

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).

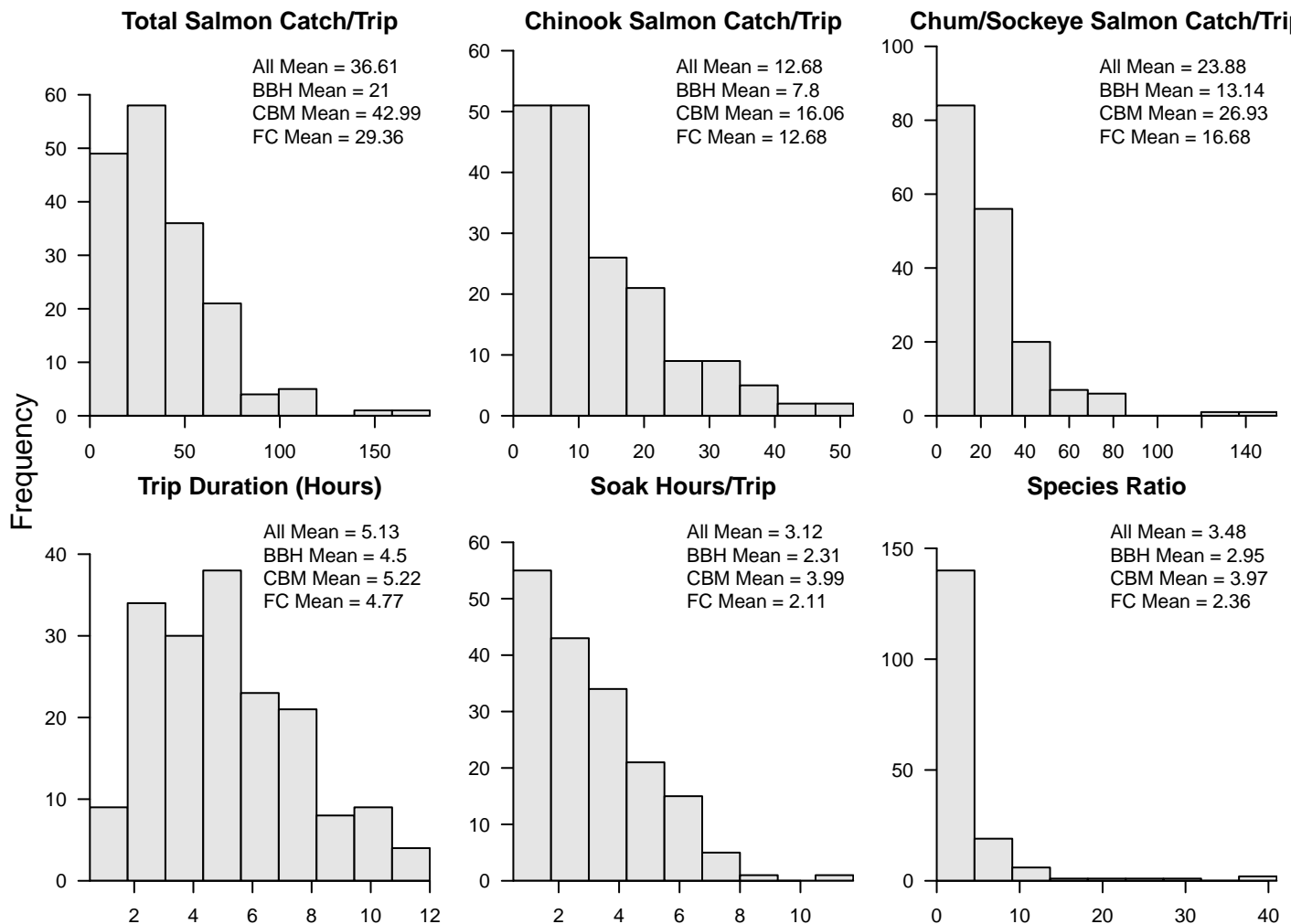
Table 1. Breakdown of relevant quantities by river stratum (area).

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.



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%

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

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

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

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.*

