YUKON RIVER SALMON 2017 SEASON SUMMARY AND 2018 SEASON OUTLOOK

Prepared by

THE UNITED STATES AND CANADA
YUKON RIVER JOINT TECHNICAL COMMITTEE

April 2018
Regional Information Report 3A18-01
Alaska Department of Fish and Game
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Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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

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The Regional Information Report Series was established in 1987 and was redefined in 2007 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as area management plans, budgetary information, staff comments and opinions to Alaska Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.adfg.alaska.gov/sf/publications/

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

Page

TABLE OF CONTENTS (Continued)

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES (Continued)

LIST OF APPENDICES (Continued)

1.0 ABSTRACT

The Yukon River Joint Technical Committee (JTC) of the United States and Canada meets twice a year to analyze and discuss harvest and escapement goals, management trends, postseason reviews, preseason outlooks, and results of cooperative research projects. This report summarizes the status of Chinook *Oncorhynchus tshawytscha*, coho *O. kisutch*, and summer and fall chum salmon *O. keta* stocks in 2017, presents a 2018 season outlook, and provides data about salmon harvests in commercial, subsistence, aboriginal, personal use, domestic, and sport or recreational fisheries. Summaries of Yukon River research projects and a list of 2017 Restoration and Enhancement Fund projects are also included. For 2017, the preliminary estimate of Chinook salmon spawning escapement in Canada was approximately 68,000 fish, exceeding the upper end of the interim management escapement goal (IMEG) range of 42,500–55,000 fish. A preliminary estimate of the total Canadian-origin Chinook salmon run was approximately 93,000 fish. The preliminary estimate of fall chum salmon spawning escapement in the Canadian mainstem Yukon River was approximately 402,000 fish, exceeding the upper end of the IMEG range of 70,000–104,000 fish. The preliminary estimate of fall chum salmon spawning escapement in the Fishing Branch River (Porcupine River), obtained from a weir count combined with sonar estimates, was approximately 49,000 fish and within the IMEG range of 22,000–49,000 fish. Recommended interim management escapement goals for Canadian-origin mainstem Yukon River Chinook and fall chum salmon and Fishing Branch (Porcupine River) fall chum salmon in 2018 remain the same as for 2017.

Key words: Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, coho salmon *O. kisutch*, Yukon River, Yukon River Salmon Agreement, Joint Technical Committee, escapement, escapement goal, interim management escapement goal IMEG, management strategy, season outlook.

2.0 INTRODUCTION

The United States (U.S.) and Canada Yukon River Joint Technical Committee (JTC) was established in 1985 and serves as a scientific advisory body to the Yukon River Panel (Panel). This annual report covers salmon fishery and management topics addressed by the JTC following the 2017 season and preceding the 2018 season, in accordance with the *Yukon River Salmon Agreement*.[1]

The JTC meets semi-annually to discuss harvest and escapement goals, stock analyses, management strategies, preseason outlooks and postseason reviews, and results of cooperative research projects. The fall meeting was held October 31–November 2, 2017 in Fairbanks, Alaska. The spring meeting was held March 13–14, 2018 in Whitehorse, Yukon Territory.

Preliminary postseason fishery reviews were presented and discussed during the 2017 fall meeting. These included presentations by U.S. and Canadian members about management, stock assessment, harvests, and escapement of Chinook *Oncorhynchus tshawytscha* and fall chum *O. keta* salmon; salmon bycatch in the Bering Sea and Gulf of Alaska trawl fisheries; and marine research surveys. Subcommittee work, including fall chum salmon assessments about the Porcupine and Fishing Branch rivers; Restoration and Enhancement Fund proposals; and JTC report, were discussed. The JTC heard additional reports about 1) biometric efforts to standardize Chinook salmon age and sex data collected at the U.S./Canada border from 1982 to 2006 using data collected since 2007; 2) habitat restoration efforts within the U.S. portion of the drainage; 3) revisions to the historical species apportionment at Pilot Station sonar based on revised selectivity assumptions; 4) efforts to evaluate harvest-population diversity trade-offs for Canadian-origin Chinook salmon; and 5) potential methods to evaluate management strategy options for Canadian-origin Chinook salmon (final report). An optional workshop was hosted by Mike Jones (Michigan State) and colleagues on November 3 for JTC members and agency staff to learn more about the quantitative methods used for evaluating fisheries management strategies.

[1] The Yukon River Salmon Agreement appears as Chapter 8 in the Pacific Salmon Treaty, http://www.psc.org/pubs/Treaty/Treaty.pdf.

Review of 2017 Yukon River Salmon Restoration and Enhancement (R&E) Fund detailed proposals were conducted during October and November 2017. Final bi-lateral scores and technical review comments were presented to the Yukon River Panel during its December 2017 meeting. The Panel made requests for clarifications or modifications about some proposals, and the JTC reviewed the responses to those requests in March 2018.

During the 2018 spring meeting, the JTC reviewed preseason outlooks and management plans for the upcoming 2018 season. The JTC heard a presentation about juvenile-based forecasting methods for total Yukon River and Canadian-origin Chinook salmon. The Porcupine and Fishing Branch fall chum salmon subcommittee and the JTC report subcommittee provided updates. The Restoration and Enhancement Fund subcommittee developed comments for the Pacific Salmon Commission addressing a Restoration and Enhancement Fund Process document which will be considered by the Panel during the spring meeting.

JTC membership and meeting attendance (Fall 2017 and Spring 2018 meetings):

Bill Bechtol, Tanana Chiefs Conference (TCC)
Bonnie Borba, Alaska Department of Fish and Game (ADF&G)
Chuck Brazil, ADF&G
Randy Brown, U.S. Fish and Wildlife Service (USFWS)
Holly Carroll, ADF&G
Jeff Estensen, ADF&G
Joel Harding, Department of Fisheries and Oceans Canada (DFO)
Jennifer Hooper, Association of Village Council Presidents (AVCP)
Mary Ellen Jarvis, DFO
Matt Keyse, USFWS
Zachary Liller, ADF&G, U.S. co-chair
Vesta Mather, DFO
Nathan Millar, DFO, Canadian co-chair
Jim Murphy, U.S. National Oceanic and Atmospheric Administration (NOAA)
Robert Perry, Yukon Government
Chris Stark, Bering Sea Fishermen's Association (BSFA)
Don Toews, Yukon Salmon Subcommittee (YSSC)
Fred West, ADF&G
Trix Tanner, DFO
Alida Trainor, ADF&G

JTC meeting guests (Fall 2017 and Spring 2018 meetings):
Caroline Brown, ADF&G (advisory)
Chris Carli, DFO (observer)
Mathew Catalano, Auburn University (presenter)
Brenden Connors, ESSA Technologies Ltd. (presenter)
Hamachan Hamazaki, ADF&G (presenter)
Mike Jones, Michigan State University (presenter)
Carl Pfisterer, ADF&G (presenter)
Ben Truesdell, Michigan State University (presenter)
David Wigglesworth, USFWS (observer)

Throughout the years, U.S. and Canadian researchers have developed projects to monitor escapement and to determine genetic composition, relative abundance, run characteristics, run timing and other information to characterize the annual salmon migration in the Yukon River. Mainstem river sonars, tributary sonars, counting towers, aerial surveys, and weirs are used to monitor escapement. Other information collected includes catch per unit of effort (CPUE), salmon sex and length composition, scales or vertebra for age determination, tissue samples for genetic stock identification, data about resident species, and information from recovery of tagged fish from various projects. Harvest is monitored through voluntary or required reporting. Various government agencies, non-government organizations, and private contractors operate projects throughout the drainage (Appendices A7 and A8).

Summaries of many of these projects and information used to assess escapement and stock status and provide run outlooks are presented in this report. Although most data sets have been fully compiled and most analyses completed prior to publication of this report, some information from the 2017 season were preliminary at the time of writing. Other published, peer reviewed sources, or agency staff should be consulted for definitive documentation of postseason information. The annual management report for the Yukon Area is published within the ADF&G Fishery Management Report series by year (e.g., Estensen et al. 2017, http://www.adfg.alaska.gov/sf/publications/). All Alaska subsistence and personal use harvest data are considered preliminary until the ADF&G Fisheries Data Series reports (e.g., Jallen et al. 2017, http://www.adfg.alaska.gov/sf/publications/) are published.

This JTC report is focused on Chinook, fall chum, and coho *O. kisutch* salmon stocks that occur on both sides of the international border, and more specifically on salmon originating in Canadian waters and addressed by the *Yukon River Salmon Agreement*. Summer chum salmon occur entirely within the U.S. portion of the Yukon River drainage, but have overlapping run timing with Chinook salmon and fall chum salmon, affecting management options. As such, this report contains limited information about summer chum salmon to provide context for fisheries assessment and management decision that affect Canadian-origin Chinook salmon and fall chum salmon. Like summer chum salmon, few coho salmon are bound for the upper reaches of the Yukon River in Canada, therefore discussion of coho salmon is limited to the Porcupine River population.

3.0 ALASKA MANAGEMENT OVERVIEW

3.1 CHINOOK AND SUMMER CHUM SALMON

The Yukon River drainage in Alaska (Yukon Area) is divided into fishery districts and subdistricts for management purposes (Figure 1). Management of the Yukon Area summer season mainstem commercial salmon fisheries is in accordance with the *Policy for the Management of Sustainable Salmon Fisheries* 5 ACC 39.222, the *Yukon River Drainage King Salmon Management Plan* 5 ACC 05.360, and the *Yukon River Summer Chum Salmon Management Plan* 5 ACC 05.362 (Appendix A1). The summer chum salmon management plan establishes run size thresholds needed to allow subsistence, commercial, sport, and personal-use fishing, prioritizing subsistence use. Because summer chum and Chinook salmon migrate concurrently, regulations in the management plan allow for using selective gear types that target summer chum salmon during times of Chinook salmon conservation and allow immediate release of Chinook salmon back to the water alive. These regulations help ensure Chinook

salmon escapement objectives will be met in years of low Chinook salmon run sizes and provide fishing opportunity on the more abundant summer chum salmon runs.

During the "summer season" (early May through July 15 in District 1) management and research staff are based in the Emmonak office and the focus is on assessing and managing the summer chum and Chinook salmon runs. After July 15, in Emmonak, Chinook salmon are nearly done entering the river and fall chum salmon start to replace summer chum salmon as the dominant species. On July 16, management transitions to the "fall season" and assessment and management become focused on fall chum and coho salmon.

Throughout majority of the fishing season, weekly teleconferences were facilitated by the Yukon River Drainage Fisheries Association (YRDFA) to provide managers, fishermen, tribal/traditional council representatives, and other stakeholders the opportunity to share information, provide input, and discuss inseason management options. During these weekly teleconferences, ADF&G and USFWS staff provided inseason run assessment information and upcoming management strategies; subsistence fishermen provided reports on fishing effort and water conditions in their respective communities along the river.

Preseason Management Strategy Planning

The Canadian-origin run of Yukon River Chinook salmon in 2017 was projected to be approximately 70,000–97,000 fish, and the drainagewide run (U.S. and Canada stocks) was expected to be approximately twice this size, 140,000–194,000 fish. For Canadian-origin Chinook salmon, the interim management escapement goal (IMEG) range recommended by the Yukon River Panel was 42,500–55,000 fish.

The summer chum salmon outlook projected over 2 million fish, a run size sufficient to meet escapement and subsistence needs and provide for a commercially harvestable surplus. However, the management of a summer chum-directed salmon commercial fishery would be affected by the need to conserve Chinook salmon and would depend on Chinook salmon run timing and abundance.

As in recent years, initial management would be conservative until inseason assessment indicated the Chinook salmon run size would be toward the upper end of the projected range. This run size was expected to be strong enough to meet escapement objectives and provide a harvestable surplus; however, conservation measures were still anticipated to be necessary. Before the 2017 season, YRDFA facilitated a meeting with U.S. management agencies, fishermen, tribal/traditional council representatives, and other stakeholders to develop a preseason management strategy. The purpose of this meeting was to cooperatively identify practical management strategies that would achieve the following goals: achieve escapement objectives and harvest sharing of Canadian-origin salmon stocks as defined in the Yukon River Salmon Agreement; ensure adequate numbers of Chinook salmon reach their spawning grounds in Alaska and Canada; provide some opportunity to harvest Chinook salmon; and provide ample opportunity to harvest abundant summer chum salmon and non-salmon species.

An annual informational flyer detailing the outlooks for Chinook, chum, and coho salmon and likely fishery management strategies was mailed to approximately 2,700 Yukon River households.

Inseason Run Assessment

The U.S. management agencies (ADF&G and USFWS) monitor a suite of assessment projects that provide critical data about run timing, relative abundance, and stock composition of salmon. Information from multiple assessment projects are corroborated when available to provide the best possible assessment. Initial assessment in the lower Yukon River is critical to implementing an inseason management plan and operating an orderly fishery throughout the drainage. Two projects in the lower Yukon River provided inseason abundance and timing information.

The Lower Yukon Test Fishery (LYTF) program is designed to assess salmon run timing and relative abundance and consists of 2 Chinook salmon test fisheries. An 8.5-inch mesh set gillnet test fishery operated in the Middle and South Mouths of the Yukon River and an 8.25-inch mesh drift gillnet operated at Big Eddy in the south mouth, near Emmonak. The LYTF also has a summer chum salmon-directed drift gillnet test fishery using 5.5-inch mesh gear operated in the Middle and South Mouths. These test fisheries provide relative catch data and CPUE which gives an index of abundance and indicates the presence of large groups of fish, or "pulses", entering the mouths of the river.

The mainstem sonar project near Pilot Station provides abundance estimates for Chinook salmon and summer chum salmon. The test fishery at the sonar project is used to apportion the daily sonar counts by species and is also used to sample the salmon runs for biological information such as age, sex, and length (ASL) and genetic data. ADF&G has endeavored to reduce Chinook salmon mortality in test fisheries by releasing all healthy Chinook salmon alive immediately. Any Chinook salmon mortalities were delivered to Tribal Councils in various nearby communities for distribution to elders.

In 2017, the LYTF was operational at the South Mouth drift gillnet site on May 25 and at the Middle Mouth site on June 6. The first Chinook salmon caught in the test fishery was on May 31. The Big Eddy set net site was fished until June 28. The LYTF set gillnets concluded operations on July 13 with a cumulative CPUE of 27.89, which was below the historical[2] average CPUE of 29.6 for years with early run timing (Figure 2). The first quarter point, midpoint, and third quarter point were June 13, June 20, and June 26, respectively for the Chinook run. The 8.25-inch drift gillnet project for Chinook salmon operated in Big Eddy until July 15 and provided valuable supplemental run timing information for Chinook salmon entering the South Mouth of the Yukon River. In accordance with the goal of reducing Chinook salmon mortality, 797 out of 1,736 Chinook salmon were released from the LYTF.

The cumulative passage estimate at the sonar project located near Pilot Station was approximately 263,000 Chinook salmon ±29,000 (90% CI). This passage was well above the 2012–2016 average of approximately 150,000 fish. Chinook salmon entered the river in 4 pulses consisting of 20,800 fish; 79,900 fish; 69,300 fish; and 55,200 fish. Inseason run analysis was focused on making comparisons to years with similar early run timing. The first quarter point, midpoint, and third quarter point for the sonar project near Pilot Station were on June 17, June 21, and June 27, respectively. The 2017 Chinook salmon run was 3 days earlier than average based on the midpoint at the sonar project near Pilot Station.

Tissue samples were taken from the majority of Chinook salmon caught in the test fishery at the sonar project located near Pilot Station and analyzed in 4 strata for genetic mixed stock analysis

[2] Includes early run timing years only: 1993, 1995, 1996, 2003, 2004, 2014, and 2016.

(MSA). The 4 strata periods were May 31–June 13 (number sampled (*n*) = 99), June 14–June 20 (*n* = 180), June 21–June 25 (*n* = 115), and June 26–July 19 (*n* = 192). Genetic MSA indicated the Canadian-origin stock proportion of each stratum to be 43%, 49%, 43%, and 41% for the 4 strata, respectively. The total season Canadian percentage was 44% (weighted by passage) which is slightly above average for an odd numbered year.

The mainstem Yukon River sonar operated near Pilot Station estimated a cumulative of approximately 3.1 million summer chum salmon ±138,000 (90% CI), which was above the 1995–2016 (excluding 1996, 1998, 1999, 2001 and 2009) median of 1.9 million fish for the project. The first quarter point, midpoint, and third quarter point were June 19, June 23, and June 29, respectively, which is consistent with historical early run timing. Three large pulses of summer chum salmon were detected at the sonar project with the largest group consisting of approximately 957,800 fish, which passed by the sonar between June 21 and June 25.

Chinook and Summer Chum Salmon Inseason Management

In previous years, gillnets were restricted to 6-inch or smaller mesh immediately following ice-out. However, in 2016 and 2017, managers waited for increased Chinook salmon catches at the LYTF assessment project before restricting the subsistence gillnet fishery in order to provide opportunity to target sheefish and other species.

In 2017, the North Coastal area was managed as part of District 1, therefore all actions affecting District 1 applied to the North Coastal area as well. The South Coastal area (from the Naskonat Peninsula north to 62 degrees North latitude including the communities of Hooper Bay and Scammon Bay) was managed separately. South Coastal fishermen were restricted to 6-inch or smaller mesh gillnets from May 31 until June 18, when the mesh size restriction was removed.

Ice out at the mouth of the Yukon River (near Alakanuk) occurred on May 14, which was nearly 1 week earlier than the average 1997–2016 break up date of May 20. The first summer chum salmon of the year was caught in the subsistence fishery on May 21, nearly 2 weeks earlier than the 1997–2016 average date of June 2. The first Chinook salmon was harvested on May 26 in the subsistence fishery, 4 days earlier than the 1997–2016 average date of May 30. ADF&G relied on subsistence harvest reports to guide initial management actions during the early portion of the salmon runs. Relatively small numbers of Chinook salmon were detected in the river on June 1. These fish were considered the early part of the run, and in District 1 fishing with gillnets was restricted to 6-inch or smaller mesh and fishermen were placed on the regulatory schedule of two 36-hour periods per week. In times of conservation a regulatory schedule (Table 1) is applied as the fish migrate up river. Along with alternating fishing schedules ADF&G implemented gear restrictions as part of the subsistence fishery management actions used during the summer season (Table 2).

Subsistence salmon fishing with gillnets closed June 11 and reverted to fishing with selective gear in anticipation of the first pulse passing through Districts 1, 2, and 3. In District 1, commercial and subsistence fishing periods with dip nets and beach seines were not open concurrently; subsistence fishing was open daily for 10 hour periods. In Districts 2 and 3, fishing with selective gear was open 24 hours a day, 7 days per week using dip nets and beach seines only. Both dip nets and beach seines require the live release of Chinook salmon.

Table 1.–Yukon Area regulatory subsistence salmon fishing schedule.

Area	Regulatory subsistence fishing periods	Open fishing times
Coastal District	7 days per week	M/T/W/TH/F/SA/SU - 24 hours/day
District 1	Two 36-hour periods per week	Mon 8 pm to Wed 8 am / Thu 8 pm to Sat 8 am
District 2	Two 36-hour periods per week	Wed 8 pm to Fri 8 am / Sun 8 pm to Tue 8 am
District 3	Two 36-hour periods per week	Wed 8 pm to Fri 8 am / Sun 8 pm to Tue 8 am
District 4	Two 48-hour periods per week	Sun 6 pm to Tue 6 pm / Wed 6 pm to Fri 6 pm
Koyukuk and Innoko Rivers	7 days per week	M/T/W/TH/F/SA/SU - 24 hours/day
Subdistricts 5-A, -B, -C	Two 48-hour periods per week	Tue 6 pm to Thu 6 pm / Fri 6 pm to Sun 6 pm
Subdistrict 5-D	7 days per week	M/T/W/TH/F/SA/SU - 24 hours/day
Subdistrict 6	Two 42-hour periods per week	Mon 6 pm to Wed Noon / Fri 6 pm to Sun Noon
Old Minto Area	5 days per week	Friday 6 pm to Wednesday 6 pm

Note: This schedule was altered during the 2017 season based on Chinook salmon run strength.

Table 2.–Summer season subsistence fishing openings and allowed gear.

District or Subdistrict	Management Actions				
	Regulatory schedule with 6-inch mesh	Selective gear [a]	Reduced schedule with 6-inch mesh	Surgical opening with 7.5-inch mesh	Regulatory schedule with 7.5-inch mesh
South Coastal	May 31	N/A	N/A	N/A	June 18
District 1 and North Coastal	May 31	June 11	10 hour openings June 19 and June 20	12 hour opening June 18	June 21: open except for commercial [b]
District 2	June 2	June 11	10 hour openings June 19 and June 20	12 hour opening June 18	June 21: open except for commercial [c]
District 3	June 6	June 11	June 18 [c]	24 hour opening June 20	June 21
4-A Lower	June 9	June 14	N/A	N/A	June 21
4-A Upper	June 11	June 17	N/A	N/A	June 25
4-A and 4-B	N/A	June 19	N/A	N/A	June 25
5-A, 5-B, and 5-C	June 27	June 23	N/A	N/A	June 27
5-D and Koyukuk, and Innoko rivers	N/A	N/A	N/A	N/A	All season
District 6	N/A	N/A	N/A	N/A	June 12 to end of season [d]

Note: N/A indicates an action did not take place in that district or subdistrict. Mesh size listed is the maximum allowable size, any smaller mesh gillnets could be used. Subsistence fishing for non-salmon species with 4-inch or smaller mesh gillnets remained open in all districts. The use of fish wheels was allowed during all gillnet and selective gear openings.

[a] During openings with selective gear, fishermen could use beach seines, dip nets, and fish wheels. All Chinook salmon were required to be immediately released to the water alive.

[b] Subsistence fishing open 24 hours a day, 7 days per week except for closures before, during, and after commercial periods.

[c] Fishing was open for one 36-hour period with 6-inch or smaller mesh gillnets between other actions.

[d] Prior to June 12, fishing was open 24 hours a day, 7 days per week.

Short periods of gillnet fishing with 7.5-inch gillnets or smaller mesh gillnets were offered in Districts 1 through 3 (Table 2). The management strategy was to provide some Chinook-directed opportunity in the lower river at a time when high abundance of summer chum salmon make it hard for fishermen in the lower river to catch Chinook salmon with 6-inch or smaller mesh nets.

The 2017 the Chinook salmon run was conservatively managed in the early part of the season when run assessment had higher uncertainty in alignment with the proposed preseason management actions. Restrictions were relaxed or removed once run projections at the sonar project near Pilot Station coincided with the upper end of the preseason forecast, and the predicted total run estimate at the project was projected to be one of the highest since 2003. Subsistence salmon fishing restrictions were relaxed in each district, once there was confidence that the border escapement and harvest sharing objectives would be achieved. Due to the strength of the run in 2017, conservative management actions were not taken in Yukon River tributaries or Subdistrict 5-D in order to provide normal subsistence opportunity.

3.2 Fall Chum and Coho Salmon

Management of the Yukon Area fall season commercial salmon fisheries is in accordance with the Policy for the *Management of Sustainable Salmon Fisheries* 5 ACC 39.222, the *Yukon River Drainage Fall Chum Salmon Management Plan* 5 ACC 1.249, the *Yukon River Coho Salmon Management Plan* 5 ACC 05.369, and the *Tanana River Salmon Management Plan* 5 AAC 05.367. The threshold number of fall chum salmon needed to allow commercial fishing is 550,000 fish (Appendix A5) and commercial fishing is generally allowed only on the surplus above that level. The fall chum salmon plan incorporates *Yukon River Salmon Agreement* objectives for border passage and harvest shares of fall chum salmon and provides guidelines necessary for escapement and prioritized uses. The intent of the plan is to align management objectives with the established escapement goals, provide flexibility in managing subsistence harvests when stocks are low, and bolster salmon escapement as run abundance increases. The sustainable escapement goal (SEG) range for the Yukon River drainage is 300,000–600,000 fall chum salmon (Fleischman and Borba 2009). The IMEG for Canadian-origin Mainstem Yukon River fall chum salmon is 70,000–104,000, and the IMEG for Fishing Branch River fall chum salmon is 22,000–49,000. There are provisions in the plan to allow incremental levels of subsistence salmon fishing balanced with requirements to attain escapement objectives during low runs.

The coho salmon plan allows a coho salmon directed commercial fishery in the absence of achieving the threshold number of fall chum salmon if a harvestable surplus of coho salmon is identified and a commercial fishery will not have a significant impact on fall chum salmon escapement and allocation. Finally, under the Tanana River plan, commercial fishing in Subdistrict 5-A and District 6 are based on the assessment and timing of salmon stocks bound for the Tanana River drainage.

Fall Chum Salmon Management Overview

ADF&G monitored a suite of assessment projects in the lower river that provided salmon run timing, relative abundance, and stock composition information. Projects operated included 2 drift gillnet test fisheries that provided timing information and relative abundance, a mainstem Yukon River sonar located near Pilot Station that provided abundance estimates, and harvest/effort information from both subsistence and commercial fisheries. Genetic samples collected from chum salmon at the mainstem sonar provided stock composition information. Additionally,

escapement projects were operated in the upper Yukon River tributaries and the upper mainstem of the Yukon River. Assessment projects operated in the upper river included a sonar in the mainstem Yukon River near U.S./Canada border as well as in 2 tributaries (Chandalar and Upper Porcupine rivers), and a weir/sonar combination on the Fishing Branch River (Porcupine River headwater). Data from these projects were analyzed collectively inseason and used to determine whether escapement goals would be achieved. Age, sex, and length information were also collected at the lower river test fisheries, District 1 commercial fishery, mainstem Yukon River sonar (Eagle), as well as the Fishing Branch and Delta rivers (Appendix A25).

By regulation, the fall season began in District 1 on July 16. Chum salmon caught in the Lower Yukon River drift gillnet test fishery (LYTF) after July 16 were considered fall chum salmon. Mountain Village drift gillnet test fishery (MVTF) began operating on July 18, and the mainstem Yukon River sonar operated near Pilot Station began counting fall chum salmon on July 19. The subsequent transition of upriver districts and subdistricts to the fall season was based on the migration timing of fall chum salmon. In anticipation that the fall chum salmon run size in 2017 would meet both escapement needs and provide for a commercial surplus, all districts and subdistricts were placed on their regulatory subsistence fishing schedules upon transitioning to fall season management. Because of the strong run size and inseason run projections, ADF&G liberalized subsistence fishing schedules in all districts. Upon transitioning to fall season management, subsistence fishermen were allowed to use gillnets up to 7.5-inch mesh size and use of dip net gear was discontinued.

Subsistence salmon fishing in the mainstem Porcupine River within Alaska was placed on a reduced schedule of one 96-hour period per week beginning September 4. Subsistence salmon fishing on Porcupine River tributaries, such as the Sheenjek and Black rivers, remained open 7 days a week, 24 hours per day. The reduced schedule was an attempt to increase the number of fall chum salmon reaching the Canadian portion of the Porcupine River drainage. By September 22, based on favorable escapement projections for the Fishing Branch River weir project, subsistence salmon fishing was relaxed to 24 hours a day, 7 days a week.

The LYTF completed operations on September 10 (the project was operated by the Yukon Delta Fisheries Development Association after ADF&G ceased operations on August 28) and had a preliminary total CPUE for fall chum salmon of 3,827, which was well above the 2001–2016 median of 1,923. The MVTF ceased operations after September 12 with a preliminary cumulative CPUE for fall chum salmon of 6,390, which was well above the 1997–2016 (excluding 2013) median of 2,035. The mainstem Yukon River sonar near Pilot Station ceased operations after September 7. The preliminary fall chum salmon passage estimate at the mainstem sonar project near Pilot Station was 1,829,931 fish ±54,179 (90% CI), which was well above the 1995–2016 (excluding 1996 and 2009) median of 688,057 fish.

The 2017 fall chum salmon run entered the Yukon River in roughly 7 distinct pulses (Figure 3). The fourth pulse was the largest (approximately 1.1 million fish in size), was 7 days in duration, with the peak daily passage at the mainstem sonar near Pilot Station occurring on August 16. Cumulative fall chum salmon passage at the mainstem sonar remained well above the historical median the entire season. Inseason run projections remained well above the 550,000 fall chum salmon threshold necessary to allow fall chum salmon directed commercial fishing. Run timing for fall chum salmon at all the assessment projects averaged 2 days late.

Coho Salmon Management Overview

The preliminary coho salmon passage estimate at the mainstem sonar project near Pilot Station was 166,320 fish ±20,382 (90% CI), which was above the historical median of 160,272 fish. The cumulative coho salmon passage past the mainstem sonar near Pilot Station was tracking with the historical median throughout the season (Figure 4). Both the preliminary total cumulative CPUE for coho salmon at the LYTF and MVTF were above historical medians. ADF&G identified a surplus of coho salmon in addition to what was harvested in the fall chum salmon commercial fishery and allowed a coho salmon directed fishery in District 1, from September 1 to September 10, and in District 6 from October 1 to October 5.

4.0 ALASKA HARVEST SUMMARIES

4.1 SUBSISTENCE SALMON FISHERY

Subsistence salmon fishing activities in the Yukon River drainage typically begin in late May and continue through early October. Fishing opportunity in the Lower Yukon Area in May and the Upper Yukon Area in October is highly dependent upon river ice conditions. Throughout the drainage, most Chinook salmon harvested for subsistence use are dried, smoked, or frozen for later human consumption. Summer chum salmon, fall chum salmon, and coho salmon harvested in the lower Yukon River are primarily utilized for human consumption and are also dried, smoked, or frozen for later use. In the Upper Yukon Area, summer chum salmon, fall chum salmon, and coho salmon are an important human food source, but a larger portion of the harvest is fed to dogs used for recreation and transportation (Andersen 1992).

Documentation of the subsistence salmon harvest is necessary to determine if sufficient salmon are returning to the Yukon Area and enough fishing opportunities are being provided to meet subsistence needs. In years with fishery restrictions, estimates of harvest can be used to assess the effect of the management actions taken to meet escapement goals to maintain future salmon production. The primary method of estimating subsistence harvest is voluntary participation in the annual subsistence salmon harvest survey program conducted by ADF&G, Division of Commercial Fisheries. The survey is conducted in 33 communities (including the 2 coastal communities of Hooper Bay and Scammon Bay) during the fall, after most households have completed fishing for salmon (Jallen et al. 2017). Additional information about harvest timing is obtained from harvest calendars that are sent to households and filled out voluntarily (Jallen et al. 2017). Fishing permit information also provides information about harvest timing for those areas of the river.

All 2017 subsistence harvest data are considered preliminary as of the publication date of this report. Final results will be included in an ADF&G Fishery Data Series publication after the analysis is completed and reviewed. Based on survey and permit data, the 2017 preliminary subsistence salmon harvest in the Alaska portion of the Yukon River drainage was estimated to be 36,992 Chinook, 87,252 summer chum, 86,189 fall chum, and 7,645 coho salmon (Appendices B2–B5). For comparison, recent 2012–2016 average subsistence salmon harvest estimates are 15,088 Chinook, 100,113 summer chum; 95,294 fall chum; and 16,003 coho salmon (Appendices B2–B5) from communities in the Alaska portion of the Yukon River drainage. The estimated 2017 harvest of Chinook salmon, fall chum salmon, and coho salmon

were below levels defined by the Alaska Board of Fisheries as Amounts Reasonably Necessary for Subsistence[3] (Brown and Jallen 2012).

Of the 37,117 Chinook salmon harvested by subsistence and commercial fisheries in Alaska waters, 20,807 fish were considered to be of Canadian origin based on genetic samples taken from the subsistence harvest in 2017. Samples were collected from communities in each of the 5 mainstem districts and the proportion of Canadian-origin fish in each set of samples was then applied to that district's harvest. The estimated Canadian-origin harvests from each district were then summed for a total Canadian-origin harvest estimate. Subsistence fish harvested in the Black River, Koyukuk drainage, Chandalar River, and District 6 (Tanana River) are not Canadian-origin and therefore are not included in Canadian-origin harvest total.

In 2017, subsistence harvest surveys identified approximately 2,713 households in the Yukon Area in 31 communities. Of these, an estimated 1,383 households fished for salmon. Permits are not required for subsistence fishing throughout most of the Yukon Area, with the exception of the urban areas around Fairbanks and other areas accessible by road. Therefore, by far the largest share of subsistence harvest in the Yukon Area must be estimated from the detailed postseason survey results. Subsistence fishing permits were issued to 354 households, approximately 89% of the subsistence permits had been returned at the time of this publication, and 202 permitted households reported fishing for salmon or other non-salmon fish species.

4.2 COMMERCIAL FISHERY

Summer Season Harvest

With the forecasted large run of summer chum salmon and the return of a buyer to District 4, liberal commercial fishing opportunity was provided in Districts 1, 2, 4, and 6. However, there was a considerable reduction in buyer capacity in District 2.

Because Chinook salmon are encountered incidentally in the commercial summer chum salmon fishery, a suite of strategies were used to conservatively manage the fishery in order to minimize the impact to the Chinook salmon run. In Districts 1 and 2, dip nets and beach seines were used, and in District 4, manned fish wheels were used. Chinook salmon are required to be released alive from these selective gear types. Once commercial fishing was allowed with gillnets (in Districts 1, 2 and 6), all Chinook salmon could be kept for subsistence use or continued to be released alive.

For the 10th consecutive year, no commercial periods targeting Chinook salmon were allowed in the Yukon or Tanana rivers during the summer season. Sale of incidentally-caught Chinook salmon was prohibited for the seventh consecutive year in the summer season. During the fall season, on July 17, during the first fall chum-directed commercial opening, when 99% of the Chinook salmon run had passed, ADF&G allowed the sale of 168 incidentally-caught Chinook salmon. Although this represented a fraction of the number of Chinook salmon already retained by commercial fishermen for subsistence use, much concern and confusion regarding that decision was heard from the public, on both the Yukon River Drainage Fisheries Association teleconference, and in person at meetings in many Yukon villages attended by the area manager and other ADF&G staff including the commissioner. ADF&G decided to reverse its decision and

[3] Amounts reasonably necessary for subsistence are set by the Alaska Board of Fisheries for stocks which are determined to have customary and traditional use. See http://www.adfg.alaska.gov/index.cfm?adfg=subsistence.reasonable for further definition.

not allow the sale of incidentally-caught Chinook salmon until guidance from the Alaska Board of Fisheries could be sought regarding the regulations on Chinook salmon sales.

During the 2017 summer season, the total commercial harvest in the Alaska portion of the Yukon River drainage was 555,296 summer chum salmon (Appendix A3), the largest harvest since 1989 (Appendix B3). The commercial harvests of summer chum salmon in the Lower Yukon Areas (Districts 1 through 3) were 393,165 and in the Upper Yukon (Districts 4 through 6) 162,131 fish. Harvest using selective gear accounted for over a third of the total commercial summer chum salmon harvest in the Lower Yukon Area. In the Upper Yukon Area, over 97% of the total commercial harvest of summer chum salmon was from openings with selective gear (manned fish wheels with live release of all Chinook salmon). In the Yukon Area commercial fisheries, approximately 4,728 Chinook salmon were reported as caught and released. A total of 5,999 Chinook salmon were reported retained for subsistence purposes during fisheries. These numbers include 2 Chinook salmon that were reported as released and 225 Chinook salmon that were reported as retained for subsistence purposes during the fall season commercial fishery.

Fall Season Harvest

There were a total of 71 commercial periods in 2017 during the fall season, the majority of which occurred in the lower river districts. Commercial fishing periods were established in Districts 5 and 6 as well as Subdistrict 4-A, but limited markets resulted in low fishing effort and relatively small harvests. The total commercial harvest for the Yukon River in the Alaska portion of the drainage was 489,702 fall chum salmon and 138,915 coho salmon (Appendix A3). The commercial harvest of fall chum salmon in 2017 eclipsed the previous record of 466,451 fish harvested in 1981 and was higher than the 465,396 fish harvested in 2016 (Appendix B4). The coho salmon harvest was lower than 2016 but above the 2012–2015 average (Appendix B5). The average weight of fall chum salmon caught commercially in Districts 1 and 2 was 7.3 lb. The average weight of coho salmon was 6.3 lb. All fall chum salmon and coho salmon were sold in the round except for small amounts of fall chum salmon roe sold in Districts 5 and 6.

4.3 SPORT FISHERY

Sport fishing effort for wild salmon in the Yukon River drainage is directed primarily at Chinook and coho salmon, with little effort directed at chum salmon. All chum salmon harvested in the sport fishery are categorized as summer chum salmon because these fish are mostly caught incidental to Chinook salmon during mid-summer in clearwater tributaries. Some harvest of fall chum salmon entering clearwater tributaries after Chinook salmon spawning occurs but is considered negligible relative to summer chum salmon harvests.

Alaska sport fishing effort and harvests are monitored annually through a statewide sport fishery postal survey.[4] Harvest estimates are not available until approximately 1 calendar year after the fishing season; therefore, 2017 estimates were not available for this report. Total sport harvest of salmon during 2016 in the Alaska portion of the Yukon River drainage (including the Tanana River) was estimated to be 20 Chinook, 264 chum, and 670 coho salmon (Appendices B2, B3, and B5). The 2012–2016 average sport salmon harvest within the Alaska portion of the Yukon

[4] Alaska Sport Fishing Survey database [Internet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish. Available from: http://www.adfg.alaska.gov/sf/sportfishingsurvey/. Also referred to as sport harvest or guided sport harvest.

River drainage was estimated to be 105 Chinook, 505 chum, and 703 coho salmon (Appendices B2, B3, and B5).

Most of the sport fishing effort for the Yukon River occurs in the Tanana River drainage along the road system (Brase and Baker 2017). From 2012 to 2016, harvests in the Tanana River represented, on average, 59%, 10%, and 51% of the total Yukon River drainage Chinook, summer chum, and coho salmon sport fish harvest, respectively. In the Tanana River, most Chinook and chum salmon are harvested from the Chena, Salcha, and Chatanika rivers, whereas most coho salmon are harvested from the Delta Clearwater and Nenana river systems. In the Yukon River drainage, excluding the Tanana River, most sport fishing effort for salmon takes place in the Anvik and Andreafsky rivers.

Since 2005, all freshwater sport fishing guides and guide businesses operating in Alaska have been required to be licensed. In addition, sport fishing guides and businesses are required to report sport fish harvest and fish released in logbooks. From 2012 to 2016, guided sport harvests in the Yukon River drainage (excluding the Tanana River drainage) averaged 33 Chinook and 322 coho salmon.

On May 1, 2017, an emergency order closed all waters to taking of Chinook salmon in the U.S. portion of the Yukon River drainage but excluded the Tanana River drainage. That emergency order was rescinded and allowed for a bag and possession limit of 1 Chinook salmon 20-inches or greater in length beginning June 20, 2017. There were no restrictions to the Tanana River Chinook salmon sport fishery in 2017.

4.4 PERSONAL USE FISHERY

The Fairbanks Nonsubsistence Area, located in the middle portion of the Tanana River, contains the only personal use fishery within the Yukon River drainage. Subsistence or personal use permits have been required in this portion of the drainage since 1973. Personal use fishing regulations were in effect from 1988 until July 1990, and from 1992 until April 1994. In 1995, the Joint Board of Fisheries and Game reestablished the Fairbanks Nonsubsistence Area, and it has been managed consistently under personal use regulations since then. Historical harvest data must account for these changes in status.

Subdistrict 6-C is completely within the Fairbanks Nonsubsistence Area and therefore falls under personal use fishing regulations. Personal use salmon or whitefish/sucker permits and a valid resident sport fishing license are required to fish within the Fairbanks Nonsubsistence Area. The harvest limit for a personal use salmon household permit is 10 Chinook, 75 summer chum, and 75 fall chum and coho salmon combined. The personal use salmon fishery in Subdistrict 6-C also has a harvest limit of 750 Chinook, 5,000 summer chum, and 5,200 fall chum and coho salmon combined.

In 2017, the personal use salmon fishery followed the regulatory fishing schedule of two 42-hour periods per week from 6:00 pm Monday, June 20 until 6:00 pm Friday, July 15. Fishermen were required to release Chinook salmon alive from fish wheels and dip nets. A total of 82 personal use salmon and 13 personal use whitefish and sucker household permits were issued. The 2017 preliminary harvest results based on 97% of the personal use household permits returned in Subdistrict 6-C included 125 Chinook, 438 summer chum, 626 fall chum and 200 coho salmon. The 2012–2016 average personal use harvest was 35 Chinook, 218 summer chum, 287 fall

chum, and 159 coho salmon (Appendices B2–B5) in the Alaska portion of the Yukon River drainage.

5.0 CANADIAN MANAGEMENT OVERVIEW

5.1 CHINOOK SALMON

The Yukon River drainage in Canada contains numerous tributaries, towns, and commercial fishing boundaries used for effective management (Figure 5). The total run of Canadian-origin mainstem Yukon River Chinook salmon in 2017 was expected to be below average, with a preseason outlook range of 70,000–97,000 Chinook salmon. As noted previously, the escapement goal (IMEG) range recommended by the Yukon River Panel was 42,500 to 55,000 Chinook salmon.

Prior to the season, meetings were held between the Yukon Salmon Sub-Committee (YSSC), DFO, Yukon First Nation Governments, Renewable Resources Councils (RRCs), and the public to discuss the 2017 forecast and possible management scenarios. The below average preseason forecast, coupled with the failure to achieve minimum escapement targets in 5 of the last 10 years, resulted in continued concern over the long-term health of Canadian-origin Yukon River Chinook salmon stocks.

Each year, in advance of the salmon season, DFO develops an Integrated Fisheries Management Plan (IFMP) for Yukon River Chinook and fall chum salmon. The IFMP identifies the main objectives and requirements for the Canadian Yukon River salmon fishery and the management measures that will be used to achieve these objectives.[5]

Canadian management decisions were based on the application of inseason assessment information to the management decision matrix, a component of the IFMP. The decision matrix provides detailed guidance for the management of fisheries linked to specific inseason run abundance levels. The 2017 decision matrix summarized the management reference points, general allocation plans, and anticipated management responses under different run size scenarios (Table 3). At the recommendation of the YSSC, the inseason fishery management decision matrix for Yukon River Chinook salmon in Canada reflects the escapement goal range recommended by the Yukon River Panel pursuant to the *Yukon River Salmon Agreement*. In addition, to improve the likelihood of achieving conservation objectives, a midpoint management target of 48,750 was used to guide inseason management decisions. The following decision thresholds were used to guide management actions to achieve an escapement goal range of 42,500 to 55,000 fish and a management target of 48,750 Canadian-origin Chinook salmon:

RED ZONE <42,500
No harvest – removal of all Chinook salmon harvest allocations. Run sizes this low represent a high conservation risk.

YELLOW ZONE (lower) 42,500 to 48,750
Harvest in the First Nation fishery only – harvest of less than 10% of historical catch.

[5] The IFMP is available online at http://science-libraries.canada.ca/eng/fisheries-oceans/.

YELLOW ZONE (upper) 48,750 to 55,000
Harvest in the First Nation fishery only – harvest of between 10% and 90% of historical catch and varies with run abundance (i.e., higher harvest at the top end of the zone). Harvest targets are met using voluntary harvest reductions by each First Nation.

GREEN ZONE >55,000
Opportunity for normal (full) First Nation subsistence harvest (i.e., no voluntary harvest reductions sought). Harvest opportunities (and allocation) for recreational, commercial, and domestic fisheries are provided in proportion to run abundance and are considered only when opportunities for First Nation harvests have not been restricted.

As a result of recommendations brought forth by the YSSC, the total allowable catch (TAC) of Chinook salmon in commercial, domestic, and recreational fisheries was set to zero at the beginning of the season. In addition, the YSSC recommended that First Nations take a conservative approach in the early season by reducing harvest, by deploying 6-inch or smaller mesh in the gillnet fishery, and by releasing females when possible. The YSSC further recommended that DFO consider the quality of escapement in determining inseason management actions in 2017; i.e., if a below normal female to male ratio was observed, conservative approaches would be maintained. First Nations were cautioned to harvest conservatively until run strength of Canadian-origin Chinook salmon could be determined with reasonable confidence through inseason stock assessment programs, particularly the mainstem Yukon River sonar program located near Eagle. Due to recent depressed recruitment, under-representation of females and age-6 and -7 Chinook salmon, the YSSC recommended that Canadian recreational, domestic and commercial fishery allocations were only to be considered if projections indicated that there was a sufficient abundance of Chinook salmon to achieve the upper end of the escapement goal range and full allocation to the First Nation fishery.

Inseason Management Yukon River Mainstem Chinook Salmon

Early in the 2017 season, information from the ADF&G projects such as LYTF near Emmonak and the mainstem sonar operated near Pilot Station in the Lower Yukon Area, suggested that the Canadian-origin Chinook salmon run would probably be near or above the preseason outlook range of 70,000–97,000 fish. Throughout the early to mid-portion of the run, the TAC available for commercial, domestic, and recreational fisheries remained at zero and the conservative approach described above was maintained in the First Nation fishery. DFO and YSSC held regular teleconferences with First Nation managers to update them about run projection scenarios.

Border passage projections from the midpoint of the season onward, as determined by mainstem Yukon River sonar project near Eagle, indicated that the escapement of Canadian–origin Chinook salmon was projected to meet or exceed the upper end of the escapement goal range of 42,500–55,000 fish. Following discussions with the YSSC and First Nation Governments, the preseason approach for a conservative harvest was relaxed. However, the recommendation for a reduced mesh size and release of females was maintained and several First Nation Governments maintained community-based management plans that called for a conservative harvest.

In the recreational fishery, the daily catch and possession limits were reduced to zero, effective July 5 to coincide with the arrival of Chinook salmon in Canadian portions of the Yukon River. Given the limited opportunity provided to First Nation subsistence fisheries, Chinook salmon commercial and domestic fisheries in Canada remained closed throughout the 2017 season.

Table 3.–Inseason fishery management decision matrix for Yukon River mainstem Chinook salmon in Canada.

Canadian allowable catch zones[a]	Run size indicator (*based on Eagle sonar passage projections*)[b]	Fishery			
		First Nation	Recreational	Commercial	Domestic
0	<42,500	**Closed** Removal of allocation for conservation purposes.	**Closed** No retention permitted. Additional closures possible.	**Closed**	**Closed**
0 to ~ 10,000	42,500 to 55,000 *Management Target: 48,750*[c]	**Varies** **42,500 to 48,750** Harvest of less than 10% of historical catch. **48,750 to 55,000** Harvest of between 10% and 90% of historical catch and varies with abundance	**Closed** No retention permitted	**Closed**	**Closed**
>10,000	>55,000	**Open** Unrestricted	**Potentially Open**[4] Retention permitted	**Potentially Open**[4] Allocation varies with run size	**Potentially Open**[d] Allocation varies with run size

[a] The allowable catch is determined based on numerical abundance and the sex ratio of returning salmon in relation to the long-term historical sex ratio. It considers the estimate of Total Allowable Catch and the harvest sharing provisions of the *Yukon River Salmon Agreement*.

[b] In some years, a portion of the passage of adult salmon into Canada is comprised of fish allocated for harvest in U.S. fisheries but not actually harvested. When this occurs these fish are not available for allocation to Canadian fisheries. Rather, this portion of the return is permitted to migrate to spawning areas and is complementary to the salmon which are allowed to escape to spawn under the provisions of the *Yukon River Salmon Agreement*.

[c] The Management Target of 48,750 is the minimum number of salmon intended to reach the spawning grounds.

[d] Allocations (harvest opportunities) are subject to run abundance and international harvest sharing provisions. Allocations to the recreational, domestic, and commercial fisheries are considered after there is a full allocation to the First Nations fishery and the upper end of the escapement goal is reached.

Inseason Management Porcupine River Chinook Salmon

In the absence of stock specific information about Porcupine River Chinook salmon in Canada, the early season management of this stock is based on information and management of mainstem Yukon River Chinook salmon. Given the below average outlook for mainstem Chinook salmon in 2017, it was recommended that Porcupine River subsistence fishing activities proceed in a conservative manner. Consistent with the approach adopted for mainstem Chinook salmon the fishery was to open early in the season with a recommendation to harvest in a conservative manner until such time that a more robust inseason estimate may be derived from information collected through the Porcupine River Chinook salmon sonar assessment program. It was further recommended that, when possible, female Chinook salmon caught in subsistence gillnets would be released if it were likely that the fish would survive and that gillnets have a mesh size of 6-inches or less.

By late July, the inseason assessment of run strength at the Porcupine River sonar indicated that the return of Chinook salmon was weaker than anticipated. In addition, extremely low water levels and near-lethal water temperatures may have impeded the migration and survival of Chinook salmon on the Porcupine River. Following discussion with the Vuntut Gwitch'in Government, a precautionary approach was maintained throughout the season.

5.2 FALL CHUM SALMON

Mainstem Yukon River

The 2017 preseason forecast for the Canadian-origin fall chum salmon run to the mainstem Yukon River was expected to be an average to above average run with a range of 350,000–425,000 fish. The escapement goal (IMEG) range recommended by the Yukon River Panel was 70,000 to 104,000 Canadian-origin fall chum salmon.

Canadian management decisions were based on the application of inseason assessment information to the management decision matrix – a component of the IFMP. The decision matrix provides detailed guidance for the management of fisheries linked to specific inseason run abundance levels. The 2017 decision matrix summarized the management reference points, general allocation plans, and anticipated management responses under different run size scenarios (Table 4). The decision matrix is being reviewed to seek to realign it with the Yukon River Panel's current IMEG. This work was not yet concluded at time of publication of this report.

The following decision thresholds were used to guide management actions to achieve an escapement goal range of 70,000–104,000 Canadian-origin chum salmon:

RED ZONE <40,000
No harvest – removal of all chum salmon harvest allocations. Run sizes this low represent a high conservation risk.

YELLOW ZONE 40,000 to 73,000
Run supports some First Nation subsistence fishing. The harvest target varies in accordance with projected run abundance. Harvest targets are met using voluntary harvest reductions in each First Nation.

GREEN ZONE >73,000
Opportunity for normal (full) First Nation subsistence harvest (i.e., no voluntary harvest reductions sought). Harvest opportunities (and allocation) for recreational, commercial, and domestic fisheries are provided in proportion to run abundance and are considered only when opportunities for First Nation harvests have not been restricted.

Table 4.–Inseason fishery management decision matrix for mainstem Yukon River fall chum salmon in Canada, 2017.

Eagle sonar passage projections	Fishery			
	First Nation	Recreation	Commercial	Domestic
<40,000 (Red Zone)	**Closed** Removal of allocation for conservation purposes	**Closed** No retention permitted	**Closed**	**Closed**
40,000 to 73,000 (Yellow Zone)	**Varies** Catch target to vary with abundance within zone	**Closed** No retention permitted	**Closed**	**Closed**
>73,000 (Green Zone)	**Open** Unrestricted	**Open** Retention permitted. No catch anticipated	**Open** Allocation varies with run size	**Open** Allocation varies with run size

Inseason Management Mainstem Yukon Fall Chum Salmon

Inseason decisions about fishery openings and closures in Canada for fall chum salmon were made in a similar way to those for Chinook salmon. In 2017, early inseason information from the lower Yukon River suggested that border escapement would be strong enough to support a normal aboriginal harvest and to provide opportunities in the commercial fishery. Inseason projections of the Canadian component of the fall chum salmon run were first based on run estimates and genetic apportionment of Canadian-origin fall chum salmon from the mainstem Yukon River sonar project near Pilot Station and assessment information from the LYTF. As fall chum salmon approached and entered Canada, estimates from the mainstem Yukon River sonar near Eagle provided robust projections. As per the decision matrix, a border escapement projection of greater than 73,000 fish was required before commercial fishing opportunities were allowed. Because it was anticipated, based on harvest in recent years, that the Alaska subsistence fishery upstream of the sonar site near Eagle would take about 15,000 fall chum salmon, a projection greater than 88,000 fish at the sonar site was required to meet the border escapement objective.

The intention of management actions in 2017 was to ensure that the IMEG range of 70,000–104,000 fall chum salmon was achieved. By late-August, it was evident that the fall chum salmon run was well above the upper end of the preseason forecast based on projections from the mainstem sonar operated near Pilot Station and LYTF data. Given the near-record return of fall chum salmon and anticipated low harvest, commercial and domestic fisheries opened for 24 hours per day, 7 days a week in all areas defined in regulation and remained open until October 19. The total 2017 commercial fall chum salmon harvest was 2,404 fish, which was below the 2012–2016 average of 2,733 (Appendices A6 and B8). No fall chum salmon were harvested in the domestic fishery in 2017.

Fishing Branch (Porcupine) River

The 2017 preseason forecast estimate for Porcupine River fall chum salmon (at Fishing Branch River) was 56,000 to 68,000 fish. The current IMEG for the Fishing Branch River recommended by the Yukon River Panel is 22,000–49,000 adult fall chum salmon. Considering that the minimum spawning escapement of fall chum salmon to the Fishing Branch River had not been

achieved in 5 of the last 9 years, and only the very low end of the escapement goal range was achieved in 4 of the last 9 years, a conservative approach was warranted. Following discussion with Vuntut Gwitchin First Nation, the North Yukon Renewable Resources Council, and the YSSC, it was recommended that a conservative chum salmon fishery occur in the Porcupine River until such a time that an inseason projection of greater than 22,000 to the Fishing Branch River could be determined.

Inseason Management Porcupine River Fall Chum Salmon

Canadian fishery management considered early season information from the sonar project near Pilot Station. Estimates of fall chum salmon passage in combination with genetic mixed stock analysis (MSA) could potentially be used to project the return to Fishing Branch River. However, the Fishing Branch River component at the Pilot Station sonar is such a small part of the total run that the uncertainty associated with these estimates is very high, and it is difficult to base management decisions on this information.

In 2017, the Old Crow-based Porcupine River sonar provided an estimated return of fall chum salmon to the Canadian portion of the Porcupine River. Escapement to the Fishing Branch River was monitored by a counting weir (reinstalled from 2015 to 2017 after a hiatus in 2013 and 2014). Only a portion of the fall chum salmon that return to the Canadian Porcupine River are destined for the Fishing Branch River. Based on data from R&E tagging study projects CRE-27 and CRE-10 (2003–2015) and a comparison of sonar and weir counts (2011–2012 and 2015–2017; Appendix B15) approximately 60% of Canadian-origin Porcupine River fall chum salmon are destined for the Fishing Branch River. As the season progressed, a more robust estimate became available at the Porcupine River sonar indicating that the upper end of the escapement goal would probably be achieved.

6.0 CANADIAN HARVEST SUMMARIES

6.1 FIRST NATION FISHERIES

Harvest estimates of salmon in the aboriginal fisheries on the Yukon and Porcupine rivers are determined from locally conducted inseason and postseason interviews using a catch calendar and a voluntary recording system.

Mainstem Yukon River Chinook Salmon

Based on a preseason outlook for a below average run of 70,000–97,000 Canadian-origin Yukon Chinook salmon, YSSC recommended a conservative approach early in the 2017 fishing season. Although inseason border escapement projections indicated that the run strength was toward the upper end of the preseason forecast, Yukon First Nation governments continued to follow conservative management plans throughout the 2017 season, resulting in a significantly reduced harvest compared to historical averages. The Upper Yukon River aboriginal Chinook salmon catch was estimated to be 3,500 fish (Appendix A6). This compares to the 2012–2016 average of 1,554 fish and long-term (1961–2015) average of 5,035 fish (Appendix B7).

Mainstem Yukon River Fall Chum Salmon

The preseason outlook for Canadian-origin fall chum salmon in 2017 indicated an above average run of 350,000–425,000 fish. The border passage estimate at this run projection would place Canadian management in the green zone and therefore no restrictions were expected in the First

Nation fisheries. As inseason information became available, the First Nation fisheries proceeded without restrictions. The preliminary 2017 fall chum salmon harvest in the aboriginal fishery from the upper Yukon River was estimated to be 1,000 fish (Appendices A6). This was slightly below the 2007–2016 average of 1,138 fall chum salmon and below the long-term average (1961–2016) of 2,277 fall chum salmon (Appendix B8).

Porcupine River Chinook, Fall Chum, and Coho Salmon

In the aboriginal fishery at Old Crow, the Vuntut Gwitchin First Nation (VGFN) reported a season total harvest of 131 Chinook salmon in 2017 (Appendices A6 and B7). The 2007–2016 average was 244 Chinook salmon (Appendix B7). A total of 2,312 fall chum salmon was harvested in the Old Crow-based VGFN fishery (Appendices A6 and B8), which was near the 2007–2016 average harvest of 2,371 fall chum salmon (Appendix B8). VGFN reported a harvest of 71 coho salmon on the Porcupine River in 2017; the 1961–2016 average was 150 coho salmon.

6.2 COMMERCIAL FISHERY

Mainstem Yukon River Chinook Salmon

The commercial Chinook salmon fishery remained closed throughout the 2017 Chinook salmon season.

Mainstem Yukon River Fall Chum Salmon

A strong return of fall chum salmon resulted in opportunities for commercial fishery openings throughout the fall season. A total of 2,404 fall chum salmon was harvested during commercial fishery openings (Appendix A6). This level of harvest was 26% below the 2007–2016 average of 3,263 fall chum salmon and 12% below the 2012–2016 average of 2,733 fish (Appendix B8). Since 1997, there has been a marked decrease in commercial catches of Upper Yukon River fall chum salmon as a result of a limited market. Between 1961 and 2017, the commercial fall chum salmon catch ranged from a low of 293 fish in 2009, when the run was late and the fishery was closed most of season due to conservation concerns, to a high of 40,591 fish in 1987.

Mainstem Yukon River Coho Salmon

Commercial harvest of coho salmon in the mainstem Yukon River in Canada is usually very small. This is thought to be related to a combination of low abundance and limited availability of this species to fisheries due to late migration timing. There were no coho salmon harvested in the commercial fishery in 2017.

6.3 DOMESTIC FISHERY

The domestic fishery was closed during the Chinook salmon season (Appendix B7). For fall chum salmon, there were openings (concurrent with commercial fishery openings) during the season; however, there were no catches reported. This compares to a long-term (1974–2016) average of 443 fish and a recent (2012–2016) average of 14 fish (Appendix B8).

6.4 RECREATIONAL FISHERY

In 1999, the Salmon Sub-Committee introduced a mandatory Yukon Salmon Conservation Catch Card (YSCCC) to improve harvest estimates and to serve as a statistical base to ascertain the importance of salmon to the Yukon River recreational fishery. Anglers are required to report

their catch and harvest by late fall. The information reported includes the number, species, fate (kept or released), sex, size, date, and location of all salmon caught. From preliminary catch card information received at the time of this publication, no Chinook salmon were caught and no Chinook salmon were retained in the Yukon River or its tributaries in the 2017 recreational fishery. Over the last 10 years retention (harvest) of Chinook salmon in the recreational fishery has only been permitted in 2009 and 2011 (Appendix B7). For the 2017 season, the daily catch and possession limits of fall chum salmon in the recreational fishery remained at 2 and 4, respectively. There were no reports of fall chum salmon caught.

7.0 TOTAL RUN AND ESCAPEMENT ASSESSMENTS FOR 2017

7.1 CHINOOK SALMON

Total 2017 Chinook salmon passage at the mainstem Yukon River sonar project near Pilot Station was approximately 263,000 fish[6] (Appendix A2). This is considered an index of drainagewide Chinook salmon run, rather than a total run size estimate, because some salmon are harvested or enter spawning areas below this sonar site.

Total Chinook salmon passage at the mainstem Yukon River sonar near Eagle in 2017 was 73,313 fish (Appendix B11). After subtracting estimated U.S. subsistence harvest taken upriver from the Eagle sonar site (1,498 fish) and the estimated Canadian harvest of Chinook salmon (3,500 fish), the estimated spawning escapement of Canadian-origin Yukon River Chinook salmon (mainstem) was 68,315 (Appendix B11). This escapement was above the upper end of the IMEG of 42,500–55,000 fish. Preliminary harvest estimates indicate that about 20,807 Canadian-origin Chinook salmon were harvested in U.S. fisheries (Appendix D3). Combining the spawning escapement estimate with the U.S. harvest of Canadian-origin Chinook salmon and Canadian harvest indicates the total Canadian-origin run size was approximately 92,622 Chinook salmon (Appendix D2).

Age, sex, and size composition was assessed at both mainstem sonar sites and in various escapement projects. ASL samples collected at Pilot Station are thought to be representative of all Chinook salmon stocks passing the sonar and include both U.S. and Canadian stocks. ASL samples collected at the Eagle sonar are believed to be exclusively Canadian-origin. Mesh sizes used to sample the runs differ at each location. Age-5 Chinook salmon were the most common age class observed at Pilot Station whereas age-6 were the most common at Eagle. Females comprised slightly more than 50% at both locations (Table 5; Appendix A10).

Chinook salmon escapement in U.S. tributaries was assessed at 3 weirs, 3 counting towers, and 3 aerial surveys (Table 6). Existing escapement goals for all U.S. tributary stocks were met or exceeded (Table 6; Appendices B9, B10, B11 and C9). High water events on the Salcha River hindered estimating passage counts. Note that these stocks do not contribute to the border passage objective or Canadian escapement, but their performance relative to the Canadian stock may provide a comparative indicator of production trends among different stock groups.

[6] Some estimates in this section are rounded.

Table 5.–Yukon River Chinook salmon age and female percentages estimated from samples collected at the Pilot Station and Eagle sonar assessment projects, 2017.

	Chinook salmon age or sex composition (percentage of samples)			
	Lower mainstem near Pilot Station		Upper mainstem near Eagle	
Age/sex	Historical average (2005–2016)	2017	Historical average (2005–2016)	2017
Age-4	10.6	9.0	5.3	4.2
Age-5	50.4	53.2	39.7	46.5
Age-6	36.7	35.5	51.7	48.1
Female	36.6	52.8	40.9	51.2

Note: Sampling at Pilot station sonar uses a range of 6 mesh sizes (2.75–8.5 inch) whereas sampling at Eagle sonar uses a range of 4 mesh sizes (5.25–8.5 inch). This difference in mesh sizes can possibly affect the difference in observed age classes. In addition, sex is determined through visual inspection of external body characteristics only, at both projects, but sexual dimorphism is more pronounced by the time fish reach Eagle making sex identification more accurate at that site. These factors need to be considered when comparing between projects.

Table 6.–Summary of 2017 Chinook salmon escapement estimates in Alaska tributaries compared to existing escapement goals.

Location	Assessment method	Escapement goal (type)	2017 Escapement
E. Fork Andreafsky	Weir	2,100–4,900 (SEG)	2,970
W. Fork Andreafsky	Aerial survey	640–1,600 (SEG)	942
Anvik (Drainagewide)	Aerial survey	1,100–1,700 (SEG)	1,101
Nulato (Forks Combined)	Aerial survey	940–1,900 (SEG)	943
Gisasa	Weir	none	1,083
Henshaw	Weir	none	677
Chena	Tower/Sonar	2,800–5,700 (BEG)	4,201 [a]
Salcha	Tower/Sonar	3,300–6,500 (BEG)	4,195 [a]
Goodpaster	Tower	none	2,769

Note: Sustainable escapement goal (SEG) and biological escapement goal (BEG).

[a] Visual and sonar counts were combined for missed days to derive a preliminary estimate.

Escapement of Chinook salmon to tributaries in Canada was assessed at the Whitehorse Rapids Fishway and on the Pelly, Big Salmon, Takhini, and Porcupine rivers. On the Big Salmon River, 5,672 Chinook salmon were counted which was 6% above the 2007–2016 average count of 5,298 fish (Appendix B12). At the Whitehorse Rapids Fishway, 1,226 Chinook salmon were counted which was 13% above the 2007–2016 average count of 1,065 fish (Appendix B12). Hatchery-produced fish accounted for 39% of the return in 2017. High water conditions prevented counts at the Blind Creek weir (Pelly River tributary). On the Pelly River a preliminary estimate of 9,081 Chinook salmon were counted using sonar, which was higher than the 2016 count of 5,807 (Appendix B12). A new sonar project on the Takhini River estimated 1,872 Chinook salmon. On the Porcupine River 1,191 Chinook salmon were counted using sonar, which was the lowest count since start of the project in 2014 (Appendix B12).

7.2 Summer Chum Salmon Alaska (U.S. only)

In 2017, an estimated 3.09 million summer chum salmon passed the sonar project near Pilot Station (Appendix A2), which was higher than the 1995–2016 (excluding 1996, 1998, 1999, 2001 and 2009) median of 1.90 million fish for the project. The first quarter point, midpoint, and third quarter point were June 19, June 23, and June 29, respectively, which was consistent with historical early run timing. Four large pulses of summer chum salmon were detected at the sonar

project and the largest group consisting of approximately 950,000 fish passed from June 21 to June 25. A summer chum salmon drainagewide biological escapement goal (BEG) with a range of 500,000–1,200,000 was adopted in 2016 (Table 7), and the 2017 escapement exceeded this goal. The summer chum salmon escapement into the East Fork Andreafsky River met the SEG of greater than 40,000 fish (Table 7; Appendices B13 and C11). Escapement into the Anvik River was approximately 415,100 summer chum salmon, which was above the lower bound SEG of 350,000 fish. Summer chum salmon escapements were average or above average in all other tributaries monitoring summer chum salmon in 2017 (Table 7; Appendices B13 and C11).

In addition to towers, sonars were used to supplement and corroborate tower counts for Chena and Salcha river salmon. Both assessment projects were hindered by high water and flooding events and passage estimates for both rivers are still considered preliminary and incomplete (Table 7; Appendix B13).

Table 7.–Summary of 2017 summer chum salmon escapement estimates in Alaska compared to existing escapement goals.

Location	Assessment method	Escapement goal (type)	2017 Summer chum salmon escapement
Drainagewide	Sonar	500,000–1,200,000 (BEG)	3,009,490 [a]
E. Fork Andreafsky	Weir	>40,000 (SEG)	55,532
Anvik	Sonar	350,000–700,000 (BEG)	415,139
Gisasa	Weir	none	73,584
Henshaw	Weir	none	360,687
Chena	Tower/sonar	none	21,156 [b]
Salcha	Tower/sonar	none	29,093 [b]

Note: Sustainable escapement goal (SEG) and biological escapement goal (BEG).

[a] Drainagewide escapement based on mainstem Yukon River sonar near Pilot Station and Andreafsky weir minus harvest estimates above the sonar site.

[b] Due to high water events during the season and terminating the project earlier than normal, the passage estimate is considered incomplete.

7.3 FALL CHUM SALMON

The initial method of determining total drainagewide (i.e., U.S.- and Canadian-origin) fall chum salmon run size is based on the lower Yukon River mainstem sonar passage estimate and the estimated inriver harvest of fall chum salmon downstream of the sonar site. Inseason the run size model primarily uses the commercial fishery, which is the largest harvest component below the sonar site, to produce overall projections of abundance used to manage the fishery. The total run size using this method was estimated to be 2,300,000 fall chum salmon in 2017.

Postseason, a Bayesian state-space model was used to estimate drainagewide escapement (Fleischman and Borba 2009). The total drainagewide run size is then derived by adding the estimated total harvest (U.S. and Canada) to the estimate of drainagewide escapement. In 2017 this method resulted in a total drainagewide run size estimate of 2,230,000 fall chum salmon, which was well above the 2017 forecast of 1,400,000–1,700,000 fish. The total run size was also higher than the inseason projection of 1,110,000–1,630,000 fall chum, based on the relationship of summer to fall chum salmon runs.

The drainagewide escapement estimate produced by the Bayesian state-space model was 1,648,000 fall chum salmon, which exceeded the upper end of the escapement goal range (Table

8). The model utilized historical escapement data from the Toklat, Delta, Chandalar, Sheenjek, Fishing Branch and Canadian mainstem Yukon rivers, as well as mark–recapture estimates of abundance from the upper Tanana, and Kantishna projects (Appendices B14–B16). Individually the fall chum salmon escapements to Chandalar, Canadian mainstem Yukon and Delta rivers each exceeded the upper end of the individual escapement goals (Table 8; Appendices B14, B16, and C14).

Table 8.–Summary of 2017 fall chum salmon escapement estimates compared to existing escapement goals in Alaska.

Location	Assessment method	Escapement goal (type)	2017 fall chum salmon escapement
Drainagewide	Bayesian	300,000–600,000 (SEG)	1,648,000
Chandalar River	Sonar	74,000–152,000 (BEG)	509,000
Tanana River	none	61,000–136,000 (BEG)	–
Delta River	Ground Surveys	6,000–13,000 (BEG)	49,000

Note: Biological escapement goal (BEG) and sustainable escapement goal (SEG).

The 2017 fall chum salmon run was characterized as the second largest run in 43 years (largest 1975). Based on the larger than average return of age-3 fall chum salmon in 2015 that carried forward, expectations were high that a larger than average age-5 component could bolster the run should the age-4 component also materialize. The age-4 fall chum salmon returning in 2017 were the ninth largest return of this age class. In 2017, the proportions by age class for fall chum salmon caught in the LYTF, and used to represent the drainagewide run, included 2% age-3, 84.1% age-4, 13.2% age-5, and less than 1% age-6 fish. The age-4 component was well above average, the age-5 component was correspondingly well below average, and age-3 and age-6 components were near average when compared to LYTF weighted averages for years 1977–2016. Fall chum salmon ASL composition estimates from data collected in the Delta River included 5.0% age-3, 87.5% age-4, and 7.5% age-5 (Appendix A25). Samples were also collected for the escapement into Canada based on test fishing near the Eagle sonar site, and included less than 1.0% age-3, 58.4% age-4, and 41.5% age-5 fall chum salmon (Appendix A25).

Canadian-Origin Fall Chum Salmon Mainstem Yukon River

The estimate of U.S./Canada border passage for fall chum salmon included the Eagle sonar estimate (407,166 fish) plus an expansion for fish passing after the project near Eagle closed and a subtraction of harvest in the U.S. between the sonar and the border. In 2017 the expanded estimate of passage at the sonar site was 419,099 fall chum salmon (Appendix B16). After subtracting the preliminary U.S. subsistence harvest taken upriver from the Eagle sonar site (14,110 fish), the estimated border passage was 404,989 fall chum salmon. After subtracting the preliminary Canadian harvest of 3,404 fish (Appendix A6) the estimated spawning escapement of Canadian-origin fall chum salmon (mainstem) was 401,585 fall chum salmon and was well above the upper end of the IMEG of 70,000–104,000 fish (Table 9).

The preliminary reconstruction of the total 2017 mainstem run suggests a run size of approximately 560,000 Canadian-origin fall chum salmon for the mainstem Yukon River. Total run size was approximated using the expanded estimate of fall chum salmon past the Eagle sonar near the U.S./Canada border plus 25% of the U.S. harvest of fall chum salmon that occurred

downriver from the Eagle sonar. This estimate exceeds the preseason outlook range of 350,000–425,000 Canadian-origin mainstem Yukon River fall chum salmon.

Canadian-Origin Fall Chum Salmon Porcupine River (including the Fishing Branch River)

In 2017 the Porcupine River sonar fall chum salmon project was operated for the sixth year immediately downstream of Old Crow. An estimated 67,818 fall chum salmon passed by the sonar and an estimated 2,313 fish were harvested in the Old Crow fishery resulting in a preliminary spawning escapement estimate of 65,505 chum salmon in the upper Porcupine River (Table 9; details are presented in Section 8.2).

DFO operated the Fishing Branch River weir in 2017 and installed a sonar unit to monitor the weir exit. In 2017, the spawning escapement for fall chum salmon at the Fishing Branch River was 48,524 fish. The Canadian harvest of Fishing Branch River fall chum salmon in 2017 was estimated to be 1,341, based on the 2,313 fish harvested in Old Crow and the assumption that 58% of those fish that are destined for Fishing Branch.

Table 9.–Summary of 2017 preliminary fall chum salmon spawning escapements in Canada in comparison with existing international interim management escapement goals (IMEG).

Location	Assessment method	Escapement goal (type)	2017 fall chum salmon escapement
Fishing Branch River	Weir/sonar count	22,000–49,000 (IMEG)	48,524
Yukon River Mainstem	Sonar and harvest	70,000–104,000 (IMEG)	401,585
Porcupine River (Canadian portion)	Sonar and harvest	none	65,505

8.0 PROJECT SUMMARIES

8.1 ALASKA, U.S.

Mainstem Yukon River Sonar Project near Pilot Station

The goal of the mainstem Yukon River sonar project is to estimate daily upstream passage of Chinook, chum, and coho salmon. The project has been in operation since 1986. Both split-beam and Adaptive Resolution Imaging Sonar (ARIS)[7] are used to estimate total fish passage and CPUE from the drift gillnet test fishing portion of the project are used to estimate species composition. A detailed history of refinements and enhancements to the project's sonar equipment and apportionment methodologies can be found in Schumann et al. 2017 and Pfisterer et al. 2017.

Fish passage estimates at the mainstem Yukon River sonar project are based on a sampling design in which sonar equipment is operated daily in three 3-hour periods and drift gillnets 25 fathoms long with mesh sizes ranging from 7.0 cm to 21.6 cm (2.75- to 8.5-inch) are fished twice each day between sonar periods to apportion the sonar counts to species. During the 2017 season, both banks were fully operational starting with period 3 on May 31 and continued operations through September 7. The ice went out on the mainstem Yukon River at Pilot Station on May 5 based on National Weather Service data. Test fishing began on May 31, with the first Chinook and summer chum salmon both caught that first day of operation. The first coho salmon was caught on July 23.

[7] Product names used in this report are included for scientific completeness, but do not constitute a product endorsement.

An estimated 6,315,728 fish passed through the sonar sampling area between May 31 and September 7 (Table 10). Drift gillnetting resulted in catches of 10,495 fish including 613 Chinook, 4,374 summer chum, 3,136 fall chum, and 630 coho salmon. A total of 1,742 fish of other species were also caught. Chinook salmon were sampled for ASL; sex and length were collected from chum, pink, sockeye, and coho salmon without aging structures but for all other non-salmon species, only length was collected. Genetic samples were taken from Chinook and chum salmon. Any captured fish that were not successfully released alive were distributed daily to residents in Pilot Station.

The right bank bottom profiles at the sonar site remained similar to prior years with little or no change throughout the season. Left bank profiles remained linear throughout the field season, and there were no detection problems caused by silt or other environmental factors. During the summer season, water levels observed near Pilot Station were below the 2001–2016 average[8], and then rose to a near average level during the end of the fall season (approximately mid-August).

In 2017, all project goals were met and passage estimates were provided to fisheries managers daily during the season. Information generated at the sonar project near Pilot Station was also discussed weekly through multi-agency international teleconferences that included stakeholders from the Lower Yukon River and headwater communities in Canada. Preliminary daily salmon passage estimates were available online and disseminated daily to the general public via a list serve.

Table 10.–Cumulative fish passage estimates by species with 90% confidence intervals (CI), at the mainstem Yukon River sonar project near Pilot Station in 2017.

		90% CI	
Species	Total passage	Lower	Upper
Large Chinook [a]	217,821	191,408	244,234
Small Chinook [b]	45,193	32,957	57,429
Summer chum	3,093,735	2,955,476	3,231,994
Fall chum	1,829,931	1,740,807	1,919,055
Coho	166,320	132,791	199,849
Pink	166,529	135,289	197,769
Other [c]	796,199	731,884	860,514
Total	6,315,728		

[a] Large Chinook salmon >655 mm.

[b] Small Chinook salmon ≤655 mm.

[c] Includes sockeye salmon, cisco, whitefish, sheefish, burbot, long nose sucker, Dolly Varden *Salvelinus malma*, and northern pike.

Chinook Salmon Genetic Sampling 2017

In 2017, ADF&G and other collaborators collected 3,695 tissue samples from adult Chinook salmon harvested in test and subsistence fisheries that occurred in the Alaska portion of the Yukon River. These samples were from mixed stock fisheries in the mainstem Yukon River in Districts 1–5. Samples collected from Yukon River mainstem test fisheries totaled 1,767 fish and

[8] http://waterdata.usgs.gov/ak/nwis/uv?cb_00060=on&cb_00065=on&format=gif_stats&period=21&site_no=15565447

included 358 fish from the lower Yukon, 605 fish from the sonar project near Pilot Station, and 804 fish from the sonar project near Eagle. Samples collected from subsistence fisheries in Alaska totaled 1,928 fish from 10 locations: 227 from Alakanuk, Emmonak, and Kotlik (District 1); 190 from Mountain Village (District 2); 259 from Russian Mission (District 3); 957 from Nulato, Kaltag, Galena, and Ruby (District 4); and 295 from Tanana (District 5). Sample collection from the subsistence harvest was coordinated by Spearfish Research, which contracted individual fishermen to sample their harvest.

In Alaska, a total of 91 baseline samples of Chinook salmon were collected from 2 locations: 49 from the Salmon Fork of the Black River and 42 from the Coleen River.

Mixed Stock Analysis of Yukon River Chinook Salmon Harvested in Alaska, 2017

Three broad-scale stock (reporting) groups are used to apportion Chinook salmon harvest by Alaska fisheries within the Yukon River drainage. The Lower and Middle Yukon River stock groups spawn in Alaska and the Upper Yukon River stock group spawns in Canada. Scale pattern analysis, age composition estimates, and geographic distribution were used by ADF&G from 1981–2003 to estimate Chinook salmon stock composition in Yukon River harvests. From 2004–present, genetic analysis has been the primary method for stock identification. Harvest percentages by stock group from 2014–2017 include the Coastal District, whereas the Coastal District was not included in years prior to 2014. The 2017 subsistence harvest and stock composition estimates are still considered preliminary as of the publication date of this report.

Genetic MSA results indicate that the U.S. harvest of Yukon River Chinook salmon was comprised of 9.1% Lower, 34.9% Middle, and 56.0% Upper (Canadian-origin) stock groups. U.S. harvest composition for 2017 was below the 2012–2016 average for the Lower stock group, and above the 2012–2016 average for the Middle and Upper stock groups (Appendix A13).

Mixed Stock Analysis of Yukon River Chum Salmon at Pilot Station in 2017

In 2017, ADF&G, in cooperation with USFWS, collected and analyzed genetic tissue samples from 4,373 summer and 3,124 fall run chum salmon during the test fishery associated with the sonar project near Pilot Station. Chum salmon genetic samples are stored in the Conservation Genetics Laboratory, USFWS, in Anchorage. Populations in the baseline are reported in aggregated stock groups (Table 11). Genetic MSA composition as used in fall season fishery management, with consideration for all chum salmon stocks entering the river after July 19, breaks out the major components as summer, Tanana, Border U.S. (Chandalar, Sheenjek, Black River) and total Canadian-origin stocks and does not separate Canadian mainstem from Porcupine stocks (Appendix A15).

Chum salmon were sampled from the sonar test fishery near Pilot Station from the end of May to September 7 to provide stock composition estimates for most of the summer and fall chum salmon runs. Results from analysis of these samples were reported for each pulse or time stratum and distributed by email to fishery managers within 24–48 hours of receiving the samples. For summer chum salmon, the lower river stock group comprised 77% of the run and the middle river stock group comprised 23%. The Tanana component of the middle river stock group comprised 6% of the total summer chum salmon run and peaked in passage past the Pilot Station sonar during the sampling period of July 19 to July 22. The run transition from summer to fall chum salmon occurred during the second period of the fall management season (July 23–August 2) when 73% of the mixture was comprised of fall chum salmon. For fall chum salmon, 74% of

the run was of U.S.-origin and 26% of Canadian-origin. The composition of the U.S. contribution was 36% Tanana and 38% U.S. border (Chandalar, Sheenjek, and Black rivers). The composition of the Canadian contribution was 7% mainstem Yukon, 5% Porcupine, and 14% White rivers. Preparations are underway to continue genetic MSA of Yukon River fall chum salmon for the 2018 season if funding is secured.

Table 11.–Microsatellite baseline is comprised of 37 stocks used to estimate stock composition from chum salmon sampled in the test drift gillnet program near Pilot Station in 2017.

Stock aggregate name	Populations in baseline
Lower	Andreafsky, Anvik, California, Chulinak, Clear, Dakli, Kaltag, Nulato, Gisasa, Melozitna, Rodo, Tolstoi
Upper Koyukuk+Main	Henshaw, Jim, South Fork Koyukuk (early and late run), Tozitna
Tanana Summer	Chena, Salcha
Tanana Fall	Bluff Cabin, Delta, Nenana, Kantishna, Toklat, Tanana mainstem
Border U.S.	Big Salt, Chandalar, Sheenjek, Black
Porcupine	Fishing Branch
Mainstem	Big Creek, Minto, Pelly, Tatchun
White	Donjek, Kluane
Teslin	Teslin
Aggregate name	**Aggregate within aggregate**
Summer	Lower, Middle
Middle	Upper Koyukuk+Main, Tanana Summer
Fall	Tanana Fall, Border U.S., Border Canada, Upper Canada
Fall U.S.	Tanana Fall, Border U.S.
U.S.	Lower, Middle, Tanana Fall, Border U.S.
Border Canada	Porcupine, Mainstem
Upper Canada	White, Teslin
Canada	Border Canada, Upper Canada

8.2 MAINSTEM YUKON RIVER SONAR NEAR EAGLE, ALASKA

ADF&G and DFO collaborate to jointly assess the passage of Yukon River mainstem Chinook and chum salmon just downstream of the international border. Since 2006, Chinook and fall chum salmon passage has been estimated using split-beam and imaging sonar near the community of Eagle, Alaska (McDougall and Lozori 2017). Additionally, drift gillnets (5.25-, 6.5-, 7.5-, and 8.5-inch mesh), 25 fathoms in length, and approximately 4.3 fathoms in depth are fished daily to monitor species composition and collect ASL and genetic samples from Chinook and fall chum salmon passing the sonar site. Although there is some minor overlap, Chinook and fall chum salmon runs are largely discrete in time based on test fishery results, local knowledge of catches, and data collected in Canada.

Overall in 2017, there were no significant operational problems and both sonars performed well throughout the season. The 2017 Chinook salmon passage estimate at the sonar was 73,313 fish (90% CI: 72,654–73,882) for the dates July 1 through August 20. The fall chum salmon passage estimate was 407,166 fish (90% CI: 404,590–409,742) for the dates August 21 through October 6. Because of continued high passage at the termination of the project, the fall chum salmon estimate was subsequently adjusted to 419,099 fish (Appendix B16). This expansion was calculated using a second order polynomial calculated for each day through October 18.

8.3 YUKON, CANADA

Yukon River (Mainstem) Adult Chinook Salmon Assessment

Blind Creek Weir

The Blind Creek weir project has enumerated Chinook salmon escapement since 1997–1999 and since 2003–present (Appendix B12). The weir has been situated at the same location during this time period, on Blind Creek approximately 1 km upstream of the confluence with the Pelly River. In 2017, weir installation was initiated on July 14, but high flows delayed completion until July 24. From July 24 to July 27, 17 Chinook salmon were sampled for ASL data. Heavy rainfall led to extreme flood conditions beginning July 28. With rising water levels and increased turbidity, weir operations were suspended and un-impeded fish passage was provided by the removal of the pen gates and weir panels next to each bank. Water levels continued to rise with the eventual collapse of the weir structure on July 29. The 2017 weir project was terminated at this time and the camp was dismantled on August 1. The remaining weir material was removed from the creek on August 11 after water levels had receded (Jane Wilson, J. Wilson & Associates; personal communication). The 2017 project year was the first time the weir failed due to high water.

Big Salmon Sonar

An ARIS Explorer 1800 multi-beam sonar was used to enumerate the Chinook salmon escapement to the Big Salmon River in 2017. This was the 13th year of escapement monitoring at this site. The operation has been located at the same site since 2005, approximately 1.5 km upstream of the confluence of the Yukon River. Sonar operation began on July 16 and continued without interruption through to August 20 producing a count of 5,551 fish. An expansion was used to estimate counts for the full 24 hour period on July 16, and to interpolate the end of the run to August 29, using a log regression based on daily counts of the previous 2 weeks. The expansions resulted in a total estimate of 5,672 Chinook salmon (Appendix B12). The peak daily count of 432 fish occurred on July 31, when 47% of the run had passed the sonar site. Approximately 50% of the run had passed the sonar by August 1 (4 days earlier than the 10-year average midpoint and 5 days later than the earliest midpoint in 2014). Approximately 90% of the run had passed the site by August 9, 6 days earlier than average (Brian Mercer, Metla Environmental Inc.; personal communication). The 2017 Chinook salmon estimate from the Big Salmon was the sixth highest escapement recorded and was near the average 2007–2016 estimate of 5,298 fish.

Genetic stock identification sampling at the mainstem Yukon River sonar operated near Eagle indicated that the Big Salmon River stock group comprised 8.5% (SD 1.5) of the Yukon River mainstem Chinook salmon escapement to Canada in 2017. This genetics estimate is very close to the 8.3% estimate derived by comparing the Big Salmon River sonar passage to the mainstem escapement estimate from Eagle sonar and harvest data (68,315; Appendices B11 and B12).

Carcass samples were collected from August 9–26, over approximately 155 km of the Big Salmon River, yielding 87 Chinook salmon samples. Of this total, 45 (52%) fish were female and 42 (48%) fish were male. The mean mideye fork length MEFL of females and males sampled was 816 mm and 736 mm respectively (Brian Mercer, Metla Environmental Inc.; personal communication). Of the 60 samples which were successfully aged, 1.7% (3.7% of the males and

none of the females) were age-4, 38.3% (70.4% of the males and 12.1% of the females) were age-5, and 60.0% (25.9% of the males and 87.9% of the females) were age-6.

Pelly River Sonar

On the Pelly River, SIMRAD EK60 split-beam (right bank) and ARIS Explorer 1800 multi-beam (left bank) sonar systems were used to estimate 2017 Chinook salmon passage. This was the second year of assessment undertaken by Selkirk First Nation with Environmental Dynamics Incorporated (EDI), at a site approximately 20 km upstream of the confluence of the Pelly and Yukon rivers. Sonar operation began on July 3 and concluded on August 15, counting 8,543 fish. Accounting for periods of data expansion produces a total passage estimate of 9,081 Chinook salmon. The peak daily count of 651 fish on July 28 occurred when 55% (un-interpolated counts) of the run had passed (Jolene Lust, EDI; personal communication). More information is available in the report for R&E project CRE-94-17.

Whitehorse Rapids Fishway Chinook Salmon Enumeration

The Whitehorse Rapids Fishway is a fish ladder bypassing the Whitehorse dam. It has an observation window into a chamber with upstream and downstream gates. The viewing window allows visual enumeration of migrating adult Chinook salmon. Fishway staff counted 1,226 adult Chinook salmon at the Whitehorse Rapids Fishway between July 25 and September 5, 2017 (Appendix B12). Of these salmon, 476 were of hatchery origin, comprising 39% of the return. The hatchery component included 94 females and 382 males, comprising 29% of the female and 42% of the male escapement to the Fishway. The wild component included 227 females and 523 males. Female Chinook salmon made up 26% of the total return to the Fishway.

The Whitehorse Rapids Fishway program is a joint initiative of the Yukon Fish and Game Association, Yukon Energy Corporation, and DFO. Students count all adult salmon migrating through the Fishway, record the sex and size category (small, medium, or large) of each salmon, and identify hatchery-origin fish based on the absence of the adipose fin. Students also assist the Whitehorse Rapids Hatchery with broodstock collection at the Fishway.

Whitehorse Hatchery Operations

The Whitehorse Rapids Hatchery has a current annual release target of 150,000 Chinook salmon fry (2.0 gram). Fry are released upstream of the dam. This target has been in place since 2002; releases since that time have ranged from 85,306 fry in 2008 to 176,648 fry in 2003; the 10-year average (2008–2017) is 136,149 fry clipped and released (Appendix A16).

Chinook salmon fry reared at the Whitehorse Rapids Hatchery were adipose fin-clipped and injected with decimal coded wire tags in the early summer of 2017. The tagging procedure included the application of separate tag codes to distinguish groups released to 4 locations.

The 2017 release was the 20th year in which all fish released from the Whitehorse Rapids Hatchery into the Yukon River were marked. Fish were coded wire tagged and had their adipose fin removed, with the exception of 4,020 fish that were too small to tag, and therefore were only adipose fin-clipped. This marking facilitates determination of the hatchery contribution to the return through visual observation of adult Chinook salmon migrating upstream through the viewing chamber at the Whitehorse Rapids Fishway; it also allows hatchery managers to identify origin of fish during broodstock collection. Fin clipping also enables researchers to distinguish hatchery fry from wild fry when investigating juvenile Chinook salmon habitat use. Marked fish

are recovered in marine studies, in in-river stock assessment of juvenile and adult Yukon River Chinook salmon, and in harvests.

A total of 145,137 Chinook salmon fry reared and marked (clipped and/or tagged) at the Whitehorse Rapids Hatchery from the 2016 brood year were released between May 28 and June 7, 2017. The fry[9] were released to 4 locations upstream of the Whitehorse Rapids hydroelectric dam (Appendix A16). Average fry weight at time of release was 2.79 grams; average weights ranged from 2.65 grams (Wolf Creek release group) to 2.85 grams (Michie Creek release group).

Tag retention, estimated 2–4 days after tagging, for the 2017 release (2016 brood year) was 98%. The total 2017 release included an estimated 145,137 adipose-clipped fish with coded wire tags, and 6,748 fish that were clipped but not tagged, including the fish that were estimated to have lost their tags, and 4,160 small (or unfit) fish (Appendix A16).

Brood stock collection in 2017 began on August 8, after 161 Chinook salmon had migrated through the Whitehorse Rapids Fishway, and ended on August 31. A total of 63 males, including 41 wild and 22 adipose-clipped (hatchery) Chinook salmon, were removed from the Fishway for the brood stock program. An additional hatchery male was released back to the Fishway after milt collection. The hatchery removed 6.9% of the total 905 returning Chinook salmon males.

In total, 41 female Chinook salmon (12.8% of the total 321 female Chinook salmon return to the Fishway) were removed for hatchery brood stock, including 2 fish salvaged from the Fishway in poor condition. Eggs were taken between August 24 and September 11 from 35 full (or nearly full) ripe females, and 4 partially spent (with an estimated 50% or less eggs remaining) females. Two females (1 hatchery, 1 wild) died in holding prior to ripening. Female brood stock removals were comprised of 24 wild and 17 adipose-clipped (hatchery) Chinook salmon. Fecundity estimates, excluding those egg takes estimated to be partial (less than 50%), averaged 5,206 eggs, and ranged from 3,686 to 7,449 eggs.

The total estimated egg take was 189,889 green eggs. The fertilization rate was estimated to be 100%. Removals of 390 samples and 970 dead eggs prior to the eyed stage, and 6,883 at shocking (between October 13 and October 30) resulted in a green egg to eyed egg survival estimate of 95.9%. Thereafter, 30,201 were provided to McIntyre Salmon Incubation Facility to be raised to the fry stage for the Ta'an Kwachan First Nation Fox Creek salmon restoration program, and 1,150 eggs were provided to the Stream to Sea classroom incubation program. After additional mortalities of 8,957 eyed eggs, 14,593 alevins, and 2,712 fry, an estimated 124,083 Chinook salmon fry were being held in rearing tanks on February 25, 2018.

Porcupine River Investigations

Porcupine River Chinook Salmon Sonar

In 2017, VGFN and DFO collaborated to enumerate Chinook salmon on the Porcupine River near Old Crow using multi-beam ARIS Explorer 1200 (long range) sonars located on each bank. Both sonars recorded inshore ranges (1–20 m) for half of each hour, and offshore ranges (20–40 m) for the other half hour. Set gillnets were deployed throughout the run to assess species composition and collect biometric samples.

[9] The fish released are referred to as fry, however virtually all of them emigrate to the ocean shortly after release, and they may more accurately be referred to as pre-smolts.

Chinook salmon sonar operations occurred from June 29 to August 4. This was the fourth year of Porcupine Chinook salmon enumeration. A total of 1,076 Chinook salmon were counted migrating upstream past the sonar site during the operation of the Chinook sonar. Interpolated estimates for short periods of sonar downtime produced a total season passage estimate of 1,191 Porcupine River Chinook salmon. This estimate is 24% of the average passage estimate over the previous 3 years of operation. Subtracting local harvest above the sonar (74) results in a Chinook salmon escapement estimate of 1,117 fish to the Porcupine River above Old Crow. More project details can be found in the R&E project report CRE-09-17: *Assessing passage of Porcupine River Chinook and chum salmon at Old Crow using sonar* (2017).

Given the low daily passage throughout the Chinook salmon run, there was not a peak run period. Chinook passage occurred on both banks, with 45% of targets counted on the right bank and 55% on the left bank. The majority of Chinook salmon migrated within the first 15 m of the sonar transducer (70% on right bank and 86% on left bank), and the majority also migrated overnight (64% of passage on right bank and 72% of passage on left bank occurring between 1900 and 0700). August 4 was the date of the last Chinook salmon sonar enumeration and the first chum salmon capture in the test fisheries and was assumed to be the end of the Chinook salmon run. Chum salmon enumeration began on August 5.

Although no distinct peaks were identified, a period of higher passage from July 24 to July 29 coincided with an increase in water levels and precipitation. Water levels were below the 30-year average (survey station 09FD002) throughout the Chinook season and were generally 0.5 m lower than any previous minimums. This extreme low-water event along with very high water temperatures (average weekly surface temperatures ranged from 15.5°C to 18.6°C) may have limited upstream migration of Chinook salmon. The estimated passage of Chinook salmon was the lowest of the 4 years of project operation (Appendix B12).

Porcupine River Chum Salmon Sonar

In 2017, VGFN and DFO collaborated to enumerate fall chum salmon on the Porcupine River near Old Crow using multi-beam ARIS sonars on each bank at the same location used for Chinook salmon enumeration. Drift gillnets were deployed throughout the run to assess species composition and collect biometric samples. This was the seventh year of Porcupine fall chum salmon enumeration. Note that during the first 2 years of this project (2011 and 2012), the assessment did not cover the entire length of the chum salmon run. Data from these years will be reviewed and adjusted before being presented in future versions of this report (Appendix B15).

The first chum salmon was caught in the test gillnets on August 4, and date of August 5 was chosen as the first day sonar operations stopped counting Chinook salmon and started counting chum salmon. A second order polynomial equation (Crane and Dunbar 2011) was applied from the last full day of counts (October 9 on both banks) to expand the estimate through to a run end date of October 15. A total of 60,552 fall chum salmon were counted migrating upstream past the sonar site during the fall chum operational periods of the sonar project (August 5 to October 9). The addition of expanded estimates for post sonar periods, and interpolated estimates for short periods of sonar downtime produced a total season passage estimate of 67,818 Porcupine River fall chum salmon (Appendix B15). This estimate is more than double the average passage over the previous 6 years. Subtracting local harvest above the sonar (2,313) results in a fall chum salmon escapement estimate of 65,505 fish to the Porcupine River above Old Crow. More

project details can be found in the R7E project report CRE-09-17: *Assessing passage of Porcupine River Chinook and chum salmon at Old Crow using sonar* (2017).

The maximum daily passage estimate of 3,803 fall chum salmon occurred on September 19 with an earlier lower peak of 1,883 fall chum salmon on September 2. The majority of fall chum salmon (an estimated 96%) migrated along the left bank. As in previous years, the majority of fall chum salmon migrated within the first 15 m of the sonar transducer (80% on right bank and 96% on left bank). Water levels were also below average and near the historical minimum at the survey station near the international border (09FD002) during the chum salmon operational period.

Fishing Branch River Chum Salmon Weir

Fall chum salmon returns to the Fishing Branch River have been assessed annually since 1971. A weir has been used in most years, aerial surveys were used in some years, and in 2013–2014 estimates were based on proportion of radio tag recoveries combined with sonar based passage estimate on the Porcupine mainstem (Appendix B15). Spawning escapement estimates for the Fishing Branch River have ranged from approximately 5,100 fall chum salmon in 2000 to 353,300 fall chum salmon in 1975 (Appendix B15). In 2017, Fishing Branch River chum salmon enumeration was conducted using a combination of weir and sonar. An ARIS 1800 (short range) sonar was installed immediately upstream of the weir site to observe fish passage through a constrained weir opening (trap box). The weir was installed, and sonar operations began on September 1, and ran continuously until weir disassembly on October 21. Sonar counts were verified for a period of each day with visual observations of weir passage, and biometric sampling occurred in proportion to the run. Water levels were relatively steady during the season, with no flooding events.

ASL data was collected from 620 chum salmon between September 9 and October 17. Of the 537 samples which were successfully aged, 0.4% (0% of the males and 0.4% of the females) were age-3, 65.2% (25.0% of the males and 40.2% of the females) were age-4, 33.5% (15.3% of the males and 18.3% of the females) were age-5, and 0.9% (0.7% of the males and 0.2% of the females) were age-6 (Appendix A25). An estimated 48,398 chum salmon migrated past the site during the period of sonar operation. Although sex composition was not available from the sonar data, sex ratios of daily visual counts applied to the daily sonar passage estimates indicated that the run was comprised of approximately 40.9% male and 59.1% female chum salmon.

An estimated 104 fish were missed over the week prior to weir installation, and a postseason expansion estimate of 22 fish between weir removal and October 25 were added to the weir-sonar passage estimate to produce a total Fishing Branch River fall chum salmon spawning escapement estimate of 48,524 fish (Appendix B15). This estimate is within the Fishing Branch River interim escapement goal range of 22,000–49,000 fish. In 2017, 74% of the Porcupine River fall chum salmon that were counted passing Old Crow arrived at the Fishing Branch River, as determined after subtracting harvest from the Porcupine River sonar estimate.

Aerial Surveys

An aerial survey of the Kluane River was conducted on October 19, 2017. The Kluane River has not been surveyed since 2006. The survey area involves a large number of discrete spawning areas (sloughs and side channels) and ranges from low to high densities of fish. The Kluane River index count for 2017 was 16,625, 16% higher than the average count for the 1996–2006

period (14,079). Observer efficiency was moderate due to weather and variable water clarity. Historical data are presented in Appendices B15 and C13.

Genetic Stock Identification and Stock Composition of Canadian Yukon River Chinook and Fall Chum Salmon

Chinook Salmon

Genetic stock composition of the 2017 Chinook salmon migration bound for Canada was estimated using genetic samples collected from the drift gillnet test fishing program conducted in conjunction with Yukon River sonar operations near Eagle. Analysis this year switched to a new method using single nucleotide polymorphisms (SNPs). Genotypes from SNPs were assembled from 733 Chinook salmon sampled between July 1 and August 15. Chinook salmon sonar operations occurred from July 1 to August 20. Chinook salmon stock contribution estimates were based on 8 regional reporting groups (stock aggregates; Table 12) and estimated by period and for the entire season (Table 13).

Table 12.–Baseline comprised of 27 stocks used to estimate stock compositions of Chinook salmon collected in the test gillnet fishery at the Eagle sonar project in 2017.

Stock aggregate	Populations in baseline
North Yukon Tributaries	Chandindu and Klondike rivers
White River	Tincup Creek, Nisling River
Stewart River	Mayo, McQuesten, and Stewart rivers
Pelly River	Little and Big Kalzas, Earn, Glenlyon, Ross and Pelly rivers, Blind Creek
Mid-mainstem Tributaries	Mainstem Yukon and Nordenskiold rivers
Carmacks Area Tributaries	Little Salmon, Big Salmon, and North Big Salmon rivers, Tatchun Creek
Teslin River	Teslin Lake, Nisutlin, Morley, Jennings, and Teslin rivers
Upper Yukon Tributaries	Whitehorse Hatchery and Takhini River

Table 13.–Estimated stock composition of Chinook salmon in the test gillnet fishery at the Eagle sonar project in 2017.

Period	Jul 1–15	Jul 16–21	Jul 22–27	Jul 28–Aug 20	Season
Sample size	n = 161	n = 161	n = 183	n = 228	n = 733
Stock aggregate	Est. (SD)	Est. (SD)	Est. (SD)	Est. (SD)	Est. (SD)
Upper Yukon Tributaries	0.0 (0.2)	1.9 (1.1)	6.9 (1.9)	9.5 (2.0)	5.1 (0.8)
Teslin River	24.9 (3.7)	27.3 (4.8)	35.4 (5.1)	36.6 (5.2)	30.9 (2.3)
Carmacks Area Tributaries	21.1 (3.8)	27.0 (4.3)	23.0 (4.0)	12.5 (3.2)	20.7 (2.0)
Mid-Mainstem	4.3 (1.8)	6.8 (3.9)	14.4 (4.3)	31.8 (5.0)	16.0 (2.2)
Pelly River	18.3 (3.6)	24.0 (4.0)	10.2 (2.7)	5.9 (2.0)	13.8 (1.5)
Stewart River	7.1 (3.1)	6.2 (2.7)	6.2 (2.3)	3.0 (1.6)	5.7 (1.1)
North Yukon Tributaries	15.4 (4.0)	4.7 (1.7)	2.5 (1.2)	0.2 (0.5)	4.9 (1.0)
White River	8.9 (2.5)	2.0 (1.3)	1.4 (1.0)	0.0 (0.1)	2.9 (0.7)

Note: The mainstem Yukon River sonar operated near Eagle switched from enumerating Chinook to fall chum salmon on August 21, 2017. Est. refers to estimate and SD refers to standard deviation.

Passage (i.e., abundance) estimates for each stock aggregate at Eagle were calculated by multiplying the total Chinook salmon passage estimate from sonar by the percent composition of

each stock aggregate, as determined by the genetic analysis. This was done for 4 sample periods and for the season as a whole (Table 14; Figure 6).

Estimated stock percentages from samples obtained at the mainstem sonar project near Eagle for 2017 are within the ranges observed between 2008 and 2016 with the exception of the Carmacks Area Tributaries which had a percentage contribution higher than previously observed since 2008 (Appendices B18 and C17). Teslin River and Carmacks Tributaries were above the 2008–2016 average stock contribution. The Mid-Mainstem, Stewart River, North Yukon Tributaries and White River aggregates were all below the 2008–2016 average stock contribution. The Upper Yukon Tributaries and Pelly River stock compositions were near the 2008–2016 average.

Table 14.–Estimated abundance of Chinook salmon migrating past the Eagle sonar project in 2017.

Period	Jul 1–15	Jul 16–21	Jul 22–27	Jul 28–Aug 20	Season estimate
Sample size	n = 161	n = 161	n = 183	n = 228	n = 733
Stock aggregate	Estimate	Estimate	Estimate	Estimate	Estimate
Upper Yukon Tributaries	0	369	1,284	1,757	3,739
Teslin River	4,180	5,303	6,587	6,768	22,654
Carmacks Area Tribs.	3,542	5,245	4,280	2,404	15,176
Mid-Mainstem	722	1,321	2,680	5,880	11,730
Pelly River	3,072	4,662	1,898	1,091	10,117
Stewart River	1,192	1,204	1,154	555	4,179
North Yukon Tributaries	2,586	913	465	37	3,592
White River	1,494	389	261	0	2,126

Note: The Eagle sonar switched from enumerating Chinook to fall chum salmon on August 21, 2017. Includes 7 Chinook salmon tissue samples were collected after August 20, 2017.

Fall Chum Salmon

Genetic stock identification of the 2017 fall chum salmon migration bound for Canada was estimated using genetic samples collected from the drift gillnet test fishing program conducted in conjunction with mainstem Yukon River sonar operations near Eagle. Variation of 14 microsatellite loci was analyzed for 697 fall chum salmon and stock contribution estimates were based on 4 regional reporting groups (stock aggregates; Table 15). The estimated proportions of stock composition are broken down by the various sampling periods from August 21 to October 6, 2017 (Table 16). An estimated 54.9% of the return that passed the sonar site up to October 6 originated from the Mainstem Yukon River reporting group (which includes a number of mainstem Yukon River spawning populations) and 45.1% were from the White River aggregate (Table 16). Less than 1% of the return was estimated to originate from the remaining 2 reporting groups: the Teslin River and the Yukon Early group. Passage (i.e., abundance) estimates for each fall chum salmon stock aggregate at Eagle were calculated by multiplying the total fall chum salmon passage estimate from the sonar project by the percent composition of each stock aggregate, as determined by the genetic analysis. This was calculated for 3 separate sample periods and the total season (Table 17). Abundance estimates by stock aggregate are also presented in Figure 7 for the sampling period only.

Table 15.–Baseline comprising 4 stock aggregates used to estimate stock compositions of fall chum salmon collected from the test gillnet fishery at Eagle sonar project in 2017.

Stock aggregate	Population in baseline
Yukon Early	Chandindu River
White River	Kluane River, Kluane Lake, Donjek River
Mainstem Yukon River	Mainstem Yukon River at Pelly River, Tatchun Creek, Big Creek, and Minto
Teslin River	Teslin River

Table 16.–Estimated stock composition of fall chum salmon in the test gillnet fishery at Eagle sonar project in 2017.

Period	Aug 21–Sep 8		Sep 9–19		Sep 20–Oct 6		Sampling season	
Sample size	*n* = 171		*n* = 258		*n* = 268		*n* = 697	
Region	Est.	(SD)	Est.	(SD)	Est.	(SD)	Est.	(SD)
Mainstem	47.8	(4.1)	43.3	(3.7)	67.4	(3.2)	54.9	(2.4)
White	52.0	(4.1)	56.3	(3.7)	32.5	(3.2)	45.1	(2.4)
Teslin	0.1	(0.3)	0.2	(0.4)	0.1	(0.3)	0.0	(0.1)
Yukon Early	0.1	(0.4)	0.2	(0.4)	0.0	(0.1)	0.0	(0.1)

Note: Est. refers to estimate and SD refers to standard deviation.

Table 17.–Estimated abundance of fall chum salmon migrating past the Eagle sonar project in 2017.

Period	Aug 21–Sep 8	Sep 9–19	Sep 20–Oct 6	Sampling season
Sample size	*n* = 171	*n* = 258	*n* = 268	*n* = 697
Region	Estimate	Estimate	Estimate	Estimate
Mainstem	18,348	57,708	158,885	223,530
White	19,960	74,918	76,614	183,436
Teslin	22	240	173	103
Yukon Early	33	256	10	97

Note: The mainstem Yukon River sonar enumerated fall chum salmon from August 21 to October 6, 2017. An expansion formula was used to estimate passage October 7 to 18 and is included in these estimates. Fall chum salmon genetic samples were collected between August 1 and September 30, 2017. Stock proportions in the last sample were applied to estimate composition of the last period which includes expansion to October 18.

The mainstem fall chum salmon stock aggregate proportion of the total sonar passage at Eagle was very close to the 2009–2016 mean stock proportion (56.4%). The Teslin and Yukon early chum salmon stock group proportions were the lowest estimated for the same period (Appendix B19). The estimated abundance for the mainstem stock group was over double the average (2009–2016) passage, but the estimated abundance of the White River stock group was just above average for the same period. Abundance estimates for the mainstem stock was within previously observed ranges, White River stock abundance was the highest on record and abundances for both Teslin River and Yukon Early stock groups were the lowest on record (Appendix C18). However, the Teslin and Yukon Early groups comprise very small proportions

of the total fall chum salmon sonar passage and of the genetic sample; thus, there is greater uncertainty associated with these estimates, particularly in high abundance years such as 2017.

Estimated chum salmon spawning escapement for regions represented in the genetic baseline is calculated by multiplying the genetic analysis estimate of stock aggregate proportions of the years' pooled samples by the spawning escapement estimate for the corresponding year (Appendix C18). Genetic stock identification (GSI) analysis of samples, from the mainstem Yukon River test fish program associated with the sonar near Eagle, in recent years (R&E projects CRE-79-13, CRE-79-14, CRE-79-15) has indicated that the mainstem fall chum salmon component increases in the latter part of the run, but the White River proportion declines (reflecting differences in run timing). This suggests that applying the seasonal genetic proportion estimate to the whole run may overestimate the White River contribution (and underestimate the mainstem contribution) in late run years. This was the case in 2016, when the postseason expansion indicated that over 30% of the run passed the sonar site after the last genetic sampling period. However only 10% of the estimated fall chum salmon run passed after the last genetic sample in 2017.

Collection of Samples for Genetic Baselines

Genetic samples from 144 Chinook salmon were collected from 4 locations to add to the genetic baseline: 47 from Hoole River, 32 from Morley River, 60 from North Big Salmon River, and 5 from the Pelly River. These samples are housed at the DFO's Pacific Biological Station in Nanaimo and were shared with ADF&G's Gene Conservation Laboratory in Anchorage.

Yukon Education Program

Fisheries and Oceans Canada Whitehorse and contractors have carried out the Salmon in the Classroom educational program, since 1989. Activities include classroom lessons, presentations, classroom salmon incubation, and field trips to release fry and study aquatic habitat. Chinook salmon eggs are collected in August, prior to the school year, while some classes are able to participate in the October collection of fall chum salmon eggs. Classroom activities are carried out over the course of the school year; schools incubate eggs from October or November until spring time, and field trips are conducted in spring and early summer. Schools incubate salmon eggs from nearby salmon spawning streams when possible, and are then able to release these fry back to their local stream; this enhances students' understanding of the salmon life cycle and the local aquatic habitats, and helps them to develop the connection between the local salmon and their Stream to Sea studies. All efforts are made to collect a small number of eggs from mostly spawned salmon so as to limit disturbance to returning salmon. Classroom topics include salmon biology and life cycles, salmon habitat, challenges to salmon survival, and salmon anatomy (usually through dissection of chum salmon). Twenty-three schools, including 11 rural schools, participated in the Stream to Sea program in the 2016–2017 school year; schools incubated chum salmon eggs for release back to the Kluane River, and to the Yukon River near Minto, and Chinook salmon eggs for release back to Blind Creek and to Fox Creek (from the Yukon River Whitehorse Rapids stock). Twenty-five schools, including 12 rural schools, are participating in the Stream to Sea classroom incubation program in 2017–2018. Specific annual project information can be found in R&E reports and the Salmon in the Classroom website http://www.pac.dfo-mpo.gc.ca/education/index-eng.html.

Environmental Conditions Report

This summary of environmental conditions is in response to a request from the JTC to report annually about the conditions influencing fish habitat in the Canadian sub-basin of the Yukon River; the area upstream of the Alaska/Yukon border that includes the Yukon River and the Porcupine River. The sub-basin encompasses a very large expanse of salmon habitat including over 100 documented spawning streams and many more rearing streams. In lieu of annual surveys throughout these widespread spawning and rearing habitats, this brief summary serves to record significant weather conditions and resulting influences on stream conditions of the last year. The purpose of this summary is to record annual environmental conditions that may influence Yukon River Chinook salmon spawning and rearing habitat. This record may be used to determine opportunities to improve management, research, or restoration strategies and to focus habitat considerations in the future.

Due to the spatial scale, specific salmon habitat information is not collected extensively from year to year; therefore, the following information is provided as a high level synopsis of what was experienced in the Canadian sub-basin for a given year. Various weather records and stream discharge data from other agencies are applied as a means to 1) determine if environmental conditions are within normal ranges on record, 2) identify observed unusual trends and/or events, and 3) consider implications for Chinook salmon. Conditions reported herein are informed through observations based on relevant activities, projects, or studies carried out by the public, fishers, consultants, and Fisheries and Oceans Canada staff. Through scientific evidence, local knowledge, experience, and professional judgment, this information is applied to fish habitat to determine general conditions experienced for the year.

November 2016 to April 2017

The 2016–2017 winter was warmer and drier than normal until March, when temperatures dipped to well below average throughout the territory. April then brought above average temperatures and precipitation to the south and central Yukon, while dry conditions persisted in the Porcupine River drainage. Mean air temperatures in the Canadian Yukon river sub-basin between October and February ranged up to 2 degrees Celsius above normal in the southern half of the territory and up to 3 degrees above normal in parts of the northern region (Porcupine River drainage). Winter precipitation was below average for this period over most of the territory. Spring snowpack values ranged from well below normal in southeastern Yukon to near or somewhat below normal in central southwestern regions, and somewhat above normal in the Porcupine drainage. Winter streamflow conditions throughout the territory were generally above normal with the exception of the Pelly River, which was somewhat below normal. Streamflow during the November to April period represents base flow and generally provides an indication of groundwater contributions (Yukon Snow Survey Bulletin and Water Supply Forecast)[10]. These conditions represent the incubation and alevin development period for Chinook and chum salmon.

May 2017 to July 2017

A warm May in most of the territory resulted in early snow melt. Given the reduced amount of water stored as snow, summer flow impacts were uncertain. Precipitation was below average across the territory in the early spring months. May through July temperatures were near average

[10] http://www.env.gov.yk.ca/air-water-waste/snow_survey.php.

through the Southern Yukon, and water levels remained low. Ongoing low precipitation and high temperatures in the Porcupine basin caused record low water levels and very high water temperatures; these conditions are expected to have negatively affected the migration and incubation of Porcupine Chinook salmon stocks in 2017. The Pelly drainage experienced high water events related to rainfall in early July, and again in late July. Temperatures in this period align with 1+ Chinook salmon outmigration, and 0+ emergence and movement downstream, followed by juvenile upstream migration into non-natal tributaries. Adult Chinook salmon upstream migration, and spawning in some populations, also occurs in this time period.

August 2017 to October 2017

Temperatures across the drainage were above average throughout the fall. Precipitation was above normal for northern Yukon, near normal in central Yukon, and below normal in the south Yukon during this period. Elevated temperatures combined with low precipitation in August in southern Yukon and continuing high temperatures in northern Yukon (Porcupine River drainage), may have negatively influenced migration and incubation of some Chinook salmon stocks. High water conditions during August in central Yukon also probably had an adverse impact on some Chinook salmon stocks, particularly in the Pelly watershed. Temperatures and water levels in this period align with adult upstream migration and spawning.

Summary

Migration, spawning, and rearing conditions in the Canadian sub-basin of the Yukon River were varied throughout the drainage in 2016–2017. Moderate winter conditions were probably favorable for incubation of the 2016 brood year salmon. However, water levels well above normal during Chinook salmon migration in the Pelly drainage, and water temperatures above normal during Chinook salmon migration and spawning in the southern Yukon, and in the Porcupine River drainage may have adversely affected spawning and incubation of some Chinook salmon stocks in the 2017 brood year. With increased climate variability, on-going habitat monitoring and assessment in the Yukon River Canadian Sub-basin is encouraged to continue to inform management, research, restoration strategies, and habitat considerations going forward

8.4 RESTORATION AND ENHANCEMENT FUND

The *Yukon River Salmon Agreement* between Canada and the United States was initialed in March 2001 and signed in December 2002. Under the terms of the Agreement, the 2 countries established the $1.2M U.S. per annum Yukon River Salmon Restoration and Enhancement (R&E) Fund.

The purpose of the R&E Fund is to financially support:

(a) programs, projects, and associated research and management activities on either side of the Alaska Yukon border directed at restoration, conservation and enhancement of Canadian origin salmon stocks; and

(b) programs and projects directed at developing stewardship of salmon habitat and resources and maintaining viable fisheries in the Yukon River in Canada.

Seven categories or areas of activity have been established as eligible for R&E funding, including:

1. Conservation,
2. Restoration,
3. Enhancement,
4. Stewardship,
5. Viable fisheries,
6. Communications, and
7. Administration. (Administrative activities are not eligible for funding by grants from the R&E Fund to third parties responding to the annual Call for Proposals).

In developing the 2017 Call for Project Proposals, the Yukon River Panel re-confirmed the same two 2016 Near-Term Restoration priority interests as the focus for the 2017 year, namely:

1) Identify depleted stocks or limits to production and identify candidate stocks or systems for stock restoration;

2) Identify potential spawning and rearing habitat restoration sites.

In addition, priority consideration was again provided for 2017 project proposals that demonstrated local community involvement or local partnerships (in particular with First Nations). The selection of these particular Near-Term priorities was driven by the Panel's on-going desire to improve the effectiveness of Restoration and Enhancement Fund resources in response to the decline of Yukon River Chinook salmon stocks experienced in recent years.

All the Detailed Proposals submitted were subject to an in-depth technical assessment by the JTC's R&E subcommittee, as well as being evaluated for their relevance and significance to the *Yukon River Salmon Agreement*; the priorities outlined in the 2007 Budget Priorities Framework; and the Call for Project Proposals by the members of the Yukon River Panel.

Yukon River Panel questions and recommendations pertaining to certain selected Detailed Proposals were provided to the project proponents concerned following the December 2016 Panel meeting. Specific feedback from the proponents involved was sought and later provided to the Panel. Using this additional information, and having provided the opportunity for public comments on the proposals (none being received), the Yukon River Panel made final funding decisions at its Spring meeting in April, 2017 in Whitehorse, Yukon.

In 2017, a total of 32 projects were selected for R&E funding, of which, 24 were on-going multi-year projects and 8 were new (Table 18). Funds in the amount of $1,498,386 U.S. were allocated to projects. In U.S. dollar terms 63% of the funds were directed towards Conservation projects; 14% to Restoration; 10% towards Stewardship; and 13% towards Communications. To achieve this level of project spending in 2017 the Panel drew on unspent project funds from previous years to supplement the annual $1.2M U.S. R&E Fund disbursement. Remaining additional unspent funds have been earmarked specifically to be expended on projects focusing on "restoration" priorities between 2016 and 2019.

Status of 2017 R&E Projects

Table 18.–Restoration and Enhancement Fund projects, cost and status for completion, grouped by envelope/category type

Project #	Project title	Amount	Status & due date
URE-92-17	Genetic stock identification of Pilot Station Chinook salmon	$42,343 U.S.	30-Jun-18
URE-03-17	Yukon River Chinook subsistence harvest genetic stock identification	$146,260 U.S.	30-Jun-18
CRE-79-17	Genetic stock identification of Canadian-origin Yukon River Chinook and chum salmon	$30,000 CAD	31-Mar-18
URE-16-17	Yukon River Border Sonar Operations	$110,996 U.S.	30-Jun-18
CRE-09-17	Porcupine River Chinook Salmon Sonar Program.	$134,400 CAD	31-Mar-18
CRE-37-17	Blind Creek Chinook Salmon Enumeration Weir	$49,203 CAD	28-Feb-18
CRE-41-17	Sonar Enumeration of Chinook Salmon on the Big Salmon River	$82,288 CAD	28-Feb-18
CRE-94-17	Pelly River Chinook salmon sonar pilot project	$164,398 CAD	31-Jan-18
CRE-95-17	Enhancing the information value of coded wire tags applied to Canadian-origin Chinook salmon	$7,500 CAD	Project cancelled
CRE-26-17	Yukon River Canadian-origin Juvenile Chinook out-migrant assessment.	$89,660 CAD	28-Mar-18
CRE-99-17	Assessing the limits to production of juvenile Canadian-origin Yukon River Chinook salmon	$34,750 CAD	30-Mar-18
CRE-22-17	Fishing Branch River Chum Salmon Habitat Assessment	$158,050 CAD	15-Oct-18
CRE-51-17	2016 Michie Creek Salmon and Habitat Monitoring Project	$23,330 CAD	31-Dec-17
CRE-20-17	Temperature Monitoring of Yukon River Chinook Salmon Spawning and Migration Habitats in Canada	$6,000 CAD	Project completed
CRE-145-17N	Impacts to the Kluane River Chum salmon stock from a major natural hydrological change	$43,288 CAD	30-Mar-18
CRE-146-17N	Porcupine Community-based Salmon Management Plan	$30,880 CAD	31-Jan-18
	Conservation total	**$948,447 U.S.**	
CRE-25-17	Ta'an Kwach'an Council - Fox Creek Salmon Restoration Project	$28,697 CAD	31-Mar-18
CRE-18-17	Deadman Creek Chinook restoration pilot project & in-stream egg incubation trial	$100,056 CAD	30-Jun-18
CRE-149-17N	Assessing the fate of returning Upper Yukon River Chinook salmon	$42,700 CAD	31-Dec-17
CRE-152-17N	Takhini River Chinook salmon restoration investigation	$81,600 CAD	31-Mar-18
CRE-153-17N	Klondike River Chinook salmon stock restoration plan	$22,311 CAD	31-Mar-18
	Restoration total	**$209,277 U.S.**	

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Table 18.–Page 2 of 2.

Project #	Project title	Amount	Status & due date
CRE-07-17	Tr'ondëk Hwëch'in First Fish Youth Culture Camp	$10,900 CAD	Completed
CRE-65-17	McIntyre Creek salmon incubation project	$39,880 CAD	31-Aug-18
CRE-06-17	Yukon River North Mainstem Stewardship	$31,980 CAD	Completed
CRE-02-17	Salmon Stewardship Coordinators for Yukon Schools	$34,380 CAD	30-Jan-18
CRE-19-17	Yukon River Chinook Salmon Stock Restoration Community Technical Team	$44,060 CAD	31-Mar-18
CRE-64-17	Whitehorse Rapids Fishway Stewardship	$14,883 CAD	Completed
CRE-155-17N	Selkirk First Nation Fall Chum Utilization Project	$15,000 CAD	Project cancelled
	Stewardship total	**$145,224 U.S.**	
CC-02-17	Salmon Know No Borders – 2017 Yukon River Exchange	$62,993 CAD	31-Mar-18
CC-03-17	Yukon River Preseason Preparation meeting	$98,245 U.S.	1-Oct-18
CC-156-17N	Enhanced Education and Outreach – Salmonids in the Classroom	$25,000 CAD	31-Mar-18
CC-157-17N	Selkirk First Nation Citizen Outreach & Communications Plan	$20,000 CAD	31-Mar-18
	Communication total	**$195,438 U.S.**	
	Total U.S. dollars	**$1,498,386 U.S.**	

Note: CRE = Canadian Restoration and Enhancement Proposal, U.S. = United States, URE = U.S. Restoration and Enhancement Proposal, N = New Proposal, CC = Communications Committee Project, and CAD = Canadian.

9.0 MARINE FISHERIES INFORMATION

9.1 INTRODUCTION

Yukon River salmon migrate into the Bering Sea during the spring and summer after spending 0, 1, or 2 winters rearing in fresh water. Information about stock origin from tagging, scale patterns, parasites, and genetic analysis indicate that Yukon River salmon are present throughout the Bering Sea, in regions of the North Pacific Ocean, south of the Aleutian Chain, and the Gulf of Alaska during their ocean migration (Healey 1991; Salo 1991). Yukon River salmon have the potential to be captured by fisheries that harvest mixed stocks of salmon, other species of fish (bycatch), and by illegal fishing activities throughout their oceanic distribution. Coded-wire tag recoveries in these fisheries and in research surveys provide a key descriptor of the oceanic distribution of Yukon River Chinook salmon (Whitehorse Rapids Hatchery Chinook salmon; Appendix A19). However, genetic stock identification has become the primary tool for identifying Yukon River Chinook salmon in marine habitats (Larson et al. 2013; Guthrie et al. 2016). U.S. groundfish trawl fisheries in the Gulf of Alaska (GOA) and Bering Sea-Aleutian Islands (BSAI) management areas are managed to limit the incidental harvest (bycatch) of salmon. Bycatch amounts and bycatch management in these trawl fisheries are summarized below.

9.2 SALMON BYCATCH IN THE BERING SEA AND GULF OF ALASKA GROUNDFISH FISHERIES

U.S. groundfish fisheries in the BSAI and GOA regions are managed under the Magnuson-Stevens Fisheries Conservation and Management Act by the North Pacific Fishery Management Council (NPFMC), and are regulated by the National Marine Fisheries Service (NMFS) Alaska Regional Office. Annual summaries and inseason information about Pacific salmon bycatch in the Bering Sea and Gulf of Alaska groundfish fisheries are provided by the Alaska Regional Office as part of NMFS catch accounting system. Chinook and chum salmon from throughout the Pacific Rim contribute to the bycatch in eastern Bering Sea groundfish fisheries (Guthrie et al. 2016; Kondzela et al. 2016). Bycatch of Chinook salmon in the BSAI and GOA remained at relatively low levels in 2017 (Appendices A20, A21, and A22). Bycatch numbers of Chinook salmon in BSAI groundfish fisheries (n = 36,279) were higher than GOA groundfish fisheries (n = 24,969), with most of the bycatch occurring during the A-season (n = 21,827). Bycatch numbers of Chinook salmon are not equivalent to numbers of Chinook salmon returning to freshwater due to the natural mortality that occurs in marine habitats; the numbers of salmon captured as bycatch need to be converted to adult equivalents before the impact to terminal runs can be estimated (Ianelli and Stram 2014). Bycatch of non-Chinook salmon species (predominately chum salmon) in the BSAI groundfish fisheries increased to 471,362 in 2017 and nearly all non-Chinook bycatch occurred during the B-season (n = 465,772).

Pollock directed fisheries have been the primary groundfish fishery of concern for salmon bycatch in the Bering Sea because they account for approximately 88% of the total Chinook salmon bycatch and 99% of the non-Chinook salmon bycatch in the BSAI groundfish fisheries (Appendix A22). Pollock harvests are managed in the BSAI pollock fishery by setting an annual total allowable catch (TAC) for pollock and allocating the catch to various sectors of the fishery as specified by the American Fisheries Act in 1998. These allocations are divided into 2 seasons, 40% to the winter roe season (January 20 to June 10; A-season) and 60% to summer/fall season (June 10 to November 1; B-season). Chinook salmon bycatch occurs in both the winter season (61%) and the summer/fall season, whereas non-Chinook salmon are caught almost entirely during the summer/fall season (99%; Appendix A22).

A variety of regulatory measures have been used to limit salmon bycatch in the GOA and BSAI groundfish fisheries. These measures include: classifying salmon as a prohibited species, salmon savings areas, voluntary rolling hotspot system (VRHS), and bycatch incentive plan agreements (IPAs). Prohibited species within U.S. groundfish fisheries must be either discarded or donated through the Pacific Salmon Donation Program, which allows for distribution of salmon taken as bycatch to economically disadvantaged individuals by tax exempt organizations. Chinook and Chum Salmon Savings Areas were created in the mid-1990s. Savings areas enabled cap-and-closure measures to limit salmon bycatch in the Bering Sea pollock fishery, and were based on locations with historically high spatial and temporal levels of salmon bycatch. In 2006, fishing vessels participating in VRHS were exempted from the salmon savings areas. VRHS minimizes bycatch by adaptively defining area closures with inseason bycatch information.

Escalating numbers of Chinook salmon captured as bycatch in the BSAI pollock fishery in 2006 and 2007 prompted an environmental impact assessment of Chinook salmon bycatch in the Bering Sea pollock fishery and a review of alternative management measures used to limit the bycatch of Chinook salmon (NMFS 2009a, NMFS 2009b). Following these reviews, the NPFMC

recommended amendment 91 (https://alaskafisheries.noaa.gov/rules-notices/search) be added to the *BSAI Groundfish Fisheries Management Plan* for the Bering Sea pollock fishery. Amendment 91 was implemented by NMFS during the 2011 fishing season and established a bycatch hard-cap of 60,000 Chinook salmon and a performance cap of 47,591 Chinook salmon for vessels participating in a bycatch IPA. Chinook salmon bycatch quotas are allocated to each season and sector of the fishery based on the bycatch cap, historical Chinook salmon bycatch, and pollock harvest allocations. Sectors that exceed their proportion of the performance cap more than 2 times in any 7 year period while participating in an IPA will have their hard cap reduced to their proportion of the performance cap. Salmon still retain their classification of a prohibited species; however, amendment 91 establishes benchmark performance criteria for incentive plan agreements such as the voluntary rolling hotspot system that have been used or may be used in the future to avoid salmon bycatch in the Bering Sea pollock fishery. Amendment 110 was added in 2016 to provide additional Chinook salmon bycatch avoidance measures during periods of low abundance to protect western Alaska Chinook salmon subsistence fisheries. Amendment 110 lowers the 60,000 hard cap for Chinook salmon bycatch to 45,000 (with a similar proportional reduction in the performance cap) following years when the combined in-river run size of Unalakleet, Upper Yukon, and Kuskokwim River stock groups fall below 250,000 fish.

10.0 RUN OUTLOOKS 2018

10.1 YUKON RIVER CHINOOK SALMON

Canadian-origin Brood Table

The brood table for Canadian-origin Yukon River Chinook salmon (Appendix A9) is the basis of the current spawner-recruitment model (Figure 8) which is used to forecast returns in future years. Age-specific returns have been estimated from harvest and escapement data by age class in the return years. Because assessment methods have changed over time, the brood table is constructed from a variety of data sources (Appendix B11). For the years 1982–2001, initial estimates were derived from the DFO Chinook salmon mark–recapture program but information from a number of sources, reviewed in 2008, indicated that these data were probably biased low. Subsequently, the 1982–2001 Canadian spawning escapement estimates were reconstructed using a linear regression of the estimated total spawning escapements for 2002–2007 against a 3-area aerial survey index of combined counts from Big Salmon, Little Salmon, and Nisutlin rivers. Spawning escapement estimates for years 2002–2004 were from radiotelemetry studies. Since 2005, spawning escapement estimates have been derived from the border sonar project at Eagle after subtracting the Canadian harvest and the U.S. harvest that occurred upriver from the sonar project site, all of which are Canadian-origin fish.

Canadian-origin Yukon River Chinook Salmon

The 2018 preseason outlook for Canadian-origin Chinook salmon is for a run size of 71,000–103,000 and is based on an average of 2 independent forecast ranges. The first method was based on an average of the spawner-recruitment and sibling models corrected to generate an adjusted outlook range. The second method was based on juvenile abundance estimates from Northern Bering Sea trawl surveys.

Spawner-recruit and Sibling Model Average

Spawner-recruitment and sibling models predict the 2018 run size of Canadian-origin Chinook salmon will be approximately 89,400 and 120,800 fish, respectively (Table 19). The average of those 2 models indicates a return of about 105,000 Chinook salmon. However, these models do not account for uncertainty associated with lower productivity and poor model performance observed in recent years. Over the last 10 years, observed run sizes were approximately 31% lower than preseason outlooks developed with the spawner-recruitment model, 30% lower than preseason outlooks developed with the sibling model, and 32% lower than preseason outlooks developed by averaging the 2 models (Figure 9).

The 2018 forecast range was developed by adjusting the uncorrected spawner-recruit and sibling average of 105,000 Canadian-origin Chinook salmon to account for poor model performance observed from 2007–2013 and improved model performance observed from 2014–2017. An annual correction factor was calculated for each year since 2007 as the ratio of observed to predicted run size. The 2007–2013 average correction was 0.61. The 2014–2017 average correction was 0.83. The forecast range was developed by multiply the uncorrected forecast of 105,000 by 0.61 and 0.83 respectively. This method is consistent with JTC forecasts produced in 2016 and 2017. The corrected spawner-recruit and sibling model produced a forecast range of 63,000–88,000.

Juvenile-based Forecast

Fisheries and oceanographic research surveys in the northern Bering Sea shelf were initiated in 2002 as part of the Bering-Aleutian Salmon International Survey (BASIS; NPAFC 2001). BASIS was developed by member nations of the North Pacific Anadromous Fish Commission (NPAFC) (United States, Russia, Japan, Canada, and Korea) to improve our understanding of marine ecology of salmon in the Bering Sea. These surveys use pelagic rope trawls to sample fish at or near the surface. The surveys are designed to support broad-scale marine ecosystem research. Although the investigators, vessels, funding support, and research objectives of these trawl surveys have varied with time, attempts have been made to occupy a core station grid to improve the consistency of the data collected during these research surveys. Stations are typically sampled during September along a systematic latitude and longitude grid with stations separated by approximately 30 nautical miles.

Pelagic trawl surveys in the northern Bering Sea capture Yukon River salmon stocks during their first summer at sea (juvenile life-history stage). Canadian-origin Chinook salmon are the primary stock group of Chinook salmon in the northern Bering Sea during the summer (Murphy et al. 2009) and trawl surveys have been used to provide stock-specific juvenile abundance estimates (Figure 10; Murphy et al. 2017). Juvenile Chinook salmon abundance estimates provide an early indicator of stock status for the Canadian-origin stock group due to the relatively stable marine survival after the stage at which juveniles are sampled in the northern Bering Sea (Figure 11).

Juvenile abundance-based projections of Canadian-origin Chinook salmon have been provided to the JTC and Yukon River Panel since 2013, and recent year forecast performance suggests that juvenile abundance provides a reasonable predictor of future year adult run size (Table 19). Juveniles in the Bering Sea in 2014 and 2015 would be the primary contributors to the 2018 adult run (returning as 6- and 5-year-old, respectively) and both years had above average juvenile abundance. The juvenile-based method produced a forecast range of 78,000–117,000 Canadian-origin Chinook salmon returning to the Yukon River in 2018.

The juvenile-based forecast method provides an early indicator of Canadian-origin run sizes 3 years in advance. Early indications suggest that 2018 and 2019 run abundances will both be similar or slightly smaller compared to the 2017 run. The 2020 run is expected to decrease and be similar in size to the 2016 run (Figure 12).

Since 2014, the juvenile-based forecast has been used informally by the JTC as additional information about future year run sizes. The JTC decided to explicitly incorporate the juvenile-based forecast as part of the formal outlook for 2018.

Table 19.–Preseason Canadian-origin Yukon River Chinook salmon outlooks for 2013–2018.

	Expected run size (Preseason)								
				Adjusted outlook range [a]		Juvenile-based model range		Average of adjusted outlook and juvenile-based model ranges [b]	
Year	Spawner-recruit	Sibling	Model average	Low end	High end	Low end	High end	Low end	High end
2013	109,984	79,160	95,000	**49,000**	**72,000**	43,000	61,000		
2014	100,159	53,287	77,000	**32,000**	**61,000**	45,000	65,000		
2015	96,083	103,701	100,000	**59,000**	**70,000**	55,000	79,000		
2016	96,983	108,003	102,000	**65,000**[c]	**88,000**[c]	61,000	88,000		
2017	93,724	135,105	114,000	**73,000**[c]	**97,000**[c]	93,000	134,000		
2018	89,356	120,834	105,000	63,000[c]	88,000[c]	78,000	117,000	**71,000**	**103,000**

Note: Bold numbers represent the outlook range used in each year.

[a] From 2013 to 2015, the Spawner-recruitment model and Sibling model based outlooks have been adjusted by applying average (2007–2015) model performance (percent difference from expected) to the projection and rounding to the nearest 1,000 to create an "adjusted outlook range".

[b] Average of the lower ends of the adjusted outlook and the juvenile ranges determines lower end. Average of the upper ends of the adjusted outlook and the juvenile ranges determines upper end.

[c] Starting in 2016, the adjusted outlook uses the average of the 2 model forecasts and applies a correction factor (2007–2014 average performance) for the lower end and the correction factor seen in 2014 through current year for the upper end.

2018 Canadian-origin Chinook Salmon Outlook

The outlook for 2018 Canadian-origin run was developed by averaging the forecast ranges based on the adjusted spawner-recruit/sibling method and the juvenile-based method. A simple model average was chosen to give equal weight to both methods. The forecast range is for a run size of 71,000–103,000.

The 2018 forecast of 71,000–103,000 suggests a run size of Canadian-origin Chinook salmon similar or slightly smaller than the run size observed 2017. A run of this size would be above the 2007–2016 average of 69,000 Chinook salmon but below the 1982–1997 average run size of 153,000 Chinook salmon.

The Chinook salmon runs on the Yukon River are typically dominated by age-5 and age-6 fish. The brood years producing these age classes in 2018 are 2012 (age-6) and 2013 (age-5). The Canadian-origin Yukon River Chinook salmon spawning escapements in 2012 and 2013 were 32,656 and 28,669 fish, both of which were below the 1982–2010 average escapements and the smallest since 2000 (Appendix A9; Figure 8). The run in 2017 was the largest since 2006 primarily due to the high relative abundance of age-5 and age-6 fish. In 2015 and 2016 the

estimated returns of age-4 fish were the largest since 1993 and subsequently the returns of age-5 fish in 2016 and 2017 were the largest since 1996 and 2006 respectively (Appendix A9). The large return of age-5 fish in 2017 is indicating the potential for a strong age-6 return in 2018 (Appendix A9).

10.2 YUKON RIVER SUMMER CHUM SALMON

The strength of the summer chum salmon run in 2018 will be dependent on production from the 2014 (age-4 fish) and 2013 (age-5 fish) escapements, because these age classes generally dominate the run. The total runs during 2013 and 2014 were approximately 3.3 million and 2.4 million summer chum salmon, respectively. The escapement goal on the Anvik River (350,000–700,000 fish) was achieved in 2013 and 2014, and the escapement goal on the East Fork Andreafsky River (>40,000 fish) was also met in 2013 but just shy of the goal in 2014. It is expected that the 2018 run will be similar or slightly smaller than the 2017 run of approximately 3.6 million fish.

The 2018 run is anticipated to provide for escapements, a normal subsistence harvest, and a surplus for commercial harvest. Summer chum salmon runs have provided for a harvestable surplus in each of the last 15 years (2003–2017). If inseason indicators of run strength suggest sufficient abundance exists to allow for a commercial fishery, the commercially harvestable surplus in Alaska could range from 1,200,000 to 1,900,000 summer chum salmon. Similar to the last 4 years, however, commercial harvest of summer chum salmon in 2018 could be affected by measures taken to protect Chinook salmon from incidental harvest in chum salmon-directed fisheries.

10.3 YUKON RIVER FALL CHUM SALMON

Drainagewide Fall Chum Salmon

Preseason outlooks are determined using estimates of escapement and resulting production. Yukon River drainagewide estimated escapement of fall chum salmon for the period 1974 through 2011 have ranged from approximately 224,000 (2000) to 2,200,000 (1975) fish, based on Bayesian analysis of escapement assessments to approximate overall abundance (Fleischman and Borba 2009). Escapements in these years resulted in subsequent returns that ranged in size from approximately 318,000 (1996 production) to 2,900,000 (2001 production) fish. Corresponding return per spawner rates ranged from 0.3 to 8.9, averaging 1.72 for all years combined (1974–2011; Appendix A23).

A considerable amount of uncertainty has been associated with these run forecasts, particularly in the last decade, because of unexpected run failures (1998 to 2002) followed by strong runs from 2003 through 2008. Weakness in these salmon runs prior to 2003 was generally attributed to reduced productivity in the marine environment and not to low levels of parental escapement. Similarly, improvements in productivity (2007–2010) have been attributed to the marine environment. Forecasts have been presented as ranges since 1999 to allow for adjustments based on more recent trends in production. Historical ranges included the normal point projection as the upper and lower ends were determined by reducing the projection by the average ratio of observed to predicted returns from 1998 to each consecutive current year through 2004. In 2005, the average ratio of 2001 to 2004 was used to develop the point projection in an attempt to capture some of the observed improvement in the run. The point estimate for 2006 and 2007 odd/even maturity schedules used the years 1974–1983 to represent years of higher production, whereas point estimates for 2008–2012 used odd/even maturity schedules from 1984 to current

year to represent years of lower production up through brood year 2005 (Appendix A23). With the dissipation of the odd/even cycles in the last 18 years the trend is not as clear in the dataset, therefore, the odd/even maturity schedule for all completed brood years 1974–2011 (Appendix A23) were used to determine the point estimates from 2013–2018.

Yukon River fall chum salmon return primarily as age-4 and age-5 fish, although age-3 and age-6 fish also contribute to the run (Appendix A23). The 2018 run will be composed of brood years 2012 to 2015 (Table 20). Estimates of returns per spawner (R/S) were used to estimate production for 2012 and 2013. An auto-regressive Ricker spawner-recruit model was used to predict returns from 2014 and 2015. The point projection estimates for 2018 used the 1974 to current complete brood year returns (2011) applied to the even/odd maturity schedule. The result is an estimate of 1,700,000 fall chum salmon returning in 2018. The forecast range is based on the upper and lower values of the 80% confidence bounds for the point projection. Confidence bounds were calculated using deviation of point estimates and observed returns from 1987 through 2017. Therefore, the 2018 forecasted run size is expressed as a range from 1,600,000 to 1,800,000 fall chum salmon (Table 20). This forecasted run size is the highest on record.

The dominant parent year escapements contributing to this outlook are 2013 and 2014, both of which exceeded the upper end of the drainagewide escapement goal range of 300,000–600,000 fall chum salmon (Appendix C16). The R/S (3.06) in the parent year 2013 was exceptional ranking third highest on record and will be represented by the age-5 fish. The major contributor to the 2018 fall chum salmon run is anticipated to be age-4 fish returning from the 2014 parent year (Appendix A23). If favorable conditions permit another year of above average production as forecasted the run size will be well above average.

Table 20.–Forecasted 2018 total run size of fall chum salmon based on parent year escapement for each brood year and predicted return per spawner (R/S) rates, Yukon River, 2012–2015.

Brood year	Escapement	Estimated production (R/S)	Estimated production	Age	Contribution based on age	Current return
2012	679,700	2.32	1,576,904	6	1.1%	18,911
2013	827,950	3.06	2,533,527	5	37.5%	629,903
2014	724,250	2.10	1,523,951	4	59.5%	1,001,596
2015	536,900	1.93	1,037,293	3	1.9%	31,532
Total expected run (unadjusted)						1,700,000
Total 2018 run size expressed as a range based on the forecasted vs. observed returns from 1987 to 2017 (80% CI):						1,600,000 to 1,800,000

For fall chum salmon, the sibling relationship is best between the age-5 to age-6 component (R^2 = 0.57). Typically, the sibling relationship between the age-3 to age-4 fish (R^2 = 0.50) is better than the age-4 to age-5 fish (R^2 = 0.27). Brood year returns of age-3 fish range from zero to 199,000 chum salmon. Returns of age-4 fish from even-numbered brood years during the time period 1974 to 2011 typically averages 457,000 fall chum salmon, and in all years ranges from a low of 175,000 for brood year 1996 to a high of 2,054,000 for brood year 2001. Return of age-5 fish from the same time period for even-numbered brood years typically averages 209,000 fall chum salmon, and in all years ranges from a low of 59,000 fish for brood year 1998 to a high of 705,000 fish for brood year 2001. Considering the sibling relationship described, the contribution of age-5 fish should be well above average sustaining the run size to near average should the age-4 component come in below average.

Production from returns with large escapement (>800,000) are considered because 8 out of 10 years failed to yield replacement values. Out of those 10 large brood year escapements the most substantial production failure occurred in 2005. However, the 2013 brood year is estimated to be producing the third largest R/S on record indicating at least a short upturn in production. The forecast models rarely predict extreme changes in production. The fluctuations observed in fall chum salmon run sizes (postseason run size estimates) in comparison with the expected run sizes (preseason outlooks) are reflected in the outlook performance; i.e., proportions of the expected run size, observed for the 1998 to 2017 period (Table 21).

Table 21.–Preseason Yukon River drainagewide fall chum salmon outlooks 1998–2018 and estimated run sizes for 1998–2017.

Year	Expected run size (preseason)	Estimated run size (postseason) [a]	Actual run size as proportion of expected run
1998	880,000	352,000	0.40
1999	1,197,000	419,000	0.35
2000	1,137,000	252,000	0.22
2001	962,000	375,000	0.39
2002	646,000	426,000	0.66
2003	647,000	792,000	1.22
2004	672,000	653,000	0.97
2005	776,000	2,180,000	2.81
2006	1,211,000	1,190,000	0.98
2007	1,106,000	1,130,000	1.02
2008	1,057,000	831,000	0.79
2009	791,000	608,000	0.77
2010	690,000	574,000	0.83
2011	740,000	1,220,000	1.65
2012	1,114,000	1,080,000	0.97
2013	1,029,000	1,190,000	1.16
2014	932,000	937,000	1.01
2015	1,060,000	819,000	0.77
2016	666,000	1,390,000	2.09
2017	1,560,000	2,230,000	1.43
2018	1,700,000		

Note: The expected run sizes are point estimates (rounded). Ranges were used since 1999 but until 2006 were not always distributed around the point estimate. Starting in 2006, expected run sizes are the midpoint of the outlook range.

[a] Postseason estimates are updated annually based on the Bayesian space-state modeling of the drainagewide escapement estimates and may include refined harvest estimates.

During the 2018 fall fishing season, estimated strength of the projected run will be adjusted using the relationship to summer chum salmon run abundance and assessed based on various inseason monitoring project data. With a record forecasted run size range of 1,600,000–1,800,000 fall chum salmon (midpoint 1,700,000 fish; Table 21), it is anticipated that escapement goals will be met while supporting normal subsistence fishing activities. The forecast suggests a commercial surplus between 1,050,000 and 1,250,000 fall chum salmon may be available. However, commercially harvestable surpluses will be determined inseason and applied to the guidelines outlined in the management plan with further considerations of fishing effort and buying capacity.

Canadian-origin Upper Yukon River Fall Chum Salmon

To develop an outlook for the 2018 Canadian-origin Yukon River fall chum salmon, the drainagewide outlook range of 1,600,000–1,800,000 fall chum salmon was multiplied by 25% (the estimated contribution of mainstem Yukon River Canadian-origin fall chum salmon), producing an outlook range of 400,000–450,000 fish (midpoint of 425,000 fish; Table 22). Recent genetic stock identification analyses have indicated that this assumption (i.e., 25%) is reasonably close. The preliminary 2018 outlook is the highest on record and above the 1998–2017 average estimated run size of 236,000 fish.

Table 22.–Preseason Canadian-origin mainstem Yukon River chum salmon outlooks for 1998–2018 and observed run sizes for 1998–2017.

Year	Expected run size (preseason)	Estimated run size (postseason)	Performance of preseason outlook (preseason/postseason)
1998	198,000	70,000	2.83
1999	336,000	116,000	2.90
2000	334,000	66,000	5.06
2001	245,000	49,000	5.00
2002	144,000	113,000	1.27
2003	145,000	182,000	0.80
2004	147,000	193,000	0.76
2005	126,000	558,000	0.23
2006	126,000	330,000	0.38
2007	147,000	347,000	0.42
2008	229,000	269,000	0.85
2009	195,000	128,000	1.52
2010	172,000	143,000	1.20
2011	184,000	326,000	0.56
2012	273,000	238,000	1.15
2013	257,000	303,000	0.85
2014	230,000	223,000	1.03
2015	265,000	205,000	1.29
2016	166,000	298,000	0.56
2017	388,000	563,000	0.69
2018	425,000		

Note: The 2009 through 2018 preseason expected run sizes are the midpoint of the outlook range. Estimated run sizes are calculated by adding estimated U.S. harvest of Canadian-origin fall chum salmon to the mainstem Yukon River sonar passage estimate. In recent years, the proportion of Canadian mainstem fall chum salmon in the total U.S. harvest is assumed to be equal to the proportion of Canadian-origin fall chum salmon in the drainagewide escapement (i.e. 25%).

Canadian-origin Porcupine River Fall Chum Salmon

In the Canadian section of the Porcupine River, most of the production of fall chum salmon originates from the Fishing Branch River. Canadian-origin Porcupine River stocks have been estimated to comprise 5% of the drainagewide run. Fishing Branch River fall chum salmon are estimated to comprise up to 80% of the Canadian-origin Porcupine River stocks, and approximately 4% of the drainagewide run, though estimates have ranged from 1.3% to 7%. Applying the 4% average estimate to the drainagewide outlook range of 1,600,000–1,800,000 fish yields a Fishing Branch River outlook of 64,000–72,000 fish, with a midpoint of 68,000 fish (Table 23). This outlook is considered uncertain due to the high variation in contributions of Fishing Branch River fall chum salmon to drainagewide stocks.

Though the models used to develop forecasts have varied from year-to-year, the postseason run size estimates of Fishing Branch River fall chum salmon have been consistently below preseason outlooks since 1998, with the exception of 2003 to 2005, 2016, and 2017.

Table 23.–Preseason Fishing Branch River fall chum salmon outlooks for 1998 to 2018 and observed run sizes for 1998–2017.

Year	Expected run size (preseason)	Estimated run size (postseason)[a]	Performance of preseason outlook (preseason/postseason)
1998	112,000	25,000	4.48
1999	124,000	24,000	5.17
2000	150,000	13,000	11.54
2001	101,000	33,000	3.06
2002	41,000	19,000	2.16
2003	29,000	46,000	0.63
2004	22,000	32,000	0.69
2005	48,000	186,000	0.26
2006	54,000	48,000	1.13
2007	80,000	50,000	1.60
2008	78,000	30,000	2.60
2009	49,000	40,000	1.23
2010	43,000	20,000	2.15
2011	37,000	28,000	1.32
2012	55,000	50,000	1.10
2013	52,000	39,000 (52,000)[b]	–
2014	46,000	13,000 (24,000)[b]	–
2015	17,000	13,000	1.31
2016	27,000	54,000	0.50
2017	62,000	73,000	0.85
2018	68,000		

Note: Run sizes are rounded to nearest 1,000. The 2009 through 2018 preseason forecasted run sizes are the midpoint of an outlook range. The Fishing Branch River weir monitors the dominant spawning stock within the Porcupine River drainage.

[a] The total run size is estimated by adding the estimated Canadian (Porcupine) harvest and U.S. harvest of Fishing Branch River fall chum salmon to the Fishing Branch River weir escapement estimate, unless otherwise noted. In recent years, the proportion of Fishing Branch River fall chum salmon in the total U.S. harvest is assumed to be equal to the proportion of Fishing Branch River fall chum salmon in the drainagewide escapement (i.e. 4%). Beginning in 2016, it is also assumed that Fishing Branch River fall chum salmon comprise 80% of Canadian chum salmon harvest in the Porcupine River. Previously 100% of Canadian fall chum salmon harvest in the Porcupine River was included in the Fishing Branch River estimated run size.

[b] Run size was based on Old Crow sonar counts and proportion of tag recoveries. Numbers in parentheses are the corresponding Canadian-origin Porcupine River sonar based estimates. Outlook performances are not included due to uncertainty in the assessment methods compared with previous years.

10.4 YUKON RIVER COHO SALMON

Although there is little comprehensive escapement information for Yukon River drainagewide coho salmon, it is known that coho salmon primarily return as age-2.1 fish (4-year-old, age in European notation) and overlap in run timing with fall chum salmon. The major contributor to the 2018 coho salmon run will be age-4 fish returning from the 2014 parent year. Based on the run reconstruction index (1995–2017, excluding 1996 and 2009), the 2014 escapement was estimated to be 264,000 coho salmon, which was well above the median (165,000). In 2014, a relatively large amount of coho salmon were harvested incidentally in the directed fall chum

salmon commercial fisheries. Subsistence harvest in 2014 was above the 2004–2013 average of 17,000 coho salmon.

Escapements are primarily monitored in the Tanana River drainage. The Delta Clearwater River (DCR) is a major producer of coho salmon in the upper Tanana River drainage and has comparative escapement monitoring data since 1972 (Appendix B17). The DCR parent year escapement of 4,285 fish in 2014 was below the lower end of the SEG range of 5,200–17,000 coho salmon and well below all average escapements for the system. Six other locations in the Tanana River drainage were surveyed for coho salmon specifically; all but one was below average when compared to the (2012–2016) average escapements. Very informal coho salmon outlooks are made preseason based on average survival of the primary parent year escapement estimate, which in 2018 would indicate that the return would be average. However, the last 4 years of returns (2014–2017) have been high abundance years which may indicate good productivity which typically cycles for several years in succession; thus, it would not be unexpected if the 2018 return was above average.

11.0 STATUS OF ESCAPEMENT GOALS

11.1 SPAWNING ESCAPEMENT TARGET OPTIONS IN 2017

Canadian-origin mainstem Yukon River Chinook and fall chum salmon are managed under the umbrella of the *Yukon River Salmon Agreement* (YRSA). The Yukon River Panel meets annually and recommends escapement goals to the Canadian and U.S. management agencies.

Canadian-origin Mainstem Yukon River Chinook Salmon

In 2010, the Panel adopted an IMEG range of 42,500–55,000 Chinook salmon. In the absence of a biological escapement goal, i.e. a goal based on a production or population model, the IMEG has been retained each year since then. At the April 2017 meeting, the Yukon River Panel took action to implement the current IMEG range of 42,500–55,000 for 3 years, 2017–2019.

Canadian-origin Mainstem Yukon River Fall Chum Salmon

In 2010, the Panel adopted an IMEG range of 70,000–104,000 Canadian-origin mainstem Yukon River fall chum salmon. This range was developed as 0.8 to 1.2 times the estimated spawners at maximum sustained yield (86,600 fish), which was derived prior to the returns from the exceptional 2005 spawning escapement of over 437,000 fall chum salmon. Run size at the border has been assessed through the joint U.S./Canada sonar program near Eagle since 2006. The JTC recommends that the Canadian-origin mainstem Yukon IMEG remain as established in 2010 and remain in place for the 2018 and 2019 season.

Fishing Branch River Fall Chum Salmon

An IMEG range of 22,000–49,000 fall chum salmon for the Fishing Branch River has been extended for 3-year periods since 2008 (Appendix A24). The most recent 3-year period, 2014-2016, just ended. The JTC recommends that Fishing Branch River fall chum salmon IMEG remain in place for the 2018 and 2019 season.

11.2 ESCAPEMENT GOALS FOR ALASKA STOCKS

Yukon salmon escapement goals for all species in Alaska were last reviewed in conjunction with the 2016 Alaska Board of Fisheries (BOF) process for the Arctic, Yukon, and Kuskokwim (AYK)

region (Conitz et al. 2015). Alaska salmon escapement goals are generally reviewed every 3 years coinciding with the BOF cycle. Escapement goal review began in December 2017 and final recommendations will be available in a written report by December 2018.

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FIGURES

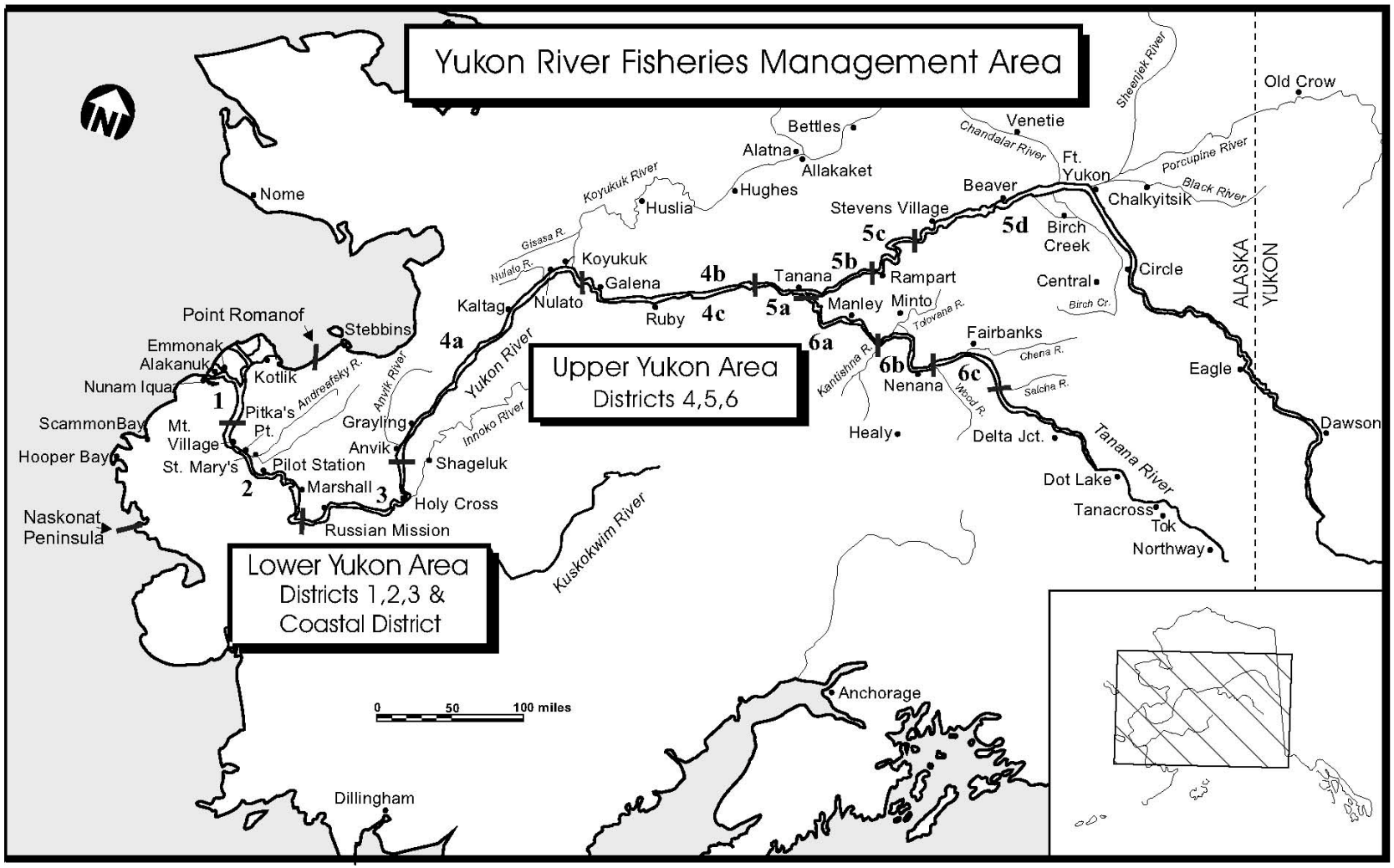

Figure 1.–Map of the Alaska (U.S.) portion of the Yukon River drainage showing communities and fishing districts.

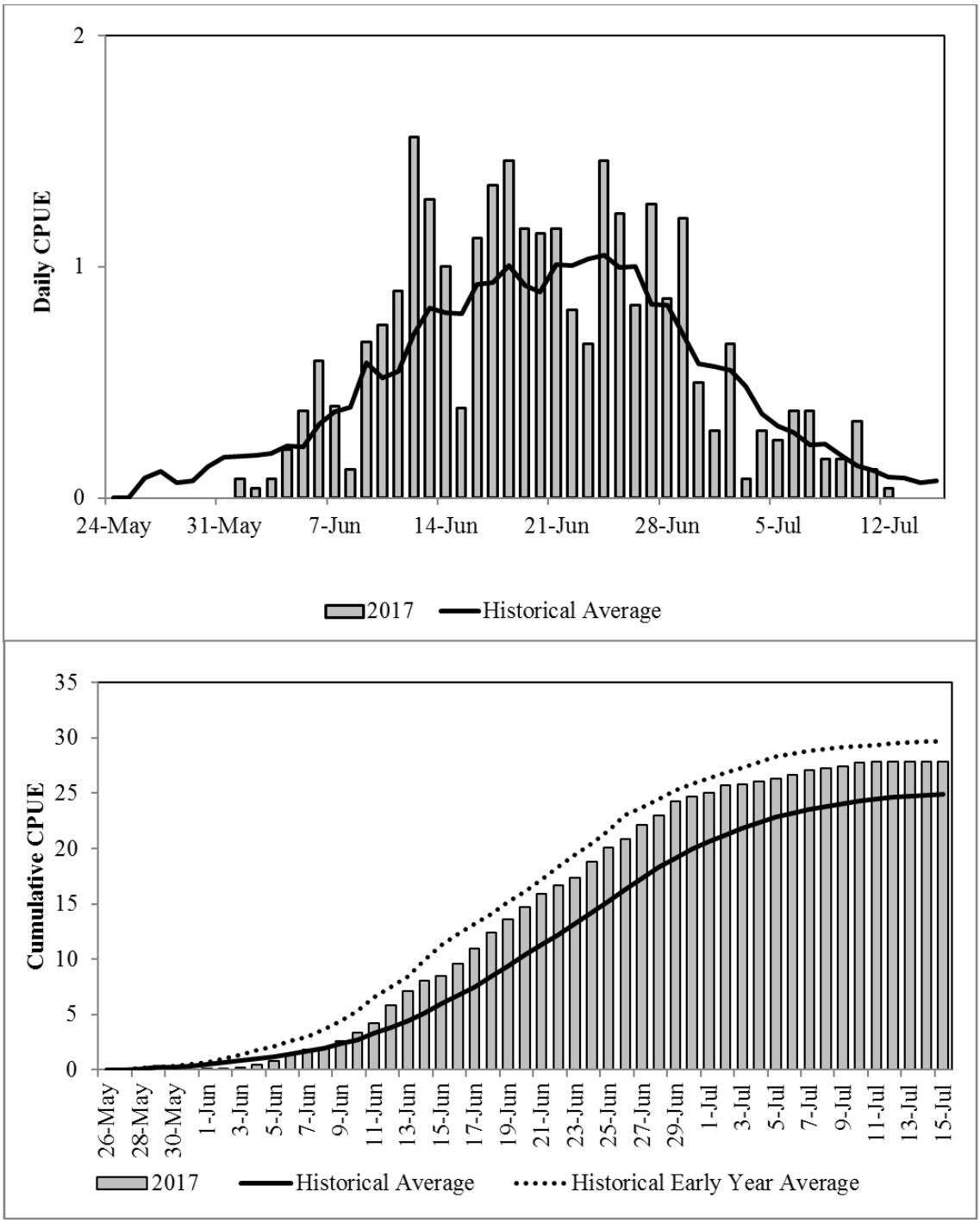

Figure 2.–Daily (top) and cumulative (bottom) catch per unit effort (CPUE) for Chinook salmon in the 8.5-inch set gillnet Lower Yukon Test Fishery in 2017, compared to historic and early year average CPUEs, 1989–2016.

Note: Historical average includes 1989–2011, excluding 2001, 2009 and 2012–2013. Historical early average includes only 1993, 1995, 1996, 2003, 2004, 2014, and 2016.

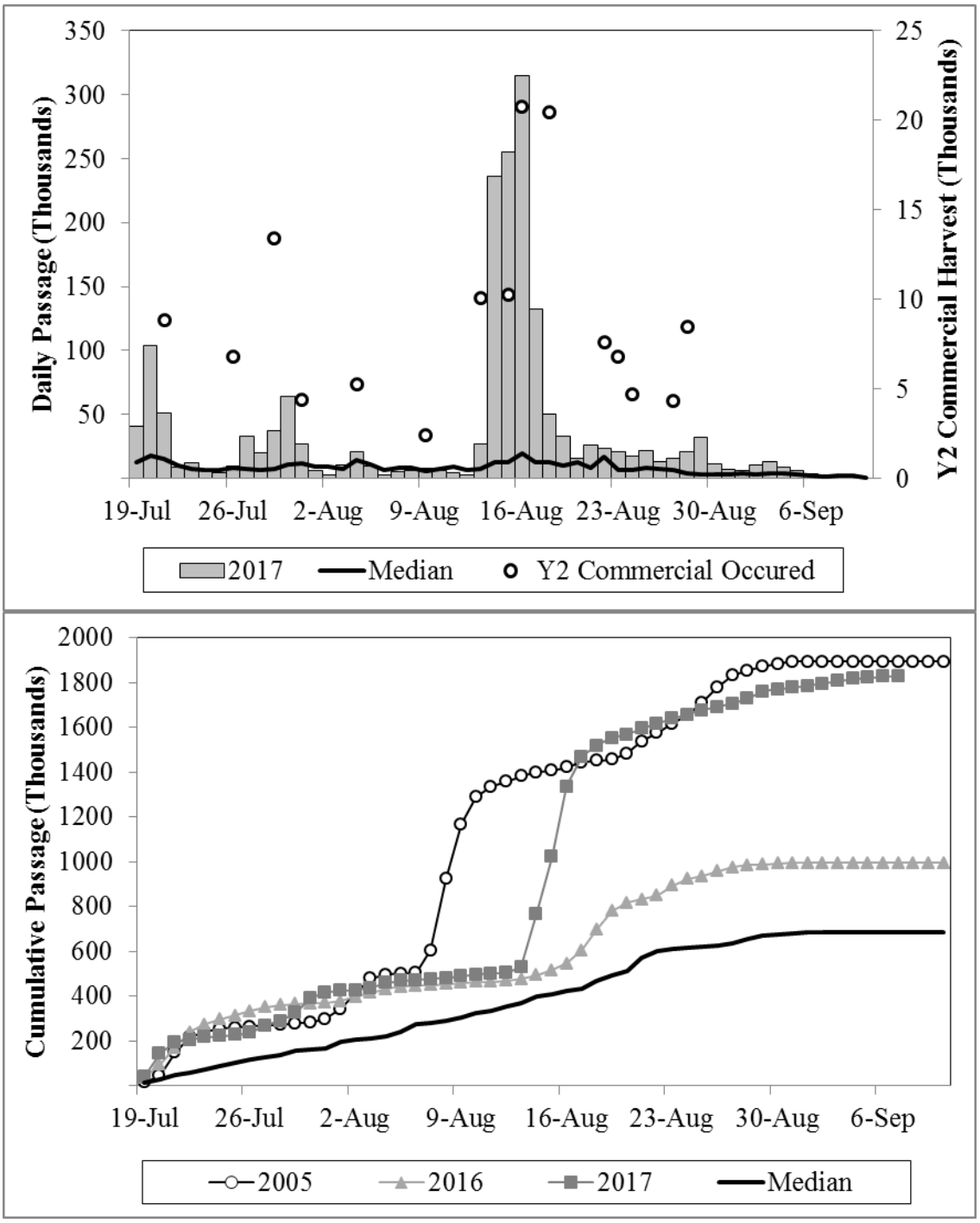

Figure 3.–Top: daily passage estimates of fall chum salmon at the mainstem Yukon River sonar at Pilot Station in 2017. Bottom: cumulative passage estimate of fall chum salmon compared other runs of similar sizes (2005 and 2016) and to the median.

Note: Historical median includes 1995–2016, excluding 1996 and 2009. Y2 refers to District 2 Yukon Area.

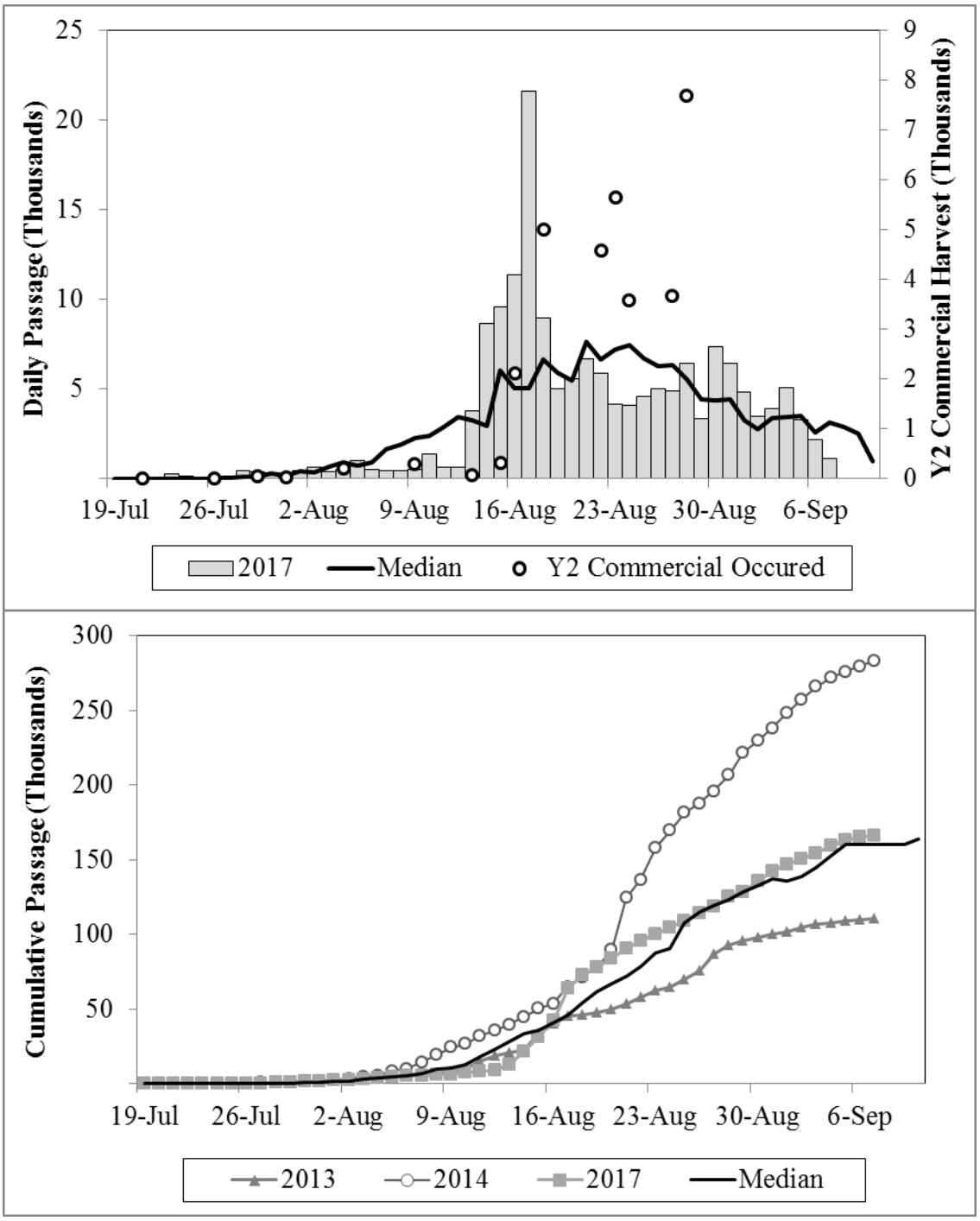

Figure 4.–Top: daily passage estimates of coho salmon at the mainstem Yukon River sonar at Pilot Station. Bottom: cumulative passage estimate of coho salmon compared to other select years (2013 and 2014) and the median.

Note: Historical median includes 1995–2016, excluding 1996 and 2009. Y2 refers to District 2 Yukon Area.

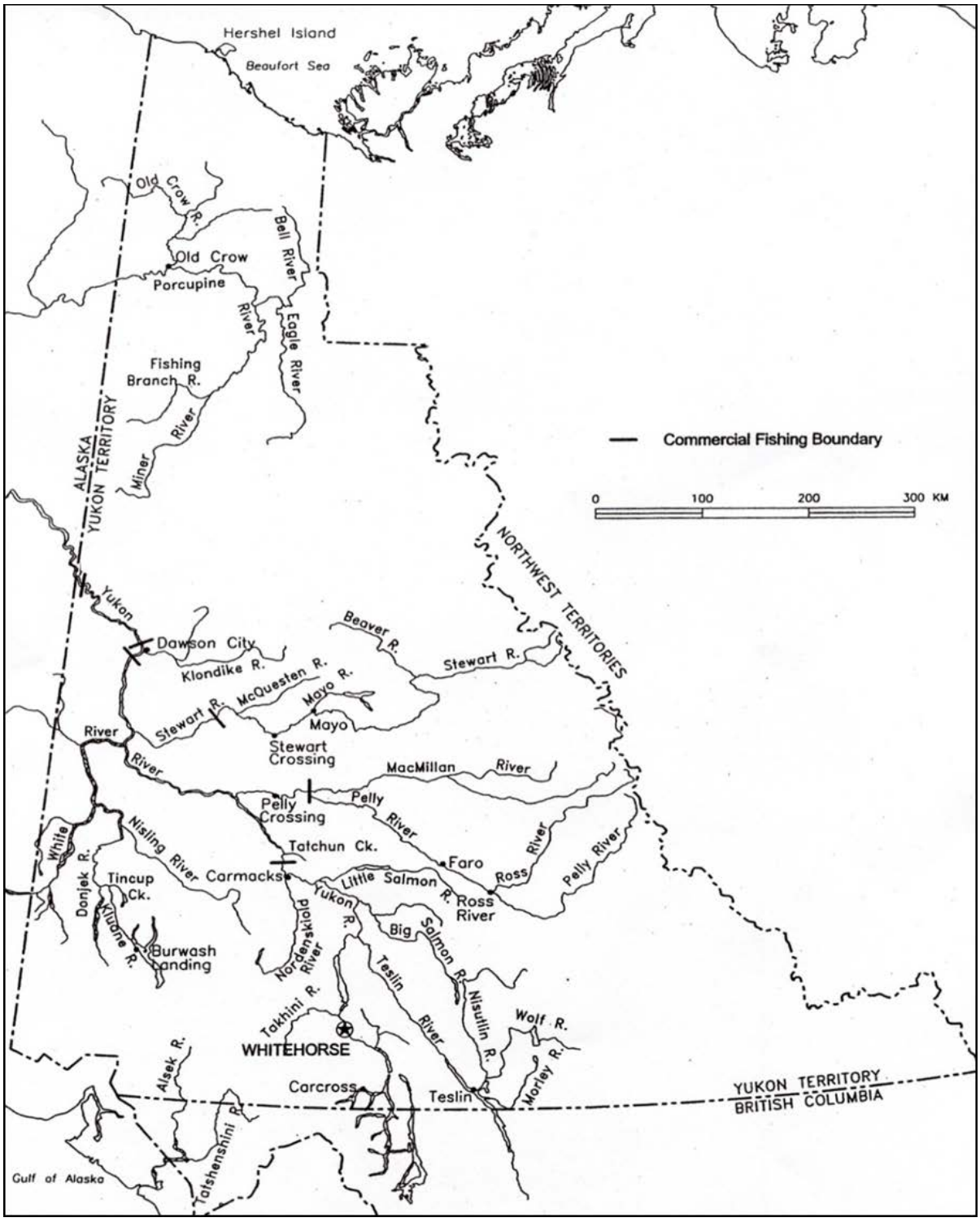

Figure 5.–Commercial fishing boundaries, tributaries, and major towns within the Yukon Territory, Canada.

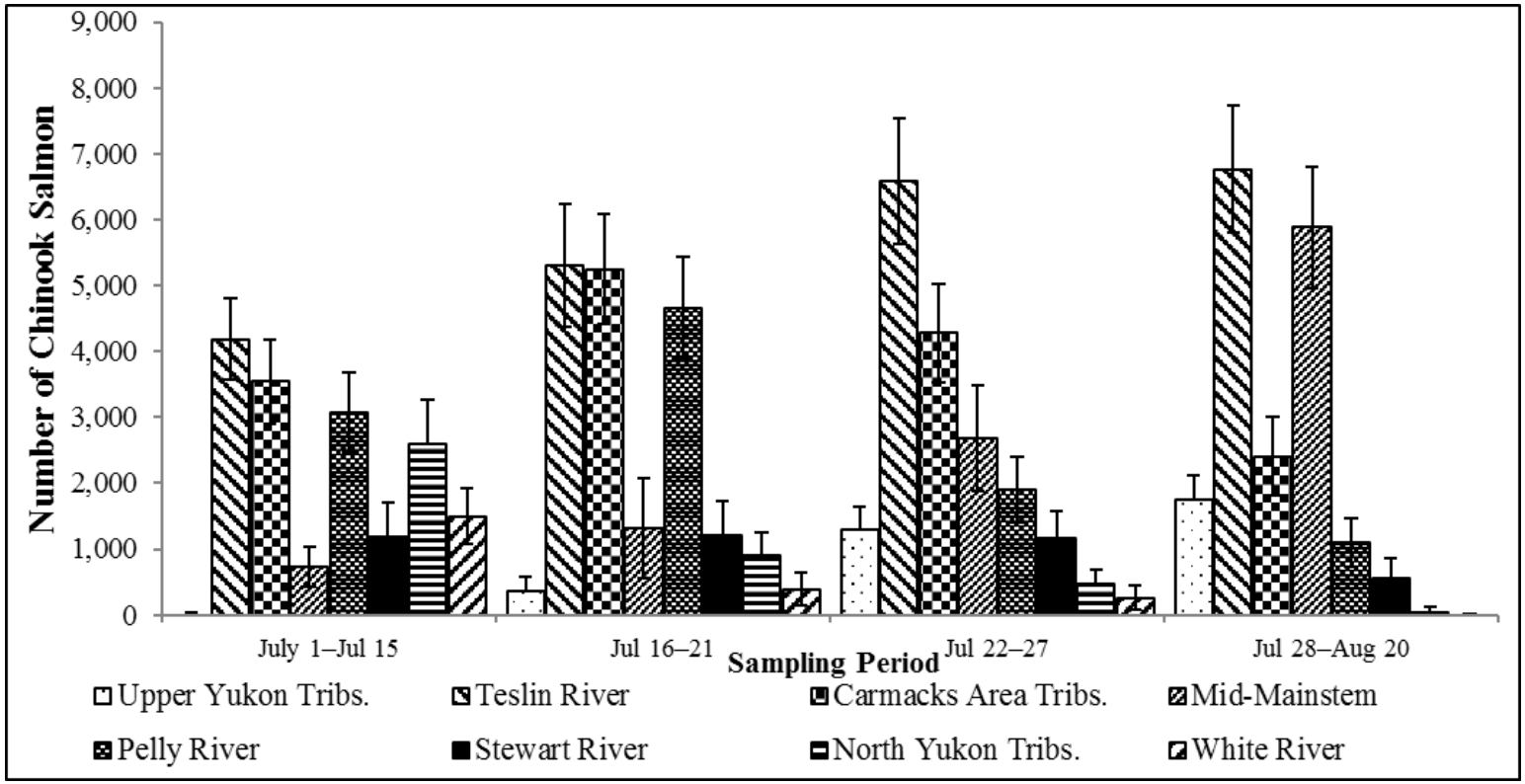

Figure 6.–Seasonal abundance of 8 regional stock aggregates of Canadian-origin Yukon Chinook salmon in 2017.

Note: Stock composition, as determined by genetic stock identification of samples collected through test netting associated with the Eagle sonar assessment, was applied to total abundance estimates from the Eagle sonar to derive these estimates.

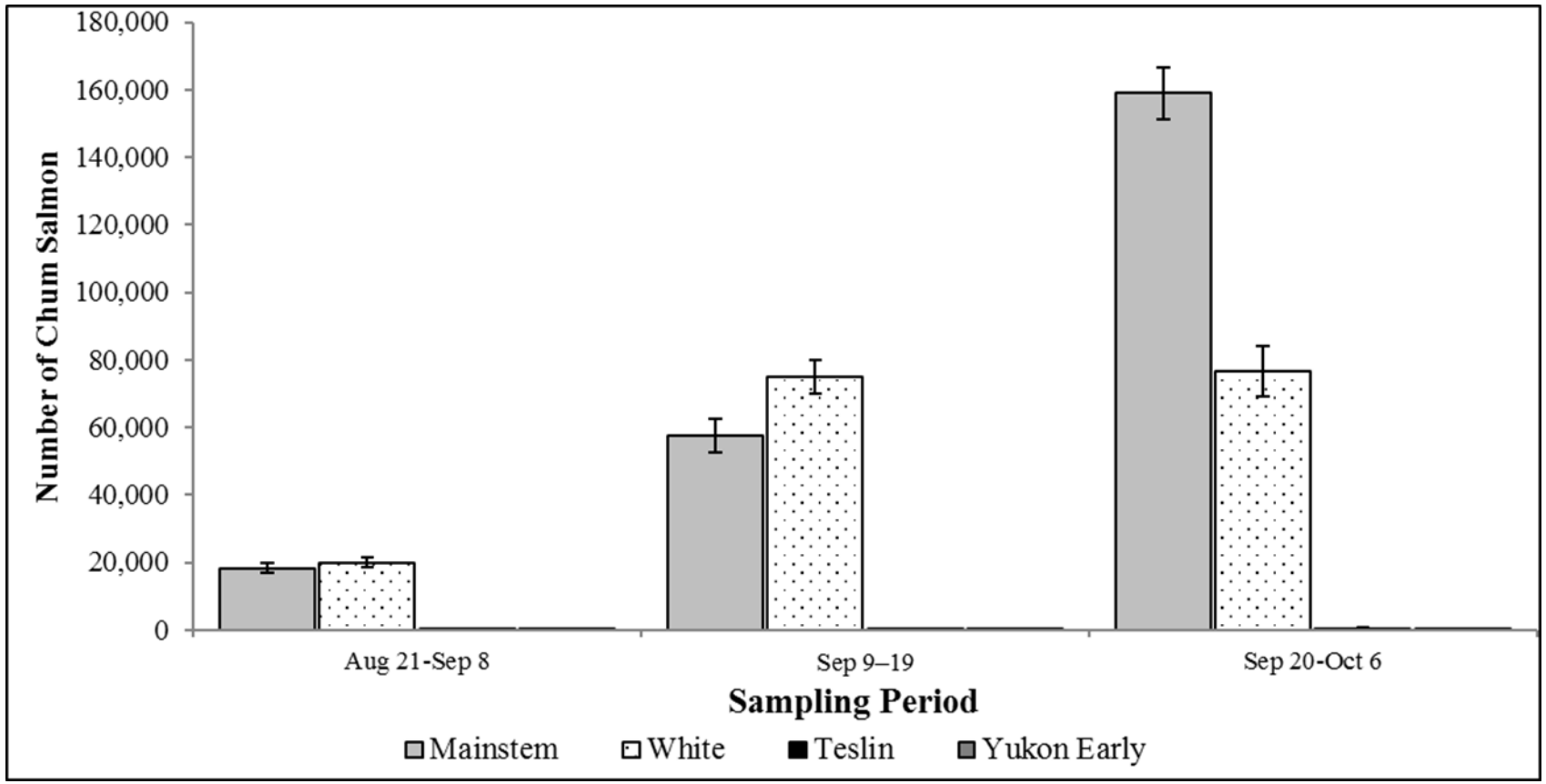

Figure 7.–Seasonal abundance of 4 regional stock aggregates of Canadian-origin Yukon fall chum salmon in 2017.

Note: Stock composition, as determined by genetic stock identification of samples collected through test netting associated with the Eagle sonar assessment, was applied to total abundance estimates from the Eagle sonar to derive these estimates.

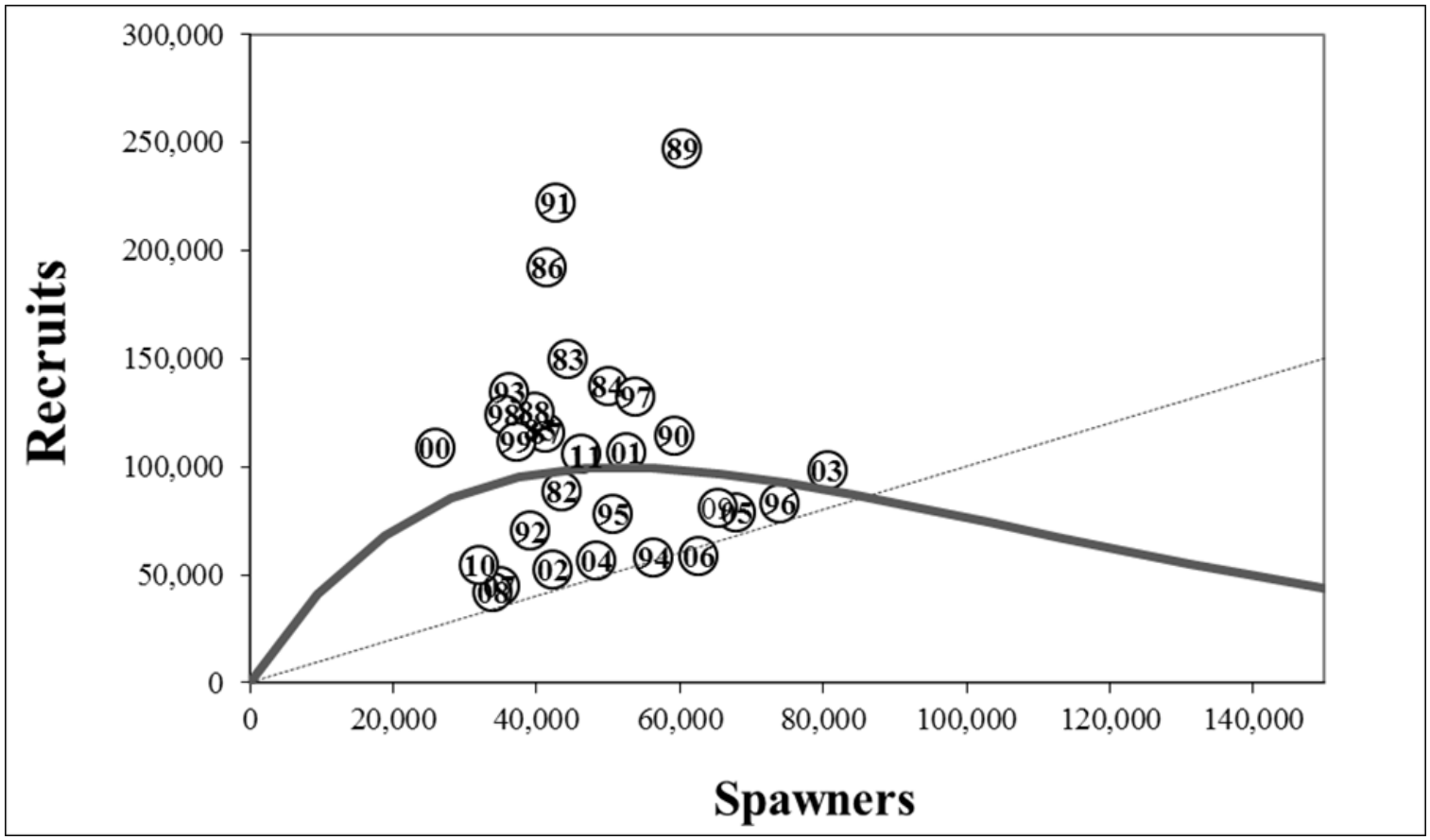

Figure 8.–Yukon River Canadian-origin Chinook salmon recruits versus spawners, Ricker curve, and 1:1 replacement line. Brood years 1982–2011 are included.

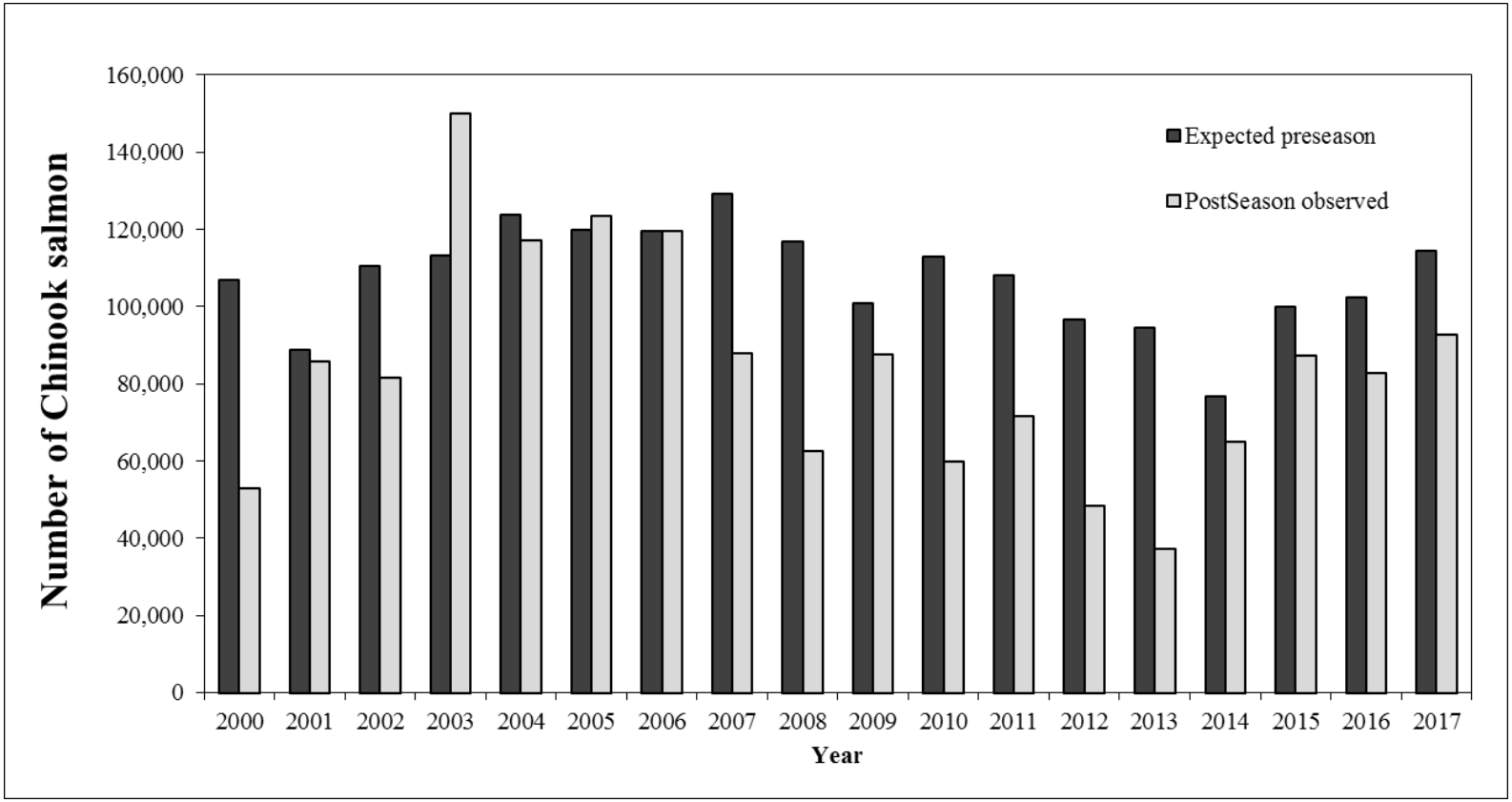

Figure 9.–Expected versus observed number of Canadian-origin Chinook salmon returning to spawn, 2000–2017.

Note: The "expected" value is the average of the Spawner-Recruit and Sibling relationship-generated projections created preseason. Correction value based on model performance has not been applied to the "expected" values. The "observed" is estimated total Canadian-origin run size. This is calculated as the spawning escapement plus the harvests in the U.S. and Canada.

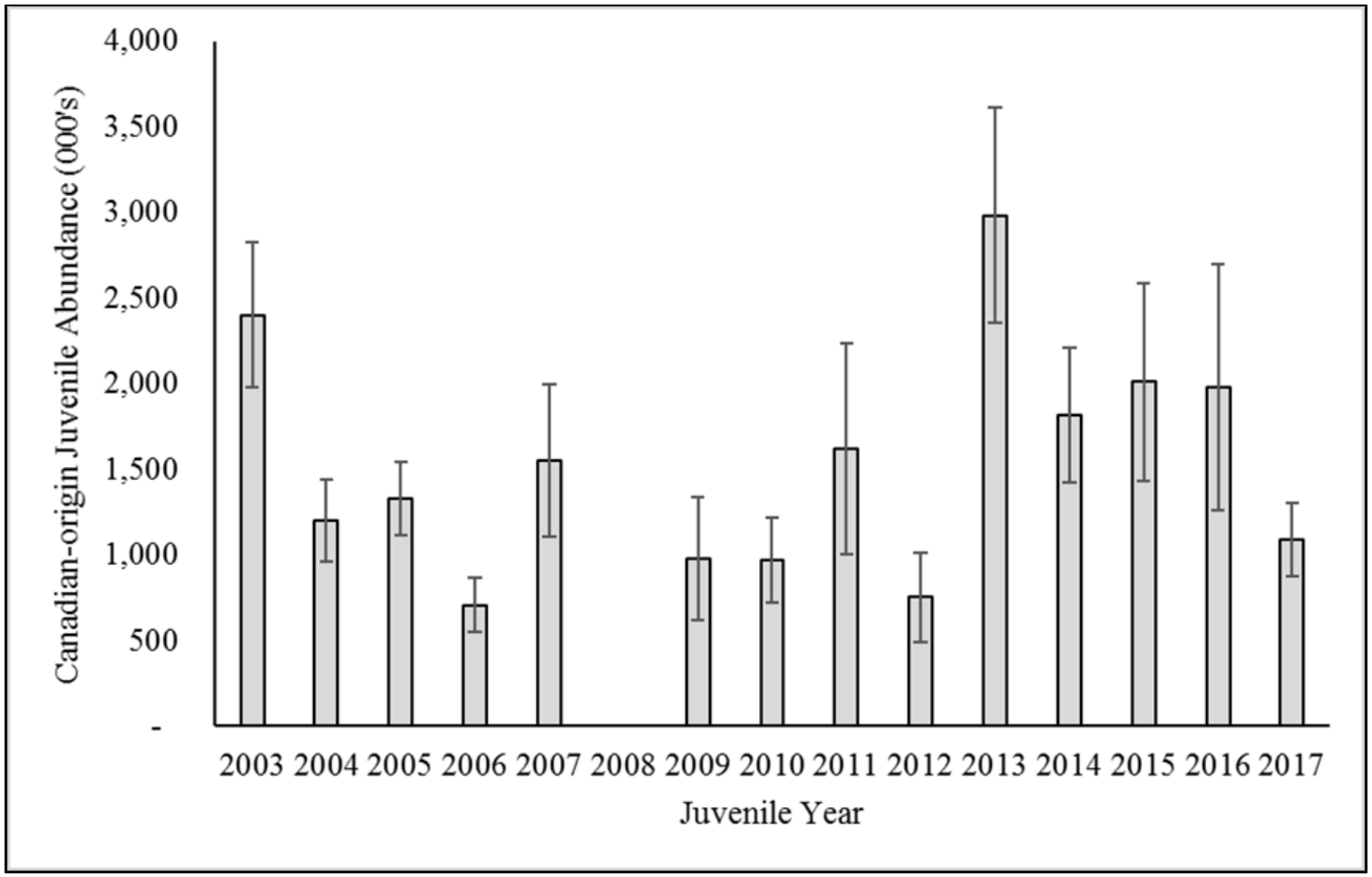

Figure 10.–Juvenile abundance estimates of Canadian-origin Chinook salmon from the Yukon River based on pelagic trawl research surveys in the northern Bering Sea (2003–2017).

Note: Error bars ranges are 2 standard deviation of the abundance estimates. The 2017 estimate is preliminary and subject to change.

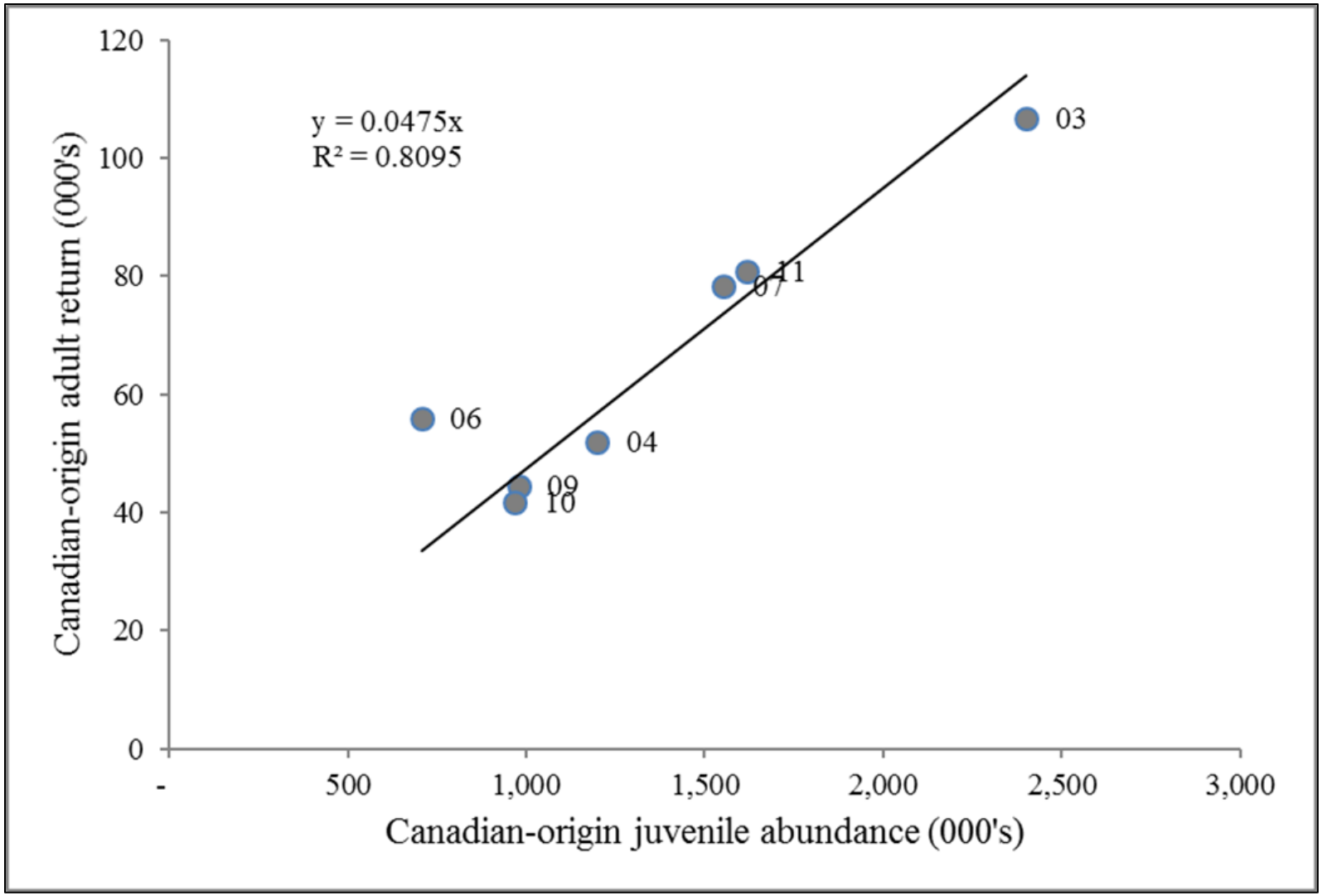

Figure 11.–The relationship between juvenile and adult abundance for Canadian-origin Chinook salmon from the Yukon River. Data labels indicate sampling years for juvenile abundance.

Note: Genetic data are not available for years 2005, 2012, and 2013, therefore, those years are not included in the regression.

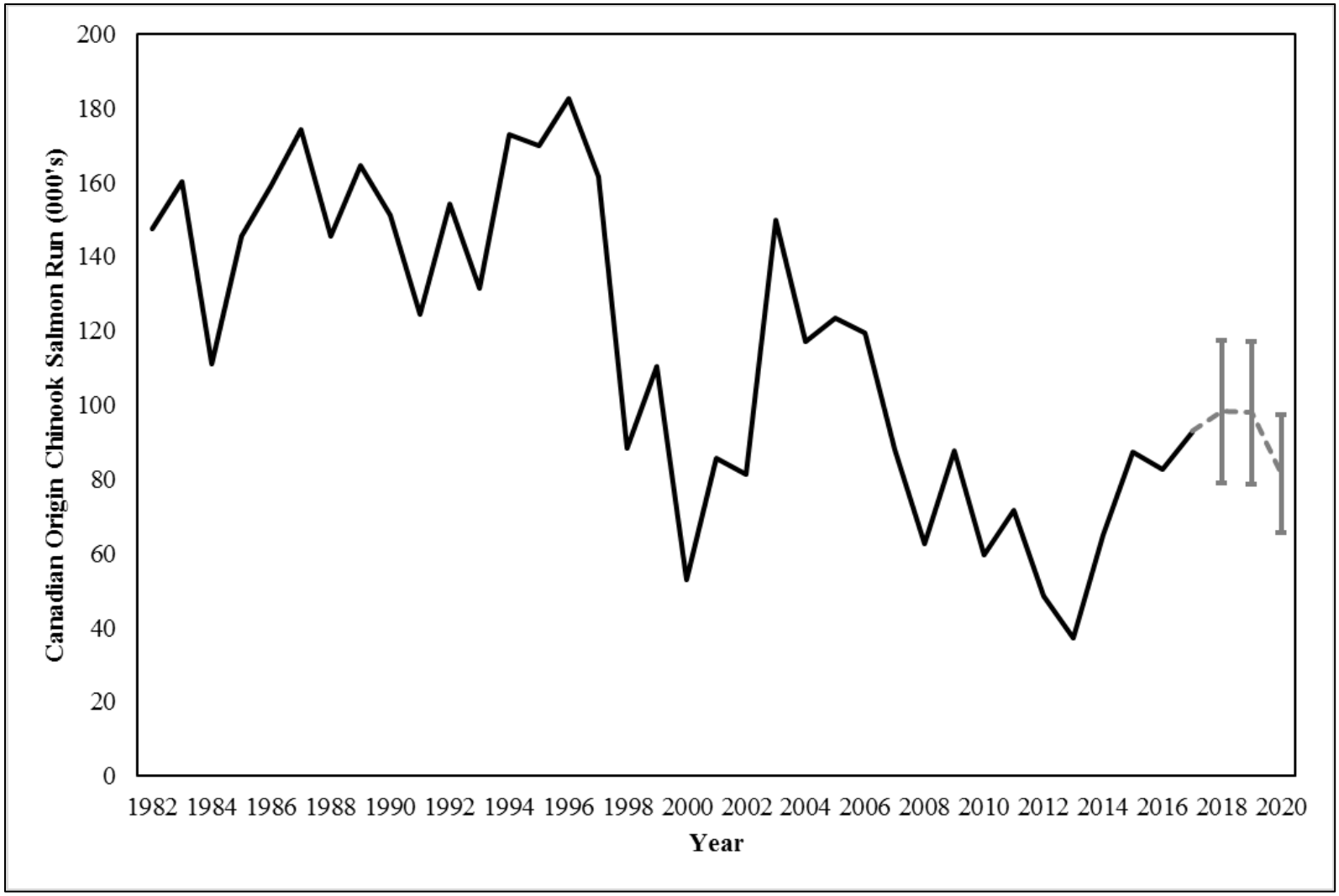

Figure 12.–Historic run size estimates of Canadian-origin Chinook salmon in the Yukon River (solid line 1982–2017) and preliminary projected run sizes based on juvenile abundance (dashed line 2018–2020).

Note: Preliminary run projections exclude 2012 juvenile abundance due to incomplete survey coverage during 2012. Error bar ranges are 2 standard deviation of the abundance estimates.

APPENDIX A: TABLES

Appendix A1.–Yukon River drainage, Alaska, summer chum salmon management plan overview.

Projected Run Size [a]	Recommended Management Actions by Fishery			
	Commercial	Personal Use	Sport	Subsistence
500,000 or Less	Closure	Closure	Closure	Restrictions [b]
500,001 to 650,000	Closure [c]	Closure [c]	Closure [c]	Possible Restrictions [d]
650,001 to 750,000	0 – 50,000 [e]	Restrictions [c]	Restrictions [c]	Normal Fishing Schedules
Greater than 750,000	500,000 – 1,200,000 [f]	Open	Open	Normal Fishing Schedules

[a] ADF&G will use best available data including preseason projections, test fishing indices, age and sex composition, subsistence and commercial harvest reports, and passage estimates from escapement monitoring projects to assess the run.

[b] A directed subsistence summer chum salmon fishery may be opened by emergency order in a district, subdistrict, or portion of a district or subdistrict if indicators show the individual escapement goal for that area will be met.

[c] If indicators show that individual escapement goals and subsistence needs within a district, subdistrict, or portion of a district or subdistrict will be met, ADF&G may open, by emergency order, a summer chum salmon fishery for commercial, sport, or personal use fishing in that district, subdistrict, or portion of a district or subdistrict.

[d] The department may restrict the subsistence directed summer chum salmon fishery to achieve drainagewide escapement of no less than 600,000 summer chum salmon, except that, if indicators show that individual escapement goals within a district, subdistrict, or portion of a district or subdistrict will be met, ADF&G may open, by emergency order, a less restrictive directed subsistence summer chum salmon fishery in that district, subdistrict, or portion of a district or subdistrict.

[e] ADF&G may open a drainagewide commercial fishery with the harvestable surplus distributed by district or subdistrict in proportion to the guideline harvest levels established in 5 AAC 05.362 (g) if buying capacity allows.

[f] When the projected run size of summer chum salmon is more than 750,000 fish, ADF&G may open, by emergency order, a drainagewide commercial fishery managed to achieve escapements within the established drainagewide escapement goal range of 500,000–l,200,000 summer chum salmon. The targeted harvest of the surplus will be distributed by district or subdistrict in proportion to the guideline harvest levels established in 5 AAC 05.362 (g).

Appendix A2.–Passage estimates based on the mainstem Yukon River sonar near Pilot Station, Alaska, Yukon River drainage, 1995 and 1997–2017.

	Chinook			Chum						
Year [a]	Large [b]	Small	Total	Summer	Fall [c]	Total	Coho [c]	Pink	Other [d]	Total
1995	164,867	45,874	210,741	3,632,179	1,156,278	4,788,457	119,893	53,277	708,747	5,881,115
1997 [e]	114,519	85,244	199,763	1,359,117	579,767	1,938,884	118,065	3,872	376,841	2,637,425
1998	88,129	19,909	108,038	824,901	375,222	1,200,123	146,365	103,416	210,677	1,768,619
1999	159,805	24,413	184,218	969,459	451,505	1,420,964	76,174	3,947	337,701	2,023,004
2000	48,321	6,239	54,560	448,665	273,206	721,871	206,365	61,389	262,627	1,306,812
2001 [f]	104,060	17,029	121,089	442,546	408,961	851,507	160,272	2,846	265,749	1,401,463
2002	111,290	40,423	151,713	1,097,769	367,886	1,465,655	137,077	123,698	405,534	2,283,677
2003	287,729	30,359	318,088	1,183,009	923,540	2,106,549	280,552	11,370	379,651	3,096,210
2004	138,317	62,444	200,761	1,344,213	633,368	1,977,581	207,844	399,339	391,939	3,177,464
2005 [g]	165,349	22,527	187,876	2,384,645	1,893,688	4,278,333	194,372	61,091	364,250	5,085,922
2006	192,296	36,467	228,763	3,780,760	964,238	4,744,998	163,889	183,006	531,047	5,851,703
2007	119,622	50,624	170,246	1,875,491	740,195	2,615,686	192,406	126,282	761,657	3,866,277
2008	138,220	36,826	175,046	1,849,553	636,525	2,486,078	145,378	580,127	306,225	3,692,854
2009 [h]	128,154	49,642	177,796	1,477,186	274,227	1,751,413	240,779	34,529	589,916	2,794,433
2010	118,335	26,753	145,088	1,415,027	458,103	1,873,130	177,724	917,731	569,905	3,683,578
2011	117,213	31,584	148,797	2,051,501	873,877	2,925,378	149,533	9,754	453,537	3,686,999
2012	106,529	21,026	127,555	2,136,476	778,158	2,914,634	130,734	420,344	464,058	4,057,325
2013	120,536	16,269	136,805	2,849,683	865,295	3,714,978	110,515	6,126	732,009	4,700,433
2014	120,060	43,835	163,895	2,020,309	706,630	2,726,939	283,421	679,126	584,831	4,438,212
2015	105,063	41,796	146,859	1,591,505	669,483	2,260,988	121,193	39,690	853,989	3,422,719
2016	135,013	41,885	176,898	1,921,748	994,760	2,916,508	168,297	1,364,849	355,365	4,981,917
2017	217,821	45,193	263,014	3,093,735	1,829,931	4,923,666	166,320	166,529	796,199	6,315,728

Note: Historical passage estimates at the mainstem Yukon River sonar near Pilot Station were adjusted in 2016 after the adoption of a new species apportionment model.

[a] Estimates for all years were generated with the most current apportionment model and may differ from earlier estimates.

[b] Chinook salmon >655 mm measured mideye to fork length.

[c] This estimate may not include the entire run. Most years operated through August 31, except 1995 (September 3), 1998 (September 9), 2000 (September 14) and 2008–2014 (September 7).

[d] Includes sockeye salmon, cisco, whitefish, sheefish, burbot, suckers, Dolly Varden, and northern pike.

[e] High water levels were experienced at Pilot Station in 2009 during the summer season and extreme low water occurred during the fall season, and therefore passage estimates are considered conservative.

[f] Estimates include extrapolations for the dates June 10 to June 18, 2005 to account for the time before the DIDSON was deployed.

[g] High water levels were experienced at Pilot Station in 2001 throughout the season, and therefore passage estimates are considered conservative.

[h] The Yukon River sonar project did not operate at full capacity in 1996 and there are no passage estimates for this year.

Appendix A3.–Alaska commercial salmon sales (in numbers) by district and subdistrict, 2017.

District/Subdistrict	Number of Fishermen [a]	Chinook	Summer Chum	Fall Chum	Coho	Pink
1	338	168	345,395	328,410	95,982	0
2	157	0	47,770	134,668	33,277	0
Subtotal Districts 1 and 2	457	168	393,165	463,078	129,259	0
3	–	–	–	–	–	–
Total Lower Yukon Area	457	168	393,165	463,078	129,259	0
Anvik River	–	–	–	–	–	–
4-A	10	–	157,831	1,402	0	–
4-BC	–	–	–	–	–	–
Subtotal District 4	10	–	157,831	1,402	0	–
5-ABC	4	–	–	1,952	0	–
5-D	–	–	–	–	–	–
Subtotal District 5	4	–	–	1,952	0	–
6-ABC	5	0	4,300	23,270	9,656	0
Total Upper Yukon Area	19	0	162,131	26,624	9,656	0
Total Alaska	476	168	555,296	489,702	138,915	0

Note: En dash indicates no commercial fishing activity occurred. Does not include ADF&G test fishery sales.

[a] Number of unique permits fished by district, subdistrict or area. Totals by area may not add up due to transfers between districts or subdistricts.

Appendix A4.–Number of commercial salmon fishing gear permit holders making at least 1 delivery by district and season, Yukon Area, Alaska, 1990–2017.

Chinook and Summer Chum Salmon Season									
	Lower Yukon Area				Upper Yukon Area				Yukon Area
Year	District 1	District 2	District 3	Subtotal	District 4	District 5	District 6	Subtotal	Total
1990	453	242	15	679	92	27	23	142	821
1991	489	253	27	678	85	32	22	139	817
1992	438	263	19	679	90	28	19	137	816
1993	448	238	6	682	75	30	18	123	805
1994	414	250	7	659	55	28	20	103	762
1995	439	233	0	661	87	28	21	136	797
1996	448	189	9	627	87	23	15	125	752
1997	457	188	0	639	39	29	15	83	722
1998	434	231	0	643	0	18	10	28	671
1999	412	217	5	631	5	26	6	37	668
2000	350	214	0	562	0	0	0	0	562
2001 [a]	-	-	-	-	-	-	-	-	-
2002	322	223	0	540	0	18	6	24	564
2003	351	217	0	556	3	16	7	26	582
2004	396	212	0	549	0	14	6	20	569
2005	370	228	0	578	0	12	5	17	595
2006	379	214	6	569	0	15	10	25	594
2007	359	220	3	564	5	12	10	27	591
2008	266	181	0	444	8	0	5	13	457
2009	213	166	0	376	6	0	5	11	387
2010	264	181	0	440	5	0	5	10	450
2011	228	182	0	403	0	0	5	5	408
2012	242	178	0	413	11	0	3	14	427
2013	220	174	0	384	9	0	2	11	395
2014	231	183	0	405	10	0	1	11	416
2015	270	177	0	435	0	0	2	2	437
2016	245	198	0	435	0	0	2	2	437
2017	284	114	0	388	10	10	0	3	13
2007–2016 Average	254	184	0	430	5	5	1	4	11

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Fall Chum and Coho Salmon Season									
	Lower Yukon Area				Upper Yukon Area				Yukon Area
Year	District 1	District 2	District 3	Subtotal	District 4	District 5	District 6	Subtotal	Total
1990	301	227	19	529	11	11	27	49	578
1991	319	238	19	540	8	21	25	54	594
1992	0	0	0	0	0	0	22	22	22
1993 [a]	-	-	-	-	-	-	-	-	-
1994	0	0	0	0	0	1	11	12	12
1995	189	172	0	357	4	12	20	36	393
1996	158	109	0	263	1	17	17	35	298
1997	176	130	0	304	3	8	0	11	315
1998	0	0	0	0	0	0	0	0	0
1999	146	110	0	254	4	0	0	4	258
2000 [a]	-	-	-	-	-	-	-	-	-
2001 [a]	-	-	-	-	-	-	-	-	-
2002 [a]	-	-	-	-	-	-	-	-	-
2003	75	0	0	75	2	0	5	7	82
2004	26	0	0	26	0	0	6	6	32
2005	177	0	0	177	0	0	7	7	184
2006	219	71	0	286	0	4	11	15	301
2007	181	122	0	300	0	2	8	10	310
2008	251	177	0	428	0	3	8	11	439
2009	165	130	0	292	0	0	2	2	294
2010	72	18	0	90	0	0	4	4	93
2011	234	169	0	395	0	2	5	7	402
2012	266	201	0	457	4	3	5	12	469
2013	251	197	0	436	0	1	6	7	443
2014	256	199	0	441	0	2	2	4	445
2015	266	184	0	440	0	1	5	6	446
2016	275	197	0	459	0	4	4	8	467
2017	318	144	0	438	5	4	4	13	451
2007–2016 Average	222	159	0	374	0	2	5	7	381

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COMBINED SEASON									
	Lower Yukon Area				Upper Yukon Area				Yukon Area
Year	District 1	District 2	District 3	Subtotal	District 4	District 5	District 6	Subtotal	Total
1990	459	258	22	679	92	31	30	153	832
1991	497	272	29	680	85	33	28	146	826
1992	438	263	19	679	90	28	25	143	822
1993	448	238	6	682	75	30	18	123	805
1994	414	250	7	659	55	28	20	103	762
1995	446	254	0	664	87	31	24	142	806
1996	455	217	9	628	87	29	19	135	763
1997	463	221	0	640	39	31	15	85	725
1998	434	231	0	643	0	18	10	28	671
1999	422	238	5	632	6	26	6	38	670
2000	349	214	0	561	0	0	0	0	561
2001 [a]	-	-	-	-	-	-	-	-	-
2002	322	223	0	540	0	18	6	24	564
2003	358	217	0	557	3	16	8	27	584
2004	399	212	0	551	0	14	9	23	574
2005	392	228	0	581	0	12	9	21	602
2006	396	224	6	574	0	20	16	36	610
2007	366	236	3	566	5	13	12	30	596
2008	297	208	0	474	8	3	11	22	496
2009	226	172	0	391	6	0	6	12	403
2010	274	183	0	444	5	0	6	11	455
2011	260	201	0	437	0	2	7	9	446
2012	284	210	0	475	11	3	5	19	494
2013	264	211	0	451	9	1	6	16	467
2014	277	216	0	468	10	2	2	14	482
2015	299	207	0	480	0	1	5	6	486
2016	288	216	0	483	0	4	5	9	492
2017	338	157	0	457	19	4	5	19	476
2007–2016 Average	284	206	0	467	5	3	7	15	482

Note: Subtotals and combined season (summer and fall) totals are not additive because fishermen may have operated in more than 1 district during the year. Dash indicates no harvest occurred.

[a] No commercial salmon fishery was conducted the entire season in 2001.

Appendix A5.–Yukon River drainage, Alaska, fall chum salmon management plan overview, 5 AAC 01.249.

Run Size Estimate [b] (Point Estimate)	Recommended Management Action [a] Fall Chum Salmon Directed Fisheries				Targeted Drainagewide Escapement
	Commercial	Personal Use	Sport	Subsistence	
300,000 or Less	Closure	Closure	Closure	Closure [c]	300,000
300,001 to 550,000	Closure	Closure [c]	Closure [c]	Possible Restrictions [c, d]	to
Greater Than 550,001	Open [e]	Open	Open	Regulatory Fishing Schedules	600,000

[a] Considerations for the Canadian mainstem rebuilding plans may require more restrictive management actions.

[b] ADF&G will use the best available data, including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects.

[c] The fisheries may be opened or less restrictive in areas where indicator(s) suggest the escapement goal(s) in that area will be achieved.

[d] Subsistence fishing will be managed to achieve a minimum drainagewide escapement goal of 300,000 fall chum salmon.

[e] Drainagewide commercial fisheries may be open and the harvestable surplus above 550,000 fall chum salmon will be distributed by district or subdistrict (in proportion to the guidelines harvest levels established in 5 AAC 05.365 and 5 AAC 05.367).

Appendix A6.–Canadian weekly commercial catches of Chinook, fall chum and coho salmon in the Yukon River in 2017.

Statistical Week	Week Ending	Start Date	Finish Date	Days Fished	Number of Fishermen	Boat Days	Chinook Salmon	Chum Salmon	Coho Salmon
28	15-Jul	9-Jul	15-Jul	closed					
29	22-Jul	16-Jul	22-Jul	closed					
30	29-Jul	23-Jul	29-Jul	closed					
31	5-Aug	30-Jul	5-Aug	closed					
32	12-Aug	6-Aug	12-Aug	closed					
33	19-Aug	13-Aug	19-Aug	closed					
34	26-Aug	20-Aug	26-Aug	closed					
35	2-Sep	27-Aug	2-Sep	3	0.3	24.0	0	42	0
36	9-Sep	3-Sep	9-Sep	7	0.7	5.0	0	222	0
37	16-Sep	10-Sep	16-Sep	7	0.0	0.0	0	231	0
38	23-Sep	17-Sep	23-Sep	7	0.9	6.0	0	474	0
39	30-Sep	24-Sep	30-Sep	7	1.1	8.0	0	1,060	0
40	7-Oct	1-Oct	7-Oct	7	0.6	4.0	0	362	0
41	14-Oct	8-Oct	14-Oct	7	0.0	0.0	0	0	0
42	21-Oct	15-Oct	21-Oct	5	0.1	0.0	0	13	0
43	28-Oct	22-Oct	28-Oct	closed	0.0	0.0	0	0	0
Dawson Area Commercial				50.0		24.0	0	2,404	0
Upriver Commercial							0	0	0
Total Commercial Harvest							0	2,404	0
Domestic							0	0	0
Recreational							0	0	0
Aboriginal Fishery							3,500 [a]	1,000 [a]	0
Total Upper Yukon Harvest							3,500	3,404	0
Old Crow Aboriginal Fishery							131	2,312 [a]	71 [a]
Total Canada Harvest							3,631 [a]	5,716 [a]	71 [a]

Note: Number of fishermen = Average number of fishermen over days open.

[a] Data are preliminary.

Appendix A7.–Salmon fishery projects conducted in the U.S. (Alaska) portion of the Yukon River drainage in 2017.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Building & Maintaining Public Support of Salmon Resource Management	Yukon River Drainage, Alaska	Annual river-wide meeting for fishermen to discuss Yukon River fishery issues and provide State and Federal managers with input from YR communities.	Feb-Apr	YRDFA, USFWS. ADF&G	All aspects R&M Funding
Yukon River Preseaon Salmon Preparation Meeting	Yukon River drainage, Alaska	Annual river-wide forum for fishermen to interact with state and federal managers for sharing input and prepare for the coming fishing season.	April	YRDFA, ADF&G, USFWS	All aspects R&E Funding
Commercial Catch and Effort Assessment	Alaska portion of the Yukon River drainage	1) Document and estimate the catch and associated effort of the Alaska Yukon River and; 2) Commercial salmon fishery via receipts (fish tickets) of commercial sales of salmon.	Jun-Oct	ADF&G	All aspects
Commercial Catch Sampling and Monitoring	Alaska portion of the Yukon River drainage	1) Determine age, sex and size of Chinook, chum and coho salmon harvested in Alaska Yukon River commercial fisheries and; 2) Monitor Alaska commercial fishery openings and closures.	Jun-Oct	ADF&G, ADPS	All aspects Enforcement
Subsistence and Personal Use Catch and Effort Assessment	Alaska portion of the Yukon River drainage	Document and estimate the catch and associated effort of the Alaska Yukon River subsistence salmon fishery via interviews, catch calendars, mail-out questionnaires, telephone interviews, and subsistence fishing permits, and of the personal use fishery based on fishery permits.	Ongoing	ADF&G, YRDFA	All aspects Assistants in Communities
Sport Catch, Harvest and Effort Assessment	Alaska portion of the Yukon River drainage	Document and estimate the catch, harvest, and associated effort of the Alaska Yukon River sport fishery via post-season mail-out questionnaires.	Postseason	ADF&G	All aspects
Biological Sampling of Yukon River Salmon	Yukon, RM 17-1,002	Collect genetics samples and age, sex, and length information from subsistence caught Chinook salmon.	Jun-Aug	Spearfish Research	All aspects
Yukon River Chinook Microsatellite Baseline	Yukon River drainage	Survey standardized microsatellites and Yukon River Chinook salmon both U.S. and Canada populations.	Ongoing	ADF&G, USFWS, DFO	TI Funding R&E Funding

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Appendix A7.–Page 2 of 6.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Yukon River Salmon Stock Identification	Yukon River drainage	Estimate Chinook salmon stock composition of the various Yukon River drainage harvests through genetic stock identification, age compositions, and geographical distribution of catches and escapements.	Ongoing	ADF&G	All aspects TI Funding
Yukon Delta Smolt	Yukon Delta (mouths and delta platform)	1) Determine the composition and spatio-temporal variation in prey species of juvenile Chinook salmon; 2) Determine the quality of dominate juvenile Chinook salmon prey;3) Assess the relationship between prey quality and juvenile Chinook salmon size and condition during summer; 4) Evaluate juvenile Chinook salmon spatial distribution and habitat use in relation to prey communities in Yukon River tributaries and delta habitats; and 5) evaluate spatio-temporal differences in juvenile Chinook salmon condition, size, and energy content.	May-Aug	NOAA-AFSC & Spearfish Research & YDFDA	All aspects
Local and Traditional Knowledge (LTK) of Freshwater Aspects of Chinook Salmon Life Cycle, Yukon River	St. Marys, Anvik, Huslia, Allakaket, and Fort Yukon	1) Identify and map the specific fresh-water habitat areas where local residents have personal experience through fishing or other activities;2) Conduct in-depth ethnographic interviews to document LTK of these areas regarding such factors as spawning density and behavior, water quality, migratory access; 3) Compare ethnographic data to results of area enumeration projects for potential correlation; 4) Consult the Anadromous Waters Catalog regarding identified areas and compare with results of key respondent interviews/maps.	Dec 2013 – Jun 2018	ADF&G	All aspects
Patterns and Trends in Subsistence Salmon Fishing on the Yukon River	Alakanuk, Marshall, Nulato, Galena, Beaver, and Eagle.	1) Compare community and household harvest databases; conduct quality and control assessment; 2) Analyze the databases to identify harvest patterns and trends that influence harvest activities for 3 salmon species (Chinook, summer chum and fall chum salmon) in 6 communities.	Dec 2013 – Feb 2018	ADF&G	All aspects
Customary Trade Barter as part of a Continuum of Exchange Practices in 3 Upper Yukon River Region Communities	Fort Yukon, Manley Hot Springs and Venetie	1) Use ethnographic methods to describe how customary trade practices fit within the overall subsistence use of salmon in the Upper Yukon Area, both historically and in present time; 2) administer household surveys to document the scope and local nature of barter and customary trade. Describe exchange networks and transactions in terms of the species and the way fish is processed and traded, quantify transactions; 3) improve understanding of the role of customary trade within a continuum of exchange practices, including any potential effects on the practice as a result of poor Chinook salmon runs.	Dec 2013 – Jan 2018	ADF&G & YRDFA	ADF&G data entry, analysis and final report. YRDFA data collection and some write-up.

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Appendix A7.–Page 3 of 6.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
YRDFA Weekly Teleconferences	Yukon River drainage	Acts as a forum for fishermen along the Yukon River to interact with state and federal managers for the collection and dissemination of fisheries information.	May–Sep	YRDFA	All aspect OSM Funding
Lower Yukon River Set Gillnet Test Fishing	South, Middle, and North mouths of the Yukon River Delta, RM 20	1) Index Chinook salmon run timing and abundance using set gillnets and; 2) Sample captured salmon for age, sex, size composition information.	Jun–Aug	ADF&G, YDFDA	All aspects
Lower Yukon River Drift Test Fishing	South, Middle, and North mouths of the Yukon River Delta, RM 20	1) Index Chinook, summer and fall chum, and coho salmon run timing and abundance using drift gillnets and; 2) Sample captured salmon for age, sex, size composition information.	Jun–Aug	ADF&G, YDFDA	All aspects
Mountain Village Drift Gillnet Test Fishing	Mainstem Yukon River, RM 87	1) Index fall chum and coho salmon run timing and relative abundance using drift gillnets and; 2) Sample captured salmon for age, sex, size composition information.	Jul–Sep	Sandone Consulting LLC, ATC, ADF&G	All aspects R&M funding
East Fork Weir, Andreafsky River	RM 20 East Fork, Yukon RM 124	Estimate daily escapement, with age, sex and size composition, of Chinook and summer chum salmon into the East Fork of the Andreafsky River.	Jun–Aug	USFWS	All aspects OSM Funding
Anvik River Sonar	RM 40 Anvik River, Yukon RM 358	1) Estimate daily escapement of summer chum salmon to the Anvik River and; 2) Estimate age, sex, and size composition of the summer chum salmon escapement.	Jun–Jul	ADF&G	All aspects AKSSF Funding
Inseason Monitoring of Subsistence Salmon Harvests	Marshall, Yukon RM 161	Collected inseason data by conducting door-to-door salmon harvest surveys during the fishing season with reference to: 1) local research assistant capacity with staff oversight; 2) financial costs; 3) community response; provide regular updates to managers; and 4) currently producing report outlining results.	May–Jan	ADF&G	All aspects
Yukon River Sonar	Pilot Station, RM 123	Estimate Chinook and summer and fall chum salmon passage in the mainstem Yukon River. Apportionment of species including coho salmon and other finfish.	May–Sep	ADF&G	All aspects
Gisasa River Weir	RM 3 Gisasa River, Koyukuk River drainage, RM 567	1) Estimate daily escapement of Chinook and summer chum salmon into the Gisasa River and; 2) Estimate age, sex, and size composition of the Chinook and summer chum salmon escapements.	June–Aug	USFWS	All aspects OSM Funding
Henshaw Creek Weir	RM 1 Henshaw Creek, Koyukuk River drainage, RM 976	1) Estimate daily escapement of Chinook and summer chum salmon into Henshaw Creek and; 2) Estimate age, sex, and size composition of the Chinook and summer chum salmon escapements.	Jun–Aug	TCC, USFWS-OSM	All aspects oversight & funding report write-up

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Appendix A7.–Page 4 of 6.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Chandalar River Sonar	RM 14 Chandalar River, Yukon RM 996	1) Estimate fall chum salmon passage using DIDSON sonars in the Chandalar River.	Aug–Sept	USFWS	All aspects TI Funding
Yukon River Sonar	Eagle, RM 1,213	1) Estimate daily passage of Chinook and chum salmon in the mainstem Yukon River using both split-beam and DIDSON and; 2) Estimate age, sex, and size composition of salmon captured in the test nets.	Jul–Oct	ADF&G, DFO	All aspects, technical support, TI Funding, ADF&G GF
Nenana River Escapement Surveys	Nenana River drainage, RM 860	Aerial surveys for numbers and distribution of coho and chum salmon in 10 tributaries of the Nenana River below Healy Creek.	Sep–Oct	ADF&G	All aspects
Delta River Ground Surveys	Tanana River drainage RM 1,031	1) Estimate fall chum salmon spawning escapement in Delta River and; 2) Sample fall chum salmon carcasses for age, sex, and size composition information.	Oct–Dec	ADF&G	All aspects
Chena River Tower	RM 45 Chena River, Tanana River drainage, RM 921	Estimate daily escapement of Chinook and summer chum salmon into the Chena River.	Jul–Aug	ADF&G	All aspects AYKSSF Funding
Salcha River Tower	RM 4 Salcha River, Tanana River drainage, RM 967	Estimate daily escapement of Chinook and summer chum salmon into the Salcha River.	Jul–Aug	ADF&G	All aspects AYKSSF Funding
Upper Tanana Escapement Surveys	Tanana River drainage, RM 991-1,053	Boat survey for number and distribution of coho salmon in a tributary of the Tanana River drainage.	Oct	ADF&G	All aspects
Goodpaster River Tower	RM 45 Goodpaster River, Tanana River drainage, RM 1,049	Estimate daily escapement of Chinook and summer chum salmon into the Goodpaster River.	Jul–Aug	BSFA	All aspects Pogo Mine funding
Upper Yukon River Chum Salmon Genetic Stock Identification	Yukon River drainage	Establish the feasibility of using DNA markers for genetic stock identification of chum salmon in the Yukon River.	Jun–Oct	USFWS	All aspects
Yukon River Inseason Salmon Harvest Interviews	Alakanuk, Marshall, Russian Mission, Holy Cross, Kaltag, Huslia, Galena, Nenana, Ft. Yukon and Eagle	Collect qualitative inseason subsistence salmon harvest information through weekly interviews.	May-Aug	YRDFA, USFWS	All aspects OSM funding
Migratory Timing and Harvest Information of Chinook Salmon Stocks	Yukon River drainage	Enlarge existing allozyme and develop a DNA database to characterize the genetic diversity of Chinook salmon in the Yukon River within the U.S. and Canada. U.S. collections include microsatellites and allozyme. Canadian collections include microsatellites.	Jun–Aug	USFWS-OSM, ADF&G, DFO	All aspects

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Appendix A7.–Page 5 of 6.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
In-river coded-wire-tag (CWT) recovery (Whitehorse Hatchery tags)	Yukon River drainage	Collection of Chinook salmon heads from all operating project that are marked with no adipose fin and sent to lab to extract data tag (Appendix A17).	May-Sep	ADF&G	Decoding
Yukon River Community Support and Engagement for BLM Resource Management Planning	Bering Sea-Western Interior & Central Yukon BLM Planning Regions	Assistance and support to Yukon River communities for engaging BLM in 20 year Resource Management Planning in the Bering Sea-Western Interior and Central Yukon BLM planning regions	Jan-Dec	YRDFA	All aspects of PEW Charitable Trust funding
Yukon River Education & Outreach/Young Fishers program	Yukon River drainage, Alaska	Assistance to Yukon River communities for engaging young fishers and providing support for understanding and engagement with fisheries management for increasing future leadership	Jan-Dec	YRDFA	All aspects of National Fish & Wildlife funding
Salmon Know No Borders: 2017 Yukon River Exchange	Yukon River drainage, Alaska & Canada	Yukon River Education Exchange between Alaska and Canada	Apr-Oct	YRDFA/YSSC	Shared aspects of R&E Funding
Building & Maintaining Public Support of Salmon Resource Management; Newsletters	Yukon River drainage, Alaska & Canada	YRDFA newsletter (2 annually) communications for YR fishers and communities focused on management, science and sustaining YR salmon runs	Jan-Dec	YRDFA, USFWS. ADF&G	All aspects R&M Funding
Customary Trade in the Upper Yukon River	Manley Hot Springs, Fort Yukon, Venetie	This project examined customary trade in the upper Yukon and found that customary trade can only be understood in relation to the equally complex process of sharing and barter as part of a continuum of exchange that serves to distribute subsistence resources within and between communities.	ended Dec 2017	YRDFA, ADF&G.	Shared aspects of OSM Funding
Value of Salmon	Russian Mission, Nenana, Fort Yukon	Results show that study communities value salmon primarily as a food representing their culture. Salmon is an essential nutritious, local food which sustains and connects people to their culture and is a teaching tool enabling them to pass on the heart of their culture.	Ended Dec 2017	YRDFA	North Pacific Research Board
Learning From Tradition	Lower Yukon River	6 Elders from Lower Yukon met to discuss, in Yup'ik, their experiences and observations of salmon over their lifetimes and their knowledge and observations of the Chinook salmon decline	Thru Jan 2018	YRDFA, CEC	National Science Foundation

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Acronyms:

ADF&G	= Alaska Department of Fish and Game
ADPS	= Alaska Department of Public Safety
AFSC	= Alaska Fisheries Science Center
APU	= Alaska Pacific University
ATC	= Asacarsarmiut Tribal Council
AVCP	= Association of Village Council Presidents, Inc.
AYKSSF	= Arctic-Yukon-Kuskokwim Sustainable Salmon Fund
BLM	= Bureau of Land Management
BSFA	= Bering Sea Fishermen's Association
CEC	= Career Educational Center
DFO	= Department of Fisheries and Oceans (Canada)
DIDSON	= Dual-frequency Identification Sonar
DNA	= Deoxyribonucleic acid
LLC	=Limited Liability Company
NOAA	= National Oceanic and Atmospheric Association
OSM	= Office of Subsistence Management
R&E	=Yukon River Panel Restoration and Enhancement Program
R&M	=Research and Management Fund
TCC	= Tanana Chiefs Conference, Inc.
TI	=Treaty Implementation Funds
USFWS	= United States Fish and Wildlife Service
YDFDA	=Yukon Delta Fisheries Development Association
YRDFA	= Yukon River Drainage Fisheries Association
YSSC	= Yukon Salmon Subcommittee

Appendix A8.–List of harvest/escapement monitoring and incubation/rearing projects involving salmon in the Canadian (Yukon Territory) portion of the Yukon River drainage in 2017.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Aboriginal Catch Monitoring	Yukon communities	1) To determine weekly catches and effort in the aboriginal fishery, and; 2) To implement components of the UFA and AFS.	Jul–Oct	YFN's DFO	Joint Project
Recreational Catch Monitoring	Yukon River mainstem and tributaries	1) To determine the recreational harvest by species including the date, sex, whether released or retained, and fishing location, and; 2) Salmon caught are reported through the YSCCC program.	Jul– Oct	DFO	All aspects
Commercial Catch Monitoring	Yukon River mainstem	1) To determine weekly catches and effort in the Canadian commercial fishery (Chinook and chum) and; 2) to collect other information as required.	Jul–Oct	DFO	All aspects
Escapement Surveys and Biological Sampling	Throughout upper Yukon River drainage	1) To conduct surveys of spawning fish by foot, boat, air etc.; 2) To collect ASL and genetic tissue samples from spawning populations, and; 3) To enumerate and recover tags in terminal areas.	Jul–Oct	R&E Projects DFO YFNs AFS	All aspects
Porcupine River Sonar - Chinook	Old Crow RM 1,257	1) Installation and operation of 2 ARIS sonars to 1) estimate Chinook salmon daily passage, and 2) to conduct biological sampling for species apportionment, age, sex and length.	Jul–Aug	VGG & DFO	All aspects
Porcupine River Sonar - Chum	Old Crow RM 1,257	1) Operation of 2 ARIS sonars to 1) estimate chum salmon daily passage, and 2) conduct biological sampling for species apportionment, age, sex and length.	Aug–Oct	VGG & DFO	All aspects
Whitehorse Rapids Fishway	Whitehorse RM 1,745	1) To enumerate wild and hatchery-reared Chinook salmon returns to the Whitehorse fishway area and; 2) obtain age, size, sex and tag data.	Jul–Aug	YFGA	All aspects
Blind Creek Weir	Pelly River RM 1,478	1) To enumerate Chinook salmon escapement, recover tags and; 2) collect ASL data and DNA samples.	Jul–Aug	JW&A	All aspects
Big Salmon Sonar	Big Salmon River RM 1,621	1) Installation and operation of a DIDSON sonar program for Chinook salmon, and; 2) obtain carcass ASL samples.	Jul–Aug	Metla Env. Inc., JW&A	All aspects

-continued-

Appendix A8.–Page 2 of 3.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Pelly River Sonar	Pelly River mainstem RM 1,478	1) Develop an accurate, inseason stock assessment tool to estimate the annual passage rates for Chinook salmon in the Pelly River; and 2) conduct test netting for species apportionment, and to collect ASL samples.	Jul–Aug	Selkirk First Nation & EDI	All aspects
Whitehorse Rapids Fish Hatchery and Coded-Wire Tagging Project	Whitehorse RM 1,745	1) To rear and release ~150K Chinook salmon fry produced from Whitehorse Rapids Fishway broodstock, and; 2) To mark fry with a CWT, adipose clip, and release upstream of the Whitehorse hydroelectric facility.	Ongoing	YG and YEC, YF&GA, DFO	All aspects Coded-wire tagging
McIntyre Incubation Facility and Coded-Wired Tagging Project	Whitehorse RM 1,745	1) To incubate up to 120K Chinook salmon eggs from brood stock collected in Yukon River spawning tributaries, and/or the Whitehorse Rapids Fishway, and; 2) To rear, mark with CWT, adipose clip, and release fry to natal streams and/or restoration sites.	Ongoing	YC, YEC, TKC, DFO	Field work, project monitoring, technical support
Big Salmon River Juvenile Chinook Assessment	Big Salmon River RM 1,621	1) Operation of Rotary Screw Trap, Gee minnow traps and seine nets to capture juvenile Chinook salmon and use CPUE and mark-recapture to initiate development of an abundance index 2) sample juvenile chinook salmon to monitor change in size through the season.	May–Aug	DFO & Metla Env. Inc.	All aspects
Takhini River Chinook Salmon Restoration Investigation	Takhini River RM 1,718	1) Quantify and characterize habitats used by, and relative fish abundance of, Takhini River Chinook salmon as a) summer-rearing juveniles and b) migrating and spawning adults; 2) establish a baseline understanding of current abundance and distribution in the system.	Jul-Aug	DFO	All aspects

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Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Impacts to the Kluane Fall Chum Salmon Stock from a Major Hydrological Change	Kluane Lake and River RM 1,587 (Lake Outlet)	1) Describe baseline and current habitat use of spawning and incubating chum salmon; 2) Assess suitability of habitat given recent reduction in flow; 3) project likely impact of changes.	Sept - March	DFO	All aspects
Overwintering Limitations to Juvenile Chinook	Yukon River (Whitehorse) RM 1,745	1) Describe and characterize habitats used by Yukon juvenile Chinook salmon during the winter and how it differs from habitat used in the summer months	Jan-March	DFO	All aspects

Acronyms:

ASL = Age Sex Length- term that refers to the collection of biological information.
AFS = Aboriginal Fisheries Strategy
BM&A = B. Mercer and Associates
CWT = Coded Wire Tag
DFO = Department of Fisheries and Oceans Canada
DNA = Deoxyribonucleic acid
EDI = Environmental Dynamics Incorporated
YG = Government of Yukon-Environment Yukon
VGG = Vuntut Gwitch'in Government
JW&A = Jane Wilson & Associates
Metla Env. Inc = Metla Environmental Incorporated
TKC = Ta'an Kwa'chan Council
UFA = Umbrella Final Agreement
YC = Yukon College
YEC = Yukon Energy Corporation
YFN's = Yukon First Nations
YFGA = Yukon Fish and Game Association
YSCCC = Yukon Salmon Conservation Catch Card

Appendix A9.–Yukon River Canadian-origin Chinook salmon total run by brood year and escapement by year.

Brood Year	Age 3	4	5	6	7	8	Return	Spawners	R/S
75					33,080	175			
76				88,405	22,026	40			
77			19,491	111,771	19,734	801	151,797		
78		4,443	22,845	63,235	29,424	1,493	121,439		
79	1,534	3,388	21,422	100,503	48,253	1,175	176,274		
80	15	6,604	13,510	70,415	33,978	4,240	128,763		
81	0	1,122	33,220	114,180	54,845	1,841	205,208		
82	0	5,141	17,169	37,883	27,763	376	88,330	43,538	2.03
83	560	7,558	35,117	89,449	16,408	162	149,253	44,475	3.36
84	69	13,368	34,379	75,041	13,782	138	136,778	50,005	2.74
85	223	10,738	38,956	62,142	4,756	91	116,906	40,435	2.89
86	347	20,408	45,928	109,067	15,843	138	191,731	41,425	4.63
87	0	2,368	33,542	67,697	11,700	18	115,325	41,307	2.79
88	0	6,641	34,323	75,396	8,937	68	125,366	39,699	3.16
89	75	13,517	78,826	128,851	25,841	0	247,109	60,299	4.10
90	56	6,343	24,873	71,641	10,816	9	113,737	59,212	1.92
91	501	7,107	82,332	121,590	10,182	0	221,712	42,728	5.19
92	6	2,608	23,981	41,677	1,831	0	70,103	39,155	1.79
93	14	5,313	36,363	86,880	5,880	0	134,450	36,244	3.71
94	0	755	19,932	30,683	6,175	0	57,545	56,449	1.02
95	34	1,784	15,989	52,720	7,026	10	77,562	50,673	1.53
96	20	276	23,201	44,462	14,610	2	82,571	74,060	1.11
97	14	3,567	26,386	94,406	7,828	14	132,216	53,821	2.46
98	0	3,478	39,260	76,502	4,357	0	123,598	35,497	3.48
99	134	1,692	30,110	76,649	2,870	0	111,455	37,184	3.00
00	0	2,798	40,704	63,414	1,509	0	108,424	25,870	4.19
01	8	1,813	50,877	51,785	2,205	0	106,688	52,564	2.03
02	75	2,262	28,704	20,725	227	9	52,003	42,359	1.23
03	63	5,898	37,236	52,339	2,261	2	97,798	80,594	1.21
04	3	2,462	26,833	21,936	4,777	1	56,012	48,469	1.16
05	9	8,268	29,475	38,857	1,754	0	78,362	67,985	1.15
06	15	6,009	25,248	25,683	1,568	0	58,522	62,630	0.93
07	47	2,858	17,746	22,193	1,694	1	44,539	34,904	1.28
08	1	3,138	11,092	25,750	1,853	0	41,834	33,883	1.23
09	173	2,324	32,868	44,943	456	0	80,763	65,278	1.24
10	1	4,379	29,627	19,598	844		54,450	32,014	1.70
11	194	10,645	52,670	41,975			105,484	46,307	2.28
12	255	9,885	44,598					32,656	
13	92	5,095						28,669	
14	110							63,331	
15								82,674	
16								68,798	
17								68,315	
Average 1982–2010							106,041	48,026	2.21
							Contrast =	3.12	

Note: Spawner data are derived from a 3-area aerial survey index of combined counts from Big Salmon, Little Salmon, and Nisutlin rivers (1982-2001), radiotelemetry (2002–2004), and the mainstem Yukon River sonar at Eagle (2005–2017). Shaded values are preliminary estimates by brood year. Average includes the years with complete brood information through age-7. Ages used were from samples collected at the mainstem sonar test fishery and fish wheel data for years prior to the 2005.

Appendix A10.–Chinook salmon age and sex percentages from selected Yukon River monitoring projects operated in Alaska, 2017.

Location	Sample Size		Age 3	4	5	6	7	Total
Districts 1-5	1,573	Male	0.1	10.2	39.4	13.6	0.1	63.4
Subsistence Harvest		Female	0.0	1.5	16.7	18.2	0.2	36.6
		Total	0.1	11.7	56.1	31.8	0.3	100.0
East Fork	162	Male	0.0	60.5	11.1	2.5	0.0	74.1
Andreafsky River [a]		Female	0.0	2.5	11.7	11.7	0.0	25.9
		Total	0.0	63.0	22.8	14.2	0.0	100.0
Pilot Station	547	Male	0.4	7.7	26.0	12.2	0.9	47.2
test fishery [b]		Female	0.0	1.3	27.2	23.2	1.1	52.8
		Total	0.4	9.0	53.2	35.4	2.0	100.0
Eagle test fishery [b]	719	Male	0.1	4.2	32.8	12.0	0.0	49.1
		Female	0.0	0.0	13.6	36.2	1.1	50.9
		Total	0.1	4.2	46.4	48.2	1.1	100.0

[a] Samples were collected from a weir trap.

[b] Samples were from test fishing with drift gillnets.

Appendix A11.–Yukon River Chinook salmon age and female percentages and mean length from the mainstem Yukon River sonar project test fishery operated near Eagle, 2005–2017.

		Percent by Age Class						
		3 yr	4 yr	5 yr	6 yr	7 yr		
Year	Sample Size	(1.1)	(1.2, 2.1)	(1.3, 2.2)	(1.4, 2.3)	(1.5, 2.4)	Percent Female	Mean Length
2005	171	0.0	8.2	50.3	38.0	3.5	33.0	779.2
2006	256	0.0	16.8	60.2	22.7	0.4	38.6	736.1
2007	389	0.0	5.7	40.1	53.7	0.5	44.3	785.0
2008	375	0.0	2.7	56.3	36.5	4.5	37.0	779.4
2009	647	0.0	7.7	33.2	59.0	0.0	40.8	793.0
2010	336	0.0	7.4	46.4	42.0	4.2	41.0	774.8
2011	420	0.0	2.1	29.5	60.5	7.9	48.8	813.0
2012	249	0.4	6.4	30.1	58.6	4.4	46.8	782.2
2013	265	0.0	4.2	27.5	63.4	4.9	51.0	806.6
2014	606	0.2	6.6	50.5	40.1	2.6	35.0	764.0
2015	927	0.3	10.8	34.4	52.3	2.2	41.4	774.1
2016	666	0.0	9.2	65.1	25.2	0.6	32.4	759.0
2017	719	0.1	4.2	46.5	48.1	1.1	50.9	796.0
Average								
2005–2016	464	0.1	7.1	43.9	46.2	2.8	41.6	780.2
2012–2016	543	0.2	7.4	41.5	47.9	2.9	41.3	777.2
Minimum-16	171	0.0	2.1	27.5	22.7	0.0	32.4	736.1
Maximum-16	927	0.4	16.8	65.1	63.4	7.9	51.0	813.0

Note: Minimum and maximum indicate year with the lowest and highest values through 2016. Length is measured mid-eye to the fork of tail to the nearest mm.

Appendix A12.–Total (U.S. and Canada) Yukon River Chinook salmon harvest percentage by stock group, 1981–2017.

	Stock Group		
Year	Lower	Middle	Upper
1981	5.4	54.5	40.1
1982	13.9	24.7	61.4
1983	12.9	33.7	53.3
1984	25.3	40.2	34.5
1985	27.6	22.3	50.1
1986	19.5	9.6	70.9
1987	15.9	19.6	64.5
1988	21.8	15.8	62.5
1989	24.4	15.9	59.7
1990	20.2	25.2	54.7
1991	28.0	25.3	46.7
1992	16.3	21.8	61.9
1993	21.5	25.4	53.1
1994	18.2	21.4	60.4
1995	17.9	22.4	59.7
1996	21.0	10.4	68.6
1997	26.4	16.8	56.9
1998	32.7	17.4	49.8
1999	40.1	6.3	53.6
2000	33.9	12.3	53.8
2001	31.6	16.0	52.4
2002	19.4	29.2	51.4
2003	6.8	28.9	64.3
2004	15.3	28.8	55.9
2005	20.7	21.4	57.9
2006	17.6	27.6	54.9
2007	13.0	30.6	56.4
2008	17.0	28.0	55.0
2009	11.1	31.4	57.5
2010	17.8	32.7	49.5
2011	13.9	29.8	56.3
2012	13.3	34.8	51.9
2013	13.4	21.0	65.6
2014	25.4	27.8	46.8
2015	13.5	31.3	55.2
2016	13.4	29.4	57.2
2017 [a]	8.3	31.9	59.8
Average			
1981-2016	19.6	24.7	55.7
2012-2016	15.8	28.9	55.3
Minimum-16	5.4	6.3	34.5
Maximum-16	40.1	54.5	70.9

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Data preliminary.

Appendix A13.–U.S. (Alaska) harvest of Yukon River Chinook salmon by stock group, 1981–2017.

	Stock Group		
Year	Lower	Middle	Upper
1981	5.9	59.8	34.3
1982	15.4	27.5	57.1
1983	14.2	37.0	48.9
1984	28.0	44.3	27.7
1985	30.4	24.6	45.1
1986	22.3	10.9	66.8
1987	17.4	21.4	61.2
1988	24.9	18.1	57.0
1989	27.2	17.7	55.1
1990	22.8	28.4	48.8
1991	31.8	28.7	39.6
1992	18.0	24.1	57.8
1993	23.7	28.0	48.3
1994	20.4	24.1	55.5
1995	20.0	25.0	55.0
1996	24.0	11.8	64.2
1997	28.9	18.3	52.8
1998	34.7	18.5	46.8
1999	44.1	6.9	49.0
2000	37.5	13.6	48.9
2001	37.5	19.0	43.5
2002	22.1	33.3	44.6
2003	7.5	31.7	60.8
2004	16.9	31.6	51.5
2005	23.4	24.2	52.4
2006	19.2	30.2	50.5
2007	13.7	32.3	54.0
2008	18.2	30.0	51.8
2009	12.7	35.8	51.6
2010	18.7	34.3	47.0
2011	15.6	33.3	51.1
2012	14.4	37.5	48.2
2013	16.0	25.0	59.0
2014	29.8	26.0	44.3
2015	15.6	36.3	48.1
2016	15.2	33.4	51.3
2017 [a]	9.1	34.9	56.0
Average			
1981-2016	21.9	27.3	50.8
2012-2016	18.2	31.6	50.2
Minimum-16	5.9	6.9	27.7
Maximum-16	44.1	59.8	66.8

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Data preliminary.

Appendix A14.–Upper stock group percentage, by country, from the Yukon River Chinook salmon harvest, 1981–2017.

	Upper Stock Group	
Year	U.S.	Canada
1981	78.1	21.9
1982	83.5	16.5
1983	83.7	16.3
1984	72.7	27.3
1985	81.6	18.4
1986	82.7	17.3
1987	86.7	13.3
1988	79.8	20.2
1989	82.9	17.1
1990	79.2	20.8
1991	74.8	25.2
1992	84.5	15.5
1993	82.6	17.4
1994	81.8	18.2
1995	82.4	17.6
1996	81.9	18.1
1997	84.8	15.2
1998	88.8	11.2
1999	83.0	17.0
2000	81.9	18.1
2001	69.8	30.3
2002	76.3	23.5
2003	86.2	13.8
2004	83.7	16.3
2005	80.1	19.9
2006	84.1	15.9
2007	90.5	9.5
2008	88.1	11.9
2009	78.8	21.2
2010	90.5	9.5
2011	81.0	19.0
2012	86.3	13.7
2013	75.5	24.5
2014	93.4	6.6
2015	75.2	24.8
2016	79.1	20.9
2017 [a]	85.5	14.5
Average		
1981-2016	82.2	17.8
2012-2016	82.3	17.7
Minimum-16	69.8	6.6
Maximum-16	93.4	30.3

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Data preliminary.

Appendix A15.–Stock group percentage by major stock and by country, from chum salmon beginning July 19 at the mainstem Yukon River sonar operated near Pilot Station, 1999–2017.

	Season Stock Groups		U.S. Stock Groups		Fall Stock Country Groups	
Year [a]	Summer	Fall	Tanana Fall [b]	Border U.S. [c]	Fall U.S.	Canada
1999	16%	84%	–	–	–	–
2000	12%	88%	–	–	–	–
2001	13%	87%	–	–	–	–
2002	19%	81%	–	–	–	–
2003	–	–	–	–	–	–
2004	13%	87%	32%	27%	59%	28%
2005	11%	89%	21%	43%	63%	26%
2006	19%	81%	16%	36%	53%	28%
2007	21%	79%	23%	26%	49%	30%
2008	17%	83%	21%	31%	52%	31%
2009	23%	77%	20%	31%	51%	27%
2010	25%	75%	24%	20%	44%	31%
2011	14%	86%	13%	39%	52%	34%
2012	20%	80%	26%	32%	58%	22%
2013	11%	89%	34%	23%	57%	32%
2014	9%	91%	29%	32%	61%	30%
2015	22%	78%	22%	29%	51%	27%
2016	20%	80%	24%	29%	52%	27%
2017	12%	88%	32%	33%	66%	22%
Average						
2004–2016	17%	83%	24%	31%	54%	29%
2012–2016	16%	84%	27%	29%	56%	28%
Minimum-16	9%	75%	13%	20%	44%	22%
Maximum-16	25%	91%	34%	43%	63%	34%

Note Minimum and maximum indicate year with the lowest and highest values through 2016. En dash indicates no analysis occurred.

[a] Stock identification methods from 1999 through 2004 were based on allozyme analysis. Beginning in 2004, analysis was based on microsatellite baseline.

[b] Tanana River escapement estimates are based on both fall and average summer (3%) components due to the transition of stocks in this system.

[c] Border U.S. stocks include Big Salt, Chandalar, Sheenjek and Black rivers.

Appendix A16.–Summary of releases for coded-wire tagged Chinook salmon from Whitehorse Hatchery, 1985–2017.

Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Michie	25-May-85	02-32-48	26,670	518	0.019	27,188		0	27,188
Michie	25-May-85	02-32-26	28,269	518	0.018	28,787		0	28,787
Michie	25-May-85	02-32-47	43,325	518	0.012	43,843		0	43,843
Wolf	1985	no-clip	0	0		0		10,520	10,520
SUM	1985		98,264	1,555		99,819		10,520	110,339
Michie	1986	02-37-31	77,170			77,170		1,000	78,170
Wolf	1986					0		5,720	5,720
SUM	1986		77,170			77,170		6,720	83,890
Michie	5-Jun-87	02-48-12	47,644	1,361	0.028	49,005	2.50	9,598	58,603
Michie	5-Jun-87	02-48-13	49,344	808	0.016	50,152	2.50	9,141	59,293
Michie	5-Jun-87	02-48-14	51,888	559	0.011	52,447	2.50	9,422	61,869
Michie	5-Jun-87	02-48-15	43,367	2,066	0.045	45,433	2.50	7,868	53,301
Michie	5-Jun-87	02-42-58	25,945	245	0.009	26,190	2.50	4,171	30,361
Wolf	30-May-87	02-42-59	26,752	123	0.005	26,875	2.50	422	27,297
SUM	1987		244,940	5,162		250,102		40,622	290,724
Michie	10-Jun-88	02-55-49	77,670	1,991	0.025	79,661	2.80	84,903	164,564
Michie	10-Jun-88	02-555-0	78,013	1,592	0.020	79,605	2.70	85,288	164,893
Wolf	5-Jun-88	no-clip	0	0		0		25,986	25,986
SUM	1988		155,683	3,583		159,266		196,177	355,443
Wolf	1989	no-clip	0	0		0		22,388	22,388
Michie	6-Jun-89	02-60-04	26,161	326	0.012	26,487	2.30	0	26,487
Michie	6-Jun-89	02-60-05	24,951	128	0.005	25,079	2.30	0	25,079
Michie	6-Jun-89	02-60-06	25,098	291	0.011	25,389	2.40	0	25,389

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Michie	6-Jun-89	02-60-07	25,233	156	0.006	25,389	2.20	95,724	121,113
Fishway	6-Jun-89	02-60-08	25,194	357	0.014	25,551	2.70	0	25,551
Fishway	6-Jun-89	02-60-09	25,190	351	0.014	25,541	2.70	0	25,541
SUM	1989		151,827	1,609		153,436		118,112	271,548
Wolf	6-Jun-90	no-clip	0	0		0		11,969	11,969
Michie	2-Jun-90	02-02-38	24,555	501	0.020	25,056	2.30	0	25,056
Michie	2-Jun-90	02-02-39	24,345	753	0.030	25,098	2.30	0	25,098
Fishway	2-Jun-90	02-02-60	24,508	501	0.020	25,009	2.20	0	25,009
Fishway	2-Jun-90	02-02-63	25,113	254	0.010	25,367	2.20	0	25,367
SUM	1990		98,521	2,009		100,530		11,969	112,499
Wolf	8-Jun-91	18-03-22	49,477	793	0.016	50,270	2.30	0	50,270
Fishway	6-Jun-91	18-03-23	52,948	193	0.004	53,141	2.30	0	53,141
Michie	6-Jun-91	18-03-24	50,020	176	0.004	50,196	2.30	87,348	137,544
SUM	1991		152,445	1,162		153,607		87,348	240,955
Wolf	4-Jun-92	18-08-29	48,239	0	0.000	48,239	2.40	0	48,239
Fishway	4-Jun-92	18-08-28	49,356	99	0.002	49,455	2.30	0	49,455
Michie	4-Jun-92	18-08-30	52,946	643	0.012	53,589	2.20	249,166	302,755
SUM	1992		150,541	742		151,283		249,166	400,449
Wolf	6-Jun-93	18-12-15	50,248	0	0.000	50,248	2.30	0	50,248
Fishway	6-Jun-93	18-12-16	49,957	434	0.009	50,391	2.30	0	50,391
Michie	6-Jun-93	18-12-17	50,169	0	0.000	50,169	2.30	290,647	340,816
SUM	1993		150,374	434		150,808		290,647	441,455

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Wolf	2-Jun-94	18-14-27	50,155	270	0.005	50,425	2.30	0	50,425
Michie	2-Jun-94	18-14-28	50,210	127	0.003	50,337	2.30	158,780	209,117
Fishway	2-Jun-94	18-14-29	50,415	125	0.002	50,540	2.30	0	50,540
SUM	1994		150,780	522		151,302		158,780	310,082
Wolf	6-Jun-95	18-12-46	10,067	164	0.016	10,231	1.67	0	10,231
Wolf	6-Jun-95	18-12-47	9,122	0	0.000	9,122	1.53	0	9,122
Michie	6-Jun-95	18-18-26	25,231	337	0.013	25,568	2.47	4,552	30,120
Michie	6-Jun-95	18-18-27	25,187	141	0.006	25,328	2.33	0	25,328
SUM	1995		69,607	642		70,249		4,552	74,801
Wolf	26-May-96	18-07-48	10,131	102	0.010	10,233	2.30	0	10,233
Fox (Michie)	4-Jun-96	18-28-23	35,452	0	0.000	35,452	2.43	0	35,452
Byng	4-Jun-96	18-10-41	25,263	516	0.020	25,779	2.37	0	25,779
Michie	5-Jun-96	18-33-45	50,082	1,022	0.020	51,104	2.51	0	51,104
Michie	5-Jun-96	18-33-46	50,260	508	0.010	50,768	2.43	0	50,768
Michie	5-Jun-96	18-33-47	49,985	505	0.010	50,490	2.32	0	50,490
Judas	4-Jun-96	18-33-48	49,798	1,016	0.020	50,814	2.43	0	50,814
McClintock	4-Jun-96	18-33-49	49,991	302	0.006	50,293	2.27	0	50,293
SUM	1996		320,962	3,971		324,933		0	324,933
Wolf	1-Jun-97	18-23-25	14,850	150	0.010	15,000	2.30	0	15,000
Wolf	1-Jun-97	18-23-26	20,334	0	0.000	20,334		0	20,334
Wolf	8-Jun-97	18-29-06	10,158	0	0.000	10,158		0	10,158
Fox (Michie)	11-Jun-97	18-25-54	25,242	0	0.000	25,242	2.43	0	25,242

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Fox (Michie)	11-Jun-97	18-25-55	24,995	253	0.010	25,248		0	25,248
Byng	11-Jun-97	18-29-07	10,029	0	0.000	10,029	2.37	0	10,029
Byng	11-Jun-97	18-29-05	10,155	0	0.000	10,155		0	10,155
Michie	11-Jun-97	18-28-59	49,657	502	0.010	50,159	2.51	0	50,159
Michie	11-Jun-97	18-28-60	50,130	0	0.000	50,130	2.43	0	50,130
Judas	7-Jun-97	18-23-27	19,951	202	0.010	20,153	2.43	0	20,153
Judas	11-Jun-97	18-25-53	25,146	0	0.000	25,146	2.43	0	25,146
McClintock	11-Jun-97	18-25-51	25,399	0	0.000	25,399	2.27	0	25,399
McClintock	11-Jun-97	18-25-52	24,792	251	0.010	25,043		0	25,043
SUM	1997		310,838	1,358		312,196		0	312,196
Michie	12-Jun-98	18-41-22	49,243	1,004	0.020	50,247	2.84	0	50,247
Michie	12-Jun-98	18-41-21	49,197	1,004	0.020	50,201	2.81	0	50,201
Byng	12-Jun-98	18-31-60	24,518	1,022	0.040	25,540	3.00	0	25,540
McClintock	12-Jun-98	18-40-43	49,810	503	0.010	50,313	2.76	0	50,313
Judas	13-Jun-98	02-54-17	19,018	1,432	0.070	20,450	2.55	0	20,450
Judas	12-Jun-98	18-31-59	25,331	256	0.010	25,587	2.60	0	25,587
Wolf	6-Jun-98	02-19-58	10,104	421	0.040	10,525	1.95	0	10,525
Wolf	4-Jun-98	02-46-06	34,813	710	0.020	35,523	2.63	0	35,523
SUM	1998		262,034	6,352		268,386		0	268,386
Michie	6-Jun-99			80,393		80,393	3.13	0	80,393
Byng	6-Jun-99			64,430		64,430	2.92	0	64,430
McClintock	6-Jun-99			64,169		64,169	2.95	0	64,169
Wolf	6-Jun-99			31,048		31,048	3.07	0	31,048

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
SUM	1999			240,040		240,040		0	240,040
Michie	8-Jun-00	18-31-28	25,114	254	0.010	25,368	2.80	0	25,368
Michie	8-Jun-00	18-31-29	25,037	253	0.010	25,290	2.80	0	25,290
Michie	8-Jun-00	18-43-03	10,907	110	0.010	11,017	2.84	0	11,017
McClintock	8-Jun-00	18-13-54	25,041	254	0.010	25,295	2.70	0	25,295
McClintock	8-Jun-00	18-13-55	25,016	253	0.010	25,269	2.68	0	25,269
Wolf	4-Jun-00	18-23-53	25,071	253	0.010	25,324	2.67	0	25,324
Wolf	4-Jun-00	18-23-54	25,012	254	0.010	25,266	2.40	0	25,266
SUM	2000		161,198	1,631		162,829		0	162,829
Michie	8-Jun-01	18-44-16	25,318	256	0.010	25,574	2.68	0	25,574
Michie	8-Jun-01	18-44-17	27,293	276	0.010	27,569	2.68	0	27,569
Michie	8-Jun-01	18-44-18	27,337	276	0.010	27,613	2.60	0	27,613
Michie	8-Jun-01	18-44-19	11,629	117	0.010	11,746	2.60	0	11,746
McClintock	8-Jun-01	18-44-12	24,526	248	0.010	24,774	3.13	0	24,774
McClintock	8-Jun-01	18-44-13	25,033	253	0.010	25,286	3.13	0	25,286
McClintock	8-Jun-01	18-36-50	10,840	110	0.010	10,950	3.13	0	10,950
Byng	8-Jun-01	18-44-14	25788	260	0.010	26,048	2.84	0	26,048
Byng	8-Jun-01	18-44-15	25,136	254	0.010	25,390	2.84	0	25,390
Wolf	28-May-01	18-44-10	26,205	265	0.010	26,470	3.34	0	26,470
Wolf	28-May-01	18-44-11	23,902	241	0.010	24,143	3.34	0	24,143
SUM	2001		253,007	2,556		255,563		0	255,563
Wolf	23-May-02	18-51-01	25,334	126	0.005	25,460	3.30	0	25,460

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Wolf	2-Jun-02	18-51-02	25,079	177	0.007	25,256	3.10	0	25,256
McClintock	10-Jun-02	18-51-03	24,769	505	0.020	25,274	3.60	0	25,274
Byng	10-Jun-02	18-51-04	24,907	0	0.000	24,907	3.00	0	24,907
Byng	10-Jun-02	18-51-05	24,925	125	0.005	25,050	3.00	0	25,050
Michie	10-Jun-02	18-51-06	27,114	191	0.007	27,305	3.20	0	27,305
Michie	10-Jun-02	18-51-07	26,854	0	0.000	26,854	3.02	0	26,854
Michie	10-Jun-02	18-50-61	27,850	281	0.010	28,131	3.20	0	28,131
Michie	10-Jun-02	18-50-62	27,241	0	0.000	27,241	3.04	0	27,241
Michie	10-Jun-02	18-50-63	8,481	86	0.01	8567	3.2	0	8567
Yukon River								3,062	3062
SUM	2002		242,554	1,491		244,045		3,062	247,107
Wolf	25-May-03	18-47-48	27,489	83	0.0030	27,572	2.72	0	27,572
Wolf	25-May-03	18-47-49	26,704	161	0.0060	26,865	2.69	0	26,865
Byng	2-Jun-03	18-47-47	23,483	71	0.0030	23,554	3.01	0	23,554
Byng	2-Jun-03	18-47-46	27,058	54	0.0020	27,112	2.98	0	27,112
Michie	2-Jun-03	18-49-58	28,485	0	0.0000	28,485	3.05	0	28,485
Michie	2-Jun-03	18-49-59	27,519	0	0.0000	27,519	2.98	0	27,519
Michie	2-Jun-03	18-49-60	15,541	0	0.0000	15,541	3.07		15,541
Judas L. (not in totals)	6-Jun-03							2,500	
SUM	2003		176,279	369		176,648		0	176,648
Wolf	5/28-30/2004	01-01-70	28,946	292		29,238	2.90	0	29,238
Wolf	22-Jun-04							2,514	2,514

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Mainstem	5/28-29/2004	02-01-69	24,920	431		25,351	3.10	0	25,351
Byng	8-Jun-04	02-01-68	24,401	626		25,027	3.36	0	25,027
McClintock	8-Jun-04	02-01-67	24,246	879		25,125	3.20	0	25,125
Michie	8-Jun-04	02-01-66	24,609	554		25,163	3.12	0	25,163
Michie	8-Jun-04	02-01-65	13,594	306		13,900	3.12	0	13,900
SUM	2004		140,716	3,088		143,804		2,514	146,318
Wolf	5/31-6/05	18-19-36	10,751	109	1.000	10,860	2.50	0	10,860
Wolf	5/31-6/05	18-56-17	5,835	59	1.000	5,894	2.50	0	5,894
Wolf	7-Jul-05			614		614			614
Byng	13-Jun-05	18-56-18	5,853	119	2.000	5,972	2.50	0	5,972
Byng	13-Jun-05	18-56-19	4,369	89	2.000	4,458	2.50	0	4,458
McClintock	13-Jun-05	18-44-19	10,632	0	0.000	10,632	2.50	0	10,632
Michie	13-Jun-05	02-01-64	4,870	0	0.000	4,870	2.50	0	4,870
Michie	13-Jun-05	02-01-65	5,983	0	0.000	5,983	2.50	0	5,983
Michie	13-Jun-05	08-01-65	28,082	284	1.000	28,366	2.50	0	28,366
Michie	13-Jun-05	18-56-20	5,906	0	0.000	5,906	2.50	0	5,906
Mainstem	6/02,6/14,07/7	08-01-68	28,991	293	1.000	29,284	2.50	0	29,284
SUM	2005		111,272	1,567		112,839			112,839
Wolf	6/4 - 6/11	08-01-66	26,412	0	0.000	26,412	2.66	0	26,412
Wolf	6/4 - 6/11	08-01-71	8,718	88	1.000	8,806	2.66	0	8,806
Mainstem	8-Jun-06	08-01-72	6,761	427	1.500	7,188	2.63	0	7,188
Mainstem	8-Jun-06	08-01-67	28,045	103	1.500	28,148	2.63	0	28,148

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Michie	14-Jun-06	08-01-68	39,164	596	1.500	39,760		0	39,760
Michie	14-Jun-06	08-01-74	3,692	56	1.500	3,748	2.41	0	3,748
McClintock	14-Jun-06	08-01-70	29,282	296	1.000	29,578	2.58	0	29,578
McClintock	14-Jun-06	08-01-73	5,426	55	1.000	5,481	2.89	0	5,481
Wolf	11-Jun-06		0	7,658	0.000	7,658	3.02	0	7,658
SUM	2006		147,500	9,279		156,779			156,779
Wolf	5/24-6/3	Agency Tags 18	37,781	771	2.000	38,552		0	38,552
Wolf	3-Jun-07			2,632	0.000	2,632	2.33	0	2,632
Mainstem	29-May-07	Agency Tags 18	35,253	356	1.000	35,609	2.87	0	35,609
Michie	8-Jun-07	Agency Tags 18	50,084	506	1.000	50,590	3.22	0	50,590
McClintock	8-Jun-07	Agency Tags 18	38,383	388	1.000	38,771	3.22	0	38,771
SUM	2007		161,501	4,653		166,154			166,154
Wolf	6/01-6/26	Agency Tags 08	10,939	0	0.000	10,939	2.97		10,939
Wolf	26-Jun-08			2,618		2,618			2,618
Mainstem	5-Jun-08	Agency Tags 08	20,498	418	2.000	20,916	2.84		20,916
Michie	5-Jun-08	Agency Tags 08	24,615	502	2.000	25,117	2.71		25,117
McClintock	5-Jun-08	Agency Tags 08	24,687	1,029	4.000	25,716	2.89		25,716
SUM	2008		80,739	4,567		85,306		0	85,306
Wolf	31-May-09	Agency Tags 08	19,652	199	1.000	19,851	2.76		19,851
Wolf	11-Jun-09			2,672		2,672			2,672
Mainstem	6-Jun-09	Agency Tags 08	42,648	258	0.600	42,906	3.00		42,906
Michie	6-Jun-09	Agency Tags 08	77,048	778	0.100	77,826	2.87		77,826
McClintock	6-Jun-09	Agency Tags 08	26,338	53	0.020	26,391	2.52		26,391
SUM	2009		165,686	3,960		169,646		0	169,646

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Wolf	30-May-10	Agency Tag 18	12,000	0	0.000	12,000	2.89	0	12,000
Michie	1-Jun-10	Agency Tag 18	66,848	2,067	3.000	68,915	3.00	0	68,915
McClintock	1-Jun-10	Agency Tag 18	19,714	0	0.000	19,714	3.00	0	19,714
McClintock	1-Jun-10			1,369		1,369		0	1,369
Mainstem	1-Jun-10	Agency Tag 18	23,985	242	1.000	24,227	2.98	0	24,227
SUM	2010		122,547	3,678		126,225		0	126,225
Wolf	10-Jun-11	Agency Tag 18	10,000	1,550	0.000	11,550	2.76	0	11,550
Michie	6-Jun-11	Agency Tag 18	65,640	1,000	1.500	66,640	2.94	0	66,640
McClintock	6-Jun-11	Agency Tag 18	32,811	0	0.000	32,811	2.65	0	32,811
Mainstem	6-Jun-11	Agency Tag 18	23,921	0	0.000	23,921	2.67	0	23,921
SUM	2011		132,372	2,550		134,922		0	134,922
Wolf	27-May-12	18-61-03	10,171	103	1.000	10,274	2.80	0	10,274
Michie	6-Jun-12	18-13-74	43,412	488	1.100	43,900	2.87	0	43,900
Michie	6-Jun-12	18-17-79	36,033	549	1.500	36,582	2.87	0	36,582
Mainstem	6-Jun-12	18-26-85	28,345	1,705	0.500	30,050	2.78	0	30,050
McClintock	6-Jun-12	18-26-86	27,264	418	1.500	27,682	2.83	0	27,682
SUM	2012		145,225	3,263		148,488		0	148,488
Wolf	27-May-13	18-60-25	10,377	3,473	1.003	13,850	2.24	0	13,850
Michie	4-Jun-13	18-25-79	46,625	952	2.000	47,577	2.7	0	47,577
Michie	4-Jun-13	18-17-82	32,358	660	2.000	33,018	2.46	0	33,018
Mainstem	4-Jun-13	18-36-08	9,192	93	1.000	9,285	2.44	0	9,285

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Mainstem	4-Jun-13	18-36-09	6,857	140	2.000	6,997	2.44	0	6,997
McClintock	4-Jun-13	18-27-64	31,665	0	0.000	31,665	2.35	0	31,665
SUM	2013		137,074	5,318		142,392		0	142,392
Wolf	1-Jun-14	18-31-84	6,509	2,821	3.000	9,330	2.15	0	9,330
Michie	3-Jun-14	18-31-87	68,638	1,401	2.000	70,039	2.72	0	70,039
McClintock	3-Jun-14	18-28-74	29,618	604	2.000	30,222	2.46	0	30,222
Mainstem	3-Jun-14	18-31-85	14,883	150	1.000	15,033	2.22	0	15,033
SUM	2014		119,647	4,977		124,624		0	124,624
Wolf	31-May-15	18-39-96	9,991	4,032	2.000	14,023	2.08	0	14,023
Michie	3-Jun-15	18-40-65	78,594	1,604	2.000	80,198	2.35	0	80,198
McClintock	3-Jun-15	18-40-64	29,919	303	1.000	30,222	2.24	0	30,222
Mainstem	3-Jun-15	18-39-98	9,742	99	1.000	9,841	2.35	0	9,841
Mainstem	3-Jun-15	18-39-97	8,980	91	1.000	9,071	2.38	0	9,071
Fox Cr [b]	8-Jun-15	18-31-86	14,949	151	1.000	15,100	2.50	0	15,100
SUM	2015		137,226	6,129		143,355		0	143,355
Wolf	29-May-16	18-38-68	7,273	2,706	10.000	9,979	2.21	0	9,979
Wolf	29-May-16	18-38-69	3,949	439	10.000	4,388	2.34	0	4,388
Michie	7-Jun-16	18-45-90	43,820	1,355	3.000	45,175	2.43	0	45,175
Michie	7-Jun-16	18-45-91	35,896	733	2.000	36,629	2.39	0	36,629
McClintock	17-Jun-16	18-38-90	33,239	336	1.000	33,575	2.82	0	33,575
Mainstem	7-Jun-16	18-44-91	5,723	117	2.000	5,840	2.41	0	5,840
Mainstem	7-Jun-16	18-44-92	5,694	116	2.000	5,810	2.54	0	5,810
SUM	2016		135,594	5,802		141,396		0	141,396

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Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
Wolf	28-May-17	18-07-79	5,225	107	2.000	5,332	2.65	0	5,332
Wolf	28-May-17	18-07-80	4,688	96	2.000	4,784	2.65	0	4,784
Wolf	28-May-17	18-45-88	406	8	2.000	414	2.65	0	414
Wolf	28-May-17		0	4,020	1.000	4,020		0	4,020
Michie	7-Jun-17	18-45-92	41,929	1,476	3.400	43,405	2.85	0	43,405
Michie	7-Jun-17	18-45-93	42,961	434	1.000	43,395	2.81	0	43,395
McClintock	7-Jun-17	18-45-88	20,130	203	1.000	20,333	2.80	0	20,333
McClintock	7-Jun-17	18-25-83	9,186	93	1.000	9,279	2.81	0	9,279
Mainstem	7-Jun-17	18-47-89	9,269	209	2.200	9,478	2.67	0	9,478
Mainstem	7-Jun-17	18-08-77	4,594	103	2.200	4,697	2.67	0	4,697
SUM	2017		138,389	6,748		145,137		0	145,137
AVERAGE	2008–2017		131,450	4,699		136,149	2.63	0	136,149
TOTAL	1985–2017		5,102,512	340,767		5,298,142		1,180,189	6,623,468

Note: Hatchery Chinook salmon fry released as 0+ sub yearling smolt.

[a] Usually corresponds to "tagged" category on Mark–Recapture Program (MRP) release forms. Coded Wire Tag (CWT) data recorded from CWT release sheets 1989–1994 and; CWT data prior to 1987 not verified against Salmonid Enhancement Program (SEP) records.

[b] Tributary to Lake Laberge, Release numbers not included in long-term average and totals.

Appendix A17.–Summary of releases of Chinook salmon from Yukon Territory instream incubation/rearing sites 1991–2017.

Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
Klondike R.	1990	Tatchun R.	02-01-01-02-12	Spring Fry	Tatchun R.	6/28/1991	6/28/1991	13593	21	650	14264	0.74
Klondike R.	1990	Tatchun R.	02-01-01-02-09	Spring Fry	Tatchun R.	6/28/1991	6/28/1991	15247	173	750	16170	0.74
Klondike R.	1991	Tatchun R.	18-06-45	Spring Fry	Tatchun R.	NA	8/31/1992	11734	0	817	12551	2.47
Klondike R.	1991	Tatchun R.	02-33-56	Spring Fry	Tatchun R.	NA	8/31/1992	6453	0	852	7305	2.47
Klondike R.	1991	Tatchun R.	18-06-44	Spring Fry	Tatchun R.	NA	8/31/1992	11585	0	320	11905	2.47
Klondike R.	1991	Yukon R	NOCN9148	Spring Fry	Pothole Lk.	6/1992	6/1992	0	0	1500	1500	0.00
Klondike R.	1992	Klondike R.	02-01-01-04-04	Spring Fry	Klondike R.	7/1/1993	7/1/1993	12832	240	144	13216	1.14
Klondike R.	1992	Klondike R.	02-01-01-04-05	Spring Fry	Klondike R.	7/1/1993	7/1/1993	7546	256	167	7969	1.14
Klondike R.	1992	Tatchun R.	02-01-01-04-02	Spring Fry	Tatchun R.	6/17/1993	6/17/1993	4654	633	335	5622	0.76
Klondike R.	1993	Klondike R.	02-01-01-05-03	Spring Fry	Klondike R.	6/30/1994	6/30/1994	6174	10	54	6238	0.88
Klondike R.	1993	Tatchun R.	02-01-01-04-07	Spring Fry	Tatchun R.	6/30/1994	6/30/1994	12077	246	71	12394	0.99
Klondike R.	1993	Tatchun R.	02-01-01-05-05	Spring Fry	Tatchun R.	6/30/1994	6/30/1994	9982	0	61	10043	0.99
Klondike R.	1994	Klondike R.	02-01-01-06-03	Spring Fry	Klondike R.	NA	7/4/1995	2159	11	190	2360	0.75
Klondike R.	1994	Klondike R.	02-01-01-06-02	Spring Fry	Klondike R.	NA	7/4/1995	1809	16	56	1881	0.75
Klondike R.	1994	Tatchun R.	02-01-01-05-11	Spring Fry	Tatchun R.	7/4/1995	7/4/1995	12431	100	686	13217	0.81

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Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
Mayo River	1991	Mayo R.	NOCN9147	Spring Fry	Mayo R.	6/1992	6/1992	0	0	13000	13000	0.00
Mayo River	1992	Mayo R.	NOCN9292	Spring Fry	Mayo R.	7/1993	7/1993	0	0	500	500	0.00
McIntyre Ck.	1990	Takhini R.	02-33-55	Fall Fry 5-8 gm	Takhini R.	9/13/1990	9/13/1990	7967	80	39	8086	3.20
McIntyre Ck.	1990	Takhini R.	02-33-54	Fall Fry 5-8 gm	Takhini R.	9/13/1990	9/13/1990	10789	109	101	10999	3.20
McIntyre Ck.	1991	Takhini R.	02-01-01-03-08	Spring Fry	Flat Ck.	NA	7/4/1992	12141	143	3425	15709	0.98
McIntyre Ck.	1991	Takhini R.	02-01-01-03-09	Spring Fry	Flat Ck.	NA	7/4/1992	13102	466	1398	14966	0.98
McIntyre Ck.	1991	Takhini R.	02-01-01-03-10	Spring Fry	Flat Ck.	NA	7/4/1992	4955	261	601	5817	0.98
McIntyre Ck.	1992	Klondike R.	02-01-01-04-04	Spring Fry	Klondike R.	7/1/1993	7/1/1993	12832	240	144	13216	1.14
McIntyre Ck.	1992	Klondike R.	02-01-01-04-05	Spring Fry	Klondike R.	7/1/1993	7/1/1993	7546	256	167	7969	1.14
McIntyre Ck.	1992	Takhini R.	02-34-24	Spring Fry	Flat Ck.	8/17/1993	8/17/1993	9532	823	95	10450	2.71
McIntyre Ck.	1992	Takhini R.	02-34-23	Spring Fry	Flat Ck.	8/17/1993	8/17/1993	9822	850	218	10890	2.71
McIntyre Ck.	1992	Takhini R.	18-14-54	Spring Fry	Flat Ck.	8/17/1993	8/17/1993	10925	567	227	11719	2.71
McIntyre Ck.	1992	Takhini R.	18-14-53	Spring Fry	Flat Ck.	8/17/1993	8/17/1993	10658	865	226	11749	2.71
McIntyre Ck.	1992	Takhini R.	02-02-17	Spring Fry	Flat Ck.	8/17/1993	8/17/1993	2291	114	37	2442	2.71
McIntyre Ck.	1992	Takhini R.	02-34-22	Spring Fry	Flat Ck.	8/17/1993	8/17/1993	10355	314	40	10709	2.71
McIntyre Ck.	1992	Tatchun Ck.	02-01-01-04-02	Spring Fry	Tatchun Ck.	6/17/1993	6/17/1993	4654	633	335	5622	0.76
McIntyre Ck.	1993	Takhini R	18-17-51	Spring Fry	Flat Ck.	8/26/1994	8/31/1994	7410	46	222	7678	2.60

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Appendix A17.–Page 3 of 9.

Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre Ck.	1993	Takhini R.	18-17-50	Spring Fry	Flat Ck.	8/26/1994	8/31/1994	11227	40	87	11354	2.6
McIntyre Ck.	1993	Takhini R.	18-17-49	Spring Fry	Flat Ck.	8/26/1994	8/31/1994	11071	159	142	11372	2.6
McIntyre Ck.	1993	Takhini R.	18-17-48	Spring Fry	Flat Ck.	8/26/1994	8/31/1994	11375	0	104	11479	2.6
McIntyre Ck.	1993	Takhini R.	18-17-52	Spring Fry	Flat Ck.	8/26/1994	8/31/1994	10668	21	198	10887	2.6
McIntyre Ck.	1993	Takhini R.	02-02-16	Spring Fry	Takhini R.	8/30/1994	8/30/1994	9343	271	36	9650	2.8
McIntyre Ck.	1993	Takhini R.	02-01-63	Spring Fry	Takhini R.	8/30/1994	8/30/1994	10899	222	62	11183	2.8
McIntyre Ck.	1994	Takhini R.	02-01-01-04-15	Spring Fry	Takhini R.	8/14/1995	8/14/1995	9887	0	410	10297	2.2
McIntyre Ck.	1994	Takhini R.	02-01-01-04-13	Spring Fry	Takhini R.	8/14/1995	8/14/1995	14452	0	365	14817	2.2
McIntyre Ck.	1994	Takhini R.	02-01-01-04-12	Spring Fry	Flat Ck.	8/14/1995	8/14/1995	14193	59	281	14533	2.2
McIntyre Ck.	1994	Takhini R.	02-01-01-04-14	Spring Fry	Flat Ck.	8/14/1995	8/14/1995	13586	130	295	14011	2.2
McIntyre Ck.	1995	Takhini R.	02-01-01-05-08	Spring Fry	Takhini R.	8/12/1996	8/12/1996	15731	251	496	16478	2.1
McIntyre Ck.	1995	Takhini R.	02-01-01-05-09	Spring Fry	Takhini R.	8/12/1996	8/12/1996	8085	41	293	8419	2.1
McIntyre Ck.	1995	Takhini R.	02-01-01-05-10	Spring Fry	Flat Ck.	8/7/1996	8/7/1996	10727	65	170	10962	2.0
McIntyre Ck.	1995	Takhini R.	02-01-01-02-10	Spring Fry	Takhini R.	6/27/1996	6/27/1996	14530	49	62	14641	0.8
McIntyre Ck.	1995	Takhini R.	02-01-01-02-11	Spring Fry	Takhini R.	6/27/1996	6/27/1996	13526	91	294	13911	0.8
McIntyre Ck.	1996	Takhini R.	02-01-01-06-14	Spring Fry	Flat Ck.	7/2/1997	7/4/1997	15622	158	382	16162	0.8
McIntyre Ck.	1996	Takhini R.	02-01-01-04-06	Spring Fry	Flat Ck.	7/2/1997	7/4/1997	14845	37	280	15162	0.8
McIntyre Ck.	1996	Takhini R.	02-01-01-07-03	Spring Fry	Takhini R.	6/27/1997	6/27/1997	1521	15	148	1684	1.0

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Appendix A17.–Page 4 of 9.

Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre Ck.	1997	Tatchun Ck.	02-01-01-06-08	Spring Fry	Tatchun Ck.	6/19/1998	6/19/1998	9284	150	74	9508	1.1
McIntyre Ck.	1997	Tatchun Ck.	02-01-01-06-09	Spring Fry	Tatchun Ck.	6/19/1998	6/19/1998	10318	211	188	10717	1.1
McIntyre Ck.	1997	Tatchun Ck.	02-01-01-07-02	Spring Fry	Tatchun Ck.	6/19/1998	6/19/1998	2536	52	0	2588	1.1
McIntyre Ck.	1997	Takhini R.	02-01-01-07-09	Spring Fry	Flat Ck.	6/22/1998	6/22/1998	11374	115	115	11604	1.1
McIntyre Ck.	1997	Takhini R.	02-01-01-06-11	Spring Fry	Takhini R.	6/23/1998	6/23/1998	12933	334	118	13385	1.1
McIntyre Ck.	1997	Takhini R.	02-01-01-06-10	Spring Fry	Takhini R.	6/23/1998	6/23/1998	12186	37	115	12338	1.1
McIntyre Ck.	1997	Takhini R.	02-01-01-07-08	Spring Fry	Takhini R.	6/23/1998	6/23/1998	12341	253	148	12742	1.1
McIntyre Ck.	1998	Tatchun Ck.	02-01-01-06-12	Spring Fry	Tatchun Ck.	NA	7/8/1999	10363	0	67	10430	NA
McIntyre Ck.	1998	Tatchun Ck.	02-01-01-06-13	Spring Fry	Tatchun Ck.	NA	7/8/1999	4733	0	82	4815	NA
McIntyre Ck.	1998	Takhini R.	02-01-01-07-10	Spring Fry	Takhini R.	NA	7/14/1999	13753	28	148	13929	NA
McIntyre Ck.	1998	Takhini R.	02-01-01-07-11	Spring Fry	Flat Ck.	NA	7/15/1999	11273	23	206	11502	NA
McIntyre Ck.	1999	Takhini R.	02-01-0-07-07	Spring Fry	Flat Ck.	NA	6/23/2000	11333	114	219	11666	0.8
McIntyre Ck.	1999	Takhini R.	02-01-01-07-12	Spring Fry	Flat Ck.	NA	6/23/2000	12246	0	214	12460	0.8
McIntyre Ck.	1999	Takhini R.	02-01-01-06-04	Spring Fry	Takhini R.	NA	6/24/2000	11105	0	147	11252	0.9
McIntyre Ck.	1999	Takhini R.	02-01-01-06-05	Spring Fry	Takhini R.	NA	6/24/2000	12044	0	88	12132	0.9
McIntyre Ck.	1999	Takhini R.	02-01-01-06-06	Spring Fry	Takhini R.	NA	6/24/2000	4561	0	0	4561	0.9
McIntyre Ck.	1999	Tatchun Ck.	02-01-01-07-05	Spring Fry	Tatchun Ck.	NA	6/19/2000	12239	188	409	12836	1.0
McIntyre Ck.	1999	Tatchun Ck.	02-01-01-07-06	Spring Fry	Tatchun Ck.	NA	6/19/2000	987	10	0	997	1.0

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Appendix A17.–Page 5 of 9.

Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre Ck.	2000	Takhini R.	02-01-01-08-01	Spring Fry	Takhini R.	NA	7/25/2001	11724	163	123	12010	1.1
McIntyre Ck.	2000	Takhini R.	02-01-01-08-02	Spring Fry	Flat Ck.	NA	7/26/2001	9995	101	60	10156	1.1
McIntyre Ck.	2000	Tatchun Ck.	02-01-01-07-05	Spring Fry	Tatchun Ck.	NA	7/9/2001	11654	360	10	12024	1.1
McIntyre Ck.	2000	Tatchun Ck.	02-01-01-07-06	Spring Fry	Tatchun Ck.	NA	7/9/2001	6321	329	14	6664	1.1
McIntyre Ck.	2001	Takhini R.	02-01-01-08-04	Spring Fry	Takhini R.	NA	6/29/2002	10109	314	301	10724	1.0
McIntyre Ck.	2001	Takhini R.	02-01-01-08-05	Spring Fry	Takhini R.	NA	6/29/2002	9814	100	405	10319	1.0
McIntyre Ck.	2001	Takhini R.	02-01-01-08-07	Spring Fry	Flat Ck.	NA	6/28/2002	4161	42	0	4203	1.0
McIntyre Ck.	2001	Tatchun Ck.	02-01-01-08-03	Spring Fry	Tatchun Ck.	NA	6/27/2002	6432	415	279	7126	1.0
McIntyre Ck.	2002	Takhini R.	02-11-22-31-41	Spring Fry	Takhini R.	NA	7/21/2003	8431	0	55	8486	1.7
McIntyre Ck.	2002	Takhini R.	02-11-22-31-42	Spring Fry	Takhini R.	NA	7/21/2003	14017	0	76	14093	1.7
McIntyre Ck.	2002	Takhini R.	02-01-01-07-01	Spring Fry	Takhini R.	NA	7/21/2003	11589	13	104	11706	1.7
McIntyre Ck.	2002	Takhini R.	02-11-21-38-46	Spring Fry	Flat Ck.	NA	7/22/2003	6426	65	0	6491	1.7
McIntyre Ck.	2002	Tatchun Ck.	02-01-01-07-14	Spring Fry	Tatchun Ck.	NA	7/4/2003	10746	50	79	10875	1.4
McIntyre Ck.	2002	Tatchun Ck.	02-01-01-07-15	Spring Fry	Tatchun Ck.	NA	7/4/2003	13261	0	166	13427	1.4
McIntyre Ck.	2003	Tatchun R.	02-01-02-01-05	Spring Fry	Tatchun R.	NA	6/27/2004	10701	805	0	11506	1.1
McIntyre Ck.	2003	Tatchun R.	02-01-02-01-04	Spring Fry	Tatchun R.	NA	6/27/2004	9919	556	0	10475	1.1
McIntyre Ck.	2003	Tatchun R.	02-01-02-01-03	Spring Fry	Tatchun R.	NA	6/27/2004	5249	395	0	5644	1.1
McIntyre Ck.	2003	Takhini R.	02-01-02-02-01	Spring Fry	Takhini R.	NA	7/12/2004	10449	268	0	10717	1.3

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Appendix A17.–Page 6 of 9.

Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre Ck.	2003	Takhini R.	02-01-02-01-06	Spring Fry	Takhini R.	NA	7/12/2004	11685	178	0	11863	1.3
McIntyre Ck.	2003	Takhini R.	02-01-02-01-08	Spring Fry	Flat Ck.	NA	8/16/2004	7785	95	0	7880	1.1
McIntyre Ck.	2003	Tatchun R.	02-01-01-09-01	Spring Fry	Tatchun R.	NA	8/20/2004	9381	143	0	9524	1.3
McIntyre Ck.	2003	Tatchun R.	02-01-01-08-08	Spring Fry	Tatchun Ck.	NA	8/20/2004	5216	79	0	5295	1.5
McIntyre Ck.	2003	Takhini R.	02-01-01-09-03	Spring Fry	Takhini R.	NA	8/21/2004	10112	154	0	10266	1.2
McIntyre Ck.	2003	Takhini R.	02-01-01-09-02	Spring Fry	Takhini R.	NA	8/21/2004	10180	155	0	10335	1.2
McIntyre Ck.	2003	Takhini R.	02-01-02-01-03	Spring Fry	Takhini R.	NA	8/21/2004	5390	82	0	5472	1.2
McIntyre Ck.	2004	Tatchun R.	02-01-01-08-09	Spring Fry	Tatchun R.	NA	6/27/2005	2361	426	0	2787	1.3
McIntyre Ck.	2004	Takhini R.	02-01-02-02-02	Spring Fry	Takhini R.	NA	7/14/2005	23068	2175	1100	26343	1.3
McIntyre Ck.	2004	Takhini R.	02-01-02-02-03	Spring Fry	Takhini R.	NA	7/14/2005	9146	1016	1100	11262	1.3
McIntyre Ck.	2004	Takhini R.	02-01-02-01-08	Spring Fry	Flat Ck.	NA	7/7/2005	5592	233	0	5825	1.3
McIntyre Ck.	2005	Takhini R.	02-1-2-2-5	Spring Fry	Takhini R.	NA	7/10/2006	10766	748	0	11514	1.3
McIntyre Ck.	2005	Takhini R.	02-1-2-1-9	Spring Fry	Takhini R.	NA	7/10/2006	10952	534	0	11486	1.6
McIntyre Ck.	2005	Takhini R.	02-1-2-2-6	Spring Fry	Takhini R.	NA	7/10/2006	11108	394	0	11502	1.6
McIntyre Ck.	2005	Takhini R.	02-1-2-3-4	Spring Fry	Takhini R.	NA	7/18/2006	2520	152	0	2672	1.6
McIntyre Ck.	2005	Tatchun R.	02-1-2-1-7	Spring Fry	Tatchun R.	NA	7/7/2006	9243	182	0	9425	2.4
McIntyre Ck.	2005	Tatchun R.	02-1-2-3-3	Spring Fry	Tatchun R.	NA	7/23/2006	26094	847	0	26941	2.4
McIntyre Ck.	2006	Takhini R	02-01-02-03-09	Spring Fry	Takhini R	7/17/2007	7/20/2007	8422	936	552	9910	1.6a

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Appendix A17.–Page 7 of 9.

Project	Brood Year	Stock	Mark	Stage	Release Sire	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre Ck.	2006	Takhini R.	02-01-02-03-07	Spring Fry	Takhini R.	7/17/2007	7/20/2007	10108	645	185	10938	1.6[a]
McIntyre Ck.	2006	Takhini R.	02-01-02-03-08	Spring Fry	Takhini R.	7/17/2007	7/20/2007	10080	420	183	10683	1.6[a]
McIntyre Ck.	2006	Takhini R.	02-01-02-04-01	Spring Fry	Takhini R.	7/17/2007	7/20/2007	8881	567	688	10136	1.6[a]
McIntyre Ck.	2006	Takhini R.	02-01-02-04-04	Spring Fry	Takhini R.	7/17/2007	7/20/2007	1500	131	55	1686	1.6[a]
McIntyre Ck.	2006	Tatchun R.	02-01-02-04-02	Spring Fry	Tatchun R.	7/21/2007	7/26/2007	9775	182	185	10142	>2.4[a]
McIntyre Ck.	2006	Tatchun R.	02-01-02-04-03	Spring Fry	Tatchun R.	7/21/2007	7/26/2007	9450	476	113	10039	>2.4[a]
McIntyre Ck.	2006	Tatchun R.	02-01-02-03-05	Spring Fry	Tatchun R.	7/21/2007	7/26/2007	8972	955	196	10123	>2.4[a]
McIntyre Ck.	2006	Tatchun R.	02-01-02-03-06	Spring Fry	Tatchun R.	7/21/2007	7/26/2007	6261	261	101	6623	>2.4[a]
McIntyre Ck.	2007	Tatchun R.	02-01-02-04-03	Spring Fry	Tatchun R.	6/27/2008	6/27/2008	10170	103	145	10418	1.6
McIntyre Ck.	2007	Tatchun R.	02-01-02-04-05	Spring Fry	Tatchun R.	6/27/2008	6/27/2008	10056	311	228	10595	1.6
McIntyre Ck.	2007	Tatchun R.	02-01-02-04-06	Spring Fry	Tatchun R.	6/27/2008	6/27/2008	4345	44	328	4717	1.6
McIntyre Ck.	2007	Takhini R.	02-01-02-04-08	Spring Fry	Takhini R.	7/2/2008	7/2/2008	6756	209	197	7162	1.4
McIntyre Ck.	2007	Takhini R.	02-01-02-04-07	Spring Fry	Takhini R.	7/2/2008	7/2/2008	9490	293	119	9902	1.4
McIntyre Ck.	2008	Tatchun R.	02-01-02-05-06	Spring Fry	Tatchun R.	6/30/2009	6/30/2009	2576	136	37	2749	1.3
McIntyre/ Fox	2008	Whitehorse Fishway	02-01-02-05-01	Spring Fry	Fox Creek (Laberge)	7/3/2009	7/3/2009	10141	459	0	10600	1.4
McIntyre/ Fox	2008	Whitehorse Fishway	02-01-02-05-02	Spring Fry	Fox Creek (Laberge)	7/3/2009	7/3/2009	10019	459	0	10478	1.4
McIntyre/ Fox	2008	Whitehorse Fishway	02-01-02-05-03	Spring Fry	Fox Creek (Laberge)	7/3/2009	7/10/2009	9739	1253	0	10992	1.4
McIntyre/ Fox	2008	Whitehorse Fishway	02-01-02-05-04	Spring Fry	Fox Creek (Laberge)	7/9/2009	7/10/2009	9194	1417	0	10611	1.4
McIntyre/ Fox	2008	Whitehorse Fishway	02-01-02-05-05	Spring Fry	Fox Creek (Laberge)	7/9/2009	7/10/2009	9747	1126	0	10873	1.4

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Appendix A17.–Page 8 of 9.

Project	Brood Year	Stock	Mark	Stage	Release Sire	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre Ck.	2009	Tatchun R.	02-01-02-05-07	Spring Fry	Tatchun R.	6/21/2010	6/21/2010	1373	131	0	1504	1.3
McIntyre/ Fox	2009	Whitehorse Fishway	02-01-02-05-09	Spring Fry	Fox Creek (Laberge)	6/18/2010	6/18/2010	7930	1251	0	9181	1.1
McIntyre Ck.	2010	Tatchun Ck.	02-01-02-06-02	Spring Fry	Tatchun R.	6/27/2011	6/27/2011	9378	152	0	9530	1.2
McIntyre Ck.	2010	Tatchun Ck.	02-01-02-06-04	Spring Fry	Tatchun R.	6/27/2011	6/27/2011	10594	3567	0	14161	1.2
McIntyre/ Fox	2010	Whitehorse Fishway	02-01-02-06-06	Spring Fry	Fox Creek (Laberge)	5/7/2011	5/7/2011	2864	2362	0	5226	1.2[a]
McIntyre/ Fox	2010	Whitehorse Fishway	02-01-02-06-07	Spring Fry	Fox Creek (Laberge)	5/7/2011	5/7/2011	1161	826	0	1987	1.2[a]
McIntyre Ck.	2011	Tatchun Ck.	02-01-02-07-01	Spring Fry	Tatchun R.	6/28/2012	6/28/2012	3481	175	0	3656	1.5
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-02	Spring Fry	Fox Creek (Laberge)	7/11/2012	7/11/2012	3121	87	0	3208	1.5
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-03	Spring Fry	Fox Creek (Laberge)	7/11/2012	7/11/2012	10060	135	0	10195	1.5
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-04	Spring Fry	Fox Creek (Laberge)	7/11/2012	7/11/2012	9932	139	0	10071	1.5
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-08	Spring Fry	Fox Creek (Laberge)	7/11/2012	7/11/2012	10612	89	0	10701	1.5
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-06-08	Spring Fry	Fox Creek (Laberge)	7/18/2012	7/18/2012	10577	71	0	10648	1.8
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-05	Spring Fry	Fox Creek (Laberge)	7/18/2012	7/18/2012	11208	113	0	11321	1.8
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-09	Spring Fry	Fox Creek (Laberge)	7/24/2012	7/24/2012	10806	32	0	10838	2.0
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-06	Spring Fry	Fox Creek (Laberge)	7/24/2012	7/24/2012	10956	76	0	11032	2.0

-continued-

Project	Brood Year	Stock	Mark	Stage	Release Sire	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-07	Spring Fry	Fox Creek (Laberge)	7/26/2012	7/26/2012	9053	91	0	9144	2.0
McIntyre/ Fox	2012	Whitehorse Fishway	02-01-02-07-09	Spring Fry	Fox Creek (Laberge)	7/8/2013	7/8/2013	9940	246	0	10186	1.4
McIntyre/ Fox	2012	Whitehorse Fishway	02-01-02-08-01	Spring Fry	Fox Creek (Laberge)	7/8/2013	7/8/2013	11288	410	0	11698	1.4
McIntyre/ Fox	2012	Whitehorse Fishway	02-01-02-08-02	Spring Fry	Fox Creek (Laberge)	7/8/2013	7/8/2013	241	51	0	292	1.4
McIntyre/ Fox	2013	Whitehorse Fishway	02[b]-01-02-08-05	Spring Fry	Fox Creek (Laberge)	7/3/2013	7/8/2013	5516	151	0	5667	NA
McIntyre/ Fox	2013	Whitehorse Fishway	02[b]-01-02-08-04	Spring Fry	Fox Creek (Laberge)	7/3/2013	7/8/2013	10896	193	0	11089	NA
McIntyre/ Fox	2014	Whitehorse Fishway	02-01-02-08-06	Spring Fry	Fox Creek (Laberge)	7/12/2015	7/12/2015	10000	0	0	10000	1.2
McIntyre/ Fox	2014	Whitehorse Fishway	02-01-02-08-07	Spring Fry	Fox Creek (Laberge)	7/12/2015	7/12/2015	10000	0	0	10000	1.2
McIntyre/ Fox	2014	Whitehorse Fishway	02-01-02-08-08	Spring Fry	Fox Creek (Laberge)	7/12/2015	7/12/2015	3000	477	0	3477	1.2
McIntyre/ Fox	2015	Whitehorse Fishway	02-01-02-09-00	Spring Fry	Fox Creek (Laberge)	7/17/2016	7/17/2016	11449	0	0	11449	1.3
McIntyre/ Fox	2015	Whitehorse Fishway	02-01-02-08-09	Spring Fry	Fox Creek (Laberge)	7/17/2016	7/17/2016	11456	0	0	11456	1.3
McIntyre/ Fox	2015	Whitehorse Fishway	02-01-02-09-01	Spring Fry	Fox Creek (Laberge)	7/17/2016	7/17/2016	11467	0	0	11467	1.3
McIntyre/ Fox	2015	Whitehorse Fishway	02-01-02-09-02	Spring Fry	Fox Creek (Laberge)	7/17/2016	7/17/2016	11315	600	0	11915	1.3
McIntyre/ Fox	2016	Whitehorse Fishway	02-01-02-09-04	Spring Fry	Fox Creek (Laberge)	7/16/2017	7/24/2017	11497	677	0	12174	1.3
McIntyre/ Fox	2016	Whitehorse Fishway	02-01-02-09-05	Spring Fry	Fox Creek (Laberge)	7/16/2017	7/24/2017	9926	526	0	10452	1.3
McIntyre/ Fox	2016	Whitehorse Fishway	02-01-02-09-06	Spring Fry	Fox Creek (Laberge)	7/16/2017	7/24/2017	8933	959	0	9892	1.3

Note: NA= Not Available; #=Number; Ad=Adipose; Rel.=Released. Klondike R. refers to North Klondike River.

[a] Weight (WT) not taken at release, but based on earlier sampling data and assumed growth.

[b] Initial BY 2013 "02" mark code segment could not be confirmed at the time of reporting.

Appendix A18.–Summary of samples submitted for coded wire tag identification from adipose-clipped adult Chinook salmon, by community and sampling project in Alaska, 1989–2017.

	District 1			District 2			District 3	District 5				
	Emmonak			Pilot Station	Other	Marshall	Russian Mission	Tanana Village	Bridge Area	Fort Yukon	Eagle	District Community
Year	Comm.	Sub.	Proj.	Pro.	Comm.	Proj.	Proj.	Comm.	Comm.	Sub.	Proj.	Total Sampled
1989					2							2
1990												0
1991												0
1992	18		2									20
1993	12											12
1994	10											10
1995	14											14
1996	1											1
1997	9											9
1998	26		2									28
1999	50		5						8			63
2000	4		1									5
2001						2	1					3
2002												0
2003	2	1	3					7				13
2004	40		4					9				53
2005	11		2					1			0	14
2006	29		3			2					6	40
2007	9		2						3		2	16
2008	4	1	1	1							1	8
2009			1	1							6	8
2010	5		4								4	13
2011	2	1	8								3	14
2012	3	2	8								3	16
2013		3	3								3	9
2014			3							8	13	24
2015										5	19	24
2016											6	6
2017 [a]				1							5	6
Total	249	8	52	3	2	4	1	17	11	13	71	430

Note: Commercial fishery samples are listed as "common property" in the tag lab database. http://mtalab.adfg.alaska.gov/cwt/reports/cwt_glossary.asp; Proj. = Project, Sub. = Subsistence, Comm. = Commercial; source*:* http://mtalab.adfg.alaska.gov/cwt/reports/numbersampled.asp.

[a] Preliminary number.

Appendix A19.–Recoveries of Chinook salmon coded wire tags from the Whitehorse Rapids Fish hatchery in the U.S. domestic groundfish fisheries and research trawl surveys.

Gear Type	Brood Year	Tag Code	Release Location	Release Date	Recovery Date	Age (yrs)	Length (mm)	Latitude	Longitude
Domestic	1988	26006	Michie Cr.	6/6/1989	3/25/1992	4	620	56° 44'°	173° 15'
Trawl	1990	180322	Wolf Cr.	6/8/1991	3/14/1994	4	687	60° 06'	178° 58'
	1991	180830	Michie Cr.	6/4/1992	2/24/1995	4		55° 19'	164° 43'
	1992	181215	Wolf Cr.	6/6/1993	12/6/1994	2	400	56° 52'	171° 18'
	1992	181216	Yukon R.	6/15/1993	6/2/1997	5	833	59° 29'	167° 49'
	1993	181428	Michie Cr.	6/1/1994	3/10/1998	5	760	59° 26'	178° 05'
	1995	182823	Fox Cr.	6/4/1996	3/29/1998	3	650	58° 56'	178° 06'
	1995	183348	Judas Cr.	6/4/1996	3/30/1999	4	660	57° 43'	173° 34'
	1996	182554	Michie Cr.	6/11/1997	3/16/2000	4	550	55° 56'	168° 52'
	1997	183159	Judas Cr.	6/12/1998	3/28/2001	4	550	56° 18'	170° 33'
	1999	182353	Wolf Creek	6/10/2000	3/3/2003	4	650	56° 26'	169° 55'
	2000	184412	McClintock R.	6/8/2001	3/19/2004	4	610	NMFS Stat Area 513	
	2000	184412	McClintock R.	6/8/2001	2/15/2002	2	230	56° 10'	166° 00'
	2001	185107	Michie Cr.	6/10/2002	2/8/2003	2	250	56° 44'	167° 00'
	2001	185101	Wolf Cr.	5/23/2002	10/8/2004	3	590	54°01'	166° 29'
	2001	185061	Michie Cr.	6/10/2002	3/15/2005	4	640	57° 21'	171° 39'
	2001	185101	Wolf Cr.	5/23/2002	2/21/2006	5	800	55° 42'	168° 53'
	2005	080166	Wolf Cr.	6/11/2006	2/7/2009	4	630	56° 29'	168° 12'
	2005	080173	McClintock R.	6/14/2006	3/2/2009	4	650	56° 22'	169° 21'
	2005	080169	Mitchie Cr.	6/14/2006	3/26/2010	5	900	57° 07'	172° 26'
	2011	181374	Mitchie Cr.	6/6/2012	Mar. 2015	4	620	56°	170°
	2011	182685	Yukon R.	6/6/2012	Feb. 2015	4	630	NMFS Stat Area 521	
Research	2001	185106	Michie Cr.	6/10/2002	10/3/2002	1	193	64° 06'	164° 31'
Trawl	2001	185102	Wolf Cr.	6/2/2002	10/3/2002	1	153	64° 06	164° 31'
	2001	185061	Michie Cr.	6/10/2002	10/4/2002	1	155	63° 00'	165° 58'
	2011	181374	Michie Cr.	6/6/2012	9/22/2012	1	138	61° 29'	167° 00'
	2011	181779	Michie Cr.	6/6/2012	9/24/2012	1	160	64° 06'	163° 33'
	2011	181779	Michie Cr.	6/6/2012	9/24/2012	1	138	60° 59'	168° 00'
	2013	182874	McClintock R.	6/6/2014	9/5/2014	1	126	63° 51'	165° 58'
	2013	183184	Wolf Cr.	6/1/2014	9/6/2014	1	120	63° 01'	166° 03'
	2013	183185	Yukon R.	6/6/2014	9/14/2014	1	192	62° 30'	167° 05'
	2013	183187	Michie Cr.	6/6/2014	9/14/2014	1	177	62° 30'	167° 05'
	2014	183186	Fox Cr.	6/8/2015	9/8/2015	1	109	62° 59'	165° 58'
	2014	183186	Fox Cr.	6/8/2015	9/14/2015	1	120	64° 00'	166° 01'
	2014	183186	Fox Cr.	6/8/2015	9/14/2015	1	124	64° 00'	166° 01'
	2014	184064	McClintock R.	6/3/2015	9/9/2015	1	112	63° 01'	167° 04'
	2014	184065	Michie Cr.	6/3/2015	9/14/2015	1	129	64° 00'	166° 01'

Appendix A20.–Estimated bycatch (numbers) of Pacific salmon by species, and year in U.S. groundfish fisheries in the Bering Sea-Aleutian Islands (BSAI) management area, 1991–2017.

Year	Chinook	Chum	Coho	Sockeye	Pink	Total Non-Chinook
1991	48,880 [a]	28,270 [a]	656 [a]	1,310 [a]	26 [a]	30,262 [a]
1992	91,954	40,090 [a]	1,266 [a]	14 [a]	80 [a]	41,450 [a]
1993	46,013	242,916 [a]	324 [a]	22 [a]	8[a]	243,270 [a]
1994	43,821	94,107	228	20	193	94,548
1995	23,436	20,983	871	0	21	21,875
1996	63,204	77,819	234	5	2	78,060
1997	50,530	66,816	109	3	66	66,994
1998	60,548	–	–	–	–	66,611
1999	14,599	–	–	–	–	47,234
2000	8,222	–	–	–	–	59,326
2001	40,547	–	–	–	–	60,730
2002	39,683	–	–	–	–	82,482
2003	53,661	–	–	–	–	189,212
2004	60,038	–	–	–	–	462,439
2005	75,084	–	–	–	–	715,628
2006	87,114	–	–	–	–	321,964
2007	130,000	–	–	–	–	96,378
2008	23,837	–	–	–	–	16,503
2009	14,115	–	–	–	–	46,277
2010	12,401	–	–	–	–	14,417
2011	26,609	–	–	–	–	192,496
2012	12,930	–	–	–	–	24,053
2013	16,007	–	–	–	–	126,792
2014	18,097	–	–	–	–	223,853
2015	25,253	–	–	–	–	243,343
2016	32,560	–	–	–	–	347,139
2017	36,279					471,362

Sources: Berger 2010; NMFS web sites:

https://alaskafisheries.noaa.gov/sites/default/files/reports/chinook_salmon_mortality2017.pdf;
https://alaskafisheries.noaa.gov/sites/default/files/reports/chum_salmon_mortality2017.pdf

[a] Community Development Quota (CDQ) bycatch not included.

Appendix A21.–Estimated bycatch (numbers) of Pacific salmon by species and year in U.S. groundfish fisheries in the Gulf of Alaska (GOA) management area, 1991–2017.

Year	Chinook	Chum	Coho	Sockeye	Pink	Total Non-Chinook
1991	38,893	13,711	1,133	46	64	14,954
1992	16,788	11,140	55	21	0	11,216
1993	19,260	55,268	306	15	799	56,388
1994	13,616	36,782	42	96	306	37,226
1995	14,653	64,067	668	41	16	64,792
1996	15,761	3,969	194	2	11	4,176
1997	15,229	3,349	41	7	23	3,420
1998	16,983	–	–	–	–	13,544
1999	30,600	–	–	–	–	7,529
2000	26,730	–	–	–	–	10,995
2001	15,104	–	–	–	–	6,063
2002	12,919	–	–	–	–	3,219
2003	15,367	–	–	–	–	9,530
2004	17,777	–	–	–	–	5,809
2005	31,271	–	–	–	–	6,608
2006	18,763	–	–	–	–	4,226
2007	40,521	–	–	–	–	3,421
2008	16,264	–	–	–	–	2,156
2009	8,475	–	–	–	–	2,355
2010	54,678	–	–	–	–	NA
2011	19,773	–	–	–	–	NA
2012	19,992	–	–	–	–	NA
2013	23,343	–	–	–	–	NA
2014	15,751	–	–	–	–	NA
2015	18,969	–	–	–	–	NA
2016	22,078	–	–	–	–	NA
2017	24,969	–	–	–	–	NA

Sources: Berger 2010; NMFS https://alaskafisheries.noaa.gov/sites/default/files/reports/goasalmonmort2017.pdf.

Appendix A22.–Estimated bycatch (numbers) of Chinook and non-Chinook salmon in the U.S. Bering Sea-Aleutian Islands (BSAI) groundfish fisheries by season, 1991–2017.

	BSAI Chinook Salmon Bycatch				BSAI Non-Chinook Salmon Bycatch			
	A-season		B-season		A-season		B-season	
Year	Pollock Fisheries	All Fisheries	Pollock Fisheries	All Fisheries	Pollock Fisheries	All Fisheries	Pollock Fisheries	All Fisheries
1991	38,791 [a]	46,392 [a]	2,114 [a]	2,488 [a]	2,850 [a]	3,015 [a]	26,101 [a]	27,245 [a]
1992	25,691	31,418	10,259	10,536	1,951 [a]	2,120 [a]	38,324 [a]	39,329 [a]
1993	17,264	24,688	21,252	21,325	1,594 [a]	1,848 [a]	240,597 [a]	241,422 a
1994	28,451	38,921	4,686	4,899	3,991	5,599	88,681	88,949
1995	10,579	18,939	4,405	4,497	1,708	3,033	17,556	18,842
1996	36,068	43,316	19,554	19,888	222	665	77,014	77,395
1997	10,935	16,401	33,973	34,128	2,083	2,710	63,904	64,285
1998	16,132	19,869	40,308	40,679	4,090	4,520	60,866	61,177
1999	6,352	8,793	5,627	5,805	362	393	44,909	46,739
2000	3,422	6,567	1,539	1,655	213	350	58,358	58,976
2001	18,484	24,871	14,961	15,676	2,386	2,903	54,621	57,827
2002	21,794	26,276	12,701	13,407	1,377	1,697	79,274	80,784
2003	33,478	40,058	12,183	13,603	3,831	3,831	184,513	185,381
2004	24,925	30,766	26,837	29,272	426	1,020	451,907	461,419
2005	27,960	33,622	40,224	41,462	594	1,029	710,196	714,599
2006	58,547	62,547	24,205	24,568	1,323	2,310	305,674	319,654
2007	72,943	78,156	51,780	51,844	8,481	9,599	84,387	86,779
2008	16,495	18,827	4,811	5,009	247	442	14,732	16,060
2009	9,882	11,289	2,697	2,825	48	174	45,397	46,103
2010	7,649	9,480	2,071	2,921	40	222	13,158	14,195
2011	7,137	7,602	18,362	19,007	297	414	191,138	192,082
2012	7,765	8,981	3,579	3,949	11	307	22,265	23,746
2013	8,237	9,186	4,797	6,821	215	447	125,101	126,345
2014	11,539	13,837	3,492	4,261	577	1,581	218,851	222,519
2015	12,304	17,502	6,025	7,751	4,800	6,200	232,996	237,143
2016	16,828	25,721	5,098	6,840	3,903	4,838	339,098	342,309
2017	21,827	27,009	8,248	9,270	1,902	2,308	465,772	469,054

Note: A-season (winter; January 20-June 10) B-season (summer/fall; June 10-November 1). Actual fishing dates when fishing starts and stops varies by year. Source: NMFS https://alaskafisheries.noaa.gov/sites/default/files/reports/chinook_salmon_mortality2017.pdf; https://alaskafisheries.noaa.gov/sites/default/files/reports/chum_salmon_mortality2017.pdf

[a] Community Development Quota (CDQ) bycatch not included.

Appendix A23.–Drainagewide Yukon River fall chum salmon estimated brood year production and return per spawner estimates 1974–2017.

				Estimated Brood Year Return								(R)	(R/P)
	(P)	Estimated Annual Totals		Number of Salmon [a]				Percent				Total Brood	Return/
Year	Escapement [b]	Catch	Run	Age 3	Age 4	Age 5	Age 6	Age 3	Age 4	Age 5	Age 6	Year Return [a]	Spawner
1974	689,500	478,875	1,168,375	112,594	658,928	97,484	0	0.13	0.76	0.11	0.00	869,006	1.26
1975	2,244,500	473,062	2,717,562	199,167	1,739,055	67,869	125.426	0.10	0.87	0.03	0.00	2,006,215	0.89
1976	564,100	339,043	903,143	144,839	649,362	139,223	4,874	0.15	0.69	0.15	0.01	938,297	1.66
1977	733,550	447,918	1,181,468	113,474	1,092,332	198,398	5,022	0.08	0.78	0.14	0.00	1,409,226	1.92
1978	564,800	434,030	998,830	22,577	375,175	108,597	0	0.04	0.74	0.21	0.00	506,349	0.90
1979	1,366,000	615,377	1,981,377	46,428	922,553	312,865	4,045	0.04	0.72	0.24	0.00	1,285,892	0.94
1980	342,400	488,305	830,705	10,044	413,107	217,086	3,888	0.02	0.64	0.34	0.01	644,124	1.88
1981	572,000	682,257	1,254,257	52,300	992,883	346,349	9,548	0.04	0.71	0.25	0.01	1,401,079	2.45
1982	251,700	373,175	624,875	11,767	498,054	179,143	712.785	0.02	0.72	0.26	0.00	689,678	2.74
1983	521,200	525,016	1,046,216	15,637	940,386	234,649	2,408	0.01	0.79	0.20	0.00	1,193,080	2.29
1984	365,950	412,322	778,272	7,616	428,455	181,370	10,113	0.01	0.68	0.29	0.02	627,553	1.71
1985	710,300	515,481	1,225,781	48,968	910,788	321,809	3,247	0.04	0.71	0.25	0.00	1,284,813	1.81
1986	545,900	318,028	863,928	0	510,352	374,707	5,266	0.00	0.57	0.42	0.01	890,325	1.63
1987	730,550	406,143	1,136,693	14,741	627,899	351,764	8,293	0.01	0.63	0.35	0.01	1,002,697	1.37
1988	359,100	353,685	712,785	41,692	211,997	163,670	13,100 [c]	0.10	0.49	0.38	0.03	430,458	1.20
1989	549,400	545,166	1,094,566	3,320	303,890	415,009 [c]	22,234	0.00	0.41	0.56	0.03	744,452	1.36
1990	504,750	352,264	857,014	762.584	696,763 [c]	458,542	32,739	0.00	0.59	0.39	0.03	1,188,806	2.36
1991	608,450	439,096	1,047,546	4,404 [c]	1,122,992	396,858	12,959	0.00	0.73	0.26	0.01	1,537,213	2.53
1992	423,500	148,846	572,346	7,411	702,799	209,889	4,123	0.01	0.76	0.23	0.00	924,224	2.18
1993	385,600	91,015	476,615	8,327	480,678	108,088	3,228	0.01	0.80	0.18	0.01	600,321	1.56
1994	960,050	169,225	1,129,275	4,603	237,709	149,185	1,691 [c]	0.01	0.60	0.38	0.00	393,188	0.41
1995	1,150,000	461,180	1,611,180	2,502	266,344	72,706 [c]	374.926	0.01	0.78	0.21	0.00	341,928	0.30
1996	879,800	260,923	1,140,723	419.176	174,798 [c]	134,111	8,313	0.00	0.55	0.42	0.03	317,641	0.36
1997	538,050	170,079	708,129	3,257 [c]	239,803	118,592	3,406	0.01	0.66	0.32	0.01	365,058	0.68
1998	281,600	70,823	352,423	637.3742	270,222	59,255	7,117	0.00	0.80	0.18	0.02	337,231	1.20
1999	288,000	131,176	419,176	29,158	720,883	185,422	13,065	0.03	0.76	0.20	0.01	948,528	3.29
2000	223,900	28,553	252,453	8,635	315,741	109,960	0	0.02	0.73	0.25	0.00	434,335	1.94
2001	329,900	45,026	374,926	144,616	2,054,394	704,752	34,040	0.05	0.70	0.24	0.01	2,937,803	8.91
2002	398,800	27,485	426,285	0	463,628	239,755	13,872	0.00	0.65	0.33	0.02	717,254	1.80
2003	713,100	79,079	792,179	25,306	860,872	461,417	17,499	0.02	0.63	0.34	0.01	1,365,094	1.91

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Appendix A23.–Page 2 of 2.

Year	(P) Escapement [b]	Estimated Annual Totals Catch	Run	Estimated Brood Year Return Number of Salmon [a] Age 3	Age 4	Age 5	Age 6	Percent Age 3	Age 4	Age 5	Age 6	(R) Total Brood Year Return [a]	(R/P) Return/ Spawner
2004	576,600	76,296	652,896	0	352,936	158,710	2,068	0.00	0.69	0.31	0.00	513,714	0.89
2005	1,887,000	290,418	2,177,418	2,409	404,796	94,096	5,362	0.00	0.80	0.19	0.01	506,663	0.27
2006	923,200	270,486	1,193,686	26,614	395,053	345,251	30,190	0.03	0.50	0.43	0.04	797,108	0.86
2007	929,000	205,667	1,134,667	83,239	857,948	189,357	6,513	0.07	0.75	0.17	0.01	1,137,057	1.22
2008	612,650	217,983	830,633	10,115	844,715	402,275	7,628	0.01	0.67	0.32	0.01	1,264,732	2.06
2009	514,300	93,319	607,619	12,027	775,222	414,074	22,954	0.01	0.63	0.34	0.02	1,224,276	2.38
2010	494,450	80,005	574,455	1,900	491,771	244,844	9,188	0.00	0.66	0.33	0.01	747,703	1.51
2011	891,300	327,376	1,218,676	23,994	482,841	182,406	2,246	0.03	0.70	0.26	0.00	691,487	0.78
2012	679,700	396,589	1,076,289	68,716	1,166,421	319,881	18,875	0.04	0.74	0.20	0.01	1,573,894 [d]	>2.32
2013	827,950	357,960	1,185,910	29,169	1,853,953	650,986		0.01	0.73	0.26		2,534,109 [e]	>3.06
2014	724,250	213,217	937,467	55,608									
2015	536,900	282,455	819,355										
2016	831,200	555,985	1,387,185										
2017	1,648,000	583,688	2,231,688										
Avg. 2016	679,650	308,149	987,799										
Min 2011	223,900	27,485	252,453	0	174,798	59,255	0	0.00	0.41	0.03	0.00	317,641	0.27
Max 2011	2,244,500	682,257	2,717,562	199,167	2,054,394	704,752	34,040	0.15	0.87	0.56	0.04	2,937,803	8.91
	674,341	All Brood Years (1974–2011)		32,776	644,424	240,777	8,983	0.03	0.68	0.28	0.01	943,295	1.72
	524,355	Even Brood Years (1974–2011)		21,696	457,451	209,108	8,152	0.03	0.66	0.30	0.01	696,407	1.50
	824,326	Odd Brood Years (1974–2011)		43,857	831,398	272,446	9,293	0.03	0.71	0.25	0.01	1,156,994	1.94

Note: Minimum (Min) and maximum (Max) indicate year with the lowest and highest values through 2011. Average value is through the year 2016. Current brood year data are preliminary as is 2017 harvest estimate. In 2015, estimates of drainagewide escapement were based on Bayesian analysis.

[a] The estimated number of salmon which returned are based upon annual age composition observed in Lower Yukon Test Fishery gillnets each year, weighted by test fish catch per unit effort.

[b] Contrast in escapement data is 10.02.

[c] Based upon expanded test fish age composition estimates for years in which the test fishery terminated early both in 1994 and 2000.

[d] rood year return for 3, 4, and 5 year fish, indicate that production (R/P) from brood year 2012 was at least 2.32. Recruits estimated for incomplete brood year, denoted by shaded values.

[e] Brood year return for 3 and 4 year fish, indicate that production (R/P) from brood year 2013 was at least 3.06. Recruits estimated for incomplete brood year, denoted by shaded values.

Appendix A24.–Escapement, rebuilding and interim goals for Canadian-origin Chinook and fall chum salmon stocks, 1985–2018.

	Canadian Origin Stock Targets					
	Chinook Salmon		Fall Chum Salmon			
	Mainstem Escapement	Stabilization/ Rebuilding/	Mainstem Escapement	Stabilization/ Rebuilding/	Fishing Branch	
Year	Goal	Interim Goals	Goal	Interim Goals	Escapement Goal	Interim Goal
1985	33,000-43,000					
1986	33,000-43,000					
1987	33,000-43,000		90,000-135,000		50,000-120,000	
1988	33,000-43,000		90,000-135,000		50,000-120,000	
1989	33,000-43,000		90,000-135,000		50,000-120,000	
1990	33,000-43,000	18,000	80,000		50,000-120,000	
1991	33,000-43,000	18,000	80,000		50,000-120,000	
1992	33,000-43,000	18,000	80,000	51,000	50,000-120,000	
1993	33,000-43,000	18,000	80,000	51,000	50,000-120,000	
1994	33,000-43,000	18,000	80,000	61,000	50,000-120,000	
1995	33,000-43,000	18,000	80,000		50,000-120,000	
1996	33,000-43,000	28,000	80,000	65,000	50,000-120,000	
1997	33,000-43,000	28,000	80,000	49,000	50,000-120,000	
1998	33,000-43,000	28,000	80,000		50,000-120,000	
1999	33,000-43,000	28,000	80,000		50,000-120,000	
2000	33,000-43,000	28,000	80,000		50,000-120,000	
2001	33,000-43,000	28,000	80,000		50,000-120,000	
2002	33,000-43,000	28,000	80,000	60,000	50,000-120,000	
2003 [a]	33,000-43,000	28,000 [b]	80,000	65,000	50,000-120,000	15,000
2004	33,000-43,000	28,000	80,000	65,000	50,000-120,000	13,000
2005	33,000-43,000	28,000	80,000	65,000	50,000-120,000	24,000
2006	33,000-43,000	28,000	80,000		50,000-120,000	28,000
2007	33,000-43,000		80,000		50,000-120,000	34,000
2008	33,000-43,000	45,000 [c]	80,000		50,000-120,000	22,000-49,000 [d]
2009	33,000-43,000	45,000	80,000		50,000-120,000	22,000-49,000
2010	33,000-43,000	42,500-55,000 [e]	80,000	70,000-104,000 [f]	50,000-120,000	22,000-49,000
2011	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2012	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2013	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2014	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2015	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2016	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2017	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000
2018	33,000-43,000	42,500-55,000	80,000	70,000-104,000	50,000-120,000	22,000-49,000

Note: All single numbers are considered minimums.

[a] Treaty was signed by governments in December 2002.

[b] In 2003 the Chinook salmon goal was set at 25,000 fish. However, if the U.S. conducted a commercial fishery the goal would be increased to 28,000 fish.

[c] Interim management escapement goal (IMEG) assessed using sonar near Eagle (previous years were measured by mark–recapture abundance estimates).

[d] Interim Management Escapement Goal (IMEG) established for 2008–2010, based on percentile method, and recommended to continue by default if no new analysis in subsequent years.

[e] IMEG of 42,500 to 55,000 fish recommended in 2010, based on levels selected from several unpublished analyses.

[f] IMEG established in 2010 based on brood table of Canadian origin mainstem stocks (1982 to 2003), and recommended to continue by default if no new analysis in subsequent years.

Appendix A25.–Fall chum salmon age and sex percentages with average lengths from selected Yukon River escapement projects, 2017.

Location	Sample Size		Age 3	4	5	6	7	Total	Average Length (mm) [a]
Delta River, Alaska [b]	160	Males	1.9	56.9	3.1	0.0	0.0	61.9	593.6
		Females	3.1	30.6	4.4	0.0	0.0	38.1	574.6
		Total	5.0	87.5	7.5	0.0	0.0	100.0	586.3
Yukon Mainstem [c]	730	Males	0.1	34.4	29.2	0.0	0.0	63.7	605.0
at Eagle, Alaska		Females	0.0	24.0	12.3	0.0	0.0	36.3	576.0
		Total	0.1	58.4	41.5	0.0	0.0	100.0	594.6
Fishing Branch	537	Males	0.0	25.0	15.3	0.7	0.0	41.0	599.9
River, Canada [d]		Females	0.4	40.2	18.3	0.2	0.0	59.0	573.5
		Total	0.4	65.2	33.5	0.9	0.0	100.0	584.3

[a] Length is measured mid-eye to fork.

[b] Samples were handpicked carcasses from east and middle channels, structure is vertebra.

[c] Samples were from test fishing with drift gillnets, structure is scales.

[d] Samples were collected live at the weir, structure is scales.

APPENDIX B: TABLES

Appendix B1.–Alaska and Canadian total utilization of Yukon River Chinook, chum, and coho salmon, 1961–2017.

	Alaska/U.S. [a,b]			Yukon Territory/Canada [c]			Total		
Year	Chinook	Other Salmon	Total	Chinook	Other Salmon [d]	Total	Chinook	Other Salmon	Total
1961	141,152	461,597	602,749	13,246	9,076	22,322	154,398	470,673	625,071
1962	105,844	434,663	540,507	13,937	9,436	23,373	119,781	444,099	563,880
1963	141,910	429,396	571,306	10,077	27,696	37,773	151,987	457,092	609,079
1964	109,818	504,420	614,238	7,408	12,221	19,629	117,226	516,641	633,867
1965	134,706	484,587	619,293	5,380	11,789	17,169	140,086	496,376	636,462
1966	104,887	309,502	414,389	4,452	13,324	17,776	109,339	322,826	432,165
1967	146,104	352,397	498,501	5,150	16,961	22,111	151,254	369,358	520,612
1968	118,632	270,818	389,450	5,042	11,633	16,675	123,674	282,451	406,125
1969	105,027	424,399	529,426	2,624	7,776	10,400	107,651	432,175	539,826
1970	93,019	585,760	678,779	4,663	3,711	8,374	97,682	589,471	687,153
1971	136,191	547,448	683,639	6,447	17,471	23,918	142,638	564,919	707,557
1972	113,098	461,617	574,715	5,729	7,532	13,261	118,827	469,149	587,976
1973	99,670	779,158	878,828	4,522	10,182	14,704	104,192	789,340	893,532
1974	118,053	1,229,678	1,347,731	5,631	11,646	17,277	123,684	1,241,324	1,365,008
1975	76,705	1,307,037	1,383,742	6,000	20,600	26,600	82,705	1,327,637	1,410,342
1976	105,582	1,026,908	1,132,490	5,025	5,200	10,225	110,607	1,032,108	1,142,715
1977	114,494	1,090,758	1,205,252	7,527	12,479	20,006	122,021	1,103,237	1,225,258
1978	129,988	1,615,312	1,745,300	5,881	9,566	15,447	135,869	1,624,878	1,760,747
1979	159,232	1,596,133	1,755,365	10,375	22,084	32,459	169,607	1,618,217	1,787,824
1980	197,665	1,730,960	1,928,625	22,846	23,718	46,564	220,511	1,754,678	1,975,189
1981	188,477	2,097,871	2,286,348	18,109	22,781	40,890	206,586	2,120,652	2,327,238
1982	152,808	1,265,457	1,418,265	17,208	16,091	33,299	170,016	1,281,548	1,451,564

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Appendix B1.–Page 2 of 3.

	Alaska/U.S. [a,b]			Yukon Territory/Canada [c]			Total		
Year	Chinook	Other Salmon	Total	Chinook	Other Salmon [d]	Total	Chinook	Other Salmon	Total
1983	198,436	1,678,597	1,877,033	18,952	29,490	48,442	217,388	1,708,087	1,925,475
1984	162,683	1,548,101	1,710,784	16,795	29,767	46,562	179,478	1,577,868	1,757,346
1985	187,327	1,657,984	1,845,311	19,301	41,515	60,816	206,628	1,699,499	1,906,127
1986	146,004	1,758,825	1,904,829	20,364	14,843	35,207	166,368	1,773,668	1,940,036
1987	188,386	1,276,066	1,464,452	17,614	44,786	62,400	206,000	1,320,852	1,526,852
1988	150,009	2,360,718	2,510,727	21,427	33,915	55,342	171,436	2,394,633	2,566,069
1989	157,632	2,292,211	2,449,843	17,944	23,490	41,434	175,576	2,315,701	2,491,277
1990	149,433	1,055,515	1,204,948	19,227	34,304	53,531	168,660	1,089,819	1,258,479
1991	154,651	1,335,111	1,489,762	20,607	35,653	56,260	175,258	1,370,764	1,546,022
1992	169,642	880,535	1,050,177	17,903	21,312	39,215	187,545	901,847	1,089,392
1993	161,718	362,551	524,269	16,611	14,150	30,761	178,329	376,701	555,030
1994	171,654	567,074	738,728	21,198	38,342	59,540	192,852	605,416	798,268
1995	179,748	1,455,736	1,635,484	20,884	46,109	66,993	200,632	1,501,845	1,702,477
1996	141,649	1,143,992	1,285,641	19,612	24,395	44,007	161,261	1,168,387	1,329,648
1997	176,025	560,777	736,802	16,528	15,900	32,428	192,553	576,677	769,230
1998	99,760	201,480	301,240	5,937	8,168	14,105	105,697	209,648	315,345
1999	125,427	250,198	375,625	12,468	19,736	32,204	137,895	269,934	407,829
2000	45,867	120,424	166,291	4,879	9,283	14,162	50,746	129,707	180,453
2001	56,620	131,500	188,120	10,144	9,872	20,016	66,764	141,372	208,136
2002	69,240	137,688	206,928	9,258	8,567	17,825	78,498	146,255	224,753
2003	101,000	214,323	315,323	9,619	11,435	21,054	110,619	225,758	336,377
2004	114,370	214,744	329,114	11,238	9,930	21,168	125,608	224,674	350,282
2005	86,369	493,542	579,911	11,371	18,583	29,954	97,740	512,125	609,865

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Appendix B1.–Page 3 of 3.

	Alaska/U.S. [a,b]			Yukon Territory/Canada [c]			Total		
Year	Chinook	Other Salmon	Total	Chinook	Other Salmon [d]	Total	Chinook	Other Salmon	Total
2006	96,067	553,299	649,366	9,072	11,908	20,980	105,139	565,207	670,346
2007	90,753	548,568	639,321	5,094	14,332	19,426	95,847	562,900	658,747
2008	50,362	500,029	550,391	3,713	9,566	13,279	54,075	509,595	563,670
2009	35,111	368,717	403,828	4,758	2,011	6,769	39,869	370,728	410,597
2010	55,092	415,968	471,060	2,706	5,891	8,597	57,798	421,859	479,657
2011	41,625	780,784	822,409	4,884	8,226	13,110	46,509	789,010	835,519
2012	30,831	935,740	966,571	2,200	7,033	9,233	33,031	942,773	975,804
2013	12,741	1,037,537	1,050,278	2,146	6,170	8,316	14,887	1,043,707	1,058,594
2014	3,287	950,408	953,695	103	5,166	5,269	3,390	955,574	958,964
2015	7,595	872,084	879,679	1,204	4,453	5,657	8,799	876,537	885,336
2016 [e]	21,684	1,376,869	1,398,553	2,946	5,750	8,696	24,630	1,382,619	1,407,249
2017 [e]	37,285	1,371,599	1,408,884	3,631	5,716	9,347	40,916	1,377,315	1,418,231
Average									
1961–2016	114,863	875,778	990,641	10,464	16,554	27,018	125,327	892,332	1,017,659
2007–2016	34,908	778,670	813,579	2,975	6,860	9,835	37,884	785,530	823,414
2012–2016	15,228	1,034,528	1,049,755	1,720	5,714	7,434	16,947	1,040,242	1,057,189
Minimum-16	3,287	120,424	166,291	103	2,011	5,269	3,390	129,707	180,453
Maximum-16	198,436	2,360,718	2,510,727	22,846	46,109	66,993	220,511	2,394,633	2,566,069

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe.

[b] Commercial, subsistence, personal-use, test fish sales, test fish retained for subsistence, and sport catches combined. Beginning 2017 this report includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay even though not all stocks are bound for the Yukon River. Coastal District harvest information is included in the following years: 1978, 1987–1989 and 1992 to present.

[c] Catch in number of salmon. Commercial, Aboriginal, domestic, and sport catches combined.

[d] Includes coho salmon harvests in First Nations recreational and commercial fisheries, most of which was harvested in the Old Crow Aboriginal fishery (99.8%).

[e] Data are preliminary; particularly not yet published Alaska subsistence harvest data from 2016 and 2017.

Appendix B2.–Alaska harvest of Yukon River Chinook salmon, 1961–2017.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales	Sport Fish	Yukon Area Total
1961	21,488	119,664					141,152
1962	11,110	94,734					105,844
1963	24,862	117,048					141,910
1964	16,231	93,587					109,818
1965	16,608	118,098					134,706
1966	11,572	93,315					104,887
1967	16,448	129,656					146,104
1968	12,106	106,526					118,632
1969	14,000	91,027					105,027
1970	13,874	79,145					93,019
1971	25,684	110,507					136,191
1972	20,258	92,840					113,098
1973	24,317	75,353					99,670
1974	19,964	98,089					118,053
1975	12,867	63,838					76,705
1976	17,806	87,776					105,582
1977	17,581	96,757				156	114,494
1978	30,785	99,168				523	130,476
1979	31,005	127,673				554	159,232
1980	42,724	153,985				956	197,665
1981	29,690	158,018				769	188,477
1982	28,158	123,644				1,006	152,808
1983	49,478	147,910				1,048	198,436
1984	42,428	119,904				351	162,683
1985	39,771	146,188				1,368	187,327
1986	45,238	99,970				796	146,004
1987	51,418	134,760 [e]		1,706		502	188,386

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Appendix B2.–Page 2 of 3.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales	Sport Fish	Yukon Area Total
1988	45,495	100,364		2,125	1,081	944	150,009
1989	48,462	104,198		2,616	1,293	1,063	157,632
1990	48,587	95,247 [e]	413	2,594	2,048	544	149,433
1991	46,773	104,878 [e]	1,538		689	773	154,651
1992	47,077	120,245 [e]	927		962	431	169,642
1993	63,915	93,550	560	426	1,572	1,695	161,718
1994	53,902	113,137	703		1,631	2,281	171,654
1995	50,620	122,728	1,324	399	2,152	2,525	179,748
1996	45,671	89,671	521	215	1,698	3,873	141,649
1997	57,117	112,841	769	313	2,811	2,174	176,025
1998	54,124	43,618	81	357	926	654	99,760
1999	53,305	69,275	288	331	1,205	1,023	125,427
2000	36,404	8,515	-	75	597	276	45,867
2001	55,819	-	-	122	-	679	56,620
2002	43,742	24,128	230	126	528	486	69,240
2003	56,959	40,438	-	204	680	2,719	101,000
2004	55,713	56,151	-	201	792	1,513	114,370
2005	53,409	32,029	-	138	310	483	86,369
2006	48,593	45,829	-	89	817	739	96,067
2007	55,174	33,634	-	136	849	960	90,753
2008	45,186	4,641	-	126	-	409	50,362
2009	33,805	316	-	127	-	863	35,111
2010	44,559	9,897	-	162	-	474	55,092
2011	40,980	82 [f]	-	89	-	474	41,625
2012	30,415	-	-	71	-	345	30,831
2013	12,533	-	-	42	-	166	12,741
2014	3,286	-	-	1	-	0	3,287
2015	7,577	-	-	5	-	13	7,595
2016	21,627 [g]	-	-	57 [g]	-	20	21,684

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Appendix B2.–Page 3 of 3.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales	Sport Fish	Yukon Area Total
2017	36,992 [g]	168 [f]	-	125 [g]	-	- [h]	37,285
Averages							
1961–2016	34,791	88,092	669	476	1,192	915	114,863
2007–2016	29,514	9,714	-	82	849	370	34,908
2012–2016	15,088	-	-	35	-	105	15,228
Minimum-16	3,286	82	81	1	310	0	3,287
Maximum-16	63,915	158,018	1,538	2,616	2,811	3,873	198,436

Note: Minimum and maximum indicate lowest and highest values through 2016.

[a] Includes test fish harvest and commercial retained fish (not sold) that were utilized for subsistence. Does not include harvest from the Coastal District communities of Scammon Bay and Hooper Bay.

[b] Includes ADF&G test fish sales prior to 1988.

[c] Includes an estimate of the number of salmon harvested for the commercial production of salmon roe; including carcasses from subsistence caught fish. These data are only available since 1990.

[d] Prior to 1987, and 1990, 1991, and 1994 personal use was considered part of subsistence.

[e] Includes Chinook salmon sold illegally.

[f] No Chinook salmon were sold in the summer season. A total of 82 and 168 Chinook salmon were sold in District 1 and 2 in the fall season in 2011 and 2017 respectively.

[g] Data are preliminary.

[h] Data are unavailable at this time.

Appendix B3.–Alaska harvest of Yukon River summer chum salmon, 1970–2017.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales	Sport Fish	Yukon Area Total
1970	166,504	137,006					303,510
1971	171,487	100,090					271,577
1972	108,006	135,668					243,674
1973	161,012	285,509					446,521
1974	227,811	589,892					817,703
1975	211,888	710,295					922,183
1976	186,872	600,894					787,766
1977	159,502	534,875				316	694,693
1978	171,383	1,052,226	25,761			451	1,249,821
1979	155,970	779,316	40,217			328	975,831
1980	167,705	928,609	139,106			483	1,235,903
1981	117,629	1,006,938	272,763			612	1,397,942
1982	117,413	461,403	255,610			780	835,206
1983	149,180	744,879	250,590			998	1,145,647
1984	166,630	588,597	277,443			585	1,033,255
1985	157,744	516,997	417,016			1,267	1,093,024
1986	182,337	721,469	467,381			895	1,372,082
1987	200,346	442,238	180,303	4,262		846	827,995
1988	227,829	1,148,650	468,032	2,225	3,587	1,037	1,851,360
1989	169,496	955,806 [e]	496,934	1,891	10,605	2,132	1,636,864
1990	115,609	302,625	214,552	1,827	8,263	472	643,348
1991	118,540	349,113 [e]	308,989		3,934	1,037	781,613
1992	142,192	332,313 [e]	211,264		1,967	1,308	689,044
1993	125,574	96,522	43,594	674	1,869	564	268,797
1994	124,807	80,284	178,457		3,212	350	387,110
1995	136,083	259,774	558,640	780	6,073	1,174	962,524
1996	124,738	147,127	535,106	905	7,309	1,946	817,131

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Appendix B3.–Page 2 of 3.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales	Sport Fish	Yukon Area Total
1997	112,820	95,242	133,010	391	2,590	662	344,715
1998	87,366	28,611	187	84	3,019	421	119,688
1999	83,784	29,389	24	382	836	555	114,970
2000	78,072	6,624	0	30	648	161	85,535
2001	72,155	[f]	0	146	0	82	72,383
2002	87,056	13,558	19	175	218	384	101,410
2003	82,272	10,685	0	148	119	1,638	94,862
2004	77,934	26,410	0	231	217	203	104,995
2005	93,259	41,264	0	152	134	435	135,244
2006	115,078	92,116	0	262	456	583	208,495
2007	92,926	198,201	0	184	10	245	291,566
2008	86,514	151,186	0	138	80	371	238,289
2009	80,539	170,272	0	308	0	174	251,293
2010	88,373	232,888	0	319	0	1,183	322,763
2011	96,020	275,161	0	439	0	294	371,914
2012	126,992	319,575	0	321	2,412	271	449,571
2013	115,114	485,587	0	138	2,304	1,423	604,566
2014	86,900	530,644	0	235	0	374	618,153
2015	83,567	358,856	0	220	2,494 [g]	194	445,331
2016	87,992 [h]	525,809	0	176 [h]	380	264	614,621
2017	87,252 [h]	555,296	0	438 [h]	1,819	- [i]	645,310
Averages							
1970–2016	129,766	382,635	140,385	631	2,163	687	623,032
2007–2016	94,494	324,818	0	248	768	479	420,807
2012–2016	100,113	444,094	0	218	1,518	505	546,448
Minimum-16	72,155	6,624	0	30	0	82	72,383
Maximum-16	227,829	1,148,650	558,640	4,262	10,605	2,132	1,851,360

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Note: Minimum and maximum indicate lowest and highest values through 2016.

[a] Includes test fish giveaways and commercial retained fish (not sold) that were utilized for subsistence. Beginning 2017 includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay even though not all stocks are bound for the Yukon River. Coastal District harvest information is included in the following years: 1987–1989 and 1992 to present.

[b] Includes ADF&G test fish sales prior to 1988.

[c] Includes an estimate of the number of salmon harvested for the commercial production of salmon roe; including carcasses from subsistence caught fish.

[d] Prior to 1987, 1990, 1991, and 1994 personal use was considered part of subsistence.

[e] Includes illegal sales of summer chum salmon.

[f] Summer season commercial fishery was not conducted.

[g] Test fish sales includes Lower Yukon Test Fishery and Purse Seine Test Fishery sales.

[h] Data are preliminary.

[i] Data are unavailable at this time.

Appendix B4.–Alaska harvest of Yukon River fall chum salmon, 1961–2017.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Yukon Area Total
1961	101,772 [f, g]	42,461	0			144,233
1962	87,285 [f, g]	53,116	0			140,401
1963	99,031 [f, g]		0			99,031
1964	120,360 [f, g]	8,347	0			128,707
1965	112,283 [f, g]	23,317	0			135,600
1966	51,503 [f, g]	71,045	0			122,548
1967	68,744 [f, g]	38,274	0			107,018
1968	44,627 [f, g]	52,925	0			97,552
1969	52,063 [f, g]	131,310	0			183,373
1970	55,501 [f, g]	209,595	0			265,096
1971	57,162 [f, g]	189,594	0			246,756
1972	36,002 [f, g]	152,176	0			188,178
1973	53,670 [f, g]	232,090	0			285,760
1974	93,776 [f, g]	289,776	0			383,552
1975	86,591 [f, g]	275,009	0			361,600
1976	72,327 [f, g]	156,390	0			228,717
1977	82,771 [g]	257,986	0			340,757
1978	84,239 [g]	236,383	10,628			331,250
1979	214,881	359,946	18,466			593,293
1980	167,637	293,430	5,020			466,087
1981	177,240	466,451	11,285			654,976
1982	132,092	224,187	805			357,084
1983	187,864	302,598	5,064			495,526
1984	172,495	208,232	2,328			383,055
1985	203,947	267,744	2,525			474,216
1986	163,466	139,442	577			303,485
1987	342,819 [h]	[i]		19,066		361,885

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Yukon Area Total
1988	153,848	133,763	3,227	3,881	27,663	322,382
1989	211,303	270,195	14,749	5,082	20,973	522,302
1990	167,900	124,174	12,168	5,176	9,224	318,642
1991	145,524	230,852	23,366	0	3,936	403,678
1992	107,808	15,721 [j]	3,301	0	1,407	128,237
1993	76,882	[i]		163	0	77,045
1994	123,565	3,631	4,368	0	0	131,564
1995	130,860	250,766	32,324	863	1,121	415,934
1996	129,258	88,342	17,288	356	1,717	236,961
1997	95,141	56,713	1,474	284	867	154,479
1998	62,901	[i]		2	0	62,903
1999	89,940	20,371	0	262	1,171	111,744
2000	19,395	[i]		1	0	19,396
2001	35,703	[i]		10	0	35,713
2002	19,674	[i]		3	0	19,677
2003	56,930	10,996	0	394	0	68,320
2004	62,526	4,110	0	230	0	66,866
2005	91,534	180,249	0	133	87	272,003
2006	84,002	174,542	0	333	0	258,877
2007	101,221	90,677	0	173	0	192,071
2008	89,357	119,265	0	181	0	208,803
2009	66,119	25,876	0	78	0	92,073
2010	68,645	2,550	0	3,209	0	74,404
2011	80,202	238,979	0	347	0	319,528
2012	99,309	289,692	0	410	166	389,577
2013	113,384	238,051	0	383	121	351,939
2014	92,529	115,599	0	278	30	208,436

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Appendix B4.–Page 3 of 3.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Yukon Area Total
2015	86,600	191,470	0	80	50	278,200
2016	84,650 [k]	465,396	0	283 [k]	668	550,997
2017	86,189 [k]	489,702	0	626 [k]	1,246	577,763
Averages						
1961–2016	105,167	157,467	3,448	1,427	2,448	247,663
2007–2016	88,202	177,756	0	542	104	266,603
2012–2016	95,294	260,042	0	287	207	355,830
Minimum-16	19,395	2,550	0	0	0	19,396
Maximum-16	342,819	466,451	32,324	19,066	27,663	654,976

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Includes test fish harvest and commercial retained fish (not sold) that were utilized for subsistence. Beginning 2017 this report includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay even though not all stocks are bound for the Yukon River. Coastal District harvest information is included in the following years: 1978, 1987–1989 and 1992 to present.

[b] Includes fish sold in the round and estimated numbers of female salmon commercially harvested for production of salmon roe (see Bergstrom et al. 1992). Includes ADF&G test fish prior to 1988. Beginning in 1999 commercial harvest may include some commercial related harvest.

[c] Includes an estimate of number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence. In prior JTC reports subsistence plus commercial related harvests are noted as subsistence "use".

[d] Prior to 1987, and in 1991, 1992 and 1994 personal use was considered part of subsistence.

[e] Test fish sales is the number of salmon sold by ADF&G test fisheries.

[f] Catches estimated because harvests of species other than Chinook salmon were not differentiated.

[g] Minimum estimates from 1961–1978 because subsistence surveys were conducted prior to the end of the fishing season.

[h] Includes an estimated 95,768 and 119,168 fall chum salmon illegally sold in Districts 5 (Yukon River) and 6 (Tanana River), respectively.

[i] Commercial fishery was not conducted.

[j] Commercial fishery operated only in District 6, the Tanana River.

[k] Data are preliminary.

Appendix B5.–Alaska harvest of Yukon River coho salmon, 1961–2017.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon Area Total
1961	9,192 [g, h]	2,855	0				12,047
1962	9,480 [g, h]	22,926	0				32,406
1963	27,699 [g, h]	5,572	0				33,271
1964	12,187 [g, h]	2,446	0				14,633
1965	11,789 [g, h]	350	0				12,139
1966	13,192 [g, h]	19,254	0				32,446
1967	17,164 [g, h]	11,047	0				28,211
1968	11,613 [g, h]	13,303	0				24,916
1969	7,776 [g, h]	15,093	0				22,869
1970	3,966 [g, h]	13,188	0				17,154
1971	16,912 [g, h]	12,203	0				29,115
1972	7,532 [g, h]	22,233	0				29,765
1973	10,236 [g, h]	36,641	0				46,877
1974	11,646 [g, h]	16,777	0				28,423
1975	20,708 [g, h]	2,546	0				23,254
1976	5,241 [g, h]	5,184	0				10,425
1977	16,333 [h]	38,863	0			112	55,308
1978	7,787 [h]	26,152	0			302	34,241
1979	9,794	17,165	0			50	27,009
1980	20,158	8,745	0			67	28,970
1981	21,228	23,680	0			45	44,953
1982	35,894	37,176	0			97	73,167
1983	23,905	13,320	0			199	37,424
1984	49,020	81,940	0			831	131,791
1985	32,264	57,672	0			808	90,744
1986	34,468	47,255	0			1,535	83,258
1987	82,371 [i]	[j]		2,523		1,292	86,186

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Appendix B5.–Page 2 of 3.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon Area Total
1988	69,679	99,907	0	1,250	13,720	2,420	186,976
1989	40,924	85,493	0	872	3,945	1,811	133,045
1990	43,460	41,032	3,255	1,181	2,650	1,947	93,525
1991	37,388	103,180	3,506	0	2,971	2,775	149,820
1992	51,980	6,556 [k]	1,423	0	1,629	1,666	63,254
1993	15,812	[j]		0	0	897	16,709
1994	41,775	120	4,331	0	0	2,174	48,400
1995	28,377	45,939	1,074	417	193	1,278	77,278
1996	30,404	52,643	3,339	198	1,728	1,588	89,900
1997	23,945	35,320	0	350	498	1,470	61,583
1998	18,121	1	0	9	0	758	18,889
1999	20,891	1,601	0	147	236	609	23,484
2000	14,939	[j]		0	0	554	15,493
2001	22,122	[j]		34	0	1,248	23,404
2002	15,489	[j]		20	0	1,092	16,601
2003	23,872	25,243	0	549	0	1,477	51,141
2004	20,795	20,232	0	233	0	1,623	42,883
2005	27,250	58,311	0	107	0	627	86,295
2006	19,706	64,942	0	279	0	1,000	85,927
2007	19,624	44,575	0	135	0	597	64,931
2008	16,855	35,691	0	50	0	341	52,937
2009	16,006	8,311	0	70	0	964	25,351
2010	13,045	3,750	0	1,062	0	944	18,801
2011	12,344	76,303	0	232	0	463	89,342
2012	21,533	74,789	0	100	39	131	96,592
2013	14,457	66,199	0	109	1	266	81,032
2014	17,098	104,692	0	174	0	1,855	123,819

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Appendix B5.–Page 3 of 3.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon Area Total
2015	18,107	129,700	0	145	8	593	148,553
2016	8,822 [l]	201,482	0	266 [l]	11	670	211,251
2017	7,645 [l]	139,915	0	200 [l]	63	- [m]	148,526
Averages							
1961–2016	22,400	38,031	332	350	953	979	58,718
2007–2016	15,789	74,549	0	234	6	682	91,261
2012–2016	16,003	115,372	0	159	12	703	132,249
Minimum-16	3,966	1	0	0	0	45	10,425
Maximum-16	82,371	201,482	4,331	2,523	13,720	2,775	211,251

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Includes test fish harvest and commercial retained fish (not sold) that were utilized for subsistence. Beginning 2017 this report includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay even though not all stocks are bound for the Yukon River. Coastal District harvest information is included in the following years: 1978, 1987–1989 and 1992 to present.

[b] Includes fish sold in the round and estimated numbers of female salmon commercially harvested for production of salmon roe (see Bergstrom et al. 1992: 1990 Yukon Area Annual Management Report). Includes ADF&G test fish prior to 1988. Beginning in 1999 commercial harvest may include some commercial related harvest.

[c] Includes an estimate of number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence.

[d] Prior to 1987, and 1991, 1992 and 1994 personal use was considered part of subsistence.

[e] Test fish sales is the number of salmon sold by ADF&G test fisheries.

[f] The majority of the sport-fish harvest is taken in the Tanana River drainage.

[g] Catches estimated because harvests of species other than Chinook salmon were not differentiated.

[h] Minimum estimates from 1961–1978 because subsistence surveys were conducted prior to the end of the fishing season.

[i] Includes an estimated 5,015 and 31,276 coho salmon illegally sold in Districts 5 (Yukon River) and 6 (Tanana River), respectively.

[j] Commercial fishery was not conducted.

[k] Commercial fishery operated only in District 6, the Tanana River.

[l] Data are preliminary.

[m] Data are unavailable at this time.

Appendix B6.–Alaska and Canadian total utilization of Yukon River Chinook and fall chum salmon, 1961–2017.

	Chinook Salmon			Fall Chum Salmon		
Year	Canada [a]	Alaska [b, c]	Total	Canada [a]	Alaska [b, c]	Total
1961	13,246	141,152	154,398	9,076	144,233	153,309
1962	13,937	105,844	119,781	9,436	140,401	149,837
1963	10,077	141,910	151,987	27,696	99,031 [d]	126,727
1964	7,408	109,818	117,226	12,187	128,707	140,894
1965	5,380	134,706	140,086	11,789	135,600	147,389
1966	4,452	104,887	109,339	13,192	122,548	135,740
1967	5,150	146,104	151,254	16,961	107,018	123,979
1968	5,042	118,632	123,674	11,633	97,552	109,185
1969	2,624	105,027	107,651	7,776	183,373	191,149
1970	4,663	93,019	97,682	3,711	265,096	268,807
1971	6,447	136,191	142,638	16,911	246,756	263,667
1972	5,729	113,098	118,827	7,532	188,178	195,710
1973	4,522	99,670	104,192	10,135	285,760	295,895
1974	5,631	118,053	123,684	11,646	383,552	395,198
1975	6,000	76,705	82,705	20,600	361,600	382,200
1976	5,025	105,582	110,607	5,200	228,717	233,917
1977	7,527	114,494	122,021	12,479	340,757	353,236
1978	5,881	130,476	136,357	9,566	331,250	340,816
1979	10,375	159,232	169,607	22,084	593,293	615,377
1980	22,846	197,665	220,511	22,218	466,087	488,305
1981	18,109	188,477	206,586	22,281	654,976	677,257
1982	17,208	152,808	170,016	16,091	357,084	373,175
1983	18,952	198,436	217,388	29,490	495,526	525,016
1984	16,795	162,683	179,478	29,267	383,055	412,322
1985	19,301	187,327	206,628	41,265	474,216	515,481
1986	20,364	146,004	166,368	14,543	303,485	318,028
1987	17,614	188,386	206,000	44,480	361,885 [d]	406,365
1988	21,427	150,009	171,436	33,565	322,382	355,947
1989	17,944	157,632	175,576	23,020	522,302	545,322
1990	19,227	149,433	168,660	33,622	318,642	352,264
1991	20,607	154,651	175,258	35,418	403,678	439,096
1992	17,903	169,642	187,545	20,815	128,237 [e]	149,052
1993	16,611	161,718	178,329	14,090	77,045 [d]	91,135
1994	21,198	171,654	192,852	38,008	131,564	169,572
1995	20,884	179,748	200,632	45,600	415,934	461,534
1996	19,612	141,649	161,261	24,354	236,961	261,315
1997	16,528	176,025	192,553	15,600	154,479	170,079
1998	5,937	99,760	105,697	7,954	62,903	70,857
1999	12,468	125,427	137,895	19,636	111,744	131,380

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	Chinook Salmon			Fall Chum Salmon		
Year	Canada [a]	Alaska [b, c]	Total	Canada [a]	Alaska [b, c]	Total
2000	4,879	45,867	50,746	9,246	19,396 [d]	28,642
2001	10,144	56,620 [f]	66,764	9,872	35,713 [d]	45,585
2002	9,258	69,240	78,498	8,092	19,677 [d]	27,769
2003	9,619	101,000	110,619	10,905	68,320	79,225
2004	11,238	114,370	125,608	9,750	66,866	76,616
2005	11,371	86,369	97,740	18,572	272,003	290,575
2006	9,072	96,067	105,139	11,796	258,877	270,673
2007	5,094	90,753	95,847	13,830	192,071	205,901
2008	3,713	50,362	54,075	9,566	208,803	218,369
2009	4,758	35,111	39,869	2,011	92,073	94,084
2010	2,706	55,092	57,798	5,787	74,404	80,191
2011	4,884	41,625	46,509	8,163	319,528	327,691
2012	2,200	30,831	33,031	7,023	389,577	396,600
2013	2,146	12,741	14,887	6,170	351,939	358,109
2014	103	3,287	3,390	5,033	208,436	213,469
2015	1,204	7,595	8,799	4,453	278,200	282,653
2016 [g]	2,946	21,684	24,630	5,750	550,997	556,747
2017 [g]	3,631	37,285	40,916	5,716	577,763	583,479
Averages						
1961–2016	10,464	114,863	125,327	16,374	253,080	269,454
2007–2016	2,975	34,908	37,884	6,779	266,603	273,381
2012–2016	1,720	15,228	16,947	5,686	355,830	361,516
Minimum-16	103	3,287	3,390	2,011	19,396	27,769
Maximum-16	22,846	198,436	220,511	45,600	654,976	677,257

Note: Minimum and maximum indicate year with the lowest and highest values through 2016. Canadian managers sometimes do not refer to chum as fall chum salmon because they only have 1 run.

[a] Catches in number of salmon. Includes commercial, Aboriginal, domestic, and sport catches combined.

[b] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe (see Bergstrom et al. 1992: 1990 Yukon Area Annual Management Report).

[c] Commercial, subsistence, personal-use, test fish, and sport catches combined. Beginning 2017, numbers include harvest from the Coastal District communities of Scammon Bay and Hooper Bay even though not all stocks are bound for the Yukon River. Coastal District harvest information is included in the following years: 1978, 1987–1989 and 1992 to present

[d] Commercial fishery did not operate within the Alaska portion of the drainage.

[e] Commercial fishery operated only in District 6, the Tanana River.

[f] No commercial fishery was conducted during the summer season.

[g] Data are preliminary.

Appendix B7.–Canadian harvest of Yukon River Chinook salmon, 1961–2017.

	Mainstem Yukon River Harvest						Porcupine River	
Year	Commercial	Domestic	Aboriginal Fishery	Recreational [a]	Test Fishery	Combined Non-Commercial	Total	Aboriginal Fishery Harvest	Total Canadian Harvest
1961	3,446		9,300			9,300	12,746	500	13,246
1962	4,037		9,300			9,300	13,337	600	13,937
1963	2,283		7,750			7,750	10,033	44	10,077
1964	3,208		4,124			4,124	7,332	76	7,408
1965	2,265		3,021			3,021	5,286	94	5,380
1966	1,942		2,445			2,445	4,387	65	4,452
1967	2,187		2,920			2,920	5,107	43	5,150
1968	2,212		2,800			2,800	5,012	30	5,042
1969	1,640		957			957	2,597	27	2,624
1970	2,611		2,044			2,044	4,655	8	4,663
1971	3,178		3,260			3,260	6,438	9	6,447
1972	1,769		3,960			3,960	5,729		5,729
1973	2,199		2,319			2,319	4,518	4	4,522
1974	1,808	406	3,342			3,748	5,556	75	5,631
1975	3,000	400	2,500			2,900	5,900	100	6,000
1976	3,500	500	1,000			1,500	5,000	25	5,025
1977	4,720	531	2,247			2,778	7,498	29	7,527
1978	2,975	421	2,485			2,906	5,881		5,881
1979	6,175	1,200	3,000			4,200	10,375		10,375
1980	9,500	3,500	7,546	300		11,346	20,846	2,000	22,846
1981	8,593	237	8,879	300		9,416	18,009	100	18,109
1982	8,640	435	7,433	300		8,168	16,808	400	17,208
1983	13,027	400	5,025	300		5,725	18,752	200	18,952
1984	9,885	260	5,850	300		6,410	16,295	500	16,795
1985	12,573	478	5,800	300		6,578	19,151	150	19,301
1986	10,797	342	8,625	300		9,267	20,064	300	20,364
1987	10,864	330	6,069	300		6,699	17,563	51	17,614
1988	13,217	282	7,178	650		8,110	21,327	100	21,427
1989	9,789	400	6,930	300		7,630	17,419	525	17,944
1990	11,324	247	7,109	300		7,656	18,980	247	19,227
1991	10,906	227	9,011	300		9,538	20,444	163	20,607
1992	10,877	277	6,349	300		6,926	17,803	100	17,903

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	Mainstem Yukon River Harvest							Porcupine River	
Year	Commercial	Domestic	Aboriginal Fishery	Recreational [a]	Test Fishery	Combined Non-Commercial	Total	Aboriginal Fishery Harvest	Total Canadian Harvest
1993	10,350	243	5,576	300		6,119	16,469	142	16,611
1994	12,028	373	8,069	300		8,742	20,770	428	21,198
1995	11,146	300	7,942	700		8,942	20,088	796	20,884
1996	10,164	141	8,451	790		9,382	19,546	66	19,612
1997	5,311	288	8,888	1,230		10,406	15,717	811	16,528
1998	390	24	4,687	-	737	5,448	5,838	99	5,937
1999	3,160	213	8,804	177		9,194	12,354	114	12,468
2000	-	-	4,068	-	761	4,829	4,829	50	4,879
2001	1,351	89	7,421	146	767	8,423	9,774	370	10,144
2002	708	59	7,139	128	1,036	8,362	9,070	188	9,258
2003	2,672	115	6,121	275	263	6,774	9,446	173	9,619
2004	3,785	88	6,483	423	167	7,161	10,946	292	11,238
2005	4,066	99	6,376	436		6,911	10,977	394	11,371
2006	2,332	63	5,757	606		6,426	8,758	314	9,072
2007	-	-	4,175	2 [b]	617	4,794	4,794	300	5,094
2008	1 [c]	-	2,885	-	513	3,398	3,399	314	3,713
2009	364	17	3,791	125	-	3,933	4,297	461	4,758
2010	-	-	2,455 [d]	1 [e]	-	2,456	2,456	250	2,706
2011	4 [c]	-	4,550 [d]	40	-	4,590	4,594	290	4,884
2012	-	-	2,000 [d]	-	-	2,000	2,000	200	2,200
2013	2 [c]	-	1,902 [d]	-	-	1,902	1,902	242	2,144
2014	-	-	100	-	-	100	100	3	103
2015	-	-	1,000	-	-	1,000	1,000	204	1,204
2016	1 [c]	-	2,768	-	-	2,768	2,769	177	2,946
2017	-	-	3,500	-	-	3,500	3,500	131	3,631
Averages									
1961–2016	5,367 [f]	393	5,035	342	608	5,531	10,228	250	10,464
2007–2016	364 [f]	17	2,563	42	565	2,694	2,731	244	2,975
2012–2016	-	-	1,554	-	-	1,554	1,555	165	1,720
Minimum-16	1	17	100	1	167	100	100	3	103
Maximum-16	13,217	3,500	9,300	1,230	1,036	11,346	21,327	2,000	22,846

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Note: Minimum and maximum indicate year with the lowest and highest values through 2016. Dash indicates fishery did not occur.

[a] Recreational harvest unknown before 1980.

[b] Recreational fishery involved non-retention of Chinook salmon for most of the season thus effectively closed.

[c] Closed during Chinook salmon season, harvested in chum salmon fishery.

[d] Adjusted to account for underreporting.

[e] Fishery was closed, 1 fish mistakenly caught and retained.

[f] Excluding years when no directed fishery occurred.

Appendix B8.–Canadian harvest of Yukon River fall chum salmon, 1961–2017.

	Mainstem Yukon River Harvest						Porcupine River	
							Aboriginal	Total
			Aboriginal	Test	Combined		Fishery	Canadian
Year	Commercial	Domestic	Fishery	Fishery	Non-Commercial [a]	Total [a]	Harvest	Harvest
1961	3,276		3,800		3,800	7,076	2,000	9,076
1962	936		6,500		6,500	7,436	2,000	9,436
1963	2,196		5,500		5,500	7,696	20,000	27,696
1964	1,929		4,200		4,200	6,129	6,058	12,187
1965	2,071		2,183		2,183	4,254	7,535	11,789
1966	3,157		1,430		1,430	4,587	8,605	13,192
1967	3,343		1,850		1,850	5,193	11,768	16,961
1968	453		1,180		1,180	1,633	10,000	11,633
1969	2,279		2,120		2,120	4,399	3,377	7,776
1970	2,479		612		612	3,091	620	3,711
1971	1,761		150		150	1,911	15,000	16,911
1972	2,532				0	2,532	5,000	7,532
1973	2,806		1,129		1,129	3,935	6,200	10,135
1974	2,544	466	1,636		2,102	4,646	7,000	11,646
1975	2,500	4,600	2,500		7,100	9,600	11,000	20,600
1976	1,000	1,000	100		1,100	2,100	3,100	5,200
1977	3,990	1,499	1,430		2,929	6,919	5,560	12,479
1978	3,356	728	482		1,210	4,566	5,000	9,566
1979	9,084	2,000	11,000		13,000	22,084		22,084
1980	9,000	4,000	3,218		7,218	16,218	6,000	22,218
1981	15,260	1,611	2,410		4,021	19,281	3,000	22,281
1982	11,312	683	3,096		3,779	15,091	1,000	16,091
1983	25,990	300	1,200		1,500	27,490	2,000	29,490
1984	22,932	535	1,800		2,335	25,267	4,000	29,267
1985	35,746	279	1,740		2,019	37,765	3,500	41,265
1986	11,464	222	2,200		2,422	13,886	657	14,543
1987	40,591	132	3,622		3,754	44,345	135	44,480
1988	30,263	349	1,882		2,231	32,494	1,071	33,565
1989	17,549	100	2,462		2,562	20,111	2,909	23,020
1990	27,537	0	3,675		3,675	31,212	2,410	33,622
1991	31,404	0	2,438		2,438	33,842	1,576	35,418
1992	18,576	0	304		304	18,880	1,935	20,815
1993	7,762	0	4,660		4,660	12,422	1,668	14,090

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	Mainstem Yukon River Harvest						Porcupine River	
							Aboriginal	Total
			Aboriginal	Test	Combined		Fishery	Canadian
Year	Commercial	Domestic	Fishery	Fishery	Non-Commercial [a]	Total [a]	Harvest	Harvest
1994	30,035	0	5,319		5,319	35,354	2,654	38,008
1995	39,012	0	1,099		1,099	40,111	5,489	45,600
1996	20,069	0	1,260		1,260	21,329	3,025	24,354
1997	8,068	0	1,238		1,238	9,306	6,294	15,600
1998 [b]	-		1,795		1,795	1,795	6,159	7,954
1999	10,402	0	3,234		3,234	13,636	6,000	19,636
2000	1,319	0	2,927		2,927	4,246	5,000	9,246
2001	2,198	3	3,077	1 [b]	3,080	5,278	4,594	9,872
2002	3,065	0	3,167	2,756 [b]	3,167	6,232	1,860	8,092
2003	9,030	0	1,493	990 [b]	1,493	10,523	382	10,905
2004	7,365	0	2,180	995 [b]	2,180	9,545	205	9,750
2005	11,931	13	2,035		2,048	13,979	4,593	18,572
2006	4,096	0	2,521		2,521	6,617	5,179	11,796
2007	7,109	0	2,221	3,765 [b]	2,221	9,330	4,500	13,830
2008	4,062	0	2,068		2,068	6,130	3,436	9,566
2009	293	0	820		820	1,113	898	2,011
2010	2,186	0	1,523 [c]		1,523	3,709	2,078	5,787
2011	5,312	0	1,000 [c]		1,000	6,312	1,851	8,163
2012	3,205	0	700 [c]		700	3,905	3,118	7,023
2013	3,369	18	500 [c]		518	3,887	2,283	6,170
2014	2,485	19	546		565	3,050	1,983	5,033
2015	2,862	35	1,000 [c]		1,035	3,897	556	4,453
2016	1,745	0	1,000 [c]		1,000	2,745	3,005	5,750
2017	2,404	0	1,000 [c]		1,000	3,404	2,312	5,716
Averages								
1961–2016	9,751	443	2,277	1,468	2,568	12,145	4,306	16,374
2007–2016	3,263	7	1,138	3,765	1,145	4,408	2,371	6,779
2012–2016	2,733	14	749	na	764	3,497	2,189	5,686
Minimum-16	293	0	100	1	0	1,113	135	2,011
Maximum-16	40,591	4,600	11,000	3,765	13,000	44,345	20,000	45,600

Note: Minimum and maximum indicate year with the lowest and highest values through 2016. Dash, indicates fishery did not occur. NA indicates a value cannot be calculated.

[a] Test fishery was not included in totals as it was live-release.

[b] The chum salmon test fishery practiced live-release. Not included in the annual totals.

[c] Adjusted to account for underreporting.

Appendix B9.–Chinook salmon aerial survey indices for selected spawning areas in the U.S. (Alaska) portion of the Yukon River drainage, 1961–2017.

	Andreafsky River		Anvik River		Nulato River			Gisasa River
Year	East Fork	West Fork	Drainagewide Total	Index Area [a]	North Fork [b]	South Fork	Both Forks	
1961	1,003		1,226		376 [c]	167	543	266 [c]
1962	675 [c]	762 [c]						
1963								
1964	867	705						
1965		355 [c]	650 [c]					
1966	361	303	638					
1967		276 [c]	336 [c]					
1968	380	383	310 [c]					
1969	231 [c]	231 [c]	296 [c]					
1970	665	574 [c]	368					
1971	1,904	1,682						
1972	798	582 [c]	1,198					
1973	825	788	613					
1974		285	471 [c]		55 [c]	23 [c]	78 [c]	161
1975	993	301	730		123	81	204	385
1976	818	643	1,053		471	177	648	332
1977	2,008	1,499	1,371		286	201	487	255
1978	2,487	1,062	1,324		498	422	920	45 [c]
1979	1,180	1,134	1,484		1,093	414	1,507	484
1980	958 [c]	1,500	1,330	1,192	954 [c]	369 [c]	1,323 [c]	951
1981	2,146 [c]	231 [c]	807 [c]	577 [c]		791	791	
1982	1,274	851						421
1983			653 [c]	376 [c]	526	480	1,006	572
1984	1,573 [c]	1,993	641 [c]	574 [c]				
1985	1,617	2,248	1,051	720	1,600	1,180	2,780	735
1986	1,954	3,158	1,118	918	1,452	1,522	2,974	1,346
1987	1,608	3,281	1,174	879	1,145	493	1,638	731
1988	1,020	1,448	1,805	1,449	1,061	714	1,775	797
1989	1,399	1,089	442 [c]	212 [c]				
1990	2,503	1,545	2,347	1,595	568 [c]	430 [c]	998 [c]	884 [c]
1991	1,938	2,544	875 [c]	625 [c]	767	1,253	2,020	1,690
1992	1,030 [c]	2,002 [c]	1,536	931	348	231	579	910
1993	5,855	2,765	1,720	1,526	1,844	1,181	3,025	1,573
1994	300 [c]	213 [c]		913 [c]	843	952	1,795	2,775
1995	1,635	1,108	1,996	1,147	968	681	1,649	410
1996		624	839	709		100	100	
1997	1,140	1,510	3,979	2,690				144 [c]
1998	1,027	1,249 [c]	709 [c]	648 [c]	507	546	1,053	889 [c]

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Appendix B9.–Page 2 of 2.

Year	Andreafsky River		Anvik River		Nulato River			Gisasa River
	East Fork	West Fork	Drainagewide Total	Index Area [a]	North Fork [b]	South Fork	Both Forks	
1999		870 [c]	950 [c]	950 [c]	[c]	[c]		[c]
2000	1,018		1,721	1,394	[c]	[c]		[c]
2001	1,059	565	1,420	1,177	1,116	768	1,884 [d]	1,298 [c]
2002	1,447	917	1,713	1,329	687	897	1,584	506
2003	1,116 [c]	1,578	973 [c]	973 [c]	[c]	[c]		
2004	2,879	1,317	3,679	3,304	856	465	1,321	731
2005	1,715	1,492	2,421	1,922	323	230	553	958
2006	591 [c]	824	1,886	1,776 [e]	620	672	1,292	843
2007	1,758	976	1,529	1,497	1,928	1078	2,583	593
2008	278 [c]	262 [c]	992 [c]	827 [c]	463	543	922	487
2009	84 [c]	1,678	832	590	1,418	842	2,260	515
2010	537 [c]	858	974	721	356	355	711	264
2011	620	1,173	642	501	788	613	1,401	906
2012		227 [c]	722	451	682	692	1,374	[c]
2013	1,441	1,094	940	656	586	532	1,118	201 [c]
2014		1,695	1,584	800	[c]	[c]	[c]	[c]
2015	2,167	1,356	2,616	1,726	999	565	1,564	558
2016	[f]	[f]	[f]	[f]	[f]	[f]	[f]	[f]
2017	[f]	942	1,101	894	500	443	943	[f]
SEG [g]	[h]	640–1,600	1,100–1,700				940–1,900	[i]
Averages								
1961–2016	1,324	1,134	1,208	1,094	788	574	1,327	718
2007–2016	984	1,035	1,203	863	872	630	1,492	503
2012–2016	1,804	1,092	1,466	908	756	596	1,352	380
Minimum-16	84	213	222	212	55	23	78	45
Maximum-16	5,855	3,281	3,979	3,304	1,844	1,522	3,025	2,775

Note: Aerial survey counts are peak counts only. Survey rating was fair or good unless otherwise noted. Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Anvik River Index Area includes mainstem counts between Beaver Creek and McDonald Creek.

[b] Nulato River mainstem aerial survey counts below the forks are included with the North Fork.

[c] Incomplete, poor timing and/or poor survey conditions resulting in minimal, inaccurate, or no counts.

[d] In 2001, the Nulato River escapement goal was established for both forks combined.

[e] The count represents the index area and an additional 8 river miles downstream of Yellow River confluence.

[f] No surveys conducted.

[g] Sustainable Escapement Goal.

[h] Aerial escapement goal for Andreafsky River was discontinued in 2010. Note: weir-based goal replaced East Fork Andreafsky River aerial survey goal.

[i] Gisasa River aerial escapement goal was discontinued in 2010.

Appendix B10.–Chinook salmon escapement counts and percentage females counted for selected spawning areas in the U.S. (Alaska) portion of the Yukon River drainage, 1986–2017.

	East Fork Andreafsky River Weir		Nulato River Tower	Henshaw Creek Weir		Gisasa River Weir		Chena River Tower		Salcha River Tower	
Year	No. Fish	% Fem.	No. Fish	No. Fish	% Fem.	No. Fish	% Fem.	No. Fish	% Fem. [a]	No. Fish	% Fem. [a]
1986	1,530	28.6 [b]						9,065 [c]	25.4		
1987	2,011	52.3 [b]						6,404 [c]	48.2	4,771 [c]	52.0
1988	1,341	39.8 [b]						3,346 [c]	33.9	4,322 [c]	45.3
1989								2,730 [c]	45.3	3,294 [c]	43.8
1990		41.2						5,603 [c]	36.3	10,728 [c]	36.2
1991		28.4						3,172 [c]	31.5	5,608 [c]	40.7
1992		24.0						5,580 [c]	21.6	7,862 [c]	36.0
1993		29.9						12,241	11.7	10,008	23.9
1994	7,801	35.5	1,795			2,888		11,877	32.4	18,404	38.8
1995	5,841	42.2	1,412			4,023	46.0	11,394 [c]	51.7	13,643	48.4
1996	2,955	38.5	756			1,991	19.5	7,153 [c]	26.8	7,570 [c]	26.2
1997	3,186	36.8	4,766			3,764	26.0	13,390	25.6	18,514	41.8
1998	4,034	28.8	1,536			2,414	16.2	4,745	28.4	5,027	26.1
1999	3,444	28.6	1,932			2,644	26.3	6,485	45.6	9,198	44.6
2000	1,609	32.3	908	193	29.7	2,089	33.8	4,694 [c]	21.7	4,595	34.3
2001	1,148	63.7		1,091	36.3	3,052	49.2	9,696	30.1	13,328	32.1
2002	4,123	21.1 [d]	2,696	649	30.8	2,025	20.7	6,967 [c]	27.3	9,000 [e]	29.8
2003	4,336	47.7	1,716 [f]	748	39.1	1,901	38.1	11,100	31.8	15,500 [e]	36.6
2004	8,045	34.8		1,248	23.2	1,774	33.5	9,645	43.9	15,761	54.2
2005	2,239	49.9		1,059	41.7	3,111	36.2	[d]	30.6	5,988	47.5

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Appendix B10.–Page 2 of 2.

Year	Andreafsky River Weir No. Fish	Andreafsky River Weir % Fem.	Nulato River Tower No. Fish	Henshaw Creek Weir No. Fish	Henshaw Creek Weir % Fem.	Gisasa River Weir No. Fish	Gisasa River Weir % Fem.	Chena River Tower No. Fish	Chena River Tower % Fem.	Salcha River Tower No. Fish	Salcha River Tower % Fem.
2006	6,463	43.6			[d]	3,031	29.4	2,936	32.1	10,679	38.1
2007	4,504	44.5		740	42.6	1,427	41.1	3,806	27.3	6,425	31.0
2008	4,242	38.9		766	26.9	1,738	15.2	3,208	29.0	5,415 [e]	33.7
2009	3,004	47.2		1,637	53.7	1,955	28.0	5,253	40.0	12,774	33.9
2010	2,413	47.8		857	48.8	1,516	29.9	2,382	20.6	6,135	26.6
2011	5,213	19.3		1,796	33.6	2,692	18.8	[d]	22.7	7,200 [e]	42.1
2012	2,517	27.4		922	42.9	1,323	38.7	2,220 [g]	39.1	7,165	50.9
2013	1,998	39.4		772	46.7	1,126	34.3	1,859 [d]	40.3	5,465	50.5
2014	5,949	47.9			[d]	1,589	19.2	7,192 [h]	33.1	[d]	32.0
2015	5,474	39.7		2,391	41.4	1,319	29.6	6,294	39.0	6,879 [i]	37.0
2016	2,676	49.7		1,354	47.5	1,395	27.2	6,665 [i]	22.8	2,675 [i]	38.8
2017 [j]	2,970	25.9		677	41.8	1,083	27.8	4,201 [i]	45.3	4,195 [i]	41.2
SEG [k]	2,100–4,900										
BEG [l]								2,800–5,700		3,300–6,500	
Averages											
1986–2016	3,773	38.3	1,946	1,082	39.0	2,208	29.9	6,452	32.1	8,756	38.4
2007–2016	3,799	40.2	-	1,248	42.7	1,608	28.2	4,320	31.4	6,681	37.7
2012–2016	3,723	40.8	-	1,360	44.6	1,350	29.8	4,846	34.9	5,546	41.8
Minimum-16	1,148	19.3	756	193	23.2	1,126	15.2	1,859	11.7	2,675	23.9
Maximum-16	8,045	63.7	4,766	2,391	53.7	4,023	49.2	13,390	51.7	18,514	54.2

Note: Minimum and maximum indicate year with the lowest and highest values through 2016. No. = number; Fem. = female. Dashes indicate a value cannot be calculated.

[a] Adjustment factor was applied.

[b] Tower counts.

[c] Mark–recapture population estimate.

[d] Project operations were hindered by high water most of the season.

[e] Estimate includes an expansion for missed counting days based on average run timing.

[f] Weir count.

[g] Estimated includes an expansion for missed counting days based on using 2 DIDSON sonars to assess Chinook salmon passage.

[h] Due to high water, DIDSON sonar was used and preliminary species apportionment was estimated using average run timing.

[i] Final estimate uses a binomial mixed-effects model to create passage estimates for periods of missed counts.

[j] Preliminary.

[k] Sustainable Escapement Goal (SEG).

[l] Biological Escapement Goal (BEG).

Appendix B11.–Estimated spawning escapement of Canadian-origin Yukon River mainstem Chinook salmon, 1982–2017.

Year	Historic mark-recapture border passage estimate [a]	Eagle sonar estimate	U.S. harvest above Eagle sonar [b]	Canadian mainstem border passage estimate		Canadian mainstem harvest	Spawning escapement estimate [c]
1982	36,598			60,346	[d]	16,808	43,538
1983	47,741			63,227	[d]	18,752	44,475
1984	43,911			66,300	[d]	16,295	50,005
1985	29,881			59,586	[d]	19,151	40,435
1986	36,479			61,489	[d]	20,064	41,425
1987	30,823			58,870	[d]	17,563	41,307
1988	44,445			61,026	[d]	21,327	39,699
1989	42,620			77,718	[d]	17,419	60,299
1990	56,679			78,192	[d]	18,980	59,212
1991	41,187			63,172	[d]	20,444	42,728
1992	43,185			56,958	[d]	17,803	39,155
1993	45,027			52,713	[d]	16,469	36,244
1994	46,680			77,219	[d]	20,770	56,449
1995	52,353			70,761	[d]	20,088	50,673
1996	47,955			93,606	[d]	19,546	74,060
1997	53,400			69,538	[d]	15,717	53,821
1998	22,588			41,335	[d]	5,838	35,497
1999	23,716			49,538	[d]	12,354	37,184
2000	16,173			30,699	[d]	4,829	25,870
2001	52,207			62,333	[d]	9,774	52,559
2002	49,214			51,428	[e]	9,070	42,358
2003	56,929			90,037	[e]	9,446	80,591
2004	48,111			59,415	[e]	10,946	48,469
2005	42,245	81,528	2,566	78,962	[f]	10,977	67,985
2006	36,748	73,691	2,303	71,388	[f]	8,758	62,630
2007	22,120	41,697	1,999	39,698	[f]	4,794	34,904
2008	14,666	38,097	815	37,282	[f]	3,399	33,883

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Year	Historic mark-recapture border passage estimate [a]	Eagle sonar estimate	U.S. harvest above Eagle sonar	Canadian mainstem border passage estimate	Canadian mainstem harvest	Spawning escapement estimate [b]
2009	-	69,957	382	69,575 [f]	4,297	65,278
2010	-	35,074	604	34,470 [f]	2,456	32,014
2011	-	51,271	370	50,901 [f]	4,594	46,307
2012	-	34,747	91	34,656 [f]	2,000	32,656
2013	-	30,725	152	30,573 [f]	1,904	28,669
2014	-	63,482	51	63,431 [f]	100	63,331
2015	-	84,015	341	83,674 [f]	1,000	82,674
2016	-	72,329	762	71,567 [f]	2,769	68,798
2017	-	73,313	1,498	71,815 [f]	3,500	68,315
Averages						
1982–2016	40,136	56,384	870	60,620	11,614	49,005
2007–2016	NA	52,139	557	51,583	2,731	48,851
2012–2016	NA	57,060	279	56,780	1,555	55,226
Minimum-16	14,666	30,725	51	30,573	100	25,870
Maximum-16	56,929	84,015	2,566	93,606	21,327	82,674

Note: Table includes information on U.S.-Canada border passage estimates, U.S. harvest between the sonar and the border (for applicable years), and the Canadian mainstem. Minimum and maximum indicate year with the lowest and highest values through 2016. Dashes indicate project not operational.

[a] From 1982 to 2008, a mark–recapture program was used to determine border passage; fish were sampled and tagged near the border using fish wheels and sampled for marks/tags in upstream fisheries. The Eagle sonar project replaced the mark–recapture program in 2005.

[b] U.S. harvests between the sonar site and border prior to 2008 is unknown because subsistence harvest in the Eagle area extended above and below the sonar site, but were most likely in the hundreds for Chinook salmon. Starting in 2008, subsistence harvests between the sonar site and the U.S./Canada border were recorded specifically for purpose of estimating border passage.

[c] Canadian spawning escapement estimated as border passage minus Canadian harvest.

[d] Chinook salmon passage for Yukon mainstem at U.S./Canada border from 1982 to 2001 was reconstructed using a linear relationship with 3-area index (aerial surveys of Little Salmon, Big Salmon, and Nisutlin rivers in 2002–2007) plus Canadian harvests.

[e] Border passage estimated in 2002–2004 using escapement estimate from a radio tagging proportion study, plus Canadian harvest.

[f] Since 2005, border passage was estimated as fish counted by the Eagle sonar minus the U.S. harvest upriver from the sonar project.

Appendix B12.–Chinook salmon escapement counts for selected spawning areas in the Canadian (Yukon Territory) portion of the Yukon River drainage, 1961–2017.

Year	Tatchun Creek [a]	Blind Creek Weir	Chandindu River Weir	Big Salmon Sonar	Klondike River Sonar	Teslin River Sonar	Pelly River Sonar	Porcupine River Sonar	Takhini River Sonar	Whitehorse Fishway	
										Count	Percent Hatchery Contribution
1961										1,068	0
1962										1,500	0
1963										483	0
1964										595	0
1965										903	0
1966	7 [b]									563	0
1967										533	0
1968										414	0
1969										334	0
1970	100									625	0
1971	130									856	0
1972	80									391	0
1973	99									224	0
1974	192									273	0
1975	175									313	0
1976	52									121	0
1977	150									277	0
1978	200									725	0
1979	150									1,184	0
1980	222									1,383	0
1981	133									1,555	0
1982	73									473	0
1983	264									905	0
1984	153									1,042	0
1985	190									508	0
1986	155									557	0
1987	159									327	0
1988	152									405	16
1989	100									549	19
1990	643									1,407	24

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Appendix B12.–Page 2 of 3.

Year	Tatchun Creek [a]	Blind Creek Weir	Chandindu River Weir	Big Salmon Sonar	Klondike River Sonar	Teslin River Sonar	Pelly River Sonar	Porcupine River Sonar	Takhini River Sonar	Whitehorse Fishway Count	Whitehorse Fishway Percent Hatchery Contribution
1991										1,266 [c]	51 [c]
1992	106									758 [c]	84 [c]
1993	183									668 [c]	73 [c]
1994	477									1,577 [c]	54 [c]
1995	397									2,103	57
1996	423									2,958	35
1997	1,198	957								2,084	24
1998	405	373	132							777	95
1999	252	892	239							1,118	74
2000	276 [d]		4 [e]							677	69
2001			129 [f]							988	36
2002			[g]							605	39
2003		1,115	185 [h]							1,443	70
2004		792								1,989	76
2005		525		5,584						2,632	57
2006		677		7,308						1,720	47
2007		304		4,504						427	56
2008		276		1,329						399	54
2009		716		9,261	5,147					828	47
2010		270		3,817	803					672	49
2011		360		5,156	1,181					1,534	48
2012		157		2,584		3,396				1,030	59
2013		312		3,242		9,916				1,139	67
2014		602		6,321		17,507		2,951 [i]		1,601	78
2015		964		10,071		20,410		4,623		1,465	60
2016		664		6,691			5,807 [i]	6,457		1,556	42
2017 [j]		[k]		5,672			9,081 [j]	1,191 [j]	1,872 [i,j]	1,226	39
Averages											
1961–2016	235	586	138	5489	2,377	12,807	5,807	4,677	-	973	28
2007–2016	-	463	-	5,298	2,377	12,807	5,807	4,677	-	1,065	56
2012–2016	-	540	-	5,678	-	-	-	-	-	1,388	59
Minimum-16	7	157	4	1,329	803	3,396	5,807	2,951	-	121	0
Maximum-16	1,198	1,115	239	10,071	5,147	20,410	5,807	6,457	-	2,958	95

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Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] All foot surveys prior to 1997 except 1978 (boat survey) and 1986 (aerial survey) and weir counts from 1997 to 2000.

[b] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

[c] Counts and estimated percentages may be slightly exaggerated. In some or all of these years a number of adipose-clipped fish ascended the Fishway, and were counted more than once. These fish would have been released into the Fishway as fry between 1989 and 1994, inclusive.

[d] Flood conditions caused early termination of this program.

[e] High water delayed project installation, therefore, counts are incomplete.

[f] Weir was breached from July 31 to August 7 due to high water.

[g] Resistance Board weir (RBW) tested for 3 weeks.

[h] Combination RBW and conduit weir tested and operational from July 10-30.

[i] Sonar feasibility year.

[j] Data are preliminary.

[k] High water conditions prevented weir operation.

Appendix B13.–Summer chum salmon escapement counts for selected spawning areas in the U.S. (Alaska) portion of the Yukon River drainage, 1973–2017.

	Andreafsky River			Anvik River		Rodo River	Kaltag River	Nulato River		
	East Fork		West Fork					South Fork	North Fork [a]	Mainstem
Year	Aerial [b]	Sonar, Tower, or Weir [c] Counts	Aerial [b]	Aerial [d]	Tower and Sonar	Aerial [b]	Tower	Aerial [b]	Aerial [b]	Tower
1973	10,149 [e]		51,835	249,015						
1974	3,215 [e]		33,578	411,133		16,137		29,016	29,334	
1975	223,485		235,954	900,967		25,335		51,215	87,280	
1976	105,347		118,420	511,475		38,258		9,230 [e]	30,771	
1977	112,722		63,120	358,771		16,118		11,385	58,275	
1978	127,050		57,321	307,270		17,845		12,821	41,659	
1979	66,471		43,391	-	277,712	-		1,506	35,598	
1980	36,823 [e]		114,759	-	482,181	-		3,702 [e]	11,244 [e]	
1981	81,555	152,665	-	-	1,479,582	-		14,348	-	
1982	7,501 [e]	181,352	7,267 [e]	-	444,581	-		-	-	
1983	-	113,328	-	-	362,912	-		1,263 [e]	19,749	
1984	95,200 [e]	72,598	238,565	-	891,028	-		-	-	
1985	66,146	-	52,750	-	1,080,243	24,576		10,494	19,344	
1986	83,931	152,730	99,373	-	1,085,750	-		16,848	47,417	
1987	6,687 [e]	45,221 [f]	35,535	-	455,876	-		4,094	7,163	
1988	43,056	68,937 [f]	45,432	-	1,125,449	13,872		15,132	26,951	
1989	21,460 [e]	-	-	-	636,906	-		-	-	
1990	11,519 [e]	-	20,426 [e]	-	403,627	1,941 [e]		3,196 [e, g]	1,419 [e]	
1991	31,886	-	46,657	-	847,772	3,977		13,150	12,491	
1992	11,308 [e]	-	37,808 [e]	-	775,626	4,465		5,322	12,358	
1993	10,935 [e]	-	9,111 [e]	-	517,409	7,867		5,486	7,698	
1994	-	200,981 [g]	-	-	1,124,689	-	47,295	-	-	148,762 [g]
1995	-	172,148	-	-	1,339,418	12,849	77,193	10,875	29,949	236,890
1996	-	108,450	-	-	933,240	4,380	51,269	8,490 [e]	-	129,694

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Appendix B13.–Page 2 of 5.

	Andreafsky River			Anvik River		Rodo River	Kaltag River	Nulato River		
	East Fork		West Fork					South Fork	North Fork [a]	Mainstem
Year	Aerial [b]	Sonar, Tower, or Weir Counts	Aerial [b]	Tower and Aerial [d]	Sonar	Aerial [b]	Tower	Aerial [b]	Aerial [b]	Tower
1997	-	51,139	-	-	605,751	2,775 [e]	48,018	-	-	157,975
1998	-	67,720	-	-	487,300	-	8,113	-	-	49,140
1999	-	32,587	-	-	437,355	-	5,339	-	-	30,076
2000	2,094 [e]	24,785	18,989 [e]	-	196,350	-	6,727	-	-	24,308
2001	-	2,134 [g]	-	-	224,059	-	-	-	-	-
2002	-	44,194	-	-	459,058	-	13,583	-	-	72,232
2003	-	22,461	-	-	256,920	-	3,056	-	-	19,590 [g]
2004	-	64,883	-	-	365,354	-	5,247	-	-	-
2005	-	20,127	-	-	525,392	-	22,093	-	-	-
2006	3,100 [e]	102,260	617	-	605,487	-	-	7,772	11,658	-
2007	-	69,642	-	-	459,038	-	-	21,825	15,277	-
2008	9,300	57,259	25,850	-	374,933	-	-	12,070	10,715	-
2009	736	8,770	3,877	-	193,098	621	-	2,120	567	-
2010	1,982	72,893	24,380	-	396,174	-	-	1,891	1,038	-
2011	12,889	100,473	10,020	-	642,529	6,011	-	9,454	8,493	-
2012	-	56,680	-	-	484,091	15,606	-	20,600	14,948	-
2013	10,965	61,234	9,685	-	577,876	-	-	13,695	13,230	-
2014	-	37,793	-	-	399,796	-	-	-	-	-
2015	6,004	48,809	2,836	36,871	374,968	3,685	-	4,102	9,525	-
2016	-	50,362	-	-	337,821	-	-	-	-	-
2017	-	55,532	11,655	38,191	415,139	-	-	4,890	7,882	-
GOAL [h]		>40,000			350,000-700,000					
Average										
1973–2016	42,983	75,487	54,137	396,500	596,509	12,018	26,176	11,468	21,698	96,519
2007–2016	6,979	56,392	12,775	-	424,032	6,481	-	10,720	9,224	-
2012–2016	8,485	50,976	6,261	-	434,910	9,646	-	12,799	12,568	-
Minimum–16	736	2,134	617	36,871	193,098	621	3,056	1,263	567	19,590
Maximum–16	223,485	200,981	238,565	900,967	1,479,582	38,258	77,193	51,215	87,280	236,890

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Appendix B13.–Page 3 of 5.

	Henshaw Creek	Gisasa River		Hogatza River		Tozitna River	Chena River		Salcha River	
				Clear & Caribou Cr.	Clear Creek					
Year	Weir	Aerial [b]	Weir	Aerial [b]	Tower	Weir and Aerial [b]	Aerial [b]	Tower	Aerial [b]	Tower
1973							79 [e]		290	
1974		22,022				1,823	4,349		3,510	
1975		56,904		22,355		3,512	1,670		7,573	
1976		21,342		20,744		725 [e]	685		6,484	
1977		2,204 [e]		10,734		761 [e]	610		677 [e]	
1978		9,280 [e]		5,102		2,262	1,609		5,405	
1979		10,962		14,221		-	1,025 [e]		3,060	
1980		10,388		19,786		580	338		4,140	
1981		-		-		-	3,500		8,500	
1982		334 [e]		4,984 [e]		874	1,509		3,756	
1983		2,356 [e]		28,141		1,604	1,097		716 [e]	
1984		-		184 [e]		-	1,861		9,810	
1985		13,232		22,566		1,030	1,005		3,178	
1986		12,114		-		1,778	1,509		8,028	
1987		2,123		5,669 [e]		-	333		3,657	
1988		9,284		6,890		2,983	432		2,889 [e]	
1989		-		-		-	714 [e]		1,574 [e]	
1990		450 [e]		2,177 [e]		36	245 [e]		450 [e]	
1991		7,003		9,947		93	115 [e]		154 [e]	
1992		9,300		2,986		794	848 [e]		3,222	
1993		1,581		-		970	168	5,483	212	5,809
1994		6,827	51,116 [g]	8,247 [i]		-	1,137	9,984	4,916	39,450
1995		6,458	136,886	-	116,735	4,985	185 [e]	3,519 [g]	934 [e]	30,784
1996		-	158,752	27,090 [i]	100,912	2,310	2,061	12,810 [g]	9,722	74,827
1997		686 [e]	31,800	1,821 [e]	76,454	428 [e]	594 [e]	9,439 [g]	3,968 [e]	35,741
1998		-	21,142	120 [e]	212 [g]	7 [e]	24 [e]	5,901	370 [e]	17,289
1999		-	10,155	-	11,283	-	520	9,165	150	23,221
2000	24,457	-	11,410	-	19,376	480	105	3,515	228	20,516
2001	34,777	-	17,946	-	3,674	12,527	2	4,773	-	14,900

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Appendix B13.–Page 4 of 5.

Year	Henshaw Creek	Gisasa River		Hogatza River			Tozitna River	Chena River		Salcha River	
				Clear & Caribou Cr.	Clear Creek		Weir and				
	Weir	Aerial [b]	Weir	Aerial [b]	Tower		Aerial [b]	Aerial [b]	Tower	Aerial [b]	Tower
2002	25,249	-	33,481	-	13,150		18,789	-	1,021 [g]	78	27,012 [j]
2003	21,400	-	25,999	-	6,159		8,487	-	573 [g]	-	-
2004	86,474	-	37,851	-	15,661		25,003	-	15,163 [g]	-	47,861
2005	237,481	-	172,259	-	26,420		39,700	219	16,873 [g]	4,320	194,933
2006	-	1,000	261,306	-	29,166 [j]		22,629	469	35,109 [g]	152	113,960
2007	44,425	-	46,257	-	6,029 [j]		8,470	-	4,999	4 [e]	13,069
2008	96,731	20,470	36,938	-	-		9,133	37	1,300 [g]	0 [e]	2,213 [g]
2009	156,933	1,060	25,904	3,981	-		8,434	-	16,516	-	31,035
2010	105,398	1,096	47,669	840	-		-	-	7,561	-	22,185
2011	248,247	13,228	95,796	3,665	-		11,351	-	-	-	66,564 [k]
2012	292,082	- [e]	83,423	23,022	-		11,045	-	6,882	-	46,252
2013	285,008	9,300 [e]	80,055	-	-		-	-	21,372	-	60,981
2014	- [e]	-	32,523	-	-		-	-	13,303 [e]	-	- [e]
2015	238,529	5,601	42,747	6,080	-		-	-	8,620	0 [e]	12,812
2016	286,780	-	66,670	-	-		-	-	6,493 [g]	-	2,897 [g]
2017	360,687	-	73,584	-	-		-	-	21,156 [g]	-	29,093 [g]
GOAL											
Average											
1973–2016	163,441	9,843	79,757	11,337	39,279		7,043	1,030	10,421	3,247	46,626
2007–2016	194,904	8,459	55,798	7,518	6,029		9,687	37	9,672	1	28,668
2012–2016	275,600	7,451	61,084	14,551	-		11,045	-	11,334	0	30,736
Minimum–16	21,400	334	25,904	184	6,029		36	37	573	0	2,213
Maximum–16	292,082	56,904	261,306	28,141	116,735		39,700	4,349	35,109	9,810	194,933

-continued-

Note: Unless otherwise noted blank cells indicate years prior to the project being operational. Dashes indicate years in which no information was collected. Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted.

[b] Aerial survey counts are peak counts only, survey rating is fair or good unless otherwise noted.

[c] East Fork Andreafsky passage estimated with: sonar 1981–1984, tower counts 1986–1988; weir counts from 1994 to present. The project did not operate in 1985 and 1989–1993.

[d] From 1972 to 1979 counting tower operated; escapement estimate listed is the tower counts plus expanded aerial survey counts below the tower.

[e] Incomplete survey and/or poor survey timing or conditions resulted in minimal or inaccurate count.

[f] Mainstem counts below the confluence of the North and South Forks of the Nulato River included in the South Fork counts.

[g] Incomplete count due to late installation and/or early removal of project or high water events.

[h] Biological (Andreafsky) or Sustainable (Anvik) Escapement Goal

[i] Bureau of Land Management helicopter survey.

[j] Project operated as a video monitoring system.

[k] Estimate includes an expansion for missed counting days based on average run timing. Minimum documented abundance from successful counting days was 30,411 (SE not reported).

Appendix B14.–Fall chum salmon abundance estimates or escapement estimates for selected spawning areas in the U.S. (Alaska) portions of the Yukon River drainage, 1971–2017.

		Tanana River Drainage					Upper Yukon River Drainage	
Year	Yukon River Mainstem Sonar Estimate [a]	Toklat River [b]	Kantishna River Abundance Estimate [c]	Delta River [d]	Bluff Cabin Slough [e]	Upper Tanana River Abundance Estimate [f]	Chandalar River [g]	Sheenjek River [h]
1971								
1972				5,384 [i]				
1973				10,469 [i]				
1974		41,798		5,915 [i]				117,921 [j]
1975		92,265		3,734				227,935 [j]
1976		52,891		6,312				34,649 [j]
1977		34,887		16,876				59,878 [j]
1978		37,001		11,136 [i]				42,661 [j]
1979		158,336		8,355 [i]				120,129 [j]
1980		26,346 [k]		5,137 [i]	3,190 [l]			38,093 [j]
1981		15,623		23,508 [i]	6,120 [l]			102,137 [m]
1982		3,624		4,235 [i]	1,156			43,042 [m]
1983		21,869		7,705 [i]	12,715			64,989 [m]
1984		16,758		12,411 [i]	4,017			36,173 [m]
1985		22,750		17,276	2,655 [l]			179,727 [m, n]
1986		17,976		6,703	3,458		59,313	84,207 [n, o]
1987		22,117		21,180 [i]	9,395		52,416	153,267 [n, o]
1988		13,436		18,024 [i]	4,481 [l]		33,619	45,206 [o]
1989		30,421		21,342	5,386 [l]		69,161	99,116 [o]
1990		34,739		8,992	1,632		78,631	77,750 [o]
1991		13,347		32,905	7,198			86,496 [p]
1992		14,070		8,893	3,615 [l]			78,808
1993		27,838		19,857 [i]	5,550 [l]			42,922
1994		76,057		23,777	2,277 [l]			150,565
1995	1,156,278	54,513 [k]		20,587 [i]	19,460	268,173	323,586	241,855

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Year	Yukon River Mainstem Sonar Estimate [a]	Tanana River Drainage: Toklat River [b]	Tanana River Drainage: Kantishna River Abundance Estimate [c]	Tanana River Drainage: Delta River [d]	Tanana River Drainage: Bluff Cabin Slough [e]	Tanana River Drainage: Upper Tanana River Abundance Estimate [f]	Upper Yukon River Drainage: Chandalar River [g]	Upper Yukon River Drainage: Sheenjek River [h]
1996	[q]	18,264		19,758	7,074 [d]	134,563	230,450	246,889
1997	579,767	14,511		7,705	5,707 [d]	71,661	211,914	80,423 [r]
1998	375,222	15,605		7,804	3,549 [d]	62,014	83,899	33,058
1999	451,505	4,551	27,199	16,534	7,559 [d]	97,843	92,685	14,229
2000	273,206	8,911	21,450	3,001	1,595	34,844	71,048	30,084 [s]
2001	408,961	6,007 [t]	22,992	8,103	1,808 [l]	96,556 [u]	112,664	53,932
2002	367,886	28,519	56,665	11,992	3,116	109,961	94,472	31,642
2003	923,540	21,492	87,359	22,582	10,600 [l]	193,418	221,343	44,047 [v]
2004	633,368	35,480	76,163	25,073	10,270 [l]	123,879	169,848	37,878
2005	1,894,078	17,779 [j]	107,719	28,132	11,964 [l]	337,755	526,838	561,863 [n]
2006	964,238		71,135	14,055		202,669	254,778	160,178 [n]
2007	740,195		81,843	18,610		320,811	243,805	65,435 [n]
2008	636,525			23,055	1,198 [l]		178,278	50,353 [n]
2009	[q]			13,492	2,900 [l]		[p]	54,126 [n]
2010	458,103			17,993	1,610 [l]		167,532	22,053
2011	873,877			23,639	2,655 [l]		298,223	97,976 [n]
2012	778,158			9,377 [e]			205,791	104,701 [n]
2013	865,295	9,161 [l]		31,955	5,554 [l]		252,710	
2014	706,630			32,480 [e]	4,095 [l]		226,489	
2015	669,483	8,422 [l]		33,401 [e]	6,020 [l]		164,486	
2016	994,760	16,885 [l]		21,913 [e]	4,936 [l]		295,023	
2017 [w]	1,829,931			48,783 [e]			509,115	
Escapement [x]	300,000 [y]	15,000 [z]		6,000		46,000 [aa]	74,000	50,000 [ab]
Objective	600,000	33,000		13,000		103,000	152,000	104,000

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Year	Yukon River Mainstem Sonar Estimate [a]	Tanana River Drainage					Upper Yukon River Drainage	
		Toklat River [b]	Kantishna River Abundance Estimate [c]	Delta River [d]	Bluff Cabin Slough [e]	Upper Tanana River Abundance Estimate [f]	Chandalar River [g]	Sheenjek River [h]
Averages								
1971-2016	737,554	29,550	61,392	15,808	5,427	158,011	181,500	97,856
2007-2016	747,003	-	76,489	22,592	3,621	320,811	225,815	65,774
2012-2016	802,865	-	-	25,825	5,151	-	228,900	104,701
Minimum-16	273,206	3,624	21,450	3,001	1,156	34,844	33,619	14,229
Maximum-16	1,894,078	158,336	107,719	33,401	19,460	337,755	526,838	561,863

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] New model estimates generated in 2015 and applied to dataset back to 1995 and used since.

[b] Expanded total abundance estimates for upper Toklat River index area using stream life curve (SLC) developed with 1987-1993 data. Index area includes Geiger Creek, Sushana River, and mainstem floodplain sloughs from approximately 0.25 mile upstream of roadhouse.

[c] Fall chum salmon abundance estimate for the Kantishna and Toklat River drainages is based on a mark–recapture program. Number of tagging and recovery wheels changed over the years.

[d] Population estimate generated from replicate foot surveys and stream life data (area under the curve method), unless otherwise indicated.

[e] Peak foot survey, unless otherwise indicated.

[f] Fall chum salmon abundance estimate for the upper Tanana River drainage is based on a mark–recapture program. Upper Tanana River consists of that portion upstream of the confluence with the Kantishna River. Number of tagging and recovery wheels changed over the years.

[g] Single-beam sonar estimate for 1986 to 1990 (not used in run reconstruction), split-beam sonar estimate 1995 to 2006, DIDSON in since 2007, project was aborted in 2009. Sonar counts on the Chandalar River are extrapolated after conclusion of the project through October 9 from 1995 to present.

[h] Single-beam sonar estimate beginning in 1981, split-beam sonar estimate 2003 to 2004, and DIDSON 2005 to 2012. Sonar counts on the Sheenjek River are extrapolated after conclusion of the project through October 9 from 2005 to 2012.

[i] Estimates are a total spawner abundance, using migratory time density curves and stream life data.

[j] Total escapement estimate using sonar to aerial survey expansion factor of 2.22.

[k] Minimal estimate because of late timing of ground surveys with respect to peak of spawning.

[l] Aerial survey count, unless otherwise indicated.

[m] Project started late, estimated escapements expanded for portion missed using average run timing curves based on Chandalar (1986-1990) and Sheenjek (1991-1993) rivers.

[n] Sonar counts include both banks in 1985 to 1987, 2005 to 2009, and 2011 to 2012.

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[o] Expanded estimates for period approximating second week of August through fourth week of September, using annual Chandalar River run timing data (1986–1990).

[p] Total abundance estimates are for the period approximating second week of August through fourth week of September (1991 to present). Comparative escapement estimates before 1986 are considered more conservative; approximating the period end of August through September.

[q] Project operated all or partial season, estimate was not useable.

[r] Data interpolated due to high water from August 29 to September 3, 1997; during buildup to peak passage on the Sheenjek River.

[s] Sheenjek sonar project ended early (September 12) because of low water therefore estimate was expanded based on average run timing (62%).

[t] Minimal estimate because Sushana River was breached by the main channel and uncountable.

[u] Low numbers of tags deployed and recovered resulted in an estimate with an extremely large confidence interval (95% CI +/- 41,072).

[v] Sheenjek sonar project ended on peak daily passages due to late run timing, estimate was expanded based on run timing (87%) at Rampart.

[w] Data are preliminary.

[x] Escapement Goal (EG) includes individual tributary BEGs (biological) and drainagewide SEG (sustainable).

[y] Drainagewide escapement goal is related to mainstem passage estimate based on the sonar near Pilot Station minus upriver harvests.

[z] EG discontinued in 2010.

[aa] The BEG for the Tanana River as a whole is 61,000 to 136,000. However it includes the Toklat River plus the Upper Tanana River which was broke out here for comparison to the upper Tanana River abundance estimates.

[ab] The BEG is based on estimates of Sheenjek escapements from 1974 to 1999 (Eggers 2001) which were primarily right bank only estimates. BEG discontinued in 2016.

Appendix B15.–Fall chum salmon escapement estimates for selected spawning areas in Canadian (Yukon Territory) portions of the Yukon River drainage, 1971–2017.

	Porcupine Drainage		Mainstem			
Year	Fishing Branch River [a]	Porcupine River Sonar	Yukon River Index [b,c]	Koidern River [b]	Kluane River [b, d]	Teslin River [b, e]
1971	312,800 [f]					
1972	35,230 [g]				198 [h,l]	
1973	15,991		383		2,500	
1974	31,841				400	
1975	353,282		7,671		362 [h]	
1976	36,584 [f]				20	
1977	88,400 [f]				3,555	
1978	40,800 [f]				0 [h]	
1979	119,898 [f]				4,640 [h]	
1980	55,268 [f]				3,150	
1981	57,386 [i]				25,806	
1982	15,901 [f]		1,020 [j]		5,378	
1983	27,200 [f]		7,560		8,578 [h]	
1984	15,150 [f]		2,800 [k]	1,300	7,200	200
1985	56,223		10,760	1,195	7,538	356
1986	31,811		825	14	16,686	213
1987	49,038		6,115	50	12,000	
1988	23,645		1,550	0	6,950	140
1989	44,042		5,320	40	3,050	210 [l]
1990	35,000 [m]		3,651	1	4,683	739
1991	37,870		2,426	53	11,675	468
1992	22,539		4,438	4	3,339	450
1993	28,707		2,620	0	4,610	555
1994	65,247		1,429 [j]	20 [j]	10,734	209 [l]
1995	51,971 [n]		4,701	0	16,456	633
1996	77,302		4,977		14,431	315
1997	27,031		2,189		3,350	207
1998	13,687		7,292		7,337	235
1999	12,958				5,136	19 [i]
2000	5,057		933 [l]		1,442	204
2001	21,737		2,453		4,884	5
2002	13,636		973		7,147	64
2003	29,713		7,982		39,347	390
2004	20,417		3,440		18,982	167
2005	119,058		16,425		34,600	585
2006	30,954		6,553		18,208	620
2007	32,150					
2008	19,086 [n]					
2009	25,828 [o]					
2010	15,413 [o]					
2011	13,085 [n,o]	TBD [v]				

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Year	Porcupine Drainage: Fishing Branch River [a]	Porcupine Drainage: Porcupine River Sonar	Mainstem: Yukon River Index [b,c]	Koidern River [b]	Kluane River [b, d]	Teslin River [b, e]
2012	22,399 [o]	TBD[v]				
2013	25,376 [q]	35,615				
2014	7,304 [q]	17,756				
2015	8,351 [r]	21,397				
2016	29,397	54,395				
2017 [p]	48,524	67,818			16,265 [u]	
Goal [s]	50,000-120,000					
IMEG [t]	22,000-49,000					
Averages						
1971-2016	48,299	32,291	4,480	223	8,982	317
2007-2016	19,839	32,291	-	-	-	-
2012-2016	18,565	32,291	-	-	-	-
Minimum-16	5,057	17,756	383	0	0	5
Maximum-16	353,282	54,395	16,425	1,300	39,347	739

Note: Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Weir count, unless otherwise indicated. Weir counts from 1972–1975, 1985–1989, 1991–1992, 1996–2012 were expanded to represent the remainder of the run after the project was terminated for the season through October 25.

[b] Aerial survey, unless otherwise indicated.

[c] Index area includes Tatchun Creek to Fort Selkirk.

[d] Index area includes Duke River to end of spawning sloughs below Swede Johnston Creek.

[e] Index area includes Boswell Creek area (5 km below to 5 km above confluence).

[f] Total escapement estimated using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.

[g] Weir installed September 22. Estimate consists of weir count of 17,190 after September 22, and tagging passage estimate of 17,935 before weir installation.

[h] Foot survey, unless otherwise indicated.

[I] Initial aerial survey count doubled before applying the weir/aerial expansion factor of 2.72 because only half of the spawning area was surveyed.

[j] Boat survey.

[k] Total index not surveyed. Survey included the mainstem Yukon River between Yukon Crossing to 30 km below Fort Selkirk.

[l] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

[m] Weir not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approximately 27,000 fish was made through date of survey, based upon historic average aerial-to-weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000-40,000 fish considering aerial survey timing.

[n] Incomplete count caused by late installation and/or early removal of project or high-water events.

[o] Run timing was late and counts were expanded to represent the remainder of the run after the project was terminated for the season.

[p] Data are preliminary.

[q] Fishing Branch River weir did not operate and escapement was estimated from a sonar operated on the upper Porcupine River minus Old Crow harvest and the proportion of radio tags to Fishing Branch River.

[r] Escapement Objective (EO) based on U.S./Canada Treaty Obligations, some years stabilization or rebuilding goals are applied.

[s] Interim Management Escapement Goal (IMEG) established for 2008-2012 based on percentile method.

[t] Interim Management Escapement Goal (IMEG) established for 2010-2012 based on brood table of Canadian origin mainstem stocks (1982 to 2003).

[u] Aerial survey as part of CRE-145-17

[v] Sonar project carried out; data are being reviewed and adjusted.

Appendix B16.–Estimated spawning escapement of Canadian-origin Yukon River fall chum salmon 1980–2017.

Date	Sonar Estimate	Expanded Estimate [a]	Eagle Area Subsistence Harvest	Mainstem Border Passage Estimate [b]	Canadian Mainstem Harvest	Mainstem Escapement Estimate [c]
1980				39,130	16,218	22,912
1981				66,347	19,281	47,066 [d]
1982				47,049	15,091	31,958
1983				118,365	27,490	90,875
1984				81,900	25,267	56,633 [d]
1985				99,775	37,765	62,010
1986				101,826	13,886	87,940
1987				125,121	44,345	80,776
1988				69,280	32,494	36,786
1989				55,861	20,111	35,750
1990				82,947	31,212	51,735
1991				112,303	33,842	78,461
1992				67,962	18,880	49,082
1993				42,165	12,422	29,743
1994				133,712	35,354	98,358
1995				198,203	40,111	158,092
1996				143,758	21,329	122,429
1997				94,725	9,306	85,419
1998				48,047	1,795	46,252
1999				72,188 [e]	13,636	58,552
2000				57,978 [e]	4,246	53,732
2001				38,769 [e]	5,278	33,491
2002				104,853 [e]	6,232	98,621
2003				153,656 [e]	10,523	143,133
2004				163,625 [e]	9,545	154,080
2005				451,477	13,979	437,498
2006	236,386	245,290	17,775	227,515 [f, g]	6,617	220,898
2007	235,871	265,008	18,691	246,317 [f, g]	9,330	236,987
2008	171,347	185,409	11,381	174,028 [f, g]	6,130	167,898

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Date	Sonar Estimate	Expanded Estimate [a]	Eagle Area Subsistence Harvest	Mainstem Border Passage Estimate [b]	Canadian Mainstem Harvest	Mainstem Escapement Estimate [c]
2009	95,462	101,734	6,995	94,739 [f]	1,113	93,626
2010	125,547	132,930	11,432	121,498 [f]	3,709	117,789
2011	212,162	224,355	12,477	211,878 [f]	6,312	205,566
2012	147,710	153,248	11,681	141,567 [f]	3,905	137,662
2013	200,754	216,791	12,642	204,149 [f]	3,887	200,262
2014	167,715	172,887	13,041	159,846 [f]	3,050	156,796
2015	112,136	125,095	12,540	112,555 [f]	3,897	108,658
2016	144,035	161,027	13,015	148,012 [f]	2,745	145,267
2017 [h]	407,166	419,099	14,110	404,989 [f]	3,404	401,585
Averages						
1980–2016	168,102	180,343	12,879	124,679	15,414	109,265
2007–2016	161,274	173,848	12,390	161,459	4,408	157,051
2012–2016	154,470	165,810	12,584	153,226	3,497	149,729
Minimum-16	95,462	101,734	6,995	38,769	1,113	22,912
Maximum-16	236,386	265,008	18,691	451,477	44,345	437,498

Note: Table includes information on U.S/Canada border passage estimates, Eagle area subsistence harvest between the sonar and the border (where applicable), and Canadian mainstem harvest. Estimates for subsistence caught salmon between the sonar site and border (Eagle area) prior to 2008 include an unknown portion caught below the sonar site. This number is most likely in the thousands for chum salmon. Starting in 2008, the estimates for subsistence caught salmon only include salmon harvested between the sonar site and the U.S./Canada border. Minimums and maximum indicate the lowest and highest values for each year presented through 2016.

[a] Sonar estimates include an expansion for fish that may have passed after operations ceased through October 18.

[b] Border Passage Estimate is based on a mark–recapture estimate unless otherwise indicated.

[c] Excludes Fishing Branch River escapement (estimated border passage minus Canadian mainstem harvest).

[d] Escapement estimate based on mark–recapture program unavailable. Estimate based on assumed average exploitation rate.

[e] From 1999 to 2004 border passage estimates were revised using a Stratified Population Analysis System (Arnason et. al 1995).

[f] 2006 to present border passage estimate is based on sonar minus harvest from Eagle residents upstream of deployment.

[g] Mark–recapture border passage estimates include 217,810, 235,956, and 132,048 from 2006 to 2008 respectively, during transition to sonar.

[h] Data are preliminary.

Appendix B17.–Coho salmon passage estimates or escapement estimates for selected spawning areas in the U.S. (Alaska) portion of the Yukon River drainage, 1972–2017.

		Nenana River Drainage				Upper Tanana River Drainage		
Year	Yukon River Mainstem Sonar Estimate [a]	Lost Slough	Nenana Mainstem [b]	Wood Creek	Seventeen Mile Slough	Delta Clearwater River [c]	Clearwater Lake and Outlet	Richardson Clearwater River
1972						632 (b)	417 (f)	454 (f) [d]
1973						3,322 (u)	551 (u)	375 (u)
1974		1,388 (f)			27 (f)	3,954 (h) [d]	560 (f)	652 (h)
1975		827 (f)			956 (f)	5,100 (b)	1,575 (b)	
1976		118 (f)			281 (f)	1,920 (b)	1,500 (b)	80 (f) [d]
1977		524 (f) [d]		310 (g)	1,167 (f)	4,793 (b)	730 (b)	327 (f)
1978		350 (f)		300 (g)	466 (f)	4,798 (b)	570 (b)	
1979		227 (f)			1,987 (f)	8,970 (b)	1,015 (b)	372 (f)
1980		499 (f) [d]		1,603 (g)	592 (f)	3,946 (b)	1,545 (b)	611 (f)
1981		274 (f)		849 (w) [e]	1,005 (f)	8,563 (u) [f]	459 (f)	550 (f)
1982				1,436 (w) [e]	(f)	8,365 (g) [f]		
1983		766 (f)		1,042 (w)	103 (f)	8,019 (b) [f]	253 (f)	88 (f)
1984		2,677 (f)		8,826 (w)	(f)	11,061 (b)	1,368 (f)	428 (f)
1985		1,584 (f)		4,470 (w)	2,081 (f)	5,358 (b)	750 (f)	
1986		794 (f)		1,664 (w)	218 (b)	10,857 (b)	3,577 (f)	146 (f) [d]
1987		2,511 (f)		2,387 (w)	3,802 (f)	22,300 (b)	4,225 (b)	
1988		348 (f)		2,046 (w)		21,600 (b)	825 (b)	
1989				412 (w)	824 (f) [d]	11,000 (b)	1,600 (b)	483 (f)
1990		688 (f)	1,308 (f)		(h) [d]	8,325 (b)	2,375 (b)	
1991		564 (f)	447 (f)		52 (f)	23,900 (b)	3,150 (b)	
1992		372 (f)			490 (f)	3,963 (b)	229 (b)	500 (f)

-continued-

Year	Yukon River Mainstem Sonar Estimate [a]	Nenana River Drainage				Upper Tanana River Drainage		
		Lost Slough	Nenana Mainstem [b]	Wood Creek	Seventeen Mile Slough	Delta Clearwater River [c]	Clearwater Lake and Outlet	Richardson Clearwater River
1993		350 (f)	419 (f)	666 (w) [g]	581 (h)	10,875 (b)	3,525 (b)	
1994		944 (h)	1,648 (h)	1,317 (w) [h]	2,909 (h)	62,675 (b)	3,425 (b)	5,800 (f)
1995	119,893	4,169 (f)	2,218 (h)	500 (w)	1,512 (h)	20,100 (b)	3,625 (b)	
1996	[i]	2,040 (h)	2,171 (h)	201 (u) [d]	3,668 (g/b)	14,075 (b)	1,125 (b) [d]	
1997	118,065	1,524 (h)	1,446 (h)	[j]	1,996 (h)	11,525 (b)	2,775 (b)	
1998	146,365	1,360 (h) [d]	2,771 (h) [d]	[j]	1,413 (g/b)	11,100 (b)	2,775 (b)	
1999	76,174	1,002 (h) [d]	745 (h) [d]	370 (h)	662 (h) [d]	10,975 (b)		
2000	206,365	55 (h) [d]	68 (h) [d]	[j]	879 (h) [d]	9,225 (b)	1,025 (b)	2,175 (h)
2001	160,272	242 (h)	859 (h)	699 (h)	3,753 (h)	46,985 (b)	4,425 (b)	1,531 (f)
2002	137,077	0 (h)	328 (h)	935 (h)	1,910 (h)	38,625 (b)	5,900 (b)	874 (f)
2003	280,552	85 (h)	658 (h)	3,055 (h)	4,535 (h)	102,800 (b)	8,800 (b)	6,232 (h)
2004	207,844	220 (h)	450 (h)	840 (h)	3,370 (h)	37,550 (b)	2,925 (b)	8,626 (h)
2005	194,622	430 (h)	325 (h)	1,030 (h)	3,890 (h)	34,293 (b)	2,100 (b)	2,024 (h)
2006	163,889	194 (h)	160 (h)	634 (h)	1,916 (h)	16,748 (b)	4,375 (b)	271 (h)
2007	192,406	63 (h)	520 (h)	605 (h)	1,733 (h)	14,650 (b)	2,075 (b)	553 (h)
2008	145,378	1,342 (h)	1,539 (h)	578 (h)	1,652 (h)	7,500 (b)	1,275 (b)	265 (h)
2009	[i]	410 (h)		470 (h)	680 (h)	16,850 (b)	5,450 (b)	155 (h)
2010	177,724	1,110 (h)	280 (h)	340 (h)	720 (h)	5,867 (b)	813 (b)	1,002 (h)
2011	149,533	369 (h)		0 (h) [j]	912 (h)	6,180 (b)	2,092 (b)	575 (h)
2012	130,734		106 (h)	0 (h) [j]	405 (h)	5,230 (b)	396 (h)	515 (h)
2013	110,515	721 (h)		55 (h)	425 (h)	6,222 (b)	2,221 (h)	647 (h)

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Year	Yukon River Mainstem Sonar Estimate [a]	Nenana River Drainage				Upper Tanana River Drainage		
		Lost Slough	Nenana Mainstem [b]	Wood Creek	Seventeen Mile Slough	Delta Clearwater River [c]	Clearwater Lake and Outlet	Richardson Clearwater River
2014	283,421	333 (h)	378 (h)	649 (h)	886 (h)	4,285 (b)	434 (h)	1,941 (h)
2015	121,193	242 (h)	1,789 (h)	1,419 (h)	3,890 (h)	19,533 (b)	1,621 (h)	3,742 (h)
2016	168,297 [k]	334 (h)	1,680 (h)	1,327 (h)	2,746 (h)	6,767 (b)	1,421 (h)	1,350 (h)
2017	166,320 [k]	1,278 (h)	862 (h)	2,025 (h)	1,942 (h)	9,617 (b)		
SEG [l]						5,200-17,000		
Averages								
1972-2016	164,516	801	970	1,243	1,567	15,586	2,137	1,398
2007-2016	164,356	547	899	544	1,405	9,308	1,780	1,075
2012-2016	163,113	408	988	690	1,670	8,407	1,219	1,639
Minimum-16	76,174	0	68	0	27	632	229	80
Maximum-16	283,421	4,169	2,771	8,826	4,535	102,800	8,800	8,626

Note: Only peak counts presented. Survey rating is fair to good, unless otherwise noted. Denotations of survey methods include: (b)=boat, (f)=fixed wing, (g)=ground/foot, (h)=helicopter, and (u)=undocumented. Minimum and maximum indicate year with the lowest and highest values through 2016.

[a] Passage estimates for coho salmon are incomplete. The sonar project is terminated prior to the end of the coho salmon run. New model estimates generated in 2015 and applied to dataset back to 1995 and used since.

[b] Index area includes mainstem Nenana River between confluence's of Lost Slough and Teklanika River.

[c] Index area is lower 17.5 miles of system.

[d] Poor survey, resulted in minimal count.

[e] Weir was operated at the mouth of Clear Creek (Shores Landing).

[f] Expanded estimate based on partial survey counts and historic distribution of spawners from 1977–1980.

[g] Weir project terminated on October 4, 1993. Weir normally operated until mid- to late October.

[h] Weir project terminated September 27, 1994. Weir normally operated until mid- to late October.

[i] Project operated all or partial season, estimate was not useable.

[j] No survey of Wood Creek due to obstructions in creek or surveyed with zero fish observed.

[k] Data are preliminary.

[l] Sustainable escapement goal (SEG) established January 2004, (replaces BEG of greater than 9,000 fish established March, 1993) based on boat survey counts of coho salmon in the lower 17.5 river miles during the period October 21–27.

Appendix B18.–Relative proportion of 8 Canadian Chinook salmon stock aggregates 2005–2017 as estimated by genetic stock identification of samples collected in the test netting associated with the Eagle sonar project (and the Bio Island fish wheel 2005–2008). Percentages are unweighted by sonar passage periods.

	Stock Aggregate							
Year	Upper Yukon Tributaries	Teslin River	Carmacks Tributaries	Mid-Mainstem	Pelly River	Stewart River	North Yukon Tributaries	White River
2005 [a, b]	5.6%	19.2%	24.6%	11.1%	17.5%	9.1%	12.5%	0.5%
2006 [a, b]	6.1%	13.0%	33.0%	10.2%	12.4%	13.4%	10.3%	1.7%
2007 [a, c]	2.4%	19.0%	21.7%	9.2%	20.9%	14.2%	11.5%	1.1%
2008 [a, d]	0.0%	14.7%	20.4%	11.6%	23.9%	13.1%	14.6%	1.7%
2008 [c, d]	1.6%	16.4%	10.8%	33.5%	12.1%	7.2%	8.3%	10.1%
2009 [c, d]	3.3%	25.6%	16.0%	10.5%	16.2%	9.3%	12.7%	6.4%
2010 [c, d]	7.5%	33.0%	13.1%	19.6%	9.3%	7.5%	4.6%	5.4%
2011 [c, d]	4.8%	25.3%	9.6%	22.9%	17.2%	6.0%	8.1%	6.3%
2012 [c, b]	6.4%	37.8%	13.0%	18.8%	9.7%	6.4%	3.6%	4.3%
2013 [c, b]	6.7%	25.6%	18.5%	28.6%	11.5%	5.3%	0.7%	3.2%
2014 [c, d]	4.1%	28.2%	14.3%	23.6%	14.4%	7.4%	3.1%	4.9%
2015 [c, e]	4.6%	25.4%	17.5%	16.0%	18.2%	8.2%	4.4%	5.6%
2016 [c, e]	6.6%	35.0%	16.4%	11.8%	15.3%	8.0%	4.2%	2.7%
2017 [c, f]	5.1%	30.9%	20.7%	16.0%	13.8%	5.7%	4.9%	2.9%
Average (2008–2016)[c]	5.1%	28.0%	14.4%	20.6%	13.8%	7.3%	5.5%	5.4%
Minimum (2008–2016)[c]	0.0%	14.7%	9.6%	10.5%	9.3%	5.3%	0.7%	1.7%
Maximum (2008–2016)[c]	7.5%	37.8%	20.4%	33.5%	23.9%	13.1%	14.6%	10.1%

[a] Samples from BioIsland site collected from fish wheels.

[b] Samples were run against the current year's baseline.

[c] Samples collected from the drift gillnet test fishery at the mainstem Yukon River sonar near Eagle may not be comparable to those collected at the fish wheels because of the proportion of Chinook salmon migrating offshore. Average, minimum, and maximum calculated using mainstem Yukon River sonar project test fishery samples only.

[d] Samples were run against the 2011 baseline.

[e] Samples were run against the 2015 baseline.

[f] Samples were run against the new 2017 SNP baseline.

Appendix B19.–Relative proportion of 4 Canadian fall chum salmon stock aggregates 2005–2017 as estimated by genetic stock identification of samples collected in the test netting associated with the Eagle sonar project (and the Bio Island fish wheel 2005–2008). Percentages are unweighted by sonar passage periods.

	Stock Aggregate			
Year	Mainstem	White	Teslin	Yukon Early
2005 [a]	67.7%	29.8%	0.4%	2.1%
2006 [a]	41.0%	54.9%	3.1%	1.0%
2007 [a]	46.9%	52.1%	0.5%	0.5%
2008 [a]	48.0%	49.9%	2.1%	0.1%
2009 [b]	68.3%	30.6%	1.0%	0.1%
2010 [b]	52.8%	46.3%	0.2%	0.7%
2011 [b]	51.2%	48.0%	0.7%	0.1%
2012 [b]	47.3%	52.6%	0.1%	0.1%
2013 [b]	50.5%	48.9%	0.4%	0.2%
2014 [b]	49.5%	50.1%	0.0%	0.2%
2015 [b]	61.9%	37.2%	0.1%	0.8%
2016 [b]	70.0%	29.3%	0.6%	0.0%
2017 [b,c]	54.9%	45.1%	0.0%	0.0%
Average (2009–2016) [d]	56.4%	42.9%	0.4%	0.3%
Minimum (2009–2016) [d]	47.3%	29.3%	0.0%	0.0%
Maximum (2009–2016) [d]	70.0%	52.6%	1.0%	0.8%

Note: Samples were run against the current year's baseline (ex. 2005 samples were run against the 2005 baseline).

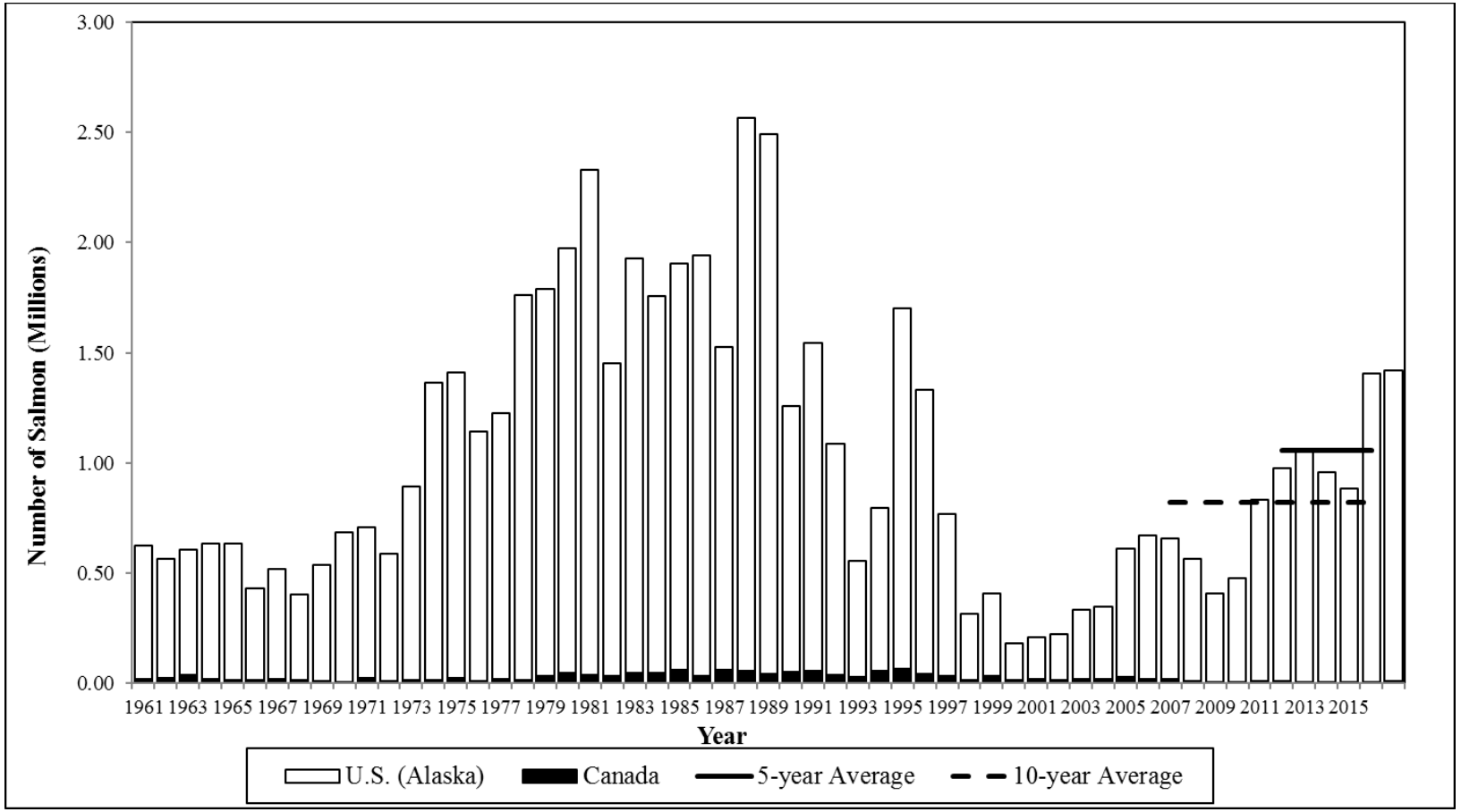
[a] Samples from BioIsland site collected from fish wheels.

[b] Samples from the mainstem Yukon River sonar operated near Eagle collected from the drift test fishery.

[c] Estimates are preliminary, not based on an aggregate season sample.

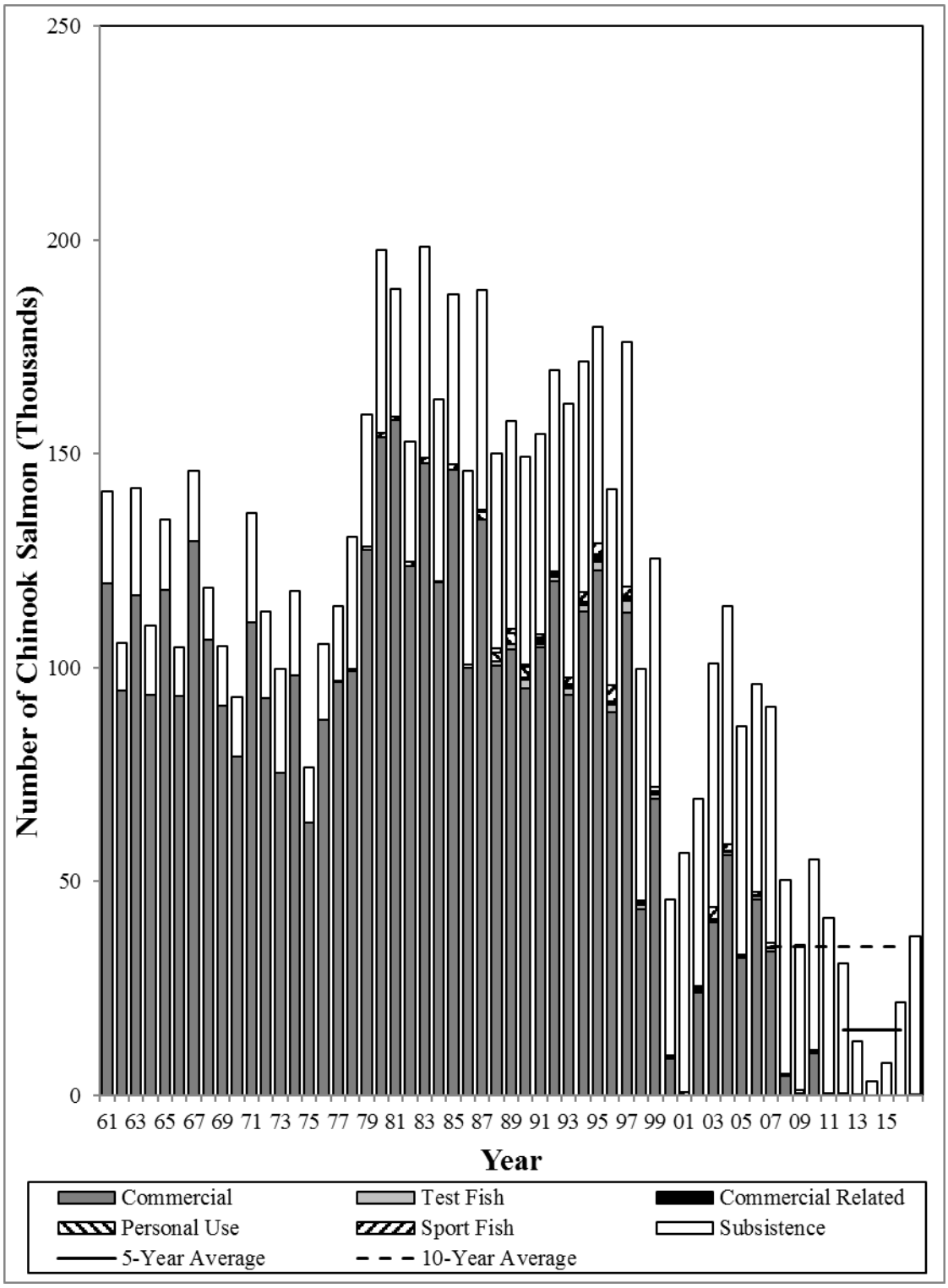
[d] Samples collected from the drift gillnet test fishery at the mainstem Yukon River sonar near Eagle may not be comparable to those collected at the fish wheels. Average, minimum, and maximum were calculated using mainstem Yukon River sonar project test fishery samples only.

APPENDIX C: FIGURES



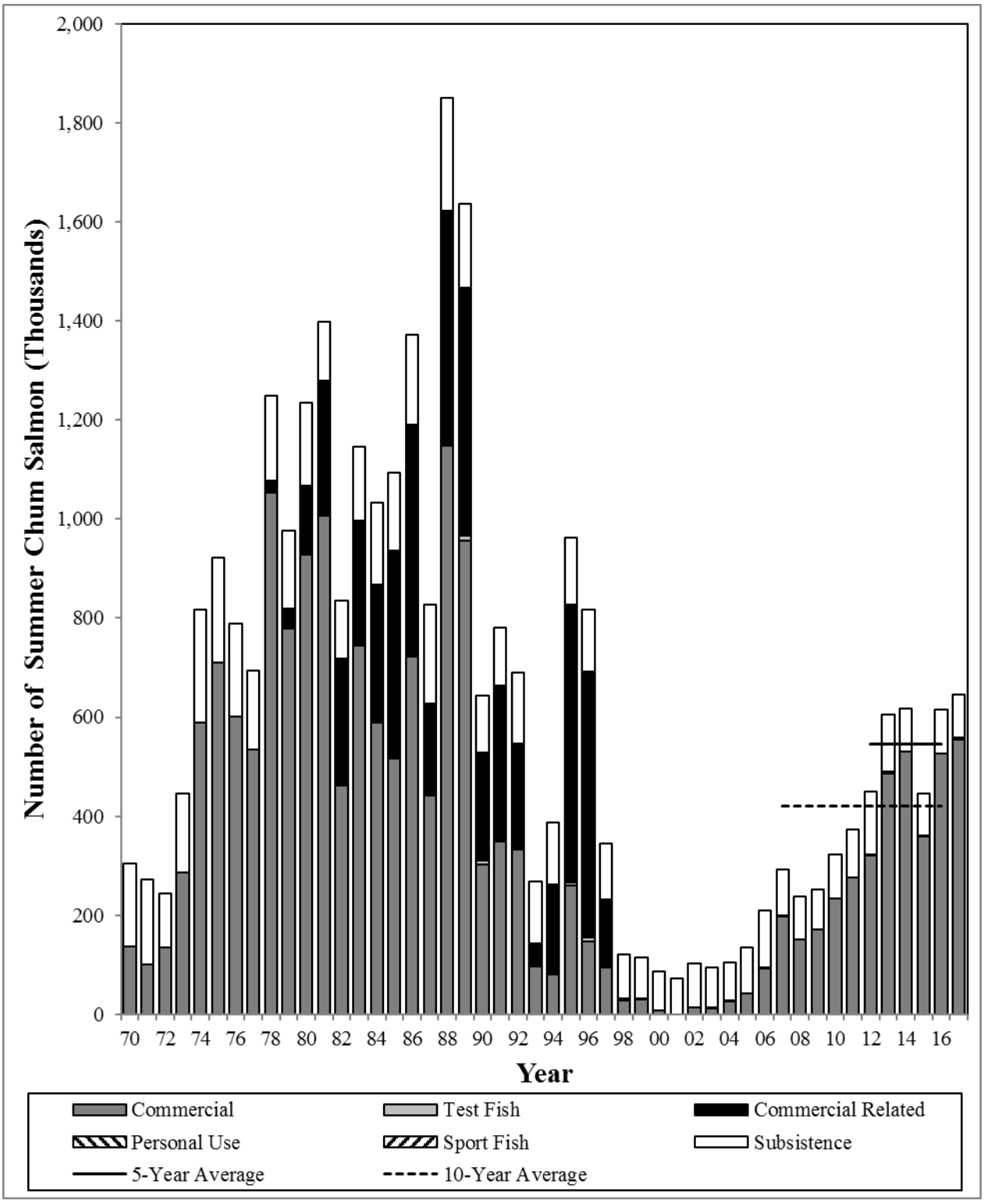
Appendix C1.–Total utilization of Chinook, chum and coho salmon, Yukon River, 1961–2017.

Note: Subsistence harvest estimates of fall chum and coho salmon are minimal prior to 1979 because of timing of harvest surveys. The 2016–2017 harvest estimates are preliminary.



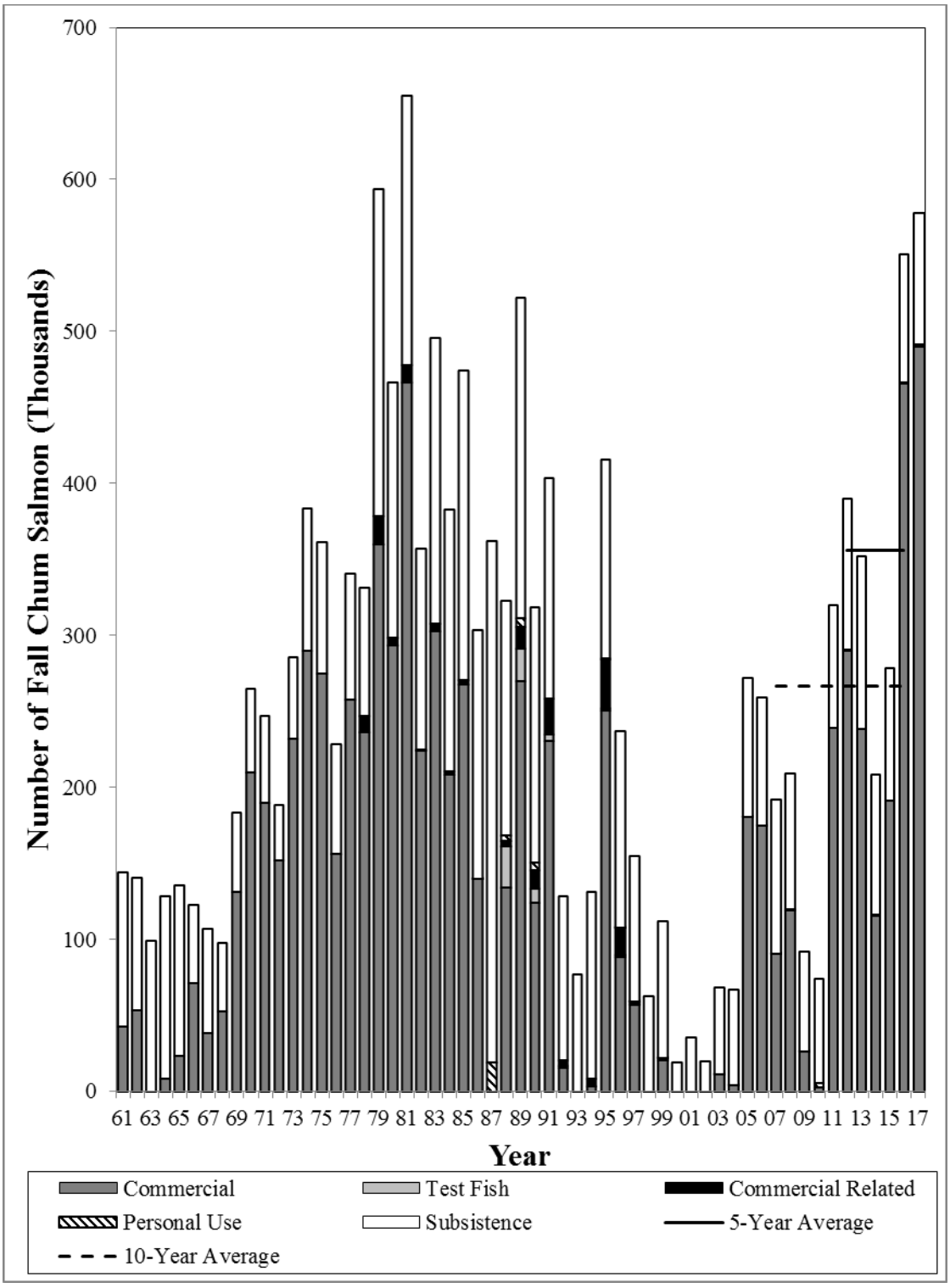
Appendix C2.–U.S. (Alaska) harvest of Chinook salmon, Yukon River, 1961–2017.

Note: No commercial fishery occurred in 2001. The 2016–2017 harvest estimates are preliminary.



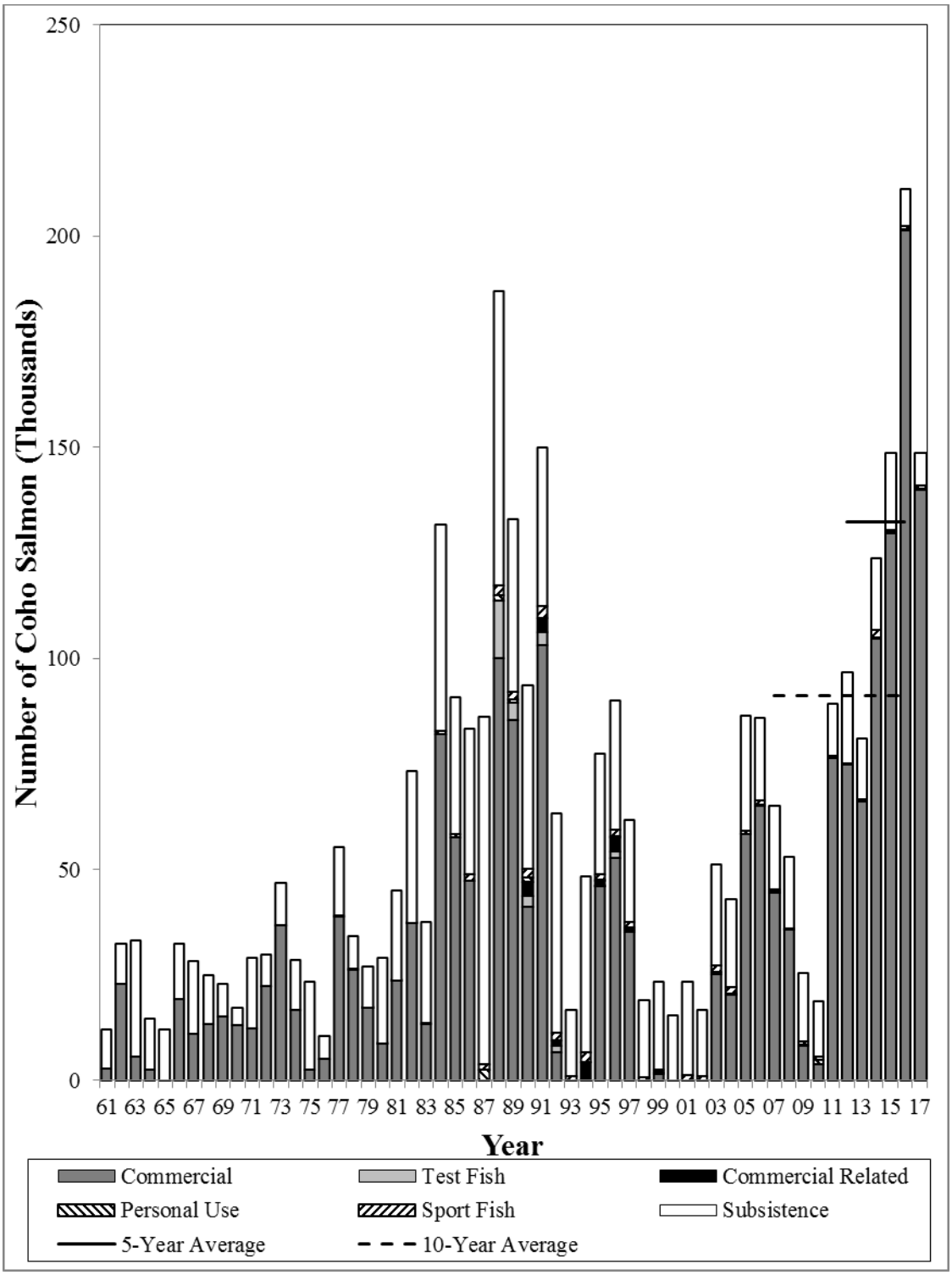
Appendix C3.–U.S. (Alaska) harvest of summer chum salmon, Yukon River, 1970–2017.

Note: The 2016–2017 harvest estimates are preliminary.



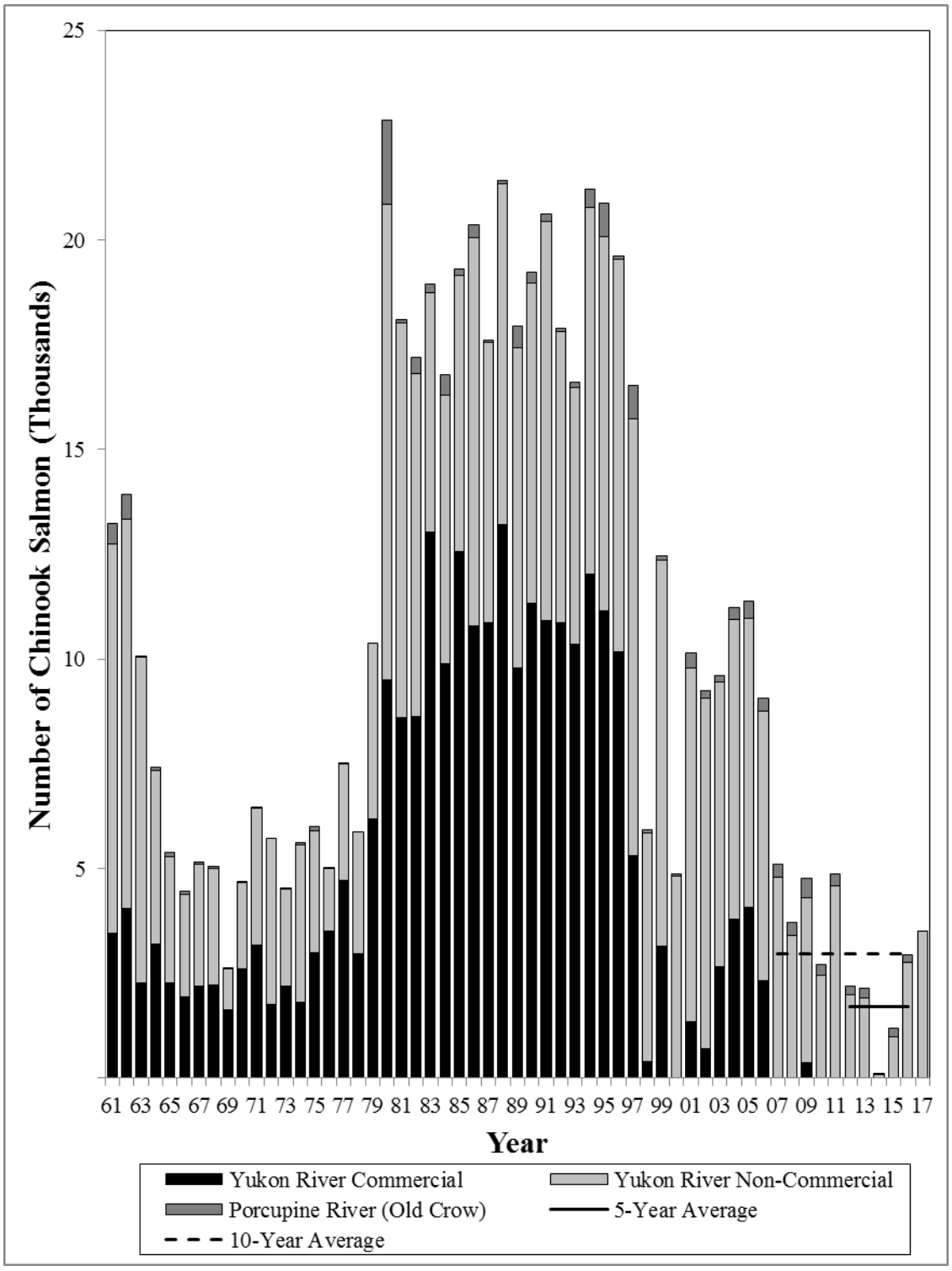
Appendix C4.–Alaska harvest of fall chum salmon, Yukon River, 1961–2017.

Note: Subsistence harvest estimates of fall chum salmon are minimal prior to 1979 because of timing of harvest surveys. The commercial fishery was closed 2000–2002. The 2016–2017 harvest estimates are preliminary.

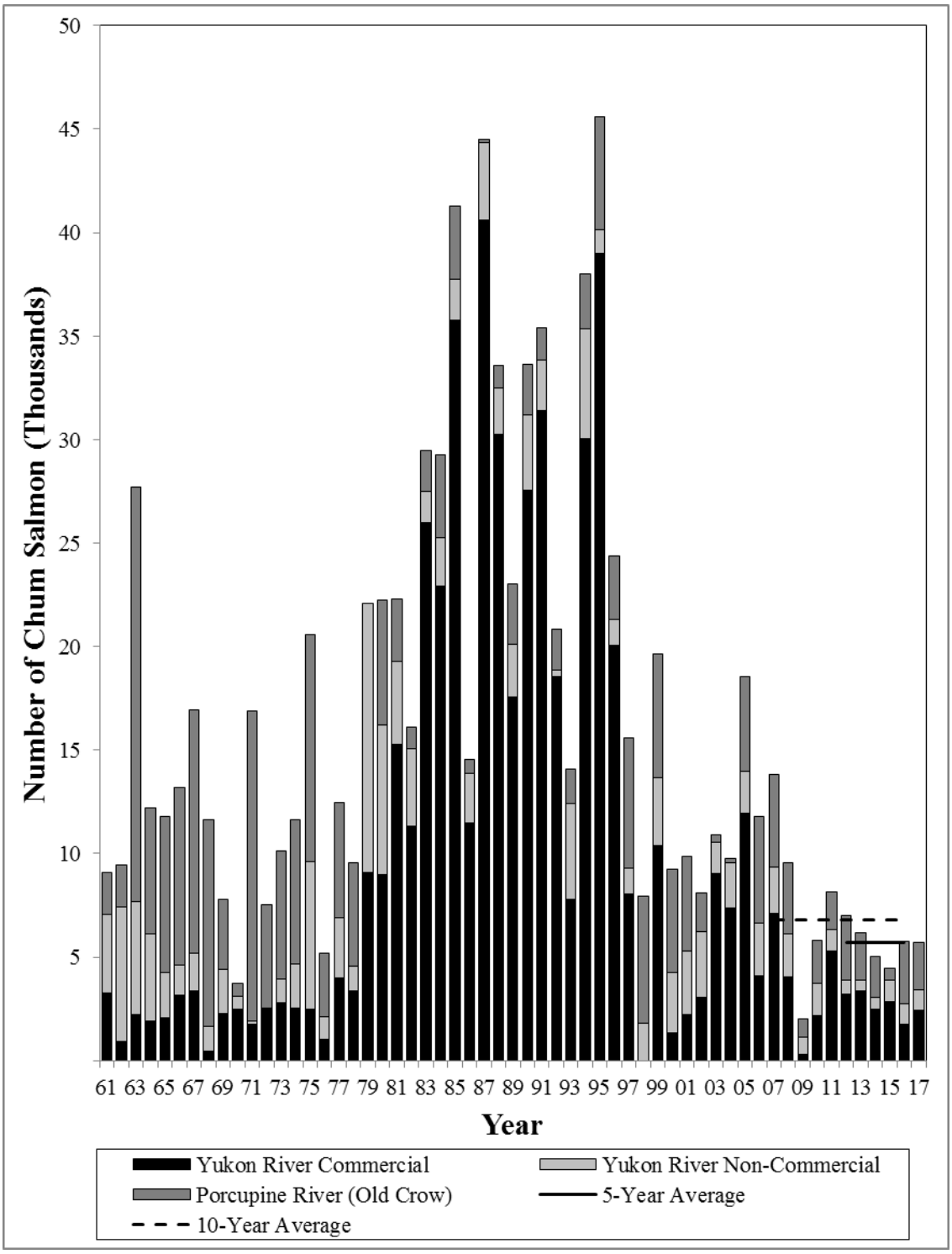


Appendix C5.–Alaska harvest of coho salmon, Yukon River, 1961–2017.

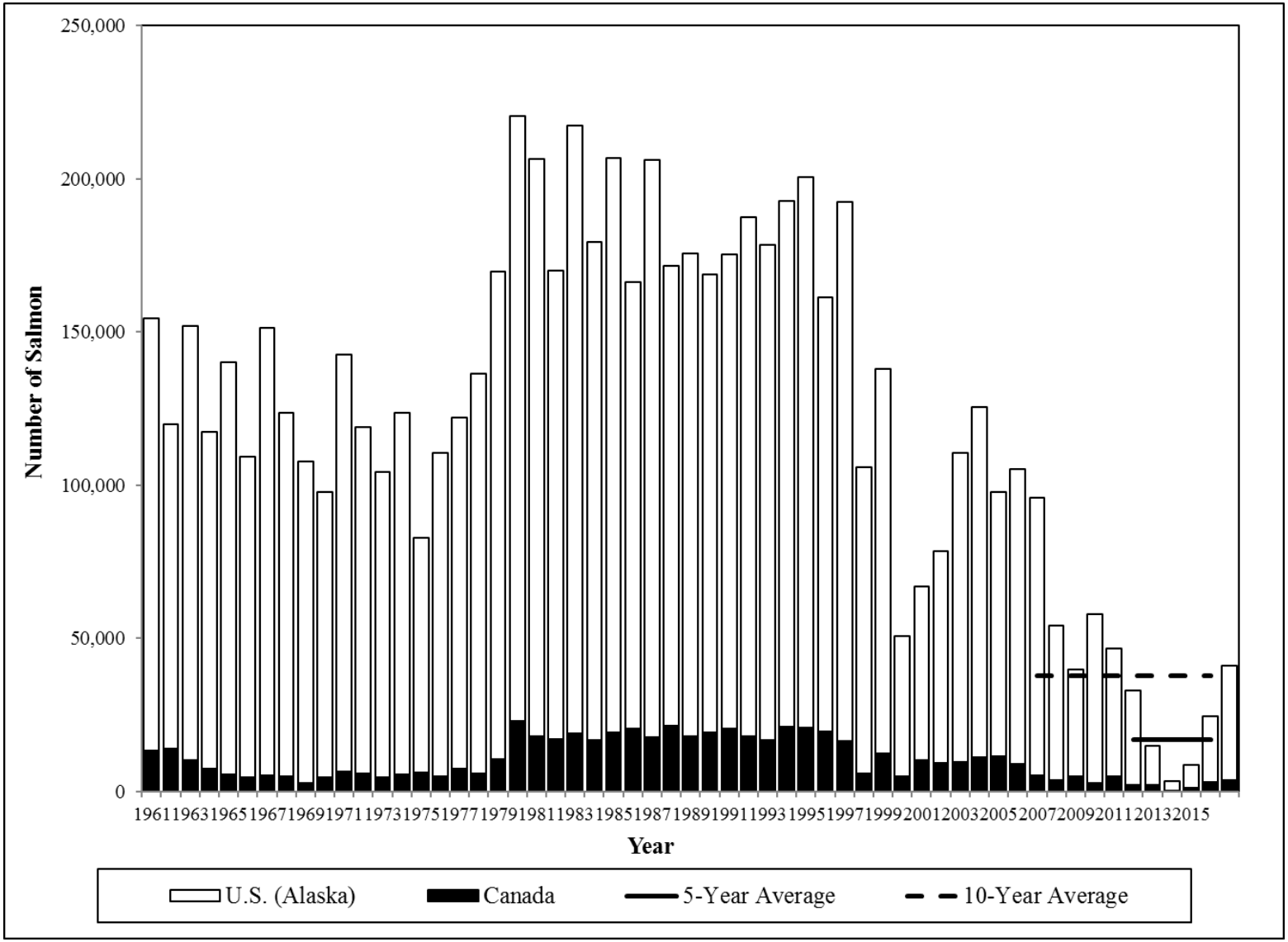
Note: Subsistence harvest estimates of coho salmon are minimal prior to 1979 because of timing of harvest surveys. The commercial fishery was closed 2000–2002. The 2016–2017 harvest estimates are preliminary.



Appendix C6.–Canadian harvest of Chinook salmon, Yukon River, 1961–2017.

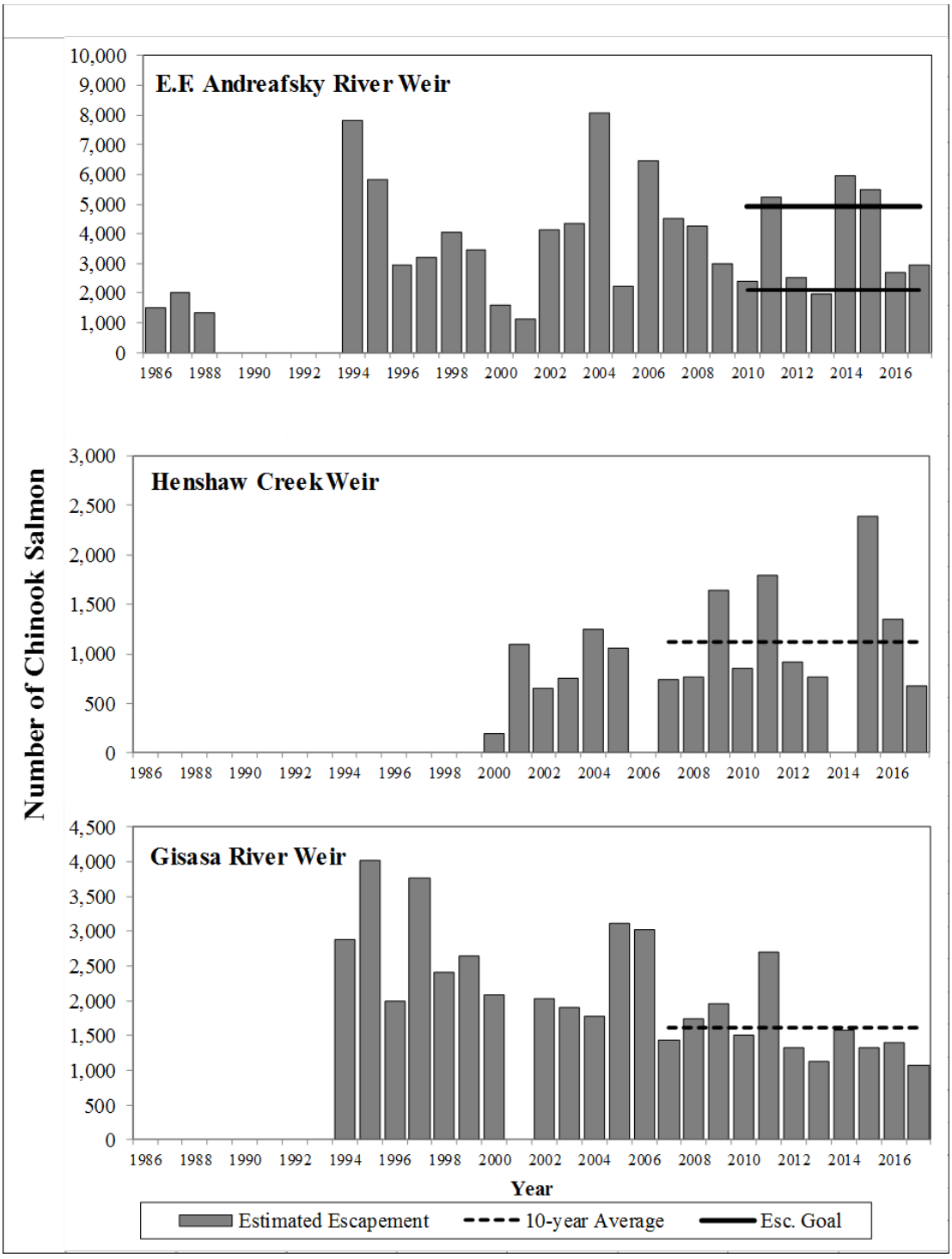


Appendix C7.–Canadian harvest of fall chum salmon, Yukon River, 1961–2017.



Appendix C8.–Total harvest of Yukon River Chinook salmon by all Alaska and Canadian fisheries, 1961–2017.

Note: The 2016–2017 harvest estimates are preliminary.



Appendix C9.–Chinook salmon ground based escapement estimates for selected tributaries in the U.S. (Alaska) portion of the Yukon River drainage, 1986–2017.

Note: Incomplete counts caused by late installation and/or early removal of project or high-water events are excluded from the graphs. Vertical scale is variable. Esc. = escapement relative to years applied as either goal minimums or ranges.

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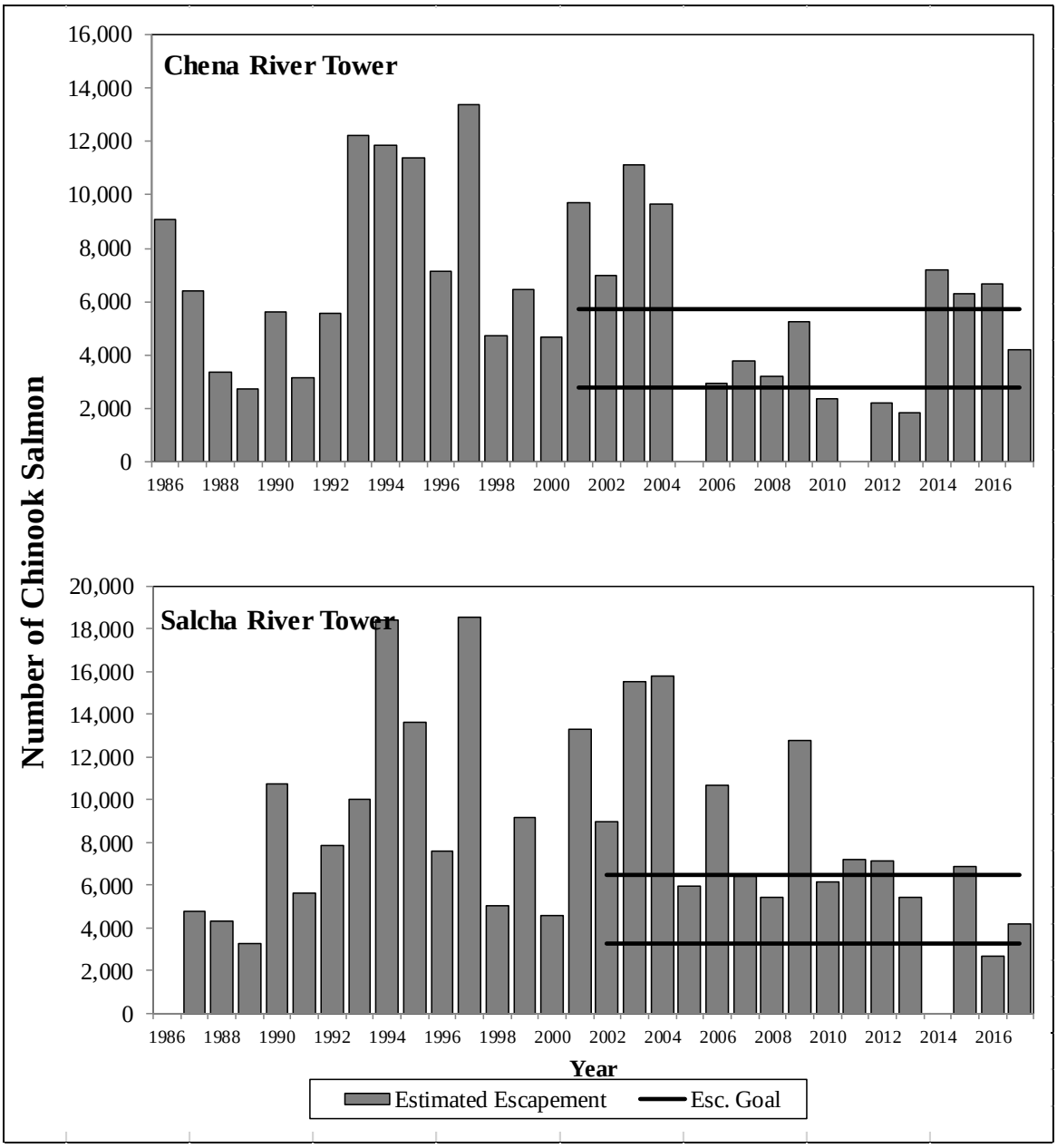
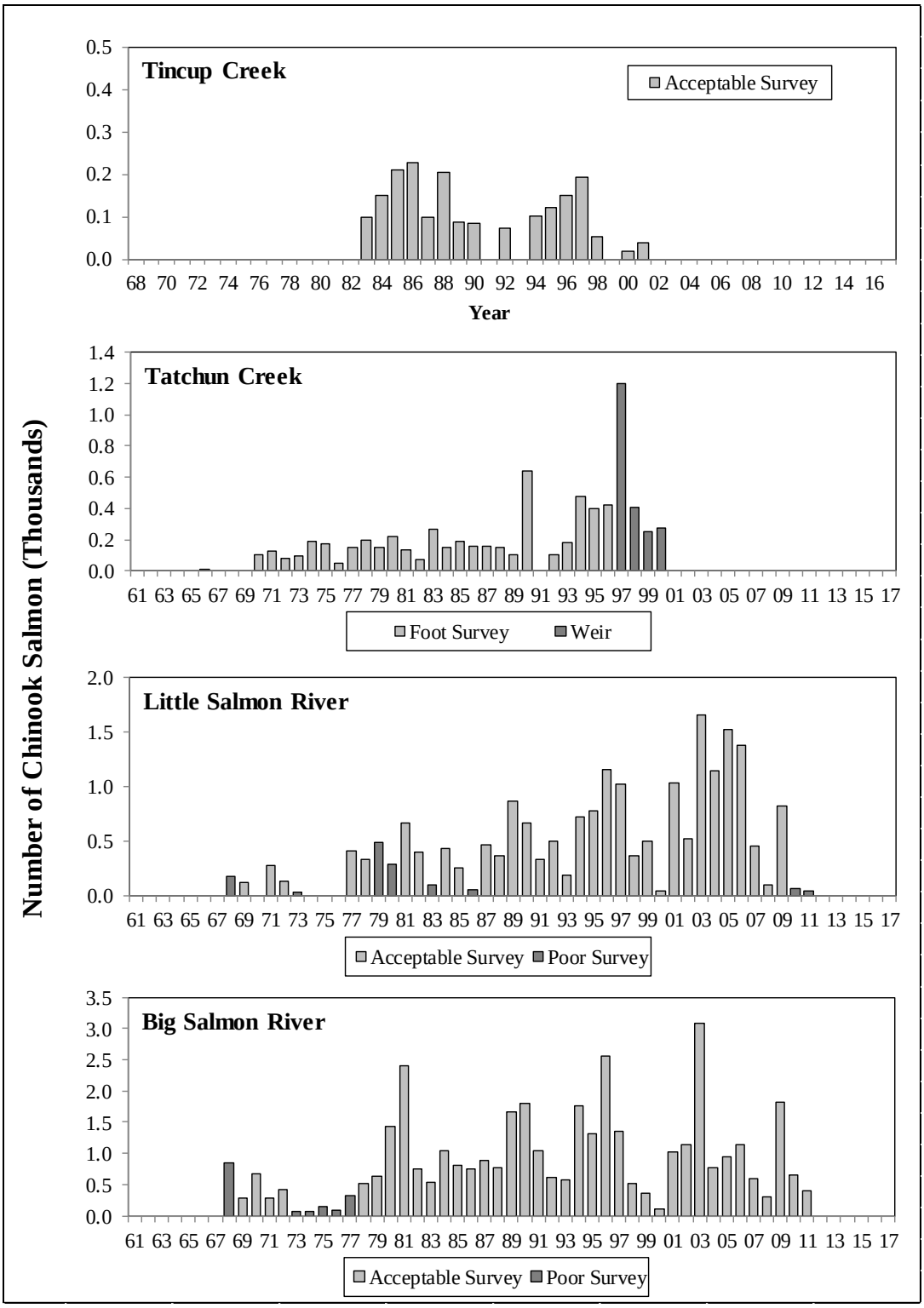


Appendix C9.–Page 2 of 2.



Appendix C10.–Chinook salmon escapement estimates for selected spawning areas in the Canadian (Yukon Territory) portion of the Yukon River drainage, 1961–2017.

Note: Estimates are aerial survey observations unless noted otherwise. Vertical scale is variable.

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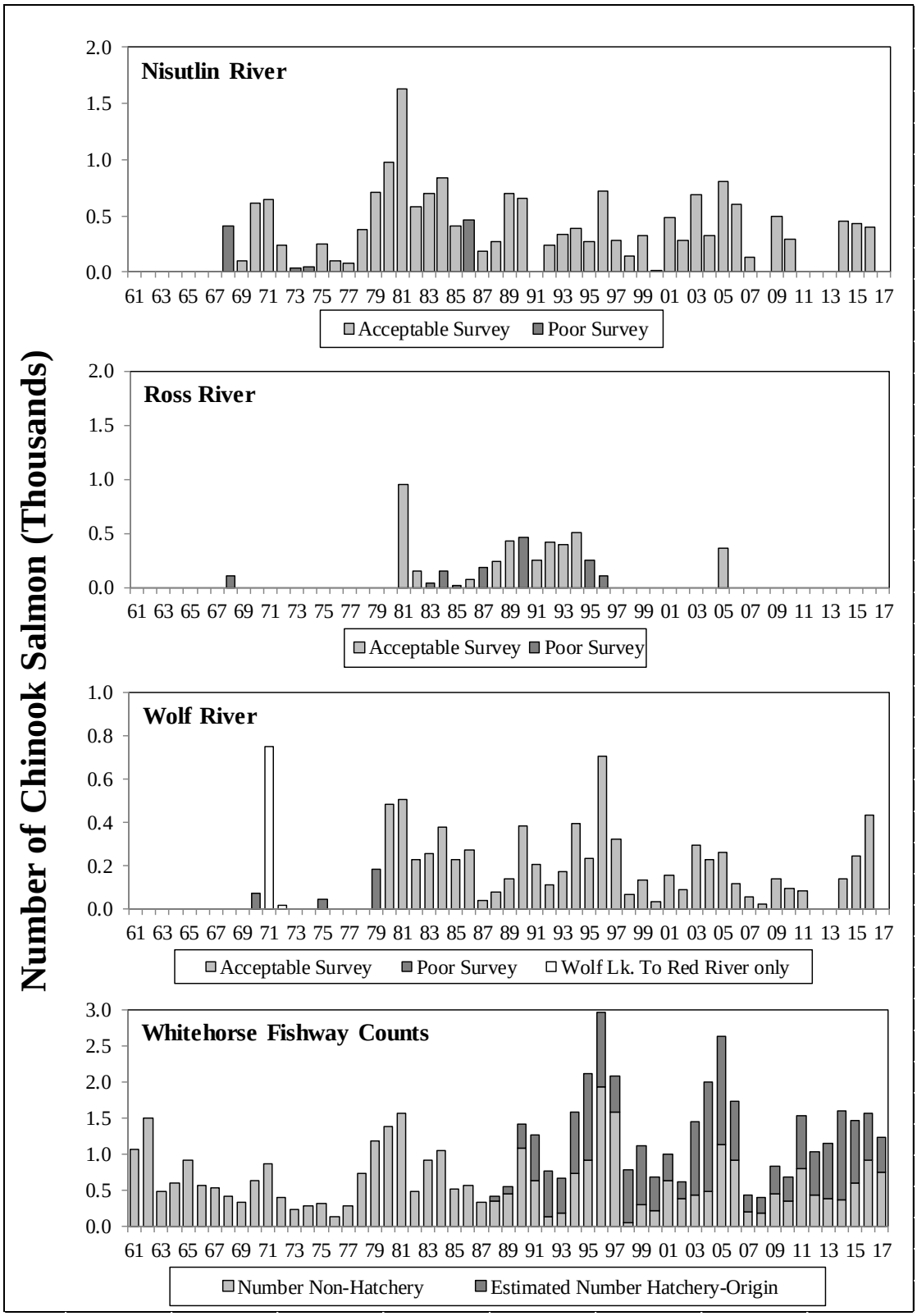
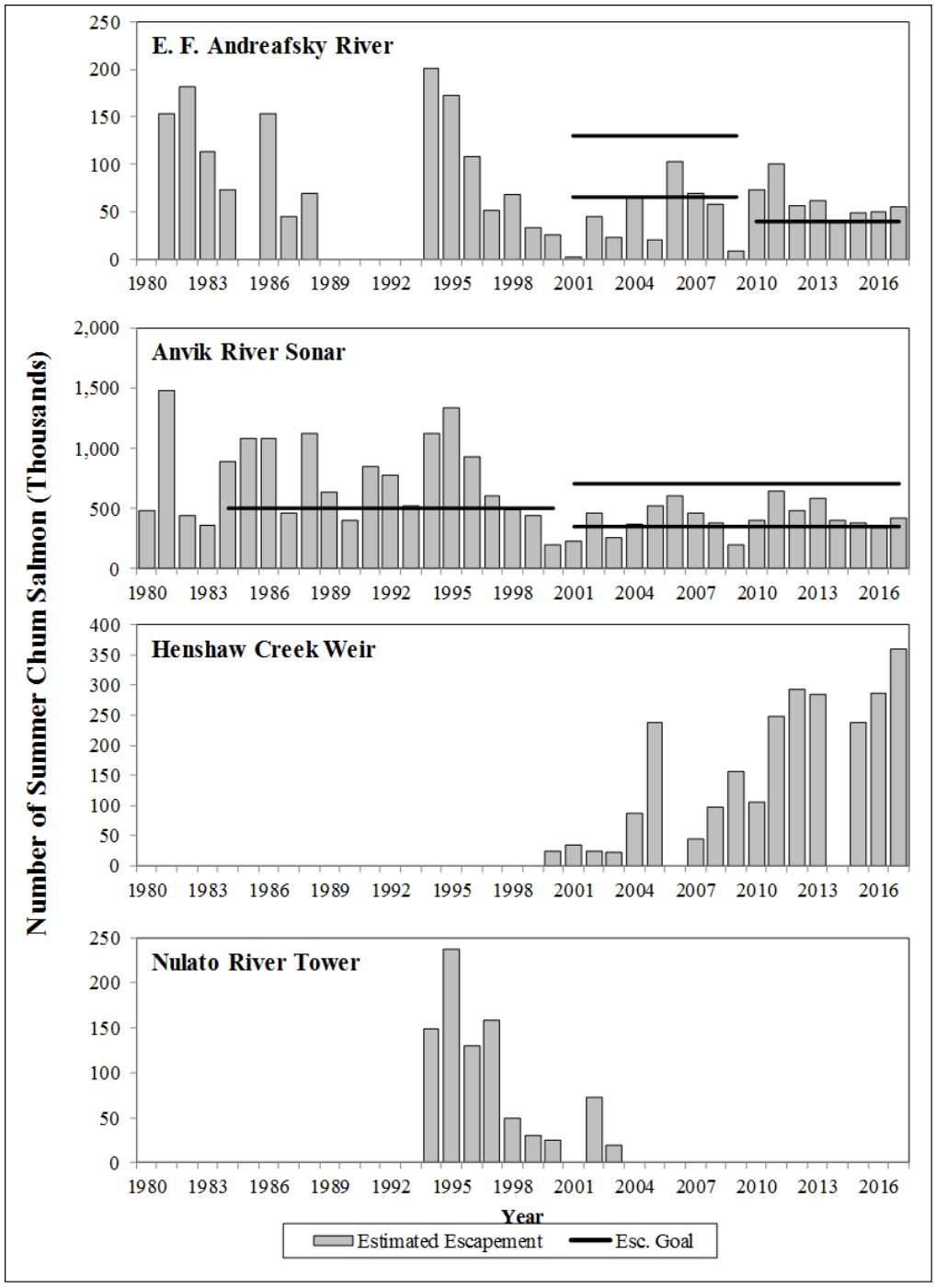


Appendix C10.–Page 2 of 2.



Appendix C11.–Summer chum salmon ground based escapement estimates for selected tributaries in the U.S. (Alaska) portion of the Yukon River drainage, 1980–2017.

Note: Incomplete counts caused by late installation and/or early removal of project or high water events are excluded from graphs. The vertical scale is variable. Esc. = escapement relative to years applied as either goal minimums or ranges.

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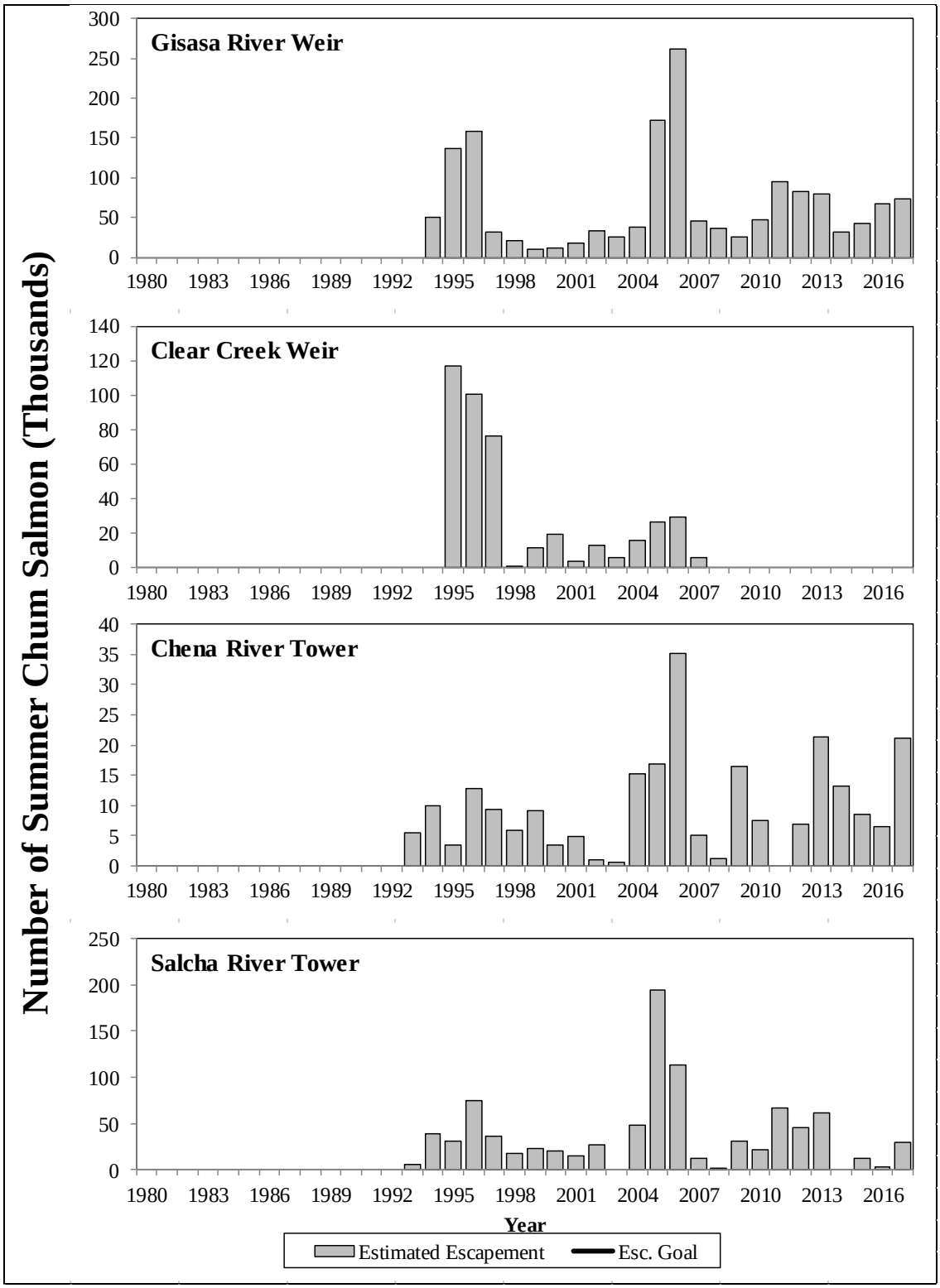
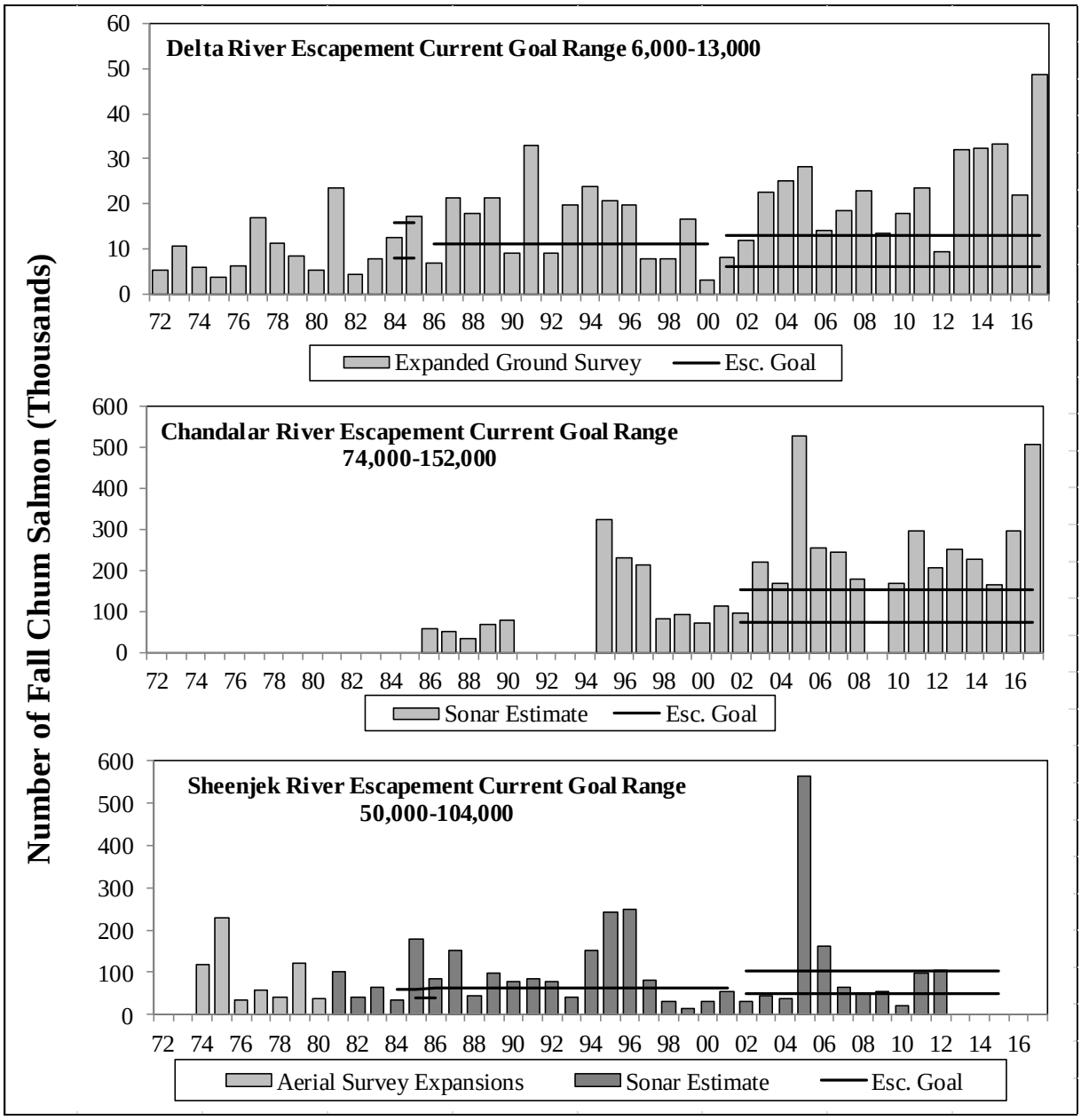
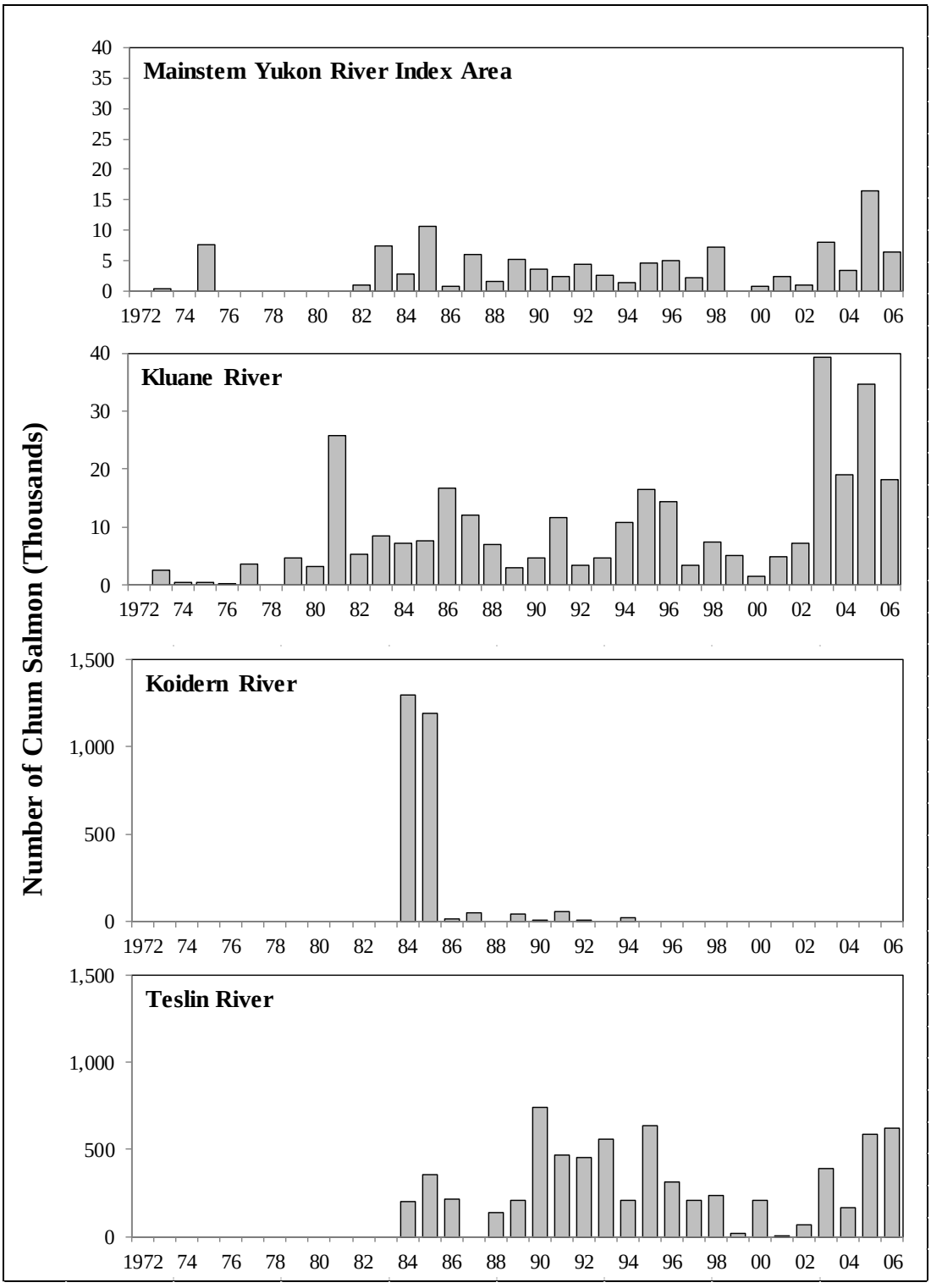


Appendix C11.–Page 2 of 2.



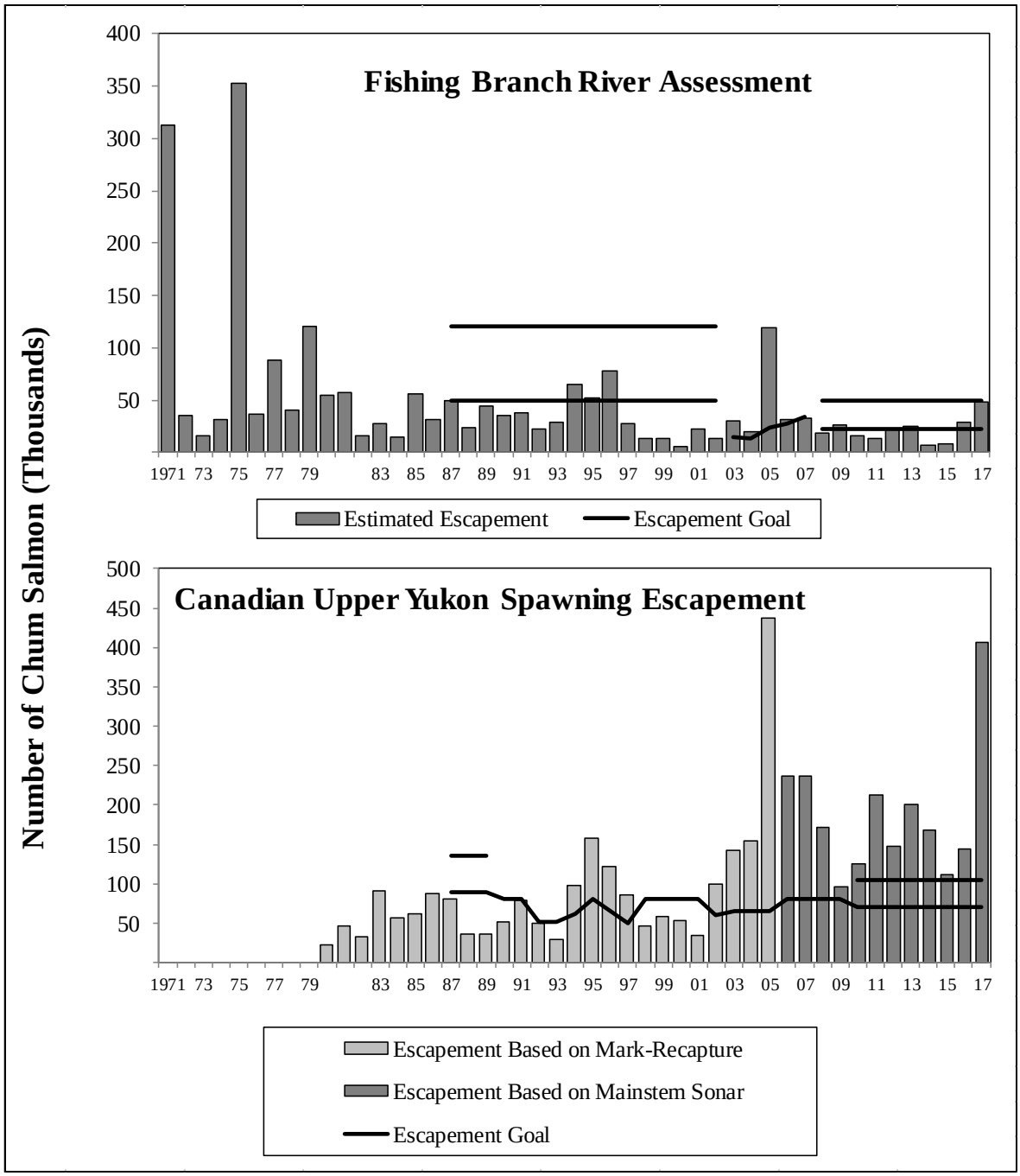
Appendix C12.–Fall chum salmon escapement estimates for selected spawning areas in the U.S. (Alaska) portion of the Yukon River drainage, 1972–2017.

Note: Horizontal lines represent escapement goals or ranges. The vertical scale is variable. Esc. = escapement relative to years applied as either goal minimums or ranges. Sheenjek escapement goal was discontinued in 2016.

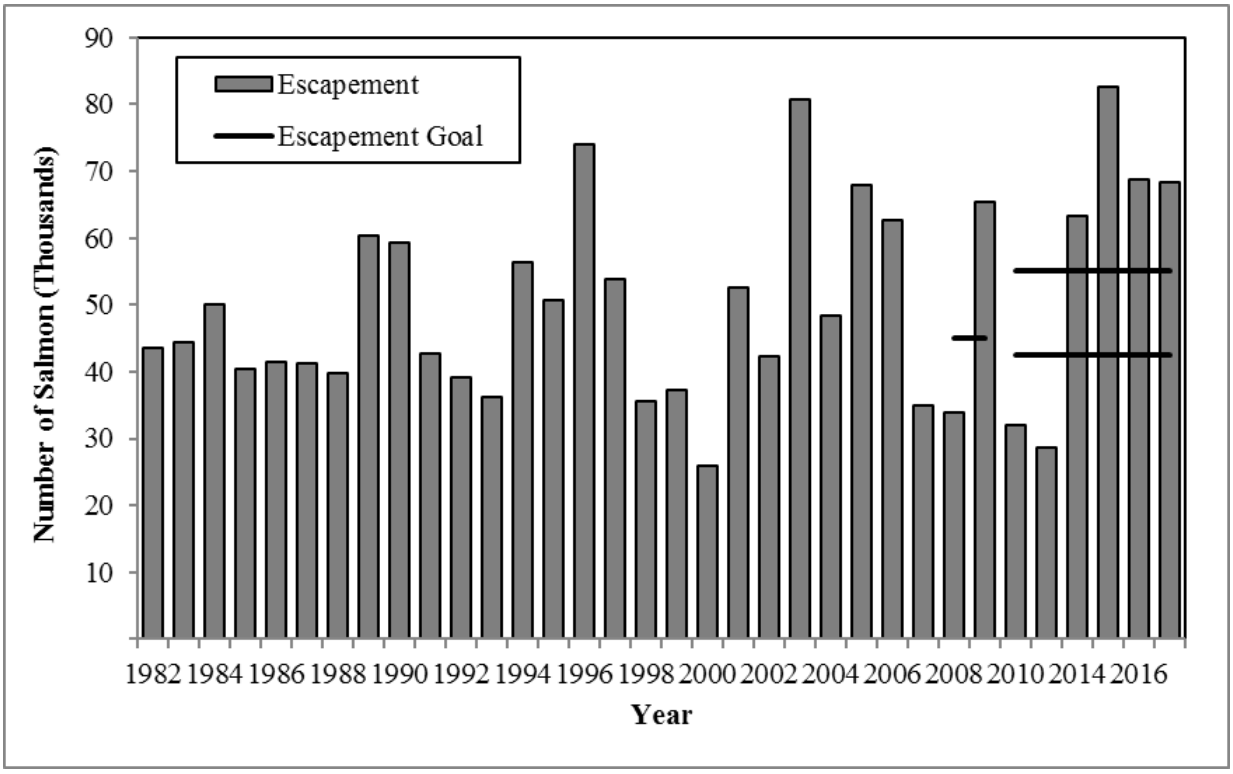


Appendix C13.–Fall chum salmon aerial survey estimates for selected spawning areas in the Canadian (Yukon Territory) portion of the Yukon River drainage, 1972–2006.

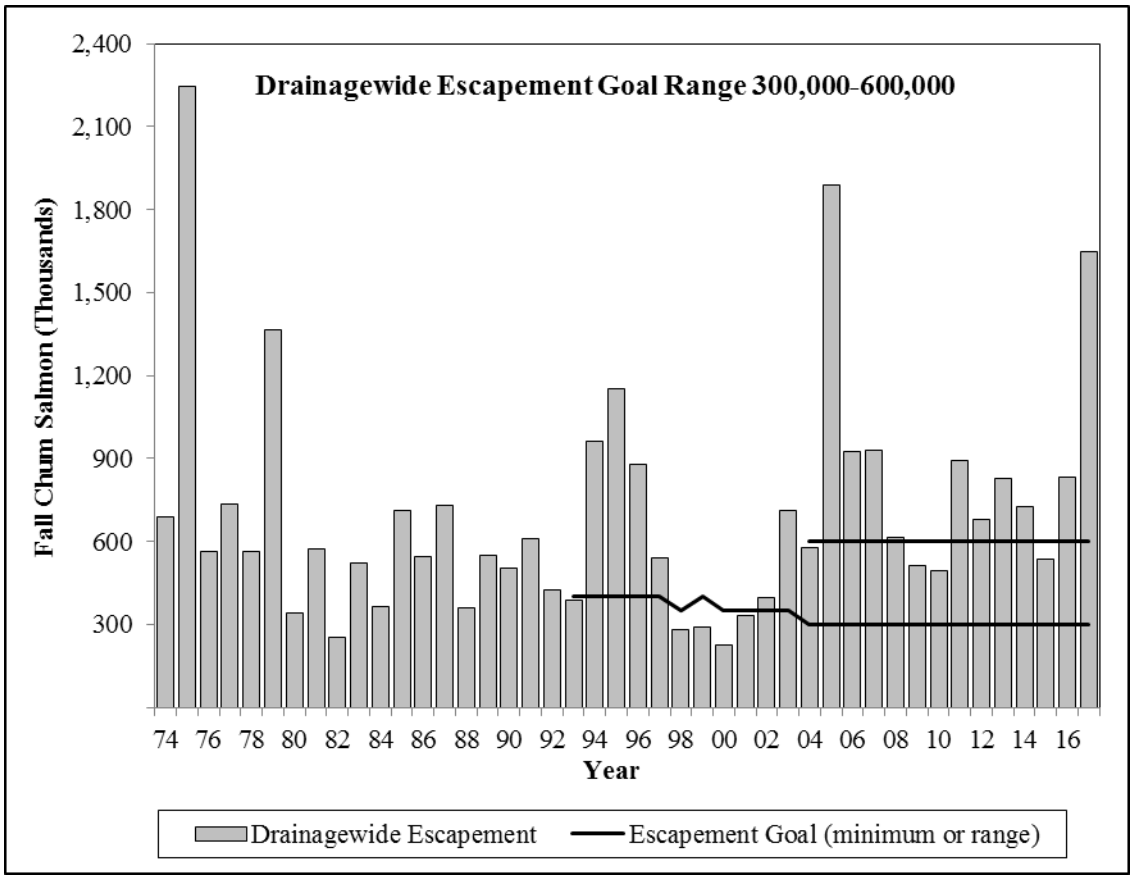
Note: The vertical scales vary. Genetic stock identification was used to determine relative tributary spawning abundance from 2007 to present (see Appendix C18).



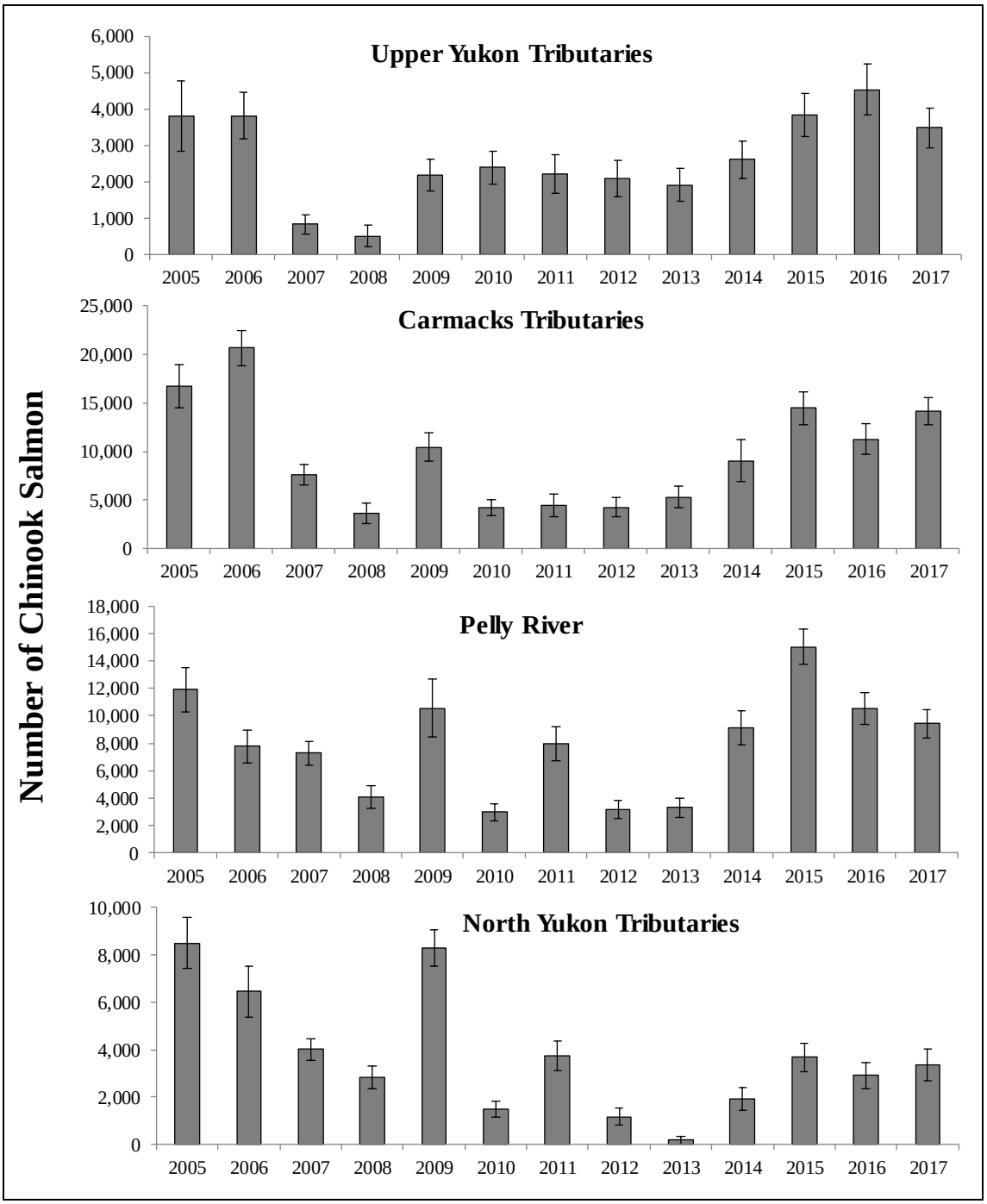
Appendix C14.–Spawning escapement estimates for Canadian-origin fall chum salmon at the Fishing Branch River and the mainstem Yukon River, 1971–2017.



Appendix C15.–Spawning escapement estimates for Canadian-origin Yukon River mainstem Chinook salmon, 1982–2017.



Appendix C16.–Estimated drainagewide escapement of fall chum salmon, Yukon River, 1974–2017.



Appendix C17.–Estimated abundance of 8 Canadian Chinook salmon stock aggregates, 2005–2017. Abundance is estimated by genetic stock identification of samples collected in the test netting associated with the Eagle sonar project (and the Bio Island fish wheel 2005–2008) combined with information about total passage each year.

Note: Genetic estimates are based on samples from fish wheels at BioIsland, 2005–2008, all other years genetic estimates are from the drift gillnet test fishery associated with the mainstem Yukon River sonar operated near Eagle.

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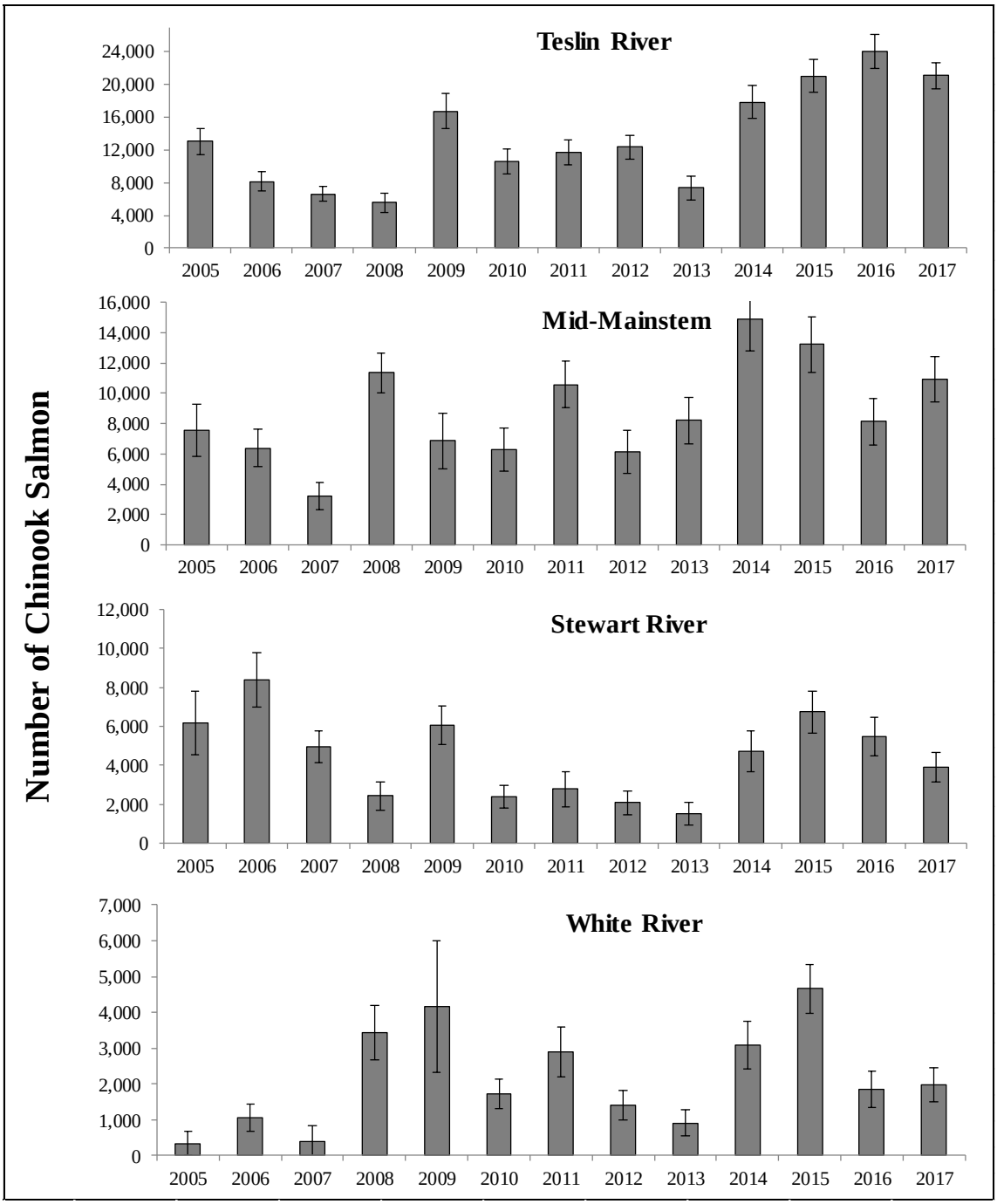
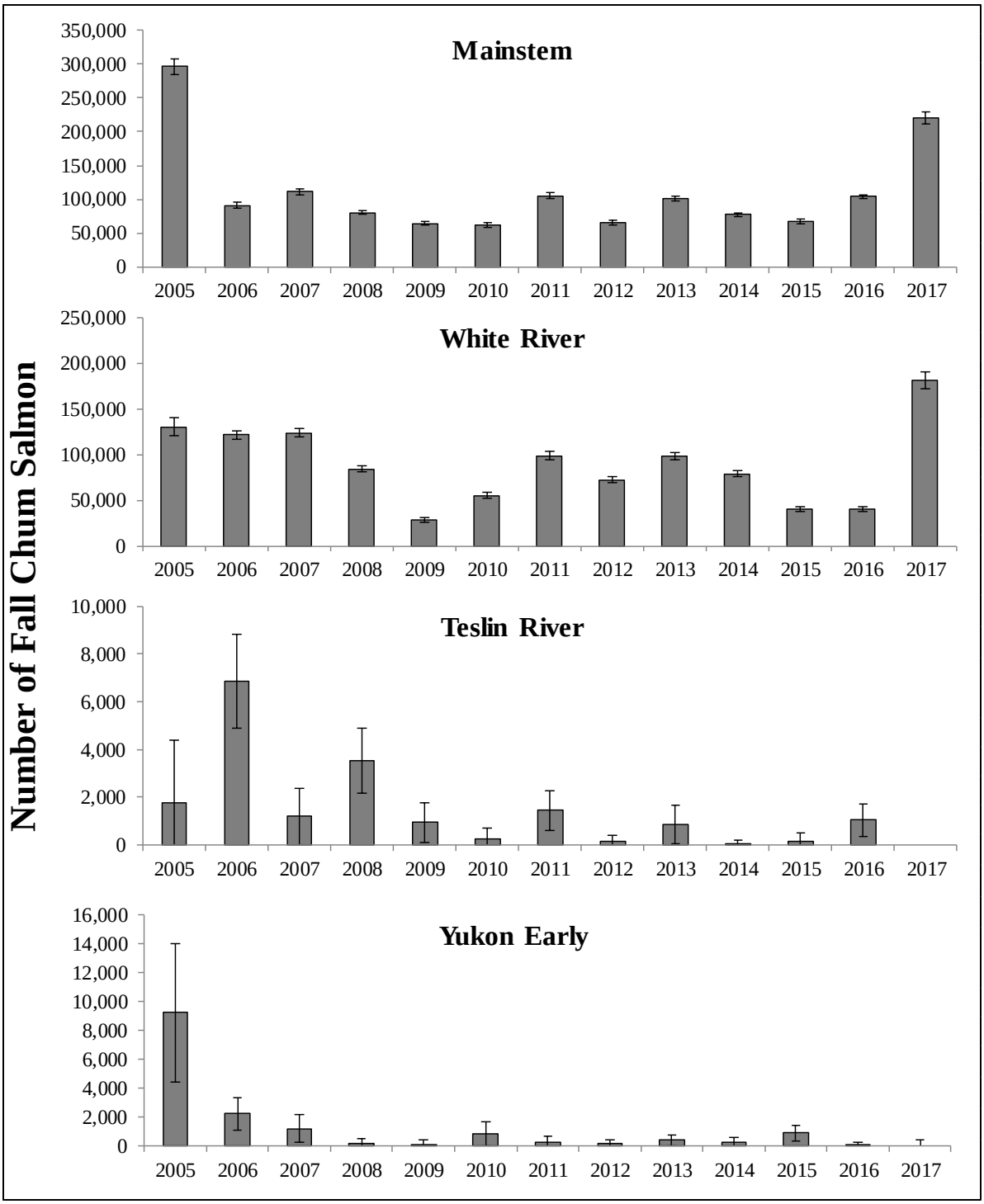


Appendix C17.–Page 2 of 2.



Appendix C18.–Estimated abundance of 4 Canadian fall chum salmon stock aggregates, 2005–2017. Abundance is estimated by genetic stock identification of samples collected in the test netting associated with the Eagle sonar project (and the Bio Island fishwheel 2005–2008) combined with information about total passage each year.

Note: Genetic estimates are based on samples from fish wheels at BioIsland, 2005–2008, all other years genetic estimates are from the drift gillnet test fishery associated with the mainstem Yukon River sonar operated near Eagle.

APPENDIX D: JTC 2017 SEASON MANAGEMENT REVIEW AND 2018 OUTLOOKS

Appendix D1.–Summary of Joint Technical Committee information about fisheries management, escapement, other assessment programs, and harvests for the 2017 season and outlooks for the 2018 season.

Duties delegated to the Yukon River Joint Technical Committee (JTC) include the review of research, assessment methods, and other information related to salmon migration, abundance, escapement, and status of individual stocks; and fishery performance, harvest rates, and management programs. The JTC produces an annual report to provide preliminary harvest and escapement assessments from the previous season; preseason and inseason management strategies; and information about assessment and research programs focused on salmon stocks which spawn in the upper Yukon River drainage in Canada. This appendix to the report is provided at the request of the Yukon River Panel (Panel) to summarize specific information about management strategies and outcomes. The JTC reminds readers that this appendix is a brief summary of information contained in the report, and further details, context, and background information can be found in the main body of the report, along with Appendices A-C which contains numerous tables and figures. The JTC also cautions readers that the management targets presented here are not based on systematic analyses of biological information about the stocks, but represent targets set in the *Yukon River Salmon Agreement* and by Panel decisions.

2017 Chinook Salmon Management, Harvest, and Escapement Summary in Alaska and Canada

In 2017, the total size of the Yukon River Canadian-origin Chinook salmon run was about 92,600 fish and was near the upper end of the 2017 preseason outlook range of 70,000–97,000 fish. The harvest of Chinook salmon in Canada in 2017 was estimated to be 3,500 fish and the harvest of Canadian-origin Chinook salmon in the U.S. was estimated to be about 20,800 fish. The spawning escapement of Canadian-origin Yukon River Chinook salmon was estimated to be approximately 68,300 Chinook salmon, exceeding the IMEG range of 42,500–55,000 fish.

U.S. management is based upon real-time indicators of run timing and strength as the season develops. In 2017, ice break-up at the mouth of the Yukon River occurred on May 14, which was nearly 1 week earlier than the average break up date of May 20 (based on the years 1997–2016). The first Chinook salmon was caught in the lower Yukon test fishery on May 31. The first quarter point, midpoint, and third quarter point were June 13, June 20, and June 26, respectively. The preliminary cumulative passage estimate at the mainstem Yukon River sonar project near Pilot Station was approximately 263,000 Chinook salmon (with a 90% confidence interval of 234,000 to 292,000 Chinook salmon), which was larger than the recent 5-year historical average of 150,000 fish. The first quarter point, midpoint, and third quarter point for the sonar project near Pilot Station were on June 17, June 21, and June 27, respectively. Overall, the 2017 Chinook salmon run appears to have been 3 days earlier than average based on the midpoints at the lower Yukon test fishery and sonar assessment projects. Genetic mixed-stock analysis (MSA) indicated Canadian-origin stock proportions of 43%, 49%, 43%, and 41% for May 31–June 13, June 14–June 20, June 21–June 25, and June 26–July 19, respectively. The season total Canadian-origin proportion of 44% (genetic proportion weighted by passage) in 2017 was slightly above average for an odd-numbered year.

Subsistence harvest of Chinook salmon in Alaska was estimated to be about 37,000 fish in 2017. Based on genetic stock identification of samples from this harvest, the Canadian-origin portion

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of the total harvest was about 20,800 fish. These estimates include all Chinook salmon received by local households from test fishery projects and all Chinook salmon retained for household use from commercial catches. No commercial periods targeting Chinook salmon were allowed in the Yukon or Tanana rivers during the summer season. Sale of incidentally-caught Chinook salmon was prohibited during the summer season; 168 incidentally-caught Chinook salmon were sold during the first fall chum salmon-directed commercial opener. Sport fishing was closed by emergency order to the taking of Chinook salmon in the U.S. portion of the Yukon River drainage but excluded the Tanana River drainage.

Canadian management was based upon available abundance and international harvest sharing provisions, and inseason estimates of run strength. A full First Nation subsistence harvest was available; however, harvest opportunities were at the discretion of individual First Nation governments. The preliminary First Nation harvest was estimated to be approximately 3,500 Chinook salmon from the mainstem Yukon River. In addition, 131 Chinook salmon were harvested in the Porcupine River, but these are not managed under the mainstem spawning escapement IMEG and border passage assessment. The overall Canadian assessment program showed above average Chinook salmon passage into Canada for 2017 as compared to the historical averages. Assessment projects on the Big Salmon River, Pelly River, and Whitehorse Rapids Fishway counted above average escapements. Porcupine River Sonar counted the smallest number of Chinook salmon since project inception in 2014. The Blind Creek weir did not operate due to high water.

2017 FALL CHUM AND COHO SALMON MANAGEMENT, HARVEST, AND ESCAPEMENT SUMMARY IN ALASKA AND CANADA

A preliminary estimate of the Canadian-origin fall chum salmon run in the mainstem Yukon River in 2017 was approximately 560,000 fish, which exceeded the preseason outlook range of 350,000–425,000. The estimate of U.S./Canada border passage for fall chum salmon was about 405,000 fish. The estimate of border passage is derived from the direct passage estimate at mainstem Yukon River sonar operated near Eagle of about 407,000 fish, plus an expansion for additional 12,000 fish after the sonar project end date, minus the U.S. subsistence harvest above the sonar site of approximately 14,000 fish. After subtracting the preliminary Canadian harvest of about 3,400 fish, estimated fall chum salmon escapement in the mainstem Yukon River in Canada was about 401,600 fish, exceeding the upper end of the IMEG (70,000–104,000 fish).

In the Porcupine River drainage, assessment of fall chum salmon was based on data from the Fishing Branch River weir combined with estimates from a mainstem sonar project near Old Crow. Approximately 65,500 fall chum salmon escaped to the upper Porcupine River, based on sonar counts and upriver harvest. The Fishing Branch River weir was supplemented by the use of sonar to count during extreme high water this season and indicated an escapement of about 48,500 fall chum salmon. This escapement fell within the fall chum salmon escapement IMEG range for the Fishing Branch River (22,000–49,000 fish).

In Alaska, initial management was based on the preseason run projection of 1.4–1.7 million fall chum salmon; however, U.S. management is always based upon real-time indicators of run timing and strength as the season develops. All districts and subdistricts were placed on their

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full regulatory subsistence fishing schedules commensurate with switching over to fall management on July 16. Because of the strong run size and inseason run projections, the department liberalized subsistence fishing schedules in all districts. Upon transitioning to fall season management, subsistence fishermen were allowed to use gillnets up to 7.5-inch mesh size. Subsistence salmon fishing in the mainstem Porcupine River was placed on a reduced schedule of one 96-hour period per week beginning September 4. Subsistence salmon fishing on Porcupine River tributaries, such as the Sheenjek and Black rivers, remained open 7 days a week, 24 hours per day. The reduced schedule was an attempt to increase the number of fall chum salmon reaching the Canadian portion of the Porcupine River drainage. By September 22, based on favorable escapement projections for the Fishing Branch River weir, subsistence salmon fishing was relaxed to 24 hours a day, 7 days a week.

Primary inseason assessment tools for fall chum salmon management were the lower Yukon test fishery, operated July 16-September 10, the Mountain Village test fishery operating July 18–September 12, and the mainstem Yukon River sonar near Pilot Station, operated July 16–September 7. Run timing for fall chum salmon over all the assessment projects averaged 2 days late. Cumulative passage estimates at the mainstem Yukon River sonar remained well above the historical median for the entire season. The preliminary fall chum salmon passage estimate from the mainstem Yukon River sonar was approximately 1,830,000 fish ±54,000 (90% CI), which is well above the historical median of about 690,000 fish.

Canadian management was initially based on the preseason run projections for fall chum salmon then on lower river-based inseason run projections. As the fish approached and entered Canada, inseason estimates from the mainstem Yukon River sonar near Eagle provided robust projections. As inseason information became available, the First Nation fisheries proceeded without restrictions. The First Nation fishery harvest was estimated to be approximately 1,000 fish. By late-August, it was evident that the fall chum salmon run was well above the upper end of the preseason forecast based on projections from the LYTF and the mainstem sonar operated near Pilot Station. Given the near-record return of fall chum salmon and anticipated low harvest, commercial and domestic fisheries opened for 24 hours/day, 7 days a week in all areas defined in regulation and remained open until October 19. The total 2017 commercial fall chum salmon harvest was approximately 2,400 fish. No fall chum salmon were harvested in the domestic fishery in 2017.

Assessment projects indicated that run timing for coho salmon was average in 2017. The cumulative coho salmon passage past the mainstem sonar near Pilot Station was tracking with the historical median throughout the season. The preliminary coho salmon passage estimate at the mainstem sonar project near Pilot Station was about 166,300 fish ±20,300 (90% CI,), which is above the historical median of about 160,000 fish. ADF&G identified a surplus of coho salmon in addition to the incidental harvest from the fall chum salmon commercial fishery and allowed a coho salmon directed fishery in District 1, from September 1 to September 10, and in District 6 from October 1 to October 5. The total commercial harvest of Yukon River coho salmon in the Alaska portion of the drainage was nearly 139,000 fish.

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2018 OUTLOOKS

The preseason outlook range for Canadian-origin Chinook salmon run size for 2018 is 71,000–103,000. The 2018 outlook was developed by averaging the forecast ranges based on the adjusted spawner-recruit/sibling method and the juvenile-based method. A simple model average was chosen to give equal weight to both methods. The 2018 forecast of 71,000–103,000 suggests a run size of Canadian-origin Chinook salmon similar or slightly smaller than the run size observed 2017. A run of this size would be above the 2007–2016 average of 69,000 Chinook salmon but below the 1982–1997 average run size of 153,000 Chinook salmon.

The preseason outlook range for Canadian-origin fall chum salmon in 2018 is 400,000–450,000 fish (midpoint of 425,000 fish), based on a total run outlook of 1,600,000–1,800,000 fish and an assumption that Canadian-origin stocks contribute about 25% of the total. The preliminary 2018 outlook is the highest since 1998 and above the 1998–2017 average estimated run size of 236,000 fish. Applying a stock contribution of 4% of the total run to estimate an outlook for the Fishing Branch River fall chum salmon run produces a range of 64,000–72,000 fish, with a midpoint of 68,000 fish. The Fishing Branch river fall chum salmon outlook is considered highly uncertain due to the high variation in contributions of Fishing Branch River fall chum salmon to drainagewide stocks.

2018 ESCAPEMENT GOAL RECOMMENDATIONS

In 2010, the Panel adopted an interim management escapement goal (IMEG) range of 42,500–55,000 Chinook salmon, to allow for the uncertainty of information from assessment projects. The IMEG has been retained each year since then. At the April 2017 meeting, the Yukon River Panel took action to implement the current IMEG range of 42,500–55,000 for 3 years, 2017–2019.

In 2010, the Panel adopted an IMEG range of 70,000–104,000 Canadian-origin mainstem Yukon River fall chum salmon. The JTC recommends that the Canadian-origin mainstem Yukon IMEG remain as established in 2010 and remain in place for the 2018 and 2019 season.

An IMEG range of 22,000–49,000 fall chum salmon for the Fishing Branch River has been extended for 3 year periods since 2008. The JTC recommends that Fishing Branch River fall chum salmon IMEG remain in place for the 2018 and 2019 season.

Appendix D2.–Yukon River Panel escapement goals, total allowable catch targets, and estimated postseason run size and spawning escapement for upper Yukon River Chinook salmon, 2001–2017.

Year	Yukon River Panel or Interim Management Escapement Goal (IMEG) [a]		Estimated upper Yukon Chinook Salmon run size [b]	Total allowable catch (TAC)		Estimated spawning escapement [c]
	from	to		from	to	
2001	18,000	28,000	85,663	57,663	67,663	52,564
2002	28,000	28,000	81,487	53,487	53,487	42,359
2003	25,000	28,000	149,979	121,979	124,979	80,594
2004	28,000	28,000	117,247	89,247	89,247	48,469
2005	28,000	28,000	123,612	95,612	95,612	67,985
2006	28,000		119,485		91,485	62,630
2007	33,000	43,000	87,899	44,899	54,899	34,904
2008	45,000		62,637		17,637	33,883
2009	45,000		87,682		42,682	**65,278**
2010	42,500	55,000	59,741	4,741	17,241	32,014
2011	42,500	55,000	71,726	16,726	29,226	46,307
2012	42,500	55,000	48,494	0	5,994	32,656
2013	42,500	55,000	37,177	0	0	28,669
2014	42,500	55,000	64,886	9,886	22,386	**63,331**
2015	42,500	55,000	87,323	32,323	44,823	**82,674**
2016	42,500	55,000	82,702	27,702	40,202	**68,798**
2017 [d]	42,500	55,000	92,622	37,622	50,122	**68,315**

Note: TAC range is calculated by subtracting each end of the goal range from the estimated run size. This is established in Appendix II of the Yukon River Salmon Agreement. Beginning in 2014, estimates of upper Yukon River Chinook salmon run size includes harvest from the Coastal District in Alaska.

[a] IMEGs are not biologically based escapement goals.

[b] Estimated run size is the border passage estimate plus the Alaska and Canadian harvest of Canadian-origin Chinook salmon. Border passage estimates incorporate: radiotelemetry data (2002–2004); Eagle sonar estimates (2005–2017); and the relationship between telemetry/sonar to aerial surveys for 2001. Harvest estimates are determined using Canadian stock genetic proportion estimates applied to Alaska harvest. Beginning in 2014, harvests from the Coastal District were included in the calculation of Chinook salmon run size.

[c] Gray shaded boxes indicate years when escapement goal was not achieved; **bold font** indicates escapement *above* the goal range).

[d] 2017 estimates are preliminary.

Appendix D3.–Summary of Chinook salmon harvests (Canadian-origin fish) and conservation measures implemented in the U.S., 2001–2017.

Year	U.S. Allowable Catch 74% from	U.S. Allowable Catch 80% to	U.S. Harvest [a]	U.S. Exploitation Rate	Management Actions (Commercial)	Management Actions (Subsistence)
2001	35,211	46,066	23,325	0.31		
2002	38,104	41,194	30,058	0.38	Chinook commercial fishing shifted to midpoint of run and later	
2003	66,017	73,770	59,939	0.51	Chinook commercial fishing shifted to midpoint of run and later	
2004	57,692	62,370	57,832	0.55	Chinook commercial fishing shifted to midpoint of run and later	Subsistence fishing schedule implemented (and continued in following years)
2005	43,703	47,246	44,650	0.51	Chinook commercial fishing shifted to midpoint of run and later	
2006	42,044	45,453	48,097	0.57		
2007	20,335	29,984	48,201	0.68		
2008	13,051	14,110	25,328	0.40	Chinook commercial fishing closed	Protection on 2nd and 3rd pulses
2009	31,585	34,146	17,646	0.20	Chinook commercial fishing closed and no sale of incidental catch; summer chum fishing delayed.	1st and 2nd pulse closure
2010	3,505	13,789	25,271	0.42	Chinook commercial fishing closed; summer chum fishing delayed	
2011	12,590	23,610	20,823	0.29	Chinook commercial fishing closed and no sale of incidental catch; summer chum fishing delayed; summer chum fishing restricted to certain areas of low Chinook abundance.	1st and 2nd pulse closure; additional fishing time reductions in upper districts; 7.5" mesh size restriction all season
2012	4,544	4,912	13,841	0.28	Chinook commercial fishing closed and no sale of incidental catch; summer chum fishing delayed and restricted to areas of low Chinook abundance; chum fish wheels attended at all times and Chinook released alive.	1st and 2nd pulse closure; additional fishing time reductions in upper districts; 6" mesh size restriction after closures
2013	0	0	6,604	0.17	Chinook commercial fishing closed and no sale of incidental catch. Summer chum fishing with beach seines and dip nets, all Chinook released alive. Gillnet summer chum fishing restricted to 5.5" and 30 meshes; delayed and restricted to areas of low Chinook abundance; chum fish wheels attended at all times and Chinook released alive.	1st, 2nd and 3rd pulse closures - limited opportunity in between pulses; additional fishing time reductions in upper districts; 6" mesh size restriction all season

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Year	U.S. Allowable Catch 74% from	U.S. Allowable Catch 80% to	U.S. Harvest [a]	U.S. Exploitation Rate	Management Actions (Commercial)	Management Actions (Subsistence)
2014	7,315	17,909	1,455	0.02	Chinook commercial fishing closed; liberal opportunity for summer chum fishing with beach seines and dip nets - all Chinook released immediately and alive; 6" or smaller gillnet summer chum fishing delayed until majority of Chinook run complete; no sale of incidental Chinook; chum fish wheels had to be attended at all times and all Chinook released immediately to the water; concurrent subsistence and commercial openings.	Entire mainstem river closed to Chinook-directed fishing; no gillnets allowed greater than 4" mesh size to harvest non-salmon species; opportunity to harvest summer chum salmon in Districts 1-4 using elective gear that allows immediate and live release of Chinook allowed (dip nets, beach seines, and fish wheels); short openings with 6" or smaller gillnets allowed in each districts after >90% of Chinook salmon run had passed through; >99% in District 5.
2015	23,919	35,858	3,649	0.04	Chinook commercial fishing closed; liberal opportunity for summer chum fishing with beach seines and dip nets - all Chinook released immediately and alive; 6" or smaller gillnet summer chum fishing delayed until majority of Chinook run complete; no sale of incidental Chinook; fish wheels had to be attended at all times and all Chinook released immediately to the water; concurrent subsistence and commercial openings.	Entire river closed to Chinook-directed fishing; no gillnets allowed greater than 4" mesh size to harvest non-salmon species; opportunity to harvest summer chum salmon in Districts 1–4 using selective gear that allows immediate and live release of Chinook (dip nets, beach seines, and fish wheels); short openings with 6" or smaller gillnets allowed in each district between pulses of Chinook salmon when summer chum abundance was high. Subsistence fishing was allowed in Subdistrict 5-D on the early trickle of Chinook salmon. Subsistence schedules liberalized in Districts 4 and 5 once Chinook salmon border escapement was surpassed.

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Year	U.S. Allowable Catch 74% from	U.S. Allowable Catch 80% to	U.S. Harvest [a]	U.S. Exploitation Rate	Management Actions (Commercial)	Management Actions (Subsistence)
2016 [b]	20,499	32,161	11,476	0.14	Chinook commercial fishing closed; liberal opportunity for summer chum fishing with selective gear - all Chinook released immediately and alive; 6" or smaller gillnet summer chum fishing delayed until majority of Chinook run complete; no sale of incidental Chinook. No concurrent subsistence and commercial openings.	Early season only : Districts 1–5 using selective gear requiring live release of Chinook (dip nets, beach seines, and fish wheels); Subdistrict 5-D had open fishing on the early trickle with 6” gillnets. Reduced regulatory schedule fishing with gillnets restricted to 6” in most districts. Followed by surgical openings with 7.5” gillnets late in the run. Subsistence schedules liberalized in Districts 4 and 5 once Chinook salmon border escapement was surpassed.
2017 [b]	27,840	40,097	20,807	0.22	Chinook commercial fishing closed; liberal opportunity for summer chum fishing with selective gear - all Chinook released immediately and alive; 6" or smaller gillnet summer chum fishing delayed until majority of Chinook salmon run had entered the river. No sale of incidental Chinook salmon in summer season; 1 commercial period occurred in District 1 where Chinook salmon caught during fall chum directed commercial fishing were allowed to be sold. No concurrent commercial and subsistence openings in Districts 1 and 2.	Early season only: Districts 1–5 placed on regulatory schedule fishing with gillnets restricted to 6” prior to the first pulse. Fishing restricted to selective gear requiring live release of Chinook (dipnets, beach seines, and fish wheels), then reopened to regulatory schedule with 7.5-inch of smaller mesh. Coastal District, Koyukuk and Innoko rivers, and Subdistrict 5-D remained open with 7.5-inch or smaller mesh all season.

Note: Beginning in 2014, harvests from the Coastal District were included with in-river harvests to estimate U.S. harvest of Canadian-origin Chinook salmon and U.S. allowable catch. Prior to 2014, only in-river harvests were used for these calculations.

[a] Gray shaded boxes indicate year when allowable harvest range was exceeded.

[b] 2017 estimates are preliminary.

Appendix D4.–Summary of Chinook salmon harvests and conservation measures implemented in Canada, 2001–2017.

Year	Canada Allowable Catch 20% from	Canada Allowable Catch 26% to	Canada Harvest [a]	Management Actions by Canada (Commercial, Domestic, recreational)	Management Actions by Canada (Subsistence)
2001	9,517	14,972	9,774	Test fishery implemented in early season; commercial/domestic openings determined by weekly estimates of abundance, recreational open	Unrestricted
2002	10,298	13,388	9,070	Test fishery implemented in early season; commercial/domestic openings determined by weekly estimates of abundance, recreational open	Unrestricted
2003	17,842	23,975	9,446	Test fishery implemented in early season; commercial/domestic openings determined by weekly estimates of abundance, recreational open	Unrestricted
2004	15,592	20,270	10,946	Test fishery implemented in early season; commercial/domestic openings determined by weekly estimates of abundance, recreational open	Unrestricted
2005	11,812	15,355	10,977	Commercial/domestic openings determined by weekly estimates of abundance, recreational open	Unrestricted
2006	11,363	14,772	8,758	Commercial/domestic openings determined by weekly estimates of abundance, recreational open	Unrestricted
2007	5,496	9,745	4,794	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River	Unrestricted
2008	3,527	4,586	3,399	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River	Voluntary reduction in harvest
2009	8,536	11,097	4,297	Commercial/domestic openings determined by weekly estimates of abundance, recreational open	Voluntary reduction in harvest in early season
2010	947	4,481	2,456	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery.	Voluntary reduction in harvest
2011	3,344	7,597	4,594	Chinook commercial/domestic fishing closed; recreational fishing varied to non-retention in the recreational fishery, angling closure at Tatchun River, recreational restrictions lifted late in the season	Voluntary reduction in harvest in early season
2012	1,199	1,558	2,000	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River	Voluntary reduction in harvest
2013	0	0	1,904	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River and Teslin River	Voluntary reduction in harvest

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Year	Canada Allowable Catch 20% from	Canada Allowable Catch 26% to	Canada Harvest [a]	Management Actions by Canada (Commercial, Domestic, recreational)	Management Actions by Canada (Subsistence)
2014	1,961	5,799	100	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River and Teslin River	Regulatory removal of TAC until 3rd quartile, voluntary reduction or closure maintained by majority of First Nations.
2015	6,467	11,657	1,000	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River.	Regulatory removal of TAC until 2nd quartile, voluntary reduction or closure maintained by majority of First Nations.
2016	5,609	10,541	2,769	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River.	Aboriginal Fishery open with recommendation for reduced harvest (30%), voluntary reduction or closure maintained by majority of First Nations.
2017 [b]	7,524	13,032	3,500	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery, angling closure at Tatchun River.	Aboriginal Fishery open with recommendation for reduced harvest, voluntary reduction or closure maintained by majority of First Nations.

Note: The "Total Allowable Catch" range (Appendix D2) is multiplied by 20% and 26% to calculate the "Canada Allowable Catch" range reported here.

[a] Gray shaded boxes indicate years when allowable harvest range was exceeded.

[b] 2017 estimates are preliminary.