

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: 06/20/2018

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:

- Salmon Hatchery Discussion: *LaMont Albertson*

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 20, 2018

Summary of Interview Activities

OTNC conducted surveys with 58 fish camps from Friday, June 15 through Monday, June 18. There appeared to be less people at fish camps when compared to the prior week. For this reason, we did some follow-up calls with long-standing fish camp users on Monday, June 18 to determine why they weren't at fish camp over the weekend and/or if our fisheries crew missed them. Reasons for not being at fish camp during the last opener included illness, boat issues, relocation, waiting until restrictions are over and inability to harvest enough fish to fill drying racks and smokehouses. Six fish camp families verbally expressed they were happy with the most recent fishing opener and an opportunity to fish while many more expressed their happiness in smiles. The most commonly reported issue this past opener was fishing snags, which was mainly attributed to high water levels. Four fish camps commented on the abundance of fish in the Kuskokwim River, in which one fisher attributed his/her success to fishing on the main channel and advised others against fishing by the beaches when water levels are high. Contrary to this, two fish camp users claimed there were very few fish in the Kuskokwim River. Three fish camps commented on weather and hoped for better weather in the future to prevent fish spoilage.

Chinook Salmon Age-Sex-Length Sampling Program

Thus far, 28 people have received sampling kits and been recruited to be an ASL sampler. We received ASL samples from five fish camp users over the past weekend.

Fish Distribution

Thus far, OTNC and KRITFC have distributed 96 Chinook salmon and two Chum salmon to Bethel elders, disabled and widows caught from the ADFG Bethel Test Fishery.

Relative Change in Harvest Goals

Of 65 fish camps asked, "How have your harvest goals for Chinook salmon, chum salmon and sockeye salmon changed when compared to last year," 59 fish camps responded.

Table 1. Relative Change in Annual Harvest Goals

Salmon Species	Increased	Same	Decreased
Chinook salmon	46% (n=27)	39% (n=23)	15% (n=9)
Chum salmon	32% (n=19)	49% (n=29)	19% (n=11)
Sockeye salmon	51% (n=30)	8% n=(5)	41% n=(24)

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Fish Camp Harvest Summary

June 16, 2018 Opener

We collected data from 33 unique fishing trips in the Bethel area fish camps. Most fishing trips (n=28) occurred from Napaskiak to Akiachak. Two fishing trips occurred from the Johnson River to just above Napaskiak with two additional fishing trips occurring below the Johnson River.

Please note any differences in the fish camp data included in the harvest estimate document produced by Ben Staton from the June 16 opener is due to additional fish camp interviews conducted after peer review of the harvest estimates.

Table 2. Gear type, mesh size range, and soak time reported from June 16 fishing opener.

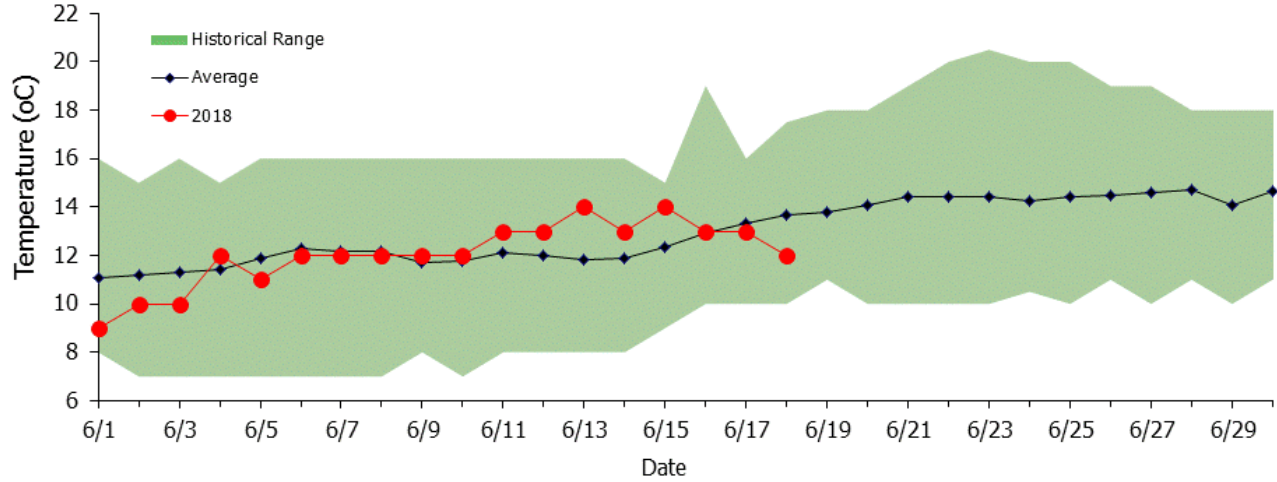
Total Drift Nets	Total Set Nets	Mesh Size Range	Average Soak Time (hours)
29	4	4.5"-6"	5.1 hours

Table 3. Average number of salmon harvested by surveyed fish camps from June 16 fishing opener.

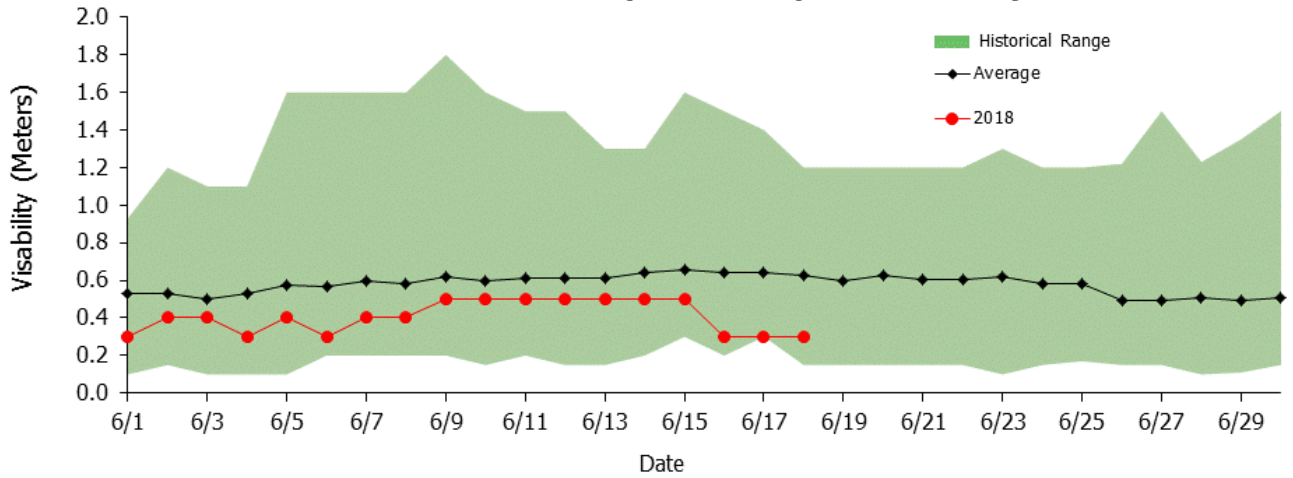
Average Chinook Salmon Harvest	Average Chum Salmon Harvest	Average Sockeye Salmon Harvest	Average other harvest
10.1	3.8	1	<1

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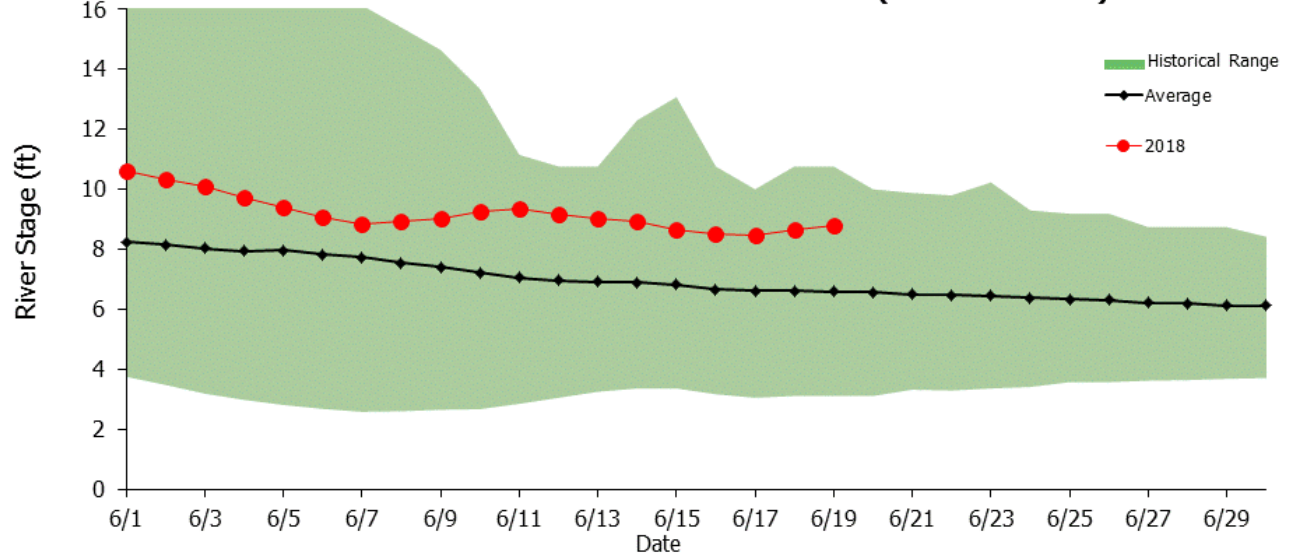
Historical Water Temperature at BTF Site (1984 to Present)



Historical Water Clarity at BTF site (1984 to Present)



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



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Kuskokwim River Salmon Assessment Update

6/18/2018



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 Fisheries 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:

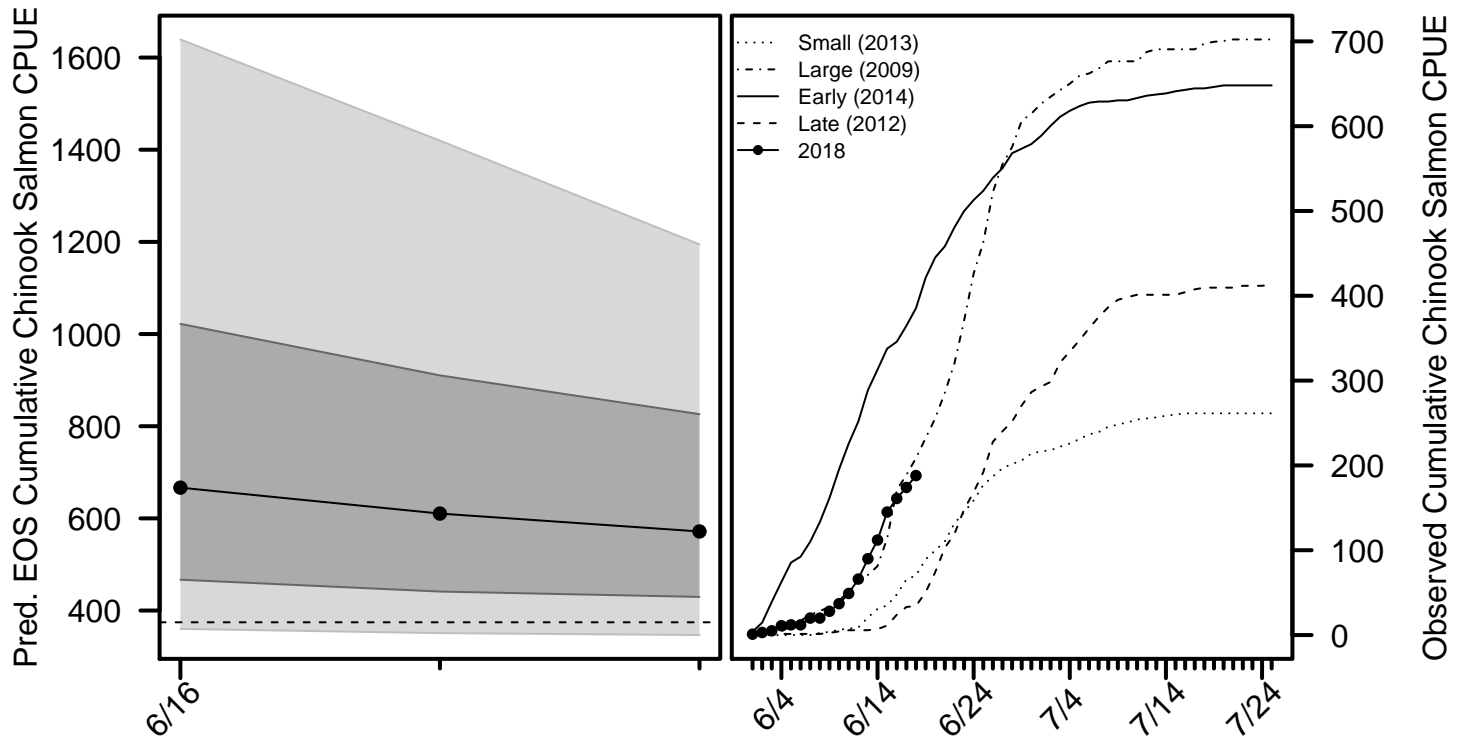
- USFWS: https://www.fws.gov/refuge/yukon_delta/wildlife_and_habitat/dailyupdate.html
- ADF&G: <http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main>

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Chinook Salmon BTF Summary (6/18)

- The BTF daily CPUE was **14**.
- The BTF cumulative CPUE is now **188**.
- **50%** years since 2008 fell below this cumulative CPUE on this date.
- **33%** of the run is complete based on historical average run timing.
- **23% - 44%** of the run is complete based the central 50% of all historical run timing scenarios.
- **21% - 23%** of the run is expected to pass Bethel in the next 5 days.
- Over the last 3 days, Chinook salmon made up **42%** of the BTF catches, compared to **24%** 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.

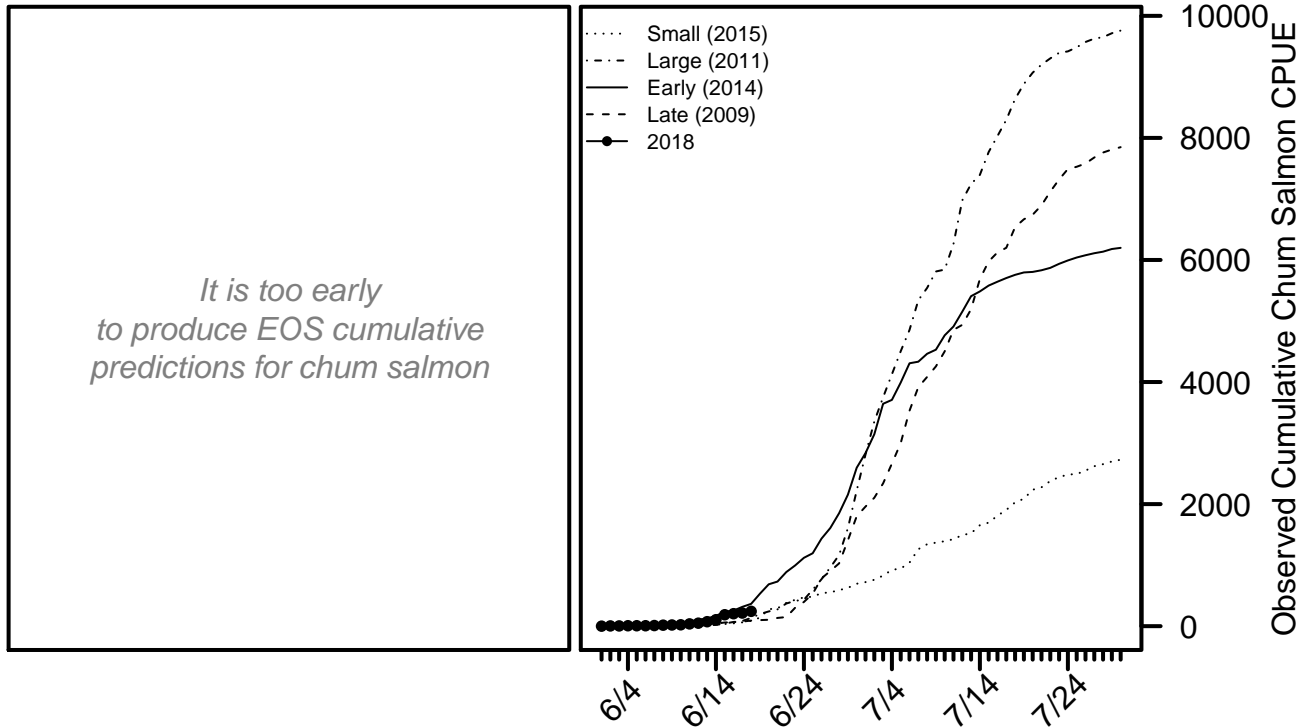
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Chum Salmon BTF Summary (6/18)

- The BTF daily CPUE was **28**.
- The BTF cumulative CPUE is now **243**.
- **80%** years since 2008 fell below this cumulative CPUE on this date.
- **4%** of the run is complete based on historical average run timing.
- **2% - 7%** of the run is complete based the central 50% of all historical run timing scenarios.
- **5% - 13%** of the run is expected to pass Bethel in the next 5 days.
- Over the last 3 days, chum salmon made up **55%** of the BTF catches, compared to **43%** 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.

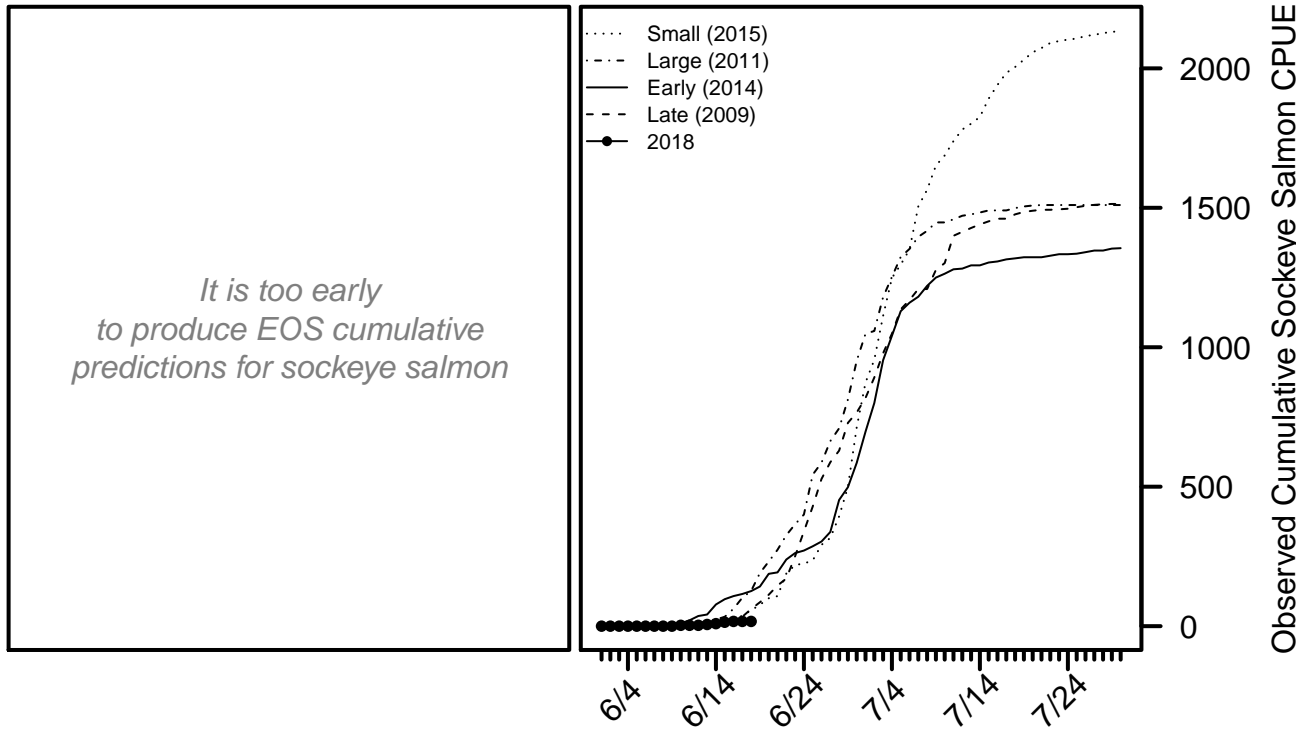
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Sockeye Salmon BTF Summary (6/18)

- The BTF daily CPUE was **0**.
- The BTF cumulative CPUE is now **17**.
- **10%** years since 2008 fell below this cumulative CPUE on this date.
- **8%** of the run is complete based on historical average run timing.
- **4% - 14%** of the run is complete based the central 50% of all historical run timing scenarios.
- **12% - 23%** of the run is expected to pass Bethel in the next 5 days.
- Over the last 3 days, sockeye salmon made up **3%** of the BTF catches, compared to **33%** 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.

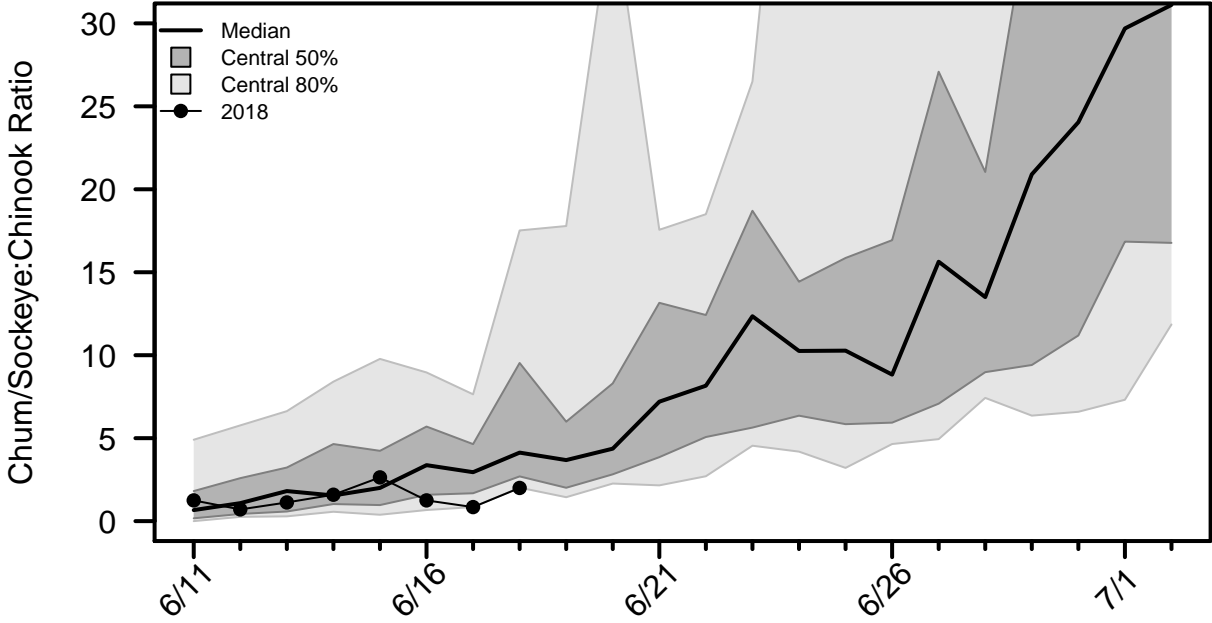
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Chum/Sockeye:Chinook Salmon Ratio

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 ATF
6/15	2.64	2	0.38	9.78	–
6/16	1.25	3.37	0.67	8.96	0
6/17	0.85	2.95	0.85	7.64	0.5
6/18	2	4.13	2.02	17.52	–
6/19		3.68	1.44	17.79	
6/20		4.37	2.27	37.29	
6/21		7.2	2.16	17.56	

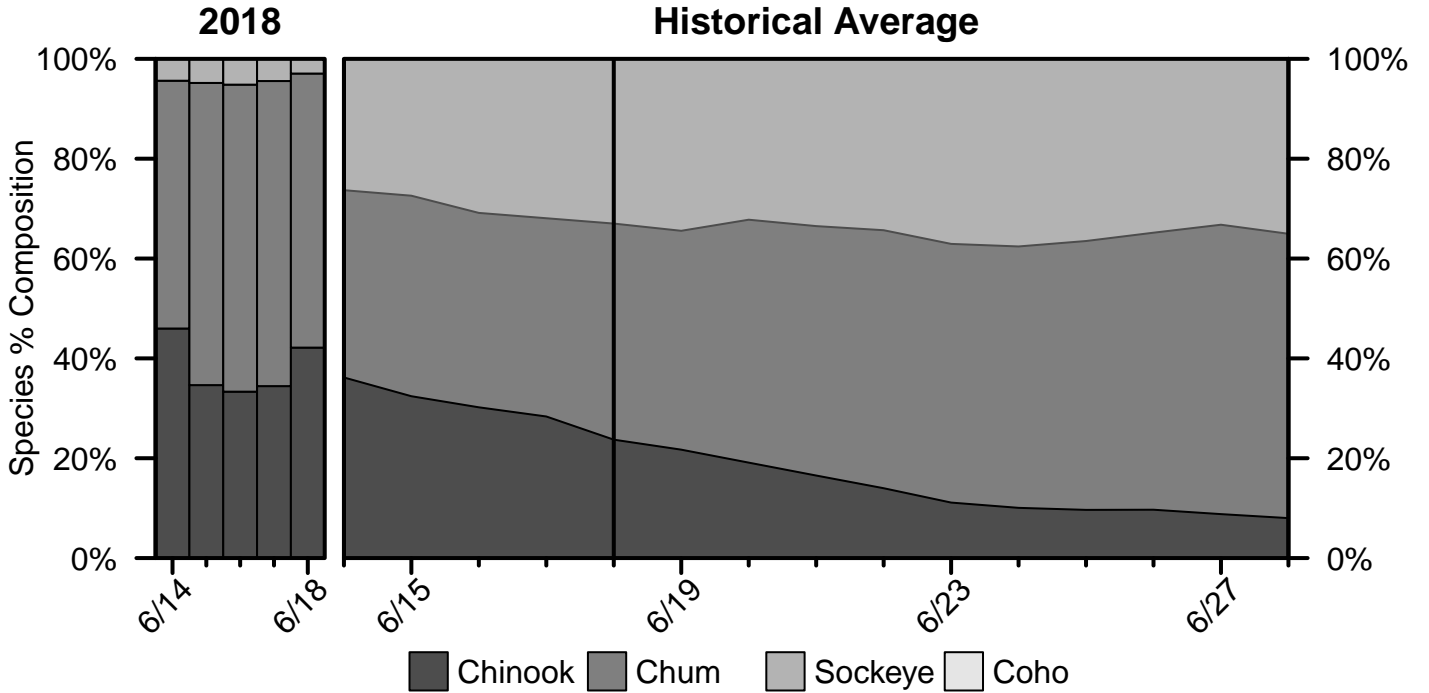
Ratio Table 2. The percent of previous years in which a given species ratio was exceeded at least once before a certain day in the BTF.

Date	Ratio > 3	Ratio > 5	Ratio > 7	Ratio > 10	Ratio > 20
6/15	76%	50%	32%	18%	3%
6/16	79%	53%	38%	21%	6%
6/17	82%	56%	41%	24%	6%
6/18	85%	62%	47%	38%	12%
6/19	88%	71%	50%	41%	15%
6/20	91%	76%	65%	50%	24%
6/21	94%	91%	74%	62%	24%

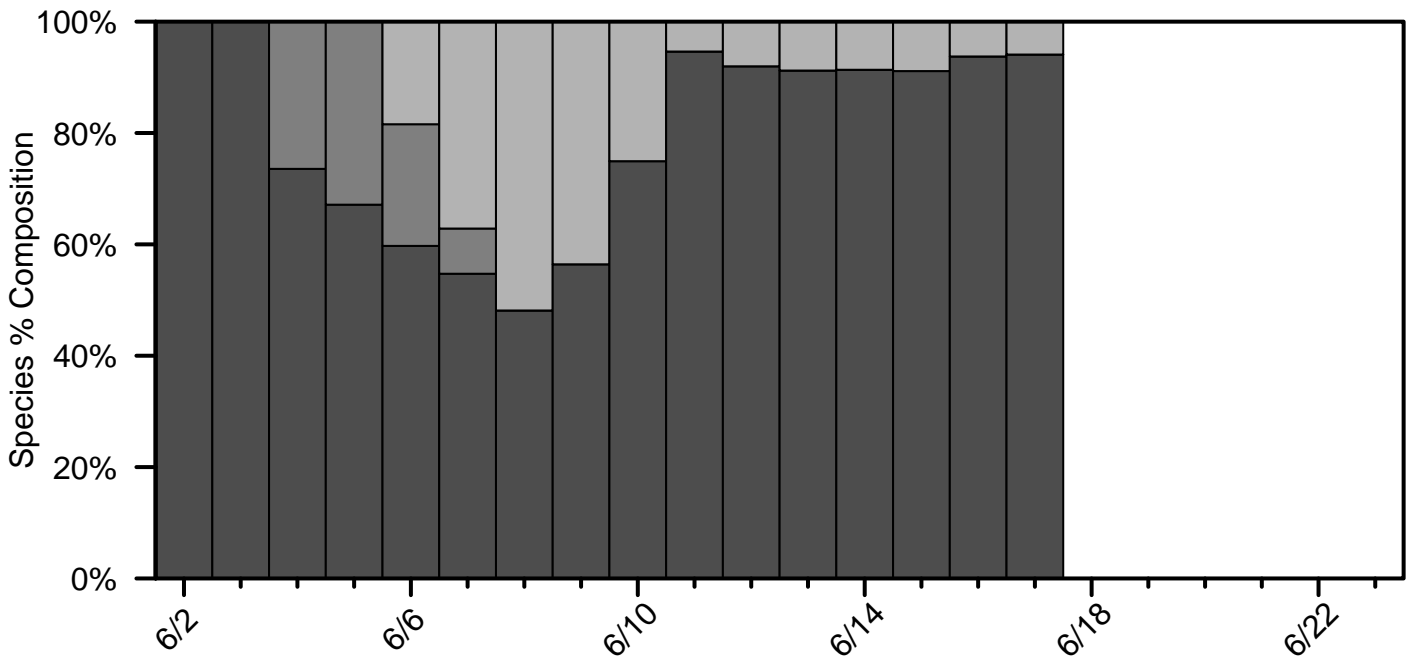
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Percent Composition by Salmon Species

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.

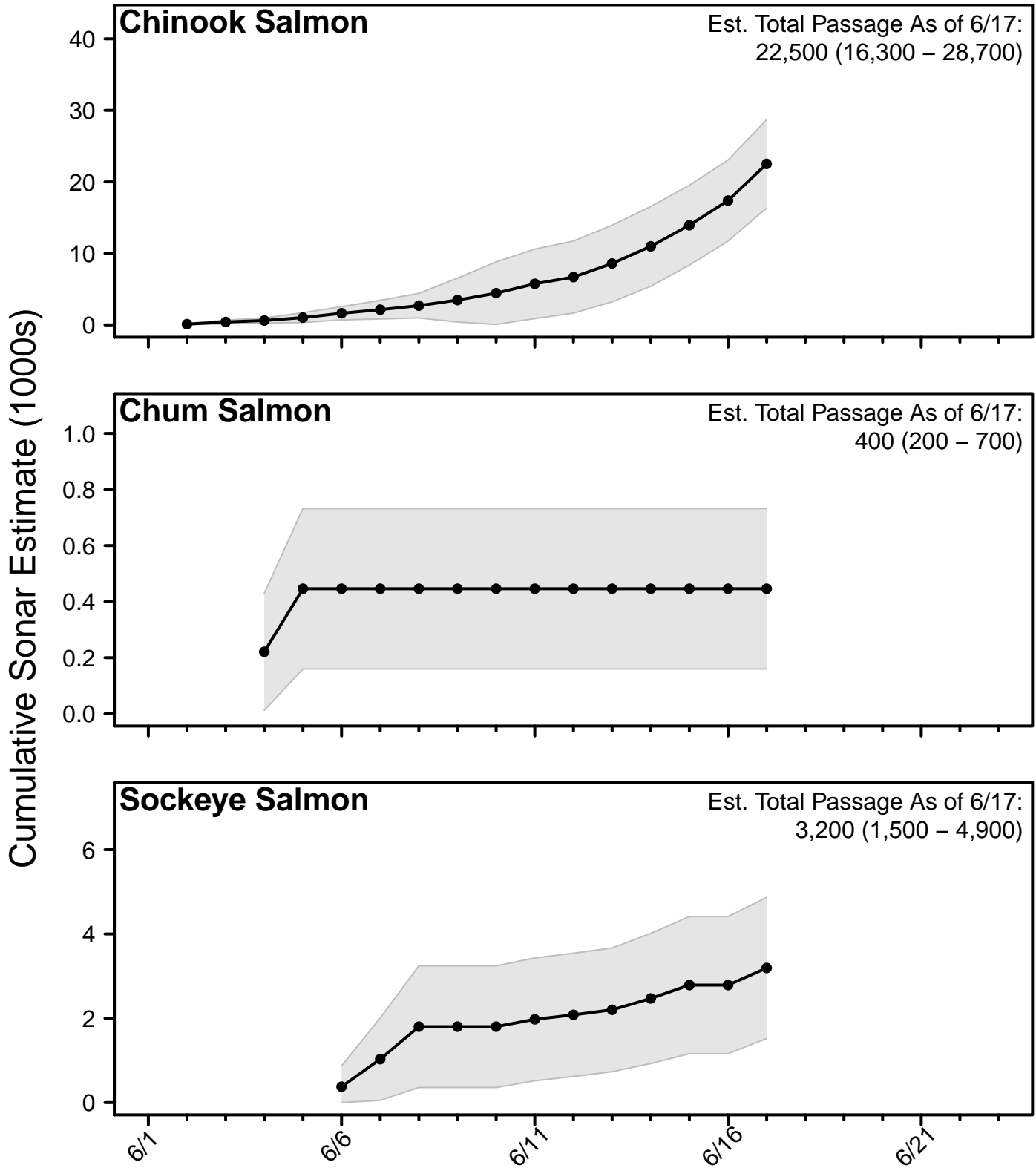


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Sonar Passage Estimates

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.



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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).

Harvest Table 1. Estimated total Chinook salmon harvest within the YDNWR, excluding the section between Akiak and Kalskag.

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

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

Harvest Table 3. Estimated total chum salmon harvest within the YDNWR, excluding the section between Akiak and Kalskag.

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

Harvest Table 3. Estimated total sockeye salmon harvest within the YDNWR, excluding the section between Akiak and Kalskag.

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

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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.
6/15	145	36	218	164	338	158	120
6/16	161	43	230	192	346	172	142
6/17	174	43	245	216	365	187	159
6/18	188	47	266	238	385	201	175
6/19		71	278	259	421	224	198
6/20		81	304	271	445	240	218
6/21		94	318	296	458	255	240
EOS		374	687	625	650	519	538

Chinook Salmon Table A2. Cumulative CPUE from the ATF.

Date	2018	2017	2016	2015
6/15	104	451	971	449
6/16	119	559	1,076	519
6/17	135	650	1,149	684
6/18	NA	726	1,189	806
6/19		792	1,304	1,020
6/20		906	1,334	1,138
6/21		1,081	1,386	1,311
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	6/18 Cumulative %
Earliest	6/14	65%
Early 10%	6/17	54%
Early 25%	6/21	44%
Median	6/22	33%
Late 25%	6/24	23%
Late 10%	6/27	16%
Latest	7/3	9%

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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.
6/15	187	92	42	35	236	84	64
6/16	204	130	50	46	255	104	83
6/17	215	148	50	62	316	125	104
6/18	243	206	58	87	365	157	155
6/19		326	61	140	532	235	222
6/20		345	120	277	686	313	283
6/21		388	209	293	731	371	361
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
6/15	8	145	72	66
6/16	8	175	80	81
6/17	15	190	105	97
6/18	NA	206	113	115
6/19		222	137	124
6/20		271	153	155
6/21		417	196	162
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	6/18 Cumulative %
Earliest	6/23	16%
Early 10%	7/1	11%
Early 25%	7/2	7%
Median	7/5	3%
Late 25%	7/7	2%
Late 10%	7/11	1%
Latest	7/14	<1%

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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.
6/15	14	23	5	19	97	32	26
6/16	17	58	5	27	108	47	42
6/17	17	71	8	37	115	55	54
6/18	17	84	18	57	126	68	69
6/19		108	39	77	142	94	100
6/20		124	55	100	188	118	123
6/21		135	57	108	193	131	154
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
6/15	0	7	0	0
6/16	0	7	0	0
6/17	0	7	0	0
6/18	NA	7	0	0
6/19		7	0	0
6/20		7	0	0
6/21		7	0	0
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	6/18 Cumulative %
Earliest	6/22	30%
Early 10%	6/24	21%
Early 25%	6/25	14%
Median	6/29	8%
Late 25%	7/1	4%
Late 10%	7/5	1%
Latest	7/10	<1%

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June 16, 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 are conducting community-based monitoring creel surveys to support Kuskokwim River Inter-Tribal Fisheries Commission and Refuge efforts to estimate total harvest after each fishing opportunity.

- Currently, we are completing surveys in Kasigluk and Atmautluak where our staff worked with 3 local community-based monitors on June 16. In Kasigluk we completed 1 survey out of 5 people who went fishing, and 6 out of 8 total fishers 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. In Aniak and Kalskag we are completing the community-based monitoring harvest surveys. 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.

- On June 16 we conducted 23 harvest surveys in Kalskag and Aniak. Among the completed surveys, on average each boat fished for 4 ½ hours and caught 4 kings and 2 chums.
- Harvest and effort data from these surveys was provided to Refuge staff for consideration in their harvest estimation model. Some of this information will be reviewed when Refuge staff present their harvest estimations to the Working Group today.
- Division staff traveled by boat between Aniak and Kalskag on June 16 between 7:00 and 8:30 P.M. when they counted 7 boats fishing near Aniak and 10 fishing near Kalskag.
- The NVN technician who is collecting data from fishers who are not surveyed spoke to 2 Kalskag fishers, one who fished on June 16 and one who did not.
- NVN and Subsistence Division are currently surveying fishers in Aniak who are fishing during the 24-hour subsistence opening in State waters. Results from those surveys will be shared during the next Working Group meeting.
- 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.

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Submitted by LaMont Albertson

Agenda Item: *Salmon Hatchery Discussion*, under *Old Business*

Hatcheries are not a solution to Alaska's weak Chinook runs, *Anchorage Daily News*

- Author: [Milo Adkinson](#)
- Updated: September 29, 2016
- Published June 9, 2014

Many people are experiencing hardship because of steep and protracted declines in Chinook stocks, particularly in rural Western Alaska. There are calls to fix the shortage of fish by planting fish, either from our existing hatcheries or from new facilities we'd build on the Yukon, the Kuskokwim, etc. Most fish biologists think this is a terrible idea, based on what we've seen of hatcheries in the Pacific Northwest.

Alaska's policy is to site hatcheries away from wild stocks. This is because hatcheries often work, and when they do, the wild stocks can suffer.

Consider a wild stock that can support harvest of half of its fish every year. If the hatchery is successful, each spawner will produce many more offspring, so that more than nine out of 10 could be harvested and still leave enough for broodstock. If the hatchery fish and wild fish mingle on the fishing grounds, harvesting nine of 10 will overharvest the wild-born fish, leading to a rapid decline in the stock.

In-river hatcheries mean intermingling wild and hatchery fish on the fishing grounds. They also mean mixing juveniles in the rivers where competition may further affect the wild fish, and elevated fish numbers could support increases in predators or diseases.

What if the hatchery fish spawn with the wild fish, increasing spawner abundance in the wild? As long as we use local broodstock, isn't this OK?

Many studies have shown that hatchery fish domesticate (e.g., adapt to life in crowded raceways, feeding on pellets spread on the surface, etc.) very quickly, and that once released to the wild their survival is lower than that of wild fish. "Local" is also hard to ensure; salmon home fairly precisely, and fish just a few miles apart can be adapted to the particular temperatures, flow regimes, and food sources of their location. Those differences can sometimes be seen in the different "runs" to the same river, but are often hidden, and these locally-adapted stocks are not always distinguishable with our genetic techniques.

Mixing hatchery fish with wild fish has a high potential to depress the fitness of our wild stocks, which is why Alaska's policy is to restrict hatchery fish to just 2 percent of spawners at any location.

All of the problems I've mentioned have been seen with hatcheries in the Lower 48. In addition, hatchery production there masked the decline in wild fish caused by the systematic destruction of their habitats, so that the fisheries are now dependent on this hatchery production. That history is

Informational Packet

Submitted by LaMont Albertson

Agenda Item: *Salmon Hatchery Discussion*, under *Old Business*

laid out in the books "King of Fish" and "Salmon without Rivers." In Alaska, our abundance of pristine habitat means our Chinook will eventually rebound on their own, when environmental conditions improve.

We've seen it before -- in the late 1970s, salmon stocks throughout the state rebounded from cold conditions and overfishing on the high seas, leading to record salmon harvests last year. We need to help people suffering because of low Chinook returns, and we need to preserve the habitat so that the fish can come back when conditions improve. On the surface, hatchery fish may look like a solution, but more likely they'd just create new problems.

Milo Adkison is a professor at the University of Alaska School of Fisheries and Ocean Sciences.

The views expressed here are the writer's own and are not necessarily endorsed by Alaska Dispatch, which welcomes a broad range of viewpoints. To submit a piece for consideration, e-mail [commentary\(at\)alaskadispatch.com](mailto:commentary(at)alaskadispatch.com).

Supplemental Document: USFWS Harvest Estimates

Harvest Estimates: 6/12/2018 Subsistence Opportunity

Kalskag - Aniak

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 12, 2018 within the Yukon Delta National Wildlife Refuge (YDNWR) boundaries. The data used to produce this estimate were collected by the Alaska Department of Fish and Game (ADF&G) Division of Subsistence. **These estimates encompass harvest taken the portion of the main-stem Kuskokwim River between and including the villages of Kalskag and Aniak.** 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 12 and ending at 10:00PM June 12. The special action can be found [here](#), and the corresponding news release [here](#).

Data Sources

- A total of **20** fisher interviews were used in this analysis.
 - All **20** fisher interviews were collected by ADF&G Division of Subsistence stationed in Kalskag and Aniak.
- **20** interviews were from drift boat fishers.
- **0** interviews were from set net fishers.
- ADF&G flew **3** aerial surveys to count drift boats and set nets, and conducted **3** boat-based surveys.
 - **1** of the aerial surveys was discarded as it was flown during the same time as the second boat-based survey.

Effort Estimates

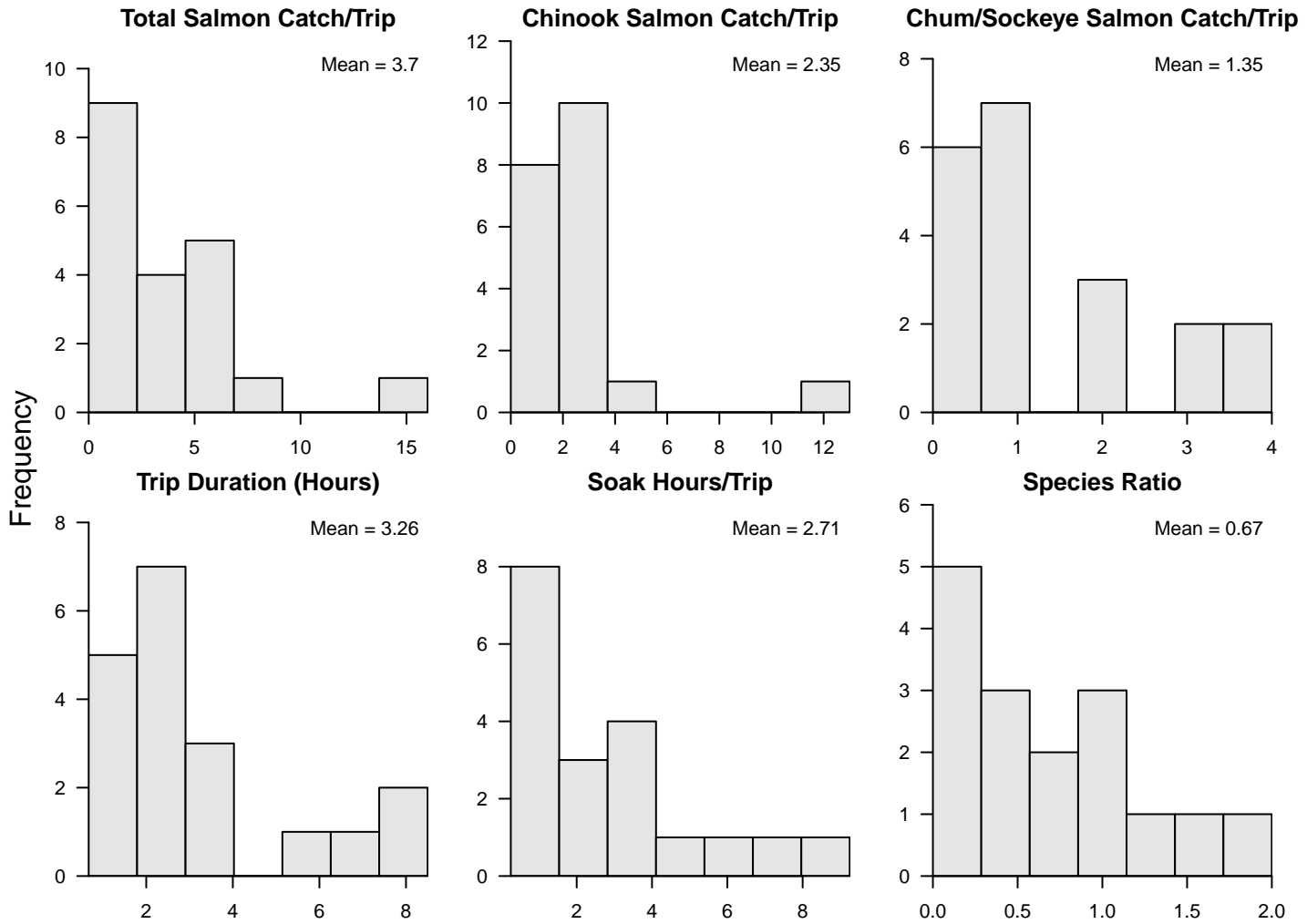
- A total of **32** drift boat trips were estimated to have occurred during the opportunity.
- During effort surveys between Kalskag and Aniak, ADF&G observed:
 - **10** drift boats between 12:23PM and 1:13PM (boat-based count),
 - **13** drift boats between 2:01PM and 3:23PM (boat-based count),
 - **10** drift boats between 5:12PM and 6:16PM (boat-based count),
 - **18** drift boats between 6:59PM and 7:17PM (aerial-based count), and
 - **15** drift boats between 7:18PM and 7:35PM (aerial-based count).
- Of the drift boats counted on the second survey, an estimated **71%** were also counted during the first survey
- Of the drift boats counted on the third survey, an estimated **43%** were also counted during the second survey.
- Of the drift boats counted on the fourth survey, an estimated **67%** were also counted during the third survey.
- Of the drift boats counted on the fifth survey, an estimated **100%** were also counted during the fourth survey.
- **7** drift boat trips were estimated to have began and ended during times that were not surveyed by boat or airplane.
- ADF&G observed **5** set nets fishing during the opportunity.

Harvest Estimates

- An estimated total of **190 (120 - 270)** salmon were harvested.
 - An estimated total of **120 (70 - 190)** Chinook salmon were harvested.
 - An estimated total of **60 (30 - 100)** chum salmon were harvested.
 - An estimated total of **0 (0 - 10)** sockeye salmon were harvested.
- No set net interviews were available, so a set net harvest was not produced.

Supplemental Document: USFWS Harvest Estimates

Figure 1. Distribution of relevant quantities from all collected drift boat interviews.



Supplemental Document: USFWS Harvest Estimates

Harvest Estimates: 6/16/2018 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 16, 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 Fisheries Commission (KRITFC) in cooperation with the Bering Sea Fisherman's Association (BSFA). **These estimates encompass harvest taken 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 16 and ending at 10:00PM June 16. The special action can be found [here](#), and the corresponding news release [here](#).

Data Sources

- A total of **248** fisher interviews were used in this analysis.
 - **90** fisher interviews collected by OTNC from the Bethel boat harbor were used.
 - **24** fisher interviews collected by OTNC from Bethel area fish camps were used.
 - **85** fisher interviews collected by KRITFC/BSFA community-based monitoring efforts were used.
 - **7** fisher interviews collected by ADF&G Division of Subsistence stationed in Kasigluk and Atmautluak were used.
 - **42** fisher interviews collected by USFWS law enforcement officers were used.
- **240** interviews were from drift boat fishers.
- **8** interviews were from set net fishers.
- USFWS flew **2** aerial surveys to count drift boats and set nets (1 scheduled flight was not flown due to weather).

Effort Estimates

- A total of **488** 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 12:30PM and 2:00PM and
 - **180** drift boats between 7:30PM and 9:20PM.
- Of the drift boats counted on the second flight, an estimated **39%** were also counted during the first flight.
- **59** drift boat trips were estimated to have began and ended during times that were not flown.
- We observed **20** set nets fishing in the main-stem Kuskokwim River during the opportunity.

Harvest Estimates

- An estimated total of **8,600 (7,330 - 10,070)** salmon were harvested.
 - An estimated total of **5,480 (4,580 - 6,470)** Chinook salmon were harvested.
 - An estimated total of **2,670 (2,150 - 3,270)** chum salmon were harvested.
 - An estimated total of **450 (300 - 630)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **190 (110 - 300)** total salmon (**83%** Chinook salmon, **9%** chum salmon, and **8%** sockeye salmon).

Supplemental Document: USFWS Harvest Estimates

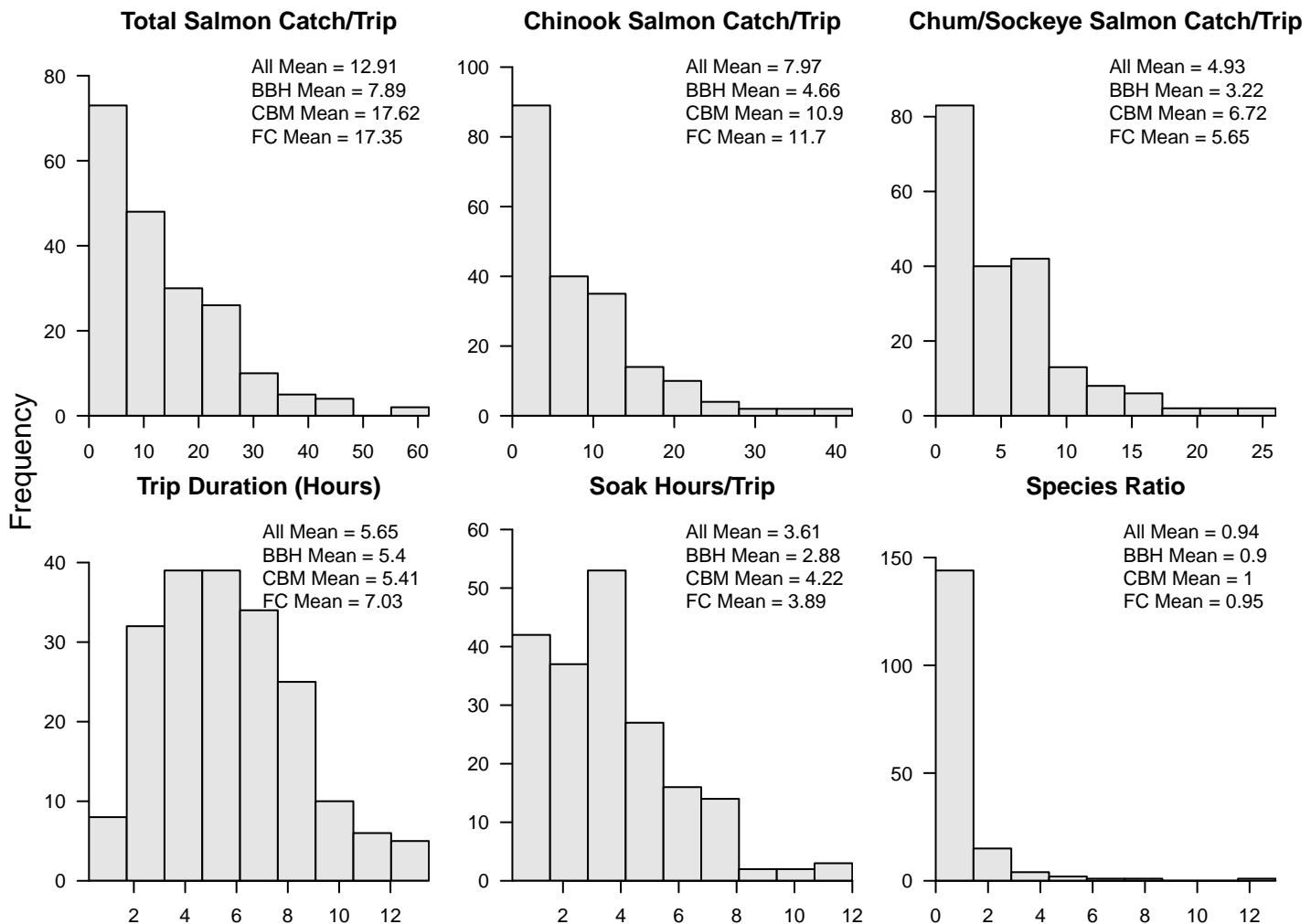
Table 1. Breakdown of relevant quantities by river stratum (area).

Stratum	Interviews	Max Drift Count	Set Net Count	Est. Drift Trips	Chinook Harvest	Chum Harvest	Sockeye Harvest
Tunt-Johnson	55	93	0	125	1,570	860	100
Johnson-Napaskiak	40	55	2	108	1,220	480	90
Napaskiak-Akaichak	139	148	16	209	2,010	990	250
Akiachak-Akiak	14	23	2	45	670	340	10
Total	248	319	20	488	5,480	2,670	450

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	20	13	30
Above Johnson R.	Salmon/Boat	16	14	19
Below Johnson R.	Ratio	0.6	0.4	0.8
Above Johnson R.	Ratio	0.6	0.5	0.7

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.	11	0	0.1	1	1.1	3.6
Johnson R. - Napaskiak	17	0	0.7	2.6	3.5	8.7
Napaskiak - Akiachak	61	0	0	1.6	2.3	8
All	89	0	0.3	1.7	2.4	8.7

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

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	11	0	0	3	6	12
Johnson R. - Napaskiak	17	0	2	6	12	15
Napaskiak - Akiachak	61	0	0	5	6	35
All	89	0	1	5	6	35

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.	11	0	0.1	0.9	1	5
Johnson R. - Napaskiak	17	0	0.3	1.3	1.7	5
Napaskiak - Akiachak	61	0	0	1.4	1.7	10
All	89	0	0.1	1.3	1.5	10

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

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	11	0	1	3	2	10
Johnson R. - Napaskiak	17	0	1	3	5	17
Napaskiak - Akiachak	61	0	0	3	4	15
All	89	0	1	3	5	17

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.	11	0%	17%	52%	79%	100%
Johnson R. - Napaskiak	17	0%	53%	65%	80%	100%
Napaskiak - Akiachak	61	0%	38%	53%	78%	100%
All	89	0%	40%	56%	80%	100%

Supplemental Document: USFWS Harvest Estimates

Table A6. Summary of trip start time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	8:50AM	10:00AM	10:54AM	12:00PM	2:00PM
Johnson R. - Napaskiak	10:00AM	11:00AM	12:57PM	1:00PM	7:30PM
Napaskiak - Akiachak	7:00AM	10:00AM	12:24PM	2:00PM	8:00PM
All	7:00AM	10:00AM	12:19PM	1:30PM	8:00PM

Table A7. Summary of trip end time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	3:18PM	3:56PM	5:42PM	6:30PM	10:14PM
Johnson R. - Napaskiak	12:20PM	3:25PM	5:18PM	7:21PM	9:34PM
Napaskiak - Akiachak	1:17PM	3:53PM	5:50PM	7:47PM	10:13PM
All	12:20PM	3:51PM	5:43PM	7:30PM	10:14PM

Supplemental Document: USFWS Harvest Estimates

Appendix B: Village-Specific Interview Information Detailed Summaries

Information is for drift nets only; data from Atmautluak were collected by ADF&G Division of Subsistence, all other data were collected by KRITFC/BSFA community-based harvest monitors. ADF&G interviewed one fisher in Kasigluk, so information from this interview is 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	10	0	1.9	2.8	3.6	6
Akiak	13	0	2.1	7	5.6	40
Atmautluak	6	0	0.2	0.3	0.4	0.7
Kwethluk	29	0	0.8	2.3	2.9	7.3
Napaskiak	17	1.1	1.8	3.2	4.3	8
Tuntutuliak	13	0	0.2	1.4	1.8	5.5
All	88	0	0.8	3	3.7	40

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

Village	N	Min	25%	Mean	75%	Max
Akiachak	10	0	7	12	17	25
Akiak	13	0	2	9	14	20
Atmautluak	6	0	1	4	6	11
Kwethluk	29	0	3	11	19	42
Napaskiak	17	4	8	12	14	20
Tuntutuliak	13	0	1	9	16	24
All	88	0	3	10	14	42

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	10	0	1	2	3	5
Akiak	13	0	1	3	4	8
Atmautluak	6	0	0	0	0	1
Kwethluk	29	0	0	1	2	6
Napaskiak	17	0	1	2	2	5
Tuntutuliak	13	0	0	0	1	1
All	88	0	0	2	2	8

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	10	1	6	10	13	22
Akiak	13	0	3	8	13	21
Atmautluak	6	0	1	3	4	10
Kwethluk	29	0	1	7	8	26
Napaskiak	17	2	4	7	8	15
Tuntutuliak	13	0	0	3	6	8
All	88	0	2	6	8	26

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

Village	N	Min	25%	Mean	75%	Max
Akiachak	10	0%	43%	51%	59%	93%
Akiak	13	0%	41%	53%	77%	100%
Atmautluak	6	0%	51%	56%	69%	100%
Kwethluk	29	7%	58%	66%	78%	100%
Napaskiak	17	29%	57%	64%	72%	87%
Tuntutuliak	13	25%	54%	68%	79%	100%
All	88	0%	50%	61%	75%	100%

Table B6. Summary of trip start time by village.

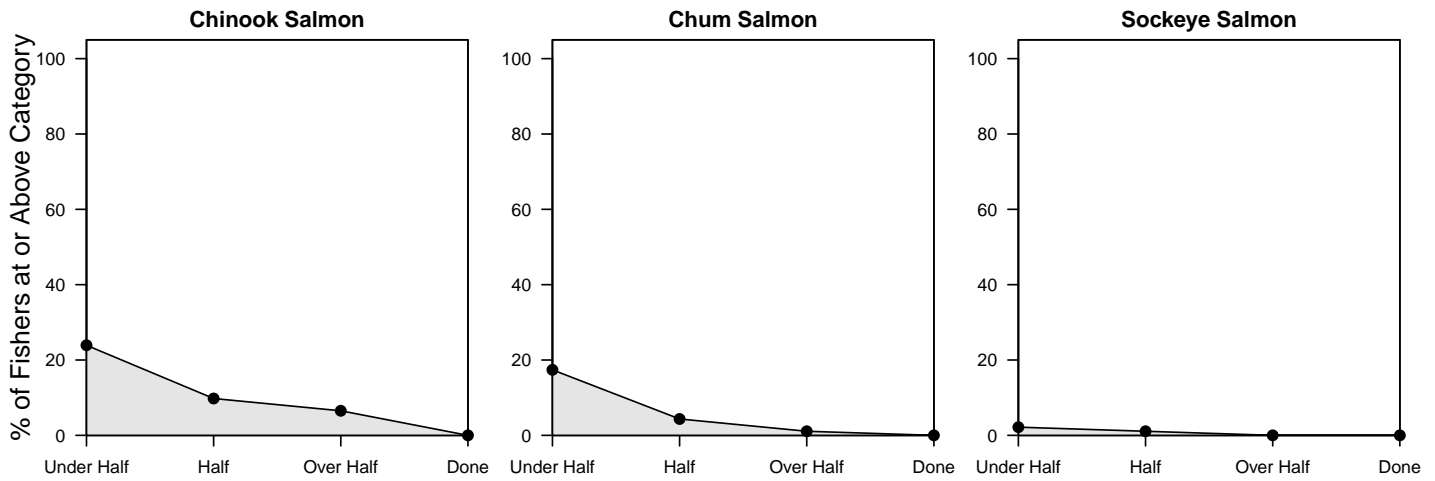
Village	Min	25%	Mean	75%	Max
Akiachak	10:00am	10:08am	12:17pm	2:08pm	7:00pm
Akiak	10:00am	12:00pm	1:03pm	2:00pm	6:45pm
Atmautluak	10:00am	2:00pm	4:00pm	7:52pm	9:30pm
Kwethluk	9:15am	10:30am	12:20pm	1:00pm	8:00pm
Napaskiak	10:00am	10:30am	11:34am	12:30pm	3:00pm
Tuntutuliak	9:00am	10:00am	12:10pm	1:00pm	6:00pm
All	9:00am	10:26am	12:31pm	2:00pm	9:30pm

Table B7. Summary of trip end time by village.

Village	Min	25%	Mean	75%	Max
Akiachak	12:00pm	5:08pm	6:12pm	8:52pm	9:30pm
Akiak	2:30pm	4:00pm	6:02pm	6:30pm	10:30pm
Atmautluak	10:00pm	10:15pm	10:55pm	11:30pm	11:30pm
Kwethluk	1:30pm	3:00pm	5:41pm	8:00pm	10:00pm
Napaskiak	11:00am	4:00pm	4:36pm	5:45pm	7:30pm
Tuntutuliak	3:00pm	6:00pm	6:14pm	7:00pm	8:00pm
All	11:00am	4:00pm	6:01pm	7:38pm	11:30pm

Supplemental Document: USFWS Harvest Estimates

Figure B1. Visual of the interviewed fishers' reported progress at meeting harvest goals for each 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 Harvest Estimates

Harvest Estimates: 6/16/2018 Subsistence Opportunity

Kalskag - Aniak

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 16, 2018 within the Yukon Delta National Wildlife Refuge (YDNWR) boundaries. The data used to produce this estimate were collected by the Alaska Department of Fish and Game (ADF&G) Division of Subsistence. **These estimates encompass harvest taken the portion of the main-stem Kuskokwim River between and including the villages of Kalskag and Aniak.** 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 16 and ending at 10:00PM June 16. The special action can be found [here](#), and the corresponding news release [here](#).

Data Sources

- A total of **22** fisher interviews were used in this analysis.
 - All **22** fisher interviews were collected by ADF&G Division of Subsistence stationed in Kalskag and Aniak.
- **22** interviews were from drift boat fishers.
- **0** interviews were from set net fishers.
- ADF&G conducted **1** boat-based survey to count fishing effort.

Effort Estimates

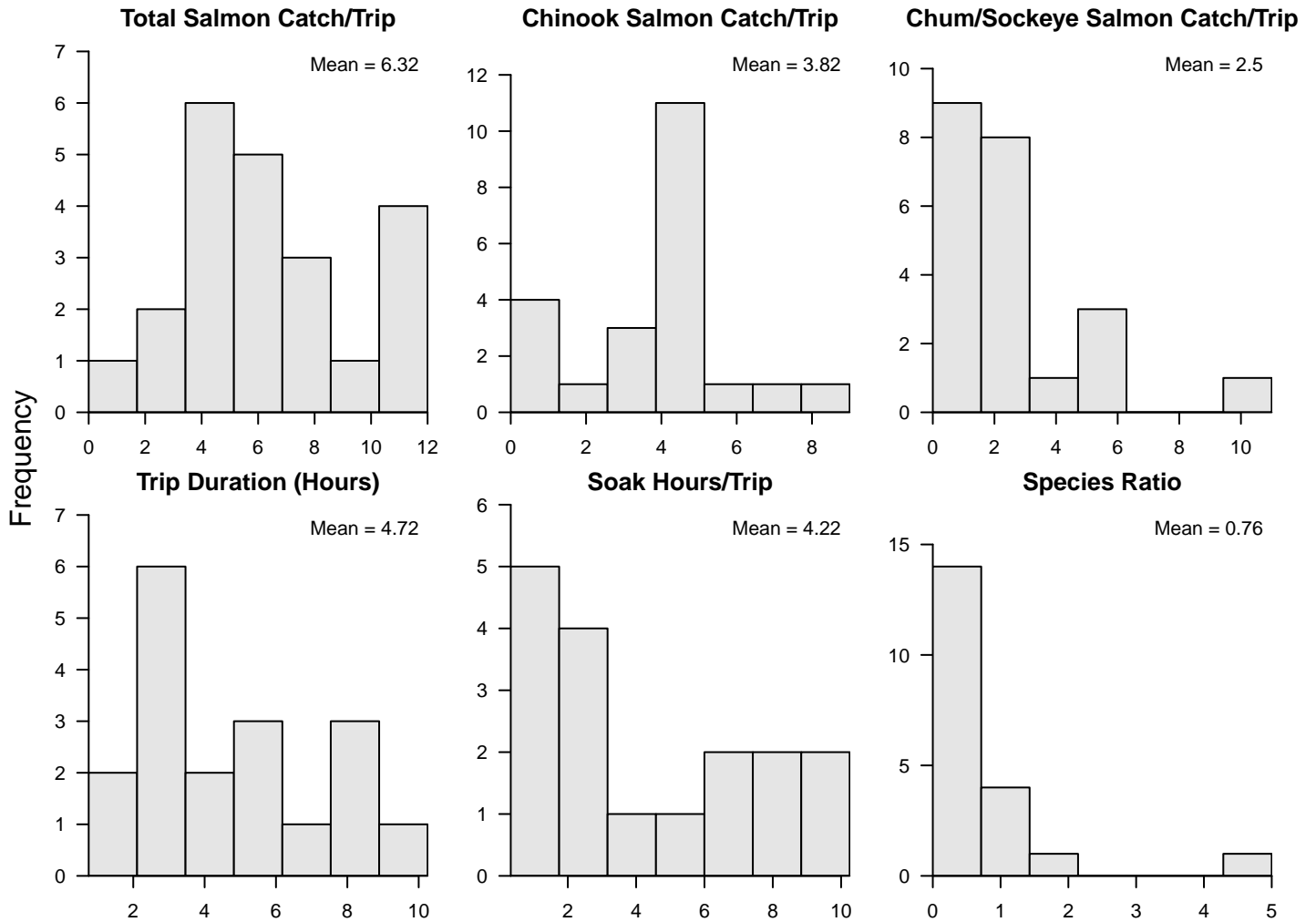
- Although an effort survey was conducted, it was decided that an inadequate amount of information was available to inform the effort estimator.
- Fishing effort was assumed to be the same as in this portion of the river during the 6/12/2018 fishing opportunity (**32** drift boat trips).
- ADF&G observed **4** set nets fishing during the opportunity.

Harvest Estimates

- An estimated total of **360 (200 - 570)** salmon were harvested.
 - An estimated total of **230 (140 - 360)** Chinook salmon were harvested.
 - An estimated total of **120 (60 - 220)** chum salmon were harvested.
 - No sockeye salmon were estimated to have been harvested.
- No set net interviews were available, so a set net harvest was not produced.

Supplemental Document: USFWS Harvest Estimates

Figure 1. Distribution of relevant quantities from all collected drift boat interviews.



Supplemental Document: USFWS Net Effort

Submitted by USFWS

Summary of Net Effort Flights (06/13/2018 – 6/19/2018)

Refuge staff flew three flights from June 13 to June 19, 2018 to enumerate netting effort during the 12 hour drift gillnet opportunity in the mainstem Kuskokwim River (covering the area from Tuntutuliak to Akiak), as well as 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 19, 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 ^c	6/15	6/16 ^c	6/19
Set	0	11	3	2	84	9	20	18	52	16	22	12
Drift	0	2 ^b	1 ^b	0	2 ^b	2 ^b	2 ^b	1 ^b	338	6 ^b	321	1
Total	0	13	4	2	86	11	22	19	390	22	343	13

^a days in which ≤ 4" set gillnet opportunities occurred; ^b drift netting occurred in nonsalmon tributary; ^c day in which 12 hour drift gillnet opportunities occurred.

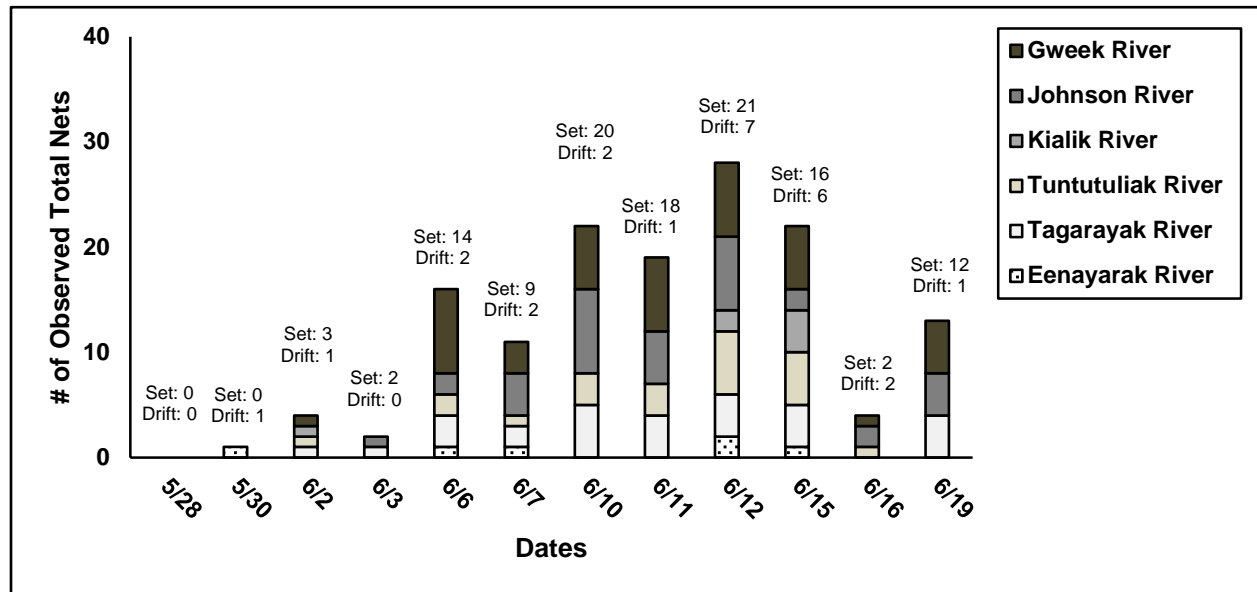


Figure 1. Location composition of observed nets in sampled nonsalmon spawning tributaries within Yukon Delta National Wildlife Refuge from May 28 – June 19, 2018.

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 10, 2018. Week 1 and 2 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 (June 11 - 17)				Week 4 (June 18 - June 24)
				6/11	6/12	6/15	6/16	6/19
Eenayarak River	Set	0	0	0	0	1	0	0
	Drift	1	2	0	2	0	0	0
	Total	1	2	0	2	1	0	0
Tagarayak River	Set	2	10	4	4	4	0	4
	Drift	0	0	0	0	0	0	0
	Total	2	10	4	4	4	0	4
Tuntutuliak River	Set	0	6	3	5	5	1	0
	Drift	1	0	0	1	0	0	0
	Total	1	6	3	6	5	1	0
Kialik River	Set	1	0	0	0	0	0	0
	Drift	0	0	0	2	4	0	0
	Total	1	0	0	2	4	0	0
Johnson River	Set	1	10	5	6	1	0	3
	Drift	0	4	0	1	1	2	1
	Total	1	14	5	7	2	2	4
Gweek River	Set	1	17	6	6	5	1	5
	Drift	0	0	1	1	1	0	0
	Total	1	17	7	7	6	1	5
TOTAL	Set	5	43	18	21	16	2	12
	Drift	2	6	1	7	6	2	1
	Total	7	49	19	28	22	4	13

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.