YUKON RIVER SALMON 2014 SEASON SUMMARY AND 2015 SEASON OUTLOOK

Prepared by

THE UNITED STATES AND CANADA
YUKON RIVER JOINT TECHNICAL COMMITTEE

March 2015
Regional Information Report 3A15-01
Alaska Department of Fish and Game
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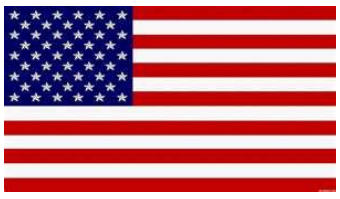

Symbols and Abbreviations

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, Special Publications and the Division of Commercial Fisheries Regional Reports. 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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1.0 ABSTRACT

The Joint Technical Committee (JTC) of the United States and Canada serves as a scientific advisory body to the Yukon River Panel. The JTC discusses 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 2014, presents a 2015 season outlook, and provides data on salmon harvests in commercial, subsistence, aboriginal, personal use, domestic, and sport or recreational fisheries. Summaries of Yukon River research projects and a list of 2014 Restoration and Enhancement Fund projects are also included. For 2014, the preliminary estimate of Chinook salmon escapement in Canada was about 63,000 fish, exceeding the upper end of the goal range of 42,500–55,000 fish. A preliminary reconstruction indicates that the total Canadian-origin Chinook salmon run size was between 64,000 and 65,000 fish. The preliminary fall chum salmon escapement estimate for the Yukon River mainstem in Canada was approximately 156,800 fish, exceeding the upper end of the escapement goal range in Canada of 70,000 to 104,000 fish. A fall chum salmon escapement estimate for the Fishing Branch River is not available but the upper Porcupine sonar assessment at Old Crow (17,756 fall chum salmon) was below the lower bound of the escapement goal range of 22,000–49,000 fish. The preliminary drainagewide total run size estimate was 1,020,000 fall chum salmon, which fell within the preseason forecast range of 814,000 to 1,051,000 salmon. Run size was based on escapement estimates, age composition, and estimates of harvest, which at the time of this publication remain preliminary. Recommended interim management escapement goals for upper Yukon River Chinook, chum, and coho salmon in 2015 remain unchanged from 2014.

Key words: Yukon watershed, Yukon River Salmon Agreement, Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, coho salmon *O. kisutch*, escapement, 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. The JTC meets semi-annually to discuss harvest and escapement goals, management strategies, preseason outlooks and postseason reviews, and results of cooperative research projects.

The fall JTC meeting was held October 28–30, 2014 in Vancouver, British Columbia. The meeting was attended by 10 United States (U.S.) and 6 Canadian members. The open portions of the meeting also included 1 U.S. advisor and guest presenter, a second U.S. guest presenter, and 2 additional Canadian guests.

A special one-and-a-half day workshop was presented by Toshihide Hamazaki and Steve Fleischman (ADF&G) to educate JTC members about the basic concepts, assumptions, and estimation methods for spawner-recruitment or life-history modeling. Spawner-recruitment modeling is the basis of most biological escapement goals (BEG) for salmon, and advanced spawner-recruitment modeling methods (e.g. Fleischman et al. 2013) have been applied to preliminary analyses for Yukon River Canadian-origin Chinook salmon *Oncorhynchus tshawytscha*. The JTC has discussed this modeling work in previous meetings, especially with consideration to generally sparse data and the poor quality of much of the older data for this stock. The workshop enabled participants to explore potential effects of these data deficiencies and of various assumptions in the model. The workshop was not intended to produce a definitive assessment of any Yukon River salmon stocks, but the new understanding of population dynamics gained by JTC members are expected to be helpful as the JTC moves forward on BEG recommendations.

Regular postseason fishery reviews were conducted, with presentations by U.S.[1] and Canadian[2] members on management, stock assessment, harvests, and escapement of Chinook and fall chum *O. keta* salmon. Updates were provided on salmon by-catch in the Bering Sea and Gulf of Alaska trawl fisheries and marine research surveys[3].

Also at the fall meeting, conceptual proposals for the Restoration and Enhancement Fund (R&E) were reviewed and final ratings and comments on these proposals were approved by the full JTC. The R&E subcommittee reviewed and rated all the proposals prior to the October meeting. Other JTC members were also given the opportunity to review the conceptual proposals before the meeting, and to provide their comments during the meeting.

Because of the new R&E focus on restoration projects, the JTC discussed the need for a Restoration Subcommittee to guide review of proposals according to the best available scientific standards. Michael Crowe (DFO) led this discussion and described a framework and practices currently in place in British Columbia with the Salmonid Enhancement Program (SEP). The discussion covered a large restoration workshop held in Whitehorse in October 2014 and plans for future related workshops. JTC members will be identified who can attend these future workshops on restoration projects in Yukon Territory. In addition, the JTC will delegate planning for a restoration workshop at its Fall 2015 meeting to either a new Restoration Subcommittee or a less formal interim working group.

Fall meeting attendance:

Susan Antpoehler (JTC Co-Chair), Department of Fisheries and Oceans Canada (DFO)
Sean Collins, DFO
Michael Crowe, DFO (Kamloops)
Mary Ellen Jarvis, DFO
Trix Tanner, DFO
Maggie Wright, DFO

Jan Conitz (JTC Co-Chair), Alaska Department of Fish and Game Division of Commercial Fisheries (ADF&G-CF)
Dan Bergstrom, ADF&G-CF
Bonnie Borba, ADF&G-CF
Caroline Brown, ADF&G Division of Subsistence
Randy Brown, U.S. Fish and Wildlife Service (USFWS)
Aaron Martin, USFWS
Brian McKenna, Tanana Chiefs Conference (TCC)
Jim Murphy, National Ocean and Atmospheric Administration (NOAA)
Stephanie Schmidt, ADF&G-CF
Chris Stark, Bering Sea Fishermen's Association (BSFA)

Fall meeting workshop guests:
Toshihide Hamazaki, ADF&G, workshop presenter
Steve Fleischman, ADF&G, workshop presenter

[1] Stephanie Schmidt, Bonnie Borba (Alaska Department of Fish and Game, Division of Commercial Fisheries).
[2] Mary Ellen Jarvis, Trix Tanner (Department of Fisheries and Oceans Canada).
[3] Jim Murphy (U.S. National Oceanic and Atmospheric Administration).

Mike Bradford, DFO (Vancouver), subject matter expert
Dennis Zimmerman, Yukon Salmon Sub-Committee (YSSC)

The spring JTC meeting was held March 9–10, 2015 by video teleconference with U.S. members convening in Fairbanks Alaska and Canadian members meeting in Whitehorse Yukon Territory. The 2014 postseason harvest and escapement summaries and the 2015 preseason outlooks for drainagewide and Canadian-origin stocks were presented. Other presentations included preseason management plans in Alaska and Canada and marine fisheries and research survey reports. Discussion topics included formation of a Restoration subcommittee and plans for a Panel restoration workshop, a possible Fishing Branch River fall chum salmon rebuilding plan, and 2015 Chinook and fall chum salmon escapement goal recommendations.

Prior to the March 2015 JTC meeting, the R&E subcommittee met by teleconference to finalize their review of Detailed Proposals for the R&E Fund and their results were presented to the full JTC. JTC members also reviewed the R&E Detailed Proposals and participated in finalizing recommendations to the Panel at the March JTC meeting.

Spring meeting attendance included the same regular JTC members as the fall meeting, with the following exceptions:

- The Canadian section also included Don Toews, Yukon Salmon Sub-Committee (YSSC);
- In the US section, Jeff Estensen, ADF&G-CF, attended in place of Dan Bergstrom, and Holly Carroll, ADF&G-CF, was added as a new member;
- No guests were in attendance.

JTC Subcommittees and Members as of March 2015

- R&E Subcommittee: Jan Conitz, Toshihide Hamazaki, Aaron Martin, Stephanie Schmidt, Holly Carroll (US); and Sean Collins, Michael Crowe, Trix Tanner, and Maggie Wright (Canada).
- Bylaws/Terms of Reference Subcommittee: Susan Antpoehler, Jan Conitz, Aaron Martin.
- Escapement Goal Subcommittee: all JTC members.
- Restoration Subcommittee: Susan Antpoehler, Sean Collins, Michael Crowe, Trix Tanner, Dave Willis, Maggie Wright (Canada); and Caroline Brown, Holly Carroll, Jeff Estensen, Aaron Martin, Stephanie Schmidt, and Chris Stark (US).

Over time, Alaskan and Canadian researchers have developed projects to monitor escapement and to determine genetic composition, relative abundance, run characteristics, and other information to characterize the annual salmon migration in the Yukon River. Main river sonar, tributary sonar, weir, counting tower projects, and aerial surveys are used to monitor escapement. Other information collected at ground based projects may include, but is not limited to, salmon sex and length composition, scales or vertebra for age determination, tissue samples for genetic stock identification, data on resident species, and information from recovery of tagged fish from various projects. Various government agencies, non-government organizations, and private contractors operate projects throughout the drainage (Appendices A7 and A8).

Summaries 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, much of the information from the 2014 season was preliminary at the time of writing. Other published, peer reviewed sources 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. 2012 (http://www.adfg.alaska.gov/sf/publications/). All Alaska subsistence and personal use harvest data are considered preliminary until the relevant ADF&G Fisheries Data Series reports (e.g. Jallen et al. 2012 (http://www.adfg.alaska.gov/sf/publications/) are published.

This report is focused on Chinook and fall chum salmon stocks that occur on both sides of the international border. However, 2 genetically distinct runs of chum salmon enter the Yukon River, an early summer component and a later fall component. Summer chum salmon are characterized by earlier run timing (early June to mid-July at the river mouth), rapid maturation in freshwater and smaller body size (average 6–7 pounds). Summer chum salmon spawn primarily in run-off streams in the lower 700 miles of the Yukon River drainage and in the Tanana River drainage. Fall chum salmon are distinguished by later run timing (mid-July to early September at the mouth), robust body shape, and larger body size (average 7–8 pounds). Fall chum salmon primarily spawn in the upper portion of the drainage in streams that are spring fed or geologically have major upwelling features. Major fall chum salmon spawning areas include the Tanana, Porcupine, and Chandalar river drainages, as well as various streams in the Yukon Territory, Canada, including the mainstem Yukon River. Like summer chum salmon, few coho salmon *O. kisutch* are bound for the upper reaches of the Yukon River in Canada, with the exception of a Porcupine River population. Most Yukon River coho salmon spawn in the lower 700 miles of the drainage, including the Tanana River drainage.

3.0 ALASKA MANAGEMENT OVERVIEW

3.1 CHINOOK AND SUMMER CHUM SALMON

The Yukon River drainage is divided into fishery districts and subdistricts for management purposes (Figure 1). Preseason, a management strategy is developed in cooperation with federal managers, fishermen, tribal council representatives, and other stakeholders that outlines run and harvest outlooks along with the regulatory subsistence salmon fishing schedule. Before implementing the regulatory schedule, subsistence fishing is allowed 7 days a week to provide opportunity to harvest non-salmon species such as whitefish *Coregonus* spp., sheefish *Stenodus leucichthys*, northern pike *Esox lucius*, and longnose suckers *Catostomus catostomus*. As the season progresses, ADF&G uses an adaptive management strategy that evaluates run strength to determine if a harvestable surplus exists above escapement requirements and subsistence uses.

2014 Chinook Salmon Outlook

Given the low productivity seen in Chinook salmon returns since 2007, the 2014 Chinook salmon run had potential to be the worst on record. The 2014 preseason estimate was based on the outputs of a Ricker spawner-recruit model and a sibling model. Past model performance was analyzed by comparing the model predictions to observed runs of Chinook salmon. A correction factor based on previous model performance was applied to the 2014 model output to incorporate the difference between model predictions and observed run size from previous years. The total Yukon River Chinook salmon run size in 2014 was projected to be 64,000–121,000 fish and would likely be near the lower end of this range. A Chinook salmon run of this size would not

provide any surplus for subsistence use. Additionally, achieving escapement objectives was expected to be extremely challenging and severe conservation measures were likely.

Preseason Management Strategy Planning

Before the 2014 season, the Yukon River Drainage Fisheries Association (YRDFA) facilitated a meeting with U.S. management agencies, ADF&G, and USFWS to develop a preseason management strategy with input from fishermen, tribal council representatives, and other stakeholders. The 2014 management plan was developed with the expectation that the total Chinook salmon run size could be near the low end of the preseason projection range. Specific conservation strategies were identified which addressed multiple goals including: providing adequate numbers of Chinook salmon to their spawning grounds in Alaska and Canada, minimizing the harvest of Chinook salmon, and providing opportunity to harvest abundant summer chum salmon or nonsalmon species.

Before Chinook salmon entered the river, subsistence fishing on non-salmon species would be provided with 6-inch or smaller mesh size gillnets. Closures would be initiated when the first Chinook salmon entered the river. Subsistence closures would continue in upriver districts, including the Koyukuk, Innoko, and Tanana rivers, as Chinook salmon migrated upriver. Subsistence restrictions would be relaxed after Chinook salmon passed through each district. When summer chum salmon become abundant, subsistence fishing would be opened using selective fishing gear (e.g., dip nets, beach seines, and manned fish wheels) to allow for the quick, live release of incidentally caught Chinook salmon. Throughout salmon subsistence closures, subsistence fishing with 4-inch or smaller mesh size gillnets would allow users to harvest non-salmon species. Managers advised users that the opportunity to use 4-inch gillnets would be discontinued if this gear type was being used to target Chinook salmon. Additionally, managers strongly encouraged fishermen to avoid fishing in areas where Chinook salmon were likely to be encountered. An informational flyer detailing these planned conservation strategies was mailed to Yukon River commercial permit holders and approximately 2,900 families identified from ADF&G's survey and permit databases. State and federal staff also presented the management strategy to YRDFA, Tanana Chiefs Conference (TCC), State of Alaska Advisory Committees, Federal Regional Advisory Councils, and other interested parties.

In response to the poor runs observed in 2012 and 2013, extensive measures would be taken to alter the regulatory subsistence fishing schedule (Table 1) by implementing closures to conserve Chinook salmon. Based on the expectation that the 2014 Chinook salmon run could potentially be weaker than the run observed in 2013, it was anticipated that the subsistence fishing schedule would be restricted further than previous years in an effort to meet escapement objectives. The objectives of the subsistence schedule were to 1) protect the first and second pulse of Chinook salmon (those containing the highest proportion of Canadian-origin stocks), 2) reduce harvest early in the summer chum salmon run when there is a higher level of uncertainty, 3) spread the harvest throughout the summer chum salmon run to reduce impacts on any particular component of the run, and 4) distribute subsistence fishing opportunity among all users. It was unlikely that districts and subdistricts would be on their subsistence schedule until the Chinook salmon run was almost entirely over.

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

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

Note: This schedule was subject to change depending on run strength.

A commercially harvestable surplus of summer chum salmon was anticipated above escapement and subsistence needs. However, the extent of a directed summer chum salmon commercial fishery would be dependent upon the strength of the Chinook salmon run. The sale of incidentally caught Chinook salmon would be prohibited for the entire season. Selective fishing gear, including dip nets and beach seines, would likely be employed during commercial summer chum salmon fishing to reduce the incidental harvest of Chinook salmon. Later in the season, gillnets with a 6-inch maximum mesh size were expected to be utilized when the rate of incidental harvest of Chinook salmon was anticipated to be low.

Inseason Run Assessment

The U.S. management agencies (ADF&G; USFWS) monitor a suite of assessment projects that provide critical data on salmon run timing, relative abundance, and stock composition. 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 to operate an orderly fishery throughout the drainage. Three projects in the lower river provided inseason abundance and timing information. First, the LYTF is a set gillnet project using 8.5 inch mesh primarily designed to assess Chinook salmon run timing operated in the Middle and South Mouths of the Yukon River. Second, a summer chum salmon directed drift gillnet test fishery using 5.5 inch mesh is operated in the Middle and South Mouths of the Yukon River. Third, a mainstem Yukon River sonar project at Pilot Station provides abundance estimates for Chinook and summer chum salmon. As in recent years, additional drift test fishing was conducted throughout the 2014 season in the South Mouth at the Big Eddy site with 8.25 inch mesh drift gillnets for Chinook salmon to provide supplemental run timing and relative abundance information. Given the anticipated low run size, efforts were made by ADF&G this year to reduce Chinook salmon mortality in test fisheries. This included releasing Chinook salmon from drift test gillnets when their condition was deemed acceptable. Due to their lower mortality rates, drift gillnets replaced set gillnets in the test fishery in the South Mouth for Chinook salmon early in the season.

Ice break up in the lower river occurred May 9, which was considerably earlier than the average break up date of May 23, based on the years 1980–2013. During this early portion of the Chinook salmon run, ADF&G monitored subsistence harvest reports from fishermen closely and relied on this information to guide initial management actions.

The LYTF was operational at the South Mouth site on May 27 and at the Middle Mouth site on June 7. The first Chinook salmon was caught in the test fishery on May 27. In an effort to reduce Chinook salmon mortality in the LYTF, the set gillnet sites located in the Big Eddy area of the South Mouth were discontinued after June 6. Additionally, only one set gillnet site was operated in Middle Mouth in a further effort to reduce Chinook salmon mortality. The LYTF was concluded on July 7 with a cumulative CPUE of 36.55, which was well above the historical average CPUE of 26.08. The first quarter point, midpoint, and third quarter point were June 14, June 21, and June 25, respectively (Figure 2). The 8.25-inch drift gillnet project for Chinook salmon operated in Big Eddy until July 15 and provided valuable supplemental assessment information for Chinook salmon entering the South Mouth of the Yukon River. In accordance with the goal of reducing Chinook salmon mortality, 622 (45%) Chinook salmon were released from the LYTF and the remainder was given to local households for subsistence use.

The preliminary cumulative passage estimate at the mainstem Yukon River sonar project at Pilot Station[4] was approximately 138,000 ± 17,000 (90% CI) Chinook salmon, which was below the historical average of 143,000[5], and below the average of 195,800 fish for years with early run timing[6]. Inseason analysis was focused on making comparisons to other early years in order to make informed management decisions. The first quarter point, midpoint, and third quarter point were on June 13, June 19, and June 24, respectively. Chinook salmon entered the river in 4 groups. The first group of Chinook salmon (June 8–10) was estimated to be approximately 22,500 fish, the second group (June 15–20) was approximately 44,400 fish, the third group (June 22–24) was about 21,500 fish, and the fourth group (June 26–27) was 8,700 fish.

Inseason genetic mixed stock analysis (MSA) on the first pulse of Chinook salmon at the mainstem Yukon River sonar project at Pilot Station (June 1–11) indicated that 50% were Canadian-origin Chinook salmon. Genetic MSA on the second pulse of Chinook salmon at the sonar (June 12–20) indicated that 52% were Canadian-origin Chinook salmon. Samples analyzed from June 21–27 indicated that 24% were from Canadian-origin Chinook salmon[7].

Chinook Salmon Inseason Management

Weekly teleconferences were facilitated by YRDFA to provide managers, fishermen, tribal 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.

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[4] For more background information on ADF&G operated sonar projects including the Pilot Station site on the Yukon River, please refer to the ADF&G's sonar webpage, http://www.adfg.alaska.gov/index.cfm?adfg=sonar.site&site=12.

[5] Average includes years 1995, 1997, 2000, 2002–2008, and 2010–2013. The sonar did not operate in 1996 and project difficulties occurred in 2000, 2001, and 2009.

[6] Years with early run timing used for comparison include 1995, 1997, 2003, and 2004.

[7] For more background information on genetic MSA for Yukon River Chinook salmon and related topics and updates, please refer to ADF&G's Gene Conservation Laboratory webpage, http://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.yukonchinook_baseline

Before Chinook salmon entered the river, subsistence fishing in the Coastal District and Districts 1–2 were open 7 days a week with 6-inch or smaller mesh size gillnets as outlined in the preseason management plan. Districts 3–5 were open for subsistence fishing 24 hours a day 7 days per week with 7.5-inch or smaller mesh gillnets and District 6 and Old Minto Area were on their regulation subsistence schedules (Table 1). The first Chinook salmon was harvested on May 19; the earliest reported Chinook salmon subsistence harvest in a decade. Subsistence fishing was closed in the northern portion of the Coastal District and in Districts 1–3 beginning May 26. The northern portion of the Coastal District remained closed until July 8. The lower portion of Subdistrict 4-A was closed on May 31 followed by the upper portion on June 2. Closures were implemented in upriver districts as Chinook salmon migrated upstream and were expected to be in place for nearly the entire duration of the run. Three major pulses of Chinook salmon passed the mainstem Yukon River sonar project at Pilot Station on June 8, June 15, and June 22, respectively.

As the Chinook salmon run progressed, inseason assessment projects indicated that the Chinook salmon run was better than anticipated; however, it was still a below average run. Fishing opportunity was provided between pulses with selective fishing gear to allow the harvest of abundant summer chum salmon for both subsistence and commercial purposes. During these fishing periods, beach seines and dip nets were utilized in the lower river with the requirement that Chinook salmon be released alive. Once the first pulse of Chinook salmon migrated out of District 4, subsistence and commercial opportunity for summer chum salmon was provided using dip nets and fish wheels with the requirement that Chinook salmon be released alive. District 5 experienced the most restrictive management measures because very few summer chum salmon migrate through this district and any subsistence opportunity would likely target Chinook salmon. Additionally, the closures in Subdistrict 5-D were necessary to ensure Chinook salmon passage into Canada in order to meet the Canadian interim management escapement goal (IMEG) for Canadian-origin Chinook salmon.

Conservative management actions were also taken in Yukon River tributaries in an effort to provide protection for Alaska Chinook salmon stocks. Gillnets were restricted to 6-inch or smaller mesh size in the Innoko River from June 19 to July 28 and in the Koyukuk River from June 18 to July 2.

Subsistence salmon fishing was closed to protect the first pulse of Chinook salmon from June 29 to July 6 in Subdistricts 6-A and 6-B and in the Old Minto Area. In Subdistrict 6-C, personal use salmon fishing was closed from June 25 to July 28, nearly spanning the entire duration of the Chinook salmon run.

As outlined in the preseason management plan, the opportunity to harvest non-salmon species using 4-inch or smaller mesh size gillnets was an option to provide 24 hours a day 7 days a week during subsistence salmon closures as long as not abused.

2014 Summer Chum Salmon Outlook

The strength of the summer chum salmon run in 2014 was dependent on production from the 2010 (age-4 fish)[8] and 2009 (age-5 fish) escapements as these age classes dominate the run. The 2014 preseason run outlook was for a run size of approximately 1.3 million to 1.5 million summer chum salmon. A summer chum salmon run of this size was anticipated to provide for escapements,

[8] Ages of salmon in this report are presented as total age, from egg-in-gravel to return as spawner, rather than the commonly used decimal (European) notation indicating freshwater and saltwater years.

a normal subsistence harvest, and a potential commercial harvest of 300,000 to 500,000 summer chum salmon. Similar to previous years, the actual commercial harvest of summer chum salmon would likely be affected by a poor Chinook salmon run, in that incidental harvest of Chinook salmon in chum salmon-directed fisheries would need to be minimized.

Summer Chum Salmon Inseason Run Assessment and Management

The Yukon River summer chum salmon run was managed according to the guidelines described in the *Yukon River Summer Chum Salmon Management Plan* (Appendix A1). The management plan provides for escapement needs and subsistence use priority before other consumptive uses such as commercial, sport, and personal use fishing. The plan allows for varying levels of harvest opportunity depending on the run size projection. ADF&G uses the best available data to assess the run including preseason run outlooks; sonar passage estimate near Pilot Station; test fishing indices; age, sex, and length (ASL) composition; subsistence and commercial harvest reports; and information from escapement monitoring projects.

Approximately 1.9 million ± 100,000 (90% CI) summer chum salmon passed the mainstem Yukon River sonar project at Pilot Station, which was exactly the same as the historical median for the project. The first quarter, midpoint, and third quarter points were June 18, June 23, and June 30, respectively, which were earlier than historical average quarter points (June 23, June 29, and July 4, respectively for years 1995–2013 not including 1996, 2001, and 2009). Four large pulses of summer chum salmon were detected with the largest group, approximately 555,000 fish, passing the sonar project from June 17 to June 20. Liberal commercial fishing opportunity was provided to target the available surplus of summer chum salmon in Districts 1 and 2, Subdistrict 4-A, and District 6. However, a suite of strategies were used to conservatively manage these fisheries to minimize incidental harvest of Chinook salmon.

Utilizing new regulations adopted by the Alaska Board of Fisheries (BOF) in 2013, ADF&G allowed for the commercial harvest of summer chum salmon using dip nets and beach seines beginning June 9 in Districts 1 and 2. The intent was to provide summer chum salmon commercial fishing opportunity once the first pulse of Chinook salmon moved out of the 2 districts. The impact to Chinook salmon was expected to be minimal as fishermen were required to immediately release incidentally caught Chinook salmon back to the water alive. Additionally, subsistence and commercial fishing occurred simultaneously in order to streamline commercial and subsistence fishing into a single event, thereby reducing the amount of time Chinook salmon were susceptible to harvest. Although commercial and subsistence fishing occurred concurrently during the week, Saturdays were reserved for subsistence fishing only to give users enough time to harvest for subsistence needs. The department allowed twenty-one 12-hour periods in District 1 and twenty-three 10-hour periods in District 2 using dip nets and beach seines only. Unfortunately, due to the difficulty of operating beach seine gear in high water conditions present during the summer season, very few fishermen chose to operate this gear. Consequently, the limited interest in using beach seines quickly waned.

In 2014, the use of gillnet gear was delayed until all pulses of Chinook salmon had migrated out of Districts 1 and 2. The first commercial gillnet period in District 1 took place on July 3 with gillnets restricted to 6-inch or smaller mesh size. The first commercial gillnet opening was 4 hours long followed by three 9-hour periods and two 12-hour periods. The first commercial gillnet opening in District 2 occurred on July 6. In total, District 2 had three 6-hour openings and three 9-hour openings. The incidental Chinook salmon harvest rates were anticipated to be low

because Chinook salmon catch in the test fisheries operated by ADF&G in the area were relatively low.

The sale of incidentally caught Chinook salmon was prohibited by emergency order during the entire commercial fishing season to dissuade fishermen from targeting Chinook salmon during commercial fishing periods. Fishermen were required to release Chinook salmon caught in dip nets and beach seine gear, but once the use of 6-inch gillnets was allowed, fishermen could release any incidentally caught Chinook salmon alive or use them for subsistence purposes. Fishermen were required to report any Chinook salmon caught but not sold on their fish tickets.

Regulations adopted by the BOF in March 2012 allowed ADF&G to open summer chum salmon commercial fishing periods with fish wheels only (gillnets were prohibited) in Subdistrict 4-A during times of Chinook salmon conservation. Commercial fishing in Subdistrict 4-A began June 23 with the requirements that fish wheels be attended at all times and all Chinook salmon caught in fish wheels be immediately released to the water alive. After the vast majority of the Chinook salmon run passed through the area, managers discontinued the requirements that commercial fish wheels be manned during operation and that all Chinook salmon caught in fish wheels be immediately released to the water alive. Additionally, fishermen were allowed to use 6-inch or smaller mesh size gillnets to target summer chum salmon. A total of thirty-five 24-hour periods were implemented, twenty-eight restricted to fish wheels only and 7 with the option to use 6-inch or smaller mesh size gillnets, resulting in a total of 840 fishing hours in Subdistrict 4-A.

District 6 was managed using inseason assessment information provided by multiple projects that operated in the Tanana River drainage. A harvestable surplus of summer chum salmon was expected based on sonar abundance estimates and genetic information. Based on this surplus and favorable market interest, the department scheduled the first commercial fishing period to target summer chum salmon in District 6 on July 11. As in Subdistrict 4-A, commercial fishing gear was initially restricted to manned fish wheels and all Chinook salmon had to be immediately released alive. These gear restrictions were relaxed on August 1 after the Chinook salmon run in the Tanana River was nearly over. ADF&G scheduled 8 commercial fishing periods. The prohibition of Chinook salmon sales continued through the fall season in all Districts.

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 500,000 fish (Appendix A5) and commercial fishing is generally allowed only on the surplus above that level. The fall chum salmon plan incorporates U.S./Canada treaty objectives for border passage 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 to 600,000 fall chum salmon. 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 exists 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 is based on the assessment and timing of salmon stocks bound for the Tanana River drainage.

Fall Chum Salmon Management Overview

The Yukon Area fall season began by regulation on July 16 in District 1. The prohibition of Chinook salmon sales continued through the fall season. Initial management was based on the preseason run projection of greater than 850,000 fall chum salmon. All districts and subdistricts were placed on their full regulatory subsistence fishing schedules commensurate with switching over to fall management. By August 12, the subsistence fishing schedules in all mainstem districts were liberated to 7 days per week, 24 hours per day.

Initially, Districts 1 and 2 were placed on a twice weekly commercial fishing schedule. Based on the passage estimates at the mainstem Yukon River sonar project near Pilot Station, from mid-July through the end of July, fall chum salmon entered Yukon River in below average to average numbers (Figure 3). Unseasonably hot, dry, and calm weather in conjunction with above average water temperature at the mouth likely contributed to the low numbers of fall chum salmon that entered Yukon River between August 3 and August 13. During this period, near the historical midpoint of the run, the number of fall chum salmon passage at the mainstem sonar fell well below the historical median. No commercial fishing periods were announced in either Districts 1 or 2 between August 3 and August 15.

Another pulse of fall chum entered Yukon River on August 13 and was approximately 92,000 fish in size. Fall chum salmon passage at the mainstem sonar remained below the historical median, however, the inseason run size projection improved to 600,000 to 723,000 fish, and commercial fishing in Districts 1 and 2 resumed.

The largest fall chum salmon pulse was approximately 252,000 fish in size and entered Yukon River from August 18 through August 19. After the pulse passed the mainstem sonar, fall chum salmon passage was above the historical median and the run projection remained at 850,000 to 950,000 fish for the remainder of the fall chum salmon season. Commercial openings were announced in Subdistricts 5-B and 5-C from mid-August through the end of September, and commercial fishing occurred in District 6 from late August through the end of September.

An estimated total of 651,800 ± 63,600 (90% CI) fall chum salmon were counted at the mainstem Yukon River sonar project near Pilot Station from July 19 through September 7. The first quarter point, midpoint, and third quarter point were on August 4, 17, and 21. Because of the magnitude and entry timing of the largest pulse, the fall chum salmon run in 2014 was late when compared to median quarter point dates of July 31, August 9, and August 17.

Coho Salmon Management Overview

Coho salmon daily and cumulative passages past the mainstem Yukon River sonar near Pilot Station were mostly above average the entire season (Figure 4). 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 through September 5. The total estimated passage of coho salmon past the mainstem sonar of 247,000 fish ± 27,300 (90%

CI) was the second highest on record. The mainstem sonar stopped operating for the season after September 7. Based on daily catches at the fall Lower Yukon River drift gillnet test fishery, which operated until September 20, no additional pulses of salmon were observed.

4.0 ALASKA HARVEST SUMMARIES

4.1 SUBSISTENCE SALMON FISHERY

Subsistence salmon fishing activities in the Yukon Area typically begin in late May and continue through early October. Fishing opportunity in the lower river area in May and in the upper river 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, fall chum and coho salmon harvested in the lower river area are primarily utilized for human consumption and are also dried, smoked, or frozen for later use. In the upper river area summer chum, fall chum, and coho salmon are all an important human food source, but a larger portion of the harvest is fed to dogs used for recreation and transportation (Andersen 1992).

Conservative management strategies were enacted throughout the Yukon River drainage to protect Chinook salmon in 2014 which affected the subsistence fishing opportunities for summer chum salmon as well. Management actions included cancelling subsistence fishing openings or restricting gear types and not allowing retention of Chinook salmon occurred throughout the Coastal District, Districts 1–5, and most of the Tanana River. To improve management precision in larger districts such as the Coastal District, District 4, and Subdistrict 5-D (Figure 5), closures were implemented in portions of these districts when Chinook salmon were present. Additional actions included restricting gillnet mesh size to 6 inch or smaller, and allowing the use of selective gear types (dip nets, beach seines, fish wheels) in portions of the drainage with the requirement that Chinook salmon be released alive. Gear restrictions were enacted in order to allow for subsistence harvest of summer chum salmon while minimizing incidental Chinook salmon harvests. Some areas that do not normally see restrictions were closed or restricted to 6 inch or smaller mesh (Coastal District, Innoko River, Koyukuk River).

Apart from the poor Chinook salmon run, summer chum, fall chum and coho salmon runs were strong enough to support escapement, subsistence, and commercial fishing. Throughout the summer and fall fishing seasons, additional subsistence fishing opportunities for non-salmon fish species were available during subsistence salmon period closures. Stipulations for harvesting non-salmon species during these closures required the use of gillnets with 4 inch or less stretch mesh and prohibition of fish wheel operation. However, fishing for all species was closed nearly 8 days in Subdistricts 5-A, 5-B, and 5-C when gillnets with 4 inch or less stretch mesh were being used to target Chinook salmon.

The preliminary percentage of households meeting over 50% of their needs for each species in 2014 was less than the recent 5-year average (2009–2013) for each species. Of the households that answered survey questions in 2014 about whether their subsistence needs were met, only 45% households reported meeting over 50% of their needs for summer chum salmon. Household responses of over 50% of needs met for fall chum (33% of households) and coho salmon (31% of households) were even lower. Only 7% of households that responded to the needs met question reported meeting over 50% of their needs for Chinook salmon, which was much lower than the average reported in 2009–2013.

Commonly cited reasons for not meeting needs included: low Chinook salmon abundance or reduced harvest opportunities, fishing periods were closed or too short, households did not fish or were conserving Chinook salmon by not harvesting what they usually get, and that households did not have the right size of gillnet or other fishing equipment. Several fishermen reported they were unable to fish because they did not have newly allowed gear types (dip nets, beach seines); or did not have gear to meet 6 inch mesh restrictions for some districts, in 2014 (to protect all Chinook salmon by targeting chum salmon). Others still did not have gear meeting the 7.5 inch maximum mesh size regulation that took effect in 2011 for the protection of large female Chinook salmon. Closures during the summer season also impacted households' ability to harvest summer chum salmon. Households that were unable to meet their needs for fall chum and coho salmon said that they did not fish for them, had equipment difficulties, or were impacted by river and weather conditions. Surveyed households mentioned other factors that contributed to the inability to meet subsistence salmon needs including fuel expenses, health issues, or other personal reasons.

Documentation of the subsistence salmon harvest is necessary to determine if sufficient salmon are returning to the Yukon Area for subsistence requirements and if enough fishing opportunities are 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 for future salmon production. The primary method of estimating this harvest is voluntary participation in the annual subsistence salmon harvest survey program conducted by ADF&G in 33 communities in the fall, after most households have completed fishing for salmon (Jallen and Hamazaki 2012). Survey data are expanded to estimate total subsistence harvest in surveyed communities. Additional information on harvest timing is obtained from harvest calendars that are sent to households and filled out voluntarily (Jallen and Hamazaki 2012).

In portions of the upper Yukon River and Tanana River drainages that are road accessible, fishermen are required to obtain a household subsistence fishing permit. Harvest reported from subsistence permits are added to the survey estimates to obtain the total number of salmon harvested in the drainage. Subsistence totals also include salmon that are harvested from test fishery projects and distributed to residents of communities near the projects.

The following summary presents preliminary results as of the publication date of this report. Final results will be included in an ADF&G Fishery Data Series publication after more thorough review. In 2014, just over 1,320 households were selected to be surveyed. Of these, 1,140 households from 31 communities fished for salmon (not including the Coastal District communities of Hooper Bay and Scammon Bay). Subsistence fishing permits were issued to 330 households in portions of the Yukon River drainage where permits are required and approximately 92% of the subsistence permits had been returned, and 140 households reported fishing for salmon and other non-salmon fish species. Based on survey and permit data, the preliminary 2014 subsistence salmon harvest estimates in the Alaska portion of the Yukon River drainage totaled approximately 2,720 Chinook, 74,240 summer chum, 84,230 fall chum, and 17,350 coho salmon (Appendices B2–B5). For comparison, recent 5-year average (2009–2013) subsistence salmon harvest estimates are 31,130 Chinook, 81,430 summer chum, 85,370 fall chum, and 15,320 coho salmon (Appendices B2–B5) from communities in the Alaska portion of the Yukon River drainage. Salmon retained from commercial fisheries or donated to upriver households or tribal councils are not included in subsistence harvest totals.

4.2 COMMERCIAL FISHERY

Summer Season Harvest

During the summer season there were a total of 56 commercial periods in the Lower Yukon Area and 43 commercial periods in the Upper Yukon Area. The total commercial harvest for the summer season in the Alaska portion of the Yukon River drainage was 530,644 summer chum salmon (Appendix A3), the largest commercial harvest since 1989. The commercial harvest of summer chum salmon in the Lower and Upper Yukon Areas were 427,347 and 103,297 fish, respectively (Appendix A3). The total summer chum salmon commercial harvest for the entire Yukon Area was approximately 80% above the 2009–2013 average harvest of 296,697 fish (Appendices B3 and C3).

Approximately 272,800 summer chum salmon were harvested during dip net and beach seine periods in the Lower Yukon Area, with approximately 5,440 Chinook salmon reported as caught and released. Selective gear harvest accounted for more than half of the total commercial summer chum salmon harvest in the Lower Yukon Area. Dip nets were surprisingly successful and accounted for nearly all (95.2%) of the summer chum salmon harvest taken with selective gear types. Approximately 154,000 summer chum salmon were harvested in the Districts 1 and 2 gillnet commercial fishery.

A total of 416 individual permit holders participated in the summer chum salmon fishery, of which 405 permit holders participated in Districts 1 and 2 and 11 permit holders participated in Subdistrict 4-A and District 6 commercial periods (Appendix A4). The preliminary summer chum salmon harvest for Subdistrict 4-A was 96,385 fish, an increase of 50% over the 2009–2013 average harvest of 64,381 fish in that subdistrict (Appendix A3). The preliminary harvest in District 6 was 6,912 summer chum salmon (Appendix A3).

The sale of incidentally caught Chinook salmon was prohibited by emergency order during the entire commercial fishing season. A total of 5,974 Chinook salmon were caught and released alive, and 451 Chinook salmon were caught and retained for subsistence purposes during summer season. Thirty Chinook salmon were caught and retained for subsistence purposes during the fall season.

Summer Season Commercial Harvest Characteristics

Due to subsistence salmon fishing restrictions on Chinook salmon, only limited biological sampling of subsistence harvest occurred and sample sizes were not sufficient for analysis. Summer chum salmon were sampled for ASL from commercial harvests in District 1, Subdistrict 4-A, and District 6. Summer chum salmon age composition from the District 1 commercial harvest was 32% age-4, 63% age-5, 4% age-6 fish and less than 1% age-7 fish, estimated from a sample of 1,095 fish. Females comprised 55% of the harvest. Summer chum salmon age composition from the Subdistrict 4-A commercial fish wheel harvest was less than 1% age-3, 38% age-4, 57% age-5 fish, and 4% age-6 fish, estimated from a sample of 507 fish. Females comprised 90% of the sample. The percentage of females is inflated because only females were purchased during most commercial periods; males were sorted and released alive from fish wheels. Summer chum salmon age composition from the District 6 commercial fish wheel harvest was 0.5% age-3, 53% age-4 fish, 46% age-5 and less than 1% age-6 fish, estimated from a sample of 302 fish. Females comprised 54% of the sample. The mean length of all summer

chum salmon harvested from District 1, Subdistrict 4-A, and District 6 commercial fisheries was 563, 541, and 590 mm, respectively.

Fall Season Harvest

There was a total of 38 commercial periods during the fall season in 2014. The majority of fall season commercial harvest occurred in Districts 1 and 2. A regular schedule of commercial fishing periods was established in Districts 5 and 6, but limited markets resulted in low fishing effort and relatively small harvests. The total commercial harvest for the Yukon River fall season in the Alaska portion of the drainage was 115,593 fall chum and 104,638 coho salmon (Appendix A3). Fall chum salmon commercial harvest was below while coho salmon harvest was above their respective most recent 5-year (2009–2013) and 10-year (2004–2013) averages (Appendices B4 and B5). The fall chum salmon harvest was the tenth largest since 1990 and the coho salmon harvest was the second largest since 1990. The average weight of fall chum salmon caught commercially in Districts 1 and 2 was 7.5 lbs, the average weight of coho salmon was 6.6 lbs. All salmon were sold in the round and no salmon roe was sold separately. A total of 445 individual permit holders participated in the fall chum and coho salmon fishery: 441 in Districts 1 and 2 combined and 4 in Districts 5 and 6 combined (Appendix A4).

Fall Season Commercial Harvest Characteristics

Fall chum salmon age composition from the District 1 commercial harvest was 2% for age-3 and 1% for age-6, and the dominant age classes with 64.0% age-4 and 32.8% age-5, estimated from a sample of 874 fish. Females comprised 58.6% of the commercial sample of fall chum salmon. The mean length of fall chum salmon in the commercial fishery was 572 mm. The proportion of fall chum salmon by age for the dominant age classes in the commercial harvest are higher for age-4 and lower for age-5 than those observed in 2014 LYTF (weighted by CPUE) of 52.5% and 44.2%, respectively. Proportions of females in the 2014 LYTF were higher at 60.3% (sample of 997 fish). Mean length of fall chum salmon in LYTF was 591 mm below the 1981–2013 average of 596 mm. Overall proportions of LYTF age-4 were slightly lower than the 1986–2013 average of 66.2% and the age-5 were correspondingly higher than average of 31.3% (Bonnie Borba, Yukon Area Commercial Fisheries Biologist, ADF&G, Fairbanks; personal communication).

Coho salmon age composition from the commercial harvest in District 1 (n=350) was 11.7% age-3, 80.9% age-4 and 7.4% age-5, estimated from a sample of 350 fish. Females comprised 51.0% of the commercial sample of coho salmon. The mean length of coho salmon in the commercial fishery was 552 mm. The 2014 LYTF coho salmon age composition, weighted by CPUE, was 8.4% age-3, 82.0% age-4 and 9.6% age-5, estimated from a sample of 426 fish. Females comprised 52.8% of the 470 fish sampled, whereas the 1987–2013 average was 43.7% in the LYTF. Mean length of coho salmon in the LYTF was 559 mm well below the 1981–2013 average of 579 mm. Overall the proportions of coho salmon by age in the commercial harvest are higher for both age-4 and age-5 but lower for age-3 compared to LYTF 1987–2013 averages by age of 76.6%, 4.9% and 15.4% respectively. Differences between the commercial fishery and the LYTF are likely due to differences in gear types, mesh size and fishing locations in the fall chum and coho salmon commercial fishery, whereas the LYTF uses 6 inch mesh drift gillnets consistently at specific fishing sites.

4.3 SPORT FISHERY

Sport fishing effort for anadromous salmon in the Yukon River drainage is directed primarily at Chinook and coho salmon, with little effort directed at chum salmon. In this report, all of the chum salmon harvested in the sport fishery are categorized as summer chum salmon. Although a portion of the chum salmon taken by sport anglers may be from the genetically distinct fall stock, most of the sport chum salmon harvest is thought to be made up of summer chum salmon because the run is much more abundant in tributaries where most sport fishing occurs and the chum salmon harvest is typically incidental to efforts directed at Chinook salmon, which overlap in run timing with summer chum salmon.

Most of the drainage's sport fishing effort occurs in the Tanana River drainage along the road system. From 2009 to 2013, harvests in the Tanana River represented, on average, 71%, 8% and 36% of the total Yukon River drainage Chinook, summer chum, and coho salmon sport fish harvest.[9] In the Tanana River, most Chinook and chum salmon are harvested from the Chena, Salcha, and Chatanika rivers, while 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.

In 2014, an emergency order was issued on May 5 closing all waters of the U.S. portion of the Yukon River drainage, excluding the Tanana River drainage, to sport fishing for Chinook salmon for the 2014 season, effective May 12. On the following day, May 6, an emergency order was issued closing all waters of the Tanana River drainage to sport fishing for Chinook salmon, effective also May 12.

Alaska sport fishing effort and harvests are monitored annually through a statewide sport fishery postal survey. Harvest estimates are typically not available until approximately one calendar year after the fishing season; therefore, the 2014 harvest estimates are not available for this report. The total 2013 sport harvest of salmon in the Alaska portion of the Yukon River drainage (including the Tanana River) was estimated at 166 Chinook, 1,423 summer chum, and 266 coho salmon (Appendices B2, B3, and B5). The recent 5-year (2009–2013) average Yukon River drainage sport salmon harvest was estimated at 464 Chinook, 669 summer chum, and 554 coho salmon (Appendices B2, B3, and B5).

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 2009 to 2013, guided sport harvests in the Yukon River drainage (excluding the Tanana River drainage) averaged 87 Chinook and 183 coho salmon (Sigurdsson and Powers 2013).

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

[9] Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited March 16, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/

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 has a harvest limit of 750 Chinook, 5,000 summer chum, and 5,200 fall chum and coho salmon combined.

In 2014, the personal use salmon fishery followed the regulatory fishing time of two 42-hour periods per week with one exception. The fishery was closed from 12:00 p.m. Wednesday, June 25 until 6:00 p.m. Monday, July 28 to conserve Chinook salmon. A total of 50 personal use salmon and 20 personal use whitefish and sucker household permits were issued. The 2014 preliminary harvest results based on 99% of the personal use household permits returned in Subdistrict 6-C included 1 Chinook, 226 summer chum, 287 fall chum, and 175 coho salmon. The recent 5-year (2009–2013) average personal use harvest was 98 Chinook, 305 summer chum, 885 fall chum, and 315 coho salmon (Appendices B2–B5) in the Yukon River drainage.

5.0 CANADIAN MANAGEMENT OVERVIEW

5.1 CHINOOK SALMON

The total run of Upper Yukon River[10] Chinook salmon in 2014 was expected to be poor to below average, with a preseason outlook range of 32,000 to 61,000 Chinook salmon. As the poorest on record, this outlook included an adjustment to reflect a recent trend where actual runs were lower than the preseason outlooks.

Upper Yukon Chinook Salmon Inseason Decision Matrix

Canadian fishing opportunities in 2014 were dependent upon inseason assessments of run strength. As in previous years, a Chinook salmon decision matrix was developed preseason and was included as part of the Integrated Fisheries Management Plan (IFMP on file with DFO). The decision matrix in the plan provided detailed guidance for the management of fisheries linked to specific inseason run abundance levels. The 2014 decision matrix summarized the management reference points, general allocation plans, and anticipated management responses under different run size scenarios (Table 2).

The following decision thresholds were used to guide management actions to achieve an escapement goal range of 42,500–55,000:

i. Green Zone: The commercial and domestic fisheries would not open unless it was expected that the border escapement would be greater than 51,000 Chinook salmon based on the mainstem sonar program near Eagle, Alaska. The recreational fishery default regulation is that it is open until closed; therefore, the recreational fishery would be closed at a run size of 51,000 or fewer. A border escapement larger than 51,000 fish would be sufficient to allow for an unrestricted First Nation fishery.

[11] This is based on a sonar estimate of 63,482 fish, Eagle subsistence catch of 51, and Canadian Upper Yukon catch of 100 fish which included: 100 fish in aboriginal, 0 fish in commercial, 0 fish in domestic and 0 fish in the recreational catches.

ii. Yellow Zone: Consideration would be given to restricting First Nation fisheries if the run size to the border was in the 30,000 to 51,000 range. It is important to note that opportunities for a limited harvest in this range would be subject to international harvest sharing provisions.

iii. Red Zone: Closures in First Nation fisheries would be expected if the run projection was 30,000 or fewer fish.

Prior to the season, meetings were held between the Yukon Salmon Sub-Committee (YSSC), DFO, Yukon First Nation Governments, Renewable Resource Councils (RRCs) and general public to discuss the 2014 forecast and possible management scenarios. Based on the preseason outlook, it was uncertain that the lower end of the escapement goal (42,500 Canadian Chinook salmon) would be achieved. The poor preseason forecast, coupled with the failure to achieve minimum escapement targets in 5 of the past 7 years resulted in considerable concern over the long-term health of Canadian-origin Yukon River Chinook salmon stocks. 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 varied to 0. In addition, the TAC for First Nations was removed for conservation purposes until run strength of Canadian-origin Chinook salmon could be determined with reasonable confidence through inseason stock assessment programs, particularly the mainstem sonar program near Eagle.

Table 2.–Inseason fishery management decision matrix for Upper Yukon Chinook salmon, 2014.

	Border Escapement Projections	Fishery	Guideline Harvest	Anticipated Management Action
RED ZONE	0–30,000	FN	0	Closures considered.
		CF	0	Closed.
		RF	0	Closed, i.e. Chinook salmon quota varied to zero.
		DF	0	Closed.
YELLOW ZONE	30,000–51,000	FN	0 to 8,000	Catch target to vary with abundance within zone: 0 at run size of 30,000; 8,000 catch at run of 51,000. Catch is subject to International harvest sharing provisions.
		CF	0	Closed.
		RF	0	Closed, i.e. Chinook salmon quota varied to zero.
		DF	0	Closed.
GREEN ZONE	>51,000	FN	8,000+	Unrestricted.
		CF	Variable	Catch target to vary with abundance and be consistent with International agreement on harvest shares.
		RF	100–700	Expected harvest range based on recent harvests. Opportunities subject to abundance and International agreement on harvest shares.
		DF	100–300	

Note: Legend: FN = First Nation fishery; CF = commercial fishery; RF = recreational fishery; DF = domestic fishery.

Upper Yukon Chinook Salmon Decisions and Management

Early in the 2014 season, information from the ADF&G Lower Yukon test fish project near Emmonak and the mainstem sonar project near Pilot Station in the Lower Yukon Area, suggested that the Canadian-origin Chinook salmon run to the Upper Yukon River would likely be the low end of the preseason outlook range of 32,000 to 61,000 Chinook salmon. The TAC remained at 0 and no harvest was permitted in all fisheries, including the First Nation fishery. DFO and YSSC held regular teleconferences with First Nation managers to update them on run projection scenarios.

As the season progressed, border passage, as determined by the mainstem sonar project near Eagle, provided greater certainty that the minimum border escapement goal of 42,500 would be achieved. There was concern, however, over the quality of escapement with the lower than average proportion of females and a higher number of 5-year-old Chinook salmon. This, coupled with unprecedented and continued closures in U.S. fisheries along the Alaska portion of the Yukon River, resulted in the YSSC continuing its recommendation for a 0 TAC for Canadian-origin Chinook salmon. This recommendation was supported by the majority of Yukon First Nations.

While border passage projections in the latter part of the run 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 the majority of Yukon First Nations chose not to fish. Several communities purchased sockeye *O. nerka* and coho salmon from the Taku River and Skeena River commercial fisheries. A very limited harvest was undertaken in 2 communities, largely for ceremonial/cultural purposes; detailed catch information was not available at the time of writing but the total harvest of Chinook salmon in these areas did not likely exceed 100 pieces in 2014.

Border escapement projections were not sufficient to allow for a commercial harvest; consequently, the Chinook salmon commercial and domestic fisheries remained closed throughout the 2014 season. In the recreational fishery, the daily catch and possession limits in the recreational fishery were reduced to zero, effective June 25. On July 4, continued low border escapement projections and the removal of a TAC in the First Nation fishery triggered the closure of the Yukon River in the vicinity of the Tatchun River to all angling to allow unimpeded passage of Chinook salmon through this popular fishing site. In addition, angling for salmon (i.e. using gear types that target salmon) was prohibited in the Yukon River and tributaries in Canada from July 18 to September 19.

Porcupine River Chinook Salmon Decisions and Management

DFO and the Vuntut Gwitch'in Government (VGG) held regular teleconference calls to provide updated information on run timing and abundance and to address conservation concerns for Chinook salmon within the Porcupine River drainage. VGG reported that a limited fishery using 4 inch mesh to target whitefish resulted in a harvest of 3 Chinook salmon.

5.2 Fall Chum Salmon

The 2014 preseason outlook for the Canadian-origin fall chum salmon run to the upper Yukon River was an average to above average run of 200,000 to 260,000 fish.

Upper Yukon Fall Chum Salmon Inseason Decision Matrix

The decision matrix adopted by DFO for the management of upper Yukon chum salmon provides detailed guidance for specific inseason decisions. The 2014 matrix (Table 2) takes into

account the changeover from the mark–recapture program to the use of the Eagle sonar and the escapement goal range, and therefore differs slightly from the matrices used from 2006 to 2009.

The following decision thresholds were used to guide management actions to achieve an escapement goal range of 70,000—104,000:

i. Green Zone: at run size projections greater than 73,000 fall chum salmon First Nation fisheries would be unrestricted and harvest opportunities within the commercial, domestic, and recreational fisheries would be considered depending on run abundance and international harvest sharing provisions.
ii. Yellow Zone: at run projections within a range of 40,000 to 73,000, commercial, domestic and recreational fisheries would be closed and the First Nation fishery would likely be reduced with restrictions increasingly more severe the closer the run projection was to the lower end of the Yellow Zone.
iii. The Red Zone: at run projections of less than 40,000 fall chum salmon closures in all fisheries could be expected.

Table 3.–Inseason fishery management decision matrix for Upper Yukon fall chum salmon, 2014.

	Border Escapement Projections	Fishery	Guideline Harvest	Anticipated Management Action
RED ZONE	<40,000	FN	0	Closures considered.
		CF	0	Closed.
		RF	0	Closed, i.e. chum salmon quota varied to zero.
		DF	0	Closed.
YELLOW ZONE	40,000–73,000	FN	0 to 3,000	Catch target to vary with abundance within zone.
		CF	0	Closed.
		RF	0	Closed, i.e. chum salmon quota varied to zero.
		DF	0	Closed.
GREEN ZONE	>73,000	FN	3,000+	Unrestricted.
		CF	Variable	Catch target to vary with abundance and be consistent with International agreement on harvest shares.
		RF	0	Fishing opportunity provided, no catch anticipated.
		DF	0	Fishing opportunity provided, no catch anticipated.

Note: Legend: FN = First Nation fishery; CF = commercial fishery; RF = recreational fishery; DF = domestic fishery.

Upper Yukon Fall Chum Salmon Determination of Inseason Run Status

Genetic stock identification data were used in conjunction with the counts from the mainstem sonar project near Pilot Station to develop a preliminary index of the Canadian-origin fall chum salmon run size estimates. These data have been useful in recent years since they provide an early indication of potential run strength to the upper Yukon River as the fish move through the lower section of the Yukon River in Alaska. Other data such as the Rampart Rapids video test

fish wheel project results were used to assess run timing for use in projection models. The mainstem sonar program near Eagle began operations for fall chum salmon in 2006, and projections from the program have been used for inseason management since 2008. Prior to 2008, the Canadian inseason management regime was based primarily on the DFO mark–recapture tagging program.

Upper Yukon Fall Chum Salmon Decisions and Management

Inseason decisions on fishery openings and closures in Canada for fall chum salmon were made in a similar way to those for Chinook salmon. Although there is often much uncertainty associated with the fall chum salmon early inseason forecasts due to the unpredictable size, timing, and destination of the pulses, there was sufficient Lower Yukon Area assessment information available to project that border escapements would be of a magnitude strong enough to support a normal aboriginal harvest and to provide opportunities in the commercial fishery. Inseason forecasts of the Canadian component of the fall chum salmon run were based on estimates from the mainstem Yukon River sonar at Eagle, and informed by run timing information from downstream indicators (mainstem Yukon River sonar at Pilot Station and the fish wheel project at Rampart Rapids) as well as genetic estimates of run composition from the test fishery at the mainstem sonar at Pilot Station.

As per the decision matrix, a border escapement projection of greater than 73,000 fish was required before commercial fishing opportunities were allowed. Since 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 2014 was to ensure that the IMEG (70,000–104,000 fall chum salmon escapement goal range) was achieved. By mid-August, it was evident that the fall chum salmon run was at or above the upper end of the preseason forecast based on projections from the LYTF, the mainstem sonar at Pilot Station, and the Rampart Rapids fish wheel. The commercial and domestic fisheries opened on August 26 for 6 days to provide opportunities for the catch and sale of early run fall chum salmon, which are considered to be marketable as food for human consumption. In this initial opening, fishing was restricted to areas below the confluence of the Yukon River and Coffee Creek in order to protect migrating and spawning Chinook salmon in upstream areas. As further confidence in projections was realized for mainstem border stocks, based on the Eagle sonar estimates, the commercial and domestic fisheries opened in all areas defined in regulation on September 3 and remained open until October 31. The total 2014 commercial and domestic fall chum salmon harvest was 2,485 and 19 fish, respectively (Appendix A6).

Porcupine River Fall Chum Salmon Inseason Decision Matrix

The following decision rules for the First Nation fishery in the Porcupine River were developed (Table 4) based on the Fishing Branch River escapement goal range of 22,000–49,000 adopted by the Panel:

i. Green Zone: The run would be considered to be in the green zone if the inseason Fishing Branch River escapement projections exceeded 22,000 fall chum salmon. No restrictions in the Vuntut Gwitchin First Nation fishery would be required.

ii. Yellow Zone: Escapement projections within a range of 10,000 to 22,000 fall chum salmon would result in restrictions in the Vuntut Gwitchin First Nation fishery, the severity of which would depend upon how close the projections were to the lower end of the range.

iii. Red Zone: Escapement projections of less than 10,000 fall chum salmon would result in a full fishery closure.

DFO and VGG would discuss potential conservation options if inseason information suggested that restrictions were required within the Vuntut Gwitchin First Nation fishery.

Table 4.–Inseason fishery management decision matrix for Fishing Branch River fall chum salmon, 2014.

	Border Escapement Projections	Fishery	Guideline Harvest	Anticipated Management Action
RED ZONE	<10,000	FN	0	Closures considered.
		RF	0	Closed, i.e. chum salmon quota varied to zero.
YELLOW ZONE	10,000–22,000	FN	0 to 3,000	Catch target to vary with abundance within zone. Catch is subject to International harvest sharing provisions.
		RF	0	Closed, i.e. chum salmon quota varied to zero.
GREEN ZONE	>22,000	FN	3,000+	Unrestricted.
		RF	0	Fishing opportunity provided, no catch anticipated.

Note: Legend: FN = First Nation fishery; RF = recreational fishery.

Porcupine River Fall Chum Salmon Determination of Inseason Run Status

Canadian fishery management considered inseason information on the status of the fall chum salmon run from Alaska portions of the river including fishery information, estimates from the sonar project near Pilot Station, and Ramparts Rapids video test fish wheel data. U.S. genetic stock identification data were used in conjunction with the sonar estimates to develop a preliminary index of the potential run size destined for the Canadian portion of the Porcupine River drainage. However, early inseason forecasts are highly uncertain.

The strong run in the basin indicated that run size could be sufficient to meet escapement. The Fishing Branch River component of the lower river genetic MSA comprises such a small part of

the total Yukon River sample that it is typically misrepresented in the mixed stock samples, and more so in years of low returns. Due to the insufficient genetic information managers relied on basin run strength and inseason sonar information. As fall chum salmon approached Old Crow, additional information was provided by the sonar assessment program operated by VGG and DFO. This was the third year of sonar enumeration of Porcupine River chum salmon and inseason data suggested that the run was coming in lower than the preseason outlook. It was recommended that a conservative approach be followed and the resulting harvest was well below recent averages.

Porcupine River Fall Chum Salmon Decisions and Management

The preseason outlook for the Fishing Branch fall chum salmon run in 2014 was an average to above average run of 40,000 to 52,000 fish. The preseason projection indicated that the escapement goal would be achieved. An expanded sonar estimate of fall chum salmon passage at the Porcupine Sonar was 17,756 fish. Of these, 1,931 fish were harvested upstream of the sonar site. Radiotagging results from 2014 indicated that about 46% of fish tagged near the sonar site were later located on the spawning grounds upstream of the historic weir site. However, at the time of writing, consensus has not been reached on a preliminary estimate of Fishing Branch River fall chum salmon escapement. Nevertheless, because the upper Porcupine River sonar estimate fell below the lower end of the escapement goal range of 22,000 to 49,000 fall chum salmon, in the red zone, the escapement goal was clearly not achieved in 2014.

6.0 CANADIAN HARVEST SUMMARIES

6.1 FIRST NATION FISHERY

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

Upper Yukon Chinook Salmon

Based on a preseason outlook for a below average run of 32,000–61,000 Upper Yukon Chinook salmon, the YSSC recommended that the TAC be varied to 0 throughout the 2014 fishing season. Although a TAC was available later in the season, Yukon First Nation Governments continued to follow very conservative management plans that, in most cases, resulted in no harvest for 2014. The Upper Yukon River aboriginal Chinook salmon catch was estimated to be less than 100 fish harvested in 2 central Yukon locations.

Upper Yukon Fall Chum Salmon

The preseason outlook for Canadian-origin fall chum salmon to the upper Yukon River in 2014 indicated an average to above average run of 200,000 to 260,000 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 fishery. As inseason information became available, the First Nation fishery proceeded without restrictions. The preliminary 2014 fall chum salmon harvest reported in the aboriginal fishery from the upper Yukon River was 546 chum salmon (Appendices A6 and B8).

Porcupine River Chinook, Fall Chum, and Coho Salmon

VGG reported a season total harvest of 3 Chinook salmon for 2014 (Appendix B7). The recent 10-year average (2004–2013) was 289 Chinook salmon. A total of 1,983 fall chum salmon was harvested in the Old Crow First Nation fishery (Appendix A6), which was 30% below the recent 10-year average harvest from 2004 to 2013 of 2,814 chum salmon. (Appendix B8). There were 133 coho salmon harvested on the Porcupine River in 2014, compared to the 2004–2013 average of 150 fish (included under "Canada, other salmon" in Appendix B1).

6.2 COMMERCIAL FISHERY

Chinook Salmon Harvest

The lower Canadian commercial fishery area is located downstream of the Stewart River. The most intensive fishing activity and catch monitoring is conducted in this area. The boundaries of the commercial fishing areas within the Yukon Territory are presented in Figure 7. Commercial fishermen are legally required to report catches, tag recovery, and associated data no later than 8 hours after the closure of each fishery and there is also a requirement that catch forms be either received by the Whitehorse office or post-marked within 10 business days after the closure of each commercial opening. A toll-free telephone catch line is also available for catch reporting.

The inseason Chinook salmon run status indicated that there would not be a sufficient run to support a commercial fishery. As a result, the fishery remained closed throughout the 2014 Chinook salmon season. There were no Chinook salmon harvested incidentally during the early fall chum salmon opening in late August (Appendices A6 and B7). The average commercial Chinook salmon catch for the 2004–2013 period, excluding years when the fishery was closed for conservation purposes, was 2,637 fish (Appendix B7). Since 1997, there has been a marked decrease in commercial catch of Chinook salmon in the upper Yukon River as a result of closures to protect weak runs and very limited fishing opportunities.

Fall Chum Salmon Harvest

A strong return of fall chum salmon resulted in opportunities for commercial fishery openings throughout the fall season. A total of 2,485 fall chum salmon were harvested during commercial fishery openings (Appendix A6). 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 as well as reduced fishing opportunities in some years due to below average run sizes.

The total 2014 commercial fall chum salmon catch of 2,485 fish was 49% below the 2004–2013 average of 4,893 fish and slightly above the 2009–2013 average of 2,873 fish (Appendix B8). During the 2004–2013 period, commercial fall chum salmon catch ranged from 293 in 2009, when the run was late and the fishery was closed most of season due to conservation concerns, to 11,931 fall chum salmon in 2005.

Commercial harvest of coho salmon within the Upper Yukon River drainage is usually negligible. 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 2014.

6.3 DOMESTIC FISHERY

The domestic fishery was closed during the Chinook salmon season and opened concurrently with the commercial fishery for 2 openings during the fall chum salmon season. There was a total reported domestic catch of 19 fall chum salmon in 2014 (Appendices A6 and B8). This compares to a long term average of 475 fish, from 1974 to 2014; domestic fishery catches were not recorded prior to 1974 (Appendices B7 and B8).

6.4 RECREATIONAL FISHERY

In 1999, the Salmon Sub-Committee introduced a mandatory Yukon Salmon Conservation Catch Card (YSCCC) in an attempt 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 by mail by late fall. The information requested includes the number, species, sex, size, date, and location of all salmon caught and released.

In 2014, in response to inseason projections for a poor return of Chinook salmon, the daily catch and possession limits in the recreational fishery were reduced to zero, effective June 25. On July 4, continued low border escapement projections and subsequent removal of a TAC in the First Nation fishery triggered the closure of the Yukon River in the vicinity of the Tatchun River to all angling. This action was taken to allow unimpeded passage of Chinook salmon through this popular fishing site. In addition, angling for salmon (i.e using gear types that target salmon) was prohibited in the Yukon River and all of its tributaries from July 18 to September 19.

From catch card information received as of this publication, no Chinook salmon were either retained or caught and released in the Yukon River or its tributaries in the 2014 recreational fishery. The average number of retained Chinook salmon catch within the 2004–2013 period was 233 fish (Appendix B7). For the 2014 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 STATUS OF SPAWNING STOCKS IN 2014

7.1 CHINOOK SALMON

Alaska

In Alaska, a suite of projects is used to assess the Chinook salmon run. LYTF, which uses 8.5 inch mesh set gillnets, indicated that the run was likely dominated by age-5 fish. Chinook salmon age composition estimated from a sample of 615 fish collected in LYTF was 1% age-4, 51% age-5, 46% age-6, and 3% age-7 fish. The proportion of age-5 was above average, while the proportion of age-6 fish was below average (Table 5). Females comprised about 46% of the samples, which was lower than historical averages (Table 5). These samples represented fish that were potentially subject to harvest later on route to spawning grounds, and thus do not represent age or sex composition of the escapement or spawning populations.

Table 5.–Yukon River Chinook salmon age and female percentages from selected mainstem Yukon River assessment projects, 2014.

	Chinook Salmon					
	LYTF 8.5" Mesh Gillnet		Mainstem sonar at Pilot Station		Mainstem sonar at Eagle	
Percent (%)	Historical average[a]	2014	Historical average[b]	2014	Historical average[c]	2014
5-year-old	29	51	45	66	42	51
6-year-old	65	46	42	20	47	40
female	54	46	41	30	42	35

[a] The averages only include years when samples were collected throughout the season and include samples with a 35 day season minimum (1994, 1998–2013). Averages were not weighted by number of fish sampled each year.

[b] The average includes years from 1998 through 2013.

[c] The average includes years from 2005 through 2013.

Chinook salmon age composition estimated from samples collected in escapement projects also indicated that age-5 fish dominated the 2014 Chinook salmon run. Age class percentage ranges on the Andreafsky, Gisasa, Chena, and Salcha rivers, and the Yukon mainstem at Eagle, Alaska were 0–2% age-3, 4–18% age-4, 51–83% age-5, 11–40% age-6, and 0–3% age-7 fish. Female percentages in these escapement projects ranged from 19 to 44% (Appendix A10).

Even though the actual 2014 Chinook salmon run was below average in run size, all escapement goals that could be assessed were achieved. Chinook salmon escapement goals for the East Fork Andreafsky (weir), West Fork Andreafsky (aerial), Anvik (aerial), and Chena (tower – assessed by DIDSON sonar) rivers were achieved (Table 6; Appendices B9, B10, and C9). The Henshaw Creek weir installation was hindered by high water and did not operate in 2014. Similarly, high water on the Salcha and Chena rivers inhibited counting at the tower projects during most of the season. Sonar was implemented on the Chena River and preliminary counts and species apportionment estimates suggest the Chinook salmon escapement goal for the Chena River was met. In addition, anecdotal information from the project leader during boat and carcass surveys indicated a healthy spawning population of Chinook salmon. The season cumulative count on the Gisasa River was below historical averages (Appendix B10).

Table 6.–Summary of 2014 Chinook salmon escapement counts, in comparison with existing escapement goals.

Location	Assessment Method	Escapement Goal (type)	2014 Chinook Salmon Escapement
E. Fork Andreafsky	Weir	2,100–4,900 (SEG)	5,949
W. Fork Andreafsky	Aerial survey	640–1,600 (SEG)	1,695
Anvik (Drainagewide)	Aerial survey	1,100–1,700 (SEG)	1,584
Nulato (Forks Combined)	Aerial survey	940–1,900 (SEG)	– [a]
Gisasa	Weir	none	1,570
Henshaw	Weir	none	– [b]
Chena	Sonar	2,800–5,700 (BEG)	4,358 [b,c]
Salcha	Tower	3,300–6,500 (BEG)	– [c]
Goodpaster	Tower	none	1,236

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

[a] Aerial survey was not flown due to run timing and/or water conditions.

[b] Project operations were hindered by high water for much of the season.

[c] Due to high water for most of the season, estimate was based on DIDSON sonar counts and preliminary species apportionment using average timing.

The preliminary Chinook salmon estimate based on the mainstem Yukon River sonar project counts at Pilot Station was 138,000 fish (Appendix A2). Preliminary Chinook salmon passage at the mainstem Yukon River sonar at Eagle in 2014 was 63,482 fish, and after subtracting estimated U.S. subsistence harvest above the mainstem Yukon River sonar at Eagle (51 fish), the estimated border passage was approximately 63,431 fish (Appendix B11).

Canada

The suite of U.S. projects provide stock status information considered in management by DFO; the Rampart Rapids fish wheel project and the joint U.S. and Canada sonar project at Eagle near the U.S./Canada border are particularly important inseason. Both projects provide timing information for Canadian bound stocks. Stock status is estimated using data from the mainstem Yukon River sonar at Eagle (details in Section 8.2). The spawning escapement to the entire mainstem was estimated at 63,331 fish[11] (Appendix B11). Although aerial surveys of Chinook salmon index areas are no longer conducted annually, the Wolf River and Nisutlin River areas were surveyed in 2014. On August 14, 318 Chinook salmon were counted in the Nisutlin River and 136 Chinook salmon were counted in the Wolf River index area.

Escapement to the Big Salmon River has been monitored for the last 10 years using a DIDSON sonar. A total of 6,277 targets were identified as Chinook salmon in 2014. The season passage estimate of 6,321 represents 10.0% of the Upper Yukon River spawning escapement estimate of 63,331 fish. The Big Salmon average sonar estimate from 2004 to 2013 was 4,744 fish (Appendix B12).

The 2014 Whitehorse Rapids Fishway count of 1,601 Chinook salmon was 29% above the 2004–2013 average count of 1,237 fish (Appendix B12) and 2.5% of the Yukon River spawning escapement estimate of 63,331 fish. The overall sex ratio was 27% female, and hatchery-produced fish accounted for 78% of the return.

The 2014 Blind Creek weir count of 602 Chinook salmon was 37% above the 2004 to 2013 average count of 439, and 8% above the average count for all years (Appendix B12). This count represents 1% of the upper Yukon River spawning escapement estimate. Forty percent of the sampled fish were female.

Multiple beam high resolution sonar was operated for the third full season on the Teslin River. A total of 17,507 Chinook salmon targets were enumerated (Appendix B12). This estimate represents 27.6% of the upper Yukon River spawning escapement estimate of 63,331 Chinook salmon.

7.2 Summer Chum Salmon Alaska

Most tributaries producing summer chum salmon experienced below average escapement in 2014 (Appendices B13 and C11). Passage estimates at the East Fork Andreafsky River weir were just below the SEG of >40,000 fish. The Anvik River BEG of 350,000–750,000 fish was achieved. Counts at the Gisasa River weir were below average (Table 7; Appendices B13 and C11), while the Henshaw Creek weir did not operate due to high water conditions. Chena and Salcha River towers were also hindered by high water, but escapement on the Chena River was assessed by DIDSON sonar and preliminary passage estimates were below average (Appendix

[11] This is based on a sonar estimate of 63,482 fish, Eagle subsistence catch of 51, and Canadian Upper Yukon catch of 100 fish which included: 100 fish in aboriginal, 0 fish in commercial, 0 fish in domestic and 0 fish in the recreational catches.

B13). The estimated cumulative passage of approximately 2,600,000 summer chum salmon at the mainstem Yukon River sonar at Pilot Station (Appendix A2), through July 18, exceeded the management threshold of 600,000 summer chum salmon.

Table 7.–Summary of 2014 summer chum salmon escapement counts, in comparison with existing escapement goals.

Location	Assessment Method	Escapement Goal (type)	2014 Summer Chum Salmon Escapement
E. Fork Andreafsky	Weir	>40,000 (SEG)	37,793
Anvik	Sonar	350,000–700,000 (BEG)	399,223
Gisasa	Weir	none	32,137
Henshaw	Weir	none	– [a]
Chena	Tower	None	17,076 [b]
Salcha	Tower	None	– [a]

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

[a] Project operations were hindered by high water conditions for much of the season and no estimates could be produced.

[b] Due to high water for most of the season, estimate based on DIDSON sonar counts and preliminary species apportionment using average timing.

7.3 FALL CHUM SALMON

Alaska

The preliminary estimate of 2014 Yukon River drainagewide total run size was 1,020,000 fall chum salmon. This run size was within the preseason forecast range of 814,000 to 1,051,000 salmon. Run size was determined based on coverage of spawner distribution (escapement estimates), age composition, and estimates of harvest, which at the time of this publication remain preliminary.

Early inseason fishery management relies largely on abundance estimates provided by the mainstem Yukon River sonar project operated near Pilot Station. The mainstem Yukon River sonar estimate of fall chum salmon passage during the period July 19 through September 7 was 650,808 fish with a 90% confidence interval ranging from 587,188 to 714,428 fish (Table 10; Figure 5; Appendices A2 and B14). The inseason run size was greater than 800,000[12] fall chum salmon.

From 2000 through 2013, the postseason run reconstruction and resulting drainagewide escapement estimate were derived from Eggers' (2001) method. In 2014, the method was updated to Bayesian (Fleischman and Borba 2009). The Bayesian analysis showed that the escapements were generally above the upper end of the individual escapement goals (Table 8 and Appendices B14 and C12), with a drainagewide escapement estimate of 800,000 fall chum salmon. Adding the preliminary U.S. and Canada harvests to the estimated escapement results in a total run size estimate of greater than 1,000,000 fall chum salmon.

[12] An inseason adjustment of 10% is added to the estimated passage attributed to fall chum salmon provided by the mainstem Yukon River sonar project at Pilot Station and the addition of the harvest taken downstream of the project.

Table 8.–Summary of 2014 fall chum salmon escapement counts, in comparison with existing escapement goals.

Location	Assessment Method	Escapement Goal (type)	2014 Fall Chum Salmon Escapement
Drainagewide	Bayesian	300,000–600,000 (SEG)	800,000
Chandalar River	Sonar	74,000–152,000 (BEG)	226,000
Sheenjek River	none	50,000–104,000 (BEG)	–
Upper Tributary [a]	none	152,000–312,000 (BEG)	–
Tanana River	none	61,000–136,000 (BEG)	–
Delta River	Ground Survey	6,000–13,000 (BEG)	32,500

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

[a] Upper Yukon Tributary goal is Chandalar, Sheenjek and Fishing Branch rivers combined.

The summer and fall chum salmon runs are split by a calendar date (July 15, at the mouth of the Yukon River), where overlap occurs. Fall chum salmon entered the Yukon River in 6 pulses in 2014 (Figure 3). The first 2 pulses contained 25% summer chum salmon based on genetic mixed stock analysis (MSA; Blair Flannery, Geneticist, Conservation Genetics Laboratory, USFWS, Anchorage; personal communications). As in 2008–2013, the mainstem Yukon River sonar at Pilot Station was operated an additional week into September. In addition, LYTF operated later into the season, through September 20, 2014. No significant pulses of fall chum or coho salmon entered the river in September based on LYTF. Most of the monitoring projects suggested the run was on average 5 days late in timing. The run was bimodal, with an early showing of Chandalar and Porcupine River fall chum salmon relative to upper Yukon mainstem stocks. Because a good portion of fall chum salmon came in late in the season, during the fifth pulse, timing was overall late for upper Yukon River stocks while the Tanana River stocks were near normal in timing.

In 2014, the proportion by age class for fall chum salmon include age-3 (<3%), age-4 (52.3%), age-5 (44.2%) and age-6 (<1%) fish. Age-4 component was lower than average while age-5 was higher than average and age-3 and age-6 were slightly below average when compared to LYTF weighted averages for the years 1977 to 2013. The contribution of age-5 fish was much higher than expected based on the preseason forecast of 23.5%, correspondingly the age-4 was lower than forecasted 72.6%. Inseason the shift in age class to dominant age-5 was first observed throughout the summer chum salmon run. Females contributed 60.3% of the samples and their numbers were slightly higher than average (58.2%). ASL composition data were collected in 2014 from escapements in the Delta River and escapement into Canada from the Yukon River mainstem at Eagle (Appendix A24).

Canada

The preliminary fall chum salmon spawning escapement estimate based on the mainstem Yukon River sonar at Eagle is 156,796 fish[13] (details are presented in Section 8.1; Table 9 and Appendix B15). The mainstem Yukon River sonar at Eagle has operated since 2006 for fall chum salmon;

[13] This is based on a sonar estimate of 172,887 fish (expanded for fish passage after the cessation of the program), Eagle subsistence catch of 13,041 fish, and Canadian Upper Yukon catch of 3,050 fish which included: 546 fish in aboriginal, 2,485 fish in commercial, 19 fish in domestic, and 0 fish in recreational catches.

generally there was good agreement between the sonar estimates and estimates derived from the mark–recapture program for 2006–2008 (Appendix B15). The highest estimated spawning escapement of 437,498 fall chum salmon occurred in 2005.

Aerial surveys of the mainstem Yukon, Kluane and Teslin River index areas were not conducted between 2007 and 2014. Estimates of the relative abundance of fall chum salmon in these areas were developed from GSI collected in conjunction with the DFO tagging program (2007–2008) and the mainstem Yukon River sonar program at Eagle (2009–2014). Historical aerial survey data are presented in Appendices B15 and C13.

A sonar program was operated on the Porcupine River immediately downstream of Old Crow in 2014. The preliminary estimated passage of fall chum salmon in 2014 was 17,756 fish. The preliminary spawning escapement estimate developed using the sonar estimate and VGG harvest data is 15,825 fall chum salmon[14]for the Porcupine River in Canada (details are presented in Section 8.2).

The Fishing Branch River weir was not operated in 2014. The Porcupine River Border sonar passage estimate was 17,756 fish, and an estimated 1,931 fish were harvested in the Old Crow fishery, leaving about 15,825 fish in the upper Porcupine River escapement. A total of 95 radio tags were applied to fall chum salmon near the Old Crow fishery, of which 75 were later re-located. Ten tags were recovered from harvested fish near Old Crow, leaving 65 tags that were re-located upstream of the fishery. Of these 65 tags, 46% were later located in the Fishing Branch River upstream of the former weir site (Ben Snow, Environmental Dynamics Inc., Whitehorse; personal communication). A tentative estimate of fall chum salmon escapement to the Fishing Branch River for 2014 derived from these data was 7,304 fall chum salmon (Table 9; Appendices B15 and C14). However, caution should be used when using the sonar-telemetry derived escapement estimate, particularly due to the low number of tag recoveries in 2014. In light of the uncertainty and questions about the reliability of the mark–recapture estimate, the relationship of the mark–recapture estimate to the sonar estimate, and the relationship to the previous weir-based estimates, a strategy must be developed to improve future assessment.

Table 9.–Summary of 2014 fall chum salmon escapement counts to Canada, in comparison with existing IMEG.

Location	Assessment Method	Escapement Goal (type)	2014 Fall Chum Salmon Escapement
Fishing Branch River	Sonar, harvest, and radiotagging near Old Crow	22,000–49,000 (IMEG)	NA[a]
Yukon River Mainstem	Sonar harvest	70,000–104,000 (IMEG)	156,796

[a] Consensus has not been reached on the JTC as to whether 2014 data from the Old Crow projects (see preceding text for details) provides an appropriate assessment of this escapement goal, in the absence of comparisons with historical weir passage data.

[14] This is based on the expanded sonar estimate of 17,756 minus the Old Crow harvest. Harvest upstream of the sonar was estimated at 1,931 fall chum salmon (Personal communications with Lance Nagwan of Vuntut Gwitchin Government).

8.0 PROJECT SUMMARIES

8.1 ALASKA

Mainstem Yukon River Sonar Project at Pilot Station

The goal of the mainstem Yukon River sonar project at Pilot Station is to estimate the daily upstream passage of Chinook, chum, and coho salmon. The project has been in operation since 1986. Both split-beam and dual frequency identification sonar (DIDSON) are used to estimate total fish passage and CPUE from the drift gillnet test fishing portion of the project is used to estimate species composition (Lozori and McIntosh 2014). Fish passage estimates at the mainstem Yukon River sonar project at Pilot Station are based on a sampling design in which sonar equipment is operated daily in three 3-hour intervals, and drift gillnets 25 fathoms long with mesh sizes ranging from 7.0 to 21.6 cm (2.75 to 8.50 in) are fished twice each day between sonar periods to apportion the sonar counts to species.

During the 2014 season, sonar units on both banks were operational from June 5 through September 7. River breakup occurred on May 3 based on National Weather Service[15] data. Test fishing began on June 1, with the first Chinook and summer chum salmon caught on June 1, and the first coho salmon caught on July 20. Drift gillnetting resulted in a catch of 10,413 fish including 515 Chinook, 4,000 summer chum, 1,870 fall chum, and 1,196 coho salmon; a total of 2,832 fish of other species were also caught. Chinook salmon were sampled for ASL and genetic samples were taken from both Chinook and chum salmon. Any captured fish that were not successfully released alive were distributed daily to nearby residents in Pilot Station.

The right bank bottom profiles 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 problems with detection due to silt or other environmental factors. At the beginning of the summer season water levels observed near Pilot Station were below average, rose to above average in late June, and then continued to be above average during the fall season until returning to average in late August, when compared to USGS 2001–2013[16] data.

An estimated 4,438,214 fish passed through the sonar sampling area between June 3 and September 7 (Table 10). Detailed historical passage estimates for 1995 and 1997–2013 are listed in Appendix A2 for comparison. The DIDSON accounted for 7.6% of Chinook salmon, 8.1% of summer chum salmon, 6.3% of fall chum salmon, and 7.2% of coho salmon total passage estimates. Overall, the DIDSON estimate contributed to 10.2% of the total passage estimate.

In 2014, all project goals were met, with passage estimates given to fisheries managers daily during the season. Information generated at the mainstem Yukon River sonar project at Pilot Station was also disseminated weekly through multi-agency international teleconferences and data-sharing with stakeholders in areas from the Lower Yukon River all the way to the spawning grounds in Canada.

[15] http://aprfc.arh.noaa.gov/php/brkup/getbrkup.php?riverbasin=Yukon&river=Yukon+River
[16] http://waterdata.usgs.gov/ak/nwis/uv?cb_00060=on&cb_00065=on&format=gif_stats&period=21&site_no=15565447

Table 10.–Cumulative fish passage estimates by species with 90% confidence intervals (CI), at the Pilot Station sonar project on the Yukon River, 2014.

Species	Total Passage	90% CI	
		Lower	Upper
Large Chinook [a]	103,613	88,650	118,576
Small Chinook [b]	34,372	26,441	42,303
Summer chum	1,924,425	1,824,167	2,024,683
Fall chum	650,808	587,188	714,428
Coho	247,047	219,790	274,304
Pink	513,599	453,486	573,712
Other [c]	964,350	880,777	1,047,923
Total	4,438,214		

[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, and northern pike.

Yukon River Chinook Salmon Harvest Stock Identification 2013

Three region-of-origin groupings (also referred to as stock groups) have been identified for Chinook salmon 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 through 2003 to estimate Chinook salmon stock composition in Yukon River harvests. From 2004 to present, genetic analysis has been the primary method for stock identification. Tissue samples were collected from fish in mixed stock harvests in Districts 1 through 5. Results from these analyses were combined with harvest age composition to provide stock composition of the various harvest components. Genetic stock estimates for Chinook salmon sampled in the incidental commercial and subsistence harvests are currently available for 2013; the 2014 estimates are still under review by the ADF&G Gene Conservation Laboratory and will be published in future reports. U.S. and Canada combined harvest estimates for 2013 were 13.4% Lower stock group, 21.0% Middle stock group, and 65.6% Upper stock group (Appendix A12). U.S.-only harvest estimates from the Lower, Middle, and Upper stock groups were 16.0%, 25.0%, and 59.0%, respectively (Appendix A13). U.S. and Canadian shares of the Upper stock group harvest were 75.5% and 24.5%, respectively (Appendix A14). Comparing U.S. and Canada combined harvest estimates for 2013 with the 2008–2012 5-year average, the Lower stock group was average, the Middle stock group was below average, and the Upper stock group was above average (Appendix A12). Comparing U.S. and Canadian shares of the Upper stock group harvest for 2013 with the 2008–2012 5-year average, the U.S. harvest estimate was below average and the Canadian harvest estimate was above average (Appendix A14).

Yukon River Chinook and Chum Salmon Genetic Sampling 2014

Chinook Salmon

ADF&G field crews, along with other collaborators, collected 1,995 samples (axillary process tissue preserved in ethanol) from Chinook salmon harvested by test and subsistence fisheries in

2014. These samples were from mixed stock fisheries in the mainstem Yukon River in Districts 1, 2, 4, and 5. Samples collected from test fisheries totaled 1,877 fish, and included 655 from Big Eddy and Middle Mouth combined, 506 from the mainstem Yukon River sonar project at Pilot Station, and 716 from the mainstem Yukon River sonar at Eagle. Samples collected from subsistence fisheries totaled 118 fish, and included 4 from Galena in District 4 and the remainder from Fort Yukon in District 5. Subsistence harvest samples were collected by Spearfish Research, which contracted with individual fishermen to sample their harvest (R&E project URE-03-14).

In Canada, a total of 245 baseline samples were collected, including 72 from McQuesten River, 2 from Miner River, 21 from North Big Salmon River, 20 from Nisutlin River, 72 from Pelly River, 51 from Ross River, and 7 from Wolf River. These samples were collected by collaborators in Canada and shared with the Gene Conservation Laboratory, ADF&G, Anchorage.

Chum Salmon

ADF&G, in cooperation with USFWS, collected genetic tissue samples from 3,980 summer and 1,857 fall run chum salmon during the test fishery associated with the mainstem Yukon River sonar project at Pilot Station. Chum salmon genetic samples reside in the Conservation Genetics Laboratory, USFWS, Anchorage. Populations in the baseline are reported in aggregated stock groups (Table 11).

Table 11.–Microsatellite baseline is comprised of 37 stocks used to estimate stock composition of chum salmon collected at the mainstem Yukon River sonar at Pilot Station test drift gillnet program, Yukon River, 2014.

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

Yukon River Chum Salmon Mixed Stock Analysis 2014

Chum salmon were sampled from the sonar test fishery near Pilot Station from the beginning of June through the first week of September in 2014, to provide for stock composition estimates for most of 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 75% of the run and the middle river stock group comprised 25%. The Tanana component of the middle river stock group comprised about 6% of the total summer chum salmon run, and peaked in passage past the mainstem Yukon River sonar at Pilot Station during the sampling period of June 30 to July 6. For fall chum salmon, 67% of the run was of U.S. origin and 33% of Canadian origin. The composition of the U.S. contribution was 31% Tanana and 36% U.S. border (Chandalar, Sheenjek, and Black rivers). The composition of the Canadian contribution was 13% mainstem Yukon, 1% Porcupine, 18% White, and 1% Teslin rivers. Stock abundance estimates were derived by combining the Pilot Station sonar passage estimates with the stock composition estimates. To evaluate the concordance of various data sources, an analysis was conducted to compare these stock specific abundance estimates against escapement and harvest estimates. This analysis revealed that the stock proportions were concordant for 2004–2012 (Flannery et al. 2010; Flannery and Wenburg 2014). Postseason analysis is being conducted for the 2013 and 2014 data, and preparations are underway to continue the project for the 2015 season.

Salcha River Tower

The Salcha River is the largest contributor to the Chinook salmon stocks in the Tanana River drainage. In addition, the Salcha and Chena river stocks averaged 44% of the middle run stocks in the lower Yukon River from 2002 through 2004. The largest Chinook salmon escapement recorded was 18,514 fish in 1997 and the lowest was 3,294 fish in 1989. The average Chinook salmon escapement from 1987 through 2013 was 9,051 fish (Appendix B10). Escapement has been assessed with mark–recapture (1987–1992, 1996) and counting tower (1993–1995, 1997–2013) techniques.

In years when mark–recapture experiments were conducted, abundance of males and females was estimated directly and their relative abundance was used to estimate proportions of males and females. Age composition was determined from samples of scales collected during the marking event (fish were captured on the spawning grounds using electrofishing), during the recapture event (from carcasses), or from samples taken during both events.

In years when tower counts were used to estimate abundance, sex composition was determined from a sample of carcasses collected on the spawning grounds. The proportion of females in the sample was multiplied by the total abundance estimate to derive abundance of females. Biased estimates of sex composition have been noted during sampling when sex ratios of Chinook salmon collected during carcass surveys were compared with those estimated with mark–recapture methods. Therefore, an adjustment based on the average of ratios of unbiased estimates from mark–recapture experiments to estimates from carcass samples over those 7 years when mark–recapture studies were conducted was developed to more accurately reflect the population. Age composition was determined from scales collected from carcasses.

The Salcha River salmon counting tower could not be operated in 2014 due extensive and persistent flooding. A helicopter survey conducted on July 22, 2014 did provide some useful

Chinook salmon counts of the upper one third of the Salcha River; however, high and turbid water in the lower two-thirds of the river prohibited useable aerial count data for the lower portion. Based on the helicopter survey of the uppermost sections of the index area the escapement goal for Chinook salmon appears to have been exceeded. At this time, no summer chum salmon escapement estimate has been made, although some ground survey and telemetry information was collected. During carcass surveys, ASL data were collected from 451 Chinook salmon. The estimated proportion of females in the carcass survey was 32%. Age-5 was the dominant age class comprising about 59.8% of the sample, followed by age-6 (22.6%) fish and age-4 (14.6%) fish. Age-7 and age-3 fish each represented 1.5% of the sample.

8.2 MAINSTEM YUKON RIVER SONAR AT EAGLE

Since 2006, both Chinook and fall chum salmon passage have been estimated at Six-Mile Bend on the Yukon River near the community of Eagle, and just below the United States/Canada border, using sonar. Both split-beam and dual frequency identification sonar (DIDSON) are used (Smith and Dunbar 2012; Carroll et al. 2007a; Carroll et al. 2007b).

In addition to operating the sonar, a drift gillnet program is conducted at or near Six-Mile Bend to monitor species composition, and to collect ASL data as well as genetic samples of the fish passing the sonar site. Four gillnets, 25 fathoms in length with mesh sizes including 5.25, 6.5, 7.5, and 8.5 inches, are fished daily to collect the samples. Although there is some minor overlap, Chinook and fall chum salmon runs appear to be largely discrete in time based on test fishery results, local knowledge of catches, and data collected in Canada.

Chinook Salmon

In 2014, the Chinook salmon passage estimate at the mainstem Yukon River sonar at Eagle was 63,482 fish for the dates June 27 through August 7 (Table 12). After subtracting the preliminary Eagle area Chinook salmon subsistence harvest of 51 fish from the sonar estimate, the resulting border passage estimate was 63,431 fish. Preliminary Canadian harvest of 100 Chinook salmon[17] was subtracted to obtain the estimate of mainstem Yukon River escapement of 63,331 fish, which was 15% above the upper end of the IMEG of 42,500–55,000 fish.

A preliminary reconstruction suggests that the total Canadian-origin Chinook salmon run size was approximately 65,000 fish (provided by Stephanie Schmidt, ADF&G Division of Commercial Fisheries). This was above the precautionary preseason outlook range of 32,000 to 61,000 (JTC 2014)[18] Chinook salmon.

[17] Preliminary harvest estimates for Chinook salmon include 100 from the aboriginal fishery (Mary Ellen Jarvis).

[18] This low end is the forecast developed using the adjustment indicated by the model's performance in 2010, while the high end is the forecast developed using the adjustment indicated by the model's performance in 2009. These were the extremes of model performance in the last 5 years update.

Table 12.–Chinook salmon passage, border passage, and escapement estimates based on the mainstem Yukon River sonar at Eagle, 2005–2014.

Date	Sonar Estimate	Eagle Area Subsistence Harvest	U.S./Canada Mainstem Border Passage Estimate	Canadian Mainstem Harvest	Mainstem Escapement Estimate
2005	81,528	2,566	78,962	10,977	67,985
2006	73,691	2,303	71,388	8,758	62,630
2007	41,697	1,999	39,698	4,794	34,904
2008	38,097	815	37,282	3,399	33,883
2009	69,957	382	69,575	4,297	65,278
2010	35,074	604	34,470	2,456	32,014
2011	51,271	370	50,901	4,594	46,307
2012	34,747	91	34,656	2,000	32,656
2013	30,725	152	30,573	1,904	28,669
2014[a]	63,482	51	63,431	100	63,331

Note: 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 hundreds for Chinook salmon. Starting in 2008, the estimates for subsistence caught salmon only include salmon harvested between the sonar site and the U.S./Canada border.

[a] Eagle subsistence and Canadian estimates are preliminary.

Fall Chum Salmon

The fall chum salmon passage estimate at the mainstem Yukon River sonar at Eagle was 165,715 fish for the dates August 8 through October 6 (Table 13). Because of the high passage of fall chum salmon when the project was terminated, the sonar estimate was subsequently adjusted to 172,887 fish. The expansion was calculated using a second order polynomial calculated to the date October 18. After subtracting the preliminary Eagle area fall chum salmon subsistence harvest of 13,041 fish from the sonar estimate, the resulting border passage estimate is 159,846 fall chum salmon. After subtracting the preliminary Canadian harvest (3,050 fish)[19] the resulting escapement of 156,796 fall chum salmon was above the upper end of the IMEG of 70,000–104,000 fish.

Based on the Bayesian method of determining overall run size (Fleischman and Borba 2009) the Canadian-origin fall chum salmon represented 18% of the drainagewide return, therefore a preliminary reconstruction of the 2014 mainstem run suggests a run size of approximately 184,000 fish. This reconstruction is slightly below the preseason outlook range of 200,000 to 260,000 upper Yukon River fall chum salmon. The 2014 preseason outlook range was based on the ADF&G drainagewide outlook range of 814,000 to 1,051,000 fall chum salmon and an assumption that upper Yukon River Canadian-origin fall chum salmon would constitute at least 25% of the drainagewide return.

[19] Preliminary harvest estimates for fall chum salmon include 625 fish caught in aboriginal, 2,421 in domestic and commercial fisheries (M.E. Jarvis, DFO, Whitehorse, Yukon Territory, personal communication).

Table 13.–Fall chum salmon passage, expansion, border passage, and escapement estimates based on the mainstem Yukon River sonar at Eagle, 2006–2014.

Date	Sonar Estimate	Expanded Estimate [a]	Eagle Area Subsistence Harvest	U.S./Canada Mainstem Border Passage Estimate	Canadian Mainstem Harvest	Mainstem Escapement Estimate
2006	236,386	245,290	17,775	227,515	6,617	220,898
2007	235,871	265,008	18,691	246,317	9,330	236,987
2008	171,347	185,409	11,381	174,028	6,130	167,898
2009	95,462	101,734	6,995	94,739	1,113	93,626
2010	125,547	133,413	11,432	121,981	3,709	118,272
2011	212,162	224,355	12,477	211,878	6,312	205,566
2012	147,710	153,248	11,681	141,567	3,905	137,662
2013	200,754	216,791	12,642	204,149	3,887	200,262
2014[b]	165,715	172,887	13,041	159,846	3,050	156,796

Note: 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 a few thousand for fall 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.

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

[b] Data is preliminary.

8.3 CANADA

Upper Yukon River Salmon Assessment Programs (Yukon Territory)

Blind Creek Weir

A weir was operated in Blind Creek in 2014 to enumerate the Chinook salmon escapement and obtain biological information from the stock. This was the twelfth year a weir has been operated in Blind Creek with funding by the Yukon River Panel, Restoration and Enhancement Fund. Camp set up and weir construction was initiated on July 12. The weir was located at the same site used for the past 11 years, approximately 1 km upstream of the confluence with the Pelly River. Operation of the weir began on July 13 and continued through to August 17. The first Chinook salmon passed through the counting chamber on July 17 which was the same date as the earliest previous observed fish passage, which occurred in 2003. A total of 602 Chinook salmon were counted in 2014 (Appendix B12), which was 137% of the 10-year average escapement of 439 fish. The midpoint of the run occurred on July 30, a week earlier than average, and 90% of the run had passed through the weir by August 5, 6 days earlier than average. Migrating Chinook salmon were sampled randomly throughout the period of weir operation to obtain information on the age, sex, and length (ASL) structure of the run. Of the 219 Chinook salmon (36% of the run) that were live sampled to determine sex composition of the run, 89 (41%) were female and 130 (59%) were male. The mean mideye to fork (MEF) length of females and males sampled was 803.5 mm and 682.8 mm, respectively. Scale samples were analyzed by the Pacific Biological Station fish ageing lab in Nanaimo, British Columbia for DFO Whitehorse. Of the 186 samples that were successfully aged, 12.4% (20.6% of the males and 1.3% of the females) were age-4, 45.2% (61.7% of the males and 22.8% of the females) were age-5, 37.6 % (15.9% of the males

and 67.1% of the females) were age-6, and 4.8% (1.9% of the males and 8.9% of the females) were age-7.

Big Salmon Sonar

A long range dual frequency identification sonar (DIDSON) was used to enumerate the Chinook salmon escapement to the Big Salmon River in 2014. The sonar was operated for its tenth year at the same site used since 2005, approximately 1.5 km upstream of the confluence of the Yukon River. Sonar operation began on July 11 and continued without interruption through August 18. A total of 6,277 targets identified as Chinook salmon were counted during the period of operation, with 2 fish counted on the first day of operation and 15 fish counted on the last day of operations. Based on linear extrapolation of the last 7 days of sonar counts, it is estimated a further 44 Chinook salmon entered the system after sonar operation ceased. This yields a total estimated Chinook salmon escapement of 6,321 fish (Appendix B12). The first Chinook salmon passing the Big Salmon sonar station was observed on July 11, the first day of operations, which was earlier than the earliest fish recorded previously on the sonar start date of July 15 in 2005 and 2006. The peak daily count of 421 fish occurred on July 27, when 53% of the run had passed the sonar station (10 days earlier than the 9 year average for 50% passage); 90% of the run had passed the station by August 6 (9 days earlier than average). The 2014 Big Salmon count of 6,321 Chinook salmon was 33% above the previous 9-year average passage of 4,754 Chinook salmon. Genetic stock identification sampling at the mainstem Yukon River sonar at Eagle indicated that the Big Salmon River stock group comprised 2.7% (SD 2.0) of the upper Yukon River Chinook salmon escapement in 2014, however the Big Salmon River escapement based on sonar represented 10.0% of the mainstem Yukon River sonar at Eagle passage estimate.

Carcass samples were collected between August 15 and August 25 over approximately 145 km of the Big Salmon River, yielding 143 Chinook salmon samples (94% in the last 3 days). Of the total, 73 (51%) fish were female and 70 (49%) fish were male. The mean MEF of females and males sampled was 852 mm and 745 mm, respectively. All sampling data and scale cards were submitted to DFO Whitehorse stock assessment; scales were subsequently read by the Pacific Biological Station fish ageing lab. Of the 114 samples which were successfully aged, 3.5% (7.8% of the males and 0.0% of the females) were age-4, 34.2% (66.7% of the males and 7.9% of the females) were age-5, 59.6% (21.6% of the males and 90.5% of the females) were age-6, and 0.9% (0.0% of the males and 1.6% of the females) were age-7.

Teslin River Sonar

Multiple beam high resolution ARIS sonars were used to enumerate the 2014 Chinook salmon escapement to the Teslin River system. This was the third year that the project was conducted at this site. The sonars were operated on the mainstem Teslin River at the site identified during the 2011 feasibility study, approximately 12 km upstream of the confluence of the Teslin and Yukon rivers at Hootalinqua. North Bank and south bank sonars began operating on July 13 and July 15, respectively, and then operated continuously through August 28. A total of 17,507 targets identified as Chinook salmon were counted during the period of operation (Appendix B12). Of this total, the north bank sonar counted 9,841 (56%) and the south bank counted 7,666 (44%) of the passing Chinook salmon. Daily 24 hour counts ranged from 25 fish (on the first full day of North bank sonar operations) to 796 fish. The peak sonar daily count of 796 occurred on August 6, 2014, August 6 was also the midpoint of the run, which was 5 days earlier than the midpoint in 2013 and 9 days earlier than in 2012. Genetic stock identification sampling at the mainstem

Yukon River sonar at Eagle indicated that the Teslin stock group contributed 28.2% (SD 2.0) of the upper Yukon River Chinook salmon escapement in 2014. In comparison, escapement indicated by the Teslin River sonar counts represented 27.6% of the mainstem Yukon River Chinook salmon counts at the Eagle sonar.

Carcass sampling was conducted over approximately 120 km of the mainstem Teslin River from September 1 to September 5, yielding 504 Chinook salmon. Of these, 304 (60%) fish were female and 200 (40%) fish were male. The MEF of females and males sampled was 848 mm and 742 mm, respectively. All sampling data and scale cards were submitted to DFO Whitehorse stock assessment; scales were subsequently read by the Pacific Biological Station fish ageing lab. Of the 443 samples which were successfully aged, 0.5% (1.1% of males and no females) were age 3, 6.3% (16.1% of the males and no females) were age 4, 28.4% (48.9% of the males and 15.2% of the females) were age 5, 63.4% (32.8% of the males and 63.4% of the females) were age 6, and 1.4% (1.1% of the males and 1.5% of the females) were age 7.

Whitehorse Rapids Fishway Chinook Salmon Enumeration

The Whitehorse Rapids Fishway is a fish ladder bypassing the Whitehorse dam that has a viewing window and trap gates on either side that are used for sampling fish without handling. Fishway staff enumerated 1,601 Chinook salmon at the Whitehorse Rapids Fishway between July 21 and September 2, 2014. Of the adult Chinook salmon counted at the Fishway, 1,248 were of hatchery origin, comprising 78% of the return. The hatchery component included 305 females (24%) and 943 males. The wild component included 127 females (36%) and 226 males. Female Chinook salmon made up 27% of the total run.

The Whitehorse Rapids Fishway program is a joint Yukon Fish and Game Association, Yukon Energy Corporation, and DFO initiative. Students count all fish moving upstream through the Fishway, record the sex and relative size of each fish, and identify hatchery-origin fish based on the absence of the adipose fin; this information on run composition supports the Whitehorse Rapids Hatchery coded wire tagging program. Students also assist the Whitehorse Rapids Hatchery with brood stock collection at the Fishway.

Hatchery personnel collected biological samples from 56 male (21 wild and 35 hatchery) and 40 female (15 wild and 25 hatchery) Chinook salmon taken from the Whitehorse Rapids Fishway for broodstock. Scale samples from 2 wild male Chinook salmon and one head from a clipped hatchery male were collected during carcass sampling in Wolf Creek. No weirs (Wolf or Michie Creek) were operated in the drainage upstream of the Whitehorse Rapids Fishway in 2014.

Whitehorse Hatchery Operations

The Whitehorse Rapids Hatchery has a current annual release target of 150,000 2.0 gram Chinook salmon fry. 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 (2004–2013) is 138,907 fry (Appendix A15).

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 2014. The tagging procedure included the application of separate tag codes to each of 4 release groups. Tagging procedures followed the standard procedures used in recent years, including using of Tricaine methane sulphonate (MS222) to anaesthetize the fry prior to clipping and tagging.

The 2014 release was the eighteenth year in which all fit fish released from the Whitehorse Rapids Hatchery into the Yukon River were marked. With the exception of all fish released from the 1998 brood year, which were adipose-clipped but not tagged, all of the fry released from 1995–2013 brood years were coded wire tagged as well as adipose-clipped. The initiative to mark all of the fish released from the hatchery provides an opportunity to accurately determine the hatchery contribution as adult fish migrating upstream through the Whitehorse Rapids Fishway (sampled by viewing); it is also helpful during brood stock collection. Fin clipping also enables researchers to distinguish hatchery fry from wild fry when investigating juvenile Chinook salmon habitat use. Marked fish are occasionally recovered in marine studies, although none have been reported for 2013 or 2014 (see Northern Bering Sea Pelagic Trawl Surveys Section 9.4; Appendix A20).

All 124,624 Chinook salmon fry reared and marked (clipped and/or tagged) at the Whitehorse Rapids Hatchery from the 2013 brood year were released between June 1 and June 3, 2014. The fry[20] were released to various locations upstream of the Whitehorse Rapids hydroelectric dam (Appendix A15). Average fry weight at time of release was 2.6 grams; average weights ranged from 2.2 grams (Wolf Creek release) to 2.7 grams (Michie Creek release).

The estimated tag retention 5 days after tagging for the 2014 release (2013 BY) was 98%. The total 2014 release included an estimated 119,569 adipose-clipped fish with coded wire tags, 2,357 fish estimated to have lost their tags, and 2,620 small (or unfit) fish that were clipped but not tagged (Appendix A15).

Brood stock collection began on August 11, after 557 Chinook salmon had migrated through the Whitehorse Rapids Fishway, and ended on September 1, 2014. An attempt was made to collect 2 males for each female during brood stock collection to allow matrix spawning. Matrix spawning has been used for 25 years in an effort to maintain genetic diversity. A total of 66 males were used for the brood stock program. Fifty-six of these males, including 21 wild and 35 adipose-clipped (hatchery) Chinook salmon were removed from the run, while an additional 10 hatchery males were released back to the Fishway after milt collection. The hatchery removed 5% of the total 1,169 returning Chinook salmon males, and used a total of 6% for brood stock purposes.

In total, 40 female Chinook salmon (9% of the total 432 female chinook that returned to the fishway), including 3 partially spent fish, were spawned for the Whitehorse Rapids Hatchery program between August 18 and September 9. These included 15 wild and 25 adipose-clipped (hatchery) female Chinook salmon. There were no mortalities during holding. The preliminary estimated total egg take was 160,000 green eggs. The fertilization rate was estimated to be 100%. Shocking and second inventory of the eggs began on October 7 and was completed by November 1, 2014. The estimated total egg take was then revised to 213,138, calculated from the eyed egg inventory of 200,250 and the 12,888 mortalities that had been removed. The overall green egg to eyed egg survival was estimated to be 94%.

On November 12, 2014, an estimated 22,481 eyed eggs were transferred from the Whitehorse Rapids Hatchery to the McIntyre Creek Salmon Incubation Facility, to be raised to the fry stage for the Ta'an Kwachan First Nation Fox Creek salmon restoration program. An additional 900 eyed eggs were provided to the Stream to Sea program for classroom incubation projects. After

[20] 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.

these transfers and the removal of subsequent egg and alevin mortalities, Whitehorse Rapids inventory on January 31, 2015 was 158,638 Chinook salmon alevins. The estimated survival rate from egg take to ponding was 85%.

Porcupine River Investigations

Fishing Branch River Fall Chum Salmon

Fall chum salmon returns to the Fishing Branch River were assessed annually from 1971 to 2012 by means of aerial survey or weir. The weir, established to enumerate fall chum salmon escapement to the Fishing Branch River, was operated during the periods 1972–1975, 1985–1989, and 1991–2012 in a cooperative effort between DFO and the Vuntut Gwitchin Government. Spawning escapement estimates for the Fishing Branch River, including aerial expansions for years lacking complete weir counts, have ranged from approximately 5,100[21] fall chum salmon in 2000 to 353,300[22] fall chum salmon in 1975 (Appendix B15).

The Fishing Branch River weir has not been operated since 2012. A rough estimate of Fishing Branch River spawning escapement was derived from Porcupine River sonar counts, Old Crow harvest, and a proportion of radiotagged fish that reached the Fishing Branch River weir site. The preliminary estimate for the 2014 Fishing Branch River escapement above the weir site was 7,304 fall chum salmon. The 2014 escapement estimate was 23% of the 2004–2013 average of 32,413 fall chum salmon; however, the 2013 and 2014 estimates may not be comparable with the earlier weir counts (Appendix B15).

Porcupine River Chum Salmon Sonar

In 2014, stock assessment of chum salmon on the Porcupine River was conducted using multi-beam ARIS sonars, one on each bank, at a site approximately 2 km downstream of Old Crow from August 11 to October 5, 2014. In conjunction with sonar counts, drift and set gillnetting was conducted near the sonar site to apportion the sonar counts between chum salmon and other fish species present at the site. The test netting was conducted primarily by Vuntut Gwitch'in First Nation (VGFN) technicians.

A total of 17,531 fish targets were identified as migrating chum salmon during the operational period of the sonar project, producing a season passage estimate of 17,756 Porcupine River chum salmon after extrapolation for post-sonar project passage. Ninety-three percent of all fish captured in project sampling gillnets were chum salmon. The project also had catches dominated by over 90% chum salmon in previous years, suggesting that the numbers of adult fish other than chum salmon are very low in comparison to numbers of migrating chum salmon during the period of sonar operations. Age composition of the 178 chum salmon successfully aged from the test gillnetting was 70.2% age-4, 25.8% age-5, and 3.4% age-3.

The 2014 sonar counts showed a bi-modal distribution, with the single highest daily passage estimate of 680 chum salmon occurring on September 25. The majority (84%) of chum salmon migrated along the left bank. As in previous years, the majority of chum salmon (78% and 84% on right bank and left bank, respectively) migrated within 20 m of the sonar transducers. This behavioral pattern facilitates the enumeration of these fish with multi-beam sonar.

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[21] Weir operations were interrupted due to flooding for an 8 day period following September 22 in 2005. Weir count prior to the flooding was 4,993. Only 60 fall chum salmon were counted through the weir after operations resumed on October 1, 2005.

[22] Estimate expanded from a count of 301,296 at the weir, which was out of operation due to high water for a 3 day period at the peak of the run.

Porcupine River Telemetry

In 2013, the Department of Fisheries and Oceans transitioned the stock assessment of chum salmon in the Porcupine River from an enumeration weir on the Fishing Branch River to a sonar program located approximately 2 km downstream of Old Crow, YT. In 2011 and 2012, the weir and sonar programs were operated together (for a portion of the season) and comparisons of estimates from the 2 programs were possible. The weir was not operated in 2013; however, additional comparative data were desired to allow for a better understanding of the relationship between weir and sonar counts. As such, in 2013, EDI Environmental Dynamics (EDI) applied dorsal implant coded radio tags to chum salmon near Old Crow and conducted aerial radio telemetry surveys to determine their fate. In 2014, EDI again conducted a radio telemetry study, this time using esophageal implant tags. Ninety-five tags (including 2 that were re-applied after being returned in the fishery) were applied to chum salmon near the sonar site between August 24 and September 30. Telemetry tracking flights were conducted in areas of the Porcupine River upstream of the sonar site from October 23–26, as compared with survey dates of October 12, 17, and 26–28 in 2013.

In total, 75 of 95 tags were successfully relocated in 2014. Two tags that were captured in the VGFN chum salmon subsistence fishery were turned in to the VGG Natural Resources Department. Eight additional tags were located in the vicinity of Old Crow and were also thought to have been captured in the local fishery or died near the tagging site. Of the remaining 65 tags, 46% (30 tags) were relocated in the Fishing Branch River upstream of the weir location. This proportion is lower than the 74% of tags observed upstream of the weir site in 2013. The proportion was also lower, in comparison, than the ratio of chum salmon observed at the Fishing Branch weir to sonar passage estimates in 2011 and 2012 (about 78% each year). In previous Floy tagging studies, an average of 56% of tags (applied near Old Crow?) were observed at the weir, but somewhat lower percentages of Floy tags were relocated at Fishing Branch River weir in 2008, 2009, and 2010. Of the radio tags re-located upstream of the Old Crow fishery in 2014, 11 (17%) tags were located in the Fishing Branch River downstream of the weir site (making a total of 63% in the whole Fishing Branch River), 14 (22%) tags were relocated in the upper Porcupine River mainstem, 4 (6%) tags were relocated in the Bell River and tributaries, and 5 (8%) tags were located in the Crow River.

Porcupine River Chinook Salmon Sonar

In 2014, stock assessment of Chinook salmon on the Porcupine River was conducted at the chum salmon sonar site using a multi-beam ARIS sonar on each bank from July 3 to August 9, 2014, except for a 9 day period during which a technical defect took the right bank sonar out of operation.

Species apportionment was attempted by drift gillnetting with 100 foot long nets with mesh sizes of 5.5, 6.5, 7.5 and 8.5 inches. Only one Chinook salmon (and no other adult fish) was captured during 427 drifts. A preliminary passage estimate of 2,660 Chinook salmon is subject to review.

Stock Identification of Yukon River Chinook and Fall Chum Salmon using Microsatellite DNA Loci

Chinook Salmon

Genetic stock identification of the 2014 Chinook salmon migration bound for Canada was estimated using genetic samples collected from the drift gillnet test fishing program conducted in

conjunction with the mainstem Yukon River sonar at Eagle. Variation of 15 microsatellite loci was surveyed from 708 Chinook salmon sampled between June 30 and August 24 (including those captured after the August 7 transition date (<1%), when all sonar targets were counted as fall chum salmon).

Chinook salmon stock contribution estimates were based on 8 regional reporting groups (stock aggregates; Table 14). The estimated stock composition and the associated standard deviations (Table 15) apply for the period from June 30 to August 7, 2014.

Table 14.–Baseline comprised of 25 stocks used to estimate stock compositions of Chinook salmon collected at the mainstem Yukon River sonar at Eagle test drift gillnet program, Yukon River, 2014.

Stock Aggregate Name	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, 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

The contributions of the Chinook salmon stock aggregates to the total 2014 Eagle sonar test fishery samples were estimated by period, and for the total season sample. The Chinook salmon stock composition of the total season sample was: Upper Yukon River Tributaries (3.7%); Teslin River (31.6%); Carmacks Area Tributaries (15.1%); Mid-mainstem Tributaries (21.1%); Pelly River (13.8%); Stewart River (9.7%); North Yukon Tributaries (3.1%); White River (4.1%); and Upper Yukon River Tributaries (3.7%; Table 15).

Table 15.–Estimated stock composition of Chinook salmon in the test gillnet fishery at the mainstem Yukon River sonar at Eagle in 2014.

	Jun 30–Jul 9 *n*=126	Jul 10–13 *n*=115	Jul 14–18 *n*=117	Jul 19–22 *n*=113	Jul 23–26 *n*=118	Jul 27–Aug 24 *n*=119	Season *n*=708
Region	Est. (SD)	Est. (SD)	Est. (SD)	Est. (SD)	Est. (SD)	Est. (SD)	Est. (SD)
Upper Yukon Tribs.	1.6 (1.1)	3.1 (1.7)	4.0 (1.9)	5.9 (2.4)	2.6 (1.7)	5.3 (2.2)	4.1 (0.8)
Teslin River	22.3 (4.1)	26.3 (5.7)	14.2 (6.2)	45.1 (8.2)	41.3 (8.2)	43.0 (8.0)	28.2 (3.3)
Carmacks Area Tribs.	18.4 (8.5)	14.1 (8.0)	25.5 (7.4)	6.8 (7.0)	14.9 (6.0)	8.4 (4.7)	14.3 (3.4)
Mid-Mainstem	2.4 (2.5)	0.6 (1.8)	18.4 (5.9)	31.4 (7.6)	32.3 (7.7)	40.4 (8.0)	23.6 (3.3)
Pelly River	24.8 (5.3)	21.1 (5.2)	22.8 (5.7)	6.0 (3.7)	4.4 (2.7)	1.8 (2.1)	14.4(1.9)
Stewart River	9.7 (3.8)	19.4 (5.5)	10.4 (4.5)	2.9 (3.1)	3.9 (3.0)	0.9 (1.5)	7.4 (1.7)
North Yukon Tribs.	6.7 (2.4)	8.5 (2.8)	4.0 (2.0)	0.0 (0.3)	0.0 (0.3)	0.0 (0.3)	3.1 (0.7)
White River	14.0 (3.8)	6.9 (3.1)	0.7 (2.1)	1.9 (1.5)	0.6 (1.0)	0.1 (0.5)	4.9 (1.0)

Note: The mainstem Yukon River sonar at Eagle switched from enumerating Chinook to fall chum salmon on August 8, 2014.

The estimated abundance for the 6 sample periods (i.e. June 30–July 9, July 10–13, July 14–18, July 19–23, July 23–26 and July 27–August 24) were derived from the analysis of individual genetic samples, pooled into these sample periods and multiplied by the abundance estimates

from the Eagle sonar corresponding to these periods (Table 16; Figure 7). The seasonal estimate provided is derived from the genetic analysis (all periods pooled) multiplied by the total passage estimate from the mainstem Yukon River sonar at Eagle.

Table 16.–Estimated abundance of Chinook salmon migrating past the mainstem Yukon River sonar at Eagle in 2014.

	Jun 30–Jul l9	Jul 10–13	Jul 14–18	Jul 19–22	Jul 23–26	Jul 27–Aug 24	Season
Region	*n*=126	*n*=115	*n*=117	*n*=113	*n*=118	*n*=119	*n*=708
Upper Yukon Tribs.	194	243	480	669	268	509	2,624
Teslin River	2,707	2,092	1,714	5,118	4,252	4,162	17,917
Carmacks Area Tribs.	2,239	1,119	3,077	770	1,536	817	9,070
Mid-Mainstem	293	46	2,221	3,567	3,332	3,906	14,960
Pelly River	3,010	1,676	2,748	680	454	175	9,143
Stewart River	1,183	1,543	1,255	332	403	89	4,728
North Yukon Tribs.	814	678	484	2	1	3	1,938
White River	1,702	545	87	221	58	9	3,103

Note: The mainstem Yukon River sonar at Eagle switched from enumerating Chinook to fall chum salmon on August 8, 2014. The season estimate of stock abundances includes periods where tissue samples were not collected.

All estimated stock–percentages for 2014 are within the ranges observed between 2007–2013 from samples obtained at the mainstem Yukon River sonar at Eagle[23] (Appendices B17 and C17). Estimated Chinook salmon spawning escapement for tributaries represented in the genetic baseline for 2005 to 2014 is calculated by the year's pooled genetic analysis multiplied by the spawning escapement estimate for the corresponding year (Appendix C17). The derived abundance estimates for the Teslin River and Mid-Mainstem stock aggregates were the highest recorded for the 2005–2014 period, while the Upper Yukon Tributaries abundance estimate was the highest recorded since the sampling started at the sonar project at Eagle.

Fall Chum Salmon

Stock identification of the 2014 fall chum salmon migration bound for Canada was estimated using genetic samples collected from the drift gillnet test fishing program conducted in conjunction with the mainstem Yukon River sonar at Eagle. Variation of 14 microsatellite loci was surveyed for 944 fall chum salmon from the samples collected in the test drift gillnet program at Eagle. Fall chum salmon stock contribution estimates were based on 4 regional reporting groups (stock aggregates; Table 17). The estimated proportions of stock composition are broken down by the various sampling periods from July 24 to September 30 (Table 18).

Table 17.–Baseline comprised of 9 stocks used to estimate stock compositions of fall chum salmon collected from the test gillnetting program at the mainstem Yukon River sonar project at Eagle in 2014.

Stock Aggregate Name	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

[23] Prior to 2009, samples were collected from BioIsland and are not considered directly comparable.

An estimated 49.5% of the return that passed the sonar site up to September 30 originated from the Mainstem Yukon River reporting group, which includes a number of mainstem Yukon River spawning populations, and 50.4% were from the White River aggregate (Table 18). The 2 remaining reporting groups contributing to the run were the Teslin River and the Yukon Early group, which is represented by the Chandindu River population (Table 17).

The estimated abundance for the 4 sample periods (July 24 to September 2, September 3–19, September 19–24, and September 25–30) were derived from the stock proportions determined from genetic analysis of the chum samples collected in these periods multiplied by the passage estimates at the mainstem Yukon River sonar at Eagle for the corresponding periods (Table 19; and Figure 8).

Table 18.–Estimated proportions of fall chum salmon stock composition migrating past the mainstem Yukon River sonar at Eagle in 2014.

Period	Jul 24–Sep 2		Sep 3–19		Sep 19–24		Sep 25–30		Season	
Sample Size	*n*=217		*n*=247		*n*=296		*n*=184		*n*=944	
Region	Est.	SD	Est.	SD	Est.	SD	Est.	SD	Est.	SD
Mainstem	41.7	(4.4)	39.4	(3.6)	47.1	(3.2)	68.2	(3.7)	49.5	(1.8)
White	56.3	(4.4)	60.5	(3.6)	52.9	(3.2)	31.3	(3.7)	50.4	(1.8)
Teslin	0.0	(0.2)	0.0	(0.2)	0.0	(0.2)	0.5	(0.9)	0.0	(0.1)
Yukon Early	2.0	(1.1)	0.0	(0.2)	0.0	(0.1)	0.0	(0.3)	0.2	(0.2)

Table 19.–Estimated relative abundance of fall chum salmon migrating past the mainstem Yukon River sonar at Eagle in 2014.

Region	Jul 24–Sep 2	Sep 3–19	Sep 19–24	Sep 25–30	Season
Mainstem	8,653	16,805	26,580	20,105	73,837
White	11,682	25,804	29,840	9,221	75,217
Teslin	2	18	15	139	24
Yukon Early	420	6	7	12	231
Total	20,757	42,633	56,442	29,477	149,309

The estimated abundances for the Mainstem, White River and Early chum stock groups from 2014 are within the ranges observed from the Eagle sonar samples from 2009 to 2013 (Appendices B18 and C18). The Teslin stock group season abundance estimate was the lowest estimated in this period. However, the Teslin group comprises a very small proportion of the stock and of the genetic sample; thus, there is greater uncertainty associated with this estimate; the upper end of the confidence interval (329) is within the range observed between 2009 and 2013. Prior to 2009, samples were collected from BioIsland and are not considered directly comparable. Estimated fall chum salmon spawning escapement for tributaries represented in the genetic baseline for 2005 to 2013 is calculated by the year's pooled genetic analysis multiplied by the spawning escapement estimate for the corresponding year (Figure 8; Appendix C18).

Yukon Education Program 2014

Fisheries and Oceans Canada Whitehorse received R&E funding to contract personnel to deliver the Stream to Sea education program in Yukon Schools to provide direction, foster capacity, and provide the means to allow communities and schools to seek opportunities to independently deliver the program in the future. The program engages students in learning about salmon and salmon habitat. Activities include classroom lessons, presentations, salmon incubation and fry

releases. Services for the 2014–2015 projects were secured via a competitive tender process. One consultant was contracted as the lead Salmon Stewardship Coordinator to deliver and/or oversee the delivery of the Stream to Sea program support services to Yukon Schools.

The Whitehorse Rapids Fish Hatchery, operated by Yukon Energy, provided eggs to the education program for use in schools. Chinook salmon eggs for this purpose were collected from Whitehorse Rapids Fishway Chinook salmon by Hatchery personnel in August and transferred to the McIntyre Facility for incubation until they could be transferred to schools at the end of October. Also in October, the consultant and hatchery staff captured Kluane River chum salmon broodstock and took eggs for schools along the North Alaska Highway. In addition, during this egg collection effort, a multi school field trip was conducted with classes from the North Alaska Highway area attending the field inspection and collection day; students learned about fish habitat, salmon spawning activity, and egg collection methods. DFO fertilized some of the eggs at the Kluane Lake School and the consultant planted remaining eggs at the McIntyre Creek facility for later use by other schools.

The lead Salmon Stewardship Coordinator and assistants delivered salmon eggs to 15 schools between October and December, 2014. Schools participating include those from Dawson, Mayo, Pelly Crossing, Carmacks, Teslin, Carcross, Haines Junction, Destruction Bay, Beaver Creek, and the Whitehorse Area. Other schools may participate in the future by taking on egg incubation or participating in the release and field habitat presentations occurring in the spring of 2015. Updates and complete details of the education support project will be provided in an R&E Report to be submitted to the YR Panel in July 2015.

Yukon River Canadian Subbasin Environmental Conditions

The summary of environmental conditions is in response to a request from the JTC to report annually on the conditions influencing fish habitat in the Canadian subbasin of the Yukon River - the area upstream of the Alaska/Yukon Territory border that includes the Yukon River and Porcupine River. The subbasin 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 past year. The purpose of the 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.

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 subbasin for a given year. Various weather records and stream discharge measurements from other government agencies are applied as a means to 1) determine whether environmental conditions are within normal ranges on record and 2) to identify observed unusual trends and/or events. Additionally, 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, experience, and professional judgment, this information is applied to fish habitat to determine general conditions experienced for the year.

Early 2013/2014 was mild with above-normal temperatures in October and near-normal temperatures in November. There was widespread snowfall throughout much of the territory followed by an unusually mild January. February was characterized as cold and dry.

Snowpack in Yukon was generally close to normal. Above average snowfall in December was tempered by drier weather in January, February, and March with variable precipitation in April, resulting in levels only somewhat above average. Southwestern and northern Yukon were the exceptions, with below-average snowpack. There was above-normal snowpack in much of southeastern Yukon and in an area extending north and west through to the Carmacks area.

Streamflow conditions in March throughout Yukon were generally above normal. The upper Yukon River was just above-normal, while the Stewart and Pelly Rivers were well-above-normal. The Porcupine River was running somewhat above-normal for the time of year. Streamflow during this period represents winter baseflow, providing an indication of winter groundwater contributions.

Break-up and peak water level conditions generally occurred earlier. As a result of a warmer than normal winter, ice cover was recorded as thinner than normal on the Klondike, Yukon (at Dawson), and Porcupine rivers. Klondike River break-up occurred on April 28 with peak water levels the first week of June. Yukon River (at Dawson) break-up occurred on May 2, 2 weeks earlier than average. Porcupine River (at Old Crow) break-up occurred on May 7, 9 days earlier than average. Pelly River (at Ross River) break-up occurred on May 5, with peak water levels on May 23. Stewart River (at Mayo) break-up occurred on May 6 with peak water levels on May 23. Teslin River peak water levels occurred second week of June. Southern Lakes peak water levels occurred in August.

Air temperatures reflected an early start to the summer of 2014 throughout Yukon with rapid warming. However, temperatures moderated in June and the remainder of the summer was relatively cool.

Two precipitation events in July were experienced across most of Yukon. Water levels rose, but generally not to flood levels. Water levels remained high in the Teslin, Upper Yukon River and Pelly Rivers, possibly as a result of delayed snowmelt at high elevations. Flows in the Stewart remained above normal, but to a lesser extent than the more southerly major tributaries. The Yukon River at Carmacks and Dawson remained higher than normal throughout the open water period.

Observations from the July 3 to August 9, 2014 at the upper Porcupine River border sonar program indicated fluctuating water levels. Water levels steadily fell in early July, before rising toward a high water event in mid-July and a second fall/rise toward a second high water event in late July. In early August, water levels began to rise and were continuing to rise at the end of the period of operation of the Chinook salmon sonar program. A survey of the headwater of the Porcupine River (Fishing Branch and Miner rivers) from August 2 to 5, 2014, showed water levels considerably higher than in recent (2009; 2011–2013) past surveys of this area in early August, and water clarity was low. Similar conditions were observed in the Miner River during a survey on August 9, 2010.

Based on previous aerial surveys of the Miner River (2009–2013), this high water event may have coincided with the peak Chinook salmon spawning period. A follow up survey of both the

Fishing Branch and Miner rivers on August 14–15 showed that water levels had fallen and clear water conditions had returned to both rivers.

Water temperatures in the main tributaries (i.e. major spawning routes) did not reach the threshold of concern of 18 degrees Celsius (mean daily temperature). Migration and spawning rivers and streams began to cool between early and mid-July, roughly at the time that the first Chinook salmon entered the upstream tributaries.

Streams warmed early in 2014, to the probable benefit of overwintered juvenile Chinook salmon. This cohort more than doubles their body weight between ice off and leaving the areas where they had overwintered. Effects on emergent 0+ are less clear, with speculation that the conditions would also be favorable given that food organisms also depend on water temperatures to develop.

Autumn temperatures appeared normal and flows were elevated. Ample flows are predicted for egg incubation. Fry abundance appeared low in 2014; thus, there should be sufficient overwintering habitat in 2014/15.

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 requiring R&E funding, including:

1. Conservation,
2. Restoration,
3. Enhancement,
4. Stewardship,
5. Viable fisheries,
6. Communications, and
7. Administration.

The R&E funding process is initiated every fall with a Call for Conceptual Proposals. The process is guided by the Yukon River Panel's Budget Priorities Framework and an annually compiled list of Near-Term Priorities. The JTC, through its R&E subcommittee, reviews and screens submitted Conceptual Proposals for technical merit. Based on the merits and appropriateness of the proposed project, the Panel decides which applicants should submit a fully Detailed Proposal. These Detailed Proposals are reviewed by the R&E subcommittee and JTC

members in mid-winter. Final funding decisions guided by these reviews are made by the Panel in March or early April.

In 2014, a total of 29 projects were selected for R&E funding, of which, 21 (72.4%) were on-going multi-year projects and 8 (27.6%) were new. Funds in the amount of $1.076M were allocated to projects. Sixty five percent of the funds were directed towards Conservation projects; 14.5% towards Stewardship; 10.7% towards Communications; and 9.3% to Restoration. As of mid-January 2015, 2 projects have completed on time and on budget (Table 20). The remaining projects are on track to complete as scheduled in the coming months. Five projects have passed their contractual end dates having final reports still outstanding.

Status of 2014 R&E Projects

Table 20.–Restoration and enhancement fund projects, cost and status for completion, listed by envelope/category type, 2014.

Project #	Project Title	Amount (U.S.$)	Status & Due Date
CRE-05-14N	Collection of genetic material from adult Chinook salmon in the North Big Salmon watershed	$9,720	Completed
CRE-11-14N	Chinook salmon radio tracking and genetic sampling in the Porcupine River, Canada	$53,798	31-Dec-14
CRE-51-14	2014 Michie Creek Salmon and Habitat Monitoring Project	$16,020	31-Dec-14
URE-06-14N	Exploration of potential early life mortality in Canadian-origin Chinook salmon eggs due to thiamine deficiency	$11,000	30-Jan-15
URE-09-14	Rampart Rapids All Season Video Monitoring, 2014	$51,100	31-Jan-15
CRE-10-14	Porcupine River Chum Salmon Telemetry – Year 2	$43,772	31-Jan-15
CRE-09-14N	Porcupine River Chinook Salmon Sonar Program	$102,794	31-Jan-15
CRE-37-14	Blind Creek Chinook Salmon Enumeration Weir	$44,163	15-Feb-15
CRE-41-14	Chinook Salmon Sonar Enumeration on the Big Salmon River	$71,878	15-Feb-15
CRE-01-14	Mainstem Teslin River sonar project - 2014	$89,842	28-Feb-15
URE-03-14	Yukon River Chinook Salmon Subsistence Sampling: (Anvik, Galena, Ruby, Fort Yukon)	$40,275	31-Mar-15
CRE-20-14	Temperature monitoring of Yukon River Chinook Salmon spawning and migration habitats in Canada	$5,400	31-Mar-15
CRE-78-14	Collection and Analysis of Yukon River DNA Baseline Samples in AK & Canada	$66,500	31-Mar-15
URE-05-14N	Genetic stock identification of fall chum salmon in subsistence harvest from the Tanana Area, Yukon River, 2014.	$30,768	15-Apr-15
URE-01-14N	Genetic stock identification of fall chum salmon in commercial harvests, Yukon River 2014.	$40,000	30-Apr-15
CRE-79-14	Yukon River Salmon Stock Identification	$27,000	30-Jun-15
URE-16-14	Yukon River Border Sonar Operations	$0	30-Jun-15
	Conservation Total	**$704,030**	

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Project #	Project Title	Amount (U.S.$)	Status & Due Date
CRE-16-14N	Yukon River Chinook Salmon Mainstem Outplant Program Spawning Success Evaluation	$12,564	31-Oct-14
CRE-25-14	Fox Creek Salmon Restoration Project	$19,602	31-Dec-14
CRE-24-14	McIntyre Creek Stream Bank Stabilization	$40,380	31-Jan-15
CRE-15-14N	Restoration of Chinook Salmon – Upper Mayo River	$27,900	31-Jul-15
	Restoration Total	**$100,446**	
CRE-07-14	Tr'ondëk Hwëch'in First Fish Culture Camp	$9,000	31-Dec-14
CRE-06-14	Yukon River North Mainstem Stewardship	$28,314	Completed
CRE-64-14	Whitehorse Rapids Fishway Stewardship	$13,339	30-Jan-15
CRE-65-14	McIntyre Creek Salmon Incubation Project	$66,185	15-Aug-15
CRE-02-14	Salmon Stewardship Coordinators for Yukon Schools	$39,650	30-Aug-15
	Stewardship Total	**$156,488**	
CC-01-14	Yukon River Inseason Management Teleconferences	$10,000	31-Mar-15
CC-02-14	Yukon River Educational Exchange Trip	$35,000	31-Mar-15
CC-03-14	Yukon River Preseason Planning Process	$71,000	31-Oct-15
	Communication Total	**$116,000**	
	Grand Total	**$1,076,964**	

Note: CRE=Canadian Restoration and Enhancement Proposal, URE=U.S. Restoration and Enhancement Proposal, N=New proposal, and CC=Communications Committee project.

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, depending on the species. Information on stock origin from tagging, scale pattern, 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. Recovery of coded wire tags in these fisheries provides one of the key descriptors of the oceanic distribution of Yukon River Chinook salmon (Whitehorse Rapids Chinook salmon; Appendix A20).

Several U.S. fisheries are currently managed to limit the interception and bycatch of salmon stocks that include Yukon River salmon. These fisheries include salmon fisheries in the South Alaska Peninsula area and U.S. groundfish trawl fisheries in both the Gulf of Alaska (GOA) and Bering Sea-Aleutian Islands (BSAI) management areas. Information on the South Alaska Peninsula fisheries and salmon bycatch in the Bering Sea and Gulf of Alaska groundfish fisheries

are included here along with information on High Seas Driftnet enforcement activities by the United States Coast Guard and National Marine Fisheries Service. Relative abundance estimates of juvenile Chinook salmon in the northern Bering Sea from pelagic trawl surveys by the Alaska Fisheries Science Center, Auke Bay Laboratories are also included as a leading ecosystem indicator of stock status for Yukon River Chinook salmon.

9.2 WESTERN ALASKA SALMON STOCK IDENTIFICATION PROGRAM

Uncertainty about the magnitude, frequency, location and timing of stock-specific sockeye and chum salmon harvests in Western Alaska fisheries was the impetus for developing the Western Alaska Salmon Stock Identification Program (WASSIP). In May, 2006, a group of 11 signatories to a memorandum of understanding created WASSIP. Signatories include Alaska Department of Fish and Game, Aleut Corporation, Aleutians East Borough, Association of Village Council Presidents, Bering Sea Fishermen's Association, Bristol Bay Native Association, Concerned Area M Fishermen, Kawerak, Lake and Peninsula Borough, Tanana Chiefs Conference, and Yukon River Drainage Fisheries Association. WASSIP was a comprehensive program to sample commercial and subsistence chum and sockeye salmon fisheries in coastal marine areas of western Alaska from 2006 through 2009. This program is unprecedented in its magnitude and scope, including salmon fisheries from Chignik Bay to Kotzebue Sound, stretching over 3,000 km of shoreline. The program was designed to use genetic data in mixed stock analysis of fisheries samples to more clearly describe harvest patterns of chum and sockeye salmon stocks in Western Alaska. During the 4 years of fishery sampling, approximately 320,000 samples were collected and some 156,000 samples were analyzed by the ADF&G Gene Conservation Laboratory to estimate stock composition of fishery harvests with the finest resolution possible. Additional populations were added to the genetic baselines for both species and the number of DNA markers was greatly expanded to provide for increased stock resolution. Results of this study provide the most comprehensive examination of stock-specific harvest and harvest rates across Western Alaska fisheries ever attempted.

As no significant sockeye salmon stocks exist in the Yukon River, a synopsis of only chum salmon results from the WASSIP program is presented here. Despite significant advances in genetic baselines and DNA markers, the WASSIP program was unable to reliably differentiate among coastal Western Alaska chum salmon stocks (coastal stocks from Bristol Bay north through Norton Sound, excludes upper Yukon/fall chum salmon stocks) and that group of stocks is identified as Coastal Western Alaska (CWAK) reporting group. The Upper Yukon reporting group (primarily Yukon fall chum salmon) is genetically distinct and analyzed separately. Within the years assessed by WASSIP (2007–2009), the highest harvest rates for CWAK reporting group were in Bristol Bay area fisheries (20.5% to 22.3%). The South Alaska Peninsula June fishery was the only other fishery with harvest rates above 5% in any year. Total harvest rates across all assessed fisheries ranged from 26.7% to 33.2%. The highest harvest rates for Upper Yukon reporting group were in the Yukon Area fall fishery (1.6% to 6.3%). Harvest rates for the Upper Yukon group were below 1% in all other fisheries. Total harvest rates for Upper Yukon across all assessed fisheries were low and ranged from 2.3% to 7.7%.

Full documentation of the WASSIP process and resulting reports can be found online at http://www.adfg.alaska.gov/index.cfm?adfg=wassip.main. This documentation includes important information to assist stakeholders in interpreting complex and highly technical information provided by this project.

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

U.S. groundfish fisheries in the Bering Sea-Aleutian Islands (BSAI) and Gulf of Alaska (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 on 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 (http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm). Bycatch of Chinook and non-Chinook salmon (principally chum salmon) in the BSAI and GOA remained at relatively low levels in 2014 (Appendices A21 and A22). Bycatch of Chinook salmon was higher in BSAI groundfish fisheries (n=17,472; Appendix A21) than GOA groundfish fisheries (n=10,008; Appendix A22) during 2014. Consistent with previous years, bycatch levels of Chinook salmon were higher in the A-season (n=13,837) than the B-season (n=3,635) in the BSAI groundfish fisheries (Appendix A23). Bycatch of non-Chinook salmon species (predominately chum salmon) increased significantly in the BSAI groundfish fisheries from 2013 levels during 2014 (A and B seasons; n=222,864; Appendix A21).

Pollock directed fisheries in the Bering Sea have been the primary groundfish fishery of concern for salmon bycatch as they account for 88% of the total Chinook salmon bycatch and 98% of the non-Chinook salmon bycatch in the BSAI groundfish fisheries (Appendix A23). Harvests are managed in the BSAI pollock fishery by setting an annual 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; non-Chinook salmon are caught almost entirely during the summer/fall season (99%; Appendix A23).

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, and a voluntary rolling hotspot system (VRHS). 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 as part of the BSAI groundfish fisheries. These savings areas enabled cap-and-closure measures to limit salmon bycatch in the Bering Sea pollock fishery. Savings areas are based on locations with historically high spatial and temporal levels of salmon bycatch and were closed to fishing once salmon bycatch levels reached a specified cap. In 2006, fishing vessels participating in the VRHS were exempted from the salmon savings areas. The VRHS is intended to increase the ability of the pollock fishery to minimize salmon 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 a review of alternative management measures used to limit the bycatch of Chinook salmon and an environmental impact assessment of Chinook salmon bycatch in the Bering Sea pollock fishery (NMFS 2009a, NMFS 2009b). Following these reviews, the NPFMC recommended amendment 91 (http://www.fakr.noaa.gov/frules/75fr53026.pdf,

http://www.fakr.noaa.gov/frules/75fr58337.pdf) 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 an incentive plan agreement (IPA). Chinook salmon bycatch quotas are allocated to each season and sector of the fishery based on bycatch caps, historical Chinook salmon bycatch, and pollock harvest allocations; however, provisions are made in the amendment to transfer unused quotas under the approval of the National Marine Fisheries Service (NMFS) Alaska Regional Office. Performance caps establish benchmark performance criteria of incentive plan agreements, the primary tool used to minimize salmon bycatch. 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.

9.4 Northern Bering Sea Pelagic Trawl Surveys

Pelagic trawl surveys in the northern Bering Sea shelf were initiated in 2002 as part of the Bering-Aleutian Salmon International Survey (BASIS: 2002–2007). 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. The United States (Alaska Fisheries Science Center, Auke Bay Laboratories) continued pelagic trawl surveys in the northern Bering Sea in support of the Bering Sea Integrated Ecosystem Research Project (BSIERP) in 2009 and 2010. Funding support for the northern Bering Sea trawl studies in 2011 was provided by the Alaska Sustainable Salmon Fund and the Arctic Yukon Sustainable Salmon Initiative to specifically address Yukon River juvenile Chinook salmon. Northern Bering Sea pelagic trawl surveys were completed in 2012 and 2013 as part of Arctic EIS, a multi-disciplinary Arctic research program led by the University of Alaska and the Alaska Fisheries Science Center. Salmon catch data collected during these fisheries and oceanographic surveys provide a unique opportunity to evaluate the status of salmon stocks during their juvenile life-history stage. Vessel support for trawl surveys in 2014 was provided by the State of Alaska's Chinook Salmon Initiative program as part of a calibration study between large and small vessels. Yukon River Chinook salmon are the predominate stock group in the northern Bering Sea (Murphy et al. 2009); and stock-specific juvenile abundance estimates in the Northern Bering Sea has been used to provide an early indicator of Canadian-origin Chinook salmon production to inform preseason management decisions (Figure 9). The juvenile index in 2011 and 2012 will be the primary contributors to the 2015 return as Chinook salmon typically return to the Yukon River after spending 3 to 4 years in the ocean.

9.5 Enforcement of High Seas Driftnet Fishing Moratorium

The following summary, submitted by Commander, U.S. Coast Guard District 17 (Juneau, Alaska), is a summary of U.S. Coast Guard enforcement efforts and multilateral coordination addressing the threat of large-scale high seas driftnet (HSDN) fishing in the North Pacific Ocean.

In 2014 the U.S. Coast Guard once again implemented Operation North Pacific Guard, the U.S. Coast Guard's high seas fisheries enforcement operation to detect, deter, and eliminate illegal,

unreported, and unregulated (IUU) fishing activity on the high seas of the North Pacific Ocean. The focus of Operation North Pacific Guard included large-scale HSDN activity and any high seas capture of anadromous species (salmon). Operation North Pacific Guard is planned and executed by Commander, U.S. Coast Guard District 17 in harmonization with the multilateral enforcement focus of the North Pacific Anadromous Fisheries Commission's (NPAFC) Enforcement Coordination Committee. In addition, Operation North Pacific Guard implements the *Memorandum of Understanding Between the Government of the United States of America and the Government of the People's Republic of China on Effective Cooperation and Implementation of United Nations General Assembly Resolution 46/215 of December 20, 1991,* known more generally as the U.S.-PRC Agreement (http://www.nmfs.noaa.gov/ia/agreements/bilateral_arrangements/us_china.pdf) on Fisheries Enforcement and Shiprider Cooperation.

10.0 RUN OUTLOOKS 2015

10.1 YUKON RIVER CHINOOK SALMON

Canadian-Origin Upper Yukon River Chinook Salmon

The Chinook salmon run on the Yukon River is typically dominated by age-5 and age-6 fish. The brood years producing these age classes in 2015 were 2009 (age-6) and 2010 (age-5). The Canadian-origin upper Yukon River Chinook salmon spawning escapements in 2009 and 2010 were 65,278 and 32,009 fish, which were above and below average escapements, respectively (Appendix A9; Figure 10).

Stock-recruitment (S/R) and sibling models predict the 2015 run size of Canadian-origin Chinook salmon to be as high as 96,083 and 103,701 fish, respectively (Table 21). However, these models do not include uncertainty associated with lower productivity observed in recent years. Over the past 8 years, observed run sizes were approximately 39% lower than preseason outlooks developed with the stock-recruitment (S/R) model, 33% lower than preseason outlooks developed with the sibling model, and 36% lower than preseason outlooks developed by averaging the 2 models. It is important to note that neither model incorporates environmental variables such as oceanic or freshwater conditions.

To account for some of the uncertainty in the preseason outlook due to lower productivity in recent years, the projections from each of the 2 models (96,083 and 103,701 fish for S/R and sibling models) were adjusted by the recent 8 year model performance. Based on this adjustment, the resulting preseason outlook range for Canadian origin Chinook salmon is 59,000 to 70,000 fish[24]. In the past 8 years, odd-year runs (2007, 2009, and 2011) have tended to be better than even-year runs, due to a stronger age-6 component returning (Figure 11). However, the 2013 Chinook salmon run had a weaker age-5 component than anticipated and ended up being one of the lowest Chinook salmon runs on record. In 2014, the age-6 component was also subsequently weak, but a strong age-5 component returned, resulting in a larger run size than 2013. The sibling model is predicting a strong return of age-6 fish for 2015. These outlooks suggest that the 2015 Canadian-origin upper Yukon River Chinook salmon run may be similar to 2014, but will still be below average in run size (average run size for 2000–2014 was 83,000 fish; Table 21).

[24] The preseason range was rounded to the nearest thousand.

Development of Revised Canadian-origin Chinook Salmon Database

The current method of estimating border passage was developed from a combination of mainstem sonar estimates (2005–2007) and radiotelemetry data (2002–2004). Total spawning escapements for 2002 to 2007 were calculated by subtracting the Canadian catch from these estimates. Linear regression of the estimated total spawning escapements for these years against a 3-area aerial survey index of Big Salmon, Little Salmon, and Nisutlin rivers was used to reconstruct historical Canadian spawning escapement estimates back to 1982 (Appendix B11). These estimates replaced the earlier border and spawning escapement estimates, derived from the DFO Chinook salmon mark–recapture program. Information from a number of sources, reviewed in 2008, indicated that the earlier mark–recapture derived border and spawning escapement estimates were likely biased low.

Age-specific returns were then calculated based on age, harvest and escapement data in the return years (Appendix A9). The resulting database forms the basis for the current stock-recruitment model. Sonar estimates from the project near Eagle have been used from 2005 to present. The JTC is pursuing further statistical run reconstruction analyses to improve historic run size estimates.

Performance of Stock-Recruitment Models for the Years 2000–2014

A review of preseason outlook performance provides an opportunity to document the recent decline in the upper Yukon River Chinook salmon return per spawner values. Revised historical Canadian run size estimates were used to reconstruct the 2000 and 2001 runs. The average of the preseason outlook is derived using stock-recruitment (S/R) and sibling model projections compared to postseason estimates of run size (Table 21). The averaged model projection for 2015 is about 100,000 Chinook salmon. As stated previously, the preseason estimates derived from each model are multiplied by the 8-year average performance to create a range. Despite good brood year escapements, the observed run sizes were relatively low from 2000 to 2002 and from 2007 to 2014. The causes of low returns are unknown but likely involve a number of factors in the marine and freshwater environments. For example, the 2008 outlook of 117,000 Chinook salmon overestimated the run size by a factor of 1.77, or 77% above the actual run. It will be important to determine if the low run sizes observed in the 2007 to 2014 period develop into a long-term trend.

Table 21.–Preseason upper Yukon River Chinook salmon outlooks for 2000 to 2015 and the observed run sizes for 2000 to 2014.

	Expected Run Size (Preseason)					Estimated	Performance
Year	S/R	Sibling	Avg. (S/R & Sib.)	Avg S/R Performance	Avg. Sib Performance	Run Size (Postseason)	of Preseason Outlook Models
2000	127,784	85,889	107,000			53,000	2.02
2001	126,641	51,082	89,000			86,000	1.03
2002	113,759	107,496	111,000			82,000	1.35
2003	116,948	109,577	113,000			150,000	0.75
2004	123,469	124,326	124,000			117,000	1.06
2005	121,764	117,860	120,000			124,000	0.97
2006	115,995	123,132	120,000			119,000	1.01
2007	118,557	139,934	129,000			88,000	1.47
2008	111,551	122,435	117,000			63,000	1.77
2009	98,172	103,541	101,000			87,000	1.16
2010	109,797	116,346	113,000			60,000	1.88
2011	102,831	113,323	108,000			72,000	1.50
2012	106,090	87,167	98,000	73,000*	54,000	48,000	2.00
2013	109,984	79,160	95,000	72,000*	49,000	37,000	2.57
2014	100,159	53,287	77,000	61,000*	32,000	65,000	1.18
2015	96,083	103,701	100,000	59,000*	70,000		
Average 2000–2014	113,567	102,304	108,000			83,000	1.45

Note: Run size is estimated as the border passage estimate plus the Alaska harvest of Canadian-origin Chinook salmon. Border passage estimates incorporate: radiotelemetry data (2002–2004); the mainstem Yukon River sonar at Eagle estimates (2005–2014); and the relationship between telemetry/sonar to aerial surveys for 2000 and 2001. Harvest estimates are determined using genetic sampling estimates (and historically, scale pattern analysis) and total Alaska harvest data. The average of the preseason spawner/recruit (S/R) and sibling run sizes, and the postseason run sizes are rounded to nearest thousand. The adjusted outlooks since 2012 have been calculated by applying recent average model performance to each model (* indicates adjusted S/R model outlook, while the other end of the range is the adjusted sibling model outlook).

Drainagewide Chinook Salmon

The outlook for the total Yukon River Chinook salmon run can be estimated by applying historical average proportions of Canadian-origin fish in the total run to the outlook estimated for the Canadian component of the run. The average proportion of Canadian-origin fish in the total run is approximately 50%. The drainagewide run outlook based on the adjusted Canadian-origin model estimate, which attempts to account for low productivity since 2007, is 118,000–140,000 Chinook salmon. Thus, the 2015 Yukon River Chinook salmon run will likely be below average.

During the winter and spring of 2015, ADF&G and USFWS fisheries managers are traveling to stakeholder meetings such as the YRDFA annual meeting in Anchorage, Alaska Board of Fisheries Advisory Committee meetings, U.S. Department of Interior Regional Advisory Council meetings, and the Yukon River Panel meeting in Whitehorse, YT to engage fishermen, tribal council representatives, and other stakeholders to share information, provide input, and discuss

management options. The purpose of these meetings is to work cooperatively to identify options and practical management strategies for 2015 that will assist in getting adequate numbers of fish to the spawning grounds, should the Chinook salmon run be similar to the below average runs of 2007–2014.

10.2 YUKON RIVER SUMMER CHUM SALMON

The strength of the summer chum salmon run in 2015 will be dependent on production from the 2011 (age-4 fish) and 2010 (age-5 fish) escapements, as these age classes generally dominate the run. The total runs during 2010 and 2011 were approximately 1.6 and 2.2 million summer chum salmon, respectively. The escapement goal on the Anvik River (350,000–750,000 fish) was achieved in 2010 and exceeded in 2011, while the escapement goal on the East Fork Andreafksy River (>40,000 fish) was also met in both years. However, poor runs have sometimes resulted from large escapements in the past Yukon River summer chum salmon generally exhibit strong run size correlations among adjacent years, and it is expected that the 2015 total run in the Yukon River will be slightly lower than the 2014 run of approximately 2.4 million fish.

The 2015 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 12 years (2003–2014). 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 800,000 to 1,400,000 summer chum salmon. Similar to the last 2 years, the actual commercial harvest of summer chum salmon in 2015 will likely be affected by a potentially below average Chinook salmon run, as Chinook salmon are incidentally harvested 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 2008 have ranged from approximately 223,000 (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 316,000 (1996 production) to 2,900,000 (2001 production) fish. Corresponding return per spawner rates ranged from 0.3 to 8.9, averaging 1.75 for all years combined (1974–2008).

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 salmon runs prior to 2003 has generally been attributed to reduced productivity in the marine environment and not to low levels of parental escapement. Similarly, recent improvements in productivity may be 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 end and the lower end was 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 in attempt to capture some of the observed improvement in the run. The point estimate for 2006 and 2007 used 1974 to 1983 odd/even

maturity schedules to represent years of higher production, while 2008–2012 used 1984 to current year odd/even maturity schedules to represent years of lower production (Appendix A18). With the dissipation of the even/odd cycles in the past 15 years the trend is not as clear in the dataset therefore the maturity schedule for all completed brood years 1974–2008 (Appendix A18) was used to determine the point estimates in 2013–2015.

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 A18). The 2015 run will be composed of brood years 2009 to 2012 (Table 22). Estimates of returns per spawner (R/S) were used to estimate production for 2009 and 2010. An auto-regressive Ricker spawner-recruit model was used to predict returns from 2011 and 2012. The point projection estimates for 2015 used the 1974 to current complete brood year returns applied to the odd/even maturity schedule. The result is an estimate of 1,060,000 fall chum salmon. 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 2014. Therefore, the 2015 forecasted run size is expressed as a range from 944,000 to 1,176,000 fall chum salmon. This forecasted run size is slightly below average for odd-numbered year runs (1974–2013).

Table 22.–Forecasted 2015 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, 2009–2012.

Brood Year	Escapement	Estimated Production (R/S)	Estimated Production	Age	Contribution based on age	Current Return
2009	503,800	2.60	1,309,880	6	1.0%	10,451
2010	486,400	1.61	783,104	5	22.2%	235,521
2011	890,000	1.23	1,092,800	4	74.0%	784,598
2012	678,900	1.41	955,688	3	2.8%	29,439
Total expected run (unadjusted)						1,060,000
Total 2015 run size expressed as a range based on the forecasted vs. observed returns from 1987 to 2014 (80% CI):						944,000 to 1,176,000

The dominant parent year escapements contributing to this outlook were 2010, which was above the midpoint, and 2011, which exceeded the upper end of the drainagewide escapement goal range of 300,000 to 600,000 fish (Appendix C16). All parent year production (R/S) is estimated to be greater than 1.0 return per spawner. The 2009 parent year R/S is estimated to be the highest since the 2005 record low. The major contributor to the 2015 fall chum salmon run is anticipated to be age-4 fish returning from 2011 parent year (Appendix A18). The combination of good sized escapements and improved production has produced above average runs since 2011; however production may be leveling off.

For fall chum salmon, the sibling relationship is best between the age-5 to age-6 component (R^2=0.55). 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 196,000 chum salmon. Returns of age-4 fish from odd-numbered brood years during the time period 1974 to 2008 typically averaged 848,000 fall chum salmon, and in all years ranged from a low of 174,000 for brood year 1996 to a high of 2,039,000 for brood year 2001. Return of age-5 fish from the same time period for odd-numbered brood years typically averaged 268,000 fall

chum salmon, and in all years ranged from a low of 59,000 for brood year 1998 to a high of 703,000 for brood year 2001.

Additionally, there is uncertainty as to how well returns from large escapements (>700,000) produce since 7 out of 11 failed to yield replacement values. The most recent high production levels of 2.0 return/spawner (average R/S 1998 to 2003 completed brood years, excluding 2001) are well above the poor returns observed in 1994–1997 (average 0.44 R/S). Production in 2005 was at a record low of 0.27 R/S indicating poor survival; however, 2006 through 2009 have increased each year respectably as predicted. 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 2014 period (Table 23).

During the 2015 fall fishing season, estimated strength of the projected run will be adjusted using summer chum salmon run abundance, and assessed based on various inseason monitoring projects data. With a projected run size range from 944,000 to 1,176,000 fall chum salmon (midpoint 1,060,000 fish; Table 23), it is anticipated that escapement goals will be met while supporting normal subsistence fishing activities and potential commercial harvest levels of 390,000 to 626,000 fall chum salmon (Appendix A5). Commercial harvestable surpluses will be determined inseason and opportunity provided where commercial markets exist.

Table 23.–Preseason Yukon River drainagewide fall chum salmon outlooks 1998–2015 and observed run sizes 1998–2014.

Year	Expected Run Size (Preseason)	Estimated Run Size (Postseason)	Proportion of Expected Run
1998	880,000	322,000	0.37
1999	1,197,000	415,000	0.03
2000	1,137,000	239,000	0.21
2001	962,000	381,000	0.40
2002	646,000	424,000	0.66
2003	647,000	773,000	1.19
2004	672,000	613,000	0.91
2005	776,000	2,280,000	2.94
2006	1,211,000	1,161,000	0.96
2007	1,106,000	1,127,000	1.02
2008	1,057,000	899,000	0.85
2009	791,000	577,000	0.73
2010	690,000	607,000	0.88
2011	737,000	1,208,000	1.64
2012	1,114,000	969,000	0.87
2013	1,029,000	1,228,000	1.18
2014	932,000	1,020,000	1.09
2015	1,060,000		
Avg. (1998–2014)	917,000	837,000	0.95

Note: Run sizes are rounded to nearest one thousand. The expected run sizes are point estimates that ranges were developed for since 1999 however the ranges were not always distributed around the point estimate (1999–2005, see annual JTC reports for methods). From 2006 to present expected run sizes are the midpoints of the outlook range.

Canadian-Origin Upper Yukon River Fall Chum Salmon

The drainagewide outlook range of 944,000 to 1,176,000 fall chum salmon was used to develop the upper Yukon River fall chum salmon outlook. For this analysis (see also Section 7.3) the Canadian contribution to the drainagewide return of fall chum salmon was assumed to be approximately 30%. Recent genetic stock identification analyses have indicated that this assumption is reasonably close. For the purpose of developing a 2015 outlook, it was assumed that the upper Yukon River Canadian-origin component is likely to be at least 25% of the drainagewide return. Based upon the drainagewide outlook, and applying an assumed 25% contribution, the upper Yukon River outlook range is 236,000 to 294,000 fall chum salmon. The average estimated upper Yukon River fall chum salmon run size for 1998–2014 was approximately 215,000 fish (Table 24).

Table 24.–Preseason upper mainstem Yukon River fall chum salmon outlooks for 1998 to 2015 and observed run sizes for 1998–2014.

Year	Expected Run Size (Preseason)	Estimated Run Size (Postseason)	Performance of Preseason Outlook
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		
Average (1998–2014)	205,000	215,000	1.58

Note: Run sizes are rounded to nearest one thousand. The 2009 through 2014 preseason expected run sizes are the midpoint of the outlook range.

There is a considerable amount of uncertainty associated with the upper Yukon River fall chum salmon run projections due to unexpected run failures within the 1998–2002 period, followed by improved productivity and higher runs observed within the 2003–2007 period. For example: the 1998 outlook of 198,000 overestimated the run size by a factor of 2.83, or 183% above the actual run size. Weakness in fall chum salmon runs prior to 2003 may have resulted more from reduced productivity in the marine environment rather than low levels of parental escapement. A notable development that added to the uncertainty and complexity of both the 2009 and 2010 preseason outlooks was high parent spawning escapements which were well above levels previously observed. For example, the 2005 escapement of approximately 437,500 fall chum salmon was the highest observed within the 1982 to 2010 period, while the 2006 and 2007 escapements were the fourth and third highest observed, respectively (Appendix B15). Returns from the high spawning escapements of 2005 to 2007 (Appendix B15) were observed between 2008 and 2011; these returns have helped

to redefine a number of S/R parameters, including the number of spawners at maximum sustained yield and the number of spawners at equilibrium (i.e. replacement, the point where the return equals escapement). The 2009–2012 brood year escapements will contribute to the 2014 run (Table 25). The average proportional contribution of each age class to the total returns from a brood year is estimated at 58.8% age-4 and 38.4% age-5 fish.

Table 25.–Summary of upper mainstem Yukon River fall chum salmon brood year spawning escapements for the 2009–2012 period and the average contributions for age-3 to age-6 fish returning in 2015.

Brood Year	Escapement	Age	Contribution based on age
2009	93,626	6	1.2%
2010	117,789	5	38.4%
2011	205,566	4	58.8%
2012	137,662	3	1.6%

Given the uncertainty associated with the 2015 upper Yukon River fall chum salmon return, it is prudent to enter the 2015 season with the expectation that inseason assessment programs will determine run strength and appropriate management actions will be undertaken to ensure conservation and harvest sharing objectives are achieved. Annual runs have been reconstructed using mark–recapture and recent sonar data, and assumed contributions to U.S. catches. Genetic stock identification data (i.e., mixed stock analyses) projects have been initiated using R&E funding to analyze some of the U.S. fisheries to assist in determining the proportion of Canadian-origin stocks in the harvest.

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. Conservation concerns for the Fishing Branch River fall chum salmon run arose in the late 1990s and were heightened in 2000 when the count through the Fishing Branch River weir was only 5,057[25] fish, the lowest recorded escapement for the system. However, run sizes improved somewhat within the 2001–2012 period when weir counts ranged from a low of 13,085 fish in 2011 to a high of 119,058 fish in 2005 (Appendix B15). On occasion the Fishing Branch River fall chum counting program would end while considerable numbers of fish were still migrating; therefore a consistent approach was used to estimate the number of fish that may have migrated after the weir program ended.

The 2009–2012 brood year escapements will contribute to the 2014 run with age 3–6 fish returning in 2015 from these contributing brood years (Table 26). The estimate of the 1985 to 2008 average age composition of offspring produced was 60.7% age-4 fish and 36.5% age-5 fish. The weighted (by age composition) base level escapement that will produce the 2015 Porcupine River fall chum salmon run is approximately 14,500 fish.

[25] The counting fence was inoperable due to high water levels for a full week in late September, 2000. Passage during this time is considered negligible.

Table 26.–Summary of Fishing Branch River fall chum salmon brood year spawning escapements for the 2009–2012 period and the average contribution for age-3 to age-6 fish returning in 2015.

Brood Year	Escapement	Age	Contribution based on age
2009	25,828	6	1.7%
2010	15,773	5	36.5%
2011	13,085	4	60.7%
2012	22,399	3	1.2%

For many years the preseason outlook for the Porcupine River fall chum salmon was based on an assumed rate of 2.5 returns per spawner. In more recent years, the preseason Porcupine River outlook has been estimated as 5% of the basinwide forecast. Based upon the low returns observed in the 2014 run and apparent poor production from the 2010 brood year escapement of 15,413 fall chum salmon, a return per spawner value of 2.5 is unlikely. The Porcupine River run productivity appears to have declined relative to that of other Yukon River fall chum salmon stocks and an outlook calculation based on the basin-wide forecast may not be warranted. If the productivity of the 2011 brood year is similar to that of the 2010 brood year, the 2015 return is expected to be very poor.

The 2015 outlook range for the Fishing Branch River portion of the Porcupine River is from 14,000 to 26,000 (midpoint 20,000) fall chum salmon. This range is based on a number of assumptions, as follows.

1. The estimates of Fishing Branch River escapement derived from sonar and radio telemetry in 2014 and 2013 were accurate.
2. The average age proportions of returns from Fishing Branch River fall chum salmon, as estimated from weir and test fishing samples, are assumed to describe the age proportions of returns of brood years contributing to the 2015 run.
3. The Alaska harvest of Fishing Branch River fall chum salmon was equivalent to 30% of the basinwide fall chum harvest times the proportion of the Fishing Branch River escapement out of the total Canadian escapement (Fishing Branch River plus upper Yukon River fall chum salmon).
4. The apparent level of productivity (R/S) estimated for the 2010 brood year will apply to the subsequent brood years (2011 and 2012) contributing to the 2015 run.
5. Additionally, for the upper end of the range, 80% of the Porcupine River fall chum salmon spawning escapement upstream of Old Crow is assumed to have returned to Fishing Branch River in 2013 and 2014.
6. Historic stock recruitment relationships, if known, for the Fishing Branch River portion of the drainagewide stock will accurately describe the return from the 2011 spawning escapement.

This Fishing Branch River outlook is lower than the outlook range of 38,000 to 47,000 (midpoint 42,000) fish that would be made using the assumption that Fishing Branch River stock comprises approximately 4% of the drainagewide outlook.

The 2015 outlook range is the estimated number of fall chum salmon entering the mouth of the Yukon River bound for the Fishing Branch River; hence, the number of fish reaching the Fishing Branch River weir site will be reduced by catches in U.S. and Canadian fisheries prior to the fish reaching the site. Genetic samples are collected at the test fishery at the mainstem Yukon River sonar at Pilot Station and include representation of the Porcupine River stock. However, annual estimates of the contribution of Porcupine River stock to the total Yukon River fall chum salmon run have not accurately represented the Porcupine run size. Sufficient sample sizes to accurately apportion Porcupine River fall chum salmon in the genetic analysis are not attainable because of

their small proportion in the total run. Therefore estimates based on stock proportions in the lower river are of limited use in estimating the Porcupine River stock. Accurate estimates of the U.S. harvest rate (and catch) of upper Porcupine River stocks are not currently available and would likewise be difficult to obtain, increasing the level of uncertainty in the estimation of total run sizes and stock productivity. However, the 2015 Fishing Branch River outlook range suggests that there may not be a harvestable surplus relative to the escapement goal range of 22,000 to 49,000. Given the outlook, it is prudent to enter the 2015 season with the expectation that management actions will likely be necessary to ensure that conservation and harvest sharing objectives are achieved. Inseason assessment programs will determine the run strength and inform appropriate management actions.

As was observed with the upper Yukon River fall chum salmon stocks, the postseason estimates of the upper Porcupine River fall chum salmon run sizes were consistently below preseason outlooks throughout the 1998–2002 period (Table 27). For example, the 1998 outlook of 112,000 overestimated the run size by a factor of 4.48; the preseason outlook was 348% above the actual run size. Canadian postseason estimates of the fall chum salmon run to the upper Porcupine River drainage exceeded preseason outlooks from 2003 to 2005. However since 2006, the postseason estimates have been consistently lower than the preseason estimates. Although the 2013 sonar estimate of upper Porcupine River run size met the preseason outlook for the Fishing Branch River component of the run, not all upper Porcupine River fall chum salmon spawn in the Fishing Branch River.

Table 27.–Preseason upper Porcupine River fall chum salmon outlooks for 1998 to 2015 and observed run sizes for 1998–2014.

Year	Expected Run Size (Preseason)	Estimated Run Size (Postseason)	Performance of Preseason Outlook
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	1.6
2008	78,000	30,000	2.6
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	1.1
2013	52,000	39,000 (52,000)[a]	–
2014	46,000	13,000 (24,000)[a]	–
2015	17,000		
Average (1998–2012)	67,000	42,000	2.61

Note: Run sizes are rounded to nearest one thousand. The 2009 through 2014 preseason expected run sizes are the average of an outlook range. The Fishing Branch River weir monitored what is believed to be the dominant spawning stock within the Porcupine River drainage, and these escapement estimates are the basis for the preseason and postseason run size estimates.

[a] Run size estimates for 2013 and 2014 were based on Old Crow sonar counts and proportion of tag recoveries. Numbers in parentheses are the upper Porcupine River sonar based estimates for 2013 and 2014. 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 drainage 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 2015 coho salmon run will be age-4 fish returning from the 2011 parent year. Based on the run reconstruction index (1995–2013, excluding 1996 and 2009) the 2011 escapement was estimated to be 122,000 coho salmon which was below average (140,000). In 2011 a large amount of coho salmon were harvested incidentally to the directed fall chum salmon commercial fisheries. Subsistence harvest in 2011 was below the 1995–2013 average of 20,000 coho salmon.

Escapements are mostly monitored in the Tanana River drainage. The Delta Clearwater River (DCR) is a major producer of coho salmon in the upper Tanana River drainage with comparative escapement monitoring data since 1972. The parent year escapement of 6,180 fish in 2011 was above the lower end of the SEG range of 5,200 to 17,000 coho salmon. However, this escapement count is considered a minimum as the survey was likely conducted early and may not represent a peak spawning count. Six locations in the Tanana River drainage were surveyed for coho salmon specifically, of which 2 were above average, 2 were below average and one was average when compared to the recent 5-year average (2009–2013). Assuming average survival, the 2015 coho salmon run is anticipated to be average based on escapements observed in 2011.

10.5 SPAWNING ESCAPEMENT TARGET OPTIONS IN 2015: CANADIAN ORIGIN CHINOOK AND FALL CHUM SALMON

Canadian-origin upper Yukon River Chinook and fall chum salmon are managed under the umbrella of the Yukon River Salmon Agreement (YRSA). The Yukon River Panel (YRP) meets annually to recommend the escapement goals.

Canadian-Origin Upper Yukon River Chinook Salmon

In 2010, the Panel adopted an IMEG range of 42,500 to 55,000 Chinook salmon, to allow for the uncertainty of information from assessment projects. The IMEG has been retained each year since then. In the absence of a BEG, the JTC recommends retaining this IMEG range again in 2015, as per the intention of the Yukon River Panel to retain this objective for 2014—2016.

Previously, the IMEG was a point goal of greater than 45,000 Canadian-origin upper Yukon River Chinook salmon, agreed upon in 2008 and continued through 2009, and assessed using information from the mainstem Yukon River sonar at Eagle (Appendix A18). The IMEG supplanted the longstanding stock rebuilding goal range of 33,000 to 43,000 fish, which was used from 1985 to 2007, and monitored by a mark–recapture program just upstream of the international border. When the older IMEG recommendation was made in 2008, the JTC recognized that further analysis of a biologically based escapement goal was required.

Upper Yukon River Fall Chum Salmon

The upper Yukon River escapement goal specified within the YRSA is greater than 80,000 fall chum salmon (Appendix A19). This goal was achieved 20 times during the period from 1982–2014. The DFO fall chum salmon mark–recapture program was conducted from 1982 to 2008 while the joint U.S./Canada sonar program at Eagle was conducted for fall chum salmon from 2006 to 2014. The mark–recapture estimates generally agreed with Eagle sonar estimates for fall chum salmon when the 2 programs were conducted concurrently (2006–2008). The Eagle sonar

project became the primary assessment tool for the Canadian border passage and has been applied from 2006 to present.

The upper Yukon River escapement goal was reviewed in 2001 and after considerable analysis of the available data a recommendation was made for a BEG of 60,000 to 129,000 fall chum salmon (Eggers 2001). However, due to concerns over the quality of the data and analytical issues, the BEG recommendation was not accepted during a Pacific Scientific Advice Review Committee (PSARC) review (Tanasichuk 2002).

For 2015, the JTC recommends that the upper Yukon IMEG remain as established in 2010 as a range from 70,000 to 104,000 fall chum salmon (Appendix A19). 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 437,498 fall chum salmon. A range was established to offer more flexibility with respect to uncertainties associated with management. Returns from the high 2005 escapement have greatly increased the contrast in the spawner-recruit data, but the spawner-recruit analysis cannot be completed until estimates of the proportions of Canadian-origin fall chum salmon in Alaska harvests can be obtained. The JTC escapement goal subcommittee will continue to examine other data that may be used in recommending a revised escapement goal for future years, including genetic stock composition and age composition estimates for this stock.

Fishing Branch River Fall Chum Salmon

The escapement goal specified within the Yukon River Salmon Agreement is a range of 50,000 to 120,000 fall chum salmon to the Fishing Branch River. This goal has been achieved only 10 times from 1974 to 2012 and only 5 times from 1985 to 2012 when the weir program returned to operation. The Fishing Branch escapement goal was reviewed in 2001 and after considerable analysis of the available data a recommendation was made for a BEG of 27,000 to 56,000 fall chum salmon (Eggers 2001). However, due to concerns over the quality of the data and analytical issues, the BEG recommendation was also not accepted during a PSARC review (Tanasichuk 2002).

The goal of 50,000–120,000 fish generally could not be reached, having been achieved only once over the 2 fall chum salmon 4 year cycles preceding 2008 when escapements to the upper Yukon River in Canada were rebuilding. This led the JTC to question whether the lack of success was related to an unrealistically high goal. A JTC escapement goal subcommittee reviewed the goal and attempted to address some of the issues raised during the PSARC review. However as with the mainstem goal, no harvest proportions are available to separately estimate the spawner-recruit relationship in the Canadian-origin stock.

In April 2008, the Yukon River Panel accepted the Canada/U.S. Joint Technical Committee recommendation to adopt an IMEG range of 22,000 to 49,000 fall chum salmon for the Fishing Branch River for the 2008 to 2010 period. This IMEG range was extended in 2010 for another 3 years, 2011–2013 (Appendix A19). Following consultation with the Yukon Salmon Subcommittee, the IMEG was subsequently adopted by DFO and included in the IFMP. The 2012 Fishing Branch weir count and run size estimate did not provide any indication that the 2008 IMEG required revision. The JTC recommended extending the Fishing Branch IMEG range (22,000 to 49,000 fall chum salmon) for another 3 years, 2014–2016.

The analysis used to determine the IMEG was based on an assumption that when fishery exploitation has been low to moderate and the production regime has been somewhat stable, a SEG range tends to overlap with the historical spawning escapement range (Clark et al. 2014). The sustainable escapement is not necessarily the number of spawners at maximum sustained yield (S*msy*). The analysis uses escapement contrast (i.e. ratio of maximum to minimum escapement) and harvest rate information to determine what percentile range of observed escapements is appropriate for the escapement goal range determination. In the Fishing Branch River fall chum salmon analysis, escapements from 1985 to 2007 (excluding 1990) were incorporated along with the high contrast ratio of 24:1. The escapement goal range reflects the approximate 25 and 75 percentiles of 22 years of Fishing Branch River weir counts.

Assessment of the Fishing Branch fall chum salmon IMEG can no longer be based on weir counts, since the weir project was discontinued after the 2012 season. The JTC is currently analyzing options including appropriate methods to substitute for the weir-based assessment in the Fishing Branch River, and a possible alternative Porcupine River border passage goal, which could be developed and assessed using the existing sonar project.

11.0 STATUS OF ESCAPEMENT GOALS

11.1 ESCAPEMENT GOALS FOR ALASKA STOCKS

Yukon salmon escapement goals for all species in Alaska are under review in conjunction with the 2016 Alaska Board of Fisheries process for the Arctic, Yukon, and Kuskokwim (AYK) region (Conitz et al. 2012). The updated escapement goals will be presented at the January 2016 Board of Fisheries meeting, and approved by the directors of the ADF&G Commercial Fisheries and Sport Fish divisions following that meeting.

11.2 ESCAPEMENT GOALS FOR CANADIAN (TRANSBOUNDARY) STOCKS

Chinook Salmon

The current goal for Chinook salmon in Canada is an IMEG based on negotiations and agreement between U.S. and Canadian representatives, and has remained the same since 2010. The JTC is in continuing discussions over a new, biologically based escapement goal for upper mainstem Yukon River Chinook salmon in Canada. Expert presentations have been provided to the JTC at a number of recent meetings, covering run reconstructions, reconstructed age-composition estimates, and a salmon life history model workshop. The age composition analysis indicated that reconstructed age composition estimates produced by 9 different methods had similar effects on spawner-recruitment estimates. The JTC approved of a reconstructed age composition for 1982–2004 that averages the results from all candidate methods (T. Hamazaki, ADF&G Division of Commercial Fisheries, personal communication, February 2014). A Bayesian state-space run reconstruction and spawner-recruitment analysis has been completed and discussed with the JTC (S. Fleischman, ADF&G Division of Sport Fish, personal communication, October 2014). The JTC has requested that the run reconstruction and spawner-recruitment analysis be published and made available for use in providing a biologically based Chinook salmon escapement goal recommendation to the Panel.

Fall Chum Salmon

No new analysis is being conducted at this time for fall chum salmon. Reconstructed age composition to compare the DFO fish wheels to the drift gillnet gear at the sonar site (near

Eagle) has not yet been accomplished. The analysis is also on hold for genetic composition data to obtain better estimates of U.S. harvest proportions of Canadian-origin fall chum salmon. Therefore the JTC intends to maintain the current goal for fall chum salmon in the upper Yukon River mainstem established in 2010 until such a time that better data for escapement goal analysis is in hand. Further analysis on the Porcupine River fall chum salmon component would also require enough years of sonar data at the U.S./Canada border to develop a border goal to replace the Fishing Branch River goal.

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FIGURES

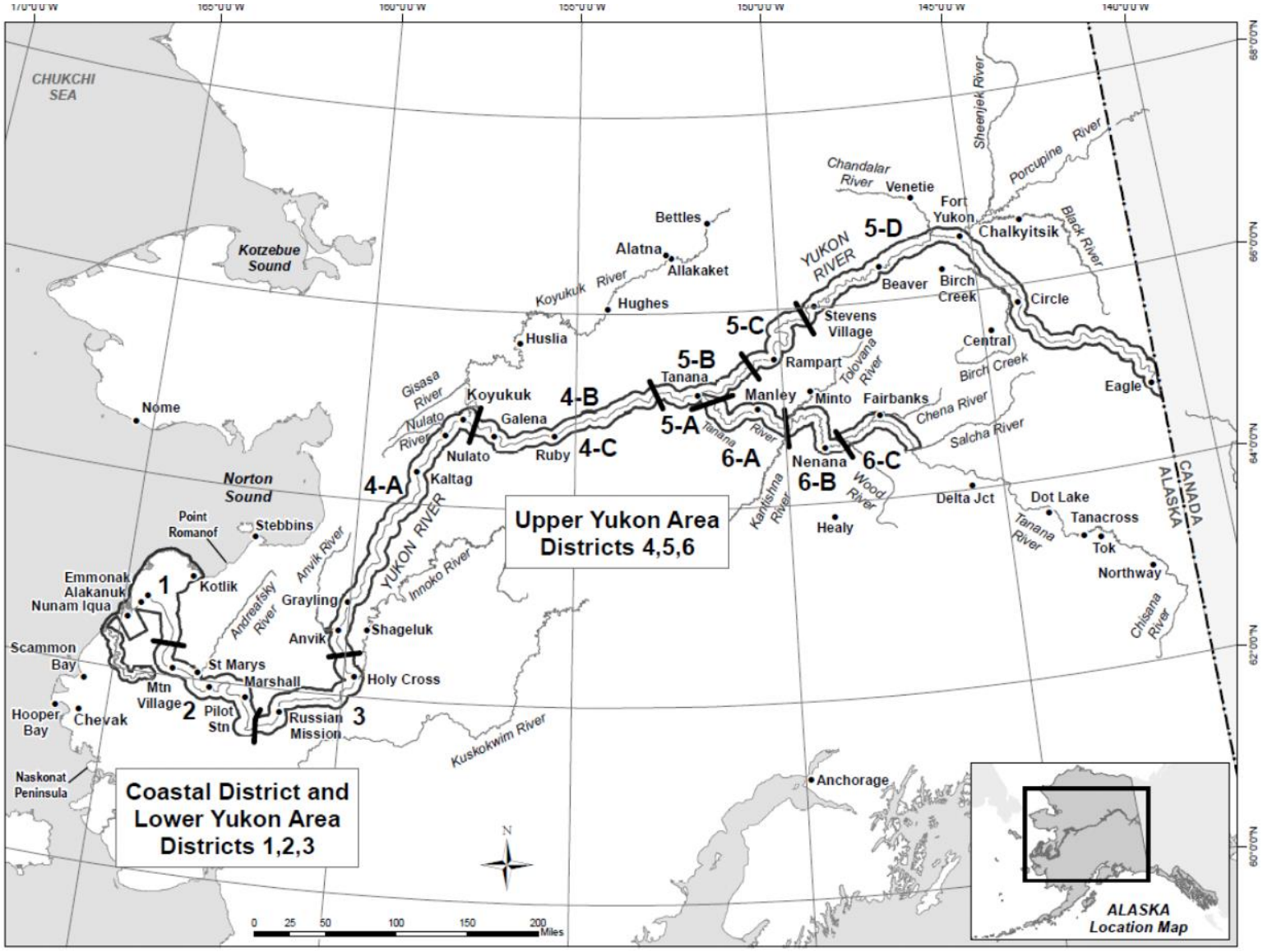
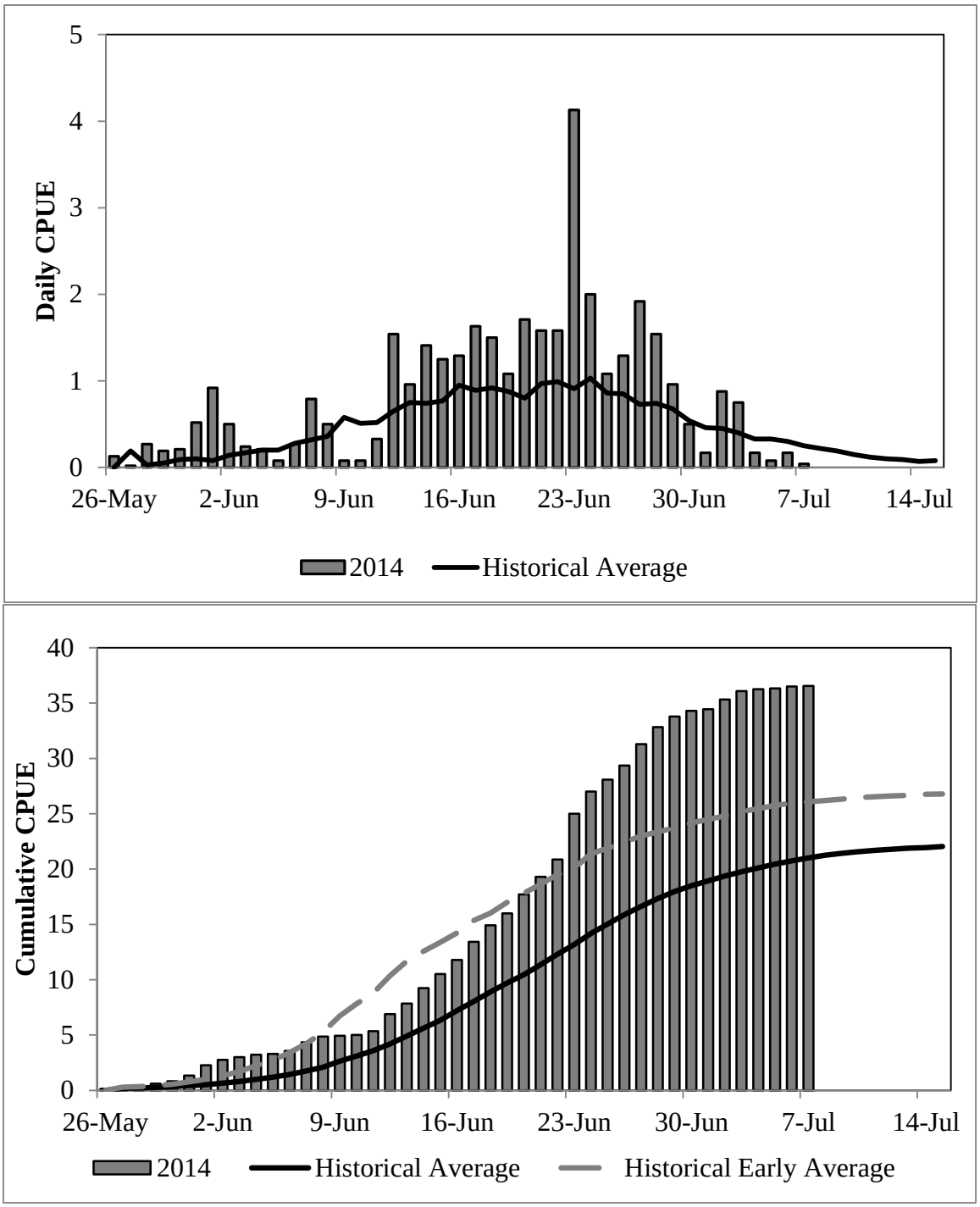
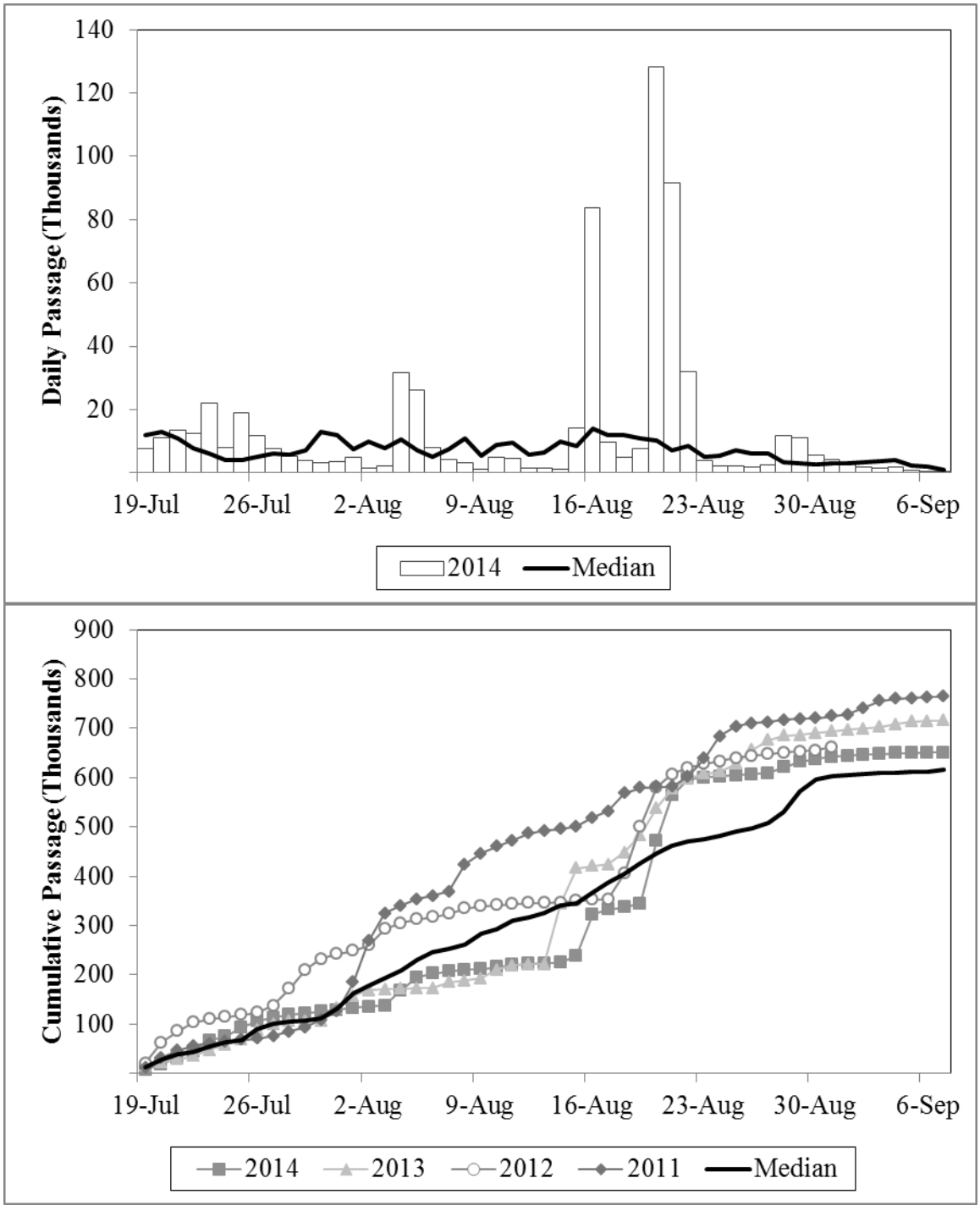


Figure 1.–Map of the Alaska portion of the Yukon River drainage showing communities and fishing districts.



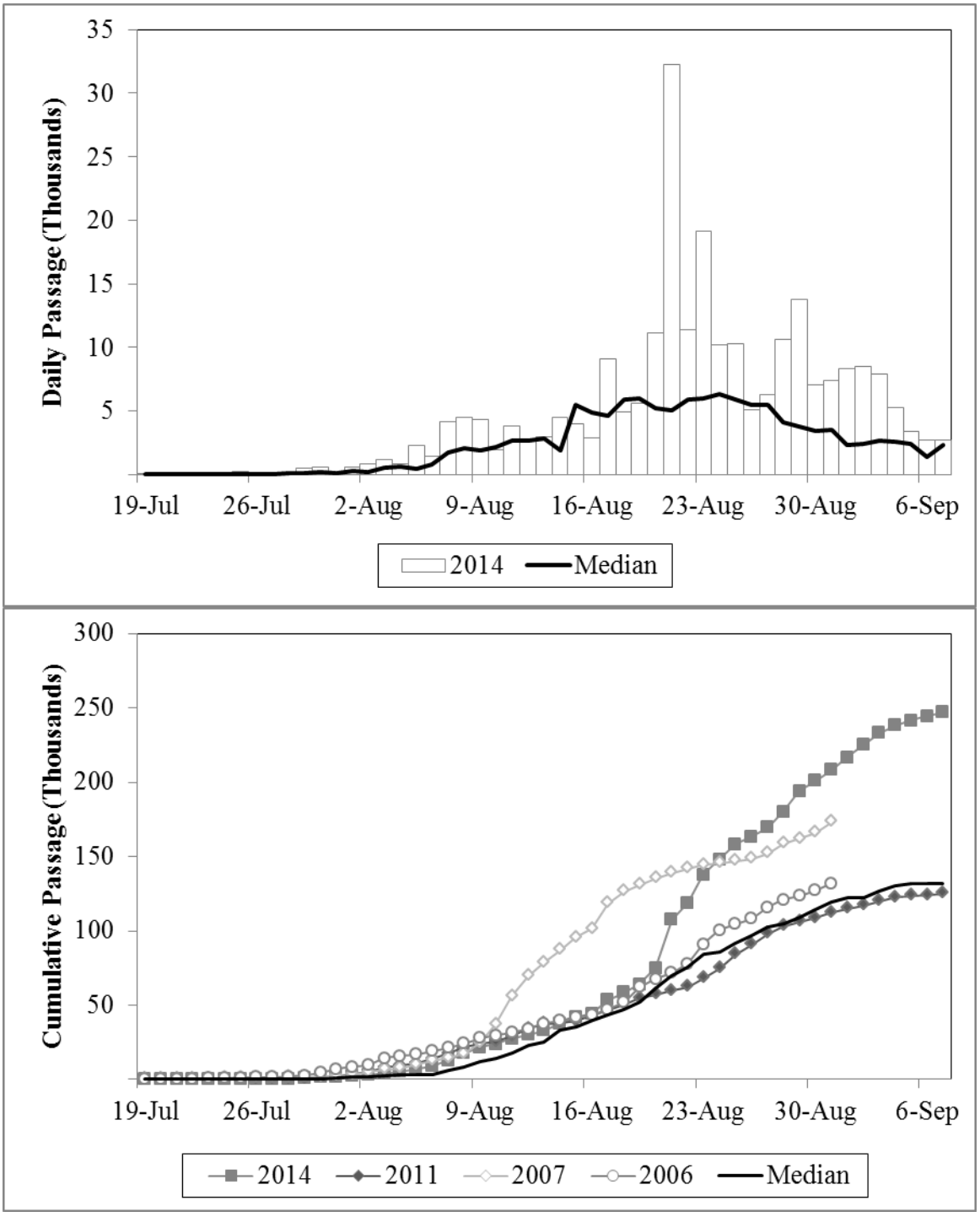
Note: Historical average includes 1989–2013, excluding 2009. Historical late average includes only 1993, 1995, 1996, 2003, and 2004.

Figure 2.–Daily and cumulative catch per unit effort (CPUE) for Chinook salmon in 8.5 inch set gillnet test fishery sites in 2014, compared to historic and early year average run timing, 1989–2013.



Note: Historical median includes 1995–2013, excluding 1996 and 2009.

Figure 3.–Daily passage estimates at the mainstem Yukon River sonar at Pilot Station attributed to fall chum salmon 2014 (top), compared to median and cumulative passage estimates (bottom), compared to other runs of similar size.



Note: Historical median includes 1995–2013, excluding 1996 and 2009.

Figure 4.–Daily passage estimates at the mainstem Yukon River sonar at Pilot Station attributed to coho salmon 2014 (top), compared to median and cumulative passage estimates (bottom), compared to median and other select years.

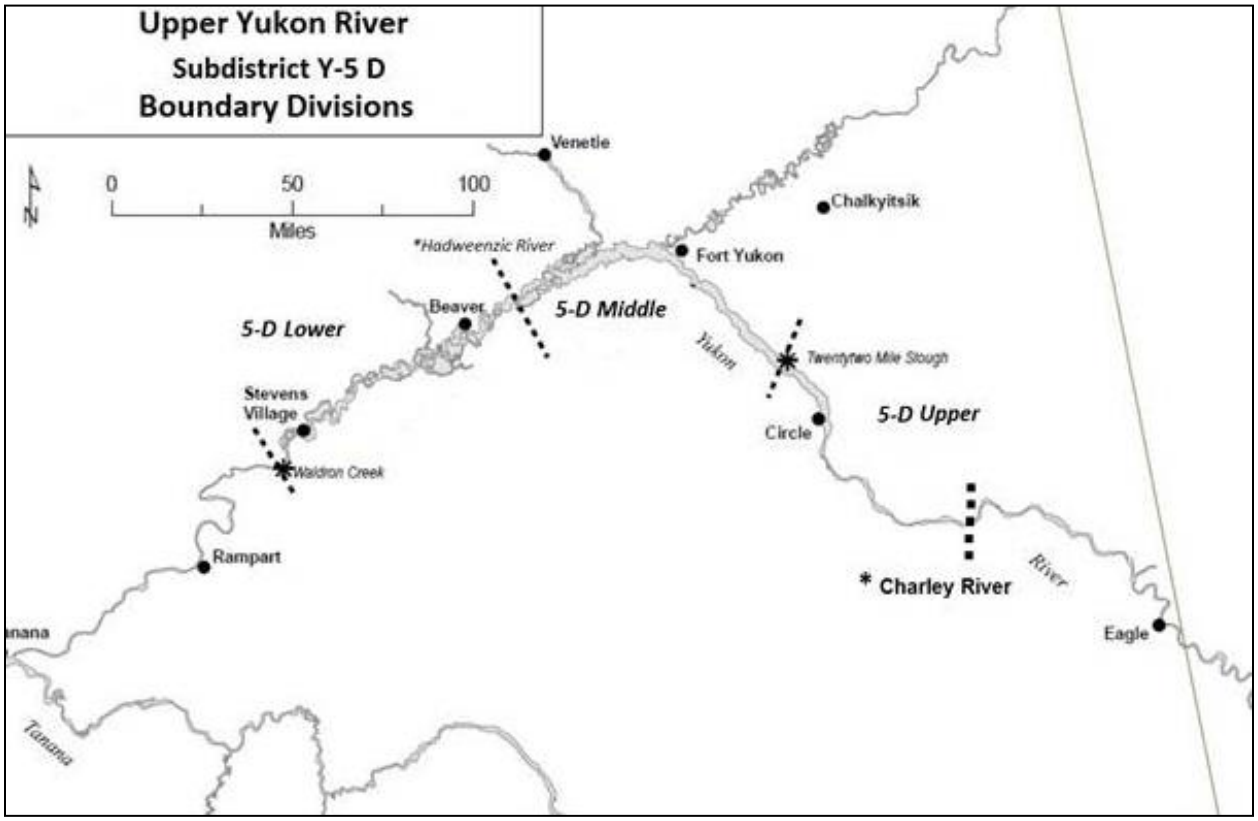


Figure 5.–Subdistrict 5-D was divided into 4 smaller areas during the 2014 season in order to implement Chinook salmon pulse protections.

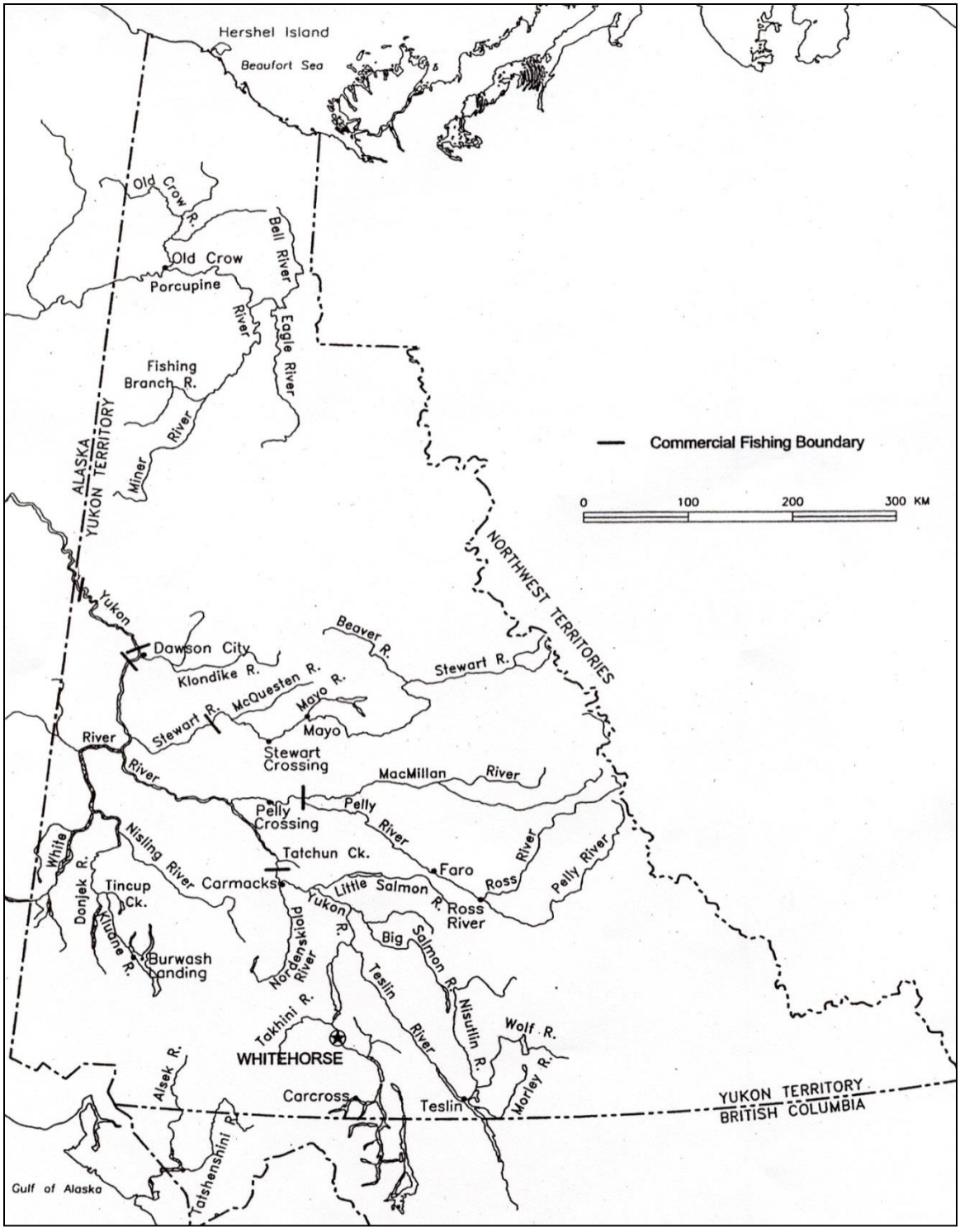
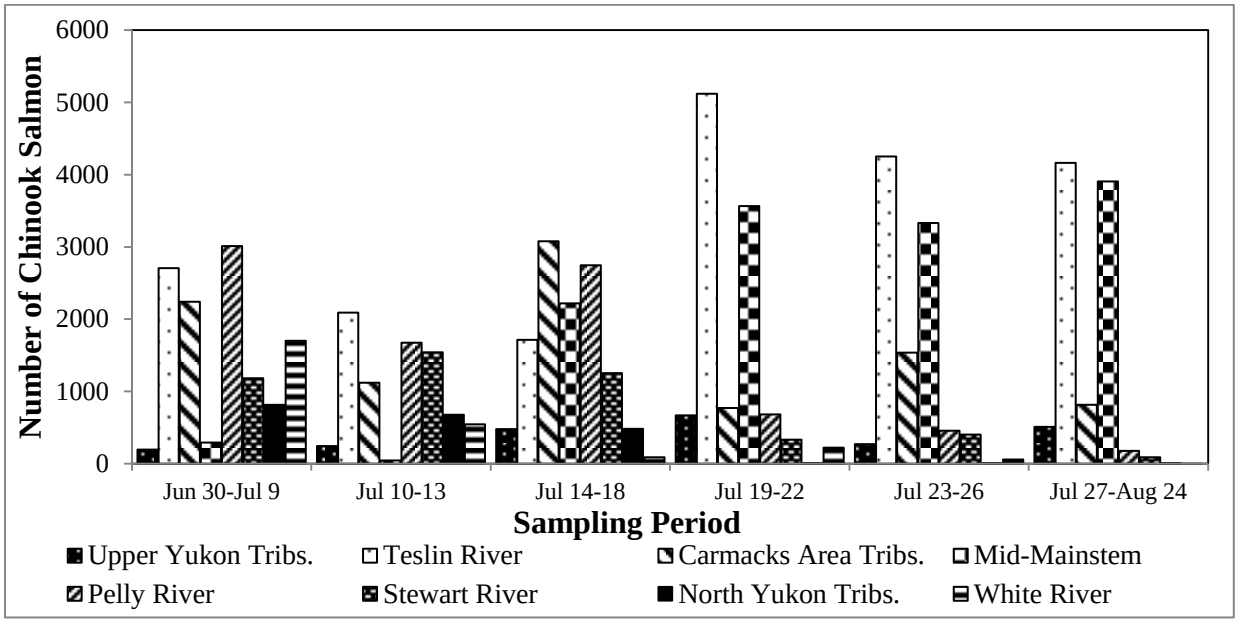
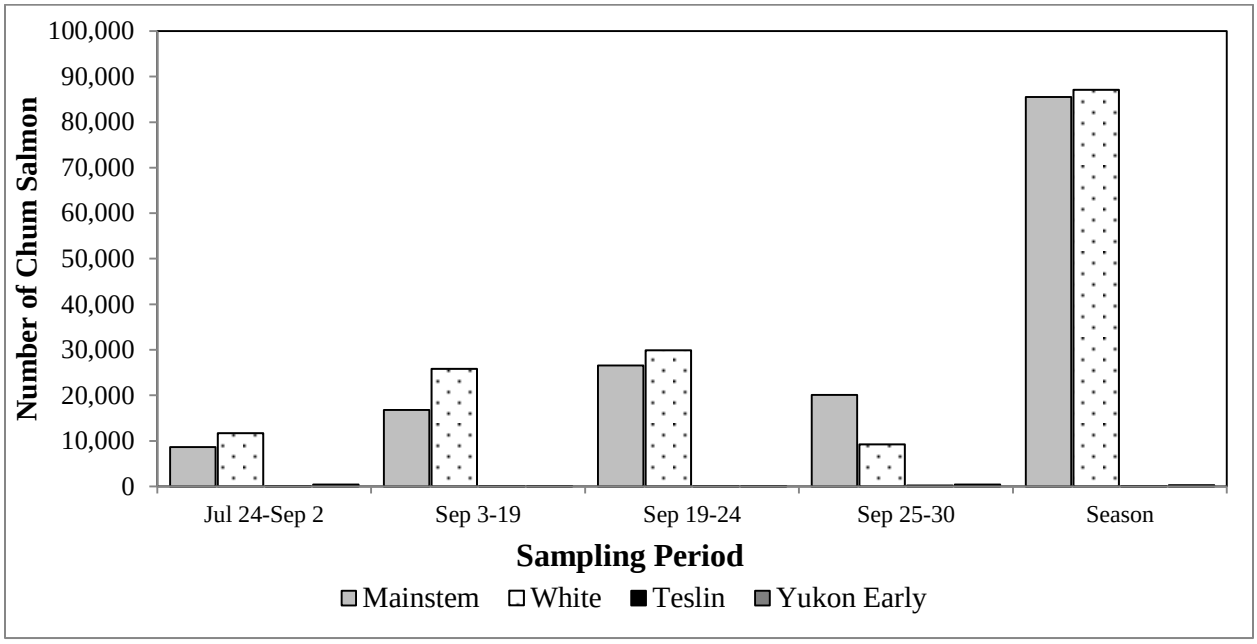


Figure 6.–Commercial fishing boundaries, tributaries, and major towns within the Yukon Territory, Canada.



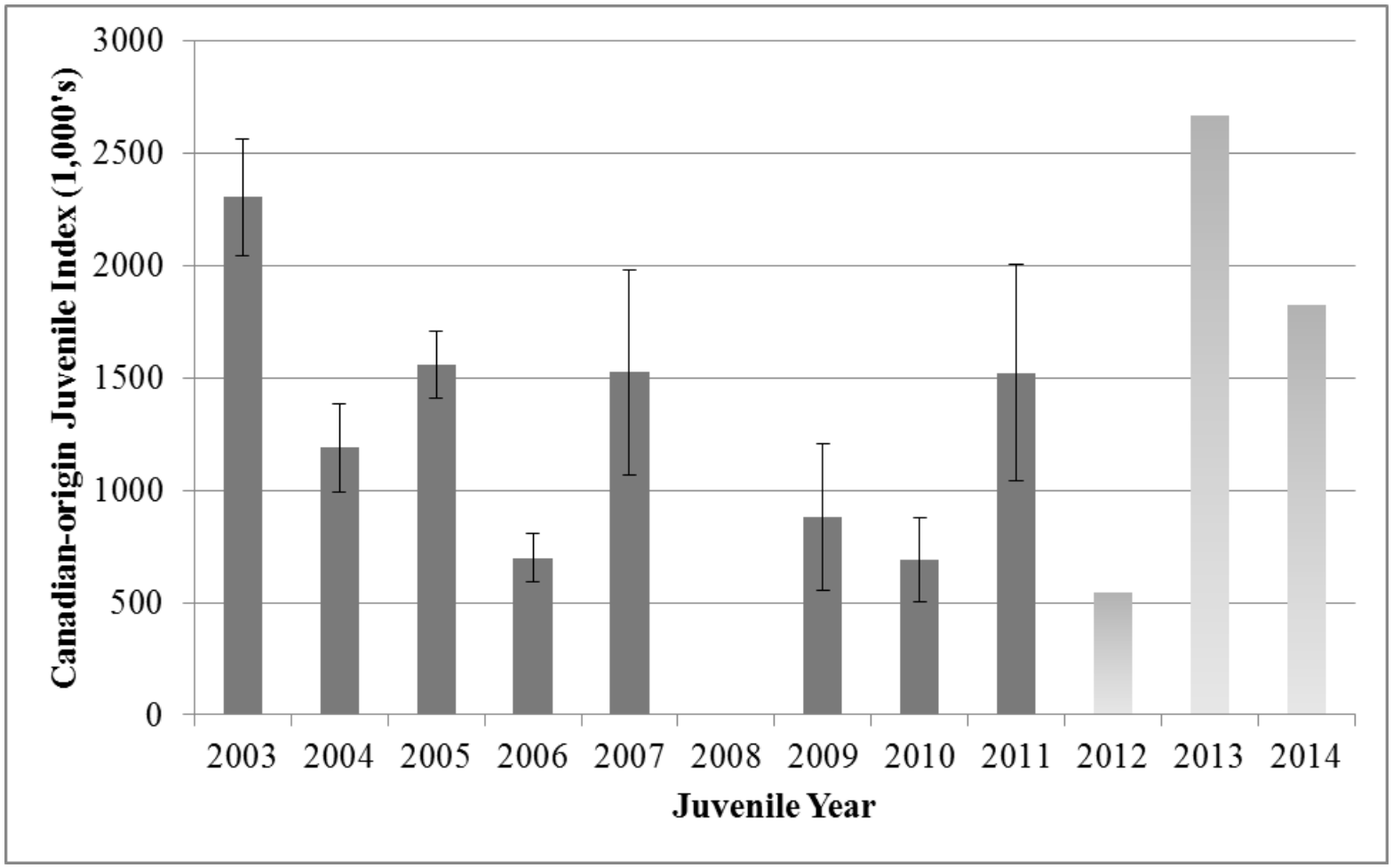
Note: This figure shows total seasonal abundance for 8 regional stock aggregates.

Figure 7.–Estimated abundance of Upper Yukon Chinook salmon stocks at Eagle sonar site in 2014 determined by Genetic Stock Identification analyses.



Note: This figure shows the abundance for each sampling period as well as the seasonal estimate for 4 regional stock aggregates.

Figure 8.–Relative abundance of Upper Yukon fall chum salmon stocks at Eagle sonar site in 2014 determined by Genetic Stock Identification analyses.



Note: Error bars identify the 80% confidence interval of the abundance estimates. The 2012–2014 estimates are preliminary and subject to change.

Figure 9.–Relative abundance of juvenile Chinook salmon estimated from catch rates in pelagic trawl research surveys in the northern Bering Sea (60N-65N).

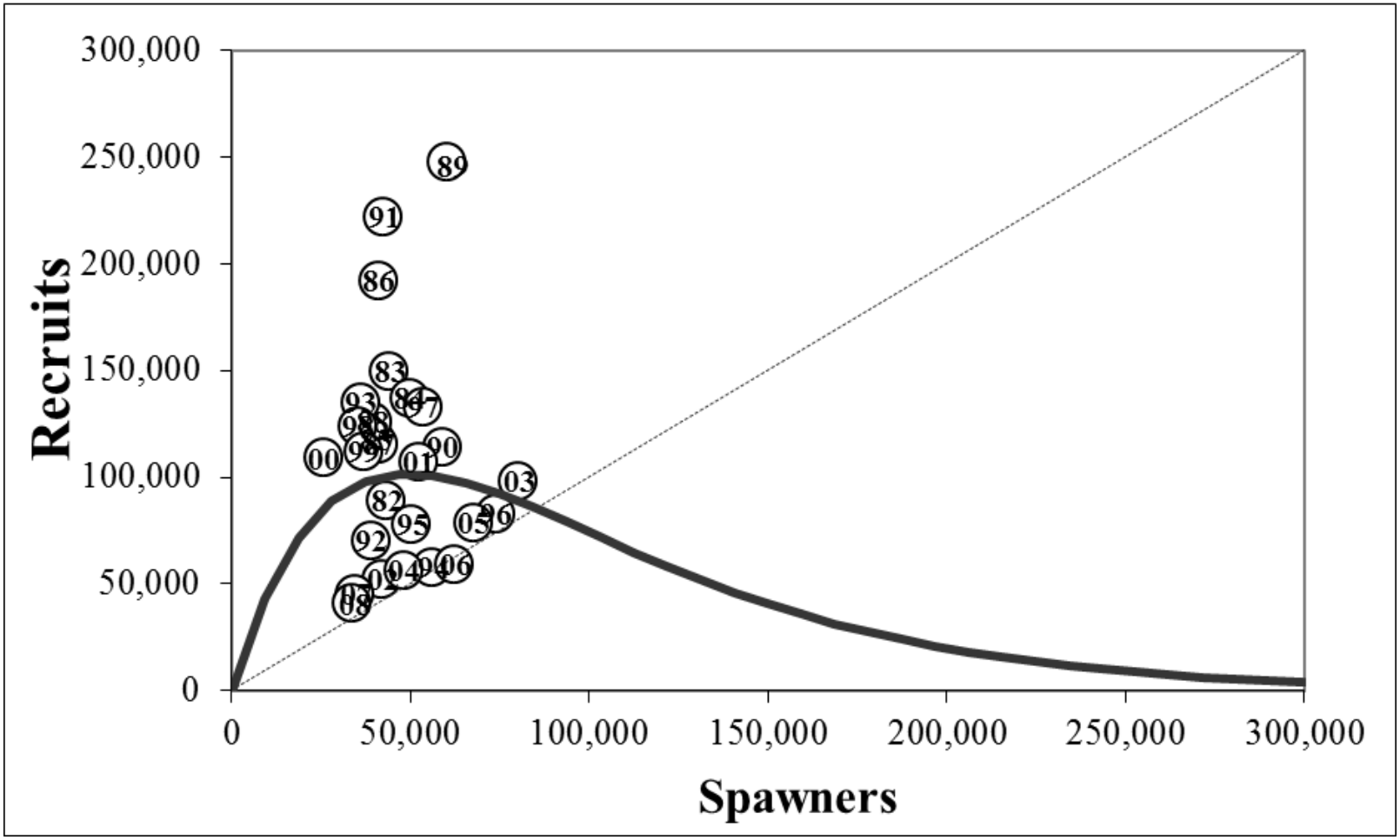


Figure 10.–Yukon River Canadian-origin Chinook salmon recruits versus spawners, Ricker curve, and 1:1 replacement line. Brood years 1982—2008 are included.

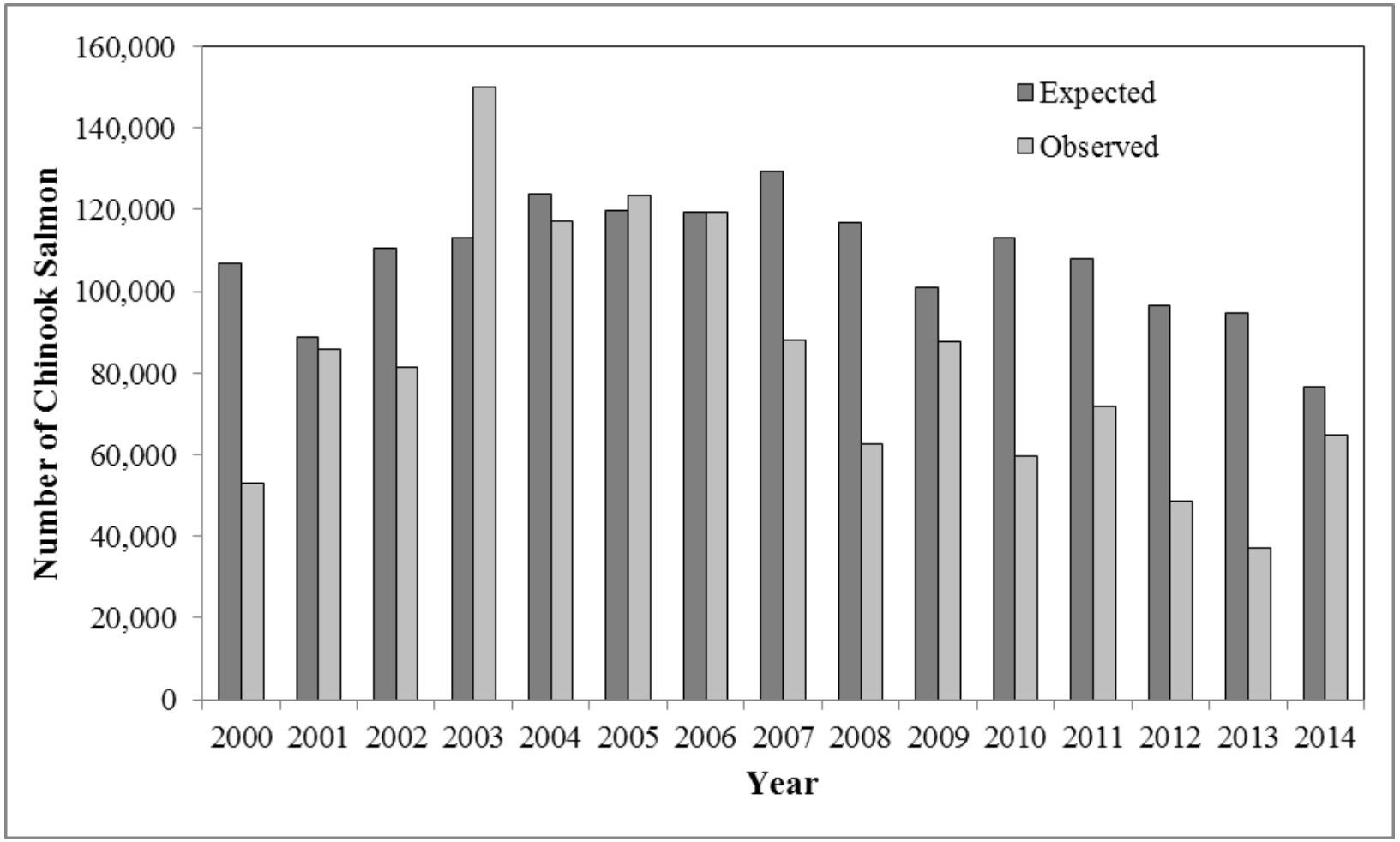


Figure 11.–Expected versus observed number of Canadian-origin Chinook salmon returning to spawn, 2000–2014.

APPENDIX A: TABLES

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

	Recommended Management Actions			
Projected Run Size [a]	Commercial	Personal Use	Sport	Subsistence
600,000 or Less	Closure	Closure	Closure	Closure [b]
600,001 to 700,000	Closure	Closure	Closure	Possible Restrictions [b]
700,001 to 1,000,000	Restrictions [b]	Restrictions [b]	Restrictions [b]	Normal Fishing Schedules
900,001 to 1,000,000	0-50,000	Open	Open	Normal Fishing Schedules
Greater than 1,000,000 [d]	Open [c]	Open	Open	Normal Fishing Schedules

[a] ADF&G will use best available data including preseason projections, mainstem river sonar passage estimates, plus the estimated harvest below the sonar site and the Andreafsky River escapement.

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

[c] 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 (f) and (g) and 5 AAC 05.365 if buying capacity allows.

[d] Inriver run goal: This is a specific management objective for salmon stocks that are subject to harvest upstream of the point where escapement is estimate.

Appendix A2.–Passage estimates based on the mainstem Yukon River sonar at Pilot Station, Yukon River drainage, 1995 and 1997–2014.

	Chinook			Chum						
Year [a]	Large [b]	Small	Total	Summer	Fall [c]	Total	Coho [c]	Pink	Other [d]	Total
2014	103,613	34,372	137,985	1,924,425	650,808	2,575,233	247,047	513,599	964,350	4,438,214
2013	105,433	11,726	117,159	2,747,218	716,727	3,463,945	84,795	4,624	1,029,900	4,700,423
2012	90,936	15,790	106,726	2,130,404	682,510	2,812,914	106,782	352,518	678,382	4,057,322
2011	100,217	23,152	123,369	1,977,808	764,194	2,742,002	124,931	6,526	694,700	3,691,528
2010	100,699	19,476	120,175	1,405,533	393,326	1,798,859	155,784	747,297	862,034	3,684,149
2009 [e]	108,361	35,688	144,049	1,421,646	233,307	1,654,953	206,620	23,679	765,140	2,794,441
2008	106,708	23,935	130,643	1,665,667	615,127	2,280,794	135,570	558,050	585,303	3,690,360
2007	90,184	35,369	125,553	1,726,885	684,011	2,410,896	173,289	71,699	1,085,316	3,866,753
2006	145,553	23,850	169,403	3,767,044	790,563	4,557,607	131,919	115,624	875,899	5,850,452
2005 [f]	142,007	17,434	159,441	2,439,616	1,813,589	4,253,205	184,718	37,932	593,248	5,228,544
2004	110,236	46,370	156,606	1,357,826	594,060	1,951,886	188,350	243,375	637,257	3,177,474
2003	245,037	23,500	268,537	1,168,518	889,778	2,058,296	269,081	4,656	502,878	3,103,448
2002	92,584	30,629	123,213	1,088,463	326,858	1,415,321	122,566	64,891	557,779	2,283,770
2001 [g]	85,511	13,892	99,403	441,450	376,182	817,632	137,769	665	353,431	1,408,900
2000	39,233	5,195	44,428	456,271	247,935	704,206	175,421	35,501	361,222	1,320,778
1999	127,809	16,914	144,723	973,708	379,493	1,353,201	62,521	1,801	465,515	2,027,761
1998	71,177	16,675	87,852	826,385	372,927	1,199,312	136,906	66,751	277,566	1,768,387
1997 [h]	118,121	77,526	195,647	1,415,641	506,621	1,922,262	104,343	2,379	621,857	2,846,488
1995	130,271	32,674	162,945	3,556,445	1,053,245	4,609,690	101,806	24,604	1,011,855	5,910,900

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

[b] Chinook salmon > 655 mm MEFL.

[c] This estimate may not include the entire run. Most years previously operated through August 31, except 1995 (September 3), 1998 (September 9), 2000 (September 14) and since 2008, operations have been extended to 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, 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 by district and subdistrict, 2014.

District/Subdistrict	Number of Fishermen [a]	Chinook	Summer Chum	Fall Chum	Coho	Pink
1	277	–	198,240	51,823	54,750	49,289
2	216	–	229,107	59,138	48,602	5,380
Subtotal Districts 1 and 2	468	0	427,347	110,961	103,352	54,669
3	–	–	–	–	–	
Total Lower Yukon	468	0	427,347	110,961	103,352	54,669
Anvik River	–	–	–	–	–	–
4–A	10	–	96,385	–	–	–
4–BC	–	–	–	–	–	–
Subtotal District 4	10	0	96,385	0	0	0
5–ABC	2	–	–	1,264	–	–
5–D	–	–	–	–	–	–
Subtotal District 5	2	0	0	1,264	0	0
6–ABC	2	–	6,912	3,368	1,286	–
Total Upper Yukon	14	0	103,297	4,632	1,286	0
Total Alaska	482	0	530,644	115,593	104,638	54,669

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 one delivery by district and season, Yukon Area, 1990–2014.

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
2004–2013 Average	294	194	1	472	4	5	6	15	487

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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	94
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
2004–2013 Average	184	109	0	289	0	2	6	8	297

-continued-

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	465
2014	277	216	0	468	10	2	2	14	482
2004–2013 Average	316	209	1	494	4	7	9	20	514

Note: Subtotals and combined season totals are not additive since fishermen may have operated in more than one district during the year. The table represents the number of permit holders which made at least one delivery.

[a] No commercial fishery was conducted that season.

Appendix A5.–Yukon River drainage 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 500,000	Closure	Closure [c]	Closure [c]	Possible Restrictions [c, d]	to
Greater Than 500,001	Open [e]	Open	Open	Pre-2001 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 500,000 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 2014.

Statistical Week	Week Ending	Start Date	Finish Date	Days Fished	Number of Fishermen	Boat Days	Chinook Salmon	Chum Salmon	Coho Salmon
28	20 Jul	12 Jul	6 Jul	12 Jul	closed				
29	27 Jul	19 Jul	13 Jul	19 Jul	closed				
30	3 Aug	26 Jul	20 Jul	26 Jul	closed				
31	10 Aug	2 Aug	27 Jul	2 Aug	closed				
32	17 Aug	9 Aug	3 Aug	9 Aug	closed				
33	24 Aug	16 Aug	10 Aug	16 Aug	closed				
34	31 Aug	23 Aug	17 Aug	23 Aug	closed			0	
35	7 Sep	30 Aug	24 Aug	30 Aug	3.5	0.7	0	169	
36	14 Sep	6 Sep	31 Aug	6 Sep	6	1.3	0	273	
37	21 Sep	13 Sep	7 Sep	13 Sep	7	1.7	0	642	
38	28 Sep	20 Sep	14 Sep	20 Sep	7	1.4	0	535	
39	5 Oct	27 Sep	21 Sep	27 Sep	7	0.7	0	581	
40	12 Oct	4 Oct	28 Sep	4 Oct	7	0.6	0	82	
41	19 Oct	11 Oct	5 Oct	11 Oct	7	0.9	0	203	
42	26 Oct	18 Oct	12 Oct	18 Oct	7	0	0	0	
43	2 Nov	25 Oct	19 Oct	25 Oct	closed	0	0	0	
Dawson Area Commercial					51.5	7.3	0	2,485	0
Upriver Commercial							0	0	0
Total Commercial Harvest							0	2,485	0
Domestic							0	19	0
Recreational							0	0	0
Aboriginal Fishery							100 [a]	546	0
Total Upper Yukon Harvest							100	3,050	0
Old Crow Aboriginal Fishery							3	1,983 [a]	133

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

[a] Data are preliminary.

Appendix A7.–Salmon fishery projects conducted in the Alaska portion of the Yukon River drainage in 2014.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
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.	June-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.	June-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 postseason 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.	June - 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
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) Describe catch rates and distribution of juvenile Chinook; update juvenile life-history information on size and timing of marine entry. 2) Describe fish communities in Yukon Delta tributary, tidal channel, and delta front/prodelta habitats and investigate prey consumption by potential juvenile salmon competitors and predators. 3) Describe temporal and spatial patterns in juvenile Chinook nutritional status.	May-August	All aspects	All aspects

-continued-

Appendix A7.–Page 2 of 5.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Local and Traditional Knowledge 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.	December 2013 – June 2016	All aspects	ADF&G
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 three salmon species (Chinook, summer chum and fall chum salmon) in six communities.	December 2013 – January 2017	ADF&G, APU	All aspects. APU statistical analysis macro-level patterns
Yukon River Chum Salmon Mixed-Stock Analysis	Pilot Station, RM 123	Estimate the stock compositions of chum salmon using samples collected from Pilot Station sonar test fisheries.	May – Aug.	USFWS	All aspects TI Funding summer, OSM Funding -fall
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 – Sept.	YRDFA	All aspects R&M 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.	June – 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.	June – Aug.	ADF&G, YDFDA	All aspects
Mountain Village Drift Gillnet Test Fishing	Mainstem Yukon River, MR 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.	July – Sept.	Sandone Consulting LLC, ATC, ADF&G	All aspects R&E 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.	June – Aug.	USFWS	All aspects OSM Funding

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Appendix A7.–Page 3 of 5.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
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.	June – July	ADF&G	All aspects OSM Funding
Inseason Monitoring of Subsistence Salmon Harvests	Marshall, Yukon RM 161	Collect 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) produce 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 – Sept.	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.	June – Aug.	TCC, USFWS-OSM	All aspects oversight & funding report write-up
Chandalar River Sonar	RM 14 Chandalar River, Yukon RM 996	1) Estimate fall chum salmon passage using DIDSON sonar 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 gillnets.	July – Oct.	ADF&G, DFO	All aspects, technical support, TI Funding, R&E Funding
Rapids Test Fish Wheel	Mainstem Yukon River, RM 730	1) Index run timing of Chinook and fall chum salmon runs as well as non-salmon species using video monitoring techniques and; 2) Characterize the sex, weight, and girth composition of Chinook salmon.	June – Sept.	Zuray USFWS	All aspects R&E funding
Tanana River Sonar	Mainstem Tanana River, RM 765	1) Estimate daily passage of Chinook, chum and coho salmon in the mainstem Tanana River using both split-beam and DIDSON and; 2) Estimate age, sex, and size composition of salmon captured in the test gillnets and fish wheel. Feasibility year.	Jul. – Sept.	ADF&G	All aspects

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Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
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.	Sept. – 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.	July – 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.	July – Aug.	BSFA	All aspects R&M Funding
Upper Tanana Escapement Surveys	Tanana River drainage, RM 991-1,053	Aerial surveys for numbers and distribution of coho and chum salmon in the side sloughs and tributaries of the Tanana River drainage.	Nov.	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.	July – 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.	June – 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.	June – Sept.	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.	June – Aug.	USFWS-OSM, ADF&G, DFO	All aspects
Inriver 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 send to lab to extract data tag. (Appendix A17)	May-Sept	ADF&G	Decoding

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Acronyms:

ADF&G	= Alaska Department of Fish and Game
ADPS	= Alaska Department of Public Safety
APU	= Alaska Pacific University
ATC	= Asacarsarmiut Tribal Council
AVCP	= Association of Village Council Presidents, Inc.
AYKSSF	= Arctic-Yukon-Kuskokwim Sustainable Salmon Fund
BSFA	= Bering Sea Fishermen's Association
DFO	= Department of Fisheries and Oceans (Canada)
DNA	= Deoxyribonucleic acid
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.
USFWS	= United States Fish and Wildlife Service
USFWS-OSM	= United States Fish and Wildlife Service, Office of Subsistence Management
YDFDA	=Yukon Delta Fisheries Development Association
YRDFA	= Yukon River Drainage Fisheries Association

Appendix A8.–List of harvest/escapement monitoring and incubation/rearing projects involving salmon in the Canadian portion of the Yukon River drainage in 2014.

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.	July – 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 Yukon Salmon Conservation Catch Card (YSCCC) program.	July – 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	July – 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 population, and; 3) To count and recover tags in terminal areas.	July – Oct.	R&E Projects DFO YFNs AFS	All aspects
Porcupine River Chum Salmon Radiotagging and Telemetry	Porcupine River and tributaries (Including Fishing Branch) upstream of Old Crow.	1) To estimate the % of Porcupine River chum salmon spawning upstream of the Fishing Branch weir site, to allow comparison of Old Crow hydroacoustic estimates to historic weir counts; and 2) To identify chum spawning locations in the Porcupine River upstream of Old Crow.	Aug. – Oct.	VGG & EDI & DFO	Joint Project
Porcupine River Sonar - Chinook	Old Crow	1) Installation and operation of 2 ARIS sonar program for Chinook salmon, 2) Conduct biological sampling for species apportionment, age, sex and length, and; 3) To provide inseason projections of run strength.	Aug. – Oct.	EDI & VGG	All aspects
Porcupine River Sonar - Chum	Old Crow	1)Operation of 2 ARIS sonar program for chum salmon, 2) Conduct biological sampling for species apportionment, age, sex and length, and; 3) To provide inseason projections of run strength.	Aug. – Oct.	DFO & VGG	All aspects
Whitehorse Rapids Fishway	Whitehorse	1) To enumerate wild and hatchery reared Chinook salmon returns to the Whitehorse fishway area and; 2) obtain age, size, sex and tag data.	July – Aug.	YF&GA	All aspects
Blind Creek Weir	Pelly River	1) To enumerate Chinook salmon escapement, recover tags and; 2) collect ASL data and DNA samples.	July – Aug.	JW&A	All aspects
Big Salmon Sonar	Big Salmon River	1) Installation and operation of a DIDSON sonar program for Chinook salmon, and; 2) obtain carcass survey, ASL, and genetic samples.	July – Aug.	JW&A	All aspects

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Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Teslin River Sonar	Teslin River	Installation and operation of a DIDSON sonar program for Chinook salmon enumeration.	July – Oct.	BM&A	All aspects
Whitehorse Rapids Fish Hatchery and Coded wireTagging Project	Whitehorse	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	GY and YEC, YF&GA	All aspects Coded wiretagging
McIntyre Incubation Facility and Coded-Wired Tagging Project	Whitehorse	1) To incubate up to 120K CK salmon eggs from brood stock collected at Tatchun R, and/or the Whitehorse Rapids fishway, and; 2) To rear, mark with CWT, adipose clip, and release fry to natal sites.	Ongoing	YC, YEC, TKC, DFO	Field work, project monitoring, technical support
Fox Creek Restoration Program	Whitehorse Area	Rear, tag and release Whitehorse Rapids CK to Fox Creek.	Ongoing	TKC	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
GY = Government of Yukon-Environment Yukon
JW&A = Jane Wilson & Associates
TKC = Ta'an Kwa'chin Council
VGG = Vuntut Gwitchin Government
YC = Yukon College
YEC = Yukon Energy Corporation
YFN's = Yukon First Nation's
YF&GA = Yukon Fish and Game Association

Appendix A9.–Yukon River Canadian-origin Chinook salmon total run by brood year and escapement by year 1982–2004 based on 3-Area Index, the mainstem Yukon River sonar at Eagle (2005–2014), and radiotelemetry (2002–2004).

Brood	Age								
Year	3	4	5	6	7	8	Return	Spawners	R/S
74						634			
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	38,458	1,755	0	77,964	67,985	1.15
06	15	6,008	25,640	25,684	1,568	0	58,914	62,630	0.94
07	47	2,849	17,746	22,193	1,705	0	44,540	34,904	1.28
08	1	3,138	11,092	25,974			40,205	33,883	1.19
09	173	2,324	32,663					65,278	
10	1	4,326						32,009	
11	106							46,307	
12								32,656	
13								28,669	
14									
Average							111,465	48,552	2.30
							Contrast	3.12	

Note: Current brood year data are preliminary.

Appendix A10.–Chinook salmon age and sex percentages from selected Yukon River escapement projects, 2014.

Location	Sample Size		Age 3	4	5	6	7	Total
East Fork	317	Males	1.1	5.8	47.7	1.1	0.0	55.7
Andreafsky River [a]		Females	0.0	1.2	33.2	10.0	0.0	44.3
		Total	1.1	6.9	80.9	11.1	0.0	100.0
Gisasa River [a]	130	Males	0.8	17.7	58.5	3.8	0.0	80.8
		Females	0.0	0.0	7.7	10.0	1.5	19.2
		Total	0.8	17.7	66.2	13.8	1.5	100.0
Yukon Mainstem [b]	606	Males	0.2	6.6	43.6	13.9	0.6	64.9
at Eagle, Alaska		Females	0.0	0.0	6.9	26.3	2.0	35.1
		Total	0.2	6.6	50.5	40.1	2.7	100.0
Chena River [c]	284	Males	1.4	3.5	60.2	1.4	0.4	66.9
		Females	0.0	0.0	22.9	10.2	0.0	33.1
		Total	1.4	3.5	83.1	11.6	0.4	100.0
Salcha River [c]	403	Males	1.5	14.6	47.8	3.7	0.2	68.0
		Females	0.0	0.0	11.9	18.9	1.2	32.0
		Total	1.5	14.6	59.8	22.6	1.5	100.0

[a] Samples were collected from a weir trap.

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

[c] Samples were handpicked from carcasses.

Appendix A11.–Summer chum salmon age and sex percentages with average lengths from selected Yukon River escapement projects, 2014.

Location	Sample Size		Age 3	4	5	6	7	Total	Average Length (mm)
East Fork	592	Males	0.3	46.5	14.7	5.6	0.0	67.1	556.1
Andreafsky River [a]		Females	0.5	24.0	6.8	1.5	0.0	32.9	519.8
		Total	0.8	70.5	21.5	7.1	0.0	100	544.0
Anvik River [b]	152	Males	0.0	20.6	21.4	3.4	0.0	45.4	593.2
		Females	0.0	24.2	26.9	3.5	0.0	54.6	561.4
		Total	0.0	44.8	48.3	6.9	0.0	100	575.5
Gisasa River [a]	249	Males	0.0	22.0	25.1	2.6	0.0	49.7	578.3
		Females	1.8	25.8	21.9	0.8	0.0	50.3	545.6
		Total	1.8	47.8	47.0	3.4	0.0	100	561.8
Salcha River [c]	160	Males	0.0	6.9	26.9	3.8	0.0	37.5	593.9
		Females	0.0	19.4	41.9	1.3	0.0	62.5	556.6
		Total	0.0	26.3	68.8	5.0	0.0	100	570.6

[a] Samples were collected from a weir trap, structure is scales.

[b] Samples were collected by beach seine, structure is scales.

[b] Samples were handpicked carcasses, structure is vertebra.

Appendix A12.–Total (U.S. and Canada) Yukon River Chinook salmon harvest percentage by stock group, 1981–2013.

Year [a]	Stock Group		
	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[b]			
Average			
1981-2012	20.0	24.4	55.6
2008-2012	14.6	31.3	54.0
Minimum 2012	5.4	6.3	34.5
Maximum 2012	40.1	54.5	70.9

Note: Minimum and maximum indicate year with the lowest and highest values through 2012.

[a] Stock identification methods from 1981 through 2003 were based on scale pattern analysis. Beginning in 2004, genetic analysis was used.

[b] Estimates for 2014 have not yet been finalized.

Appendix A13.–Yukon River Chinook salmon harvest percentage by stock group in Alaska, 1981–2013.

Year [a]	Stock Group		
	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[b]			
Average			
1981-2012	22.2	26.9	50.8
2008-2012	15.9	34.2	49.9
Minimum 2012	5.9	6.9	27.7
Maximum 2012	44.1	59.8	66.8

Note: Minimum and maximum indicate year with the lowest and highest values through 2012.

[a] Stock identification methods from 1981 through 2003 were based on scale pattern analysis. Beginning in 2004, genetic analysis was used.

[b] Estimates for 2014 have not yet been finalized.

Appendix A14.–Upper stock group percentage, by country, from the Yukon River Chinook salmon harvest, 1981–2013.

	Upper Stock Group	
Year [a]	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[b]		
Average		
1981-2012	82.3	17.7
2008-2012	84.9	15.1
Minimum 2012	69.8	9.5
Maximum 2012	90.5	30.3

Note: Minimum and maximum indicate year with the lowest and highest values through 2012.

[a] Stock identification methods from 1981 through 2003 were based on scale pattern analysis. Beginning in 2004, genetic analysis was used.

[b] Estimates for 2014 have not yet been finalized.

Appendix A15.–Summary of releases for coded wire tagged Chinook salmon from Whitehorse Hatchery, 1985–2014.

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
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

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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
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
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	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

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Appendix A15.–Page 3 of 7.

Release Location	Release Date	Code	# Tagged & Clipped [a]	Adipose Clipped Only	%Tag-Loss	Total Clipped	Weight (grams)	Total Unclipped	Total Released
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	11-Jun-97	18-25-54	25,242	0	0.000	25,242	2.43	0	25,242
Fox	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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Appendix A15.–Page 4 of 7.

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
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

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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	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	5/28-30/04	01-01-70	28,946	292		29,238	2.90	0	29,238
Wolf	22-Jun-04							2,514	2,514
Mainstem	5/28-29/04	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

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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	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 -11/06	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
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	5/24-6/3/07	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	6/01-26	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
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	6,710	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		122,004		0	124,624
AVERAGE	2004-2013		134,463	4,192		138,656	2.70	0	138,907
TOTAL			4,691,304	322,088		5,010,771		1,180,189	6,193,580

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.

Appendix A16.–Summary of releases of Chinook salmon from Yukon Territory instream incubation/rearing sites 1991–2014.

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 Ck.	02-01-01-02-12	Spring Fry	Tatchun Ck.	6/28/1991	6/28/1991	13593	21	650	14264	0.74
Klondike R.	1990	Tatchun Ck.	02-01-01-02-09	Spring Fry	Tatchun Ck.	6/28/1991	6/28/1991	15247	173	750	16170	0.74
Klondike R.	1991	Tatchun Ck.	18-06-45	Spring Fry	Tatchun Ck.	NA	8/31/1992	11734	0	817	12551	2.47
Klondike R.	1991	Tatchun Ck.	02-33-56	Spring Fry	Tatchun Ck.	NA	8/31/1992	6453	0	852	7305	2.47
Klondike R.	1991	Tatchun Ck.	18-06-44	Spring Fry	Tatchun Ck.	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.	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 Ck.	02-01-01-04-07	Spring Fry	Tatchun Ck.	6/30/1994	6/30/1994	12077	246	71	12394	0.99
Klondike R.	1993	Tatchun Ck.	02-01-01-05-05	Spring Fry	Tatchun Ck.	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 Ck.	02-01-01-05-11	Spring Fry	Tatchun Ck.	7/4/1995	7/4/1995	12431	100	686	13217	0.81
Klondike R.	1994	Tatchun Ck.	02-01-01-05-15	Spring Fry	Tatchun Ck.	7/4/1995	7/4/1995	2490	33	177	2700	0.81
Klondike R.	1994	Tatchun Ck.	02-01-01-06-01	Spring Fry	Tatchun Ck.	7/4/1995	7/4/1995	1476	19	155	1650	0.81
Klondike R.	1994	Tatchun Ck.	02-01-01-05-13	Spring Fry	Tatchun Ck.	7/4/1995	7/4/1995	11649	238	413	12300	0.81
Klondike R.	1995	Klondike R.	02-01-01-04-08	Spring Fry	Klondike R.	6/22/1996	6/22/1996	11423	1707	0	13130	0.76

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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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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	Tatchun Ck.	02-01-01-02-10	Spring Fry	Tatchun Ck.	6/27/1996	6/27/1996	14530	49	62	14641	0.8
McIntyre Ck.	1995	Tatchun Ck.	02-01-01-02-11	Spring Fry	Tatchun Ck.	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	Tatchun Ck.	02-01-01-07-03	Spring Fry	Tatchun Ck.	6/27/1997	6/27/1997	1521	15	148	1684	1.0

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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)
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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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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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
McIntyre Ck.	2006	Takhini R.	02-01-02-03-07	Spring Fry	Takhini R.	7/17/2007	7/20/2007	10108	645	185	10938	1.6a
McIntyre Ck.	2006	Takhini R.	02-01-02-03-08	Spring Fry	Takhini R.	7/17/2007	7/20/2007	10080	420	183	10683	1.6a
McIntyre Ck.	2006	Takhini R.	02-01-02-04-01	Spring Fry	Takhini R.	7/17/2007	7/20/2007	8881	567	688	10136	1.6a
McIntyre Ck.	2006	Takhini R.	02-01-02-04-04	Spring Fry	Takhini R.	7/17/2007	7/20/2007	1500	131	55	1686	1.6a

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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)
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	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	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	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	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	7/9/2009	7/10/2009	9747	1126	0	10873	1.4
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	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	5/7/2011	5/7/2011	2864	2362	0	5226	1.2a

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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)
McIntyre/ Fox	2010	Whitehorse Fishway	02-01-02-06-07	Spring Fry	Fox Creek	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	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	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	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	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	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	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	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	7/24/2012	7/24/2012	10956	76	0	11032	2.0
McIntyre/ Fox	2011	Whitehorse Fishway	02-01-02-07-07	Spring Fry	Fox Creek	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	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	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	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	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	7/3/2013	7/8/2013	10896	193	0	11089	NA

-continued-

Project	Brood Year	Stock	Mark	Stage	Release Site	Start Date	End Date	Number Tagged	# Ad. Only	# Un-Marked	Total Rel.	WT. (gm)
McIntyre/ Fox	2013	Whitehorse Fishway	02-[b]01-02-08-03	Spring Fry	Fox Creek	7/3/2013	7/8/2013	758	90	0	848	NA

Notes: 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 couild not be confirmed at the time of reporting.

Appendix A17.–Summary of potential coded wire tag recoveries from Chinook salmon by community and sampling effort in Alaska, 1989–2014.

	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[a]			3								8	13	24
Total	249	8	52	2	2	4	1	17	11	8	41		395

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 of potential coded wire tag recoveries within the Yukon River submitted to tag lab.

Appendix A18.–Yukon River fall chum salmon estimated brood year production and return per spawner estimates 1974–2014.

				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	658,200	478,875	1,137,075	111,350	649,033	96,106	0	0.13	0.76	0.11	0.00	856,489	1.30
1975	2,216,000	473,062	2,689,062	196,176	1,714,479	67,327	124.47	0.10	0.87	0.03	0.00	1,978,106	0.89
1976	548,900	339,043	887,943	142,792	644,178	138,161	4,832	0.15	0.69	0.15	0.01	929,963	1.69
1977	720,500	447,918	1,168,418	112,568	1,084,001	196,697	4,984	0.08	0.78	0.14	0.00	1,398,251	1.94
1978	549,800	434,030	983,830	22,404	371,959	107,784	0	0.04	0.74	0.21	0.00	502,148	0.91
1979	1,338,000	615,377	1,953,377	46,030	915,648	310,112	4,005	0.04	0.72	0.24	0.00	1,275,795	0.95
1980	335,700	488,373	824,073	9,968	409,471	214,943	3,834	0.02	0.64	0.34	0.01	638,217	1.90
1981	561,300	683,391	1,244,691	51,840	983,082	341,578	9,465	0.04	0.71	0.25	0.01	1,385,964	2.47
1982	246,000	373,519	619,519	11,651	491,194	177,575	705.19	0.02	0.72	0.26	0.00	681,125	2.77
1983	512,900	525,485	1,038,385	15,422	932,154	232,147	2,383	0.01	0.79	0.20	0.00	1,182,106	2.30
1984	359,100	412,323	771,423	7,549	423,887	179,514	10,036	0.01	0.68	0.29	0.02	620,986	1.73
1985	698,200	515,481	1,213,681	48,446	901,469	319,365	3,214	0.04	0.71	0.25	0.00	1,272,495	1.82
1986	534,000	318,028	852,028	0	506,477	370,898	5,200	0.00	0.57	0.42	0.01	882,575	1.65
1987	720,600	406,143	1,126,743	14,629	621,515	347,400	8,187	0.01	0.63	0.35	0.01	991,731	1.38
1988	351,500	353,685	705,185	41,268	209,367	161,575	12,947 [c]	0.10	0.49	0.38	0.03	425,157	1.21
1989	538,200	545,166	1,083,366	3,278	300,000	410,176 [c]	22,192	0.00	0.41	0.56	0.03	735,647	1.37
1990	498,500	352,007	850,507	752.824	688,649 [c]	457,679	32,650	0.00	0.58	0.39	0.03	1,179,730	2.37
1991	597,800	439,096	1,036,896	4,353 [c]	1,120,878	395,779	12,879	0.00	0.73	0.26	0.01	1,533,889	2.57
1992	416,400	148,846	565,246	7,397	700,890	208,594	4,106	0.01	0.76	0.23	0.00	920,987	2.21
1993	379,500	91,015	470,515	8,305	477,712	107,627	3,208	0.01	0.80	0.18	0.01	596,852	1.57
1994	946,900	169,225	1,116,125	4,574	236,696	148,295	1,683 [c]	0.01	0.60	0.38	0.00	391,247	0.41
1995	1,147,000	461,147	1,608,147	2,492	264,755	72,329 [c]	373.08	0.01	0.78	0.21	0.00	339,949	0.30
1996	876,700	260,923	1,137,623	416.675	173,891 [c]	133,449	8,278	0.00	0.55	0.42	0.03	316,035	0.36

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				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
1997	533,700	170,059	703,759	3,240 [c]	238,619	118,099	3,396	0.01	0.66	0.33	0.01	363,354	0.68
1998	280,100	70,820	350,920	634.229	269,098	59,079	7,089	0.00	0.80	0.18	0.02	335,900	1.20
1999	285,500	131,175	416,675	29,037	718,744	184,712	12,967	0.03	0.76	0.20	0.01	945,461	3.31
2000	222,600	28,543	251,143	8,609	314,532	109,140	0	0.02	0.73	0.25	0.00	432,280	1.94
2001	328,100	44,976	373,076	144,063	2,039,076	703,276	33,437	0.05	0.70	0.24	0.01	2,919,852	8.90
2002	397,100	27,411	424,511	0	462,657	235,508	13,850	0.00	0.65	0.33	0.02	712,015	1.79
2003	710,300	79,529	789,829	25,253	845,622	460,702	17,197	0.02	0.63	0.34	0.01	1,348,774	1.90
2004	574,100	76,296	650,396	0	352,390	155,967	2,039	0.00	0.69	0.31	0.00	510,396	0.89
2005	1,871,000	290,183	2,161,183	2,405	397,801	92,777	5,349	0.00	0.80	0.19	0.01	498,332	0.27
2006	920,700	270,486	1,191,186	26,154	389,517	344,398	30,168	0.03	0.49	0.44	0.04	790,237	0.86
2007	908,900	205,667	1,114,567	82,072	855,829	189,216	7,036	0.07	0.75	0.17	0.01	1,134,153	1.25
2008	611,400	217,947	829,347	10,090	844,087	434,539	8,305	0.01	0.65	0.34	0.01	1,297,021	2.12
2009	503,800	93,319	597,119	12,018	837,399	450,838	10,457	0.01	0.64	0.34		1,310,712 [d]	>2.60
2010	486,400	80,005	566,405	2,052	535,433	244,631						782,116 [e]	>1.61
2011	890,000	325,666	1,215,666	26,125									
2012	678,900	396,589	1,075,489										
2013	923,400	357,626	1,281,026										
2014	800,000	220,701	1,020,701										
Avg 2013	671,943	304,961	976,904										
Min 2008	222,600	27,411	251,143	0	173,891	59,079	0	0.00	0.41	0.03	0.00	316,035	0.27
Max 2008	2,216,000	683,391	2,689,062	196,176	2,039,076	703,276	33,437	0.15	0.87	0.56	0.04	2,919,852	8.90
	668,434	All Brood Years (1974-2008)		34,149	644,267	236,644	8,461	0.03	0.69	0.27	0.01	923,521	1.75
	518,206	Even Brood Years (1974-2008)		22,534	452,109	207,400	8,096	0.03	0.66	0.30	0.01	690,139	1.52
	827,500	Odd Brood Years (1974-2008)		46,447	847,729	267,607	8,847	0.03	0.72	0.24	0.01	1,170,630	1.99

Note: Minimum and maximum indicate year with the lowest and highest values through 2008. Current brood year data is preliminary as is 2014 harvest estimate. In 2014, estimates of 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 gillnets each year, weighted by test fish CPUE.

[b] Contrast in escapement data is 9.96.

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

[d] Brood year return for 3, 4, and 5 year fish, indicate that production (R/P) from brood year 2009 was at least 2.60. Recruits estimated for incomplete brood year.

[e] Brood year return for 3 and 4 year fish, indicate that production (R/P) from brood year 2010 was at least 1.61. Recruits estimated for incomplete brood year.

Appendix A19.–Escapement, rebuilding and interim goals for Canadian origin Chinook and fall chum salmon stocks, 1985–2015.

	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 [c]	80,000		50,000-120,000	22,000-49,000 [d]
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 [d]
2011	33,000-43,000	42,500-55,000 [f]	80,000	70,000-104,000 [f]	50,000-120,000	22,000-49,000 [d]
2012	33,000-43,000	42,500-55,000 [f]	80,000	70,000-104,000 [f]	50,000-120,000	22,000-49,000 [d]
2013	33,000-43,000	42,500-55,000 [f]	80,000	70,000-104,000 [f]	50,000-120,000	22,000-49,000 [d]
2014	33,000-43,000	42,500-55,000 [f]	80,000	70,000-104,000 [f]	50,000-120,000	22,000-49,000 [d]
2015	33,000-43,000	42,500-55,000 [f]	80,000	70,000-104,000 [f]	50,000-120,000	[d]

Note: All single numbers are considered minimums.

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

[b] In 2003 the goal was set at 25,000. However, if the U.S. decided on a commercial opening the goal would be increased to 28,000 fish.

[c] Interim management escapement goal (IMEG) using the mainstem Yukon River sonar at Eagle estimates of Canadian border passage, previous years were measured by mark–recapture abundance estimates.

[d] Interim management escapement goal (IMEG) established for 2008–2013, by default recommended again in 2014. Rebuilding goal to be discussed for 2015.

[e] The IMEG goal of 42,500 to 55,000 was chosen at the Spring 2010 Yukon River Panel meeting to include a precautionary approach to put more large older fish on the spawning grounds. The Panel agreed with 42,500 for the lower end of the range based on an average of the 2 proposed lower goals of 40,000 and 45,000 discussed.

[f] The IMEGs from 2010 were recommended to continue in 2015.

Appendix A20.–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	2006	Michie Cr.	6/6/1989	3/25/1992	4	620	56° 44’°	173° 15’
Trawl	1988	–	McClintock R.	6/6/1989	3/19/1994	6		Area 513	
	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’	164o 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	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’
	–	18	Yukon R.	–	3/6/2010	–	650	57° 05’	171° 43’
	–	18	Yukon R.	–	3/13/2010	–	580	56° 43’	172° 27’
	–	18	Yukon R.	–	3/13/2010	–	630	56° 43’	172° 27’
	–	18	Yukon R.	–	3/19/2010	–	660	56° 46’	172° 20’
	–	18	Yukon R.	–	3/23/2010	–	640	57° 02’	171° 38’
	–	18	Yukon R.	–	3/24/2010	–	680	57° 02’	172° 17’
	–	18	Yukon R.	–	3/25/2010	–	630	56° 55’	172° 24’
	–	18	Yukon R.	–	3/29/2010	–	680	Area 509	
	–	8	Yukon R.	–	3/9/2011	–	650	Area 521	
	–	8	Yukon R.	–	10/15/2011	–	590	55° 13’	165° 49’
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’
	2003	–	Yukon R.	–	9/11/2004	1	154	64° 01’	166° 01’
	2006	18	Yukon R.	–	9/13/2007	1	176	65° 12’	168° 06’
	2006	18	Yukon R.	–	9/13/2007	1	179	65° 12’	168° 06’
	2006	18	Yukon R.	–	9/13/2007	1	125	65° 12’	168° 06’
	2009	18	Yukon R.	–	9/24/2010	1	190	63° 49’	162° 47’
	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’
	2011	–	Yukon R.	–	9/12/2012	1	185	64° 24’	166° 04’

Appendix A21.–Estimated bycatch (numbers) of Pacific salmon by species, and year in United States groundfish fisheries in the Bering Sea-Aleutian Islands (BSAI) management area, 1991–2014.

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	41,955	40,090 [a]	1,266 [a]	14 [a]	80 [a]	41,450 [a]
1993	46,014	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	63,205	77,819	234	5	2	78,060
1997	50,530	66,816	109	3	66	66,994
1998	55,431	–	–	–	–	65,697
1999	14,599	–	–	–	–	47,132
2000	8,223	–	–	–	–	59,327
2001	40,547	–	–	–	–	60,731
2002	39,684	–	–	–	–	82,483
2003	53,571	–	–	–	–	197,150
2004	59,964	–	–	–	–	450,541
2005	74,266	–	–	–	–	709,388
2006	87,084	–	–	–	–	325,183
2007	129,568	–	–	–	–	97,348
2008	24,105	–	–	–	–	16,877
2009	13,796	–	–	–	–	47,130
2010	12,383	–	–	–	–	14,423
2011	26,672	–	–	–	–	192,902
2012	12,937	–	–	–	–	24,320
2013	16,003	–	–	–	–	126,980
2014	17,472	–	–	–	–	222,864

Sources: Berger 2010; NMFS http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm

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

Appendix A22.–Estimated bycatch (numbers) of Pacific salmon by species and year in United States groundfish fisheries in the Gulf of Alaska (GOA) management area, 1991–2014.

Year	Chinook	Chum	Coho	Sockeye	Pink	Total Non-Chinook
1991	38,894	13,711	1,133	46	64	14,954
1992	16,787	11,140	55	21	0	11,216
1993	19,260	55,268	306	15	799	56,388
1994	13,615	36,782	42	96	306	37,226
1995	14,652	64,067	668	41	16	64,792
1996	15,761	3,969	194	2	11	4,176
1997	15,230	3,349	41	7	23	3,420
1998	16,984	–	–	–	–	13,544
1999	30,600	–	–	–	–	7,529
2000	26,729	–	–	–	–	10,995
2001	15,104	–	–	–	–	6,063
2002	12,920	–	–	–	–	3,219
2003	15,369	–	–	–	–	9,530
2004	17,777	–	–	–	–	5,809
2005	31,270	–	–	–	–	6,608
2006	18,795	–	–	–	–	4,226
2007	40,609	–	–	–	–	3,421
2008	16,153	–	–	–	–	2,156
2009	8,483	–	–	–	–	2,355
2010	54,621	–	–	–	–	NA
2011	21,724	–	–	–	–	NA
2012	22,551	–	–	–	–	NA
2013	23,899	–	–	–	–	NA
2014	10,008	–	–	–	–	NA

Sources: Berger 2010; NMFS http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm

Appendix A23.–Estimated bycatch (numbers) of Chinook and non-Chinook salmon in the Bering Sea-Aleutian Islands (BSAI) groundfish fisheries by season, 1991–2014.

	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]	3,016 [a]	26,101 [a]	27,246 [a]
1992	25,691	31,419	10,259	10,536	1,951 [a]	2,120 [a]	38,324 [a]	39,329 [a]
1993	17,264	24,688	21,252	21,326	1,594 [a]	1,848 [a]	240,597 [a]	241,422 [a]
1994	28,451	38,921	4,686	4,900	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	34,129	2,083	2,710	63,904	64,285
1998	15,193	18,930	36,130	36,501	4,002	4,520	60,040	61,177
1999	6,352	8,794	5,627	5,805	362	393	44,810	46,739
2000	3,422	6,568	1,539	1,655	213	350	58,358	58,977
2001	18,484	24,871	14,961	15,676	2,386	2,903	54,621	57,828
2002	21,794	26,277	12,701	13,407	1,377	1,698	79,404	80,785
2003	32,609	40,044	12,977	13,527	3,834	4,113	185,351	187,037
2004	23,093	30,716	28,603	29,248	422	1,028	440,038	449,513
2005	27,331	33,633	40,030	40,632	595	1,030	704,993	708,358
2006	58,391	62,582	24,304	24,502	1,328	2,312	308,318	322,871
2007	69,420	77,119	52,350	52,450	8,524	9,639	85,264	87,709
2008	16,638	18,996	4,842	5,109	322	517	14,947	16,360
2009	9,711	11,010	2,658	2,786	48	163	46,227	46,967
2010	7,630	9,466	2,067	2,917	40	222	13,240	14,201
2011	7,137	7,652	18,362	19,020	297	415	191,144	192,489
2012	7,765	8,985	3,579	3,952	10	307	22,265	24,010
2013	8,236	9,185	4,797	6,817	200	432	125,101	126,530
2014	11,539	13,837	3,437	3,635	550	1,579	217,786	221,252

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. NMFS http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm

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

Appendix A24.–Fall chum salmon age and sex proportions with average lengths from selected Yukon River escapement projects, 2014.

Location	Sample Size		Age 3	4	5	6	7	Total	Average Length (mm)
Yukon Mainstem [a]	623	Males	0.3	26.5	34.7	1.0	0.0	62.4	584.3
at Eagle, Alaska		Females	0.6	23.3	13.5	0.2	0.0	37.6	619.0
		Total	1.0	49.8	48.2	1.1	0.0	100.0	605.9
Delta River [b]	160	Males	0.6	23.8	27.5	5.0	0.6	57.5	597.0
		Females	0.6	25.0	15.6	1.3	0.0	42.5	560.6
		Total	1.3	48.8	43.1	6.3	0.6	100.0	581.6

[a] Samples were from test fishing with drift gillnets, structure is scales.
[b] Samples were handpicked carcasses from east and middle channels, structure is vertebra.

APPENDIX B: TABLES

Appendix B1.–Alaska and Canadian total utilization of Yukon River Chinook, chum, and coho salmon, 1961–2014.

	Alaska [a,b]			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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	Alaska [a,b]			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	1,246,176	1,434,562	17,614	44,786	62,400	206,000	1,290,962	1,496,962
1988	148,421	2,325,377	2,473,798	21,427	33,915	55,342	169,848	2,359,292	2,529,140
1989	157,616	2,289,501	2,447,117	17,944	23,490	41,434	175,560	2,312,991	2,488,551
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	168,191	863,575	1,031,766	17,903	21,312	39,215	186,094	884,887	1,070,981
1993	160,289	341,593	501,882	16,611	14,150	30,761	176,900	355,743	532,643
1994	170,829	551,743	722,572	21,198	38,342	59,540	192,027	590,085	782,112
1995	177,663	1,437,870	1,615,533	20,884	46,109	66,993	198,547	1,483,979	1,682,526
1996	139,284	1,121,273	1,260,557	19,612	24,395	44,007	158,896	1,145,668	1,304,564
1997	174,886	545,066	719,952	16,528	15,900	32,428	191,414	560,966	752,380
1998	99,369	199,735	299,104	5,937	8,168	14,105	105,306	207,903	313,209
1999	124,316	236,464	360,780	12,468	19,736	32,204	136,784	256,200	392,984
2000	45,304	106,936	152,240	4,879	9,283	14,162	50,183	116,219	166,402
2001	53,738	116,523	170,261	10,144	9,872	20,016	63,882	126,395	190,277
2002	68,118	122,360	190,478	9,258	8,567	17,825	77,376	130,927	208,303
2003	99,150	199,917	299,067	9,619	11,435	21,054	108,769	211,352	320,121
2004	112,332	206,099	318,431	11,238	9,930	21,168	123,570	216,029	339,599
2005	85,521	478,749	564,270	11,371	18,583	29,954	96,892	497,332	594,224

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Year	Alaska [a,b]			Canada [c]			Total		
	Chinook	Other Salmon	Total	Chinook	Other Salmon [d]	Total	Chinook	Other Salmon	Total
2006	95,184	528,606	623,790	9,072	11,908	20,980	104,256	540,514	644,770
2007	89,555	532,103	621,658	5,094	14,332	19,426	94,649	546,435	641,084
2008	48,870	481,407	530,277	3,713	9,566	13,279	52,583	490,973	543,556
2009	34,206	355,516	389,722	4,758	2,011	6,769	38,964	357,527	396,491
2010	53,792	393,233	447,025	2,706	5,891	8,597	56,498	399,124	455,622
2011	40,856	762,109	802,965	4,884	8,226	13,110	45,740	770,335	816,075
2012	28,727	912,395	941,122	2,200	7,033	9,233	30,927	919,428	950,355
2013	11,199	1,013,966	1,025,165	1,904	16,115	18,019	13,103	1,030,081	1,043,184
2014 [e]	2,720	928,409	931,129	100	5,033	5,133	2,820	933,442	936,262
Average									
1961-2013	120,140	856,762	976,902	10,972	17,389	28,360	131,111	874,151	1,005,262
2004-2013	60,024	566,427	626,451	5,694	10,360	16,054	65,718	576,787	642,505
2009-2013	33,756	687,444	721,200	3,290	7,855	11,146	37,046	695,299	732,345
Minimum 2013	11,199	106,936	152,240	1,904	2,011	6,769	13,103	116,219	166,402
Maximum 2013	198,436	2,325,377	2,473,798	22,846	46,109	66,993	220,511	2,359,292	2,529,140

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[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 retained for subsistence, and sport catches combined. Does not include harvest from the Coastal District communities of Hooper Bay and Scammon Bay.

[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.

Appendix B2.–Alaska harvest of Yukon River Chinook salmon, 1961–2014.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
1961	21,488	119,664					141,152	141,152
1962	11,110	94,734					105,844	105,844
1963	24,862	117,048					141,910	141,910
1964	16,231	93,587					109,818	109,818
1965	16,608	118,098					134,706	134,706
1966	11,572	93,315					104,887	104,887
1967	16,448	129,656					146,104	146,104
1968	12,106	106,526					118,632	118,632
1969	14,000	91,027					105,027	105,027
1970	13,874	79,145					93,019	93,019
1971	25,684	110,507					136,191	136,191
1972	20,258	92,840					113,098	113,098
1973	24,317	75,353					99,670	99,670
1974	19,964	98,089					118,053	118,053
1975	12,867	63,838					76,705	76,705
1976	17,806	87,776					105,582	105,582
1977	17,581	96,757				156	114,494	114,494
1978	30,297	99,168				523	129,988	130,476
1979	31,005	127,673				554	159,232	159,232
1980	42,724	153,985				956	197,665	197,665
1981	29,690	158,018				769	188,477	188,477
1982	28,158	123,644				1,006	152,808	152,808
1983	49,478	147,910				1,048	198,436	198,436
1984	42,428	119,904				351	162,683	162,683
1985	39,771	146,188				1,368	187,327	187,327
1986	45,238	99,970				796	146,004	146,004
1987	51,418	134,760 [h]		1,706		502	188,386	188,386

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
1988	43,907	100,364		2,125	1,081	944	148,421	150,009
1989	48,446	104,198		2,616	1,293	1,063	157,616	157,632
1990	48,587	95,247 [i]	413	2,594	2,048	544	149,433	149,433
1991	46,773	104,878 [j]	1,538		689	773	154,651	154,651
1992	45,626	120,245 [k]	927		962	431	168,191	169,642
1993	62,486	93550	560	426	1572	1,695	160,289	161,718
1994	53,077	113,137	703		1631	2,281	170,829	171,654
1995	48,535	122,728	1,324	399	2,152	2,525	177,663	179,748
1996	43,306	89,671	521	215	1,698	3,873	139,284	141,649
1997	55,978	112,841	769	313	2811	2,174	174,886	176,025
1998	53,733	43618	81	357	926	654	99,369	99,760
1999	52,194	69,275	288	331	1,205	1,023	124,316	125,427
2000	35,841	8,515		75	597	276	45,304	45,867
2001	52,937	[l]		122		679	53,738	56,620
2002	42,620	24128	230	126	528	486	68,118	69,240
2003	55,109	40,438		204	680	2,719	99,150	101,000
2004	53,675	56,151		201	792	1,513	112,332	114,370
2005	52,561	32,029		138	310	483	85,521	86,369
2006	47,710	45,829		89	817	739	95,184	96,067
2007	53,976	33,634		136	849	960	89,555	90,753
2008	43,694	4,641		126		409	48,870	50,362
2009	32,900	316		127		863	34,206	35,111
2010	43,259	9,897		162		474	53,792	55,092
2011	40,211	82 [m]		89		474	40,856	41,625
2012	28,311 [n]			71 [n]		345	28,727	30,486
2013	10,991 [n]			42 [n]		166	11,199	12,741
2014	2,719 [n]			1 [n]		[o]	2,720	3,283

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
Averages								
1961 – 2013	35,536	84,704	306	533	871	989	120,140	120,744
2004 – 2013	40,729	18,258	0	118	277	643	60,024	61,298
2009 – 2013	31,134	2,059	0	98	0	464	33,756	35,011
Minimum 2013	10,991	0	0	42	0	156	11,199	12,741
Maximum 2013	62,486	158,018	1,538	2,616	2,811	3,873	198,436	198,436

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[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.

[d] Prior to 1987, and 1990, 1991, 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] Sport fish harvest for the Alaska portion of the Yukon River drainage. Most of this harvest is taken within the Tanana River drainage (see Brase and Baker (2012) and Burr (2012)).

[g] Yukon Area Total includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay (1978, 1988–1989 and 1992 to present).

[h] Includes 653 and 2,136 Chinook salmon illegally sold in Districts 5 (Yukon River) and 6 (Tanana River), respectively.

[i] Includes the illegal sales of 1,101 Chinook salmon.

[j] Includes the illegal sales of 2,711 Chinook salmon in District 1, and 284 Chinook salmon in District 2.

[k] Includes the illegal sales of 1,218 Chinook salmon in District 1, and 207 Chinook salmon in District 2.

[l] Summer season commercial fishery was not conducted.

[m] No Chinook salmon were sold in the summer season. A total of 82 Chinook salmon were sold in District 1 and 2 in the fall season.

[n] Data are preliminary.

[o] Data are unavailable at this time. Estimate is expected to be less than average.

Appendix B3.–Alaska harvest of Yukon River summer chum salmon, 1970–2014.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
1970	166,504	137,006					303,510	303,510
1971	171,487	100,090					271,577	271,577
1972	108,006	135,668					243,674	243,674
1973	161,012	285,509					446,521	446,521
1974	227,811	589,892					817,703	817,703
1975	211,888	710,295					922,183	922,183
1976	186,872	600,894					787,766	787,766
1977	159,502	534,875				316	694,693	694,693
1978	171,383	1,052,226	25,761			451	1,249,821	1,249,821
1979	155,970	779,316	40,217			328	975,831	975,831
1980	167,705	928,609	139,106			483	1,235,903	1,235,903
1981	117,629	1,006,938	272,763			612	1,397,942	1,397,942
1982	117,413	461,403	255,610			780	835,206	835,206
1983	149,180	744,879	250,590			998	1,145,647	1,145,647
1984	166,630	588,597	277,443			585	1,033,255	1,033,255
1985	157,744	516,997	417,016			1,267	1,093,024	1,093,024
1986	182,337	721,469	467,381			895	1,372,082	1,372,082
1987	170,678	442,238	180,303	4,262		846	798,327	827,995
1988	196,599	1,148,650	468,032	2,225	3,587	1,037	1,820,130	1,851,360
1989	167,155	955,806 [h]	496,934	1,891	10,605	2,132	1,634,523	1,636,864
1990	115,609	302,625 [i]	214,552	1,827	8,263	472	643,348	643,348
1991	118,540	349,113 [j]	308,989		3,934	1,037	781,613	781,613
1992	125,497	332,313 [k]	211,264		1,967	1,308	672,349	689,044
1993	104,776	96,522	43,594	674	1,869	564	247,999	268,797
1994	109,904	80,284	178,457		3,212	350	372,207	387,110
1995	118,723	259,774	558,640	780	6,073	1,174	945,164	962,524
1996	102,503	147,127	535,106	905	7,309	1,946	794,896	817,131

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
1997	97,109	95,242	133,010	391	2,590	662	329,004	344,715
1998	86,004	28,611	187	84	3,019	421	118,326	119,688
1999	70,323	29,389	24	382	836	555	101,509	114,970
2000	64,895	6,624	0	30	648	161	72,358	85,535
2001	58,239	- [l]	0	146	0	82	58,467	72,383
2002	72,260	13,558	19	175	218	384	86,614	101,410
2003	68,304	10,685	0	148	119	1,638	80,894	94,862
2004	69,672	26,410	0	231	217	203	96,733	104,995
2005	78,902	41,264	0	152	134	435	120,887	135,244
2006	90,907	92,116	0	262	456	583	184,324	208,495
2007	76,805	198,201	0	184	10	245	275,445	291,566
2008	68,394	151,186	0	138	80	371	220,169	238,289
2009	67,742	170,272	0	308	0	174	238,496	251,293
2010	65,948	232,888	0	319	0	1,183	300,338	322,763
2011	77,715	275,161	0	439	0	294	353,609	371,914
2012	103,751 [m]	319,575	0	321 [m]	2,412	271	426,330	446,376
2013	91,979 [m]	485,587	0	138 [m]	2,304	1,423	581,431	604,566
2014	74,015 [m]	530,644	0	226 [m]	0	669 [n]	605,554	624,858

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
Averages								
1970-2013	123,137	376,416	152,083	684	2,302	721	617,769	627,300
2004-2013	79,182	199,266	0	249	561	518	279,776	297,550
2009-2013	81,427	296,697	0	305	943	669	380,041	399,382
Minimum 2013	58,239	6,624	0	30	0	82	58,467	72,383
Maximum 2013	227,811	1,148,650	558,640	4,262	10,605	2,132	1,820,130	1,851,360

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[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 and the carcasses from subsistence caught fish. These data are only available since 1990. In JTC reports prior to 2009 subsistence plus commercial related harvests are noted as subsistence "use".

[d] Prior to 1987, 1990, 1991, 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 (see Brase and Baker (2012) and Burr (2012)). Division of Sport Fish does not differentiate between the 2 races of chum salmon. Sport fish harvest is assumed to be primarily summer chum salmon caught incidental to directed Chinook salmon fishing.

[g] Yukon Area Total includes subsistence harvest from the Coastal District communities of Hooper Bay and Scammon Bay (1978, 1987–1989 and 1992 to present).

[h] Includes illegal sales of 150 summer chum salmon in District 1.

[i] Does not include 1,233 female summer chum salmon sold in Subdistrict 6-C with roe extracted and roe sold separately. These fish are included in estimated harvest to produce roe sold.

[j] Includes the illegal sales of 1,023 summer chum salmon.

[k] Includes the sales of 31 summer chum salmon in District 1, and 91 summer chum salmon in District 2.

[l] Summer season commercial fishery was not conducted.

[m] Data are preliminary.

[n] Data are unavailable at this time. Estimated based on the previous 5-year average.

Appendix B4.–Alaska harvest of Yukon River fall chum salmon, 1961–2014.

Year	Subsistence	[a]	Commercial	[b]	Commercial Related	[c]	Personal Use	[d]	Test Fish Sales	[e]	Yukon River Total	Yukon Area Total [f]
1961	101,772	[g, h]	42,461		0						144,233	144,233
1962	87,285	[g, h]	53,116		0						140,401	140,401
1963	99,031	[g, h]			0						99,031	99,031
1964	120,360	[g, h]	8,347		0						128,707	128,707
1965	112,283	[g, h]	23,317		0						135,600	135,600
1966	51,503	[g, h]	71,045		0						122,548	122,548
1967	68,744	[g, h]	38,274		0						107,018	107,018
1968	44,627	[g, h]	52,925		0						97,552	97,552
1969	52,063	[g, h]	131,310		0						183,373	183,373
1970	55,501	[g, h]	209,595		0						265,096	265,096
1971	57,162	[g, h]	189,594		0						246,756	246,756
1972	36,002	[g, h]	152,176		0						188,178	188,178
1973	53,670	[g, h]	232,090		0						285,760	285,760
1974	93,776	[g, h]	289,776		0						383,552	383,552
1975	86,591	[g, h]	275,009		0						361,600	361,600
1976	72,327	[g, h]	156,390		0						228,717	228,717
1977	82,771	[h]	257,986		0						340,757	340,757
1978	84,239	[h]	236,383		10,628						331,250	331,915
1979	214,881		359,946		18,466						593,293	593,293
1980	167,637		293,430		5,020						466,087	466,087
1981	177,240		466,451		11,285						654,976	654,976
1982	132,092		224,187		805						357,084	357,084
1983	187,864		302,598		5,064						495,526	495,526
1984	172,495		208,232		2,328						383,055	383,055
1985	203,947		267,744		2,525						474,216	474,216
1986	163,466		139,442		577						303,485	303,485
1987	342,597	[i]		[j]			19,066				361,663	361,885

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Yukon River Total	Yukon Area Total [f]
1988	151,586	133,763	3,227	3881	27,663	320,120	322,382
1989	211,147	270,195	14,749	5082	20,973	522,146	522,302
1990	167,900	124,174	12,168	5176	9,224	318,642	318,642
1991	145,524	230,852	23,366	0	3,936	403,678	403,678
1992	107,602	15,721 [k]	3,301	0	1,407	128,031	128,237
1993	76,762	[j]		163	0	76,925	77,045
1994	123,218	3,631	4,368	0	0	131,217	131,564
1995	130,506	250,766	32,324	863	1,121	415,580	415,934
1996	128,866	88,342	17,288	356	1,717	236,569	236,961
1997	95,141	56,713	1,474	284	867	154,479	154,479
1998	62,867	[j]		2	0	62,869	62,903
1999	89,736	20,371	0	261	1,171	111,539	111,743
2000	19,306	[j]		1	0	19,307	19,396
2001	35,144	[j]		10	0	35,154	35,713
2002	19,390	[j]		3	0	19,393	19,677
2003	56,784	10,996	0	394	0	68,174	68,320
2004	62,206	4,110	0	230	0	66,546	66,866
2005	91,464	180,249	0	133	0	271,846	271,916
2006	83,815	174,542	0	333	0	258,690	258,877
2007	100,987	90,677	0	173	0	191,837	192,071
2008	88,971	119,265	0	181	0	208,417	208,803
2009	65,961	25,269	0	78	0	91,308	91,466
2010	68,459	2,550	0	3,209	0	74,218	74,404
2011	79,887	238,979	0	347	0	319,213	319,528
2012	99,298 [l]	289,692	0	410 [l]	166	389,566	389,577
2013	113,235 [l]	238,051	0	383 [l]	121	351,790	351,939
2014	84,230 [l]	115,593	0	287 [l]	30	200,140	200,392

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Yukon River Total	Yukon Area Total [f]
Averages							
1961-2013	105,617	157,638	3,595	1,519	2,633	247,688	247,840
2004-2013	85,428	136,399	0	548	37	222,413	222,614
2009-2013	85,368	159,030	0	885	57	245,340	245,504
Minimum 2013	19,306	2,550	0	0	0	19,307	19,396
Maximum 2013	342,597	466,451	32,324	19,066	27,663	654,976	654,976

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[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 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 the 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] Yukon Area Total includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay (1978, 1987–1989 and 1992 to present).

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

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

[i] Includes an estimated 95,768 and 119,168 fall chum 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.

Appendix B5.–Alaska harvest of Yukon River coho salmon, 1961–2014.

Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
1961	9,192 [h, i]	2,855	0				12,047	12,047
1962	9,480 [h, i]	22,926	0				32,406	32,406
1963	27,699 [h, i]	5,572	0				33,271	33,271
1964	12,187 [h, i]	2,446	0				14,633	14,633
1965	11,789 [h, i]	350	0				12,139	12,139
1966	13,192 [h, i]	19,254	0				32,446	32,446
1967	17,164 [h, i]	11,047	0				28,211	28,211
1968	11,613 [h, i]	13,303	0				24,916	24,916
1969	7,776 [h, i]	15,093	0				22,869	22,869
1970	3,966 [h, i]	13,188	0				17,154	17,154
1971	16,912 [h, i]	12,203	0				29,115	29,115
1972	7,532 [h, i]	22,233	0				29,765	29,765
1973	10,236 [h, i]	36,641	0				46,877	46,877
1974	11,646 [h, i]	16,777	0				28,423	28,423
1975	20,708 [h, i]	2,546	0				23,254	23,254
1976	5,241 [h, i]	5,184	0				10,425	10,425
1977	16,333 [i]	38,863	0			112	55,308	55,308
1978	7,787 [i]	26,152	0			302	34,241	34,330
1979	9,794	17,165	0			50	27,009	27,009
1980	20,158	8,745	0			67	28,970	28,970
1981	21,228	23,680	0			45	44,953	44,953
1982	35,894	37,176	0			97	73,167	73,167
1983	23,905	13,320	0			199	37,424	37,424
1984	49,020	81,940	0			831	131,791	131,791
1985	32,264	57,672	0			808	90,744	90,744
1986	34,468	47,255	0			1,535	83,258	83,258
1987	82,371 [j]	[k]		2,523		1,292	86,186	86,186

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
1988	67,830	99,907	0	1,250	13,720	2,420	185,127	186,976
1989	40,711	85,493	0	872	3,945	1,811	132,832	133,045
1990	43,460	41,032	3,255	1,181	2,650	1,947	93,525	93,525
1991	37,388	103,180	3,506	0	2,971	2,775	149,820	149,820
1992	51,921	6,556 [l]	1,423	0	1,629	1,666	63,195	63,254
1993	15,772	[k]		0	0	897	16,669	16,709
1994	41,694	120	4,331	0	0	2,174	48,319	48,400
1995	28,225	45,939	1,074	417	193	1,278	77,126	77,278
1996	30,312	52,643	3,339	198	1,728	1,588	89,808	89,900
1997	23,945	35,320	0	350	498	1,470	61,583	61,583
1998	17,772	1	0	9	0	758	18,540	18,889
1999	20,823	1,601	0	147	236	609	23,416	23,484
2000	14,717	[k]		0	0	554	15,271	15,493
2001	21,620	[k]		34	0	1,248	22,902	23,404
2002	15,241	[k]		20	0	1,092	16,353	16,601
2003	23,580	25,243	0	549	0	1,477	50,849	51,141
2004	20,732	20,232	0	233	0	1,623	42,820	42,883
2005	26,971	58,311	0	107	0	627	86,016	86,295
2006	19,371	64,942	0	279	0	1,000	85,592	85,927
2007	19,514	44,575	0	135	0	597	64,821	64,931
2008	16,739	35,691	0	50	0	341	52,821	52,937
2009	15,760	8,026	0	70	0	964	24,820	25,066
2010	12,921	3,750	0	1,062	0	944	18,677	18,801
2011	12,289	76,303	0	232	0	463	89,287	89,342
2012	21,440 [m]	74,789	0	100 [m]	39	131	96,499	96,592
2013	14,170 [m]	66,199	0	109 [m]	1	266	80,745	81,032
2014	17,348 [m]	104,638	0	175 [m]	0	554 [n]	122,715	122,919

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Year	Subsistence [a]	Commercial [b]	Commercial Related [c]	Personal Use [d]	Test Fish Sales [e]	Sport Fish [f]	Yukon River Total	Yukon Area Total [g]
Averages								
1961-2013	22,726	31,328	353	368	1,062	975	52,806	52,919
2004-2013	17,991	45,310	0	328	4	696	64,238	64,409
2009-2013	15,316	45,870	0	315	8	554	62,063	62,224
Maximum 2013	3,966	1	0	0	0	45	10,425	10,425
Maximum 2013	82,371	103,180	4,331	2,523	13,720	2,775	185,127	186,976

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[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 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.

[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 (see Brase and Baker (2012) and (Burr 2012)).

[g] Yukon Area Total includes harvest from the Coastal District communities of Scammon Bay and Hooper Bay (1978, 1988–1989 and 1992 to present).

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

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

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

[k] Commercial fishery was not conducted.

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

[m] Data are preliminary.

[n] Data are unavailable at this time. Estimate based on the previous 5-year average.

Appendix B6.–Alaska and Canadian total utilization of Yukon River Chinook and fall chum salmon, 1961–2014.

	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	129,988	135,869	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	361,663 [d]	406,143
1988	21,427	148,421	169,848	33,565	320,120	353,685
1989	17,944	157,616	175,560	23,020	522,146	545,166
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	168,191	186,094	20,815	128,031 [e]	148,846
1993	16,611	160,289	176,900	14,090	76,925 [d]	91,015
1994	21,198	170,829	192,027	38,008	131,217	169,225
1995	20,884	177,663	198,547	45,600	415,580	461,180
1996	19,612	139,284	158,896	24,354	236,569	260,923
1997	16,528	174,886	191,414	15,600	154,479	170,079
1998	5,937	99,369	105,306	7,954	62,869	70,823
1999	12,468	124,316	136,784	19,636	111,539	131,175

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Year	Chinook Salmon			Fall Chum Salmon		
	Canada [a]	Alaska [b, c]	Total	Canada [a]	Alaska [b, c]	Total
2000	4,879	45,304	50,183	9,246	19,307 [d]	28,553
2001	10,144	53,738 [f]	63,882	9,872	35,154 [d]	45,026
2002	9,258	67,118	77,376	8,092	19,393 [d]	27,485
2003	9,619	99,150	108,769	10,905	68,174	79,079
2004	11,238	112,332	123,570	9,750	66,546	76,296
2005	11,371	85,521	96,892	18,572	271,846	290,418
2006	9,072	95,184	104,256	11,796	258,690	270,486
2007	5,094	89,555	94,649	13,830	191,837	205,667
2008	3,426	48,870	52,296	9,566	208,417	217,983
2009	4,758	34,206	38,964	2,011	91,308	93,319
2010	2,705	53,792	56,497	5,787	74,218	80,005
2011	4,884	40,856	45,740	8,163	319,213	327,376
2012	2,200	28,727	30,927	7,023	389,566	396,589
2013 [g]	100	11,199	11,299	6,170	351,790	357,960
2014 [g]	0	2,720	2,720	0	200,140	200,140
Averages						
1961-2013	10,937	120,140	131,077	17,013	247,688	264,701
2004-2013	5,514	60,024	65,538	9,267	222,413	231,679
2009-2013	2,930	33,756	36,686	5,831	245,340	251,171
Minimum 2013	100	11,199	11,299	2,011	19,307	27,485
Maximum 2013	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 2013.Canadian managers sometimes do not refer to chum as fall chum salmon since they only have one 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)

[c] Commercial, subsistence, personal use, test fish, and sport catches combined. Does not include the subsistence harvest from the Coastal District communities of Hooper Bay and Scammon Bay.

[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 catch of Yukon River Chinook salmon, 1961–2014.

	Mainstem Yukon River Harvest							Porcupine River Aboriginal Fishery	Total Canadian
Year	Commercial	Domestic	Aboriginal Fishery	Recreational [a]	Test Fishery	Combined Non-Commercial	Total	Harvest	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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Year	Mainstem Yukon River Harvest							Porcupine River Aboriginal Fishery Harvest	Total Canadian Harvest
	Commercial	Domestic	Aboriginal Fishery	Recreational [a]	Test Fishery	Combined Non-Commercial	Total		
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]	18	1,902 [d]	-	-	1,920	1,922	242	2,164
2014	-	19	100 [f]	-	-	100	100	unavailable	100
Averages									
1961-2013	5,717 [g]	382	5,248	342	608	5,772	10,734	257	10,976
2004-2013	2,637 [g]	57	4,037	233	432	4,359	5,414	306	5,720
2009-2013	364 [g]	18	2,940	83	0	2,980	3,054	289	3,342
Minimum 2013	1	17	957	1	167	957	1,922	4	2,164
Maximum 2013	13,217	3,500	9,300	1,230	1,036	11,346	21,327	2,000	22,846

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Note: Dash "-" means fishery did not occur. Minimum and maximum indicate year with the lowest and highest values through 2013.

[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, one fish mistakenly caught and retained.
[f] Data are preliminary.
[g] Excluding years when no directed fishery occurred.

Appendix B8.–Canadian catch of Yukon River fall chum salmon, 1961–2014.

	Mainstem Yukon River Harvest						Porcupine River Aboriginal Fishery	Total Canadian
Year	Commercial	Domestic	Aboriginal Fishery	Test Fishery	Combined 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 Fishery Harvest	Total Canadian Harvest
Year	Commercial	Domestic	Aboriginal Fishery	Test Fishery	Combined Non-Commercial [a]	Total [a]		
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 [c]	3,080	5,278	4,594	9,872
2002	3,065	0	3,167	2,756 [c]	3,167	6,232	1,860	8,092
2003	9,030	0	1,493	990 [c]	1,493	10,523	382	10,905
2004	7,365	0	2,180	995 [c]	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 [c]	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 [d]		1,523	3,709	2,078	5,787
2011	5,312	0	1,000 [d]		1,000	6,312	1,851	8,163
2012	3,205	0	700 [d]		700	3,905	3,118	7,023
2013	3,369	18	500 [d]		518	3,887	2,283	6,170
2014	2,485 [e]	19	546 [e]		565	3,050	1,983 [e]	5,033
Averages								
1961-2013	10,177	475	2,359	1,701	2,665	12,650	4,448	17,013
2004-2013	4,893	3	1,557	2,380	1,560	6,453	2,814	9,267
2009-2013	2,873	4	909	na	912	3,785	2,046	5,831
Minimum 2013	293	0	100	1	0	1,113	135	2,011
Maximum 2013	40,591	4,600	11,000	3,765	13,000	44,345	20,000	45,600

Note: Dash "-" means fishery did not occur. Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

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

[b] A test fishery and aboriginal fishery took place, but all other fisheries were closed.

[c] The chum salmon test fishery practiced live-release.

[d] Adjusted to account for underreporting.

[e] Data are preliminary.

Appendix B9.–Chinook salmon aerial survey indices for selected spawning areas in the Alaska portion of the Yukon River drainage, 1961–2014.

	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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Year	Andreafsky River East Fork	Andreafsky River West Fork	Anvik River Drainagewide Total	Anvik River Index Area [a]	Nulato River North Fork [b]	Nulato River South Fork	Nulato River Both Forks	Gisasa River
1999	[c]	870 [c]	[c]	950 [c]	[c]	[c]		[c]
2000	1,018	427	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 [c]	1,100 [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	1,876	1,776 [e]	1,292	-	1,292	843
2007	1,758	976	1,529	1,497	2,583	-	2,583	593
2008	278 [c]	262 [c]	992 [c]	827 [c]	922	-	922	487
2009	84 [c]	1,678	832	590	2,260	-	2,260	515
2010	537	858	974	721	356	355	711	264
2011	620	1,173	642	501	788	613	1,401	906
2012	[c]	[c]	722	451	682	691	1,373	[c]
2013	1,441	1,090	940	656	586	832	1,118	201 [c]
2014	[f]	1,695	1,584	800	[f]	[f]	[f]	[f]
SEG [g]	[h]	640-1,600	1,100-1,700				940-1,900	[h]
Averages								
1961-2013	1,305	1,121	1,210	1,083	873	575	1,320	729
2004-2013	1,100	1,074	1,461	1,225	1,065	531	1,353	611
2009-2013	671	1,200	822	584	934	623	1,373	472
Minimum 2013	84	213	296	212	55	23	78	45
Maximum 2013	5,855	3,281	3,979	3,304	2,583	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 2013.

[a] Anvik River Index Area includes mainstem counts between Yellow River 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] Index area includes counts from Beaver Creek to McDonald Creek.

[f] Aerial survey was not flown due to run timing and/or water/weather conditions.

[g] Sustainable Escapement Goal.

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

Appendix B10.–Chinook salmon escapement counts for selected spawning areas in the Alaska portion of the Yukon River drainage, 1986–2014.

	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	23.3 [b]						9,065 [c]	25.4		
1987	2,011	56.1 [b]						6,404 [c]	48.2	4,771 [c]	52.0
1988	1,339	38.7 [b]						3,346 [c]	33.9	4,322 [c]	45.3
1989	-	13.6						2,730 [c]	45.3	3,294 [c]	43.8
1990	-	41.6						5,603 [c]	36.3	10,728 [c]	36.2
1991	-	33.9						3,172 [c]	31.5	5,608 [c]	40.7
1992	-	21.2						5,580 [c]	21.6	7,862 [c]	36.0
1993	-	29.9						12,241 [b]	11.7	10,007 [b]	23.9
1994	7,801	35.5	1,795			2,888		11,877 [b]	32.4	18,399 [b]	38.8
1995	5,841	43.7	1,412			4,023	46.0	11,394 [c]	51.7	13,643 [b]	48.5
1996	2,955	41.9	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 [b]	25.6	18,514 [b]	43.4
1998	4,034	29.0	1,536			2,414	16.2	4,745 [b]	28.4	5,027 [b]	26.1
1999	3,444	28.6	1,932			2,644	26.4	6,485 [b]	45.6	9,198 [b]	47.4
2000	1,609	54.3	908	244	29.7	2,089	34.4	4,694 [c]	21.7	4,595 [b]	38.1
2001	-	-	-	1,103	36.3	3,052	49.2	9,696 [b]	30.1	13,328 [b]	32.5
2002	4,123	21.1	2,696	649	30.8	2,025	20.7	6,967 [c]	27.3	9,000 [b,d]	30.1
2003	4,336	45.3	1,716 [e]	763	38.4	1,901	38.1	11,100 [b,f]	31.8	15,500 [b,d]	34.3
2004	8,045	37.3		1,248	21.3	1,774	30.1	9,645 [b]	43.9	15,761 [b]	54.5
2005	2,239	50.2		1,059	41.4	3,111	34.0	[g,h]	30.6	5,988 [b]	47.1
2006	6,463	42.6			[g]	3,031	28.2	2,936 [b]	32.1	10,679 [b]	37.6
2007	4,504	44.7		740	24.9	1,427	39.0	3,806 [b]	26.0	6,425 [b]	31.0
2008	4,242	34.8		766	27.7	1,738	16.2	3,208 [b]	29.0	5,415 [b,d]	34.1
2009	3,004	46.0		1,637	49.0	1,955	29.3	5,253 [b]	40.0	12,774 [b]	33.9
2010	2,413	48.6		857	49.6	1,516	29.0	2,382 [b]	20.6	6,135 [b]	26.6
2011	5,213	20.2		1,796	33.9	2,692	19.5	[g,h]	22.7	7,200 [i]	36.3
2012	2,517	28.0		922	43.0	1,323	17.0	2,220 [b,j]	39.1	7,165 [b]	50.9
2013	1,998	40.4		772	44.8	1,126	34.1	1,859 [b,g]	40.3	5,465 [b]	50.5
2014[l]	5,949	44.2			[g]	1,589	18.5	4,358 [g,h]	33.1	[g]	32.0
SEG [m]	2,100-4,900										
BEG [n]								2,800-5,700		3,300-6,500	

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Year	Andreafsky River Weir No Fish	% Fem	Nulato River Tower No Fish	Henshaw Creek Weir No Fish	% Fem	Gisasa River Weir No Fish	% Fem	Chena River Tower No Fish	% Fem	Salcha River Tower No Fish	% Fem
Averages											
1986-2013	3,766	36.6	1,946	966	36.2	2,324	29.1	6,421	32.1	9,051	38.7
2004-2013	4,064	39.3	-	1,089	37.3	1,969	27.6	3,914	32.4	8,301	40.3
2009-2013	3,029	36.6	-	1,197	44.1	1,722	25.8	2,929	32.5	7,748	39.6
Min 2013	1,339	13.6	756	244	21.3	1,126	16.2	1,859	11.7	3,294	23.9
Max 2013	8,045	56.1	4,766	1,796	49.6	4,023	49.2	13,390	51.7	18,514	54.5

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[a] In years when only carcass surveys were conducted, proportions of males and females were adjusted based on the average of ratios of unbiased estimates from mark–recapture experiments to estimates from carcass samples over those years when mark–recapture studies were conducted. In years when mark–recapture experiments were conducted, proportions of males and females were estimated as the ratio of the abundance estimate of each gender to the abundance estimate of all fish.

[b] Tower counts.

[c] Mark–recapture population estimate.

[d] Estimate includes an expansion for missed counting days based on average run timing. Minimum documented abundances from successful counting days were 4,644 in 2002, 11,758 in 2003, and 5,415 in 2008.

[e] Weir count.

[f] Estimate includes an expansion for missed counting days based on average run timing. Minimum documented abundance during successful counting days was 8,739 (SE=653) fish.

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

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

[i] Aerial survey estimate. High water conditions prevented tower counting much of the season.

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

[l] Preliminary.

[m] Sustainable escapement goal (SEG)

[n] Biological escapement goal (BEG)

Appendix B11.–Chinook salmon estimated U.S.-Canada border passage, total Canadian harvest, and spawning escapement in Canada, 1982–2014.

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

-continued-

Year	Historic Wheel Mark-recapture Border Passage Estimate [a]	Canadian Mainstem Border Passage Estimate	Canadian Mainstem Harvest	Spawning Escapement Estimate [b]
2009	-	69,575 [e]	4,297	65,278
2010	-	34,470 [e]	2,456	32,014
2011	-	50,901 [e]	4,594	46,307
2012	-	34,656 [e]	2,000	32,656
2013	-	30,573 [e]	1,904	28,669
2014	-	63,431 [e]	100	63,331
Averages				
1982-2013	40,136	59,469	12,582	46,887
2004-2013	NA	50,692	5,413	45,280
2009-2013	NA	44,035	3,050	40,985
Minimum 2013	14,666	30,573	1,904	25,870
Maximum 2013	56,929	93,606	21,327	80,591

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[a] From 1982 to 2008, a mark–recapture program was used to determine border passage. Fish wheels near the US/Canada border captured and tagged fish and recaptures were collected from upstream fisheries. After the mainstem Yukon River sonar at Eagle was initiated in 2005, it became obvious that the mark–recapture estimates were biased low and the JTC recommended future fish passage estimates to be based on the mainstem Yukon River sonar at Eagle passage estimates.

[b] Canadian spawning escapement estimated as border passage minus Canadian harvest, except where estimated directly as noted as follows.

[c] 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.

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

[e] Border passage estimated from the mainstem Yukon River sonar at Eagle counts since 2005.

Appendix B12.–Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961–2014.

Year	Tatchun Creek		Blind Creek Weir	Chandindu River Weir		Big Salmon Sonar	Klondike River Sonar	Teslin River Sonar	Whitehorse Fishway Count		Whitehorse Fishway 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	
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	

-continued-

Year	Tatchun Creek [a]	Blind Creek Weir	Chandindu River Weir	Big Salmon Sonar	Klondike River Sonar	Teslin River Sonar	Whitehorse Fishway Count	Whitehorse Fishway Percent Hatchery Contribution
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[i]		312		3,242		9,916	1,139	67
2014[i]		602		6,321		17,507	1,601	78
Averages								
1961-2013	235	552	138	4,754	-	-	941	26
2004-2013	-	439	-	4,754	2,377	6,656	1,237	56
2009-2013	-	363	-	4,812	2,377	6,656	1,041	54
Minimum 2013	7	157	4	1,329	803	3,396	121	0
Maximum 2013	1,198	1,115	239	9,261	5,147	9,916	2,958	95

Note: Canadian mainstem border passage and spawning escapement estimates are based on a 3-Area escapement index, radiotelemetry (local) (2002–2004), and the mainstem Yukon River sonar at Eagle (2005–2007). Minimum and maximum indicate year with the lowest and highest values through 2013.

[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] RBW tested for 3 weeks.

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

[i] Data are preliminary.

Appendix B13.–Summer chum salmon escapement counts for selected spawning areas in the Alaska portion of the Yukon River drainage, 1973–2014.

	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, Weir[c] Counts	Aerial [b]	Tower and Aerial [d]	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	-	482,121	-		3,702 [e]	11,244 [e]	
1981	81,555	147,312 [f]	-	-	1,479,582	-		14,348	-	
1982	7,501 [e]	180,078 [f]	7,267 [e]	-	444,581	-		-	-	
1983	-	110,608 [f]	-	-	362,912	-		1,263 [e]	19,749	
1984	95,200 [e]	70,125 [f]	238,565	-	891,028	-		-	-	
1985	66,146	-	52,750	-	1,080,243	24,576		10,494	19,344	
1986	83,931	167,614 [f]	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 [i]	-	-	1,124,689	-	47,295	-	-	148,762 [i]
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,h]	-	129,694

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Year	Andreafsky River			Anvik River		Rodo River	Kaltag River	Nulato River		
	East Fork		West Fork					South Fork	North Fork [a]	Mainstem
	Aerial [b]	Sonar, Tower, or Weir Counts	Aerial [b]	Tower and Aerial [c]	Sonar	Aerial [b]	Tower	Aerial [b]	Aerial [b]	Tower
1997	-	51,139 [h]	-	-	605,752	2,775 [e]	48,018	-	-	157,975
1998	-	67,720 [h]	-	-	487,301	-	8,113	-	-	49,140
1999	-	32,587 [h]	-	-	437,356	-	5,339	-	-	30,076
2000	2,094 [e]	24,785 [h]	18,989 [e]	-	196,349	-	6,727	-	-	24,308
2001	-	2,134 [h,i]	-	-	224,058	-	-	-	-	-
2002	-	44,194 [h]	-	-	459,058	-	13,583	-	-	72,232
2003	-	22,461 [h]	-	-	256,920	-	3,056	-	-	19,590 [i]
2004	-	64,883 [h]	-	-	365,353	-	5,247	-	-	-
2005	-	20,127	-	-	525,391	-	22,093	-	-	-
2006	3,100 [e]	102,260	617	-	605,485	-	-	7,772	11,658	-
2007	-	69,642	-	-	460,121	-	-	21,825	15,277	-
2008	9,300	57,259	25,850	-	374,928	-	-	12,070	10,715	-
2009	736	8,770	3,877	-	193,099	621	-	2,120	567	-
2010	1,982	72,839	24,380	-	396,173	-	-	1,891	1,038	-
2011	12,889	100,473	10,020	-	642,527	6,011	-	9,454	8,493	-
2012	-	56,680	-	-	483,972	15,606	-	20,600	14,948	-
2013	10,965	61,234	9,685	-	571,690	-	-	13,695	13,230	-
2014	-	37,793	-	-	399,223	-	-	-	-	-
GOAL [j]		>40,000			350,000-700,000					
Average										
1973-2013	44,352	78,913	56,189	-	615,699	-	26,176	11,741	22,185	-
2004-2013	6,495	61,417	12,405	-	461,874	-	13,670	11,178	9,491	-
2009-2013	6,643	59,999	11,991	-	457,492	-	-	9,552	7,655	-
Minimum 2013	736	2,134	617	249,015	193,099	621	3,056	1,263	567	19,590
Maximum 2013	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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	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	5,400	212	5,809
1994		6,827	51,116 [i]	8,247 [k]			-	1,137	9,984	4,916	39,450
1995		6,458	136,886	-	116,735		4,985	185 [e]	3,519 [i]	934 [e]	30,784
1996		-	158,752	27,090 [k]	100,912		2,310	2,061	12,810 [i]	9,722	74,827
1997		686 [e]	31,800	1,821 [e]	76,454		428 [e]	594 [e]	9,439 [i]	3,968 [e]	35,948
1998		-	21,142	120 [e]	212 [i]		7 [e]	24 [e]	5,901	370 [e]	17,289
1999		-	10,155	-	11,283		-	520	9,165	150	23,221
2000	27,271	-	11,410	-	19,376		480	105	3,515	228	20,516
2001	35,031	-	17,936	-	3,674		12,527	2	4,773	-	14,900

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Year	Henshaw Creek Weir	Gisasa River Aerial [b]	Gisasa River Weir	Hogatza River Clear & Caribou Cr. Aerial [b]	Hogatza River Clear Creek Tower	Tozitna River Weir and Aerial [b]	Chena River Aerial [b]	Chena River Tower	Salcha River Aerial [b]	Salcha River Tower
2002	25,249	-	33,481	-	13,150	18,789	-	1,021 [i]	78	20,837 [l]
2003	22,556	-	25,999	-	6,159	8,487	-	573 [i]	-	-
2004	86,474	-	37,851	-	15,661	25,003	-	15,162 [i]	-	47,861
2005	237,481	-	172,259	-	26,420	39,700	219	2,928 [i]	4,320	193,085
2006	-	1,000	261,306	-	29,166	22,629	469	35,109 [i]	152	111,869
2007	44,425	-	46,257	-	6,029 [l]	8,470	-	4,999	4 [e]	13,069
2008	97,281	20,470	36,938	-	-	9,133	37	1,300 [i]	0 [e]	2,212 [i]
2009	156,201	1,060	25,904	3,981	-	8,434	-	16,516	-	31,035
2010	105,398	1,096	47,669	840	-	-	-	7,560	-	22,185
2011	248,247	13,228	95,796	3,665	-	11,351	-	-	-	66,564 [m]
2012	292,082	- [e]	83,423	23,022	-	11,045	-	6,882	-	46,251
2013	285,008	9,300 [e]	80,055	-	-	-	-	21,372	-	60,980
2014	- [n]	-	32,523	-	-	-	-	17,076 [e]	-	- [n]
GOAL										
Average										
1973-2013	127,900	9,654	69,307	10,664	32,710	6,568	908	8,896	3,095	43,935
2004-2013	172,511	7,692	88,746	7,877	19,319	16,971	242	12,425	1,119	59,511
2009-2013	217,387	6,171	66,569	7,877	-	10,277	-	13,083	-	45,403
Minimum 2013	22,556	334	10,155	120	212	7	2	573	0	2,212
Maximum 2013	292,082	56,904	261,306	28,141	116,735	39,700	4,349	35,109	9,810	193,085

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Note: Unless otherwise noted blank cells indicate years prior to the project being operational. Dash indicates years in which no information was collected. Minimum and maximum indicate year with the lowest and highest values through 2013.

[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 weir installed in 1994; all numbers from that point onwards are weir counts unless otherwise noted.

[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] East Fork Andreafsky: sonar count for 1981-1984; tower count for 1986-1988.

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

[h] Weir count.

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

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

[k] BLM helicopter survey.

[l] Project operated as a video monitoring system.

[m] 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).

[n] No estimates due to high water conditions that prevented counting for much of the season.

Appendix B14.–Fall chum salmon abundance estimates or escapement estimates for selected spawning areas in Alaska portions of the Yukon River drainage, 1971–2014.

	Yukon River	Tanana River Drainage					Upper Yukon River Drainage		
Year	Mainstem Sonar Estimate	Toklat River [a]	Kantishna River Abundance Estimate [b]	Delta River [c]	Bluff Cabin Slough [d]	Upper Tanana River Abundance Estimate [e]	Rampart-Rapids Mark-Recapture Estimate	Chandalar River [f]	Sheenjek River [g]
1971									
1972				5,384 [h]					
1973				10,469 [h]					
1974		41,798		5,915 [h]					89,966 [i]
1975		92,265		3,734					173,371 [i]
1976		52,891		6,312					26,354 [i]
1977		34,887		16,876					45,544 [i]
1978		37,001		11,136 [h]					32,449 [i]
1979		158,336		8,355 [h]					91,372 [i]
1980		26,346 [j]		5,137 [h]	3,190 [k]				28,933 [i]
1981		15,623		23,508 [h]	6,120 [k]				74,560 [l]
1982		3,624		4,235 [h]	1,156				31,421 [l]
1983		21,869		7,705 [h]	12,715				49,392 [l]
1984		16,758		12,411 [h]	4,017				27,130 [l]
1985		22,750		17,276	2,655 [k]				152,768 [l,m]
1986		17,976		6,703	3,458			59,313	84,207 [m,n]
1987		22,117		21,180 [h]	9,395			52,416	153,267 [m,n]
1988		13,436		18,024 [h]	4,481 [k]			33,619	45,206 [n]
1989		30,421		21,342	5,386 [k]			69,161	99,116 [n]
1990		34,739		8,992	1,632			78,631	77,750 [n]
1991		13,347		32,905	7,198				86,496 [o]
1992		14,070		8,893	3,615 [k]				78,808
1993		27,838		19,857 [h]	5,550 [k]				42,922
1994		76,057		23,777	2,277 [k]				150,565
1995	1,053,248	54,513 [j]		20,587 [h]	19,460	268,173	230,643	280,999	241,855

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Year	Yukon River Mainstem Sonar Estimate	Tanana River Drainage: Toklat River	Kantishna River Abundance Estimate	Delta River	Bluff Cabin Slough	Upper Tanana River Abundance Estimate	Upper Yukon River Drainage: Rampart-Rapids Mark-Recapture Estimate	Chandalar River	Sheenjek River
1996	[p]	18,264		19,758	7,074 [c]	134,563	654,296	230,450	246,889
1997	506,621	14,511		7,705	5,707 [c]	71,661	369,547	211,914	80,423 [q]
1998	372,927	15,605		7,804	3,549 [c]	62,384	194,963	83,899	33,058
1999	379,493	4,551	27,199	16,534	7,559 [c]	97,843	189,741	92,685	14,229
2000	247,935	8,911	21,450	3,001	1,595	34,844	[p]	71,048	30,084 [r]
2001	376,182	6,007 [s]	22,992	8,103	1,808 [k]	96,556 [t]	201,766	112,664	53,932
2002	326,858	28,519	56,719	11,992	3,116	109,970	196,186	94,472	31,642
2003	889,778	21,492	87,359	22,582	10,600 [k]	193,418	485,102	221,343	44,047 [u]
2004	594,060	35,480	76,163	25,073	10,270 [k]	123,879	618,597 [v]	169,848	37,878
2005	1,813,589	17,779 [j]	107,719	28,132	11,964 [k]	337,755	1,987,982	526,838	561,863 [m]
2006	790,563		71,135	14,055		202,669		254,778	160,178 [m]
2007	684,011		81,843	18,610		320,811		243,805	65,435 [m]
2008	615,127			23,055	1,198 [k]			178,278	50,353 [m]
2009	[p]			13,492	2,900 [k]			[q]	54,126 [m]
2010	393,326			17,933	1,610 [k]			167,532	22,053
2011	764,194			23,639	2,655 [k]			298,223	97,976 [m]
2012	682,510			9,377 [d]				205,791	104,701 [m]
2013	716,727			31,955	5,554 [k]			252,710	
2014	650,808 [w]			32,480 [d]	4,095 [k]			226,489 [w]	
Escapement [x]	300,000 [y]	15,000 [z]		6,000		46,000 [aa]	212,000 [ab]	74,000	50,000 [ac]
Objective	600,000	33,000		13,000		103,000	441,000	152,000	104,000
Averages									
1971-2013	659,244	31,243	61,398	14,846	5,467	158,040	512,882	173,496	91,598
2004-2013	783,790	26,630	84,215	20,532	5,164	246,279	-	255,311	128,285
2009-2013	639,189	-	-	19,279	3,180	-	-	231,064	69,714

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Year	Yukon River Mainstem Sonar Estimate	Tanana River Drainage: Toklat River [a]	Kantishna River Abundance Estimate [b]	Delta River [c]	Bluff Cabin Slough [d]	Upper Tanana River Abundance Estimate [e]	Upper Yukon River Drainage: Rampart-Rapids Mark-Recapture Estimate	Chandalar River [f]	Sheenjek River [g]
Minimum 2013	247,935	3,624	21,450	3,001	1,156	34,844	189,741	33,619	14,229
Maximum 2013	1,813,589	158,336	107,719	32,905	19,460	337,755	1,987,982	526,838	561,863

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[a] 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.

[b] Fall chum salmon abundance estimate for the Kantishna and Toklat River drainages is based on a mark–recapture program. Tag deployment occurs at a fish wheel located near the mouth of the Kantishna River and recaptures are collected at 4 fish wheels; 2 located 8 miles upstream of the mouth of the Toklat River (1999–2005) and 1 fish wheel on the Kantishna River (2000–2002, 2006–2007) and 2 fish wheels in 2003–2005.

[c] Estimates are a total spawner abundance, using migratory time density curves and stream life data, unless otherwise indicated.

[d] Peak foot survey, unless otherwise indicated.

[e] Fall chum salmon abundance estimate for the upper Tanana River drainage is based on a mark–recapture program. Tag deployment occurs from a fish wheel (2 fish wheels in 1995) located just upstream of the Kantishna River and recaptures are collected from 1 fish wheel (2 fish wheels in 1995) located downstream from the village of Nenana.

[f] 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.

[g] 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.

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

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

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

[k] Aerial survey count, unless otherwise indicated.

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

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

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

[o] Total abundance estimates are for the period approximating second week 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.

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

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

[r] Sheenjek sonar project ended early (September 12) because of low water.

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

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

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

[v] Mark–recapture estimate for 2004 was 618,579 fall chum salmon (SE 60,714 notably high).

[w] Data are preliminary.

[x] Escapement goal (EG) includes individual tributary BEGs and drainagewide SEG.

[y] Drainagewide escapement goal is related to mainstem passage estimate at Pilot Station sonar 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 plus the Upper Tanana which was broke out here for comparison to the upper Tanana River abundance estimates.

[ab] Sum of BEGs for Chandalar, Sheenjek, Fishing Branch rivers and Mainstem Yukon River in Canada escapements based on Eggers (2001) and is not an established BEG.

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

Appendix B15.–Fall chum salmon abundance estimates or escapement estimates for selected spawning areas in Canadian portions of the Yukon River drainage, 1971–2014.

	Porcupine Drainage						Canadian Mainstem		
Year	Fishing Branch River [a]	Porcupine River Sonar	Mainstem Yukon River Index [b,c]	Koidern River [b]	Kluane River [b, d]	Teslin River [b, e]	Border Passage Estimate [f]	Harvest	Spawning Escapement Estimate [g]
1971	312,800 [h]								
1972	35,230 [i]				198 [i, k]				
1973	15,991		383		2,500				
1974	31,841				400				
1975	353,282		7,671		362 [k]				
1976	36,584 [h]				20				
1977	88,400 [h]				3,555				
1978	40,800 [h]				0 [k]				
1979	119,898 [h]				4,640 [k]				
1980	55,268 [h]				3,150		39,130	16,218	22,912
1981	57,386 [l]				25,806		66,347	19,281	47,066 [m]
1982	15,901 [h]		1,020 [n]		5,378		47,049	15,091	31,958
1983	27,200 [h]		7,560		8,578 [k]		118,365	27,490	90,875
1984	15,150 [h]		2,800 [o]	1,300	7,200	200	81,900	25,267	56,633 [m]
1985	56,223		10,760	1,195	7,538	356	99,775	37,765	62,010
1986	31,810		825	14	16,686	213	101,826	13,886	87,940
1987	49,038		6,115	50	12,000		125,121	44,345	80,776
1988	23,645		1,550	0	6,950	140	69,280	32,494	36,786
1989	44,041		5,320	40	3,050	210 [j]	55,861	20,111	35,750
1990	35,000 [p]		3,651	1	4,683	739	82,947	31,212	51,735
1991	37,870		2,426	53	11,675	468	112,303	33,842	78,461
1992	22,539		4,438	4	3,339	450	67,962	18,880	49,082
1993	28,707		2,620	0	4,610	555	42,165	12,422	29,743
1994	65,247		1,429 [j]	20 [j]	10,734	209 [j]	133,712	35,354	98,358
1995	51,971 [q]		4,701	0	16,456	633	198,203	40,111	158,092

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Appendix B15.–Page 2 of 3.

	Porcupine Drainage						Canadian Mainstem		
Year	Fishing Branch River [a]	Porcupine River Sonar	Mainstem Yukon River Index [b,c]	Koidern River [b]	Kluane River [b, d]	Teslin River [b, e]	Border Passage Estimate [f]	Harvest	Spawning Escapement Estimate [g]
1996	77,302		4,977		14,431	315	143,758	21,329	122,429
1997	27,031		2,189		3,350	207	94,725	9,306	85,419
1998	13,687		7,292		7,337	235	48,047	1,795	46,252
1999	12,958				5,136	19 [i]	72,188 [r]	13,636	58,552
2000	5,057		933 [j]		1,442	204	57,978 [r]	4,246	53,732
2001	21,737		2,453		4,884	5	38,769 [r]	5,278	33,491
2002	13,600		973		7,147	64	104,853 [r]	6,174	98,679
2003	29,713		7,982		39,347	390	153,656 [r]	10,523	143,133
2004	20,417		3,440		18,982	167	163,625 [r]	9,545	154,080
2005	119,058		16,425		34,600	585	451,477	13,979	437,498
2006	30,954		6,553		18,208	620	227,515 [s, t]	6,617	220,898
2007	32,150						246,317 [s, t]	9,330	236,987
2008	19,086 [q]						174,028 [s, t]	6,130	167,898
2009	25,828 [u]						94,739 [s]	1,113	93,626
2010	15,773 [u]						121,981 [s]	3,709	118,272
2011	13,085 [u,q]						211,878 [s]	6,312	205,566
2012	22,399 [u]						141,567 [s]	3,905	137,662
2013[v]	na [w]	35,615					204,149 [s]	3,887	200,262
2014[v]	na [w]	17,756					159,846 [s]	3,050	156,796
Goal[x]	50,000-120,000								>80,000
IMEG	22,000-49,000 [y]								70,000-104,000 [z]
Averages									
1971-2013	50,629		4,480	223	8,982	317	123,329	16,489	106,840
2004-2013	32,413		8,806	-	23,930	457	203,728	6,453	197,275
2009-2013	20,492		-	-	-	-	154,863	3,785	151,078
Minimum 2013	5,057	12,438	383	0	0	5	38,769	1,113	22,912
Maximum 2013	353,282	29,824	16,425	1,300	39,347	739	451,477	44,345	437,498

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Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

[a] Weir count, unless otherwise indicated.

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

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

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

[i] 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.

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

[k] Foot survey, unless otherwise indicated.

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

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

[n] Boat survey.

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

[p] 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.

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

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

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

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

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

[v] Data are preliminary.

[w] Fishing Branch River weir did not operate but 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 providing rough preliminary estimates of 25,376 and 7,304 in 2013 and 2014.

[x] Escapement objective (EO) based on US/Canada Treaty Obligations, some years stabilization or rebuilding goals are applied.

[y] Interim management escapement goal (IMEG) established for 2008–2012 based on percentile method.

[z] Interim management escapement goal (IMEG) established for 2010–2012 based on brood table of Canadian origin mainstem stocks (1982 to 2003).

Appendix B16.–Coho salmon passage estimates or escapement estimates for selected spawning areas in the Alaska portion of the Yukon River drainage, 1972–2014.

		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)

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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
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	100,664	4,169 (f)	2,218 (h)	500 (w)	1,512 (h)	20,100 (b)	3,625 (b)	
1996		2,040 (h)	2,171 (h)	201 (u) [d]	3,668 (g/b)	14,075 (b)	1,125 (b) [d]	
1997	105,956	1,524 (h)	1,446 (h)	[i]	1,996 (h)	11,525 (b)	2,775 (b)	
1998	129,076	1,360 (h) [d]	2,771 (h) [d]	[i]	1,413 (g/b)	11,100 (b)	2,775 (b)	
1999	60,886	1,002 (h) [d]	745 (h) [d]	370 (h)	662 (h) [d]	10,975 (b)		
2000	169,392	55 (h) [d]	68 (h) [d]	[i]	879 (h) [d]	9,225 (b)	1,025 (b)	2,175 (h)
2001	132,283	242 (h)	859 (h)	699 (h)	3,753 (h)	27,500 (b)	4,425 (b)	1,531 (f)
2002	117,908	0 (h)	328 (h)	935 (h)	1,910 (h)	38,625 (b)	5,900 (b)	874 (f)
2003	265,119	85 (h)	658 (h)	3,055 (h)	4,535 (h)	102,800 (b)	8,800 (b)	6,232 (h)
2004	199,884	220 (h)	450 (h)	840 (h)	3,370 (h)	37,550 (b)	2,925 (b)	8,626 (h)
2005	184,071	430 (h)	325 (h)	1,030 (h)	3,890 (h)	34,293 (b)	2,100 (b)	2,024 (h)
2006	131,919	194 (h)	160 (h)	634 (h)	1,916 (h)	16,748 (b)	4,375 (b)	271 (h)
2007	173,289	63 (h)	520 (h)	605 (h)	1,733 (h)	14,650 (b)	2,075 (b)	553 (h)
2008	135,570	1,342 (h)	1,539 (h)	578 (h)	1,652 (h)	7,500 (b)	1,275 (b)	265 (h)
2009	206,620 [j]	410 (h)		470 (h)	680 (h)	16,850 (b)	5,450 (b)	155 (h)
2010	155,784	1,110 (h)	280 (h)	340 (h)	720 (h)	5,867 (b)	813 (b)	1,002 (h)
2011	124,931	369 (h)			912 (h)	6,180 (b)	2,092 (b)	575 (h)
2012	106,782		106 (h)		405 (h)	5,230 (b)	396 (h)	515 (h)
2013	84,795	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	247,047 [o]	333 (h)	378 (h)	649 (h)	886 (h)	4,285 (b)	434 (h)	886 (h)
SEG [l]						5,200-17,000 [k]		
Averages								
1972-2013	139,901 [j]	842	923	1,344	1,488	15,971	2,210	1,297
2004-2013	144,114 [j]	540	483	569	1,570	15,109	2,372	1,463
2009-2013	131,849 [j]	653	193	288	628	8,070	2,194	579
Minimum 2013	60,886	0	68	55	27	632	229	80
Maximum 2013	265,119	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 2013.

[a] Passage estimates for coho salmon are incomplete. The sonar project is terminated prior to the end of the coho salmon run.

[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.

[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 to 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-October.

[i] No survey of Wood Creek due to obstructions in creek.

[j] The mainstem Yukon River sonar at Pilot Station encountered record low water levels during the fall season causing difficulties with species apportionment and catchability. Coho salmon are suspected of being over estimated therefore this value should not be used in averages or run reconstructions.

[k] Data 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 B17.–Stock percentage estimates of Chinook salmon migrating across the mainstem U.S./Canada border, Yukon River, 2005–2014.

Year	Region							
	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, b]	4.1%	28.2%	14.3%	23.6%	14.4%	7.4%	3.1%	4.9%
Average (2007–2013) [c]	4.1%	24.7%	15.4%	19.3%	15.1%	8.6%	8.0%	4.8%
Minimum (2007–2013)	0.0%	14.7%	9.6%	9.2%	9.3%	5.3%	0.7%	1.1%
Maximum (2007–2013)	7.5%	37.8%	21.7%	33.5%	23.9%	14.2%	14.6%	10.1%

Note: Minimum and maximum indicate year with the lowest and highest values through 2013.

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

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

[c] Samples from the mainstem Yukon River sonar at Eagle collected from the drift gillnet test fishery and may not be comparable to those collected at the fish wheels because of the proportion of Chinook salmon migrating offshore.

[d] Samples were run against the 2011 baseline.

Appendix B18.–Stock percentage estimates of fall chum salmon migrating across the mainstem U.S./Canada border, Yukon River, 2005–2014.

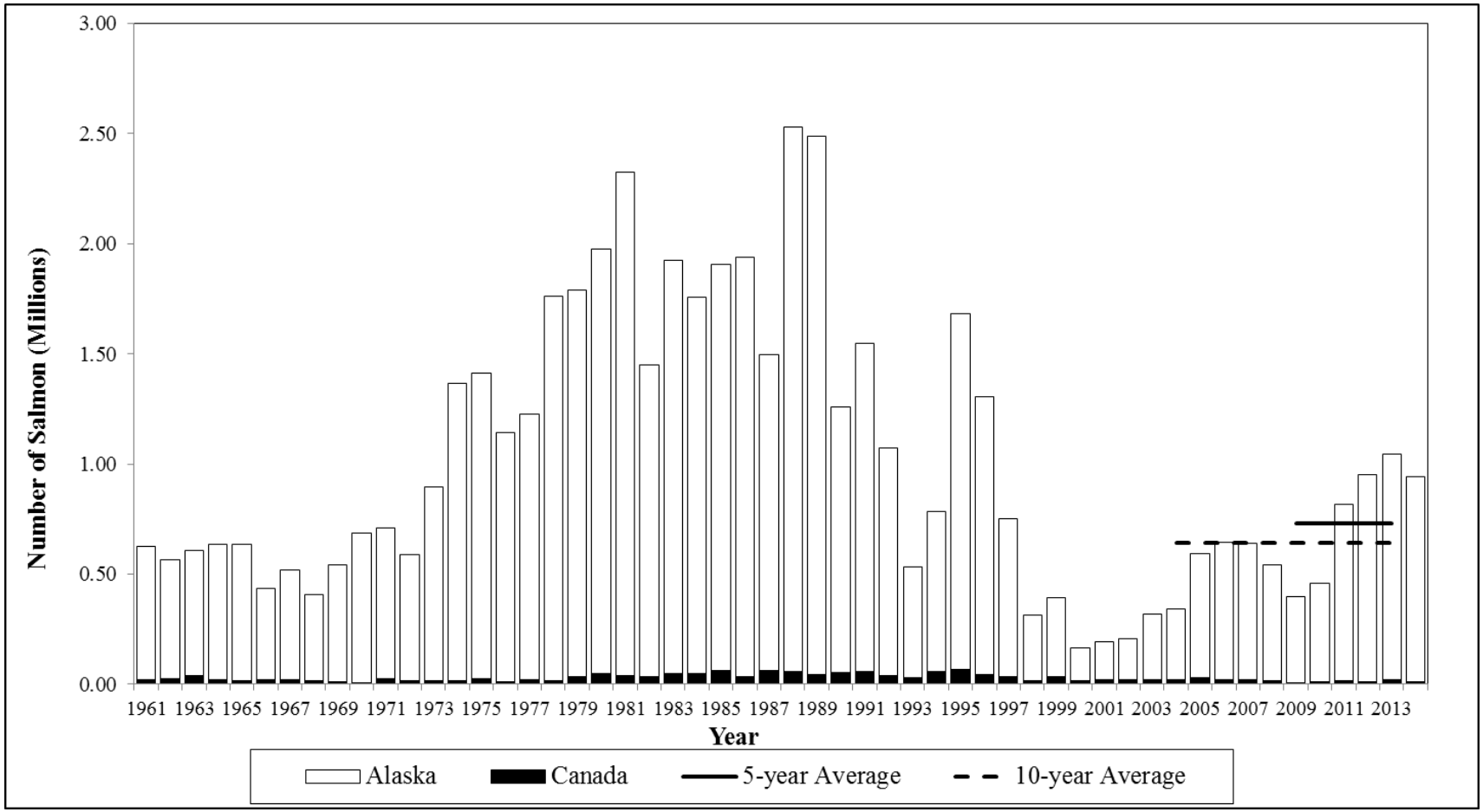
	Region			
Year	Mainstem	White	Teslin	Yukon Early
2005 [a]	67.7%	29.8%	0.4%	2.1%
2006 [a]	41.0%	54.9%	3.1%	1.0%
2007 [a]	46.9%	52.1%	0.5%	0.5%
2008 [a]	48.0%	49.9%	2.1%	0.1%
2009 [b]	68.3%	30.6%	1.0%	0.1%
2010 [b]	52.8%	46.3%	0.2%	0.7%
2011 [b]	51.2%	48.0%	0.7%	0.1%
2012 [b]	47.3%	52.6%	0.1%	0.1%
2013 [b]	50.5%	48.9%	0.4%	0.2%
2014 [b]	49.5%	50.4%	0.0%	0.2%
Average (2009–2013) [b]	54.0%	45.3%	0.5%	0.2%
Minimum (2009–2013)	47.3%	30.6%	0.1%	0.1%
Maximum (2009–2013)	68.3%	52.6%	1.0%	0.7%

Note: Samples were run against the current year's baseline (ex. 2005 samples were run against the 2005 baseline). Minimum and maximum indicate year with the lowest and highest values through 2013.

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

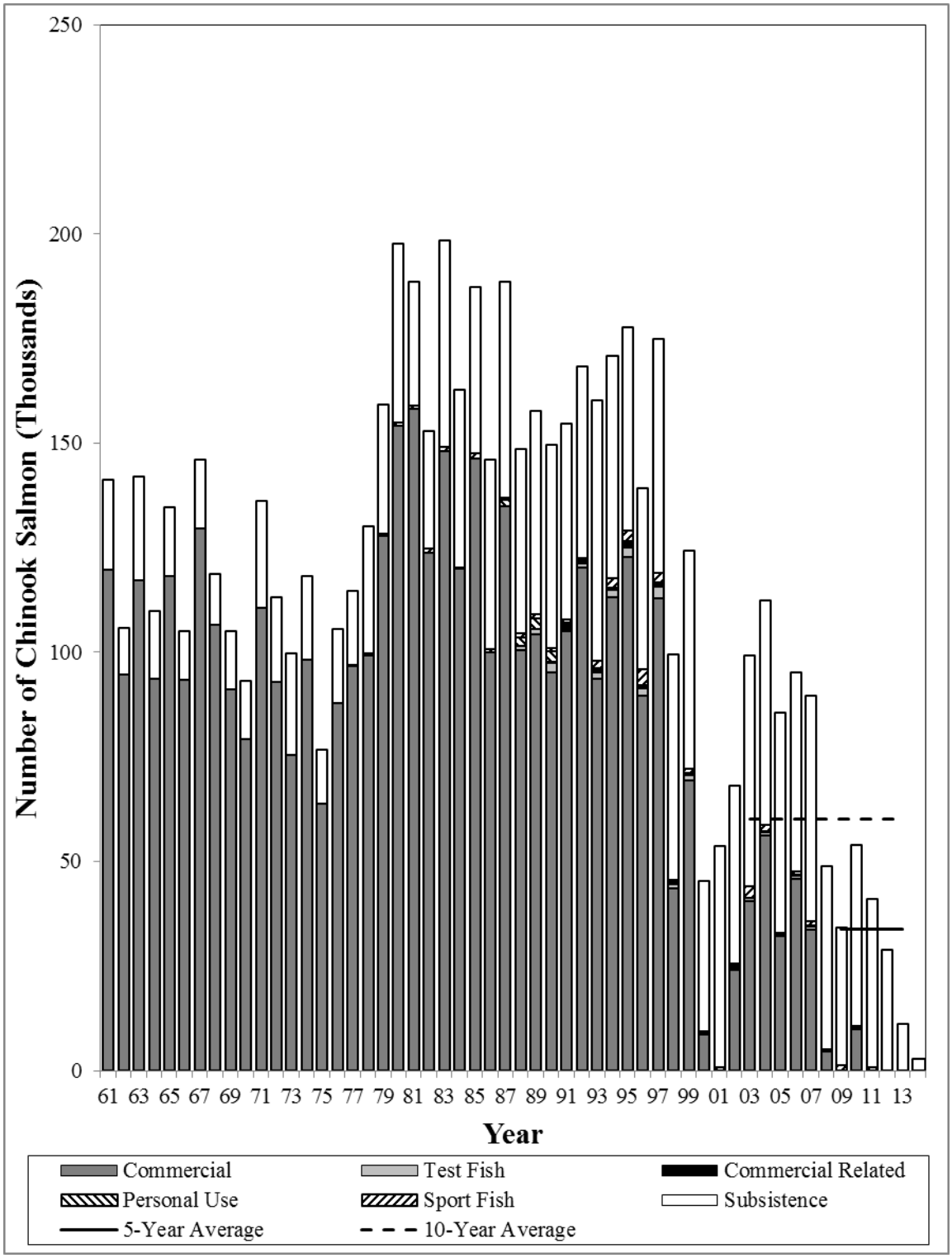
[b] Samples from the mainstem Yukon River sonar at Eagle collected from the drift test fishery.

APPENDIX C: FIGURES



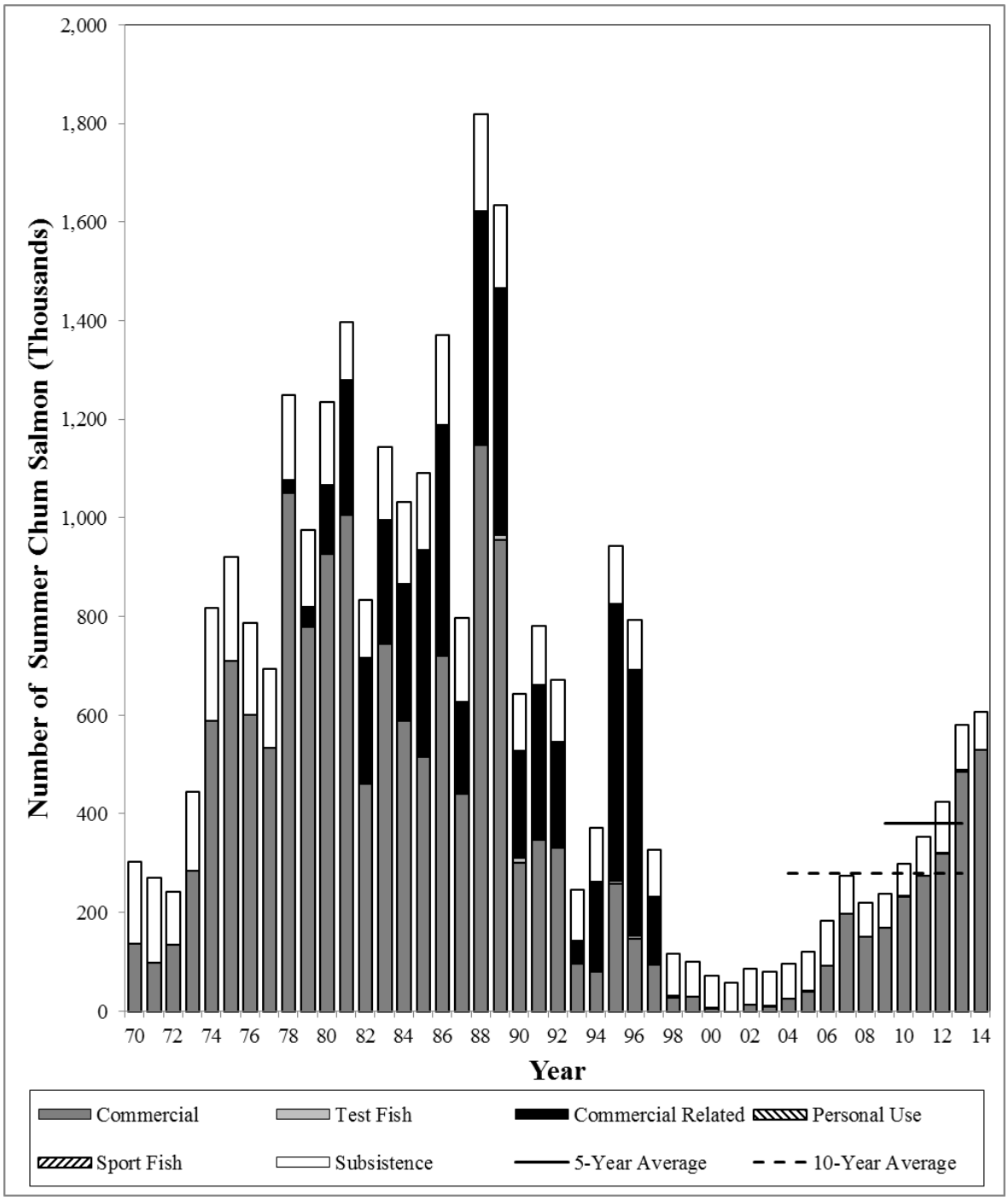
Note: Subsistence harvest estimates of fall chum and coho salmon are minimal prior to 1979 because of timing of harvest surveys. The 2012–2014 harvest estimates are preliminary.

Appendix C1.–Total utilization of Chinook, chum and coho salmon, Yukon River, 1961–2014.



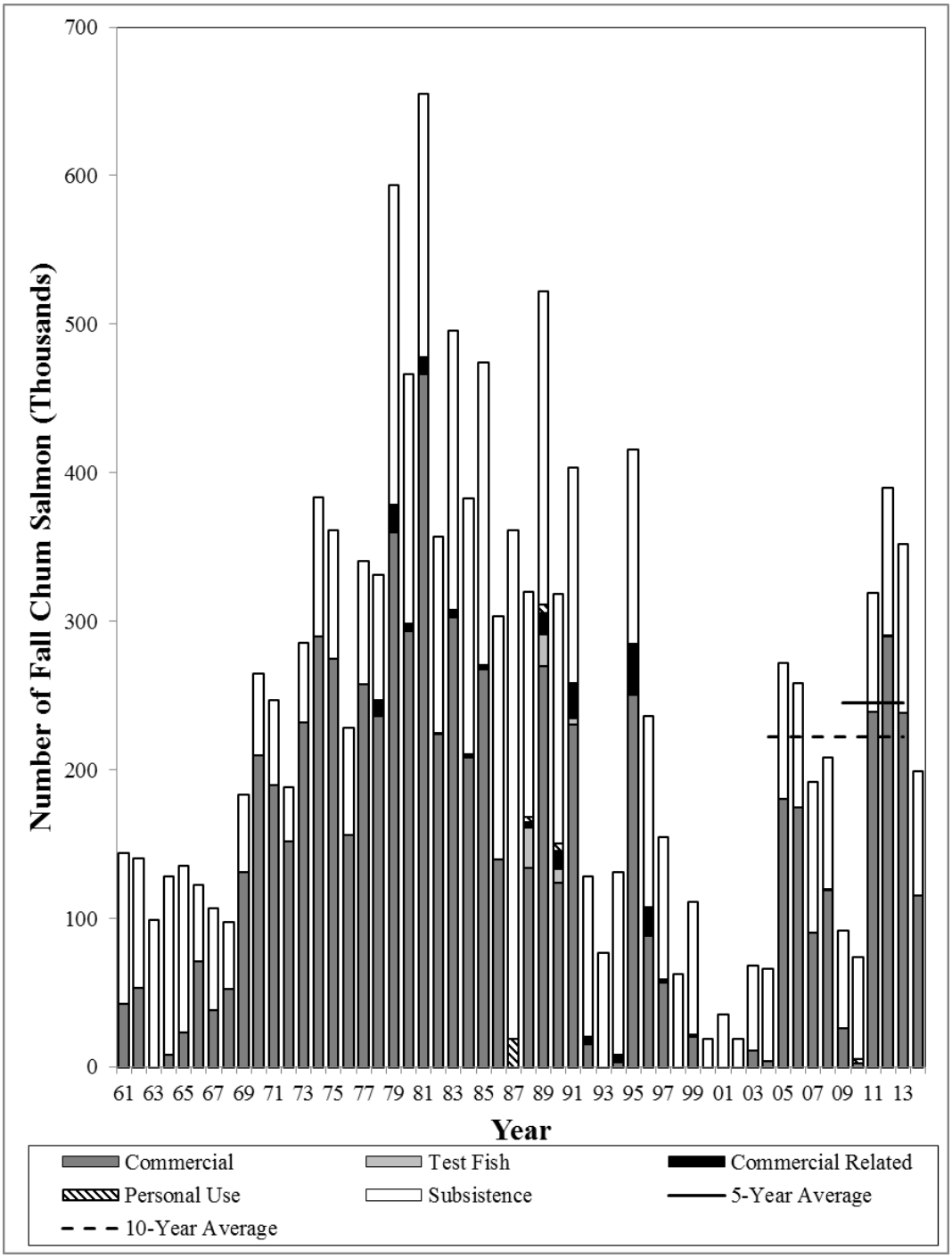
Note: No commercial fishery occurred in 2001. The 2012–2014 harvest estimates are preliminary.

Appendix C2.–Alaska harvest of Chinook salmon, Yukon River, 1961–2014.



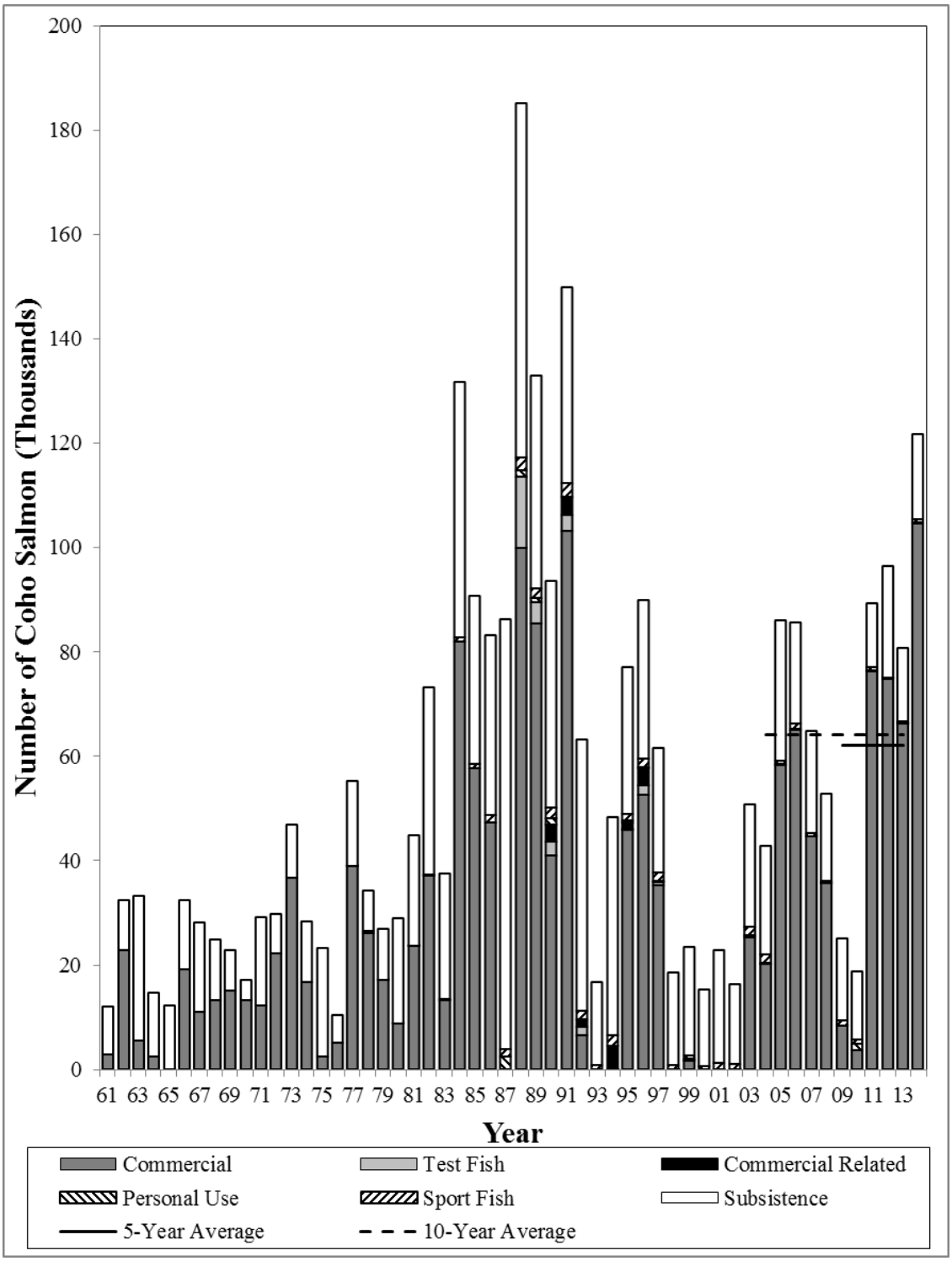
Note: The 2012–2014 harvest estimates are preliminary.

Appendix C3.–Alaska harvest of summer chum salmon, Yukon River, 1970–2014.



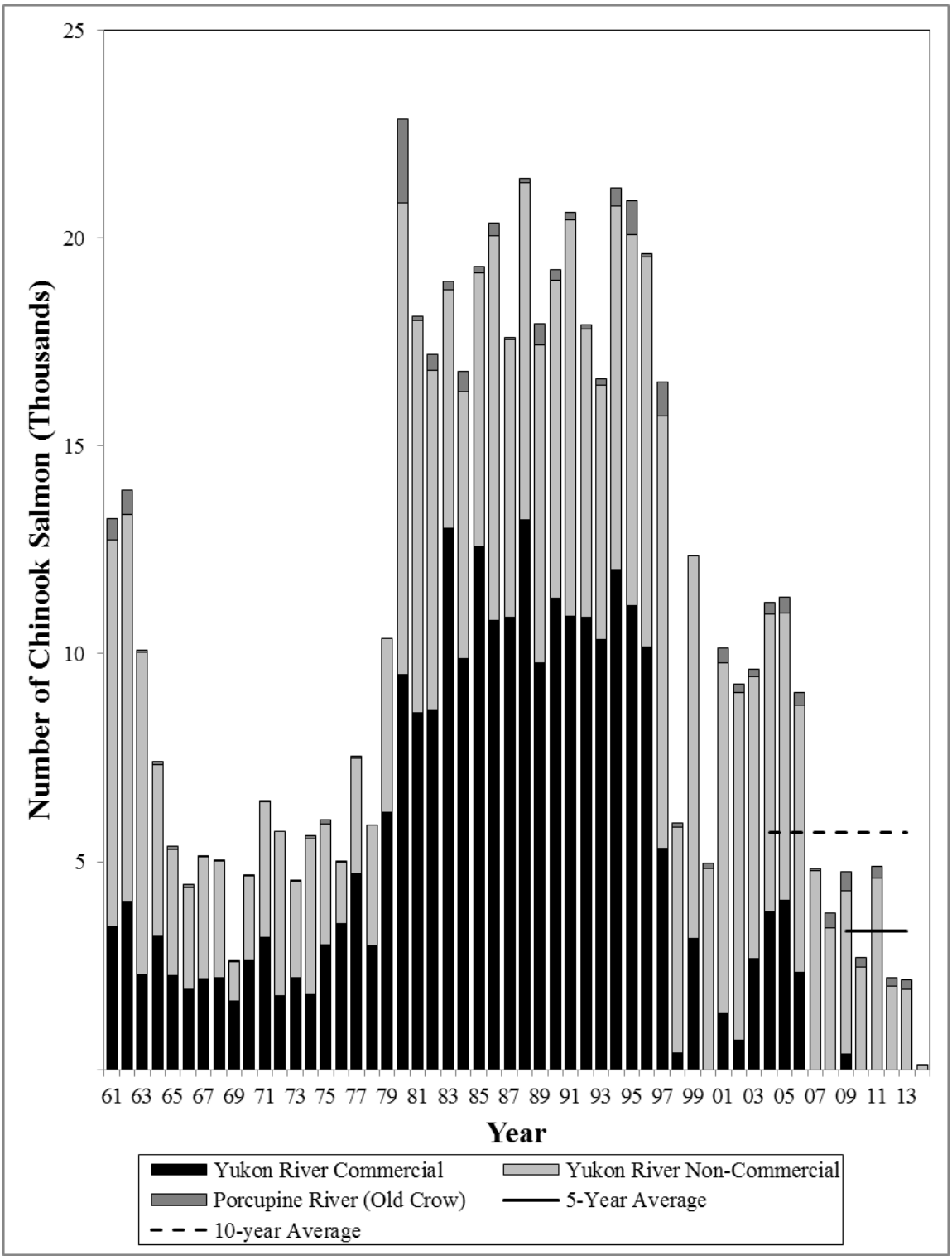
Note: Subsistence harvest estimates of fall chum salmon are minimal prior to 1979 because of timing of harvest surveys. The commercial fishery was closed 2000–2002. The 2012–2014 harvest estimates are preliminary.

Appendix C4.–Alaska harvest of fall chum salmon, Yukon River, 1961–2014.

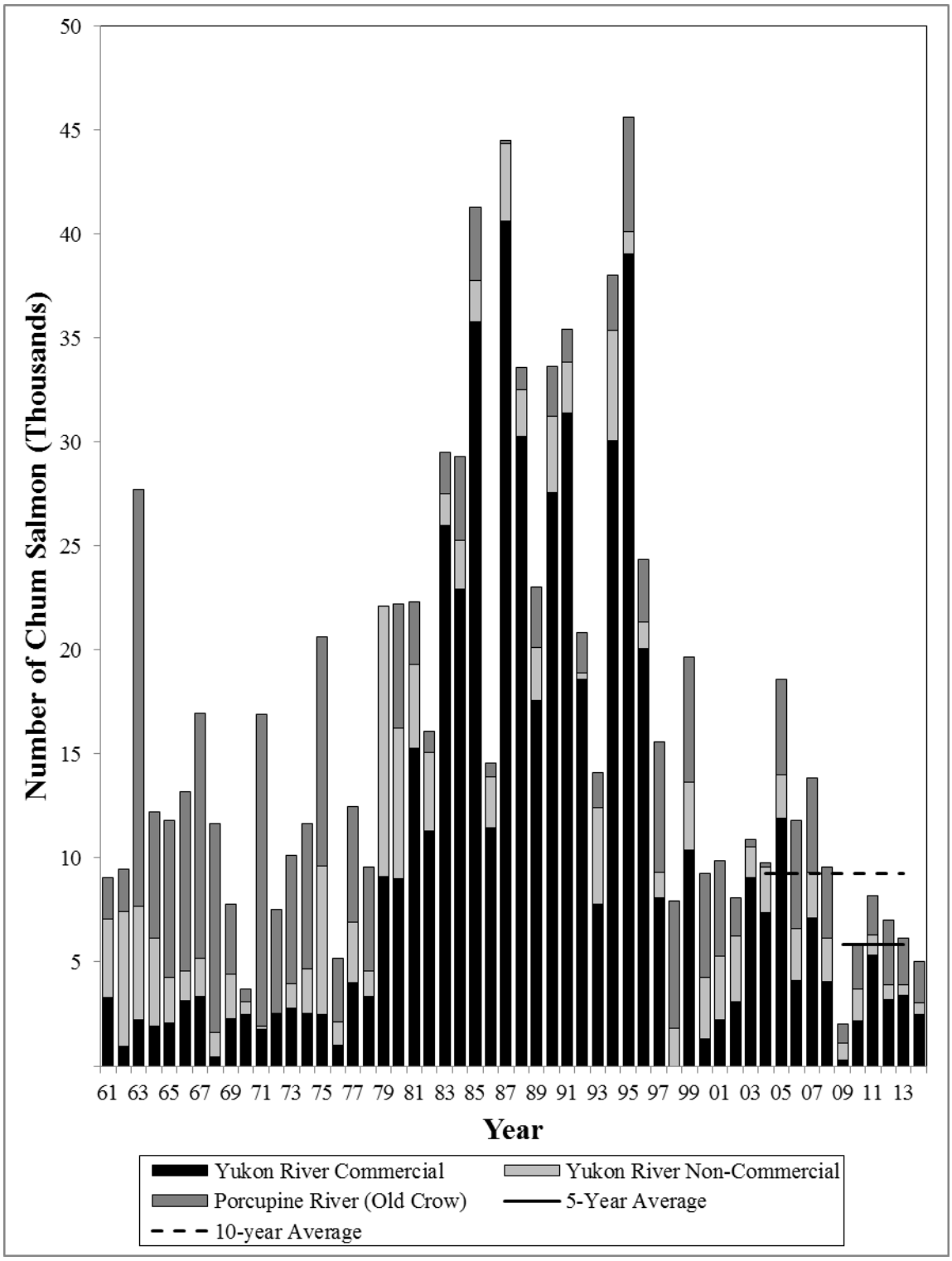


Note: Subsistence harvest estimates of coho salmon are minimal prior to 1979 because of timing of harvest surveys. The commercial fishery was closed 2000–2002. The 2012– 2014 harvest estimates are preliminary.

Appendix C5.–Alaska harvest of coho salmon, Yukon River, 1961–2014.

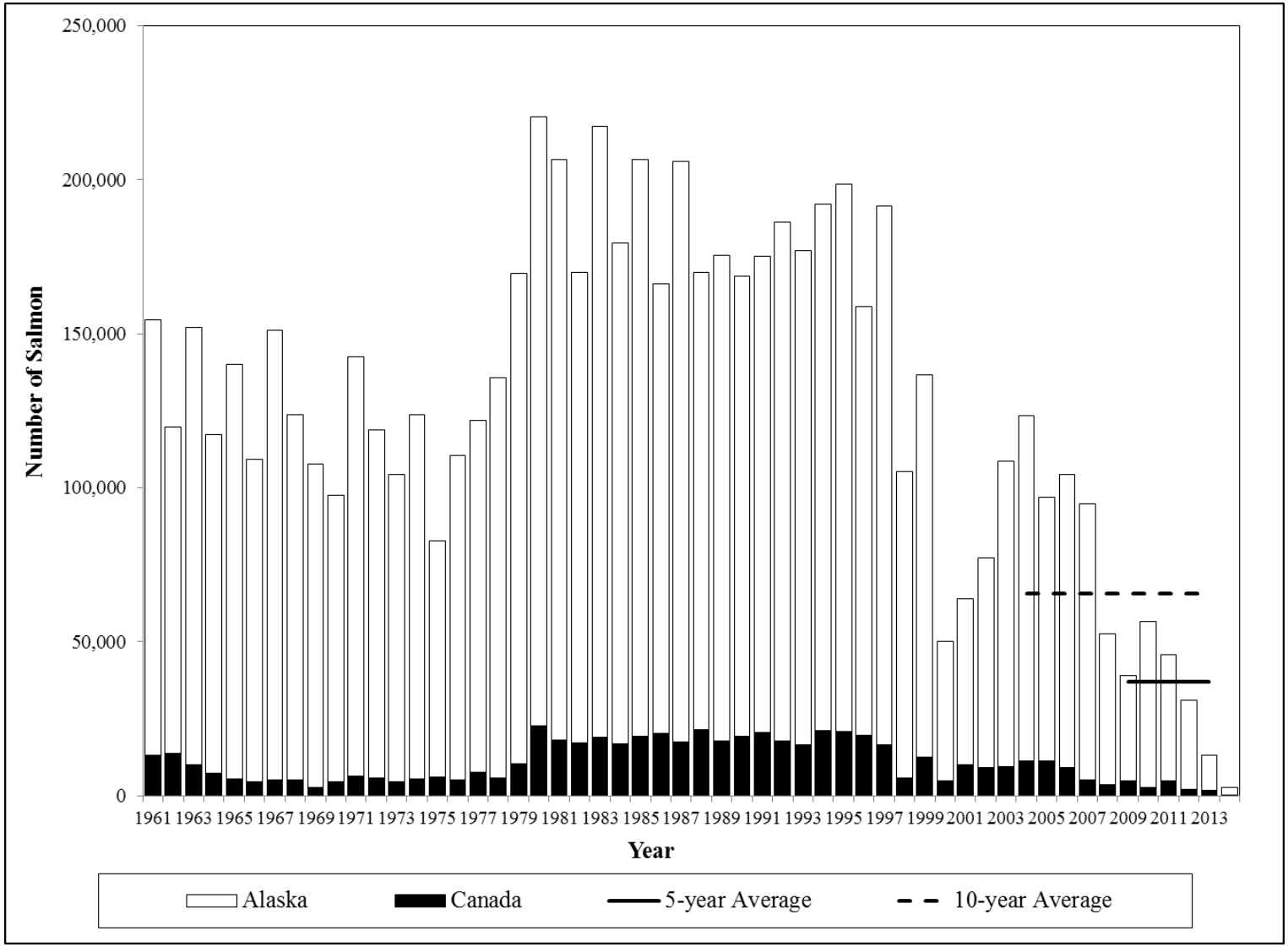


Appendix C6.–Canadian harvest of Chinook salmon, Yukon River, 1961–2014.



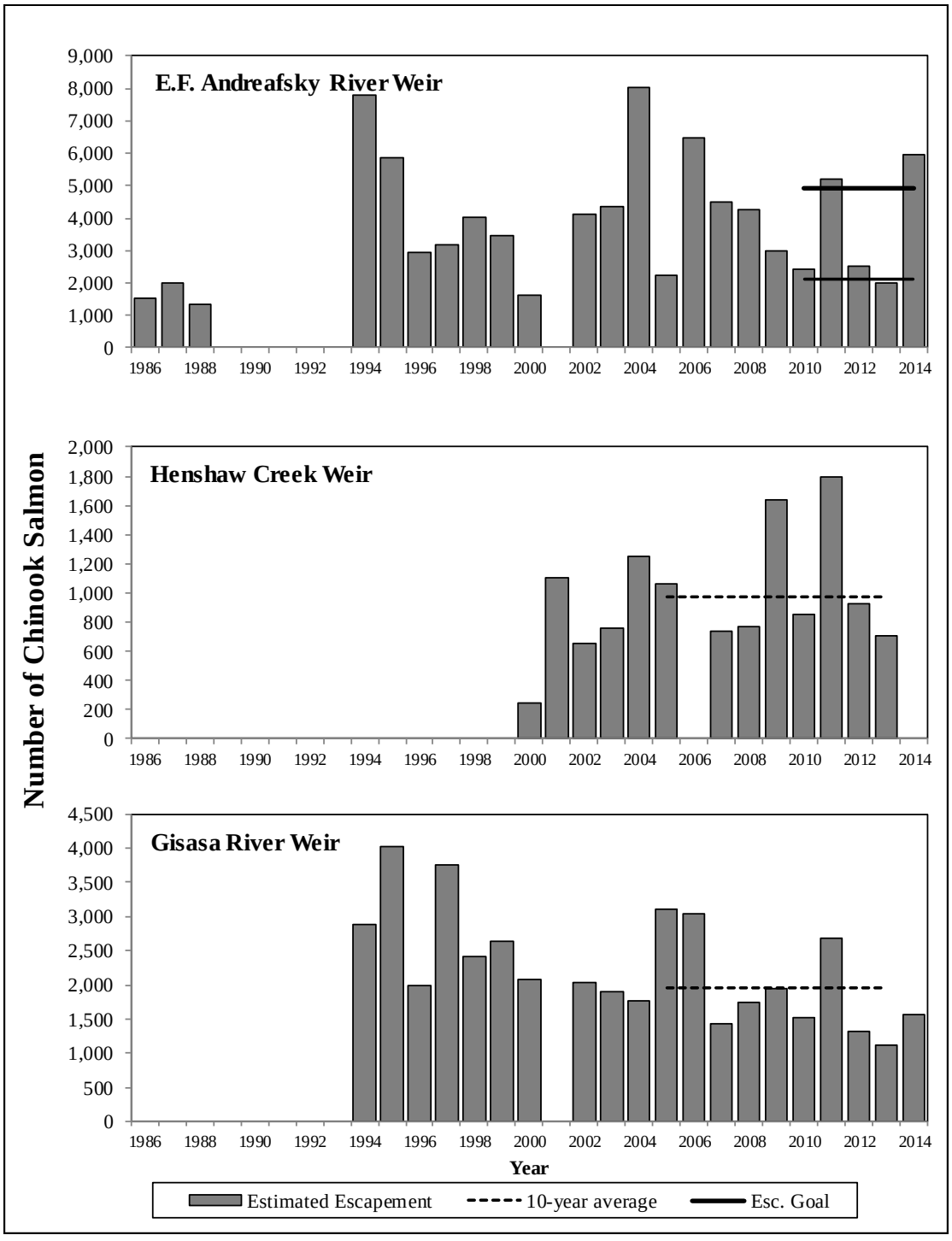
Note: The 2014 harvest estimates are preliminary.

Appendix C7.–Canadian harvest of fall chum salmon, Yukon River, 1961–2014.



Note: The 2012–2014 harvest estimates are preliminary.

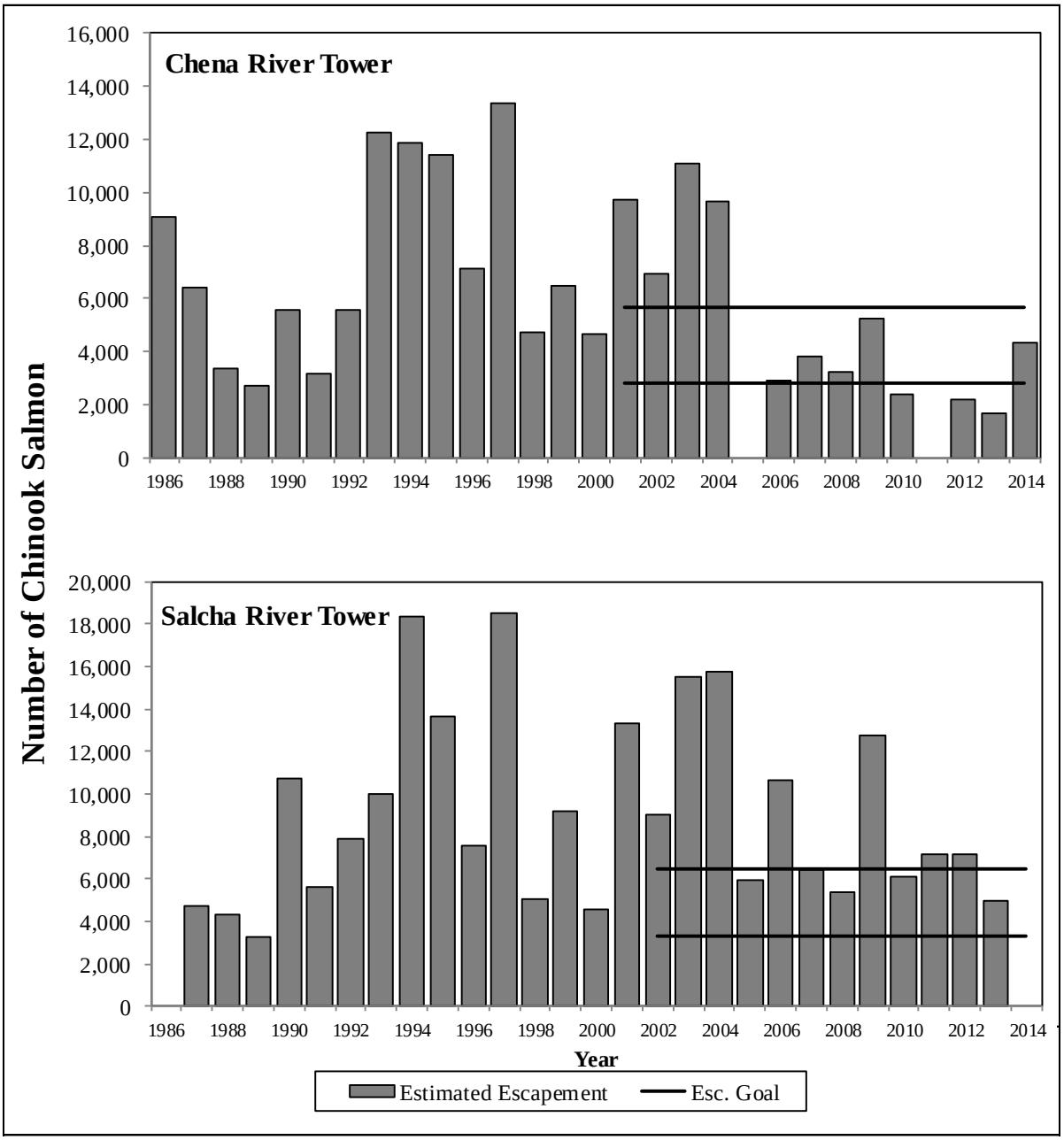
Appendix C8.–Total utilization of Chinook salmon, Yukon River, 1961–2014.

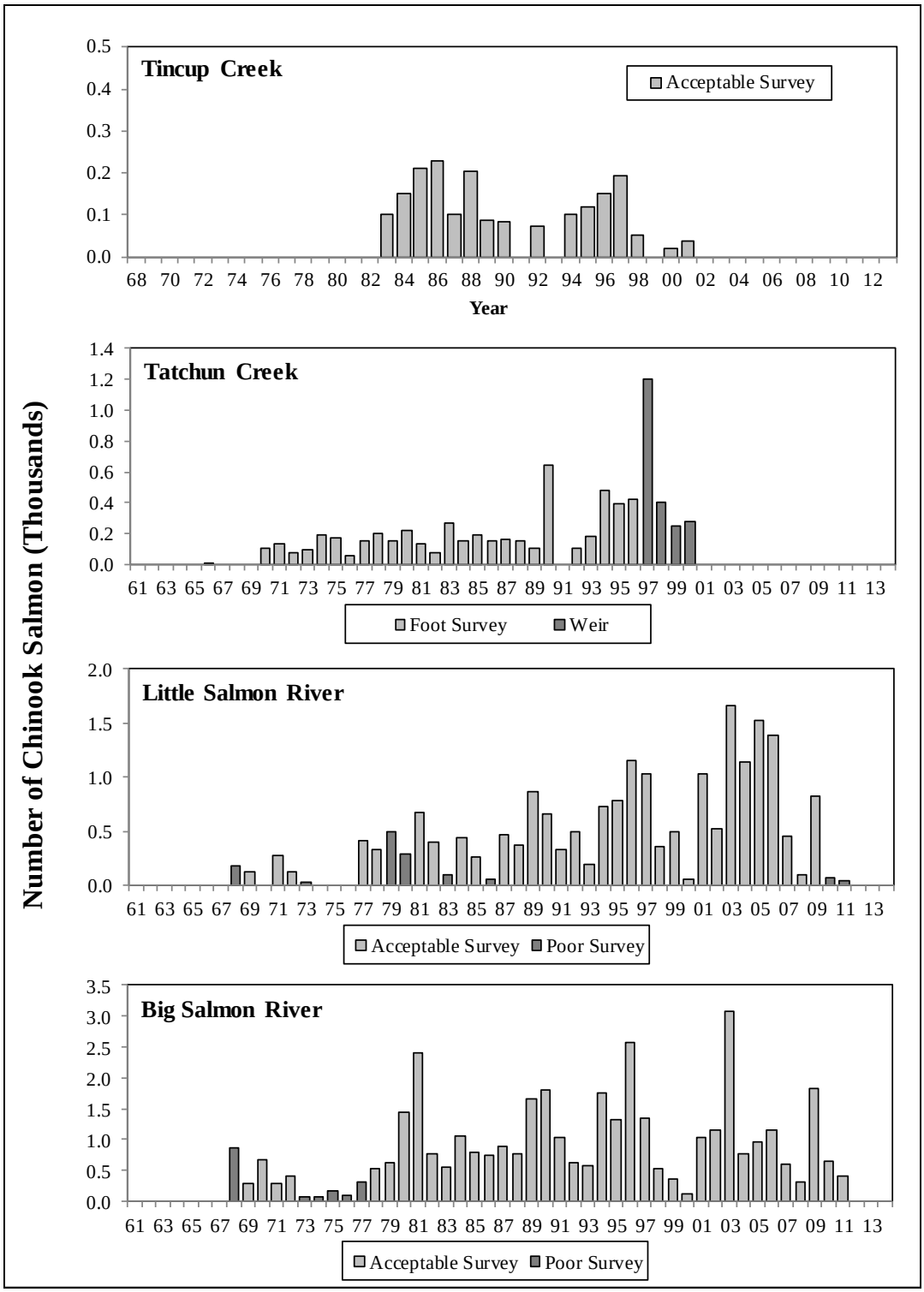


Note: Incomplete counts caused by late installation and/or early removal of project or high water events are excluded from the graphs. Vertical scale is variable.

Appendix C9.–Chinook salmon ground based escapement estimates for selected tributaries in the Alaska portion of the Yukon River drainage, 1986–2014.

-continued-

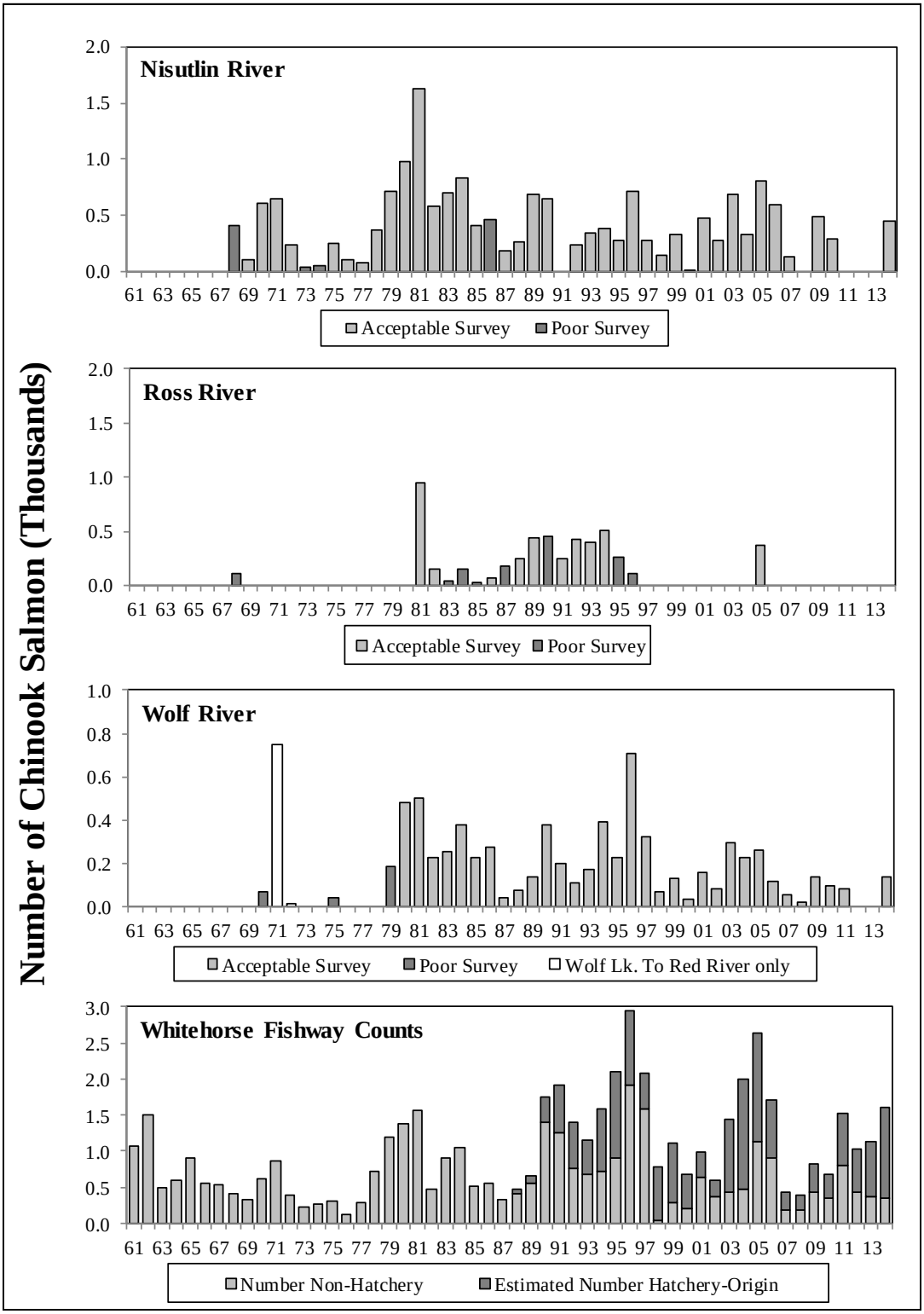

Chena River Tower
Salcha River Tower
Number of Chinook Salmon
Year
Estimated Escapement
Esc. Goal

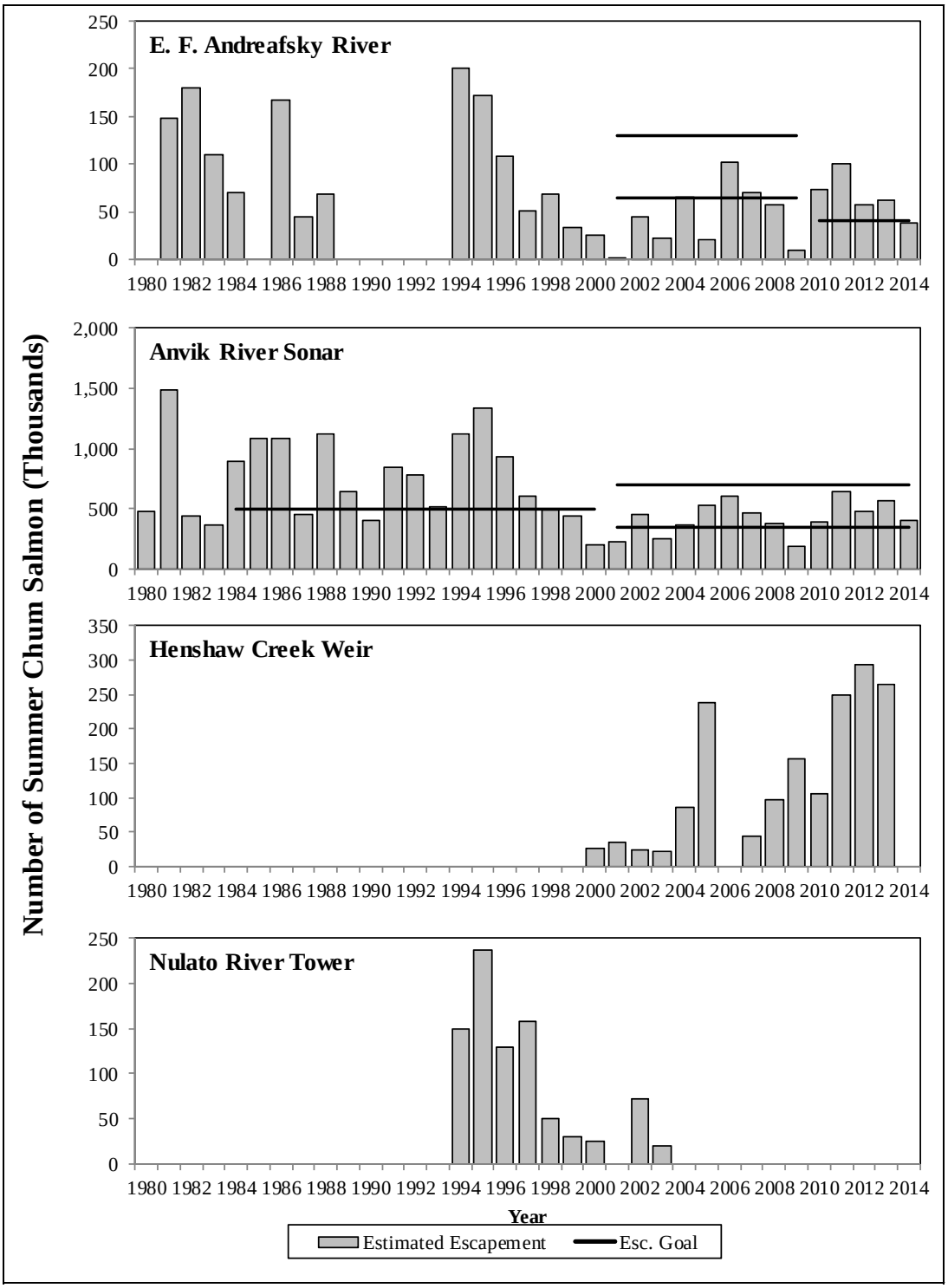


Note: Estimates are aerial survey observations unless noted otherwise. Vertical scale is variable.

Appendix C10.–Chinook salmon escapement estimates for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961–2014.

-continued-

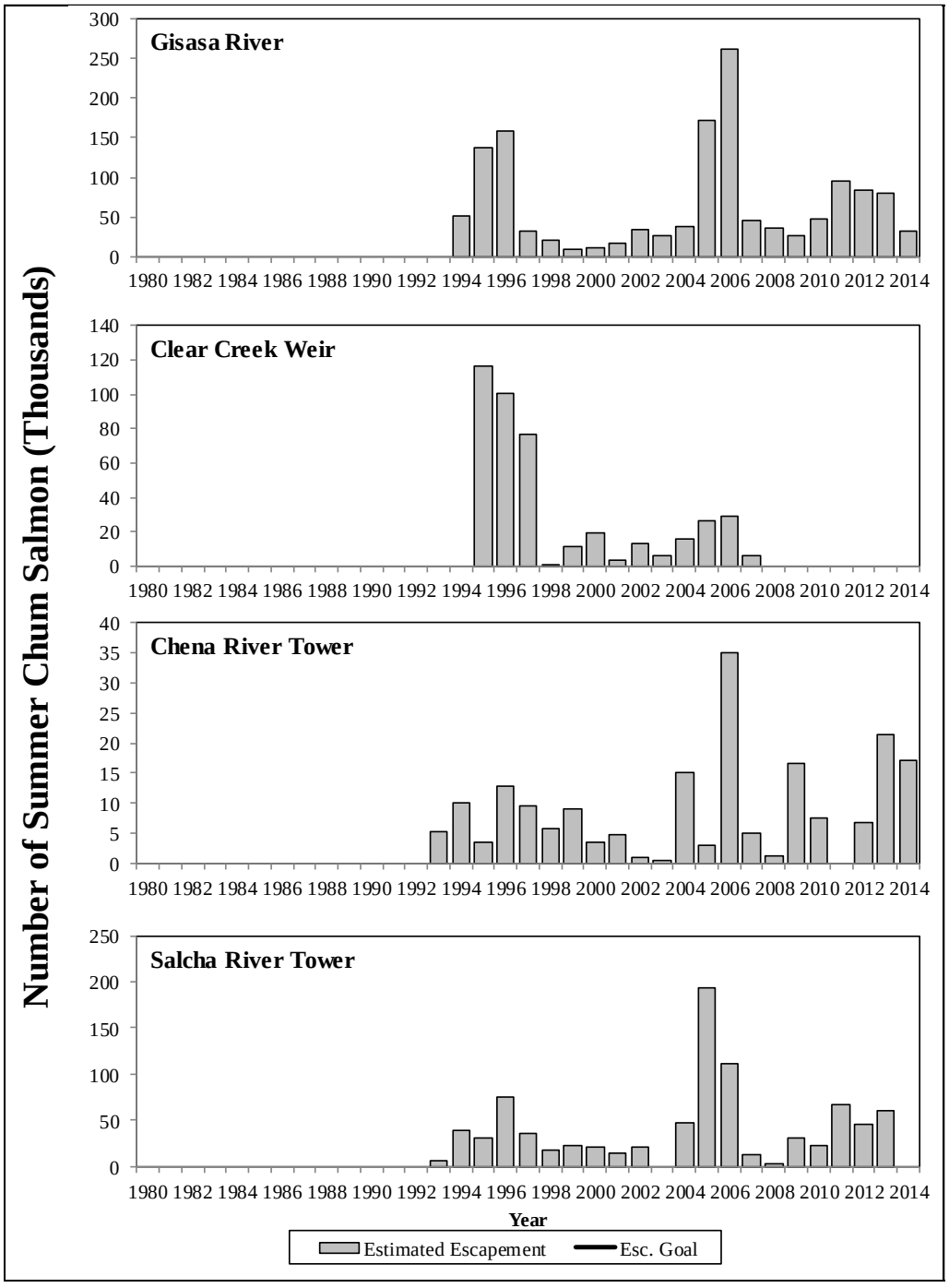

Number of Chinook Salmon (Thousands)
Nisutlin River
2.0
1.5
1.0
0.5
0.0
61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 13
Acceptable Survey
Poor Survey
Ross River
2.0
1.5
1.0
0.5
0.0
61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 13
Acceptable Survey
Poor Survey
Wolf River
1.0
0.8
0.6
0.4
0.2
0.0
61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 13
Acceptable Survey
Poor Survey
Wolf Lk. To Red River only
Whitehorse Fishway Counts
3.0
2.5
2.0
1.5
1.0
0.5
0.0
61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 01 03 05 07 09 11 13
Number Non-Hatchery
Estimated Number Hatchery-Origin

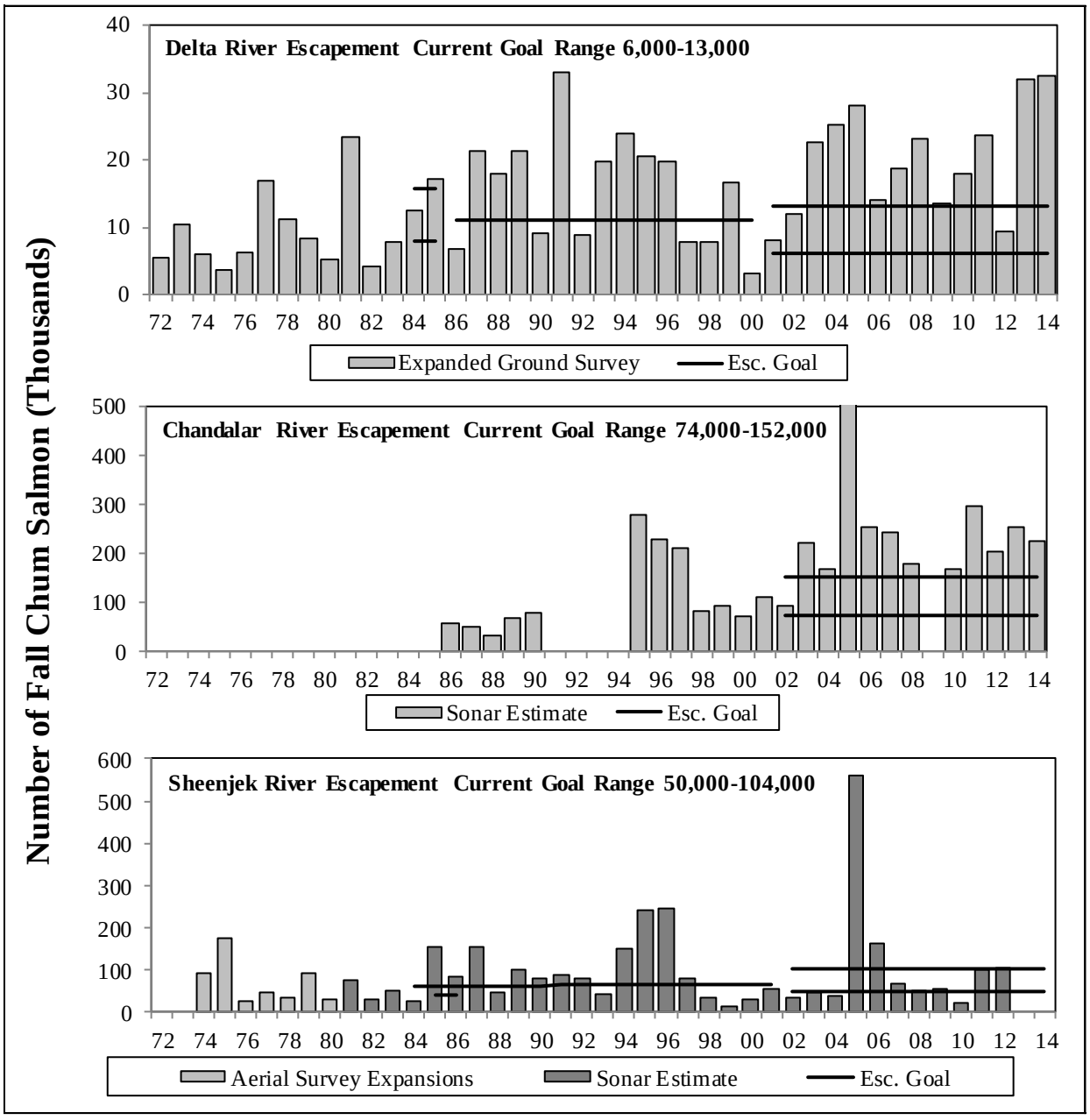


Note: Incomplete counts caused by late installation and/or early removal of project or high water events are excluded from graphs. The vertical scale is variable.

Appendix C11.–Summer chum salmon ground based escapement estimates for selected tributaries in the Alaska portion of the Yukon River drainage, 1980–2014.

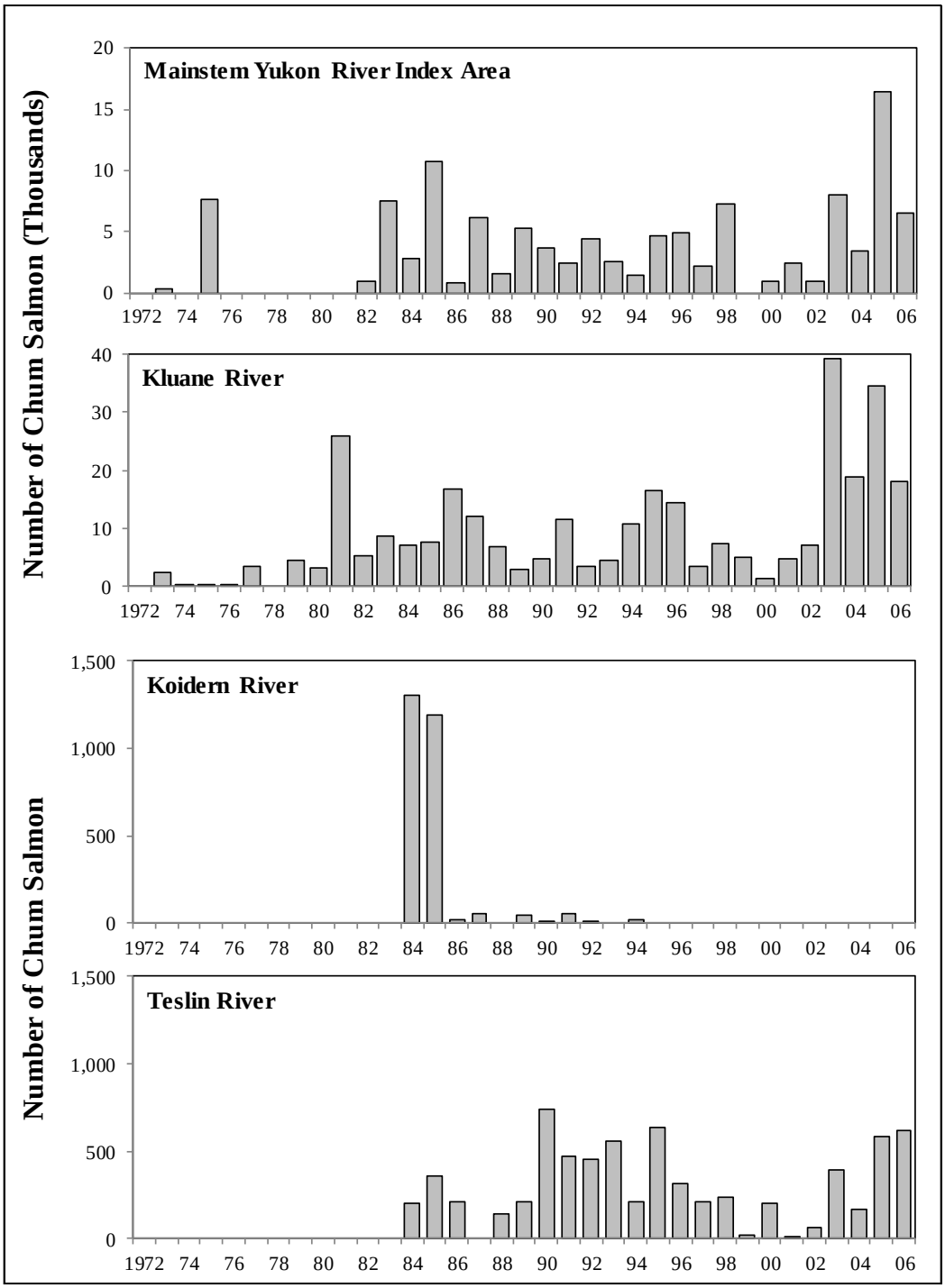
-continued-


Number of Summer Chum Salmon (Thousands)
Gisasa River
Clear Creek Weir
Chena River Tower
Salcha River Tower
Year
Estimated Escapement
Esc. Goal



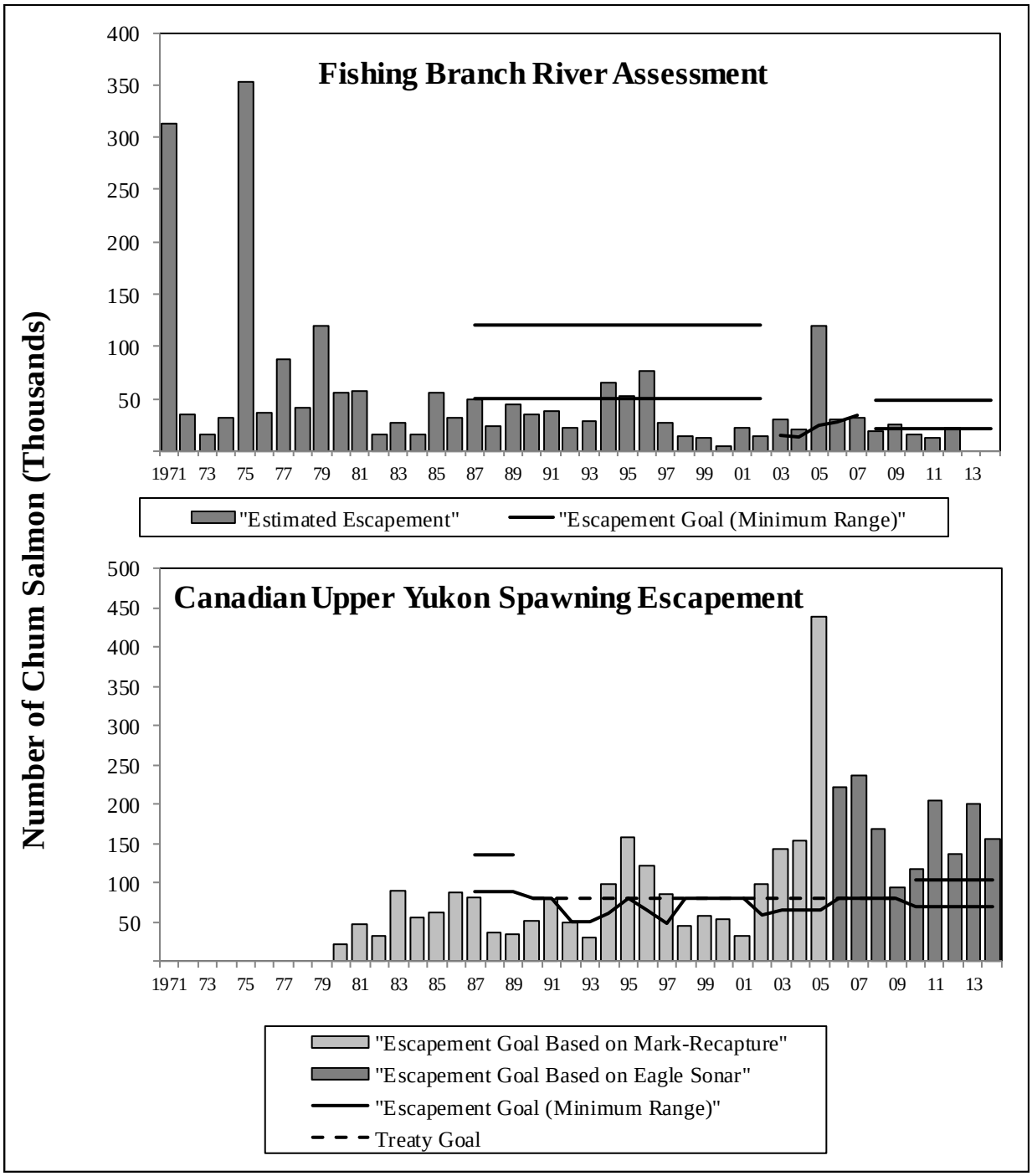
Note: Horizontal lines represent escapement goals or ranges. Vertical scale is variable.

Appendix C12.–Fall chum salmon escapement estimates for selected spawning areas in the Alaska portion of the Yukon River drainage, 1972–2014.



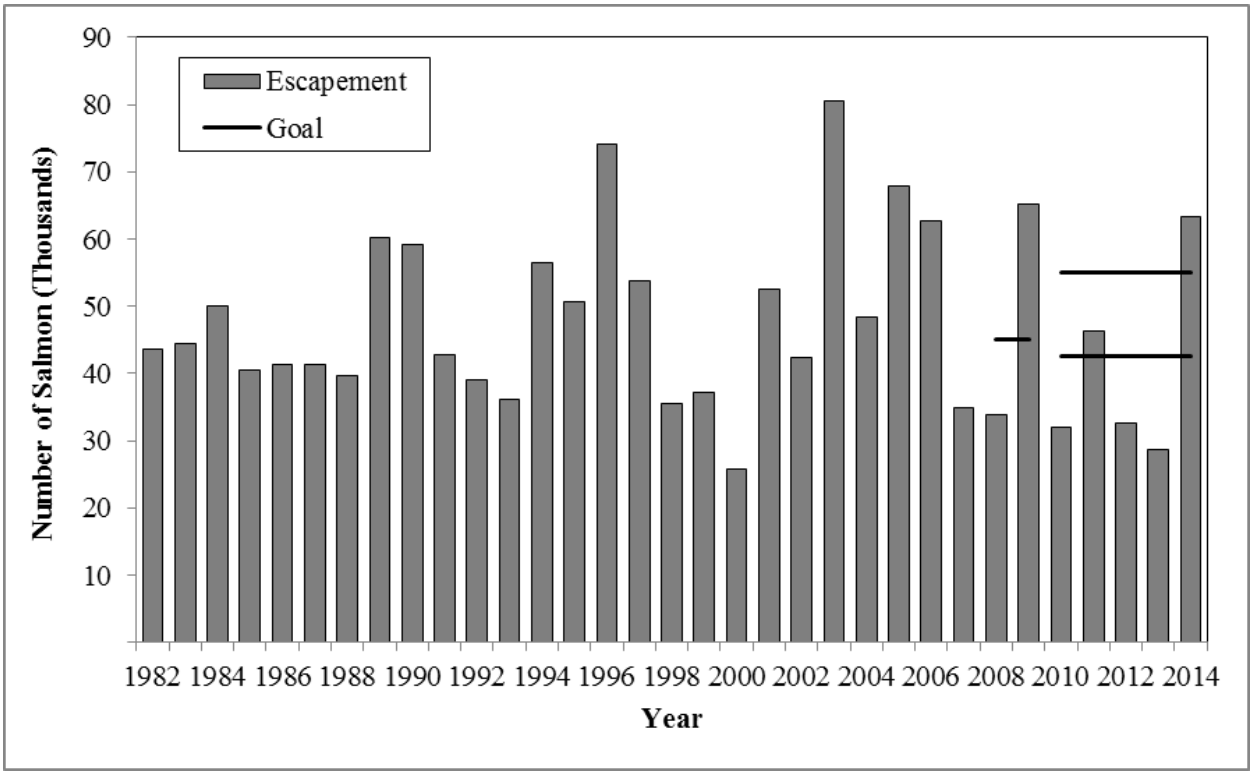
Note: The vertical scales vary. Genetic stock identification was used to determine relative tributary spawning abundance from 2007 to present.

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



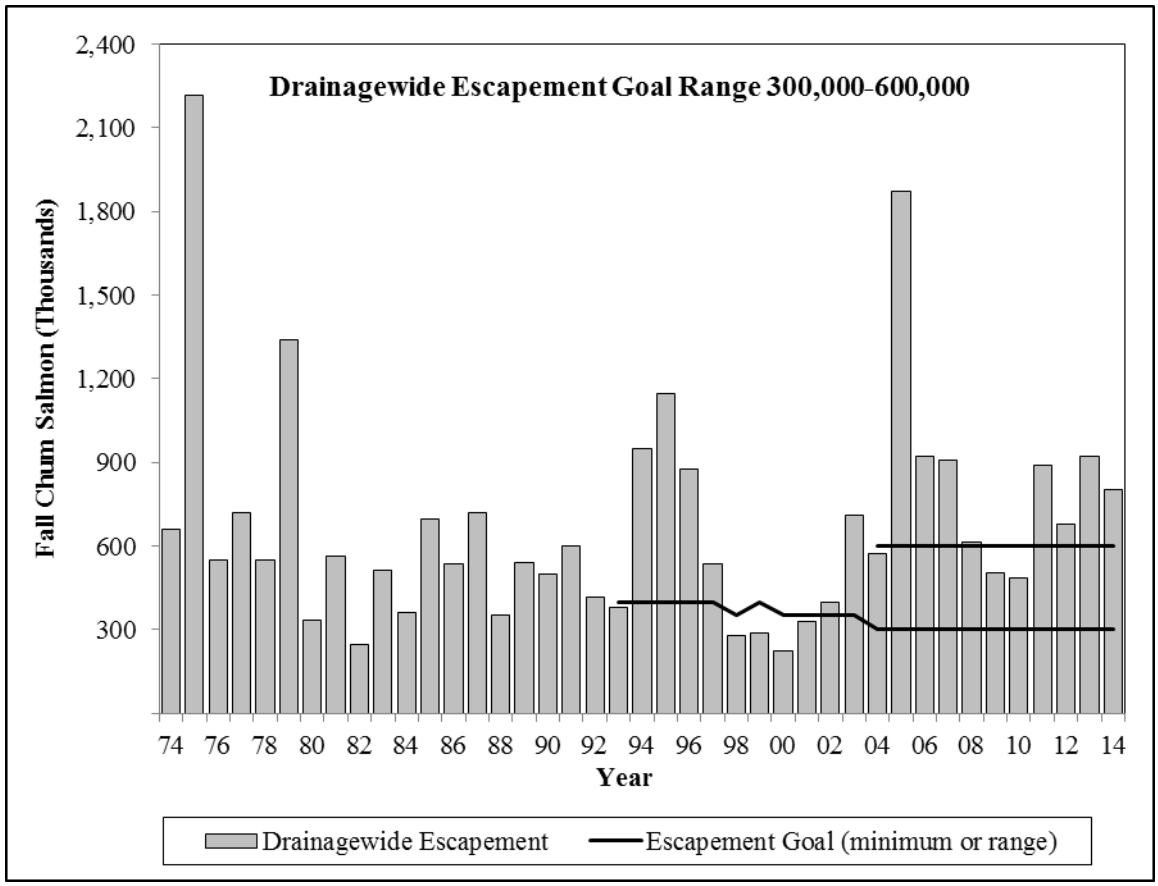
Note: Horizontal lines represent escapement goals which include treaty, rebuilding, and interim stabilization goals.

Appendix C14.–Fall chum salmon spawning escapement estimates for Canadian portion of the Yukon River drainage, 1971–2014.

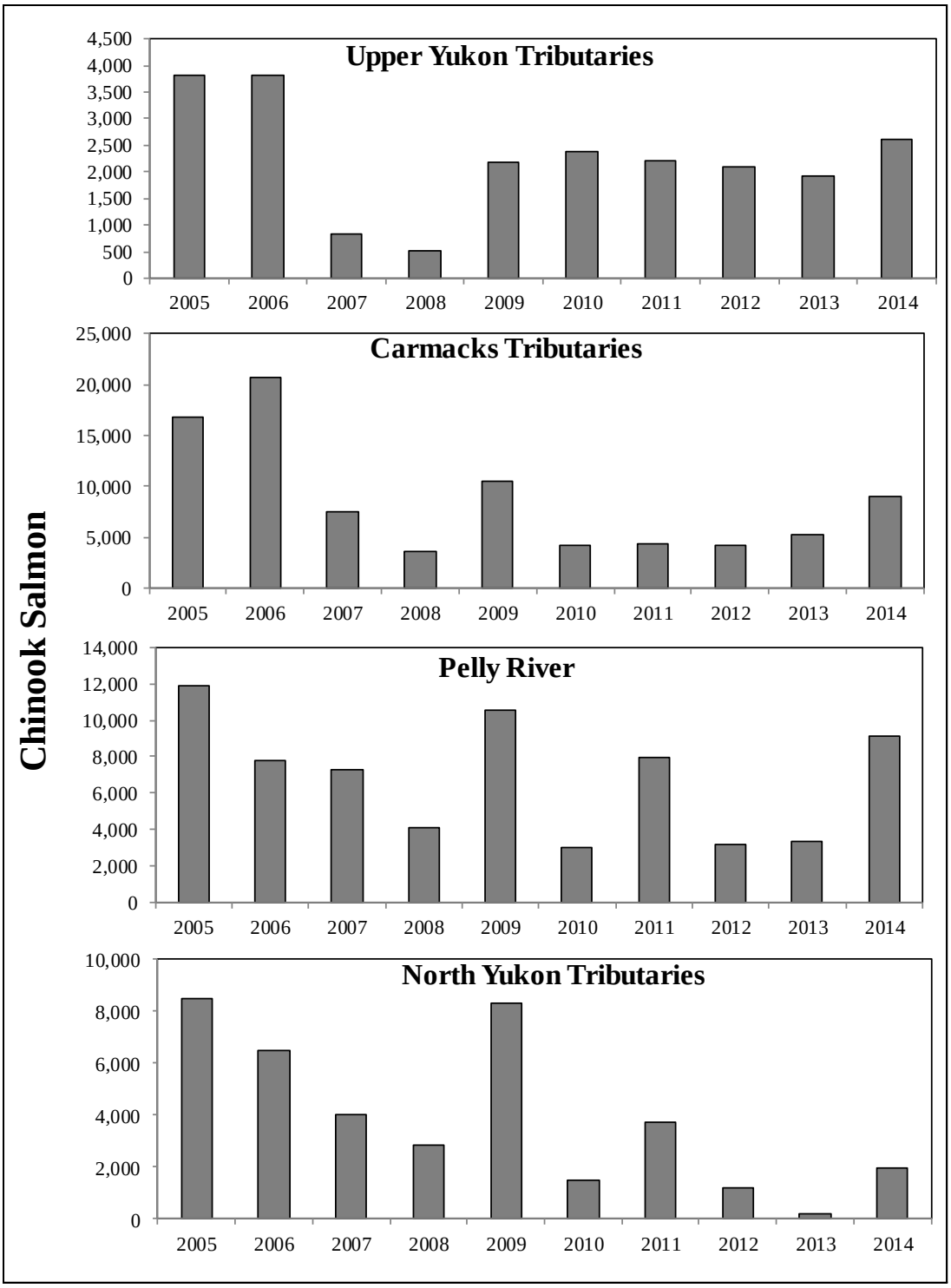


Note: The JTC adopted a revised escapement database in March 2008. The 2008 and 2009 interim management escapement goal (IMEG) was set at 45,000. The IMEG for 2010–2014 was 42,500 to 55,000 salmon.

Appendix C15.–Estimated total Chinook salmon spawning escapement in the Canadian portion of the mainstem Yukon River drainage, 1982–2014.



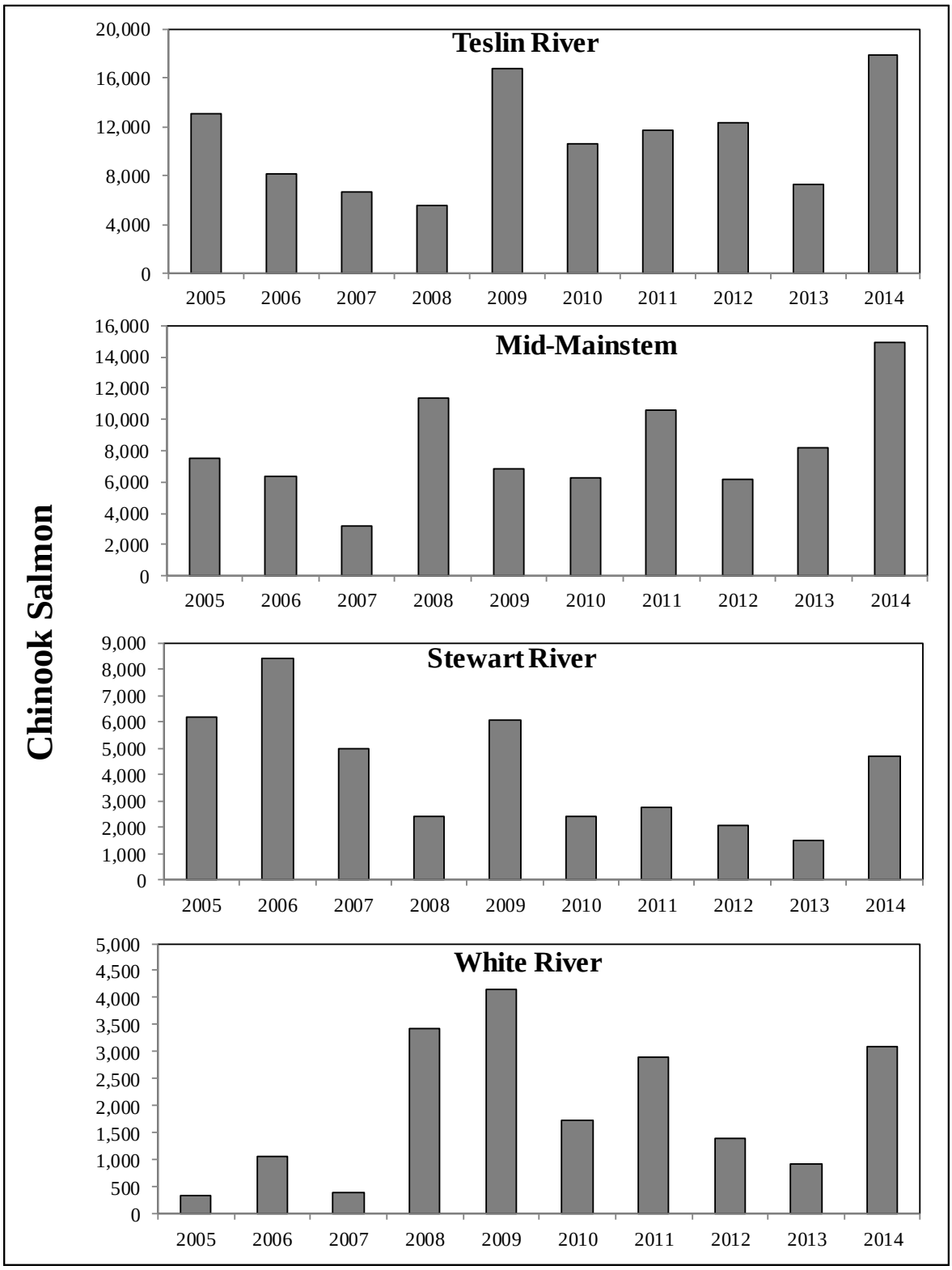
Appendix C16.–Estimated drainagewide escapement of fall chum salmon, Yukon River, 1974–2014.

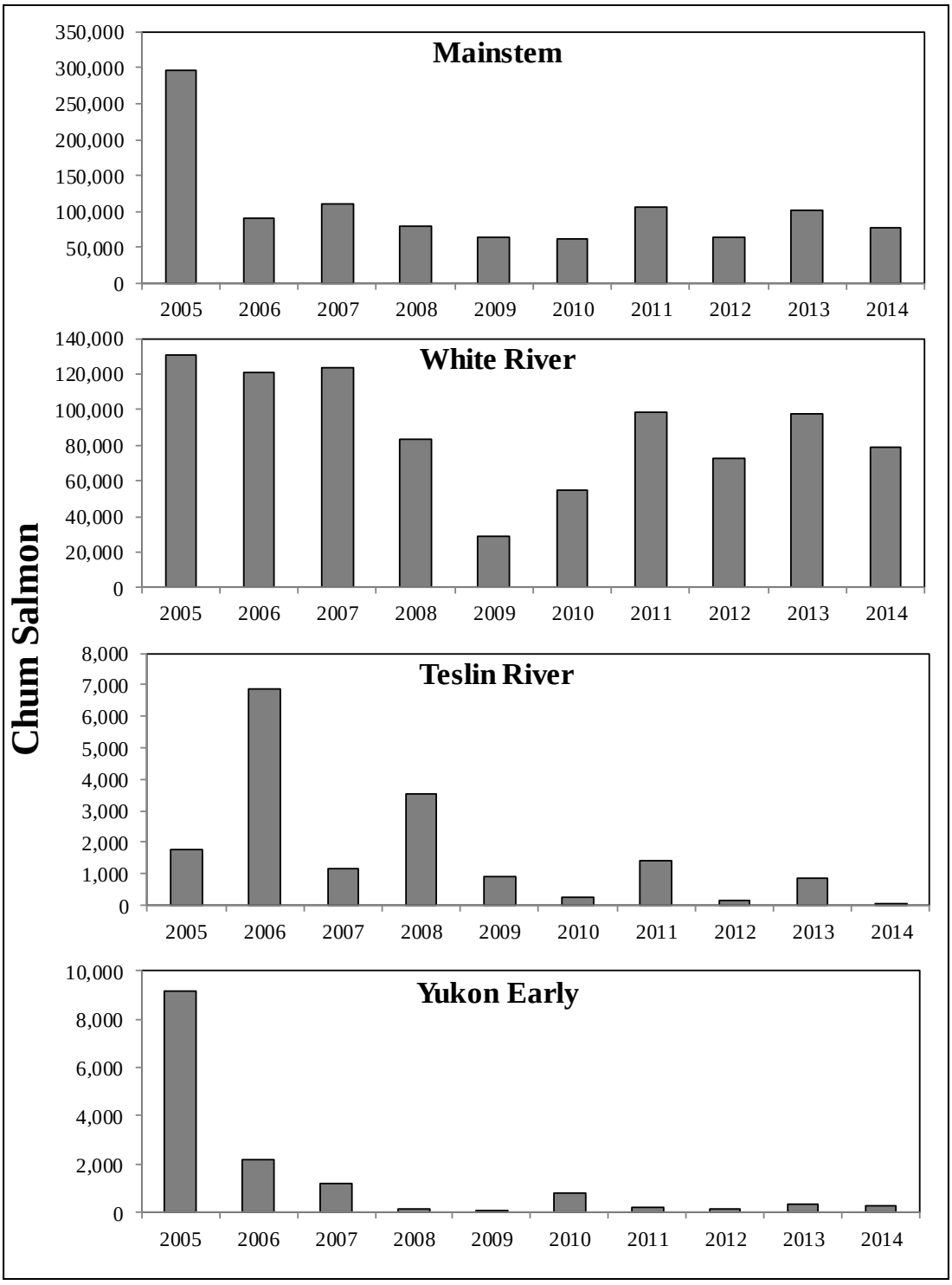


Note: Genetic estimates are based on samples from fish wheels at BioIsland, 2005–2008, all other years genetic estimates are from the drift gillnet test fishery associated with the mainstem Yukon River sonar at Eagle.

Appendix C17.–Estimated Chinook salmon spawning escapement to regions represented in the genetic baselines, Yukon River, 2005–2014.

-continued-


Chinook Salmon
Teslin River
20,000
16,000
12,000
8,000
4,000
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Mid-Mainstem
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
Stewart River
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014
White River
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2005 2006 2007 2008 2009 2010 2011 2012 2013 2014



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 at Eagle.

Appendix C18.–Estimated fall chum salmon spawning escapement to regions represented in the genetic baselines, Yukon River, 2005–2014.

APPENDIX D: JTC 2014 SEASON MANAGEMENT REVIEW AND 2015 OUTLOOKS

Appendix D1.–Summary of Joint Technical Committee information on fisheries management, escapement, other assessment programs, and harvests for the 2014 season and outlooks for the 2015 season.

Duties delegated to the Yukon River Joint Technical Committee (JTC) include the review of research, assessment methods, and other information relating to salmon migration, abundance, escapement, and status of individual stocks; and fishery performance, harvest rates, and management programs. The JTC produces this 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.

JOINT TECHNICAL COMMITTEE MANAGEMENT AND RESEARCH REVIEWS IN 2014-2015

The JTC met in October 2014 and March 2015. The fall meeting is typically focused on postseason reviews of management and harvests, stock assessment, escapement, and marine fisheries and surveys information presented by research and management biologists and other specialists in both Alaska and Canada. At the time of the fall meeting, data and estimates from seasonal assessments and projects may not have been completed, quality controlled, or finalized and reports are focused on activities and preliminary results. In the spring meeting, more definitive postseason reviews can be provided and preseason outlooks and management strategies are discussed in preparation for the Yukon River Panel spring meeting. However, readers are cautioned that information provided in this report and during spring JTC and Yukon River Panel meetings must be regarded as preliminary and subject to change as further refinements and levels of review occur. In addition to routine management and assessment reports, the JTC considers certain special topics related to assessment and monitoring, conservation, and research interests necessary to support the Yukon River Salmon Agreement. A special salmon life-history modeling workshop was held during the October JTC meeting, to familiarize members with analytical methods used in current spawner-recruit and escapement goal analyses. At the December 2014 Yukon River Panel meeting, the JTC was tasked with developing a restoration workshop for the spring Panel meeting, as well as investigating options for a Fishing Branch River chum salmon rebuilding plan. Both of these assignments were discussed at the March JTC meeting and will be included in the April 2015 agenda for the Yukon River Panel, but are not discussed further in this report.

2014 CHINOOK SALMON MANAGEMENT, HARVEST, AND ESCAPEMENT SUMMARY IN ALASKA AND CANADA

The preseason projection for total Yukon Chinook salmon abundance in 2014 indicated a potential run size of 64,000 – 121,000 fish. A Chinook salmon run of this size would not provide any surplus for subsistence use. Additionally, achieving escapement objectives was expected to be extremely challenging and severe conservation measures were likely. Extensive preparations were made by U.S. management agencies for implementation these measures, through numerous public and advisory group meetings, individual conferences with community leaders and resource users, and publicity by mail, email, broadcast and print media, and teleconferences. These efforts continued throughout the 2014 fishing season in Alaska. It was anticipated that the subsistence fishing schedule would be restricted further than previous years in an effort to meet escapement objectives. It was unlikely that districts and subdistricts would see any scheduled subsistence fishing periods until the Chinook salmon run was almost entirely over. A commercially harvestable surplus of summer chum salmon was anticipated above escapement and subsistence needs. However, the extent of a directed summer chum salmon commercial fishery would be dependent upon the strength of the Chinook salmon run. The sale of incidentally caught Chinook salmon would be prohibited for the entire season. Selective fishing gear would be employed to reduce the incidental harvest of Chinook salmon.

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The first Chinook salmon was harvested on May 19; the earliest reported Chinook salmon subsistence harvest in a decade, and subsistence fishing was closed in coastal and lower Yukon districts beginning May 26. Additional conservation measures were put into place as the run progressed. Closures were implemented in upriver districts as Chinook salmon migrated upstream and were expected to be in place for nearly the entire duration of the run. As the season progressed, inseason assessment indicated that the Chinook salmon run was better than anticipated; however, it was still a below average run. Fishing opportunity was provided between pulses with selective fishing gear to allow the harvest of abundant summer chum salmon for both subsistence and commercial purposes, with requirements that Chinook salmon be released alive. District 5 experienced the most restrictive management measures because very few summer chum salmon migrate through this district and any subsistence opportunity would likely target Chinook salmon. Additionally, the closures in Subdistrict 5-D were necessary to ensure Chinook salmon passage into Canada in order to meet the Canadian IMEG for Canadian-origin Chinook salmon. Conservative management actions were also taken in Yukon River tributaries in an effort to provide protection for Alaska Chinook salmon stocks.

Subsistence harvest in Alaska is estimated through an extensive village by village door to door postseason survey, conducted in person. Over 1,320 households were selected for the survey in 2014, out of an estimated total of 2,500 households in 31 subsistence fishing communities throughout the Alaska portion of the Yukon River drainage. Preliminary estimates indicate that about 2,720 Canadian-origin Chinook salmon were harvested for subsistence purposes. This harvest represents a further 62% reduction in harvest from 2013, which in turn saw a 47% reduction in harvest from 2012.

In Canada, a decision matrix guides management strategies, based on the projected run size, and with the low forecast at the outset for 2014, these strategies included closure of commercial, domestic, and recreational fisheries. Additionally, DFO conducted a series of regular teleconferences with First Nation managers to update them on run projections scenarios and to advise a precautionary approach be adopted. Based on a preseason outlook for a below average run of 32,000 to 61,000 Canadian-origin Chinook salmon, conservation measures were expected to be required in First Nation fisheries. Using the decision matrix, DFO recommended that Yukon First Nations develop individual community harvest plans to address conservation concerns for Chinook salmon. First Nations accepted the need for conservation and implemented harvest monitoring measures in order to stay below normal harvest levels, including reduced effort and reduced fishing periods.

In Canada, inseason harvest information for the Upper Yukon River was collected in 2014 by First Nations within their respective Traditional Territories, as part of the implementation of the First Nation Final Agreements. Interviews were conducted inseason to obtain detailed catch, effort, gear, and location information at fish camps or in the community, 1–3 times weekly. In most cases, weekly summaries were completed by the surveyors and e-mailed to the DFO office in Whitehorse. Late or incomplete information was obtained postseason and reviewed by First Nation staff in conjunction with DFO.

2014 FALL CHUM SALMON MANAGEMENT, HARVEST, AND ESCAPEMENT SUMMARY IN ALASKA AND CANADA

The Alaska fall chum salmon management plan incorporates Yukon River Salmon Agreement objectives for border passage of fall chum salmon and is intended to align management objectives with 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 to 600,000 fall chum salmon. 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 threshold number of fall chum salmon needed to prosecute a commercial fishery is 500,000 fish and commercial fishing is generally allowed only on the surplus above that level. The drainagewide escapement estimate for fall chum salmon was approximately 800,000 fall chum salmon in 2014, well above the escapement goal and adequate to support subsistence and commercial fisheries.

In Alaska, summer chum, fall chum, and coho salmon runs were strong enough to support escapement, subsistence, and commercial fishing, but the fisheries were subject to restrictions to conserve Chinook salmon. Fall chum salmon

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harvests are not currently separated into major stock groups by genetic analysis. The total U.S. commercial harvest of U.S. and Canadian fall chum salmon combined stocks was approximately 200,000 fish. In Canada, the total 2014 fall chum salmon harvest from aboriginal, commercial, and domestic fisheries was about 2,500 fish, including the mainstem and Porcupine River.

Estimated fall chum escapement in the mainstem Yukon River in Canada was 156,796 fish, surpassing the upper bound of the current IMEG (70,000—104,000 fish). In the Porcupine River drainage, there is no longer a direct assessment of fall chum salmon escapement through the Fishing Branch River weir. Fall chum passage estimates for the upper Porcupine River are provided by a sonar project operated near the U.S.-Canada border. Based on the 2014 upper Porcupine River sonar passage estimate of 17,756 fall chum salmon, the current Fishing Branch River IMEG (22,000—49,000 fish) was not met. The JTC is considering whether the fall chum salmon stock on the Porcupine River is experiencing declining productivity in relation to other upper Yukon River fall chum salmon stocks. Note that this report does not contain management summary tables for upper Yukon River fall chum salmon, but the JTC plans to include them in the future.

PROJECTS CONTRIBUTING TO SALMON MANAGEMENT DECISIONS IN ALASKA AND CANADA

A suite of assessment projects extending from the Yukon River delta to headwater tributaries in the upper Yukon basin provides essential information which is used to assess run strength and timing and guide inseason fishery management decisions. Escapement counting and sampling projects also provide critical information on stock status and condition after fishing has occurred. Without these projects and programs to estimate run timing, abundance, stock apportionment, and escapement, fisheries managers would have no way to determine whether salmon runs were sufficient to support and sustain fisheries or to meet objectives of the Yukon River Salmon Agreement.

One of the largest and most important assessment programs is the Yukon River mainstem sonar project near Pilot Station. The goal of this sonar project is to estimate the daily upstream passage of Chinook, chum, and coho salmon on the mainstem below most major tributaries. The project has been in operation since 1986, and many refinements and enhancements to the project's sonar equipment and apportionment methodologies have been implemented over the years. Both split-beam and dual frequency identification sonar (DIDSON) are currently used to estimate total fish passage at this site. A test fishery is operated to estimate the species apportionment of the sonar counts. For Chinook salmon, contributions of U.S. and Canadian stocks are also estimated from DNA samples collected in the test fishery. DNA is also sampled in several other projects for mixed-stock analysis (MSA) of fisheries in the lower and middle Yukon River, in order to determine U.S. and Canadian components of harvests inseason and postseason. DNA samples from chum salmon are also collected at the apportionment test fishery near Pilot Station, to provide estimates of mixed stock proportions needed to manage the fisheries. Proportions of summer and fall chum salmon are estimated, as well as proportions of U.S. and Canadian fall chum salmon stocks and some component stocks including those in Tanana River and combined Chandalar and Sheenjek Rivers. Other test fisheries are operated in the Yukon River delta and near Rampart Rapids, providing additional run timing information within the respective portions of the river. The Yukon River mainstem sonar project near Eagle provides critical information on salmon passage into Canada. Chinook salmon counts from the Eagle sonar program have been accepted by the JTC as the basis for estimating total run size and escapement of the upper Yukon River (Canadian) stock since 2005.

In Canada, escapement projects operated on Blind Creek (Pelly River), Big Salmon, Teslin, and Porcupine Rivers, and at the Whitehorse Fishway, provide escapement counts and in some cases, age, sex, and size information for specific upper Yukon River salmon stocks. Apportionment of Chinook salmon passage at the border into major upper Yukon River stock groups is also estimated using DNA samples collected at the Eagle sonar site.

2015 OUTLOOKS AND ESCAPEMENT GOAL RECOMMENDATIONS

For Chinook salmon, the preseason outlook range for Canadian-origin upper Yukon River Chinook salmon is 59,000 to 70,000 fish, suggesting that the 2015 Canadian-origin upper Yukon River Chinook salmon run may be a poor run. The summer chum salmon outlook indicates the run could provide for escapements, a normal subsistence harvest, and a surplus for commercial harvest. Similar to the last several years, actual commercial harvest of summer chum salmon in 2015 will likely be affected by conservation measures on a potentially poor Chinook salmon run. The drainagewide projection for fall chum salmon is 944,000 to 1,176,000 fish. This expected run size should provide enough fish to meet

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escapement goals while supporting normal subsistence fishing activities, and potential commercial harvest. The upper Yukon mainstem (Canadian) outlook range, based on the drainagewide outlook, is 236,000 to 294,000 fall chum salmon, above the average 1998–2014 run size of approximately 210,000 fish. The 2015 Fishing Branch River outlook range is 14,400 to 19,900 (midpoint 17,100) fall chum salmon.

In 2010, the Panel adopted an IMEG range of 42,500 to 55,000 Chinook salmon, to allow for the uncertainty of information from assessment projects. The IMEG has been retained each year since then. In the absence of a BEG, the JTC recommends retaining this IMEG range again in 2015.

For fall chum salmon, the JTC likewise recommends that the upper Yukon IMEG remain as established in 2010 as the range from 70,000 to 104,000 fall chum salmon. The JTC is reviewing information on the fall chum salmon in the Fishing Branch River, and considering a change or suspension of the existing IMEG in the absence of a weir or other direct means to measure the annual escapement. A rebuilding plan is also under consideration that could include a short-term rebuilding goal.

The JTC continues work on development of a BEG recommendation for Chinook salmon. A total run reconstruction and spawner-recruit analysis for the Canadian stock has been completed and a written report documenting the analysis is in progress (S.Fleischman, ADF&G Division of Sport Fish, personal communication). The whole JTC participated in a salmon life-history modeling workshop at the October 2014 meeting to gain experience with a modeling process related to what will be used in the escapement goal analysis. For fall chum salmon, certain data limitations have made it difficult to re-analyze spawner-recruit relationships and biologically based escapement goal ranges. Genetic stock composition estimates are critical for estimating the Canadian-origin fall chum salmon run, and 2 R&E funded projects have been sampling commercial and subsistence harvests and will provide harvest stock composition estimates.

Appendix D2.–Yukon River Panel escapement goals and total allowable catch targets and estimated run size and spawning escapement for upper Yukon River Chinook salmon, 2001–2014.

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	75,583	47,583	57,583	52,559
2002	28,000	28,000	79,492	51,492	51,492	42,358
2003	25,000	28,000	117,212	89,212	92,212	80,591
2004	28,000	28,000	105,962	77,962	77,962	48,469
2005	28,000	28,000	87,058	59,058	59,058	67,985
2006	28,000		84,816		56,816	62,630
2007	33,000	43,000	70,480	27,480	37,480	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	59,736	4,736	17,236	32,009
2011	42,500	55,000	72,013	17,013	29,513	46,307
2012	42,500	55,000	48,640	0	6,140	32,656
2013	42,500	55,000	37,915	0	0	28,669
2014 [d]	42,500	55,000	64,773	9,773	22,273	**63,331**

[a] IMEGs are not biologically based escapement goals.

[b] Fish wheel mark–recapture estimates were used for assessments in 2001–2007; Eagle sonar counts have been used since 2008 to present.

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

[d] Important note: 2014 estimates are preliminary.

Appendix D3.–Summary of Chinook salmon harvests (Canadian-origin fish) and conservation measures implemented in the U.S., 2001–2014.

Year	U.S. Allowable Catch 74%	U.S. Allowable Catch 80%	U.S. Harvest [a]	U.S. Exploitation Rate	U.S. Average Harvest 2001–2007	Management Actions (Commercial)	Management Actions (Subsistence)
2001	35,211	46,066	23,325	0.31	44,586	Chinook commercial fishing shifted to midpoint of run and later	Subsistence fishing schedule implemented (and continued in following years)
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	
2005	43,703	47,246	44,650	0.51	Percent Reduction in Harvest From 2001–2007 Average	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	43.2%	Chinook commercial fishing closed	Protection on 2nd and 3rd pulses
2009	31,585	34,146	17,646	0.20	60.4%	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	43.3%	Chinook commercial fishing closed; summer chum fishing delayed	
2011	12,590	23,610	20,823	0.29	53.3%	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	69.0%	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	85.2%	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		U.S. Harvest [b]	U.S. Exploitation Rate	Percent Reduction in Harvest From 2001–2007 Average	Management Actions (Commercial)	Management Actions (Subsistence)
2014[a]	7,232	17,818	1.342	0.02	97.0%	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.

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

[b] Important note: 2014 estimates are preliminary.

Appendix D4.–Summary of Chinook salmon harvests and conservation measures implemented in Canada, 2001–2014.

Year	Canada Allowable Catch 20% from	26% to	Canada Harvest [a]	2001–2007 Average Harvest	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	9,109	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	Percent Reduction in Harvest From 2001–2007 Average	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	62.7%	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	52.8%	Commercial/domestic openings determined by weekly estimates of abundance, recreational open	Voluntary reduction in harvest in early season
2010	947	4,481	2,456	73.0%	Chinook commercial/domestic fishing closed; varied to non-retention in the recreational fishery.	Voluntary reduction in harvest
2011	3,403	7,673	4,594	49.6%	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	1,228	1,596	2,000	78.0%	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	79.1%	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
2014[b]	1,955	5,791	100			

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

[b] Important note: 2014 estimates are preliminary.