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INTER-TRIBAL FISH COMMISSION
OUR RIVER, OUR PEOPLE, OUR FISH
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2023 Takotna River Salmon Run Timing and Abundance

by

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I. ACKNOWLEDGEMENTS:

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II. ABSTRACT:

The Kuskokwim River Inter-Tribal Fish Commission, assisted by the Takotna Tribal Council and local fish technicians, monitored the escapement of Chinook salmon (*Oncorhynchus tshawytscha*) and chum salmon (*O. keta*), returning to the Takotna River, Alaska. A resistance board weir was used from July 7 to August 7, 2023, to collect abundance and run timing of both Chinook and chum salmon, shorter than the traditional target period of July 1 to August 10. Data collected at the weir support management of the salmon fisheries that occur in the Kuskokwim River drainage. Observed totals of 137 Chinook salmon and 2,314 chum salmon passed the weir during the 2023 operational period. 2023 weir counts were estimated to account for days in which the Takotna weir was not operational, including days before and after weir installation, resulting in total counts of 233 Chinook salmon and 2,763 chum salmon. The midpoint of observed cumulative 2023 passage was July 26 for both Chinook and chum salmon. Age, sex, and length data were collected from a subsample of the Chinook salmon. The predominant Chinook salmon ages were age 1.2 for males and 1.3 for females, corresponding to both 2019 and 2018 brood years respectively. Females comprised an estimated 39.5% of the weir passage of Chinook salmon in 2023. Mean lengths were 728.4 millimeters (mm) for female Chinook salmon and 582.3 mm for males.

III. INTRODUCTION:

The Kuskokwim River has historically supported the largest subsistence salmon (*Oncorhynchus* spp.) fishery in the state of Alaska, in both the number of residents who participate in the fishery and the number of salmon harvested (Fall et al. 2012). With some of the lowest per capita monetary incomes in the United States, subsistence use in this region is extremely important and is characterized by a high production of wild foods for local use (Wolfe and Walker 1987). In recent decades, residents of the Kuskokwim region have annually harvested over 360 pounds of wild foods per person for human consumption, with fish comprising up to 85% of the total poundage of subsistence harvests, and salmon contributing up to 53% of subsistence harvests (Simon et al. 2007; Wolfe et al. 2011). Residents harvest all five species of Pacific salmon: Chinook (*O. tshawytscha*), chum (*O. keta*), coho (*O. kisutch*), pink (*O. gorbuscha*), and sockeye (*O. nerka*). The importance of salmon, particularly Chinook salmon, to local residents extends

beyond nutrition and economic values, and includes sociocultural and personal identities (Ikuta et al. 2013). Kuskokwim River Chinook salmon stocks have been in a period of low productivity since 2007, requiring significant subsistence fishing restrictions to meet established escapement goals. Since 2011, subsistence harvests of Chinook salmon from the Kuskokwim River drainage have been below the Amounts Reasonably Necessary for Subsistence (ANS) for the Kuskokwim River, designated by the Alaska Board of Fisheries (the Board) as the range of 64,500-83,000 fish during 2001–2012 and 67,200–109,800 fish beginning in 2013 (McDevitt and Koster 2022; Smith and Gray 2022; Smith et al. 2022). Since 2019, estimated subsistence harvests of chum salmon in the Kuskokwim River have been below the ANS range, designated by the Board, of 41,200–116,400 fish (McDevitt and Koster 2022; Smith and Gray 2022; Smith et al. 2022).

A weir has been operated on the Takotna River for 21 years (2000–2013 and 2017–2023) as an upper Kuskokwim River index for salmon escapement (Figure 1). During 1995–1998, enumeration of the Takotna River salmon escapement was estimated using a counting tower. Tower operation employed students and staff of Takotna Charter School and Training Center with assistance from the Alaska Department of Fish and Game (ADF&G). However, tower operations were only considered successful in 1996 and 1997 as water conditions impeded accurate counting of salmon passage in other years (Molyneaux et al. 2000). Beginning in 2000, a resistance board weir has been operated with a live trap, to allow enumeration and collection of biological data from passing fish, including during most high-water conditions with poor visibility (Williams and Blain 2013; Whitworth and Bechtol 2022).

Following the lowest escapement of Chinook salmon to the Takotna River ever documented in 2013, combined with budget cuts and revised assessment priorities, ADF&G withdrew project funding beginning in 2014. Unfortunately, 2012–2014 also produced the lowest total Chinook salmon returns ever estimated for the Kuskokwim River drainage (Larson 2022). In response, regulatory changes adopted in 2016 closed salmon fishing during the early portion of the Chinook salmon spawning run, with the understanding that most of these early fish were upstream spawners (Clark and Smith 2019).

The Takotna River weir was re-established in 2017 to measure Chinook salmon returns, after a three-year absence. The revival of the project was determined to be important for a couple reasons. First, the importance of the project was recognized after the Takotna River weir was determined to be the only upriver tributary with a long-term data series suitable for evaluating the effects of the early season closures on headwater stocks in the Kuskokwim River drainage. Second, the importance of small/weak stocks had become increasingly recognized for maintaining diversity and productivity in large river systems (Connors et al. 2020, 2022).

Historically the Takotna River weir has operated as a community-based project with strong involvement from local villages to build local capacity and increase participation of upper Kuskokwim River stakeholders in the Chinook salmon management process. The weir project was designed to continue with this approach, under administrative oversight by the Kuskokwim River Inter-Tribal Fish Commission (KRITFC) and with support from the Takotna Tribal Council. Beginning in 2023, KRITFC assumed full ownership of the Takotna River weir, with ADF&G donating all remaining project materials and ending the cooperative agreement.

IV. OBJECTIVES:

The overarching project goal is to continue a long-term ground-based project that will adequately index salmon escapement to the headwater tributaries of the Kuskokwim River. By continuing the only long-term data set dedicated to evaluating salmon escapement to a Kuskokwim River headwater tributary, including continuing the time series of environmental data, this project provides local residents, researchers, and managers with data and insights for understanding the local impacts of climate change and fishery management practices. Specific project objectives include:

- Enumerate the daily passage and characterize the run timing of Chinook salmon through the resistance board weir from July 1 to August 10.
- Enumerate the daily passage and characterize the run timing of chum salmon and resident fish species through the resistance board weir from July 1 to August 10.
- Estimate the weekly sex and age composition of Chinook such that the simultaneous 95% confidence intervals have a maximum width of 0.20.
- Collection of environmental data (air/water temperature, flow volume, precipitation, etc.).
- Serve as a platform to develop local talent/capacity in a community-based stock assessment project and conduct community outreach.
- Serve as a platform for future research projects such as tagging studies, heat-stress, collection of genetics data, and monitoring of environmental data.

V. METHODS:

1. Project Area:

Originating in the central Kuskokwim Mountains of the upper Kuskokwim River, the Takotna River (Figure 1) is formed by the confluence of Moore Creek and Little Walden Fork (Brown 1983). From this confluence, the Takotna River flows northeast, passing the community of Takotna at river kilometer (rkm) 80 (river mile [rm] 50), before turning southeast near the confluence with the Nikon Fork at rkm 24 (rm 15). The Tatalina River enters the Takotna at rkm 5 (rm 3), and then the Takotna River merges with the Kuskokwim River across from the community of McGrath at rkm 752 (rm 467) from the mouth of the Kuskokwim River. The Takotna River is about 160 km (99 miles) long with a drainage of 5,646 square kilometers (2,180 square miles).

The Takotna River region has a sub-arctic climate characterized by extremes in temperature. Summer temperatures average 6 to 27 ˚C (42 to 80 ˚F), whereas winter temperatures average -18 to 6 ˚C (0 to 43 ˚F). Average yearly precipitation is approximately 30.5 centimeters (cm) (12 inches), with the majority falling between June and October. The rivers in this area generally become ice-free in the slow current sections by early May and freeze over during November.

During 2000–2013, and 2017–2023, the Takotna River weir was installed at 62°58.0' N., 156°05.9' W., a site several hundred meters above the Takotna River bridge near the

community of Takotna (Williams and Blain 2013) and about 17 air miles west of the community of McGrath (Figure 1). The location provides for enumeration of most salmon spawning in the Takotna River drainage, excluding the Nixon Fork tributary returns. At the Takotna River weir site, the river channel is about 85 meters (279 feet) wide and less than 1 meter (3 feet) deep during normal summer flows, with a substrate of gravel mixed with some sand and cobble. Non-salmon species commonly found at this location include Arctic grayling (*Thymallus arcticus*), whitefish (*Coregonus spp*.), northern pike (*Esox lucius*), and longnose suckers (*Catostomus catostomus*).

2. Project Design:

All salmon passing upstream through the weir were counted to achieve a complete visual count of escapement during operations. Counts, by species as they passed, were made daily. The timing and number of counting sessions were adjusted in-season depending on the timing and abundance of fish passing through the weir (Molyneaux et al. 2010).

A resistance board weir was installed across the entire 85-meter channel following the techniques described by Stewart (2003) and employed in prior years at this site. Weir installation was targeted for mid-June, the typical low water time period. The weir has two sectional components: (1) a substrate rail and resistance board panels placed in the middle 75-meter portion of the channel; and (2) fixed weir materials (picket fence) installed from the stream bank to the floating panels. The floating and fixed weir lengths were adjusted as needed to accommodate river width and depth. Specific details of the design and materials for weir construction were provided by Tobin (1994), with panel modifications presented by Stewart (2003). The Takotna River weir design applied a 4.29 cm (1 11/16 in) gap between pickets, which was enough to stop all adult salmon, except pink salmon, from upstream migration (Williams and Blain 2013). A live trap and skiff gate were incorporated into the weir structure at the deeper portion of the channel. The live trap was set to either allow fish to freely pass upstream while being counted, or to retain fish for collection of age, sex, and length (ASL) samples. The skiff gate allowed boat operators to pass with little or no involvement of the weir crew, while minimizing or preventing passage of migrating salmon during boat passage.

During the period of weir operation, several non-salmon species (e.g., longnose suckers) migrated downstream. To provide for such migrations, “downstream passage chutes” were established by releasing the resistance boards on a pair of adjacent weir panels so that the downstream ends of the panel settled slightly below the water surface. The weir crew monitored and adjusted these chutes as needed to ensure downstream migrant passage while preventing upstream migration of adult salmon.

The composition of spawning Chinook salmon (escapement quality) was estimated by sampling salmon retained by the live trap. Sampling techniques were consistent with standard methods described by Molyneaux et al. (2010), using a conventional fish trap design described by Linderman et al. (2002). Chinook salmon escapement was sampled daily, approximately in proportion to observed passage abundance.

Climatological, stage height, and air and water temperature data were collected and recorded daily. Stream gauge stage height was measured and recorded each morning at 0900 hours. Water temperature was also measured hourly using a HOBO Water Temp Pro v2 logger.

3. Data Collection and Reduction:

a. Escapement Monitoring

Historically, the weir was used to assess most Takotna River salmon runs, including coho salmon which have a later run timing than other species. But similar to the past five years, the 2023 Takotna River weir objectives were focused on enumerating Chinook and chum salmon escapements. To achieve the objectives, July 1 to August 10 remained the target operational period. Data collected in 2023 continued the 20-plus-year dataset of Takotna River Chinook and chum salmon escapement estimates.

During the operational period, weir crews recorded daily and cumulative escapements by salmon species including estimated passage missed due to weir problems. The weir was inspected daily for holes and the potential for missed fish passage was documented. Weir panels were cleaned daily, or as needed, of carcasses and debris. Carcasses were identified, and daily counts were recorded by species and sex.

Counts of passing fish were made at a frequency of four to eight shifts per day between 0700 and 2400 hours. Counting effort increased during times of higher fish passage, regardless of fish species, to reduce stress to fish being held in the weir live trap. During counting, a crew member opened the passage gate to allow fish to pass freely. Then the crew member identified each fish being passed upstream by species, and the count was recorded on a multiple tally counter. Then the passage gate was securely closed at the end of each counting shift.

b. Age, Sex, and Length Composition

Collection of ASL data is crucial to evaluating the composition of salmon returning to any stream, and how management strategies and escapement composition may interact to affect long-term productivity within environmental constraints. Per Bromaghin (1993), an ASL minimum sample size of 75 Chinook salmon was determined, assuming 10 age-sex categories, an unknown population size, and 95% confidence intervals for each age-sex bin. The Takotna River presently supports a relatively small population of Chinook salmon and counting tower/weir counts ranged from 104 to 1,197 during 1996-2022, with a historical average escapement of 403 Chinook salmon. The smallest observed escapement, 104 Chinook salmon, occurred in 2013 (Larson 2022). While there have been indications of improved returns in recent years, the rate of improvement has been slower than increases following historical declines. Therefore, it was anticipated that ASL samples should be collected from as many of the Chinook salmon being passed through the weir as was reasonable and prudent.

Chinook salmon used for ASL sample collections were captured from the weir live trap. During weir operation, salmon migrating upstream pass the entrance gate while the exit gate is closed. A V-shaped entrance gate prevents fish from easily returning downstream. The live trap was allowed to fill with fish until a reasonable number was inside. Weir crew members removed fish from the live trap using a short-handled dipnet, and fish were placed in a partially submerged fish "cradle." Scales were removed from the preferred area of the fish (INPFC 1963) and transferred to numbered gum cards as described in Molyneaux et al. (2010). Sex was determined through visual examination of

the external morphology, focusing on the prominence of a kype, roundness of the belly, and the presence or absence of an ovipositor. Length (mid-eye to tail fork; nearest millimeter [mm]) was measured with a straight edge meter stick. Sex and length data were recorded on standardized numbered data sheets that correspond to numbers on the gummed scale cards. Immediately after sampling, fish were released upstream of the weir and the process was repeated until the live trap was empty. At the end of a sampling session, data on sampling date, sampling location, sex, length, and corresponding gum card numbers were transferred to an Excel spreadsheet. Salmon scales were cleaned and properly affixed to gummed scale cards. Scale cards were completed according to ADF&G procedures for the Kuskokwim Area (Buklis 1985; Merritt 1987).

Subsequent scale analysis and reporting by ADF&G followed methods described by Mosher (1969). Age determinations for Chinook salmon included the number of years spent in freshwater as a juvenile and the number of years spent in saltwater. The ASL data were archived within the Alaska-Yukon-Kuskokwim-Database Management System[1] by ADF&G staff.

c. Environmental Monitoring

Environmental data were recorded in a designated logbook at approximately 0900 and 1700 hours daily with both air and water temperature (°C) first recorded on the morning of July 8, with recordings extending to the completion of weir operations on August 7. Additional information included wind direction, wind speed, cloud cover, precipitation, and river depth. Precipitation (in mm) was recorded based on a rain gauge. River depth was determined using a standardized gauge consisting of a metal rod driven into the stream channel with a meter stick attached. The gauge was calibrated to a semi-permanent benchmark that corresponded to a stage measurement of 300 cm (Williams and Blain 2013).

4. Data Analysis:

Daily escapement counts and ASL data underwent a standardized post-season quality control review. Estimates of missed upstream passage of Chinook and chum salmon for days in which the weir was inoperable or incomplete due to delayed installation, flood events, or minor structural damage typically involve a Bayesian analysis (Dickerson et al. 2019). Missed passage estimates were made for both species in 2023 because the threshold of 60% of each species' run counted was met. Daily averages were calculated for water temperature and water stage data. Age and size composition data for dates when no ASL samples were collected were estimated from weekly compositions for available passage dates.

Project Monitoring and Evaluation:

The two primary objectives of this project are to operate a resistance board weir to count passage of Chinook and chum salmon during the period of July 1 to August 10, and to collect ASL data from Chinook salmon passing the weir. The project is deemed successful if the weir is operated by local hire technicians with minimum down time due to environmental conditions and counts of fish passage are obtained by species. This information was summarized for consideration

[1] https://www.adfg.alaska.gov/CF_R3/external/sites/aykdbms_website/Default.aspx

during the in-season decision processes by fishery managers and advisory groups. The secondary objective of collecting Chinook salmon ASL data is deemed successful if 75 ASL samples are collected, contingent on the magnitude of the Chinook salmon escapement return. The ASL data is used as input data into postseason stock assessment models. Collection of environmental data during the period of weir operation provides a synopsis of conditions during the spawning season but also serves as a basis for interannual comparisons to document the effects of climate change.

VI. RESULTS:

Weir Operation:

In 2023, the Takotna River weir crew started preparing the weir and setting up camp on June 16. The crew consisted of eight local hires from the community of Takotna. Due to weir repair needed from the previous year, the weir was not fully installed until the afternoon of July 7. The weir passage gate was opened late on July 16 due to high water with no fish counts made until the morning of July 20. The weir remained fish tight the remainder of its operations during the 2023 season and was dismantled starting on August 7.

Environmental Data:

The average water level recorded was 83.1cm between July 11 and August 7. The highest water levels were 110 cm on July 12 and July 17. The lowest water level was 66.0 cm on August 3. The average daily water temperature (averaged between morning and evening readings) was 13.3 ˚C (Figure 2). The highest water temperature recorded in the morning was 15.9 ˚C on August 4, and in the evening was 18 ˚C on August 4 and August 7. The lowest water temperature in the morning was 9.6˚C on July 10 and July 11, and in the evening was 10 ˚C on July 10. Average daily air temperature (averaged between morning and evening readings) was 15.4 ˚C. The warmest air temperature recorded in the morning was 26 ˚C on July 24, and in the evening was 30 ˚C on August 3. The lowest air temperature in the morning was 6 ˚C on July 21 and July 28, and in the evening was 3 ˚C on August 6.

Biological Data:

Chinook Salmon – The weir was first fish tight midday on July 7, with the first full day of weir operation considered to be counts on July 8. A total of 137 Chinook salmon were counted past the weir location during July 7 through August 7, 2023 (Table 1). A Bayesian statistical analysis to estimate weir counts of Chinook salmon for partial or missed days during the historical run period requires that 60% of the historical July 1 to August 10 dates be covered by full weir counts (Adkison and Su 2001; S. Larson, ADF&G, per. com.). This requirement was met in 2023 and including missed passage estimation, a total count of 233 Chinook salmon was determined. The peak observed weekly passage (measured as Sunday to Saturday) of 65 Chinook salmon occurred during the week of July 23–29, and the midpoint of observed passage occurred on July 26.

Chum Salmon – An observed total of 2,314 chum salmon passed the weir during July 7 to

August 7, 2023 (Table 1). The requirement for missed passage estimate was met in 2023 and including missed passage estimation, a total count of 2,763 chum salmon was determined. The first chum was observed on July 7 and the last on August 7. The observed peak weekly passage of 930 chum salmon occurred July 23–29, and the midpoint of observed passage occurred on July 26.

Sockeye Salmon – Only 64 sockeye salmon were counted past the weir during the 2023 season, with sockeye observations occurring throughout the season (Table 1).

Coho Salmon – Only 19 coho salmon were counted past the weir during the 2023 season, with coho observations beginning the end of July (Table 1).

ASL data were collected from 94 Chinook salmon (no ASL data were collected from chum salmon). Sex was identified for 93 samples, and 80 samples produced a readable scale. Data were not extrapolated beyond the successful days of weir coverage. Four age classes (1.1, 1.2, 1.3, and 1.4) were identified from scale samples (Table 2). The predominant age class was 1.2 for males and 1.3 for females. After weighting the estimated passage by the ASL samples where age and sex were available, females comprised of 39.5% of Takotna River Chinook salmon return. The mean length, after weighting by age class and weekly passage, was 728.4 mm for females and 582.3 mm for males. Five of the Chinook salmon sampled for ASL measured larger than 800 mm; all were female, and none were larger than 900 mm. Of the age-6 Chinook salmon identified, two were females with lengths of 870 mm and 875 mm, and one was male with a length of 464 mm.

Other Species – Other migrant and resident fish species counted during the weir operational period from July 7 through August 7, 2023, included 17 longnose suckers, and 1 whitefish.

VII. DISCUSSION:

The Takotna River weir project was successful in meeting the goals and objectives even with weir material and environmental complications. The resistance board weir was fully installed and operational on July 7 (instead of July 1) because of weir repairs needed from the previous year and high water. Operations continued through August 7, except for July 16–19 when high water prevented accurate fish counts. Takotna River Chinook and chum salmon escapement and ASL data were collected and processed, archived, and distributed to interested parties, including ADF&G. The 2023 Chinook salmon estimated passage of 233 fish was the fifth lowest in the Takotna weir history. This 2023 Takotna weir count was 42% less than the average escapement of 403 fish during 1996–2022 (Figure 3; Whitworth 2021; Whitworth and Bechtol 2022). The estimated passage of 2,763 chum salmon in 2023 was the fourth lowest in the past two decades. The 2023 chum salmon passage was 49% less than the average escapement of 5,637 fish during 1996–2022 (Figure 3). In conclusion, clear concerns remain over both chum salmon that have generally declined in the past decade and Chinook salmon that show improvement over the past decade but are still highly variable and below the long-term average return.

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Table 1. Daily, cumulative (Cum), and cumulative percent (%) passage for Chinook, sockeye, chum, and coho salmon at the Takotna River weir, 2023.

	Chinook			Chum			Sockeye			Coho		
Date	Daily	Cum	%	Daily	Cum	%	Daily	Cum	%	Daily	Cum	%
7-Jul	0	0	0	8	8	0	0	0	0	0	0	0
8-Jul	2	2	1	18	26	1	1	1	2	0	0	0
9-Jul	2	4	3	24	50	2	0	1	2	0	0	0
10-Jul	0	4	3	21	71	3	0	1	2	0	0	0
11-Jul	6	10	7	27	98	4	0	1	2	0	0	0
12-Jul	2	12	9	44	142	6	0	1	2	0	0	0
13-Jul	5	17	12	14	156	7	0	1	2	0	0	0
14-Jul	8	25	18	68	224	10	2	3	5	0	0	0
15-Jul	0	25	18	62	286	12	0	3	5	0	0	0
16-Jul	1	26	19	52	338	15	0	3	5	0	0	0
17-Jul		26	19		338	15		3	5		0	0
18-Jul		26	19		338	15		3	5		0	0
19-Jul		26	19		338	15		3	5		0	0
20-Jul	1	27	20	70	408	18	1	4	6	0	0	0
21-Jul	7	34	25	150	568	24	2	6	9	0	0	0
22-Jul	0	34	25	116	684	29	0	6	9	0	0	0
23-Jul	5	39	28	88	762	33	2	8	13	0	0	0
24-Jul	7	46	34	163	925	40	3	11	17	0	0	0
25-Jul	10	56	41	166	1,091	47	2	13	20	0	0	0
26-Jul	12	68	50	132	1,223	53	3	16	25	0	0	0
27-Jul	9	77	56	167	1,390	60	4	20	31	0	0	0
28-Jul	14	91	66	95	1,485	64	8	28	44	0	0	0
29-Jul	8	99	72	119	1,604	69	6	34	53	3	3	16
30-Jul	8	107	78	112	1,716	74	7	41	64	0	3	16
31-Jul	7	114	83	100	1,816	78	6	47	73	0	3	16
1-Aug	5	119	87	111	1,927	83	9	56	88	1	4	21
2-Aug	4	123	90	84	2,011	87	3	59	92	2	6	32
3-Aug	4	127	93	77	2,088	90	2	61	95	3	9	47
4-Aug	4	131	96	86	2,174	94	0	61	95	5	14	74
5-Aug	3	134	98	54	2,228	96	0	61	95	1	15	79
6-Aug	2	136	99	66	2,294	99	2	63	98	4	19	100
7-Aug	1	137	100	20	2,314	100	1	64	100	0	19	100
Weir	137			2,314			64			19		
Total	233			2,763			*			*		

Notes:

Shaded dates are when the weir did not operate for all or part of a day.

Total counts are estimated for missing or partial days for both Chinook and chum salmon.

Boxes show the dates when 25, 50, and 75 percent of the total observed escapement passed.

* Missed passage estimates and total escapement counts are not generated for sockeye or coho salmon.

Table 2. Kuskokwim River Chinook salmon age, sex, and length (mm) composition after weighting ASL samples to the total passage (n=137) from the Takotna River weir escapement project, 2023.

		2020			2019			2018			2017				
Age		1.1			1.2			1.3			1.4			Total	
		N	%		N	%		N	%		N		%	N	%
Expanded															
Male		3	2.4		49	36.0		28	20.8		2		1.2	83	60.5
Female		0	0		6	4.6		44	32.5		3		2.5	54	39.5
Total		3	2.4		56	40.6		73	53.3		5		3.8	137	100.0
Size															
Male		465.5			553.0			654.8			464.0			582.3	
Female					513.0			747.6			872.5			728.4	
Total		465.5			548.4			712.0			736.7			640.7	

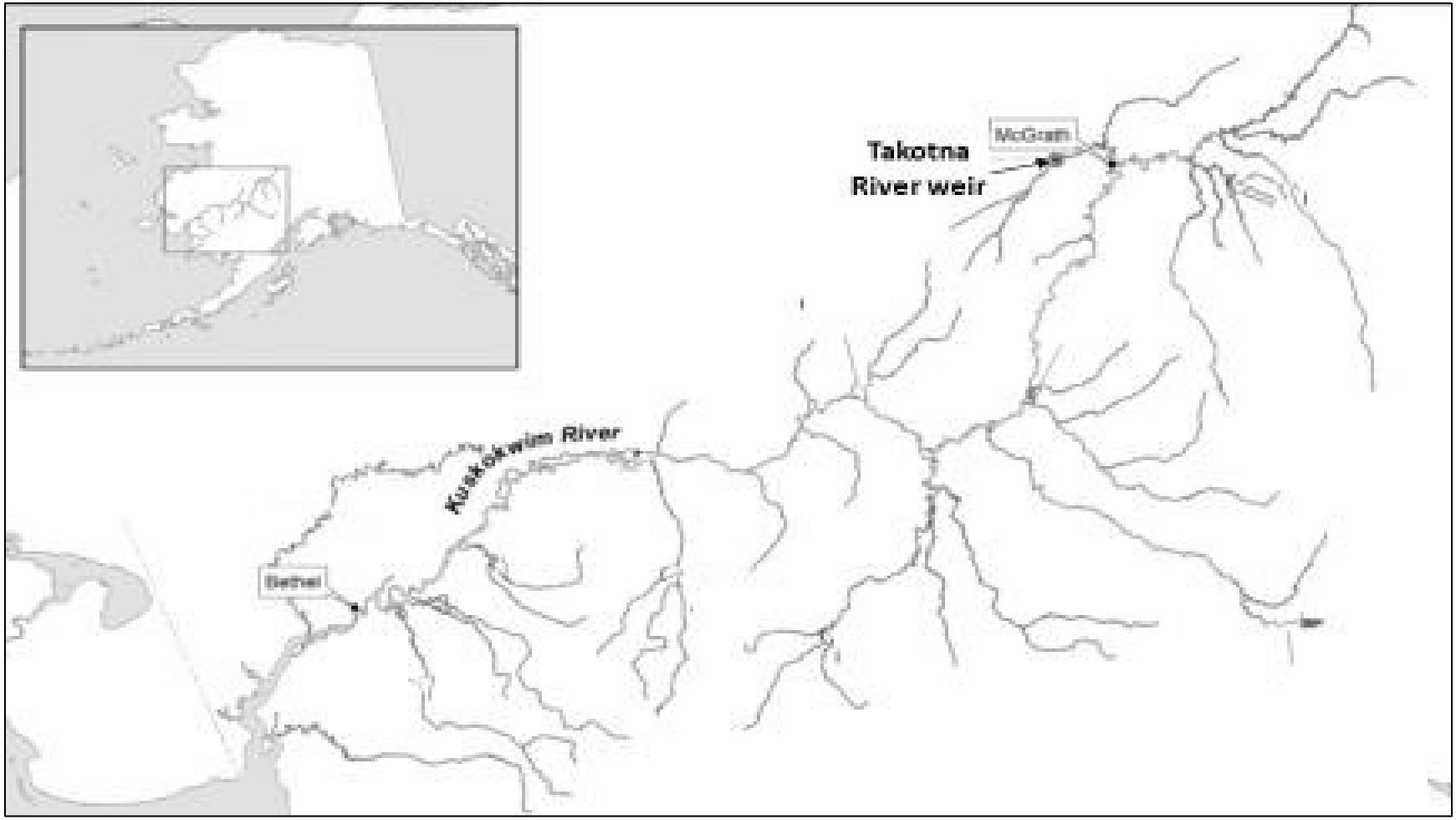

Figure 1. Location of the Takotna River weir project on the Upper Kuskokwim River.

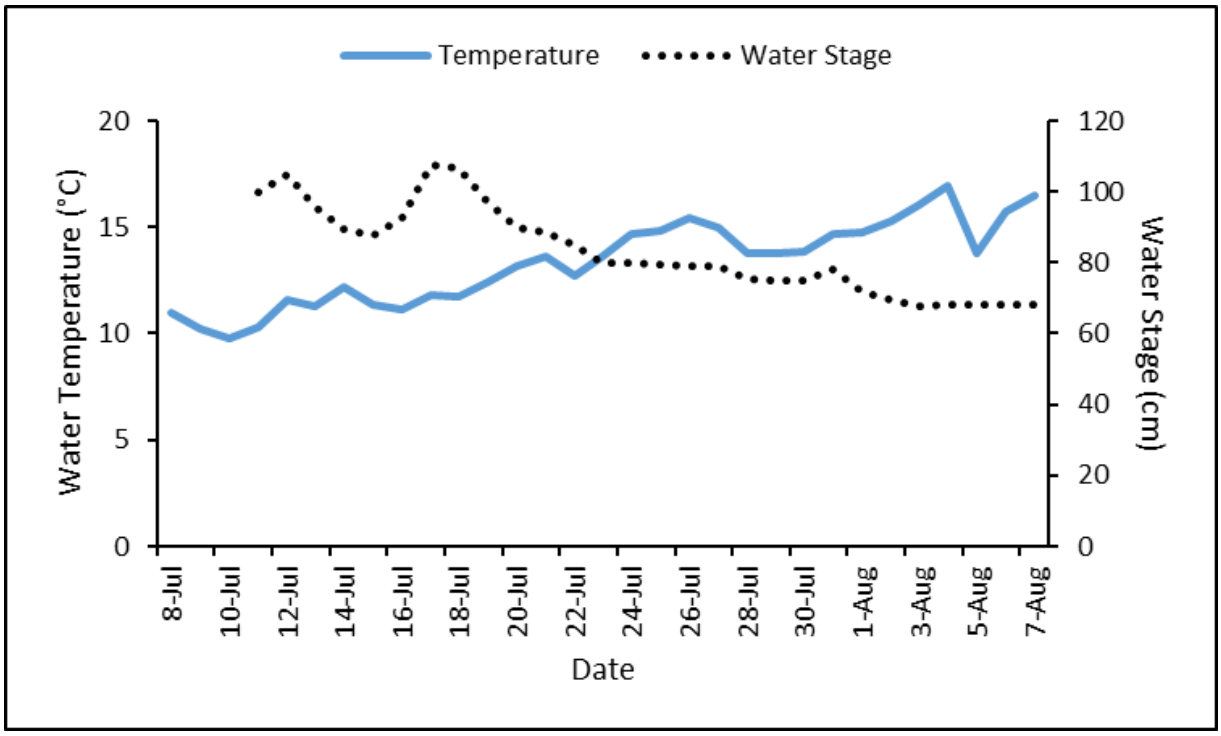

Figure 2. Average daily water temperature (°C) (solid line) and water stage (cm) (dotted line) recorded at the Takotna River weir, 2023.

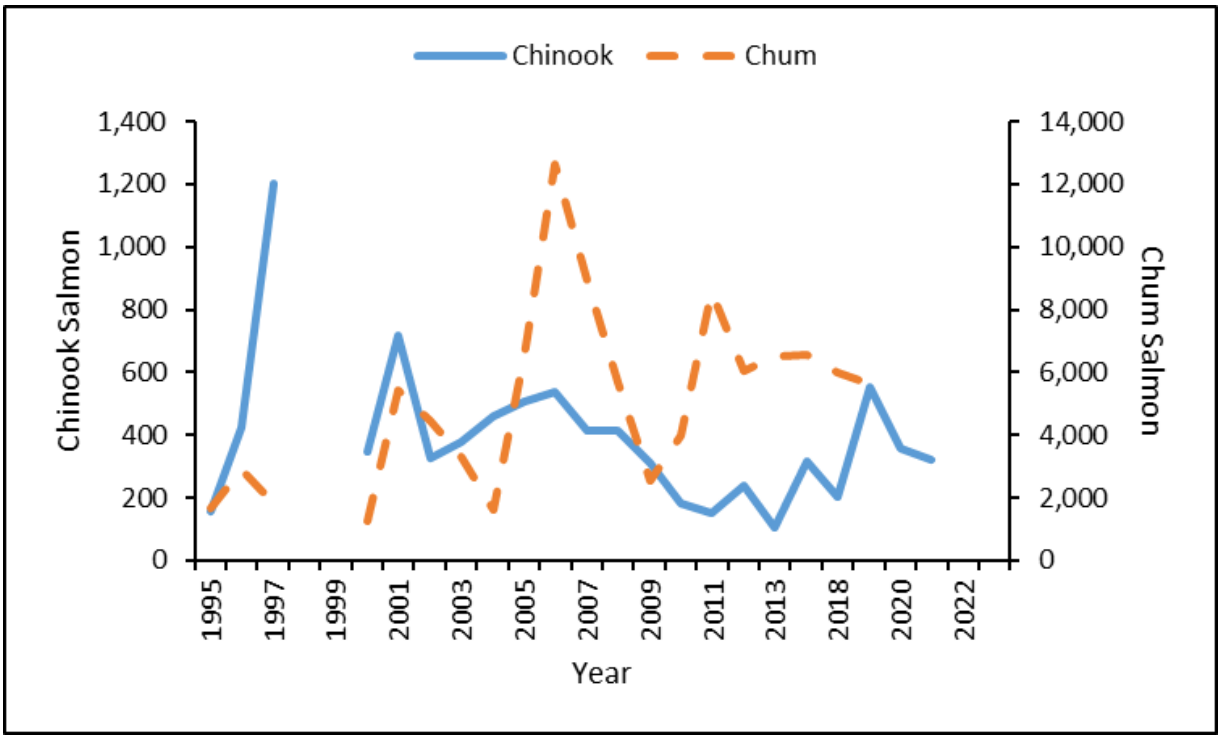

Figure 3. Annual escapements of Chinook and chum salmon to the Takotna River, 1995–2023.