river well before the fish reached the counting tower near the outlet of Ugashik Lake 3-7 days later. The ERF was near zero until July 3, at which point there was a major movement of fish into the river (Figure B-3). Fishing time in the district was expanded in a much timelier manner than if the manager had to rely on the tower counts alone. This information provided higher catches and the escapement goal was better met in 2018 than had it not been available.

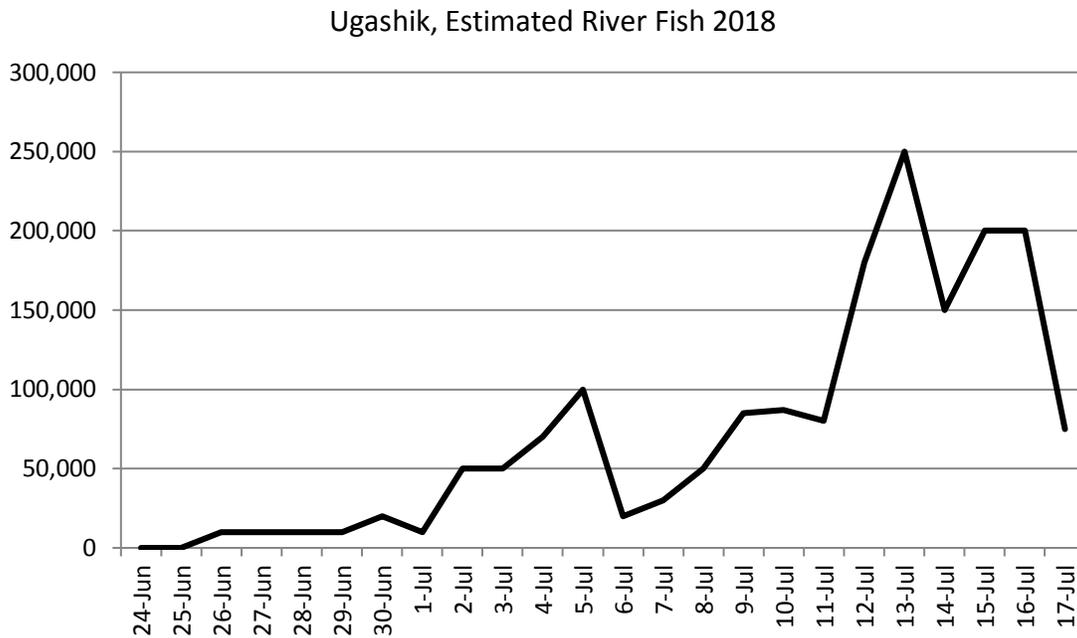


Figure B-3. Daily Estimated River Fish in the Ugashik River in 2018 based on the in-river test fishery funded by BBFC.

Kvichak In-river Test operated 0.5 miles below the Village of Levelock from June 22 to July 16. A total of 190 sets were made and 2,179 sockeye salmon were captured. Due to late run timing in 2018, catches in the test fishery were essentially zero until July 2. Travel time from the test fishery to the counting tower ranges from 1-3 days. In 2018, the Kvichak ERF peaked on July 15 with an estimated 750,000 fish between the district and the counting tower (Figure B-4). Results from the test fishery were used to inform decisions on the use of the Naknek River

Special Harvest Area (NRSHA, Figure B-4). Test fish results through July 5 indicated that was unlikely that the Kvichak River escapement goal would be met so the fishery was moved into the NRSHA on July 7. On July 12 the ERF was 600,000 fish which indicated that escapement goal would be met, and the fishery was moved back into the main district based on this information. This was two days earlier than would have been possible without the project.

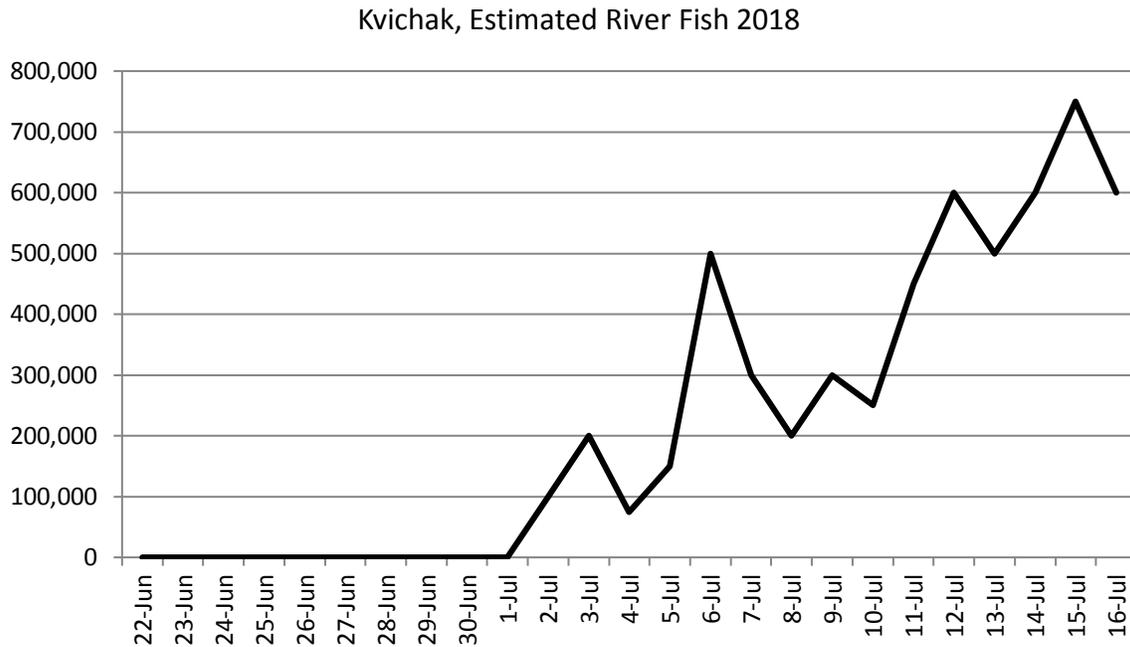


Figure B-4. Daily Estimated River Fish in the Kvichak River in 2018 based on the in-river test fishery funded by the BBFC.

Nushagak Sonar

The Nushagak River sonar has operated near Portage Creek since 1980⁶. In 2018, the 6-person field crew began their season on June 1 and commenced estimating the Nushagak River daily escapement on June 7. This season, project operations were extended past the July 20 end date until August 17 to estimate pink and Coho salmon escapement. Daily drift gillnet sampling was used to apportion raw sonar counts into daily estimates of sockeye, Chinook, chum, pink and Coho salmon (Table B-1). Combined across all species, 2.9 million salmon were estimated to have passed the Nushagak River sonar site in 2018.

The Nushagak River sonar counts are an integral part of the Nushagak District salmon management program. Managers depend on the daily counts and use them to inform management decisions daily. Sonar counts allow managers to make decisions that protect vulnerable stocks and provide fishing opportunity as appropriate to achieve escapement goals for all salmon species being monitored on the Nushagak River.

⁶ http://www.adfg.alaska.gov/index.cfm?adfg=sonar.site_info&site=8

Table B-1. Daily and cumulative escapement at the Portage Creek sonar site on the Nushagak River in 2018.

Date	Chinook		Chum		Sockeye		Coho		Pink	
	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum
7-Jun	35	35	316	316	47	47	0	0	0	0
8-Jun	53	88	592	908	85	132	0	0	0	0
9-Jun	29	117	314	1,222	450	582	0	0	0	0
10-Jun	47	164	441	1,663	424	1,006	0	0	0	0
11-Jun	17	181	149	1,812	368	1,374	0	0	0	0
12-Jun	131	312	203	2,015	452	1,826	0	0	0	0
13-Jun	335	647	719	2,734	1,304	3,130	0	0	0	0
14-Jun	2,759	3,406	7,516	10,250	1,977	5,107	0	0	0	0
15-Jun	4,266	7,672	13,914	24,164	3,942	9,049	0	0	0	0
16-Jun	2,256	9,928	7,913	32,077	1,651	10,700	0	0	0	0
17-Jun	4,419	14,347	26,149	58,226	6,117	16,817	0	0	0	0
18-Jun	3,812	18,159	6,486	64,712	5,819	22,636	0	0	0	0
19-Jun	7,509	25,668	35,338	100,050	11,431	34,067	0	0	0	0
20-Jun	6,630	32,298	27,270	127,320	11,885	45,952	0	0	0	0
21-Jun	4,707	37,005	31,254	158,574	18,526	64,478	0	0	0	0
22-Jun	3,157	40,162	23,009	181,583	11,744	76,222	0	0	0	0
23-Jun	3,017	43,179	18,998	200,581	6,623	82,845	0	0	0	0
24-Jun	1,874	45,053	14,931	215,512	3,523	86,368	0	0	0	0
25-Jun	2,490	47,543	16,663	232,175	13,385	99,753	0	0	0	0
26-Jun	5,665	53,208	35,114	267,289	15,873	115,626	0	0	0	0
27-Jun	4,185	57,393	40,131	307,420	14,510	130,136	0	0	0	0
28-Jun	2,977	60,370	17,182	324,602	18,735	148,871	0	0	0	0
29-Jun	1,691	62,061	8,824	333,426	16,635	165,506	0	0	0	0
30-Jun	979	63,040	18,440	351,866	18,452	183,958	0	0	0	0
1-Jul	677	63,717	28,670	380,536	8,550	192,508	0	0	0	0
2-Jul	5,179	68,896	41,357	421,893	70,392	262,900	0	0	0	0
3-Jul	2,266	71,162	43,860	465,753	120,591	383,491	0	0	0	0
4-Jul	2,579	73,741	26,753	492,506	32,055	415,546	0	0	0	0
5-Jul	1,357	75,098	8,410	500,916	52,002	467,548	0	0	0	0
6-Jul	1,772	76,870	19,541	520,457	51,053	518,601	0	0	0	0
7-Jul	1,043	77,913	23,564	544,021	40,487	559,088	0	0	0	0
8-Jul	982	78,895	9,077	553,098	46,617	605,705	0	0	0	0
9-Jul	1,104	79,999	16,816	569,914	45,298	651,003	0	0	0	0
10-Jul	2,144	82,143	14,379	584,293	47,202	698,205	0	0	0	0
11-Jul	2,002	84,145	17,898	602,191	37,307	735,512	0	0	0	0
12-Jul	689	84,834	22,044	624,235	69,006	804,518	0	0	0	0
13-Jul	1,141	85,975	30,292	654,527	71,921	876,439	0	0	0	0
14-Jul	1,073	87,048	15,005	669,532	45,206	921,645	0	0	0	0
15-Jul	154	87,202	16,804	686,336	47,573	969,218	0	0	0	0

Table B-1. Continued.

Date	Chinook		Chum		Sockeye		Coho		Pink	
	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum	Daily	Cum
16-Jul	0	87,202	13,230	699,566	22,747	991,965	79	79	0	0
17-Jul	909	88,111	9,235	708,801	18,720	1,010,685	0	79	0	0
18-Jul	665	88,776	7,536	716,337	19,855	1,030,540	0	79	0	0
19-Jul	433	89,209	9,098	725,435	19,023	1,049,563	0	79	0	0
20-Jul	369	89,578	10,193	735,628	13,036	1,062,599	0	79	0	0
21-Jul	488	90,066	5,769	741,397	11,569	1,074,168	0	79	1,085	1,085
22-Jul	530	90,596	15,336	756,733	27,396	1,101,564	0	79	2,685	3,770
23-Jul	1,239	91,835	8,175	764,908	15,445	1,117,009	1,169	1,248	0	3,770
24-Jul	381	92,216	4,959	769,867	13,535	1,130,544	0	1,248	0	3,770
25-Jul	444	92,660	4,326	774,193	3,361	1,133,905	0	1,248	14,675	18,445
26-Jul	685	93,345	2,416	776,609	5,849	1,139,754	613	1,861	19,275	37,720
27-Jul	74	93,419	2,824	779,433	14,442	1,154,196	554	2,415	13,867	51,587
28-Jul	134	93,553	4,390	783,823	10,505	1,164,701	3,386	5,801	40,241	91,828
29-Jul	273	93,826	2,486	786,309	18,517	1,183,218	6,118	11,919	36,356	128,184
30-Jul	608	94,434	4,033	790,342	12,101	1,195,319	9,095	21,014	67,151	195,335
31-Jul	1,173	95,607	3,555	793,897	11,424	1,206,743	5,753	26,767	44,821	240,156
1-Aug	150	95,757	4,850	798,747	13,842	1,220,585	2,922	29,689	45,459	285,615
2-Aug	230	95,987	3,327	802,074	7,025	1,227,610	2,657	32,346	29,296	314,911
3-Aug	435	96,422	522	802,596	5,251	1,232,861	2,056	34,402	19,780	334,691
4-Aug	166	96,588	1,341	803,937	1,937	1,234,798	1,096	35,498	33,297	367,988
5-Aug	0	96,588	1,063	805,000	1,550	1,236,348	1,052	36,550	49,735	417,723
6-Aug	0	96,588	2,305	807,305	1,522	1,237,870	7,072	43,622	73,311	491,034
7-Aug	0	96,588	1,840	809,145	3,402	1,241,272	18,579	62,201	43,160	534,194
8-Aug	0	96,588	487	809,632	768	1,242,040	7,348	69,549	13,916	548,110
9-Aug	244	96,832	223	809,855	2,498	1,244,538	3,658	73,207	8,519	556,629
10-Aug	97	96,929	11	809,866	10	1,244,548	689	73,896	8,492	565,121
11-Aug	92	97,021	29	809,895	783	1,245,331	968	74,864	6,504	571,625
12-Aug	130	97,151	478	810,373	802	1,246,133	2,948	77,812	6,062	577,687
13-Aug	0	97,151	234	810,607	341	1,246,474	12,505	90,317	21,987	599,674
14-Aug	0	97,151	378	810,985	364	1,246,838	15,805	106,122	8,817	608,491
15-Aug	56	97,207	298	811,283	295	1,247,133	3,330	109,452	6,622	615,113
16-Aug	19	97,226	0	811,283	200	1,247,333	1,232	110,684	7,886	622,999
17-Aug	13	97,239	0	811,283	127	1,247,460	771	111,455	5,070	628,069

District Catch Sampling

In 2018 a total of 34,749 fish were sampled for age (scales), length, and sex from Bristol Bay commercial harvest (Table B-2). The catch sampling crew consisted of three catch samplers in King Salmon, two in Dillingham, and one in Togiak. In addition, two scale agers stationed in King Salmon aged salmon scales collected from the commercial fishery and the escapement monitoring projects in 2018. These data are used to determine the age-specific harvest by stock in each district. That information is integral to building brood tables used in annual

preseason forecasts, escapement goal evaluations, and monitoring changes in freshwater and marine productivity over time.

Table B-2. Summary of the numbers of fish sampled in the Bristol Bay commercial fishing districts in 2018.

Fishing District	Number of Fish Sampled
Ugashik	3,427
Egegik	5,167
Naknek-Kvichak	9,282
Nushagak	13,279
Togiak	3,594
Total	34,749

Aerial Surveys of the Naknek, Kvichak, and Alagnak watersheds

Aerial surveys of spawning grounds in the Naknek, Kvichak, and Alagnak watersheds were conducted August 9–10 and August 27–28, 2018. Twenty-eight hours of flight time were used to conduct the surveys. Surveys were timed to coincide with peak spawning periods. Escapement surveys provide indices that are used to assess spawning distribution to individual tributaries and unique habitats. These indices go into historical data sets for each watershed (the dataset for Kvichak pre-dates statehood). Surveys also provide managers with visual of spawning densities throughout each watershed and the ability to see variability of production within and among these three major watersheds.

In 2018, approximately 740,000 sockeye salmon were observed in the Kvichak drainage, which was 17 percent of the estimated tower escapement of 4,398,708. Approximately 340,000 sockeye salmon were observed in the Naknek drainage, which was 15% of the estimated tower escapement of 2,221,152. Approximately 375,000 sockeye salmon were observed in the Alagnak drainage, which was 24% of the observed tower escapement of 1,581,426. The percentages of observed escapements in the aerial surveys compared to the tower counts were similar to previous years for each drainage.

Management Trainee

A BBFC-supported entry level Biologist position was added to area staff to assist with project operations on the East side of Bristol Bay. A Fish Biologist I (FB I) was hired and started on May 1. This FB I assisted with pre-season logistics in Anchorage before transitioning out to King Salmon on June 1. During the fishing season the FB I was responsible for overseeing the operation of the three East Side in river test fish projects. In addition, the FB I was trained in the day to day operations in the King Salmon office. After the fishing season, the FB I coordinated the breakdown of field camps, assisted with motor and boat maintenance, and preliminary data analysis until their season ended on August 31. This position was identified as part of the Core Program in 2017 but went unfilled due to the lateness of BBFC's implementation that year.