

Harvest Estimates: 6/24/2017 Subsistence Opportunity

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, 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.

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 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 opportunity was 12 hours in duration, starting at 12:01PM June 24 and ending at 11:59PM June 24.

Data Sources

- A total of **272** fisher interviews were used in this analysis.
 - **97** fisher interviews collected by ONC from the Bethel boat harbor were used.
 - **32** fisher interviews collected by ONC from Bethel area fish camps were used.
 - **63** fisher interviews collected by KRITFC/BSFA community-based monitoring efforts were used.
 - **80** fisher interviews collected by USFWS law enforcement officers were used.
- **256** interviews were from drift boat fishers.
- **16** interviews were from set net fishers.
- USFWS flew **3** aerial surveys to count drift boats and set nets.

Effort Estimates

- A total of **447** drift boat trips were estimated to have occurred during the opportunity.
- During aerial survey flights between Tuntutuliak and Akiak, we observed:
 - **359** drift boats between 1:00PM and 2:30PM,
 - **213** drift boats between 5:00PM and 6:10PM, and
 - **79** between 8:45PM and 10:10PM.
- Of the drift boats counted on the second flight, we estimated that **73%** of them were also counted during the first flight.
- Of the drift boats counted on the third flight, we estimated that **94%** of them were also counted during the second flight.
- **25** drift boat trips were estimated to have began and ended during times that were not flown.
- We observed **38** set nets fishing during the opportunity.

Harvest Estimates

- An estimated total of **33,470 (29,290 - 37,910)** salmon were harvested.
 - An estimated total of **4,560 (3,780 - 5,410)** Chinook salmon were harvested.
 - An estimated total of **20,410 (17,680 - 23,310)** chum salmon were harvested.
 - An estimated total of **8,500 (6,920 - 10,220)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **3,830 (2,360 - 5,850)** total salmon (**13%** Chinook salmon, **52%** chum salmon, and **36%** sockeye salmon).

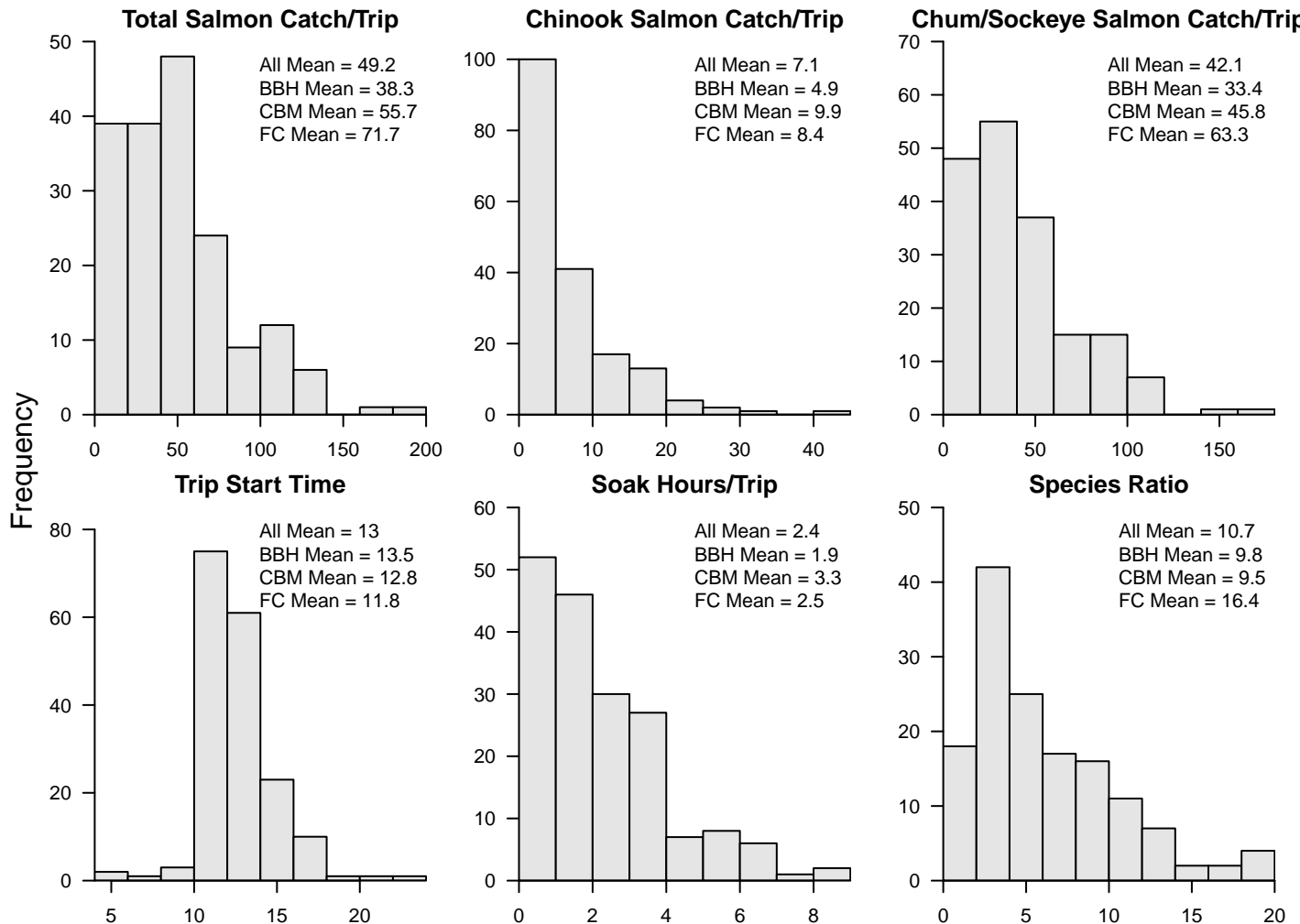
Table 1. Breakdown of relevant quantities by river stratum (area). Reported harvest is by both drift and set nets.

Stratum	Interviews	Max. Drift Count	Max. Set Net Count	Est. Drift Trips	Chinook Salmon Harvest	Chum Salmon Harvest	Sockeye Salmon Harvest
Tunt-Johnson	42	85	3	105	880	3,430	1,650
Johnson-Napaskiak	76	131	8	157	1,580	8,340	2,800
Napaskiak-Akaichak	145	112	23	129	1,340	6,640	3,240
Akiachak-Akiak	9	31	4	55	760	2,000	800
Total	272	359	38	447	4,560	20,410	8,490

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	54	37	75
Above Johnson R.	Salmon/Boat	70	61	80
Below Johnson R.	Ratio	5.8	4.3	7.7
Above Johnson R.	Ratio	6.4	5.2	7.7

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.



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	0.7	4.4	8	12
Johnson R. - Napaskiak	17	0	1.3	5.5	4.5	40
Napaskiak - Akiachak	67	0	1.3	4	5.8	26.2
All	95	0	1.2	4.3	5.8	40

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

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	11	0	2	8	12	32
Johnson R. - Napaskiak	17	0	3	5	5	11
Napaskiak - Akiachak	67	0	2	5	6	18
All	95	0	2	5	7	32

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	2	2.9	22.3	35	90
Johnson R. - Napaskiak	17	0.9	8	27.5	38.6	80
Napaskiak - Akiachak	67	0	10.1	29.6	40.6	160
All	95	0	8.1	28.3	40	160

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

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	11	2	8	25	36	60
Johnson R. - Napaskiak	17	2	14	37	45	112
Napaskiak - Akiachak	67	0	11	33	44	120
All	95	0	11	33	44	120

Table A5. Summary of species ratios (chum/sockeye:Chinook salmon) by area.

Area	N	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	11	0.2	3	4.2	6	8.3
Johnson R. - Napaskiak	17	0.7	2.5	9.7	11.1	34
Napaskiak - Akiachak	67	0	3.6	10.4	11	105
All	95	0	3.2	9.6	10.4	105

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.	11	0.5	0.8	1.9	2.5	5.2
Johnson R. - Napaskiak	17	0.2	0.8	2.1	2.3	7
Napaskiak - Akiachak	67	0.2	0.8	1.8	2.5	6
All	95	0.2	0.8	1.9	2.5	7

Table A7. Summary of trip start time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	6:00am	10:52am	12:04pm	1:15pm	5:00pm
Johnson R. - Napaskiak	11:00am	12:00pm	12:52pm	1:38pm	3:30pm
Napaskiak - Akiachak	9:30am	12:00pm	1:48pm	3:00pm	10:30pm
All	6:00am	12:00pm	1:26pm	2:41pm	10:30pm

Table A8. Summary of trip end time by area.

Area	Min	25%	Mean	75%	Max
Tunt. - Johnson R.	3:30pm	6:25pm	8:13pm	9:47pm	11:59pm
Johnson R. - Napaskiak	2:00pm	2:52pm	6:11pm	9:47pm	11:59pm
Napaskiak - Akiachak	2:00pm	4:30pm	6:42pm	9:33pm	11:59pm
All	2:00pm	4:22pm	6:47pm	9:42pm	11:59pm

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	9	0	0.7	3	5.3	10
Napakiak	7	0	1.7	5.2	8.8	13
Napaskiak	20	0.4	1.4	4.4	5.9	16.8
Kwethluk	12	0.4	1.4	2.7	3.7	6.3
Akiak	11	0	1.8	3.9	5.6	10
All	59	0	1.3	3.9	5.5	16.8

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

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	9	0	3	6	5	18
Napakiak	7	0	2	10	16	25
Napaskiak	20	1	4	8	11	20
Kwethluk	12	2	4	9	10	17
Akiak	11	0	4	16	24	44
All	59	0	3	10	14	44

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	9	0	1	9	5	62
Napakiak	7	15	34	57	77	98
Napaskiak	20	4	14	28	40	70
Kwethluk	12	5	6	13	19	31
Akiak	11	3	6	10	12	25
All	59	0	6	22	31	98

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

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	9	1	3	10	12	31
Napakiak	7	32	48	70	90	92
Napaskiak	20	9	34	58	76	150
Kwethluk	12	17	34	44	55	67
Akiak	11	15	21	36	48	100
All	59	1	23	45	62	150

Table B5. Summary of species ratios by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	9	0.2	0.5	2.4	2.8	8.7
Napakiak	7	3.6	4.7	19.2	36.2	49
Napaskiak	20	2.2	3.4	13	12.5	68
Kwethluk	12	3.4	3.8	6.8	7.2	18.7
Akiak	11	0.6	1.6	4.6	4.4	21
All	59	0.2	2.8	9.3	8.8	68

Table B6. Summary of soak time by village.

Village	N	Min	25%	Mean	75%	Max
Tuntutuliak	9	2	2	3	3	5
Napakiak	7	0	1	2	3	4
Napaskiak	20	0	1	3	4	7
Kwethluk	12	2	3	5	6	8
Akiak	11	2	2	4	5	7
All	59	0	2	3	4	8

Table B7. Summary of trip start time by village.

Village	Min	25%	Mean	75%	Max
Tuntutuliak	11:00am	11:15am	12:28pm	1:00pm	4:00pm
Napakiak	12:00pm	12:00pm	12:54pm	1:40pm	2:30pm
Napaskiak	8:30am	12:15pm	12:59pm	2:00pm	5:00pm
Kwethluk	12:00pm	12:00pm	12:49pm	1:30pm	3:00pm
Akiak	12:00pm	12:00pm	12:35pm	1:15pm	2:00pm
All	8:30am	12:00pm	12:47pm	1:30pm	5:00pm

Table B8. Summary of trip end time by village.

Village	Min	25%	Mean	75%	Max
Tuntutuliak	3:00pm	4:00pm	5:05pm	6:00pm	8:00pm
Napakiak	1:00pm	3:52pm	4:26pm	5:45pm	6:30pm
Napaskiak	1:20pm	3:11pm	4:16pm	5:19pm	9:15pm
Kwethluk	2:30pm	3:45pm	5:45pm	7:00pm	11:35pm
Akiak	2:30pm	5:08pm	6:48pm	8:45pm	11:00pm
All	1:00pm	3:30pm	5:11pm	6:08pm	11:35pm

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. E.g., 82% in the “Under Half” category indicates that 82% of reported fishers report that they are at least under halfway done with harvest for that species, some of those 82% may also be halfway done or over halfway, or completely done.

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

Village	Under Half	Half	Over Half	Done
Tuntutuliak	82%	82%	45%	9%
Napakiak	71%	29%	0%	0%
Napaskiak	17%	0%	0%	0%
Kwethluk	42%	17%	8%	0%
Akiak	82%	55%	9%	0%
All	50%	30%	11%	2%

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

Village	Under Half	Half	Over Half	Done
Tuntutuliak	91%	73%	55%	18%
Napakiak	100%	43%	43%	29%
Napaskiak	74%	26%	9%	4%
Kwethluk	83%	50%	17%	0%
Akiak	100%	45%	27%	0%
All	86%	44%	25%	8%

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

Village	Under Half	Half	Over Half	Done
Tuntutuliak	82%	45%	36%	9%
Napakiak	57%	29%	29%	29%
Napaskiak	65%	17%	4%	0%
Kwethluk	25%	17%	8%	0%
Akiak	82%	27%	18%	0%
All	62%	25%	16%	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.

