Division of Commercial Fisheries
Sam Rabung, Director

Headquarters Office
PO Box 115526
Juneau, AK 99811-5526

Alaska Department of Fish and Game
Doug Vincent-Lang, Commissioner

PO Box 115526
Juneau, AK 99811-5526
www.adfg.alaska.gov

Advisory Announcement

CONTACT:
Deena Jallen, Area Management Biologist
(907) 459-7309

Released: **October 26, 2021**

Toll free fishing schedule and counts: (866) 479-7387
In Fairbanks fishing schedule hotline: 459-7387

2021 Yukon River Summer Season Summary

The following is a summary of the 2021 Yukon River Chinook and summer chum salmon fisheries. All data reported here are considered preliminary. For management purposes, the Yukon River is divided into several fishing districts and subdistricts (Figure 1).

In 2020, the Emmonak office was not opened due to the ongoing COVID-19 pandemic. In 2021, staff returned to Emmonak, and operations of the Lower Yukon Test Fishery (LYTF) were conducted by ADF&G technicians and Yukon Delta Fishery Development Association (YDFDA) crew. Operations were altered this year to reduce Chinook salmon mortalities and the Middle Mouth cabin was not opened this year to reduce possible COVID-19 exposures amongst the crew. Management and research staff travelled to Emmonak from the Anchorage and Fairbanks offices and followed local travel and health mandates.

The "summer season" refers to management of Chinook and summer chum salmon runs (early May through July 15 in District 1). After July 15, Chinook salmon are nearly done entering the river and fall chum start to replace summer chum as the dominant species. On July 16, management transitions to the "fall season" and assessment and management become focused on fall chum and coho salmon entering the mouth of the Yukon River. However, summer season management continued beyond this date in upper river districts as Chinook and summer chum salmon migration progressed upstream. Data presented in this summary applies to "summer season" species only. While summer season assessment and escapement projects have wrapped up by the date of this announcement, subsistence harvest estimation is only now beginning; final total run sizes cannot be estimated until harvest estimates are complete.

The summer season management team consisted of Alaska Department of Fish and Game (ADF&G) area management and research biologists, subsistence resource specialists, and the Federal subsistence fishery management staff from U.S. Fish and Wildlife Service (USFWS). The team met preseason to form the management strategy based on public input. Inseason, they met daily to consider and discuss daily updates of the summer chum and Chinook salmon assessment and escapement data, and plan management actions accordingly.

To more effectively reach fishermen, daily test fish counts and news releases were posted on a Facebook page called "Yukon River Fishing-ADFG". A toll-free fishery hotline was updated regularly and magnets with the hotline number were widely distributed. Updates were also provided via Yukon River Drainage Fisheries Association (YRDFA) weekly public teleconferences, the ADF&G News Release and assessment data list-serves, radio broadcasts, and the ADF&G web page.

2021 Preseason Outlook

Chinook salmon

The 2021 drainage-wide outlook was for a run size of 102,000 to 189,000 fish. This outlook was smaller than the 2020 outlook, and potentially as small as the runs from 2012 and 2013. Despite very restricted fishing in those

years, the Canadian Chinook salmon escapement objective was not met. Because of the poor projected run size, a cautious management approach was taken and the season began with salmon fishing closed.

Summer chum salmon

It was expected that the 2021 summer chum salmon run would be below average. The 2021 preseason outlook was for approximately 1.2 million summer chum salmon. A run of this size was anticipated to provide for escapements, an average subsistence harvest, and a surplus for commercial harvest. Based on the preseason outlook, it was expected that a commercially harvestable surplus of up to 0.5 million summer chum salmon would be available.

2021 Preseason Management Strategy

Prior to the annual preseason planning meeting, YRDFA hosted additional teleconferences with participants from each district in mid-April. Discussion topics included how to prepare for low salmon runs, importance and ability to harvest nonsalmon species, gear types, and how to adapt to changing conditions.

YRDFA hosted the preseason planning meeting with board members attending in person, and the public invited via teleconference. This meeting was held in late April and funded by the Yukon River Panel. The purpose of this meeting was to present the preseason outlook and management strategies and answer questions from participants. Fishermen from throughout the drainage discussed management options and raised additional concerns about environmental factors, bycatch, fish diseases, food security, and project operations. Updates on COVID-19 contingency plans and changes to project operations and were also given. The preseason plan and publicly distributed "Outlook Flier" included the following key management strategies:

- As Chinook salmon enter the Coastal Area and each district and tributary, subsistence salmon fishing will be closed. This closure may be weeks long until the midpoint of the Chinook salmon run is assessed at Pilot Station sonar. If inseason assessment indicates a run closer to the lower end of the outlook, subsistence fishing for Chinook salmon will remain closed.
- The sport fishery for Chinook salmon will begin the season closed throughout the U.S. portion of the Yukon River drainage, excluding the Tanana River drainage. Chinook salmon may not be retained or possessed. Management actions for the Tanana River drainage will be announced in early June.
- Subsistence fishing for summer chum salmon will be opened with selective gear (dip nets, beach seines, fish wheels) once summer chum salmon become more abundant.
- If confidence is high that the Chinook salmon run is near the upper end of the outlook, and escapement goals are likely to be met, some subsistence fishing opportunities (on reduced fishing schedules) with gillnets may be allowed. For most districts and areas, gillnets will be restricted to 6-inch or smaller mesh.
- Fishing for non-salmon species with 4-inch or smaller mesh gill nets will be allowed during salmon fishing closures; however, net length will be reduced to a maximum of 60 feet at the start of the season. If there are indications that salmon are being targeted with this gear, or if it is determined that there is no harvestable surplus of Chinook salmon, openings for this gear may be discontinued.
- When the summer chum salmon run is projected to meet the drainagewide escapement goal, commercial fishing for summer chum salmon may begin with selective gear (dip nets and beach seine with all Chinook salmon released alive). Openings in Districts 1 and 2 will be dependent on processor capacity.

2021 Inseason Run Assessment Overview

Ice break-up at the mouth of the Yukon River (near Emmonak) occurred on May 13, which was 6 days earlier than the average break-up on May 19 (based on the years 2001–2020). The first Chinook salmon was caught on May 31 in the Pilot Station sonar test fishery. Accounting for a 3-day travel time, the first detected Chinook salmon likely passed by Emmonak on May 28, 2 days earlier than the average of May 30 (based on years 2001–

2020). The first summer chum salmon was caught on May 30 in the LYTF, which was 2 days earlier than the average date of June 1 (based on years 2001–2020).

The LYTF program is primarily designed to assess salmon run timing. The LYTF provides relative catch data and Catch Per Unit Effort (CPUE), which gives an index of abundance and indicates the presence of large groups of fish or "pulses" entering the mouths of the river. Operations for the LYTF were altered in 2021 compared to prior years. The Middle Mouth set gillnet site was not operated in order to reduce Chinook salmon mortalities. Drift gillnet operations using 8.25-inch mesh were added to Middle Mouth fishing sites to obtain Chinook salmon CPUE data from that location. In the South Mouth at Big Eddy, set gillnet operations for Chinook salmon and drift gillnet operations for summer chum and Chinook salmon were operated the same as they were in past years. The Big Eddy Chinook salmon drift CPUE values can be compared to historical averages. The set net information from LYTF in 2021 should not be compared to historical data because it did not include any Middle Mouth set net data; however, daily CPUE values were useful for indicating the presence of large groups of fish entering the river.

The LYTF was operational at the South Mouth (Big Eddy) drift and set gillnet sites on May 22 and June 4, respectively. The LYTF set gillnet for Chinook salmon concluded operations on July 12 at Big Eddy. The cumulative Chinook salmon CPUE for the Big Eddy set net was 29.82. The 8.25-inch drift gillnet for Chinook salmon operated in Big Eddy until July 15 with a cumulative CPUE of 41.92, which was well below the historical average of 389.49. The Middle Mouth cumulative Chinook salmon CPUE in the 8.25-inch drift gillnet was 73.01 and the combined Chinook salmon drift CPUE was 64.89. The combined cumulative summer chum salmon CPUE for the 5.5-inch drift gillnet at the Big Eddy and Middle Mouth sites was 191.90, which was well below the historical median of 7,265.00. Water temperatures recorded at the LYTF remained near or below average throughout most of the summer (Figure 2).

Chinook and summer chum salmon caught in the LYTF were either released alive or sampled and distributed to local community members. In 2021, 324 Chinook salmon were released alive from the LYTF while 521 Chinook salmon were distributed. For summer chum salmon, 26 fish were released alive and 297 fish were distributed. The number of test fish distributed in 2021 was far less than the recent 5-year averages of 982 Chinook and 3,094 summer chum salmon, which reflects the low abundance of salmon and changes to test fishing projects to reduce mortalities. The fish donation program was coordinated with village Tribal Councils and with the assistance of YDFDA.

The Pilot Station sonar provides abundance estimates and run timing information for Chinook and summer chum salmon. The test fishery at the sonar project is used to apportion the daily sonar counts by species and is also used to sample the salmon runs for ASL and genetic data. A total of 301 Chinook and 321 summer chum salmon mortalities were delivered to nearby communities for distribution. This was the first year of a feasibility study to test whether the prevalence and intensity if the Ichthyophonus parasite could be quantified in the lower river for future research. Approximately 200 of the Chinook salmon mortalities were sampled across all age and size classes throughput the run. Results of this study and plans for expanded future research will be made available when completed.

The cumulative passage estimate at the Pilot Station sonar was approximately 124,874 Chinook salmon (with a 90% confidence interval of 114,100 to 135,700 fish). This passage was below the historical average of approximately 146,066 fish for late run timing years and the run appeared to come in toward the lower end of the outlook. Most of the Chinook salmon entered the river in four pulses consisting of approximately 22,550 fish; 53,670 fish; 20,760 fish; and 3,790 fish. However, similar to 2020, the front end of the run had an unusually long and consistent flow of 'tricklers' that lasted for almost two weeks before the more distinctive first pulse arrived. The first quarter point, midpoint, and third quarter point for Chinook salmon at the Pilot Station sonar project

were on June 19, June 29, and July 4, respectively. The 2021 Chinook salmon run appears to have been six days later than average based on the midpoint at the sonar project.

Approximately 153,497 summer chum salmon were counted at the Pilot Station sonar (with a 90% confidence interval of 137,200 to 169,800 fish), which was well below the historical median from years with late run timing of 1.6 million fish. Season total counts of summer chum salmon at the Pilot Station sonar were the lowest in all the years of project operations (1995–2021) and were well below the previous lowest counts of 442,546 and 448,665 in 2001 and 2000 respectively. Forecasting models, even with some adjustments to account for poor age class returns, did not accurately predict this weak return.

Three pulses of summer chum salmon were detected at the sonar project; the largest group consisted of approximately 83,045 fish and passed by the sonar between July 6 and July 29. The first quarter point, midpoint, and third quarter point at the Pilot Station sonar were June 30, July 6, and July 11, respectively. This indicated that the summer chum salmon run was likely 9 days later than average and the latest on record based on the midpoint at the sonar project.

2021 Subsistence Fishery Management Overview

Based on preseason forecasts and the expectation of a low run, managers planned to close salmon fishing as soon as Chinook salmon began entering the lower Yukon and to maintain the closure until the midpoint of the run at Pilot Station sonar.

Closures began on June 2 in the Coastal District and District 1 and progressed upriver based on run timing (Table 1). During the salmon fishing closures, fishermen could use nonsalmon gear, including 4-inch or smaller mesh gillnets restricted to 60 feet in length. Nonsalmon fishing opportunities remained open 24 hours a day, seven days a week throughout the entire summer season. Fishermen were asked to release all Chinook and summer chum salmon from nonsalmon gear whenever possible, and to avoid fishing in areas where salmon could be caught.

Table 1: Dates of subsistence salmon fishing closures, 2021.

District or Subdistrict	Closure Date
Coastal District	June 2
District 1	June 2
District 2	June 4
District 3	June 7
Innoko River	June 9
Koyukuk River	June 14
4-A Lower	June 10
4-A Upper	June 13
4-B and 4-C	June 15
5-A, 5-B, 5-C	June 19
5-D Lower	June 23
5-D Middle	June 26
5-D Upper	June 28
District 6	June 21

Note: Salmon fishing remained closed through the end of the summer season in each district.

Around the typical midpoint of the run (June 23) at the Pilot Station sonar, the Chinook salmon run projection indicated that the drainagewide run size was too weak to meet escapement goals and provide any harvestable surplus. Once the second stratum of genetic samples were analyzed, the Canadian-origin run estimate was approximately 64,000 Chinook salmon (with an 80% confidence interval of 58,000 to 70,000 fish). While there

was a higher-than-average proportion of Canadian-origin fish, the overall run was too weak to support harvest, and a conservative approach was warranted based on the lower-than-expected passage of Canadian-origin Chinook salmon at the border the last two years. In 2021, a similar pattern emerged and despite fishing closures, on July 28 at the Eagle sonar project (the midpoint based on late timing), only 15,815 Chinook salmon had been counted at the Eagle sonar project near the U.S./Canada border. Projections for Chinook salmon passage at the Eagle sonar were below the lower end of the Interim Management Escapement Goal (IMEG) of 42,500 fish.

Cumulative summer chum salmon counts at the Pilot Station sonar were the lowest ever observed in the history of the project (from 1995–2021). At the midpoint of the run at the Pilot Station sonar (July 6), season cumulative counts were 79,138 fish. To protect summer chum and Chinook salmon, all salmon fishing remained closed, and selective gear types were only open for nonsalmon species. A few summer chum salmon continued to enter the river during the first part of the fall season, however, on July 18 (the cross over date between summer and fall seasons), less than 153,500 summer chum salmon had been counted at the sonar, which was well below the historical cumulative median of 1.6 million fish and the drainagewide escapement goal of 500,000 fish.

Despite subsistence salmon fishery closures, a small number of Chinook and summer chum salmon were harvested in test fisheries (and distributed within nearby communities) and taken incidentally in nonsalmon gear. Harvest estimates will be available postseason. The preliminary 2021 total run sizes for Chinook and summer chum salmon were well below the recent 5- and 10-year averages (Figures 3 and 4).

2021 Commercial Fishery

Due to very poor summer chum salmon abundance and subsistence fishery closures, no commercial periods occurred in 2021 in the Lower or Upper Yukon River districts. Similar to 2001, there was zero commercial harvest of summer chum salmon. Based on the recent 10-year average commercial harvest of 380,016 summer chum salmon, the Yukon River commercial fishing closure represents a loss of $1.4 million dollars to the region (Appendices A and B). For the fourteenth consecutive year, no commercial periods targeting Chinook salmon were allowed in the Yukon Management Area.

2021 Age, Sex, and Stock Composition

Age and Sex Composition in LYTF

Due to reduced LYTF sampling discussed above, catches of Chinook salmon were lower than from previous years in the test fishery. The number of samples aged in 2021 was 411 fish, which was the second smallest sample size since 2000, and about half the number of samples from a typical year.

The Chinook salmon age composition from the LYTF 8.5-inch mesh setnet and 8.25-inch drift gillnet was 3% age-4, 36% age-5, 57% age-6, 5% age-7, and less than 1% age-8 fish. Females comprised 48% of the samples. The age-4 and age-5 percentages were below average; the age-6 and age-7 percentages were above average; and females was below average based on the years 2011–2020. It is important to note that while mesh sizes have been consistent across years, catch in the large mesh gear used at LYTF is biased toward older, larger fish.

The summer chum salmon sex composition from the 5.5-inch mesh LYTF drift nets 44% female, which is below the average of 59%. The summer chum salmon age composition was 84% age-4, 11% age-5, and 4% age-6 fish. The sample size was 158 fish and was the lowest since 2007. The age-4 percentage was well above the average of 47%, and the age-5 percentage was well below the average of 50% based on the years 2011–2020. The age-4 and age-5 percentages were the highest and lowest (respectively) observed since 2005. This suggests very poor survival of the age-5 summer chum salmon from the 2016 parent year and follows a very low percentage of age-4 fish seen in 2020. The age-4 fish in the samples averaged 540 mm and age-5 were 566 mm which are both record small when compared to the long-term average (1981–2020). Other regions of the state also experienced

a below average return of age-4 and age-5 chum, and more evaluation needs to be done to determine whether this poor survival was driven by the freshwater or ocean environment.

Age and Sex Composition in Pilot Station Sonar test fishery

The age composition from 646 Chinook salmon caught in all mesh sizes combined at the Pilot Station sonar project was 2% age-4, 48% age-5, 45% age-6, 5% age-7, and less than 1% age-8 fish. The age-3, age-4, and age-5 percentages were below average, and the age-6, age-7, and age-8 percentages were above average; females comprised 50% of the fish sampled, which is above average based on the years 2011–2020. Chinook salmon within each age class were smaller than average. However, the average length of 741 mm across all age classes is slightly larger than the recent 10-year average length of 737 mm because of the above average proportion of age-6 and age-7 fish increasing the overall average length. The project uses a wide range of mesh sizes and likely captures a representative sample across sizes and age classes. It is important to note that sex was determined visually, and this method has reduced accuracy compared to internal inspection.

Stock genetic identification in Pilot Station test fishery

Chinook and summer chum salmon were sampled for genetics at Pilot Station sonar throughout the summer season. Genetic mixed stock analysis (MSA) on the early group and first pulse of Chinook salmon (May 31 to June 22) indicated that 62% of the fish sampled were of Canadian-origin. Genetic MSA on the second pulse of Chinook salmon sampled at the sonar (June 23 to July 6) indicated that 54% of the fish sampled were of Canadian-origin. These results indicated a weaker U.S. stock component, which coupled with a low total run, increased the conservation concern for Alaskan Chinook salmon stocks. The remaining group of samples from the third and fourth pulses through the end of the run (July 7 to August 8) indicated that 35% of the fish sampled were Canadian origin. The total season estimate of stock composition, weighted by passage counts, was 54% Canadian-origin. This is above the recent 10-year average of 42% and the highest observed since sampling began in 2005. For more background information on genetic MSA for Yukon River Chinook salmon, please refer to the department's Gene Conservation Laboratory webpage[1].

The first stratum of summer chum salmon samples (from June 7 through July 2) was 86% lower river stocks and 14% middle Yukon River stocks. The second stratum of chum salmon samples (from July 3 through July 18) consisted of nearly 100% summer chum salmon, of which, 75% were lower river stocks, 20% were bound for the middle Yukon River and 4% were bound for the Tanana River. The proportions of lower and middle stocks are slightly above average whereas the Tanana stocks were below average in the second stratum.

The strata from July 19 to August 5, which has historically been predominately fall chum salmon, was determined to be 64% summer chum salmon, of which 37% were lower stocks, 18% were middle stocks, and 9% were bound for the Tanana River. Even though MSA indicated a high proportion of summer chum salmon were present during the first two weeks of the fall season, the administrative cut-off date for summer and fall chum is July 16 in District 1 and July 18 at the Pilot Station sonar. These dates are used to maintain consistency with historical data sets, and in any given year the proportions of summer chum still passing in the fall season varies. The 2021 total summer chum salmon run abundance is likely be a conservative estimate, however the run is still well below the drainagewide escapement goal.

Age and Sex Composition in Eagle Sonar test fishery

The Chinook salmon age composition from the 324 samples that were aged from the test fishery at the Eagle sonar project (all mesh sizes combined) was 2% age-4, 45% age-5, 49% age-6, and 4% age-7 fish. The age-5 and age-7 components were above average, the age-6 component was average, and the age-4 component was below

[1] http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.yukonchinook_baseline

average compared to recent 10-year (2011–2020) averages. Females made up 44% of the fish sampled, which was slightly below the 2011–2020 average of 45%. This project has used a consistent suite of mesh sizes since it began in 2005. The smallest mesh used at the project is 5.25-inch, so the smallest fish may be underrepresented in the samples.

2021 Escapement

Chinook Salmon Escapement

River conditions were favorable on the Chena and Salcha River systems this year, with below average water levels during the summer season passage dates (late-June to mid-August; Figure 5). Most assessment projects were able to get successful counts for nearly all days of operation. However, aerial surveys of the East and West Forks of the Andreafsky River, Anvik River, Nulato River, Gisasa River, Henshaw Creek, etc. were not conducted due to record levels of rain and sustained poor weather in western and interior Alaska during early August survey dates. Chinook salmon escapements into systems with escapement goals failed to meet those goals and were below average (Table 2).

Table 2.–Escapement goals and preliminary passage estimates for Chinook salmon at selected Yukon River tributaries, 2021.

Project	Current Goal	Type of Goal	Historical Average [a]	2021 Escapement
Eagle Sonar	42,500–55,000	IMEG	55,433	31,631 [b]
East Fork Andreafsky Weir	2,100 - 4,900	SEG	3,928	1,418
Henshaw Creek Weir	–	–	1,057	130
Chena River Tower	2,800–5,700	BEG	6,138	1,416
Salcha River Tower	3,300–6,500	BEG	8,413	2,081

Note: En dash indicates no goal at the project. Due to high water and poor visibility in August, aerial surveys were not flown in 2021. Biological Escapement Goals (BEGs) and Sustainable Escapement Goals (SEGs) are determined through ADF&G research programs.
[a] Historical averages include all years the projects operated with the exclusion of years the projects operated poorly.
[b] Passage estimate at Eagle Sonar is not an escapement estimate. Some harvest may have occurred between the project and the border, and in Canada.

Passage at the border was much lower than expected based on the inseason abundance estimate of approximately 59,000 Canadian-origin salmon. The preliminary cumulative passage estimate at the Eagle sonar was 31,631 Chinook salmon (with a 90% confidence interval of 31,289 to 31,973 fish). This is not considered an escapement estimate as it does not account for harvest in Eagle or Canada. This passage was not enough to meet the lower end of the IMEG of 42,500–55,000 salmon and does not provide the Canadian harvest share as outlined in the Salmon Agreement with Canada. The escapement estimates and harvest shares will be determined once harvest estimates and total run sizes are available.

Preliminary results of samples taken from a first-year study at the Pilot Station sonar indicate that the prevalence of Ichthyophonus infections in 2021 were again much higher than higher than other periods in the past when baseline sampling was in place. and above the threshold level identified by the JTC of 25% to establish a monitoring program. Full results will be available post season and efforts are continuing to establish a monitoring program for next season.

Summer Chum Salmon Escapement

The Gisasa River weir did not operate in 2021 due to COVID-19 travel restrictions and staffing concerns, and aerial surveys were not conducted because of poor weather. Carcass sampling on the Salcha River was cancelled due to low abundance of fish and high water during the peak spawning and carcass sampling periods.

Three escapement goals exist for summer chum salmon: a drainage-wide goal of 500,000–1,200,000 fish (established in 2016) and goals at the East Fork Andreafsky River and the Anvik River (Table 3). None of these

goals were met in 2021 and counts at the other projects (Henshaw Creek weir, Chena and Salcha River sonars) were well below the historic medians (Table 3).

Table 3.–Escapement goals and preliminary passage estimates for summer chum salmon at selected Yukon River tributaries, 2021.

Project	Current Goal	Type of Goal	Historical Median [a]	2021 Escapement
Drainage-wide	500,000–1,200,000	BEG	1,626,239 [b]	153,497 [c]
East Fork Andreafsky Weir	>40,000	SEG	55,265	2,531
Anvik Sonar	350,000 - 700,000	BEG	457,457	18,812
Henshaw Creek Weir	-	-	140,947	3,729 [d]
Chena River Tower	-	-	8,462	578 [e]
Salcha River Tower	-	-	21,057	2,193 [e]

Note: En dash indicates no escapement goal at the project.

[a] Historical median include all years the projects operated with the exclusion of years the projects operated poorly.

[b] Historical median from years with late run timing. The historical median from all years is 1.8 million summer chum salmon.

[c] Estimate of abundance at the Pilot Station sonar. Salmon fishing was closed above and below the sonar for the whole season, however small numbers of summer chum salmon were harvested in nonsalmon gear and test fisheries. After accounting for harvest and escapements below the sonar, the lower end of the drainagewide goal will not be met.

[d] Counts ended on July 29 due to high water.

[e] Incomplete and partial estimate due to run timing.

Canadian Fisheries

The preseason outlook was for a run size of approximately 42,000 to 77,000 Canadian-origin Chinook salmon. Fishery Managers at the Department of Fisheries and Oceans Canada (DFO) implemented Canadian Chinook salmon fisheries according to International (i.e. Pacific Salmon Treaty; Yukon River Salmon Agreement) and Domestic allocation provisions outlined in the Yukon River Integrated Fisheries Management Plan (IFMP). Based on the preseason information and the in-season estimates at Pilot Station sonar suggesting a run below or near the preseason forecast, and taking into consideration escapement goals, harvest shares, and the IFMP, the Chinook salmon run was considered to have no available harvest allocation. The recreational, commercial, and domestic Fisheries were closed. As the season developed and it became progressively apparent that the passage at Eagle sonar would be insufficient to achieve spawning escapement objectives, DFO asked First Nations to manage their fisheries accordingly as no harvest share was available (i.e. “Red” zone). DFO maintained the closures in the recreational, commercial, and domestic fisheries throughout the 2021 Chinook salmon run. While not all information is currently available, due to low numbers of Chinook salmon and measures taken by First Nations, the indication is that First Nation harvest on the Mainstem Yukon River is expected to be minimal.

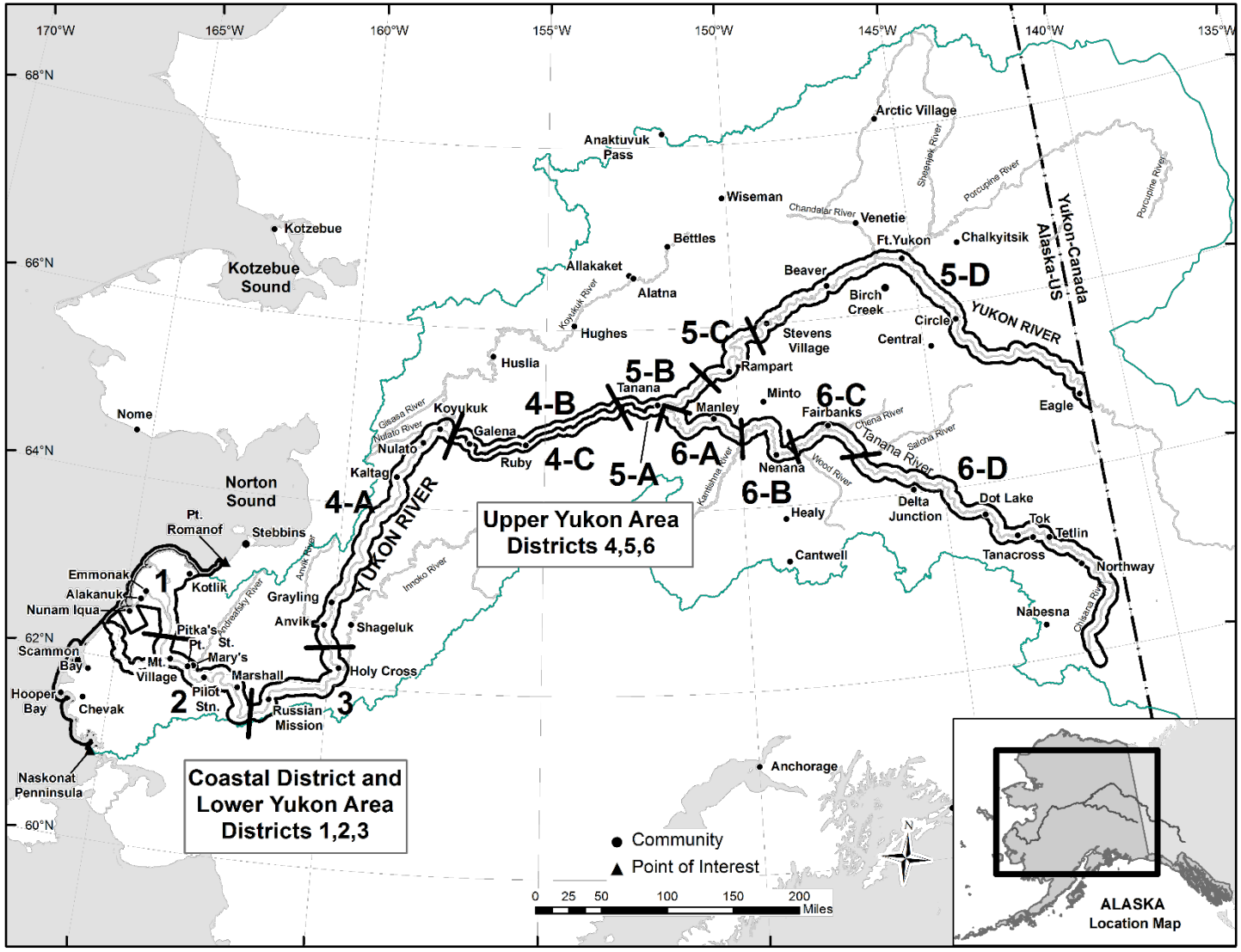

Figure 1.–Yukon Area communities and fishing districts.

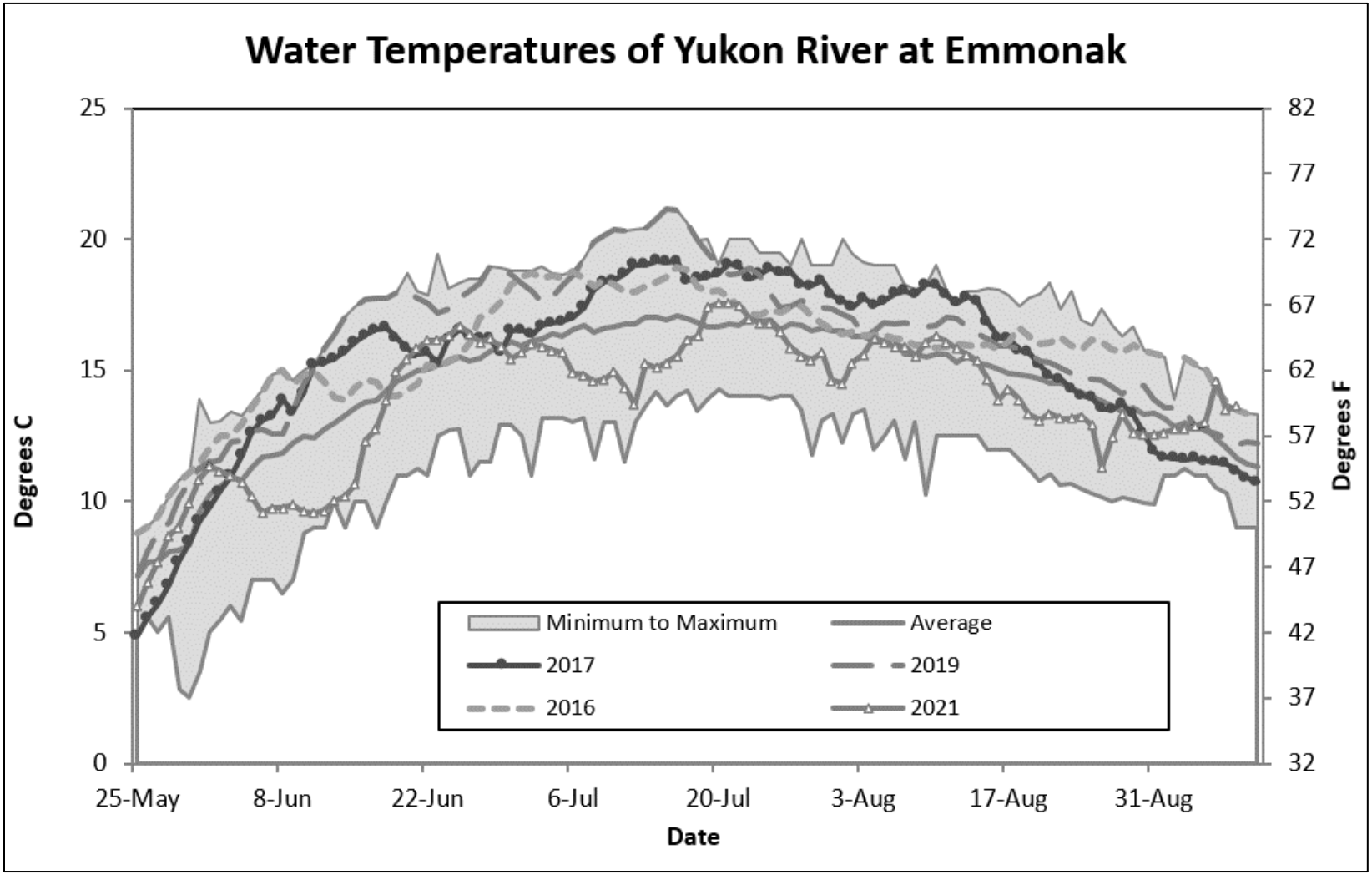

Figure 2.–Average daily water temperatures collected (from hand-held thermometers 1984–present and loggers 2004–2020) in the Yukon River near Emmonak, comparing 2021 and select years to historical minimum, maximum, and average temperatures. Measurements from 2021 were taken with a handheld thermometer and are preliminary.

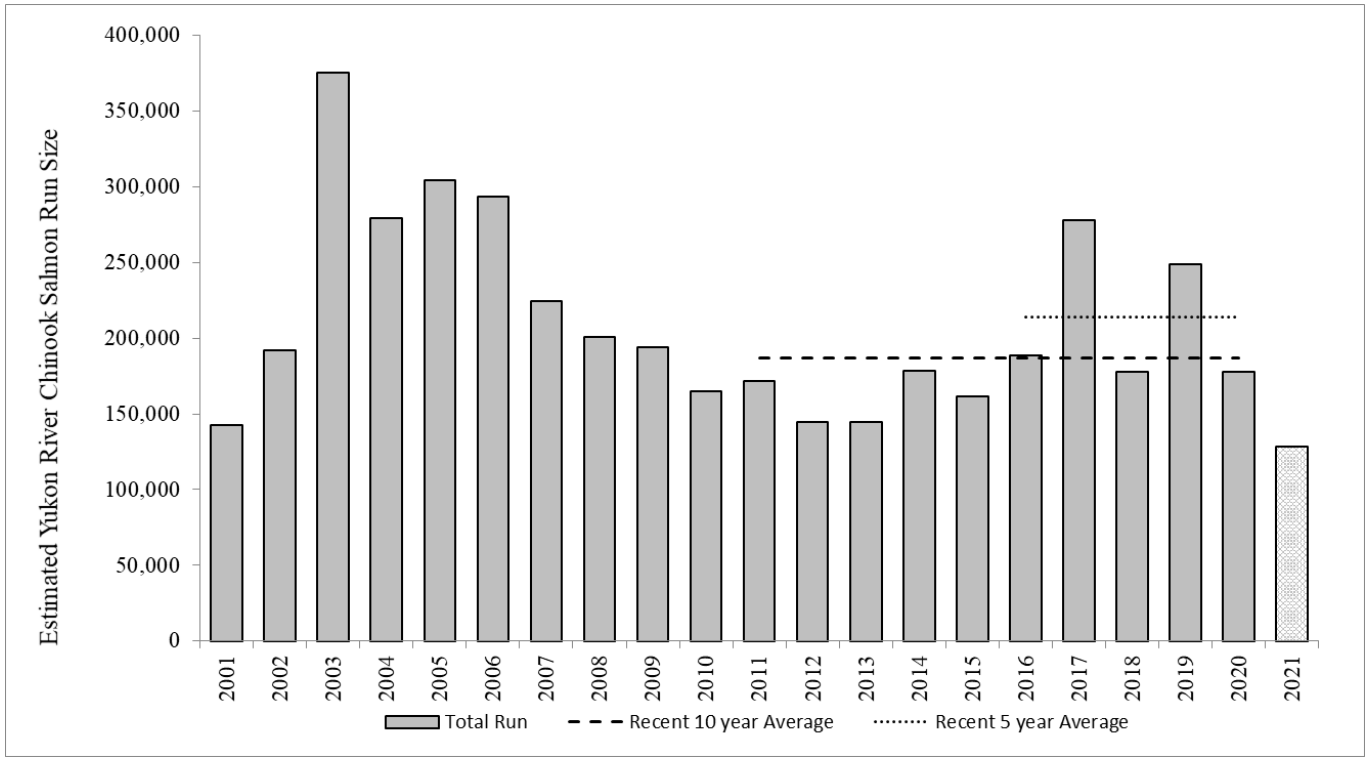

Figure 3.–Estimated Yukon River Chinook salmon run size. Run size from 2021 incorporates the escapement estimates into the Andreafsky River and a preliminary estimate of harvest based on years with fishing closures.

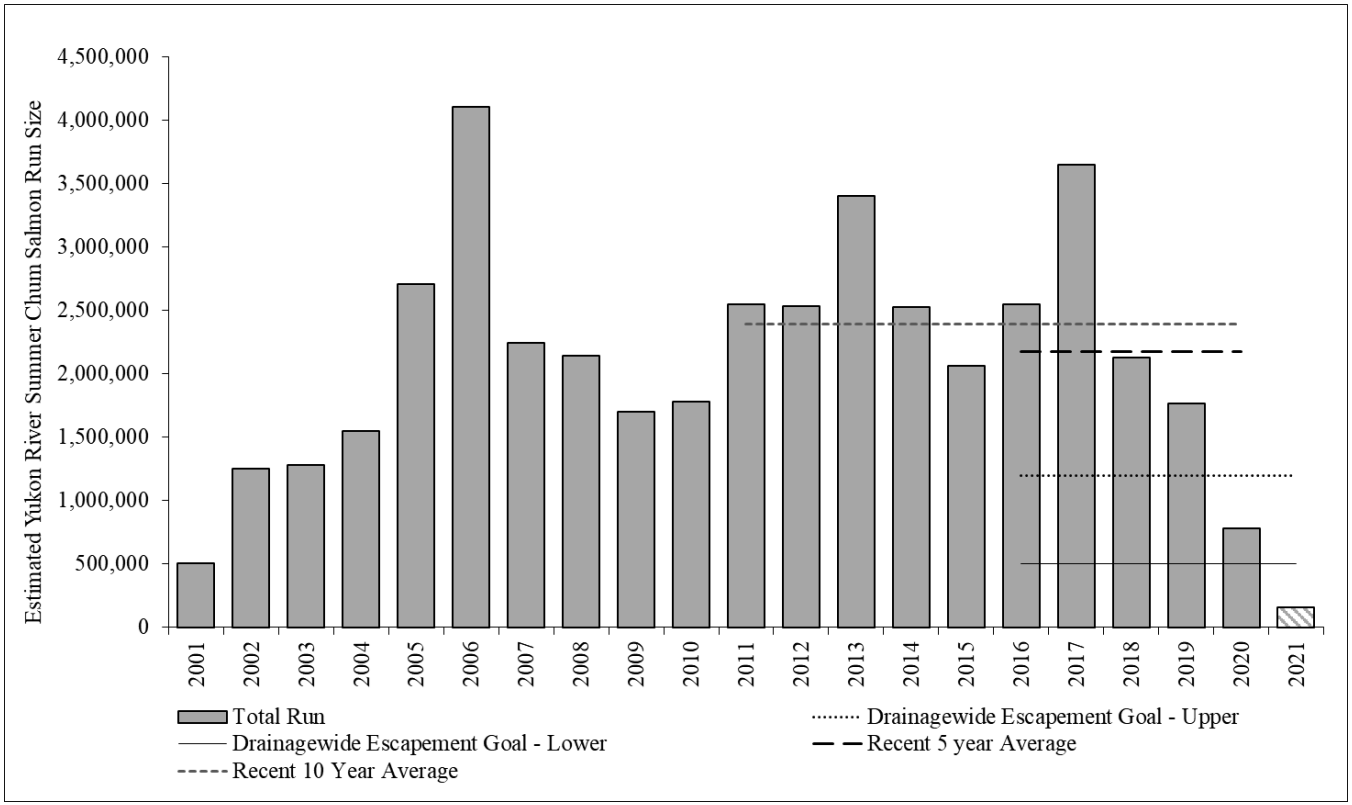

Figure 4.–Estimated Yukon River summer chum salmon run size. Run size from 2021 incorporates the escapement estimates into the Andreafsky River and a preliminary estimate of harvest based on years with fishing closures.

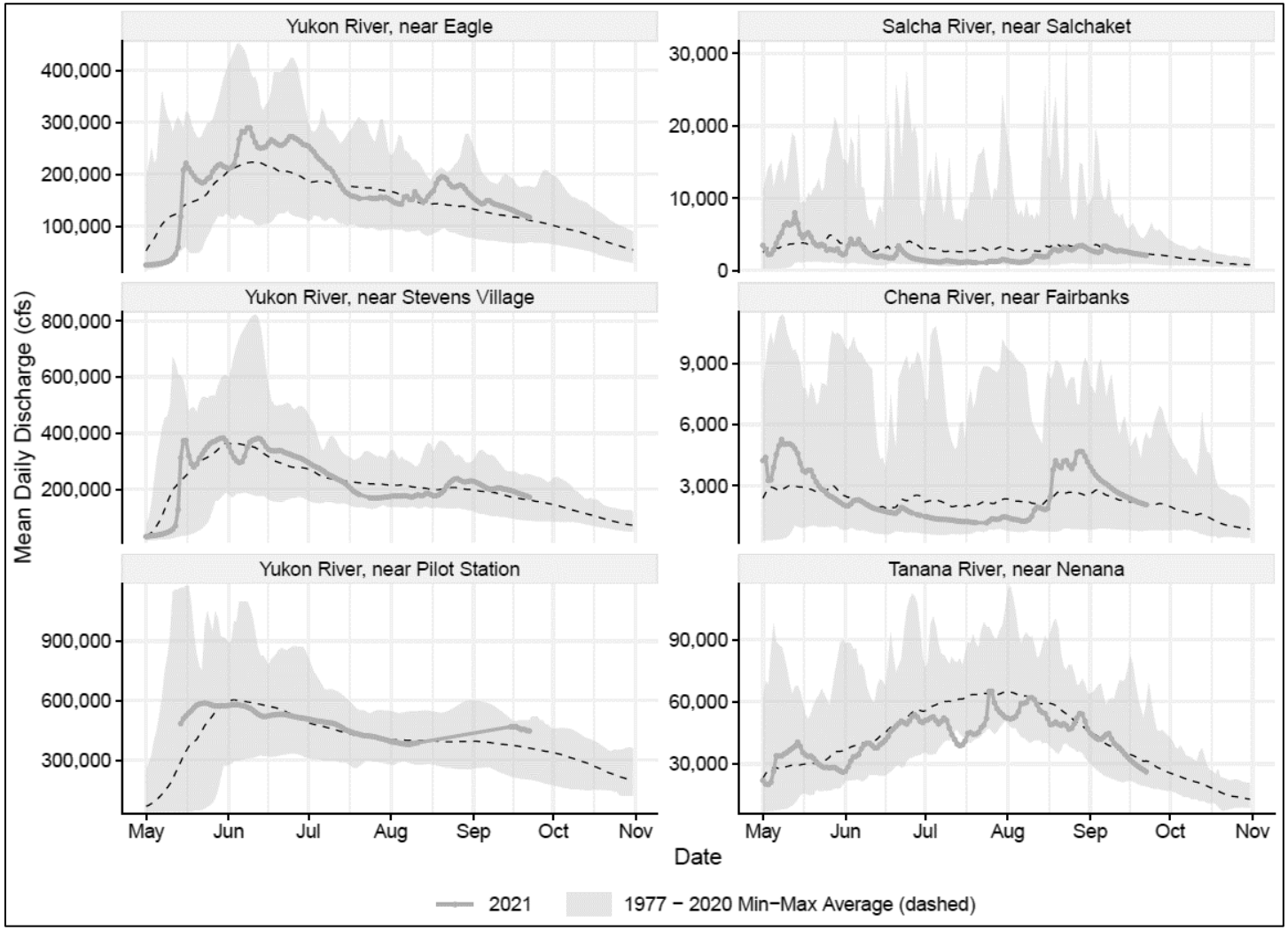

Figure 5.–Water levels from USGS gauging stations in the Yukon River drainage at select locations, comparing 2021 to historical minimum and maximum (shaded area), and average water levels (dashed line).

Appendix A.–Summer chum salmon commercial harvest totals by district, 2011–2021.

District/ Subdistrict	Guideline harvest range	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	5-yr Average (2016–2020)
District 1	NA	163,439	150,800	207,871	198,240	172,639	293,522	345,395	250,958	183,658	9,613	–	216,629
District 2	NA	103,071	57,049	171,272	229,107	181,447	228,267	47,770	195,423	41,835	4,355	–	103,530
Subtotal Dist. 1–2	251,000–755,000	266,510	207,849	379,143	427,347	354,086	521,789	393,165	446,381	225,493	13,968	–	320,159
Subdistrict 4-A	113,000–338,000	–	108,222	100,507	96,385	–	–	159,051	126,892	–	–	–	142,972
District 6	13,000–38,000	8,651	3,504	5,937	6,912	4,770	4,020	4,300	3,427	1,596	–	–	3,336
Total Districts 1–6	400,000– 1,200,000	275,161	319,575	485,587	530,644	358,856	525,809	556,516	576,700	227,089	13,968	–	380,016

Note: En dash indicates no fishery occurred. NA indicates no guideline harvest range set. Commercial harvest only includes summer chum salmon sold in the round.

Appendix B.–Value of Yukon Area summer season commercial salmon fishery, 2011–2021.

	Chinook		Summer chum				Value by species (dollars)		Value by area (dollars)			Total
	Lower Yukon		Lower Yukon		Upper Yukon							Yukon Area
Year	$/lb	Value ($)	$/lb	Value ($)	$/lb	Value ($)	Chinook	Summer chum	Lower		Upper	(dollars)
2011			0.75	1,301,008	0.26	12,966		1,313,974	1,301,103	[a]	12,966	1,314,069
2012			0.75	980,424	0.37	137,817		1,118,241	980,424		137,817	1,118,241
2013			0.75	1,721,524	0.3	152,110		1,873,634	1,721,552	[a]	152,110	1,873,662
2014			0.60	1,648,866	0.29	154,959		1,803,825	1,662,634	[b]	154,959	1,817,593
2015			0.60	1,259,908	0.23	7,166		1,267,074	1,262,034	[b]	7,166	1,269,200
2016			0.60	1,903,490	0.26	6,030		1,909,520	1,958,311	[b]	6,030	1,964,341
2017			0.60	1,470,353	0.34	276,682		1,747,035	1,470,353	[c]	276,682	1,747,035
2018			0.60	1,679,448	0.33	217,064		1,896,512	1,695,468	[b]	217,064	1,912,549
2019	6.59	210,079	0.60	820,654	0.29	2,819	210,079	807,367	1,034,117	[c, d]	2,819	1,036,936
2020			0.60	51,067				51,067	51,440	[d]		51,440
2021												
2016–2020 Average	6.59	210,079	0.60	1,185,002	0.31	125,649	210,079	1,282,300	1,241,938		125,649	1,342,460
2011–2020 Average	5.80	210,079	0.65	1,283,674	0.30	107,513	210,079	1,378,825	1,313,744		107,513	1,410,507

Note: Blank cells indicate no sales occurred or harvest level was insufficient to generate summary information.

[a] Includes sales of coho salmon in Districts 1 and 2.

[b] Includes sales of pink and coho salmon in Districts 1 and 2.

[c] Does not include value from Chinook salmon sold during fall season. Value of Chinook salmon sold in fall season was $9,922 in 2017 and $41,594 in 2019.

[d] Includes sales of pink salmon in Districts 1 and 2.