

# Harvest Estimates: 6/12/2018 Subsistence Opportunity

*Prepared by USFWS*

*CORRECTED*

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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 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](mailto: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 **274** fisher interviews were used in this analysis.
  - **97** fisher interviews collected by OTNC from the Bethel boat harbor were used (**23** did not have soak time).
  - **17** 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.
  - **10** fisher interviews collected by ADF&G Division of Subsistence stationed in Kasigluk were used.
  - **76** fisher interviews collected by USFWS law enforcement officers were used.
- **263** interviews were from drift boat fishers.
- **11** interviews were from set net fishers.
- USFWS flew **3** aerial surveys to count drift boats and set nets.

## Effort Estimates

- A total of **466** drift boat trips were estimated to have occurred during the opportunity.
- During aerial survey flights between Tuntutuliak and Akiak, we observed:
  - **305** drift boats between 11:00AM and 12:40PM,
  - **315** drift boats between 3:00PM and 5:00PM, and
  - **202** drift boats between 7:00PM and 8:30PM.
- Of the drift boats counted on the second flight, we estimated that **69%** of them were also counted during the first flight.
- Of the drift boats counted on the third flight, we estimated that **71%** of them were also counted during the second flight.
- **5** drift boat trips were estimated to have begun and ended during times that were not flown.
- We observed **31** set nets fishing in the main-stem Kuskokwim River during the opportunity.

## Harvest Estimates

- An estimated total of **7,170 (5,970 - 8,550)** salmon were harvested.
  - An estimated total of **5,120 (4,300 - 6,060)** Chinook salmon were harvested.
  - An estimated total of **1,780 (1,290 - 2,450)** chum salmon were harvested.
  - An estimated total of **260 (150 - 390)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **740 (330 - 1330)** total salmon (**86%** Chinook salmon, **14%** chum salmon, and **0%** sockeye salmon).

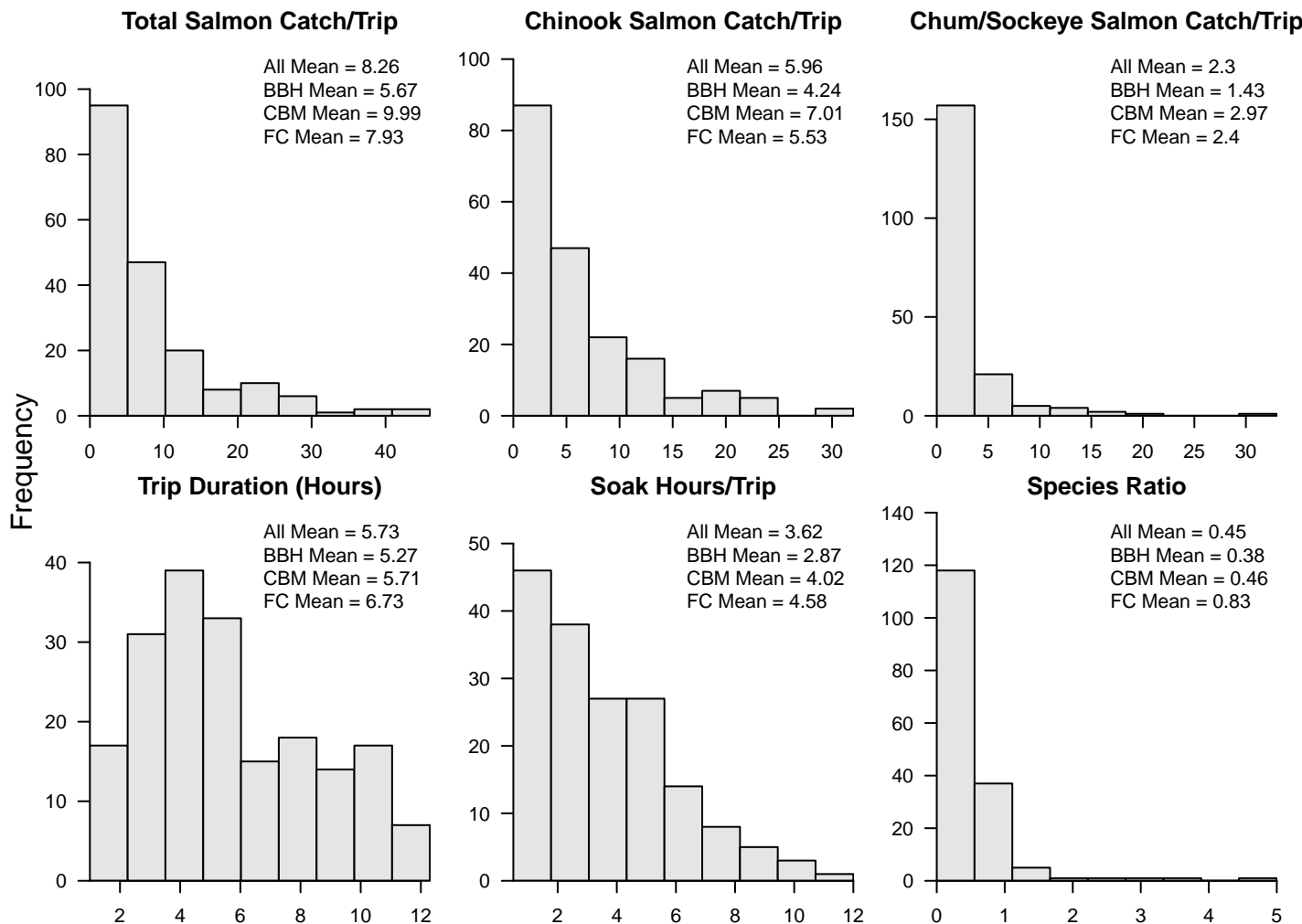
**Table 1.** Breakdown of relevant quantities by river stratum (area).

Stratum	Interviews	Max Drift Count	Set Net Count	Est. Drift Trips	Chinook Harvest	Chum Harvest	Sockeye Harvest
Tunt-Johnson	77	93	0	110	1,910	1,250	90
Johnson-Napaskiak	48	98	4	139	870	220	90
Napaskiak-Akaichak	120	104	19	160	1,650	240	70
Akiachak-Akiak	29	36	8	57	700	80	20
<b>Total</b>	<b>274</b>	<b>331</b>	<b>31</b>	<b>466</b>	<b>5,120</b>	<b>1,780</b>	<b>260</b>

**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	30	21	40
Above Johnson R.	Salmon/Boat	9	7	11
Below Johnson R.	Ratio	0.7	0.5	1
Above Johnson R.	Ratio	0.2	0.2	0.3

**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
<b>Tunt. - Johnson R.</b>	19	0	0.6	1.7	2.3	8.6
<b>Johnson R. - Napaskiak</b>	28	0	0.2	1.4	1.5	10.5
<b>Napaskiak - Akiachak</b>	48	0	0.6	2.1	2	12.5
<b>All</b>	<b>95</b>	<b>0</b>	<b>0.4</b>	<b>1.8</b>	<b>2</b>	<b>12.5</b>

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

Area	N	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	19	0	2	8	16	24
<b>Johnson R. - Napaskiak</b>	28	0	1	3	3	12
<b>Napaskiak - Akiachak</b>	48	0	1	4	5	13
<b>All</b>	<b>95</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>5</b>	<b>24</b>

**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
<b>Tunt. - Johnson R.</b>	19	0	0.2	0.9	0.8	6.3
<b>Johnson R. - Napaskiak</b>	28	0	0	0.5	0.5	3
<b>Napaskiak - Akiachak</b>	48	0	0	0.4	0.4	3.3
<b>All</b>	<b>95</b>	<b>0</b>	<b>0</b>	<b>0.6</b>	<b>0.5</b>	<b>6.3</b>

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

Area	N	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	19	0	1	4	4	20
<b>Johnson R. - Napaskiak</b>	28	0	0	1	2	4
<b>Napaskiak - Akiachak</b>	48	0	0	1	1	6
<b>All</b>	<b>95</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>20</b>

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

Area	N	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	19	0%	50%	67%	83%	100%
<b>Johnson R. - Napaskiak</b>	28	0%	62%	75%	100%	100%
<b>Napaskiak - Akiachak</b>	48	0%	58%	77%	100%	100%
<b>All</b>	<b>95</b>	<b>0%</b>	<b>50%</b>	<b>74%</b>	<b>100%</b>	<b>100%</b>

**Table A6.** Summary of trip start time by area.

Area	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	8:30AM	10:00AM	11:55AM	1:15PM	6:00PM
<b>Johnson R. - Napaskiak</b>	9:30AM	10:41AM	1:22PM	4:00PM	8:00PM
<b>Napaskiak - Akiachak</b>	9:00AM	10:00AM	1:19PM	4:38PM	9:00PM
<b>All</b>	<b>8:30AM</b>	<b>10:05AM</b>	<b>1:03PM</b>	<b>4:00PM</b>	<b>9:00PM</b>

**Table A7.** Summary of trip end time by area.

Area	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	3:45PM	5:35PM	6:57PM	7:42PM	10:40PM
<b>Johnson R. - Napaskiak</b>	12:30PM	4:54PM	6:25PM	8:15PM	10:20PM
<b>Napaskiak - Akiachak</b>	12:00PM	2:59PM	6:00PM	8:51PM	10:27PM
<b>All</b>	<b>12:00PM</b>	<b>3:57PM</b>	<b>6:19PM</b>	<b>8:36PM</b>	<b>10:40PM</b>

## 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

### 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
<b>Akiachak</b>	8	1.2	1.9	2.8	3.3	6.3
<b>Akiak</b>	12	0	1.2	2.9	3.8	8
<b>Kasigluk</b>	10	0.5	0.9	4.3	4.9	20.6
<b>Kwethluk</b>	19	0	0.5	1.3	1.3	8.2
<b>Napaskiak</b>	16	0.4	0.9	1.9	2.3	7.4
<b>Tuntutuliak</b>	15	0	0.5	2.4	3	7.5
<b>All</b>	<b>80</b>	<b>0</b>	<b>0.8</b>	<b>2.4</b>	<b>2.6</b>	<b>20.6</b>

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

Village	N	Min	25%	Mean	75%	Max
<b>Akiachak</b>	8	2	4	11	20	23
<b>Akiak</b>	12	0	4	8	8	29
<b>Kasigluk</b>	10	6	8	16	22	32
<b>Kwethluk</b>	19	0	2	5	7	16
<b>Napaskiak</b>	16	2	5	7	9	18
<b>Tuntutuliak</b>	15	0	2	7	12	15
<b>All</b>	<b>80</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**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
<b>Akiachak</b>	8	0	0	1	1	2
<b>Akiak</b>	12	0	0	0	0	1
<b>Kasigluk</b>	10	0	0	2	2	10
<b>Kwethluk</b>	19	0	0	0	0	1
<b>Napaskiak</b>	16	0	0	1	1	2
<b>Tuntutuliak</b>	15	0	0	2	4	7
<b>All</b>	<b>80</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>10</b>

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

Village	N	Min	25%	Mean	75%	Max
<b>Akiachak</b>	8	0	1	2	4	6
<b>Akiak</b>	12	0	0	1	1	3
<b>Kasigluk</b>	10	1	3	6	6	13
<b>Kwethluk</b>	19	0	0	1	2	7
<b>Napaskiak</b>	16	0	1	2	3	7
<b>Tuntutuliak</b>	15	0	0	8	12	33
<b>All</b>	<b>80</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>33</b>

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

Village	N	Min	25%	Mean	75%	Max
<b>Akiachak</b>	8	40%	80%	82%	94%	100%
<b>Akiak</b>	12	50%	78%	87%	100%	100%
<b>Kasigluk</b>	10	60%	65%	73%	80%	86%
<b>Kwethluk</b>	19	0%	67%	80%	100%	100%
<b>Napaskiak</b>	16	50%	62%	76%	87%	100%
<b>Tuntutuliak</b>	15	21%	38%	53%	67%	100%
<b>All</b>	<b>80</b>	<b>0%</b>	<b>61%</b>	<b>75%</b>	<b>96%</b>	<b>100%</b>

**Table B6.** Summary of trip start time by village.

Village	Min	25%	Mean	75%	Max
<b>Akiachak</b>	10:00am	10:22am	11:34am	12:22pm	3:00pm
<b>Akiak</b>	10:00am	11:22am	12:58pm	2:08pm	7:00pm
<b>Kasigluk</b>	8:30am	9:49am	10:22am	10:52am	1:00pm
<b>Kwethluk</b>	10:00am	10:00am	12:35pm	1:30pm	8:00pm
<b>Napaskiak</b>	10:00am	10:11am	10:52am	11:30am	1:00pm
<b>Tuntutuliak</b>	9:50am	10:30am	11:11am	11:13am	1:30pm
<b>All</b>	<b>8:30am</b>	<b>10:00am</b>	<b>11:40am</b>	<b>12:03pm</b>	<b>8:00pm</b>

**Table B7.** Summary of trip end time by village.

Village	Min	25%	Mean	75%	Max
<b>Akiachak</b>	12:30pm	5:52pm	6:41pm	9:08pm	9:30pm
<b>Akiak</b>	12:00pm	5:52pm	7:48pm	10:00pm	10:30pm
<b>Kasigluk</b>	3:00pm	7:30pm	7:12pm	8:00pm	8:40pm
<b>Kwethluk</b>	12:30pm	4:00pm	6:16pm	8:30pm	10:00pm
<b>Napaskiak</b>	1:30pm	3:38pm	4:06pm	4:22pm	6:30pm
<b>Tuntutuliak</b>	1:00pm	3:00pm	3:49pm	4:15pm	7:25pm
<b>All</b>	<b>12:00pm</b>	<b>3:45pm</b>	<b>5:46pm</b>	<b>8:00pm</b>	<b>10:30pm</b>