

Harvest Estimates: 7/1/2017 Subsistence Opener

Prepared by USFWS

This document presents harvest and effort estimates as well as fisher-trip information for the subsistence salmon fishery opener on the Kuskokwim River that occurred on July 1, 2017 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 Native Council (ONC), and the Kuskokwim River Inter-tribal Fisheries Commission (KRITFC) in cooperation with the Bering Sea Fisherman's Association (BSFA). **These estimates encompass the portion of the YDNWR 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, as described in Staton and Coggins (2016). Please contact Ben Staton (benjamin_staton@fws.gov) for a copy of that report, or if you have any questions regarding these estimates.

USFWS had the opportunity to discuss the sampling and analytical methods used and the results obtained from these efforts with ADF&G and KRITFC and no alterations were suggested.

Opener 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 opener for Federally-qualified subsistence users to harvest fish other than Chinook salmon within the YDNWR waters. Chinook salmon caught incidentally by Federally-qualified subsistence users were allowed to be retained. The opener was 6 hours in duration, starting at 3:00PM July 1 and ending at 9:00PM July 1.

Data Sources

- A total of **113** fisher interviews were used in this analysis.
 - **42** fisher interviews collected by ONC from the Bethel boat harbor were used.
 - **21** fisher interviews collected by ONC from Bethel area fish camps were used.
 - **39** fisher interviews collected by KRITFC/BSFA community-based monitoring efforts were used.
 - **11** fisher interviews collected by USFWS law enforcement officers were used.
- **106** interviews were from drift boat fishers.
- **7** interviews were from set net fishers.
- USFWS flew **2** aerial surveys to count drift boats and set nets.

Effort Estimates

- A total of **320** drift boat trips were estimated to have occurred during the opener.
- During aerial survey flights between Tuntutuliak and Akiak, we observed:
 - **256** drift boats between 4:00PM and 5:15PM
 - **119** drift boats between 7:00PM and 8:15PM
- Of the drift boats counted on the second flight, we estimated that **69%** of them were also counted during the first flight.
- **26** drift boat trips were estimated to have begun and ended during times that were not flown.
- We observed **19** set nets fishing during the opener.

Harvest Estimates

- An estimated total of **30,190 (24,290 - 37,030)** salmon were harvested.
 - An estimated total of **990 (700 - 1,340)** Chinook salmon were harvested.
 - An estimated total of **19,640 (15,380 - 24,490)** chum salmon were harvested.
 - An estimated total of **9,550 (7,100 - 12,300)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **690 (550 - 830)** total salmon (**3%** Chinook salmon, **56%** chum salmon, and **42%** sockeye salmon).

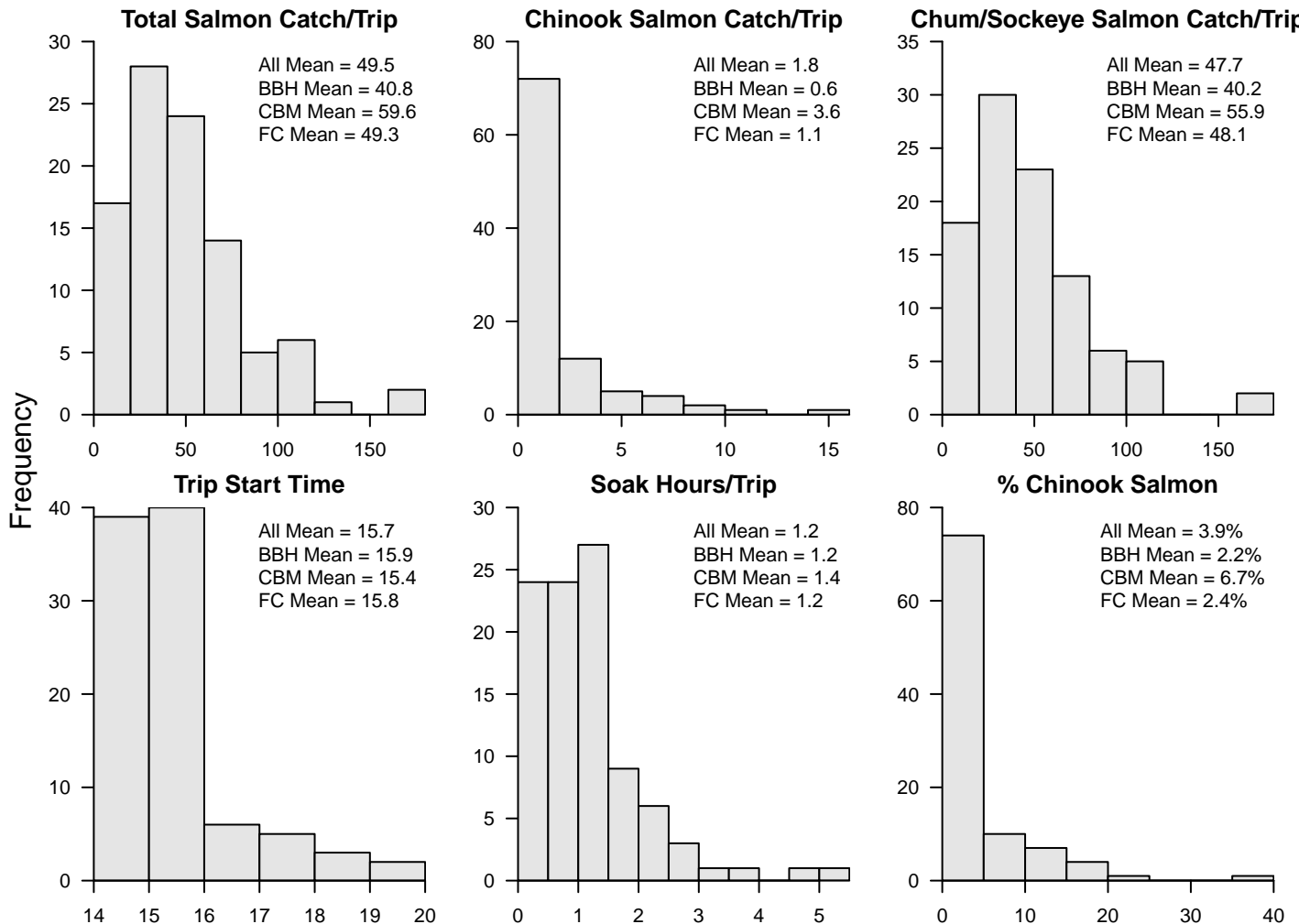
Table 1. Breakdown of relevant quantities by river stratum (area). Reported harvest is by both drift and set nets.

Stratum	Interviews	Max. Drift Count	Max. Set Net Count	Est. Drift Trips	Chinook Salmon Harvest	Chum Salmon Harvest	Sockeye Salmon Harvest
Tunt-Johnson	8	45	4	62	360	4,490	2,560
Johnson-Napaskiak	57	86	3	117	230	5,680	2,030
Napaskiak-Akaichak	33	106	7	106	180	7,260	4,080
Akiachak-Akiak	14	19	5	35	230	2,210	890
Total	112	256	19	320	1,000	19,640	9,560

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	117	63	183
Above Johnson R.	Salmon/Boat	86	69	108
Below Johnson R.	Ratio	22.6	6.5	48.7
Above Johnson R.	Ratio	35.8	25.2	50.4

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. Note there was one interview with out a fishing area recorded. It is included in the All statistics.

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.	1			2.5		
Johnson R. - Napaskiak	25	0	0	2.4	1.3	30
Napaskiak - Akiachak	14	0	0	1.6	0	10
All	41	0	0	2.1	1.4	30

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

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	1			5		
Johnson R. - Napaskiak	25	0	0	1	1	5
Napaskiak - Akiachak	14	0	0	0	0	1
All	41	0	0	1	1	5

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.	1			25.5		
Johnson R. - Napaskiak	25	1.8	19.7	69.3	77.8	270
Napaskiak - Akiachak	14	6	38.9	124.4	162.8	600
All	41	1.8	27.1	88	108	600

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

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	1			51		
Johnson R. - Napaskiak	25	2	17	34	43	120
Napaskiak - Akiachak	14	3	24	52	68	180
All	41	2	18	40	50	180

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.	1			9%		
Johnson R. - Napaskiak	25	0%	0%	3%	2%	25%
Napaskiak - Akiachak	14	0%	0%	1%	0%	4%
All	41	0%	0%	2%	2%	25%

Table A6. Summary of soak hours (the number of hours the net was actively fishing) by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	1			2		
Johnson R. - Napaskiak	25	0.2	0.5	1.2	1.5	5
Napaskiak - Akiachak	14	0.2	0.3	1.1	1.1	5.2
All	41	0.2	0.5	1.2	1.5	5.2

Table A7. Summary of trip start time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.			3:00pm		
Johnson R. - Napaskiak	12:00pm	3:05pm	4:07pm	4:00pm	8:00pm
Napaskiak - Akiachak	2:50pm	3:00pm	3:45pm	4:00pm	7:00pm
All	12:00pm	3:00pm	3:56pm	4:00pm	8:00pm

Table A8. Summary of trip end time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.			7:00pm		
Johnson R. - Napaskiak	4:35pm	5:45pm	7:21pm	9:00pm	9:35pm
Napaskiak - Akiachak	3:30pm	5:35pm	6:55pm	8:50pm	9:00pm
All	3:30pm	5:30pm	7:08pm	9:00pm	9:35pm

Appendix B: Community-Based Monitoring Interview Information Detailed Summaries

Information is for drift nets only

Column Meanings

- **Area:** 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
Tuntutuliak	5	0	1.8	7.5	9.4	18.2
Napaskiak	18	0	0	1.5	2.4	6.1
Kwethluk	2	3.3	5.5	7.7	9.8	12
Akiak	10	0.4	2.3	5.5	7.8	15
All	35	0	0.5	3.9	5.5	18.2

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

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	5	0	1	3	4	10
Napaskiak	18	0	0	2	3	4
Kwethluk	2	10	10	11	12	12
Akiak	10	1	4	6	7	15
All	35	0	1	4	5	15

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
Tuntutuliak	5	29	75	146	141	384
Napaskiak	18	2	22	56	74	160
Kwethluk	2	21	33	45	58	70
Akiak	10	13	20	51	66	110
All	35	2	24	67	78	384

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

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	5	16	34	62	50	168
Napaskiak	18	7	34	52	66	115
Kwethluk	2	62	64	66	68	70
Akiak	10	27	40	56	60	110
All	35	7	34	55	66	168

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

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	5	0%	2%	10%	6%	38%
Napaskiak	18	0%	0%	3%	5%	12%
Kwethluk	2	14%	14%	14%	14%	15%
Akiak	10	1%	6%	10%	15%	19%
All	35	0%	1%	7%	11%	38%

Table B6. Summary of soak time by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	5	0.5	0.5	1.2	1.5	2.2
Napaskiak	18	0.2	1.2	1.3	1.5	3.5
Kwethluk	2	1	1.5	2	2.5	3
Akiak	10	0.5	1	1.5	1.5	4
All	35	0.2	1	1.4	1.5	4

Table B7. Summary of trip start time by village.

Village	Min	25%	Mean	75%	Max
Tuntutuliak	3:00pm	3:00pm	3:42pm	4:00pm	5:30pm
Napaskiak	12:30pm	3:00pm	3:13pm	3:27pm	5:00pm
Kwethluk	3:00pm	3:00pm	3:00pm	3:00pm	3:00pm
Akiak	3:00pm	3:00pm	3:33pm	4:00pm	5:00pm
All	12:30pm	3:00pm	3:22pm	3:52pm	5:30pm

Table B8. Summary of trip end time by village.

Village	Min	25%	Mean	75%	Max
Tuntutuliak	5:00pm	5:30pm	6:42pm	7:30pm	8:00pm
Napaskiak	3:30pm	4:30pm	5:04pm	5:26pm	7:00pm
Kwethluk	4:00pm	4:30pm	5:00pm	5:30pm	6:00pm
Akiak	3:40pm	4:38pm	5:57pm	7:00pm	8:40pm
All	3:30pm	4:30pm	5:33pm	7:00pm	8:40pm

The percentages in tables and figures on this page are interpreted as the percent of interviewed fishers that have at least met the category listed. For example, 60% in the “Half” category indicates that 60% of interviewed fishers reported that they were at least halfway done with harvest for that species, some of those 60% may also be over halfway done or completely done.

Table B9. Progress at meeting needs for Chinook salmon by village.

Village	Under Half	Half	Over Half	Done
Tuntutuliak	80%	60%	40%	40%
Napaskiak	74%	0%	0%	0%
Kwethluk	100%	50%	0%	0%
Akiak	92%	50%	42%	0%
All	82%	26%	18%	5%

Table B10. Progress at meeting needs for chum salmon by village.

Village	Under Half	Half	Over Half	Done
Tuntutuliak	100%	100%	60%	40%
Napaskiak	95%	89%	47%	5%
Kwethluk	100%	50%	50%	0%
Akiak	100%	75%	58%	0%
All	97%	84%	53%	8%

Table B11. Progress at meeting needs for sockeye salmon by village.

Village	Under Half	Half	Over Half	Done
Tuntutuliak	80%	20%	20%	20%
Napaskiak	95%	63%	26%	5%
Kwethluk	100%	50%	50%	0%
Akiak	100%	67%	50%	0%
All	95%	58%	34%	5%

Figure B1. Visual of the interviewed fishers’ progress at meeting harvest goals for each three salmon species of interest. More grey on the left indicates fishers are close to meeting needs, less grey on left indicates fishers are far from meeting needs.

