Fishery Data Series No. 22-25

Tagging Response, Distribution, and Migration of Taku River Sockeye Salmon, 2020

by

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Alaska Department of Fish and Game Divisions of Sport Fish and Commercial Fisheries

Symbols and Abbreviations

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Weights and measures (metric)	
centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)	
cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature	
day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry	
all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General	
Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics	
all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log_2, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

FISHERY DATA SERIES NO. 22-25

TAGGING RESPONSE, DISTRIBUTION, AND MIGRATION OF TAKU RIVER SOCKEYE SALMON, 2020

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ABSTRACT

In 2020, a radiotelemetry study was conducted on Taku River sockeye salmon (*Oncorhynchus nerka*) to assess dropout rates (and potential bias) in annual mark–recapture studies, and to estimate the spawning distribution and migration rates among stocks. Every sixth sockeye salmon captured in fish wheels was radiotagged (406 fish) and no differences were detected between the length distributions of radiotagged and nonradiotagged fish (i.e., spaghetti tagged fish in the mark–recapture study). The total fish wheel catch was estimated to be 29.6% river-type and 70.4% lake-type stocks, based on genetic stock identification analysis of radiotagged fish. King Salmon Lake was the largest contributor (30.5%), followed by mainstem Taku River (27.7%), Little Trapper Lake (14.3%), Kuthai Lake (13.0%), Tatsamenie Lake (12.6%), and Tatsatua Lake (1.7%). Analysis of tag recoveries, based on 24 aerial surveys, was used to determine fates of the 406 radiotagged fish. Two radiotagged fish were censored because they were not detected after deployment. Of the 404 remaining radiotagged fish, the estimated dropout rate was 17.8% (i.e., the proportion that did not cross the U.S./Canada border), 9.9% were harvested in the Canadian commercial fishery, and 72.3% were tracked to a probable spawning location. Based on aerial surveys, the estimated proportion of river- and lake-type stocks was 66.8% river-type and 33.2% lake-type. Three hundred forty-eight of the 404 radiotagged fish met or exceeded the 95% probability threshold required for individual genetic assignment to reporting group and were matched to the individual radiotagged fish tracked to probable spawning locations. Thirty-five individually assigned fish were harvested in the Canadian commercial fishery between 0 and 16 days after being radiotagged. On average, radiotagged fish were harvested 3 days after tagging and 48.6% were harvested less than 5 days after tagging.

Keywords: Sockeye salmon, *Oncorhynchus nerka*, mark–recapture, Taku River, radiotelemetry, radio tag, dropout rate, migration rate, genetic stock identification, Pacific Salmon Treaty

INTRODUCTION

The Taku River is a transboundary river system that produces one of the largest runs of sockeye salmon (*Oncorhynchus nerka*) in northern British Columbia and Southeast Alaska (Figure 1). During the period 1984–2019, the terminal run[1] of Taku River sockeye salmon averaged 171,200 fish (range 81,700 to 336,900 fish) and the annual average harvest was 106,200 fish, of which 80,300 fish were harvested in the U.S. District 111 commercial drift gillnet fishery, 1,200 fish were harvested in the U.S. inriver personal use fishery, 24,500 fish were harvested in the Canadian inriver commercial fishery, and 200 fish were harvested in the Canadian First Nations fishery on average (TTC 2022). The Taku River sockeye salmon stock is jointly managed by the Alaska Department of Fish and Game (ADF&G), Fisheries and Oceans Canada (DFO), and the Taku River Tlingit First Nation (TRTFN). The Pacific Salmon Commission, via the Pacific Salmon Treaty, commits Canada and the U.S. to conservation and harvest allocation obligations for salmon originating in the waters of the Canadian portion of the Taku River.

A joint U.S./Canada Taku River sockeye salmon stock assessment program has been conducted annually since 1984 by ADF&G, DFO, and TRTFN. The program includes a mark–recapture study to provide weekly inseason abundance estimates and postseason abundance estimates of Canadian-origin Taku River sockeye salmon (Clark et al. 1986; McGregor and Clark 1987, 1988, 1989; McGregor et al. 1991; Boyce and Andel 2014; Pestal et. al 2020). Detailed methods of the annual two-event mark–recapture abundance estimate are outlined in Bednarski et al. (2020). In summary, migrating adult salmon are captured with fish wheels, located in the vicinity of Canyon Island on the downstream (U.S. side) of the U.S./Canada border (Figure 1), as part of event one. All healthy adult salmon are spaghetti tagged, given a secondary mark (axillary process clip), and released from the fish wheels. Event two consists of recovery of tags and

[1] Terminal run size is the total run excluding allowance for harvests in marine areas outside the terminal Alaska drift gillnet fishery in District 111 (see Table 6 in TTC 2022).

secondary mark data obtained from sockeye salmon harvested in Canadian commercial and assessment/test gillnet fisheries. These gillnet fisheries involve set nets and drift nets and occur in Canadian portions of the Taku River within 20 km of the international border; almost all harvest occurs within 5 km of the U.S./Canada border. Additional information on the distribution and abundance of discrete spawning stocks is collected at escapement weirs at Little Trapper and Tatsamenie Lakes (operated by DFO), and Kuthai and King Salmon Lakes (operated by TRTFN).

The Taku River sockeye salmon population consists of 4 lake stocks (Tatsamenie, King Salmon, Little Trapper, and Kuthai Lakes) and a conglomerate of all other stocks, often referred to as the mainstem stock. In 1984 and 1986, radiotelemetry was used to locate and characterize the distribution of spawning sockeye salmon in the Taku River (Eiler et al. 1992). Through this work, the mainstem component was shown to contribute approximately 63% to the total inriver run. In contrast, the average proportion of the mainstem component calculated from recent mark–recapture estimates has been much larger (79% average, 2013–2017). Further, the mark–recapture estimates of the proportion of the mainstem component also differed from estimates based on stock composition data from both the inriver Canadian fishery (47% average, 2008–2018), and the U.S. District 111 traditional commercial drift gillnet fishery (56% average, 2013–2018; TTC 2022). The discrepancy between the proportion of mainstem and lake spawning components highlighted the need to address potential bias in mark–recapture estimates due to dropouts (i.e., tagged fish that do not migrate above the U.S./Canada border) and to properly define the current distribution of spawning sockeye salmon in the drainage.

A comprehensive multiyear radiotelemetry study was added to the Taku River stock assessment project in 2019 to assess the dropout rate in the mark–recapture study, the distribution of spawning populations and migration rates among stocks. Potential reasons for dropouts include tagged fish spawning below the border, tag loss through shedding of tags or nonrecognition of secondary marks, and mortality of tagged fish due to predation or stress from capture and handling during the tagging event. Thus, assessment of dropout rates in mark–recapture studies is important, as the loss of tags results in abundance estimates that are biased high (Pestal et al. 2020). The 1984 radiotelemetry study (Eiler et al. 1992) and partial radiotelemetry studies conducted in 2015, 2017, and 2018 were used to assess dropout rates and to adjust historical (1984–2018) inriver run estimates (Pestal et al. 2020). Although Eiler et al. (1992) conducted a radiotelemetry study in 1986, the study area included the upper Taku Inlet near the Taku Lodge, approximately 20 km below the border, so results of that study were not directly comparable to the mark–recapture study area.

The radiotelemetry studies conducted in 1984 and 1986 (Eiler et al. 1992) were the only studies conducted prior to 2019 that specifically characterized the distribution of spawning sockeye salmon in the Taku River. All other drainagewide spawning distribution information has been acquired through related projects like escapement weirs at the lakes and incidental tag recoveries from the mark–recapture study. A dropout rate of 16.8% was estimated from the radiotelemetry study in 2019, which was less than the 22.0% dropout rate that was factored into historical mark–recapture estimates based on previous radiotelemetry studies (Miller and Pestal 2020). In 2019, the estimated proportions of river-type (71.1%) and lake-type (28.9%) fish, based on the genetic stock composition of radiotagged fish at the fish wheels, were similar to findings by Eiler et al. (1992), who estimated 63% river-type fish and 37% lake-type fish. Additional years of the radiotelemetry studies will help to better characterize the spawning distribution and locations of sockeye salmon in the Taku River and will provide for improved estimates of inriver abundance. The assessment of the dropout rate of tagged fish in the mark–recapture study will be used to improve inriver run abundance estimates and management of U.S. and Canadian fisheries.

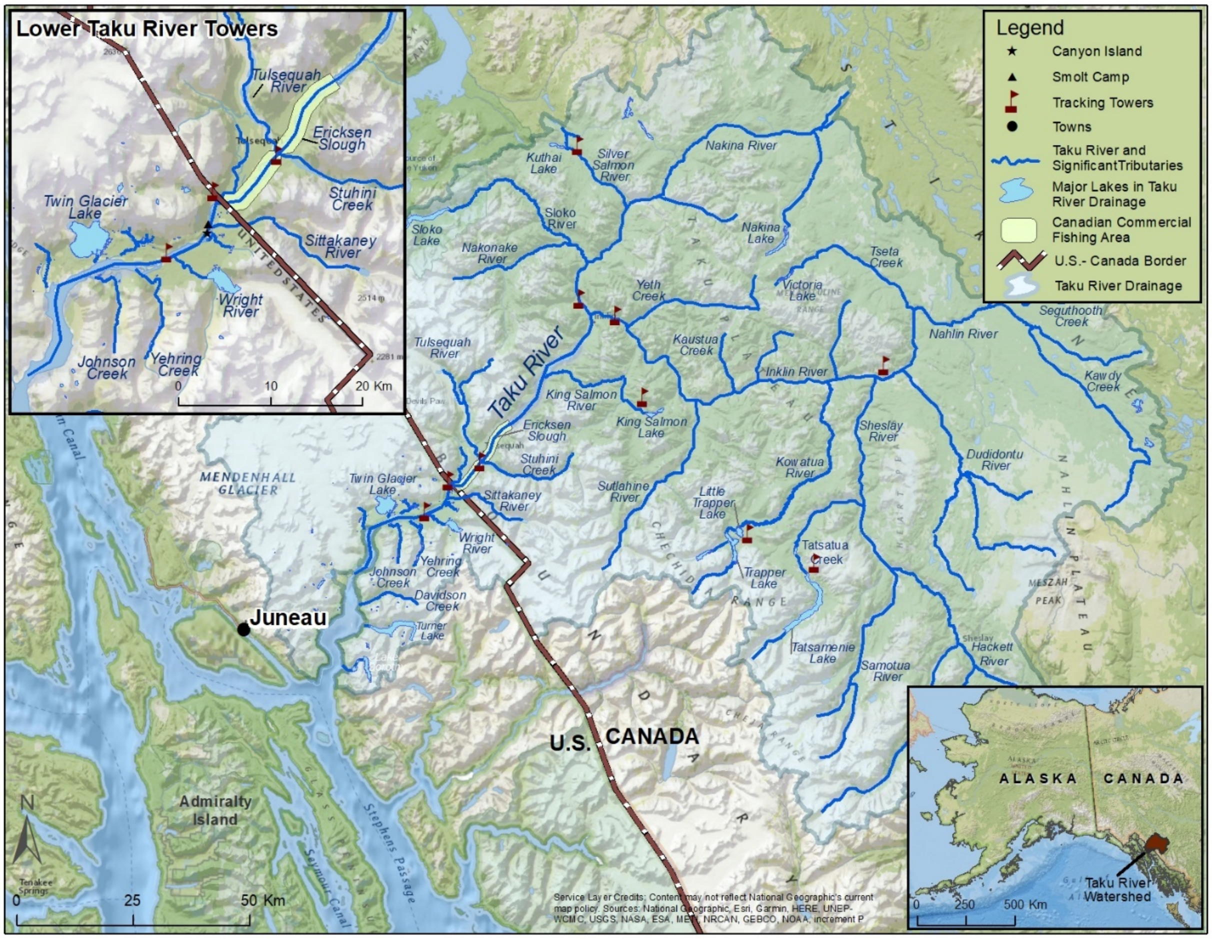

Figure 1.–Taku River in Southeast Alaska and British Columbia and key landmarks, including the marking (Canyon Island) and recovery (Canadian fishery) locations of the mark–recapture study and radiotelemetry tracking towers.

STUDY SITE

The Taku River is a transboundary river system originating in the Stikine Plateau of northwestern British Columbia. The merging of 2 principal tributaries, the Inklin and Nakina Rivers, approximately 50 km upstream from the border, forms the mainstem of the Taku River. The Taku River flows southwest from this point through the Coast Mountain Range, eventually draining into Taku Inlet in Southeast Alaska, about 30 km northeast of Juneau (Figure 1). Most of the 17,000 km^2 Taku River watershed lies within Canada.

Seasonally, the Taku River is glacially turbid. Water discharge in the winter (November–March) ranges from approximately 49 m^3/s to 196 m^3/s at the U.S. Geological Survey water gauging station located on the lower Taku River near Canyon Island (USGS 2019a; 1988–2018). Discharge increases in April and May and reaches a maximum average flow of 890 m^3/s to

1,000 m^3/s in June. Flow usually remains high in July but drops to approximately 500 m^3/s by late August. Sudden increases in discharge in the lower Taku River result from a Jökulhlaup—the release of the glacially impounded waters along the Tulsequah Glacier (Kerr 1948; Marcus 1960). These floods usually occur once or twice a year between June and September and cause water levels to fluctuate dramatically while carrying a tremendous load of debris. From 1987 to 2018, the maximum instantaneous peak flow due to a Jökulhlaup event was 3,200 m^3/s (22 July 2007; USGS 2019b). From 1987 to 2003, the majority of the annual peak floods from the Jökulhlaup occurred in August (53%); from 2004 to 2018 only 2 annual peak floods from the Jökulhlaup occurred in August, whereas the majority of the peak floods occurred in July (53%; USGS 2019b).

OBJECTIVES

PRIMARY OBJECTIVES

1. Estimate the proportion of fish that dropout of the mark–recapture study using radiotagged fish and determine, to the extent possible, the fate of these fish.
2. Estimate the stock composition of the fish wheel catch using standard genetic stock identification analysis of radiotagged fish.
3. Determine final fates of radiotagged fish that cross the border to determine probable spawning locations for Canadian-origin sockeye salmon using radiotelemetry.

SECONDARY OBJECTIVE

1. Estimate the stock composition of the Canadian fishery harvest using standard genetic stock identification analysis of radiotagged fish.
2. Perform individual genetic assignment on all sockeye salmon captured and radiotagged at the fish wheels to determine genetic affinity for comparison with telemetry fates.
3. Estimate the proportion of lake-type and river-type sockeye salmon in the Taku River using radiotelemetry data and genetic analysis of radiotagged fish.
4. Estimate the migratory timing profiles of sockeye salmon stocks in the Taku River from the point of radiotagging, at the Canyon Island fish wheels, to their final spawning destination.

METHODS

FISH WHEELS

Sockeye salmon were captured using 2 fish wheels in the lower Taku River. Fish wheels were positioned in the vicinity of Canyon Island (58°32′58 N, 133°40′52 W) on opposite riverbanks, approximately 200 m apart. The Taku River channel at this location is ideal for fish wheel operation since the river is fully channelized through a relatively narrow canyon that has very steep walls. The fish wheels were secured in position by anchoring to large trees with 0.95 cm steel cable and held out from, and parallel to, the shoreline by log booms. Each fish wheel consisted of 2 aluminum pontoons, measuring approximately 12.2 m (length) × 0.8 m (width), filled with closed cell Styrofoam for flotation. The pontoons supported a 5.2 m wide structure consisting of an adjustable height axle, 2 or 3 catch baskets, metal slides, and 1 live box that held captured fish. The live boxes were 2.4 m (length) × 0.9 m (width) × 1.5 m (depth). The aluminum catch baskets were 3.0 m (width) × 3.7 m (depth), covered with nylon webbing (5.1 cm × 5.1 cm mesh openings), and bolted to a steel axle that spins in a pillow-block bearing assembly. The fish-catching baskets were rotated about the axle by the force of the water current against the baskets and uprights. Paddle boards or doors were added or removed from the fish wheel uprights and heavy canvas was draped on the back of the catch baskets as needed throughout the season to maintain an optimal speed of 2.0 to 3.0 revolutions per minute (Bednarski et al. 2020).

Salmon migrating upriver were captured by the rotating baskets as they swam under the fish wheels. Aluminum slides bolted to the rib midsection of each basket directed fish into the aluminum live boxes mounted to the outer side of the fish wheel pontoons. The live boxes were perforated to allow constant flow of fresh river water. Sampling and tagging were conducted on a boat tied off to the pontoons. Fish were netted from the live box and transferred to a trough filled with fresh river water for tagging and sampling. All healthy sockeye salmon ≥350 mm mid eye to tail fork (METF) captured were sampled for sex and METF length data and tagged with a numbered spaghetti tag. Fish that showed signs of injury or acted lethargic were enumerated and released untagged.

The fish wheels were operated from 13 May 2020, during statistical week 20, through 3 October 2020, at the end of statistical week 40. The fish wheels were fished as continually as possible for approximately 15 hours per day in 2 shifts (0400–1130 and 1600–2330). Each shift consisted of a crew of 2 or 3 people. The fish wheels were shut down between shifts (1130–1600 and 2330–0400) and when repairs were necessary. Prior to 15 June, the fish wheel live boxes were checked every 2 hours. Starting 16 June, the live boxes were checked on an hourly basis until mid-August when daily sockeye salmon catches slowed, after which they were checked every 2 hours for the remainder of the season. Because sampling was conducted from a boat, the fish wheels were allowed to continue spinning while fish were sampled and tagged. Detailed methods of fish sampling were outlined in Bednarski et al. (2020).

RADIOTELEMETRY

Radiotelemetry is the preferred method to determine spawning distribution of river-type salmon stocks (Eiler 1995; Koehn 2000; Reine 2005). Methods used during this project were similar to radiotelemetry studies that have been implemented by ADF&G on the Susitna River drainage for sockeye salmon (Yanusz et al. 2007 and 2011) and on the Taku and Stikine Rivers for Chinook salmon (*O. tshawytscha*; Richards et al. 2016a, 2016b). Internal pulse-coded radio tags, manufactured by Advanced Telemetry Systems (ATS), were placed in a subset of sockeye salmon that were marked in conjunction with the spaghetti tagged sockeye salmon in the mark–recapture project. The radio tags were 52 mm long, 19 mm in diameter, 26 g in mass, had a 30 cm external whip antenna, a terminal battery life of 96 d, and operated on several frequencies within the 150.000–152.999 MHz range. Five frequencies had up to 100 pulse codes each, resulting in a total of 406 uniquely identifiable radio tags deployed. Each radio tag was equipped with a mortality indicator mode that activated when the radio tag was motionless for approximately 24 h. Radio tags were inserted through the esophagus and into the upper stomach of the fish using a 1.0 cm outside diameter and 30 cm long piece of cross-linked polyethylene plastic tubing (e.g., PEX). The antenna of the radio tag was threaded through the tube and pinched by hand at the end of the tube, such that the radio transmitter was tight against the opposite end of the tube. The plastic tube was marked with reference points to assist in proper tag insertion depths based on the length of the fish. Resistance felt during tag insertion, however, was the most useful indicator of proper insertion depth. The esophagus was visually inspected to ensure none of the body of the radio tag was visible prior to releasing the fish, which would potentially result in regurgitation of the radio tag and inadvertently affect estimates of the dropout rate.

Every sixth sockeye salmon captured in the fish wheels was tagged with a radio transmitter and matched with individual tissue and scale samples. Injured fish were not tagged and returned to the water. These systematically collected samples were used to estimate the genetic stock composition and age-sex-length composition of the fish wheel catch. The initial rate of deployment of the radio tags was determined by total number of radio tags allotted to the project (500 tags), the 2019 catch rates of the fish wheels, and the preseason forecast for 2020 (Table 1). The goal was to apply the radio tags proportionally throughout the run while using all 500 tags. The radiotagging rate was assessed throughout the season so adjustments could have been made if too few or too many tags were deployed daily. Movements of radiotagged fish were monitored from time of release by a combination of twice weekly aerial surveys and 10 stationary radiotelemetry tracking towers (towers) located throughout the drainage (Figure 1).

Table 1.–The weekly and seasonal deployment goals for radio tags at the Taku River, 2020. The proposed weekly tagging rate of sockeye salmon was based on the proportion and catch at the fish wheels in 2018 and 2019 during statistical weeks 21–40, the forecasted run size in 2020, and the 500 radio tags allocated for the project.

		Weekly				Cumulative			
		Expected		Goal		Expected		Goal	
Statistical week	Start date	CPUE	Catch	Radio	Scale/tissue /length sampling	CPUE	Catch	Radio	Scale/tissue /length sampling
21	17-May	0.00	0	0	0	0.00	0	0	0
22	24-May	0.00	0	0	0	0.00	0	0	0
23	31-May	0.00	1	0	0	0.00	1	0	0
24	7-Jun	0.00	14	2	2	0.00	15	2	2
25	14-Jun	0.02	52	8	8	0.02	67	10	10
26	21-Jun	0.03	95	15	15	0.05	162	25	25
27	28-Jun	0.09	293	45	45	0.14	455	70	70
28	5-Jul	0.14	454	70	70	0.28	909	140	140
29	12-Jul	0.14	457	70	70	0.42	1,366	210	210
30	19-Jul	0.22	716	111	111	0.64	2,082	321	321
31	26-Jul	0.17	541	83	83	0.81	2,623	404	404
32	2-Aug	0.08	249	38	38	0.89	2,872	442	442
33	9-Aug	0.05	148	23	23	0.94	3,020	465	465
34	16-Aug	0.03	99	15	15	0.97	3,119	480	480
35	23-Aug	0.02	72	11	11	0.99	3,191	491	491
36	30-Aug	0.01	39	6	6	1.00	3,230	497	497
37	6-Sep	0.00	11	2	2	1.00	3,241	499	499
38	13-Sep	0.00	3	1	1	1.00	3,244	500	500
39	20-Sep	0.00	0	0	0	1.00	3,244	500	500
40	27-Sep	0.00	0	0	0	1.00	3,244	500	500
Totals:		1.00	3,244	500	500				

Assumptions of the radiotagging study included: (1) sockeye salmon were radiotagged in proportion to the run; (2) radiotagging did not change the survival, movement (i.e., destination or fate), or catchability of a fish (i.e., no tagging effects); (3) fates of radiotagged fish were accurately determined (Bednarski et al. 2020); and (4) the radiotagged fish were a representative sample of the spaghetti tagged fish.

The first assumption (i.e., sockeye salmon were radiotagged in proportion to the run) is true if fishing effort and catchability was constant for all "stocks" (i.e., fish that spawn in the same area) that enter the river. Throughout the study, sampling effort was held as consistent as possible (i.e., every sixth sockeye salmon captured in the fish wheels was tagged with a radio transmitter) so that the cumulative distribution of tagged fish would be similar to the cumulative distribution of sockeye salmon returning the Taku River to spawn over the same time period. If nonproportional tagging occurred, the proportions were stratified by time and CPUE (see *Spawning Distributions* section in *Methods*). If fishing effort at the fish wheels (event one marking) and in the Canadian fishery (potentially recaptured in the fishery) were not consistent across the run, the ratios of radiotagged fish observed in the various spawning areas would be biased.

Assumption two (i.e., tagging effects) cannot be directly tested because an individual fish that was not handled or tagged cannot be tracked along its route or to its final destination. An indirect test of this assumption, though, is the time between tag application and recovery. Based on mark–recapture data from spaghetti tagged fish on the Taku River in years 1984 through 2018, the behavior of tagged fish, such as sulking, was not very long for most fish that eventually migrated upstream and, thus, was not a major source of bias (Pestal et al. 2020).

The third assumption (i.e., fates of radiotracked fish were accurately determined) is true if (1) radio tags remain operational throughout the project, (2) all radiotagged fish are detected during aerial surveys during their migration upstream, and (3) radiotagged fish are detected at their final destination during aerial surveys. The final destination of a radiotagged fish may not be detected during an aerial survey if its carcass was washed downstream (or the fish was not detected at all during its migration due to a faulty radio tag, an unknown migration path, or the fish regurgitates the tag), or if the last survey was conducted before a radiotagged fish reaches its final destination. The towers and radio tags remained operational throughout the project, with minimal periods of reduced or no coverage, and concerted effort was made to ensure proper installation, testing, and monitoring of all towers throughout the season. Eiler (1995) found tracking success to be >97% for radiotagged Chinook salmon that passed undamaged towers on the Taku River, and other salmon telemetry studies conducted in Southeast Alaska experienced similar high detection rates (Johnson et al. 1992; Pahlke and Bernard 1996; Pahlke et al. 1996; Pahlke and Etherton 1999; Richards et al. 2008; Weller and Evans 2012). Throughout the 2020 season, 24 aerial surveys were conducted to track radiotagged sockeye salmon to determine their final fate locations, during which all major spawning tributaries were surveyed roughly twice per week (see *Aerial Telemetry Surveys* section in *Methods*). It was assumed that all radiotagged fish that successfully spawned should have been at or near their spawning location during at least one of the aerial tracking surveys (Richards et al. 2014).

To ensure the fourth assumption (i.e., the radiotagged fish were a representative sample of the spaghetti tagged fish) was met, every sixth sockeye salmon that was captured in the fish wheels was radiotagged. We assumed that the radiotagged fish would provide a representative sample of the spaghetti tagged fish (i.e., share similar survival, movement, and catchability) and the results derived from radiotagged fish (fates, dropout rates, genetic stock composition) could be extended to the inriver population. To test this assumption, the cumulative time-to-recovery in the Canadian harvest (i.e., sulk time) was compared between the radiotagged and the spaghetti tagged fish, and two-sample Kolmogorov-Smirnov (KS) nonparametric tests (Conover 1999) were used to compare the length distribution of radiotagged fish to nonradiotagged fish to determine whether radiotagged sockeye salmon were representative of the size distribution of the inriver population. The length distribution of nonradiotagged fish was represented by sex and length data collected from sockeye salmon captured and spaghetti tagged at the Canyon Island fish wheels. The KS test was used to calculate *D*, the maximum vertical deviation between 2 cumulative length-frequency distributions from 2 sets of sample data. The *D* statistic is sensitive to differences in both the shape and location (mean length) of the distributions. The null hypothesis states that there is no difference between the 2 distributions. If the calculated value *D* is less than the critical value, one fails to reject the null hypothesis (i.e., *P*-value > 0.05). Three KS tests were performed using the statistical program R (R Core Team 2021; version 4.1.2) to compare the lengths of radiotagged fish to the lengths of nonradiotagged fish for (1) all fish, both sexes combined; (2) males only; and (3) females only. All associated files, data, and code were archived at https://gitlab.com/transboundary-committee/Taku-Sockeye-Public.

Size and Age Composition

Scale samples were analyzed at the ADF&G Region I Scale Aging Laboratory in Douglas, Alaska. Scale impressions were made in cellulose acetate and prepared for analysis as described by Clutter and Whitesel (1956). Scales were examined under moderate (70×) magnification to determine age. Age classes were designated by the European aging system where freshwater and saltwater years were separated by a period (e.g., age 1.3 denoted a fish with 1 freshwater and 3 ocean years; Koo 1962). Age, length, and sex data were entered into the Region I Commercial Fisheries Database by Douglas staff. The weekly age distribution, the seasonal age distribution weighted by week, and the mean length by age and sex weighted by week were calculated using standard sampling summary statistics from Cochran (1977) (Appendix A).

Genetic Analyses

To meet the objectives of this study, 2 different genetic analyses were performed: (1) standard genetic stock identification to estimate stock composition; and (2) individual assignment analysis, where each radiotagged fish was individually assigned to the most probable reporting group. Stocks were partitioned into 9 reporting groups: (1) mainstem Taku/Stikine River (mainstem Taku River), (2) Nahlin River, (3) King Salmon Lake, (4) Kuthai Lake, (5) Little Trapper Lake, (6) Tatsatua Lake, (7) Tatsamenie Lake, (8) Chutine Lake, and (9) Other (Appendix D). Among these genetic reporting groups, 4 (King Salmon Lake, Kuthai Lake, Little Trapper Lake, and Tatsemenie Lake) were considered to be lake-type stocks, and the remaining (mainstem Taku River, Nahlin River, Tatsatua Lake, Chutine Lake, and Other) were grouped as river-type stocks (Miller and Pestal 2020).

Standard genetic stock identification analysis was conducted to estimate stock composition of all fish radiotagged at the fish wheels (expanded to the population captured in event one of the mark–recapture study) and to estimate stock composition of radiotagged fish harvested in the Canadian commercial fishery. Sample sizes obtained in the study were adequate for estimating the stock composition within 5% of true value, 90% of the time. The individual assignment data were used to calculate the number of fish in each reporting group and to compare with known telemetry fates (see *Individual Genetic Assignment Analysis* section).

Laboratory Analysis

Genomic DNA was extracted from tissue samples using a NucleoSpin® 96 Tissue Kit by Macherey-Nagel (Düren, Germany). DNA was screened for 96 SNPs using Fluidigm 96.96 Dynamic Arrays (http://www.fluidigm.com). The Dynamic Arrays was read on a Fluidigm EP1 System after amplification and scored using Fluidigm® SNP Genotyping Analysis software. If necessary, SNPs were rescreened on a QuantStudio™ 12K Flex Real-Time PCR System (Life Technologies) as a backup method for assaying genotypes. Approximately 8% of individuals analyzed for this project were reextracted and genotyped as a quality control measure to identify laboratory errors and to measure the background discrepancy rate of the genotyping process. The quality control analyses were performed by staff not involved in the original genotyping, and the methods are described in detail in Dann et al. (2012). Genotypes were imported and archived in the Gene Conservation Laboratory Oracle database, LOKI.

Genotypes in the LOKI database were imported into the statistical program R for analysis (R Core Team 2021; version 4.1.1). Prior to statistical analysis, 3 statistical quality control analyses were performed to ensure high-quality data: (1) individuals missing >20% of their genotype data (markers) were identified and removed from analyses because this is indicative of low-quality DNA (80% rule; Dann et al. 2012); (2) duplicate individuals were identified and removed; and (3) non-sockeye salmon were identified and removed.

Stock Composition

The current genetic baseline consists of 241 populations, which are representative of the major producing stocks in the study area. The baseline consists of minor changes to Rogers Olive et al. (2018), with additional years pooled with existing Tatsatua and Nahlin River populations and additional collections in the Yakutat area (Appendix D). The baseline was evaluated to ensure that the reporting groups meet reporting criteria as outlined in Barclay et al. (2019). Stock composition for the entire season, by strata, and for the subset of fish harvested in the Canadian commercial fishery was estimated using the R package *rubias* (Moran and Anderson 2019). Strata generally corresponded to statistical week but were determined postseason as some weeks needed to be pooled to maintain greater than 30 fish per stratum. A single Markov Chain Monte Carlo chain with starting values equal among all populations formed the posterior distribution that described the stock composition of each stratum. Summary statistics were tabulated from these distributions to describe stock compositions.

TAG RECOVERY AND FINAL FATES

Aerial Telemetry Surveys

Twenty-four aerial surveys were conducted in 2020 to track radiotagged sockeye salmon to determine their final fate locations and to calculate the dropout rate of fish radiotagged at the fish wheels (Appendix B). Two aerial surveys in fixed wing aircraft were generally conducted per week from 7 July to 15 October to cover the entire drainage: one survey on the east side (Inklin River drainage) and one survey on the west side (Nakina River drainage). All surveys included the mainstem Taku River, below the Inklin-Nakina confluence (Figure 1). All major spawning tributaries were surveyed, including those previously identified by Eiler et al. (1988, 1992). An antenna was mounted to the side of the aircraft and an ATS 4520 receiver with internal GPS receiver was used to record the location of each fish. The date and time of decoding, frequency, pulse code, latitude and longitude, signal strength (decibel-milliwatts, dBm), and activity status of each decoded transmitter was automatically recorded by the receiver. An aerial survey sheet was completed for each survey and included date, time of flight (start and end time), surveyor, weather, general flight path, name of file downloaded, and a brief description of the survey (Appendix C). After the survey was completed, a preliminary map of survey points was created for detection of possible errors and to track the progress of radiotagged fish.

Stationary Telemetry Towers

Towers were used to confirm undetected deployed radio tags and confirm the movement of radiotagged fish into the lakes. Ten stationary tracking towers were used on the Taku River to record movements (upstream or downstream passage) of radiotagged fish (Figure 1, Appendix F). One tower was placed below the tagging site, one tower was placed at the U.S./Canada border between the marking site and Canadian fisheries, and one tower was placed above the main Canadian fishery near the Tulsequah River. The tower placed downstream of the tagging site was used to estimate the emigration rate of radiotagged sockeye salmon from the study area. The upstream towers were used to estimate immigration rates into Canada. The distance between the tower at the U.S./Canada border and the Tulsequah tower was approximately 9 km. In addition, one tower was placed near the Nakina/Sloko confluence, and one tower was placed near the confluence of the Nahlin and Sheslay Rivers (start of the Inklin River). Towers were also placed at the outlets of each of the 4 lake systems with weirs (Tatsamenie, King Salmon, Little Trapper, and Kuthai Lakes). Tower operations were started before fish were present at each location and were concluded after mid-October (Appendix F).

The towers were constructed and operated as described by Eiler (1995), except that they did not have satellite up-link capabilities (see Richards et al. 2016a for details). Each tower consisted of an ATS R4500C integrated receiver and data logger, 2 directional Yagi antennae (1 aimed upstream and 1 aimed downstream), a solar panel, and battery power system. The towers were strategically placed to afford the antennae unobstructed downstream and upstream views. Radiotagged fish within reception range of the towers were identified by radio frequency and recorded on the data logger. The towers recorded the date and time that each radio tag was detected, the antenna that detected the tag (upstream, downstream, or both), the signal strength, and the activity pattern (active or inactive) of the radio tag. The towers were programmed to record data every 60 minutes. The location of each radio tag relative to the tower (upriver or downriver from the site) was deduced by comparing the upstream and downstream antenna signal strengths. A reference radio tag was placed near each tower to verify that the tower components were functioning properly and to identify if/when the tower stopped working or recording data. Depending on accessibility, the towers were checked from weekly to approximately every 3 weeks. Tracking data were downloaded from the receivers via a laptop computer and copied onto a separate external hard drive. A logbook was maintained at each tower to record date, staff name, settings, and battery voltage for each visit. A checklist with radio receiver settings and the data download steps was stored at each site.

The final fates of all radiotagged sockeye salmon were determined and categorized following the completion and processing of all aerial surveys. Fates were determined based on the highest signal strength (signal strength of 120 dBm or above) recorded along the fish's route and maximum upstream location based on aerial surveys and stationary tower data. Spawning locations were then assigned to one of the general spawning locations as determined by genetic reporting group.

Dropout

A dropout was defined as a fish that did not migrate above the U.S./Canada border. Based on the final fates of the radiotagged fish, the proportion of radiotagged fish that dropout of the study was determined by dividing the total number of radiotagged fish that did not cross the U.S./Canada border by the total number of radiotagged fish, excluding any fish with a fate description of “Never located, unknown fate.”

Canadian Fisheries

Tags were recovered daily from the Canadian commercial fishery harvest. A directed sockeye salmon fishery occurred from 30 June to 15 August, after which time directed fishing effort shifted to coho salmon (*O. kisutch*). Weekly commercial fishing periods ranged from 1 to 5 days.

Commercial license conditions stipulated that spaghetti and radio tags recovered from harvested sockeye salmon must be submitted to DFO personnel daily. Harvest statistics, secondary mark data, and tag information were collected daily by DFO personnel based at Ericksen Slough and reported to the Whitehorse office, then forwarded to the ADF&G office in Douglas. ADF&G staff also recovered small numbers of spaghetti and radio tags from the U.S. inriver personal use fishery and the District 111 commercial drift gillnet fishery, located downriver from the fish wheels. These tags were not removed from the analysis because they were included in the dropout estimate. Tag information from individual recoveries in harvests was also used to identify paired tissues, which were used for genetic analyses.

Observations and recoveries of radiotagged fish were made at upstream sockeye salmon enumeration weirs at the outlets of Little Trapper Lake (23 July–14 September), Tatsamenie Lake (9 August–4 October), Kuthai Lake (11 July–4 September), and King Salmon Lake (8 July–4 September) (TTC 2022). Additional recoveries were made during escapement sampling activities directed at Chinook salmon or sockeye salmon at the Nakina, Nahlin, and Tatsatua Rivers, and in the mainstem Taku River (TTC 2022).

Spawning Distributions

If we assume that the fish migrating past the 2 fish wheels were proportionally tagged, the proportion of sockeye salmon destined for probable spawning location ($\hat{p}_i$) was estimated as (Cochran 1977, page 52),

$$\hat{p}_i = \frac{r_i}{r}, \tag{1}$$

where:

r_i = number of radiotagged fish out of r assumed to have spawned in location i, and

r = number of radiotagged fish released from the marking site that retained upstream migration and were assigned to a probable spawning location.

The variance of $\hat{p}_i$ was then estimated by (Cochran 1977, page 52),

$$\text{var}(\hat{p}_i) = \frac{\hat{p}_i(1-\hat{p}_i)}{r-1}. \tag{2}$$

If the assumption of proportional tagging was not met, the number of fish with radio tags *r,* distributed by time stratum *j* (i.e., statistical week) and spawning location *i,* was adjusted to compensate for unequal effort and unequal tagging fractions over time (Ericksen and Chapell 2006),

$$r'_{ij} = \frac{r_{ij}}{\hat{\phi}_j}, \tag{3}$$

where $\hat{\phi}_j$ = the proportion of sampled fish that were radiotagged, adjusted for unequal fish wheel effort over time,

$$\hat{\phi}_j = \frac{x_{1j}+x_{2j}}{X_{1j}\frac{H_{1j}}{h_{1j}}+X_{2j}\frac{H_{2j}}{h_{2j}}}, \tag{4}$$

where:

X = number of sockeye salmon caught in fish wheels (fish wheel designation by subscript 1, 2),

x = number of sockeye salmon radiotagged in fish wheels (fish wheel designation by subscript 1, 2),

H = total possible number of hours of fish wheel operation (fishing effort), and

h = actual number of hours of fish wheel operation (fishing effort).

All quantities are specific to time stratum *j* (i.e., statistical weeks). Then, the proportion of fish that spawn in location *i* was estimated as,

$$\hat{q}_i = \frac{\sum_j^{\text{weeks}} r'_{ij}}{\sum_i^{\text{fates}} \sum_j^{\text{weeks}} r'_{ij}}, \tag{5}$$

with approximate variance,

$$\text{var}(\hat{q}_i) \cong \frac{\hat{q}_i(1-\hat{q}_i)}{\sum_j^{\text{weeks}}(x_{1j}+x_{2j})-1}. \tag{6}$$

Equations 5 and 6 are restricted to those fish that were assigned a spawning fate.

Individual Genetic Assignment Analysis

Once final fates were assigned and probable spawning locations were mapped out, those data were paired with individual genetic assignment results, which were used to examine evidence of straying by reporting group. Specifically, to detect instances when fish identified as lake-type stocks did not make it to their natal lakes where they could be enumerated as escapement.

Individual assignment data were generated using the R package *rubias*. Briefly, for each radiotagged fish, the posterior means of reporting group membership was calculated along with the probability of the individual's genotype given it is from that collection. Together, these data were used to determine the most probable reporting group. We implemented a cutoff requirement of 95% probability to determine a "true" group membership (Simmons et al. 2013). Samples that fell below the cutoff were considered inconclusive and were not assigned to a reporting group. It is worth noting that although proportional stock composition analysis could be calculated from individual assignment data, it is not recommended because calculations would be limited to the subset of fish that met assignment thresholds. Further, depending on the study objectives, assignment thresholds could be modified, resulting in changes to stock composition.

Migratory Timing and Travel Rates

For the secondary objectives, migratory timing and travel rate statistics were calculated for the following sockeye salmon stocks: Kuthai, Little Trapper, Tatsamenie, and King Salmon Lakes. These statistics are useful for characterizing the annual timing of fish migrations and for comparing the timing of migrations between years. Although spaghetti tags can provide some migratory timing information, radio tags can provide timing statistics at a finer spatial and temporal resolution.

Migratory timing profiles can be described as time density. Two simple features of the time density are mean date and variance or dispersion of the migration through time. Fish wheel CPUE was used as an index of the abundance of fish migrating past the Canyon Island fish wheels, and migratory timing statistics were calculated following the procedures of Mundy (1979, 1982, 1984). Mean date of passage in a migration of *m* days was estimated by

$$\bar{t} = \sum_{t=1}^{m} tP_t \tag{14}$$

where:

$\bar{t}$ = the estimated mean day of the migration (t =1 is the first day of the migration and m is the last day), and

P_t = the proportion of the total cumulative fish wheel CPUE that occurred on day t (the CPUE on time interval t divided by the total CPUE).

The calculated mean date is reported as the corresponding calendar date. The variance of the migrations was estimated by,

$$\hat{S}_t^2 = \sum_{t=1}^{m}(t-\bar{t})^2 P_t. \tag{15}$$

The timing of sockeye salmon stocks past Canyon Island was derived from relocation dates of radiotagged fish on the spawning grounds, which were weighted by fish wheel CPUE to allow the escapement of a particular stock to be allotted to week of passage past Canyon Island. The proportion of the run occurring each week for each stock is

$$P_{js} = \frac{C_j T_{j,s}}{T_j - T_{j,c} - T_{j,d}} \Big/ \sum_{j=21}^{40} \frac{C_j T_{j,s}}{T_j - T_{j,c} - T_{j,d}}, \tag{16}$$

where:

j = the statistical week of interest;

C_j = the weekly proportion of the total season's fish wheel CPUE;

$T_{j,s}$ = the number of spawning grounds derived from relocation dates of stock s that were radiotagged in statistical week j;

T_j = the number of fish radiotagged in the fish wheels in statistical week j;

$T_{j,c}$= the number of fish radiotagged at the fish wheels in statistical week j and harvested in the Canadian inriver fishery; and

$T_{j,d}$ =the number of fish radiotagged at the fish wheels in statistical week j, but "dropped out."

Migratory timing is probably influenced by many factors including water level and tagging-induced behavior. An assumption implicit in this calculation is that the removal of fish by the Canadian inriver fishery does not alter the migratory timing distribution of individual stocks. This assumption may be violated because the harvest rate of the Canadian fishery on the inriver run varies among fishing periods. "Sulking" behavior, or the tendency for a salmon captured and tagged during upstream migration in a river to pause or move downstream before continuing upstream movement, can result in slower initial migration rates for tagged individuals (Bernard et al. 1999).

RESULTS

Operation of the fish wheels began on 13 May and ended on 3 October. A total of 2,409 sockeye salmon were tagged with spaghetti tags, and of these, 406 were also radiotagged (Appendix E). The first sockeye salmon was radiotagged on 11 June (statistical week 24), and the last radio tag was deployed on 9 September (statistical week 37). Tagging rates peaked during statistical week 31 when 382 fish were spaghetti tagged, of which 65 were also radiotagged, which represented 16% of the season total tags deployed for each tag type (Table 2). Radio tags were deployed in proportion to abundance throughout the sockeye salmon run (i.e., every sixth sockeye salmon captured was radiotagged). Five unique frequencies containing 100 individual pulse codes were used (Table 3). Seven defective radio tags were not deployed.

Table 2.–Number of radio tags and spaghetti tags applied to Taku River sockeye salmon at the Canyon Island fish wheels by statistical week, 2020.

		Spaghetti tags applied		Radio tags applied	
Statistical week	Start date	Weekly	Cumulative	Weekly	Cumulative
23	31-May	2	2	0	0
24	7-Jun	13	15	2	2
25	14-Jun	5	20	1	3
26	21-Jun	171	191	28	31
27	28-Jun	321	512	54	85
28	5-Jul	267	779	44	129
29	12-Jul	320	1,099	55	184
30	19-Jul	351	1,450	59	243
31	26-Jul	382	1,832	65	308
32	2-Aug	224	2,056	38	346
33	9-Aug	164	2,220	28	374
34	16-Aug	109	2,329	19	393
35	23-Aug	40	2,369	6	399
36	30-Aug	34	2,403	6	405
37	6-Sep	4	2,407	1	406
38	13-Sep	1	2,408	0	406
39	20-Sep	1	2,409	0	406
Totals:		2,409		406	

Table 3.–Number of Taku River sockeye salmon radiotagged by statistical week and frequency at the Canyon Island fish wheels, 2020.

	Radio tag frequency (MHz)					
Statistical week	150.593	150.733	150.773	150.694	150.493	Total
24	2	0	0	0	0	2
25	1	0	0	0	0	1
26	28	0	0	0	0	28
27	54	0	0	0	0	54
28	13	31	0	0	0	44
29	0	55	0	0	0	55
30	0	11	48	0	0	59
31	0	0	50	15	0	65
32	0	0	0	38	0	38
33	0	0	0	28	0	28
34	0	0	0	19	0	19
35	0	0	0	0	6	6
36	0	0	0	0	6	6
37	0	0	0	0	1	1
Total	98	97	98	100	13	406

AGE, SEX, AND LENGTH OF FISH WHEEL CATCH

The 2020 sockeye salmon catch at the Canyon Island fish wheels was composed primarily of age-1.2 (74%), age-0.3 (8%), age-1.3 (7%), and age-0.2 (7%) fish (Table 4). The remainder of the catch (4%) was composed of age-1.1, age-2.1, age-2.2, and age-2.3 fish. The mean length of age-0.2 fish was 433 mm for males and 441 mm for females, and the mean length of age-1.2 fish was 473 mm for males and 484 mm for females. The mean length of age-0.3 fish was 557 mm for males and 549 mm for females, and age-1.3 was 573 mm for males and 552 for females (Table 5).

Table 4.–Age composition of Taku River sockeye salmon captured at the Canyon Island fish wheels weighted by statistical week, 2020.

Age class	Brood year	Sample size	Estimated catch	SE catch	Percent of catch	SE percent
0.2	2017	21	174	34	7%	1%
0.3	2016	23	192	35	8%	1%
1.1	2015	4	16	10	1%	0%
1.2	2016	232	1,780	53	74%	2%
1.3	2015	20	160	32	7%	1%
2.1	2016	1	9	8	0%	0%
2.2	2015	8	63	20	3%	1%
2.3	2014	1	9	8	0%	0%
Total		310	2,402			

Table 5.–Average length (METF in mm) of Taku River sockeye salmon captured at the Canyon Island fish wheels by age class and sex, 2020.

		Male			Female			Both sexes		
Age class	Brood year	Sample size	Mean length	SE	Sample size	Mean length	SE	Sample size	Mean length	SE
0.2	2017	17	433	6.1	4	441	18.5	21	434	5.9
0.3	2016	5	557	10.7	18	549	4.3	23	551	4.0
1.1	2015	2	375	5.0	–	–	–	2	375	5.0
1.2	2016	105	473	3.3	127	484	2.0	232	479	1.9
1.3	2015	10	573	8.5	10	552	7.1	20	562	5.9
2.1	2016	1	365	–	–	–	–	1	365	–
2.2	2015	2	480	40.0	6	481	10.7	8	481	10.9
2.3	2014	1	600	–	–	–	–	1	600	–

Two-sample KS tests were used to determine whether there were differences between the radiotagged and nonradiotagged fish. One of the 2,017 nonradiotagged fish did not have an associated length. Of the fish with associated lengths and sex, there were 199 male radiotagged fish, 207 female radiotagged fish, 968 male nonradiotagged fish, and 1,048 female nonradiotagged fish (Tables 6 and 7).

Cumulative length distributions of radiotagged fish compared to nonradiotagged fish ($D = 0.0270$, P-value = 0.9663; Figure 2), male radiotagged fish compared to male nonradiotagged fish ($D = 0.0480$, P-value = 0.8411; Figure 3), and female radiotagged fish to female nonradiotagged tagged fish ($D = 0.0367$, P-value = 0.9739; Figure 4) did not appear to differ. Therefore, the radiotagged fish adequately represented the length distribution of sockeye salmon as sampled from the Canyon Island fish wheels in the Taku River.

Table 6.–Range, average, and mode of mid eye to tail fork fish lengths (METF, mm) of radiotagged fish.

Tag type	Sample size	Sex	Range	Average	Mode
Radiotagged	199	Male	365–600	475	450
Radiotagged	207	Female	410–585	494	485
Radiotagged	406	Both	365–600	485	500

Table 7.–Range, average, and mode of mid eye to tail fork fish lengths (METF, mm) of nonradiotagged fish.

Tag type	Sample size	Sex	Range	Average	Mode
Nonradiotagged	968	Male	350–630	473	450
Nonradiotagged	1,048	Female	370–615	495	485
Nonradiotagged	2,016	Both	350–630	485	500

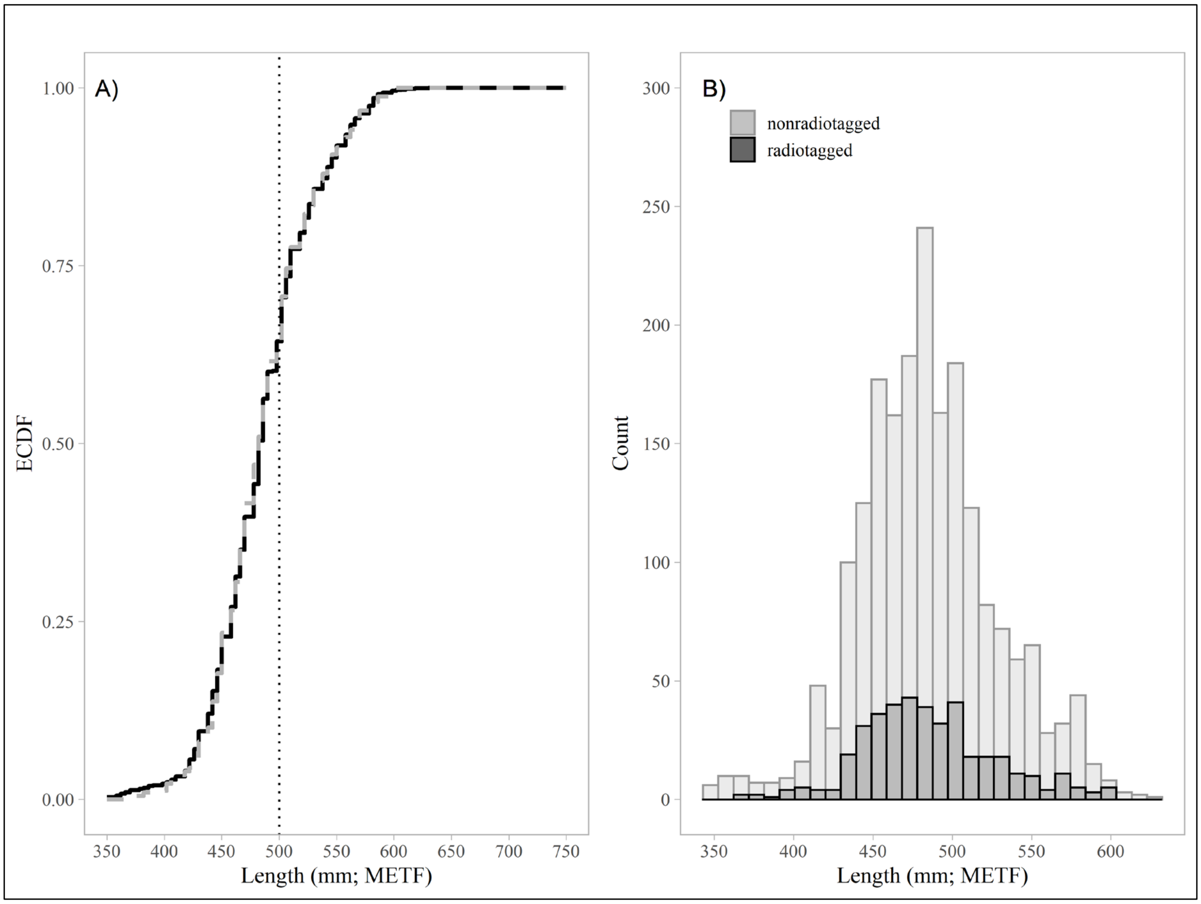

Figure 2.–(A) Empirical cumulative distribution function (ECDF) for all sockeye salmon sampled at the Canyon Island fish wheels, both sexes combined, 2020. The black line is length data from fish captured and tagged at the fish wheels (nonradiotagged fish) and the gray line is length data from radiotagged fish. The black dotted vertical line is the length (mm; METF) where the maximum deviation between the 2 curves occurs (500 mm). (B) Histogram of fish length samples for radiotagged and nonradiotagged fish.

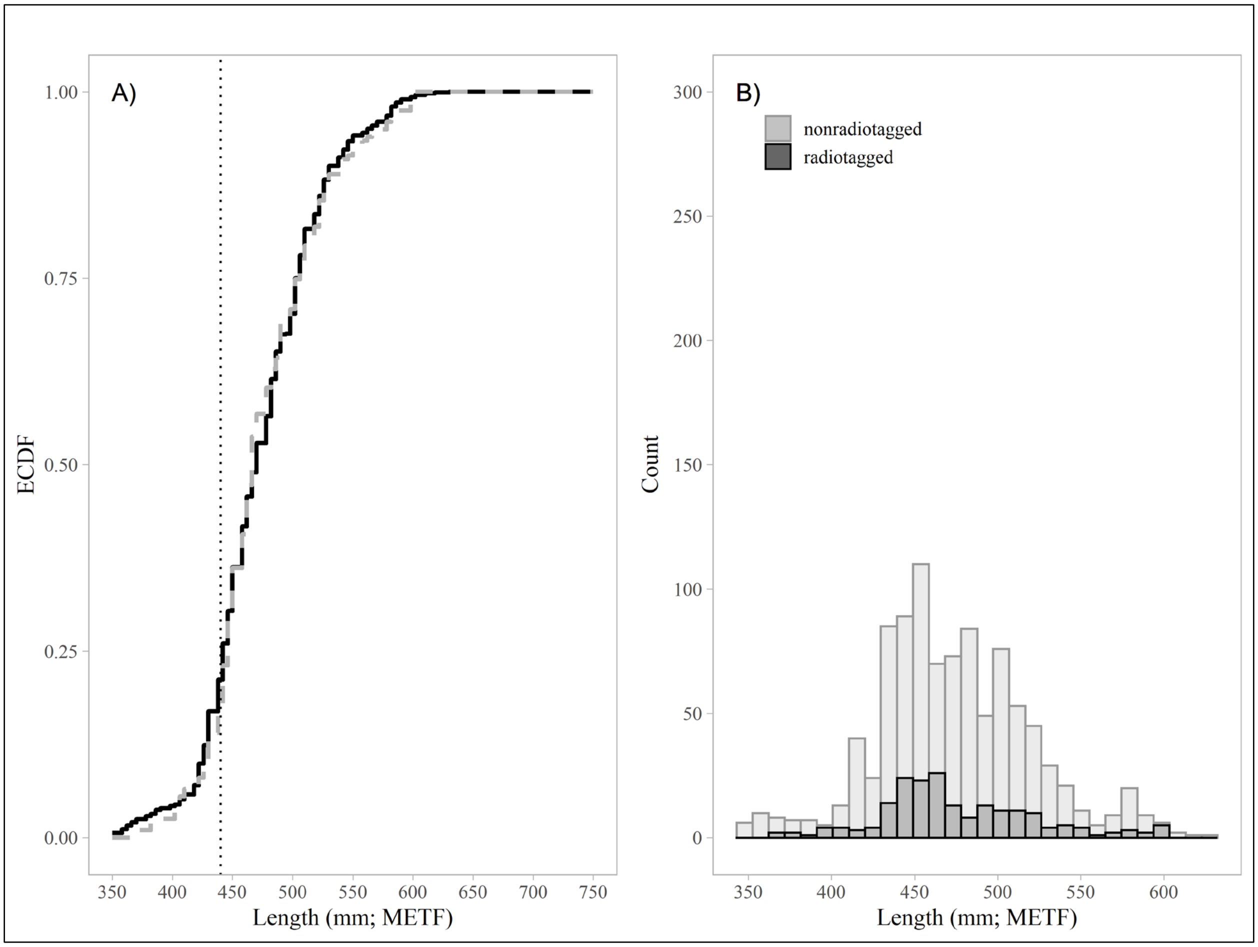

Figure 3.–(A) Empirical cumulative distribution function (ECDF) for male sockeye salmon sampled at the Canyon Island fish wheels, 2020. The black line is length data from male fish captured and tagged at the fish wheels (male nonradiotagged fish) and the gray line is length data from male radiotagged fish. The black dotted vertical line is the length (mm; METF) where the maximum deviation between the 2 curves occurs (440 mm). (B) Histogram of male fish length samples for radiotagged and nonradiotagged fish.

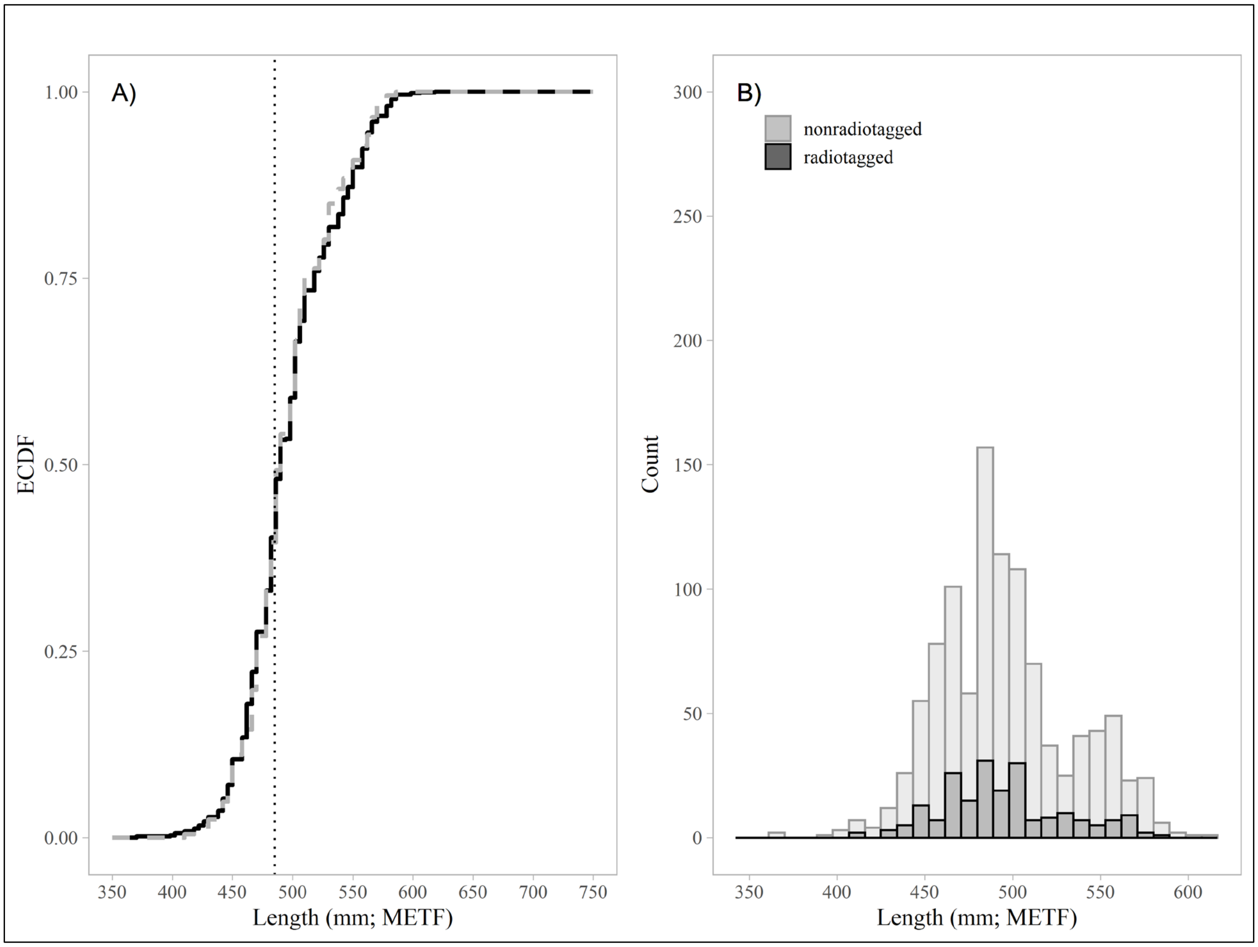

Figure 4.–(A) Empirical cumulative distribution function (ECDF) for female sockeye salmon sampled at the Canyon Island fish wheels, 2020. The black line is length data from female fish captured and tagged at the fish wheels (female nonradiotagged fish) and the gray line is length data from female radiotagged fish. The black dotted vertical line is the length (mm; METF) where the maximum deviation between the 2 curves occurs (485 mm). (B) Histogram of female fish length samples for radiotagged and nonradiotagged fish.

GENETIC STOCK COMPOSITION OF FISH WHEEL CATCH

The stock composition of the fish wheel catch was estimated using the 404 radiotagged sockeye salmon that passed quality control measures (Appendix G). Estimates were stratified by week, but statistical weeks 24–26 and 34–37 were pooled due to low sample sizes (n < 30). The estimated total proportion of river-type stocks was 29.6% and lake-type stocks was 70.4%. By reporting group, King Salmon Lake was the largest contributor (30.5%), followed by the mainstem Taku River (27.7%, SD = 7.8%), Little Trapper Lake (14.3%, SD = 6.3%), Kuthai Lake (13.0%, SD = 4.9%), Tatsamenie Lake (12.6%, SD = 5.7%), and Tatsatua Lake (1.7%, SD = 0.4%). Although the Nahlin River, Chutine Lake, and Other reporting groups were represented in the analysis, they were insignificant contributors to the overall stock composition (<0.01%), and will not be discussed further (Table 8, Figure 5, Appendix G).

Run timing varied by stock (Figure 6). The King Salmon Lake reporting group, the highest contributing stock, peaked at the fish wheels in statistical week 27 when it accounted for 61.8%

of the total stock composition (Table 8). The mainstem Taku River reporting group, the second highest contributing stock, peaked during statistical week 32 when it accounted for 53.0% of the total stock contribution. The Kuthai Lake reporting group peaked early in the season during the statistical week 24–26 stratum (67.9%). The Little Trapper Lake reporting group showed the highest contributions near the midpoint of the season and peaked in statistical week 30, when it represented 34.7% of the stock composition. The Tatsamenie Lake reporting group peaked late in the season during the statistical week 34–39 stratum, when it contributed 47.4% of the composition. The Tatsatua Lake reporting group showed small contributions to the stock composition during the second half of the season, and peaked in statistical week 33, when it composed 10.5% of the stock composition (Table 8).

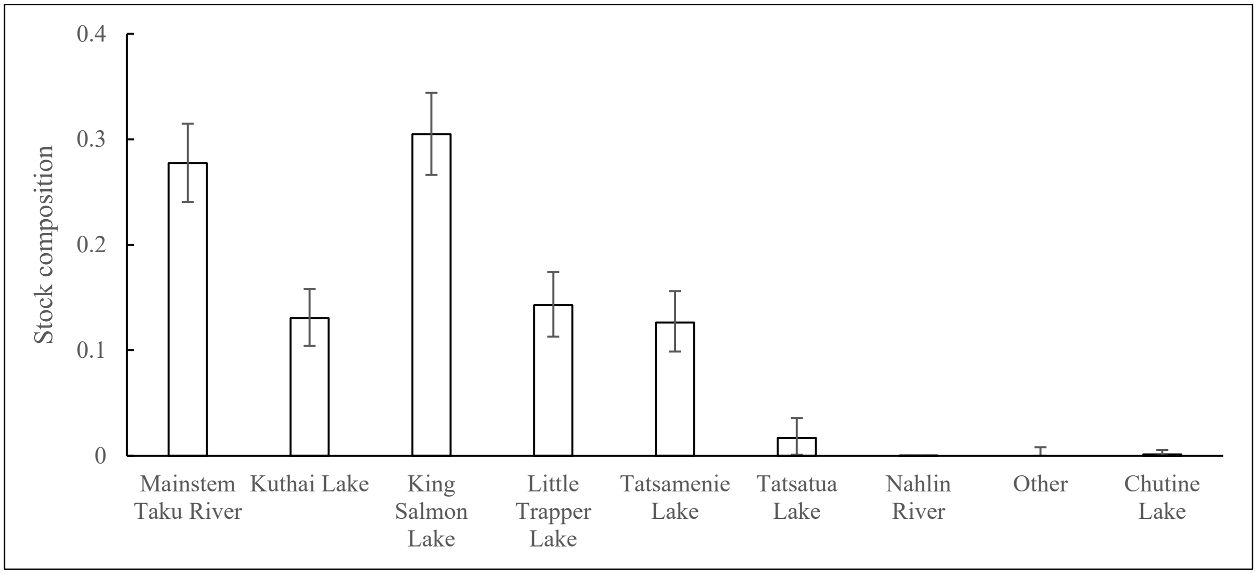

Figure 5.–Estimated genetic stock composition and 90% credible intervals of radiotagged Taku River sockeye salmon in the Canyon Island fish wheel catch, by reporting group, 2020 (*n* = 404 fish).

Table 8.–Estimated genetic stock composition of the fish wheel catch based on radiotagged fish (top), and estimated numbers of sockeye salmon spaghetti tagged by stock (bottom) based on genetic stock identification at the Canyon Island fish wheels, 2020.

Statistical week	*n*	Mainstem Taku River	Tatsamenie Lake	Little Trapper Lake	King Salmon Lake	Kuthai Lake	Tatsatua Lake	Nahlin River	Chutine Lake	Other
24–26	31	0.000	0.000	0.040	0.280	0.679	0.000	0.000	0.000	0.002
27	54	0.067	0.000	0.048	0.618	0.267	0.000	0.000	0.000	0.000
28	44	0.114	0.003	0.136	0.551	0.195	0.000	0.000	0.000	0.000
29	55	0.179	0.000	0.257	0.442	0.101	0.000	0.000	0.000	0.021
30	59	0.238	0.086	0.347	0.289	0.000	0.016	0.000	0.022	0.002
31	63	0.514	0.120	0.169	0.153	0.027	0.012	0.000	0.000	0.005
32	38	0.530	0.274	0.093	0.076	0.023	0.000	0.000	0.000	0.003
33	28	0.216	0.398	0.165	0.116	0.000	0.105	0.000	0.000	0.000
34–39	32	0.519	0.474	0.007	0.000	0.000	0.000	0.000	0.000	0.000
Total	404	0.277	0.126	0.143	0.305	0.130	0.017	0.000	0.001	0.000
23–26	191	0	0	8	53	130	0	0	0	0
27	321	21	0	15	198	86	0	0	0	0
28	267	30	1	36	147	52	0	0	0	0
29	320	57	0	82	141	32	0	0	0	7
30	351	83	30	122	101	0	5	0	8	1
31	382	196	46	65	58	10	4	0	0	2
32	224	119	61	21	17	5	0	0	0	1
33	164	35	65	27	19	0	17	0	0	0
34–39	189	98	90	1	0	0	0	0	0	0
Total	2,409	668	304	344	735	314	41	0	3	0

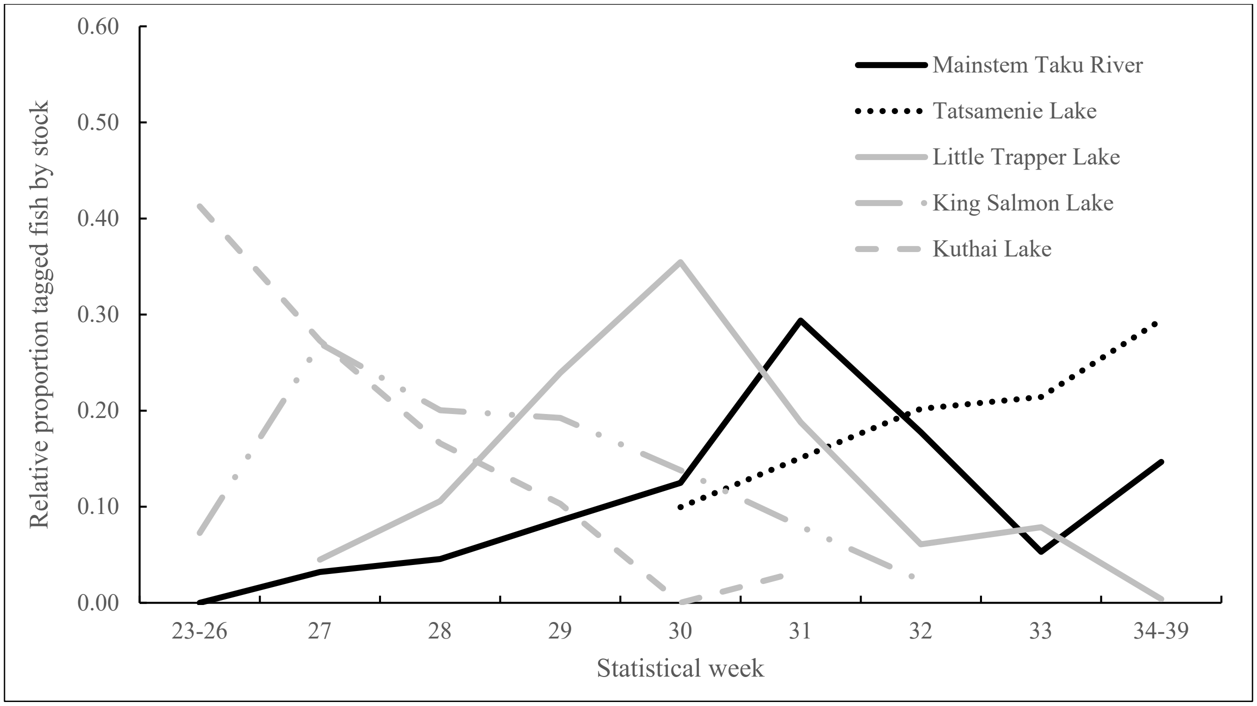

Figure 6.–Relative run timing of each major contributing sockeye salmon reporting group (i.e., those contributing >4% of annual escapement) radiotagged at the Canyon Island fish wheels by statistical week, 2020. Weekly proportions sum to 100% for individual stocks.

TAG RECOVERIES AND FINAL FATES

Fates were designated for all 406 radiotagged sockeye salmon in 2020. Two radiotagged fish (0.5%) were never detected during aerial surveys or at any of the stationary tracking towers (Table 9). The total number of dropouts—fish that never passed the U.S./Canada border—was 72 fish, or 17.8% (i.e., 72/404) of the radiotagged fish. Of the 332 radiotagged fish that successfully crossed the U.S./Canada border, 40 fish (9.9%; 40/404) were captured in the Canadian commercial fishery, and 292 fish (72.3%; 292/404) were tracked to a probable spawning location (Table 9).

Table 9.–List of fate descriptions recorded for all radiotagged sockeye salmon on the Taku River, 2020.

Fate description	*n*	Proportion	SE
Never located, unknown fate	2	0.005	0.003
Never passed the border, regurgitated tag/died	70	0.173	0.019
Never passed the border, was recovered in a U.S. fishery	2	0.005	0.003
Passed the border, unknown fate	0	–	–
Passed the border, captured in the Canadian inriver fishery	40	0.723	0.022
Passed the border, tracked to a probable spawning location	292	0.099	0.015

Canadian Commercial Fishery

The Canadian commercial fishery occurred from statistical weeks 27 to 39 and fishery openings varied from 2 to 5 days per week. Harvest rates on spaghetti tagged and radiotagged sockeye salmon in the commercial fishery varied by statistical week (Table 10). Peak harvest of spaghetti tagged sockeye salmon occurred during statistical weeks 31 and 32 when 19% and 20%, respectively, of the spaghetti tagged fish were harvested. Harvest of radiotagged fish was more variable with similar proportions of radiotagged sockeye salmon harvested between statistical weeks 29 and 33 (13% to 15% per statistical week; Figure 7). The cumulative time-to-recovery of radiotagged fish in the Canadian harvest was slightly behind spaghetti tagged recovery (Figure 8).

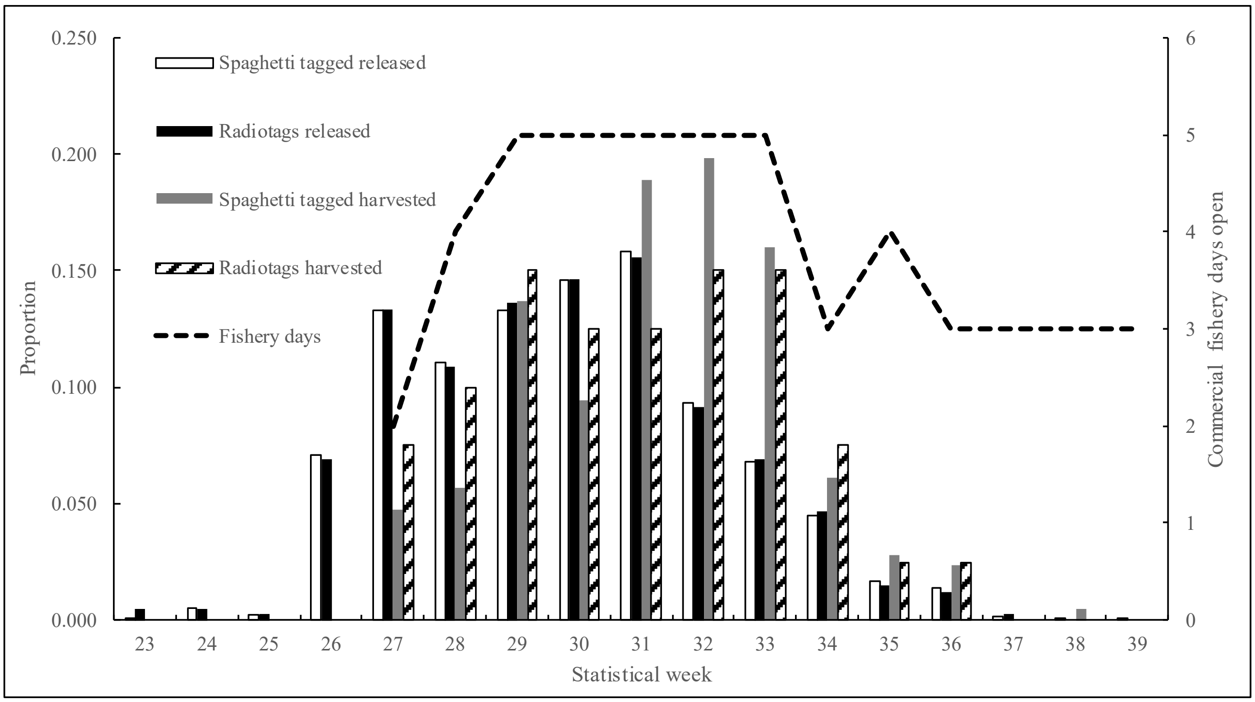

Figure 7.–Proportion of spaghetti tagged and radiotagged sockeye salmon released at the Canyon Island fish wheels and proportion of recoveries of spaghetti tagged and radiotagged fish harvested in the Canadian commercial fishery by statistical week, 2020. The number of Canadian commercial fishery days by statistical week is shown by the dashed black line.

Table 10.–Proportion and number (*n*) of radiotagged sockeye salmon released at the Canyon Island fish wheels and radiotagged fish harvested in the Canadian commercial fishery by statistical week, 2020.

Released		Stat.	Radiotagged fish harvested by statistical week										Harvested	
Proportion	*n*	week	27	28	29	30	31	32	33	34	35	36	*n*	Proportion
0.005	2	23	0	0	0	0	0	0	0	0	0	0	0	0.000
0.005	2	24	0	0	0	0	0	0	0	0	0	0	0	0.000
0.002	1	25	0	0	0	0	0	0	0	0	0	0	0	0.000
0.069	28	26	0	0	0	0	0	0	0	0	0	0	0	0.000
0.134	54	27	3	4	0	0	0	0	0	0	0	0	3	0.055
0.109	44	28	0	0	1	2	0	0	0	0	0	0	4	0.073
0.136	55	29	0	0	5	2	0	0	0	0	0	0	6	0.109
0.146	59	30	0	0	0	1	2	0	0	0	0	0	5	0.091
0.156	63	31	0	0	0	0	3	3	2	0	0	0	5	0.091
0.092	37	32	0	0	0	0	0	3	3	0	0	0	6	0.109
0.069	28	33	0	0	0	0	0	0	1	2	0	0	6	0.109
0.047	19	34	0	0	0	0	0	0	0	1	1	0	3	0.055
0.015	6	35	0	0	0	0	0	0	0	0	0	1	1	0.018
0.012	5	36	0	0	0	0	0	0	0	0	0	0	1	0.018
0.002	1	37	0	0	0	0	0	0	0	0	0	0	0	0.000
Total	404		3	4	6	5	5	6	6	3	1	1	40	0.099
Proportion of total harvested			0.08	0.10	0.15	0.13	0.13	0.15	0.15	0.08	0.03	0.03	1.00	

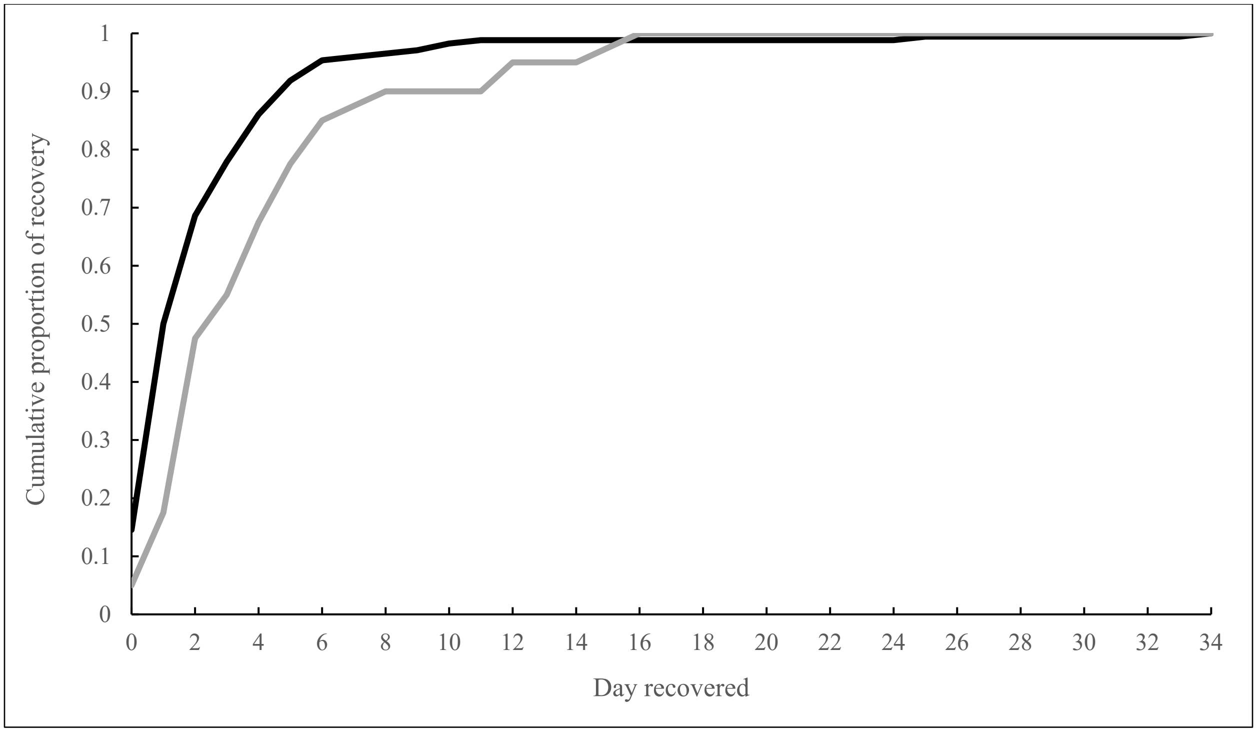

Figure 8.–The cumulative time-to-recovery of spaghetti tagged fish (black line; *n* = 172) and radiotagged fish (gray line; *n* = 40) between release at the Canyon Island fish wheels and recovery in the Canadian commercial fishery, 2020.

Stock Composition of Canadian Harvest

The stock composition of radiotagged sockeye salmon harvested in the Canadian commercial fishery was estimated from 38 radiotagged fish that passed all quality control measures for further analysis. Most harvested sockeye salmon were estimated to be from the lake-type stocks (66.4%) and the remaining were river-type stocks (33.6%). By reporting group, King Salmon Lake (26.6%, SD = 7.1%) was the largest contributor, followed by the mainstem Taku River (33.0%, SD = 7.8%), Little Trapper Lake (16.3%, SD = 6.3%), Tatsamenie Lake (13.7%, SD = 5.7%), Kuthai Lake (9.7%, SD = 4.9%), and Other (0.5%, SD = 3.0%). No radiotagged sockeye salmon from Tatsatua Lake, Chutine Lake, or the Nahlin River reporting groups were recovered in the harvested samples (Figure 9, Appendix H).

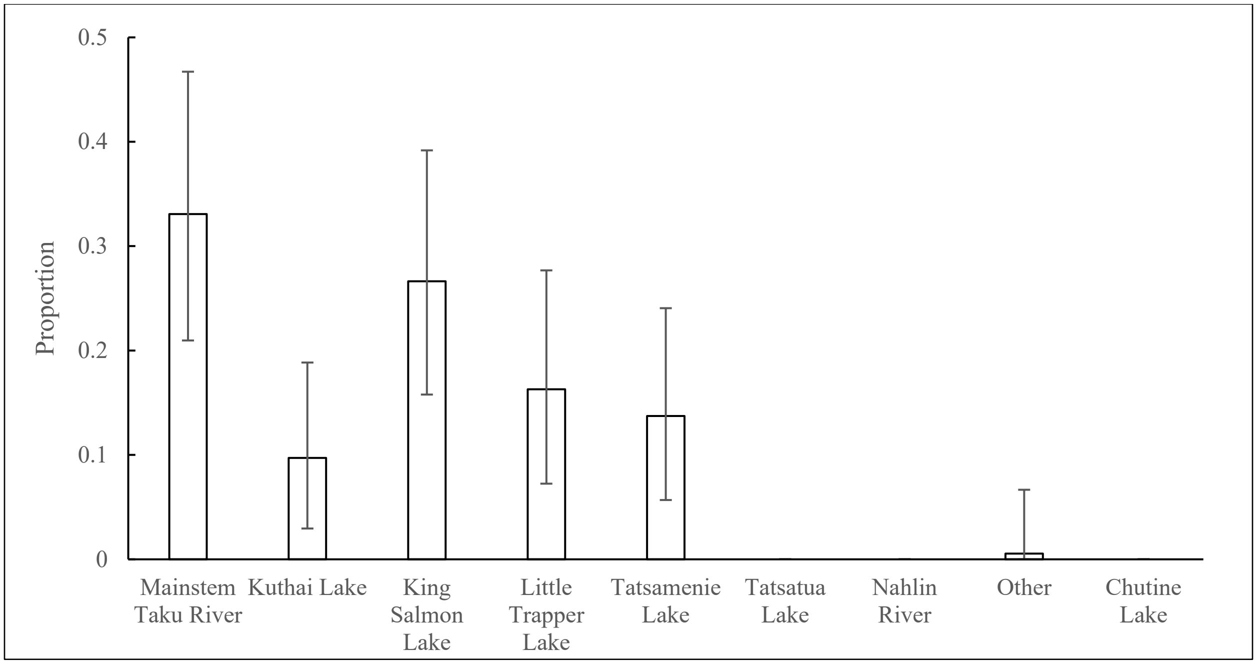

Figure 9.–Estimated genetic stock composition and 90% credible intervals of radiotagged Taku River sockeye salmon harvested in the Canadian commercial fishery, by reporting group, in 2020 (n = 38 fish).

Aerial Survey Spawning Distribution

Probable spawning locations were determined for 292 radiotagged fish (Table 11) based on data gathered during 24 drainagewide aerial surveys (Appendix B). Probable spawning location was assigned using the farthest upstream detection, preferably within a cluster of detections that showed a high signal strength (>120 dBm). These probable spawning locations are approximate, however, because the telemetry dataloggers marked the location of the aircraft when recording data and not the precise location of the radio tags being detected (Figure 10).

The estimated proportions of river-type and lake-type stocks based on aerial surveys was 66.8% river-type and 33.2% lake-type stocks (Table 11). If the outlet streams of the respective lakes are included in the calculation of lake-type stocks (e.g., King Salmon and Silver Salmon Rivers, and Kowatua and Tatsatua Creeks), the aerial estimate of river-type and lake-type stocks changes to 48.6% and 51.4%, respectively. The King Salmon Lake system—including outflowing King Salmon River—accounted for nearly a third (31.5%) of radio tags tracked to probable spawning locations, the highest among the lake systems, and the mainstem Taku River contributed 22.9%.

Table 11.–Final probable spawning locations of radiotagged sockeye salmon based on drainagewide aerial surveys of the Taku River, 2020. Locations are listed geographically, progressing upstream from the U.S./Canada border.

Location	*n*	Proportion	SE
Mainstem Taku River	67	0.229	0.025
Tulsequah River	3	0.010	0.006
King Salmon River	36	0.123	0.019
King Salmon Lake	56	0.192	0.023
Sloko River	1	0.003	0.003
Nakina River	48	0.164	0.022
Silver Salmon River	3	0.010	0.006
Inklin River	12	0.041	0.012
Kowatua Creek	6	0.021	0.008
Little Trapper Lake	34	0.116	0.019
Sheslay River	8	0.027	0.010
Tatsatua Creek	8	0.027	0.010
Tatsamenie Lake	7	0.024	0.009
Hackett River	3	0.010	0.006
Total	292		

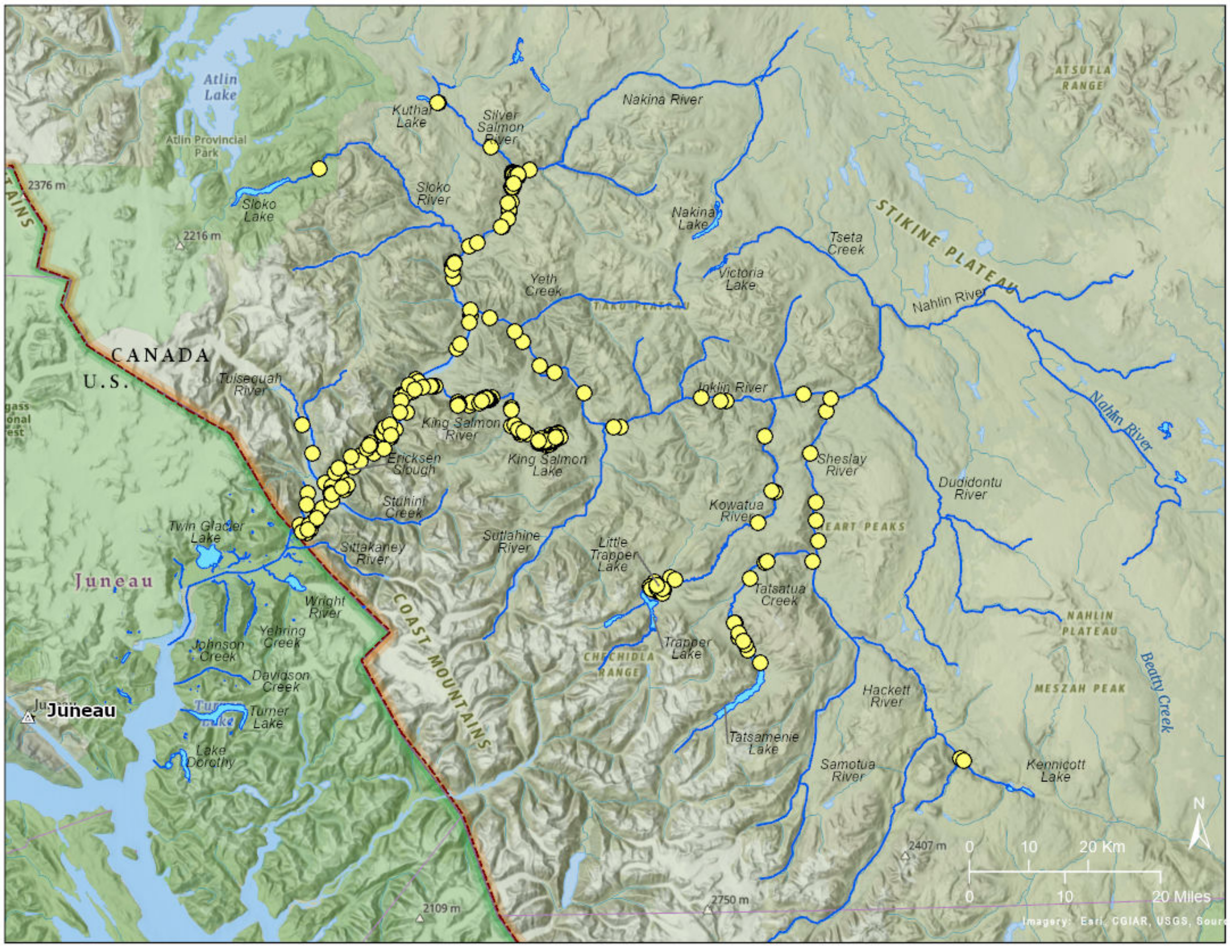

Figure 10.–Final fate locations of radiotagged Taku River sockeye salmon that crossed the U.S./Canada border (maroon dotted line) and probably spawned (*n* = 292 fish), in 2020. Final fate locations indicate farthest upstream detections, not necessarily exact spawning locations.

Individual Genetic Assignment of Radiotagged Fish

In addition to estimating stock composition of the fish wheel catch through standard genetic stock identification methods, we calculated individual genetic assignment to the reporting group for each fish radiotagged at the fish wheels (Table 12). Overall, 348 (86.1%) of the 404 radiotagged fish met the ≥0.95 probability threshold required for successful reporting group assignment. Fish that fell below this threshold were not considered conclusively assigned to a specific reporting group and were excluded from the following results (Table 12).

Table 12.–Number of sockeye salmon (*n*) that were radiotagged at the fish wheels and identified to reporting group through individual assignment (≥0.95 probability threshold), 2020.

Reporting group	*n*
King Salmon Lake	121
Mainstem Taku River	91
Kuthai Lake	51
Little Trapper Lake	42
Tatsamenie Lake	41
Tatsatua Lake	2
Nahlin River	0
Other	0
Total	348

The majority of radiotagged sockeye salmon individually assigned to lake-type stocks (*n* = 255 fish). Within this classification, most of the radiotagged fish assigned to the King Salmon Lake reporting group (*n* = 121 fish), followed by Kuthai Lake (*n* = 51 fish), Little Trapper Lake (*n* = 42 fish), and Tatsamenie Lake (*n* = 41 fish). The river-type mainstem Taku River reporting group contributed a smaller amount of individually assigned fish (*n* = 91 fish; Table 12). Based on aerial surveys and stationary tower detections, 26 radiotagged sockeye salmon that were genetically assigned to one of the lake-type reporting groups—Tatsamenie Lake (*n* = 4), Little Trapper Lake (*n* = 5), King Salmon Lake (*n* = 10), Kuthai Lake (*n* = 5), and Tatsatua Lake (*n* = 2)—were found to have final fate locations in the mainstem of the Taku River (Figure 11). It is unknown if these fish strayed from the spawning areas predicted from their genetic assignments, died in migration, regurgitated the radio tag, or washed downriver after spawning. However, due to the stringent probability threshold (≥0.95), we feel confident that the reporting group assignments are true.

Individual Assignment of Above Border Individuals

Of the 332 radiotagged sockeye salmon that crossed the U.S./Canada border, 283 of these fish met the ≥0.95 probability threshold for individual genetic assignment. Lake-type stocks composed the majority of the individually assigned fish that crossed the U.S./Canada border (*n* = 220 fish), with the largest contribution from the King Salmon Lake reporting group (*n* = 106 fish), followed by Kuthai Lake (*n* = 46 fish), Little Trapper Lake (*n* = 35 fish), and Tatsamenie Lake (*n* = 33 fish) reporting groups. The river-type stocks contributed 63 individually assigned fish with most from the mainstem Taku River reporting group (*n* = 61 fish), and a small number from the Tatsatua Lake reporting group (*n* = 2 fish; Table 13).

Table 13.–Number of radiotagged sockeye salmon that met the genetic individual assignment probability threshold (≥0.95 probability) and crossed the U.S./Canada border, by statistical week and reporting group, Taku River, 2020.

	Statistical week radiotagged															
Reporting group	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	Total
Mainstem Taku River	0	0	0	2	2	5	13	19	8	3	7	1	1	0	0	61
King Salmon Lake	0	0	9	29	21	21	14	7	2	3	0	0	0	0	0	106
Kuthai Lake	2	0	17	14	7	3	0	2	1	0	0	0	0	0	0	46
Little Trapper Lake	0	0	1	2	4	7	12	5	2	2	0	0	0	0	0	35
Tatsamenie Lake	0	0	0	0	1	0	2	5	7	8	8	1	1	0	0	33
Tatsatua Lake	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Nahlin River	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	27	47	35	36	41	38	20	18	15	2	2	0	0	283

Evidence of sockeye salmon straying from their natal streams was evident when reviewing the individual genetic assignments of radiotagged fish that were tracked to final locations. Fish from the King Salmon Lake reporting group were found throughout the drainage, with 2 radiotagged fish tracked to the Nakina River, 1 in Sloko River, and 1 at Kowatua Creek. Two fish from the Kuthai Lake reporting group were tracked to the King Salmon Lake drainage. A small number of radiotagged sockeye salmon assigned to the mainstem Taku River reporting group were tracked to lake systems, with 3 fish tracked to lower King Salmon River and 2 fish to the Little Trapper Lake system. Twelve radiotagged sockeye salmon assigned to the Tatsamenie Lake reporting group were tracked to final fates in eastside tributaries of the Inklin and Sheslay Rivers, downstream of Tatsamenie Lake (Figure 11); however, Tatsamenie Lake fish are known to spawn late in the season (Figure 12).

Partial barriers to migration appeared to have affected the ability of fish to reach Kuthai and King Salmon Lakes. A cluster of 27 radiotagged sockeye salmon assigned to the Kuthai Lake reporting group were tracked to a known partial barrier near the junction of the Silver Salmon and Nakina Rivers and presumably were unable to reach Kuthai Lake (Figure 13). Twenty-one radiotagged sockeye salmon, assigned to the King Salmon Lake reporting group, were tracked to the lower King Salmon River, below a known partial barrier, and were similarly probably unable to reach the lake (Figure 14).

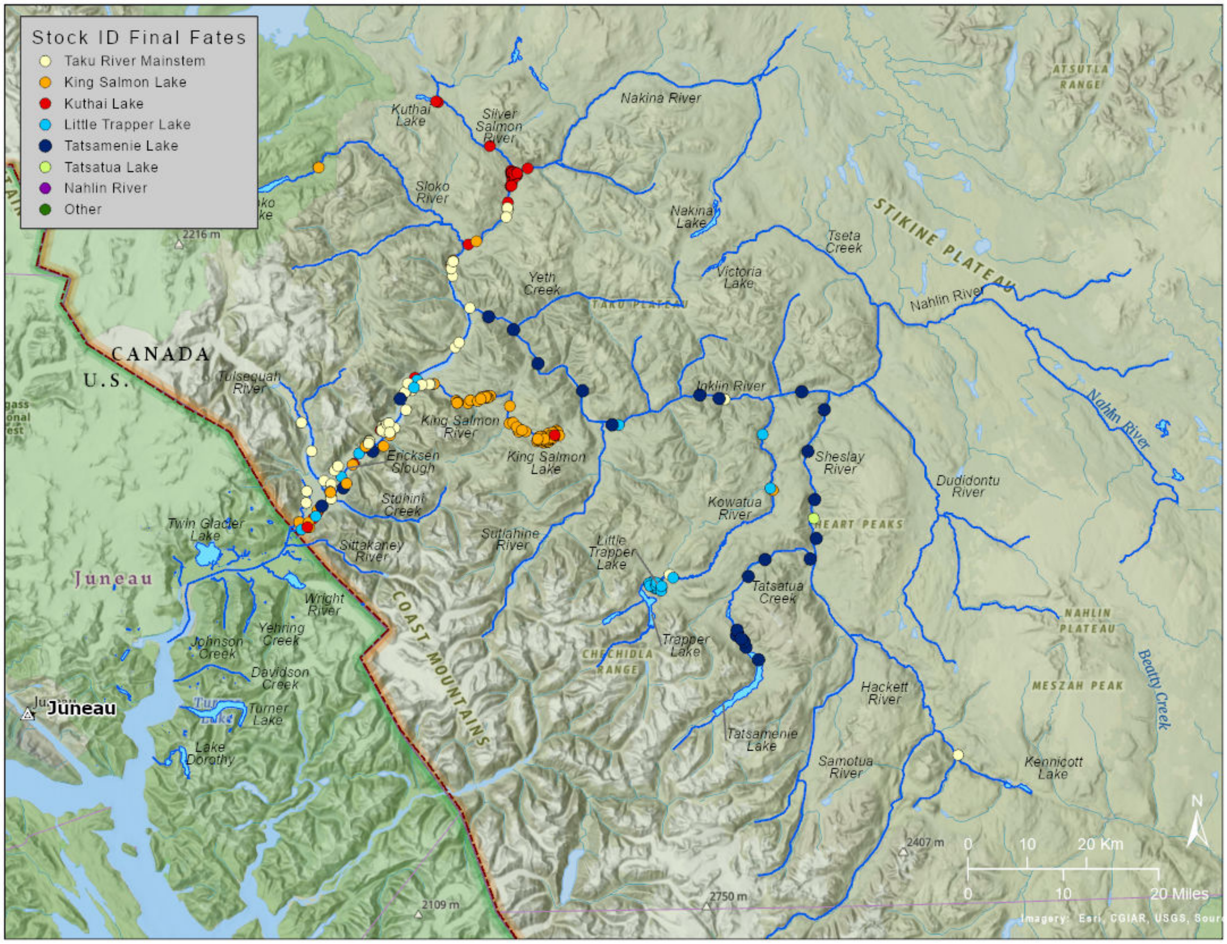

Figure 11.–Final fates and distribution of radiotagged sockeye salmon that met the individual assignment probability threshold (≥0.95; n = 348 fish), Taku River 2020.

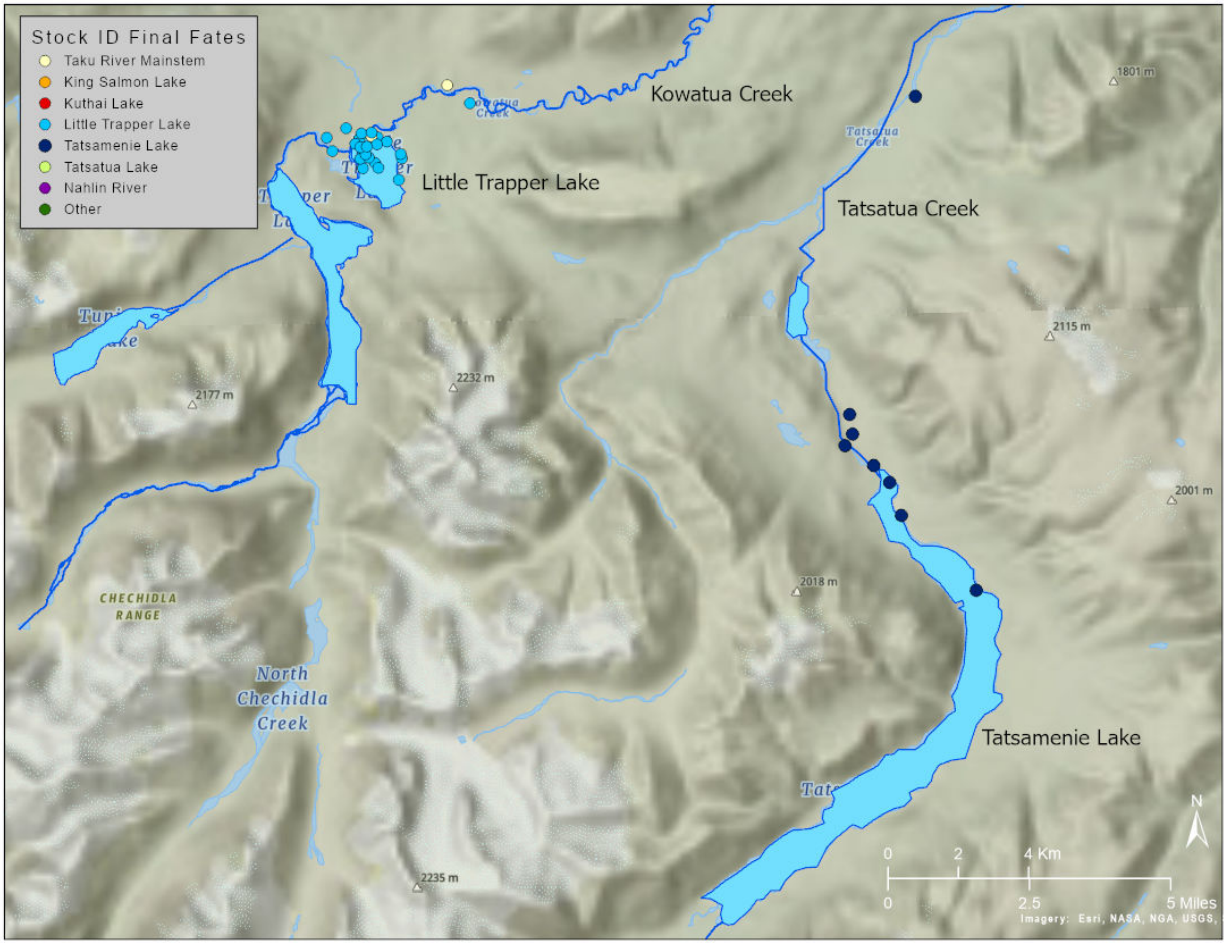

Figure 12.–Final fates of radiotagged sockeye salmon that met the individual genetic assignment probability threshold (≥0.95) at Little Trapper and Tatsamenie Lakes, 2020.

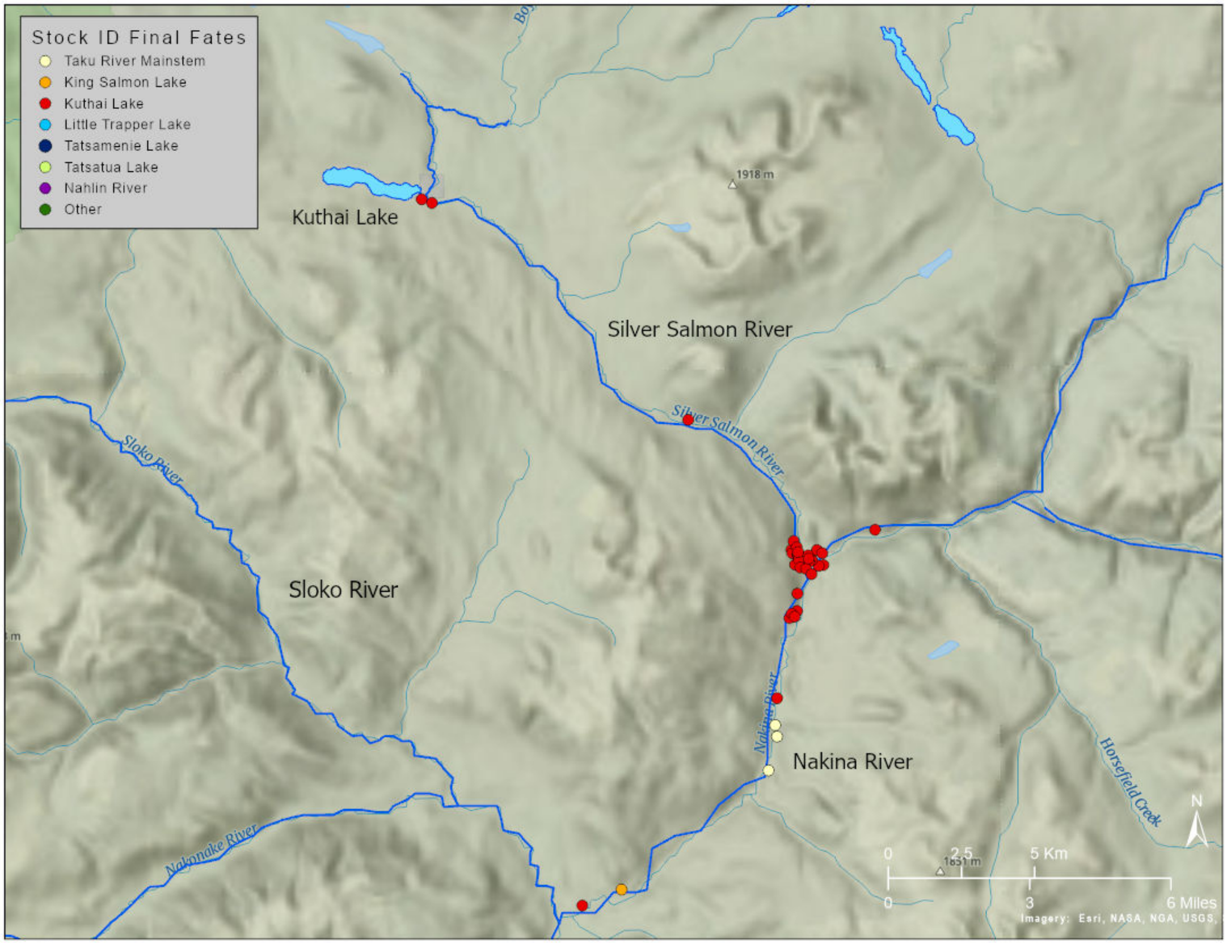

Figure 13.–Final fates of radiotagged sockeye salmon that met the individual genetic assignment threshold (≥0.95) at the confluence of the Nakina and Silver Salmon Rivers, 2020.

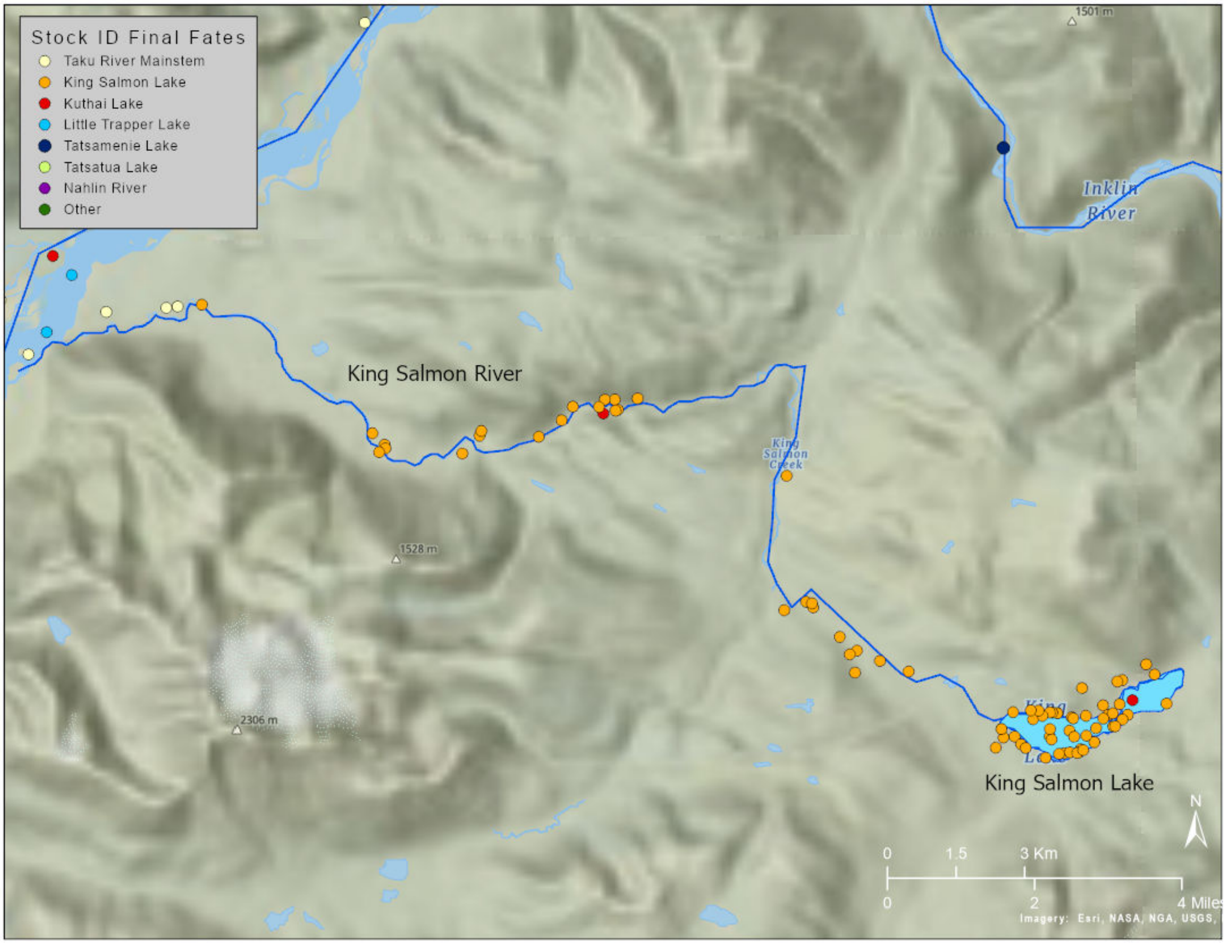

Figure 14.–Final fates of radiotagged sockeye salmon that me the individual genetic assignment threshold (≥0.95) at King Salmon River and King Salmon Lake, 2020.

Individual Assignment of Canadian Commercial Harvest

Thirty-five of the 40 radiotagged sockeye salmon harvested in the Canadian commercial fishery met the ≥0.95 probability threshold for individual genetic assignment. The mainstem Taku River reporting group had the highest contribution (n = 14 fish), of which 64.3% were radiotagged between statistical weeks 30 and 32. The King Salmon Lake reporting group showed the second highest contribution (n = 10 fish), with 90% radiotagged between statistical week 27 and 29. The early returning Kuthai Lake reporting group contributed 3 fish between statistical weeks 27 and 31, the Little Trapper Lake reporting group contributed 4 fish between statistical weeks 28 and 32, and the Tatsamenie Lake reporting group contributed 4 fish between statistical weeks 31 and 34 (Table 14).

Table 14.–Number of radiotagged sockeye salmon that met the genetic individual assignment probability threshold (≥0.95 probability) and were harvested in the Canadian commercial fishery by statistical week and reporting group, Taku River, 2020.

	Statistical week radiotagged											
Reporting group	25	26	27	28	29	30	31	32	33	34	35	Total
Mainstem Taku River	0	0	2	0	0	3	4	2	1	1	1	14
King Salmon Lake	0	0	4	2	3	0	0	0	1	0	0	10
Kuthai Lake	0	0	1	0	1	0	1	0	0	0	0	3
Little Trapper Lake	0	0	0	1	1	0	1	1	0	0	0	4
Tatsamenie Lake	0	0	0	0	0	0	1	2	0	1	0	4
Tatsatua Lake	0	0	0	0	0	0	0	0	0	0	0	0
Nahlin River	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	7	3	5	3	7	5	2	2	1	35

Migration Timing

Migration time within the Taku River was estimated for radiotagged sockeye salmon that were individually assigned to reporting groups (*n* = 348 fish). Migration time from the Canyon Island fish wheels (from time of tagging) to harvest in the Canadian commercial fishery ranged between 0 and 16 days (Figure 15). On average, radiotagged fish were harvested 3 days after tagging (SD = 4 days), and the median number of days between tagging and harvest was 3 days. Of the radiotagged sockeye salmon harvested in the Canadian commercial fishery that met the ≥0.95 probability threshold for individual genetic assignment (*n* = 35 fish), 48.6% were harvested <5 days after the tagging event at the fish wheels (Figure 15).

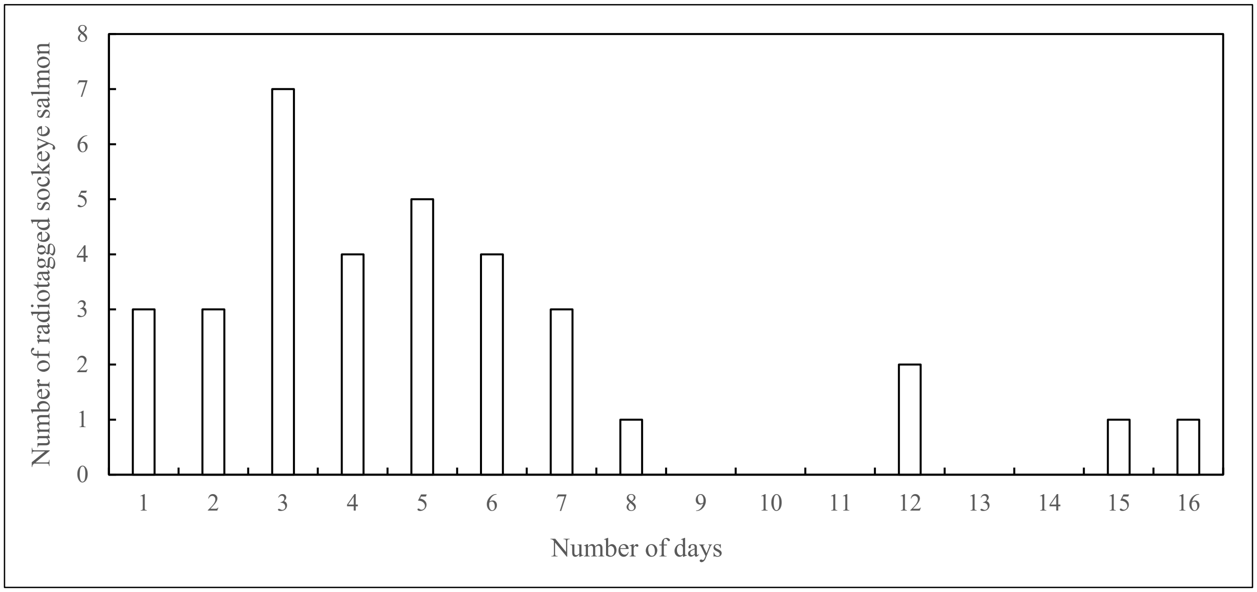

Figure 15.–Number of days between radiotagging at the Canyon Island fish wheels and subsequent harvest in the Canadian commercial fishery for radiotagged sockeye salmon that met the genetic individual assignment probability threshold (≥0.95 probability; *n* = 35 fish), Taku River, 2020.

The migration time (days) for individually assigned sockeye salmon between the initial tagging event at Canyon Island and the first detection at towers located at tributary lakes was also examined (*n* = 86 fish; Table 15).

Table 15.–Migration time of individually assigned radiotagged sockeye salmon (≥0.95 probability threshold) from the time of tagging to detection at towers at tributary lakes, 2020.

Reporting group	*n*	Average days to tributary towers	SD
King Salmon Lake	52	25	7
Kuthai Lake	2	37	11
Tatsamenie Lake	10	36	6
Little Trapper Lake	22	34	6

DISCUSSION

Estimating the proportion of radiotagged fish that dropped out of the concurrent mark–recapture study was a primary objective of this project. In 2020, we estimated the dropout rate to be 17.8% (SE = 1.9%) of all sockeye salmon radiotagged. The estimated dropout rate was incorporated into the final Taku River sockeye salmon mark–recapture estimate of 112,677 fish (TTC 2022). The 2020 dropout rate was similar to the dropout rate of 16.8% (SE = 0.6%) estimated in 2019, but less than the 22.0% dropout rate that was factored into historical mark–recapture estimates based on previous radiotelemetry studies (Miller and Pestal 2020; Vinzant et al. 2022). To reduce stress on the fish and potentially reduce dropout rates of marked fish in 2018 fish wheel methods were changed to reduce the time fish were held in live boxes (Bednarski et al. 2019). The dropout rates estimated from the 2019 and 2020 studies, along with estimates from future studies, will be used to provide an average dropout rate for continuing mark–recapture studies in the Taku River.

An important assumption of this study was that radiotagged fish were representative of the spaghetti tagged fish (i.e., they shared similar survival, movement, and catchability). Results derived from radiotagged fish—final fates, dropout rates, genetic stock composition—could then be reasonably extended to spaghetti tagged (nonradiotagged) fish in the mark–recapture study. Systematically radiotagging every sixth fish helped ensure that the cumulative length distributions of radiotagged and nonradiotagged fish were the same over the entire study period. The cumulative time from release at the fish wheels to recovery in the Canadian commercial fishery (i.e., sulk time) was also similar between radiotagged and nonradiotagged sockeye salmon. Two-sample KS tests confirmed that the size distributions of radiotagged and nonradiotagged fish were similar for captured males, females, and both sexes combined in 2020.

In 2020, the proportions of river- and lake-type fish estimated from the genetic stock composition were quite different from the proportions estimated from radiotelemetry. The estimated proportions of river- and lake-type fish based on genetic stock composition of fish radiotagged at the fish wheels was 29.6% (SD = 2.6%) river-type and 70.4% (SD = 3.9%) lake-type. If river- and lake-type classifications were estimated using only radiotelemetry (i.e., no genetic analysis), the distribution is much different: 66.8% (SE = 0.04%) river-type and 33.2% (SE = 0.28%) lake-type stocks. In 2019, when fish assigned a final fate to a lake outlet stream were reassigned to the respective lake-type stock, the river- and lake-type proportions were then very close to the estimates based on genetic stock composition of fish radiotagged at the fish wheels (e.g., the fish wheel stock composition was estimated to be 71.1% river-type and 28.9% lake-type, whereas reassigned fish were 76.0% river-type and 24.0% lake-type; Vinzant et al. 2022). However, a similar reassignment to fates of radiotagged fish in 2020 does improve the comparison: the estimated proportions based on radiotelemetry changed to 48.6% (SE = 0.25%) river-type and 51.4% (SE = 0.24%) lake-type, which is still quite different from the proportions estimated through genetic stock identification. The difference in the classification estimates (genetic and telemetry tracking) indicate that a significant fraction of marked, lake-type stocks do not make it to their natal lakes where they can be enumerated as escapement.

Further genetic analysis of radiotagged fish was useful in determining specific stock contributions and was useful for determining the run timing of specific sockeye salmon stocks within the Taku River. Additional studies in 2021 and 2022 will continue to provide essential information on dropout rates and spawning stock distribution and aid in the management of this important sockeye salmon run. In the 2021 and 2022 field season, we recommend conducting ground surveys to determine whether sockeye salmon are spawning in the outlet streams below King Salmon and Little Trapper Lakes. Upon completion of this multiyear study, we recommend examining the spawning distribution across all years using a habitat classification model. A fine-scale, multiyear, habitat model may prove useful in identifying habitat usage (e.g., river, creek, lake, outlet stream) of sockeye salmon in the Taku River watershed.

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APPENDICES

The weekly sockeye salmon age-sex distribution, the seasonal age-sex distribution weighted by week, and the mean length by age and sex weighted by week, were calculated using equations from Cochran (1977).

Let

h	=	index of the stratum (week),
j	=	index of the age class,
p_{hj}	=	proportion of the sample taken during stratum h that is age j,
n_h	=	number of fish sampled in week h, and
n_{hj}	=	number observed in class j, week h.

Then the age distribution was estimated for each week of the escapement in the usual manner:

$$\hat{p}_{hj} = n_{hj}/n_h. \tag{1}$$

If N_h equals the number of fish in the escapement in week h, standard errors of the weekly age class proportions are calculated in the usual manner (Cochran 1977, page 52, Equation 3.12):

$$SE(\hat{p}_{hj}) = \sqrt{\left[\frac{(\hat{p}_{hj})(1-\hat{p}_{hj})}{n_h-1}\right][1 - n_h/N_h]}. \tag{2}$$

The age distributions for the total escapement were estimated as a weighted sum (by stratum size) of the weekly proportions. That is,

$$\hat{p}_j = \sum_h p_{hj}\,(N_h/N), \tag{3}$$

such that N equals the total escapement. The standard error of a seasonal proportion is the square root of the weighted sum of the weekly variances (Cochran 1977, pages 107–108):

$$SE(\hat{p}_j) = \sqrt{\sum_j^h \left[SE(\hat{p}_{hj})\right]^2 (N_h/N)^2}. \tag{4}$$

The mean length, by sex and age class (weighted by week of escapement), and the variance of the weighted mean length, were calculated using the following equations from Cochran (1977, pages 142–144) for estimating means over subpopulations. That is, let i equal the index of the individual fish in the age-sex class j, and y_{hij} equal the length of the ith fish in class j, week h, so that,

$$\hat{\bar{Y}}_j = \frac{\sum_h (N_h/n_h)\sum_i y_{hij}}{\sum_h (N_h/n_h) n_{hj}}, \text{ and} \tag{5}$$

$$\hat{V}\left(\hat{\bar{Y}}_j\right) = \frac{1}{\hat{N}_j^2}\sum_h \frac{N_h^2(1-n_h/N_h)}{n_h(n_h-1)}\left[\sum_i \left(y_{hij} - \bar{y}_{hj}\right)^2 + n_{hj}\left(1 - \frac{n_{hj}}{n_h}\right)\left(\bar{y}_{hj} - \hat{\bar{Y}}_j\right)^2\right]. \tag{6}$$

Appendix B.–Dates of aerial telemetry surveys, survey area, and tributaries surveyed, Taku River, 2020.

Date	Survey area	Tributaries surveyed
7-Jul	East	Taku River, Inklin River, Nahlin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River, Tulsequah River, Wilm's Creek
10-Jul	West	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, King Salmon River, Tulsequah River, Wilm's Creek
15-Jul	West	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, King Salmon River, Tulsequah River, Wilm's Creek
17-Jul	East	Taku River, Inklin River, Nahlin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River
24-Jul	West	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, King Salmon River, Tulsequah River, Wilm's Creek
28-Jul	East	Taku River, Inklin River, Nahlin River, Dudidontu River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River
31-Jul	West	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, King Salmon River, King Salmon Lake
6-Aug	West/East	Taku River, Nakina River, Inklin River, Nahlin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River
14-Aug	West/East	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Inklin River, Sheslay River, Tatsatua Creek, Kowatua Creek, King Salmon Lake, King Salmon River, Tulsequah River, Wilm's Creek
18-Aug	West/East	Taku River, Nakina River, Inklin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River
21-Aug	West/East	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, Inklin River, Sheslay River, Tatsatua Creek, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River, Wilm's Creek
28-Aug	West/East	Taku River, King Salmon River, King Salmon Lake, Inklin River, Kowatua Creek, Little Trapper Lake, Tatsamenie Lake, Tatsatua Creek, Sheslay River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River

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Date	Survey area	Tributaries surveyed
1-Sep	West/East	Taku River, King Salmon River, King Salmon Lake, Inklin River, Kowatua Creek, Little Trapper Lake, Tatsamenie Lake, Tatsatua Creek, Sheslay River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River
4-Sep	East	Taku River, Inklin River, Nahlin River, Kennicott Lake, Hackett River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, King Salmon Lake, King Salmon River
11-Sep	West/East	Taku River, King Salmon River, King Salmon Lake, Inklin River, Kowatua Creek, Little Trapper Lake, Tatsatua Creek, Sheslay River, Nakina River, Fish Creek, Yehring Creek
14-Sep	East	Tatsamenie Lake, Tatsatua Creek, Sheslay River, Nahlin River, Kennicott Lake, Hackett River, Little Trapper Lake, Kowatua Creek, Inklin River, Taku River
18-Sep	East	Taku River, Inklin River, Kowatua Creek, Little Trapper Lake, Tatsamenie Lake, Tatsatua Creek, Sutlahine River, King Salmon Lake, King Salmon River, Fish Creek, Wilm's Creek, Tulsequah River
22-Sep	West/East	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, Inklin River, Sheslay River, Tatsatua Creek, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River
24-Sep	Mainstem	Taku River, Yehring Creek, Wright River, Sittakaney River, Wilms Creek, Tulsequah River, Stuhini Creek
29-Sep	East	Taku River, Inklin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River, Wilm's Creek
6-Oct	East	Taku River, Inklin River, Nahlin River, Dudidontu River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek
8-Oct	West	Taku River, Nakina River, Silver Salmon River, Kuthai Lake, Sloko River, Tulsequah River, Wilm's Creek, Stuhini Creek, Fish Creek, Wright River, Yehring Creek, Johnson Creek, Sockeye Creek
13-Oct	East	Taku River, Inklin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek
15-Oct	East	Taku River, Inklin River, Sheslay River, Tatsatua Creek, Tatsamenie Lake, Little Trapper Lake, Kowatua Creek, King Salmon Lake, King Salmon River

Appendix C.–Sample telemetry aerial survey form, Taku River, 2020.

Aerial Survey Data Entry Sheet

Date:

Time (Start/End):

Weather:

General Flight Path (based on handheld GPS):

Biologist(s):

Name of File Downloaded:

Brief Description of Survey:

Appendix D.–Reporting group, Location, ADF&G collection code, and the number (*n*) of sockeye salmon used in the genetic baseline for mixed stock analysis of Taku River fish wheel catches, 2020.

Reporting group	Location	ADF&G collection code	*n*
Chutine Lake	Stikine - Chutine Lake	SCHUTL09.SCHUT11	224
King Salmon Lake	Taku - King Salmon Lake	SKSLK10.SKSLK11	214
Kuthai Lake	Taku - Kuthai Lake	SKUTH06	171
Tatsatua	Taku - Tatsatua Lake (Tatsatua)	SLTAT11.SLTAT12	153
Little Trapper Lake	Taku - Little Trapper	SLTRA90.SLTRA06	237
Mainstem Taku River	Stikine - Andy Smith Slough	SFOWL07.SFOWL08.SFOWL09.SANDY07. SANDY09	54
Mainstem Taku River	Stikine - Bronson Slough	SBRON08.SBRON09	78
Mainstem Taku River	Stikine - Christina Lake	SCHRI11.SCHRI12	70
Mainstem Taku River	Stikine - Chutine River	SCHUT08	94
Mainstem Taku River	Stikine - Craig River	SCRAIG06.SCRAIG07.SCRAIG08	38
Mainstem Taku River	Stikine – Devil's Elbow	SDEVIL07.SDEVIL08	148
Mainstem Taku River	Stikine – Devil's Elbow	SDEVIL09	53
Mainstem Taku River	Stikine - Iskut River	SISKU85.SISKU86.SISKU02.SISKU06. SISKU08.SISKU09	153
Mainstem Taku River	Stikine - Iskut River (Craigson Slough)	SISKU07	42
Mainstem Taku River	Stikine - Porcupine River	SPORCU07.SPORCU11	74
Mainstem Taku River	Stikine - Scud River	SSCUD07.SSCUD08.SSCUD09	191
Mainstem Taku River	Stikine - Shakes Slough Creek	SSHAKS06.SSHAKES07.SSHAKS09	67
Mainstem Taku River	Taku - Fish Creek	SFISHCR09.SFISHCR10	159
Mainstem Taku River	Taku - Hackett River	SHACK08	52
Mainstem Taku River	Taku - Sustahine Slough	SSUSTA08.SSHUST09	185
Mainstem Taku River	Taku - Tulsequah River	STULS07.STULS08.STULS09	156
Mainstem Taku River	Taku - Tuskwa Creek	STUCH08.SCHUNK09.STUSK08.SBEARSL09. STUSKS08.STUSKS09	356
Mainstem Taku River	Taku - Yehring Creek	SYEHR07.SYEHR09	171
Mainstem Taku River	Taku - Yellow Bluff	SYELLB08.SYELLB10.SYELLB11	81
Mainstem Taku River	Taku Mainstem - Taku River	STAKU07	95
Mainstem Taku River	Taku Mainstem - Takwahoni/Sinwa	STAKWA09	67
Nahlin River	Taku - Nahlin River	SNAHL03.SNAHL04.SNAHL05.SNAHL06. SNAHL07.SNAHL12	341
Tatsamenie	Taku - Tatsamenie Lake	STATS05.STATS06	288

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Reporting group	Location	ADF&G collection code	*n*
Other	Ahrnklin River	SAHRN07	90
Other	Akwe River	SAKWE09.SAKWE16	186
Other	Alsek - Blanchard River	SBLAN07	89
Other	Alsek - Blanchard River	SBLAN09	62
Other	Alsek - Border Slough	SBORD07.SBORD08	71
Other	Alsek - Border Slough	SBORD09.SBORD11	70
Other	Alsek - Datlasaka Creek	SDATLAS12	95
Other	Alsek - Goat Creek	SGOATC07.SGOATC12	56
Other	Alsek - Klukshu River	SKLUK07	94
Other	Alsek - Klukshu River Weir late	SKLUK06	95
Other	Alsek - Kudwat (Little Tatshenshini Lake)	SLTATS01.SLTATS03	65
Other	Alsek - Kudwat (Tatshenshini) - Bridge/Silver	SBRIDGE11.SBRIDGE12	105
Other	Alsek - Kudwat (Tatshenshini) - Kwatini	SKWAT11	65
Other	Alsek - Kudwat (Tatshenshini) - Stinky Creek	SSTINKY11	40
Other	Alsek - Kudwat (Upper Tatshenshini)	SUTATS03	95
Other	Alsek - Kudwat Creek (Tatshenshini)	SKUDW09.SKUDW10.SKUDW11	100
Other	Alsek - Neskataheen Lake	SNESK07	195
Other	Alsek - Tweedsmuir	STWEED07	48
Other	Alsek - Tweedsmuir	STWEED09	46
Other	Alsek - Vern Ritchie	SVERNR09.SVERNR10	114
Other	Antler-Gilkey River	SANTGILK13	53
Other	Bainbridge Lake	SBAIN10	95
Other	Banana Lake - Klutina	SBANA08	80
Other	Bar Creek - Essowah Lake	SBAR04	95
Other	Bartlett River - Creel survey	SBART13	69
Other	Bear Hole - tributary Klutina	SBEARH08	94
Other	Bering Lake	SBERI91	95
Other	Berners River	SBERN03.SBERN13	165
Other	Big Lake - Ratz Harbor Creek	SBIGLK10.SBIGLA14	161
Other	Bloomfield Lake	SBLOOM05	93
Other	Central - Kitlope Lake	SKITL06	95
Other	Central Coast - Amback Creek	SAMBA04	91
Other	Chilkat Lake	SCKAT13	189
Other	Chilkat Lake early run	SCKAT07E.SCKAT07L	190
Other	Chilkat Mainstem - Bear Flats	SBEARFL07	95
Other	Chilkat Mainstem - Mosquito Lake	SMOSQ07	95
Other	Chilkat River - Mule Meadows	SMULE03.SMULE07	190
Other	Chilkoot Lake - beaches	SCHILB07	251
Other	Chilkoot Lake - Bear Creek	SCHILBC07	233
Other	Chilkoot River	SCHIK03	159

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Reporting group	Location	ADF&G collection code	*n*
Other	Clear Creek at 40 Mile	SCLEAR07	86
Other	Coghill Lake	SCOGH91.SCOG92HL.SCOG92ES.SCOGH10	378
Other	Columbia River - Okanagan River	SOKAN02	95
Other	Crescent Lake	SCRES03	194
Other	Dangerous River	SDANG09	95
Other	East Alsek River	SEAST03B	94
Other	Eek Creek	SEEK04.SEEK07	50
Other	Eshamy Creek	SESHAR08.SESHA91	185
Other	Eyak Lake - Hatchery Creek	SEYAK10	95
Other	Eyak Lake - Middle Arm	SEYAM07	95
Other	Eyak Lake - South beaches	SEYASB07	87
Other	Falls Lake - East Baranof Island	SFALL03.SFALL10	190
Other	Fillmore Lake - Hoffman Creek	SFILLM05	52
Other	Fish Creek - off East Fork Gulkana River	SFISHC08	95
Other	Ford Arm Creek	SFORD13	199
Other	Ford Arm Lake weir	SFORD04	207
Other	Fraser - Adams River - Shuswap late	SLADA02.SADAM07	187
Other	Fraser - Birkenhead	SBIRK07	90
Other	Fraser - Chilko Lake	SCHILK01	87
Other	Fraser - Chilliwack Lake	SCHILW04	89
Other	Fraser - Cultus Lake	SCULT02	91
Other	Fraser - Fraser Lake	SFRAS96	85
Other	Fraser - Gates Creek	SGATES09	90
Other	Fraser - Harrison River	SHARR07	95
Other	Fraser - Lower Horsefly River	SLHOR01.SUHOR01.SHORSE07	274
Other	Fraser - Middle Shuswap River	SMSHU02	91
Other	Fraser - Nahatlatch - Nahatlatch River	SNAHAT02	92
Other	Fraser - North Thompson	SNTHOM05	95
Other	Fraser - Raft River	SRAFT01	84
Other	Fraser - Scotch River	SSCOT00	91
Other	Fraser - Stellako River	SSTEL07	94
Other	Fraser - Tachie River	STACH01	94
Other	Fraser - Trembleur - Kynock	SKYNO97	94
Other	Fraser - Weaver Creek	SWEAV01	88
Other	Great Central Lake	SGCENLK02	95
Other	Gulkana River - East Fork	SGULK08EF	75
Other	Hasselborg Lake	SHASSEL12.SHASSELR13	209
Other	Hatchery Creek - Sweetwater	SHATC03.SHATC07	142
Other	Heckman Lake	SHECK04.SHECK07	189
Other	Helm Lake	SHELM05	94
Other	Hetta Creek - early run	SHETT10E	95

-continued-

Reporting group	Location	ADF&G collection code	*n*
Other	Hetta Creek - late run	SHETT03.SHETT08.SHETT09L	281
Other	Hetta Creek - middle run	SHETT09M	95
Other	Hoktaheen - marine waters	SHOKTAM14	47
Other	Hoktaheen - upper lake main inlet	SHOKTAI04	47
Other	Hoktaheen - upper lake outlet	SHOKTAO04	49
Other	Hugh Smith - Cobb Creek	SCOBB07	99
Other	Hugh Smith Lake	SHSMI92.SHUGH13	155
Other	Hugh Smith Lake - Bushmann Creek	SHUGH04	150
Other	Inlet Creek - Klawock	SINCK03.SINCK08.SHALF08	212
Other	Issaquah Creek - Puget Sound Drainage	SISSA96	82
Other	Italio River	SITAL17	41
Other	Kah Sheets Lake	SKAHS03	96
Other	Kanalku Creek	SKANA07.SKANA10.SKANAL13	319
Other	Kegan Lake	SKEGA04	95
Other	Kitimat River	SKITIM10	93
Other	Kitwanga River	SKITW12	92
Other	Klag Bay Stream outlet	SKLAG09	200
Other	Klakas Lake	SKLAK04	95
Other	Klawock-Three Mile Creek	STHRE04.STHRE10	181
Other	Klutina Lake - inlet	SKLUTI08.SKLUTI09	95
Other	Klutina River - mainstem	SKLUT08	95
Other	Kook Lake	SKOOK12E.SKOOK13	148
Other	Kook Lake - late	SKOOK07.SKOOK10L.SKOOK12L	194
Other	Kunk Lake - Etolin Island system	SKUNK03	96
Other	Kushtaka Lake	SKUSH07.SKUSH08	189
Other	Kutlaku Lake	SKUTL03	95
Other	Kutlaku Lake	SKUTL12	78
Other	Kutlaku Lake	SKUTL13	50
Other	Lace River	SLACE13	63
Other	Lake Creek	SAUKE13baseline.SLAKECR14	318
Other	Lake Eva	SLEVA12	115
Other	Lake Pleasant - Soleduck River	SLAKE97	76
Other	Lake Wenatchee	SWENA98	95
Other	Long Lake weir	SLONGLK05	95
Other	Lost/Tahwah Rivers	SLOST03B.SLOST03C	139
Other	Luck Lake - P.O.W. Island	SLUCK04	94
Other	Mahlo River	SMAHL08	94
Other	Mahoney Creek	SMAHO03.SMAHO07	153
Other	Main Bay	SMAIN91	96
Other	Martin Lake	SMART07.SMART08	187
Other	Martin River Slough	SMARTR08	95

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Reporting group	Location	ADF&G collection code	*n*
Other	McDonald Lake - Hatchery Creek	SMCDO01.SMCDO03.SMCDO07.SMCDO13	368
Other	McGilvery Creek	SKART92.SMCGI03.SMCGI04.SMCGI16	472
Other	McKinley Lake	SMCKI07	95
Other	McKinley Lake	SMCKI08	95
Other	McKinley Lake	SMCKI91	95
Other	McKinley Lake - Salmon Creek	SMCKSC07	93
Other	Mendeltna Creek	SMEND08.SMEND09	188
Other	Mentasta Lake	SMENT08	95
Other	Mill Creek Weir Early - Virginia Lake	SMILLC07E	94
Other	Mill Creek Weir Late - Virginia Lake	SMILLC07L	95
Other	Miners Lake	SMINE91.SMINE09	191
Other	Mitchell River	SMITCH01	94
Other	Nass - Bonney Creek	SBONN01.SBONN12	164
Other	Nass - Bowser Lake	SBOWS01	94
Other	Nass - Damdochax Creek	SDAMD01	93
Other	Nass - Gingit Creek	SGING97	94
Other	Nass - Hanna Creek	SHANNA06	93
Other	Nass - Kwinageese	SKWIN01.SKWIN12U	76
Other	Nass - Meziadin Beach	SMERI01.SMEZIB06	186
Other	Nass - Tintina Creek	STINT06	94
Other	Necker Bay	SNECKER91.SNECKER93	95
Other	Neva Lake weir	SNEVA08	94
Other	Neva Lake weir	SNEVA09.SNEVA13	255
Other	North Berg Bay inlet	SNBERG91	53
Other	North Berg Bay inlet	SNBERG92	100
Other	Old Situk	SOSITU07	163
Other	Pavlof River	SPAVLOF12.SPAVLOFR13	174
Other	Paxson Lake - outlet	SPAXSO09	75
Other	Petersburg Lake	SPETL04	95
Other	QCI - Naden River	SNADE95	95
Other	QCI - Yakoun Lake	SYAKO93	70
Other	Red Bay Lake	SREDBL04	95
Other	Redfish Lake Beaches	SREDB93	94
Other	Redoubt Lake - outlet	SREDOUBT13	200
Other	Salmon Bay Lake	SSALM04.SSALM07	170
Other	Salmon Creek - Bremner	SSALMC08	93
Other	Salmon Lake weir	SSALML07.SSALML08	185
Other	Sarkar - Five Finger Creek	SSARK00.SSARF05	91
Other	Seclusion Lake - in lake	SSECLK14.SSECLKIN14	117
Other	Shipley Lake	SSHIP03	94
Other	Sitkoh Lake	SSITK03.SSITK11.SSITK12	351

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Reporting group	Location	ADF&G collection code	*n*
Other	Situk Lake	SSITU07	159
Other	Situk Lake	SSITU13	190
Other	Skeena - Alastair Lake	SALAS87.SALAS06	118
Other	Skeena - Four Mile Creek	SFMILE06	85
Other	Skeena - Fulton River	SFULT06	95
Other	Skeena - Grizzly Creek	SGRIZ87	76
Other	Skeena - Kispiox River	SKISP02	53
Other	Skeena - Kitsumkalum Lake	SKALUM06	56
Other	Skeena - Kitsumkalum Lake	SKALUM12	94
Other	Skeena - Lakelse Lake (Williams)	SLAKEL06	93
Other	Skeena - Lower Tahlo River	SLTAH94	78
Other	Skeena - McDonell Lake (Zymoetz River)	SMCDON02.SMCDON06	131
Other	Skeena - Morrison	SMORR07	92
Other	Skeena - Motase Lake	SMOTA87	47
Other	Skeena - Nangeese River	SNANG06	40
Other	Skeena - Nanika River	SNANI88.SNANI07	113
Other	Skeena - Pierre Creek	SPIER06	95
Other	Skeena - Pinkut Creek	SPINK94.SPINK06	187
Other	Skeena - Salix Bear	SSALIX87.SSALIX88	94
Other	Skeena - Slamgeesh River	SSLAM06	95
Other	Skeena - Stephens Creek	SSTECR01	95
Other	Skeena - Sustut River	SSUST01	79
Other	Skeena - Swan Lake	SSWANLK06	93
Other	Skeena - Tahlo Creek	STAHLO07	95
Other	Skeena - Upper Babine River	SUBAB06	95
Other	Snettisham Hatchery	SSNET06.SSPEE07	190
Other	Snettisham Hatchery - Speel Lake	SSPEE13	146
Other	Sockeye Creek	SSOCK17.SSOCK18	136
Other	Speel Lake	SSPEE03	95
Other	St. Anne Creek	SSANN05.SSTACR08	186
Other	Steamboat Lake - Bremner	SSTEAM08	95
Other	Steep Creek	SSTEE03	91
Other	Stikine - Little Tahltan	SLTAH90	95
Other	Stikine - Tahltan Lake	STAHL06	196
Other	Swede Lake	SSWEDE08	95
Other	Tanada Creek weir	STANA05	94
Other	Tanada Lake - lower outlet	STANAO09	95
Other	Tanada Lake - shore	STANAS09	93
Other	Tankeeah River	STANK03	47
Other	Tankeeah River	STANK05	47
Other	Tawah Creek	STAWA17	94

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Appendix D.–Page 7 of 7.

Reporting group	Location	ADF&G collection code	*n*
Other	Thoms Lake	STHOM04.STHOM14	93
Other	Tokun Lake	STOKUN08.STOKUN09	189
Other	Tonsina Lake	STONSL09	94
Other	Unuk River - Gene's Lake	SGENE07	95
Other	Unuk River – Gene's Lake	SGENE08	69
Other	Vancouver Island - Quatse River	SQUAT03	95
Other	Vivid Lake	SVIVID93	48
Other	Windfall Lake	SWIND03.SWIND07	142

Appendix E.–Individual sockeye salmon radiotagged at Canyon Island by tagging date, spaghetti tag number, size (METF), genetic identification number (GSI sample vial #), Radio tag frequency, radio tag pulse code, and final location, Taku River, in 2020.

Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
24	6/11/20	1	93631	500	333501	150.593	0	Nakina River	59.11580	-133.01154
24	6/12/20	2	93637	500	333502	150.593	1	Nakina River	59.11889	-133.00906
25	6/18/20	3	93643	500	333503	150.593	2	Dropout	–	–
26	6/23/20	4	93650	490	333504	150.593	3	Mainstem Taku River	58.73133	-133.40000
26	6/23/20	5	93656	450	333505	150.593	4	Nakina River	59.12020	-132.99841
26	6/24/20	6	93662	510	333506	150.593	6	Silver Salmon River	59.16051	-133.07449
26	6/24/20	7	93668	440	333507	150.593	7	Nakina River	59.11873	-133.00997
26	6/24/20	8	93674	455	333508	150.593	8	Nakina River	59.12033	-133.01361
26	6/24/20	9	93680	505	333509	150.593	9	Nakina River	59.11667	-133.00299
26	6/24/20	10	93686	505	333510	150.593	10	Nakina River	59.11770	-133.00313
26	6/24/20	11	93692	485	333511	150.593	11	Nakina River	59.12303	-133.01226
26	6/24/20	12	93698	480	333512	150.593	12	Nakina River	59.11964	-133.00972
26	6/25/20	13	93705	470	333513	150.593	13	Nakina River	59.11492	-133.00843
26	6/25/20	14	93711	490	333514	150.593	14	Nakina River	59.11710	-133.00144
26	6/25/20	15	93717	495	333515	150.593	15	Nakina River	59.12110	-133.01039
26	6/26/20	16	93725	450	333516	150.593	16	Little Trapper Lake	58.48853	-132.60217
26	6/26/20	17	93731	430	333517	150.593	18	King Salmon Lake	58.71361	-132.90791
26	6/26/20	18	93737	460	333518	150.593	19	Nakina River	59.01185	-133.14008
26	6/26/20	19	93743	490	333519	150.593	20	King Salmon Lake	58.71473	-132.94219
26	6/26/20	20	93749	500	333520	150.593	21	King Salmon Lake	58.71939	-132.92178
26	6/27/20	21	93755	465	333521	150.593	22	Nakina River	59.12624	-132.96360
26	6/27/20	22	93761	465	333522	150.593	23	Nakina River	59.11449	-133.00501
26	6/27/20	23	93767	485	333523	150.593	24	King Salmon River	58.77492	-133.13903
26	6/27/20	24	93774	475	333524	150.593	25	King Salmon River	58.78197	-133.07915

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
26	6/27/20	25	93780	455	333525	150.593	26	Nakina River	59.01667	-133.11667
26	6/27/20	26	93786	535	333526	150.593	27	King Salmon Lake	58.72777	-132.99800
26	6/27/20	27	93793	450	333527	150.593	28	Nakina River	59.09772	-133.01387
26	6/27/20	28	93799	465	333528	150.593	29	King Salmon Lake	58.72546	-132.89901
26	6/27/20	29	93805	430	333529	150.593	30	Mainstem Taku River	58.60854	-133.58258
26	6/27/20	30	93811	525	333530	150.593	31	Nakina River	59.11559	-132.99472
26	6/27/20	31	93817	515	333531	150.593	32	King Salmon Lake	58.72102	-132.89820
27	6/28/20	32	93823	490	333532	150.593	33	King Salmon Lake	58.71151	-132.91924
27	6/28/20	33	93828	475	333533	150.593	34	King Salmon River	58.77909	-133.09219
27	6/28/20	34	93834	565	333534	150.593	35	Mainstem Taku River	58.64582	-133.50684
27	6/28/20	35	93839	475	333535	150.593	36	Nakina River	59.10159	-133.01064
27	6/28/20	36	93846	500	333536	150.593	37	Nakina River	59.11859	-133.00379
27	6/28/20	37	93853	495	333537	150.593	38	King Salmon River	58.77557	-133.17951
27	6/28/20	38	93859	495	333538	150.593	39	King Salmon Lake	58.71207	-132.91216
27	6/28/20	39	93865	490	333539	150.593	40	Nakina River	59.11934	-133.01307
27	6/28/20	40	93871	505	333540	150.593	41	Harvested	–	–
27	6/28/20	41	93877	440	333541	150.593	42	King Salmon River	58.74176	-133.01616
27	6/28/20	42	93885	485	333542	150.593	43	King Salmon River	58.73207	-132.99719
27	6/28/20	43	93891	450	333543	150.593	44	Nakina River	59.11731	-133.00929
27	6/28/20	44	93897	450	333544	150.593	45	King Salmon Lake	58.71939	-132.92178
27	6/29/20	45	93904	470	333545	150.593	46	Mainstem Taku River	58.81077	-133.30000
27	6/29/20	46	93910	445	333546	150.593	47	Silver Salmon River	59.22763	-133.22665
27	6/29/20	47	93916	530	333547	150.593	48	King Salmon Lake	58.71956	-132.92458
27	6/29/20	48	93922	510	333548	150.593	49	King Salmon River	58.73333	-132.99855

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
27	6/29/20	49	93928	480	333549	150.593	50	King Salmon River	58.78180	-133.08779
27	6/29/20	50	93934	510	333550	150.593	51	Harvested	–	–
27	6/29/20	51	93940	495	333551	150.593	52	Mainstem Taku River	58.68060	-133.47848
27	6/29/20	52	93946	495	333552	150.593	53	King Salmon River	58.74064	-133.01355
27	6/30/20	53	93952	515	333553	150.593	54	Nakina River	59.11779	-133.00950
27	6/30/20	54	93959	520	333554	150.593	55	King Salmon Lake	58.71950	-132.92364
27	6/30/20	55	93965	500	333555	150.593	56	King Salmon Lake	58.71896	-132.90245
27	6/30/20	56	93971	510	333556	150.593	57	Dropout	–	–
27	6/30/20	57	93977	465	333557	150.593	58	Mainstem Taku River	58.61010	-133.58470
27	6/30/20	58	93983	490	333558	150.593	59	King Salmon Lake	58.71226	-132.91317
27	6/30/20	59	93990	405	333559	150.593	60	Dropout	–	–
27	6/30/20	60	93996	530	333560	150.593	61	Nakina River	59.11964	-133.00972
27	6/30/20	61	94002	595	333561	150.593	62	Little Trapper Lake	58.48963	-132.58905
27	6/30/20	62	94008	500	333562	150.593	63	Harvested	–	–
27	7/1/20	63	94014	440	333563	150.593	64	Dropout	–	–
27	7/1/20	64	94020	510	333564	150.593	65	King Salmon River	58.80104	-133.24372
27	7/1/20	65	94026	505	333565	150.593	66	King Salmon Lake	58.71991	-132.92884
27	7/1/20	66	94032	520	333566	150.593	67	King Salmon Lake	58.71140	-132.92130
27	7/1/20	67	94038	480	333567	150.593	68	King Salmon River	58.77331	-133.17499
27	7/1/20	68	94044	495	333568	150.593	69	King Salmon Lake	58.71167	-132.91720
27	7/1/20	69	94050	515	333569	150.593	70	Harvested	–	–
27	7/2/20	70	94057	525	333570	150.593	71	Mainstem Taku River	58.58488	-133.61397
27	7/2/20	71	94063	490	333571	150.593	72	King Salmon Lake	58.71999	-132.93178
27	7/2/20	72	94069	470	333572	150.593	73	Little Trapper Lake	58.49331	-132.60111
27	7/2/20	73	94075	470	333573	150.593	74	King Salmon Lake	58.72082	-132.90450

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
27	7/2/20	74	94081	475	333574	150.593	75	King Salmon River	58.76652	-133.02307
27	7/2/20	75	94087	465	333575	150.593	76	Nakina River	59.10690	-133.01031
27	7/2/20	76	94093	480	333576	150.593	77	Nakina River	58.98161	-133.19134
27	7/2/20	77	94100	545	333577	150.593	78	Harvested	–	–
27	7/2/20	78	94106	440	333578	150.593	79	Dropout	–	–
27	7/3/20	79	94112	480	333579	150.593	80	Harvested	–	–
27	7/3/20	80	94118	465	333580	150.593	81	Dropout	–	–
27	7/3/20	81	94124	445	333581	150.593	82	King Salmon Lake	58.71639	-132.94292
27	7/3/20	82	94130	490	333582	150.593	83	Dropout	–	–
27	7/3/20	83	94136	485	333583	150.593	84	King Salmon River	58.77463	-133.11667
27	7/3/20	84	94142	435	333584	150.593	85	King Salmon Lake	58.71361	-132.90791
27	7/3/20	85	94149	485	333585	150.593	86	King Salmon Lake	58.71799	-132.89721
28	7/5/20	86	94155	465	333586	150.593	87	Dropout	–	–
28	7/6/20	87	94161	510	333587	150.593	88	King Salmon Lake	58.72572	-132.89712
28	7/6/20	88	94168	450	333588	150.593	89	Little Trapper Lake	58.49753	-132.61604
28	7/6/20	89	94174	520	333589	150.593	90	Nakina River	59.09944	-133.01517
28	7/6/20	90	94180	490	333590	150.593	91	King Salmon Lake	58.71490	-132.91093
28	7/6/20	91	94186	460	333591	150.593	92	King Salmon Lake	58.71832	-132.91580
28	7/6/20	92	94192	525	333592	150.593	93	King Salmon River	58.77146	-133.14561
28	7/7/20	93	94198	555	333593	150.593	94	Mainstem Taku River	58.79149	-133.30944
28	7/7/20	94	94204	500	333594	150.593	95	Harvested	–	–
28	7/7/20	95	94210	485	333595	150.593	96	King Salmon Lake	58.71592	-132.91725
28	7/7/20	96	94216	445	333596	150.593	97	Little Trapper Lake	58.49176	-132.62289
28	7/7/20	97	94222	480	333597	150.593	98	King Salmon River	58.77259	-133.17467
28	7/7/20	98	94228	475	333598	150.593	99	King Salmon Lake	58.71482	-132.92470

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
28	7/7/20	99	94234	485	333599	150.733	0	King Salmon Lake	58.71855	-132.91638
28	7/7/20	100	94240	475	333600	150.733	1	Dropout	–	–
28	7/8/20	101	94246	490	333601	150.733	2	King Salmon River	58.78180	-133.09158
28	7/8/20	102	94252	500	333602	150.733	3	Silver Salmon River	59.22877	-133.23276
28	7/8/20	103	94258	505	333603	150.733	4	King Salmon Lake	58.71879	-132.91099
28	7/8/20	104	94264	450	333604	150.733	5	Nakina River	59.10077	-133.01380
28	7/8/20	105	94270	470	333605	150.733	6	King Salmon Lake	58.72876	-132.88800
28	7/9/20	106	94276	470	333606	150.733	7	King Salmon Lake	58.71171	-132.91364
28	7/9/20	107	94282	470	333607	150.733	8	King Salmon Lake	58.72176	-132.89334
28	7/9/20	108	94288	460	333608	150.733	9	Hackett River	58.22123	-131.73738
28	7/9/20	109	94294	455	333609	150.733	10	King Salmon Lake	58.72427	-132.91232
28	7/9/20	110	94300	475	333610	150.733	11	Inklin River	58.73586	-132.70634
28	7/10/20	111	94306	440	333611	150.733	12	King Salmon Lake	58.71824	-132.93095
28	7/10/20	112	94312	445	333612	150.733	13	Mainstem Taku River	58.78480	-133.34320
28	7/10/20	113	94318	485	333613	150.733	14	Dropout	–	–
28	7/10/20	114	94325	465	333614	150.733	15	King Salmon Lake	58.71047	-132.92193
28	7/10/20	115	94331	485	333615	150.733	16	King Salmon Lake	58.71639	-132.94292
28	7/10/20	116	94337	500	333616	150.733	17	Nakina River	59.11924	-132.99528
28	7/10/20	117	94343	450	333617	150.733	18	King Salmon Lake	58.71066	-132.92640
28	7/10/20	118	94349	450	333618	150.733	19	Tulsequah River	58.65505	-133.56554
28	7/10/20	119	94355	500	333619	150.733	20	Harvested	–	–
28	7/11/20	120	94361	535	333620	150.733	21	Inklin River	58.73625	-132.72576
28	7/11/20	121	94367	465	333621	150.733	22	Mainstem Taku River	58.59708	-133.59803
28	7/11/20	122	94374	510	333622	150.733	23	Sloko River	59.12949	-133.57940

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
28	7/11/20	123	94379	475	333623	150.733	24	King Salmon Lake	58.71275	-132.94515
28	7/11/20	124	94385	530	333624	150.733	25	Dropout	–	–
28	7/11/20	125	94391	465	333625	150.733	26	Dropout	–	–
28	7/11/20	126	94397	580	333626	150.733	27	Tatsatua Creek	58.43646	-132.38458
28	7/11/20	127	94403	475	333627	150.733	28	Nakina River	59.07489	-133.02309
28	7/11/20	128	94409	530	333628	150.733	29	Harvested	–	–
28	7/11/20	129	94415	520	333629	150.733	30	King Salmon River	58.77585	-133.13834
29	7/12/20	130	94421	490	333630	150.733	31	Nakina River	59.11536	-132.99747
29	7/12/20	131	94427	440	333631	150.733	32	Kowatua Creek	58.63609	-132.26891
29	7/12/20	132	94433	485	333632	150.733	33	Harvested	–	–
29	7/12/20	133	94439	500	333633	150.733	34	Little Trapper Lake	58.49519	-132.62557
29	7/12/20	134	94445	500	333634	150.733	35	King Salmon River	58.77585	-133.13834
29	7/12/20	135	94453	510	333635	150.733	36	King Salmon Lake	58.71261	-132.93385
29	7/12/20	136	94457	455	333636	150.733	37	Dropout	–	–
29	7/12/20	137	94463	465	333637	150.733	38	Mainstem Taku River	58.58454	-133.60797
29	7/12/20	138	94469	455	333638	150.733	39	Nakina River	58.98333	-133.18956
29	7/13/20	139	94475	465	333639	150.733	40	Little Trapper Lake	58.49465	-132.62549
29	7/13/20	140	94481	465	333640	150.733	41	Harvested	–	–
29	7/13/20	141	94487	445	333641	150.733	42	Mainstem Taku River	58.68774	-133.46175
29	7/13/20	142	94493	485	333642	150.733	43	King Salmon River	58.72787	-132.97776
29	7/13/20	143	94499	570	333643	150.733	44	Harvested	–	–
29	7/13/20	144	94505	430	333644	150.733	45	Little Trapper Lake	58.49542	-132.60374
29	7/13/20	145	94511	490	333645	150.733	46	Harvested	–	–
29	7/13/20	146	94517	485	333646	150.733	47	Tatsatua Creek	58.52757	-132.29369
29	7/13/20	147	94523	480	333647	150.733	48	King Salmon Lake	58.71635	-132.90720

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
29	7/13/20	148	94529	425	333648	150.733	49	Little Trapper Lake	58.49465	-132.62549
29	7/13/20	149	94536	470	333649	150.733	50	Dropout	–	–
29	7/13/20	150	94542	440	333650	150.733	51	Nakina River	59.06667	-133.02432
29	7/13/20	151	94548	460	333651	150.733	52	Harvested	–	–
29	7/13/20	152	94554	560	333652	150.733	53	Dropout	–	–
29	7/14/20	153	94560	420	333653	150.733	54	Tulsequah River	58.74321	-133.63059
29	7/14/20	154	94567	450	333654	150.733	55	Little Trapper Lake	58.49511	-132.60074
29	7/14/20	155	94573	500	333655	150.733	56	King Salmon Lake	58.71968	-132.93846
29	7/14/20	156	94579	570	333656	150.733	57	Harvested	–	–
29	7/14/20	157	94585	500	333657	150.733	58	King Salmon River	58.77782	-133.10794
29	7/14/20	158	94591	500	333658	150.733	59	Little Trapper Lake	58.49486	-132.60961
29	7/14/20	159	94597	555	333659	150.733	60	Harvested	–	–
29	7/14/20	160	94603	485	333660	150.733	61	King Salmon River	58.77964	-133.08755
29	7/14/20	161	94609	505	333661	150.733	62	Nakina River	59.11763	-133.00335
29	7/14/20	162	94615	475	333662	150.733	63	Kowatua Creek	58.63303	-132.26125
29	7/14/20	163	94621	485	333663	150.733	64	King Salmon Lake	58.71888	-132.92740
29	7/15/20	164	94627	445	333664	150.733	65	King Salmon Lake	58.71891	-132.89516
29	7/15/20	165	94633	470	333665	150.733	66	King Salmon River	58.73480	-133.00361
29	7/15/20	166	94639	465	333666	150.733	67	Dropout	–	–
29	7/15/20	167	94646	600	333667	150.733	68	Dropout	–	–
29	7/16/20	168	94652	455	333668	150.733	69	Little Trapper Lake	58.48416	-132.59067
29	7/16/20	169	94658	520	333669	150.733	70	King Salmon River	58.77978	-133.08663
29	7/16/20	170	94664	510	333670	150.733	71	King Salmon Lake	58.71823	-132.90442
29	7/16/20	171	94670	460	333671	150.733	72	Little Trapper Lake	58.48920	-132.60928
29	7/16/20	172	94676	540	333672	150.733	73	Harvested	–	–

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
29	7/17/20	173	94682	450	333673	150.733	74	Little Trapper Lake	58.48725	-132.60818
29	7/17/20	174	94689	470	333674	150.733	75	King Salmon Lake	58.71639	-132.94292
29	7/17/20	175	94694	480	333675	150.733	76	Little Trapper Lake	58.49429	-132.61122
29	7/17/20	176	94700	450	333676	150.733	78	King Salmon River	58.78048	-133.10366
29	7/17/20	177	94706	575	333677	150.733	79	Dropout	–	–
29	7/18/20	178	94712	450	333678	150.733	81	Nakina River	58.97552	-133.19094
29	7/18/20	179	94718	460	333679	150.733	82	Little Trapper Lake	58.49023	-132.60924
29	7/18/20	180	94724	465	333680	150.733	83	Mainstem Taku River	58.70724	-133.39193
29	7/18/20	181	94729	470	333681	150.733	84	King Salmon Lake	58.71924	-132.90084
29	7/18/20	182	94735	485	333682	150.733	85	King Salmon Lake	58.72876	-132.88800
29	7/18/20	183	94741	565	333683	150.733	86	Dropout	–	–
29	7/18/20	184	94747	470	333684	150.733	87	Dropout	–	–
30	7/19/20	185	94753	545	333685	150.733	88	Little Trapper Lake	58.49103	-132.60824
30	7/19/20	186	94758	520	333686	150.733	89	Mainstem Taku River	58.64744	-133.51667
30	7/19/20	187	94764	440	333687	150.733	90	Nakina River	59.06314	-133.02330
30	7/19/20	188	94770	430	333688	150.733	91	Dropout	–	–
30	7/19/20	189	94776	440	333689	150.733	92	Nakina River	59.04082	-133.04438
30	7/19/20	190	94782	435	333690	150.733	93	Dropout	–	–
30	7/20/20	191	94788	560	333691	150.733	95	Dropout	–	–
30	7/20/20	192	94794	565	333692	150.733	96	Dropout	–	–
30	7/20/20	193	94800	555	333693	150.733	97	Mainstem Taku River	58.67715	-133.52460
30	7/20/20	194	94806	520	333694	150.733	98	King Salmon River	58.80046	-133.25718
30	7/20/20	195	94812	450	333695	150.733	99	Dropout	–	–
30	7/20/20	196	94818	495	333696	150.773	0	King Salmon Lake	58.71152	-132.91440

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
30	7/21/20	197	94824	435	333697	150.773	1	Dropout	–	–
30	7/21/20	198	94831	540	333698	150.773	2	Little Trapper Lake	58.49263	-132.60923
30	7/21/20	199	94837	510	333699	150.773	3	Little Trapper Lake	58.49079	-132.60671
30	7/21/20	200	94843	540	333700	150.773	4	Mainstem Taku River	58.63916	-133.61545
30	7/22/20	201	94849	470	333701	150.773	5	King Salmon Lake	58.71473	-132.91549
30	7/22/20	202	94855	430	333702	150.773	6	King Salmon River	58.80702	-133.29289
30	7/22/20	203	94861	450	333703	150.773	7	King Salmon Lake	58.71489	-132.93800
30	7/22/20	204	94867	455	333704	150.773	8	Mainstem Taku River	58.59179	-133.61057
30	7/22/20	205	94873	470	333705	150.773	9	King Salmon Lake	58.71629	-132.92460
30	7/22/20	206	94879	540	333706	150.773	10	Nakina River	58.96424	-133.18723
30	7/22/20	207	94885	470	333707	150.773	11	King Salmon River	58.71639	-132.94292
30	7/23/20	208	94891	480	333708	150.773	12	Little Trapper Lake	58.49038	-132.60593
30	7/23/20	209	94897	570	333709	150.773	13	Dropout	–	–
30	7/23/20	210	94903	435	333710	150.773	14	Dropout	–	–
30	7/23/20	211	94909	500	333711	150.773	15	King Salmon Lake	58.72675	-132.88489
30	7/23/20	212	94915	445	333712	150.773	16	King Salmon River	58.77186	-133.17705
30	7/23/20	213	94921	470	333713	150.773	17	Little Trapper Lake	58.49469	-132.61096
30	7/23/20	214	94927	475	333714	150.773	18	King Salmon Lake	58.72102	-132.88050
30	7/23/20	215	94933	450	333715	150.773	19	Mainstem Taku River	58.63747	-133.54642
30	7/23/20	216	94939	500	333716	150.773	20	Mainstem Taku River	58.90619	-133.13942
30	7/23/20	217	94945	520	333717	150.773	21	Little Trapper Lake	58.49350	-132.61169
30	7/23/20	218	94951	430	333718	150.773	22	Mainstem Taku River	58.86337	-133.16983
30	7/23/20	219	94957	465	333719	150.773	23	King Salmon River	58.78199	-133.09613
30	7/23/20	220	94963	460	333720	150.773	24	King Salmon Lake	58.71665	-132.90077
30	7/23/20	221	94969	530	333721	150.773	26	Sheslay River	58.58849	-132.14495

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
30	7/23/20	222	94975	450	333722	150.773	27	Inklin River	58.86667	-132.98746
30	7/23/20	223	94981	450	333723	150.773	28	Little Trapper Lake	58.49396	-132.59625
30	7/23/20	224	94988	440	333724	150.773	29	Nakina River	59.07775	-133.01809
30	7/24/20	225	94996	455	333725	150.773	30	King Salmon River	58.76273	-133.02199
30	7/24/20	226	95002	465	333726	150.773	31	Mainstem Taku River	58.59237	-133.63765
30	7/24/20	227	95008	440	333727	150.773	32	Little Trapper Lake	58.48967	-132.60936
30	7/24/20	228	95013	545	333728	150.773	33	Harvested	–	–
30	7/24/20	229	95020	440	333729	150.773	34	Hackett River	58.22528	-131.74583
30	7/24/20	230	95025	465	333730	150.773	35	King Salmon Lake	58.71424	-132.92406
30	7/24/20	231	95031	450	333731	150.773	36	Mainstem Taku River	58.76176	-133.32611
30	7/25/20	232	95037	445	333732	150.773	37	Mainstem Taku River	58.63877	-133.54837
30	7/25/20	233	95042	495	333733	150.773	38	Mainstem Taku River	58.67921	-133.48203
30	7/25/20	234	95048	435	333734	150.773	39	Little Trapper Lake	58.49072	-132.58956
30	7/25/20	235	95054	405	333735	150.773	40	Little Trapper Lake	58.49616	-132.60862
30	7/25/20	236	95059	515	333736	150.773	41	Inklin River	58.90214	-133.08299
30	7/25/20	237	95065	510	333737	150.773	42	Dropout	–	–
30	7/25/20	238	95071	475	333738	150.773	43	Little Trapper Lake	58.48729	-132.60061
30	7/25/20	239	95077	430	333739	150.773	44	Dropout	–	–
30	7/25/20	240	95083	470	333740	150.773	45	Little Trapper Lake	58.48996	-132.60514
30	7/25/20	241	95089	555	333741	150.773	46	Sheslay River	58.52771	-132.15741
30	7/25/20	242	95095	425	333742	150.773	47	Mainstem Taku River	58.60131	-133.58945
30	7/25/20	243	95101	460	333743	150.773	48	Nakina River	59.05278	-133.02859
31	7/26/20	244	95107	440	333744	150.773	49	Dropout	–	–
31	7/26/20	245	95113	540	333745	150.773	50	Dropout	–	–
31	7/26/20	246	95118	475	333746	150.773	51	Harvested	–	–

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
31	7/26/20	247	95124	550	333747	150.773	52	Mainstem Taku River	58.71201	-133.43437
31	7/26/20	248	95130	460	333748	150.773	53	Mainstem Taku River	58.78950	-133.34129
31	7/26/20	249	95136	535	333749	150.773	54	Mainstem Taku River	58.62987	-133.54470
31	7/26/20	250	95142	400	333750	150.773	55	Kowatua Creek	58.50341	-132.55541
31	7/26/20	251	95148	450	333751	150.773	56	Tatsatua Creek	58.50310	-132.33784
31	7/27/20	252	95153	445	333752	150.773	57	Dropout	–	–
31	7/28/20	253	95160	460	333753	150.773	59	Dropout	–	–
31	7/28/20	254	95166	460	333754	150.773	60	Mainstem Taku River	58.73617	-133.38050
31	7/28/20	255	95172	555	333755	150.773	61	Harvested	–	–
31	7/28/20	256	95177	600	333756	150.773	62	Harvested	–	–
31	7/28/20	257	95184	465	333757	150.773	63	King Salmon Lake	58.71334	-132.93557
31	7/28/20	258	95190	500	333758	150.773	64	King Salmon Lake	58.71667	-132.90000
31	7/28/20	259	95196	500	333759	150.773	65	Nakina River	58.98787	-133.18533
31	7/28/20	260	95202	460	333760	150.773	66	Harvested	–	–
31	7/28/20	261	95208	390	333761	150.773	67	Mainstem Taku River	58.72921	-133.39073
31	7/28/20	262	95214	475	333762	150.773	68	Hackett River	58.22189	-131.73467
31	7/28/20	263	95220	475	333763	150.773	69	Mainstem Taku River	58.58128	-133.63122
31	7/28/20	264	95226	485	333764	150.773	70	Dropout	–	–
31	7/28/20	265	95232	540	333765	150.773	71	Harvested	–	–
31	7/28/20	266	95238	480	333766	150.773	72	Dropout	–	–
31	7/28/20	267	95245	480	333767	150.773	73	Mainstem Taku River	58.70671	-133.44415
31	7/29/20	268	95251	550	333768	150.773	74	Nakina River	59.04054	-133.04622
31	7/29/20	269	95257	445	333769	150.773	75	Mainstem Taku River	58.85616	-133.18127
31	7/29/20	270	95264	520	333770	150.773	76	Mainstem Taku River	58.61667	-133.57190
31	7/29/20	271	95270	435	333771	150.773	77	Kowatua Creek	58.50812	-132.56633

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
31	7/29/20	272	95276	435	333772	150.773	78	Inklin River	58.81865	-132.89554
31	7/29/20	273	95281	490	333773	150.773	79	Mainstem Taku River	58.66101	-133.51470
31	7/29/20	274	95287	430	333774	150.773	80	Little Trapper Lake	58.48910	-132.60359
31	7/29/20	275	95293	570	333775	150.773	81	Dropout	–	–
31	7/30/20	276	95298	560	333776	150.773	82	Nakina River	59.10546	-133.00839
31	7/30/20	277	95304	430	333777	150.773	83	Tulsequah River	58.70000	-133.60162
31	7/30/20	278	95310	490	333778	150.773	84	Tatsatua Creek	58.43736	-132.38589
31	7/30/20	279	95311	505	333779	150.773	85	Harvested	–	–
31	7/30/20	280	95323	475	333780	150.773	86	Mainstem Taku River	58.69621	-133.46350
31	7/30/20	281	95329	455	333781	150.773	87	Dropout	–	–
31	7/30/20	282	95335	465	333782	150.773	88	King Salmon River	58.74014	-133.02447
31	7/30/20	283	95341	485	333783	150.773	89	Little Trapper Lake	58.49270	-132.61207
31	7/30/20	284	95347	475	333784	150.773	90	Mainstem Taku River	58.65086	-133.49979
31	7/31/20	285	95353	560	333785	150.773	91	Mainstem Taku River	58.76062	-133.34785
31	7/31/20	286	95359	575	333786	150.773	92	Dropout	–	–
31	7/31/20	287	95365	565	333787	150.773	93	Mainstem Taku River	58.71148	-133.43518
31	7/31/20	288	95371	455	333788	150.773	94	Dropout	–	–
31	7/31/20	289	95377	465	333789	150.773	95	Mainstem Taku River	58.79974	-133.27992
31	7/31/20	290	95383	445	333790	150.773	96	Dropout	–	–
31	7/31/20	291	95390	545	333791	150.773	97	Mainstem Taku River	58.72775	-133.37363
31	7/31/20	292	95395	435	333792	150.773	98	Mainstem Taku River	58.79583	-133.30253
31	7/31/20	293	95400	440	333793	150.773	99	Mainstem Taku River	58.78408	-133.33526
31	7/31/20	294	95407	460	333794	150.694	0	Mainstem Taku River	58.57911	-133.61725
31	7/31/20	295	95412	485	333795	150.694	1	Tatsatua Creek	58.41715	-132.37173
31	8/1/20	296	95418	465	333796	150.694	2	Mainstem Taku River	58.73793	-133.39345

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
31	8/1/20	297	95424	535	333797	150.694	3	Dropout	–	–
31	8/1/20	298	95430	480	333798	150.694	4	Nakina River	59.11285	-133.00180
31	8/1/20	299	95436	585	333799	150.694	5	Mainstem Taku River	58.78889	-133.32878
31	8/1/20	300	95442	455	333800	150.694	6	Mainstem Taku River	58.72884	-133.39059
31	8/1/20	301	95449	480	333801	150.694	7	Little Trapper Lake	58.50142	-132.61264
31	8/1/20	302	95455	410	333802	150.694	8	Mainstem Taku River	58.73940	-133.38998
31	8/1/20	303	95461	415	333803	150.694	9	Mainstem Taku River	58.62166	-133.61717
31	8/1/20	304	95467	400	333804	150.694	10	Dropout	–	–
31	8/1/20	305	95473	470	333805	150.694	11	King Salmon River	58.73136	-132.99987
31	8/1/20	306	95479	555	333806	150.694	12	Harvested	–	–
31	8/1/20	307	95485	465	333807	150.694	13	Tatsamenie Lake	58.40904	-132.36171
31	8/1/20	308	95491	450	333808	150.694	14	Harvested	–	–
32	8/2/20	309	95497	555	333809	150.694	15	Dropout	–	–
32	8/2/20	310	95503	485	333810	150.694	16	Dropout	–	–
32	8/2/20	311	95509	585	333811	150.694	17	Mainstem Taku River	58.73820	-133.38748
32	8/2/20	312	95515	475	333812	150.694	18	Dropout	–	–
32	8/2/20	313	95521	485	333813	150.694	19	Little Trapper Lake	58.49670	-132.60646
32	8/2/20	314	95527	550	333814	150.694	20	Dropout	–	–
32	8/3/20	315	95533	565	333815	150.694	21	Mainstem Taku River	58.71447	-133.43275
32	8/3/20	316	95540	520	333816	150.694	22	Dropout	–	–
32	8/3/20	317	95546	530	333817	150.694	23	Tatsatua Creek	58.52825	-132.28849
32	8/3/20	318	95552	480	333818	150.694	24	Dropout	–	–
32	8/3/20	319	95558	530	333819	150.694	25	Nakina River	59.09988	-133.01208
32	8/4/20	320	95565	505	333820	150.694	26	Little Trapper Lake	58.49632	-132.60364
32	8/4/20	321	95571	575	333821	150.694	27	Harvested	–	–

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
32	8/4/20	322	95578	425	333822	150.694	28	Dropout	–	–
32	8/4/20	323	95583	470	333823	150.694	29	King Salmon River	58.74144	-133.01399
32	8/4/20	324	95588	585	333824	150.694	30	Inklin River	58.77208	-132.39625
32	8/5/20	325	95594	535	333825	150.694	31	Dropout	–	–
32	8/5/20	326	95600	500	333826	150.694	32	Harvested	–	–
32	8/5/20	327	95607	420	333827	150.694	33	Mainstem Taku River	58.62779	-133.54466
32	8/5/20	328	95612	505	333828	150.694	34	Dropout	–	–
32	8/5/20	329	95619	425	333829	150.694	35	Mainstem Taku River	58.72375	-133.37350
32	8/6/20	330	95625	525	333830	150.694	36	Harvested	–	–
32	8/6/20	331	95632	430	333831	150.694	37	Dropout	–	–
32	8/6/20	332	95638	520	333832	150.694	38	Mainstem Taku River	58.69959	-133.42387
32	8/6/20	333	95644	530	333833	150.694	39	Harvested	–	–
32	8/6/20	334	95649	455	333834	150.694	40	Harvested	–	–
32	8/7/20	335	95654	445	333835	150.694	41	Mainstem Taku River	58.69503	-133.48832
32	8/7/20	336	95660	460	333836	150.694	42	Mainstem Taku River	58.73483	-133.35949
32	8/7/20	337	95666	515	333837	150.694	43	Sheslay River	58.69069	-132.15734
32	8/7/20	338	95672	505	333838	150.694	44	Dropout	–	–
32	8/7/20	339	95679	445	333839	150.694	45	Harvested	–	–
32	8/7/20	340	95685	380	333840	150.694	46	Dropout	–	–
32	8/8/20	341	95691	600	333841	150.694	47	Inklin River	58.78843	-132.81036
32	8/8/20	342	95697	490	333842	150.694	48	Tatsamenie Lake	58.40904	-132.36171
32	8/8/20	343	95703	410	333843	150.694	49	Dropout	–	–
32	8/8/20	344	95709	400	333844	150.694	50	Nakina River	58.98626	-133.18534
32	8/8/20	345	95714	530	333845	150.694	51	Dropout	–	–
32	8/8/20	346	95720	380	333846	150.694	52	Dropout	–	–

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
33	8/9/20	347	95726	525	333847	150.694	53	Tatsatua Creek	58.41424	-132.37550
33	8/9/20	348	95732	475	333848	150.694	54	No detections	–	–
33	8/9/20	349	95739	575	333849	150.694	55	Nakina River	59.07651	-133.02541
33	8/9/20	350	95745	465	333850	150.694	56	Dropout	–	–
33	8/9/20	351	95751	490	333851	150.694	57	Sheslay River	58.75309	-132.10711
33	8/10/20	352	95757	440	333852	150.694	58	Mainstem Taku River	58.79012	-133.32554
33	8/11/20	353	95763	435	333853	150.694	59	Mainstem Taku River	58.80219	-133.31980
33	8/11/20	354	95769	570	333854	150.694	60	Dropout	–	–
33	8/11/20	355	95775	490	333855	150.694	61	Mainstem Taku River	58.77912	-132.46859
33	8/13/20	356	95781	365	333856	150.694	62	Dropout	–	–
33	8/13/20	357	95787	520	333857	150.694	63	Mainstem Taku River	58.67070	-133.53477
33	8/13/20	358	95794	470	333858	150.694	64	Tatsamenie Lake	58.40904	-132.36171
33	8/13/20	359	95800	445	333859	150.694	65	Little Trapper Lake	58.49277	-132.60603
33	8/13/20	360	95807	495	333860	150.694	66	Inklin River	58.88213	-133.01023
33	8/14/20	361	95813	470	333861	150.694	67	Inklin River	58.78096	-132.17128
33	8/14/20	362	95819	470	333862	150.694	68	Tatsatua Creek	58.42218	-132.37292
33	8/14/20	363	95826	455	333863	150.694	69	Sheslay River	58.58905	-132.14490
33	8/14/20	364	95832	460	333864	150.694	70	Mainstem Taku River	58.73809	-133.38419
33	8/14/20	365	95839	460	333865	150.694	71	Dropout	–	–
33	8/14/20	366	95844	475	333866	150.694	72	King Salmon River	58.73001	-132.98851
33	8/14/20	367	95848	480	333867	150.694	73	Dropout	–	–
33	8/14/20	368	95853	480	333868	150.694	74	Tatsamenie Lake	58.39616	-132.34868
33	8/15/20	369	95859	485	333869	150.694	75	Dropout	–	–
33	8/15/20	370	95865	475	333870	150.694	76	King Salmon River	58.78039	-133.09382
33	8/15/20	371	95871	440	333871	150.694	77	Harvested	–	–

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
33	8/15/20	372	95877	445	333872	150.694	78	Harvested	–	–
33	8/15/20	373	95883	485	333873	150.694	79	Kowatua Creek	58.58852	-132.31119
33	8/15/20	374	95889	475	333874	150.694	80	Kowatua Creek	58.71788	-132.28800
34	8/16/20	375	95895	500	333875	150.694	81	Inklin River	58.83044	-132.93978
34	8/16/20	376	95900	445	333876	150.694	82	Sheslay River	58.55857	-132.13904
34	8/16/20	377	95906	505	333877	150.694	83	Tatsamenie Lake	58.40904	-132.36171
34	8/16/20	378	95909	530	333878	150.694	84	Mainstem Taku River	58.74189	-133.37582
34	8/17/20	379	95915	495	333879	150.694	85	Harvested	–	–
34	8/17/20	380	95921	490	333880	150.694	86	Mainstem Taku River	58.73130	-133.39624
34	8/17/20	381	95927	480	333881	150.694	87	Dropout	–	–
34	8/18/20	382	95933	540	333882	150.694	88	Inklin River	-132.69824	
34	8/18/20	383	95939	595	333883	150.694	89	Dropout	–	–
34	8/18/20	384	95946	505	333884	150.694	90	Sheslay River	58.61738	-132.14095
34	8/19/20	385	95951	415	333885	150.694	91	Mainstem Taku River	58.74088	-133.38165
34	8/19/20	386	95957	370	333886	150.694	92	Mainstem Taku River	58.64426	-133.50889
34	8/19/20	387	95963	490	333887	150.694	93	Mainstem Taku River	58.77861	-133.34274
34	8/20/20	388	95969	500	333888	150.694	94	Tatsamenie Lake	58.40461	-132.35408
34	8/20/20	389	95975	480	333889	150.694	95	Dropout	–	–
34	8/20/20	390	95981	530	333890	150.694	96	Harvested	–	–
34	8/20/20	391	95987	520	333891	150.694	97	King Salmon River	58.80071	-133.25292
34	8/22/20	392	95993	450	333892	150.694	98	Mainstem Taku River	58.71545	-133.43330
34	8/22/20	393	95999	530	333893	150.694	99	Mainstem Taku River	58.65000	-133.54477
35	8/23/20	394	96005	550	333894	150.493	0	Dropout	–	–
35	8/25/20	395	96011	500	333895	150.493	1	Dropout	–	–
35	8/26/20	396	96017	495	333896	150.493	2	Dropout	–	–

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Statistical week	Tag date	Sample number	Spaghetti tag number	METF (mm)	GSI sample vial #	Radio tag frequency (MHz)	Radio tag pulse code	Final location	Latitude	Longitude
35	8/27/20	397	96023	450	333897	150.493	3	Dropout	–	–
35	8/28/20	398	96029	515	333898	150.493	4	Tatsamenie Lake	58.37666	-132.31301
35	8/28/20	399	96034	510	333899	150.493	5	Harvested	–	–
36	8/30/20	400	96040	505	333900	150.493	6	Inklin River	58.77338	-132.41270
36	8/30/20	401	96046	410	333901	150.493	7	Nakina River	58.91576	-133.13775
36	8/31/20	402	96052	505	333902	150.493	8	Mainstem Taku River	58.89710	-133.14205
36	9/1/20	403	96059	505	333903	150.493	9	Dropout	–	–
36	9/4/20	404	96065	475	333904	150.493	10	Sheslay River	58.77341	-132.09103
36	9/5/20	405	96071	495	333905	150.493	11	No detections	–	–
37	9/9/20	406	96077	520	333906	150.493	12	Dropout	–	–

Appendix F.–Stationary telemetry tower operation dates and periods of no coverage, Taku River, in 2020.

Tower	Date installed	Date removed	Periods with no coverage
Flannigan receiver 1 (border)	29-Apr	20-Oct	12 May–22 May, 16 Jul–24 Jul, 1 Aug–28 Aug, 13 Sep–2 Oct
Flannigan receiver 2 (border)	3-May	20-Oct	3 Jun–20 Jun, 11 Jul–14 Jul, 12 Aug–16 Aug, 13 Sep–2 Oct
Deadfall (below border)	29-Apr	22-Oct	15 Jul–30 Jul, 1 Aug–17 Aug
King Salmon Lake	25-Jul	29-Oct	None
Kuthai Lake	23-Jun	29-Oct	None
Nahlin River	29-Apr	22-Oct	18 Jul–30 Jul, 1 Aug–17 Aug, 31 Aug–2 Oct
Sloko/Nakina River (junction)	30-May	29-Oct	None
Tatsamenie Lake	23-Jun	29-Oct	None
Little Trapper Lake	23-Jun	29-Oct	None
Tulsequah River	29-Apr	20-Oct	1 Aug–17 Aug

Appendix G.–The genetic stock identification analysis results, with 90% credible intervals (C.I.), of radiotagged sockeye salmon at the Canyon Island fish wheels, 2020.

Statistical week	Number genotyped	Reporting group	Mean	SD	C.I. 5%	C.I. 95%
24–26	31	Other	0.002	0.029	0.000	0.059
		Kuthai Lake	0.679	0.082	0.543	0.805
		King Salmon Lake	0.280	0.078	0.165	0.420
		Little Trapper Lake	0.040	0.030	0.010	0.101
		Tatsatua Lake	0.000	0.002	0.000	0.000
		Tatsamenie Lake	0.000	0.002	0.000	0.000
		Nahlin River	0.000	0.002	0.000	0.000
		Mainstem Taku River	0.000	0.012	0.000	0.015
		Chutine Lake	0.000	0.002	0.000	0.000
27	54	Other	0.000	0.017	0.000	0.033
		Kuthai Lake	0.267	0.059	0.173	0.366
		King Salmon Lake	0.618	0.067	0.507	0.723
		Little Trapper Lake	0.048	0.031	0.010	0.109
		Tatsatua Lake	0.000	0.001	0.000	0.000
		Tatsamenie Lake	0.000	0.001	0.000	0.000
		Nahlin River	0.000	0.001	0.000	0.000
		Mainstem Taku River	0.067	0.034	0.021	0.132
		Chutine Lake	0.000	0.002	0.000	0.000
28	44	Other	0.000	0.025	0.000	0.048
		Kuthai Lake	0.195	0.057	0.108	0.296
		King Salmon Lake	0.551	0.074	0.428	0.672
		Little Trapper Lake	0.136	0.052	0.059	0.228
		Tatsatua Lake	0.000	0.006	0.000	0.000
		Tatsamenie Lake	0.003	0.011	0.000	0.022
		Nahlin River	0.000	0.001	0.000	0.000
		Mainstem Taku River	0.114	0.052	0.039	0.207
		Chutine Lake	0.000	0.001	0.000	0.000
29	55	Other	0.021	0.027	0.000	0.073
		Kuthai Lake	0.101	0.042	0.044	0.180
		King Salmon Lake	0.442	0.066	0.333	0.549
		Little Trapper Lake	0.257	0.060	0.166	0.359
		Tatsatua Lake	0.000	0.002	0.000	0.000
		Tatsamenie Lake	0.000	0.001	0.000	0.000
		Nahlin River	0.000	0.001	0.000	0.000
		Mainstem Taku River	0.179	0.053	0.099	0.272
		Chutine Lake	0.000	0.001	0.000	0.000
30	59	Other	0.002	0.021	0.000	0.043
		Kuthai Lake	0.000	0.001	0.000	0.000
		King Salmon Lake	0.289	0.058	0.199	0.392
		Little Trapper Lake	0.347	0.064	0.245	0.457
		Tatsatua Lake	0.016	0.030	0.004	0.084
		Tatsamenie Lake	0.086	0.037	0.035	0.156
		Nahlin River	0.000	0.004	0.000	0.000
		Mainstem Taku River	0.238	0.058	0.147	0.335
		Chutine Lake	0.022	0.018	0.005	0.056

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Statistical week	Number genotyped	Reporting group	Mean	SD	C.I. 5%	C.I. 95%
31	63	Other	0.005	0.023	0.000	0.055
		Kuthai Lake	0.027	0.022	0.001	0.068
		King Salmon Lake	0.153	0.045	0.085	0.233
		Little Trapper Lake	0.169	0.054	0.086	0.267
		Tatsatua Lake	0.012	0.026	0.003	0.072
		Tatsamenie Lake	0.120	0.044	0.057	0.201
		Nahlin River	0.000	0.001	0.000	0.000
		Mainstem Taku River	0.514	0.069	0.397	0.626
		Chutine Lake	0.000	0.001	0.000	0.000
32	38	Other	0.003	0.035	0.000	0.073
		Kuthai Lake	0.023	0.026	0.000	0.073
		King Salmon Lake	0.076	0.043	0.020	0.151
		Little Trapper Lake	0.093	0.046	0.031	0.182
		Tatsatua Lake	0.000	0.002	0.000	0.000
		Tatsamenie Lake	0.274	0.071	0.165	0.396
		Nahlin River	0.000	0.002	0.000	0.000
		Mainstem Taku River	0.530	0.081	0.391	0.662
		Chutine Lake	0.000	0.001	0.000	0.000
33	28	Other	0.000	0.032	0.000	0.067
		Kuthai Lake	0.000	0.001	0.000	0.000
		King Salmon Lake	0.116	0.056	0.042	0.221
		Little Trapper Lake	0.165	0.072	0.062	0.296
		Tatsatua Lake	0.105	0.060	0.028	0.220
		Tatsamenie Lake	0.398	0.094	0.243	0.551
		Nahlin River	0.000	0.002	0.000	0.000
		Mainstem Taku River	0.216	0.080	0.095	0.359
		Chutine Lake	0.000	0.003	0.000	0.000
34–37	32	Other	0.000	0.034	0.000	0.067
		Kuthai Lake	0.000	0.001	0.000	0.000
		King Salmon Lake	0.000	0.002	0.000	0.000
		Little Trapper Lake	0.007	0.017	0.002	0.037
		Tatsatua Lake	0.000	0.002	0.000	0.000
		Tatsamenie Lake	0.474	0.088	0.334	0.620
		Nahlin River	0.000	0.003	0.000	0.000
		Mainstem Taku River	0.519	0.091	0.372	0.666
		Chutine Lake	0.000	0.004	0.000	0.000
Total	404	Other	0.000	0.004	0.000	0.008
		Kuthai Lake	0.130	0.017	0.104	0.158
		King Salmon Lake	0.305	0.023	0.266	0.344
		Little Trapper Lake	0.143	0.019	0.113	0.174
		Tatsatua Lake	0.017	0.011	0.001	0.036
		Tatsamenie Lake	0.126	0.017	0.099	0.156
		Nahlin River	0.000	0.000	0.000	0.000
		Mainstem Taku River	0.277	0.023	0.240	0.315
		Chutine Lake	0.001	0.002	0.000	0.006

Appendix H.–Genetic stock identification results, with 90% credible intervals (C.I.), of radiotagged sockeye salmon harvested in the Canadian Commercial fishery, 2020.

Statistical week	Number genotyped	Reporting group	Mean	SD	C.I. 5%	C.I. 95%
27–35	38	Other	0.005	0.030	0.000	0.067
		Kuthai Lake	0.097	0.049	0.030	0.189
		King Salmon Lake	0.266	0.071	0.158	0.392
		Little Trapper Lake	0.163	0.063	0.072	0.277
		Tatsatua Lake	0.000	0.004	0.000	0.000
		Tatsamenie Lake	0.137	0.057	0.057	0.241
		Nahlin River	0.000	0.001	0.000	0.000
		Mainstem Taku River	0.331	0.078	0.210	0.467
		Chutine Lake	0.000	0.001	0.000	0.000