

# Harvest Estimates: 7/5/2018 Subsistence Opportunity

Tuntutuliak - Akiak

*Prepared by USFWS*

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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 July 5, 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](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 9:00AM July 5 and ending at 9:00PM July 5. The special action can be found [here](#), and the corresponding news release [here](#).

## Data Sources

- **94** fisher interviews were used in this analysis.
  - **29** fisher interviews collected by OTNC from the Bethel boat harbor were used.
  - **20** fisher interviews collected by OTNC from Bethel area fish camps were used.
  - **43** fisher interviews collected by KRITFC/BSFA community-based monitoring efforts were used.
  - **2** fisher interviews collected monitors trained by ADF&G Division of Subsistence staff stationed in Kasigluk were used.
- **81** interviews were from drift boat fishers.
- **13** interviews were from set net fishers.
- USFWS flew **2** aerial surveys to count drift boats and set nets (3 were scheduled but the morning flight was canceled due to inclement weather).

## Effort Estimates

- **276** drift boat trips were estimated to have occurred during the opportunity.
- During aerial survey flights between Tuntutuliak and Akiak, we observed:
  - **87** drift boats between 2:00PM and 4:00PM,
  - **90** drift boats between 6:40PM and 8:00PM, and
- Of the drift boats counted on the second flight, an estimated **30%** were also counted during the first flight.
- **126** drift boat trips were estimated to have began and ended during times that were not flown.
- We observed **13** set nets fishing in the main-stem Kuskokwim River during the opportunity.

## Harvest Estimates

- An estimated total of **24,800 (21,210 - 28,680)** salmon were harvested.
  - An estimated total of **1,020 (820 - 1,240)** Chinook salmon were harvested.
  - An estimated total of **12,500 (10,380 - 14,760)** chum salmon were harvested.
  - An estimated total of **11,280 (9,250 - 13,490)** sockeye salmon were harvested.
- Harvest by set nets accounted for an estimated **1,220 (830 - 1,670)** total salmon (**4%** Chinook salmon, **35%** chum salmon, and **61%** sockeye salmon).

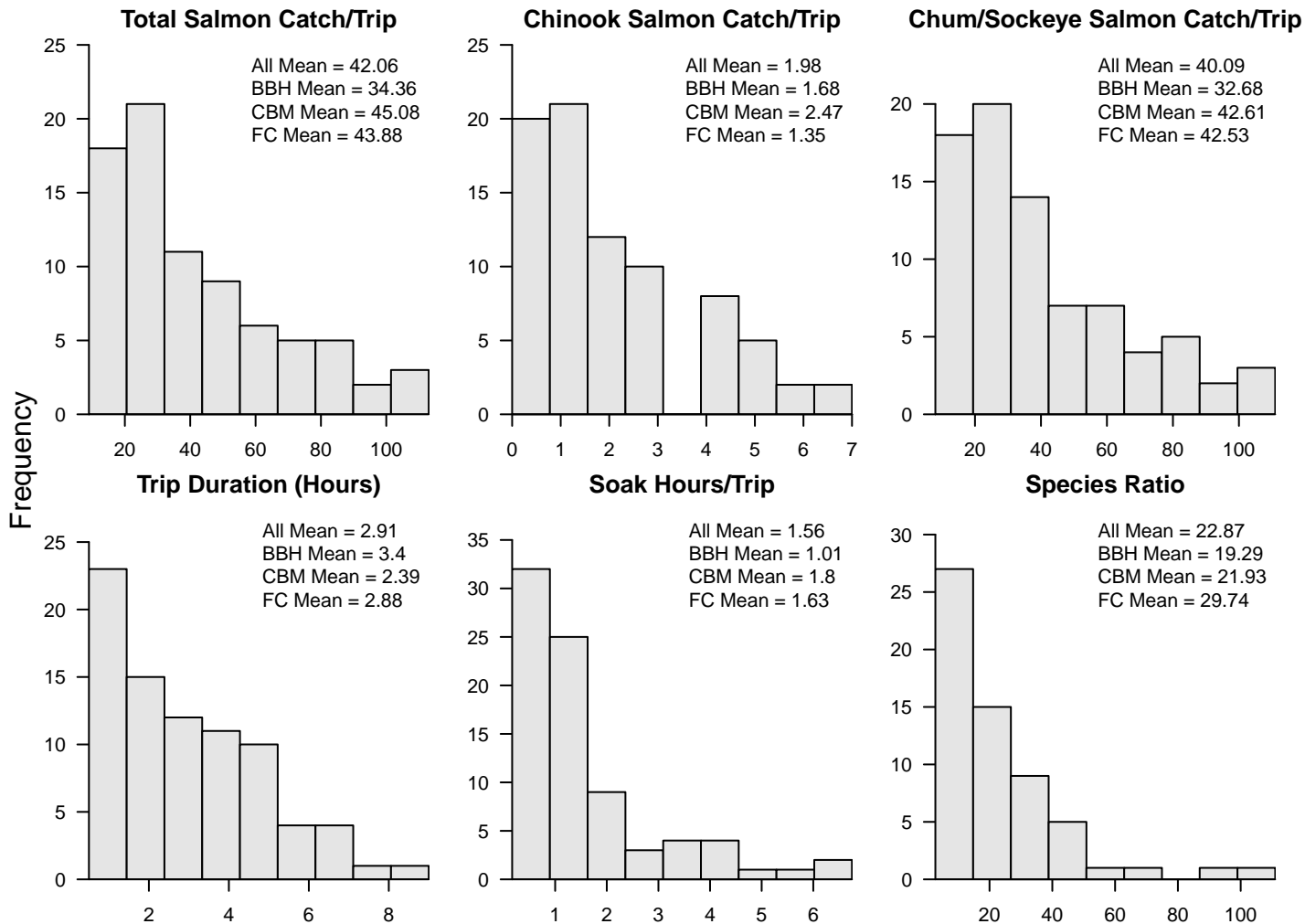
**Table 1.** Breakdown of relevant quantities by river stratum (area). *It was necessary to pool data from the Johnson-Napaskiak stratum in with the Tunt-Johnson to produce the estimate for the Tunt-Johnson stratum.*

Stratum	Interviews	Max Drift Count	Est. Drift Trips	Chinook Harvest	Chum Harvest	Sockeye Harvest
Tunt-Johnson	4	20	50	230	3,670	2,540
Johnson-Napaskiak	20	22	61	300	4,330	3,250
Napaskiak-Akiachak	52	47	132	370	3,340	4,800
Akiachak-Akiak	18	12	33	120	1,160	690
<b>Total</b>	<b>94</b>	<b>101</b>	<b>276</b>	<b>1,020</b>	<b>12,500</b>	<b>11,280</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	129	93	168
Above Johnson R.	Salmon/Boat	76	62	91
Below Johnson R.	Ratio	27.3	18.1	40.9
Above Johnson R.	Ratio	22.6	17.1	29.9

**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>	1	0	0	0	0	0
<b>Johnson R. - Napaskiak</b>	2	1	1.1	1.2	1.4	1.5
<b>Napaskiak - Akiachak</b>	22	0	0.1	2.7	2.9	15
<b>All</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>2.5</b>	<b>2.5</b>	<b>15</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>	1	0	0	0	0	0
<b>Johnson R. - Napaskiak</b>	2	1	1	2	2	2
<b>Napaskiak - Akiachak</b>	22	0	0	2	2	5
<b>All</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>5</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>	1	54	54	54	54	54
<b>Johnson R. - Napaskiak</b>	2	40	41.6	43.2	44.9	46.5
<b>Napaskiak - Akiachak</b>	22	9	15.4	43.6	64.5	144
<b>All</b>	<b>25</b>	<b>9</b>	<b>18</b>	<b>44</b>	<b>60</b>	<b>144</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>	1	54	54	54	54	54
<b>Johnson R. - Napaskiak</b>	2	31	43	56	68	80
<b>Napaskiak - Akiachak</b>	22	9	14	30	30	108
<b>All</b>	<b>25</b>	<b>9</b>	<b>15</b>	<b>33</b>	<b>49</b>	<b>108</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>	1			0%		
<b>Johnson R. - Napaskiak</b>	2	2%	3%	3%	3%	3%
<b>Napaskiak - Akiachak</b>	22	0%	0%	7%	8%	27%
<b>All</b>	<b>25</b>	<b>0%</b>	<b>0%</b>	<b>6%</b>	<b>8%</b>	<b>27%</b>

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

Area	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	11:00AM	11:00AM	11:00AM	11:00AM	11:00AM
<b>Johnson R. - Napaskiak</b>	2:00PM	2:15PM	2:30PM	2:45PM	3:00PM
<b>Napaskiak - Akiachak</b>	8:30AM	9:30AM	12:09PM	1:45PM	7:45PM
<b>All</b>	<b>8:30AM</b>	<b>9:30AM</b>	<b>12:18PM</b>	<b>2:00PM</b>	<b>7:45PM</b>

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

Area	Min	25%	Mean	75%	Max
<b>Tunt. - Johnson R.</b>	3:33PM	3:33PM	3:33PM	3:33PM	3:33PM
<b>Johnson R. - Napaskiak</b>	6:40PM	7:02PM	7:24PM	7:45PM	8:07PM
<b>Napaskiak - Akiachak</b>	10:00AM	1:58PM	3:22PM	5:09PM	9:00PM
<b>All</b>	<b>10:00AM</b>	<b>2:06PM</b>	<b>3:41PM</b>	<b>5:14PM</b>	<b>9:00PM</b>

## Appendix B: Village-Specific Interview Information Detailed Summaries

Information is for drift nets only; data from Kasigluk, Kwethluk, and Akiachak are not shown because very few interviews were available there.

### 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>Akiak</b>	13	0	0	2.6	3	12
<b>Napaskiak</b>	19	0	0.7	2.1	3.7	6
<b>All</b>	<b>32</b>	<b>0</b>	<b>0.4</b>	<b>2.3</b>	<b>3.5</b>	<b>12</b>

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

Village	N	Min	25%	Mean	75%	Max
<b>Akiak</b>	13	0	0	2	3	6
<b>Napaskiak</b>	19	0	2	3	4	7
<b>All</b>	<b>32</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>7</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>Akiak</b>	13	5	16	36	55	72
<b>Napaskiak</b>	19	4	7	52	74	170
<b>All</b>	<b>32</b>	<b>4</b>	<b>11</b>	<b>46</b>	<b>64</b>	<b>170</b>

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

Village	N	Min	25%	Mean	75%	Max
<b>Akiak</b>	13	16	24	31	35	65
<b>Napaskiak</b>	19	11	26	49	71	111
<b>All</b>	<b>32</b>	<b>11</b>	<b>24</b>	<b>42</b>	<b>58</b>	<b>111</b>

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

Village	N	Min	25%	Mean	75%	Max
<b>Akiak</b>	13	0%	0%	5%	11%	15%
<b>Napaskiak</b>	19	0%	3%	8%	10%	23%
<b>All</b>	<b>32</b>	<b>0%</b>	<b>1%</b>	<b>7%</b>	<b>11%</b>	<b>23%</b>

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

Village	Min	25%	Mean	75%	Max
<b>Akiak</b>	9:00am	12:00pm	1:25pm	2:15pm	8:30pm
<b>Napaskiak</b>	9:00am	10:00am	10:47am	11:45am	12:30pm
<b>All</b>	<b>9:00am</b>	<b>10:00am</b>	<b>11:51am</b>	<b>12:45pm</b>	<b>8:30pm</b>

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

Village	Min	25%	Mean	75%	Max
<b>Akiak</b>	9:45am	2:10pm	3:33pm	5:00pm	9:00pm
<b>Napaskiak</b>	10:30am	11:52am	1:21pm	2:30pm	5:30pm
<b>All</b>	<b>9:45am</b>	<b>12:00pm</b>	<b>2:15pm</b>	<b>4:16pm</b>	<b>9:00pm</b>

**Table B8.** Fisher’s reported progress at meeting harvest goals for Chinook salmon. The percentage is the fraction of fishers reporting they are at or above each category after fishing on 7/5/2018.

Village	N	Under Half	Half	Over Half	Done
<b>Akiachak</b>	7	100%	100%	100%	100%
<b>Akiak</b>	13	100%	92%	92%	50%
<b>Bethel Area Fish Camps</b>	19	63%	47%	26%	26%
<b>Kwethluk</b>	4	100%	100%	100%	100%
<b>Napaskiak</b>	19	100%	100%	47%	0%
<b>All</b>	<b>62</b>	<b>89%</b>	<b>82%</b>	<b>59%</b>	<b>36%</b>

**Table B9.** Fisher’s reported progress at meeting harvest goals for chum salmon. Interpretted the same as in **Table B8**.

Village	N	Under Half	Half	Over Half	Done
<b>Akiachak</b>	7	100%	100%	100%	100%
<b>Akiak</b>	13	100%	92%	92%	58%
<b>Bethel Area Fish Camps</b>	19	89%	89%	84%	79%
<b>Kwethluk</b>	4	100%	100%	100%	100%
<b>Napaskiak</b>	19	100%	100%	95%	58%
<b>All</b>	<b>62</b>	<b>97%</b>	<b>95%</b>	<b>92%</b>	<b>72%</b>

**Table B10.** Fisher’s reported progress at meeting harvest goals for sockeye salmon. Interpretted the same as in **Table B8**.

Village	N	Under Half	Half	Over Half	Done
<b>Akiachak</b>	7	100%	100%	86%	0%
<b>Akiak</b>	13	92%	92%	54%	23%
<b>Bethel Area Fish Camps</b>	19	84%	79%	63%	47%
<b>Kwethluk</b>	4	100%	100%	100%	100%
<b>Napaskiak</b>	19	100%	100%	53%	11%
<b>All</b>	<b>62</b>	<b>94%</b>	<b>92%</b>	<b>63%</b>	<b>29%</b>

**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.

