

Kuskokwim River Salmon Management Working Group

1 (800) 315-6338 (MEET) Code: 58756# (KUSKO)

ADF&G Bethel toll free: 1 (855) 933-2433

Meeting Agenda

Date: 06/27/2018

Time: 10:00 a.m.

Place: Bethel

Time Called to Order:

Chair: Alissa Rogers

ROLL CALL TO ESTABLISH QUORUM:

Upriver Elder:
Downriver Elder:
Commercial Fisher:
Lower River Subsistence:
Middle River Subsistence:
Upper River Subsistence:
Headwaters Subsistence:

QUORUM MET? Yes / No

Processor:
Member at Large:
Sport Fisher:
Western Interior RAC:
Y-K Delta RAC:
KRITFC:
ADF&G:

INTRODUCTIONS:

INVOCATION:

APPROVAL OF AGENDA: *the agenda may be amended at this time.*

APPROVAL OF MINUTES: *Optional. ADF&G does not prepare official meeting minutes.*

USFWS/KRITFC UPDATE:

ADF&G MANAGEMENT ACTIONS UNDER CONSIDERATION:

PEOPLE TO BE HEARD:

CONTINUING BUSINESS:

- Subsistence Reports: Lowest River, OTNC Inseason Subsistence Report, Lower River, Middle River, Upper River, Headwaters
- Overview of Kuskokwim River salmon run assessment:
 - a. Test Fisheries (Bethel and Aniak):
 - b. Sonar/Weirs/Aerial Surveys/Other:
 - c. Subsistence Division Project Update:
 - d. NVN Project Update:
- Commercial Catch Report: N/A
- Processor Report: N/A
- Sport Fish Report:
- Intercept Fishery Report: *optional*
- Weather Forecast:
- Discussion of ADF&G Management considerations and discussion of possible alternatives (recommendations from the Working Group):
- Motion for Discussion and Action:

OLD BUSINESS:

NEW BUSINESS:

COMMENTS FROM WORKING GROUP MEMBERS:

NEXT MEETING DATE: _____ **Time:** _____ **Place:** _____

Informational Packet

Information Packets *ARE*:

- **Intended to help inform Working Group discussions.**
- **To be viewed and used in context with Working Group meetings only.**

Packets *ARE NOT*:

- **To be viewed as standalone documents.**
- **A final say on fisheries management decisions.**

Please use this information responsibly:

Packet information is an incomplete snapshot of an ongoing discussion and changing conditions. Packet information should not be reproduced for any purpose other than to describe Working Group meeting discussions.

Misuse of Packet information can contribute to misunderstandings that can **cause harm to salmon users** and potentially **damage salmon resources**.

Ask Questions: ADF&G staff will be happy to answer biology and management questions. Please call **1-855-933-2433** to reach ADF&G Kuskokwim Area staff.

Attend Meetings: Each Working Group meeting is announced at least 48 hours prior to time and date of meeting. In addition, each meeting is recorded. Recordings can be found here:
http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyarea_kuskokwim.kswg

Viewing the information packet while listening to meetings/recordings will provide a better understanding of the information presented in this packet.

Thank you.
Jennifer Peeks
Aaron Tiernan
Working Group Coordinators

Informational Packet

Orutsararmiut Traditional Native Council (OTNC) Inseason Harvest Monitoring Weekly Report

June 27, 2018

Summary of Interview Activities

OTNC conducted surveys with 46 fish camps from Sunday, June 24 through Monday, June 25, 2018. Overall, people seemed happy at fish camps and our fisheries crew noticed many fish racks at occupied fish camps were beginning to fill up or already completely filled with fish. Five fish camps commented on the abundance of fish this season, with one fish camp respondent claiming he/she hasn't seen this many large Chinook salmon in over 10 years. Two fish camp respondents were surprised about the abundance of Chinook salmon this late in June and were grateful. Six fish camps commented on the regulations, two of which did not agree with the Sunday opener and one fish camp respondent claimed the 12 hour opener is "harassment." We also received one report of chum salmon chucking in which the respondent claimed non-local fishermen were chucking chum salmon catch back in the water and only keeping the larger Chinook salmon. A group of fish camps were confused about the regulations and thought the entire river was open 24-7 as of Tuesday, June 26. One fish camp recommended conducting law enforcement in the late night and early morning. Four fish camps reported becoming closer to achieving their goals as a result of fishing in the non-spawning salmon tributaries. One recommended monitoring the harvest occurring in nearby non-spawning salmon tributaries due to the higher number of nets he/she observed when fishing on the main Kuskokwim was closed. This life-long fisher hadn't observed this much effort prior to this summer.

Chinook Salmon ASL (Age-Sex-Length) Sampling Program

We recruited one more ASL sampler this past week, bringing our total recruitment to 29 ASL samplers.

Fish Distribution

As of June 24, we've distributed 193 Chinook salmon, 59 chum salmon and 18 sockeye salmon to Bethel elders, disabled and widows caught from the ADFG Bethel Test Fishery. KRITFC assisted with distribution on three separate occasions and YDNWR distributed fish to Kasigluk and Atmautluak.

Harvest Summary

June 24, 2018 Opener

We collected data from 28 unique fishing trips. Most fishing trips (n=25) occurred from Napaskiak to Akiachak.

Table 1. Gear type, mesh size range and soak time reported from June 24 fishing opener.

Total Drift Nets	Total Set Nets	Mesh Size Range	Average Soak Time (hours)
25	3	5.5"-6"	2.3 hours

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Table 2. Average number of salmon harvested by surveyed fish camps from June 24 fishing opener.

Average Chinook Salmon Harvest	Average Chum Salmon Harvest	Average Sockeye Salmon Harvest	Average other harvest
12	11.7	3.7	<1

Fishing Progress Data

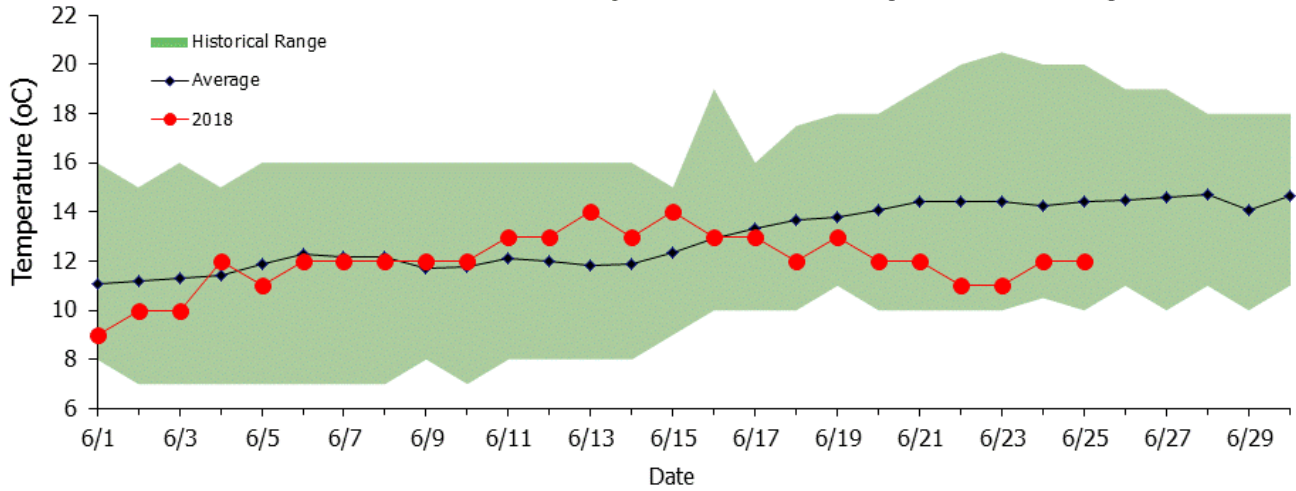
This past survey period, we asked fish camps the following question: “How close are you to achieving your Chinook salmon, chum salmon and sockeye salmon harvest goals?” 30 fish camps had responses for their Chinook salmon fishing progress and 29 fish camps had responses for their chum salmon and sockeye salmon fishing progress. Those that did not respond to this question had no specific goal for salmon and “get as many as they can.”

Table 3. Fishing progress by fish camp users for Chinook salmon, chum salmon and sockeye salmon following the June 24 opener.

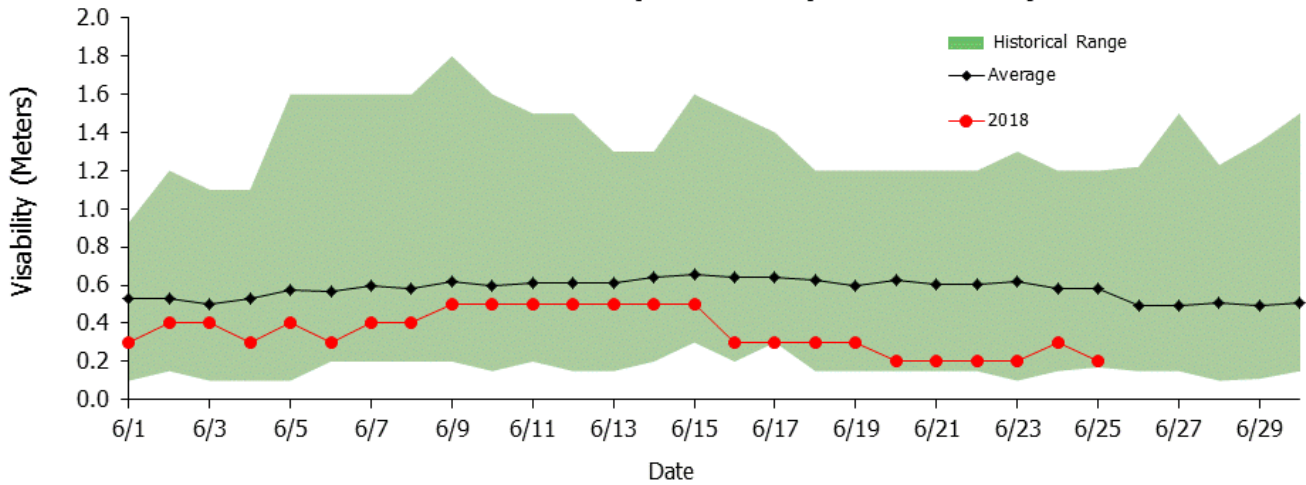
Salmon Species	Not at all	Under Half	Halfway	Over Half	Goal Met
Chinook salmon	23.3% (n=7)	30% (n=9)	16.7% (n=5)	16.7% (n=5)	13.3% (n=4)
Chum salmon	20.7% (n=6)	24.1% (n=7)	17.2% (n=5)	10.3% (n=3)	27.6% (n=8)
Sockeye salmon	48.3% (n=14)	24.1% (n=7)	10.3% (n=3)	10.3% (n=3)	6.9% (n=2)

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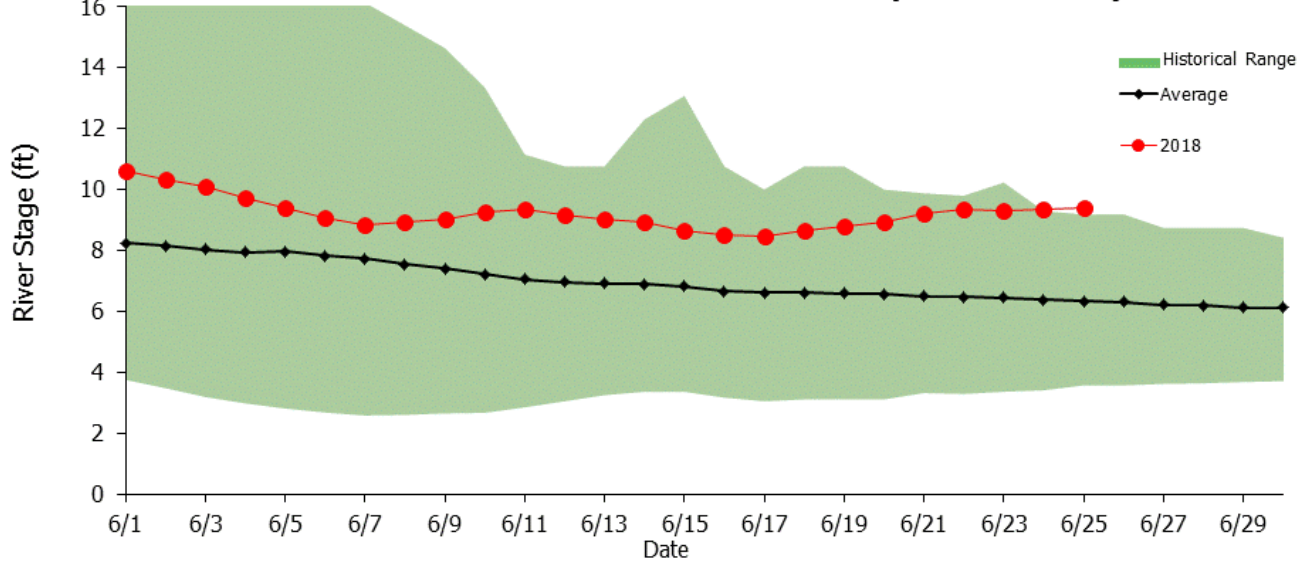
Historical Water Temperature at BTF Site (1984 to Present)



Historical Water Clarity at BTF site (1984 to Present)



Kuskokwim River Water Level at Crooked Creek (1984 to Present)



Informational Packet

Kuskokwim River Salmon Assessment Update

6/25/2018



This document presents the key assessment information considered by managers in-season. The production of this document is a collaborative effort between USFWS and ADF&G. **All data and analyses contained are preliminary and are subject to change, so please make interpretations carefully.**

If you have any questions about the content, please contact Ben Staton (USFWS; benjamin_staton@fws.gov) or Nick Smith (ADF&G; nick.smith@alaska.gov).

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Abbreviations:

- BTF: Bethel Test Fishery
- ATF: Aniak Test Fishery
- CPUE: Catch-per-unit-effort
- EOS: End-of-Season
- ADF&G: Alaska Department of Fish and Game
- KRITFC: Kuskokwim River Inter-tribal Fish Commission
- OTNC: Orutsaramiut Traditional Native Council
- USFWS: United States Fish and Wildlife Service
- YDNWR: Yukon Delta National Wildlife Refuge

To view escapement information, please visit the ADF&G Kuskokwim River Fish Counts page:

- <http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareakuskokwim.salmon#fishcounts>

For the most up-to-date information regarding fishing opportunities please visit:

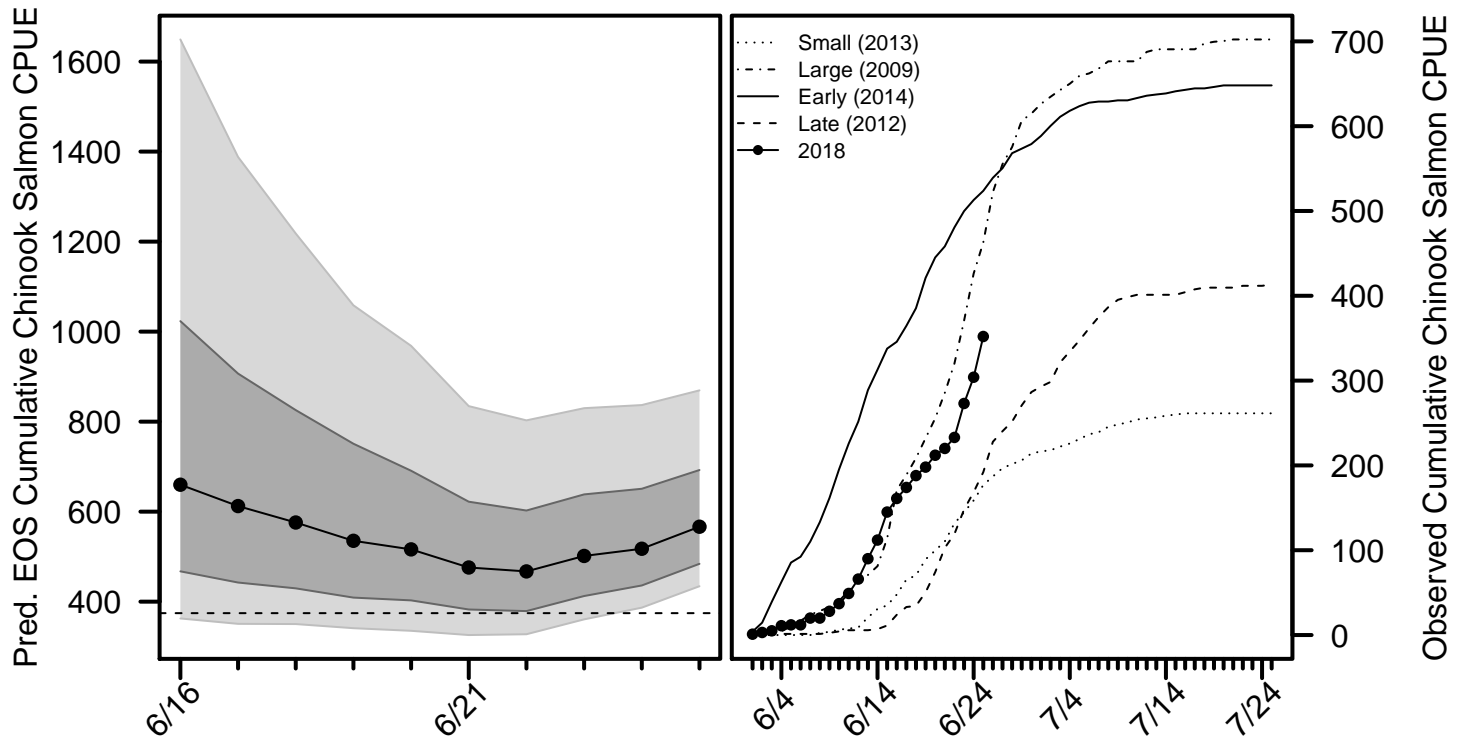
- USFWS: https://www.fws.gov/refuge/yukon_delta/wildlife_and_habitat/dailyupdate.html
- ADF&G: <http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main>

Informational Packet

Chinook Salmon BTF Summary (6/25)

- The BTF daily CPUE was **48**.
- The BTF cumulative CPUE is now **352**.
- **70%** years since 2008 fell below this cumulative CPUE on this date.
- **62%** of the run is complete based on historical average run timing.
- **51% - 73%** of the run is complete based the central 50% of all historical run timing scenarios.
- **13% - 18%** of the run is expected to pass Bethel in the next 5 days.
- Over the last 3 days, Chinook salmon made up **21%** of the BTF catches, compared to **10%** on average.

Chinook Salmon Figure 1. *Left:* predicted cumulative EOS BTF CPUE according to various run timing scenarios: central 80% (light grey band), central 50% (dark grey band), and the historical median (circles). The dashed horizontal line shows the EOS value from 2017. *Right:* The cumulative BTF CPUE from 2018 plotted along with four previous years intended to represent a range of early/late and small/large index values.



For more detailed information, see the [Chinook salmon appendix](#) at the end of this document.

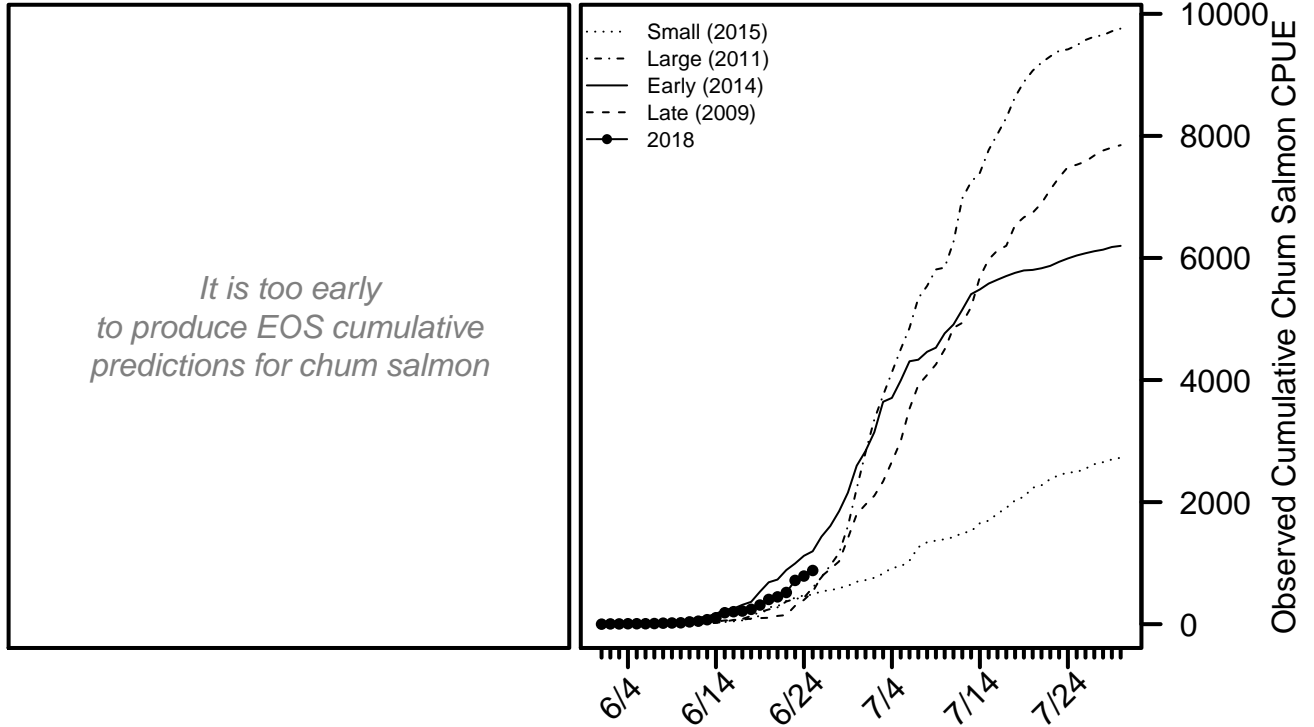
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Chum Salmon BTF Summary (6/25)

- The BTF daily CPUE was **91**.
- The BTF cumulative CPUE is now **879**.
- **70%** years since 2008 fell below this cumulative CPUE on this date.
- **16%** of the run is complete based on historical average run timing.
- **9% - 26%** of the run is complete based the central 50% of all historical run timing scenarios.
- **14% - 17%** of the run is expected to pass Bethel in the next 5 days.
- Over the last 3 days, chum salmon made up **65%** of the BTF catches, compared to **54%** on average.

Chum Salmon Figure 1. *Left:* will show predicted cumulative EOS BTF CPUE according to various run timing scenarios when enough data have been collected. *Right:* The cumulative BTF CPUE from 2018 plotted along with four previous years intended to represent a range of early/late and small/large index values.



For more detailed information, see the [chum salmon appendix](#) at the end of this document.

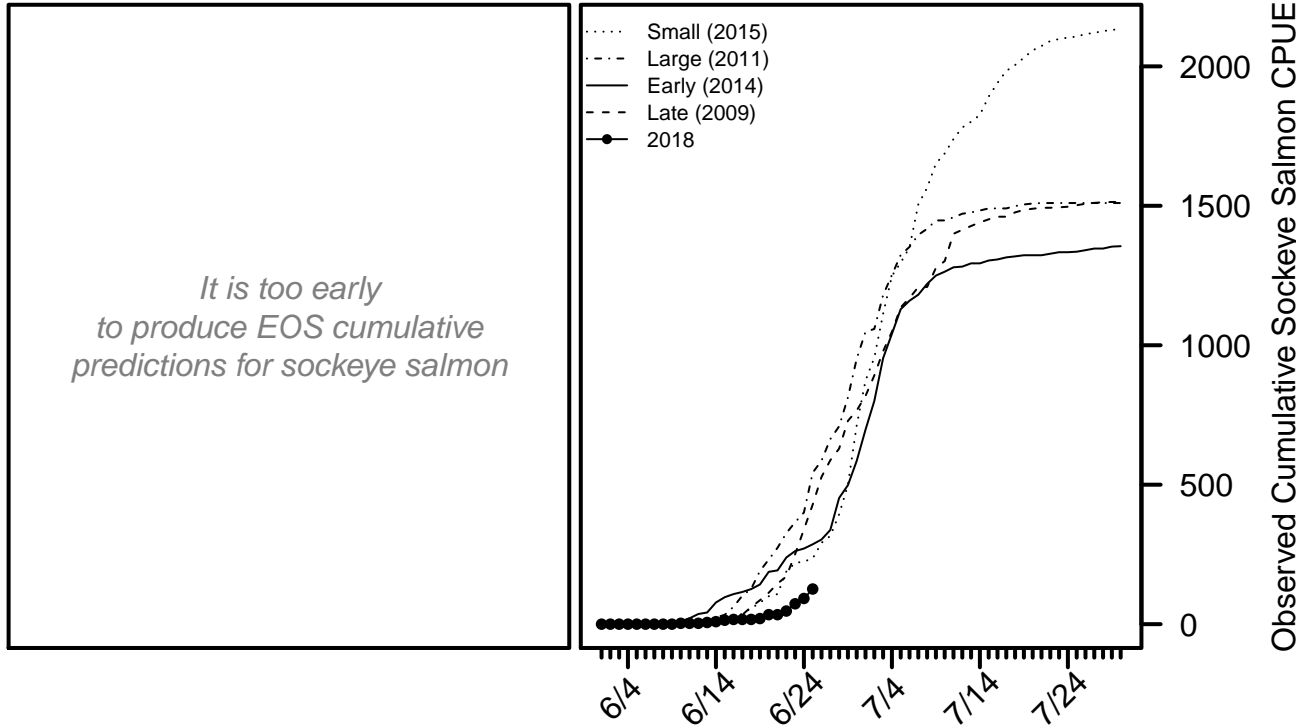
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Sockeye Salmon BTF Summary (6/25)

- The BTF daily CPUE was **34**.
- The BTF cumulative CPUE is now **126**.
- **0%** years since 2008 fell below this cumulative CPUE on this date.
- **34%** of the run is complete based on historical average run timing.
- **23% - 47%** of the run is complete based the central 50% of all historical run timing scenarios.
- **22% - 25%** of the run is expected to pass Bethel in the next 5 days.
- Over the last 3 days, sockeye salmon made up **14%** of the BTF catches, compared to **36%** on average.

Sockeye Salmon Figure 1. *Left:* will show predicted cumulative EOS BTF CPUE according to various run timing scenarios when enough data have been collected. *Right:* The cumulative BTF CPUE from 2018 plotted along with four previous years intended to represent a range of early/late and small/large index values.



For more detailed information, see the [sockeye salmon appendix](#) at the end of this document.

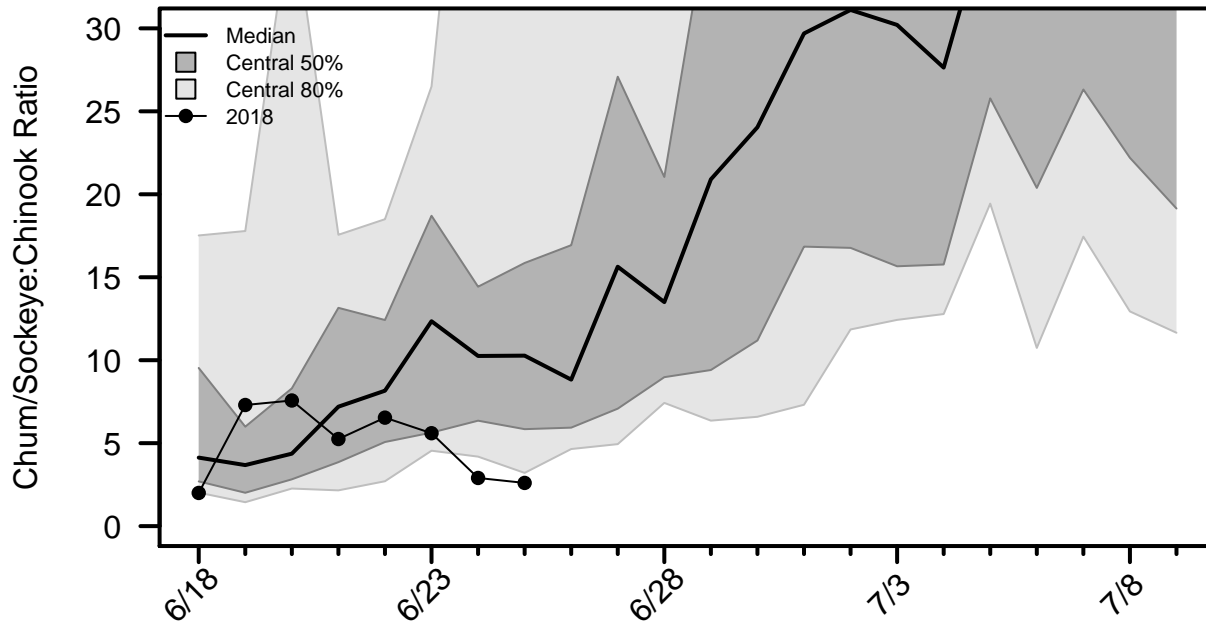
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Chum/Sockeye:Chinook Salmon Ratio

This ratio is calculated by dividing the total number of chum and sockeye salmon counted by the number of Chinook salmon counted by a project each day. A value of zero indicates Chinook salmon were counted that day, but not chum or sockeye salmon. A missing value on a day the project operated indicates no Chinook salmon were counted that day.

Species Ratio Figure 1. Time series of the species ratio in the BTF with historical quantiles shown as grey regions and the ratio time series for 2018 shown with points connected by lines.



Ratio Table 1. A subset of the species ratios displayed in **Ratio Figure 1**, including the ratios from the ATF.

Date	2018 BTF	BTF Median	BTF Lower 10%	BTF Upper 10%	2018 Sonar	2018 ATF
6/22	6.54	8.16	2.71	18.5	8.53	5.63
6/23	5.6	12.35	4.55	26.5	1.43	–
6/24	2.9	10.26	4.19	53.98	1.49	3.05
6/25	2.6	10.28	3.21	45.47		2.96
6/26		8.83	4.65	34.14		
6/27		15.63	4.94	49.46		
6/28		13.5	7.43	31.24		

Ratio Table 2. The percent of previous years in which a given species ratio was exceeded at least once before a certain day in the BTF.

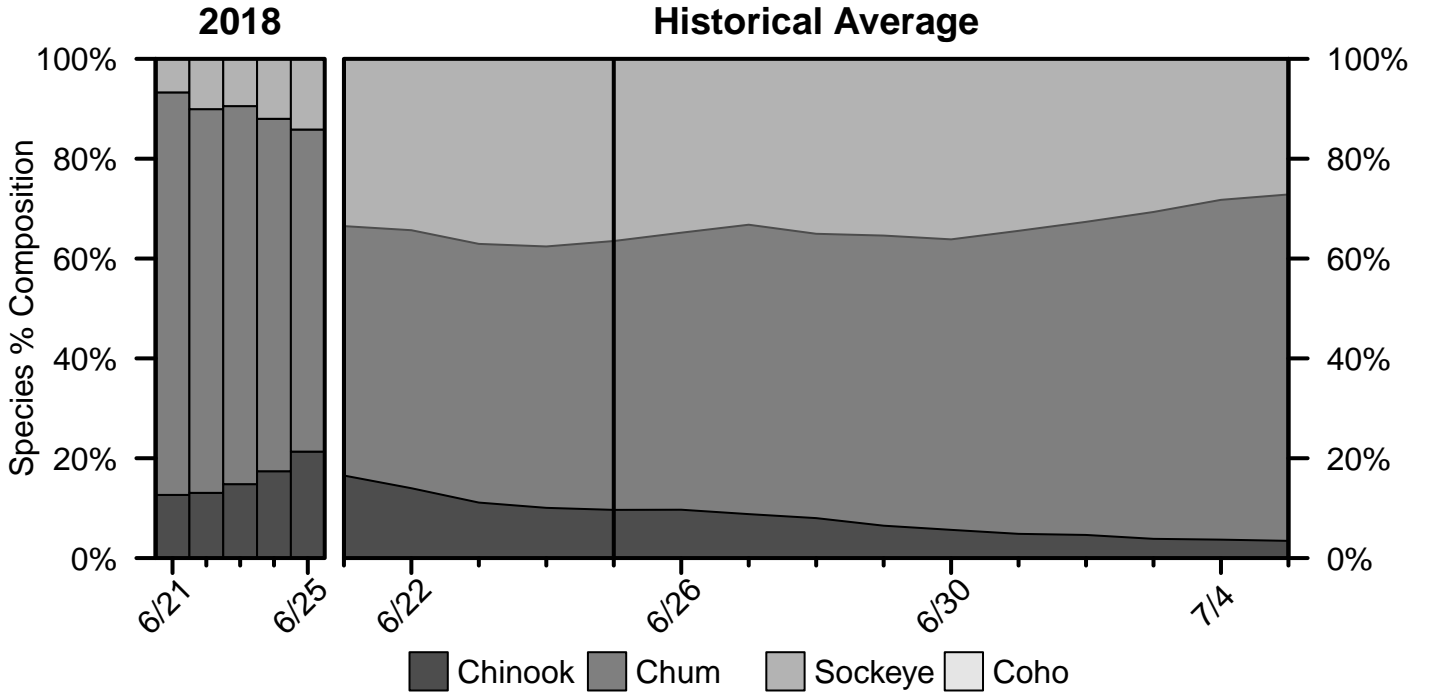
Date	Ratio > 10	Ratio > 15	Ratio > 20	Ratio > 25
6/22	68%	44%	24%	21%
6/23	71%	53%	35%	24%
6/24	79%	53%	41%	29%
6/25	88%	62%	44%	32%
6/26	91%	65%	47%	35%
6/27	91%	79%	59%	47%
6/28	94%	82%	68%	53%

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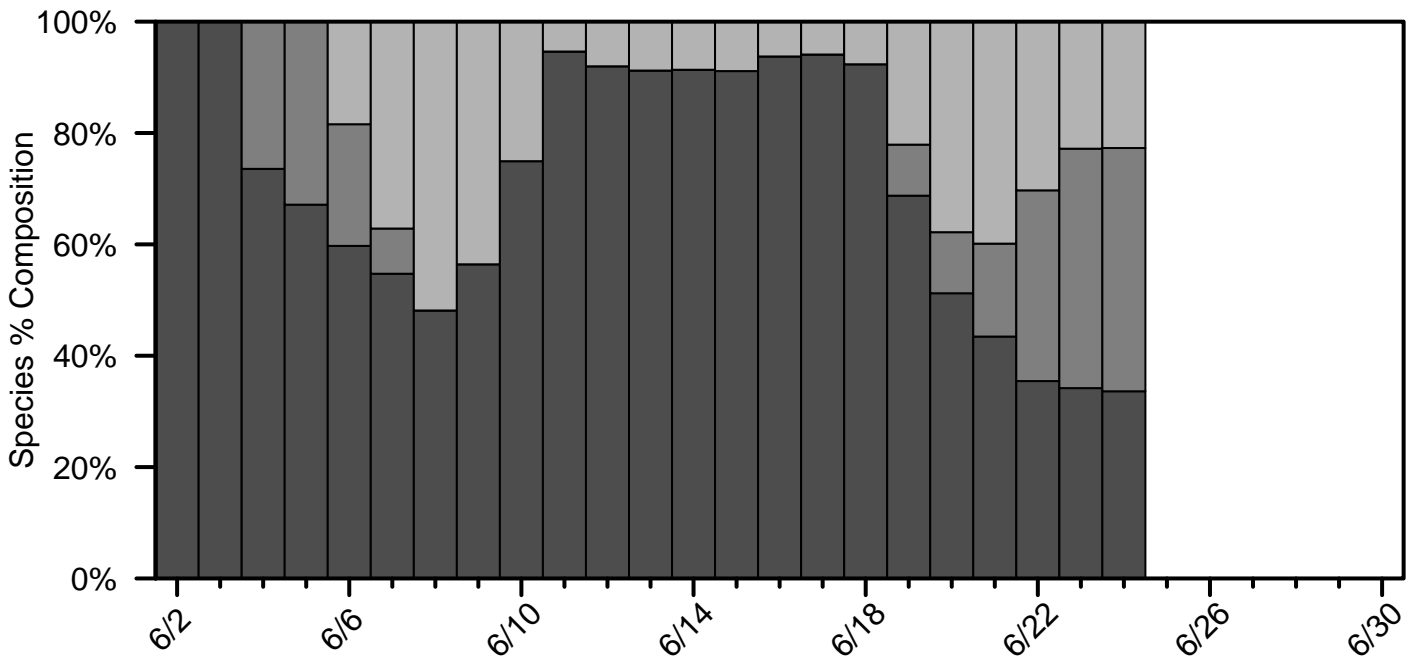
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Percent Composition by Salmon Species

Percent Composition Figure 1. Species percent composition in the BTF from 2018 and based on the historical average. The composition presented on each day represents the average composition over the past 3 days.



Species Composition Figure 2. Species percent composition from the sonar estimates from 2018 (salmon species only, excluding pink salmon). The composition presented on each day represents the average composition over the past 3 days.

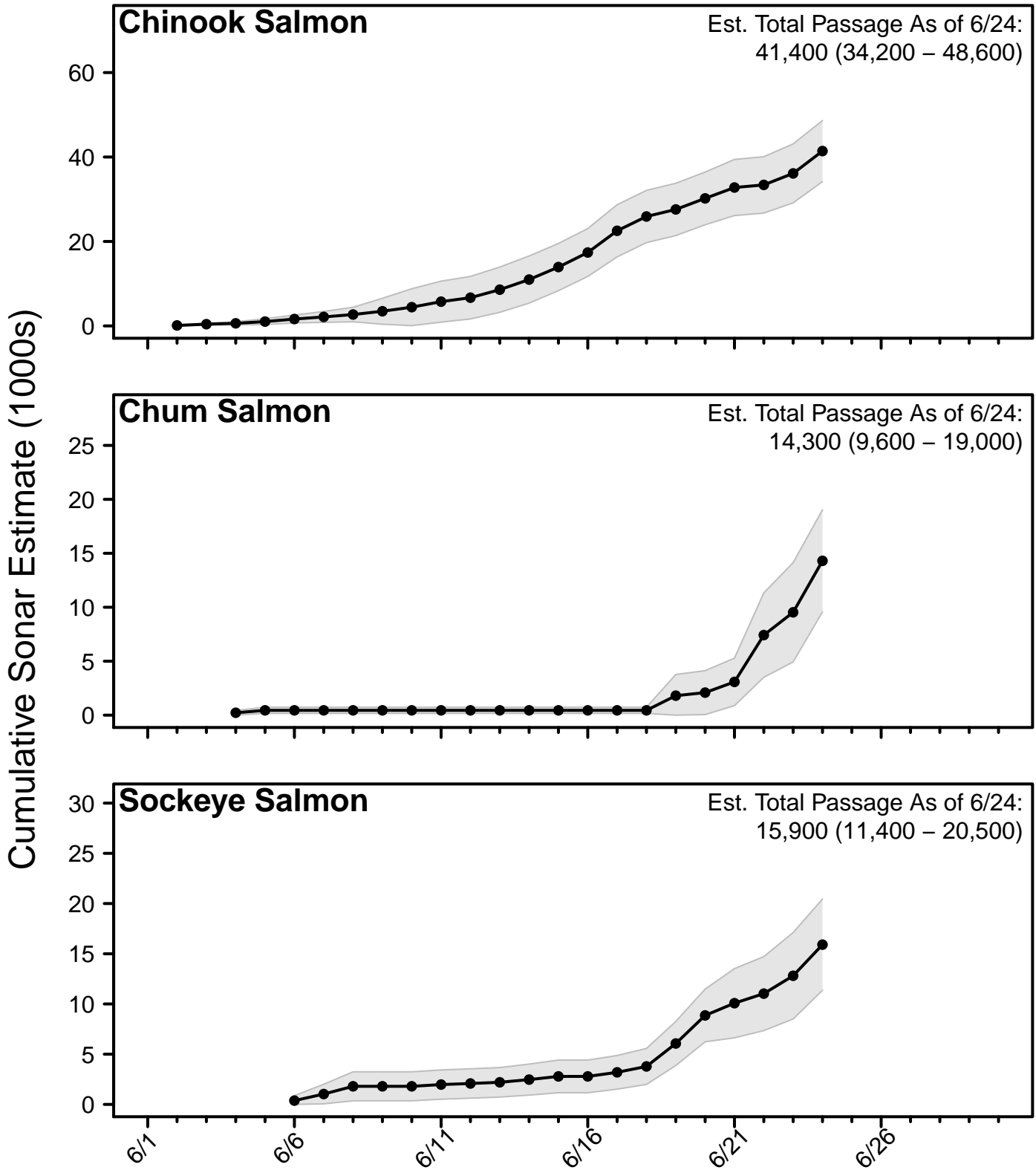


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Sonar Passage Estimates

Sonar Figure 1. Cumulative estimates of salmon passage from the 2018 sonar operation through the last complete reporting day. Grey bands show the 95% confidence intervals on each complete reporting day. **Sonar operations have not been fully operational since 6/21.**



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In-Season Harvest Estimates

In-season harvest estimates are produced by combining counts of total fishing effort (usually obtained via aerial survey) and on-the-ground fisher interview information using statistically-rigorous methodology. The data collection efforts to produce these estimates is a highly collaborative effort, involving staff from ADF&G, KRITFC, OTNC, and USFWS. Although USFWS performs the data analysis and harvest estimation, all estimates undergo technical review by a panel comprised of representatives from each of these entities.

Much more detailed information can be found on the YDNWR website (https://www.fws.gov/refuge/yukon_delta/wildlife_and_habitat/dailyupdate.html).

In the tables below, CV stands for coefficient of variation, which is a commonly-used measure of uncertainty in the estimate (larger CV values are more uncertain).

Spatial Coverage:

- The 6/6 estimate was for a set net only opportunity and covers the main-stem Kuskokwim River between Tuntutuliak and Akiak.
- The 6/12 and 6/16 estimates cover the main-stem between Tuntutuliak and Akiak and between Kalskag and Aniak.
- The 6/24 estimate covers the main-stem between Tuntutuliak and Akiak.

Harvest Table 1. Estimated total Chinook salmon harvest within the YDNWR.

Date	Daily Harvest	Cumulative Harvest	Daily CV	Cumulative CV
6/6	100	100	0.21	0.21
6/12	5,340	5,440	0.09	0.09
6/16	5,710	11,150	0.09	0.06
6/24	6,100	17,250	0.07	0.05

Harvest Table 2. Estimated Chinook salmon harvested downstream of the BTF.

Date	Daily Harvest	Cumulative Harvest	Daily CV	Cumulative CV
6/6	30	30	0.29	0.29
6/12	3,210	3,240	0.1	0.1
6/16	3,530	6,770	0.11	0.07
6/24	3,700	10,470	0.08	0.06

Harvest Table 3. Estimated total chum salmon harvest within the YDNWR.

Date	Daily Harvest	Cumulative Harvest	Daily CV	Cumulative CV
6/12	1,830	1,830	0.16	0.16
6/16	2,800	4,630	0.1	0.09
6/24	8,890	13,520	0.07	0.05

Harvest Table 3. Estimated total sockeye salmon harvest within the YDNWR.

Date	Daily Harvest	Cumulative Harvest	Daily CV	Cumulative CV
6/12	250	250	0.21	0.21
6/16	450	700	0.19	0.14
6/24	3,660	4,360	0.08	0.07

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Chinook Salmon Appendix

Chinook Salmon Table A1. Cumulative CPUE from the BTF.

Date	2018	2017	2016	2015	2014	5-Yr Avg.	2008 - 2017 Avg.
6/22	233	109	340	321	481	276	263
6/23	273	121	357	336	500	292	287
6/24	304	148	378	345	513	309	307
6/25	352	161	400	347	524	322	324
6/26		168	432	366	539	339	349
6/27		196	454	372	550	354	366
6/28		216	463	387	568	367	380
EOS		374	687	625	650	519	538

Chinook Salmon Table A2. Cumulative CPUE from the ATF.

Date	2018	2017	2016	2015
6/22	172	1,244	1,403	1,496
6/23	172	1,481	1,435	1,619
6/24	180	1,645	1,470	1,716
6/25	218	1,945	1,514	1,884
6/26		2,165	1,564	2,008
6/27		2,500	1,657	2,169
6/28		3,012	1,763	2,187
EOS		6,508	2,729	2,916

Chinook Salmon Table A3. Percent of run complete according to various historical run timing scenarios from the BTF.

Timing	Midpoint	6/25 Cumulative %
Earliest	6/14	88%
Early 10%	6/17	81%
Early 25%	6/21	73%
Median	6/22	63%
Late 25%	6/24	51%
Late 10%	6/27	41%
Latest	7/3	30%

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Chum Salmon Appendix

Chum Salmon Table A1. Cumulative CPUE from the BTF.

Date	2018	2017	2016	2015	2014	5-Yr Avg.	2008 - 2017 Avg.
6/22	519	482	239	381	886	460	459
6/23	717	565	283	431	994	557	559
6/24	788	698	353	471	1,120	662	654
6/25	879	760	393	482	1,194	727	757
6/26		930	460	541	1,434	849	900
6/27		1,317	541	554	1,608	1,000	1,070
6/28		1,671	602	590	1,851	1,144	1,212
EOS		6,785	3,894	2,943	6,343	5,135	6,525

Chum Salmon Table A2. Cumulative CPUE from the ATF.

Date	2018	2017	2016	2015
6/22	209	607	221	179
6/23	264	728	229	240
6/24	286	927	307	390
6/25	401	1,214	456	467
6/26		1,494	563	649
6/27		1,696	649	772
6/28		1,966	958	810
EOS		11,588	5,304	5,669

Chum Salmon Table A3. Percent of run complete according to various historical run timing scenarios from the BTF.

Timing	Midpoint	6/25 Cumulative %
Earliest	6/23	49%
Early 10%	7/1	37%
Early 25%	7/2	26%
Median	7/5	17%
Late 25%	7/7	9%
Late 10%	7/11	5%
Latest	7/14	2%

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Sockeye Salmon Appendix

Sockeye Salmon Table A1. Cumulative CPUE from the BTF.

Date	2018	2017	2016	2015	2014	5-Yr Avg.	2008 - 2017 Avg.
6/22	47	187	63	188	239	171	201
6/23	73	265	103	219	262	213	249
6/24	92	316	120	225	271	258	297
6/25	126	341	142	236	286	293	349
6/26		373	236	292	303	339	399
6/27		456	279	316	338	384	449
6/28		504	291	393	452	448	500
EOS		2,690	2,463	2,157	1,367	1,965	1,711

Sockeye Salmon Table A2. Cumulative CPUE from the ATF.

Date	2018	2017	2016	2015
6/22	0	58	0	0
6/23	0	67	0	0
6/24	0	67	0	0
6/25	0	83	8	17
6/26		83	8	42
6/27		92	8	120
6/28		118	26	129
EOS		393	405	1,245

Sockeye Salmon Table A3. Percent of run complete according to various historical run timing scenarios from the BTF.

Timing	Midpoint	6/25 Cumulative %
Earliest	6/22	71%
Early 10%	6/24	59%
Early 25%	6/25	47%
Median	6/29	34%
Late 25%	7/1	23%
Late 10%	7/5	15%
Latest	7/10	8%

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June 24, 2018 ADFG Subsistence Division Inseason Salmon Harvest Survey Project Update

Department of Fish and Game Division of Subsistence staff are working with local fishers in several communities in the lower and middle Kuskokwim River to learn more about subsistence salmon harvests, and to share that information with the Working Group and fishery managers.

Lower Kuskokwim

We're conducting community-based monitoring surveys to help FWS Refuge staff and the Kuskokwim River Inter-Tribal Fisheries Commission in estimating total harvest after each fishing opportunity.

- We're completing surveys in Kasigluk and Atmautluak where our staff worked with 3 local community-based monitors on June 24. In Kasigluk we completed 15 surveys out of approximately 18 boats fishing, and 2 out of 3 total fishing boats in Atmautluak.
- Harvest and effort data from these surveys was provided to Refuge staff for incorporation in their harvest estimation model.
- We will also be consulting with other tribes in the lower river for inseason outreach. Subsistence Division staff will be traveling to communities in the lower Kuskokwim River in June to meet with the public, provide information about subsistence fishing management and regulation, answer questions, and address concerns.

Middle Kuskokwim

Subsistence Division is collaborating with Native Village of Napaimute in middle Kuskokwim River villages. We've finished the community-based monitoring harvest surveys in Kalskag and Aniak. Because all fishing restrictions have been lifted in the area we expect people's fishing effort will be spread out over time. It's unlikely that we'll be able to complete very many surveys to get an accurate harvest estimate. Also, in July DFG and NVN staff will be contacting people in all communities from Kalskag to Stony River to ask about household progress toward their fishing goals. We want to avoid the possibility of survey fatigue among respondents in the area, another good reason to halt harvest and effort surveys at this time.

NVN has also organized several volunteer fishers in various middle river communities who are writing down information while they fish. Volunteers record where they fish, what size net they use, the length of time of each drift they make, and how many king, chum, and sockeye they catch in each drift.

- Since the previous WG meeting, Rebecca Wilmarth (NVN) has contacted 11 out of 14 fishers in Kalskag, Chuathbaluk, Crooked Creek, Red Devil, and Sleetmute. Several have been fishing with permits. Some also fished during subsistence openings on June 19 and 24. Rebecca will provide a summary of information that she's collected so far.
- In July NVN and Subsistence Division will travel to all communities from Kalskag to Stony River to ask people about how far along they are in fishing and whether they will be able to meet their salmon fishing goals for the season. Information from those surveys will be reported in WG meetings.

Supplemental Document: USFWS Harvest Estimates

Harvest Estimates: 6/24/2018 Subsistence Opportunity

Tuntutuliak - Akiak

Prepared by USFWS

This document presents harvest and effort estimates as well as fisher-trip information for the subsistence salmon fishery opportunity on the Kuskokwim River that occurred on June 24, 2018 within the Yukon Delta National Wildlife Refuge (YDNWR) boundaries. The production of these estimates was a highly collaborative effort between the U.S. Fish and Wildlife Service (USFWS), the Orutsararmuit Traditional Native Council (OTNC), the Alaska Department of Fish and Game (ADF&G) and the Kuskokwim River Inter-Tribal Fish Commission (KRITFC) in cooperation with the Bering Sea Fisherman's Association (BSFA). **These estimates encompass harvest taken in the portion of the main-stem Kuskokwim River between and including the villages of Tuntutuliak and Akiak.** Harvest and effort estimation was conducted by USFWS staff using the same methods as in 2016 and 2017. Please contact Ben Staton (benjamin_staton@fws.gov) if you have any questions regarding these estimates.

Opportunity Details

The YDNWR federal in-season manager, with authority delegated by the Federal Subsistence Board and in consultation with the KRITFC, announced a subsistence fishing opportunity for Chinook salmon within the YDNWR waters for federally-qualified subsistence users. The opportunity was 12 hours in duration, starting at 10:00AM June 24 and ending at 10:00PM June 24. The special action can be found [here](#), and the corresponding news release [here](#).

Data Sources

- **208** fisher interviews were used in this analysis.
 - **67** fisher interviews collected by OTNC from the Bethel boat harbor were used.
 - **28** fisher interviews collected by OTNC from Bethel area fish camps were used.
 - **74** fisher interviews collected by KRITFC/BSFA community-based monitoring efforts were used.
 - **16** fisher interviews collected by ADF&G Division of Subsistence stationed in Kasigluk and Atmautluak were used.
 - **23** fisher interviews collected by USFWS law enforcement officers were used.
- **199** interviews were from drift boat fishers.
- **9** interviews were from set net fishers.
- USFWS flew **3** aerial surveys to count drift boats and set nets.

Effort Estimates

- **410** drift boat trips were estimated to have occurred during the opportunity.
- During aerial survey flights between Tuntutuliak and Akiak, we observed:
 - **319** drift boats between 11:40PM and 1:30PM,
 - **203** drift boats between 3:45PM and 5:00PM, and
 - **71** drift boats between 7:15PM and 8:20PM.
- Of the drift boats counted on the second flight, an estimated **70%** were also counted during the first flight.
- Of the drift boats counted on the third flight, an estimated **69%** were also counted during the second flight.
- **7** drift boat trips were estimated to have begun and ended during times that were not flown.
- We observed **18** set nets fishing in the main-stem Kuskokwim River during the opportunity.

Harvest Estimates

- An estimated total of **18,650 (16,650 - 20,750)** salmon were harvested.
 - An estimated total of **6,100 (5,310 - 6,960)** Chinook salmon were harvested.
 - An estimated total of **8,890 (7,700 - 10,130)** chum salmon were harvested.
 - An estimated total of **3,660 (3,110 - 4,250)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **500 (350 - 640)** total salmon (**43%** Chinook salmon, **16%** chum salmon, and **40%** sockeye salmon).

Supplemental Document: USFWS Harvest Estimates

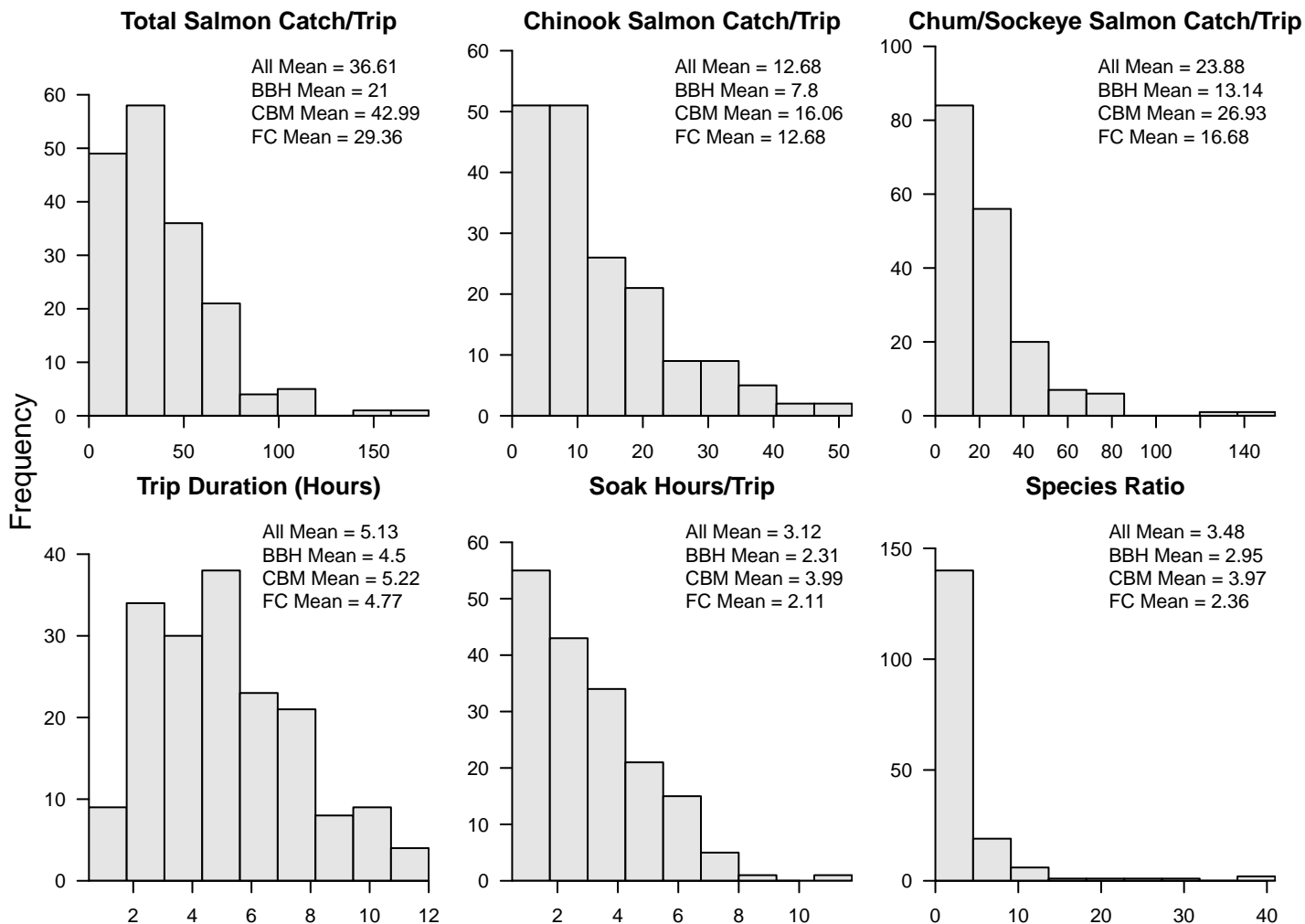
Table 1. Breakdown of relevant quantities by river stratum (area).

Stratum	Interviews	Max Drift Count	Set Net Count	Est. Drift Trips	Chinook Harvest	Chum Harvest	Sockeye Harvest
Tunt-Johnson	40	77	0	91	1,450	2,900	1,650
Johnson-Napaskiak	33	57	2	67	1,060	1,120	470
Napaskiak-Akiachak	117	153	12	197	2,650	3,370	1,270
Akiachak-Akiak	18	32	4	54	950	1,500	270
Total	208	319	18	410	6,100	8,890	3,660

Table 2. Specific quantities for the decision framework used by the USFWS and KRITFC. *Salmon/boat* is total salmon harvest per drift boat and *Ratio* is the chum/sockeye:Chinook salmon ratio. Quantities were calculated using the harvest estimates for each species and the number of estimated number of boat trips, *not* the raw interview values.

Area	Quantity	Mean	Lower 95%	Upper 95%
Below Johnson R.	Salmon/Boat	66	52	80
Above Johnson R.	Salmon/Boat	38	33	43
Below Johnson R.	Ratio	3.2	2.6	3.9
Above Johnson R.	Ratio	1.7	1.5	2

Figure 1. Distribution of relevant quantities from all collected drift boat interviews, excluding those conducted by USFWS law enforcement officers. BBH = Bethel boat harbor, CBM = community-based monitoring, FC = Bethel area fish camps.



Supplemental Document: USFWS Harvest Estimates

Appendix A: Bethel Boat Harbor Interview Information Detailed Summaries

Information is for drift nets only

Column Meanings

- **Area:** The area of the river the trip occurred in
- **N:** The number of interviews with fishing reported in each area
- **Min:** the minimum value among all interviews conducted in each area
- **25%:** the value that 25% of the interview values fell below in each area
- **Mean:** the mean value among all interviews conducted in each area
- **75%:** the value that 75% of the interview values fell below in each area
- **Max:** the maximum value among all interviews conducted in each area

Table A1. Summary of catch rates for Chinook salmon by area (units are catch per 150 feet of net soaked for 1 hour).

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	4	1	1.5	2.2	2.8	3.7
Johnson R. - Napaskiak	5	0.7	1.3	4.6	9	10
Napaskiak - Akiachak	53	0	1.9	3.4	4.6	14
All	62	0	1.6	3.4	4.6	14

Table A2. Summary of catch per trip for Chinook salmon by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	4	2	5	12	15	31
Johnson R. - Napaskiak	5	1	2	6	10	12
Napaskiak - Akiachak	53	0	2	8	10	26
All	62	0	2	8	10	31

Table A3. Summary of catch rates for chum/sockeye salmon by area (units are catch per 150 feet of net soaked for 1 hour).

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	4	3.2	3.8	5.1	6.4	6.9
Johnson R. - Napaskiak	5	1.3	2.8	12	20.8	23.2
Napaskiak - Akiachak	53	0	3	7.3	9.3	22
All	62	0	3.2	7.4	9.3	23.2

Table A4. Summary of catch per trip for chum/sockeye salmon by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	4	8	13	22	30	40
Johnson R. - Napaskiak	5	2	4	14	23	31
Napaskiak - Akiachak	53	0	6	13	19	32
All	62	0	6	14	20	40

Table A5. Summary of the percent of salmon catches that were Chinook salmon by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	4	20%	20%	31%	35%	53%
Johnson R. - Napaskiak	5	17%	25%	32%	38%	50%
Napaskiak - Akiachak	53	0%	19%	36%	50%	83%
All	62	0%	20%	36%	50%	83%

Supplemental Document: USFWS Harvest Estimates

Table A6. Summary of trip start time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	7:00AM	8:52AM	10:12AM	11:05AM	2:20PM
Johnson R. - Napaskiak	9:00AM	10:00AM	11:42AM	2:00PM	2:30PM
Napaskiak - Akiachak	9:30AM	10:00AM	12:26PM	2:00PM	7:45PM
All	7:00AM	10:00AM	12:14PM	2:00PM	7:45PM

Table A7. Summary of trip end time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	4:27PM	4:51PM	5:25PM	5:55PM	6:30PM
Johnson R. - Napaskiak	12:44PM	2:14PM	3:21PM	5:24PM	6:00PM
Napaskiak - Akiachak	11:40AM	3:04PM	4:48PM	6:48PM	10:04PM
All	11:40AM	2:42PM	4:44PM	5:59PM	10:04PM

Supplemental Document: USFWS Harvest Estimates

Appendix B: Village-Specific Interview Information Detailed Summaries

Information is for drift nets only; data from Kasigluk were collected by ADF&G Division of Subsistence, all other data were collected by KRITFC/BSFA community-based harvest monitors. ADF&G interviewed two fisher in Atmautluak, so data from these interviews are not shown.

Column Meanings

- **Village:** The village the interview occurred in
- **N:** The number of interviews conducted in each village
- **Min:** the minimum value among all interviews conducted in each village
- **25%:** the value that 25% of the interview values fell below in each village
- **Mean:** the mean value among all interviews conducted in each village
- **75%:** the value that 75% of the interview values fell below in each village
- **Max:** the maximum value among all interviews conducted in each village

Table B1. Summary of catch rates for Chinook salmon by village (units are catch per 150 feet of net soaked for 1 hour).

Village	N	Min	25%	Mean	75%	Max
Akiachak	9	0.8	4.6	6.8	10	12
Akiak	17	0.2	2.5	7.1	9.3	21
Kasigluk	14	0.5	1.4	2.5	3.2	8.5
Kwethluk	14	0.9	2.1	2.9	3.3	6.8
Napaskiak	17	0.7	2.1	5.2	8.8	11.1
Tuntutuliak	14	0	1	2.2	2.3	9.9
All	85	0	1.5	4.4	6.2	21

Table B2. Summary of catch per trip for Chinook salmon by village.

Village	N	Min	25%	Mean	75%	Max
Akiachak	9	3	9	25	40	52
Akiak	17	1	7	16	30	42
Kasigluk	14	2	13	18	24	34
Kwethluk	14	5	8	13	16	33
Napaskiak	17	2	11	18	25	34
Tuntutuliak	14	0	4	10	13	23
All	85	0	8	16	23	52

Table B3. Summary of catch rates for chum/sockeye salmon by village (units are catch per 150 feet of net soaked for 1 hour).

Village	N	Min	25%	Mean	75%	Max
Akiachak	9	3	5	10	8	32
Akiak	17	4	7	13	16	37
Kasigluk	14	3	5	9	12	24
Kwethluk	14	1	4	7	8	18
Napaskiak	17	1	2	6	10	16
Tuntutuliak	14	0	2	6	10	19
All	85	0	4	9	11	37

Supplemental Document: USFWS Harvest Estimates

Table B4. Summary of catch per trip for chum/sockeye salmon by village.

Village	N	Min	25%	Mean	75%	Max
Akiachak	9	11	24	30	35	48
Akiak	17	8	16	30	34	83
Kasigluk	14	25	48	68	78	154
Kwethluk	14	6	18	30	34	65
Napaskiak	17	5	12	22	34	35
Tuntutuliak	14	0	11	25	40	57
All	85	0	17	34	43	154

Table B5. Summary of the percent of salmon catches that were Chinook salmon by village.

Village	N	Min	25%	Mean	75%	Max
Akiachak	9	8%	24%	43%	60%	70%
Akiak	17	2%	17%	35%	60%	70%
Kasigluk	14	4%	16%	22%	26%	49%
Kwethluk	14	12%	26%	33%	35%	70%
Napaskiak	17	17%	40%	45%	52%	71%
Tuntutuliak	14	3%	16%	30%	40%	59%
All	85	2%	20%	34%	50%	71%

Table B6. Summary of trip start time by village.

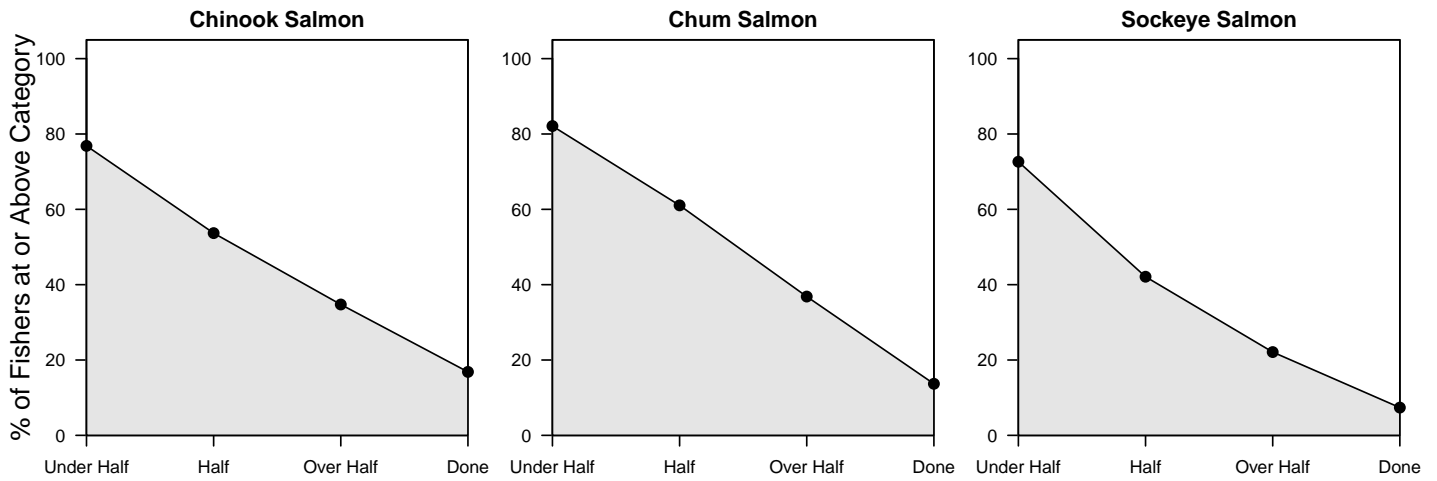
Village	Min	25%	Mean	75%	Max
Akiachak	10:00am	10:00am	11:03am	11:00am	5:00pm
Akiak	10:00am	11:00am	2:10pm	6:00pm	7:00pm
Kasigluk	5:00am	8:30am	8:43am	9:22am	10:00am
Kwethluk	10:00am	10:00am	11:04am	11:52am	2:00pm
Napaskiak	9:00am	10:30am	11:12am	12:00pm	2:30pm
Tuntutuliak	9:45am	10:38am	11:57am	12:00pm	4:00pm
All	5:00am	10:00am	11:28am	12:00pm	7:00pm

Table B7. Summary of trip end time by village.

Village	Min	25%	Mean	75%	Max
Akiachak	12:00pm	3:00pm	4:10pm	6:00pm	9:30pm
Akiak	12:30pm	3:00pm	6:38pm	9:30pm	11:00pm
Kasigluk	1:00pm	3:38pm	4:33pm	5:45pm	8:30pm
Kwethluk	3:00pm	4:30pm	5:19pm	6:00pm	7:30pm
Napaskiak	12:30pm	2:00pm	4:14pm	5:30pm	10:00pm
Tuntutuliak	3:00pm	3:03pm	5:22pm	6:48pm	10:00pm
All	12:00pm	3:00pm	5:07pm	7:00pm	11:00pm

Supplemental Document: USFWS Harvest Estimates

Figure B1. Visual of the interviewed fishers' reported progress at meeting harvest goals for each of the three salmon species of interest. The height of the point/grey area is interpreted as the percent of interviewed fishers that have reportedly met at least the category on the horizontal axis. More grey on the right indicates fishers are close to meeting needs, less grey on right indicates fishers are far from meeting their harvest goals *Only fishers interviewed by the CBM program and by ADF&G were asked these questions.*



Supplemental Document: USFWS Net Effort

Submitted by USFWS

Summary of Net Effort Flights (06/19/2018 – 6/23/2018)

Refuge staff flew two flights from June 21 to June 23, 2018 to enumerate netting effort in the following non-salmon spawning tributaries: Eenayarak River, Tagarayak River, Tuntutuliak River, Kialik River, Johnson River, and Gweek River. Flights in the nonsalmon tributaries were scheduled around high tides, typically the higher of the two high tides. Observed counts during these flights are shown in the tables and figures below.

Table 1. Number of total observed nets across set net and drift net opportunities in mainstem Kuskokwim River and non-salmon spawning tributaries by date and net method from May 28 – June 23, 2018. The number of observed drift gillnets on 6/12 and 6/16 is the combined non-salmon spawning tributary observed drift net counts plus the maximum number of observed drift gillnets counted in the mainstem Kuskokwim River during the flights flown throughout the day. New data since last report are highlighted in yellow. For estimates of mainstem Kuskokwim River drift gillnets during 6/12 or 6/16 opportunity please refer to Harvest Assessment document for 6/16.

Net Method	5/28	5/30 ^a	6/2	6/3	6/6 ^a	6/7	6/10	6/11	6/12 ^b	6/15	6/16 ^b	6/19	6/21	6/22
Set	0	11	3	2	84	9	20	18	52	16	22	12	23	16
Drift	0	2	1	0	2	2	2	1	338	6	321	1	20	11
Total	0	13	4	2	86	11	22	19	390	22	343	13	43	27

^a days in which $\leq 4''$ set gillnet opportunities occurred; ^b day in which 12 hour drift gillnet opportunities occurred.

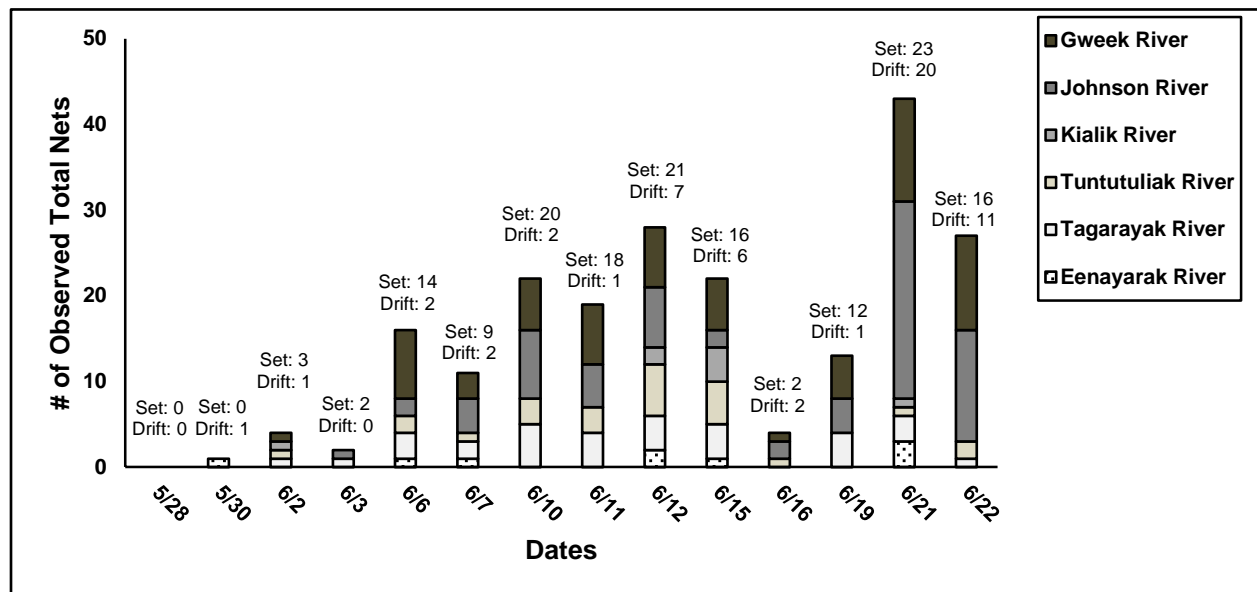


Figure 1. Location composition of observed nets in sampled nonsalmon spawning tributaries within Yukon Delta National Wildlife Refuge from May 28 – June 23, 2018.

Supplemental Document: USFWS Net Effort

Submitted by USFWS

Table 2. Number of nets observed by date and method in sampled non-salmon spawning tributaries within Yukon Delta National Wildlife Refuge from May 28 – June 23, 2018. Week 1 – 3 are the sum of observed net counts. New data are highlighted.

Location	Net Method	Week 1 (5/28 - 6/3)	Week 2 (6/4 - 6/10)	Week 3 (6/11 - 6/17)	Week 4 (June 18 - June 24)		
					6/19	6/21	6/22
Eenayarak River	Set	0	0	1	0	0	0
	Drift	1	2	2	0	3	0
	Total	1	2	3	0	3	0
Tagararak River	Set	2	10	12	4	3	1
	Drift	0	0	0	0	0	0
	Total	2	10	12	4	3	1
Tuntutuliak River	Set	0	6	14	0	1	0
	Drift	1	0	1	0	0	2
	Total	1	6	15	0	1	2
Kialik River	Set	1	0	0	0	0	0
	Drift	0	0	6	0	1	0
	Total	1	0	6	0	1	0
Johnson River	Set	1	10	12	3	9	6
	Drift	0	4	4	1	14	7
	Total	1	14	16	4	23	13
Gweek River	Set	1	17	18	5	10	9
	Drift	0	0	3	0	2	2
	Total	1	17	21	5	12	11
TOTAL	Set	5	43	57	12	23	16
	Drift	2	6	16	1	20	11
	Total	7	49	73	13	43	27

Table 3. Number of nets observed by date, location, and method in mainstem Kuskokwim River during 12 hour $\leq 4''$ set net opportunities on May 30 and June 6, 2018, as well as maximum drift gillnets observed and observed set nets during 12 hour $\leq 6''$ drift net opportunity on June 12 and June 16, 2018.

Description	Location	Net Method	5/30	6/6	6/12 ^a	6/16 ^a
Below Johnson River	A	Set	1	0	0	0
		Drift	0	0	93	93
		Total	2	0	93	93
Johnson River to Napaskiak	B	Set	1	16	4	2
		Drift	0	0	98	55
		Total	1	16	102	57
Napaskiak to Akiachak	C	Set	5	35	19	16
		Drift	0	0	104	148
		Total	5	35	123	164
Akiachak to Akiak	D	Set	4	19	8	2
		Drift	0	0	36	23
		Total	4	19	44	25
Total	Total	Set	11	70	31	20
		Drift	1	0	331	319
		Total	12	70	362	339

^a Drift gillnet estimates for 6/12 & 6/16 opener are maximum observed drift gillnet counts in each stratum during the three flights conducted.