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Age, sex, and length for Chinook and summer chum salmon within the Yukon Area, 2016

by

Sean Larson

August 2019

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

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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by
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ABSTRACT

Biological data were collected from Chinook (*Oncorhynchus tshawytscha*) and summer chum (*O. keta*) along the United States portion of the Yukon River drainage in 2016. Age, sex, and length data were obtained from 5,392 Chinook and 6,019 summer chum salmon from commercial and subsistence harvests, test fisheries, and escapement projects. Samples were collected from salmon caught using gillnets, dip nets, fish wheels, beach seines, weir traps, and from hand-picked carcasses. Ages were successfully estimated for 90% of the Chinook salmon and 85% of the summer chum salmon. Sex and length were recorded for nearly all salmon sampled. This report provides a summary of the age, sex, and length data collected in 2016 for Chinook and summer chum salmon and is a single source document for historical summaries of long-term projects that collect age, sex, and length data from the Yukon Area. This report also provides a brief description of the Arctic-Yukon-Kuskokwim Database Management System, which is a publicly-accessible online data archiving system that acts as an interface for querying and downloading historical age, sex, and length data.

Key words: Age, sex, length, ASL, Pacific salmon, *Oncorhynchus* spp., age class composition, sex composition, length composition, Arctic-Yukon-Kuskokwim Database Management System, AYKDBMS, Yukon River.

INTRODUCTION

The Yukon River is the longest river in Alaska and supports runs of all 5 species of Pacific salmon *Oncorhynchus* spp. The Yukon River drainage exceeds 855,000 km^2 and is the fourth largest drainage basin in North America (Brabets et al. 2000; Figure 1). For management purposes, the Alaska portion of the drainage is divided into 7 Yukon Fishery Management Districts, hereafter Districts, and 10 subdistricts (Figure 2).

Adult Chinook salmon *Oncorhynchus tshawytscha* and summer chum salmon *O. keta* typically enter the mouth of the Yukon River during late May or early June to begin their upstream migration. These runs are followed by pink, *O. gorbuscha*, fall chum, *O. keta*, and then coho, *O. kisutch*, salmon. Summer chum salmon are genetically distinct from fall chum salmon and can be distinguished by their smaller size, lower oil content, and different spawning locations. Chum salmon entering the Yukon River after July 15 are considered fall chum salmon for the purposes of fishery management. July 15 is the approximate date that half of the chum salmon entering the river are genetically distinguished as fall chum salmon, and the proportion of fall chum salmon continues to increase throughout the remainder of the run (Flannery and Wenburg 2015). As chum salmon migrate upriver, the transition dates for management are typically applied by district or subdistrict. Chum salmon that migrate up the mainstem Yukon River past the confluence of the Tanana River are predominately fall chum salmon.

Age, sex, and length (ASL) data have been collected for Chinook and summer chum salmon within the Yukon Area since the early 1960s. To characterize annual spawning runs of each species, sampling must adequately represent all major components of harvest and escapement. Through the ASL sampling program, data have been collected from salmon harvested in commercial, subsistence, and sport fisheries as well as escapement monitoring projects, test fisheries, and independent research projects. These data have been collected by state, federal, tribal, and non-government organizations using methods that have been standardized for the entire Arctic-Yukon-Kuskokwim region (Eaton 2015) and used for a variety of purposes; including, evaluation of management actions, evaluation of quality of escapement, gear selectivity, and brood table development. These data also allow researchers to evaluate changes in the ASL composition of salmon throughout the Yukon River drainage. Each year there are notable fluctuations in the ASL compositions observed at individual projects or components of projects. Some of these fluctuations are continuations of past observations, whereas others may

occur at random. It is important to monitor fluctuations in ASL composition because they can reveal larger patterns in population structure over time.

In 2016, salmon ASL data were collected at numerous projects within the Yukon Area, including test fisheries and escapement monitoring projects (Table 1). Samples were collected from Chinook and summer chum at the Lower Yukon Test Fishery (LYTF) near Emmonak. Since 1979, the LYTF has utilized set and drift gillnets to estimate run timing, relative abundance, and characterize the ASL composition of salmon as they enter the Yukon River. ASL data for Chinook and summer chum salmon were collected at projects monitoring salmon in tributary escapements; including, 3 weirs (Andreafsky and Gisasa rivers and Henshaw Creek), 1 sonar (Anvik River), and 2 counting towers (Chena and Salcha rivers). On the Chena and Salcha rivers, Chinook salmon ASL data were collected from carcasses recovered upriver of the tower escapement projects. Chum salmon are not typically sampled on the Chena River. Chinook salmon ASL data were collected at the mainstem Yukon River sonar near Eagle (hereafter, Eagle sonar). Chinook salmon were also sampled at test fisheries at the mainstem Yukon River sonar near Pilot Station (hereafter, Pilot Station sonar). Sampling designs at escapement projects are believed to adequately represent the escapement to individual systems. The ASL composition at the Pilot Station sonar test fishery is believed to be representative of the total run of Chinook and summer chum. The ASL composition at the Eagle sonar test fishery is representative of the Canadian-origin Chinook salmon boarder passage and used to update the brood table for this stock. The ASL composition at the LYTF is not representative of the run; however, it provides an index of ASL that can be monitored through time.

In 2016, summer chum ASL was sampled from commercial fisheries and Chinook salmon were sampled from the subsistence fishery (Table 1). ASL sampling of the commercial harvests took place in Districts 1, 2, and 6. Sampling occurred systematically throughout the duration of the summer chum salmon commercial fishery in Districts 1 and 2 to encompass each gear type used. Chinook salmon caught in the subsistence fishery were sampled for ASL within select villages in Districts 1–5. Chinook salmon age data from subsistence harvests are used to update the brood table for the Canadian component of the stock.

Annual ASL data summaries have been reported in a variety of formats since sampling began in the 1960's. For example, ASL data have been reported in Annual Management Reports, Arctic Anadromous Fishery Investigation Reports, Special Report Series, Technical Fisheries Report series (e.g., Buklis 1987), Regional Information Report series (e.g., Menard 1996), and ADF&G Fishery Data Series (e.g., Schumann and DuBois 2011). Prior reports included all ASL collection; i.e., summer and fall species. Beginning with this report, ASL data for Chinook salmon and summer chum salmon will be reported separately from fall chum salmon and coho salmon due to the timing of data availability and a desire to expedite reporting. More recently, ASL data collected in the Yukon Area were entered into the AYK Database Management System[1] (AYKDBMS) by ADF&G staff. Escapement and ASL data were archived in the AYKDBMS to provide the public and staff an interface for querying and downloading historical ASL data.

The primary purpose of the ASL catalog presented here is to provide a summary of the ASL data collected for Chinook and summer chum salmon in the Yukon Area during 2016. This document

[1] http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx

also includes historical summaries for select long term projects that collect ASL data, and a brief introduction to the AYKDBMS. Readers should exercise caution when using historical data because some assessment projects assess escapements thoroughly whereas others may only focus on certain components of the run; i.e., larger, older, fish.

OBJECTIVES

The goal of this work was to process, compile, and analyze Chinook and summer chum salmon scale, sex, and length samples collected in 2016 from Yukon Area commercial fisheries, subsistence fisheries, escapement monitoring projects, and test fisheries. Specific objectives of this report were as follows:

1. Provide an overview of projects and methods used to collect ASL data,
2. Provide detailed project ASL data summaries for data collected in 2016,
3. Provide a historical summary of annual ASL composition estimates for select long-term monitoring projects, and
4. Provide a quick reference guide to the available historical ASL data archived in the AYKDBMS.

METHODS

DATA COLLECTION

Sampling Procedures

ASL samples were collected from commercial harvests, subsistence harvests, test fisheries, and escapement monitoring projects. The species sampled, capture gear, and sampling methods differed across projects (Table 1). A minimum of 3 scales for Chinook salmon and 1 scale for chum salmon were removed from the preferred area of the fish and mounted on gum cards for age determination by ADF&G staff. The preferred area was located on the left side of the fish, 2 rows of scales above the lateral line, in an area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). Scales collected from the preferred area have been shown to be less affected by scale regeneration or loss relative to other areas of the body and therefore are a more complete record of total age. The sex of the fish was determined by either cutting the fish open and examining gonads (internal sex-ID) or through examination of external characteristics (external sex-ID). Only the LYTF, carcass sampling surveys at escapement projects, and subsistence harvest sampling used internal sex-ID. Fish length was measured from the mid-eye to tail-fork (METF) to the nearest millimeter using a ridged measuring device. Vertebrae containing at least 3 centrum bones were sampled aft of the dorsal fin during summer chum salmon carcass surveys on the Salcha River because scales are typically well resorbed in that location.

Commercial Harvest

Summer chum salmon ASL data were collected from commercial harvests in Districts 1 and 2 and sex and length data were collected from commercial harvests in District 6. The sample goal was 160 summer chum salmon within each fishing period (Bromaghin 1993). Data collection in District 1 occurred at a fish processing plant in Emmonak, which included summer chum

harvested in District 2, and data collected in District 6 occurred at the fishing site and a processing plant in North Pole.

Subsistence Harvest

In 2016, ADF&G partnered with Spearfish Research to continue a long-standing Chinook salmon subsistence harvest sampling program. The objective of the program was to collect at least 200 ASL and axillary tissue samples from subsistence-harvested Chinook salmon in each management district sampled. The following communities were selected for sampling based on past success and data gaps among management districts: Kotlik and Emmonak in District 1; Mountain Village, St. Mary's, and Marshall in District 2; Russian Mission in District 3; Kaltag and Nulato in Subdistrict 4A-Upper; Galena and Ruby in Subdistricts 4-B and 4-C, respectively; and Tanana in Subdistrict 5-B.

Participants were given formal training on sampling protocol and were asked to sample each Chinook salmon caught for subsistence purposes. Sampling methods followed routine procedures outlined by ADF&G (Larson and Dann 2018). Collecting subsistence harvest samples was opportunistic and depended on timing and willingness of fishermen to participate.

Test Fisheries

In 2016, ASL data were collected from Chinook and summer chum salmon caught in the LYTF near Emmonak and test fisheries associated with the Pilot Station and Eagle sonars. Fishing at the LYTF was performed at the Big Eddy and Middle Mouth test fish sites. At each site, an 8.5-inch mesh set gillnet was used to catch Chinook salmon and 5.5-inch mesh drift gillnets were used to catch summer chum salmon. In addition, an 8.25-inch mesh drift gillnet was used to catch Chinook salmon at the Big Eddy site, but all fish caught in the drift gillnet were released alive immediately and not sampled. Daily sampling goals were 30 fish per day per site for Chinook salmon and 15 fish per day per site for summer chum salmon. Every fish was sampled until the daily sampling goal was reached, which was typically attained only during periods of peak run passage. The LYTF used only large mesh gear to assess Chinook salmon abundance and only a single mesh size to assess summer chum salmon; therefore, the age composition of the samples does not represent the age or sex structure of the total run. For example, younger, smaller, Chinook salmon are less likely to be selected for than older, larger, Chinook salmon.

At the test fishery associated with the Pilot Station sonar, salmon were caught in a suite of drift gillnets of various mesh sizes, including 2.75-, 4.0-, 5.25-, 6.5-, 7.5-, and 8.5-inch stretch mesh and sampled for ASL and genetic axillary tissue (Schumann et al. 2017). Because this project uses a comprehensive suite of gear, selecting for fish of all age classes, samples probably reflect the composition of the total run. However, because external sex-ID was used, and fish in the lower river are brighter and less dimorphic than those on spawning grounds, sex ratio of the run may have varied accuracy. All summer chum salmon were sampled for sex, length, and genetic axillary tissue in the Pilot Station test fishery (no age structure), whereas complete ASL was collected for Chinook salmon. Every fish caught in the test fishery was sampled each day.

At the test fishery associated with the Eagle sonar, Chinook salmon were caught with drift gillnets of various mesh sizes, including 5.25-, 6.5-, 7.5-, and 8.5-inch stretch mesh (Lozori and McDougall 2016). Although this suite of mesh sizes probably represents the age structure of most of the run, the lack of smaller mesh, such as 4.0-inch may cause the relative proportion of age-3 and age-4 fish to be underrepresented. This project performed external sex-ID which can

affect accuracy; however, salmon in the upper Yukon River have begun to develop dimorphic characteristics. The ASL composition of samples collected at the Eagle sonar represents only the Canadian-origin stock. All Chinook salmon caught in the test fishery were sampled for ASL each day.

Escapement Projects

Escapement projects were operated by multiple agencies. A range of different fish capture methods and sampling designs were used depending on the type of assessment project and the objectives of the individual programs. Efforts were made to have consistent protocols among projects for measuring fish length and determining sex. Age was estimated by ADF&G for all projects.

Salmon ASL data were collected at projects utilizing resistance board weirs, a beach seine, and carcass sampling methods for data collection. ASL sampling at the East Fork Andreafsky River, Gisasa River, and Henshaw Creek weirs involved sampling live fish from a weir trap. Samples collected from weir traps typically represent all age classes present in the escapement because weir traps are not size selective. At the East Fork Andreafsky River and Gisasa River weirs, which used external sex-ID, all Chinook salmon less than 655 mm in length were assumed to be male (Table 1). Sampling at the Anvik River sonar involved sampling summer chum salmon caught in a beach seine. Since sampling was shore-based, not all fish sizes may be represented. Sampling at the Chena and Salcha river towers involved sampling dead fish during carcass surveys. Each of these sampling methods may have varied effects of bias on the age composition, length structure, or sex ratio in the dataset. For example, carcass surveys tend to bias towards older, larger, female fish (Kissner and Hubartt 1986).

Sampling goals varied among projects. In general, 160 ASL collections per sampling event for Chinook and summer chum salmon. An event may have been weekly sampling, quartiles based on run timing, or a single sample goal for the season. Sampling schedules were adjusted as needed inseason to account for observed run abundance.

PROCESSING AND ANALYSIS

Age Estimation

Scales or vertebrae were used to determine ages of Chinook and summer chum salmon. Scales were mounted on gum cards during sampling and later impressed into cellulose acetate (Clutter and Whitesel 1956). Scale impressions were magnified and examined using a Microfiche reader. Vertebrae collections were cleaned and dried prior to annuli being read under a dissecting scope (Figure 3). Age was determined by counting the number of freshwater and marine annuli pairs. Annuli are the regions of the scale where the circuli, or growth rings, are tightly spaced relative to the preceding and proceeding circuli, representing slower growth rates associated with winter conditions (Mosher 1969). Freshwater annuli are distinguishable from saltwater annuli because the circuli formed in freshwater are finer and closer together than those formed while the fish was in the ocean (Major et al. 1972). Ages were recorded using European notation (Koo 1962), where the number of freshwater annuli is followed by a decimal and then the number of marine annuli. Total age from the brood year is the sum of freshwater and marine annuli plus 1 to account for time spent in the gravel before hatching.

Estimates of Age, Sex, and Length Composition

The ASL composition of a returning salmon population often changes over the course of the season (Molyneaux et al. 2006); therefore, sample proportions may not be representative of the entire season if samples were not collected throughout the season or proportional to the harvest or escapement. Samples collected from the commercial harvest and at escapement projects were used to estimate their respective ASL composition for the entire season. To account for seasonal changes in ASL composition, samples collected from the commercial fishery and escapement projects were grouped into time strata and the sample proportions from each stratum were applied to the harvest or escapement for each respective stratum. Strata were determined by examining the number and distribution of samples collected relative to the size of harvest or escapement and making a good fit; i.e., making sample sizes more similar between them using 3 or more strata. An attempt was made to include sufficient sample sizes within each stratum to estimate the proportion of each major age class to obtain a 95% confidence interval width no greater than 10% of the estimate (Bromaghin 1993). The escapement or harvest by date was provided by project leaders and ADF&G fish ticket harvest reports.

For projects where sample ASL estimates were applied to the harvest or escapement, the proportion of fish of age class (*a*) of sex (*s*) during the stratified period (*i*) was estimated as:

$$\hat{p}_{a,s,i} = \frac{n_{a,s,i}}{n_i}, \quad (1)$$

where

$n_{a,s,i}$ = number of samples for age class (*a*) of sex (*s*) in stratified period (*i*), and

n_i = number of samples in stratified period (*i*).

The number of fish of specific age class (*a*) and sex (*s*) during a stratified period (*i*) was estimated as:

$$\hat{N}_{a,s,i} = \hat{p}_{a,s,i} N_i, \quad (2)$$

where:

N_i = number of fish during the stratified period (*i*).

When data for all strata were available, the season total proportion of fish of specific age (*a*) and sex (*s*) was estimated as:

$$\hat{p}_{a,s} = \frac{1}{N} \sum_i N_i \hat{p}_{a,s,i}, \quad (3)$$

where:

$$N = \sum_i N_i. \quad (4)$$

The season total number of fish of specific age (*a*) and sex (*s*) was estimated as:

$$\hat{N}_{a,s} = \sum_i \hat{N}_{a,s,i}. \quad (5)$$

The season total age proportion was estimated as:

$$\hat{p}_a = \frac{1}{N}\sum_i \sum_s N_i \hat{p}_{a,s,i} \quad . \tag{6}$$

The season total female proportion was estimated as:

$$\hat{p}_{s=f} = \frac{1}{N}\sum_i \sum_a N_i \hat{p}_{a,s=f,i} \quad . \tag{7}$$

Mean length for fish of age (*a*) and sex (*s*) in stratified period (*i*) was estimated as:

$$\bar{y}_{a,s,i} = \frac{\sum_j y_{a,s,i,j}}{n_{a,s,i}} \quad , \tag{8}$$

where:

$y_{a,s,i,j}$ = length of fish (*j*) of age (*a*) and sex (*s*), sampled during period (*i*),

with a standard error (*se*) of:

$$se = \sqrt{\frac{s^2_{a,s,i}}{n_{a,s,i}}} \quad , \tag{9}$$

where:

$$s^2_{a,s,i} = \frac{\sum_j (y_{a,s,i,j} - \bar{y}_{a,s,i})^2}{n_{a,s,i} - 1} \quad . \tag{10}$$

When data for all strata were available, season total mean length for fish of age (*a*) and sex (*s*) were estimated as:

$$\bar{y}_{a,s} = \frac{1}{N_{a,s}}\sum_i N_{a,s,i}\bar{y}_{a,s,i} \quad , \tag{11}$$

with a standard error of:

$$se = \sqrt{\hat{V}(\bar{y}_{a,s})} \quad , \tag{12}$$

where:

$$\hat{V}(\bar{y}_{a,s}) = \frac{1}{N^2_{a,s}}\sum_i N^2_{a,s,i}\hat{V}(\bar{y}_{a,s,i}) \quad , \tag{13}$$

and

$$\hat{V}(\bar{y}_{a,s,i}) = \left(\frac{s^2_{a,s,i}}{n_{a,s,i}} \right). \quad (14)$$

Seasonal and historical summaries were generated. Season total ASL summaries were produced for each project; however, ASL composition was further summarized by village for the subsistence fishery, sampling locations for the LYTF, and mesh size for test fisheries associated with the Pilot Station and Eagle sonars. Data summaries include the dates of data collection, the total number of samples that were collected and successfully aged, and the brood year (age) and mean length of the samples by male, female, and both sexes combined. Historical ASL data summaries were produced to allow for the identification of temporal trends in ASL structure at select projects. Each historical summary presents the sample size, percent by age and sex, and mean length for each year the project operated for samples that contained all 3 ASL components. Data used to produce historical summaries were derived from the AYKDBMS and do not consider any adjustments for bias or weighting by project daily or annual estimates. The unweighted historical estimates provided in this report may differ from historical ASL data summaries published in other reports which may be weighted or had adjustment factors applied.

ARCHIVING AND USER GENERATED REPORTS

Raw data forms, scale cards, and acetate impressions were archived in the ADF&G, Anchorage Regional Office, and ASL data were archived and made publicly accessible in the AYKDBMS. By selecting the "Search" link on the main database page, users are directed to a series of data filters that allow for focused searches by management area, data type, project type, species group, and species. The user can also access an alphabetical list of all available projects by selecting the "Go to Projects" link on the data filters page. Selection of a specific project will yield a general project description and annual year notes that provide context (i.e., metadata) regarding the type, quality, quantity, and utility of the data available. An ASL link will be visible under "Available Data Views by Data Type" if ASL data are available for the selected project. If data are available and the "ASL" link is selected, the user will be prompted to select a specific year(s) for which ASL data is desired. Once the year(s) is selected and the user selects "Go to Data View", a report will be generated with all the data associated with each fish sampled; including, information about data collection (e.g., date of sample, location, method of capture, method of sex determination, etc.); archival references (i.e., scale card number and fish number), and primary biological data such as fresh water age, saltwater ASL. The reports are generated online; however, users can export them into Microsoft Excel or other formats (CSV, tab delimited, PDF etc.). Similarly, many of the assessment projects with abundance data used in conjunction with ASL samples such as CPUE from test fisheries and escapement enumerations are also available within the AYKDBMS.

RESULTS

A total of 5,392 Chinook and 6,019 summer chum salmon were sampled for ASL data from the Alaska portion of the Yukon River drainage in 2016 (Tables 2 and 3). Ages were successfully read for 90% of the Chinook salmon and 85% of the summer chum salmon sampled, and sex and length were recorded for nearly all salmon sampled. Temporal stratification was applied to the ASL compositions at the Gisasa River and Henshaw Creek weirs for Chinook salmon and the East Fork Andreafsky River weir, Anvik River sonar, Gisasa River weir, and Henshaw Creek

weir for summer chum salmon (Table 4). Temporal stratification was not applied to the ASL composition at the Andreafsky River weir for Chinook salmon due to an insufficient sample size.

A total of 61 subsistence fishermen were trained by Spearfish Research to collect ASL samples in 2016. Samples were collected from Chinook salmon caught in a range of gear; including, dip nets, fish wheels, and set and drift gillnets with stretched mesh ranging from 4.0–7.5 inches. Only 25 (2%) of the fish sampled were caught using dip nets or fish wheels, probably due to the low frequency of use of the fish wheel in Districts 1–4. Drift and set gillnets accounted for 742 (61%) and 427 (35%) of the Chinook salmon sampled, respectively. Gear type was unknown for 12 fish sampled.

ASL summaries were generated for Chinook and summer chum salmon sampled from commercial harvests, subsistence harvests, test fisheries, and escapement projects. Summaries for Chinook salmon include ASL composition for salmon harvested in the subsistence fishery (Table 5), the LYTF (Table 6), and test fisheries associated with the Pilot Station sonar (Table 7) and Eagle sonar (Table 8). ASL composition for Chinook salmon is also provided for 5 escapement monitoring projects, encompassing 5 distinct tributaries within the Yukon River drainage (Tables 9–13). Summaries for summer chum salmon include ASL composition for salmon harvested in the commercial fishery in Districts 1–2 and 6 (Tables 14 and 15) and the LYTF (Table 16). In the test fishery associated with the Pilot Station sonar project, a summary of summer chum salmon sex and length were provided because no age structure was collected (Table 17). Summer chum salmon escapement ASL was collected at 5 monitoring projects, encompassing 5 distinct tributaries within the Yukon River drainage (Tables 18–22).

Historical summaries were produced for 12 projects that have an extended time series of ASL data collection; including, 8 projects for Chinook salmon and 7 projects for summer chum salmon. Historical data summaries for Chinook salmon include ASL composition for the LYTF (Table 23); the test fisheries associated with the Pilot Station and Eagle sonars on the mainstem Yukon River (Tables 24 and 25); and escapement monitoring projects on the East Fork Andreafsky and Gisasa rivers, Henshaw Creek, and the Chena and Salcha rivers (Tables 26–30). Historical data summaries for summer chum salmon include ASL composition for the LYTF (Table 31); the commercial harvest in Districts 1–2 (Table 32) and District 6 (Table 33); and escapement monitoring projects on the East Fork Andreafsky, Anvik, and Gisasa rivers, and Henshaw Creek (Tables 34–37).

The AYKDBMS acts as a platform for managers, researchers, and the public to access current and historical ASL data for the Yukon Area. The AYKDBMS contains ASL data collected from 61 different projects for Chinook salmon and 47 projects for summer chum salmon; including, commercial, subsistence, sport, and test fisheries, escapement monitoring projects, and independent (Chinook and summer chum salmon) radiotelemetry studies (Tables 38–39). The length and continuity of the time series of available data varies considerably within and between project types. For example, ASL composition for summer chum salmon caught in the commercial fishery in Districts 1 and 2 has a nearly complete time series beginning with 1964 but many other projects may have only operated for a single season. Any ASL data not described in this report can be pursued within the AYKDBMS.

DISCUSSION

There were several distinct patterns observed in the ASL structure of the Chinook salmon runs returning to the Yukon River in 2016. For example, age-4 and age-5 Chinook salmon comprised

an above average percentage of the run at the LYTF, Pilot Station sonar test fishery, and Eagle sonar test fishery, East Fork Andreafsky River weir, and the Chena and Salcha river towers. Conversely, age-6 and age-7 Chinook salmon made up less than average percentage of the run at those same locations. The percentages of age-4 fish were the highest on record at the Chena and Salcha river towers and the percentages of age-6 fish were the lowest on record at the Chena and Salcha river towers and the East Fork Andreafsky River weir. Canadian-origin Chinook salmon sampled at the Eagle sonar test fishery were also predominately age-4 and age-5 fish. The age-5 percentage of the run passing Eagle sonar was the highest on record for the project. There may be an above average percentage of age-5 and age-6 Chinook salmon returning in 2017, given the above average percentage of age-4 and age-5 fish observed in 2016.

Summer chum salmon typically mature as age-4 or age-5 fish. Age-4 fish made up a larger percentage than age-5 fish at all assessment locations in 2016. Age-4 summer chum salmon were above the 2011–2015 average but age-5 summer chum salmon were below the 2011–2015 average at all projects. The percentage of the 2016 summer chum salmon run that consisted of females was similar to the long-term average at all projects. There may be an above average percentage of age-5 summer chum salmon returning in 2017, given the above average percentage of age-4 fish observed in 2016.

Yukon River ASL sampling projects were designed to account for temporal and spatial variability that exists within salmon populations. The collection of regenerated scales was the primary reason some ages could not be read in 2016. Of the ASL samples that were used, there is potential for bias caused by small sample sizes, scale absorption, and collection methods. Scale absorption refers to the margin of the scale being absorbed as an energy reserve in the last few weeks of a salmon's life (Clutter and Whitesel 1956). Scale absorption normally becomes more pronounced the farther upriver the samples are collected and can lead to underestimating saltwater age because less of the outermost annulus remains. Carcass sampling can result in a high number of absorbed scales. Vertebra or otolith sampling can alleviate issues with resorbed scales but are more time-consuming methods of collection and reading. Representative carcass sampling can be challenging because male Chinook salmon tend to drift downstream while females tend to remain near their redds; thus, smaller fish have a greater potential to be carried downstream and out of the study area during periods of increased water velocities (Kissner and Hubartt 1986). This nonrandom dispersal of carcasses could bias ASL data towards fish that are female, larger size, and older; although, proper sampling designs have been shown to reduce this (Evenson 1991; Skaugstad 1990). Bias may also exist in weir sampling towards smaller fish when larger fish are more reluctant to enter a confined weir trap structure and be available for live sampling. Though "trap shyness" has yet to be scientifically evaluated, users of these data should be aware that this potential bias exists.

There is also inherent size selectivity in some sample collection methods, potentially skewing sex composition because of the size difference between male and female fish. Gillnets are size selective based on mesh size and fish wheels tend to be biased towards smaller fish that migrate near shore in lower water velocities (Meehan 1961; Molyneaux et al. 2005). This bias is most apparent with Chinook salmon because males and younger-aged fish are predominately smaller in size than females. In 2016, regulatory requirements to use relatively small mesh (≤6 inch) gillnets for much of the season probably contributed to the low female percentages observed in the subsistence sampling project. Additional information on sampling biases and data quality concerns in salmon populations are documented in previously published ASL reports (e.g.,

Molyneaux et al. 2006). ASL data users are cautioned to be aware of inherent biases when interpreting data.

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TABLES AND FIGURES

Table 1.–Projects and salmon species for which age, sex, and length data were collected in the Yukon Area, 2016.

Project type	Location	Capture gear	Sex ID	Species	
				Chinook	Chum
Commercial [a]					
	Districts 1–2	Dipnet/Gillnet	External		X
	District 6	Fish Wheel	External		X
Subsistence [b]					
	Kotlik	Dipnet/Gillnet	Internal	X	
	Emmonak	Gillnet	Internal	X	
	Mountain Village	Gillnet	Internal	X	
	St. Mary's	Gillnet	Internal	X	
	Marshal	Gillnet	Internal	X	
	Russian Mission	Gillnet	Internal	X	
	Kaltag	Gillnet	Internal	X	
	Nulato	Gillnet	Internal	X	
	Galena	Gillnet	Internal	X	
	Ruby	Gillnet	Internal	X	
	Tanana	Fish Wheel	Internal	X	
Test fishery [a]					
	LYTF Big Eddy	Gillnet	Internal	X	X
	LYTF Middle Mouth	Gillnet	Internal	X	X
	Pilot Station	Gillnet	External	X	X
	Eagle	Gillnet	External	X	
Escapement					
	Andreafsky River, East Fork [c]	Weir	External	X	X
	Anvik River [a]	Beach Seine	External		X
	Gisasa River [c]	Weir	External	X	X
	Henshaw Creek [d]	Weir	External	X	X
	Chena River [e]	Carcass Survey	Internal	X	
	Salcha River [e]	Carcass Survey	Internal	X	X

Note: The X indicates that samples were collected in 2016. Salcha River chum salmon aging structure was vertebrae; all other samples were aged by scales. Only length and sex data (no age structure) were collected for summer chum salmon at the Pilot Station test fishery.

[a] Project was operated by the Alaska Department of Fish and Game, Division of Commercial Fisheries.

[b] Project was operated by Spearfish Research.

[c] Project was operated by the United States Fish and Wildlife Service.

[d] Project was operated by the Tanana Chiefs Conference.

[e] Project was operated by the Alaska Department of Fish and Game, Division of Sport Fish.

Table 2.–Number of Chinook salmon samples collected from Yukon Area projects and percent used for determining age, sex, and length, 2016.

				Age		Sex ID		Length	
Project type	Location	Capture gear	Number sampled	Number	Percent	Number	Percent	Number	Percent
Subsistence									
	Kotlik	Dipnet/Gillnet	67	61	91.0	67	100.0	67	100.0
	Emmonak	Gillnet	44	42	95.5	44	100.0	44	100.0
	Mountain Village	Gillnet	38	33	86.8	38	100.0	38	100.0
	St. Mary's	Gillnet	88	79	89.8	88	100.0	80	90.9
	Marshal	Gillnet	8	8	100.0	8	100.0	8	100.0
	Russian Mission	Gillnet	135	129	95.6	135	100.0	135	100.0
	Kaltag	Gillnet	330	281	85.2	330	100.0	330	100.0
	Nulato	Gillnet	85	74	87.1	85	100.0	85	100.0
	Galena	Gillnet	84	79	94.0	84	100.0	84	100.0
	Ruby	Gillnet	128	110	85.9	128	100.0	128	100.0
	Tanana	Fish Wheel	202	154	76.2	202	100.0	200	99.0
Test fishery									
	LYTF Big Eddy	Set Gillnet	382	349	91.4	382	100.0	382	100.0
	LYTF Middle Mouth	Set Gillnet	631	564	89.4	617	97.8	617	97.8
	Pilot Station	Drift Gillnet	693	618	89.2	693	100.0	693	100.0
	Eagle	Drift Gillnet	748	666	89.0	748	100.0	748	100.0
Escapement									
	Andreafsky River, East Fork	Weir	166	161	97.0	166	100.0	166	100.0
	Gisasa River	Weir	258	239	92.6	258	100.0	258	100.0
	Henshaw Creek	Weir	407	384	94.3	404	99.3	407	100.0
	Chena River	Carcass Survey	388	368	94.8	388	100.0	388	100.0
	Salcha River	Carcass Survey	510	473	92.7	510	100.0	510	100.0
Total			5,392	4,872	90.4	5,375	99.7	5,368	99.6

Table 3.–Number of summer chum salmon samples collected from Yukon Area projects and percent used for determining age, sex, and length, 2016.

				Age		Sex ID		Length	
Project type	Location	Capture gear	Number sampled	Number	Percent	Number	Percent	Number	Percent
Commercial									
	Districts 1–2	Dipnet/Gillnet	1,040	1,006	96.7	1,035	99.5	1,035	99.5
	District 6	Fish Wheel	480	0	0.0	480	100.0	480	100.0
Test fishery									
	LYTF Big Eddy	Drift Gillnet	603	513	85.1	527	87.4	527	87.4
	LYTF Middle Mouth	Drift Gillnet	343	298	86.9	314	91.5	314	91.5
Escapement									
	Andreafsky River, East Fork	Weir	868	834	96.1	868	100.0	868	100.0
	Anvik River	Beach Seine	724	675	93.2	724	100.0	724	100.0
	Gisasa River	Weir	1,040	964	92.7	1,039	99.9	1,039	99.9
	Henshaw Creek	Weir	760	668	87.9	760	100.0	760	100.0
	Salcha River	Carcass Survey	161	159	98.8	161	100.0	161	100.0
Total			6,019	5,117	85.0	5,908	98.2	5,908	98.2

Table 4.–Postseason stratification of Chinook and chum salmon at escapement monitoring projects in the Yukon Area, 2016.

Species	Project	Stratum	Sample size	Escapement	Stratum dates	Sample dates
Chinook salmon	Gisasa River	1	55	300	6/17-7/4	6/29 -7/4
		2	49	257	7/5-7/7	7/5-7/7
		3	81	479	7/8-7/14	7/8-7/14
		4	54	359	7/15-7/28	7/15, 7/18-7/25
	Henshaw Creek	1	34	376	6/26-7/6	6/27, 6/30-7/5
		2	98	521	7/7-7/13	7/9-7/13
		3	249	457	7/14-8/1	7/14-8/1
Summer chum salmon	Andreafsky River, East Fork	1	139	9,837	6/20-6/25	6/21-6/25
		2	147	14,441	6/26-6/30	6/26-6/28
		3	292	12,457	7/1-7/8	7/4-7/8
		4	156	13,627	7/9-7/24	7/9-7/13, 7/17-7/24
	Anvik River	1	51	60,154	6/16-6/26	6/24-6/26
		2	144	73,118	6/27-7/1	6/27-6/30
		3	158	66,262	7/2-7/8	7/2-7/5
		4	154	60,810	7/9-7/13	7/9-7/13
		5	168	77,477	7/14-7/26	7/16-7/22
	Gisasa River	1	336	11,365	6/17-6/29	6/17-6/29
		2	126	14,207	6/30-7/4	6/30-7/4
		3	155	13,800	7/5-7/11	7/5-7/11
		4	147	12,759	7/12-7/20	7/12-7/15, 7/18-7/20
		5	199	14,539	7/21-7/28	7/21-7/27
	Henshaw Creek	1	143	49,403	6/26-7/6	6/28, 6/30, 7/2, 7/4
		2	68	57,837	7/7-7/10	7/10
		3	109	49,676	7/11-7/13	7/11, 7/13
		4	68	72,205	7/14-7/19	7/16, 7/17
		5	280	57,659	7/20-8/1	7/20, 7/23-7/25, 7/27, 7/29, 7/31-8/1

Table 5.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon caught during subsistence fishery in the Yukon Area, 2016.

Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
	42	Male n	0	6	20	0	1	0	0	0	27
5/26, 5/29, 6/26, 6/28-6/30,		Female n	0	2	11	0	2	0	0	0	15
7/2-7/3, 7/5-7/6, 7/9		Total n	0	8	31	0	3	0	0	0	42
(Emmonak)		Male %	0.0	14.3	47.6	0.0	2.4	0.0	0.0	0.0	64.3
		Female %	0.0	4.8	26.2	0.0	4.8	0.0	0.0	0.0	35.8
		Total %	0.0	19.1	73.8	0.0	7.2	0.0	0.0	0.0	100.0
		Male Mean Length		568	674		640				
		SD		56	55		0				
		Range		500-650	590-780		640-640				
		n	0	6	20	0	1	0	0	0	
		Female Mean Length		605	712		760				
		SD		7	71		14				
		Range		600-610	580-840		750-770				
		n	0	2	11	0	2	0	0	0	
Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
	60	Male n	0	18	21	0	2	0	0	0	41
6/7-6/8, 6/13-6/14, 6/16,		Female n	0	3	5	0	10	1	0	0	19
6/20, 6/24, 6/26		Total n	0	21	26	0	12	1	0	0	60
(Kotlik)		Male %	0.0	30.0	35.0	0.0	3.3	0.0	0.0	0.0	68.3
		Female %	0.0	5.0	8.3	0.0	16.7	1.7	0.0	0.0	31.7
		Total %	0.0	35.0	43.3	0.0	20.0	1.7	0.0	0.0	100.0
		Male Mean Length		627	710		712				
		SD		70	95		117				
		Range		484-773	563-975		629-794				
		n	0	18	21	0	2	0	0	0	
		Female Mean Length		728	787		839	811			
		SD		16	53		65	0			
		Range		710-740	720-860		740-920	811-811			
		n	0	3	5	0	10	1	0	0	

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Table 5.–Page 2 of 6.

Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
6/28	8	Male n	0	0	4	0	0	0	0	1	5
(Marshall)		Female n	0	0	2	0	1	0	0	0	3
		Total n	0	0	6	0	1	0	0	1	8
		Male %	0.0	0.0	50.0	0.0	0.0	0.0	0.0	12.5	62.5
		Female %	0.0	0.0	25.0	0.0	12.5	0.0	0.0	0.0	37.5
		Total %	0.0	0.0	75.0	0.0	12.5	0.0	0.0	12.5	100.0
		Male Mean Length			749					804	
		SD			65					0	
		Range			664-814					804-804	
		n	0	0	4	0	0	0	0	1	
		Female Mean Length			746		828				
		SD			12		0				
		Range			738-755		828-828				
		n	0	0	2	0	1	0	0	0	
Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
5/29-5/30, 6/2, 6/5, 6/9, 6/12, 7/6	33	Male n	0	12	13	1	1	0	0	0	27
		Female n	0	0	5	0	1	0	0	0	6
(Mountain Village)		Total n	0	12	18	1	2	0	0	0	33
		Male %	0.0	36.4	39.4	3.0	3.0	0.0	0.0	0.0	81.8
		Female %	0.0	0.0	15.2	0.0	3.0	0.0	0.0	0.0	18.2
		Total %	0.0	36.4	54.6	3.0	6.0	0.0	0.0	0.0	100.0
		Male Mean Length		526	683	548	638				
		SD		134	38	0	0				
		Range		310-686	633-766	548-548	638-638				
		n	0	12	13	1	1	0	0	0	
		Female Mean Length			678		920				
		SD			46		0				
		Range			644-758		920-920				
		n	0	0	5	0	1	0	0	0	

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Table 5.–Page 3 of 6.

Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
6/6, 6/19, 6/25-6/29, 7/1-7/3, 7/5-7/6, 7/9 (St. Mary's)	72	Male n	0	24	25	1	3	0	0	0	53
		Female n	0	4	11	0	4	0	0	0	19
		Total n	0	28	36	1	7	0	0	0	72
		Male %	0.0	33.3	34.7	1.4	4.2	0.0	0.0	0.0	73.6
		Female %	0.0	5.6	15.3	0.0	5.6	0.0	0.0	0.0	26.5
		Total %	0.0	38.9	50.0	1.4	9.8	0.0	0.0	0.0	100.0
		Male Mean Length		612	722	520	757				
		SD		76	75	0	85				
		Range		510-830	590-870	520-520	660-820				
		n	0	24	25	1	3	0	0	0	
		Female Mean Length		626	728		792				
		SD		74	87		49				
		Range		540-700	520-815		730-840				
		n	0	4	11	0	4	0	0	0	
Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
6/10-6/12, 6/14, 6/16, 6/18-6/23, 6/25-6/27, 6/30-7/1, 7/4 (Russian Mission)	129	Male n	30	39	30	0	1	2	0	0	102
		Female n	1	10	13	0	3	0	0	0	27
		Total n	31	49	43	0	4	2	0	0	129
		Male %	23.3	30.2	23.3	0.0	0.8	1.6	0.0	0.0	79.0
		Female %	0.8	7.8	10.1	0.0	2.3	0.0	0.0	0.0	21.0
		Total %	24.1	38.0	33.4	0.0	3.1	1.6	0.0	0.0	100.0
		Male Mean Length	411	573	687		745	606			
		SD	60	51	92		0	0			
		Range	330-650	470-700	400-810		745-745	606-606			
		n	30	39	30	0	1	2	0	0	
		Female Mean Length	390	535	771		862				
		SD	0	49	42		49				
		Range	390-390	465-610	701-880		807-900				
		n	1	10	13	0	3	0	0	0	

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Table 5.–Page 4 of 6.

Sample dates (community)	Sample size	Brood year / Age	2013 1.1	2012 1.2	2011 1.3	2011 2.2	2010 1.4	2010 2.3	2009 1.5	2009 2.4	Total
6/11-6/12, 6/29-6/30, 7/4-7/5 (Galena)	79	Male n	0	9	34	0	7	2	1	0	53
		Female n	0	1	19	0	4	1	0	1	26
		Total n	0	10	53	0	11	3	1	1	79
		Male %	0.0	11.4	43.0	0.0	8.9	2.5	1.3	0.0	67.0
		Female %	0.0	1.3	24.1	0.0	5.1	1.3	0.0	1.3	33.0
		Total %	0.0	12.7	67.1	0.0	14.0	3.8	1.3	1.3	100.0
		Male Mean Length		602	702		808	634	855		
		SD		64	46		71	30	0		
		Range		536-714	608-794		709-938	612-655	855-855		
		n	0	9	34	0	7	2	1	0	
		Female Mean Length		719	739		815	740		856	
		SD		0	43		32	0		0	
		Range		719-719	669-843		788-853	740-740		856-856	
		n	0	1	19	0	4	1	0	1	

Sample dates (community)	Sample size	Brood year / Age	2013 1.1	2012 1.2	2011 1.3	2011 2.2	2010 1.4	2010 2.3	2009 1.5	2009 2.4	Total
6/14, 6/18, 7/3-7/4, 7/6-7/8, 7/11 (Ruby)	110	Male n	0	33	54	0	6	1	0	0	94
		Female n	0	0	11	0	4	0	1	0	16
		Total n	0	33	65	0	10	1	1	0	110
		Male %	0.0	30.0	49.1	0.0	5.5	0.9	0.0	0.0	85.5
		Female %	0.0	0.0	10.0	0.0	3.6	0.0	0.9	0.0	14.5
		Total %	0.0	30.0	59.1	0.0	9.1	0.9	0.9	0.0	100.0
		Male Mean Length		607	695		786	645			
		SD		33	59		58	0			
		Range		520-675	540-891		700-869	645-645			
		n	0	33	54	0	6	1	0	0	
		Female Mean Length			736		828		890		
		SD			48		50		0		
		Range			653-798		773-876		890-890		
		n	0	0	11	0	4	0	1	0	

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Table 5.–Page 5 of 6.

Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
6/27-6/28, 6/30-7/1, 7/4-7/8, 7/11-7/12 (Kaltag)	281	Male n	0	58	94	2	12	3	0	0	169
		Female n	0	10	59	0	40	2	0	1	112
		Total n	0	68	153	2	52	5	0	1	281
		Male %	0.0	20.6	33.5	0.7	4.3	1.1	0.0	0.0	60.2
		Female %	0.0	3.6	21.0	0.0	14.2	0.7	0.0	0.4	39.9
		Total %	0.0	24.2	54.5	0.7	18.5	1.8	0.0	0.4	100.0
		Male Mean Length		600	709	580	823	728			
		SD		31	49	21	50	35			
		Range		535-690	605-870	565-595	760-910	690-760			
		n	0	58	94	2	12	3	0	0	
		Female Mean Length		635	753		843	680		785	
		SD		55	53		41	85		0	
		Range		570-740	600-870		740-910	620-740		785-785	
		n	0	10	59	0	40	2	0	1	
Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
7/1, 7/4-7/6 (Nulato)	44	Male n	0	16	17	2	2	0	0	0	37
		Female n	0	0	4	0	2	1	0	0	7
		Total n	0	16	21	2	4	1	0	0	44
		Male %	0.0	36.4	38.6	4.5	4.5	0.0	0.0	0.0	84.0
		Female %	0.0	0.0	9.1	0.0	4.5	2.3	0.0	0.0	15.9
		Total %	0.0	36.4	47.7	4.5	9.0	2.3	0.0	0.0	100.0
		Male Mean Length		589	707	596	808				
		SD		29	44	26	32				
		Range		527-635	595-765	578-615	785-830				
		n	0	16	17	2	2	0	0	0	
		Female Mean Length			754		791	777			
		SD			13		37	0			
		Range			742-772		765-817	777-777			
		n	0	0	4	0	2	1	0	0	

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Table 5.–Page 6 of 6.

Sample dates (community)	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
6/14, 6/16, 6/20-6/23, 7/6, 7/9-7/11, 7/13, 7/19, 7/21 (Tanana)	153	Male n	0	49	66	0	9	1	1	0	126
		Female n	0	0	19	0	7	1	0	0	27
		Total n	0	49	85	0	16	2	1	0	153
		Male %	0.0	32.0	43.1	0.0	5.9	0.7	0.7	0.0	82.4
		Female %	0.0	0.0	12.4	0.0	4.6	0.7	0.0	0.0	17.7
		Total %	0.0	32.0	55.5	0.0	10.5	1.4	0.7	0.0	100.0
		Male Mean Length		605	723		851	634	810		
		SD		52	75		53	0	0		
		Range		508-780	530-880		782-924	634-634	810-810		
		n	0	49	66	0	9	1	1	0	
		Female Mean Length			796		893	700			
		SD			55		50	0			
		Range			709-910		833-955	700-700			
		n	0	0	19	0	7	1	0	0	
Total All communities	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	Total
	1,011	Male n	30	264	378	6	44	9	2	1	734
		Female n	1	30	159	0	78	6	1	2	277
		Total n	31	294	537	6	122	15	3	3	1,011
		Male %	3.0	26.1	37.4	0.6	4.4	0.9	0.2	0.1	72.7
		Female %	0.1	3.0	15.7	0.0	7.7	0.6	0.1	0.2	27.4
		Total %	3.1	29.1	53.1	0.6	12.1	1.5	0.3	0.3	100.0
		Male Mean Length	411	596	705	570	801	660	832	804	
		SD	60	59	65	34	74	57	32		
		Range	330-650	310-830	400-975	520-615	629-938	606-760	810-855	804-804	
		n	30	264	378	6	44	9	2	1	
		Female Mean Length	390	611	751		840	731	890	820	
		SD		80	59		51	66		50	
		Range	390-390	465-740	520-910		730-955	620-811	890-890	785-856	
		n	1	30	159	0	78	6	1	2	

Table 6.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon caught in the Lower Yukon test fishery using 8.5-inch set gillnets, 2016.

Sample dates (site)	Sample size	Brood year / Age	2013 / 1.1	2012 / 1.2	2011 / 1.3	2011 / 2.2	2010 / 1.4	2010 / 2.3	2009 / 1.5	2009 / 2.4	2008 / 2.5	Total
5/24, 5/26, 5/28-6/30	349	Male n	1	33	126	0	26	2	1	0	0	189
		Female n	0	1	56	0	93	0	8	1	1	160
		Total n	1	34	182	0	119	2	9	1	1	349
(Big Eddy)		Male %	0.3	9.5	36.1	0.0	7.4	0.6	0.3	0.0	0.0	54.2
		Female %	0.0	0.3	16.0	0.0	26.6	0.0	2.3	0.3	0.3	45.8
		Total %	0.3	9.8	52.1	0.0	34.0	0.6	2.6	0.3	0.3	100.0
		Male Mean Length	356	602	725		860	751	932			
		SD	0	39	61		74	85	0			
		Range	356-356	499-674	550-870		646-1000	691-811	932-932			
		n	1	33	126	0	26	2	1	0	0	
		Female Mean Length		740	791		844		897	816	887	
		SD		0	60		38		28	0	0	
		Range		740-740	499-895		755-926		859-951	816-816	887-887	
		n	0	1	56	0	93	0	8	1	1	

Sample dates (site)	Sample size	Brood year / Age	2013 / 1.1	2012 / 1.2	2011 / 1.3	2011 / 2.2	2010 / 1.4	2010 / 2.3	2009 / 1.5	2009 / 2.4	2008 / 2.5	Total
6/03, 6/07-7/11, 7/14	564	Male n	0	40	193	1	51	5	1	0	0	291
		Female n	0	1	125	0	143	0	1	3	0	273
(Middle Mouth)		Total n	0	41	318	1	194	5	2	3	0	564
		Male %	0.0	7.1	34.2	0.2	9.0	0.9	0.2	0.0	0.0	51.6
		Female %	0.0	0.2	22.2	0.0	25.4	0.0	0.2	0.5	0.0	48.5
		Total %	0.0	7.3	56.4	0.2	34.4	0.9	0.4	0.5	0.0	100.0
		Male Mean Length		590	737	642	840	702	927			
		SD		35	59	0	61	35	0			
		Range		535-716	574-869	642-642	712-1001	667-757	927-927			
		n	0	40	193	1	51	5	1	0	0	
		Female Mean Length		751	793		843		825	816		
		SD		0	34		43		0	57		
		Range		751-751	673-886		761-995		825-825	777-881		
		n	0	1	125	0	143	0	1	3	0	

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Table 6.–Page 2 of 2.

Total All sites	Sample size	Brood year	2013	2012	2011	2011	2010	2010	2009	2009	2008	
		Age	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
	913	Male n	1	73	319	1	77	7	2	0	0	480
		Female n	0	2	181	0	236	0	9	4	1	433
		Total n	1	75	500	1	313	7	11	4	1	913
		Male %	0.1	8.0	34.9	0.1	8.4	0.8	0.2	0.0	0.0	52.5
		Female %	0.0	0.2	19.8	0.0	25.8	0.0	1.0	0.4	0.1	47.4
		Total %	0.1	8.2	54.7	0.1	34.2	0.8	1.2	0.4	0.1	100.0
		Male Mean Length	356	595	732	642	847	716	930			
		SD		37	60		66	51	4			
		Range	356-356	499-716	550-870	642-642	646-1001	667-811	927-932			
		n	1	73	319	1	77	7	2	0	0	
		Female Mean Length		746	792		844		889	816	887	
		SD		8	44		41		36	46		
		Range		740-751	499-895		755-995		825-951	777-881	887-887	
		n	0	2	181	0	236	0	9	4	1	

Note: This project used only large mesh gear and therefore data may not be representative of younger age classes and sex ratios should not be considered representative of the total run.

Table 7.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon caught in the Pilot Station sonar drift gillnet test fishery, 2016.

Sample dates (Mesh size)	Sample size	Brood year / Age	2013 / 1.1	2012 / 1.2	2011 / 1.3	2010 / 1.4	2010 / 2.3	2009 / 1.5	2009 / 2.4	Total
6/15, 6/21, 6/29, 7/2, 7/15 (2.75)	5	Male n	1	0	1	0	0	0	0	2
		Female n	0	1	2	0	0	0	0	3
		Total n	1	1	3	0	0	0	0	5
		Male %	20.0	0.0	20.0	0.0	0.0	0.0	0.0	40.0
		Female %	0.0	20.0	40.0	0.0	0.0	0.0	0.0	60.0
		Total %	20.0	20.0	60.0	0.0	0.0	0.0	0.0	100.0
		Male Mean Length	320		720					
		SD	0		0					
		Range	320-320		720-720					
		n	1	0	1	0	0	0	0	
		Female Mean Length		730	682					
		SD		0	64					
		Range		730-730	637-727					
		n	0	1	2	0	0	0	0	
Sample dates (Mesh size)	Sample size	Brood year / Age	2013 / 1.1	2012 / 1.2	2011 / 1.3	2010 / 1.4	2010 / 2.3	2009 / 1.5	2009 / 2.4	Total
6/2, 6/9, 6/11, 6/15-6/16, 6/18, 6/20-6/22, 6/24, 6/26-6/28, 6/30-7/1, 7/4, 7/7-7/9, 7/14, 7/17, 7/19 (4.0)	25	Male n	0	6	11	1	0	0	0	18
		Female n	0	1	5	0	1	0	0	7
		Total n	0	7	16	1	1	0	0	25
		Male %	0.0	24.0	44.0	4.0	0.0	0.0	0.0	72.0
		Female %	0.0	4.0	20.0	0.0	4.0	0.0	0.0	28.0
		Total %	0.0	28.0	64.0	4.0	4.0	0.0	0.0	100.0
		Male Mean Length		544	679	711				
		SD		51	59	0				
		Range		482-593	584-767	711-711				
		n	0	6	11	1	0	0	0	
		Female Mean Length		645	777		740			
		SD		0	71		0			
		Range		645-645	706-885		740-740			
		n	0	1	5	0	1	0	0	

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Table 7.–Page 2 of 5.

Sample dates (Mesh size)	Sample size	Brood year	2013	2012	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
8/11, 8/24 (5.0)	1	Male n	0	0	0	0	0	0	0	0
		Female n	0	0	1	0	0	0	0	1
		Total n	0	0	1	0	0	0	0	1
		Male %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Female %	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
		Total %	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
		Male Mean Length								
		SD								
		Range								
		n	0	0	0	0	0	0	0	
		Female Mean Length			885					
		SD			0					
		Range			885-885					
		n	0	0	1	0	0	0	0	

Sample dates (Mesh size)	Sample size	Brood year	2013	2012	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
6/1, 6/3, 6/5-6/7, 6/9-6/12, 6/15, 6/18-6/19, 6/21-6/24, 6/26-6/27, 7/3-7/5, 7/7, 7/15 (5.25)	41	Male n	0	20	11	0	0	0	0	31
		Female n	0	2	7	1	0	0	0	10
		Total n	0	22	18	1	0	0	0	41
		Male %	0.0	48.8	26.8	0.0	0.0	0.0	0.0	75.6
		Female %	0.0	4.9	17.1	2.4	0.0	0.0	0.0	24.4
		Total %	0.0	53.7	43.9	2.4	0.0	0.0	0.0	100.0
		Male Mean Length		587	696					
		SD		42	66					
		Range		487-670	585-790					
		n	0	20	11	0	0	0	0	
		Female Mean Length		576	693	761				
		SD		36	50	0				
		Range		550-601	590-751	761-761				
		n	0	2	7	1	0	0	0	

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Sample dates (Mesh size)	Sample size	Brood year	2013	2012	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
8/12 (5.75)	1	Male n	0	1	0	0	0	0	0	1
		Female n	0	0	0	0	0	0	0	0
		Total n	0	1	0	0	0	0	0	1
		Male %	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
		Female %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Total %	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
		Male Mean Length		620						
		SD		0						
		Range		620-620						
		n	0	1	0	0	0	0	0	
		Female Mean Length								
		SD								
		Range								
		n	0	0	0	0	0	0	0	
Sample dates (Mesh size)	Sample size	Brood year	2013	2012	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
6/1-6/28, 6/30-7/6, 7/8-7/15 (6.5)	204	Male n	1	30	72	10	0	1	1	115
		Female n	0	4	62	19	2	2	0	89
		Total n	1	34	134	29	2	3	1	204
		Male %	0.5	14.7	35.3	4.9	0.0	0.5	0.5	56.4
		Female %	0.0	2.0	30.4	9.3	1.0	1.0	0.0	43.6
		Total %	0.5	16.7	65.7	14.2	1.0	1.5	0.5	100.0
		Male Mean Length	376	626	690	720		932	678	
		SD	0	50	68	34		0	0	
		Range	376-376	495-782	465-857	660-768		932-932	678-678	
		n	1	30	72	10	0	1	1	
		Female Mean Length		705	737	803	770	896		
		SD		92	53	52	102	6		
		Range		610-798	628-884	716-900	698-842	892-900		
		n	0	4	62	19	2	2	0	

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Table 7.–Page 4 of 5.

Sample dates (Mesh size)	Sample size	Brood year	2013	2012	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
6/1-7/6, 7/8-7/13, 7/16, 7/18 (7.5)	247	Male n	0	17	100	10	1	0	0	128
		Female n	0	3	92	22	1	1	0	119
		Total n	0	20	192	32	2	1	0	247
		Male %	0.0	6.9	40.5	4.0	0.4	0.0	0.0	51.8
		Female %	0.0	1.2	37.2	8.9	0.4	0.4	0.0	48.2
		Total %	0.0	8.1	77.7	12.9	0.8	0.4	0.0	100.0
		Male Mean Length		616	723	751	718			
		SD		73	65	85	0			
		Range		430-741	364-875	575-868	718-718			
		n	0	17	100	10	1	0	0	
		Female Mean Length		685	748	807	852	857		
		SD		114	50	68	0	0		
		Range		609-816	638-906	649-911	852-852	857-857		
		n	0	3	92	22	1	1	0	
Sample dates (Mesh size)	Sample size	Brood year	2013	2012	2011	2010	2010	2009	2009	
		Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
5/30, 6/1-6/2, 6/4, 6/6, 6/9-6/24, 6/26-7/1, 7/3, 7/5-7/9, 7/13, 7/15 (8.5)	94	Male n	0	1	33	9	2	0	0	45
		Female n	0	1	31	15	1	1	0	49
		Total n	0	2	64	24	3	1	0	94
		Male %	0.0	1.1	35.1	9.6	2.1	0.0	0.0	47.9
		Female %	0.0	1.1	33.0	16.0	1.1	1.1	0.0	52.1
		Total %	0.0	2.1	68.1	25.5	3.2	1.1	0.0	100.0
		Male Mean Length		903	752	819	680			
		SD		0	55	75	24			
		Range		903-903	634-849	730-960	663-697			
		n	0	1	33	9	2	0	0	
		Female Mean Length		864	776	838	710	781		
		SD		0	54	42	0	0		
		Range		864-864	678-894	765-915	710-710	781-781		
		n	0	1	31	15	1	1	0	

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Total	Sample	Brood year	2013	2012	2011	2010	2010	2009	2009	
All mesh sizes	size	Age	1.1	1.2	1.3	1.4	2.3	1.5	2.4	Total
	618	Male n	2	75	228	30	3	1	1	340
		Female n	0	12	200	57	5	4	0	278
		Total n	2	87	428	87	8	5	1	618
		Male %	0.3	12.1	36.9	4.9	0.5	0.2	0.2	55.0
		Female %	0.0	1.9	32.4	9.2	0.8	0.6	0.0	45.0
		Total %	0.3	14.1	69.3	14.1	1.3	0.8	0.2	100.0
		Male Mean Length	348	610	713	760	693	932	678	
		SD	40	67	67	77	28			
		Range	320-376	430-903	364-875	575-960	663-718	932-932	678-678	
		n	2	75	228	30	3	1	1	
		Female Mean Length		689	748	813	768	858		
		SD		102	56	58	73	54		
		Range		550-864	590-906	649-915	698-852	781-900		
		n	0	12	200	57	5	4	0	

Note: Although this data probably represents the ASL of the total run (excluding fish bound for the Andreafsky River), the sex ratios may be inaccurate due to visual inspections of external characteristics to determine sex.

Table 8.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon caught in the Eagle sonar drift gillnet test fishery, 2016.

Sample dates (Mesh size)	Sample size	Brood year / Age	2012 / 1.2	2011 / 1.3	2010 / 1.4	2010 / 2.3	2009 / 1.5	2009 / 2.4	Total
7/2, 7/5-7/7, 7/9-7/11, 7/13-15, 7/17-7/19, 7/21-7/23, 7/25-7/27, 7/29-8/2, 8/4-8/8, 8/10, 8/24, 9/15 (5.25")	193	Male n	29	105	12	5	0	0	151
		Female n	0	15	24	1	1	1	42
		Total n	29	120	36	6	1	1	193
		Male %	15.0	54.4	6.2	2.6	0.0	0.0	78.2
		Female %	0.0	7.8	12.4	0.5	0.5	0.5	21.8
		Total %	15.0	62.2	18.7	3.1	0.5	0.5	100.0
		Male Mean Length	604	727	814	713			
		SD	41	74	57	92			
		Range	548-713	572-939	695-883	640-836			
		n	29	105	12	5	0	0	
		Female Mean Length		773	860	678	894	763	
		SD		47	45	0	0	0	
		Range		704-867	772-932	678-678	894-894	763-763	
		n	0	15	24	1	1	1	

Sample dates (Mesh size)	Sample size	Brood year / Age	2012 / 1.2	2011 / 1.3	2010 / 1.4	2010 / 2.3	2009 / 1.5	2009 / 2.4	Total
7/2, 7/5, 7/7-7/9, 7/11-7/13, 7/15-7/17, 7/19-7/21, 7/23-7/25, 7/27-7/29, 7/31-8/2, 8/4, 8/6, 8/8-8/9 (6.5")	166	Male n	9	91	10	1	0	0	111
		Female n	0	21	32	1	0	1	55
		Total n	9	112	42	2	0	1	166
		Male %	5.4	54.8	6.0	0.6	0.0	0.0	66.8
		Female %	0.0	12.7	19.3	0.6	0.0	0.6	33.2
		Total %	5.4	67.5	25.3	1.2	0.0	0.6	100.0
		Male Mean Length	634	725	864	683			
		SD	70	62	49	0			
		Range	515-764	588-995	807-943	683-683			
		n	9	91	10	1	0	0	
		Female Mean Length		763	827	734		808	
		SD		30	45	0		0	
		Range		705-802	710-914	734-734		808-808	
		n	0	21	32	1	0	1	

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Table 8.–Page 2 of 3.

Sample dates (Mesh size)	Sample size	Brood year	2012	2011	2010	2010	2009	2009	
		Age	1.2	1.3	1.4	2.3	1.5	2.4	Total
8/1, 8/2, 8/4, 8/6-8/8, 7/10-7/12, 7/14-7/16, 7/18-7/20, 7/22-7/24, 7/26-7/28, 7/30-8/3, 8/5-8/9, 8/11-8/12, 8/14-8/16, 8/22-8/23, 8/25 (7.5")	209	Male n	17	92	14	3	0	0	126
		Female n	0	47	36	0	0	0	83
		Total n	17	139	50	3	0	0	209
		Male %	8.1	44.0	6.7	1.4	0.0	0.0	60.3
		Female %	0.0	22.5	17.2	0.0	0.0	0.0	39.7
		Total %	8.1	66.5	23.9	1.4	0.0	0.0	100.0
		Male Mean Length	618	743	865	659			
		SD	70	62	76	82			
		Range	505-747	609-925	774-984	579-743			
		n	17	92	14	3	0	0	
		Female Mean Length		793	849				
		SD		44	42				
		Range		688-933	768-927				
		n	0	47	36	0	0	0	
Sample dates (Mesh size)	Sample size	Brood year	2012	2011	2010	2010	2009	2009	
		Age	1.2	1.3	1.4	2.3	1.5	2.4	Total
7/6, 7/9-7/10, 7/12-7/14, 7/16-7/18, 7/20-7/22, 7/26, 7/28-7/30, 8/1, 8/3, 8/13 (8.5")	98	Male n	6	46	8	2	0	0	62
		Female n	0	16	19	0	1	0	36
		Total n	6	62	27	2	1	0	98
		Male %	6.1	46.9	8.2	2.0	0.0	0.0	63.3
		Female %	0.0	16.3	19.4	0.0	1.0	0.0	36.7
		Total %	6.1	63.3	27.6	2.0	1.0	0.0	100.0
		Male Mean Length	648	763	840	725			
		SD	74	69	88	35			
		Range	577-767	652-902	736-965	700-750			
		n	6	46	8	2	0	0	
		Female Mean Length		815	868		900		
		SD		58	50		0		
		Range		717-888	775-968		900-900		
		n	0	16	19	0	1	0	

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Table 8.–Page 3 of 3.

Total	Sample	Brood year	2012	2011	2010	2010	2009	2009	
All mesh sizes	size	Age	1.2	1.3	1.4	2.3	1.5	2.4	Total
	666	Male n	61	334	44	11	0	0	450
		Female n	0	99	111	2	2	2	216
		Total n	61	433	155	13	2	2	666
		Male %	9.2	50.2	6.6	1.7	0.0	0.0	67.6
		Female %	0.0	14.9	16.7	0.3	0.3	0.3	32.4
		Total %	9.2	65.0	23.3	2.0	0.3	0.3	100.0
		Male Mean Length	617	736	846	698			
		SD	58	68	69	75			
		Range	505-767	572-995	695-984	579-836			
		n	61	334	44	11	0	0	
		Female Mean Length		787	848	706	897	786	
		SD		47	47	40	4	32	
		Range		688-933	710-968	678-734	894-900	763-808	
		n	0	99	111	2	2	2	

Table 9.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon that escaped past the East Fork Andreafsky River weir, 2016.

Sample dates	Sample size	Brood year	2013	2012	2011	2010	
		Age	1.1	1.2	1.3	1.4	Total
6/25-8/1, 8/4-8/12	161	Male n	3	40	38	0	81
		Female n	0	2	67	11	80
		Total n	3	42	105	11	161
		Male %	1.9	24.8	23.6	0.0	50.4
		Female %	0.0	1.2	41.6	6.8	49.6
		Total %	1.9	26.0	65.2	6.8	100.0
		Male Mean Length	383	593	722		
		SD	8	53	58		
		Range	375-390	440-689	569-843		
		n	3	40	38	0	
		Female Mean Length		644	762	818	
		SD		50	38	67	
		Range		609-679	686-897	712-915	
		n	0	2	67	11	

Note: Sample size was not sufficient to stratify and apply to escapement. Only a summary of the samples was generated for this project.

Table 10.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon that escaped past the Gisasa River weir, 2016.

Sample dates	Sample size	Brood year / Age	2013 / 1.1	2012 / 1.2	2011 / 1.3	2011 / 2.2	2010 / 1.4	2010 / 2.3	2009 / 1.5	Total
6/29-7/15, 7/18-7/25	239	Male n	6	456	491	5	48	0	0	1,006
		Female n	0	17	124	0	232	6	7	386
		Total n	6	473	615	5	280	6	7	1,392
		Male %	0.4	32.8	35.3	0.4	3.4	0.0	0.0	72.3
		Female %	0.0	1.2	8.9	0.0	16.7	0.4	0.5	27.7
		Total %	0.4	34.0	44.2	0.4	20.1	0.4	0.5	100.0
		Male Mean Length	410	553	667	617	723			
		SE	0	2	3	0	13			
		Range	410-410	450-710	360-853	617-617	568-828			
		n	1	79	85	1	8	0	0	
		Female Mean Length		653	755		807	770	725	
		SE		2	2		3	0	0	
		Range		544-894	720-824		696-901	770-770	725-725	
		n	0	3	21	0	39	1	1	

Table 11.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon that escaped past the Henshaw Creek weir, 2016.

Sample dates	Sample size	Brood year	2013	2012	2011	2011	2010	2009	
		Age	1.1	1.2	1.3	2.2	1.4	1.5	Total
6/27, 6/30-7/5, 7/9-8/1	381	Male n	4	138	545	4	49	0	740
		Female n	0	0	326	0	282	5	613
		Total n	4	138	871	4	331	5	1,353
		Male %	0.3	10.2	40.3	0.3	3.6	0.0	54.7
		Female %	0.0	0.0	24.1	0.0	20.8	0.4	45.3
		Total %	0.3	10.2	64.4	0.3	24.4	0.4	100.0
		Male Mean Length	342	612	701	580	830		
		SE	2	6	3	10	6		
		Range	339-344	498-817	533-838	566-594	756-901		
		n	4	75	58	20	47	0	
		Female Mean Length			762		829	801	
		SE			2		2	0	
		Range			715-874		743-922	801-801	
		n	0	0	99	0	81	1	

Table 12.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon that escaped past the Chena River tower, 2016.

Sample dates	Sample size	Brood year / Age	2012 / 1.2	2011 / 1.3	2010 / 1.4	2010 / 2.3	2009 / 1.5	Total
8/8-8/12	368	Male n	159	117	8	0	0	284
		Female n	2	52	27	1	2	84
		Total n	161	169	35	1	2	368
		Male %	43.2	31.8	2.2	0.0	0.0	77.3
		Female %	0.5	14.1	7.3	0.3	0.5	22.7
		Total %	43.7	45.9	9.5	0.3	0.5	100.0
		Male Mean Length	574	692	828			
		SD	37	51	78			
		Range	475-730	540-840	710-910			
		n	159	117	8	0	0	
		Female Mean Length	545	753	824	800	770	
		SD	7	37	35	0	28	
		Range	540-550	660-865	739-900	800-800	750-790	
		n	2	52	27	1	2	

Table 13.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of Chinook salmon that escaped past the Salcha River tower, 2016.

Sample dates	Sample size	Brood year	2012	2011	2010	2009	
		Age	1.2	1.3	1.4	1.5	Total
7/29-7/30, 8/04-8/07	473	Male n	172	111	6	0	289
		Female n	28	82	73	1	184
		Total n	200	193	79	1	473
		Male %	36.4	23.5	1.3	0.0	61.2
		Female %	5.9	17.3	15.4	0.2	38.8
		Total %	42.3	40.8	16.7	0.2	100.0
		Male Mean Length	583	696	748		
		SD	46	59	117		
		Range	450-745	502-880	580-841		
		n	172	111	6	0	
		Female Mean Length	607	725	812	875	
		SD	65	61	85		
		Range	490-855	528-822	197-900	875-875	
		n	28	82	73	1	

Table 14.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon caught in the District 1 and 2 commercial fishery, from Dip nets (DN) and Beach Seines (BS), and gillnets (by mesh size), 2016.

Sample dates (period; gear)	Sample size	Brood year / Age	2013 0.2	2012 0.3	2011 0.4	2010 0.5	Total
6/14 (Period 1-5; DN/BS)	116	Male n	0	13,715	15,329	1,210	30,254
		Female n	0	10,085	6,454	0	16,539
		Total n	0	23,800	21,783	1,210	46,793
		Male %	0.0	29.3	32.8	2.6	64.7
		Female %	0.0	21.6	13.8	0.0	35.3
		Total %	0.0	50.9	46.6	2.6	100.0
		Male Mean Length		562	581	580	
		SE		4	5	6	
		Range		515-606	523-657	569-588	
		n	0	34	38	3	
		Female Mean Length		526	551		
		SE		4	6		
		Range		491-557	523-595		
		n	0	25	16	0	

Sample dates (period; gear)	Sample size	Brood year / Age	2013 0.2	2012 0.3	2011 0.4	2010 0.5	Total
6/17 (Period 6-8; DN/BS)	115	Male n	0	3,029	1,969	303	5,301
		Female n	0	2,347	984	76	3,407
		Total n	0	5,376	2,953	379	8,708
		Male %	0.0	34.8	22.6	3.5	60.9
		Female %	0.0	27.0	11.3	0.9	39.1
		Total %	0.0	61.7	33.9	4.3	100.0
		Male Mean Length		550	562	564	
		SE		5	6	5	
		Range		487-605	503-622	553-573	
		n	0	40	26	4	
		Female Mean Length		529	549	562	
		SE		4	6	-	
		Range		499-597	519-586	562-562	
		n	0	31	13	1	

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Sample dates (period; gear)	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/20	117	Male n	0	8,447	5,444	1,126	15,017
(Period 9-11; DN/BS)		Female n	0	4,130	2,628	188	6,945
		Total n	0	12,577	8,072	1,314	21,962
		Male %	0.0	38.5	24.8	5.1	68.4
		Female %	0.0	18.8	12.0	0.9	31.6
		Total %	0.0	57.3	36.8	6.0	100.0
		Male Mean Length		549	562	571	
		SE		4	5	13	
		Range		499-617	512-627	544-623	
		n	0	45	29	6	
		Female Mean Length		518	540	560	
		SE		6	6		
		Range		413-562	507-568	560-560	
		n	0	22	14	1	
Sample dates (period; gear)	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/25	118	Male n	0	2,791	1,566	204	4,561
(Period 12-13; DN/BS)		Female n	0	2,723	681	68	3,471
		Total n	0	5,513	2,246	272	8,032
		Male %	0.0	34.7	19.5	2.5	56.8
		Female %	0.0	33.9	8.5	0.8	43.2
		Total %	0.0	68.6	28.0	3.4	100.0
		Male Mean Length		545	564	565	
		SE		4	4	20	
		Range		495-596	522-593	545-605	
		n	0	41	23	3	
		Female Mean Length		527	540	548	
		SE		4	8		
		Range		473-587	499-575	548-548	
		n	0	40	10	1	

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Sample dates (period; gear)	Sample size	Brood year / Age	2013 / 0.2	2012 / 0.3	2011 / 0.4	2010 / 0.5	Total
6/28, 7/01 (Period 14-18; 5.5")	155	Male n	643	13,191	8,687	965	23,487
		Female n	322	16,409	9,009	643	26,383
		Total n	965	29,600	17,696	1,609	49,870
		Male %	1.3	26.5	17.4	1.9	47.1
		Female %	0.6	32.9	18.1	1.3	52.9
		Total %	1.9	59.4	35.5	3.2	100.0
		Male Mean Length	536	558	560	580	
		SE	16	4	4	10	
		Range	520-551	490-618	522-594	561-595	
		n	2	41	27	3	
		Female Mean Length	551	546	564	544	
		SE		4	4	5	
		Range	551-551	486-620	535-613	539-549	
		n	1	51	28	2	
Sample dates (period; gear)	Sample size	Brood year / Age	2013 / 0.2	2012 / 0.3	2011 / 0.4	2010 / 0.5	Total
7/03, 7/06 (Period 19-22; 5.5")	156	Male n	489	20,029	13,190	1,954	35,661
		Female n	489	28,333	10,259	1,466	40,546
		Total n	977	48,362	23,448	3,420	76,206
		Male %	0.6	26.3	17.3	2.6	46.8
		Female %	0.6	37.2	13.5	1.9	53.2
		Total %	1.3	63.5	30.8	4.5	100.0
		Male Mean Length	491	548	572	585	
		SE		3	5	11	
		Range	491-491	516-596	513-623	553-602	
		n	1	41	27	4	
		Female Mean Length	490	533	546	565	
		SE		3	5	5	
		Range	490-490	487-604	501-586	556-574	
		n	1	58	21	3	

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Sample dates (period; gear)	Sample size	Brood year / Age	2013 / 0.2	2012 / 0.3	2011 / 0.4	2010 / 0.5	Total
7/9	75	Male n	0	12,344	5,761	411	18,517
(Period 23-25; 6.0")		Female n	0	7,818	4,526	0	12,344
		Total n	0	20,163	10,287	411	30,861
		Male %	0.0	40.0	18.7	1.3	60.0
		Female %	0.0	25.3	14.7	0.0	40.0
		Total %	0.0	65.3	33.3	1.3	100.0
		Male Mean Length		564	564	582	
		SE		5	8		
		Range		518-614	519-640	582-582	
		n	0	30	14	1	
		Female Mean Length		547	538		
		SE		5	7		
		Range		502-592	501-567		
		n	0	19	11	0	
Sample dates (period; gear)	Sample size	Brood year / Age	2013 / 0.2	2012 / 0.3	2011 / 0.4	2010 / 0.5	Total
7/11, 7/14	154	Male n	332	25,240	6,642	0	32,214
(Period 26-29; 6.0")		Female n	0	13,616	4,649	664	18,930
		Total n	332	38,856	11,292	664	51,144
		Male %	0.6	49.4	13.0	0.0	63.0
		Female %	0.0	26.6	9.1	1.3	37.0
		Total %	0.6	76.0	22.1	1.3	100.0
		Male Mean Length	511	567	578		
		SE		3	6		
		Range	511-511	516-639	524-628		
		n	1	76	20	0	
		Female Mean Length		548	558	546	
		SE		4	6	16	
		Range		505-605	519-597	530-561	
		n	0	41	14	2	

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Table 14.–Page 5 of 5.

Total	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
	1,006	Male n	1,464	98,786	58,586	6,174	165,010
		Female n	810	85,461	39,190	3,105	128,566
		Total n	2,274	184,247	97,776	9,279	293,576
		Male %	0.5	33.6	20.0	2.1	56.2
		Female %	0.3	29.1	13.3	1.1	43.8
		Total %	0.8	62.8	33.3	3.2	100.0
		Male Mean Length	515	558	571	579	
		SE	7	1	2	5	
		Range	491-551	487-639	503-657	544-623	
		n	4	348	204	24	
		Female Mean Length	514	537	551	556	
		SE	0	1	2	4	
		Range	490-551	413-620	499-613	530-574	
		n	2	287	127	10	

Note: The mesh size listed was the maximum allowed mesh size for the commercial gillnet period and may also include fish harvested with smaller mesh gear.

Table 15.–Sex composition and mean length (mm) of summer chum salmon caught in the District 6 commercial fishery with fish wheels and gillnets, 2016.

Sample date (period)	Sample size		
7/27	160	Male Mean Length	589
(Period 5)		SE	3
		Range	521-657
		n	80
		Female Mean Length	561
		SE	3
		Range	500-670
		n	80
7/31	160	Male Mean Length	580
(Period 6)		SE	3
		Range	518-673
		n	80
		Female Mean Length	559
		SE	3
		Range	502-658
		n	80
8/3	160	Male Mean Length	575
(Period 7)		SE	3
		Range	519-646
		n	80
		Female Mean Length	550
		SE	3
		Range	490-618
		n	80
Total	480	Male Mean Length	581
All periods		SE	2
		Range	518-673
		n	240
		Female Mean Length	557
		SE	2
		Range	490-670
		n	240

Note: Periods 1-4 were not sampled. Each period is 42 hours long. Lengths were collected from equal numbers of males and females each period; therefore, sex composition was not representative of the harvest. Gillnets were limited to 6-inch or smaller mesh.

Table 16.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon caught in the Lower Yukon test fishery caught using 5.5-inch drift gillnets, 2016.

Sample dates (site)	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
5/22,5/24, 5/26, 5/28, 5/30-7/6, 7/14-7/15 (Big Eddy)	513	Male n	1	134	76	8	219
		Female n	4	171	111	8	294
		Total n	5	305	187	16	513
		Male %	0.2	26.1	14.8	1.6	42.7
		Female %	0.8	33.3	21.6	1.6	57.3
		Total %	1.0	59.4	36.4	3.2	100.0
		Male Mean Length	531	556	583	582	
		SD	0	41	27	19	
		Range	531-531	360-656	513-643	559-612	
		n	1	134	76	8	
		Female Mean Length	524	541	558	556	
		SD	12	26	28	14	
		Range	507-536	384-597	373-626	542-580	
		n	4	171	111	8	

Sample dates (site)	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/4-6/6, 6/8-6/11, 6/13-7/4, 7/12-7/14 (Middle Mouth)	298	Male n	1	73	24	5	103
		Female n	1	118	73	3	195
		Total n	2	191	97	8	298
		Male %	0.3	24.5	8.1	1.7	34.6
		Female %	0.3	39.6	24.5	1.0	65.4
		Total %	0.6	64.1	32.6	2.7	100.0
		Male Mean Length	562	565	576	587	
		SD	0	24	34	35	
		Range	562-562	517-622	523-650	540-631	
		n	1	73	24	5	
		Female Mean Length	523	542	557	552	
		SD	0	17	22	23	
		Range	523-523	490-585	516-616	538-579	
		n	1	118	73	3	

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Total All sites	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
	811	Male n	2	207	100	13	322
		Female n	5	289	184	11	489
		Total n	7	496	284	24	811
		Male %	0.2	25.5	12.3	1.6	39.6
		Female %	0.6	35.6	22.7	1.4	60.4
		Total %	0.8	61.1	35.0	3.0	100.0
		Male Mean Length	546	559	581	584	
		SD	22	36	29	25	
		Range	531-562	360-656	513-650	540-631	
		n	2	207	100	13	
		Female Mean Length	524	542	558	555	
		SD	11	23	26	16	
		Range	507-536	384-597	373-626	538-580	
		n	5	289	184	11	

Table 17.–Sex composition and mean length (mm) of summer chum salmon from the mainstem Yukon River test fishery project operated near Pilot Station, 2.75 in, 4.0 in, 5.25 in, 6.5 in, 7.5 in, and 8.5 in, mesh drift gillnets combined, 2016.

			Total	
Sample dates	Sample size		N	%
5/30-6/16	1,121	Male	628	56.0
		Female	493	44.0
		Subtotal	1,121	100.0
		Male Mean Length	602	
		SE	1	
		Range	405-855	
		n	628	
		Female Mean Length	559	
		SE	1	
		Range	499-668	
		n	493	
6/17-6/23	1,081	Male	483	44.7
		Female	598	55.3
		Subtotal	1,081	100.0
		Male Mean Length	594	
		SE	2	
		Range	504-734	
		n	483	
		Female Mean Length	558	
		SE	1	
		Range	405-681	
		n	598	
6/24-7/3	1,024	Male	430	42.0
		Female	594	58.0
		Subtotal	1,024	100.0
		Male Mean Length	589	
		SE	2	
		Range	419-721	
		n	430	
		Female Mean Length	555	
		SE	1	
		Range	418-700	
		n	594	

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Sample dates	Sample size		Total N	Total %
7/4-7/18	988	Male	382	38.7
		Female	606	61.3
		Subtotal	988	100.0
		Male Mean Length	586	
		SE	2	
		Range	484-746	
		n	382	
		Female Mean Length	548	
		SE	1	
		Range	416-677	
		n	606	
Total	4,214	Male	1,923	45.6
		Female	2,291	54.4
		Subtotal	4,214	100.0
		Male Mean Length	594	
		SE	1	
		Range	405-855	
		n	1,923	
		Female Mean Length	555	
		SE	1	
		Range	405-700	
		n	2,291	

Table 18.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon that escaped past the East Fork Andreafsky River weir, 2016.

Sample dates	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/21-6/28, 7/4-7/13, 7/17-7/24	834	Male n	43	17,821	9,007	888	27,759
		Female n	424	16,770	5,315	96	22,605
		Total n	467	34,591	14,322	984	50,364
		Male %	0.1	35.4	17.9	1.8	55.1
		Female %	0.8	33.3	10.6	0.2	44.9
		Total %	0.9	68.7	28.5	2.0	100.0
		Male Mean Length	488	541	567	553	
		SE	0	0	0	1	
		Range	488-488	440-621	453-655	470-590	
		n	1	296	133	11	
		Female Mean Length	498	510	534	536	
		SE	0	0	0	0	
		Range	478-509	447-597	428-614	509-557	
		n	6	302	83	2	

Table 19.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon that escaped past the Anvik River sonar, sampled with beach seine, 2016.

Sample dates	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/24-6/30, 7/2-7/5, 7/9-7/13, 7/16-7/22	675	Male n	927	85,266	42,533	3,163	131,889
		Female n	3,634	156,604	41,366	4,328	205,932
		Total n	4,561	241,870	83,899	7,491	337,821
		Male %	0.3	25.2	12.6	0.9	39.0
		Female %	1.1	46.4	12.2	1.3	61.0
		Total %	1.4	71.6	24.8	2.2	100.0
		Male Mean Length	519	568	591	619	
		SE	0	0	0	0	
		Range	505-530	490-665	536-656	571-644	
		n	2	167	75	5	
		Female Mean Length	509	536	546	572	
		SE	0	0	0	0	
		Range	479-529	472-623	478-622	557-595	
		n	8	327	86	5	

Table 20.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon that escaped past the Gisasa River weir, 2016.

Sample dates	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/17-7/15, 7/18-7/27	964	Male n	73	16,860	10,952	943	28,828
		Female n	733	24,779	11,784	547	37,843
		Total n	806	41,639	22,736	1,490	66,671
		Male %	0.1	25.3	16.4	1.4	43.2
		Female %	1.1	37.2	17.7	0.8	56.8
		Total %	1.2	62.5	34.1	2.2	100.0
		Male Mean Length	472	556	578	594	
		SE	0	0	0	1	
		Range	472-472	479-616	504-655	532-667	
		n	2	167	75	5	
		Female Mean Length	494	527	544	559	
		SE	0	0	0	0	
		Range	476-515	464-595	465-616	547-587	
		n	8	327	86	5	

Table 21.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon that escaped past the Henshaw Creek weir, 2016.

Sample dates	Sample size	Brood year	2013	2012	2011	2010	
		Age	0.2	0.3	0.4	0.5	Total
6/28, 6/30, 7/2, 7/4, 7/10-7/11, 7/13, 7/16-7/17, 7/20, 7/23-7/25, 7/27, 7/29, 7/31-8/1	668	Male n	0	82,692	39,742	3,405	125,839
		Female n	1,407	114,040	44,088	1,407	160,942
		Total n	1,407	196,732	83,830	4,812	286,781
		Male %	0.0	28.8	13.9	1.2	43.9
		Female %	0.5	39.8	15.4	0.5	56.1
		Total %	0.5	68.6	29.3	1.7	100.0
		Male Mean Length		560	585	627	
		SE		0	0	0	
		Range		409-635	506-676	578-676	
		n	0	184	96	6	
		Female Mean Length	502	532	545	552	
		SE	0	0	0	0	
		Range	501-505	449-603	431-641	548-563	
		n	2	280	98	2	

Table 22.–Age and sex composition, by sample size (n) and percent (%), and mean length (mm) of summer chum salmon that escaped past the Salcha River tower, 2016.

Sample dates	Sample size	Brood year / Age	2014 0.1	2013 0.2	2012 0.3	2011 1.2	2011 0.4	2010 1.3	2010 0.5	Total
7/29-7/30, 8/04-8/07	159	Male n	0	0	26	0	45	0	4	75
		Female n	0	1	25	0	52	0	6	84
		Total n	0	1	51	0	97	0	10	159
		Male %	0.0	0.0	16.4	0.0	28.3	0.0	2.5	47.2
		Female %	0.0	0.6	15.7	0.0	32.7	0.0	3.8	52.8
		Total %	0.0	0.6	32.1	0.0	61.0	0.0	6.3	100.0
		Male Mean Length			571		589		586	
		SD			30		31		32	
		Range			510-640		530-655		550-615	
		n	0	0	26	0	45	0	4	
		Female Mean Length		510	548		558		549	
		SD			24		27		28	
		Range		510-510	510-605		497-610		514-598	
		n	0	1	25	0	52	0	6	

Table 23.–Age, female percentage, and mean length (mm) of Chinook salmon from the Lower Yukon River test fishery 8.5-inch mesh set gillnet (Big Eddy and Middle Mouth sites combined), 1985–2016.

		Percent of samples by combined age class							
Year	Sample size	Age-3 (1.1)	Age-4 (1.2, 2.1)	Age-5 (1.3, 2.2)	Age-6 (1.4, 2.3)	Age-7 (1.5, 2.4)	Age-8 (1.6, 2.5)	Percent female	Mean length
1985	326	0.0	5.5	8.6	77.9	7.7	0.3	52.1	837
1986	815	0.1	5.9	37.8	40.0	16.1	0.1	37.9	785
1987	609	0.2	8.0	6.6	69.3	15.6	0.3	56.3	842
1988	366	0.5	14.5	19.1	34.7	30.1	1.1	46.2	816
1989	407	0.0	1.5	20.1	64.9	13.0	0.5	51.4	859
1990	510	0.0	25.3	21.6	47.6	5.5	0.0	39.2	768
1991	477	0.0	3.6	46.1	42.6	7.1	0.6	50.9	818
1992	367	0.0	1.9	11.2	81.5	4.9	0.5	56.4	861
1993	871	0.0	21.1	30.3	42.3	6.2	0.1	38.0	765
1994	776	0.1	3.5	45.1	46.5	4.8	0.0	44.2	802
1995	531	0.0	7.0	13.0	74.8	5.3	0.0	45.8	829
1996	490	0.0	3.7	65.7	18.4	12.2	0.0	48.6	779
1997	339	0.0	1.5	9.7	85.8	2.9	0.0	49.9	857
1998	952	0.0	1.3	43.9	45.0	9.8	0.1	50.4	830
1999	942	0.0	0.7	9.1	87.0	3.1	0.0	61.4	854
2000	1014	0.1	0.6	18.5	71.8	9.0	0.0	51.9	830
2001	1,523	0.0	1.9	13.4	76.2	8.5	0.0	52.7	833
2002	1,365	0.0	2.8	21.8	64.0	11.5	0.0	50.1	829
2003	1,722	0.0	0.6	25.4	66.7	7.2	0.1	52.5	847
2004	912	0.1	5.2	18.8	73.2	2.7	0.0	56.8	837
2005	1159	0.0	1.6	41.8	54.2	2.4	0.0	48.7	824
2006	1117	0.0	2.1	49.0	46.6	2.2	0.0	49.5	813
2007	1,422	0.0	4.4	17.4	77.2	1.0	0.0	52.4	820
2008	1,444	0.0	1.2	46.6	49.1	3.1	0.0	44.3	804
2009	1,507	0.0	3.9	11.5	82.7	1.8	0.0	57.4	829
2010	1,642	0.1	4.4	59.0	33.9	2.6	0.0	47.4	799
2011	1208	0.0	1.4	32.2	61.8	4.5	0.1	52.5	823
2012	1026	0.0	1.4	30.3	66.2	2.1	0.0	62.3	809
2013	733	0.1	5.0	22.4	68.9	3.5	0.0	59.2	801
2014	615	0.2	1.1	50.7	45.4	2.6	0.0	45.5	790
2015	595	0.0	9.7	17.0	72.1	1.2	0.0	53.4	800
2016	927	0.1	8.1	55.1	35.0	1.6	0.1	47.8	774
Average (1985-2015)	896	0.1	4.9	27.9	60.3	6.8	0.1	50.5	819
5-yr Average (2011-2015)	835	0.1	3.7	30.5	62.9	2.8	0.0	54.6	805

Note: The Lower Yukon River test fishery was conducted from the end of May through July 15. Before 1998, this test fishery was often discontinuous or was not conducted throughout the season. All values are unweighted.

Table 24.–Age, female percentage, and mean length (mm) of Chinook salmon in the mainstem Yukon River drift test fishery project operated near Pilot Station, 1985–2016.

		Percent of samples by combined age class							
Year	Sample size	Age-3 (1.1)	Age-4 (1.2, 2.1)	Age-5 (1.3, 2.2)	Age-6 (1.4, 2.3)	Age-7 (1.5, 2.4)	Age-8 (1.6, 2.5)	Percent female	Mean length
1998	506	0.2	11.5	69.6	15.8	2.8	0.2	50.4	722
1999	451	0.4	8.2	24.2	66.1	1.1	0.0	49.3	773
2000	449	0.0	5.8	39.0	49.7	5.6	0.0	61.2	748
2001	538	0.4	6.7	33.3	56.1	3.5	0.0	59.7	770
2002	538	0.0	23.2	40.3	30.7	5.8	0.0	31.3	722
2003	831	0.4	5.9	49.1	43.0	1.7	0.0	46.1	771
2004	932	0.5	27.6	30.3	39.7	1.9	0.0	34.7	741
2005	662	0.0	9.5	59.2	30.1	1.2	0.0	32.6	769
2006	507	0.0	5.5	58.0	36.1	0.4	0.0	36.9	751
2007	483	0.0	13.0	34.8	51.1	1.0	0.0	33.9	747
2008	622	0.8	5.0	62.2	28.0	4.0	0.0	30.2	742
2009	790	0.3	15.7	25.2	57.7	1.1	0.0	41.4	760
2010	256	1.2	10.5	57.8	27.7	2.7	0.0	38.0	739
2011	487	0.4	9.4	54.2	33.3	2.7	0.0	29.8	742
2012	387	0.8	5.7	48.1	43.2	2.3	0.0	42.8	752
2013	272	0.0	6.6	35.7	55.5	2.2	0.0	41.8	770
2014	444	4.1	9.5	66.0	19.6	0.9	0.0	31.2	710
2015	410	0.0	22.4	33.9	43.2	0.5	0.0	35.6	740
2016	618	0.3	14.1	69.3	15.4	1.0	0.0	44.7	723
Average (1998-2015)	531	0.5	11.2	45.6	40.4	2.3	0.0	40.4	748
5-yr Average (2011-2015)	400	1.1	10.7	47.6	39.0	1.7	0.0	36.2	743

Note: All values are unweighted.

Table 25.–Age, female percentage, and mean length (mm) of Chinook salmon in the mainstem Yukon River sonar test fishery project operated near Eagle, Alaska, 2005–2016.

Year	Sample size	Percent of samples by combined age class						Percent female	Mean length
		Age-3 (1.1)	Age-4 (1.2, 2.1)	Age-5 (1.3, 2.2)	Age-6 (1.4, 2.3)	Age-7 (1.5, 2.4)	Age-8 (1.6, 2.5)		
2005	171	0.0	8.2	50.3	38.0	3.5	0.0	33.9	779
2006	256	0.0	16.8	60.2	22.7	0.4	0.0	37.9	737
2007	389	0.0	5.7	40.1	53.7	0.5	0.0	43.4	787
2008	375	0.0	2.7	56.3	36.5	4.5	0.0	36.8	780
2009	647	0.0	7.7	33.2	59.0	0.0	0.0	39.6	791
2010	336	0.0	7.4	46.4	42.0	4.2	0.0	40.5	770
2011	419	0.0	2.1	29.6	60.4	7.9	0.0	51.3	809
2012	246	0.4	6.1	29.7	59.3	4.5	0.0	49.6	780
2013	265	0.0	4.2	27.5	63.4	4.9	0.0	51.7	807
2014	606	0.2	6.6	50.5	40.1	2.6	0.0	35.1	763
2015	926	0.3	10.8	34.3	52.4	2.2	0.0	42.1	776
2016	666	0.0	9.2	65.0	25.2	0.6	0.0	32.4	759
Average (2005-2015)	442	0.1	7.3	43.6	46.1	3.0	0.0	41.2	778
5-yr Average (2011-2015)	492	0.2	6.0	34.3	55.1	4.4	0.0	46.0	787

Note: All values are unweighted.

Table 26.–Age, female percentage, and mean length (mm) of Chinook salmon that escaped past the East Fork Andreafsky River weir, 1985–2016.

Year	Sample size	Percent of samples by combined age class						Percent female	Mean length
		Age-3 (1.1)	Age-4 (1.2, 2.1)	Age-5 (1.3, 2.2)	Age-6 (1.4, 2.3)	Age-7 (1.5, 2.4)	Age-8 (1.6, 2.5)		
1985 [ab]	108	0.0	29.6	16.7	49.1	4.6	0.0	31.5	728
1986 [bc]	80	0.0	2.5	57.5	35.0	5.0	0.0	28.8	737
1987 [bc]	192	0.5	3.1	7.3	86.5	2.6	0.0	52.6	816
1988 [bc]	189	0.5	18.5	33.3	29.6	18.0	0.0	42.3	763
1989 [b]	84	0.0	2.4	75.0	21.4	1.2	0.0	4.8	735
1990 [b]	291	0.7	35.1	28.5	34.7	1.0	0.0	38.5	747
1991 [b]	239	0.0	6.7	61.5	29.7	2.1	0.0	27.6	762
1992 [b]	23	0.0	34.8	34.8	21.7	8.7	0.0	26.1	693
1993 [b]	255	0.4	16.9	39.2	42.0	1.6	0.0	29.4	745
1994	440	0.0	8.0	53.0	34.5	4.3	0.2	35.5	748
1995	313	0.0	36.7	16.3	45.4	1.6	0.0	42.2	700
1996 [b]	340	1.5	7.1	73.8	13.5	4.1	0.0	42.1	713
1997	410	0.0	52.7	15.6	31.7	0.0	0.0	36.8	672
1998	378	0.0	16.4	70.6	12.2	0.8	0.0	28.8	700
1999	357	0.3	34.5	32.2	32.5	0.6	0.0	28.6	668
2000	303	0.0	10.6	56.1	33.0	0.3	0.0	32.3	722
2001 [d]	124	0.0	14.5	18.5	64.5	2.4	0.0	63.7	785
2002	436	0.0	30.5	48.2	20.0	1.4	0.0	21.1	664
2003	533	0.4	15.9	50.5	32.1	1.1	0.0	47.7	726
2004	508	0.0	39.2	39.8	20.5	0.6	0.0	34.8	686
2005	389	0.0	15.2	63.8	20.6	0.5	0.0	49.9	738
2006	454	0.0	17.4	55.5	27.1	0.0	0.0	43.6	721
2007	631	0.0	42.0	26.1	31.2	0.6	0.0	44.5	660
2008	470	0.0	3.2	71.3	23.6	1.9	0.0	38.9	724
2009	2,687	0.1	23.6	15.5	60.1	0.6	0.0	47.2	749
2010 [b]	624	0.3	38.6	48.7	11.2	1.0	0.2	48.7	665
2011 [b]	542	0.0	43.9	41.3	14.6	0.2	0.0	19.9	633
2012	572	0.3	12.4	64.2	22.9	0.2	0.0	27.4	689
2013	447	0.4	44.5	24.2	30.4	0.4	0.0	39.4	661
2014	317	1.9	9.8	77.9	10.4	0.0	0.0	47.9	691
2015	547	0.0	38.4	14.3	47.3	0.0	0.0	39.7	710
2016	160	1.9	26.3	65.0	6.9	0.0	0.0	49.4	705
Average (1985-2015)	428	0.2	22.7	42.9	31.9	2.2	0.0	36.8	715
5-yr Average (2011-2015)	485	0.5	29.8	44.4	25.1	0.2	0.0	34.9	677

Note: All values are unweighted. En dash indicates no data.

[a] Project was operated as sonar.

[b] Samples were from ancillary ASL collections.

[c] Project was operated as a counting tower.

[d] Sampling dates were limited and may not represent run; not included in average.

Table 27.–Age, female percentage, and mean length (mm) of Chinook salmon that escaped past the Gisasa River weir, 1995–2016.

		Percent of samples by combined age class							
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Percent	Mean
Year	size	(1.1)	(1.2, 2.1)	(1.3, 2.2)	(1.4, 2.3)	(1.5, 2.4)	(1.6, 2.5)	female	length
1995	346	0.0	15.9	30.1	52.0	2.0	0.0	44.2	776
1996	339	1.2	18.0	59.9	13.9	7.1	0.0	19.7	686
1997	497	0.4	37.0	26.8	35.6	0.2	0.0	25.0	683
1998	352	0.0	16.8	61.4	19.3	2.6	0.0	16.6	678
1999	509	0.4	16.9	41.7	40.5	0.6	0.0	25.5	697
2000	662	0.0	6.8	51.2	39.9	2.1	0.0	33.3	738
2001	637	0.2	16.6	21.8	58.6	2.8	0.0	49.4	761
2002	526	0.0	31.9	41.8	23.4	2.9	0.0	21.2	664
2003	473	0.2	5.5	69.6	23.7	1.1	0.0	38.3	750
2004	541	0.7	39.6	30.9	28.5	0.4	0.0	34.5	712
2005	591	0.0	27.2	56.9	15.6	0.3	0.0	36.4	697
2006	530	0.2	19.4	62.1	17.7	0.6	0.0	29.7	691
2007	337	0.0	28.5	20.5	50.7	0.3	0.0	40.6	711
2008	475	0.4	19.4	64.4	13.3	2.5	0.0	16.7	679
2009	521	0.0	42.0	26.1	31.7	0.2	0.0	27.0	686
2010	493	0.2	42.4	47.9	8.9	0.6	0.0	28.7	663
2011	597	0.0	31.0	56.8	11.9	0.2	0.2	19.5	659
2012	528	0.0	11.7	60.8	26.9	0.6	0.0	40.6	702
2013	458	0.0	27.9	31.4	39.5	1.1	0.0	33.2	701
2014	131	0.8	17.6	66.4	13.7	1.5	0.0	18.4	674
2015	243	0.8	25.9	39.5	33.7	0.0	0.0	29.7	690
2016	239	0.4	34.3	44.8	20.1	0.4	0.0	27.9	662
Average (1995-2015)	466	0.3	23.7	46.1	28.5	1.4	0.0	29.9	700
5-yr Average (2011-2015)	391	0.3	22.8	51.0	25.2	0.7	0.0	28.3	685

Note: All values are unweighted.

Table 28.–Age, female percentage, and mean length (mm) of Chinook salmon that escaped past the Henshaw Creek weir, 1995–2016.

Year	Sample size	Percent of samples by combined age class						Percent female	Mean length
		Age-3 (1.1)	Age-4 (1.2, 2.1)	Age-5 (1.3, 2.2)	Age-6 (1.4, 2.3)	Age-7 (1.5, 2.4)	Age-8 (1.6, 2.5)		
2000	37	0.0	18.9	62.2	18.9	0.0	0.0	29.7	678
2001	377	0.0	11.7	44.0	43.2	1.1	0.0	36.3	736
2002	347	0.0	30.3	36.0	31.4	2.3	0.0	30.8	693
2003	304	1.6	19.4	44.1	33.2	1.6	0.0	39.1	711
2004	636	0.2	45.1	28.3	25.8	0.6	0.0	23.1	682
2005	127	0.0	25.2	51.2	23.6	0.0	0.0	41.7	696
2006	–	–	–	–	–	–	–	–	–
2007	352	0.0	41.8	18.8	39.5	0.0	0.0	42.6	667
2008	349	0.6	17.2	69.6	10.6	1.7	0.3	26.9	674
2009	348	0.0	32.8	29.6	37.6	0.0	0.0	53.7	707
2010	209	0.5	20.1	58.4	20.1	1.0	0.0	48.8	712
2011	428	0.2	20.6	49.5	29.2	0.5	0.0	33.6	708
2012	286	0.0	17.5	47.6	34.6	0.3	0.0	43.4	725
2013	223	0.9	26.9	31.8	39.9	0.4	0.0	46.6	705
2014	–	–	–	–	–	–	–	–	–
2015	459	0.0	24.6	40.7	34.4	0.2	0.0	41.4	723
2016	381	0.5	10.2	63.8	25.2	0.3	0.0	47.5	740
Average (2000-2015)	320	0.3	25.1	43.7	30.2	0.7	0.0	38.4	704
5-yr Average (2011-2015)	349	0.3	22.4	42.4	34.5	0.4	0.0	41.3	715

Note: All values are unweighted. En dash indicates no data.

Table 29.–Age, female percentage, and mean length (mm) of Chinook salmon that escaped past the Chena River tower, 1985–2016.

Year	Sample size	Percent of samples by combined age class						Percent female	Mean length
		Age-3 (1.1)	Age-4 (1.2, 2.1)	Age-5 (1.3, 2.2)	Age-6 (1.4, 2.3)	Age-7 (1.5, 2.4)	Age-8 (1.6, 2.5)		
1986 [a]	721	0.1	9.4	50.8	30.1	9.4	0.1	25.4	737
1987 [a]	560	0.0	2.9	13.0	75.7	8.4	0.0	58.0	837
1988 [a]	464	0.0	10.6	17.7	46.8	24.6	0.4	61.2	813
1989 [a]	288	0.3	4.2	30.2	54.9	10.4	0.0	64.9	841
1990 [a]	382	0.0	24.6	23.0	49.2	3.1	0.0	46.9	765
1991 [a]	338	0.0	8.3	55.6	28.4	7.7	0.0	31.7	776
1992 [a]	463	1.9	40.8	16.2	40.6	0.4	0.0	37.8	694
1993	186	0.5	29.6	41.4	27.4	1.1	0.0	16.7	704
1994	512	0.0	2.9	43.6	51.2	2.3	0.0	45.1	791
1995	790	0.0	4.4	20.9	70.9	3.8	0.0	65.9	850
1996	515	2.1	6.2	44.3	23.5	23.9	0.0	43.9	802
1997	702	0.3	37.2	13.4	48.0	1.1	0.0	39.6	753
1998	228	0.0	4.4	72.4	18.4	4.8	0.0	41.2	748
1999	177	0.0	4.5	24.9	70.6	0.0	0.0	65.5	796
2000	467	0.2	27.0	37.9	30.6	4.3	0.0	25.9	705
2001	521	0.6	9.6	33.6	51.2	5.0	0.0	42.5	-
2002	944	0.1	29.2	29.6	38.3	2.8	0.0	31.9	724
2003	370	0.0	5.1	46.5	41.6	6.8	0.0	44.9	808
2004	239	0.0	10.9	17.2	69.0	2.9	0.0	63.2	820
2005	553	0.0	6.5	49.9	39.4	4.2	0.0	42.3	770
2006	361	0.0	12.7	45.7	40.4	1.1	0.0	46.0	768
2007 [b]	50	0.0	16.0	50.0	34.0	0.0	0.0	40.0	661
2008 [b]	36	0.0	8.3	61.1	25.0	5.6	0.0	44.4	775
2009	440	0.0	14.3	17.3	67.7	0.7	0.0	55.0	790
2010	81	0.0	13.6	54.3	29.6	2.5	0.0	30.9	719
2011	425	0.2	22.6	46.8	28.7	1.6	0.0	31.8	715
2012	197	0.5	5.1	45.7	48.7	0.0	0.0	55.8	758
2013	176	1.1	29.0	22.2	46.6	1.1	0.0	40.3	716
2014	283	1.4	3.5	83.0	11.7	0.4	0.0	32.9	714
2015	499	0.6	19.8	16.0	62.9	0.6	0.0	55.3	746
2016	368	0.0	43.8	45.9	9.8	0.5	0.0	22.8	662
Average (1986-2015)	424	0.4	14.2	36.2	44.4	4.8	0.0	44.4	765
5-yr Average (2011-2015)	316	0.8	16.0	42.7	39.7	0.7	0.0	43.2	730

Note: All values are unweighted. En dash indicates no data.

[a] Samples were from mark-recapture project.

[b] Not included in average due to small sample size.

Table 30.–Age, female percentage, and mean length (mm) of Chinook salmon that escaped past the Salcha River tower, 1985–2016.

		Percent of samples by combined age class							
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Age-8	Percent	Mean
Year	size	(1.1)	(1.2, 2.1)	(1.3, 2.2)	(1.4, 2.3)	(1.5, 2.4)	(1.6, 2.5)	female	length
1985 [a]	473	0.0	12.7	16.3	65.5	5.5	0.0	48.6	784
1986 [a]	570	0.2	12.1	43.0	29.6	15.1	0.0	34.6	771
1987 [a]	600	0.7	4.5	16.3	72.2	6.3	0.0	62.8	832
1988 [a]	495	0.4	20.2	22.6	42.0	14.7	0.0	39.6	797
1989 [a]	223	0.4	4.0	28.7	58.3	8.5	0.0	61.9	857
1990 [a]	368	0.0	19.6	23.1	49.7	7.6	0.0	46.7	811
1991 [a]	507	0.2	8.3	44.2	41.2	5.9	0.2	47.3	796
1992 [a]	626	1.3	30.8	28.4	38.5	1.0	0.0	34.3	724
1993	452	0.7	28.1	39.2	31.2	0.9	0.0	27.7	717
1994	521	0.6	2.7	39.3	52.6	4.8	0.0	44.7	806
1995	544	0.0	13.4	20.6	62.9	3.1	0.0	55.9	798
1996	412	2.7	6.1	38.3	28.4	24.5	0.0	50.7	808
1997	180	0.0	14.4	14.4	69.4	1.7	0.0	50.0	822
1998	123	2.4	4.9	72.4	17.9	2.4	0.0	30.1	709
1999	307	0.0	9.1	24.1	66.4	0.3	0.0	54.7	788
2000 [a]	41	0.0	22.0	48.8	24.4	4.9	0.0	43.9	703
2001	192	0.5	10.4	33.9	52.1	3.1	0.0	37.5	766
2002	282	0.0	36.2	13.8	38.7	11.3	0.0	34.8	737
2003	151	0.7	7.3	42.4	42.4	7.3	0.0	42.4	797
2004	228	0.0	8.8	8.3	82.0	0.9	0.0	63.2	850
2005	602	0.0	9.3	41.5	46.2	3.0	0.0	54.3	789
2006	509	0.0	5.7	49.3	43.0	2.0	0.0	43.4	777
2007	308	0.0	22.4	26.9	50.3	0.3	0.0	35.7	730
2008	303	0.7	9.9	51.8	36.0	1.7	0.0	39.3	756
2009	458	0.0	31.7	21.4	46.7	0.2	0.0	39.1	741
2010	460	0.4	23.9	56.7	17.4	1.5	0.0	32.6	713
2011	527	0.2	14.6	35.5	48.2	1.5	0.0	42.1	746
2012	418	0.2	6.0	33.0	59.1	1.7	0.0	59.8	781
2013	179	1.1	11.2	15.6	69.3	2.8	0.0	50.3	789
2014	403	1.5	14.6	59.8	22.6	1.5	0.0	32.0	732
2015	468	0.6	23.5	34.8	41.0	0.0	0.0	42.9	750
2016	473	0.0	42.3	40.8	16.7	0.2	0.0	38.9	673
Average (1985-2015)	385	0.5	14.5	33.7	46.6	4.7	0.0	44.6	773
5-yr Average (2011-2015)	399	0.7	14.0	35.8	48.0	1.5	0.0	45.4	760

Note: All values are unweighted.

[a] Samples were from mark-recapture project.

Table 31.–Age, female percentage, and mean length (mm) of summer chum salmon from the Lower Yukon River test fishery (combined Big Eddy and Middle Mouth sites) 5.5-inch mesh gillnet, 1985–2016.

		Percent of samples by age class						
Year	Sample size	Age-3 0.2	Age-4 0.3	Age-5 0.4	Age-6 0.5	Age-7 0.6	Percent female	Mean length
1985	986	0.1	61.7	37.7	0.5	0.0	51.4	583
1986	1,130	0.1	26.4	73.1	0.4	0.0	55.1	573
1987	1,197	0.6	49.3	43.4	6.8	0.0	56.5	576
1988	809	0.1	50.1	48.7	1.1	0.0	59.3	586
1989	1,120	0.0	39.4	60.1	0.5	0.0	62.0	583
1990	1,603	0.7	45.4	51.2	2.7	0.0	65.8	579
1991	1,583	0.0	44.9	54.2	0.9	0.0	55.3	571
1992	1,262	0.0	20.1	74.1	5.8	0.0	60.9	573
1993	1,772	0.1	37.9	57.4	4.6	0.0	50.4	567
1994	2,392	0.0	35.4	62.0	2.6	0.0	62.5	569
1995	2,203	0.5	44.9	49.2	5.3	0.0	58.0	576
1996	1,937	0.1	42.2	52.4	5.2	0.1	63.7	582
1997	1,972	0.1	24.6	70.9	4.4	0.0	61.0	581
1998	1,650	0.0	62.4	33.5	4.0	0.1	52.5	571
1999	1,137	0.4	47.8	50.7	1.1	0.0	49.3	574
2000	882	0.2	50.8	48.0	1.0	0.0	64.7	572
2001	738	0.0	24.7	74.1	1.2	0.0	64.8	575
2002	792	0.5	57.3	40.4	1.8	0.0	63.5	577
2003	822	0.4	78.7	18.7	2.2	0.0	54.4	570
2004	522	3.1	40.4	56.5	0.0	0.0	65.9	572
2005	754	0.1	89.8	9.9	0.1	0.0	54.4	569
2006	859	0.3	27.2	72.3	0.1	0.0	58.9	572
2007 [a]	91	0.0	42.9	47.3	9.9	0.0	65.9	558
2008 [b]	784	0.0	41.2	53.7	5.1	0.0	55.4	571
2009	1,042	1.2	48.8	47.9	1.8	0.2	54.3	573
2010	1,209	3.7	64.8	29.9	1.5	0.0	56.7	563
2011	1,493	0.1	44.1	55.5	0.4	0.0	63.2	568
2012	1,576	0.0	68.7	25.9	5.4	0.0	56.7	556
2013	1,180	0.0	44.8	53.4	1.7	0.1	50.3	566
2014	1,580	0.2	26.1	68.5	5.3	0.0	54.9	571
2015	856	1.5	38.2	59.0	1.3	0.0	53.3	563
2016	910	0.9	63.3	33.1	2.7	0.0	59.8	555
Average [c] (1987-1988, 1990-2006, 2009-2015)	1,301	0.5	46.5	50.3	2.6	0.0	58.1	572
5-yr Average (2011-2015)	1,337	0.4	44.4	52.4	2.8	0.0	55.7	565

Note: The Lower Yukon River test fishery was conducted from the end of May through July 15. Before 1998, this test fishery was often discontinuous or was not conducted throughout the season.

[a] One set gillnet was operated at Big Eddy only.

[b] Two drift gillnets were operated at Big Eddy and one drift gillnet was operated at Middle Mouth.

[c] Years used for average only include years when samples were collected throughout the season and include samples with a 30-day season minimum. Average was not weighted by number of fish sampled each year.

Table 32.–Age, female percentage, and mean length (mm) of summer chum salmon from the commercial fishery in Districts 1 and 2, 1985–2016.

		Percent of samples by age class						
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Percent	Mean
Year	size	0.2	0.3	0.4	0.5	0.6	female	length
1985	1,392	0.4	68.3	30.6	0.7	0.0	44.1	582
1986	2,614	0.1	29.4	69.2	1.4	0.0	48.9	586
1987	1,596	0.1	50.5	39.6	9.8	0.0	44.2	583
1988	2,618	0.1	73.8	24.9	1.2	0.0	45.2	586
1989	1,564	0.1	36.3	63.0	0.6	0.0	43.3	593
1990	666	0.6	38.0	58.9	2.6	0.0	44.4	595
1991	1,034	0.0	39.6	59.5	0.9	0.1	36.3	580
1992	1,155	0.0	21.8	73.5	4.7	0.0	49.8	579
1993	1,067	0.2	38.0	54.6	7.2	0.0	49.5	572
1994	938	0.0	32.9	63.8	3.3	0.0	52.0	577
1995	1,661	0.5	36.4	56.1	7.0	0.1	49.4	574
1996	829	0.0	40.7	55.0	4.1	0.2	49.1	595
1997	1,192	0.3	20.9	73.6	5.3	0.0	43.2	589
1998	667	0.1	62.8	33.3	3.7	0.0	39.7	576
1999	668	0.1	44.3	54.3	1.2	0.0	44.8	585
2000	290	0.0	54.1	43.4	2.4	0.0	41.4	587
2001	–	–	–	–	–	–	–	–
2002	352	0.3	55.1	40.9	3.7	0.0	41.8	590
2003	289	0.3	61.2	33.6	4.8	0.0	37.0	592
2004	818	4.3	42.5	52.8	0.4	0.0	45.2	587
2005	621	0.3	86.8	11.1	1.8	0.0	46.5	576
2006	734	0.3	24.5	75.1	0.1	0.0	46.7	585
2007	1881	0.0	32.6	50.3	17.0	0.1	50.3	578
2008	948	0.2	36.9	56.1	6.6	0.1	53.1	577
2009	954	1.4	49.2	47.4	2.0	0.1	48.6	572
2010	1,259	4.6	66.3	28.1	1.0	0.0	44.6	572
2011	1,728	0.2	53.0	46.3	0.6	0.0	40.9	572
2012	787	0.1	70.8	23.8	5.3	0.0	49.2	558
2013	1,729	0.0	44.4	53.3	2.2	0.1	45.4	558
2014	1,096	0.3	32.6	62.5	4.6	0.1	52.6	562
2015	1,108	1.4	40.8	56.0	1.8	0.0	45.4	551
2016	1,006	0.6	63.1	32.9	3.4	0.0	42.3	552
Average (1985-2015)	1,142	0.5	46.1	49.7	3.6	0.0	45.8	579
5-yr Average (2011-2015)	1,290	0.4	48.3	48.4	2.9	0.0	46.7	560

Note: All values are unweighted. En dash indicates no data.

Table 33.–Age, female percentage, and mean length (mm) of summer chum salmon from the commercial fishery in District 6, 1985–2016.

		Percent of samples by age class						
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Percent	Mean
Year	size	0.2	0.3	0.4	0.5	0.6	female	length
1985	461	1.3	77.0	19.7	2.0	0.0	70.1	574
1986	504	0.4	38.3	59.3	2.0	0.0	57.6	584
1987	259	4.2	51.4	34.7	9.7	0.0	53.8	585
1988	1,615	0.1	45.8	53.1	1.1	0.0	57.1	592
1989	544	0.7	64.7	34.0	0.6	0.0	42.9	603
1990	693	1.7	71.1	26.7	0.4	0.0	56.2	592
1991	887	13.2	74.6	12.1	0.0	0.0	38.4	579
1992	155	0.6	59.4	36.1	3.9	0.0	14.4	600
1993	48	6.3	77.1	12.5	4.2	0.0	58.2	569
1994	245	0.4	67.8	31.8	0.0	0.0	57.8	561
1995	132	0.0	50.0	49.2	0.8	0.0	51.2	580
1996	–	–	–	–	–	–	–	–
1997	10	0.0	0.0	100.0	0.0	0.0	50.0	615
1998	–	–	–	–	–	–	–	–
1999	–	–	–	–	–	–	–	–
2000	–	–	–	–	–	–	–	–
2001	–	–	–	–	–	–	–	–
2002	97	0.0	54.6	42.3	3.1	0.0	50.0	594
2003	296	0.0	70.3	26.0	3.7	0.0	55.0	588
2004	614	0.2	44.0	55.4	0.5	0.0	53.4	596
2005	618	0.0	95.6	4.4	0.0	0.0	48.3	590
2006	1,112	0.4	27.5	72.1	0.0	0.0	53.5	581
2007	1,062	0.7	67.2	30.0	2.1	0.0	54.3	577
2008	45	0.0	60.0	37.8	2.2	0.0	31.6	602
2009	679	3.7	70.5	24.4	1.2	0.1	59.2	567
2010	579	9.5	62.0	28.3	0.2	0.0	50.0	571
2011	366	1.1	47.5	51.4	0.0	0.0	37.6	589
2012	212	1.4	70.3	26.9	1.4	0.0	62.3	558
2013	407	0.0	58.5	41.3	0.2	0.0	58.2	559
2014	302	1.0	52.0	46.4	0.7	0.0	51.9	589
2015	130	0.0	33.8	64.6	1.5	0.0	53.1	586
2016	480 [a]	–	–	–	–	–	50.0	569
Average (1985-2015)	464	1.8	57.3	39.3	1.6	0.0	51.0	584
5-yr Average (2011-2015)	283	0.7	52.4	46.1	0.8	0.0	52.6	576

Note: All values are unweighted. En dash indicates no data.

[a] Sample size refers to the number of fish that were measured for length and where sex was identified. No age data was collected in 2016.

Table 34.–Age, female percentage, and mean length (mm) of summer chum salmon from the East Fork Andreafsky River weir, 1985–2016.

		Percent of samples by age class						
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Percent	Mean
Year	size	0.2	0.3	0.4	0.5	0.6	female	length
1985 [a]	537	2.0	72.1	25.7	0.2	0.0	58.10056	540
1986	775	0.3	60.9	37.2	1.7	0.0	55.4	567
1987	362	0.8	28.7	66.6	3.9	0.0	58.6	572
1988	524	2.5	71.6	23.3	2.5	0.2	49.4	574
1989 [a]	48	0.0	33.3	64.6	2.1	0.0	16.7	581
1990 [a]	108	0.0	92.6	7.4	0.0	0.0	54.6	525
1991 [a]	62	0.0	51.6	48.4	0.0	0.0	58.1	530
1992 [a]	1	0.0	100.0	0.0	0.0	0.0	0.0	565
1993 [a]	179	1.1	64.8	33.0	1.1	0.0	49.2	540
1994	733	0.0	68.9	30.0	1.1	0.0	65.2	530
1995	833	0.7	44.8	52.1	2.4	0.0	48.9	542
1996	1,277	0.5	58.1	35.4	6.0	0.0	51.4	560
1997	1,403	0.0	27.6	66.6	5.8	0.0	56.8	554
1998	888	0.5	81.8	15.5	2.3	0.0	56.3	543
1999	839	1.2	26.9	69.2	2.6	0.0	56.4	563
2000	631	0.2	52.9	43.9	3.0	0.0	48.3	555
2001	102	0.0	19.6	78.4	2.0	0.0	52.0	570
2002	772	0.9	83.5	12.2	3.0	0.4	54.3	553
2003	1,119	0.6	75.2	23.3	0.8	0.0	49.5	545
2004	703	10.8	69.0	20.1	0.1	0.0	52.9	541
2005	658	0.0	94.1	5.8	0.2	0.0	41.8	570
2006	658	0.9	40.6	58.4	0.2	0.0	54.0	542
2007	805	1.4	70.6	22.1	6.0	0.0	44.2	538
2008	746	0.0	16.4	80.6	3.1	0.0	48.4	558
2009	716	8.4	35.1	40.1	16.1	0.4	41.5	556
2010	832	6.0	88.9	4.7	0.4	0.0	53.0	542
2011	944	0.4	39.1	60.2	0.3	0.0	44.8	555
2012	606	0.5	72.4	23.6	3.5	0.0	50.0	540
2013	616	0.0	29.4	70.0	0.6	0.0	51.6	542
2014	592	0.8	63.2	24.8	11.1	0.0	33.8	544
2015	946	1.5	36.9	61.2	0.4	0.0	37.1	553
2016	834	0.8	71.7	25.9	1.6	0.0	47.1	532
Average (1985-1988, 1994-2015)	755	1.6	54.9	40.4	3.0	0.0	50.5	552
5-yr Average (2011-2015)	741	0.6	48.2	48.0	3.2	0.0	43.5	547

Note: All values are unweighted.

[a] Samples are from ancillary ASL collections.

Table 35.–Age, female percentage, and mean length (mm) of summer chum salmon from the Anvik River sonar, 1985–2016.

		Percent of samples by age class						
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Percent	Mean
Year	size	0.2	0.3	0.4	0.5	0.6	female	length
1985	527	2.1	75.3	22.2	0.4	0.0	56.4	565
1986	486	0.4	30.5	67.7	1.4	0.0	57.8	574
1987	545	1.8	66.6	28.6	2.9	0.0	64.7	568
1988	533	0.8	77.3	21.4	0.6	0.0	66.0	572
1989	593	1.5	40.1	58.2	0.2	0.0	66.3	579
1990	-	-	-	-	-	-	-	–
1991	549	0.0	45.2	54.5	0.4	0.0	56.8	572
1992	277	0.0	37.2	60.6	2.2	0.0	44.0	559
1993	548	0.7	62.6	34.1	2.6	0.0	52.8	570
1994	560	0.0	37.0	61.8	1.3	0.0	56.8	560
1995	616	4.1	57.1	35.6	3.2	0.0	38.5	577
1996	615	0.5	55.4	42.3	1.8	0.0	59.6	573
1997	611	0.5	43.7	54.2	1.6	0.0	57.6	569
1998	494	0.0	78.1	20.4	1.4	0.0	59.5	563
1999	462	0.0	37.4	61.3	1.3	0.0	58.2	579
2000	376	0.8	74.7	22.9	1.6	0.0	61.9	548
2001	538	0.2	13.6	84.2	2.0	0.0	55.1	581
2002	470	1.9	76.2	20.0	1.9	0.0	59.7	565
2003	584	1.5	72.6	24.5	1.4	0.0	54.6	558
2004	559	3.2	41.5	54.7	0.5	0.0	54.0	569
2005	600	0.0	95.3	3.8	0.8	0.0	47.9	564
2006	482	1.2	40.0	58.7	0.0	0.0	52.5	563
2007	569	1.1	60.1	30.1	8.8	0.0	57.7	559
2008	533	1.7	44.7	49.7	3.9	0.0	54.7	569
2009	338	2.7	60.7	32.5	4.1	0.0	57.4	563
2010	572	8.9	83.2	7.9	0.0	0.0	58.8	550
2011	509	0.4	47.9	50.9	0.8	0.0	51.2	567
2012	422	0.7	65.9	29.9	3.6	0.0	56.6	560
2013	582	0.0	27.7	71.0	1.4	0.0	51.6	578
2014	152	0.0	42.8	49.3	7.9	0.0	55.7	576
2015	639	2.8	41.3	54.6	1.3	0.0	57.6	555
2016	675	1.5	73.2	23.9	1.5	0.0	62.8	550
Average (1985-2015)	517	1.3	54.4	42.3	2.0	0.0	56.3	566
5-yr Average (2011-2015)	461	0.8	45.1	51.1	3.0	0.0	54.5	567

Note: All values are unweighted. En dash indicates no data.

Table 36.–Age, female percentage, and mean length (mm) of summer chum salmon from the Gisasa River weir, 1995–2016.

		Percent of samples by age class						
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Percent	Mean
Year	size	0.2	0.3	0.4	0.5	0.6	female	length
1995	632	0.9	72.9	25.3	0.8	0.0	46.5	558
1996	765	0.0	42.9	49.7	7.3	0.1	50.8	565
1997	184	0.0	7.1	78.3	14.7	0.0	49.1	579
1998	776	0.0	49.9	41.4	8.8	0.0	46.4	560
1999	739	0.1	44.1	53.9	1.9	0.0	51.6	560
2000	831	0.0	36.1	60.6	3.2	0.0	49.1	571
2001	583	0.2	21.3	73.1	5.5	0.0	50.2	563
2002	777	0.6	60.1	36.8	2.4	0.0	47.7	557
2003	703	0.6	70.1	27.9	1.4	0.0	44.9	577
2004	724	7.6	75.4	17.0	0.0	0.0	48.8	571
2005	619	0.0	98.2	1.8	0.0	0.0	46.2	563
2006	496	0.4	15.3	84.3	0.0	0.0	56.6	550
2007	580	2.6	55.3	35.7	6.4	0.0	58.6	555
2008	659	0.3	28.1	64.5	7.1	0.0	48.5	561
2009	619	3.1	62.2	32.8	1.9	0.0	55.2	561
2010	950	13.6	63.9	21.2	1.4	0.0	55.8	550
2011	846	1.2	50.6	48.1	0.1	0.0	52.2	560
2012	687	0.1	76.3	21.1	2.5	0.0	50.2	549
2013	711	0.0	46.0	53.2	0.8	0.0	57.9	555
2014	249	1.6	47.8	47.0	3.6	0.0	50.5	562
2015	1,110	2.3	32.4	64.6	0.7	0.0	54.6	551
2016	964	0.9	57.2	38.9	3.0	0.0	54.4	549
Average (1995-2015)	691	1.7	50.3	44.7	3.4	0.0	51.0	560
5-yr Average (2011-2015)	721	1.0	50.6	46.8	1.5	0.0	53.1	555

Note: All values are unweighted.

Table 37.–Age, female percentage, and mean length (mm) of summer chum salmon from the Henshaw Creek weir, 2000–2016.

		Percent of samples by age class						
	Sample	Age-3	Age-4	Age-5	Age-6	Age-7	Percent	Mean
Year	size	0.2	0.3	0.4	0.5	0.6	female	length
2000	517	0.8	58.0	41.0	0.2	0.0	64.4	548
2001	626	0.2	33.9	63.6	2.4	0.0	65.8	560
2002	693	0.1	15.7	80.1	4.0	0.0	60.6	571
2003	696	1.1	85.9	8.5	4.5	0.0	51.9	555
2004	772	7.4	85.5	7.1	0.0	0.0	54.5	551
2005	693	0.0	97.3	2.7	0.0	0.0	43.1	560
2006	–	–	–	–	–	–	–	–
2007	540	1.9	59.3	36.5	2.4	0.0	45.4	550
2008	646	4.0	72.4	19.2	4.3	0.0	48.1	550
2009	483	4.1	77.2	18.6	0.0	0.0	58.0	554
2010	562	10.3	67.6	21.9	0.2	0.0	52.7	549
2011	580	2.8	46.0	51.2	0.0	0.0	61.6	552
2012	478	0.8	85.6	12.1	1.5	0.0	54.2	550
2013	477	0.0	71.1	28.7	0.2	0.0	61.6	541
2014	–	–	–	–	–	–	–	–
2015	805	3.2	31.8	63.9	1.1	0.0	58.5	558
2016	668	0.3	69.5	29.0	1.2	0.0	57.2	550
Average (2000-2015)	616	2.6	63.4	32.5	1.5	0.0	55.7	553
5-yr Average (2011-2015)	585	1.7	58.6	39.0	0.7	0.0	59.0	550

Note: All values are unweighted. En dash indicates no data.

Table 38.–First and last year sampled, and total number of years for which age, sex, length data was collected for Chinook salmon and archived within the Arctic Yukon Kuskokwim Database Management System.

Project Name	First Year Sampled	Last Year Sampled	Years of Data
Commercial			
Y1 District	1961	2015	51
Y2 District	1961	2012	33
Y3 District	1983	2006	4
Y4 District	1971	2003	27
Y5 District	1966	2007	33
Y5 District	2010	2010	1
Y6 District	1964	2009	32
Subsistence			
Yukon River Subsistence	1960	2016	38
Rapids Research Center	2012	2012	1
Sport			
Anvik River Ancillary ASL	2010	2010	1
Test Fishing			
Dall Point	2009	2011	3
Dogfish Village (Community)	1968	2004	3
Eagle (Sonar)	2005	2016	12
Fish Village (Community)	1982	1983	2
Hooper Bay (Community)	2002	2002	1
Stink Creek	1982	1985	4
Kaltag (Community)	2002	2002	1
Lower Yukon Test Fishing	1965	2016	51
Marshall (Community)	1999	2008	8
Mountain Village (Community)	2010	2012	3
Ohogamiut (Community)	1968	1971	3
Paimiut (Community)	1968	1970	2
Pilot Station Sonar	1998	2016	19
Rapids Research Center	2011	2013	3
Ruby (Community)	1983	1986	3
Tanana River	1991	1993	3
Escapement			
Andreafsky River (East Fork) Ancillary ASL	1980	2011	17
Andreafsky River (East Fork) Escapement	1984	2016	28
Andreafsky River (East Fork) Escapement	1983	2009	3
Andreafsky River (West Fork) Ancillary ASL	1967	1995	16
Anvik River Ancillary ASL	1967	2012	36
Anvik River Escapement	1982	2016	17
Barton Creek Ancillary ASL	1990	1990	1
Beaver Creek Ancillary ASL	2000	2000	1
Beaver Creek Escapement	2001	2001	1
Chandalar River Ancillary ASL	1987	1987	1
Chatanika River Ancillary ASL	1991	2002	9
Chena River Ancillary ASL	1975	2016	38

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Project Name	First Year Sampled	Last Year Sampled	Years of Data
Escapement			
Chena River Escapement	1990	1990	1
Chulinak River Ancillary ASL	1989	1989	1
Clear Creek Hatchery Escapement	1985	1987	3
Gisasa River Ancillary ASL	1982	1988	3
Gisasa River Escapement	1989	2016	23
Goodpaster River Ancillary ASL	1990	2007	5
Henshaw Creek Ancillary ASL	1987	1987	1
Henshaw Creek Escapement	2000	2016	15
Jim River Ancillary ASL	1986	1987	2
Kateel River Escapement	2002	2002	1
Koyukuk River Ancillary ASL	1986	1988	3
Koyukuk River Escapement	1996	1997	2
Nulato River Ancillary ASL	1980	2012	8
Nulato River Escapement	1994	1999	4
Salcha River Ancillary ASL	1966	2016	48
Sheenjek River Escapement	2006	2006	1
Stevens Village Ancillary ASL	1970	1970	1
Tanana River Ancillary ASL	2004	2004	1
Tanana River Escapement	2014	2014	1
Tozitna River Ancillary ASL	2001	2001	1
Tozitna River Escapement	1989	2009	9
Telemetry			
Russian Mission Mark/Recapture	2000	2004	5
Pitkas Point Acoustic Tagging	2011	2012	2

Note: Data collection methods; i.e., protocols followed to measure length, identify sex, and collect and analyze age data, have changed through time at most projects and caution should be used when comparing ASL data between years and projects.

Table 39.–First and last year sampled, and total number of years for which age, sex, length data was collected for summer chum salmon and archived within the Arctic Yukon Kuskokwim Database Management System.

Project Name	First Year Sampled	Last Year Sampled	Years of Data
Commercial Catch			
Y1 District	1964	2016	51
Y2 District	1973	2011	25
Y3 District	1996	2006	2
Y4 District	1974	2014	32
Y5 District	1970	2006	8
Y6 District	1970	2016	39
Kaltag River	1996	1996	1
Subsistence			
Yukon River Subsistence	1964	2010	34
Test Fishing			
Alakanuk (Community)	1967	1967	1
Anvik River	1990	1990	1
Dall Point	2009	2012	4
Dogfish Village (Community)	1968	1968	1
Hooper Bay (Community)	2002	2002	1
Innoko River	1987	1987	1
Stink Creek	1981	1985	5
Kaltag (Community)	2002	2008	7
Ohogamiut (Community)	1968	1971	3
Paimiut (Community	1968	1970	2
Pilot Station (Sonar)	1986	1993	3
Lower Yukon	1964	2016	52
Ruby (Community)	1984	1984	1
Tanana River	1984	1991	3
Escapement			
Andreafsky River (East Fork) Ancillary ASL	1967	1993	10
Andreafsky River (East Fork) Escapement	1982	2016	29
Andreafsky River (West Fork) Ancillary ASL	1967	1993	8
Anvik River Ancillary ASL	1967	1993	14
Anvik River Escapement	1982	2016	34
Chatanika River Ancillary ASL	1987	1987	1
Chena River Ancillary ASL	1974	1997	6
Chulinak River Ancillary ASL	1989	1989	1
Clear Creek Escapement	2004	2005	2
Clear Creek Hatchery Escapement	1995	2003	7
Gisasa River Ancillary ASL	1982	1988	3
Gisasa River Escapement	1989	2016	23
Henshaw Creek Escapement	2000	2016	15
Kaltag River Escapement	1995	1995	1
Kateel River Escapement	2002	2002	1
Koyukuk River Escapement	1996	1996	1
Melozitna River Ancillary ASL	1981	1981	1

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Project Name	First Year Sampled	Last Year Sampled	Years of Data
Escapement			
Melozitna River Escapement	1982	1989	2
Nulato River Ancillary ASL	1987	1998	3
Nulato River Escapement	1994	2003	8
Rodo River Ancillary ASL	1989	1989	1
Salcha River Ancillary ASL	1974	2016	14
Tozitna River Ancillary ASL	2001	2001	1
Tozitna River Escapement	1989	2009	9
Telemetry			
Russian Mission Mark/Recapture	2004	2004	1

Note: Data collection methods; i.e., protocols followed to measure length, identify sex, and collect and analyze age data, have changed through time at most projects and caution should be used when comparing ASL data between years and projects.

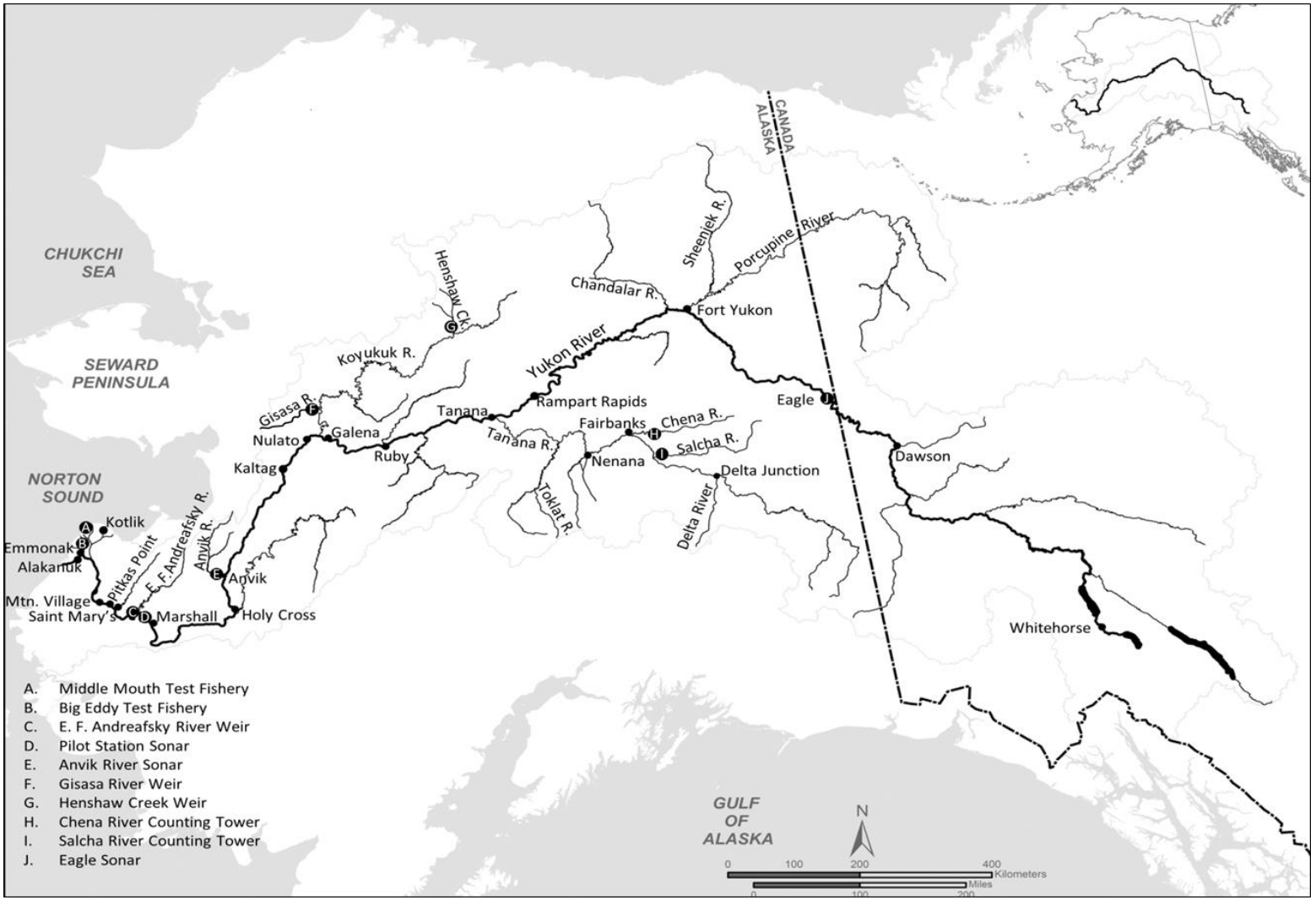

Figure 1.–Map of the Yukon River area showing the locations of major towns and summer season salmon monitoring and assessment projects.

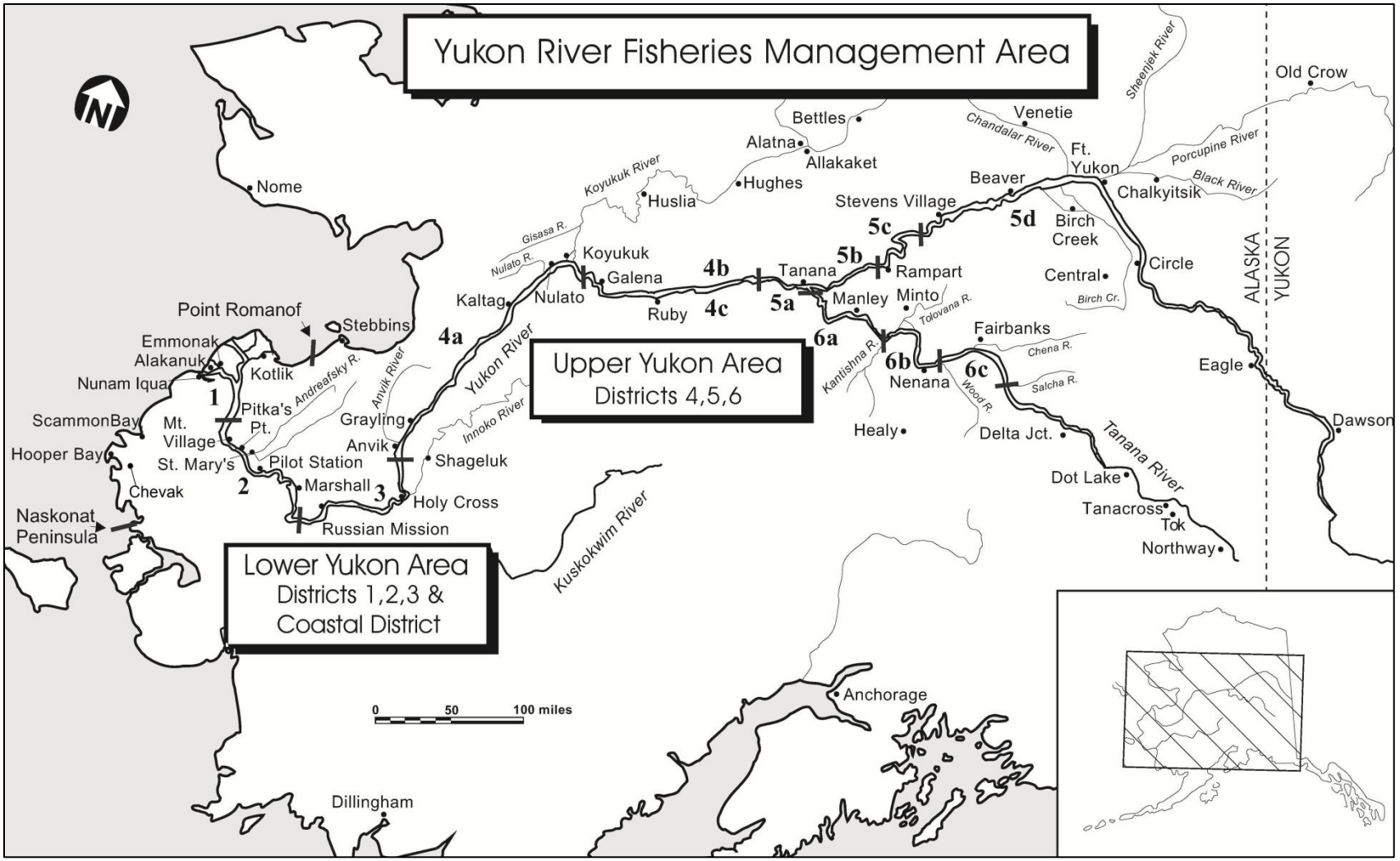

Figure 2.–Map of the Yukon River area showing the fishery management districts and subdistricts.

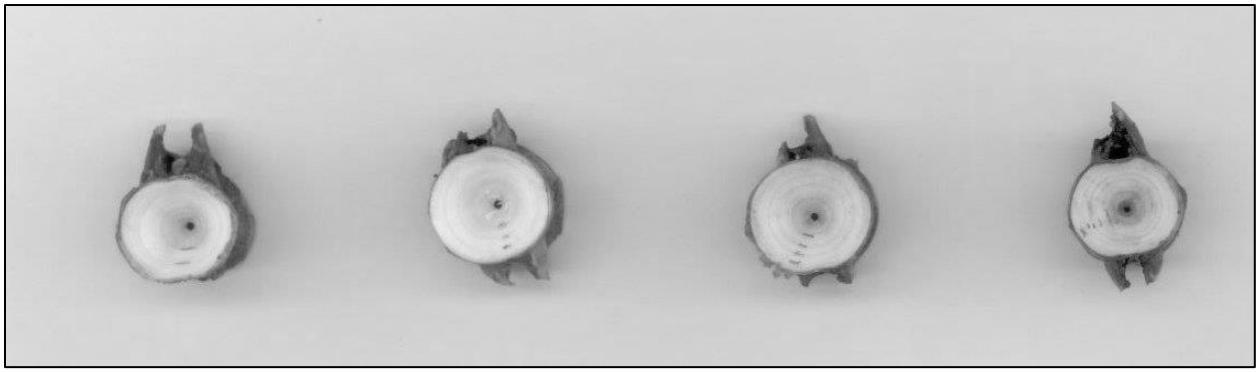

Figure 3.–Summer chum salmon vertebrae prepared for inspection under a dissecting scope.