Fishery Data Series No. 15-16

Origins of Chinook Salmon in the Yukon River Fisheries, 2012

by

Larry DuBois

June 2015

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

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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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June 2015

This investigation was financed in part by USFWS through Yukon River Salmon Agreement Treaty Implementation funds under Agreement No. 701815G339.

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This document should be cited as:
DuBois, L. 2015. Origins of Chinook salmon in the Yukon River fisheries, 2012. Alaska Department of Fish and Game, Fishery Data Series No. 15-16, Anchorage.

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ABSTRACT

The stock and age composition of Chinook salmon *Oncorhynchus tshawytscha* harvest within the Yukon River drainage was estimated for 2012. Stock composition was estimated by genetic analysis for 3 geographically-based stock groups termed Lower, Middle, and Upper. Stock composition estimates from sampled fish were applied to specific harvests across all age classes. Ages of sampled fish were determined from scales; age composition was estimated from the sample proportions in each age class. Age composition estimates were applied to specific harvests across all stock groups. The total estimated Yukon River harvest in 2012 was 30,927 Chinook salmon; of these, 13.3% were estimated to be of Lower, 34.8% Middle, and 51.9% Upper stock group origin. On average over all harvests, age-1.3 fish dominated the harvest at 52.5%, age-1.4 fish were 36.6%, age-1.2 fish were 7.2%, and other age classes combined were 3.5% of the total.

Key words: Chinook salmon, *Oncorhynchus tshawytscha*, harvest, genetic stock composition, stock composition, stock group, age composition, age-1.4, age-1.3, age-1.2, Yukon River.

INTRODUCTION

The Yukon River drains roughly 330,000 square miles, originates in northern British Columbia, and flows 2,300 river miles (rm) to its terminus at the Bering Sea (Estensen et al. 2013; Figures 1 and 2). Chinook salmon *Oncorhynchus tshawytscha* spawn in major tributaries throughout the drainage. Yukon River Chinook salmon are harvested annually in various fisheries in both marine and fresh waters. Within the Yukon River, returning adult salmon are harvested in subsistence and personal use fisheries in Alaska, aboriginal and domestic fisheries in Canada, and commercial, test, and sport fisheries in Alaska and Canada. Sport fisheries, a very minor component of harvest overall, primarily occur in lower river tributaries, Tanana River tributaries, and in Canada. The average annual harvest of Chinook salmon within the Yukon River drainage from 2002 through 2011 was 79,907 fish; harvests within Alaska averaged 72,735 fish (JTC 2013).

In 2002, the Yukon River Salmon Agreement was signed as part of the Pacific Salmon Treaty (hereafter referred to as Treaty), whereby the U.S. and Canada agreed to harvest sharing of Chinook salmon that migrate through Alaska waters and spawn in the Yukon Territory and British Columbia. Since 1985, both nations have been engaged in the cooperative management and conservation of stocks spawning in Canada (JTC 2013). Stock composition estimates of harvests in Alaska provide valuable information for management and conservation of Chinook salmon throughout the Yukon River drainage, and aid in fulfillment of Treaty objectives.

Since 1981, the Alaska Department of Fish and Game (ADF&G) has estimated the stock and age composition of Chinook salmon harvests in the Yukon River. Stock and age compositions of harvests are needed to construct brood tables, which enable run reconstructions necessary for scientifically based escapement goals and forecasts of future runs. Understanding the relative contribution of Canadian-origin fish to Alaskan harvests is of foremost importance in conservation and management of this stock group and meeting Treaty objectives.

Scale pattern analysis was used to differentiate stock of origin for Chinook salmon harvested in the Yukon River from 1981 to 2003 (e.g., DuBois 2005). Lingnau and Bromaghin (1999) identified Lower, Middle, and Upper Yukon River stock groups using unique scale signatures for these groups. The Lower stock group included Alaska tributary streams from the Andreafsky River to near the confluence with the Tanana River and the lower Koyukuk River drainage. The Middle stock group included Alaska tributary streams upstream from the Tanana River confluence, and the upper Koyukuk and Tanana river drainages. The Upper stock group consisted of Canadian-origin fish.

Based on surveys of genetic variation among Chinook salmon populations in the Yukon River drainage, a baseline of genetic information was completed and used for genetic stock identification using allozyme loci (Beacham et al. 1989; Wilmot et al. 1992; Templin et al. 2005). Subsequently, 2 types of genetic markers, single nucleotide polymorphisms (SNPs) and microsatellites were investigated to provide a replacement for the allozyme baseline. With the exception of 2005, when microsatellite markers were used, SNPs have been used from 2004 through 2012 for stock composition of Yukon River Chinook salmon. The 3 broad scale reporting groups from genetic analysis are consistent with the 3 groups from scale pattern analysis.

This report presents stock and age class components of Chinook salmon harvest in the Yukon River drainage. To accomplish this, genetic stock and age class compositions were determined from samples representative of specific harvests by district, subdistrict, village, or other specific location, and fishery. Stock composition estimates were based on genetic analysis of SNPs from fish in harvest samples. Ages were determined from scales of individual fish in harvest samples. Estimated stock and age class proportions were applied to location and fishery specific harvest estimates, and then estimates of total harvest by each stock and age class were produced by summing across locations and fisheries. Subsistence harvest estimates were obtained from the Yukon area postseason subsistence survey, which specifies harvest by species, village, and district (Deena Jallen, Commercial Fisheries Biologist, ADF&G, Fairbanks; personal communication). Commercial (Hayes and Newland 2012) and sport (Burr 2014) fishery harvests were from ADF&G sources. The resulting stock and age composition of the 2012 Chinook salmon harvest is the focus of this report.

OBJECTIVES

The objectives of this project are to estimate the total Yukon River Chinook salmon harvest by 1) stock group and 2) age class, for the 2012 season.

STUDY AREA

Within the Alaska portion of the drainage, the Yukon River is split into 6 fishing districts for management, Y-1 through Y-6, numbered sequentially progressing from the river mouth (Y-1) to the Canadian border (Y-5), and Tanana River (Y-6; Figure 1). Commercial fisheries primarily occur in Districts 1 and 2; however, they are occasionally executed in Districts 4 and 6. Subsistence fishing occurs throughout the river and major tributaries. Test fisheries occur in District 1 near Emmonak, District 2 near Pilot Station, and District 5 near Eagle. Sport fisheries occur in lower river tributaries (e.g., Anvik and Andreafsky rivers) and Tanana River tributaries (e.g., Chena, Salcha, and Goodpaster rivers).

METHODS

SAMPLING

Chinook salmon were sampled for age (from scales) and stock group (from genetic material) along the mainstem Yukon River from subsistence, incidental commercial, and test fisheries. Subsistence harvest age and genetic material were collected by fishermen (Molyneaux and Stockdale 2013; Drobny 2013). Subsistence and incidental commercial sampling was opportunistic, where every fish available was sampled. Test fisheries operated by ADF&G sampled up to 30 fish each day. Chinook salmon were sampled for age only from non-mainstem locations.

Genetic Collection, Processing, and Analysis

Tissue samples for genetic analyses were typically collected concurrent with scale samples from mainstem Yukon River locations. However, at Tanana and Rampart Rapids, only genetic samples were collected. An axillary process tissue was collected using clippers or scissors; approximately three-quarter inch was removed and put into an individually numbered 2 ml vial filled with denatured ethanol. Some locations put all tissues into 1 bulk bottle. These vials or bottles were shipped to the ADF&G Gene Conservation Laboratory for processing.

Stock composition estimates for 3 broad scale stock reporting groups were generated from the harvest samples by location, and temporally from the Pilot Station test fishery to provide estimates for successive portions of the run. Fishery managers determined these strata dates based on run timing, sample sizes, and fish pulses. Genetic processing techniques and analytical methodology similar to DeCovich and Howard (2011) was used. For this report, Lower Yukon, Middle Yukon, and Canada stock reporting groups from the ADF&G Gene Conservation Laboratory are referred to as Lower, Middle, and Upper stock groups.

Scale Collection, Processing, and Aging

Scales were removed from the preferred area of the fish for age determination and mounted on gum cards (INPFC 1963). Three scales were collected from each Chinook salmon to allow for the incidence of regenerated scales. Scales were impressed in cellulose acetate using methods described by Clutter and Whitesel (1956); impressions were magnified and examined in a Microfiche reader. Age was determined by counting the number of freshwater and marine annuli, the regions of the scale where the circuli, or rings, are tightly spaced and represent slower growth rates associated with winter conditions (Mosher 1969). Ages were recorded using European notation: number of freshwater annuli separated by a decimal from 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.

SAMPLING LOCATIONS

In District 1, Chinook salmon from incidental commercial and subsistence fisheries were sampled for scales and genetic tissue. Incidental commercial samples were obtained from Chinook salmon caught during the directed summer chum salmon fishery, in which nets were restricted to 6.0 in or less mesh size. Chinook salmon from subsistence harvests from the villages of Alakanuk, Emmonak, and Kotlik were sampled. Daily sampling for age only was conducted from catches in the Lower Yukon test fishery (LYTF) at the Big Eddy and Middle Mouth sites (Appendix A1 and Table 1).

In District 2, Chinook salmon from incidental commercial, subsistence, and test fisheries were sampled for scales and genetic tissue. The subsistence harvest from Mountain Village, St. Mary's and Marshall were sampled. Daily sampling was also conducted from catches in the Mountain Village test fishery (MVTF) and the Pilot Station sonar test fishery (Appendix A1 and Table 1). Chinook salmon from the East Fork Andreafsky River escapement were sampled for age (Appendix A1).

In District 4, Chinook salmon from subsistence harvests from the villages of Anvik, Kaltag, Galena, and Ruby were sampled for scales and genetic tissue (Appendix A1 and Table 1). Escapement samples from the Anvik River, Gisasa River, and Henshaw Creek were sampled for age (Appendix A1).

In District 5, Chinook salmon from the Fort Yukon subsistence harvest were sampled for scales and genetic tissue (Appendix A1 and Table 1). Subsistence harvests from Tanana and Rampart Rapids were sampled for genetic tissue (Table 1). Daily sampling for age only was conducted from the Eagle sonar test fishery (Appendix A1).

In District 6, age samples were collected from escapements in the Chena and Salcha rivers (Appendix A1). These 2 rivers are the largest producers of Chinook salmon in the Tanana River drainage. Chinook salmon abundance in these 2 rivers was estimated by tower counts and aerial surveys. Age data were collected from carcass samples.

ESTIMATION METHODS

Harvest samples for genetic and age data from specific locations were used to estimate stock and age composition of the harvests represented by those locations. Stock and age composition of harvests not sampled were estimated from other sampled harvests or test fishery catches that were presumed similar. Stock and age estimates may be applied to the harvest from an individual village, but typically stock and age estimates from several locations were combined and applied to the subsistence harvest of several villages. The ADF&G Gene Conservation Laboratory combined stock composition estimates from subsistence harvests in District 1 (Alakanuk, Emmonak, and Kotlik); District 2 (Mountain Village, St. Mary's, and Marshall), District 4 (Anvik, Kaltag, Galena, and Ruby); and District 5 (Rampart Rapids and Fort Yukon, Table 1). Stock composition estimates for 3 strata from Pilot Station test fishery were averaged; weighting stock proportions by number of samples in each stratum. Ages for 2 or more sampling locations were combined by pooling ages of all samples from contributing locations and deriving an age composition of the pooled set (Appendix A1 and Table 2). Subsistence harvests by village, or groups of villages, were summed to obtain districtwide estimates by stock and age class (Appendix A2 and Table 3). Subsistence harvest estimates included test fishery catches donated to subsistence; therefore, stock and age estimates from test fisheries were used to represent portions of the subsistence harvests.

In District 1, 3 estimates were summed for the subsistence harvest total by age and stock (Appendix A2). Age and genetic samples from the District 1 subsistence harvest, age and genetic samples from the incidental commercial harvest, age samples from LYTF catches, and genetic samples from MVTF catches were used to apportion harvests. Samples from Alakanuk, Emmonak, and Kotlik were assumed to represent the subsistence harvest. Age samples from LYTF catches and genetic samples from MVTF catches were assumed to represent the LYTF harvest (which was subsequently donated to subsistence users).

In District 2, 4 estimates were summed for the subsistence harvest total by age and stock (Appendix A2). Age and genetic samples from the incidental commercial harvest, District 2 subsistence, MVTF catches, and Pilot Station test fishery were used to apportion harvests. Samples from the incidental commercial harvest (mostly from District 1) were assumed to represent the incidental commercial harvest in District 2. Samples from Marshall, Mountain Village, and St Mary's subsistence harvest represent the subsistence harvest. Samples from MVTF and Pilot Station test fishery represent harvests from these test fisheries (and were subsequently donated to subsistence users). The age composition of the sport fish harvest in the Andreafsky and Anvik rivers was estimated from escapement samples collected from the East Fork Andreafsky and Anvik rivers. This sport fish harvest was assigned to the Lower stock group based on location (Appendix A2).

In District 3, in which samples were not collected, samples from the District 2 subsistence harvest were assumed to represent the age and stock composition of the District 3 subsistence harvest (Appendix A2).

In District 4, 3 estimates were summed for the subsistence harvest total by age and stock (Appendix A2). Genetic samples from Anvik, Kaltag, Galena, and Ruby were used to represent the subsistence harvest from mainstem District 4 villages. Age samples from Anvik and Kaltag were used to represent the subsistence harvest from Subdistrict 4-A villages. Age samples from Galena and Ruby were applied to harvests from those villages. Age samples from Gisasa River and Henshaw Creek were assumed to represent the Koyukuk River harvest, which was assigned to the Middle stock group based upon geographic location.

In District 5, 4 estimates were summed for the subsistence harvest total by age and stock (Appendix A2). Age and genetic samples from Fort Yukon, genetic samples from Tanana, and genetic samples from Rampart Rapids were used to apportion harvests. All age composition estimates in District 5 were based on samples collected in Fort Yukon. Stock estimates in District 5 were separated by location: Tanana village, harvests upstream of Tanana to Fort Yukon, harvests above Fort Yukon to the Canadian border, and harvests from Chandalar and Black rivers. Genetic samples from Tanana were used to represent the Tanana harvest. Genetic samples from Rampart Rapids and Fort Yukon were assumed to represent subsistence harvests upstream of Tanana to Fort Yukon. Harvests upstream of Fort Yukon were assigned to the Upper stock group based on location. The Chandalar and Black rivers subsistence harvest was assigned to the Middle stock group.

In District 6 (Tanana River), age composition from the pooled escapement samples collected from the Chena and Salcha rivers was assumed to represent the subsistence and sport fish harvest (Appendix A2). The Tanana River harvest was assigned to the Middle stock group based on location.

The age composition from the Eagle sonar test fishery was assumed to represent all harvests occurring in Canada. Harvest age samples are not routinely or consistently collected in Canada. These harvests were assigned to the Upper stock group based on location (Appendix A2).

From each sampling location, the age proportion of samples used for apportioning the harvest were assumed to be similar across all stock groups. Therefore age estimates were applied equally to all stock groups.

STOCK AND AGE ASSIGNMENT

For each harvest the number of fish per stock group and age class was estimated as follows.

Denote that:

$N_{d,i,j}$ is the number of salmon in harvest group d, stock i, and age j.

$Ps_{d,i}$ is the proportion of stock i, at harvest group d. ;

$Pa_{d,j}$ is the proportion of age j, at harvest group d.

The estimated harvest by harvest group, stock, and age class is then $\hat{N}_{dij} = \sum (\hat{N}_d \cdot \hat{P}s_{d,i} \cdot \hat{P}a_{d,j})$.

RESULTS

The 2012 total harvest of Chinook salmon from U.S. and Canada was 30,927 fish, (Table 3). Of this harvest, the Lower stock group comprised 4,123 fish (13.3%), the Middle stock group comprised 10,763 fish (34.8%), and the Upper stock group comprised 16,042 fish (51.9%, Tables 3 and 4). The harvest from Canada, 2,200 fish, was only 7.1% of the total harvest (Tables 5 and 6). Age-1.3 fish comprised 52.5% (16,226 fish) of the total harvest, followed by age-1.4 fish (36.6%) and age-1.2 fish (7.4%, Tables 3 and 4).

STOCK COMPOSITION BY DISTRICT

In Districts 1 and 2, 501 genetic samples were collected from the incidental commercial harvest (Table 1). In District 1, 275 samples were collected from the subsistence harvest. The Lower stock group dominated in the samples from both the incidental commercial and subsistence harvests. Overall, the Lower stock group dominated the District 1 subsistence harvest (41.2%), followed by 36.4% Upper and 22.4% Middle (Table 4).

In District 2, genetic sample sizes from the subsistence harvest, MVTF, and the Pilot Station test fishery were 463, 415, and 440, respectively (Table 1). The Upper stock group dominated in samples from the subsistence harvest, Mountain Village test fishery, and the first 2 strata from Pilot Station test fishery (June 10–June 24 and June 25–July 2). The Lower stock group dominated from the third Pilot Station test fishery stratum (July 3–July 23). Overall, the Upper stock group comprised 46.0% of the District 2 subsistence harvest, followed by 38.3% Middle and 15.7% Lower (Table 4). The sport fishery estimated harvest was 231 fish from the Lower stock group (Table 3).

In District 4, 234 genetic samples were collected from subsistence harvests in 4 villages (Table 1). Overall, the Middle stock group dominated the District 4 subsistence harvest (54.3%), followed by 35.4% Upper and 10.3% Lower (Table 4).

In District 5, 95 genetic samples were collected from Tanana and 447 from the combined Rampart Rapids and Fort Yukon subsistence harvests (Table 1). By District 5, most of the harvest was from the Upper stock group (81.5%), followed by 17.8% Middle and less than 1% Lower (Table 4). District 5 harvested one-third (5,267 fish) of the total Upper stock harvest from U.S. and Canada (Table 3).

In District 3, no samples were collected. Stock composition estimates for this district were made based on samples collected from subsistence harvests in District 2, in which the Upper stock group dominated (Tables 1 and 3). In District 6 and Canada all harvests were assigned to the Middle and Upper stock groups, respectively.

AGE COMPOSITION BY DISTRICT

In Districts 1 and 2, 595 age samples were collected from the incidental commercial harvest (Appendix A1). In District 1, age sample sizes from LYTF and the subsistence harvest were 1,028 and 134, respectively. Age-1.3 fish dominated the incidental commercial and subsistence harvest samples (Table 2). Age-1.4 fish dominated the LYTF catches. Overall, the District 1 subsistence harvest (4,313 fish) comprised 46.1% age-1.3 fish, followed by 40.9% age-1.4 and 10.9% age-1.2 fish (Tables 3 and 4).

In District 2, age sample sizes from the subsistence harvest, MVTF, Pilot Station test fishery, were 395, 405, and 387 fish, respectively (Appendix A1). Escapement age sample size from the East Fork Andreafsky and Anvik rivers was 804 fish. Age-1.3 fish dominated the subsistence harvest and Pilot Station test fishery samples; age-1.4 fish dominated MVTF samples (Table 2). Overall, the District 2 subsistence harvest (6,881 fish) comprised 53.9% age-1.3 fish followed by 38.6% age-1.4 and 5.1% age-1.2 fish (Tables 3 and 4). In numbers of fish, the District 2 subsistence fishery harvested the most age-1.4 fish (2,655; Table 3). The sport fishery harvest was 60.3% age-1.3 fish (Table 4).

In District 3, age composition estimates were based on samples collected from the District 2 subsistence harvest, in which age-1.3 fish dominated (Tables 3 and 4).

In District 4, 161 age samples were collected from subsistence harvests from Anvik, Kaltag, Galena, and Ruby (Appendix A1). Age-1.3 fish dominated from all of the sample locations (Table 2). Overall, the District 4 subsistence harvest (7,662 fish) comprised 63.2% age-1.3 fish, followed by 27.0% age-1.4 and just 7.5% age-1.2 fish (Tables 3 and 4). In numbers of fish, the District 4 subsistence fishery harvested the most age-1.3 fish (4,844; Table 3).

In District 5, 160 age samples were collected from the Fort Yukon subsistence harvest (Appendix A1). Overall, the District 5 subsistence harvest (6,466 fish) comprised 50.6% age-1.3, 33.8% age-1.4, and 9.4% age-1.2 fish (Tables 2 and 4). In numbers of fish, the District 5 subsistence fishery harvested the most age-1.2 fish (606; Table 3).

In 2 tributaries that flow into District 6, 621 age samples were collected from the Chena and Salcha river carcass surveys (Appendix A1) The age composition from these samples was applied to the District 6 subsistence and sport harvest (812 fish), which comprised 55.9% age-1.4, 37.0% age-1.4, and 5.6% age-1.2 fish (Tables 2 and 4).

In District 5, 249 age samples were collected from the Eagle sonar test fishery (Appendix A1). The age composition from these samples was applied to the Canadian harvest (2,200 fish), which comprised 56.2% age-1.4 fish, followed by 29.7% age-1.3 fish and 6.4% age-1.2 fish (Tables 2 and 4).

DISCUSSION

Harvest trends by stock throughout the river can be explained by the distribution of each stock. In general, the harvest proportion of Canadian-origin fish increases with upriver distance, with the greatest proportional harvest from District 5 harvest locations. Few Lower river stocks are available to upriver fishermen as these stocks mainly spawn downstream, yet Canadian-origin fish are available throughout the mainstem. The Upper stock group typically arrives earlier in the run and decreases through the season as the Lower stock group increases. In 2012, this run timing by stock group was observed from 3 strata at Pilot Station sonar test fishery (June 10–July 24, June 25–July 2, and July 3–July 23).

In 2012, age-1.3 fish predominated among U.S. harvests likely because of mesh size restrictions. Beginning in 2011, gear was restricted to mesh size of 7.5 in or less in U.S. subsistence fisheries on the Yukon River (Hayes and Estensen 2011). In 2012, subsistence fishing was closed on the first and second Chinook salmon pulses to limit harvest of Canadian-origin fish. Additionally, near the midpoint of the Chinook salmon run, mesh size during subsistence and commercial fishing periods was further reduced to 6.0 in or less to protect Chinook salmon from being incidentally harvested with summer chum salmon (Hayes and Newland 2012). Before 2011,

mesh sizes in the subsistence fishery were unrestricted and large mesh gear (e.g., 8.5 in) was typically used to target Chinook salmon. Age-1.4 fish usually predominated from these large mesh harvests as they did in 2012 from LYTF (8.5 in mesh) and MVTF (7.5 in mesh).

ACKNOWLEDGMENTS

This project was made possible by employees of the Alaska Department of Fish and Game Divisions of Commercial Fisheries and Sport Fish, Association of Village Council Presidents, City of Kaltag, Tanana Chiefs Conference, Stan Zuray (Rapids Research Center), Bering Sea Fisherman's Association, and U.S. Fish and Wildlife Service who collected scale and genetic samples from Chinook salmon in 2012. Age data were compiled by Kyle Schumann. Genetic analyses were performed by Christy Cupp, Paul Kuriscak, Zac Pechacek, Serena Olive, and Heather Liller. Toshihide Hamazaki provided biometric review. Kathrine Howard and Jan Conitz reviewed draft manuscripts. This investigation was financed in part by USFWS through Yukon River Salmon Agreement Treaty Implementation funds under Agreement No. 701815G339.

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TABLES AND FIGURES

Table 1.–Genetic stock composition of Chinook salmon sampled in the Yukon River by district or subdistrict, project, and fishery, in 2012.

District subdistrict	Project and fishery	Stock group	Sample size	Estimate [a]	90% CI
1 and 2	Incidental	Lower	501	0.541	0.485–0.598
	Commercial [b]	Middle		0.155	0.111–0.203
		Upper		0.303	0.252–0.356
1	Subsistence	Lower	275	0.375	0.323–0.427
	Alakanuk/Emmonak/	Middle		0.325	0.268–0.384
	Kotlik	Upper		0.300	0.246–0.355
2	Subsistence	Lower	463	0.083	0.054–0.117
	Mountain Village/	Middle		0.437	0.379–0.496
	St. Mary's/Marshall	Upper		0.480	0.424–0.536
2	Mountain Village	Lower	415	0.277	0.234–0.322
	Test fishery	Middle		0.230	0.179–0.281
		Upper		0.494	0.442–0.546
2	Pilot Station	Lower	138	0.190	0.124–0.261
	Sonar test fishery	Middle		0.358	0.262–0.459
	Stratum 1 (June 10–24)	Upper		0.452	0.358–0.547
2	Pilot Station	Lower	196	0.279	0.217–0.343
	Sonar test fishery	Middle		0.249	0.181–0.322
	Stratum 2 (June 25–July 2)	Upper		0.472	0.403–0.542
2	Pilot Station	Lower	106	0.504	0.414–0.594
	Sonar test fishery	Middle		0.159	0.094–0.233
	Stratum 3 (July 3–23)	Upper		0.337	0.252–0.426
4	Subsistence	Lower	234	0.106	0.068–0.149
	Anvik/Kaltag/	Middle		0.533	0.448–0.617
	Galena/Ruby	Upper		0.362	0.284–0.440
5AB	Subsistence	Lower	95	0.015	0.000–0.049
	Tanana [b]	Middle		0.375	0.255–0.494
		Upper		0.611	0.493–0.730
5BD	Subsistence	Lower	447	0.005	0.001–0.010
	Rampart Rapids/	Middle		0.074	0.041–0.113
	Fort Yukon	Upper		0.921	0.883–0.955

[a] Stock composition estimates are also available from ADF&G Gene Conservation Laboratory website: http://www.adfg.alaska.gov/static/fishing/PDFs/research/geneconservation/yukon_chinook_postseason_msa_2012.pdf

[b] Personal communication Nick Decovich, ADF&G Gene Conservation Laboratory.

Table 2.–Age class composition of Chinook salmon sampled in the Yukon River by district or subdistrict or tributary, project, and fishery, in 2012.

		Percentage by age class [a]								
	Project and fishery	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5
Districts 1 and 2	Incidental Comm	0.0	18.8	50.2	0.2	30.0	0.2	0.5	0.2	0.0
District 1	Y-1 Subsistence	0.0	8.5	59.8	0.0	28.2	1.7	0.9	0.9	0.0
District 1	LYTF	0.0	1.4	30.2	0.1	66.2	0.0	1.0	1.2	0.0
District 2	Y-2 Subsistence	0.0	3.3	55.8	0.3	38.6	0.5	1.3	0.3	0.0
District 2	Mountain Village TF	0.0	1.7	44.7	0.2	49.1	0.0	1.2	2.7	0.2
District 2	Pilot Station TF	0.8	5.7	47.8	0.0	42.9	0.5	0.8	1.6	0.0
E. F. Andreafsky and Anvik rivers	Escapement	0.2	12.2	60.9	0.0	26.4	0.0	0.2	0.1	0.0
Subdistrict 4A	Anvik/Kaltag Sub	0.0	5.6	60.7	0.0	30.8	2.8	0.0	0.0	0.0
Subdistrict 4BC	Galena/Ruby Sub	0.0	11.1	70.4	0.0	16.7	0.0	0.0	1.9	0.0
Gisasa River and Henshaw Creek	Escapement	0.0	14.0	55.6	0.1	29.8	0.0	0.4	0.1	0.0
Subdistrict 5D	Fort Yukon Sub	0.6	9.4	50.6	0.6	33.8	3.1	0.6	1.3	0.0
Chena and Salcha rivers	Escapement	0.3	5.6	37.0	0.0	55.9	0.0	1.1	0.0	0.0
Subdistrict 5D	Eagle sonar TF	0.4	6.4	29.7	0.4	56.2	2.4	1.2	3.2	0.0

Note: Comm is commercial, LYTF is Lower Yukon test fishery, TF is test fishery, and Sub is subsistence.

[a] Percentage by age class were derived from AYKDBMS: http://www.adfg.alaska.gov/CommFishR3/Website/AYKDBMSWebsite/DataTypes/ASL.aspx

Table 3.–Estimated harvest of Chinook salmon in the Yukon River apportioned by age class, stock group, and fishery, in 2012.

			Age class									
District	Fishery	Stock group	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
1	Subsistence	Lower	0	231	851	2	661	11	12	9	0	1,776
		Middle	0	94	456	1	395	9	7	7	0	968
		Alaska	0	324	1,306	3	1,056	20	19	16	0	2,744
		Upper	0	146	682	2	707	9	12	11	0	1,569
		Total	0	471	1,989	4	1,763	28	31	27	0	4,313
2	Subsistence	Lower	1	97	556	2	402	4	10	7	0	1,079
		Middle	1	111	1,443	6	1,022	12	32	11	0	2,638
		Alaska	2	207	1,999	8	1,424	16	42	18	1	3,717
		Upper	2	145	1,711	7	1,231	14	37	16	1	3,164
		Total	4	352	3,711	16	2,655	30	79	34	1	6,881
	Sport	Lower	1	31	139	0	59	0	0	0	0	231
3	Subsistence	Lower	0	7	110	0	76	1	2	0	0	197
		Middle	0	37	575	3	397	5	13	3	0	1,032
		Alaska	0	44	684	3	473	6	16	3	0	1,229
		Upper	0	40	631	3	436	6	14	3	0	1,133
		Total	0	84	1,316	6	909	12	30	6	0	2,362
4	Subsistence	Lower	0	56	502	0	213	16	0	4	0	792
		Middle	0	308	2,625	0	1,126	81	1	21	0	4,161
		Alaska	0	365	3,126	0	1,340	97	1	25	0	4,953
		Upper	0	193	1,717	0	730	55	0	14	0	2,709
		Total	0	557	4,844	0	2,069	152	1	38	0	7,662
5	Subsistence	Lower	0	4	24	0	16	1	0	1	0	48
		Middle	7	108	583	7	389	36	7	14	0	1,152
		Alaska	7	112	607	7	405	37	7	15	0	1,199
		Upper	33	494	2,666	33	1,778	165	33	66	0	5,267
		Total	40	606	3,273	40	2,182	202	40	81	0	6,466
6	Subsistence	Middle	2	39	259	0	390	0	8	0	0	698
	Sport	Middle	0	6	42	0	64	0	1	0	0	114
		Total	3	46	301	0	454	0	9	0	0	812
Canada		Upper	9	141	654	9	1,237	53	27	71	0	2,200
Total harvest		Lower	2	426	2,182	5	1,427	33	25	22	0	4,123
		Middle	11	703	5,981	17	3,782	144	69	55	0	10,763
		Alaska	13	1,129	8,164	22	5,210	176	94	77	1	14,885
		Upper	43	1,159	8,062	54	6,118	301	123	180	1	16,042
		Total	56	2,289	16,226	75	11,328	478	217	257	1	30,927

Table 4.–Estimated harvest (percentage) of Chinook salmon in the Yukon River apportioned by age class, stock group, and fishery, in 2012.

			Age class									
District	Fishery	Stock group	1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
1	Subsistence	Lower	0.0	5.4	19.7	0.0	15.3	0.3	0.3	0.2	0.0	41.2
		Middle	0.0	2.2	10.6	0.0	9.2	0.2	0.2	0.2	0.0	22.4
		Alaska	0.0	7.5	30.3	0.1	24.5	0.5	0.4	0.4	0.0	63.6
		Upper	0.0	3.4	15.8	0.0	16.4	0.2	0.3	0.3	0.0	36.4
		Total	0.0	10.9	46.1	0.1	40.9	0.7	0.7	0.6	0.0	100.0
2	Subsistence	Lower	0.0	1.4	8.1	0.0	5.8	0.1	0.1	0.1	0.0	15.7
		Middle	0.0	1.6	21.0	0.1	14.8	0.2	0.5	0.2	0.0	38.3
		Alaska	0.0	3.0	29.1	0.1	20.7	0.2	0.6	0.3	0.0	54.0
		Upper	0.0	2.1	24.9	0.1	17.9	0.2	0.5	0.2	0.0	46.0
		Total	0.1	5.1	53.9	0.2	38.6	0.4	1.2	0.5	0.0	100.0
	Sport	Lower	0.2	13.4	60.3	0.0	25.7	0.0	0.1	0.1	0.0	100.0
3	Subsistence	Lower	0.0	0.3	4.6	0.0	3.2	0.0	0.1	0.0	0.0	8.3
		Middle	0.0	1.5	24.3	0.1	16.8	0.2	0.6	0.1	0.0	43.7
		Alaska	0.0	1.8	29.0	0.1	20.0	0.3	0.7	0.1	0.0	52.0
		Upper	0.0	1.7	26.7	0.1	18.5	0.2	0.6	0.1	0.0	48.0
		Total	0.0	3.5	55.7	0.3	38.5	0.5	1.3	0.3	0.0	100.0
4	Subsistence	Lower	0.0	0.7	6.6	0.0	2.8	0.2	0.0	0.1	0.0	10.3
		Middle	0.0	4.0	34.3	0.0	14.7	1.1	0.0	0.3	0.0	54.3
		Alaska	0.0	4.8	40.8	0.0	17.5	1.3	0.0	0.3	0.0	64.6
		Upper	0.0	2.5	22.4	0.0	9.5	0.7	0.0	0.2	0.0	35.4
		Total	0.0	7.3	63.2	0.0	27.0	2.0	0.0	0.5	0.0	100.0
5	Subsistence	Lower	0.0	0.1	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.7
		Middle	0.1	1.7	9.0	0.1	6.0	0.6	0.1	0.2	0.0	17.8
		Alaska	0.1	1.7	9.4	0.1	6.3	0.6	0.1	0.2	0.0	18.5
		Upper	0.5	7.6	41.2	0.5	27.5	2.5	0.5	1.0	0.0	81.5
		Total	0.6	9.4	50.6	0.6	33.8	3.1	0.6	1.3	0.0	100.0
6	Subsistence	Middle	0.3	4.8	31.8	0.0	48.0	0.0	1.0	0.0	0.0	86.0
	Sport	Middle	0.0	0.8	5.2	0.0	7.8	0.0	0.2	0.0	0.0	14.0
		Total	0.3	5.6	37.0	0.0	55.9	0.0	1.1	0.0	0.0	100.0
Canada		Upper	0.4	6.4	29.7	0.4	56.2	2.4	1.2	3.2	0.0	100.0
Total harvest		Lower	0.0	1.4	7.1	0.0	4.6	0.1	0.1	0.1	0.0	13.3
		Middle	0.0	2.3	19.3	0.1	12.2	0.5	0.2	0.2	0.0	34.8
		Alaska	0.0	3.7	26.4	0.1	16.8	0.6	0.3	0.2	0.0	48.1
		Upper	0.1	3.7	26.1	0.2	19.8	1.0	0.4	0.6	0.0	51.9
		Total	0.2	7.4	52.5	0.2	36.6	1.5	0.7	0.8	0.0	100.0

Table 5.–Estimated harvest of Chinook salmon in the Yukon River by stock group for U.S. and Canada, 1981–2012.

			Upper			
Year	Lower	Middle	U.S.	Canada	Total	Total
1981	11,164	112,669	64,644	18,109	82,753	206,586
1982	23,601	41,967	87,241	17,208	104,449	170,017
1983	28,081	73,361	96,994	18,952	115,946	217,388
1984	45,210	71,656	44,735	16,795	61,530	178,396
1985	57,770	46,753	85,773	19,301	105,074	209,597
1986	32,517	15,894	97,593	20,364	117,957	166,368
1987	32,847	40,281	115,258	17,614	132,872	206,000
1988	36,967	26,805	84,649	21,427	106,076	169,848
1989	42,872	27,936	86,798	17,944	104,742	175,550
1990	34,007	42,430	72,996	19,227	92,223	168,660
1991	49,113	44,328	61,210	20,607	81,817	175,258
1992	30,330	40,600	97,261	17,903	115,164	186,094
1993	38,592	45,671	78,815	16,611	95,426	179,689
1994	35,161	41,488	95,666	21,218	116,884	193,533
1995	35,518	44,404	97,741	20,887	118,628	198,550
1996	33,278	16,386	88,958	19,612	108,570	158,234
1997	50,420	32,043	92,162	16,528	108,690	191,153
1998	34,759	18,509	46,947	5,937	52,884	106,152
1999	54,788	8,619	60,908	12,468	73,376	136,783
2000	16,989	6,176	22,143	4,879	27,022	50,187
2001	20,115	10,190	23,325	10,139	33,421	63,726
2002	14,895	22,395	30,058	9,257	39,387	76,677
2003	7,394	31,232	59,940	9,619	69,559	108,185
2004	18,965	35,553	57,831	11,238	69,069	123,587
2005	19,893	20,607	44,650	11,074	55,724	96,223
2006	18,301	28,756	48,097	9,072	57,169	104,225
2007	12,311	28,924	48,320	5,094	53,414	94,649
2008	8,903	14,636	25,329	3,426	28,755	52,294
2009	4,332	12,229	17,646	4,758	22,404	38,964
2010	10,046	18,465	25,271	2,647	27,918	56,429
2011	6,356	13,591	20,824	4,884	25,708	45,656
2012	4,123	10,763	13,842	2,200	16,042	30,927
1981–2011	27,919	33,373	63,864	13,703	77,568	138,860
2007–2011	8,389	17,569	27,478	4,162	31,640	57,598

Table 6.–Estimated harvest (percentage) of Chinook salmon in the Yukon River by stock group for U.S. and Canada, 1981–2012.

			Upper		
Year	Lower	Middle	U.S.	Canada	Total
1981	5.4	54.5	31.3	8.8	40.1
1982	13.9	24.7	51.3	10.1	61.4
1983	12.9	33.7	44.6	8.7	53.3
1984	25.3	40.2	25.1	9.4	34.5
1985	27.6	22.3	40.9	9.2	50.1
1986	19.5	9.6	58.7	12.2	70.9
1987	15.9	19.6	56.0	8.6	64.5
1988	21.8	15.8	49.8	12.6	62.5
1989	24.4	15.9	49.4	10.2	59.7
1990	20.2	25.2	43.3	11.4	54.7
1991	28.0	25.3	34.9	11.8	46.7
1992	16.3	21.8	52.3	9.6	61.9
1993	21.5	25.4	43.9	9.2	53.1
1994	18.2	21.4	49.4	11.0	60.4
1995	17.9	22.4	49.2	10.5	59.7
1996	21.0	10.4	56.2	12.4	68.6
1997	26.4	16.8	48.2	8.6	56.9
1998	32.7	17.4	44.2	5.6	49.8
1999	40.1	6.3	44.5	9.1	53.6
2000	33.9	12.3	44.1	9.7	53.8
2001	31.6	16.0	36.5	15.9	52.4
2002	19.4	29.2	39.3	12.1	51.4
2003	6.8	28.9	55.4	8.9	64.3
2004	15.3	28.8	46.8	9.1	55.9
2005	20.7	21.4	46.4	11.5	57.9
2006	17.6	27.6	46.1	8.7	54.9
2007	13.0	30.6	51.1	5.4	56.4
2008	17.0	28.0	48.4	6.6	55.0
2009	11.1	31.4	45.3	12.2	57.5
2010	17.8	32.7	44.8	4.7	49.5
2011	13.9	29.8	45.6	10.7	56.3
2012	13.3	34.8	44.8	7.1	51.9
1981–2011	20.2	24.0	45.9	9.8	55.7
2007–2011	14.6	30.5	47.0	7.9	54.9

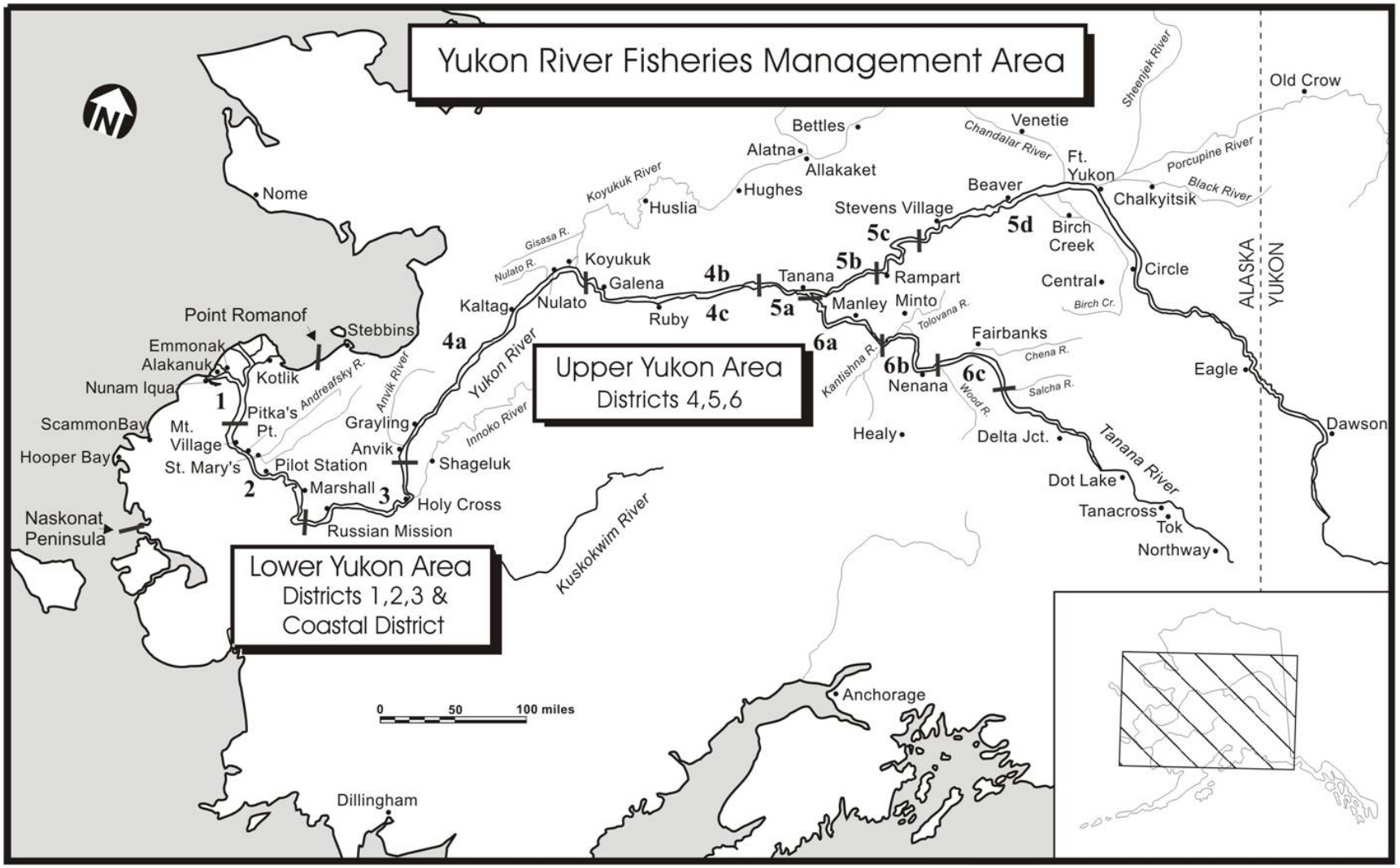

Figure 1.–Alaska portion of the Yukon River drainage with district boundaries and major spawning tributaries.

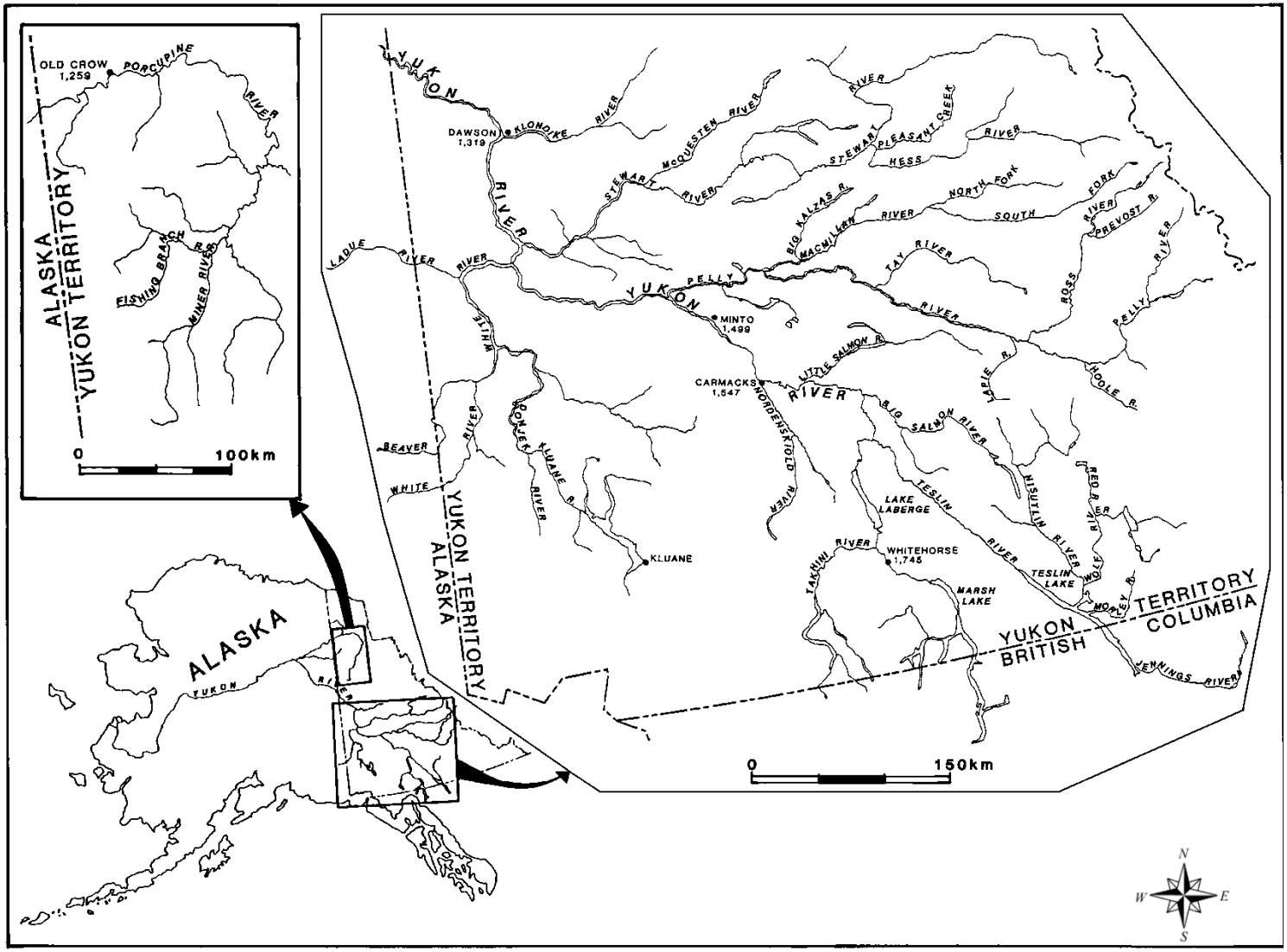

Figure 2.–Canadian portion of the Yukon River drainage and major spawning tributaries.

APPENDIX A

Appendix A1.–Age class composition, in numbers of fish, of Chinook salmon sampled in the Yukon River by project, location, gear, and mesh size in 2012.

Project	Location	Gear	Mesh		Age class [a] 1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
Commercial	Emmonak	Gillnet	≤6.0		0	100	265	1	163	1	3	1	0	534
Commercial	Kotlik	Gillnet	≤6.0		0	10	28	0	15	0	0	0	0	53
Commercial	Mountain Village	Gillnet	≤6.0		0	1	3	0	1	0	0	0	0	5
Commercial	St Mary's	Gillnet	≤6.0		0	1	2	0	0	0	0	0	0	3
Commercial	Emmonak/ Kotlik/ Mountain Village/ St Mary's	Gillnet	≤6.0	Total	0	112	298	1	179	1	3	1	0	595
Subsistence	Alakanuk	Drift gillnet	6.0		0	7	19	0	5	1	0	0	0	32
Subsistence	Alakanuk	Drift gillnet	7.5		0	1	7	0	6	1	0	0	0	15
Subsistence	Alakanuk	Set gillnet	7.5		0	2	15	0	9	1	1	0	0	28
Subsistence	Emmonak	Drift gillnet	5.5		0	0	1	0	1	0	0	0	0	2
Subsistence	Emmonak	Drift gillnet	6.0		0	1	0	0	1	0	0	0	0	2
Subsistence	Emmonak	Drift gillnet	7.5		0	0	12	0	2	0	0	0	0	14
Subsistence	Emmonak	Set gillnet	5.5		0	1	4	0	1	0	0	0	0	6
Subsistence	Emmonak	Set gillnet	6.0		0	1	6	0	1	0	0	0	0	8
Subsistence	Emmonak	Set gillnet	7.5		0	0	6	0	7	0	0	1	0	14
Subsistence	Kotlik	Drift gillnet	6.0		0	0	4	0	2	0	0	0	0	6
Subsistence	Kotlik	Set gillnet	6.0		0	0	5	0	1	0	0	0	0	6
Subsistence	Kotlik	Set gillnet	7.5		0	0	0	0	1	0	0	0	0	1
Subsistence	Alakanuk/ Emmonak/ Kotlik	All gear	All mesh	Total	0	13	79	0	37	3	1	1	0	134

-continued-

Appendix A1.–Page 2 of 3.

Project	Location	Gear	Mesh		Age class [a] 1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
Test fishing	Big Eddy	Drift gillnet	8.25		0	4	69	1	141	0	0	4	0	219
Test fishing	Big Eddy	Set gillnet	8.5		0	5	86	0	247	0	7	3	0	348
Test fishing	Middle Mouth	Set gillnet	8.5		0	5	157	0	291	0	3	5	0	461
Test fishing	Big Eddy/ Middle Mouth	All gear	All mesh	Total	0	14	312	1	679	0	10	12	0	1,028
Subsistence	Marshall	Drift gillnet	5.25		0	3	4	0	0	0	0	0	0	7
Subsistence	Marshall	Drift gillnet	7.5		0	2	56	0	35	1	1	1	0	96
Subsistence	Mountain Village	Drift gillnet	6.0		0	0	3	0	3	0	0	0	0	6
Subsistence	Mountain Village	Drift gillnet	7.0		0	0	7	0	5	0	0	0	0	12
Subsistence	Mountain Village	Drift gillnet	7.5		0	0	31	0	18	0	1	0	0	50
Subsistence	Mountain Village	Drift gillnet	8.5		0	0	1	0	3	0	0	0	0	4
Subsistence	St Mary's	Drift gillnet	5.5		0	1	1	0	0	0	0	0	0	2
Subsistence	St Mary's	Drift gillnet	6.0		0	7	11	0	1	0	0	0	0	19
Subsistence	St Mary's	Drift gillnet	7.5		0	1	106	1	87	1	3	0	0	199
Subsistence	Marshall/ Mountain Village/ St Mary's	Drift gillnet	All mesh	Total	0	14	220	1	152	2	5	1	0	395
Test fishing	Mountain Village	Drift gillnet	7.5	Total	0	7	181	1	199	0	5	11	1	405
Test fishing	Pilot Station sonar	Drift gillnet	2.75		0	0	0	0	2	0	0	0	0	2
Test fishing	Pilot Station sonar	Drift gillnet	4.0		3	4	6	0	4	0	0	0	0	17
Test fishing	Pilot Station sonar	Drift gillnet	5.25		0	5	13	0	5	1	0	0	0	24
Test fishing	Pilot Station sonar	Drift gillnet	5.75		0	0	0	0	1	0	0	0	0	1
Test fishing	Pilot Station sonar	Drift gillnet	6.5		0	5	40	0	36	1	1	2	0	85
Test fishing	Pilot Station sonar	Drift gillnet	7.5		0	3	100	0	64	0	0	2	0	169
Test fishing	Pilot Station sonar	Drift gillnet	8.5		0	5	27	0	53	0	2	2	0	89
Test fishing	Pilot Station sonar	Drift gillnet	2.75-8.5	Total	3	22	186	0	165	2	3	6	0	387
Escapement	E. F. Andreafsky River	Weir			2	74	367	0	131	0	1	0	0	575
Escapement	Anvik River	Handpicked			0	34	118	0	76	0	0	1	0	229
Escapement	E. F. Andreafsky River/ Anvik River	All gear		Total	2	108	485	0	207	0	1	1	0	804

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Project	Location	Gear	Mesh		Age class [a] 1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
Subsistence	Anvik	Drift gillnet	6.0		0	0	6	0	1	1	0	0	0	8
Subsistence	Anvik	Set gillnet	6.0		0	3	4	0	1	1	0	0	0	9
Subsistence	Anvik	Drift gillnet	7.5		0	0	6	0	2	0	0	0	0	8
Subsistence	Anvik	Set gillnet	7.5		0	2	20	0	14	1	0	0	0	37
Subsistence	Kaltag	Drift gillnet	7.5		0	1	29	0	15	0	0	0	0	45
Subsistence	Anvik/ Kaltag	All gear	All mesh	Total	0	6	65	0	33	3	0	0	0	107
Subsistence	Galena	Set gillnet	6.0		0	0	1	0	0	0	0	0	0	1
Subsistence	Galena	Set gillnet	7.5		0	0	16	0	5	0	0	0	0	21
Subsistence	Ruby	Set gillnet	7.5		0	6	21	0	4	0	0	1	0	32
Subsistence	Galena/ Ruby	Set gillnet	All mesh	Total	0	6	38	0	9	0	0	1	0	54
Escapement	Gisasa River	Weir			0	62	320	1	142	0	2	1	0	528
Escapement	Henshaw Creek	Weir			0	53	136	0	102	0	1	0	0	292
Escapement	Gisasa River/ Henshaw Creek	Weir		Total	0	115	456	1	244	0	3	1	0	820
Subsistence	Fort Yukon	Fish wheel		Total	1	15	81	1	54	5	1	2	0	160
Test fishing	Eagle sonar	Drift gillnet	5.25		1	7	26	1	37	2	0	2	0	76
Test fishing	Eagle sonar	Drift gillnet	6.5		0	5	14	0	21	3	0	2	0	45
Test fishing	Eagle sonar	Drift gillnet	7.5		0	4	32	0	57	1	2	4	0	100
Test fishing	Eagle sonar	Drift gillnet	8.5		0	0	2	0	25	0	1	0	0	28
Test fishing	Eagle sonar	Drift gillnet	All mesh	Total	1	16	74	1	140	6	3	8	0	249
Escapement	Chena River	Handpicked			1	10	91	0	98	0	0	0	0	200
Escapement	Salcha River	Handpicked			1	25	139	0	249	0	7	0	0	421
Escapement	Chena River/ Salcha River	Handpicked		Total	2	35	230	0	347	0	7	0	0	621

[a] Numbers by age class were derived from ADF&G AYKDBMS http://www.adfg.alaska.gov/CommFishR3/Website/AYKDBMSWebsite/DataTypes/ASL.aspx

Appendix A2.–Estimated harvest of Chinook salmon in the Yukon River apportioned within districts or subdistricts, by stock group and age class proportion, in 2012.

Harvest apportioned	Stock group	Stock by age proportion									Harvest	Source data for	
		1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5		Stock composition	Age composition
All District 1 villages	Lower	0.541	0.541	0.541	0.541	0.541	0.541	0.541	0.541	0.541			
	Middle	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155			
	Alaska	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697			
	Upper	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303			
	Age proportion	0.000	0.188	0.501	0.002	0.301	0.002	0.005	0.002	0.000	1,827	Incidental commercial	Incidental commercial
All District 1 villages	Lower	0.365	0.365	0.365	0.365	0.365	0.365	0.365	0.365	0.365			
	Middle	0.331	0.331	0.331	0.331	0.331	0.331	0.331	0.331	0.331			
	Alaska	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697		Alakanuk,	Alakanuk,
	Upper	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303		Emmonak, Kotlik	Emmonak, Kotlik
	Age proportion	0.000	0.097	0.590	0.000	0.276	0.022	0.007	0.007	0.000	1,116	Subsistence	Subsistence
All District 1 villages	Lower	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277			
	Middle	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230			
	Alaska	0.506	0.506	0.506	0.506	0.506	0.506	0.506	0.506	0.506			
	Upper	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494		Mountain Village	Lower Yukon
	Age proportion	0.000	0.014	0.304	0.001	0.661	0.000	0.010	0.012	0.000	1,370	Test fishery	Test fishery
All District 2 villages	Lower	0.541	0.541	0.541	0.541	0.541	0.541	0.541	0.541	0.541			
	Middle	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155	0.155			
	Alaska	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697	0.697			
	Upper	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303			
	Age proportion	0.000	0.188	0.502	0.002	0.300	0.002	0.005	0.002	0.000	697	Incidental commercial	Incidental commercial
All District 2 villages	Lower	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083			
	Middle	0.437	0.437	0.437	0.437	0.437	0.437	0.437	0.437	0.437		Marshall,	Marshall,
	Alaska	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520		Mountain Village,	Mountain Village,
	Upper	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480		St Mary's	St Mary's
	Age proportion	0.000	0.035	0.557	0.003	0.385	0.005	0.013	0.003	0.000	5,284	Subsistence	Subsistence
Mountain Village District 2	Lower	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277			
	Middle	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230			
	Alaska	0.506	0.506	0.506	0.506	0.506	0.506	0.506	0.506	0.506			
	Upper	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494		Mountain Village	Mountain Village
	Age proportion	0.000	0.017	0.447	0.002	0.491	0.000	0.012	0.027	0.002	444	Test fishery	Test fishery

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Harvest apportioned	Stock group	Stock by age proportion 1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Harvest	Source data for Stock composition	Source data for Age composition
Pilot Station District 2	Lower	0.305	0.305	0.305	0.305	0.305	0.305	0.305	0.305	0.305			
	Middle	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262			
	Alaska	0.567	0.567	0.567	0.567	0.567	0.567	0.567	0.567	0.567			
	Upper	0.433	0.433	0.433	0.433	0.433	0.433	0.433	0.433	0.433		Pilot Station TF	Pilot Station TF
	Age proportion	0.008	0.057	0.481	0.000	0.426	0.005	0.008	0.016	0.000	456	(Avg. 3 strata)	(2.75"-8.5" mesh)
District 2 Sport Harvest	Lower	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
	Middle	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Alaska	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			E.F. Andreafsky
	Upper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			and Anvik rivers
	Age proportion	0.002	0.134	0.603	0.000	0.257	0.000	0.001	0.001	0.000	231	Lower	Escapement
All District 3 villages	Lower	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083			
	Middle	0.437	0.437	0.437	0.437	0.437	0.437	0.437	0.437	0.437		Marshall,	Marshall,
	Alaska	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520	0.520		Mountain Village,	Mountain Village,
	Upper	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480		St Mary's	St Mary's
	Age proportion	0.000	0.035	0.557	0.003	0.385	0.005	0.013	0.003	0.000	2,362	Subsistence	Subsistence
All Subdistrict 4A villages	Lower	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106			
	Middle	0.533	0.533	0.533	0.533	0.533	0.533	0.533	0.533	0.533			
	Alaska	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638			
	Upper	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362		District 4	Anvik, Kaltag
	Age proportion	0.000	0.056	0.607	0.000	0.308	0.028	0.000	0.000	0.000	5,431	Subsistence	Subsistence
Galena, Ruby (Subdistrict 4BC)	Lower	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106	0.106			
	Middle	0.533	0.533	0.533	0.533	0.533	0.533	0.533	0.533	0.533			
	Alaska	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638			
	Upper	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362		District 4	Galena, Ruby
	Age proportion	0.000	0.111	0.704	0.000	0.167	0.000	0.000	0.019	0.000	2,058	Subsistence	Subsistence
Koyukuk River villages	Lower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Middle	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
	Alaska	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			Gisasa River
	Upper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			Henshaw Creek
	Age proportion	0.000	0.140	0.556	0.001	0.298	0.000	0.004	0.001	0.000	173	Middle	Escapement

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Harvest apportioned	Stock group	Stock by age proportion									Harvest	Source data for	
		1.1	1.2	1.3	2.2	1.4	2.3	1.5	2.4	2.5		Stock composition	Age composition
Tanana (Subdistrict 5AB)	Lower	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015			
	Middle	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375			
	Alaska	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389	0.389			
	Upper	0.611	0.611	0.611	0.611	0.611	0.611	0.611	0.611	0.611			Fort Yukon
	Age proportion	0.006	0.094	0.506	0.006	0.338	0.031	0.006	0.013	0.000	2,100	Tanana Subsistence	Subsistence
District 5 villages above Tanana to Fort Yukon (Subdistrict 5CD)	Lower	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
	Middle	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074			
	Alaska	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079		Fort Yukon,	
	Upper	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921	0.921		Rampart Rapids	Fort Yukon
	Age proportion	0.006	0.094	0.506	0.006	0.338	0.031	0.006	0.013	0.000	3,767	Subsistence	Subsistence
District 5 villages above Fort Yukon (Subdistrict 5D)	Lower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Middle	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Alaska	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Upper	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			Fort Yukon
	Age proportion	0.006	0.094	0.506	0.006	0.338	0.031	0.006	0.013	0.000	513	Upper	Subsistence
Chandalar and Black river villages	Lower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Middle	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
	Alaska	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
	Upper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			Fort Yukon
	Age proportion	0.006	0.094	0.506	0.006	0.338	0.031	0.006	0.013	0.000	86	Middle	Subsistence
All District 6 villages	Lower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Middle	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
	Alaska	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Upper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			Chena and Salcha rivers
	Total	0.003	0.056	0.370	0.000	0.559	0.000	0.011	0.000	0.000	698	Middle	Escapement
District 6 Sport Harvest	Lower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Middle	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
	Alaska	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Upper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			Chena and Salcha rivers
	Total	0.003	0.056	0.370	0.000	0.559	0.000	0.011	0.000	0.000	114	Middle	Escapement
Canada	Lower	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Middle	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Alaska	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
	Upper	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			Eagle sonar
	Total	0.004	0.064	0.297	0.004	0.562	0.024	0.012	0.032	0.000	2,144	Upper	Test fishery