Fishery Management Report No. 14-32

Annual Management Report Yukon and Northern Areas 2009

by

Steve J. Hayes,

Bonnie M. Borba,

Eric J. Newland,

and

Daniel J. Bergstrom

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY MANAGEMENT REPORT NO. 14-32

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Steve J. Hayes, Bonnie M. Borba, Eric J. Newland, and Daniel J. Bergstrom
Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

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The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/ This publication has undergone regional peer review.

Steve J. Hayes, Eric J. Newland and Daniel J. Bergstrom
Alaska Department of Fish and Game, Division of Commercial Fisheries,
333 Raspberry Road, Anchorage, AK 99518-1599, USA

Bonnie M. Borba
Alaska Department of Fish and Game, Division of Commercial Fisheries,
1300 College Road, Fairbanks, Alaska 99701-1551, USA

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PREFACE

This report summarizes the 2009 season and provides selected historical information concerning management of the subsistence, commercial and personal use fisheries of the Yukon–Northern Area of the Arctic-Yukon-Kuskokwim (AYK) Region. Data from selected management and research projects are included in this report. A more complete documentation of project results is presented in separate reports.

Data in this report supersedes information found in previous management reports. An attempt has been made to update information and correct errors in earlier reports. There may be minor discrepancies in the data in this report and data found online. While we have made every effort to ensure quality of the data online, we cannot guarantee the accuracy of these datasets.

This report is organized into major sections:

1. Yukon Area Salmon Fishery and Area Salmon Report 2009
2. Cape Romanzof District Herring Fishery
3. Other Marine and Freshwater Finfish Fisheries
4. Northern Area

Yukon Area salmon information is provided in Appendix A, Cape Romanzof herring information is provided in Appendix B, and Yukon Area freshwater finfish information is provided in Appendix C.

ABSTRACT

The 2009 Yukon and Northern management report summarizes management activities of the Alaska Department of Fish and Game, Division of Commercial Fisheries in the Yukon and Northern Areas of Alaska. The report provides the Yukon Area status of salmon stocks (Chinook *Oncorhynchus tshawytscha*, coho *O. kisutch*, summer and fall chum *O. keta*) in 2009, provides data on the utilization of salmon species by commercial, subsistence, personal use, and sport fisheries, and presents an outlook for the 2010 fishing season. Alaska and Canada fisheries are summarized as the Yukon River is a transboundary river. The report further compiles summaries of selected Yukon River projects. Complete documentation of these projects and results may appear in separate reports. Fisheries data in this report supersedes information in previous annual management reports. Some data are preliminary and may be presented with minor differences in future reports. The report is organized into 4 sections: 1) *Yukon Area Salmon Fishery*: a description of the Yukon Area, fishery resources, and fisheries management practices, including a comprehensive report of the 2009 Yukon Area salmon fisheries by summer and fall season, which makes comparisons with previous years, 2) *Cape Romanzof District Herring Fishery:* a description of the area, fisheries, and management practices, and summary of the 2009 herring fishery, 3) *Other Marine and Freshwater Finfish Fisheries:* a description of the fishery resources and freshwater finfish fisheries other than salmon and herring, and 4) *Northern Area* which includes a description of the area and documentation of the Colville River commercial freshwater finfish fishery.

Keywords: Yukon River, Yukon River Salmon Agreement, Chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *O. keta*, coho salmon, *O. kisutch*, Pacific herring, *Clupea pallasii*, fisheries management, escapement, commercial harvest, subsistence harvest, season outlook, Yukon Area, Annual Management Report (AMR).

YUKON AREA

INTRODUCTION

The Division of Commercial Fisheries of the Alaska Department of Fish and Game (ADF&G) is responsible for the management of state subsistence, personal use, and commercial fisheries in the Yukon Area of the Arctic-Yukon-Kuskokwim (AYK) Region. This annual management report details the activities of ADF&G in the Yukon Area during 2009. The Yukon River is a transboundary river and as such, information is provided on fishery management, harvests, and projects in the Canada portion of the drainage. Much of the information related to salmon in this report is directly taken from the annual Joint Technical Committee (JTC) of the U.S. Canada Panel Yukon Panel report, *Yukon River salmon 2009 season summary and 2010 season outlook* (JTC 2010). Historical salmon harvest and escapement data are provided in JTC (2010). For a more historical perspective pertaining to the Yukon Area fisheries, see the *Annual management report for the Yukon and Northern Areas 2007* (Hayes et al. 2012).

The Yukon Area includes all waters of the Yukon River drainage in Alaska and all coastal waters of Alaska from Point Romanzof southward to the Naskonat Peninsula (Figure 1). Important commercial and subsistence fisheries include salmon and herring. Other marine and freshwater finfish are harvested primarily for subsistence use. A list of indigenous fishes found in the Yukon Area is provided in Appendix A1.

SALMON FISHERY

DESCRIPTION OF AREA AND DISTRICT BOUNDARIES

The Yukon River is the largest river in Alaska and the fifth largest drainage in North America. The river originates in British Columbia, Canada, within 30 miles of the Gulf of Alaska, and flows over 2,300 miles to its terminus at the Bering Sea. It drains an area of approximately 330,000 square miles and approximately 222,000 square miles of the state. With the possible exception of a few fish taken near the mouth or in the adjacent coastal waters, only salmon of Yukon River origin are harvested in the Yukon Area.

Excluding the greater Fairbanks area (approximately 84,000 residents), there are approximately 21,000 rural residents in the Alaska portion of the drainage (U.S. Census 2000), the majority of whom reside in 43 small communities scattered along the coast and major river systems. Most of these people are dependent to varying degrees on fish and game resources for their livelihood.

Commercial salmon fishing is allowed along the entire 1,200 mile length of the mainstem Yukon River in Alaska, the lower 225 miles of the Tanana River, and lower 12 miles of the Anvik River. The Yukon Area is divided into 7 districts and 10 subdistricts for management and regulatory purposes (Figure 2). The district boundaries were originally established in 1961 and redefined in 1962, 1974, 1978, 1994 and 1996. The Lower Yukon Area includes the Yukon River drainage from the mouth to Old Paradise Village, river mile 301 (Districts 1, 2, and 3). The Coastal District was established in 1994, redefined in 1996 and is open only to subsistence fishing. The Upper Yukon Area is that portion of the Yukon River drainage upstream of Old Paradise Village to the border with Canada (Districts 4, 5, and 6). The districts and subdistricts are further divided into 28 statistical areas for management and reporting purposes (Figures 3–9). Yukon River mileages at specific locations are listed in Appendix A2.

In addition to the U.S. fisheries, Aboriginal, commercial, sport, and domestic salmon fisheries also occur in the Canada portion of the Yukon River drainage. Department of Fisheries and Oceans, Canada (DFO) conducts the corresponding fishery management activities in Canada.

FISHERY RESOURCES

There are 5 species of Pacific salmon found in the Yukon River drainage: Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, coho salmon *O. kisutch*, pink salmon *O. gorbuscha*, and sockeye salmon *O. nerka*. Chinook salmon are the largest salmon found in the Yukon River, ranging from 2 to 90 pounds. Spawning populations of Chinook salmon have been documented throughout the Yukon River drainage from the Archuelinguk River, located approximately 80 miles from the mouth, to as far upstream as the headwaters of the drainage in Canada, nearly 2,000 miles from the mouth. Chinook salmon begin entering the mouth of the Yukon River soon after ice breakup, during late May or early June, and continue through mid-July.

The chum salmon return is made up of a genetically distinct early summer chum salmon run and a later fall chum salmon run. Summer chum salmon are characterized by: earlier run timing (early June to mid-July at the mouth), rapid maturation in freshwater, and smaller size (average 6

to 7 pounds). Summer chum salmon spawn primarily in run-off streams in the lower 700 miles of the drainage and in the Tanana River drainage. Fall chum salmon are distinguished by: later run timing (mid-July to early September at the mouth), robust body shape, and larger size (average 7 to 8 pounds). Fall chum salmon primarily spawn in the upper portion of the drainage in streams that are spring fed. Major fall chum salmon spawning areas include the Tanana, Porcupine and Chandalar River drainages, as well as various streams in Yukon Territory, Canada, including the mainstem Yukon River. Fall chum salmon run size is typically much smaller than that of summer chum salmon.

Coho salmon enter the Yukon River from late July through September and average approximately 7 pounds in weight. Coho salmon spawn discontinuously throughout the Alaska portion of the drainage, primarily in tributaries in the lower 700 miles of the drainage and in the Tanana River drainage. Major spawning populations of coho salmon have been documented in tributaries of the Tanana River drainage and in the Andreafsky River.

Pink salmon enter the lower river from late June to late July and average approximately 2 to 3 pounds in weight. Pink salmon primarily spawn in the lower portion of the drainage, downstream of the community of Grayling, river mile 336. However, pink salmon have been caught in the mainstem Yukon River upstream as far as Fort Yukon (river mile 1,002) (Busher et al. 2009). Pink salmon have exhibited a high and low abundance 2 year cycle. High abundance has typically occurred during even numbered years.

Sockeye salmon are present but uncommon in the Yukon River drainage, and only a few fish are caught each year. Sockeye salmon have been reported in the mainstem Yukon River upstream of Rampart, river mile 763. Observations of sockeye salmon have occurred in the Innoko (ADF&G 1986), Kantishna (L. Barton, Commercial Fisheries Biologist, ADF&G, Fairbanks, personal communication 1988), Tanana River upstream of confluence with Kantishna River (B. Borba, Commercial Fisheries Biologist, ADF&G, Fairbanks, personal communication 2004), Anvik (M. Erickson, Commercial Fisheries Biologist, ADF&G, Anchorage, personal communication 1989), and Gisasa (Melegari 2009) river drainages. Sockeye salmon are annually counted at the Andreafsky River weir (Maschmann 2010).

MANAGEMENT

The policy of ADF&G is to manage the salmon runs to the extent possible for maximum sustained yield, unless otherwise directed by state regulation (5 AAC 39.222. *Policy for the Management of Sustainable Salmon Fisheries*). ADF&G has managed the salmon fisheries in the Yukon Area over the past few decades with the dual goal of maintaining important fisheries while at the same time achieving desired escapements consistent with the *Sustainable Salmon Fisheries Policy*. Management of the Yukon River salmon fishery is complex due to the inability to determine stock specific abundance and timing, overlapping multispecies salmon runs, the increasing efficiency of the fishing fleet, allocation issues, and the immense size of the Yukon River drainage. The Alaska State Legislature and the Alaska Board of Fisheries (BOF) have designated subsistence use as the highest priority among beneficial uses of the resource. To maintain the subsistence priority and to provide for spawning escapements to ensure sustainable yields, Yukon River salmon fisheries must be managed conservatively.

For management purposes, the summer season refers to the fishing associated with Chinook and summer chum salmon migrations and fall season refers to the fishing associated with the fall chum and coho salmon migrations. Salmon fisheries within the Yukon River drainage may

harvest stocks that are up to several weeks and over a thousand miles from their spawning grounds. Since the Yukon River commercial fishery is a mixed stock fishery, some tributary populations may be under or over exploited in relation to their actual abundance. Based on current knowledge, it is not possible to manage for individual stocks in most areas where commercial fishing occurs. Within the Yukon River drainage, only stocks within the Tanana and Anvik rivers can be managed as terminal harvest areas.

ADF&G uses an adaptive management strategy that evaluates run strength inseason to determine a harvestable surplus above escapement requirements and subsistence uses. Primary tools used to manage the commercial salmon fisheries are management plans, guideline harvest ranges established by the BOF, and emergency order (EO) authority, which is used to implement time and area openings or closures and fishing gear restrictions. Guideline harvest ranges have been established for Chinook, summer chum, and fall chum salmon commercial fisheries throughout the Alaska portion of the drainage. ADF&G attempts to manage the commercial salmon fisheries so harvest in each district, or subdistrict, is proportionally similar within their respective guideline harvest ranges. Management of commercial fisheries for coho salmon is conditionally based on the abundance of fall chum salmon and typically the harvest is incidental to the fall chum salmon fishery. In 1983, a Set Gillnet Only Area (Figure 10) along the coastal area of District 1 was established where only set gillnets are allowed during commercial fishing periods. In general, more commercial fishing time has been allowed in the coastal Set Gillnet Only Area due to the influence of tides on gear efficiency.

During the fishing season, management is based on preseason projections and inseason run assessment. Inseason run assessment include abundance indices from test fisheries, passage estimates from various sonar projects, and spawning escapement and harvest data. Since 1995, the main river sonar project at Pilot Station has provided inseason estimates of salmon passage for fisheries management. The level of commercial, subsistence, and personal use harvests can be adjusted through the use of EOs to control time and area of openings and closures. News releases announcing emergency orders are broadcast on local radio stations and are transmitted by fax, posted on the state web site (http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main), and distributed by email to communities, processors, buyers, fishermen, and members of the public that register online to receive such announcements. Additionally, select processors, buyers, and fishermen are notified of the EOs by telephone and VHF radio where available.

During YRDFA (Yukon River Drainage Fisheries Association) inseason weekly teleconferences, ADF&G and USFWS (U.S. Fish and Wildlife Service) staff provide run assessment and management strategies. Subsistence fishermen provided reports on fishing efforts, river conditions and the public is encouraged to provide input on management strategies.

In response to the guidelines established in the *Sustainable Salmon Fisheries Policy*, the BOF classified the Yukon River Chinook and fall chum salmon stocks as yield concerns during the September 2000 work session. This determination was based on the inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above the stock's escapement needs since 1998 and the anticipated low harvest level in 2001. In addition, the BOF classified the Yukon River summer chum and Toklat and Fishing Branch River fall chum salmon stocks as management concerns. The determination of the management concerns was based on the chronic inability to meet existing escapement goals for the summer chum stock since 1998 and for the Toklat and Fishing Branch rivers fall chum salmon stocks since 1997.

During the February 2007 BOF meeting, Yukon River summer and fall chum salmon were discontinued as stocks of concern based upon the guidelines established in the *Sustainable Salmon Fisheries Policy* (Clark et al. 2006; Bue et al. 2006). Beginning in 2002 and 2003, the Yukon River summer chum and fall chum salmon runs showed a marked improvement in abundance with the 2005 fall chum salmon the highest on record and the 2006 summer chum salmon the second largest recorded. The improved abundance led to discontinuing summer and fall chum salmon as stocks of concern. However, the most recent 5-year average (2002–2006) harvest of Chinook salmon remained approximately 40% below the historic long-term average (1989–1998) despite use of specific management measures. Thus, the Yukon River Chinook salmon stock was continued as a stock of yield concern based on the inability, despite the use of specific management measures, to maintain expected yields, or harvestable surpluses, above the stock's escapement needs since 1998 (Hayes et al. 2006). Since 2001, there has been an action plan developed through public process to address the Chinook salmon stock of yield concern. The action plan (Hayes et al. 2006) contains goals, objectives, and provisions necessary for achieving rebuilding goals and objectives and is reviewed by the BOF during each cycle meeting.

Various government and non-government agencies operate many projects in the Yukon Area and in Canada to obtain the biological information necessary for management of the salmon runs in 2009 (Appendices A3 and A4). ADF&G's Division of Commercial Fisheries permanent full time staff assigned to the Yukon Area includes 14 positions: 2 area management biologists (1 summer, 1 fall), 3 assistant area management biologists, 9 research biologists, and 1 field office assistant. In addition, approximately 30 seasonal employees annually assist in conducting various management and research projects. ADF&G staff assists with enforcement of regulations in cooperation with the Department of Public Safety, Division of Alaska Wildlife Troopers (AWT).

State of Alaska funding for the Yukon Area salmon management and research program from July 1, 2009 through June 30, 2010 was approximately $1.9 million. Additional projects were funded through federal funding for Yukon River Salmon Treaty Implementation.

ALASKA BOARD OF FISHERIES ACTIONS 2009

Effective July 1, 2009 due to the conservation concern for Chinook salmon and to provide opportunity for a directed summer chum commercial fishery in Districts 1 and 2, the BOF adopted an emergency regulation specifying that during the commercial summer chum salmon season in Districts 1 through 5; Chinook salmon taken may be retained but not sold. Therefore, fishermen could release live Chinook salmon or use them for subsistence purposes. Chinook salmon caught but not sold were to be reported on fish tickets. This emergency regulation was discontinued, effective July 16 since the majority of the Chinook salmon run had passed the lower river districts.

Inseason assessment indicated the fall chum salmon run was poor in 2009 resulting in the commercial fishery being suspended on August 6 and reductions in subsistence fishing time in an effort to attain escapement goals while continuing to provide opportunity to harvest coho salmon. On September 6, 2009 commercial fishing in the District 1 was reopened in an attempt to harvest coho salmon after most of the fall chum salmon had passed this location although this action was not specified within the Yukon River coho salmon management plan. The BOF responded to an emergency regulation request to discuss this issue and met by teleconference on September 8, 2009. The BOF passed an emergency regulation to allow for a directed coho salmon commercial

fishery if ADF&G determined that there was a harvestable surplus of coho salmon above escapement needs and those necessary for subsistence uses and that a directed coho salmon commercial fishery would not have a significant impact on escapement or allocation of fall chum salmon.

FEDERAL SUBSISTENCE MANAGEMENT

Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 mandated that rural subsistence users have a priority over other users to take wildlife on federal public lands where recognized customary and traditional use patterns exist and required the creation of Regional Advisory Councils (RAC) to enable rural residents to have a meaningful role in federal subsistence management. The RACs provide recommendations and information to the Federal Subsistence Board (FSB), review policies and management plans, provide a public forum and deal with other matters relating to subsistence uses. There are 3 RACs that cover separate portions of the Yukon River drainage. On October 1, 1999, the Secretaries of Interior and Agriculture published regulations to expand the federal management program to Alaska rivers, lakes, and limited marine waters within, and adjacent to, federal public lands in which there is a federal reserved water right. In the Yukon River drainage this resulted in a patchwork of federal public lands and waters in which there is a federal reserved water right. The Secretary of Interior and the Secretary of Agriculture delegated their authority in Alaska to the FSB to adopt subsistence harvest regulations on federal public land, including waters running through, or next to, these lands. The FSB or USFWS may close fishing for other uses in these waters and implement a priority for federally qualified rural subsistence users if it is determined necessary to provide for the priority or because of conservation concerns.

Because of the complexity of land status and fisheries in the Yukon Area, ADF&G and the Federal Office of Subsistence Management developed the *Yukon River Drainage Subsistence Salmon Fishery Management Protocol* in 2002 to coordinate subsistence fisheries management. This protocol falls under the umbrella Memorandum of Agreement between the state and federal agencies and formalizes the working relationships between state and federal agencies. State managers are responsible for management of state subsistence, commercial, recreational, and personal use fisheries in all waters. The federal subsistence program is responsible for providing a priority for subsistence harvest by qualified rural residents in waters where federal rules are applicable. The protocol also directs state and federal agencies to work with YRDFA, and Yukon River Coordinating Fishing Committee (YRCFC), which is made up of selected members from the 3 RACs covering the Yukon drainage and other affected public to solicit input to the decision-making process.

Federal subsistence fishing schedules, openings, closures, and fishing methods are established in federal regulations (U. S. Department of Interior 2009-2011). In general, the regulations are the same as those adopted for the subsistence taking of fish under Alaska Statutes (AS 16.05.060). However, differences in regulations do exist in some cases. Federal rules allow customary trade, the sale of subsistence caught fish by federally qualified rural subsistence users. State regulations prohibit the sale of subsistence caught fish in the Yukon River drainage. Since 2005, a federal subsistence drift gillnet fishery has been allowed in Subdistricts 4-B and 4-C, while state regulations do not allow the use of drift gillnet gear in these subdistricts. Participation in this fishery is open to qualified rural residents using gillnets limited to less than 150 feet in length, 35

meshes deep, and unrestricted mesh size to target Chinook salmon in waters where federal rules apply. Additionally, state regulations may be superseded inseason by a Federal Special Action.

U.S./CANADA YUKON RIVER SALMON AGREEMENT AND PANEL

Negotiations were initiated in 1985 between the United States and Canada regarding a Yukon River salmon treaty. The purpose of these negotiations was to develop coordination of management between the U.S. and Canada of salmon stocks that spawn in the Canada portion of the Yukon River drainage. On March 29, 2001 the United States and Canada initialed an agreement which was later signed in December 2002 that is referred to as the *Yukon River Salmon Agreement, Attachment B, Annex IV, Chapter 8 of the Pacific Salmon Treaty*. The Yukon River Salmon Agreement (YRSA) set salmon harvest share target ranges based on assessment of run strength and total allowable catch (TAC) for Chinook and fall chum salmon into the Canada mainstem of the Yukon River.

The United States and Canada JTC was established in 1985 and serves as a scientific advisory body to the Yukon Panel. The JTC meets semi-annually to discuss harvest and escapement goals, management trends, preseason outlooks and postseason reviews, and results of cooperative research projects.

The Yukon Panel meets each fall and spring to develop management recommendations and advise the United States and Canada Governments on conservation and management of the salmon originating in the Canada portion of the Yukon River. Since 2002, in recognition of the changing dynamics of the fishery and the spirit of the agreement, interim management escapement objectives are reviewed and agreed upon jointly each spring prior to the salmon returns.

For the 2009 season, the Yukon Panel agreed to a 1 year Canada interim management escapement goal (IMEG) of >45,000 Chinook salmon based on the Eagle sonar program. The IMEG for the Fishing Branch River of 22,000 to 49,000 fall chum salmon based on the Fishing Branch River weir count will continue through 2010. The Yukon Panel also agreed to a Canada Yukon River fall chum salmon mainstem escapement objective of >80,000 fish based on the Eagle sonar program rather than the one previously based on the mark and recapture project near the mainstem border. In addition to the escapement obligations, the U.S. agreed in the Agreement to a sharing of the harvestable surplus of the Canada run component. Canada is to receive 20% to 26% of the available TAC for Canada bound Chinook salmon and 29% to 35% of the available TAC for Canada bound fall chum salmon as follows (JTC 2010):

1. When the TAC is between zero and 110,000 Chinook salmon, the guideline harvest range for Canada shall be between 20% and 26% of the TAC;
2. When the TAC is above 110,000 Chinook salmon, the guideline harvest range for Canada shall be between 20% and 26% of 110,000, i.e., 22,000 and 28,600 Chinook salmon, plus 50% of the portion of TAC greater than 110,000 Chinook salmon;
3. When the TAC is between zero and 120,000 chum salmon, the guideline harvest range for Canada shall be between 29% and 35% of the TAC; and
4. When the TAC is above 120,000 chum salmon, the guideline harvest range shall be between 29% and 35% of 120,000, i.e., 34,800 and 42,000 chum salmon, plus 50% of the portion of the TAC greater than 120,000 chum salmon.

The Yukon Panel also administers a Restoration and Enhancement Fund (R&E Fund). A key component of the Agreement is administration of the R&E Fund by the Panel to address the restoration and enhancement of Canada spawned salmon stocks. The U.S. contributes $1,200,000 per year into the R&E Fund. Applicants have included regional organizations, Native groups, private consultants and others, primarily in Canada.

AREA SALMON REPORT 2009

TOTAL YUKON DRAINAGE SALMON HARVEST 2009

The total 2009 harvest for the Yukon River drainage, including Canada, was 38,964 Chinook, 238,496 summer chum, 93,926 fall chum, and 25,112 coho salmon (Appendix A5). The 2009 total Yukon River drainage harvests compared to the recent 5-year averages (2004–2008) were as follows: Chinook, 41% below average; summer chum, 25% above average; fall chum, 44% below average; and coho salmon, 38% below average (JTC 2010). An additional 905 Chinook, 12,797 summer chum, 158 fall chum, and 246 coho salmon were caught for subsistence use in the Coastal District outside the drainage (Appendix A24).

COMMERCIAL FISHERY–ALASKA

In 2009, a total of 204,782 salmon were harvested in the Yukon River commercial fishery in Alaska. The harvest by species was 316 Chinook, 170,272 summer chum, 25,876 fall chum, and 8,318 coho salmon taken by 403 permit holders in the Yukon Area in Alaska (Appendices A6 and A7). The 2009 Yukon Area commercial harvests compared to the recent 5-year averages (2004–2008) were as follows: Chinook, 99% below average; summer chum, 66% above average; fall chum, 23% below average; and coho salmon, 19% below average (JTC 2010). Harvest by statistical area for 2009 in the Yukon Area and by gear type in the Upper Yukon Area is shown in Appendices A7–A10. Total exvessel value was approximately $719,000, which is 73% below the recent 5-year average (Appendix A11). Salmon buyers, processors and catcher-sellers operating in the Yukon Area in 2009 are listed in Appendix A12. The salmon harvest was primarily processed as a fresh or frozen product. The summer chum salmon harvest in Subdistrict 4-A and the fall chum and coho salmon harvest in District 6 was the reported number of females taken to produce salmon roe.

CHINOOK AND SUMMER CHUM SALMON

ADF&G uses an adaptive management strategy that evaluates run strength inseason to determine a harvestable surplus above escapement requirements and subsistence uses. Before the 2009 season, YRDFA facilitated a series of regional teleconferences and an in-person meeting to provide managers, fishermen, tribal council representatives, and other stakeholders the opportunity to share information, provide input, and discuss management options. The purpose of the calls and meeting was to work cooperatively to identify options and practical management strategies for 2009 that would assist in getting adequate numbers of fish to the spawning grounds, particularly to Canada, should the 2009 Chinook salmon run be similar to the unexpected low runs of 2007 and 2008. Based on input from these meetings, a preseason management plan was developed for the subsistence fishery. The preseason plan included the following key components:

- Providing for escapement in both Alaska and Canada would be maintained as the highest management priority. Meeting the 1-year Canada IMEG of >45,000 Chinook salmon based

on the Eagle sonar program was a paramount concern after failing to meet the escapement goal in both 2007 and 2008. Subsistence fishing would remain as the highest priority use.

- Because of the below average to poor outlook for Chinook salmon in 2009, and to lessen the subsistence harvest impact on the anticipated weak Canada component, a reduced subsistence fishing schedule would be implemented along the mainstem fishing Districts 1-5. Fishing schedules in each mainstem district would be reduced by half (Table 1).
- The subsistence fishing schedule would begin approximately 7 days after ice out at Alakanuk in District 1, and implemented chronologically with the upriver migration. Delaying the implementation of the schedule would allow for additional subsistence opportunity in late May and early June to harvest whitefish species and earlier returning Chinook salmon.
- Efforts would be made to minimize hardships to the subsistence fishermen where and when available. Because of the large size of Subdistrict 5D and the travel time that is associated with fish migrating through the area, the subdistrict would be divided into separate management portions: the area below 22 Mile Slough and the area above 22 Mile Slough. Subdividing Subdistrict 5D into 2 smaller portions allowed for more management precision and flexibility. The Coastal District, which harvests primarily summer chum and few Chinook salmon, would not be placed on a reduced fishing schedule. However, to reduce harvest of Canada origin Chinook salmon while still allowing for summer chum harvest, gillnet gear in the Coastal District would be restricted to a maximum of 6-inch mesh size. The Koyukuk, Innoko, and Tanana River drainages, which do not harvest Canada-bound Chinook salmon, would be managed independently and placed on normal subsistence fishing schedules.
- Additionally, to conserve the greatest number of Canada-bound Chinook salmon, there would be no fishing on the first pulse. Based on migratory timing 1 to 2 subsistence fishing periods would be pulled and similar actions would be implemented in upriver fishing districts and subdistricts.
- Initial management would be based on this preseason management plan and projection. As the run developed, management decisions would incorporate inseason assessment information. Furthermore, the reduced subsistence fishing schedule was anticipated to be in place until the inseason run size projection was of sufficient strength to warrant relaxing, or discontinuing the schedule.
- The federal manager planned to implement a Special Action to limit the harvest of Chinook salmon in federal public waters to federally qualified rural subsistence users only.

Table 1.–Yukon Area reduced regulatory subsistence salmon fishing schedule, 2009.

Area	Reduced Regulatory Subsistence Fishing Periods	Schedule to Begin	Days of the Week
Coastal District	7 days/week with 6" or smaller mesh size gillnets	7 days after ice out	M/T/W/TH/F/SA/SU – 24 hours
District 1	Two 18-hour periods/week	7 days after ice out	Mon. 8 pm to Tue. 2 pm /Thu. 8 pm to Fri. 2 pm
District 2	Two 18-hour periods/week	2 days after 1	Wed. 8 pm to Thu. 2 pm / Sun. 8 pm to Mon. 2 pm
District 3	Two 18-hour periods/week	3 days after 2	Wed. 8 pm to Thu. 2 pm / Sun. 8 pm to Mon. 2 pm
Subdistrict 4-A	Two 24-hour periods/week	3 days after 3	Sun. 6 pm to Mon. 6 pm / Wed. 6 pm to Thu. 6 pm
Subdistricts 4-B, C	Two 24-hour periods/week	6 days after 4-A	Sun. 6 pm to Mon. 6 pm / Wed. 6 pm to Thu. 6 pm
Koyukuk and Innoko River	7 days/week	By Regulation	M/T/W/TH/F/SA/SU – 24 hours
Subdistricts 5-A, B, C	Two 24-hour periods/week	5 days after 4-B,C	Tue. 6 pm to Wed. 6 pm /Fri. 6 pm to Sat. 6 pm
Subdistrict 5-D (Below 22 Mile Slough)	3.5 days/week	4 days after 5-A,B,C	Sun. 6pm to Thurs 6am
Subdistrict 5-D (Above 22 Mile Slough)	3.5 days/week	7 days after 5-A,B,C	Sun. 6pm to Thurs 6am
District 6	Two 42-hour periods/week	By Regulation	Mon. 6 pm to Wed. Noon /Fri. 6 pm to Sun. Noon
Old Minto Area	5 days/week	By Regulation	Friday 6 pm to Wednesday 6 pm

The first pulse closure was to be announced by short notice news releases on VHF, radio, and YRDFA teleconferences. The Chinook salmon run would be reassessed near the midpoint to determine if the projected run strength was sufficient to warrant relaxing subsistence fishing regulations. If it was determined there was a harvestable surplus of salmon in excess of subsistence uses, the subsistence fishing schedule could revert to the schedule specified in 5 AAC 01.210, (c-h) *Fishing Seasons and Periods*. If projected abundance was low, the reduced subsistence fishing schedule would be re-established after the first pulse had passed.

An informational sheet was mailed to Yukon River commercial permit holders and approximately 2,900 families identified from ADF&G's subsistence survey and permit databases. State and federal staff presented the management strategy to the YRDFA, State of Alaska Fish and Game Advisory Committees, Federal RACs, and other interested and affected parties.

Chinook Salmon

The Canada spawning escapements in 2003 and 2004, the brood years producing age-6 and age-5 fish returning in 2009, were well above average and near the 1999-2008 average, respectively. However, the run of Canada-origin Chinook salmon in 2009 was expected to be below average to poor, with a run outlook of 60,700-71,600 fish based on anticipated low production as observed in 2007 and 2008. For comparison, the average Canada-origin run size from 2000 to 2008 is 97,000 Chinook salmon (JTC 2010).

The total Yukon River Chinook salmon run can be estimated by applying historical average proportions of Canada-origin fish in the total run to the outlook estimated for the Canada component of the run. The 2007 and 2008 proportions of Canada origin fish in the total run were below average (approximately 50%) at 37% and 36%, respectively. Since recent run sizes are considered the best indicators of upcoming run size, the 2009 run outlook estimate is based on the 2007 and 2008 proportions. Using this method, the expected total Yukon River run size was 166,000 based on sibling and the Ricker models, but could be as low as 149,000. Note that there was a lot of uncertainty associated with this methodology.

The 2009 Yukon River Chinook salmon run was projected to be below average to poor with the primary concern being for a poor run of Canada-origin Chinook salmon. It was therefore prudent to enter the 2009 season with the expectation that subsistence conservation measures, beyond those used in 2008, would be required in an effort to share the available subsistence harvest amount and meet escapement goals. It was unlikely that there would be a directed Chinook salmon commercial fishery in 2009 on the mainstem river, but there may have been opportunity to commercially harvest less than 1,000 Chinook salmon in District 6, as the Tanana River is managed independently as a terminal fishery.

In response to the projected low Chinook salmon run, Federal Special Actions closed waters adjacent to federal public lands to the harvest of Chinook salmon by non-federally qualified rural subsistence users effective June 3 in Districts 1, 2, and 3, June 17 in District 4, and June 26 in District 5. Chinook salmon caught by non-federally qualified users fishing for other species could not be retained, but had to be returned to the water unharmed or given to a federally qualified subsistence user.

Ice break up in the lower river occurred with near average timing around May 26. Persistent high water conditions affected early season subsistence fishing efforts. In response to these conditions, implementation of the reduced subsistence schedule was delayed until June 8, beginning in District 1, to allow subsistence fishermen more opportunity to harvest sheefish and earlier returning Chinook salmon. Historically, the schedule was implemented around May 28. The reduced schedule was implemented chronologically with the upriver migration. The Coastal District subsistence schedule remained 7 days per week, but was restricted to a maximum of 6-inch mesh size beginning June 8. The Tanana (District 6), Koyukuk and Innoko rivers subsistence fishing schedules were not reduced because these areas do not harvest Canada-bound Chinook salmon.

Lower Yukon test fishery (LYTF) indices, subsistence harvest reports, and Pilot Station sonar passage estimates provide information ADF&G uses to assess the inseason salmon run. As the run progresses upriver, other projects provide additional run assessment information. The first reported subsistence caught Chinook and summer chum salmon were reported near Emmonak on June 7. The LYTF recorded the first Chinook salmon catches on June 5.

Subsistence closures were initiated in District 1 beginning June 15 to protect the first pulse of Chinook salmon. Two subsistence fishing periods were closed and similar actions were implemented in upriver fishing districts and subdistricts based on migratory timing. Following the pulse closures, each fishing district was returned to the reduced subsistence salmon fishing schedule and remained on the reduced schedule until approximately 80% of the Chinook salmon had passed through that district. In an effort to further conserve Chinook salmon while allowing for the opportunity to target summer chum salmon, gillnets were restricted to a maximum of 6

inch mesh size when Districts 1–3 returned to the reduced fishing schedule. This gear restriction was in place for 2 fishing periods in Districts 1 and 2 and 1 period in District 3.

The LYTF concluded operations on July 15 with a cumulative catch per unit effort (CPUE) of 11.51, which was well below the average of 22.79 (Appendix A13). The first quarter point, midpoint, and third quarter point were June 16 (1 day late), June 22 (2 days late), and June 28 (2 days late) respectively (Figure 11). Estimates provided by LYTF were considered to be conservative due to high water conditions and large amount of debris.

Abundance estimates provided by Pilot Station sonar were also considered to be conservative through June 23 due to high water conditions and dense silt bands, making assessment of the early portion of the run challenging. As the water level dropped, the ability of this project to more accurately assess the run improved. Although sonar passage estimates were considered conservative estimates of the true abundance of the run, inseason run assessment still indicated a lower run size than it actually was based on Eagle sonar passage and escapement monitoring projects later in the season. The inseason Pilot Station sonar project cumulative passage estimate from June 1 to August 9 was 122,990 Chinook salmon (JTC 2010). The first quarter point, midpoint, and third quarter point were on June 24, June 27, and July 1 respectively.

The Pilot Station passage estimate was changed postseason to 144,049 Chinook salmon (Appendix A14). During the winter of 2011/2012, an error in the SAS code used to generate daily estimates at Pilot Station was discovered. This error prevented the DIDSON counts from merging correctly with the split-beam counts resulting in an underestimate of passage in the first 20 m of left bank for the 2009-2011 field seasons only. The error has been corrected and passage estimates for the affected years have updated.

No directed Chinook salmon commercial fishery occurred in 2009. The BOF adopted an emergency regulation specifying that during the commercial summer chum salmon season in Districts 1–5 Chinook salmon taken may be retained but not sold, effective July 1. This regulation was adopted to provide opportunity for a directed summer chum salmon commercial fishery, while reducing the incentive to harvest Chinook salmon.

Based on the projected average run abundance for summer chum salmon, ADF&G initiated short commercial periods restricted to 6-inch maximum mesh size in the lower river districts directed at chum salmon beginning on June 29 (Appendix A16). During the first commercial opening in Districts 1 and 2, buyers voluntarily did not purchase any Chinook salmon. Additionally, ADF&G attempted to schedule these chum salmon-directed commercial periods when Chinook salmon abundance was low. The emergency regulation prohibiting sale of Chinook salmon was discontinued by EO effective July 16 when the majority of the Chinook salmon run had passed the lower river districts. The incidental Chinook salmon commercial harvest after July 15 of 316 Chinook salmon (includes 185 harvested in the fall season) was 99% below the 1999–2008 average harvest of 34,960 fish (JTC 2010).

A total of 944 Chinook salmon were reported as caught but not sold on fish tickets in District 1, 2,596 in District 2, 200 in Subdistrict 4-A and 12 in District 6. The buyer in District 6 voluntarily did not purchase Chinook salmon (Appendix A16).

The border passage estimate from the Eagle sonar project was 69,575 Chinook salmon which was above the average passage from 2005 to 2008 of 56,833 Chinook salmon. The Canada

mainstem spawning escapement estimate of 65,278 Chinook salmon achieved the IMEG of >45,000 fish into Canada (JTC 2010).

Summer Chum Salmon

The Yukon River summer chum salmon run was managed according to the guidelines described in the *Yukon River Summer Chum Salmon Management Plan* (Table 2).

Table 2.–Summary of the summer chum salmon management plan.

	Summer Chum Salmon Management Plan Overview				
	Recommended Management Action				
Projected Run Size [a]	Commercial	Personal Use	Sport	Subsistence	Targeted Drainagewide Escapement
600,000 or less	Closure	Closure	Closure	Closure[b]	>600,000
600,001 to 700,000	Closure	Closure	Closure	Possible Restrictions[b]	
700,001 to 1,000,000	Restrictions[b]	Restrictions[b]	Restrictions[b]	Normal Fishing Schedules	
Greater than 1,000,000	Open[c]	Open	Open	Normal Fishing Schedules	>1,000,000 [d]

[a] Projected Run Size: mainstem river sonar passage estimate plus the estimated harvests below the sonar site and the Andreafsky River escapement.

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

[c] Drainagewide commercial fisheries: harvestable surplus will be distributed by district or subdistrict in proportion to the guidelines harvest levels established in 5 AAC 05.362 (f) and (g) and 5 AAC 05.365 if buying capacity allows.

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

This management plan provides for escapement needs and subsistence use priority before other consumptive uses such as commercial, sport, and personal use fishing. The plan allows for varying levels of harvest opportunity depending on the run size projection. ADF&G uses the best available data to assess the run: 1) preseason run outlooks, 2) Pilot Station sonar passage estimates, 3) test fishing indices, 4) age and sex composition, 5) subsistence and commercial harvest reports, and 6) escapement monitoring projects.

The strength of the summer chum salmon run in 2009 was dependent on production from the 2005 (age-4 fish) and 2004 (age-5 fish) escapements, as these age classes dominate the run. The total run during 2004 and 2005 was approximately 1.5 and 2.5 million summer chum salmon respectively, though tributary escapements were highly variable (JTC 2010).

Since summer chum salmon exhibit a strong every other year pattern with alternating annual dominance of age-4 fish and age-5 fish, an above average percentage of age-4 fish was expected in 2009. It was expected that the total run in the Yukon River would be approximately 1.5–2.0 million summer chum salmon, which constitutes an average run. However, the high seas Bering Arctic subarctic integrated surveys (BASIS) study in Norton Sound in fall 2006 indicated that juvenile chum salmon were less abundant and did not appear to be as healthy as previous years. This signified that the 2009 return of age-4 fish could be less than anticipated.

The 2009 summer chum salmon run was anticipated to provide for escapements, support a normal subsistence harvest, and a surplus for commercial harvest. Summer chum salmon runs have exhibited steady improvements since 2001, with a harvestable surplus in each of the last 6 years (2003–2008). If inseason indicators of run strength developed as anticipated, the commercially harvestable surplus in Alaska was expected to range from 500,000 to 900,000 summer chum salmon. However, the actual commercial harvest of summer chum salmon in 2009 would likely be affected by a potentially poor Chinook salmon run, as Chinook salmon are incidentally harvested in chum salmon-directed fisheries.

The summer chum salmon run exhibited average timing in 2009. Summer chum salmon run passage of approximately 1.4 million fish at the Pilot Station sonar project was the 6th highest on record (Appendix A14). The first quarter point, midpoint, and third quarter point was on June 26, June 28, and July 4, respectively. The average midpoint is June 28. Since 2007, there has been a renewed market interest for summer chum salmon in the lower river districts. ADF&G opened 13 short chum salmon directed commercial periods with fishing gear restricted to 6-inch maximum mesh size in Districts 1 and 2. Because of the uncertainty in Chinook salmon run strength, commercial fishing was delayed and only openings restricted to 6-inch or smaller mesh size were allowed. ADF&G attempted to schedule these directed chum salmon commercial periods when Chinook salmon abundance was low. Additionally, 4 summer chum salmon directed commercial periods were established in Subdistrict 4-A and 6 were established in District 6 (Appendix A16). A summary of emergency orders issued during the Chinook and summer chum salmon fishing season is provided in Appendices A19 and A20.

Harvest and Value

In 2009, a total of 170,272 summer chum salmon were commercially harvested (Appendices A6 and A16) in the Alaska portion of the Yukon River drainage. The incidental harvest of Chinook salmon was 316 which include 185 Chinook salmon harvested in the fall season. The Chinook salmon commercial harvest was 99% below the 1999–2008 average harvest of 32,795 fish (JTC 2010). The summer chum salmon harvest was 150% above the 1999–2008 average harvest of 50,249 fish.

A total of 387 permit holders participated in the Chinook and summer chum salmon fishery, which was 33% below the 1999–2008 (not including 2001) average of 575 permit holders. The Lower Yukon Area (Districts 1–3) and Upper Yukon Area (Districts 4–6) in Alaska are separate Commercial Fisheries Entry Commission (CFEC) permit areas. A total of 376 permit holders fished in the Lower Yukon Area in 2009, which was 32% below the 1999–2008 average of 555 permit holders. In the Upper Yukon Area in Alaska, 11 permit holders fished, which was 52% below the 1999–2008 (not including 2001) average of 23 permit holders (JTC 2010)

Yukon River fishermen in Alaska received an estimated $556,000 for their Chinook and summer chum salmon harvest in 2009, approximately 76% below the 1999–2008 average of $2.3 million (Appendix A11). Lower Yukon River fishermen received an estimated average price per pound of $5.00 for Chinook and $0.50 for summer chum salmon. The average price paid for Chinook salmon in the Lower Yukon Area was 36% above the 1999-2008 average of $3.67 per pound. Prices paid for summer chum salmon in the round continued to be low as observed since 1995. The average income for Lower Yukon Area fishermen in 2009 was $1,425. Upper Yukon Area fishermen received an estimated average price per pound of $0.26 for summer chum sold in the round and $3.00 for summer chum roe. The average price paid for summer chum salmon sold in the round in

the Upper Yukon Area was 7% above the 1999–2008 average of $0.24 per pound. The average income for Upper Yukon Area fishermen that participated in the 2009 fishery was $1,857 (JTC 2010).

Results by District

Districts 1–3

A total of 131 Chinook salmon were incidentally harvested in 1 restricted period in District 2. (Appendix A16). Additionally, a total of 185 Chinook salmon were incidentally harvested in District 1 and 2 during the fall season. The combined total harvest of all openings in Districts 1 and 2 was 316 Chinook salmon. The average weight of Chinook salmon in restricted mesh openings in Districts 1 and 2 was 13.3 pounds (Appendix A16).

Since 2007, there has been a renewed market interest for summer chum salmon. Based on the projected average run estimate for summer chum, ADF&G established short commercial periods restricted to 6-inch maximum mesh size in the lower river Districts 1 and 2 directed at chum salmon beginning in District 2 with a 3-hour commercial period on June 29. Because of the uncertainty about the Chinook salmon run strength, an attempt was made to schedule chum salmon directed periods when Chinook salmon abundance was low.

There was a total of 13 commercial periods directed at summer chum salmon. The combined commercial summer chum salmon harvest in District 1 and 2 was 157,906 fish. Average weight of summer chum salmon was 6.5 pounds. Fishermen were informed that any Chinook salmon incidentally harvested could be released alive or taken home for subsistence use. Chinook salmon caught but not sold were to be reported on fish tickets (Appendix A16).

The Chinook salmon age composition from the LYTF 8.5 inch set gillnet test fishery for the season was 3.4% age-4, 9.1% age-5, 85.5% age-6, and 2.0% age-7 fish. The sample size was 1,035 fish. Age-6 fish were 20% above average. Females comprised 60.3% of the sample; 7.0% above average (Horne-Brine et al. 2011).

The summer chum salmon age composition from the 5.5 inch drift gillnet test fishery was 1.2% age-3, 48.8% age-4, 47.9% age-5, 1.8% age-6, and 0.2% age-7 fish. The sample size was 1,042 fish and females comprised 54.3% (Horne-Brine et al. 2011).

The summer chum salmon age composition from the District 1 commercial harvest with 6-inch maximum mesh size gillnets was 1.5% age-3, 47.1% age-4, 48.8% age-5, 2.5% age-6, and 0.1% age-7 fish. The sample size was 957 fish and females comprised 49.6% (Horne-Brine et al. 2011).

The summer chum salmon age composition from the District 2 commercial harvest with 6-inch maximum mesh size gillnets was 0.9% age-3, 48.1% age-4, 48.8% age-5, 2% age-6, and 0.2% age-7 fish. The sample size was 946 fish and females comprised 48.3% (Horne-Brine et al. 2011).

Age and sex composition of Chinook salmon in the lower river commercial harvest is not available for 2009 because all commercial fishing periods were directed at summer chum salmon with gillnets restricted to 6-inch or smaller mesh size. Most Chinook salmon were either released or retained for subsistence use.

Districts 4–6

Historically, the Subdistrict 4-A fishery targets summer chum salmon. The dominant gear type (fish wheels) and the location of the fishery typically result in a very high chum to Chinook salmon ratio. Commercial fishing in Subdistrict 4-A consisted of 4 periods for a total of 108 hours of fishing time in 2009. However, limited salmon markets resulted in low effort and subsequently low harvest. Commercial fishing occurred near the village of Anvik. A total of 6 fishermen harvested 4,589 summer chum salmon, which produced a total of 3,906 pounds of summer chum salmon roe in Subdistrict 4-A (Appendix A16). Fishermen were paid based upon pounds of roe with the number of female summer chum salmon harvested reported on fish tickets. Average weight of summer chum salmon was estimated to be 5.2 pounds. Most fishermen manned their fish wheels to release Chinook salmon and male summer chum salmon. The summer chum salmon age composition from the Subdistrict 4-A commercial harvest was 2.6% age-3, 56.1% age-4, 39.2% age-5, and 2.1% age- 6 fish. Females comprised 100% of the sample. Sample size was 381 fish (Horne-Brine et al. 2011). The Anvik River had an escapement of approximately 193,099 summer chum salmon (Appendix A26). The projected escapement required to allow an inriver commercial fishery is 500,000 fish. Therefore, the Anvik River Management Area (Figure 9) remained closed to commercial fishing in 2009. No commercial deliveries were reported in Subdistricts 4-B and 4-C and District 5 because of a lack of a market.

District 6 was managed using inseason run timing information provided by the test fish wheel operated near the community of Nenana (Appendix A18) and escapement estimates provided by tower counting projects on the Chena and Salcha rivers. By July 24, a harvestable surplus of summer chum salmon was identified. Based on the available surplus and market interest, ADF&G scheduled the first commercial fishing period to target chum salmon in District 6 on July 25. ADF&G scheduled 6 commercial fishing periods in District 6. The cumulative harvest was 7,777 summer chum salmon (Appendix A16). No Chinook salmon were sold. Fishermen released live Chinook salmon or retained them for personal use.

In the District 6 summer chum salmon commercial harvest, 679 fish were sampled. The summer chum salmon age composition from the samples was 3.9% age-3, 71.1% age-4, 23.6% age-5, 1.3% age-6, and 0.1% age-7 fish. The percentage of females was 55.9% (Horne-Brine et al. 2011).

FALL CHUM AND COHO SALMON

The *Yukon River Drainage Fall Chum Salmon Management Plan* (Table 3) incorporates the U.S./Canada treaty objectives for border passage of fall chum salmon and provides guidelines necessary for escapement and prioritized uses.

Table 3.–Summary of the fall chum salmon management plan.

Projected Run Size [a]	Fall Chum Salmon Management Plan Overview Recommended Management Action				Targeted Drainagewide Escapement
	Commercial	Personal Use	Sport	Subsistence	
300,000 or less	Closure	Closure	Closure	Closure[b]	300,000 to 600,000
300,000 to 500,000	Closure	Closure[b]	Closure[b]	Possible Restrictions[b,c]	
500,000 to 600,000	Restrictions[b]	Open	Open	Pre-2001 Fishing Schedules	
Greater than 600,000	Open[d]	Open	Open	Pre-2001 Fishing Schedules	

[a] For projected run size; use the best available data (including preseason projections, mainstem river sonar passage estimates, test fisheries indices, subsistence and commercial fishing reports, and passage estimates from escapement monitoring projects).

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

[c] Subsistence fishing will be managed to achieve a minimum drainagewide escapement goal of 300,000.

[d] Drainagewide commercial fisheries may be open and the harvestable surplus above 600,000 will be distributed by district or subdistrict (in proportion to the guidelines harvest levels established in 5 AAC 05.365 and 5 AAC 05.367.

There are incremental provisions in the plan to allow varying levels of subsistence salmon fishing balanced with requirements to attain escapement objectives. The intent of the plan is to align management objectives with the established biological escapement goals (BEGs), provide flexibility in managing subsistence harvest when the stocks are low, and bolster salmon escapement as run abundance increases.

Fall Chum Salmon

The estimated summer chum salmon run size and the fall chum salmon preseason projection influences early fall season management. However, the Pilot Station sonar project is the primary inseason assessment tool used for management of the fall season. Pilot Station sonar provides daily passage estimates of fall chum salmon that is used to derive run size projections as the run develops. Inseason run projections based on passage estimates provided by Pilot Station sonar trigger management actions as dictated by the fall chum salmon management plan. Additional lower river index projects, including the drift gillnet test fisheries located at Emmonak (operated by ADF&G) (Padilla and Borba 2011) and Mountain Village (operated by Asacarsarmiut Traditional Council), provide run timing information. Relationships in run timing and run strength from the various index projects, as well as subsistence fishing reports, are compared for consistency with the Pilot Station sonar estimates as a method to check that projects appeared to be operating correctly. Individual pulses are tracked as they move up river and the Pilot Station sonar is used to estimate the abundance of each pulse.

In 2009, each pulse of fall chum salmon appeared to correlate well between the Pilot Station sonar daily passage estimates and the other assessment projects in the Lower Yukon Area for run timing, but less so for relative magnitude, particularly during pulse 3. There was concern that extremely low water levels were changing fish movement past the sonar. The 2009 fall chum salmon passage estimate was thought to be conservative due to difficulties test fishing and species apportionment issues. If fall chum salmon passage was underestimated due to species

apportionment difficulties, then coho salmon and other non-salmon species may have been over-estimated.

The primary brood years that produced the 2009 fall chum salmon run were 2005 for age-4 and 2004 for age-5 fish. There was a great amount of uncertainty concerning the return of the age-4 fish, which typically dominate the run, because of the extremely large run and resulting escapement observed in 2005. The 2009 preseason run size projection ranged from approximately 600,000 to 980,000 fall chum salmon. The projection range was developed based on 2 possible return per spawner rates; the lower bound was based on a model using 0.29 return per spawner, and the upper bound was based on the point of equilibrium of the spawner recruit model which was estimated to be 0.56 return per spawner. Both estimates of production for 2005 (age-4 component) were applied to the 1984 to 2002 even/odd maturity schedules to represent the expected lower trend in production. The range in run size developed from these models indicated an outlook that would provide for escapement requirements, subsistence and personal use fisheries, and a surplus of 50,000 to 300,000 fall chum salmon available for commercial harvest.

Although there was concern for poor production of the age-4 component of the run, the sheer size of the primary parent year escapement was taken into account and the preseason management strategy to begin the fall season using the pre-2001 subsistence fishing regulations in accordance with the management plan was implemented on July 16. Subsistence fishing in the Coastal District, and Districts 1, 2, and 3, was open 7 days a week, 24-hours a day except for closures of 12-hours before, during, and 12-hours after each commercial salmon fishing period. The Innoko River was open 7 days per week and pre-2001 subsistence salmon fishing regulations were applied in the Upper Yukon Area.

The run size projection and the relationship between the summer and fall chum salmon runs suggested the fall run would perform similarly and that there would be a surplus available for commercial harvest. Since commercial markets were willing to buy fish harvested during the overlap of summer and fall chum salmon, commercial fishing continued immediately following the summer season. These harvests took advantage of unusually good quality late summer chum salmon when they were mixed with overlapping early fall chum salmon.

Districts 1 and 2, Subdistricts 5-B and 5-C, and District 6 had commercial buyer commitments prior to the season. The first fall season commercial fishing periods began on July 17 in District 1 and July 20 in District 2 (Appendix A21 and A22). Commercial fishing periods continued to be scheduled in both District 1 and District 2 until August 5 and August 3, respectively. Fall chum salmon were harvested commercially prior to and during the first small pulse of fish. There were 7 commercial fishing periods opened, 4 in District 1 and 3 in District 2 through August 5. However, the Pilot Station sonar cumulative estimate through August 5 of 57,000 fish was well below the historical average of 243,000 fall chum salmon for that date of operation (Appendix A21). Therefore, additional fish were needed to catch-up with the run passage necessary to provide for escapement and meet subsistence requirements. Consequently, commercial fishing activity was suspended.

The first small pulse of approximately 37,000 fall chum salmon began entering the mouth of the river on July 30 and lasted 2 days. A second more significant pulse of salmon began entering the mouth of the Yukon River on August 8. The Pilot Station sonar estimated the pulse to be comprised of approximately 104,000 fall chum salmon. The third pulse was small and represented only 18,000 fall chum salmon passing on August 21–22. As of August 30, the

cumulative fall chum salmon passage was estimated to be a record low of approximately 211,000 fish, which was well below the average of 652,000 for that date. The 90% confidence interval around the point estimate suggests the passage could range from 176,000 to 247,000 fall chum salmon (Figure 12).

Annual reconstruction of previous runs suggests the point estimate based on Pilot Station sonar is conservative and therefore run passage was estimated to be near the upper end of the estimated range. Furthermore, during August and early September, unusually shallow water on the left bank sonar site appeared to be causing salmon to spread out and migrate farther offshore. Fish detection did not appear to be a problem. However, species apportionment was problematic due to very low test fish catches; some days there was no catch of fall chum salmon. Because most of the few fish caught on the left bank were coho salmon and whitefish, counts may have been underestimated for fall chum salmon on the left bank. Attempts were also made to test fish below and above the left bank sonar site to increase test fishing catches. Additionally, local fishermen were contracted to conduct drifts with longer gillnets in an effort to determine fish distribution. Flat Island, Big Eddy and Middle Mouth as well as Mountain Village test fisheries and subsistence catch reports indicated a higher proportion of coho than fall chum salmon. Taking all of this into account, the fall chum salmon run abundance was assessed to be weak with a projected run size of 300,000 to 325,000 fish inseason.

Concerns for not being able to achieve fall chum salmon escapement goals prompted reductions in subsistence fishing time in the lower river in an effort to attain goals while continuing to provide opportunity to harvest coho salmon. Similar management actions of reducing fishing time by one third of the standard windows schedule were applied sequentially as fall chum salmon moved upstream. Subsistence fishing time in Districts 1, 2, and 3 was reduced to a schedule of two 24-hour periods per week on August 18 and returned to their 7 day per week schedule on Thursday, September 3. Subsistence fishing in the Coastal District and the Innoko and Koyukuk River drainages remained open 24 hours a day, 7 days a week because of low fishing effort and inefficient fishing conditions in these areas. District 4 began a reduced schedule of two 32-hour periods a week on August 27 and went to 7 days per week on September 9. Subdistricts 5-A, 5-B, and 5-C began a reduced schedule of two 32-hour periods per week on September 2, returned to a schedule of 5 days a week on September 15, and opened to 7 days per week on September 27. The lower portion of Subdistrict 5-D, including the Porcupine River, Fort Yukon, Beaver, and Stevens Village, began a reduced weekly fishing schedule of 4.5 days per period on September 6 and returned to 7 days per week on September 23. The upper portion of Subdistrict 5-D, including the communities of Circle, Central, and Eagle, began a reduced weekly fishing schedule of open 4.5 days per period on September 15 and returned to 7 days per week on September 25. District 6 began a reduced weekly fishing schedule of two 28-hour periods per week on September 4 and returned to two 42-hour periods per week on September 18. Additionally, personal use salmon fishing in the Tanana River closed September 2 and reopened on September 18.

Most assessment projects indicated the third pulse was relatively small, however test fishing at Pilot Station sonar suggested even fewer fall chum salmon were present with a higher proportion of coho salmon. The Pilot Station sonar cumulative total estimate of fall chum salmon for the 2009 season was 233,307 fish (Figure 12; Appendix A14) through September 7, the last day of operation. Based on the uncertainties, the estimated run size at Pilot Station sonar was considered conservative, and the inseason run size estimate was increased to a range of 316,000 to 336,000

using historical average run sizes for coho salmon and other fish species. The delayed arrival of the first pulse which occurred after the average first quarter-point in run timing resulted in the run shifting 7 days late at the first quarter point, 2 days late at the mid-point, and average timing at the three-quarter point. The magnitude of pulse 3 was small at Pilot Station sonar, but appeared to sustain itself longer than expected past upriver projects even with fish migrating through a high water event between pulses 2 and 3 in the upper river.

Run reconstruction based on upriver projects appears to substantiate an under estimated abundance of fall chum salmon at Pilot Station sonar and possible over estimation of coho salmon. The total fall chum salmon run size, based partially on genetic mixed stock analysis (MSA) and estimated escapement and passage to monitored spawning areas, was approximately 450,000 fish. The MSA data indicates approximately one half of the first pulse of chum salmon was comprised of summer chum salmon stocks. Samples of the second pulse suggested that approximately 70% of the fish were likely bound for tributaries in the upper Yukon River drainage. Results from the third pulse indicated that 61% were bound for upper Yukon River tributaries, 26% were bound for Tanana River drainage, and approximately 13% were summer stocks. Although there was no large pulse detected at the end of the run, the Tanana River stocks eventually represented 56% in the last strata which is typical for the latest component of the run. Because of known difficulties in catching fish at the Pilot Station sonar site, samples may not reflect the stock composition as well as in previous years.

After the majority of fall chum salmon passed the lower Yukon River districts, commercial fishing was once again initiated beginning on September 6 in District 1 (Appendix A21) to allow harvest of later running coho salmon. The Tanana River is managed under the *Tanana River Salmon Management Plan* which provides guidelines to manage District 6 as a terminal fishery based on the assessed strength of the stocks in the Tanana River drainage. Commercial fisheries also occurred in District 6. A total of 4 commercial periods were scheduled in District 6 from September 18 to September 30. Subsistence fishing in Subdistricts 6-A and 6-B was relaxed to 7 days a week effective October 1, in accordance with the management plan at the close of the commercial fishing season.

Overall the fall season fishery was extremely challenging from the very onset with determination of the preseason projection. The nature of the fall chum salmon pulses spread out over the length of the season, separated with long durations of low passage rates of fish entering the river and relatively small pulses, made inseason run size projection difficult in 2009. Management of the fishery was a struggle the entire second half of the fall chum salmon run between meeting escapement needs and providing opportunity for subsistence fishing. The estimated overall harvest resulted in an exploitation rate (approximately 17%) which was equal to the recent 10 year average from 1999 to 2008 and slightly more than one half the previous 10-year average from 1989 to 1998 of 31%. The amount of commercial opportunity was low and fragmented with moderate effort while subsistence opportunity was restricted for a portion of the season. The drainagewide escapement was within the targeted range and, although the border objectives were met along with most tributary escapement goals, it was the reduced overall harvest that provided the necessary escapement levels.

Coho Salmon

The 2009 coho salmon commercial harvest was dependent to a large extent upon the abundance of fall chum salmon and the accompanying management strategies. The coho salmon outlook for

2009 was for a continuation in the trend of average to above average runs. Subsistence harvests were expected to be below average because of low fishing effort and there was a potential commercial harvest of 30,000 to 70,000 fish.

The coho salmon run exhibited slightly early run timing (by 2 days for most assessment projects) with an above average run size based on Pilot Station sonar. Test fishery projects at Emmonak, Mountain Village, and in the Tanana River provided similar assessment of run timing, but all test fishery projects were below average in relative abundance. The Pilot Station sonar inseason cumulative passage estimate through September 7 of 206,620 coho salmon (Appendix A14) was well above the average of 163,000 for this date but is suspected to be an over-estimation. ADF&G and cooperating fishermen conducted additional test fishing to supplement assessment project information. The additional catches agreed with other assessment projects in that the coho salmon abundance was high relative to fall chum salmon which typically dominate the fall season. However, because of species apportionment difficulties at the Pilot Station sonar site, the coho salmon run size was not considered to be above average.

On September 6 commercial fishing in District 1 was reopened in an attempt to harvest coho salmon after most of the fall chum salmon had passed this location although this action was not specified within the Yukon River coho salmon management plan. The BOF responded to an emergency regulation request to discuss this issue and met by teleconference on September 8, 2009. The BOF passed an emergency regulation to allow for a directed coho salmon commercial fishery if ADF&G determined that there was a harvestable surplus of coho salmon above escapement needs and those necessary for subsistence uses and that a directed coho salmon commercial fishery would not have a significant impact on escapement or allocation of fall chum salmon. The BOF action affirmed fishery managers' decision to open the late-season coho salmon commercial fishery. The resulting harvest averaged 77% coho salmon during the late season commercial fishing periods in the lower river districts. In the upper river, 4 commercial fishing periods were announced for District 6 after September 18, when the majority of fall chum salmon had passed. The commercial harvest of coho salmon would have been greater in 2009 if not for the fall chum salmon conservation concerns and subsequent management actions.

Harvest and Value

The 2009 total commercial harvest for the Yukon River fall season included 25,876 fall chum and 8,318 coho salmon for the Alaska portion of the drainage (Appendix A6 and A21). A total of 23,983 fall chum and 7,576 coho salmon were harvested in the Lower Yukon Area and 1,893 fall chum and 742 coho salmon were harvested in the Upper Yukon Area (Appendix A21). All of the Upper Yukon Area harvest occurred in District 6 where female salmon were selectively purchased for roe extraction during the fall season. The male portion of the harvest (2,234 fall chum and 307 coho salmon) was reported as "caught but not sold" and subsequently used for subsistence and was not counted towards the commercial harvest. Additionally, female carcasses from the roe fisheries were available for subsistence use. The 2009 Yukon Area fall chum salmon commercial harvest was approximately 58% below the previous 10-year average (1999–2008) of 60,012 fish and 68% below the 10-year average of 25,060 coho salmon (JTC 2010). In Districts 1 and 2, the average weight was 6.6 and 6.9 pounds for fall chum and coho salmon, respectively.

There were a total of 10 fall season commercial fishing periods in the Yukon River Districts 1 and 2 combined (7 periods in District 1; 3 periods in District 2) (Appendix A21). After the halt of commercial fishing in early August, buyers were only available in District 1 when fishing

reopened in September. Period length varied from 6 to 10 hours in District 1 and from 4 to 9 hours in District 2. No periods were scheduled in District 3 and 4 due to the lack of a market and District 5 due to conservation measures. In the Tanana River, District 6, there were four 42-hour commercial salmon fishing periods September 18 through September 30 (Appendix A21).

The 2009 commercial fall chum and coho salmon season value for the Yukon Area was $162,700. The 1999-2008 average value for the Yukon Area was $258,800 (Appendix A11). Yukon River fishermen received an average price of $0.70 per pound for fall chum salmon in the Lower Yukon Area and $0.19 per pound in the Upper Yukon Area in 2009. This compares to the 1999–2008 average of $0.28 per pound in the Lower Yukon Area and $0.16 per pound in the Upper Yukon Area. For coho salmon, fishermen in the Lower and Upper Yukon Areas received an average price of $1.00 per pound and $0.15 per pound, respectively compared to the recent 10-year average price of $0.39 and $0.12 per pound, respectively (JTC 2010).

Fishing effort has increased in recent years (Appendix A21). A total of 294 fishermen participated in the 2009 fall chum and coho salmon fishery (292 for the Lower Yukon Area, 2 for the Upper Yukon Area) compared to the recent 10-year average of 167 permit holders (160 for the Lower Yukon Area, 7 for the Upper Yukon Area). Even though the effort appears higher than average, participation is concentrated around a few buying stations rather than spread throughout the drainage as it was prior to 1997 (JTC 2010).

ALASKA-SUBSISTENCE, PERSONAL USE, AND SPORT FISHERY

SUBSISTENCE SALMON FISHERY

Subsistence salmon fishing activities in the Yukon Area typically begin in late May and continue through early October. Salmon fishing in May and October is highly dependent upon river ice conditions. Fishing activities are usually based from a fish camp or a home village. Extended family groups, representing 2 or more households, often work together to harvest, cut, and preserve salmon for subsistence use. Some households from communities not located along the mainstem Yukon River operate fish camps along the mainstem Yukon River.

Throughout the drainage most Chinook salmon harvested for subsistence use are dried, smoked or frozen for later human consumption. Summer chum, fall chum and coho salmon harvested in the Lower Yukon Area are primarily utilized for human consumption and are dried, smoked, or frozen for later use. In the Upper Yukon Area, small Chinook (jacks), summer chum, fall chum, and coho salmon are all important sources of food for humans, but a larger portion of the harvested salmon are fed to dogs used for recreation, transportation and drafting activities (Andersen 1992). Summer chum salmon used for dog food are typically dried. Fall chum and coho salmon are often frozen in the open air and called “cribbed” fish.

Documentation of the subsistence salmon harvest is necessary to determine if sufficient salmon are returning to the Yukon Area for subsistence uses and if enough fishing opportunities are provided to meet subsistence uses. One method for assessing the relative success of Yukon Area fishermen is to compare the annual drainagewide estimated subsistence harvest to historic averages and to the amounts (reasonably) necessary for subsistence (ANS) harvest ranges established by the BOF (Busher et al. 2008). The ANS levels outlined in regulation 5 AAC 01.236 are 45,500–66,704 Chinook, 83,500–142,192 summer chum, 89,500–167,900 fall chum, and 20,500–51,980 coho salmon. In years with fishery restrictions, estimates of harvest can be

used to assess the effect of the management actions taken to meet escapement needs for future salmon production.

Most subsistence users in the Alaska portion of the Yukon River drainage are not required to report their salmon harvest. The primary method of estimating this harvest is voluntary participation in the annual subsistence salmon harvest survey conducted by ADF&G (Jallen and Hamazaki 2011). Typically 33 communities are surveyed following the salmon fishing season beginning in early September and continuing through early November. Community household lists are maintained and updated annually during the surveys to provide the most current information. All households in each community are assigned to 1 of 5 harvest use groups based on their recent historical harvest pattern. Households are preselected for survey and heads of households are targeted for interviews but another knowledgeable household member may be interviewed. Survey data are expanded to estimate total subsistence harvest in surveyed communities.

In portions of the upper Yukon and Tanana River drainages that are road accessible, fishermen are required to obtain a household subsistence fishing permit. Data obtained from subsistence permits are added to the total estimate of the subsistence salmon harvest provided by the survey portion. Subsistence totals also include salmon that are harvested from test fishery projects and distributed to residents of communities near the projects. Subsistence surveys and fishing permits also include other information such as non-salmon harvest and demographic information. In addition to postseason surveys and permits, subsistence "catch calendars" are mailed to approximately 1,500 households annually in the non-permit portions of the Yukon River drainage. Calendars supplement the survey information, assist households in recounting their catches when surveyed, and also provide harvest timing information by fish species.

In 2009, an estimated 1,358 households fished for salmon from 33 communities including the Coastal District communities of Hooper Bay and Scammon Bay (Appendix A24). Additionally, 419 subsistence permits were issued, 404 permits were returned, and 217 household subsistence permit holders reported to have fished for salmon and other non-salmon fish species in portions of the Yukon Area drainage requiring a permit. The 2009 estimated subsistence salmon harvest in the Alaska portion of the Yukon River Area (including Coastal District communities of Hooper Bay and Scammon Bay) totaled 33,932 Chinook, 80,847 summer chum, 66,197 fall chum, and 16,076 coho salmon (Appendix A24). The recent 5 year average (2004–2008) subsistence salmon harvest is estimated at 51,611 Chinook, 93,138 summer chum, 83,472 fall chum, and 21,297 coho salmon in the Alaska portion of the Yukon River Area (Jallen and Hamazaki 2011).

Inseason reports from fishermen in 2009 suggested that most Yukon Area subsistence fishing households did not meet all their subsistence needs for salmon and all subsistence salmon harvests were below ANS. The poor Chinook salmon and fall chum salmon runs resulted in management actions that reduced subsistence salmon fishing opportunities during both fishing seasons. Closures during the first pulse of Chinook salmon and fishing restrictions in the mainstem Yukon River were mentioned by some fishermen on tributary rivers as contributing to good abundance and better quality of Chinook salmon in their areas.

Generally, surveyed households in the lower Yukon River and in some middle Yukon River communities fared better in harvesting Chinook and summer chum salmon than the upper mainstem Yukon River and tributary communities. During the fall season, surveyed households

in most drainagewide communities equally indicated that their fall chum and coho salmon subsistence needs were not met.

Other commonly cited reasons for not meeting needs: the fishing schedule conflicted with work opportunities, fishing periods were too short and families could not afford to travel back and forth to fish camps, and fishing took place during poor weather conditions for fish preservation. Additional factors contributing to the inability to meet subsistence salmon needs included fuel shortages, high fuel prices, health, elders unable to fish, lack of fishing gear, participating on fire-fighting crews, and mechanical problems. Flooding during breakup in 2009 affected many communities along the river. Some communities lost fish wheels or other gear, and fishermen may have spent time and resources cleaning up flood damages. In response to the low Chinook salmon run, Federal Special Actions restricted Chinook salmon harvest in waters adjacent to federal lands to federally qualified rural users. This resulted in confusion as to where federal waters were located and how non-federally qualified users could participate in family fishing activities.

PERSONAL USE FISHERY

Fairbanks Nonsubsistence Area, located in the middle portion Tanana River, contains the only personal use fishery within the Yukon River drainage. Subsistence or personal use permits have been required in this portion of the drainage since 1973. Personal use fishing regulations were in effect from 1988 until July 1990 and from 1992 until April 1994. In 1995, the Joint Board of Fisheries and Game reestablished the Fairbanks Nonsubsistence Area, and it has been managed consistently under personal use regulations since then. Historical harvest data must account for these changes in status. Subsistence fishing is not allowed within nonsubsistence areas.

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

In 2009, total of 57 personal use salmon and 11 personal use whitefish and sucker household permits were issued. The 2009 harvest results based on 68 (100%) personal use household permits returned in Subdistrict 6-C included 127 Chinook, 308 summer chum, 78 fall chum, and 70 coho salmon (Appendix A25). The recent 5 year (2004–2008) average personal use harvest was 138 Chinook, 193 summer chum, 210 fall chum, and 161 coho salmon in the Yukon River drainage (Jallen and Hamazaki 2011). In addition, personal use permit holders reported harvesting 48 whitefish, 1 sheefish, and 315 suckers (Appendices C1 and C2).

SPORT FISHERY

Sport fishing effort for anadromous salmon in the Yukon River drainage is directed primarily at Chinook and coho salmon, with little effort directed at chum salmon. In this report all of the chum salmon harvested in the sport fishery are categorized as summer chum salmon. A portion of the genetically distinct fall chum salmon stock may be taken by sport fishermen, however most of the sport chum salmon harvest is thought to be made up of summer chum salmon because: 1) that run is much more abundant in tributaries where most sport fishing occurs, and 2)

the chum salmon harvest is typically incidental to effort directed at Chinook salmon which overlap in run timing with summer chum salmon.

Most of the drainage's sport fishing effort occurs in the Tanana River drainage along the road system. From 2004 to 2008 the Tanana River on average made up 79% of the total Yukon River drainage Chinook salmon harvest, 36% of the summer chum salmon harvest, and 51% of the coho salmon harvest. In the Tanana River, most Chinook and chum salmon are harvested from the Chena, Salcha, and Chatanika rivers, while most coho salmon are harvested from the Delta Clearwater and Nenana River systems. In the Yukon River drainage, excluding the Tanana River, most sport fishing effort for salmon takes place in the Anvik and Andreafsky rivers.

In 2009, an Emergency Order was issued on May 28 that reduced the sport fish daily bag and possession limit from 3 to 1 Chinook salmon on the Alaska portion of the Yukon River tributaries (excluding the Tanana River drainage) and prohibited the retention of Chinook salmon in the mainstem Yukon River. On September 1 there were 2 Emergency Orders issued to close all waters of the Yukon and Tanana River drainages to the retention of chum salmon. All of these actions remained in effect throughout the entire 2009 salmon season.

Alaska sport fishing effort and harvests are monitored annually through a statewide sport fishery postal survey. The total 2009 sport harvest of salmon in the Alaska portion of the Yukon River drainage (including the Tanana River) was estimated at 863 Chinook, 174 summer chum, and 964 coho salmon (Appendix A5). The recent 5 year (2004–2008) average Yukon River drainage sport salmon harvest was estimated at 821 Chinook, 367 summer chum and 838 coho salmon (JTC 2010).

Since 2005, all freshwater sport fishing guides and guide businesses operating in Alaska have been required to be licensed. In addition, sport fishing guides and businesses are required to report sport fish harvest and fish released by species in logbooks. From 2006 to 2008, guided sport harvests in the Yukon River drainage (excluding the Tanana River drainage) averaged 98 Chinook and 246 coho salmon (Sigurdsson and Powers 2009).

ENFORCEMENT

The primary enforcement authority for violations of Fish and Game regulations is the Department of Public Safety, AWT. AWT monitored subsistence, personal use, and commercial fisheries within the Yukon Area.

Patrols were conducted in Districts 1, 2 and 3 of the Yukon Area with the use of float planes and several skiffs during salmon fisheries in June. Boating safety patrols were conducted in conjunction with commercial fisheries enforcement and citations/warnings were issued for lack of personal floatation devices and vessel registrations.

CANADA: COMMERCIAL, ABORIGINAL, DOMESTIC, AND RECREATIONAL FISHERIES

COMMERCIAL

The Canada commercial fishery was closed throughout most of the 2009 Chinook salmon season. A total of 364 Chinook salmon were harvested during 2 commercial fishery openings (Appendix A23). For comparison, the previous 10 year average (1999–2008) commercial catch was 2,582 Chinook salmon. The average does not include the years 2000, 2007 and 2008, when the

fishery was closed; however, it includes very low catches in 1998 and 2002 when the commercial fishery was severely restricted (JTC 2010). The inseason run status of the 2009 Chinook salmon return resulted in commercial fishing opportunities taking place very late in the fishing season.

Below average run strength and late timing resulted in limited opportunities for commercial fishery openings during the fall chum salmon season. Only 293 fall chum salmon were harvested in the commercial fishery (Appendix A23) which was only 4.8% of the 1999 to 2008 average of 6,058. In 2009, 18 of 21 eligible commercial fishing licenses were issued. Since 1997, there has been a marked decrease in commercial catches of Canada Yukon River mainstem Chinook and fall chum salmon because of limited markets as well as reduced fishing opportunities in some years due to below average run sizes (JTC 2010).

CHINOOK SALMON

Early in the 2009 season, information from the LYTF at Emmonak and the Pilot Station sonar program on the lower Yukon River suggested that the 2009 run would be similar to the reduced preseason outlook range for the Canada Yukon River mainstem stock (60,700 to 71,600 Chinook salmon). Farther upriver, inseason border escapement run projections were usually produced twice weekly based on data from the Eagle sonar estimate. Early season run size projections can be very sensitive to the run timing information used because the early timing information represents a very small proportion of the total run. Border escapement run projections are expanded based on what is considered to be the most likely timing scenario (i.e., early, average or late timing) given the information at hand. The intent of applying different expansions is to ensure that the projections cover an appropriate range of the potential run timing scenarios (JTC 2010).

In 2009, the inseason Chinook salmon run projections were consistently were well below the decision threshold that would have triggered a commercial fishery. Consequently, the Chinook salmon commercial fishery was closed throughout most of the 2009 season. Towards the end of July, the run size projections increased resulting in 2 commercial fishery openings: from July 30 to 31 (1.5 days); and from August 5 to 7 (2.0 days) (JTC 2010).

Fall Chum and Coho Salmon

Inseason decisions on fishery openings/closures for upper Yukon fall chum salmon were made in a similar way as those for Chinook salmon. It was apparent early in the 2009 season that it would likely be very late in the fall season before the Canada Yukon River mainstem run would be of sufficient strength to offer commercial fishing opportunities, if at all.

A border passage projection of >83,000 was required before fishing opportunities were provided in the commercial fishery. Since it was anticipated the Alaska subsistence fishery upstream of the Eagle sonar program would take about 15,000 chum salmon, a projection of >98,000 at the Eagle sonar site was required to meet the border passage objective. The average subsistence catch above the Eagle sonar program from 2006 to 2008 was 16,500, with a range from 13,000 to 18,700 (JTC 2010).

Appropriate management actions were taken to ensure that the IMEG of >80,000 was achieved. Run projections prior to October 6, the date the Eagle sonar program ended, were consistently below the objective necessary to allow a commercial fishery. As the sonar program ended, it was apparent that the daily estimates were sufficiently high that run projections would soon exceed the objective resulting in limited fishing opportunities. The commercial and domestic fisheries

were opened for 4 days from October 8 to 12 which is exceptionally late in the season for the first opening of these fisheries (JTC 2010).

The fall chum salmon commercial fishery is somewhat of a misnomer as virtually all of the catch is used for what could be termed personal needs. License holders use most of the catch to feed their personal sled dog teams. This situation could change with the development of local value-added products such as smoked fall chum salmon and salmon caviar (JTC 2010).

No coho salmon were recorded in the 2009 commercial fishery. The harvest of coho salmon is negligible within the Canada Yukon River mainstem commercial, domestic, recreational and aboriginal fisheries. This is thought to be related to a combination of low abundance and limited availability of this species based on late migration timing (JTC 2010).

Aboriginal Fishery

In 2009, as part of the implementation of the Yukon River Final Agreements (comprehensive land claim agreements), the collection of inseason harvest information for the Canada Yukon River mainstem was conducted by First Nations within their respective Traditional Territories. Before the start of the fishing season, locally hired surveyors distributed catch calendars to known fishermen and asked them to voluntarily record catch and effort information on a daily basis. Interviews were then conducted inseason to obtain more detailed catch, effort, gear, and location information at fish camps or in the community, 1 to 3 times weekly. In most cases, weekly summaries were completed by the surveyors and e-mailed to the DFO office in Whitehorse. Late or incomplete information was obtained postseason and reviewed by First Nation staff in conjunction with DFO (JTC 2010).

Based on a preseason outlook for a below average to poor run of 60,700 to 71,600 Canada Yukon River mainstem Chinook salmon in 2009, it was prudent to consider that conservation measures would likely be required in Canada fisheries. DFO hosted teleconferences with the First Nations throughout the Chinook salmon run to provide updated information on run timing and abundance, as well as to announce potential changes to fishing plans. DFO recommended that Yukon First Nations reduce their Chinook salmon harvest to one half to three-quarters of recent levels by developing individual community harvest plans. In response to this, management strategies were developed by individual communities to meet the recommended harvest guideline. Approaches to reductions in harvest varied, but generally the First Nations accepted the harvest guidelines provided by DFO and implemented harvest monitoring measures in order to stay within or below the recommended guidelines. Overall, the combined total season aboriginal fishery harvest in the Canada Yukon River mainstem of 3,791 Chinook salmon (Appendix A23) fell short of the recommended guideline harvest of 4,000 to 6,000 fish. The aboriginal Chinook salmon harvest was 36% below the recent 10-year average (1999–2008) of 5,922 fish, but 31% above the 2008 total of 2,885 fish (JTC 2010).

As inseason information became available it was apparent that the 2009 border passage would be met and the aboriginal fisheries could operate as a normal, unrestricted fishery. Yukon First Nations were notified on July 22 that the Chinook salmon run would support a full fishery. Fishermen and First Nation staff commented that the Chinook salmon run was stronger in 2009 than in recent years. Unfortunately, the majority of camps decided not to open given the preseason outlook and the needs of Yukon aboriginal communities were not met in 2009 (JTC 2010).

For Canada Yukon River mainstem fall chum salmon, there was uncertainty concerning the 2009 preseason run projection, although First Nation fishing restrictions were not expected. As inseason information became available it became apparent that the run was weaker than anticipated and restrictions were imposed on First Nation fisheries. A total of 820 fall chum salmon was harvested in the 2009 Canada Yukon River mainstem aboriginal fishery (Appendix A23). This harvest was well below the recent 5-year (2004–2008) average harvest of 3,583 fall chum salmon (JTC 2010).

Harvest estimates of salmon on the Porcupine River near Old Crow are determined from locally conducted interviews using the catch calendar and a voluntary recording system. In 2009, the Vuntut Gwitch'in Government (VGG) also conducted intensive door to door surveys, postseason. To address conservations concerns for Chinook salmon within the Porcupine River drainage, DFO and VGG closed the fishery for an extensive period in July, except for 2 short openings when the community was able to harvest 461 Chinook salmon (Appendix A5). This is 88% above the 10-year average of 245 Chinook salmon (JTC 2010).

Preseason run-size forecasts indicated that conservation measures might be required for Porcupine River fall chum salmon to meet the IMEG for the Fishing Branch River of 22,000–49,000 fish. Inseason information from a test fishery CPUE project, the Fishing Branch River weir, and projects elsewhere in the Yukon River drainage indicated that restrictions in the Old Crow aboriginal fishery were required to address conservation concerns. The Porcupine River fall chum salmon fishery closed at 12:00 noon September 21 and was expected to be closed until 12:00 noon October 5; however, due to a late surge of fish at the Fishing Branch River weir, restrictions were lifted at 12:00 noon October 1. Unfortunately, VGG citizens were not able to fulfill their needs in 2009. A total harvest of 898 fall chum salmon was reported in the Old Crow aboriginal fishery (Appendix A23), 75% below the 1999–2008 average harvest of 3,575 chum salmon which includes low harvests in 2002–2004 when voluntary restrictions were used to conserve fall chum salmon (JTC 2010).

There was 0 harvest of coho salmon on the Porcupine River in 2009 compared to the 1999-2008 average of 228 fish (JTC 2010).

Domestic Fishery

The domestic fishery was open concurrently with the commercial fishery for 2 openings during the Chinook salmon season and 1 opening during the fall chum salmon season. In recent years domestic fishermen have targeted Chinook salmon, although historically fall chum salmon were targeted in some years. The 2009 domestic catch was 17 Chinook salmon. The average domestic fishery catch of Chinook and fall chum salmon for the 1974 to 2008 period is 405 and 545, respectively; domestic fishery catches were not recorded prior to 1974 (JTC 2010).

Recreational Fishery

In 2009, due to conservation concerns, the daily catch and possession limits of Chinook salmon in the recreational fishery were reduced to 0 effective at 2400 on July 17. Chinook salmon had not yet reached the areas where most recreational fishing normally occurs by this date. Due to improved run status information, the daily catch and possession limits of Chinook salmon were subsequently reduced to 1 daily and 2 in possession effective at 1200 on July 30. The 2009 recreational harvest was 125 Chinook salmon caught and retained (Appendix A23), and 50 caught and released. The retained and released catches were 12.8% and 22.9% female,

respectively. The average Chinook salmon harvest during 1999–2008 was 313 fish. The 2009 fishery was constrained by the early season closure and reduced opportunity that resulted from the late date when retention was allowed (JTC 2010).

Most recreational fishing occurs on the mainstem Yukon River in close proximity to the Tatchun Creek confluence; 73.6% of the fish retained and 56.0% of the fish released were recorded in this area. The Teslin River accounted for 20% of the retained catch and 36% of the released catch. Limited recreational fishing for Chinook salmon also took place in Blind Creek, and the Klondike, Mayo and Morley rivers. The number of locations where catches were recorded was constrained somewhat by the reduced fishing time allowed (JTC 2010).

STATUS OF ESCAPEMENT GOALS

The next triennial review of salmon escapement goals in the Alaska portion of the drainage by ADF&G will be in preparation for its triennial BOF meeting in 2010. This review is governed by the state's *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.222) and *Policy for Statewide Salmon Escapement Goals* (5 AAC 39.223) adopted in 2001. Under these policies ADF&G sets either a BEG (biological escapement goal) or a SEG (sustainable escapement goal) (ADF&G 2004; Brannian et al. 2006). BEGs refer to a level of escapement that provides the highest potential to produce maximum sustainable yield. SEGs identify a level of escapement known to provide for sustainable yield over a 5 to 10 year period.

Current escapement goals in the Alaska portion of the Yukon River drainage were formally adopted by ADF&G in 2005. In preparation for the February 2007 BOF meeting, ADF&G again reviewed escapement goals. No changes were recommended or adopted for Yukon River escapement goals in 2007. Canada Chinook and fall chum salmon escapement goals are based on limited scientific information and are not classified as a SEG or a BEG. These goals are agreed to by the Yukon Panel annually as stipulated in the treaty agreement. Chinook, summer chum, and fall chum salmon escapement goals in the Yukon River drainage in 2009 are shown in Tables 4–6.

Table 4.–Escapement goals for Chinook salmon, Yukon Area.

Stream	Goal	Type of Goal
East Fork Andreafsky River Aerial Survey	960–1,900	SEG
West Fork Andreafsky River Aerial Survey	640–1,600	SEG
Anvik River Aerial Survey	1,100–1,700	SEG
Nulato River Aerial Survey	940–1,900	SEG
Gisasa River Aerial Survey	420–1,100	SEG
Chena River Tower	2,800–5,700	BEG
Salcha River Tower	3,300–6,500	BEG
Canada Yukon River Mainstem	>45,000	IMEG[a]

[a] The U.S./Canada Panel agreed to a 1 year interim management escapement goal (IMEG) of greater than 45,000 based on sonar assessment near Eagle, Alaska for 2009.

Table 5.–Escapement goals for summer chum salmon, Yukon Area, Alaska.

Stream	Goal	Type of Goal
East Fork Andreafsky River Weir	65,000–130,000	BEG
Anvik River Sonar	350,000–700,000	BEG
Drainagewide Escapement (above Pilot Station)	>600,000	OEG

Table 6.–Escapement goals for fall chum salmon, Yukon Area, Alaska.

Stream	Goal	Type of Goal
Drainagewide Escapement	300,000–600,000	BEG
Tanana River drainage	61,000–136,000	BEG
Delta River	6,000–13,000	BEG
Toklat River	15,000–33,000	BEG
Upper Yukon Tributaries	152,000–312,000	BEG
Chandalar River	74,000–152,000	BEG
Sheenjek River	50,000–104,000	BEG
Fishing Branch	22,000–49,000	IMEG[a]
Canada Yukon River Mainstem	>80,000	Treaty Goal[b]

[a] Canada interim management escapement goal agreed to by the Yukon River Panel for 2008 through 2010.

[b] The U.S./Canada Panel agreed to a rebuilt spawning escapement goal of greater than 80,000 based on sonar assessment near Eagle, Alaska for 2009.

There is only 1 escapement goal for coho salmon established in the entire Yukon River drainage. In the Tanana River drainage, the Delta Clearwater River boat survey goal for coho salmon is a SEG range of 5,200–17,000 fish.

In 2009, an IMEG of >45,000 was agreed to by the Yukon Panel for Canada Yukon River mainstem Chinook salmon. The U.S./Canada JTC will continue working to develop a Canada-origin Yukon River Chinook salmon spawning escapement goal that: a) is applicable to sonar; and b) is biologically defensible taking into account the data collected to date regarding escapement, returns, and factors known to limit production such as habitat capacity (JTC 2010). Available information on the return per spawner information for Yukon River Chinook salmon is presented in Appendix A27.

There are no fall chum salmon BEGs for Canada-origin stocks within the Upper Yukon River (mainstem) and Porcupine River drainages. At this time, there is an IMEG range of 22,000 to 49,000 to be used for the Fishing Branch River from 2008 to 2010. The development of the IMEG for Fishing Branch River was based on the Bue and Hasbrouck[1] method applied to those years the weir was fully operational. In 2009, the goal for rebuilt Upper Yukon River (mainstem) fall chum salmon was >80,000, as per the YRSA.

[1] Bue, B. G., and J. J. Hasbrouck. *Unpublished.* Escapement goal review of salmon stocks of Upper Cook Inlet. Alaska Department of Fish and Game, Report to the Alaska Board of Fisheries, November 2001 (and February 2002), Anchorage.

STATUS OF SPAWNING STOCKS IN 2009

Main river sonar, tributary sonar, weir, counting tower projects, and aerial surveys are used to monitor escapement. Other information collected at ground based projects may include: salmon sex and length composition, scales for age determination, samples for genetic stock identification, data on resident species, and information from the recovery of tagged fish from various projects. Various government agencies, non-government organizations, and private contractors operate projects throughout the drainage (Appendices A3 and A4).

CHINOOK SALMON

Alaska

Inseason run assessment indicated a lower run size than it actually was based on Eagle sonar passage and escapement monitoring projects later in the season. However, conservative management of the 2009 Chinook salmon fishery enabled most escapement goals to be met. A summary of 2009 escapements can be found in Appendix A26. Chena River escapement count of 5,253 Chinook salmon was near the upper end of its BEG (2,800–5,700), while Salcha River escapement count of 12,774 Chinook salmon was double the upper end of its BEG (3,300–6,500). The Chena and Salcha rivers produce the largest numbers of Chinook salmon in the Alaska portion of the Yukon drainage. Aerial surveys conducted in West Fork Andreafsky, Nulato and Gisasa rivers indicated escapement goals were achieved, whereas the Anvik River aerial survey estimate was below the escapement goal. Typically, about 50% of the Chinook salmon production occurs in Canada. The Yukon Panel agreed to a 1 year IMEG of >45,000 for Canada Yukon River mainstem Chinook salmon based on the Eagle sonar program. Eagle sonar passage was 69,575 Chinook salmon, which more than satisfied the escapement and harvest sharing objectives in the YRSA (JTC 2010). Age and sex information for Chinook salmon collected from escapement projects in 2009 are presented in Appendix A28.

CANADA

The Canada Yukon River mainstem estimated Chinook salmon spawning escapement based on Eagle sonar passage was 65,278, approximately 45% higher than the IMEG. The Eagle sonar passage estimate was reduced by subtracting Eagle community subsistence harvest of 382 Chinook salmon and total Canada Yukon River mainstem harvest of 4,297 Chinook salmon. Aerial surveys of the Little Salmon, Big Salmon, Nisutlin and Wolf River index areas were conducted by the Department of Fisheries and Oceans Canada (Appendix A26). Generally, aerial surveys were conducted under good conditions and were close to or above the recent 10-year average (JTC 2010).

Two sonar projects were conducted in the Canada portion of the Yukon River in 2009. A DIDSON sonar program was operated for the first time on the Klondike River. A total of 4,725 targets identified as Chinook salmon were counted at the sonar station (Appendix A26) representing 7.2% of the upper Yukon spawning estimate of 65,278. DIDSON sonar was operated for the fifth year on the Big Salmon River. A total of 9,261 targets identified as Chinook salmon was counted between July 18 and August 23, 2009. This estimate represents 14.1% of the upper Yukon spawning escapement estimate of 65,278. Big Salmon River sonar estimates from 2005 through 2008 were 5,584, 7,308, 4,450, and 1,329, respectively (JTC 2010).

The 2009 Whitehorse Rapids Fishway Chinook salmon count of 828 was 69% of the 1999–2008 average count of 1,200 fish. The overall sex ratio was 13% female (108 fish). Hatchery-produced fish accounted for 46.9% of the return, and consisted of 360 males and 28 females. The non-hatchery count consisted of 440 fish, 360 wild males and 80 wild females. In 2009, 716 Chinook salmon were counted at the Blind Creek weir; the 1999–2008 average count is 654 (JTC 2010).

SUMMER CHUM SALMON ALASKA

Summer chum salmon escapement was variable among projects despite an adequate run size in 2009. The Pilot Station sonar project exceeded the optimal escapement goal (OEG) of 600,000 summer chum salmon with a cumulative passage estimate through July 18 of 1,421,646 fish. Summer chum salmon escapements in Gisasa (25,904) and Tozitna (9,133) rivers were below expected levels (Appendix A26). East Fork Andreafsky and Anvik River escapements of 8,770 and 193,099 summer chum salmon, respectively, were historic lows and failed to meet their respective BEGs. Henshaw Creek escapement of 156,933 summer chum salmon, however, was twice the expected counts, and attained the second highest escapement recorded for this project (1999–2008 mean escapement was 77,000 excluding 3 years hampered by high water). On Tanana River, summer chum salmon escapements exceeded expected counts for Chena and Salcha rivers. These escapement patterns seem to signal a shift in summer chum salmon production. Age and sex composition data collected from escapement projects in 2009 are presented in Appendix A29.

FALL CHUM SALMON

Major fall chum salmon spawning areas are located in the Chandalar, Tanana, and Porcupine River drainages and within the Canada Yukon River mainstem drainage (Figure 13). Fall chum salmon runs were very poor from 1998 through 2002 and fall chum salmon were designated as a stock of concern. In response to the guidelines established in the *Policy for the Management of Sustainable Salmon Fisheries*, the BOF discontinued the stock of concern classification for the Yukon River fall chum salmon stock as a yield concern in February 2007 after reviewing stock status information and public input during the regulatory meeting. The determination was based on the availability of a near historical average harvestable surplus of fall chum salmon above escapement needs since 2003, a record run in 2005, an above average run in 2006, and an anticipated near-average run in 2007. These runs reflected a return to average to above average production rates.

Alaska

The 2009 Yukon River drainagewide total run size estimate of 560,000 fall chum salmon was based on the postseason expanded escapement and estimated harvests. This run size was below the preseason projection of 600,000 to 980,000 salmon, but within the range provided by the summer to fall chum salmon relationship (450,000 to 900,000). Estimation of total run size can be made using 2 methods. The fall chum salmon passage estimate, based on Pilot Station sonar for the period July 19 through September 7, was 233,307 fish (Appendix A14). Adding estimated commercial and subsistence harvests and test fishery catches downstream of the sonar site (approximately 25,000 fish) to the Pilot Station sonar abundance estimate results in a total run size of approximately 258,000 fall chum salmon. However, due to difficulties with water conditions, the 2009 estimate is suspected of being extremely conservative.

A second method to calculate run size utilizes the individually monitored spawning escapements in the upper Yukon and Tanana River, including estimated U.S. and Canada harvests where appropriate. In 2009 the Fishing Branch River weir, as well as the Sheenjek and Eagle sonar estimates, were extrapolated to include the projected end of the run. The Chandalar River sonar was not operated through the bulk of the run and had to be estimated based on the relationship between the U.S. border MSA (proportion of Sheenjek to total Sheenjek and Chandalar rivers) and the relationship of Chandalar to the other upper river stocks (mainstem Yukon, Fishing Branch and Sheenjek rivers). Based on these relationships the 2009 escapement to the Chandalar River was estimated to be 150,000 fall chum salmon. Additionally, the Tanana River component was not adequately monitored and, because of concerns about estimating this late running stock, MSA was not used in 2009. The Tanana River estimate was based on the relationship of the Delta River escapement to upper Tanana River mark–recapture from 1995 to 2007, which is approximately 10%. The Tanana River estimate of 150,000 fall chum salmon was broken out to an estimated 130,000 fish to the upper Tanana River and 20,000 for the Kantishna River. This method does not include an escapement estimate of 15,000 for stocks located in tributaries downstream of the confluence of the Tanana River such as in the Koyukuk River. The Pilot Station sonar estimates agree reasonably well with the reconstructed run size for most years. In the recent escapement goal analysis (Fleischman and Borba 2009) there was a 10% disagreement between the Pilot Station sonar (1995, 1997–2005) estimates and the collective escapement and harvest assessment projects. However, in 2009, the postseason total run size estimate of 560,000 fall chum salmon based on collective projects was 53% higher than the estimate using Pilot Station sonar.

In 2009, the proportions of age-3 (4.0%), age-4 (67.0%) and age-5 (26.0%) fish were average, while the age-6 (2.9%) fish were slightly higher than average (0.9%) based on the LYTF weighted averages for the years 1977 to 2008. The run size in 2009 was lower than the preseason projection, with a weak age-4 component that had been expected to contribute up to 80% of the run. Age and sex composition data collected from escapement projects in 2009 are presented in Appendix A30. Total return of fall chum salmon in 2009 was well below average for odd-numbered year runs. The summer and fall chum salmon runs are split by a calendar date (July 15, at the mouth of the Yukon River), where overlap is known to occur. In 2009, the upper Yukon River components appeared to have run timing averaging 7 days late whereas the Tanana River component appeared to be near average. Pilot Station sonar and other lower river projects, indicated run timing was about 2 days late. As in 2008 Pilot Station sonar operated an additional week into September, and Mt. Village test fishery operating through September 10, 2009 did not detect any other significant pulses.

The estimated of drainagewide escapement was approximately 463,000 fall chum salmon after subtracting U.S. and Canada commercial (26,000) as well as subsistence and Aboriginal (72,000) harvests. The Sheenjek River BEG was not achieved; however, the majority of the other areas are believed to have been achieved.

In 2009, Fishing Branch River weir operated from September 6 to October 12; however, data were extrapolated through October 25. This extrapolation represents 4.4% of the run that passed after the project ended. The 2009 estimated weir passage of 25,828 fish (Appendix A26) slightly surpassed the low end of the IMEG of 22,000 to 49,000 fish.

The Sheenjek River escapement was monitored by a sonar project operated from August 15 through September 24, 2009. Sheenjek River counts were extrapolated for late run timing

through October 9. Since 2005 the project uses dual frequency identification sonar (DIDSON) gear on both right and left banks. Most of the historical Sheenjek River escapement estimates were only derived from right bank operations with old technology, with counts ranging from 14,000 in 1999 to 247,000 fall chum salmon in 1996, and a high of 562,000 fish observed on both banks combined in 2005. The right bank estimated escapement of approximately 33,000 fish in 2009 was 34% below the lower end of the BEG range of 50,000 to 104,000 fall chum salmon, based on the historical right bank data. The left bank estimate of 21,000 fish represented approximately 38% of the 2 bank combined estimate in 2009. The combined cumulative count at termination was approximately 47,000 chum salmon. The cumulative estimate at the project termination was then further expanded to compensate for late run timing and resulted in a postseason estimate of 54,126 chum salmon for both banks combined (Appendix A16).

The Chandalar River sonar project operated from August 8 through August 23, 2009 and only counted 6,000 fish before the project was aborted at less than 14% of the average run passage. A conservative estimate of 150,000 was derived based on the relationship between the U.S. border MSA (proportion of Sheenjek to total Sheenjek and Chandalar rivers) and the relationship of Chandalar to the other upper river stocks (Mainstem Yukon, Fishing Branch and Sheenjek rivers). This level fell within the BEG range 74,000–152,000 fall chum salmon for this system.

The Yukon River mainstem sonar at Eagle operated for the fall season from August 21 through October 6 and was extrapolated through October 18, 2009. The resulting estimate of passage at Eagle was 101,734 fall chum salmon. Subtracting an estimated harvest of 6,995 fall chum salmon from the community of Eagle upstream of the sonar resulted in a border passage estimate of 94,739 fall chum salmon. A conservative harvest of 1,113 fall chum salmon in Canada resulted in a spawning escapement estimate of 93,626 fish which met the IMEG of greater than 80,000 fall chum salmon (JTC 2010).

The Delta River, a tributary in the upper Tanana River drainage, has a BEG range of 6,000 to 13,000 fall chum salmon. In 2009, 8 replicate foot surveys were conducted on the Delta River between October 5 and December 3. The Delta River escapement was estimated to be 13,492 fall chum salmon (Appendix A26) based on the area under the curve method.

Typically the Tanana River drainage produces 30% of the total fall chum salmon run. Due to concerns of estimation of Tanana River fall chum salmon stocks in 2009 based on MSA, other methods were used to determine abundance. Delta River escapement has represented approximately 10% of the total population of the upper Tanana River according to a mark–recapture project operated from 1995 to 2007. For 2009, this relationship results in a run size estimation of at least 130,000 fall chum salmon. However, this is only for the portion of the Tanana River drainage upstream of the Kantishna River. Considering the Kantishna River component of the run, another 20,000 fish was included resulting in a conservative escapement estimate of 150,000 fall chum salmon for entire Tanana River drainage. Thus, the Tanana River BEG range of 61,000 to 136,000 fall chum salmon was considered to be exceeded.

Canada

The fall chum salmon spawning escapement estimate based on the Eagle sonar program was 93,626. The sonar program near Eagle has operated since 2006 for chum salmon; generally there was good agreement between the sonar estimates and estimates derived from the mark–recapture program during 2006–2008. A final year of the mark–recapture program was planned for 2009, however a flood damaged the camp and it was not possible to initiate the program. Aerial

surveys of the mainstem Yukon, Kluane and Teslin River index areas were not conducted in 2007–2009. Estimates of the relative abundance of fall chum salmon in these areas were developed from gonadosomatic index (GSI) collected in conjunction with the DFO tagging program (2007–2008) and the Eagle sonar program in 2009 (JTC 2010).

In the Porcupine River drainage, the Fishing Branch River weir was operated from September 6 through October 12. The count through midnight October 12, the last full day of operation, was 24,670 fall chum salmon and included 14,007 females and 10,663 males. Since chum salmon were still present in low numbers at the weir when it was dismantled, an estimate of 1,158 chum salmon was made to account for fish that may have migrated after October 12. This estimate was based on interpolated run timing data. Thus the total estimated 2009 Fishing Branch River escapement was 25,828 fall chum salmon (Appendix A26).

COHO SALMON ALASKA

The coho salmon run exhibited slightly early run timing and the run size was considered to be near average. Test fishery projects at Emmonak, Mountain Village, Kaltag, and in the Tanana River provided similar run assessment of magnitude and run timing. The run size estimate at Pilot Station sonar through September 7 of 206,620 fish (Appendix A14) was above the historical average passage estimate of 163,000 coho salmon. However, because of species apportionment difficulties at the Pilot Station sonar site, the coho salmon run size was not considered to be above average. There is only 1 established escapement goal for coho salmon in the Yukon River drainage, which is a SEG for the Delta Clearwater River of 5,200–17,000. The spawning escapement estimate for the Delta River was 16,850 coho salmon which is within the SEG range.

SELECT PROJECT SUMMARIES

Various government and non-government agencies operate many projects in the Yukon Area to monitor escapement and to determine genetic composition, relative abundance, run characteristics, and other information necessary for management of the salmon runs. The following are highlights of select projects important to fishery management in Alaska. See JTC (2010) for other project summaries conducted in Alaska and Canada in 2009.

PILOT STATION SONAR

The goal of the Yukon River sonar project at Pilot Station is to estimate the daily upstream passage of Chinook, chum and coho salmon. In 2009, passage estimates were provided to fisheries managers daily during the season. Information generated at the Pilot Station Sonar project was also disseminated weekly through multi-agency international teleconferences and data-sharing with stakeholders from the lower Yukon River all the way to the spawning grounds in Canada (Lozori and McIntosh 2013).

In 2009, split-beam sonar was operated on both banks from June 3 through September 7. Test fishing began on May 30, 7 days before the first Chinook salmon was caught at Pilot Station. Use of the DIDSON accounted for 2.1% of the Chinook salmon, 3.0% of the summer chum, and 0.7% of the fall chum total passage. The DIDSON estimate contributed 2.7% of the total passage, which is the lowest contribution since the DIDSON was incorporated in the project's sampling plan in 2005 (JTC 2010).

Fish passage estimates at Pilot Station are based on a sampling design in which sonar equipment is operated daily in three 3-hour intervals, and drift gillnets are fished twice each day between sonar periods to apportion the sonar counts to species. In past seasons, on designated days, sonar sampling was expanded to a single 24-hour period as a simple qualitative assessment. Estimates obtained in the regular 3-hour intervals were then compared with those found when the sonar ran continuously.

The test fishing program, used to apportion the sonar counts to species, utilizes an assortment of gillnets, 25 fathoms long with mesh sizes ranging from 2.75 inches to 8.5 inches, drifted through the sonar sampling areas twice daily between sonar data collection periods. During 2007–2009 seasons, as part of a separate capital improvement project (CIP) funded genetic study, an extra period of gillnetting was conducted in order to collect additional Chinook salmon samples. The drifts were located upriver of the area sampled by the sonar, and 3 gillnet mesh sizes (6.5, 7.5, and 8.5 inches) were used to target all size classes of Chinook salmon. All other species captured during this extra period were immediately released, and not sampled.

The drift gillnet test fishery catch of 6,101 fish consisted of: 875 Chinook salmon (234 Chinook salmon caught during the additional test fishing period); 2,569 summer chum salmon; 440 fall chum salmon; 1,004 coho salmon; and 1,213 other species. Chinook salmon were sampled for age, sex and length, and genetic samples were taken from both Chinook and chum salmon. Any captured fish that were not successfully released alive were distributed daily to residents in Pilot Station (JTC 2010).

Because of record high water levels and flooding in many areas of the Yukon River after break up, the left bank substrate was unstable in 2009 and problems with a reverberation band were encountered. From June 3 to approximately June 23, bank erosion upstream caused large plumes of silt to pass through the sonar sampling area, undermining optimal detection of targets. Estimates during this period were considered conservative. As in previous years, the right bank substrate was consistently stable, so problems of this nature were not encountered on that bank.

Inseason cumulative passage estimates for each targeted species, through September 7, were: 92,648 large Chinook; 30,342 small Chinook; 1,285,437 summer chum; and 240,449 fall chum salmon. Additionally, inseason passage estimates for non-target fish species included 205,278 coho salmon and 677,860 other fish species. Coho salmon are considered non-targeted because a fairly large portion of the run continues after sonar operations are terminated. During the winter of 2011/2012, an error in the SAS code used to generate daily estimates at Pilot Station was discovered. This error prevented the DIDSON counts from merging correctly with the split-beam counts resulting in an underestimate of passage in the first 20 m of left bank for the 2009-2011 field seasons only. The error has been corrected and passage estimates for the affected years have updated (Appendix A14). The final postseason passage estimates were: 108,361 large Chinook; 35,688 small Chinook; 1,421,646 summer chum; 233,307 fall chum; and 206,620 coho salmon. Additionally, the passage estimate for non-target pink salmon and other fish species was 788,819 (Lozori and McIntosh 2013).

YUKON RIVER CHINOOK SALMON STOCK IDENTIFICATION

Scale pattern analysis, age composition estimates, and geographic distribution of harvests has been used by ADF&G on an annual basis from 1981 through 2003 to estimate stock composition of Chinook salmon in Yukon River harvests. Three region-of-origin groupings of Chinook

salmon, or stock groups, have been identified within the Yukon River drainage. The lower and middle stock groups spawn in Alaska and the upper stock group spawns in Canada.

Beginning in 2004, genetic analysis replaced scale pattern analysis as the primary method for stock identification. Tissue samples were collected from fish in mixed stock harvests from Districts 1 through 5 and paired with age data. Genetic analysis was performed on these samples by age group (age-1.3 and -1.4) and results from these analyses were combined with specific harvest age composition to provide the stock composition by harvest. Age groups not used for genetic analysis, age-1.1, -1.2, -2.2, -2.3, -2.4, -1.5, -1.6, and -2.5, were apportioned to stock groups using stock composition of analogous age groups, harvest age composition, and escapement age composition. Harvests from the Tanana River, the upper Koyukuk River, and Alaska tributaries upstream from the confluence of the Yukon and Tanana rivers were assigned to the middle stock group based on geographic location. Harvests occurring in Fort Yukon and above were assigned to the upper stock group under the assumption that these fish were bound for Canada.

The historical percentage by stock group in the total drainagewide Chinook salmon harvest (U.S. and Canada) is presented in Appendix A31. All fish from the lower and middle stock groups were harvested only in Alaska fisheries. Drainagewide harvest estimates for 2009 were 11.1% from the lower stock group, 31.4% from the middle stock group, and 57.5% from the Upper stock group (Appendix A31). Alaska harvest estimates from the Lower, Middle, and Upper stock groups were 12.7%, 35.7%, and 51.6%; respectively (Appendix A32). The Upper stock group harvest estimates for 2009 were 78.8% in Alaska and 21.2% in Canada (Appendix A33). Comparing the 2009 total Chinook salmon harvest (U.S. and Canada) percentage to the 1981 through 2008 average, the Lower stock group was below average, the Middle stock group was above average, and the Upper stock group was near average.

YUKON RIVER CHUM SALMON MIXED STOCK ANALYSIS

Since 2004, the stock compositions of chum salmon have been estimated from samples collected from Pilot Station sonar test fisheries for the period spanning July 1 through August 31. In 2008 and 2009, sampling began in the first week of June to estimate the stock composition for the entire summer chum salmon run as well (through the first week of September for fall chum salmon). This information is used inseason to estimate chum salmon abundance by stock and stock timing through the run.

A baseline of standardized data collected at 21 microsatellite loci was constructed using genetic samples from 27 spawning locations in Alaska and Canada (JTC 2010). Results from this analysis were reported for each pulse or time stratum and distributed by email to fishery managers within 24-48 hours of receiving the samples. For summer chum salmon, the lower river stock group comprised 86% of the run while the middle river stock group comprised 14%. Within the middle river stock group, the Tanana component comprised 8% and peaked in passage past Pilot Station sonar during the sampling period of July 19–27. For fall chum salmon, 64% of the run was of U.S.-origin and 36% of Canada-origin. The composition of the U.S. contribution was 26% Tanana and 38% U.S. border. The composition of the Canada contribution was 20% mainstem, 4% Porcupine, 11% White, and 1% Teslin. Stock abundance estimates were derived by combining the Pilot Station sonar passage estimates with the stock composition estimates. To evaluate the concordance of various data sources, an analysis was conducted to compare these stock specific abundance estimates against escapement and harvest estimates. This analysis revealed that the stock proportions were concordant for 2004–2008. However, the

level of agreement of estimated abundance between the monitoring methods appeared to be related to the run timing of the summer and fall runs of chum salmon. There was better agreement in 2004 and 2005 when fall chum salmon comprised the majority of the run after the transition date. Less agreement was found in 2006–2008 when the fall run was late, which suggested that the sonar missed the late returning fish after it ended operations and that escapement projects may have counted summer chum salmon as fall chum salmon (JTC 2010).

EAGLE SONAR

ADF&G has operated a sonar to estimate Chinook and fall chum salmon passage in the Yukon River near the U.S./Canada border since 2005. In 2009, the total Chinook salmon passage estimate at the Eagle sonar site was 69,975 for the dates July 5 through August 20 (Table 7). The Eagle area Chinook salmon subsistence harvest upstream of the sonar of 382 (Jallen and Hamazaki 2011) was subtracted from the sonar estimate to derive the border passage estimate of 69,575 fish. Canada harvest of 4,297 Chinook salmon was subtracted to obtain the estimate of mainstem Yukon River spawning escapement of 65,278 fish, which is 31% above the IMEG of >45,000 Chinook salmon. The total fall chum salmon passage estimate at the Eagle sonar site was 95,462 for the dates August 21 through October 6 (Table 7). Because of the high passage of chum salmon when the project was terminated the sonar estimate was subsequently adjusted to 101,734. The expansion was calculated using a second order polynomial calculated to the date October 18 (Bonnie Borba, Commercial Fisheries Biologist, ADF&G, Fairbanks, Alaska; personal communication). The preliminary Eagle area chum salmon subsistence harvest of 6,995 (Jallen and Hamazaki 2011) is removed from the sonar estimate, to derive a border passage estimate of 94,739 fish. Canada harvest of 1,113 chum salmon was subtracted to obtain the estimate of mainstem Yukon River escapement of 93,626 fish, which is 15% above the Canada spawning escapement goal of >80,000 fall chum salmon. The Canada mark–recapture project did not operate in 2009.

In 2009 there was 1 high water event that included large amounts of woody debris and necessitated removal of the right bank weir from the river to prevent damage or loss. Sonar counts were compromised from 1900 hours on September 18 to 0900 hours on September 20 and were subsequently adjusted to account for fish that may have been missed (Crane and Dunbar 2011). The results from 2005 to 2009 sonar operations and associated border passage estimates are summarized in Table 7.

Table 7.–Eagle sonar project passage estimates, and border passage estimates, 2005–2009.

	Sonar Estimate		Eagle Area Subsistence Harvest		U.S. Sonar Mainstem Border Passage Estimate		Canada Mainstem Border Passage Estimate [a]	
Date	Chinook	Chum	Chinook	Chum	Chinook	Chum	Chinook	Chum
2005	81,528	NA	2,566	NA	78,962	NA	42,245	451,477
2006	73,691	245,290 [b]	2,303	17,775	71,388	227,515	36,748	217,810
2007	41,697	282,670 [b]	1,999	18,691	39,698	263,979	22,120	235,956
2008	38,097	193,397 [b]	815	11,381	37,282	182,016	14,666	132,048
2009	69,957	101,734 [b]	382	6,995	69,575	94,739	Did not operate.	

Note: Estimates for subsistence caught salmon between the sonar site and border (Eagle area) prior to 2008 include an unknown portion caught below the sonar site. This number is most likely in the hundreds for Chinook salmon, and a few thousand for chum salmon. Starting in 2008, the estimates for subsistence caught salmon only include salmon harvested between the sonar site and the U.S./Canada border.

[a] Department of Fisheries and Oceans Canada (DFO) mark–recapture tagging program estimates from JTC (2009).

[b] Expanded sonar estimate, includes expansion for fish that may have passed after operations ceased.

In addition to operating the sonar, a drift gillnet program was conducted to monitor species composition, and to collect age, sex, and length data and genetic samples of the fish passing the sonar site. Four gillnets, 25 fathoms in length with mesh sizes ranging from 5.25 to 8.5 inches, were fished daily to collect the samples. Although there is some minor overlap, Chinook and chum salmon runs appear to be largely discrete in time based on test fish results, local knowledge of catches, and data collected in Canada (JTC 2010).

YUKON RIVER CHINOOK SALMON COMPARATIVE MESH SIZE STUDY

A 3 year (2007–2009) study was conducted to investigate salmon catch composition from 7.0, 7.5 and 8.0 inch stretch-mesh drift gillnets from a test fishery in District 1 near Emmonak. This was a cooperative effort between ADF&G and Yukon Delta Fisheries Development Association (YDFDA). Objectives of this study included: 1) comparison of species composition (Chinook salmon versus chum salmon) of catch, 2) comparison of age composition of Chinook salmon, 3) comparison of sex ratios of Chinook salmon, and 4) comparison of size composition of Chinook salmon (length, weight, and girth). Additionally, marketability of the catch from each mesh size was examined (JTC 2010).

Sampling for this study occurred from June 15 through June 30 in 2007, June 15 through June 20 in 2008, and June 12 through July 4 in 2009. The sampling period for 2008 was truncated because of an unexpected poor run and need to support inseason management strategies. Sample sizes are shown in Table 8. Actual sample sizes are less than those targeted, primarily because of the shortened sampling period in 2008. However, as samples were pooled across years, overall sample sizes are still sufficient for statistical assessment (JTC 2010).

Table 8.–Number of Chinook and summer chum salmon harvested in the Lower Yukon River test fishery by mesh size, 2007-2009.

Mesh Size	Chinook Salmon	Chum Salmon
7.0 inch	400	714
7.5 inch	388	325
8.0 inch	344	298
Total	1,132	1,337

Overall patterns indicate that as mesh size increases, the catch contains more Chinook salmon relative to chum salmon, a greater proportion of older fish, a greater proportion of females, and larger fish in respect to length, weight and girth. This study suggests that a reduction to 7-inch mesh would likely change the species composition (fewer Chinook salmon than chum salmon in the catch), and age and phenotypic compositions (smaller and younger individuals) of the fishery. A reduction to 8-inch mesh would not significantly change the age, gender or phenotypic composition of the catch relative to the current fishing practices, but would decrease the proportion of larger sized Chinook salmon (>900 mm) caught. A reduction to 7.5-inch mesh would likely target younger and smaller individuals on average and even fewer large size class Chinook salmon, without impairing the Chinook salmon catchability beyond what it would be for an 8-inch maximum mesh size fishery (JTC 2010).

YUKON RIVER SALMON RUN OUTLOOKS 2010

CHINOOK SALMON

The total Yukon River Chinook salmon run size can be projected by applying historical average proportions of Canada-origin fish in past total runs to the outlook estimated for the Canada component of the run. The average proportion of Canada-origin fish in the total run is approximately 50%. Using this method, the expected total Yukon River run size is 226,200[2], but could be as low as 155,600[3] based on low productivity since 2007. There is a lot of uncertainty associated with this methodology, and due to apparent reductions in productivity in recent years, environmental factors, and other phenomena not incorporated into the models, the upper end of this range is unlikely.

Thus, the 2010 Yukon River Chinook salmon run size will likely be below average to average. It is therefore prudent to enter the 2010 season with the prospect that subsistence conservation measures, much less severe than those used in 2009, may be necessary inseason in an effort to share the available subsistence harvest and meet escapement goals. Conservation measures if required may include promoting voluntary reductions such as encouraging a shift in harvest to other species, spreading harvest out over the duration of the run, reductions in extended sharing, and keeping fish harvested within the village or local area.

It is unlikely that there will be a directed Chinook salmon commercial fishery in 2010 on the mainstem Yukon River. However because the Tanana River is managed independently as a

[2] Based on the averaged value for both sibling and Ricker models. Values for each model separately are 220,000 and 233,000 for Ricker and sibling models respectively.

[3] Based on the averaged value for both sibling and Ricker models. Values for each model separately are 159,000 and 152,200 for Ricker and sibling models respectively.

terminal fishery there may be opportunity to commercially harvest less than 1,000 Chinook salmon (JTC 2010).

SUMMER CHUM SALMON

The strength of the summer chum salmon run in 2010 will be dependent on production from the 2006 (age-4 fish) and 2005 (age-5 fish) escapements as these age classes dominate the run. The total run sizes during 2005 and 2006 were approximately 2.6 and 4.0 million summer chum salmon respectively, though tributary escapements were highly variable. It appears that production has shifted from major spawning tributaries in the lower portion of the drainage, such as the Andreafsky and Anvik rivers over the last 8 years, to higher production in spawning tributaries upstream.

Yukon River summer chum salmon generally exhibit strong run size correlations among adjacent years, and it is expected that the total run in the Yukon River will be similar to the 2009 run of approximately 1.3 million fish. The high seas BASIS study indicated a decline in chum salmon in 2004 and 2005, but 2006 and 2007 results showed an increase. Juvenile chum salmon collected in the BASIS study in 2006 and 2007 would correspond to the dominant age class returns (age-5 and age-4, respectively) in 2010.

The 2010 run is anticipated to provide for escapements, a normal subsistence harvest, and a surplus for commercial harvest. Summer chum salmon runs have provided for a harvestable surplus in each of the last 7 years (2003–2009). The commercially harvestable surplus in Alaska could range from 250,000 to 500,000 summer chum salmon. The actual commercial harvest of summer chum salmon in 2010 will likely be affected by a potentially poor Chinook salmon run, as Chinook salmon are incidentally harvested in chum salmon-directed fisheries (JTC 2010).

FALL CHUM SALMON

Yukon River fall chum salmon return primarily as age-4 and age-5 fish, although age-3 and age-6 fish also contribute to the run. The 2010 run will be comprised of parent years 2004 to 2007. Estimates of returns per spawner (R/S) based on brood year return were used to estimate production for 2004 and 2005. An auto-regressive Ricker spawner-recruit model was used to predict returns from 2006 and 2007. The point projections for 2010 used the 1984 to current complete brood year returns applied to the odd/even maturity schedule because current production has declined from the pre-1984 level. The result is an estimate of 690,000 fall chum salmon (Table 9). The 80% confidence bounds around the point estimate were calculated using deviation of point estimates and observed returns from 1987 through 2009. Therefore, the 2010 run size projection is expressed as a range from 552,000 to 828,000 fall chum salmon (Table 9).

Table 9.–Projected 2010 total run size of fall chum salmon based on parent year escapement for each brood year and predicted return per spawner (R/S) rates, Yukon River, 2004–2007.

Brood Year	Escapement	Estimated production (R/S)	Estimated Production	Contribution based on age	Current Return
2004	537,873	0.90	484,086	1.1%	7,363
2005	1,996,513	0.26	519,093	20.9%	144,143
2006	873,987	0.95	830,843	75.6%	521,282
2007	928,430	1.00	929,230	2.5%	17,032
Total expected run (unadjusted)					689,820
Total 2010 run size expressed as a range based on the forecasted vs. observed returns from 1987 to 2009 (80% CI):					552,000 to 828,000

The 2004 escapement was within the drainagewide escapement goal range of 300,000 to 600,000 fall chum salmon, while escapements for the other 3 contributing parent years 2005 through 2007 all exceeded the upper end of the drainagewide escapement goal range. All of the parent year's returns per spawner are $\leq$1.0, with a failure in the 2005 brood year based on an estimated 0.26 R/S. The major contributor to the 2010 fall chum salmon run is anticipated to be age-4 fish returning from the 2006 parent year. Although the age-4 component is expected to dominate the run, there is still concern that the projection could be insensitive to the fluctuations as observed in the 2005 brood year. There is uncertainty in how 2005 will be represented in the coming generation. As examples, the returns from record escapements achieved in 1975 and 1995 resulted in very different production levels. Good survival was realized for the 1975 brood year with age-4 fish comprising 88% of the 1979 run while in the 1995 brood year, the age-4 fish comprised only 64% of the 1999 run, indicating much lower survival. Recent production levels at 2.0 return/spawner (average R/S 1998 to 2003 excluding 2001) are well above the poor returns observed in 1994–1997 (0.49 average R/S); however, they appear to be in a declining mode. That said, even a return of 1.0 R/S would provide a substantial run size for returns in 2010.

During the season, the relationship between the summer and fall chum salmon components will be monitored as an indicator of the fall chum salmon run size. With a range in run size from 552,000 and 828,000 fall chum salmon, it is anticipated that escapement goals should be met while supporting normal subsistence fishing activities. Commercial harvestable surpluses will have to be determined inseason and the run is expected to provide limited commercial ventures where markets exist.

COHO SALMON

Although there is little comprehensive escapement information for Yukon River drainage coho salmon, it is known that coho salmon primarily return as age-4 fish and overlap in run timing with fall chum salmon. The major contributor to the 2010 coho salmon run will be the age-4 fish returning from the 2006 parent year escapement. Based on run reconstruction using Pilot Station sonar estimates, the 2006 total run size estimate of 173,000 coho salmon was slightly below average. The Delta Clearwater River (DCR) is a major producer of coho salmon in the upper Tanana River drainage, which has comparative escapement monitoring data since 1972. The parent year escapement of 17,000 fish in 2006 was equal to the upper end of the SEG range of 5,200 to 17,000 coho salmon. DCR escapement has increased since 1972, particularly within the last decade when fishing effort has been low. For the same time period, coho salmon escapements in the

Nenana River complex were nearly average. Assuming average survival, the 2010 coho salmon run, is anticipated to be average based on escapements observed in 2006 (JTC 2010).

The Alaska *Yukon River Coho Salmon Management Plan* allows a directed commercial coho salmon fishery but only under unique conditions. Directed coho salmon fishing is dependent on the assessed levels in the return of both coho and fall chum salmon since they migrate together and are of similar body size.

Spawning Escapement Targets in 2010: Canada Origin Chinook and Fall Chum Salmon

For the 2010 season, the Yukon Panel agreed to 1 year IMEG ranges of 42,500–55,000 Chinook salmon and 70,000–104,000 fall chum salmon based on the Eagle sonar program. In addition to meeting escapement needs, Alaska endeavors to pass approximately 7,000 Chinook and 20,000 fall chum or more, depending on run strength across the Border, in order to fulfill harvest sharing commitments specified in the YRSA. The IMEG for the Fishing Branch River of 22,000–49,000 fall chum salmon based on the Fishing Branch River weir count will continue through 2010 (JTC 2010).

CAPE ROMANZOF DISTRICT HERRING FISHERY

INTRODUCTION

The Cape Romanzof Herring District consists of all state waters from Dall Point north to 62 degrees north latitude (Appendix B1). Pacific herring (*Clupea harengus pallasii*) are present in coastal waters of the Yukon Area during May and June. Spawning populations occur primarily in the Cape Romanzof area in Kokechik Bay and Scammon Bay where spawning habitat consists of rocky beaches and rockweed (*Fucus* sp.). The arrival of herring on the spawning grounds is influenced by ocean water temperature and ice conditions. Typically, herring appear immediately after ice breakup. Spawning usually occurs between mid-May and mid-June.

Local residents use herring harvested in Hooper Bay, Kokechik Bay and Scammon Bay for subsistence purposes. Additionally, a few fishermen in the Yukon Delta report harvesting herring along the coast near Black River and Kwiguk Pass for subsistence use. It is speculated that these herring are migrating toward southern Norton Sound. Additionally, some Yukon Delta residents harvest herring spawn-on-kelp (*Fucus* sp.) north of Stebbins in southern Norton Sound.

A commercial herring sac-roe fishery began in the Cape Romanzof District in 1980. Commercial harvests increased steadily after inception of the fishery, reaching a peak harvest of 1,865 tons in 1986 (Appendix B2). In 1982, the BOF reduced the area open to commercial fishing by closing the waters outside of Kokechik Bay because of increasing fishing effort and difficulty monitoring the fishery. Since 2000, the harvest has greatly decreased because of declining markets resulting in lower prices paid and lower fishing effort. In 2004, the BOF opened the Cape Romanzof District for commercial herring fishing to the pre-1982 boundaries in an effort to allow more fishing opportunity. Gillnets are the only legal commercial gear type and mesh size

may not be less than 2.5 inches and may not exceed 3.5 inches. The use of mechanical shakers has been prohibited since 1988. Limited entry to the fishery began with a moratorium on new entrants in 1988. The fishery is now limited to 101 permits.

COMMERCIAL FISHERY

Since the fishery was initiated in 1980, commercial harvests have ranged from 25 tons in 2005 to 1,865 tons in 1986 (Appendix B2). The exvessel value of the fishery has ranged from $10,000 in 2001–2004 to $1.1 million in 1986. The number of permit holders participating has ranged from 8 in 2006 to 157 in 1987 (Appendix B2). The commercial fishery saw an increasing trend in effort, harvests, and value from the inception of the fishery in 1980 until its peak in 1986. Declining market value after 2000 resulted in reduced effort, harvest, and exvessel values, eventually leading to no commercial fishery since 2007.

For the 2009 season, buyers indicated preseason that they would be able to meet their market needs from fisheries operating in areas south of the AYK Region. It is unknown how long poor market conditions will continue.

For each year in which commercial fishing has occurred the overall herring exploitation rate has been estimated postseason as the proportion of the available biomass harvested (Appendix B2). Historical age composition of the commercial harvest estimated using scale analysis from a subsample of commercially caught herring is presented in Bue et al. (2011). Due to the lack of commercial fishing, no samples were collected from 2007 to 2009.

SUBSISTENCE FISHERY

A total of 192 mail-out questionnaires were sent to households in the communities of Hooper Bay, Chevak, and Scammon Bay in 2009. A total of 14 (6%) households responded. The subsistence harvest and effort figures represent only the harvest which was reported. The reported harvest is a minimum estimate since not all fishing families were contacted and not all households who received questionnaires returned them. During 2009, an estimated subsistence harvest of 2.2 tons of herring was reported taken by 14 fishing families from Hooper Bay, Chevak, and Scammon Bay (Appendix B3). In addition, 1 household reported harvesting 5 pounds of herring spawn-on-kelp for subsistence purposes (Appendix B4).

STOCK STATUS

Due to excessive water turbidity in the Cape Romanzof area, it is usually not possible to estimate herring biomass using aerial survey techniques. Herring biomass in previous years has been estimated using a combination of information from aerial surveys, test and commercial catches, spawn deposition, and age composition. No aerial surveys were conducted in the Cape Romanzof District in 2009. The 2009 biomass was estimated to be 4,852 tons, which was the projected biomass preseason (Appendix B2).

ADF&G has not conducted test fishing operations in Cape Romanzof since 2007. However, test fishing with variable mesh gillnets was conducted during 1978–2006 to determine distribution, timing and relative abundance of spawning herring, and to collect samples for age, sex, size, and relative maturity information. Prior year information is shown in Bue et al. (2011).

HERRING OUTLOOK FOR 2010

The projected biomass of herring to return to Cape Romanzof District in 2010 is expected to be 5,538 tons. At a 20% exploitation rate, the allowable harvest would be 1,108 tons. Since water turbidity in the Cape Romanzof area generally prevents aerial observations of herring, spawn deposition and test and commercial catch rates will be used to determine the timing and duration of commercial fishing periods.

Normally it is not possible to determine herring abundance using aerial survey methods in the Cape Romanzof District due to turbid water conditions. Variability in the quality of aerial survey assessments of biomass and deviations from the assumed survival or recruitment rates may result in the observed biomass being either above or below these projections. Therefore, guideline harvest levels may be adjusted during the season according to observed herring spawning biomass. If determining herring abundance using aerial survey methods is not possible, stock abundance will be assessed using information from the projected biomass, test, and commercial catches, and spawn deposition observations. In accordance with the AYK Region harvest strategy, the commercial fishery will not target newly recruited age classes (age 2 through age 5 herring). If market conditions improve to allow for commercial herring fishing activity, ADF&G will work cooperatively with fishermen and buyers to optimize roe recovery. The occurrence and length of fishing periods and harvests depend on inseason biomass estimates, roe quality, spawning activity, weather conditions, fishing effort, and processor input.

OTHER MARINE AND FRESHWATER FINFISH FISHERIES

SUBSISTENCE FISHERY 2009

Non-salmon species (e.g. pike *Esox lucius*, inconnu *Stenodus leucichthys* (henceforth 'sheefish' as commonly referred to by Yukon River residents), whitefish *Coregonus* sp., blackfish *Dallia pectoralis*, etc.) are an important subsistence resource for people in most areas throughout the Yukon drainage (Brown et al. 2005; Andersen et al. 2004). Many subsistence users harvest marine and freshwater finfish other than salmon and herring either as an incidental bycatch while fishing for salmon or by directly targeting those species. Subsistence users particularly rely on non-salmon species when other sources of fish or wildlife are unavailable.

Non-salmon harvest information is documented yearly during the ADF&G postseason subsistence salmon harvest surveys, but is secondary to information regarding household use of salmon. Therefore, less emphasis is placed on determining harvest estimates of non-salmon species. Comprehensive harvest assessment projects are still needed for many areas to identify the overall non-salmon harvest and utilization on a drainagewide basis. In an effort to gain more information about these subsistence fisheries, the Koyukuk River drainage and lower-middle communities of Grayling, Anvik, Shageluk, and Holy Cross of the Yukon River were extensively surveyed in 2 studies by ADF&G (Division of Subsistence and Sport Fish) and Tanana Chiefs

Conference. These studies documented traditional ecological knowledge (TEK) of the fishing behavior and harvest by a high percentage of households in these areas (Brown et al. 2005; Andersen et al. 2004).

Subsistence harvest of freshwater finfish and other non-salmon fish species are estimated annually from subsistence surveys conducted throughout the drainage (Appendices C1 and C2). Blackfish, small whitefish, and pike accounted for the highest proportion of the total estimated and reported subsistence harvest. Since 1988, subsistence salmon surveys have included the collection of freshwater finfish harvest data. Prior to 1988, non-salmon subsistence harvest was collected with less consistency during the postseason subsistence salmon surveys. Subsistence catches of freshwater finfish taken under authority of a permit in the Upper Yukon Area are presented in Appendix C3. In 2009, a total of 419 subsistence household permits were issued. Of those issued, 404 permits were returned and 217 of the returned permits fished. The reported harvest was 3,991 whitefish, 75 sheefish, 119 burbot *Lota lota*, 733 pike, 203 longnosed suckers *Catostomus catostomus* , and 363 Arctic grayling *Thymallus arcticus* (Jallen and Hamazaki 2011).

A variety of fishing methods are used in the main rivers and coastal marine waters to harvest non-salmon finfish. Beach seines are occasionally used near spawning grounds, primarily capturing salmon or other schooling species of fish. Traps and fish weirs of various designs are used, mainly in the fall and winter months, to capture whitefish, blackfish, and burbot. Sheefish, northern pike, char *Salvelinus alpinus*, and "tomcod" (saffron cod *Eleginus gracilis*) are frequently taken through the ice using hand lines. Dip nets are used in late May to early June to harvest rainbow smelt *Osmerus mordax* in the delta area. Dip nets and “eel sticks” are used in late October to early December to harvest Arctic lamprey (*Lampetra camtschatica)* in the mainstem Yukon River from the mouth upstream to the village of Grayling.

The spring sheefish migration occurs just prior to, and during, the beginning of the upstream migration of Chinook salmon. During late May and early June, sheefish are harvested in the lower Yukon River as they migrate upriver. Harvest of whitefish and sheefish in the upper Yukon and Tanana rivers from fish wheels at times may be large in certain areas, but it is usually a relatively small incidental harvest during the subsistence and commercial salmon fisheries.

Several studies have been conducted to investigate sheefish migrations and to locate spawning areas in the Koyukuk River drainage (Alt 1968, 1969, 1970, 1974) and in the mainstem Yukon River between Stevens Village and Fort Yukon (Alt 1986). From 1997 through 1999, a sheefish tagging and radiotelemetry study was conducted by the USFWS near Rampart in cooperation with National Marine Fisheries Services (NMFS) and ADF&G. This study found that sheefish captured at the study site were mature fish engaged in a spawning migration that originated in the lower Yukon River, or associated estuary regions, and continued towards a common spawning destination in the Yukon River approximately 1,700 km from the sea (Brown 2000). USFWS, in conjunction with ADF&G, has an ongoing radiotelemetry project investigating sheefish spawning and migration for the Nowitna River drainage, upper Koyukuk, upper Yukon Flats, Tanana River drainage, and Chatanika River.

Behavior and migration patterns of whitefish species are not well documented for the Yukon River drainage, but the USFWS is currently conducting a 3-year radiotelemetry and TEK study of the seasonal migrations and important habitats for humpback *Coregonus pidschian* and broad whitefish *C. nasus* in the upper Koyukuk and the upper Tanana River drainage.

Since 1995, ADF&G Division of Sport Fish has conducted several stock assessment projects on northern pike using radiotelemetry in large tributaries of the Yukon River including: the Dall, Innoko, and Nowitna rivers, as well as in the Kaiyuh Flats and the Old Lost Creek drainage (Taube and Lubinski 1996; Chythlook and Burr 2002; Joy and Burr 2004). Based upon the results of these experiments, coupled with low reports of sport and subsistence annual harvests, there appears to be no conservation concern for these populations and harvests appear sustainable at this time.

PERSONAL USE FISHERY 2009

In 2009, the personal use salmon fishery followed the regulatory fishing time of two 42-hour periods per week except during the time period September 3–17 when it was closed to conserve fall chum salmon with the priority for subsistence fisheries and escapement requirements. A total of 57 personal use salmon and 11 personal use whitefish and sucker household permits were issued. Of the 68 personal use permits issued, 68 were returned and 28 were fished (Appendix C3). A total harvest of 48 whitefish, 1 sheefish, and 315 longnose suckers was reported in the Fairbanks Nonsubsistence Area in 2009 (Jallen and Hamazaki 2011).

COMMERCIAL FISHERY

Regulations adopted by the BOF allow ADF&G to issue permits for the commercial harvest of non-salmon freshwater fish including whitefish, sheefish, burbot, northern pike, blackfish, and Arctic lamprey throughout the Yukon and Tanana River drainages. Most of these fisheries are issued limited or experimental permits, and operate in discrete time periods during the year. Following the decline in salmon runs, a marked increase in non-salmon fisheries emerged on the Yukon River. Despite the strengthening chum salmon returns in recent years the interest in freshwater fisheries has remained, particularly for Bering cisco *Coregonus laurettae*, least cisco *C. sardinella*, and Arctic lamprey. The reported historical harvests for all lower Yukon Area commercial freshwater fisheries for whitefish are presented in Appendix C4.

YUKON RIVER WHITEFISH FISHERY SUMMARY 2009

In 2005–2009, ADF&G issued Commissioner's permits for the commercial harvest of whitefish in the Lower Yukon River. Commissioner's permits are issued for the experimental commercial harvest of species not managed under existing State of Alaska commercial fishing regulations. The purpose of the experimental commercial fishery was to collect information regarding species composition and abundance, to evaluate operational and catch characteristics of gear, and to test market conditions. Species harvested include broad whitefish, sheefish, Bering cisco, humpback whitefish, and least cisco.

Gear restrictions implemented during the 2007 and continued through the 2009 whitefish commercial fishery reduced the maximum stretch-mesh size from 6 inches (allowed in 2005 and 2006) to 4 inches. The gear restriction was implemented to target least and Bering cisco and to reduce fishing pressure on older-aged fish, such as sheefish, broad whitefish and humpback whitefish.

In 2009, there were 2 permits issued for a commercial harvest of cisco (including least cisco and Bering cisco) in the lower Yukon River. One permit authorized a maximum of 10,000 pound harvest in District 1 near Emmonak, and the second issued a maximum of 5,000 pound harvest in statistical areas 334-21 and 334-22 of District 2 near Mountain Village. The 10,000 pound

harvest cap was based on commercial harvest information from 1980 to 1990 in the lower Yukon area of sheefish and other whitefish species, primarily broad whitefish.

The first permit issued in District 1 near Emmonak was valid August 25 through December 31, 2009, or until the 10,000 pound limit was reached. Commercial fishing was prohibited in designated areas around the village of Kotlik in deference to important subsistence fishing locations. Fishing gear was restricted to 1 set or drift gillnet up to 150 feet in length with a maximum stretch-mesh size of 4 inches, or 1 hand line/hook and line. To augment commercial opportunity and gather information about cisco upstream of the Yukon River Delta, a second permit was issued for up to 5,000 pounds of cisco in District 2 near Mountain Village. The permit was valid from November 1 through December 31, 2009 or until the 5,000 pound harvest limit was reached. In late December 2009 the harvest was well below the limit; therefore, the permit was extended until late March 2010 to allow for greater fishing opportunity. Fish caught during 2009 and during the winter of 2010 in District 2 were reported as 2009 harvest in this report. In District 2, fishing gear was restricted to 1 set or drift gillnet up to 150 feet in length with a maximum stretch-mesh size of 4 inches, or 1 hand line/hook and line. During the harvest, biological information was collected to better understand cisco spawning migration patterns and demography.

The commercial harvest began in District 1 on September 16 and ended on September 26. A total of 24 fishermen made 93 deliveries to the commercial processor in Emmonak, and a total of 9,801 pounds of whitefish were harvested. The price per pound was $1.00 and the estimated harvest value to fishermen was $9,801. The average harvest value for each fisherman was $408 (Table 10). Commercial fishing effort consisted of local residents from the lower Yukon River communities of Nunam Iqua, Emmonak, Alakanuk, and Kotlik.

In District 2, the commercial harvest began on November 17, 2009 and ended March 16, 2010. A total of 5 fishermen made 17 deliveries to the commercial processor in Mountain Village, and a total of 865 pounds of whitefish were harvested. The price per pound was $1.00 and the estimated harvest value to fishermen was $865 (Table 10). Commercial fishing effort consisted of local residents from the community of Mountain Village.

Table 10.–Commercial freshwater whitefish harvest in Districts Y-1 and Y-2, Yukon River, 2009.

District	Unit	Bering Cisco	Least Cisco	Total Cisco
Y-1	Number	8,666	580	9,246
	Pounds	9,244	557	9,801
	Average weight (lbs)	1.1	1.0	1.1
	Price per pound	$1.00	$1.00	$1.00
Y-2	Number	519	170	689
	Pounds	659	206*	865
	Average weight (lbs)	1.3	1.2	1.3
	Price per pound	$1.00	$1.00	$1.00
Total	Number	9,185	750	9,935
	Pounds	9,903	763	10,666
	Average weight (lbs)	1.1	1.0	1.1
	Price per pound	$1.00	$1.00	$1.00

The total District 1 and 2 commercial harvest was 10,666 pounds, which was below the total 15,000 pound cap for District 1 and 2 combined resulting in a conservative harvest (Table 10; Appendix C4).

In the Upper Yukon Area, commercial freshwater fisheries targeting primarily whitefish have been permitted in prior years, although in recent years few permit applications have been received and no harvest has been reported since 1997 (Bue et al. 2011). Permit authorization is not required for the sale of these species when taken incidentally during the commercial salmon fishing season. In 2009, such sales of incidental whitefish during the commercial salmon fishery only occurred in District 6 (Appendix C5).

Harvest Sampling

In 2009, a total of 680 commercially harvested whitefish in Districts 1 and 2 were sampled for biological information. Age, sex, and length data were collected by ADF&G staff at the processor's facility in Anchorage before the fish were processed. All specimens were cut to identify reproductive organs. Fork length (tip of snout to fork of tail) was measured to the nearest millimeter. Bering cisco sampled (*n*=440) from District 1 had a mean length of 338 mm, and 58% of fish sampled were female. Only 1 least cisco was caught in District 1. Bering cisco sampled (*n*=219) from District 2 had a mean length of 356 mm, and 48% of fish sampled were female. A total of 21 least cisco was sampled from District 2 and had a mean length of 297 mm, and 48% of fish sampled were female (Table 11).

Table 11.–Commercial freshwater whitefish harvest in Districts Y-1 and Y-2, Yukon River, 2009.

District	Species	Bering Cisco	Least Cisco
Y-1	Average length (mm)	338.64 ± 21.95	298.00 ± 0.00
	Proportion female	0.58	1.00
	Number sampled	440	1
Y-2	Average length (mm)	356.75± 24.75	297.45 ± 15.13
	Proportion female	0.48	0.45
	Number sampled	219	20
Total	Average length (mm)	344.66 ± 24.44	297.48 ± 14.75
	Proportion female	0.55	0.48
	Number sampled	659	21

Otoliths were collected from Bering cisco (*n*=380), and age was determined by counting annual rings under a compound microscope. Bering cisco ages ranged from 3 to 9 years and both sexes had a median age of 5. Males were predominantly age 4 fish, whereas females were predominantly age 5 fish (Data on file with Yukon Research Staff, contact, Larry Dubois, Commercial Fisheries Biologist, ADF&G; Anchorage).

Assessment

There is a paucity of information relating to whitefish biology and demography within the Yukon River. As such, the Yukon River whitefish commercial fishery has been authorized since 2005 as experimental. No intensive assessment project has been initiated in the Yukon River drainage to gauge the overall abundance of whitefish in the entire watershed. This fishery may be used in the future to determine species distribution, relative abundance, and run timing for these species.

Whitefish harvest and use for subsistence purposes is documented for the lower, middle and upper Yukon River areas with TEK being useful in providing run timing information.

While the fishery provides some commercial opportunity for fishermen in the lower Yukon River, information is still insufficient to fulfill a larger harvest allocation.

ARCTIC LAMPREY FISHERY SUMMARY

Beginning in 2003 an experimental commercial Arctic lamprey fishery emerged on the Yukon River. A Commissioner's permit has been issued annually allowing for a harvest total of 5,000 to 44,080 lbs of Arctic lamprey in the lower Yukon River. The purpose of this fishery was to determine species distribution and abundance, to evaluate operational and catch characteristics of gear, and to test market conditions. The reported historical lamprey commercial harvests for the Yukon Area are presented in Appendix C6. To date, commercial fishing activity has occurred in District 2 and Subdistrict 4-A. The catch is being sold in markets in Asia and to pharmaceutical companies. The exact dates of the fishery have varied each year in response to the seasonal movements of lamprey; however, the commercial harvest has generally occurred in the mid- to late November.

Commercial Fishery

In 2009, there was 1 freshwater commercial fishery permit issued for lamprey to a commercial processor which allowed a harvest of up to 44,080 pounds of lamprey (Data on file with Yukon Management Staff, contact, Eric Newland, Commercial Fisheries Biologist, ADF&G; Anchorage). The lamprey commercial fishery permit was valid October 13 through December 1, 2009 or until the harvest limit was reached. The buying stations were located in District 2 at Marshall and Mountain Village, and in Subdistrict 4-A at Grayling.

The commercial harvest was conducted by dipping fishing gear into medium sized holes cut through nearshore ice, and the gear was restricted to 1 hand held dip net or 1 "eel stick" (large wood pole with long protruding spikes) for each permit holder.

The commercial harvest began on November 7 in Marshall and on November 19 in Grayling. The fishery ended on November 19. A total of 15 fishermen delivered a harvest of 15,210 lbs to the commercial processor (Appendix C6). The estimated value of the fishery was $18,896 (Appendix C6). By district, 4 fishermen in Marshall delivered 465 lbs to the commercial processor at $1.00 per pound, and a total of 11 fishermen in Grayling delivered 14,745 lbs to the commercial processor at $1.25 per pound (Data on file with Yukon Management Staff; contact, Eric Newland, Commercial Fisheries Biologist, ADF&G; Anchorage).

Subsistence Fishery

Beginning in late October, ADF&G monitored subsistence catches by phone contacts established in the communities of Emmonak, Mountain Village, Saint Mary's, Russian Mission, Anvik and Grayling. Information was collected regarding subsistence harvest and effort, river and weather conditions, and run timing.

Subsistence fishermen in Mountain Village reported the first Arctic lamprey was caught on October 31. The first pulse was reported on November 1, with subsistence fishermen harvesting a small quantity of Arctic lamprey. Despite fishing effort, few Arctic lamprey were caught in St. Mary's between November 3 and 6, and catch was reported as "light to moderate" between November 5 and 9 in Marhsall. Several fishermen collectively reported harvesting at least 500

Arctic lamprey (estimated 150 lbs) using dip nets. Based on this information, subsistence fishermen 52 miles upriver near Russian Mission began fishing on November 8. Arctic Lamprey were caught in Russian Mission between November 8 and 13. The run was considered strong, with fishermen reporting harvesting 40–100 Arctic lamprey (estimated 12–30 lbs) per day. Local fishermen estimated this to be the only "pulse" of Arctic lamprey that would be migrating upstream this year, due to weather conditions.

Based on estimated rate of travel, Arctic lamprey were expected to pass by the village of Holy Cross (RM 279) around November 14. On November 12, a community member looking for Arctic lamprey at fishing sites reported that a few were caught in whitefish nets. By November 16, no large numbers of Arctic lamprey were observed or harvested, perhaps due to plummeting temperatures. On November 18, a community member from Holy Cross predicted the Arctic lamprey had passed.

Fishermen in Grayling (RM 336) used chainsaws and/or manual ice breakers to cut large rectangular holes through nearshore ice at traditional fishing sites. Fishermen then visually checked the velocity of the water; if the water in the hole was slow moving they disregarded the site, cut a new hole, and continued on with the process until they identified a hole with fast moving water. The fast water is believed to be caused by a channel in the river bottom, which acts as a natural corral to funnel migrating lamprey and facilitate their catch. The fishing holes were monitored (rotating shifts, 24-hours a day) by shining a flashlight through the water to the substrate a few feet below. Fishermen also checked for lamprey by occasionally flicking a stick through the water in the fishing holes. Using these 2 methods fishermen avoided icing their dip nets, which were reserved for the Arctic lamprey migration that passed between November 18 and 20.

Assessment

TEK provides valuable information regarding run timing and favorable harvest sites for Arctic lamprey fishing in the lower Yukon River. The Arctic lamprey run is closely monitored by both subsistence and commercial fishermen, and information is readily shared between user groups and among local communities. Based on the October 31 report from subsistence fishermen in Mountain Village, and the commercial fishery which occurred in Grayling on November 19, the estimated lamprey travel speed between the 2 communities was 15 miles per day.

To obtain more timely and accurate subsistence harvest information, ADF&G mailed subsistence harvest surveys to 673 households in Yukon River communities from Mountain Village upstream to Grayling in November 2009, so households could report their harvest after the Arctic lamprey migration. A total of 127 surveys were returned (19%). Of the surveys returned, 34 households reported having participated in the Arctic lamprey subsistence fishery and 17 reported participation in the commercial fishery. The reported subsistence harvest was 2,562 lbs with an average household harvest of 34 lbs. A greater number of households reported subsistence fishing in the lower Yukon River, although average harvest was higher in the upriver communities (Jallen and Hamazaki 2011).

The Yukon River Arctic lamprey commercial fishery is experimental and exploratory in nature, and specific questions regarding the life history and abundance of Arctic lamprey persist. Should a dedicated Arctic lamprey assessment project be developed in the future, data collected during the commercial fisheries may contribute valuable baseline information.

NORTHERN AREA

DESCRIPTION OF AREA

The Northern Area includes all waters of Alaska north of the latitude of the western most tip of Point Hope and west of 141° West longitude, including those waters draining into the Arctic Ocean and the Chukchi Sea (Bue et al. 2011).

SUBSISTENCE FISHERIES

Many subsistence fishermen operate gillnets in the rivers and coastal marine waters of the Northern Area to harvest marine and freshwater finfish. Small numbers of chum, pink, and Chinook salmon have been reported by subsistence fishermen along the Arctic coast. Traps and fish weirs of various designs are also used, mainly in the fall and winter months, to capture whitefish, blackfish, and burbot. Northern pike, char, and "tomcod" are frequently taken through the ice by hand lines. The extent of the harvest of non-salmon finfish in the Northern Area is inadequately documented. However, recent fishery harvest studies were undertaken for 2 small Inupiat communities in the Northern Area by the ADF&G Division of Subsistence. It was found that annual community fish harvest for Kaktovik consisted of Dolly Varden *Salvelinus malma*, Arctic cisco *Coregonus autumnalis*, Arctic grayling, Lake trout *Salvelinus namaycush*, salmon, and Arctic cod *Boreogadus alpinus* (Pedersen and Hugo 2005). Similarly, community fishermen in Anaktuvuk Pass produced annual catches of “char” (a mix of Arctic char and Dolly Varden), lake trout, Arctic grayling, Arctic cisco, and a few burbot (Pedersen and Linn 2005).

COMMERCIAL FISHERIES

Regulations adopted by BOF allow ADF&G to issue permits for the commercial harvest of freshwater species of fish such as whitefish, sheefish, char, northern pike, blackfish and Arctic lamprey in the Northern Area. However, there are no commercial fisheries allowed for salmon species in the Northern Area. A commercial fishery for freshwater finfish has existed in the Colville River delta (located approximately 60 miles west of Prudhoe Bay) since 1964 (Bue et al. 2011). Historically, commercial fishing generally took place during late June and July for broad and humpback whitefish, and October through early December for Arctic and least cisco. Since 1990, commercial fishing effort has predominately occurred in October and November for Arctic and least cisco. Set gillnets are used as capture gear and fishing during fall months occurs under the ice. All fish have been harvested with the intent to sell commercially and are reported daily on a catch form. However, not all fish reported on permits for this area are sold. Those fish not commercially sold are retained and used for subsistence purposes. In 2009, no commercial harvest was reported.

ACKNOWLEDGEMENTS

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Employees of the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service including the Office of Subsistence Management, Bering Sea Fishermen's Association, Tanana Chiefs Conference, Association of Village Council Presidents, Yukon River Drainage Fisheries Association, Yukon Delta Fisheries Development Association, and other agencies and organizations worked long and irregular hours at various locations throughout the Yukon Area collecting data presented in this report; and we gratefully acknowledge their hard work and funding support.

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FIGURES

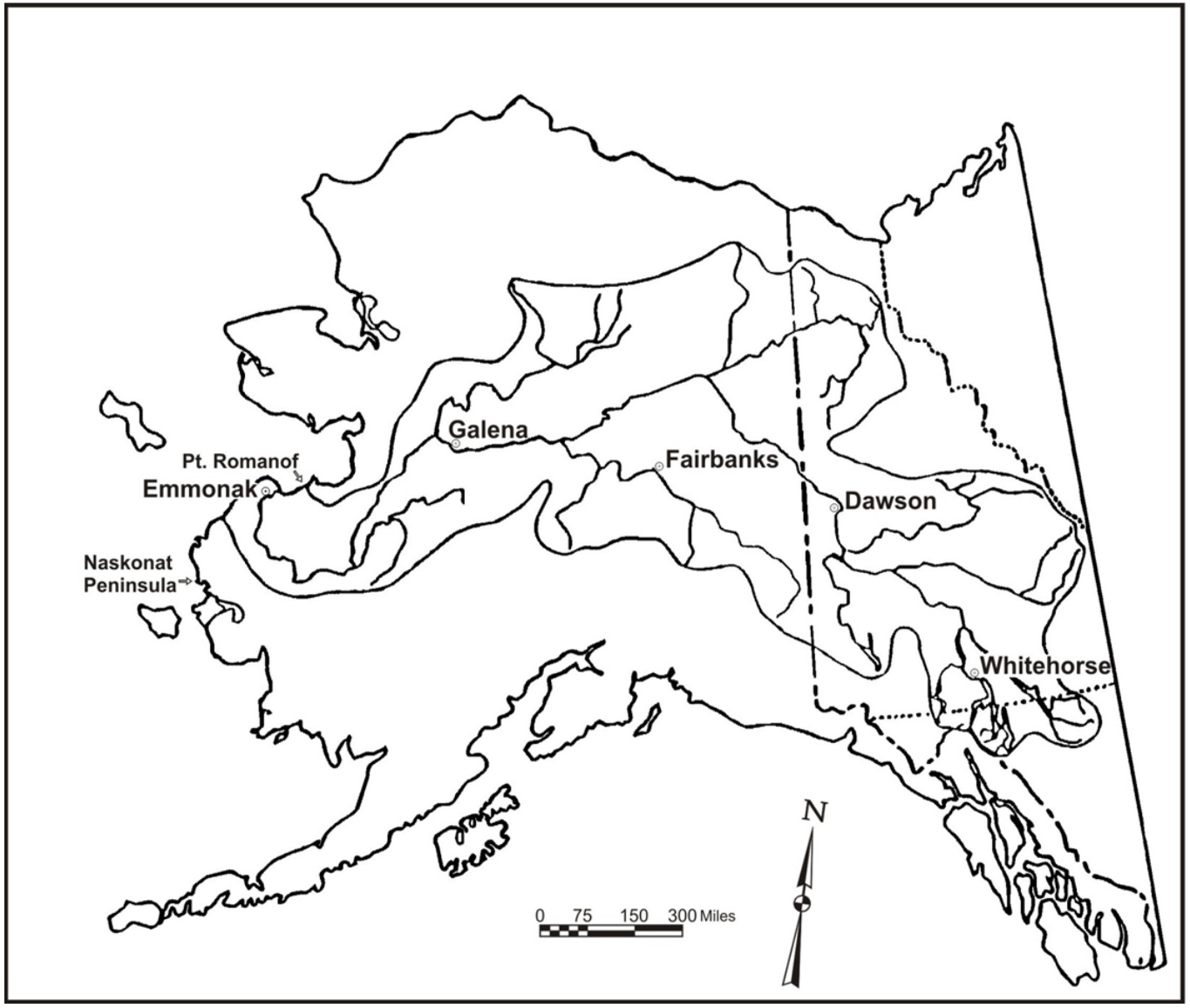


Figure 1.–Map of the Yukon River drainage.

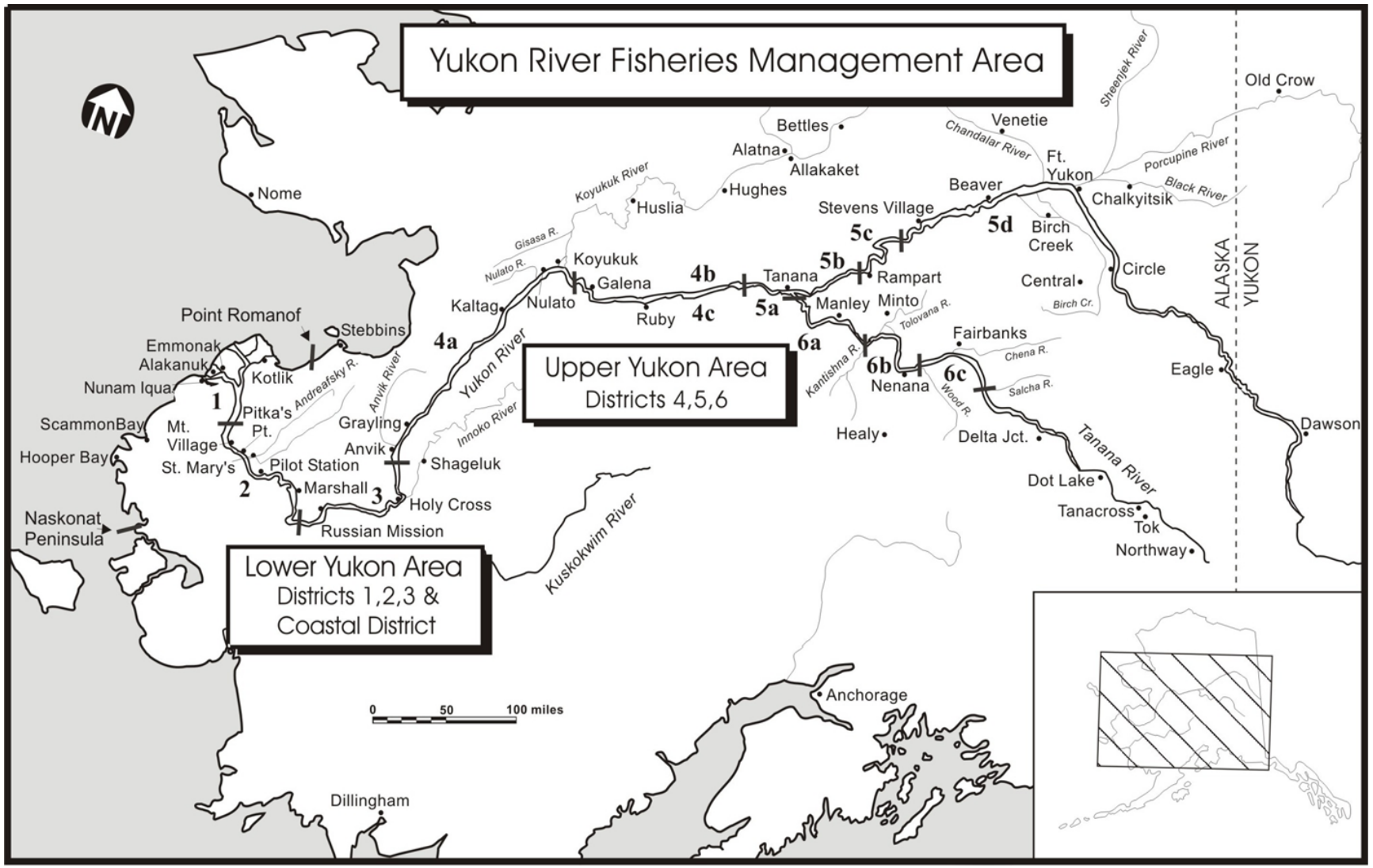


Figure 2.–Alaska portion of the Yukon River drainage showing communities and fishing districts.

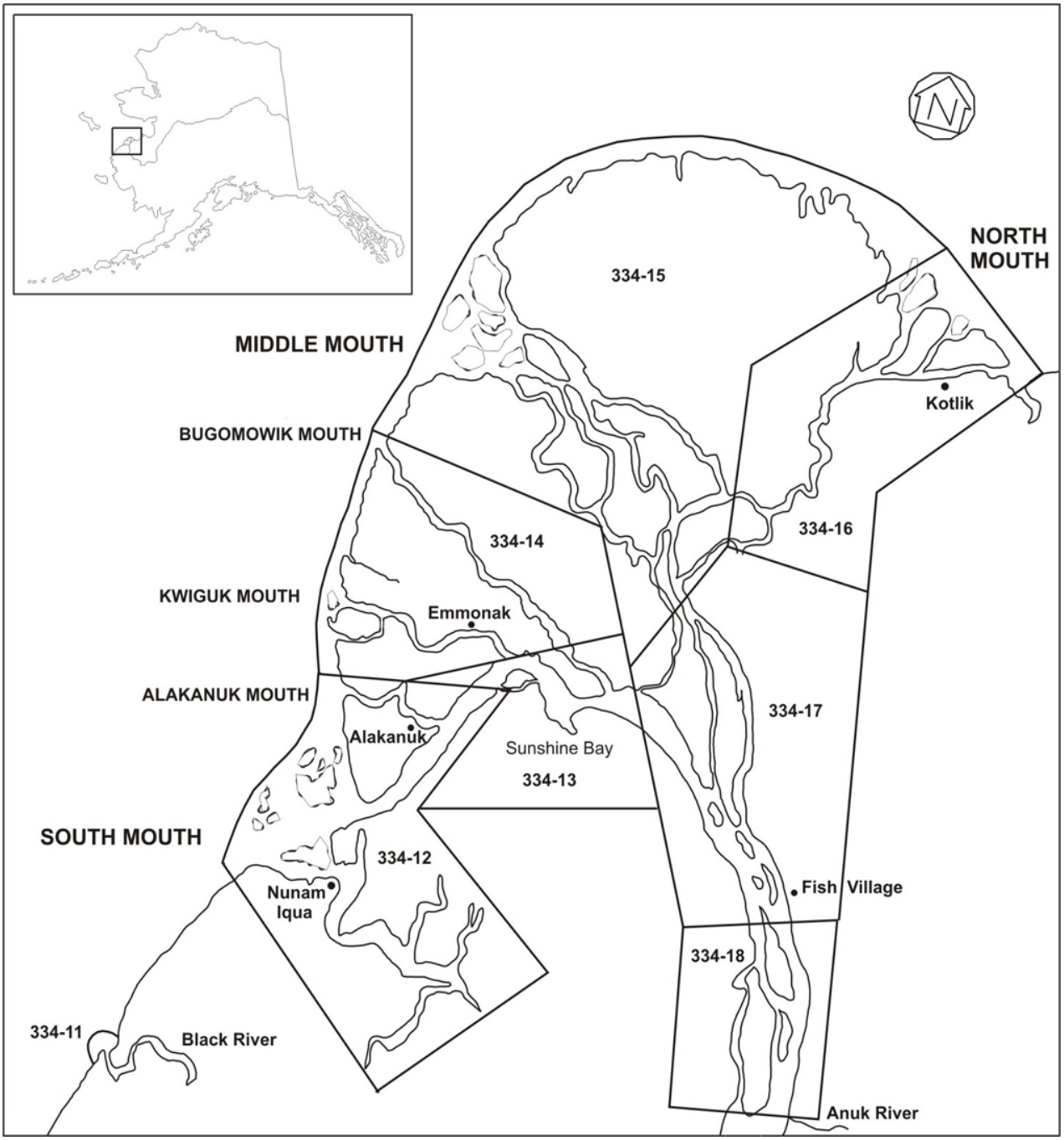


Figure 3.–District 1 showing statistical areas, Yukon Area.

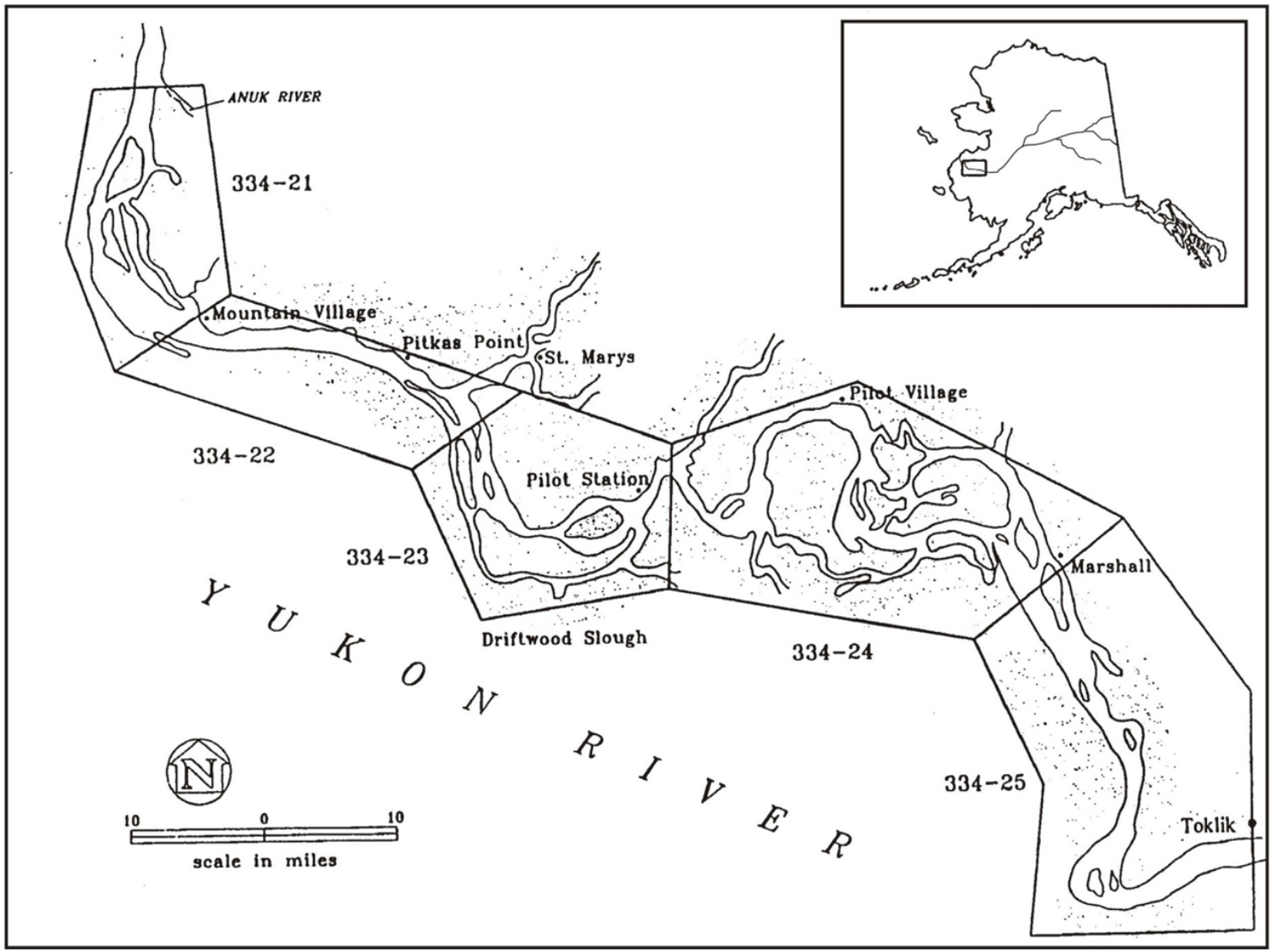


Figure 4.–District 2 showing statistical areas, Yukon Area.

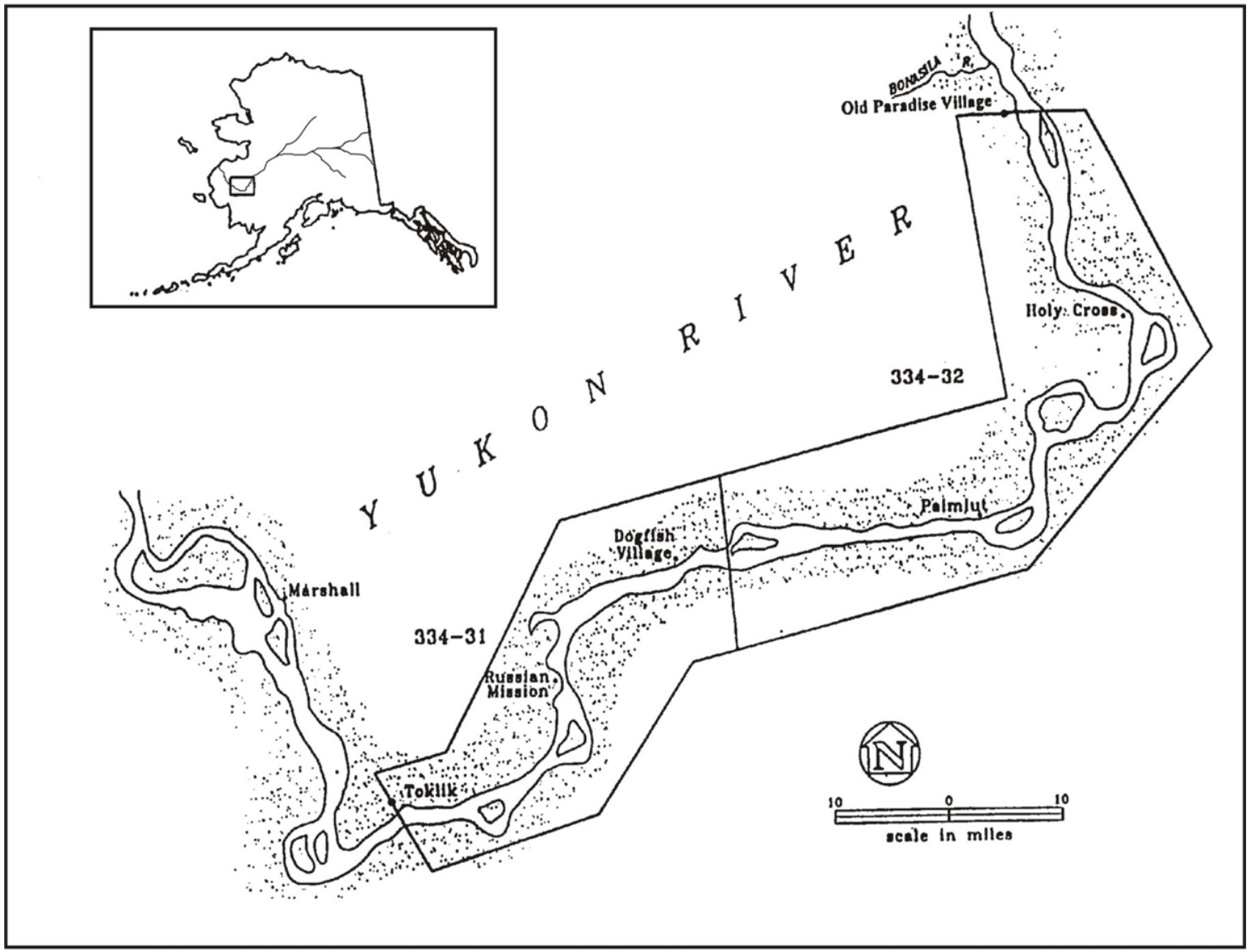


Figure 5.–District 3 showing statistical areas, Yukon Area.

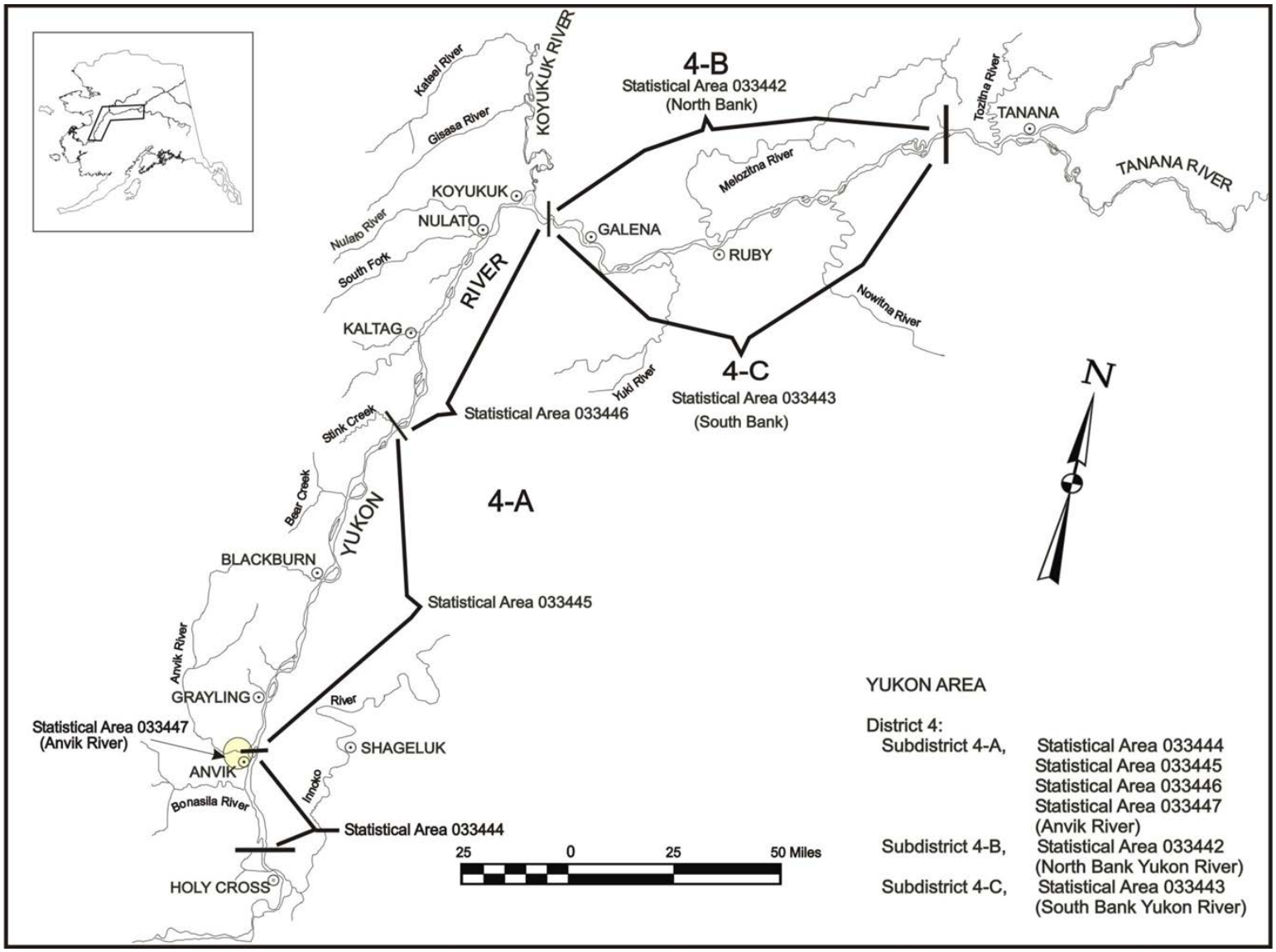


Figure 6.–District 4 showing statistical areas, Yukon Area.

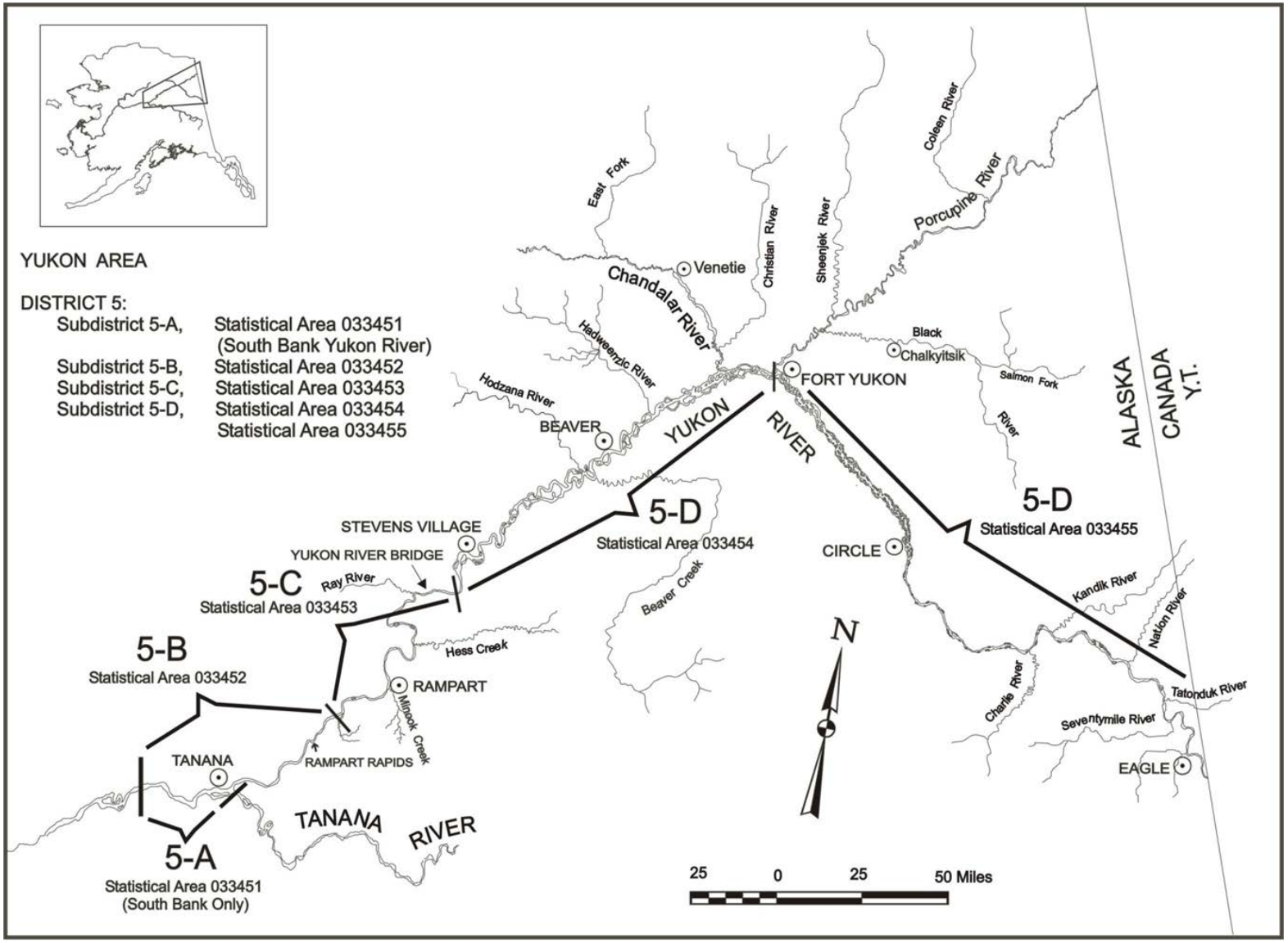


Figure 7.–District 5 showing statistical areas, Yukon Area.

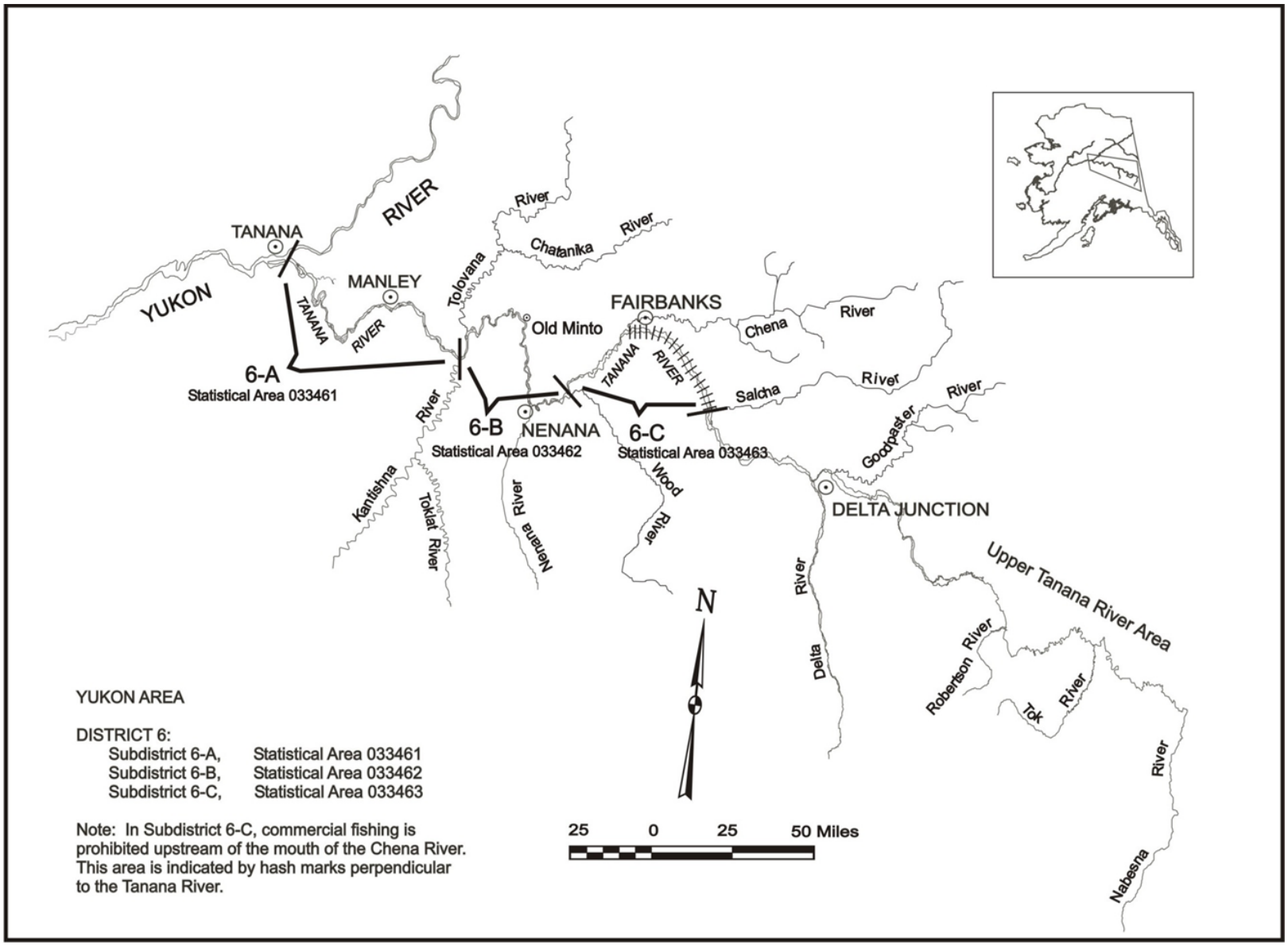


Figure 8.–District 6 showing statistical areas, Yukon Area.

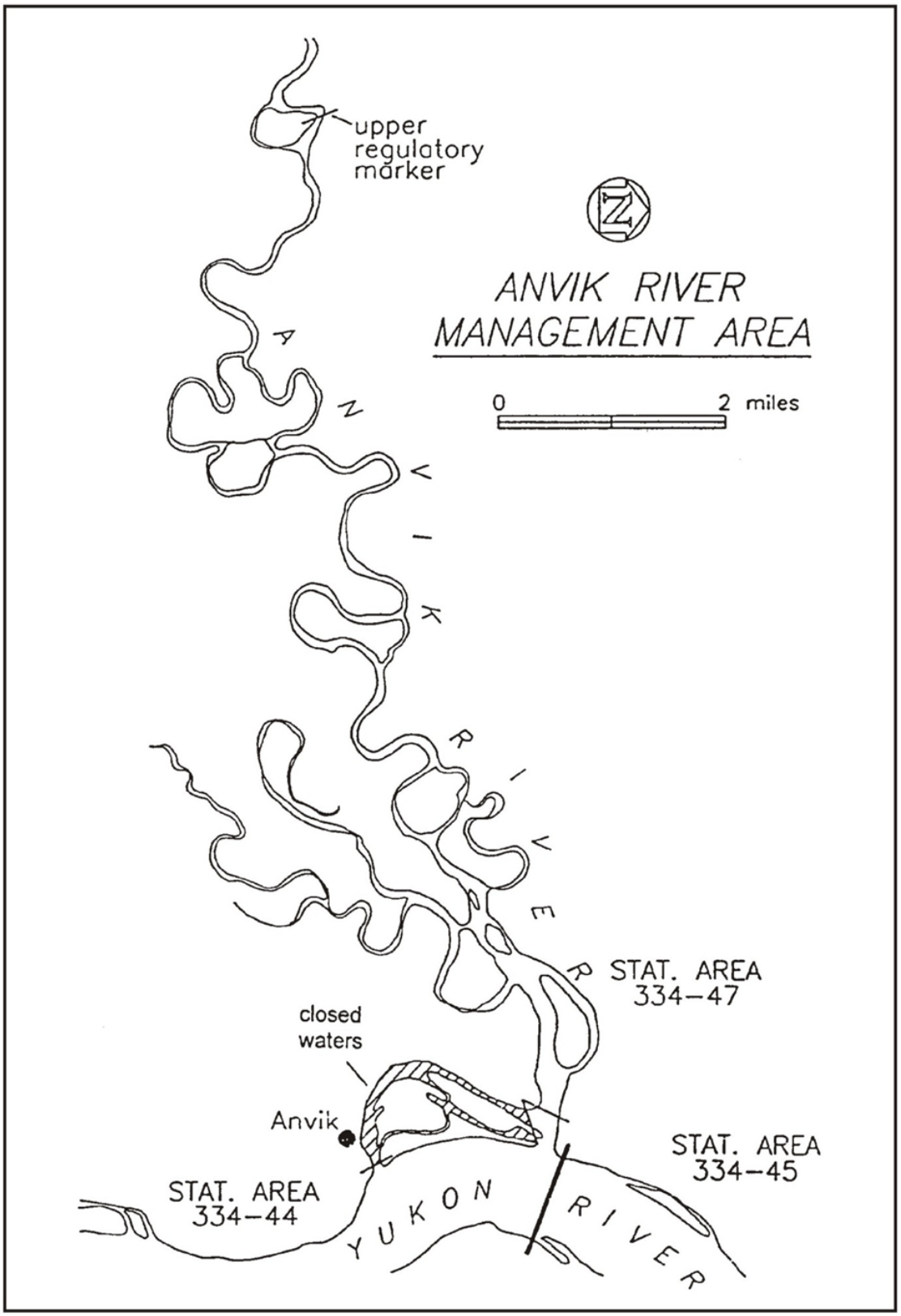


Figure 9.–Anvik River Management Area, Yukon Area.

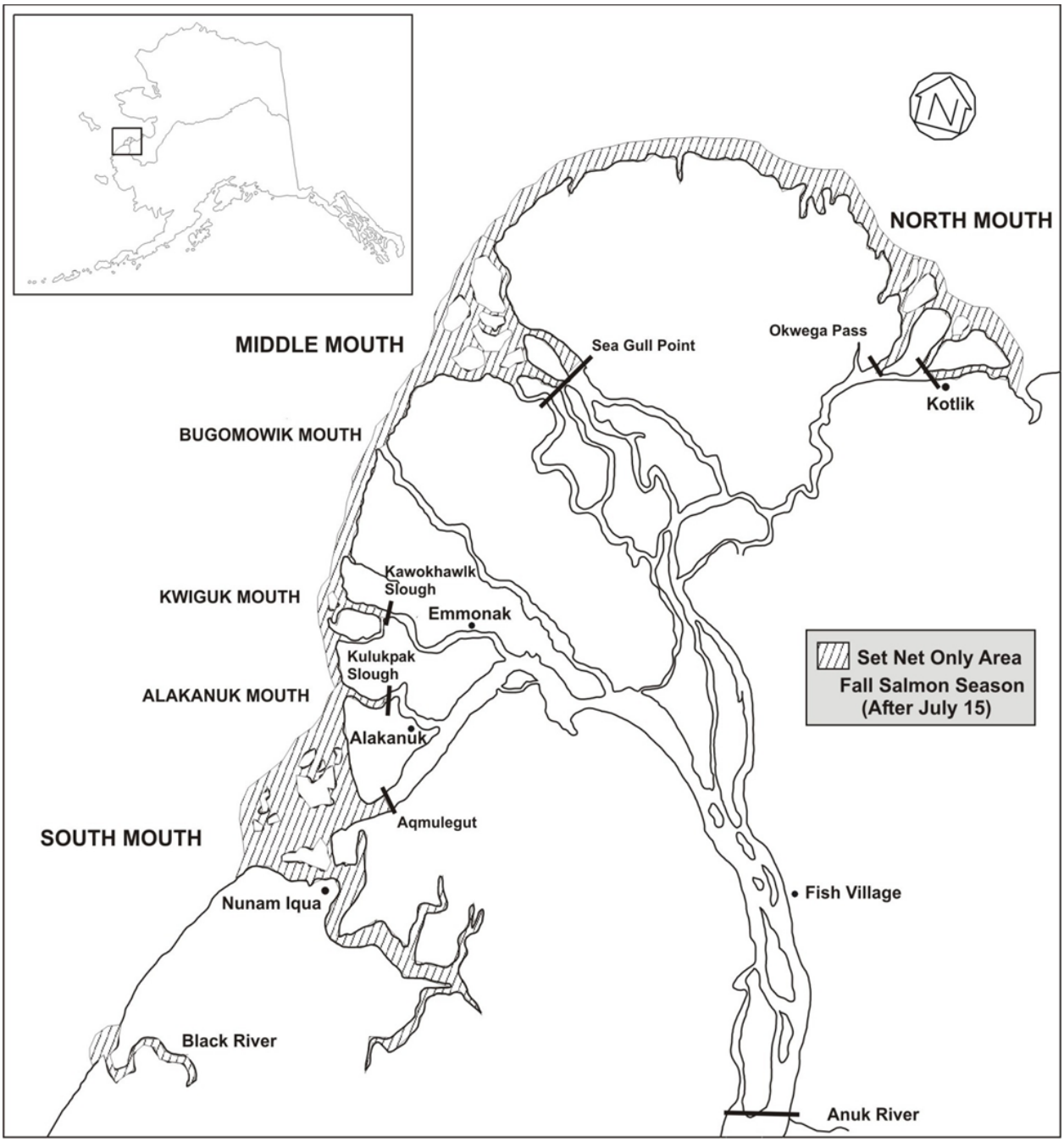
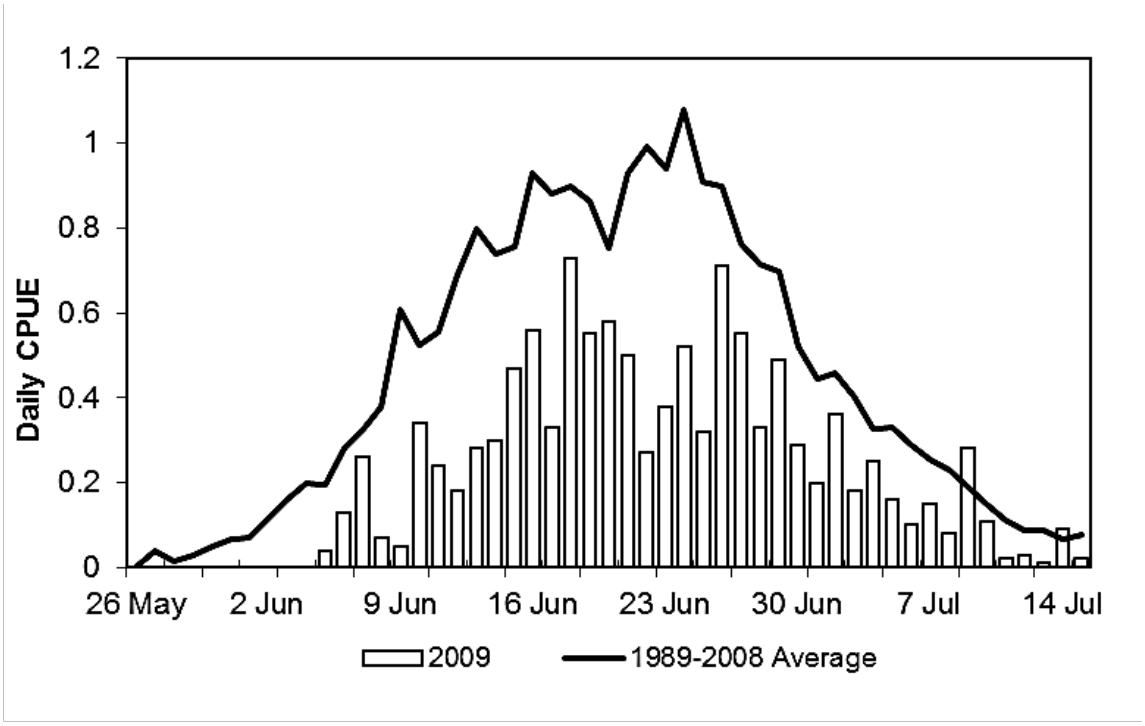


Figure 10.–Set Gillnet Only Area of District 1, Lower Yukon Area.



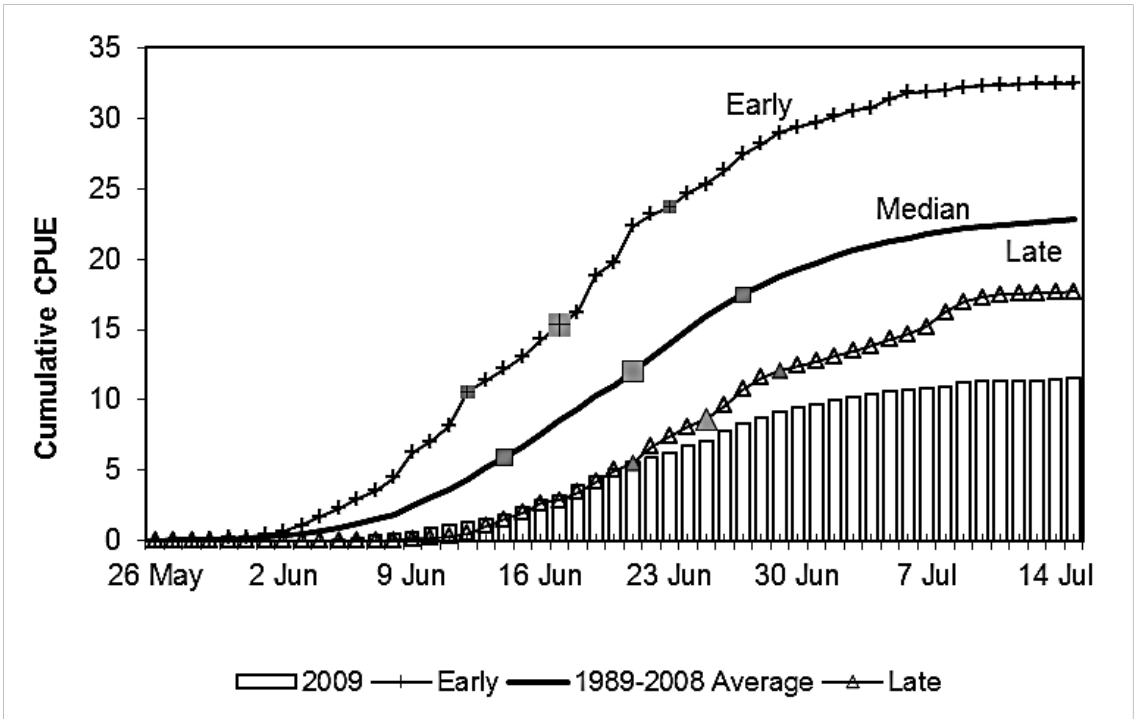
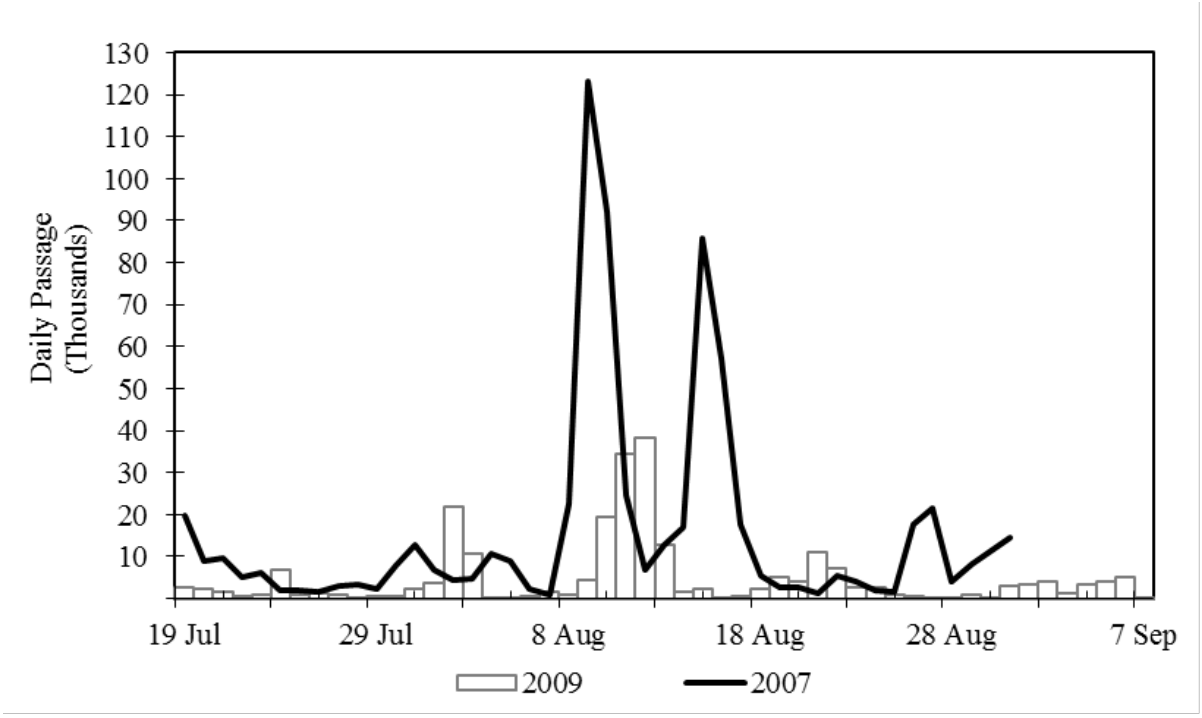


Figure 11.–Chinook salmon daily and cumulative catch per unit of effort (CPUE), Big Eddy and Middle Mouth sites combined, cooperative set net test fishery, Lower Yukon River, 1989 to 2008, early, average, and late run timing compared to 2009.



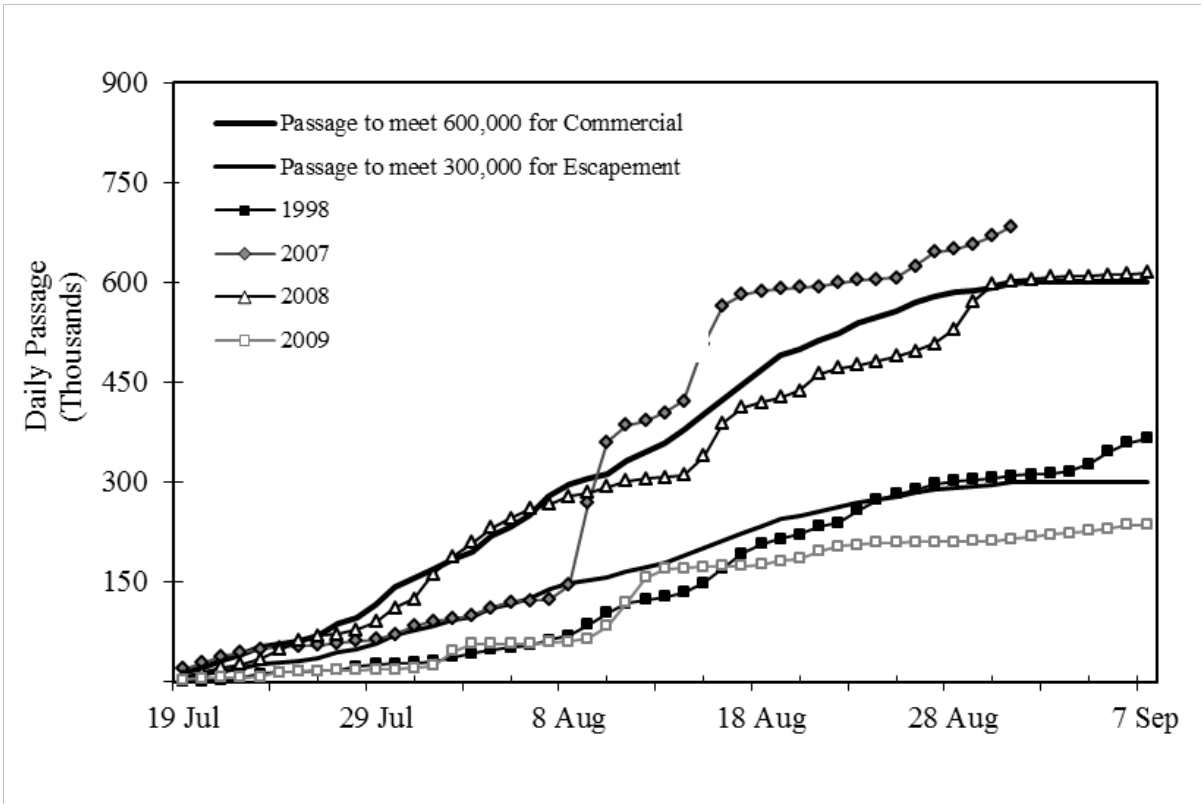


Figure 12.–Daily sonar passage counts attributed to fall chum salmon, located near the community of Pilot Station, Yukon River, 2007 compared to 2009 (top), and cumulative sonar passage counts, 1998, 2007, and 2008 with average timing to obtain threshold passages, compared to 2009 (bottom).

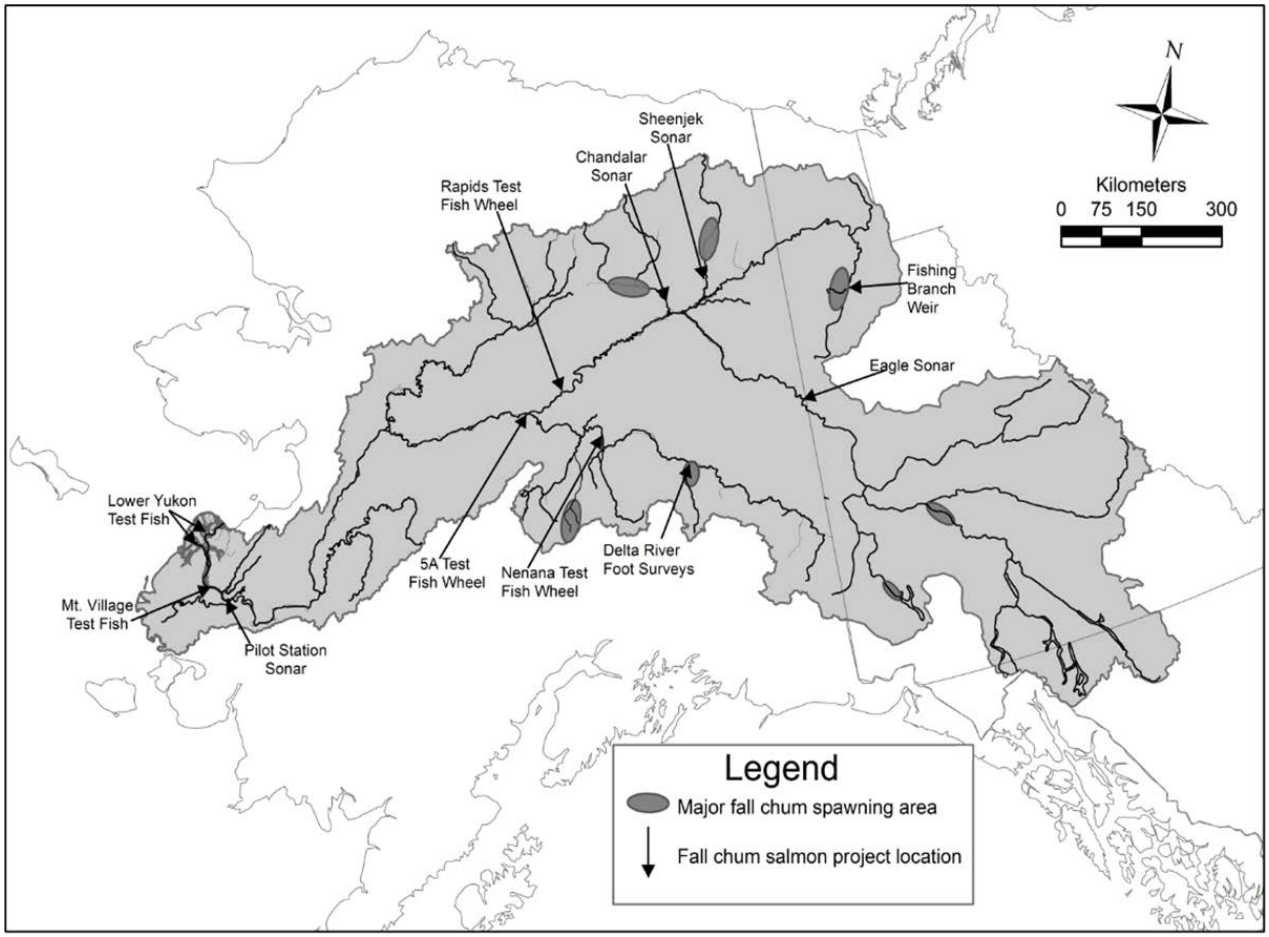


Figure 13.–Select fall chum salmon monitoring projects, Yukon River drainage.

APPENDIX A: YUKON DRAINAGE OVERVIEW AND SALMON HARVEST AND ESCAPEMENT

Appendix A1.–List of indigenous fishes found in the Yukon Area.

Species Code [a]	Scientific Name	Common Name
601	*Lampetra camtschatic*	Arctic Lamprey
570	*Stenodus leucichthys*	Inconnu (Sheefish)
588	*Coregonus nasus*	Broad Whitefish
589	*Coregonus pidschian*	Humpback Whitefish
583	*Coregonus sardinella*	Least Cisco
585	*Coregonus laurettae*	Bering Cisco
586	*Prosopium cylindraceum*	Round Whitefish
587	*Prosopium coulteri*	Pygmy Whitefish
610	*Thymallus arcticus*	Arctic Grayling
550	*Salvelinus namaycush*	Lake Trout
520	*Salvelinus alpinus*	Arctic Char
530	*Salvelinus malma*	Dolly Varden
410	*Oncorhynchus tshawytscha*	Chinook Salmon
420	*Oncorhynchus nerka*	Sockeye Salmon
430	*Oncorhynchus kisutch*	Coho Salmon
440	*Oncorhynchus gorbuscha*	Pink Salmon
450	*Oncorhynchus keta*	Chum Salmon
513	*Osmerus mordax*	Rainbow Smelt
514	*Hypomesus olidus*	Pond Smelt
500	*Esox lucius*	Northern Pike
630	*Dallia pectoralis*	Alaska Blackfish
650	*Couesius plumbeus*	Lake Chub
640	*Catostomus catostomus*	Longnose Sucker
670	*Percopsis omiscomaycus*	Trout Perch
590	*Lota lota*	Burbot (lush)
661	*Pungitius pungitius*	Ninespine Stickleback
162	*Cottus cognatus*	Slimy Sculpin
ESTUARINE		
113	*Eleginus gracilis*	Saffron Cod
122	*Liopsetta glacialis*	Arctic Flounder
127	*Limanda aspera*	Yellowfin Sole
129	*Platichthys stellatus*	Starry Flounder
192	*Hexagrammos stelleri*	Whitespotted Greenling
230	*Clupea harengus pallas*	Pacific Herring
516	*Mallotus villosus*	Capelin
NA	*Megalocottus platycephalus*	Sculpin

Note: Includes fishes found in the Yukon River drainage in Canada.

[a] The species code is a 3-digit number that identifies the type of fish caught on harvest fish tickets.

Appendix A2.–Yukon River drainage mileages.

Location	Mileage from Mouth
NORTH MOUTH (APOON PASS)	
Kotlik	6
Hamilton	26
MIDDLE MOUTH (KWIKPAK,KAWANAK PASS)	
Choolunawick	16
Akers Camp	26
New Hamilton	34
SOUTH MOUTH (KWIKLUAK PASS)	
Mouth, Black River	-18
Flat Island	0
Sheldon Point	5
Tin Can Point	8
Alakanuk	17
Emmonak-Kwiguk (Kwiguk Pass)	24
Sunshine Bay	24
Aproka Pass (upstream mouth)	35
Kwikpak Pass (upstream mouth)	44
Head of Passes	48
Fish Village	52
Mouth, Anuk River	63
(District 1/2 Boundary)	
Patsys Cabin	71
Mountain Village	87
Old Andreafsky	97
Pitkas Point	103
Mouth, Andreafsky River	104
St. Mary's	107
Pilot Station	122
Mouth, Atcheulinguk (Chulinak) River	126
Pilot Village	138
Marshall (Fortuna Ledge)	161
Upstream Mouth Owl Slough	163
Ingrihak	170
Ohogamuit	185
Toklik	191
(District 2/3 Boundary)	
Kakamut	193
Russian Mission	213
Dogfish Villaage	227
Paimuit	251
Mouth, Innoko River	274
(South Slough)	
Shageluk	328
Holikachuk	383
Holy Cross	279
Mouth, Koserefski River	286
Old Paradise Village	301
(District 3/4 Boundary)	
Mouth, Bonasila River	306
Anvik	317
Mouth, Anvik River	318
Grayling	336
Mouth, Thompson Creek	349
Blackburn	370
Eagle Slide	402
Mouth, Rodo River	447
Kaltag	450
Mouth, Nulato River	483
Nulato	484
Koyukuk	502
Mouth, Koyukuk River	508
Mouth, Gisasa River	564
Huslia	711
Mouth, Dakli River	755
Mouth, Hogatza River	780
Hughes	881
Mouth, Kanuti River	935
Alatna (Mouth, Alatna R.)	956
Allakaket	956
Mouth, South Fork	986
Mouth, John River	1,117
Bettles	1,121
Middle Fork	1,141
Cold Foot	1,174
Wiseman	1,186
Bishop Rock	514
Prospect Point	519
Galena	530
Whiskey Creek	555
Mouth, Yuki River	562
Ruby	581
Mouth, Melozitna River	583
Horner Hot Springs	605
Kokrines	608
Mouth, Nowitna River	612
Birches	647

-continued-

Location	Mileage from Mouth
(District 4/5 Boundary)	
Kallands-Mouth of Illinois Creek	664
Mouth, Tozitna River	681
Tanana Village	695
Mouth, Tanana River	695
(District 5/6 Boundary)	
Manley Hot Springs	765
Mouth, Kantishna River	793
Mouth, Toklat River	838
Mouth, Sushana R.	850
Mouth, Bearpaw River	887
Outlet, L. Minchumina	959
Minto	835
Nenana	860
Mouth, Nenana River	860
Mouth, Wood River	894
Rosie Creek Bluffs	912
Mouth, Chena R. (Fairbanks)	920
Mouth, Salcha River	965
Benchmark #735 Slough	991
Mouth, Little Delta R.	1,000
Mouth, Delta Creek	1,014
Mouth, Clear Creek (Richardson-Clearwater)	1,015
Mouth, Shaw Creek	1,021
Mouth, Delta River (Big Delta)	1,031
Delta Junction	1,041
Mouth, Goodpaster River	1,049
Bluff Cabin Slough	1,050
Outlet, Clearwater Lake	1,052
Outlet, Clearwater Crk (Delta Clearwater)	1,053
Mouth, Gerstle River	1,059
Outlet, Healy Lake	1,071
Outlet, Lake George	1,086
Tanacross	1,128
Outlet, Tetlin Lake	1,188
Mouth, Nabesna River	1,210
Northway Junction	1,214
Mouth, Chisana River	1,215
Mouth, Sheep Creek	1,297
Rampart Rapids	731
Rampart	763
Mouth, Hess Creek	789
Mouth, Ray River	817
Highway Bridge – Pipeline Crossing	820
Mouth, Dall River	841
Stevens Village	847
Mouth, Hodzana River	897
Beaver	932
Mouth Hadweenzic River	952
Mouth, Chandalar River (Venetie Landing)	982
Venetie	1,025
Fort Yukon	1,002
Mouth, Porcupine River	1,002
Mouth, Black River	1,026
Chalkyitsik	1,084
Mouth, Salmon Fork R.	1,142
Mouth, Sheenjek River	1,054
Mouth, Coleen River	1,157
Mouth, Salmon Trout R.	1,193
U.S. - Canada Border	1,219
Old Crow	1,259
Fishing Branch R. spawning area	1,600
Circle	1,061
Woodchopper	1,110
Mouth, Charley River	1,124
Mouth, Kandik River	1,135
Mouth, Nation River	1,166
Mouth, Tatonduk River	1,186
Mouth, Seventymile River	1,194
Eagle	1,213
U.S.-Canada border	1,224
Mouth, Fortymile River	1,269
Dawson	1,319
Mouth, Klondike River	1,320
Mouth, Sixty Mile River	1,369
Mouth, Stewart River	1,375
McQuesten	1,455
Stewart Crossing	1,491
Mayo	1,520
Mouth, Hess River	1,594
Mouth, White River	1,386
Mouth, Donjek River	1,455

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Location	Mileage from Mouth
Mouth Kluane River	1,541
Outlet Kluane L.	1,587
Burwash Landing	1,595
Kluane	1,625
Fort Selkirk	1,477
Mouth, Pelly River	1,478
Pelly Crossing	1,510
Mouth, MacMillan River	1,542
Ross River	1,602
Minto	1,499
Mouth Tatchun Creek	1,530
Carmacks	1,547
Mouth, Little Salmon River	1,583
Mouth, Big Salmon River	1,621
Mouth, N. Big Salmon R.	1,641
Mouth, S. Big Salmon R.	1,657
Outlet, Big Salmon Lake	1,714
Mouth, Teslin River	1,654
Roaring Bull Rapids	1,707
Johnson's Crossing (Outlet, Teslin L.)	1,756
Teslin	1,780
Mouth Nisutlin River	1,788
Mouth, Sidney Creek	1,837
Mouth, Hundred Mi. Creek	1,851
Mouth, NcNeil River	1,887
Outlet, Nisutlin Lake	1,892
Outlet, Lake Laberge	1,679
Inlet, Lake Laberge	1,712
Mouth, Takhini River	1,718
Whitehorse	1,745
Outlet, Marsh Lake	1,764
Mouth, M'Clintock River	1,769
Outlet, Little Atlin L.	1,788
Outlet, Atlin Lake	1,812
Atlin	1,844
Tagish	1,786
Outlet, Tagish Lake	1,788
Carcross (Outlet L.Bennett)	1,810
Bennett	1,835

Appendix A3.–Salmon fishery projects conducted in the Alaska portion of the Yukon River drainage in 2009.

Project Name	Location, River Mile (RM)	Primary Objective(s)	Duration	Agency	Responsibility
Commercial Catch and Effort Assessment	Alaska portion of the Yukon River drainage	1) Document and estimate the catch and associated effort of the Alaska Yukon River fisheries and 2) Commercial salmon fishery via receipts (fish tickets) of commercial sales of salmon.	June-Oct.	ADF&G	All aspects
Commercial Catch Sampling and Monitoring	Alaska portion of the Yukon River drainage	1) Determine age, sex, and size of Chinook, chum and coho salmon harvested in Alaska Yukon River commercial fisheries and 2) Monitor Alaska commercial fishery openings and closures.	June-Oct.	ADF&G ADPS	All aspects, Enforcement
Subsistence and Personal Use Catch and Effort Assessment	Alaska portion of the Yukon River drainage	Document and estimate the catch and associated effort of the Alaska Yukon River subsistence salmon fishery via interviews, catch calendars, mail-out questionnaires, telephone interviews, and subsistence fishing permits, and of the personal use fishery based on fishery permits.	Ongoing	ADF&G YRDFA	All aspects, Assistants in communities
Sport Catch, Harvest and Effort Assessment	Alaska portion of the Yukon River drainage	Document and estimate the catch, harvest, and associated effort of the Alaska Yukon River sport fishery via post-season mail-out questionnaires.	Postseason	ADF&G	All aspects
Yukon River Chinook Microsatellite Baseline	Yukon River drainage	Survey standardized microsatellites and Yukon River Chinook salmon populations.	Ongoing	ADF&G USFWS DFO	R&E Funding, R&M Funding
Yukon River Salmon Stock Identification	Yukon River drainage	Estimate Chinook salmon stock composition of the various Yukon River drainage harvests through genetic stock identification, age compositions, and geographical distribution of catches and escapements.	Ongoing	ADF&G	All aspects, R&M Funding
Yukon River Chum Salmon Mixed Stock Analysis	Pilot Station, RM 123	Estimate the stock compositions of chum salmon using samples collected from Pilot Station sonar test fisheries	May-Aug.	USFWS OSM	All aspects, R&M Funding-summer, OSM Funding - fall
YRDFA Weekly Teleconference	Yukon River drainage	Acts as a forum for fishermen along the Yukon River to interact with state and federal managers for the collection and dissemination of fisheries information.	May-Sept.	YRDFA	All aspects, R&M funding
Lower Yukon River Set Gillnet Test Fishing	South, Middle, and North mouths of the Yukon River Delta, RM 20	1) Index Chinook salmon run timing and abundance using set gillnets and 2) Sample captured salmon for age, sex, size composition information.	June-Aug.	ADF&G	All aspects
Hooper Bay Dall Point Offshore Test Fishing	Coastal Bering Sea south of Yukon River outlets	Assess run abundance, species composition, and run timing information of salmon bound for the Yukon River in offshore waters to assist with timely management decisions.	June-July	ADF&G	All aspects

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Lower Yukon River Drift Test Fishing	South, Middle, and North mouths of the Yukon River delta, RM 20	1) Index Chinook, summer and fall chum, and coho salmon run timing and abundance using drift gillnets and 2) Sample captured salmon for age, sex, size composition information.	June-Aug.	ADF&G	All aspects
Mountain Village Drift Gillnet Test Fishing	Mainstem Yukon River, RM 87	1) Index fall chum and coho salmon run timing and relative abundance using drift gillnets and 2) Sample captured salmon for age, sex, and size composition information.	July-Sept.	Asa'carsar miut Trad. Council BSFA	All aspects, R&M funding
East Fork Weir, Andreafsky River	Mile 20 East Fork, RM 124	1) Estimate daily escapement of summer chum salmon to the East Fork Andreafsky River and 2) Estimate age, sex, and size composition of the summer chum salmon escapement.	June-Aug.	USFWS	All aspects, OSM funding
Yukon River Sonar	Pilot Station, RM 123	1) Estimate Chinook and summer and fall chum salmon passage in the mainstem Yukon River. Apportionment of species including coho salmon and other finfish and 2) Biological sampling includes genetics and age, sex, length of Chinook, chum and coho salmon.	June-Sept.	ADF&G	All aspects, YDFDA and R&M funded- extended operations
Anvik River Sonar	Mile 40 Anvik River, RM 358	1) Estimate daily escapement of summer chum salmon to the Anvik River and 2) Estimate age, sex, and size composition of the summer chum salmon escapement.	June-July	ADF&G	All aspects
Gisasa River Weir	RM 3 Gisasa River, Koyukuk River drainage, RM 567	1) Estimate daily escapement of Chinook and summer chum salmon into the Gisasa River and 2) Estimate age, sex, and size composition of the Chinook and summer chum salmon escapements.	June-Aug.	USFWS	All aspects, OSM funding
Henshaw Creek Weir	RM 1 Henshaw Creek, RM 976	1) Estimate daily escapement of Chinook and summer chum salmon into Henshaw Creek and 2) Estimate age, sex, and size composition of the Chinook and summer chum salmon escapements.	June-Aug.	TCC USFWS-OSM	All aspects, oversight & funding report write-up
Y5A Test Fish Wheel	Mainstem Yukon River, RM 695	Index the timing of fall chum and coho salmon on the south bank of the Yukon River bound for the Tanana River drainage, using test fish wheel equipped with video monitoring system.	Aug.-Oct.	ADF&G USFWS	R&M funded contract, R&E funded tech support
Chandalar River Sonar	RM 14 Chandalar River, RM 43 Chandalar River, RM 996 Yukon River	1) Estimate fall chum salmon passage using DIDSON sonar in the Chandalar River and; 2) Collect vertebrae for ageing, sex and size composition of the fall chum salmon escapement.	Aug.-Sept.	USFWS	All aspects, TI Funding, R&M funding-ASL
Sheenjek River Sonar	Mile 6 Sheenjek River Porcupine River drainage, RM 1,060	1) Estimate daily escapement of fall chum salmon into the Sheenjek River using DIDSON sonar and counted both left and right banks and 2) Estimate age, sex, and size composition of the fall chum salmon escapement.	Aug.-Sept.	ADF&G	All aspects

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Yukon River Sonar	Eagle, RM 1,213	1) Estimate daily passage of Chinook and chum salmon in the mainstem Yukon River using both split-beam and DIDSON sonars and 2) Estimate age, sex, and size composition of salmon captured in the test nets, includes genetic sampling.	July-Oct.	ADF&G DFO	All aspects, technical support, TI Funding, R&E Funding
Middle Yukon River Chinook Sampling Project	Mainstem Yukon River Kaltag, RM 451	Estimate age, sex, and size composition of Chinook salmon harvested in middle Yukon River subsistence fisheries.	June-July	City of Kaltag	All aspects
Nenana River Escapement Surveys	Nenana River drainage, above RM 860	Aerial surveys for numbers and distribution of coho and chum salmon in 10 tributaries of the Nenana River below Healy Creek.	Sept.-Oct.	ADF&G	All aspects
Rapids Test Fish Wheel	Mainstem Yukon River, RM 730	1) Index run timing of Chinook and fall chum salmon runs as well as non-salmon species using video monitoring techniques and 2) Characterize the sex, weight, length, and girth composition of Chinook salmon.	June-Sept.	Zuray USFWS	All aspects, R&E funding
Nenana Test Fish Wheel	Mainstem Tanana River Nenana, RM 860	Index the timing of Chinook, summer chum, fall chum, and coho salmon runs using a test fish wheel equipped with video monitoring system.	June-Sept.	ADF&G USFWS	All aspects, R&E funded tech support
Tozitna River Weir	RM 50 Tozitna River Yukon River, RM 681	1) Estimate daily escapement of Chinook and summer chum salmon into the Tozitna River and 2) Estimate age, sex, and size composition of the Chinook and summer chum salmon escapement.	June-Aug.	BLM	All aspects
Toklat River Escapement Sampling	Toklat River, between RM 848 and 860	1) Evaluate fall chum and coho salmon spawning distribution in the Toklat River and 2) Sample fall chum salmon carcasses for age, sex, and size composition information.	Oct.	TCC ADF&G	Survey aging
Biological Sampling of Yukon River Salmon	Middle Yukon, (RM 279-581) and Fort Yukon	Collect genetics samples and age, sex, and length information from subsistence caught Chinook salmon.	July-Aug.	TCC	All aspects, R&E funded
Delta River Ground Surveys	Tanana River drainage, RM 1,031	1) Estimate fall chum salmon spawning escapement in Delta River, 2) Sample fall chum salmon carcasses for age, sex, and size composition information and 3) Recover tags from the Tanana fall chum salmon radio telemetry project.	Oct.-Dec.	ADF&G	All aspects
Chena River Tower	Chena River, Tanana River drainage, RM 921	Estimate daily escapement of Chinook and summer chum salmon into the Chena River.	July-Aug.	ADF&G	All aspects
Salcha River Tower	Salcha River, Tanana River drainage, RM 967	Estimate daily escapement of Chinook and summer chum salmon into the Salcha River.	July-Aug.	BSFA	All aspects, R&M funding
Goodpaster River Tower	RM 45 Goodpaster River, Tanana River drainage, RM 1,049	Estimate daily escapement of Chinook and summer chum salmon into the Goodpaster River.	July	TCC	All aspects, Pogo Mine funding

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Upper Yukon River Chum Salmon Genetic Stock Identification	Yukon River drainage	Establish the feasibility of using DNA marks for genetic stock identification of chum salmon in the Yukon River.	June-Oct.	USFWS	All aspects
Ichthyophonus Sampling	Emmonak, RM 20 Eagle, RM 1,213	Determine prevalence of Ichthyophonus in the lower Yukon River at Emmonak and in the upper Yukon River at Eagle.	May-July	UAF ADF&G TCC	All aspects, TI funding, R&E funding
Yukon River Inseason Salmon Harvest Interviews	Emmonak, Holy Cross, Nulato, Huslia, Galena, and Beaver	Collect qualitative inseason subsistence salmon harvest information through weekly interviews.	June-Sept	USFWS YRDFA	All aspects OSM funding
Migratory Timing and Harvest Information of Chinook Salmon Stocks	Yukon River drainage	Enlarge existing allozyme and develop a DNA database to characterize the genetic diversity of Chinook salmon in the Yukon River within the U.S. and Canada. U.S. collections include microsatellites and allozyme. Canada collections include microsatellites.	June-Aug.	USFWS ADF&G DFO OSM	All aspects
Juvenile Chinook Rearing in non-natal streams	Yukon River downstream of the Canada border	1) Capture juvenile Chinook salmon in non-natal Yukon River tributary streams, 2) Determine whether Canada-origin juvenile Chinook salmon rear in the Yukon River tributary streams of the United States using genetic techniques, and 3) Describe non-natal stream rearing habitat characteristics for habitat characteristics for Yukon River Chinook salmon.	July-Aug.	USFWS	All aspects, AKSSF Funding
Comparative Mesh Size Study	Y-1 near Emmonak	1) Determine if the proportion of Chinook and summer chum salmon caught varies by mesh size, 2) Determine if age, sex, length, weight, and girth of individual Chinook salmon caught varies by mesh size, and 3) Evaluate the marketability of the catch from the various mesh sizes.	June-July	ADF&G YDFDA	All aspects

Source: JTC 2010.

Acronyms:

ADF&G = Alaska Department of Fish and Game
ADPS = Alaska Department of Public Safety
AVCP = Association of Village Council Presidents, Inc.
AYKSSF = Arctic-Yukon-Kuskokwim Sustainable Salmon Fund
BSFA = Bering Sea Fishermen's Association
DFO = Department of Fisheries and Oceans (Canada)
DNA = Deoxyribonucleic acid
NPS = National Park Service
OSM = Office of Subsistence Management
R&E = Yukon River Panel Restoration and Enhancement Program
R&M = Research and Management Fund
TCC = Tanana Chiefs Conference, Inc.
UAF = University of Alaska Fairbanks
USFWS = United States Fish and Wildlife Service
USFWS-OSM = United States Fish and Wildlife Service, Office of Subsistence Management
YDFDA = Yukon Delta Fisheries Development Association
YRDFA = Yukon River Drainage Fisheries Association

Appendix A4.–List of harvest/escapement monitoring and incubation/rearing projects involving salmon in the Canada portion of the Yukon River drainage, 2009.

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Upper Yukon Tagging Program (mark-recapture)	Yukon River downstream of Dawson City	- to obtain population, and escapement estimates of Chinook and chum salmon in the Canada section of the mainstem Yukon River - to collect stock ID, age, size, sex composition data - to participate in the Eagle sonar program	June - Oct	DFO	all aspects
Chinook and Chum Test Fishery	Yukon River near Dawson City	- to provide catch and tag recovery information for the mark recapture program as required (Chinook required in 2008) - to provide ASL information - the Chinook test fisheye uses nets while the chum test fishery uses live release fish wheels	July-Oct	YRCFA THFN	all aspects
Commercial Catch Monitoring	Yukon River near Dawson City	- to determine weekly catches and effort in the Canada commercial fishery (CM and CK), and recovery of tags - to collect other information as required	July-Oct	DFO	all aspects
Aboriginal Catch Monitoring	Yukon communities	- to determine weekly catches and effort in the aboriginal fishery and recover tags - to implement components of the UFA and AFS	July-Oct	YFN's DFO	joint project
Recreational Catch Monitoring	Yukon R mainstem and tributaries	- to determine the recreational harvest, landed and retained, of salmon caught in the Yukon through a catch card program	July-Oct	DFO	all aspects
DFO Escapement Index Surveys	Chinook and chum aerial index streams	- to obtain counts in index areas including: Big Salmon, L. Salmon Wolf, Nisutlin, Mainstem Yukon, Kluane & Teslin rivers	Aug-Nov	DFO	all aspects
Escapement Surveys and DNA Collection	Throughout upper Yukon R. drainage	- to conduct surveys of spawning fish by foot, boat, air etc. - to enumerate and recover tags in terminal areas - to collect DNA samples from spawning population and aggregate samples from fisheries and large migration corridors	July-Oct	R&E Projects DFO YFN's AFS	all aspects
Fishing Branch Chum Salmon Weir	Fishing Branch R.	- to enumerate chum salmon returning to the Fishing Branch River and obtain age, size, tag and sex composition data	Aug-Oct	DFO VGG	joint project
Whitehorse Rapids Fish way	Whitehorse	- to enumerate wild and hatchery reared Chinook returns to the Whitehorse fish way area and obtain age, size, sex and tag data	July-Aug	YF&GA	all aspects

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Project Name	Location		Primary Objective(s)	Duration	Agency	Responsibility
Blind Creek Weir	Pelly River	-	enumerate Chinook escapement and recover tags	July-Aug.	JW&A	all aspects
		-	collect ASL data and DNA samples			
Big Salmon Sonar	Big Salmon River	-	installation and operation of a DIDSON sonar program for Chinook	July-Aug.	JW&A	all aspects
		-	carcass survey for tags, ASL, and DNA			
Klondike River Sonar Feasibility	Klondike River	-	Examine lower river for suitable sonar sites	July-Oct.	BM&A	all aspects
Escapement Sampling	Various	-	collect ASL data and DNA samples	Aug.-Oct.	DFO	all aspects
Porcupine Mark-Recapture	Porcupine River	-	conduct chum marking and test fishery program	Aug.-Oct.	EDI &	all aspects
		-	establish method of conducting in-season local management			
Whitehorse Rapids Fish Hatchery and Coded-Wire Tagging Project	Whitehorse	-	to rear and release ~150K Chinook fry produced from Whitehorse Rapids Fish way broodstock	ongoing	RR, YEC YF&GA	all aspects coded-wire
		-	to mark fry with a CWT, adipose clip, and release upstream of the Whitehorse hydroelectric facility			
MacIntyre Incubation Box and Coded-Wire Tagging Project	Whitehorse	-	to rear up to 120K Chinook fry from broodstock collected from the Takhini River and/or Tatchun Creek	ongoing	DFO YC NRI	technical support field work, project monitoring
		-	to mark fry with a CWT, adipose clip, and release at natal sites			
Fox Creek Restoration Program	Whitehorse Area	-	incubate CK eggs , mark fry with a CWT, and release into Fox	ongoing	TKC	all aspects

Source: JTC 2010.

Acronyms:

AFS = Aboriginal Fisheries Strategy
BM&A = B. Mercer and Associates
DFO = Department of Fisheries and Oceans Canada
EDI = Environmental Dynamics Incorporated
JW&A = Jane Wilson & Associates
NRI = Northern Research Institute
R&E = Yukon Panel Restoration and Enhancement Program
RR = Government of Yukon- Renewable Resources
TKC = Ta'an Kwach'an Council
THFN = Tr'ondek Hwech'in First Nation
VGG = Vuntut Gwitchin Government
YC = Yukon College
YEC = Yukon Energy Corporation
YFN's = Yukon First Nation's
YF&GA = Yukon Fish and Game Association
YRCFA = Yukon River Commercial Fishermen Association
YSC = Yukon Salmon Committee

Appendix A5.–Total utilization in numbers of salmon by district and country, Yukon River drainage, 2009.

District	Fishery	Chinook	[a]	Summer Chum	Fall Chum	Coho
1	Subsistence	4,125		23,998	1,917	847
	Commercial	90		71,335	11,911	5,994
	Test Fish Sales	0		0	0	0
	Total	4,215		95,333	13,828	6,841
2	Subsistence	6,135		21,089	1,563	1,057
	Commercial	226		86,571	12,072	1,582
	Test Fish Sales	0		0	0	0
	Total	6,361		107,660	13,635	2,639
3	Subsistence	2,924		1,146	937	321
	Commercial	0		0	0	0
	Total	2,924		1,146	937	321
Total	Subsistence	13,184		46,233	4,417	2,225
Lower	Commercial	316		157,906	23,983	7,576
Yukon	Test Fish Sales	0		0	0	0
Area	Total	13,500		204,139	28,400	9,801
4	Subsistence	9,514		14,958	7,382	3,986
	Commercial	0	[b]	4,589	0	0
	Total	9,514		19,547	7,382	3,986
5	Subsistence	8,917		5,298	38,083	2,498
	Commercial	0		0	0	0
	Total	8,917		5,298	38,083	2,498
6	Subsistence	1,285		1,253	16,079	7,051
	Commercial	0	[c]	7,777	1,893	742
	Personal use	127		308	78	70
	Total	1,412		9,338	18,050	7,863
Total	Subsistence	19,716		21,509	61,544	13,535
Upper	Commercial	0		12,366	1,893	742
Yukon	Personal use	127		308	78	70
Area	Total	19,843		34,183	63,515	14,347
Total	Subsistence	32,900		67,742	65,961	15,760
Yukon	Commercial	316		170,272	25,876	8,318
River	Personal use	127		308	78	70
(Alaska)	Test Fish sales	0		0	0	0
	Sport Fish	863	[d]	174	0	964
	Total	34,206		238,496	91,915	25,112
	Domestic	17		0	0	0
Total	Aboriginal (mainstem)	3,791		0	820	0
Canada	Sport Fish	125		0	0	0
	Commercial	364		0	293	0
	Subtotal	4,297		0	1,113	0
	Porcupine Aboriginal	461		0	898	0
	Total	4,758		0	2,011	0
Grand Total		38,964		238,496	93,926	25,112

Note: Does not include subsistence harvest from coastal communities of Hooper Bay and Scammon Bay.

[a] Commercial sale of Chinook salmon was prohibited through July 15 in Districts 1-5. A total of 944 Chinook salmon were caught but not sold in District 1, 2,596 in District 2, 200 in Subdistrict 4-A, and 12 in District 6.

[b] Summer chum salmon commercial harvest in District 4 is the number of females recorded on fish tickets that were taken to produce 3,906 pounds of roe.

[c] Female fall chum and coho salmon were selectively sold in District 6 for roe extraction.

[d] Sport fish harvest for the Alaska portion of the Yukon River drainage. Assume majority of chum salmon caught during summer season.

Appendix A6.–Commercial salmon sales and estimated harvest by district and country, Yukon River drainage, 2009.

District/ Subdistrict	Number of Fishermen [a]	Chinook [b]	Summer Chum	Fall Chum	Coho
1	226	90	71,335	11,911	5,994
2	172	226	86,571	12,072	1,582
Subtotal	391	316	157,906	23,983	7,576
3	0	0	0	0	0
Total Lower Yukon	391	316	157,906	23,983	7,576
Anvik River	0	0	0	0	0
4-A	6	0	4,589	0	0
4-BC	0	0	0	0	0
Subtotal District 4 [c]	6	0	4,589	0	0
5-ABC	0	0	0	0	0
5-D	0	0	0	0	0
Subtotal District 5	0	0	0	0	0
6 [d]	6	0	7,777	1,893	742
Total Upper Yukon	12	0	12,366	1,893	742
Total Alaska	403	316	170,272	25,876	8,318

Note: All salmon were sold in the round in 2009.

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

[b] Commercial sale of Chinook salmon was prohibited through July 15 in Districts 1-5. A total of 944 Chinook salmon were caught but not sold in District 1; 2,596 in District 2; 200 in Subdistrict 4-A; and 12 in District 6.

[c] Summer chum salmon commercial harvest in District 4 is the number of females recorded on fish tickets that were taken to produce 3,906 pounds of roe.

[d] Female fall chum and coho salmon were selectively sold in District 6 for roe extraction.

Appendix A7.–Commercial sales in numbers of salmon by statistical area, Yukon Area, 2009.

Statistical Area	Chinook	Summer Chum	Fall Chum	Coho	Total Salmon
334-11	1	730	66	0	797
12	16	7,457	1,355	227	9,055
13	4	9,120	457	124	9,705
14	3	9,569	301	11	9,884
15	36	12,979	4,576	1,566	19,157
16	17	4,930	2,118	2,486	9,551
17	10	23,532	2,415	1,493	27,450
18	3	3,018	623	87	3,731
Subtotal District 1	90	71,335	11,911	5,994	89,330
334-21	39	13,583	1,107	370	15,099
22	106	48,571	7,988	1,085	57,750
23	56	19,717	1,593	100	21,466
24	2	3,053	235	8	3,298
25	23	1,647	1,149	19	2,838
Subtotal District 2	226	86,571	12,072	1,582	100,451
334-31	–	–	–	–	0
32	–	–	–	–	0
Subtotal District 3	–	–	–	–	–
Total Lower Yukon	316	157,906	23,983	7,576	189,781
334-42	–	–	–	–	–
43	–	–	–	–	–
44	0	3,890	–	–	3,890
45	0	699	–	–	699
46	–	–	–	–	–
47	–	–	–	–	–
Subtotal District 4	0	4,589	0	0	4,589
334-51	–	–	–	–	–
52	–	–	–	–	–
53	–	–	–	–	–
54	–	–	–	–	–
55	–	–	–	–	–
Subtotal District 5	0	0	0	0	0
334-61	0	590	1,893	742	3,225
62	0	4,979	0	0	4,979
63	0	2,208	0	0	2,208
Subtotal District 6	0	7,777	1,893	742	10,412
Total Upper Yukon	0	12,366	1,893	742	15,001
Grand Total Yukon Area	316	170,272	25,876	8,318	204,782

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

Appendix A8.–Commercial sales of salmon by statistical area, set gillnet and fish wheel harvest combined, Upper Yukon area, 2009.

Statistical Area	Number of Fishermen [a]	Chinook	Summer Chum	Fall Chum	Coho
334-42	–	–	–	–	–
334-43	–	–	–	–	–
334-44	5	0	3,890	–	–
334-45	1	0	699	–	–
334-46	0	–	–	–	–
334-47 [b]	0	–	–	–	–
Subtotal District 4	6	0	4,589	–	–
334-51	–	–	–	–	–
334-52	–	–	–	–	–
334-53	–	–	–	–	–
334-54	–	–	–	–	–
334-55	–	–	–	–	–
Subtotal District 5	–	–	–	–	–
334-61	1	0	590	1,893	742
334-62	4	0	4,979	–	–
334-63	3	0	2,208	0	0
Subtotal District 6	6	0	7,777	1,893	742
Total Upper Yukon Area	12	0	12,366	1,893	742

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

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

[b] The Anvik River, statistical area 334-47, was not opened for commercial fishing in 2009. Therefore, purse and beach seine gear, which are legal gear types in this statistical area were not used for commercial purposes.

Appendix A9.–Commercial set gillnet sales in number of salmon by statistical area, Upper Yukon Area, 2009.

Statistical Area	Number of Fishermen [a]	Chinook	Summer Chum	Fall Chum	Coho
334-42	–	–	–	–	–
334-43	–	–	–	–	–
334-44	1	0	2,311	–	–
334-45	0	–	–	–	–
334-46	0	–	–	–	–
334-47	0	–	–	–	–
Subtotal District 4	1	0	2,311	–	–
334-51	–	–	–	–	–
334-52	–	–	–	–	–
334-53	–	–	–	–	–
334-54	–	–	–	–	–
334-55	–	–	–	–	–
Subtotal District 5	–	–	–	–	–
334-61	0	–	–	–	–
334-62	0	–	–	–	–
334-63	1	0	146	–	–
Subtotal District 6	1	0	146	–	–
Total Upper Yukon Area	2	0	2,457	–	–

Note: En dash indicates no commercial fishing activity occurred.

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

Appendix A10.–Commercial fish wheel sales in number of salmon by statistical area, Upper Yukon Area, 2009.

Statistical Area	Number of Fishermen [a]	Chinook	Summer Chum	Fall Chum	Coho
334-42	–	–	–	–	–
334-43	–	–	–	–	–
334-44	4	0	1,579	–	–
334-45	1	0	699	–	–
334-46	0	–	–	–	–
334-47	0	–	–	–	–
Subtotal District 4	5	0	2,278	–	–
334-51	–	–	–	–	–
334-52	–	–	–	–	–
334-53	–	–	–	–	–
334-54	–	–	–	–	–
334-55	–	–	–	–	–
Subtotal District 5	–	–	–	–	–
334-61	2	0	590	1,893	742
334-62	2	0	4,979	–	–
334-63	2	0	2,062	–	–
Subtotal District 6	5	0	7,631	1,893	742
Total Upper Yukon Area	10	0	9,909	1,893	742

Note: En dash indicates no commercial fishing activity occurred.

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

Appendix A11.–Value of commercial salmon fishery to Yukon Area fishermen, 1990–2009.

	Summer Season						
	Chinook			Summer Chum			
	Lower Yukon	Upper Yukon		Lower Yukon	Upper Yukon		Total
Year	Value	Value	Subtotal	Value	Value	Subtotal	Season
1990	4,820,859	105,295	4,926,154	497,571	506,611	1,004,182	5,930,336
1991	7,128,300	97,140	7,225,440	782,300	627,177	1,409,477	8,634,917
1992	9,957,002	168,999	10,126,001	606,976	525,204	1,132,180	11,258,181
1993	4,884,044	113,217	4,997,261	226,772	203,762	430,534	5,427,795
1994	4,169,270	124,270	4,293,540	79,206	396,685	475,891	4,769,431
1995	5,317,508	87,059	5,404,567	241,598	1,060,322	1,301,920	6,706,487
1996	3,491,582	47,282	3,538,864	89,020	966,277	1,055,297	4,594,161
1997	5,450,433	110,713	5,561,146	56,535	96,806	153,341	5,714,487
1998	1,911,370	17,285	1,928,655	26,415	821	27,236	1,955,891
1999	4,950,522	74,475	5,024,997	19,687	1,720	21,407	5,046,404
2000	725,606	–	725,606	8,633	–	8,633	734,239
2001	–	–	–	–	–	–	–
2002	1,781,996	20,744	1,802,740	4,342	6,176	10,518	1,813,258
2003	1,871,202	40,957	1,912,159	1,585	6,879	8,464	1,920,623
2004	3,063,667	38,290	3,101,957	8,884	9,645	18,529	3,120,486
2005	1,952,109	24,415	1,976,524	11,004	13,479	24,483	2,001,007
2006	3,290,367	32,631	3,322,998	23,862	42,988	66,850	3,389,848
2007	1,939,114	27,190	1,966,304	220,715	34,421	255,136	2,221,440
2008	325,470	–	325,470	326,930	65,840	392,770	718,240
2009	20,970	–	20,970	514,856	20,430	535,286	556,256
2004-2008 Average	2,114,145	30,632	2,138,651	118,279	33,275	151,554	2,290,204

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	Fall Season							
	Fall Chum			Coho				
	Lower Yukon	Upper Yukon		Lower Yukon	Upper Yukon		Total	Total
Year	Value	Value	Subtotal	Value	Value	Subtotal	Season	Value
1990	238,165	174,965	413,130	137,302	37,026	174,328	587,458	6,517,794
1991	438,310	157,831	596,141	300,182	21,556	321,738	917,879	9,552,796
1992	0	54,161	54,161	0	19,529	19,529	73,690	11,331,871
1993	0	0	0	0	0	0	0	5,427,795
1994	0	8,517	8,517	0	8,739	8,739	17,256	4,786,687
1995	185,036	167,571	352,607	80,019	11,292	91,311	443,918	7,150,405
1996	48,579	45,438	94,017	96,795	13,020	109,815	203,832	4,797,993
1997	86,526	7,252	93,778	79,973	1,062	81,035	174,813	5,889,300
1998	–	–	–	–	–	–	–	1,955,891
1999	35,639	876	36,515	3,620	0	3,620	40,135	5,086,539
2000	–	–	–	–	–	–	–	734,239
2001	–	–	–	–	–	–	–	–
2002	–	–	–	–	–	–	–	1,813,258
2003	5,993	3,398	9,391	18,168	5,095	23,263	32,654	1,953,277
2004	1,126	848	1,974	2,774	6,372	9,146	11,120	3,131,606
2005	316,698	48,159	364,857	83,793	19,182	102,975	467,832	2,468,839
2006	202,637	33,806	236,443	50,299	11,137	61,436	297,879	3,687,727
2007	144,256	16,907	161,163	127,869	1,368	129,237	290,400	2,511,840
2008	428,969	22,089	451,058	216,777	3,717	220,494	671,552	1,389,792
2009	108,778	1,286	110,064	52,176	457	52,633	162,697	718,953
2004-2008								
Average	218,737	24,362	243,099	96,302	8,355	104,658	347,757	2,637,961

Note: En dash indicates no commercial fishing activity occurred.

Appendix A12.–Salmon processors, buyers, catcher-sellers, and associated data, Yukon Area, 2009.

Commercial operation Processing location / buying station	Intended Product	District
BB's Kings HC 60 Box 227 I Copper Center, AK 99573 (St. Mary's)	Fresh Salmon Chinook	1 and 2
Bonsila Inc. P.O. Box 150 Anvik, AK 99558	Fresh Salmon Salmon Roe	4
Boreal Fisheries P.O. Box 561 Graham, WA 98338 (St. Mary's)	Fresh Salmon Chinook Chum, Coho Frozen Salmon Salmon Roe	1 and 2
Christopher D. Beans P.O. Box 313 St. Mary's, AK 99658	Fresh Salmon Chinook	2
David Dausel P.O. Box 80291 Fairbanks, AK 99708	Fresh Salmon Chinook Chum, Coho	6
David Herbert P.O. Box 287 St. Mary's, AK 99658	Fresh Salmon Chinook, Chum	2
Eric Weingarth P.O. Box 74 St. Mary's, AK 99658	Fresh Salmon Chinook	2
Francis C. Beans P.O. Box 325 St. Mary's, AK 99658	Fresh Salmon Chinook	2
Interior Alaska Fish Processors Inc. 2400 Davis Road Fairbanks, AK 99701 (Fairbanks and North Pole, AK)	Fresh Salmon Chinook Chum, Coho Frozen Salmon Salmon Roe	5 and 6
Kwik'pak Fisheries, LLC 2200 6th Avenue Suite 707 Seattle, WA 98121 (Emmonak, and Mt. Village, AK)	Fresh Salmon Chinook Chum, Coho Frozen Salmon Salmon Roe	1 and 2
Yutana Fisheries 1477 Chena Point Avenue Fairbanks, AK 99709	Fresh Salmon Chinook Chum, Coho Salmon Roe	6

Appendix A13.–Historical daily and cumulative CPUE for Chinook salmon, Lower Yukon River set net test fishery, 1989–2008 average and 2008 compared to 2009.

	Chinook Salmon in 8.5" Set Gillnets							
	2009				2008		Average 1989-2008	
Date	Daily Catch	Daily CPUE	Cumulative CPUE	Hrs Fished [a] District 1	Daily CPUE	Cumulative CPUE	Daily CPUE	Cumulative [b] CPUE
26 May							0.00	0.00
27 May							0.04	0.03
28 May							0.02	0.04
29 May							0.03	0.07
30 May							0.05	0.12
31 May							0.07	0.18
1 Jun					0.00	0.00	0.07	0.25
2 Jun	0	0.00	0.00		0.00	0.00	0.11	0.36
3 Jun	0	0.00	0.00		0.02	0.02	0.16	0.52
4 Jun	0	0	0.00		0.02	0.04	0.20	0.72
5 Jun	1	0.04	0.04		0.03	0.07	0.19	0.91
6 Jun	3	0.13	0.17		0.04	0.11	0.28	1.19
7 Jun	19	0.26	0.43		0.07	0.18	0.33	1.51
8 Jun	7	0.07	0.50		0.17	0.35	0.38	1.90
9 Jun	5	0.05	0.55		0.29	0.64	0.61	2.53
10 Jun	33	0.34	0.89		0.24	0.88	0.53	3.07
11 Jun	23	0.24	1.13		0.22	1.10	0.55	3.64
12 Jun	17	0.18	1.31		0.23	1.33	0.69	4.36
13 Jun	27	0.28	1.59		0.35	1.68	0.80	5.18
14 Jun	29	0.30	1.89		0.60	2.28	0.74	5.92
15 Jun	45	0.47	2.36		0.79	3.07	0.76	6.68
16 Jun	54	0.56	2.92		1.27	4.34	0.93	7.59
17 Jun	32	0.33	3.25		0.70	5.04	0.88	8.48
18 Jun	70	0.73	3.98		0.47	5.51	0.90	9.40
19 Jun	53	0.55	4.53		0.31	5.82	0.86	10.29
20 Jun	56	0.58	5.11		0.36	6.18	0.75	11.06
21 Jun	48	0.50	5.61		0.58	6.76	0.93	12.01
22 Jun	26	0.27	5.88		0.91	7.67	0.99	13.00
23 Jun	36	0.38	6.26		1.06	8.73	0.94	13.94
24 Jun	50	0.52	6.78		1.22	9.95	1.08	15.01
25 Jun	31	0.32	7.10		0.72	10.67	0.91	15.93
26 Jun	68	0.71	7.81		1.86	12.53	0.90	16.77
27 Jun	53	0.55	8.36		2.14	14.67	0.76	17.46
28 Jun	32	0.33	8.69		1.85	16.52	0.72	18.12
29 Jun	47	0.49	9.18	4	1.07	17.59	0.70	18.80
30 Jun	28	0.29	9.47		0.86	18.45	0.52	19.30
1 Jul	19	0.20	9.67		0.72	19.17	0.45	19.73
2 Jul	35	0.36	10.03	6	0.31	19.48	0.46	20.19
3 Jul	17	0.18	10.21		0.46	19.94	0.40	20.59
4 Jul	24	0.25	10.46	6	0.29	20.23	0.33	20.92

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	Chinook Salmon in 8.5" Set Gillnets							
	2009				2008		Average 1989-2008	
Date	Daily Catch	Daily CPUE	Cumulative CPUE	Hrs Fished [a] District 1	Daily CPUE	Cumulative CPUE	Daily CPUE	Cumulative [b] CPUE
5 Jul	15	0.16	10.62		0.35	20.58	0.33	21.25
6 Jul	10	0.10	10.72		0.64	21.22	0.29	21.52
7 Jul	14	0.15	10.87	9	0.41	21.63	0.25	21.77
8 Jul	8	0.08	10.95		0.17	21.80	0.23	22.00
9 Jul	27	0.28	11.23		0.11	21.91	0.19	22.19
10 Jul	11	0.11	11.34	9	0.16	22.07	0.15	22.34
11 Jul	2	0.02	11.36		0.05	22.12	0.11	22.46
12 Jul	3	0.03	11.39		0.02	22.14	0.09	22.55
13 Jul	1	0.01	11.40		0.06	22.20	0.09	22.64
14 Jul	9	0.09	11.49	9	0.03	22.23	0.07	22.71
15 Jul	2	0.02	11.51		0.04	22.27	0.08	22.79
	1,090		11.51			22.27		22.79

Note: The box within the column indicates the first to the third quartile of the cumulative index. The median date of the cumulative index is also highlighted.

[a] Includes restricted mesh commercial periods only.

[b] Average CPUE is without 1998 and 2000. Data are smoothed and adjusted for late run timing.

Appendix A14.–Pilot Station sonar project passage estimates, Yukon River drainage, 1995 and 1997–2009.

	Chinook			Chum						
Year [a]	Large [b]	Small	Total	Summer	Fall [c]	Total	Coho [c]	Pink	Other [d]	Total
2009 [e]	108,361	35,688	144,049	1,421,646	233,307	1,654,953	206,620	23,679	765,140	2,794,441
2008	106,708	23,935	130,643	1,665,667	615,127	2,280,794	135,570	558,050	585,303	3,690,360
2007	90,184	35,369	125,553	1,726,885	684,011	2,410,896	173,289	71,699	1,085,316	3,866,753
2006	145,553	23,850	169,403	3,767,044	790,563	4,557,607	131,919	115,624	875,899	5,850,452
2005 [f]	142,007	17,434	159,441	2,439,616	1,813,589	4,253,205	184,718	37,932	593,248	5,228,544
2004	110,236	46,370	156,606	1,357,826	594,060	1,951,886	188,350	243,375	637,257	3,177,474
2003	245,037	23,500	268,537	1,168,518	889,778	2,058,296	269,081	4,656	502,878	3,103,448
2002	92,584	30,629	123,213	1,088,463	326,858	1,415,321	122,566	64,891	557,779	2,283,770
2001 [g]	85,511	13,892	99,403	441,450	376,182	817,632	137,769	665	353,431	1,408,900
2000	39,233	5,195	44,428	456,271	247,935	704,206	175,421	35,501	361,222	1,320,778
1999	127,809	16,914	144,723	973,708	379,493	1,353,201	62,521	1,801	465,515	2,027,761
1998	71,177	16,675	87,852	826,385	372,927	1,199,312	136,906	66,751	277,566	1,768,387
1997 [h]	118,121	77,526	195,647	1,415,641	506,621	1,922,262	104,343	2,379	621,857	2,846,488
1995	130,271	32,674	162,945	3,556,445	1,053,245	4,609,690	101,806	24,604	1,011,855	5,910,900

Source: JTC 2010.

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

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

[c] This estimate may not include the entire run. However, since 2008, operations have been extended to September 7 instead of the end date of August 31.

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

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

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

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

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

Appendix A15.–Commercial Fisheries Entry Commission salmon gear permits issued by residence, Yukon, 2009.

District	Residence	Gillnet Permits (SO4Y)
1, 2, and 3	Alakanuk	98
	Anchorage	48
	Aniak	1
	Bethel	14
	Chevak	3
	Copper Center	4
	De Pere	1
	Dillingham	1
	Eagle River	2
	Elim	1
	Emmonak	118
	Everett	1
	Fairbanks	8
	Fort Richardson	1
	Fortuna Ledge	2
	Girdwood	2
	Glennallen	1
	Green Bay, WI	1
	Hixson, TN	1
	Holy Cross	8
	Homer	3
	Hooper Bay	2
	Kalskag	1
	Kotlik	78
	Kotzebue	1
	Kwethluk	2
	Lakewood, WA	1
	Manley Hot Springs	1
	Marshall	45
	Mcgrath	1
	Mountain Village	100
	Newhalen	1
	Newtok	1
	Nome	3
	Nunam Iqua	11
	Palmer	1
	Pilot Point	1
	Pilot Station	59
	Rock Hill, SC	1
	Russian Mission	15
	Saint Marys	89
	Saint Michael	5
	Sand Point	2
	Scammon Bay	36
	Shageluk	1
	Shaktoolik	2
	Sheldon Point	5
	Sitka	1
	Snohomish, WA	2
	Stebbins	10
	Tuluksak	1
	Unalakleet	1
	Wasilla	6
	Wasilla, WA	1
	Willow	1
Total Lower Yukon Area		807

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District	Residence	Gillnet Permits (S04P)	Fish Wheel Permits (S08P)	Total
4, 5, and 6	Anacortes, WA	0	1	1
	Anchorage	4	6	10
	Aniak	1	0	1
	Anvik	4	8	12
	Barrow	0	1	1
	Bemidji, MN	1	0	1
	Circle City	0	1	1
	Comstock, WI	0	1	1
	Delta Junction	0	1	1
	Dot Lake	0	1	1
	Eagle River	0	1	1
	Fairbanks	29	33	62
	Fort Wainwright	0	1	1
	Fort Yukon	0	1	1
	Galena	5	20	25
	Grayling	6	7	13
	Holy Cross	2	0	2
	Huslia	0	1	1
	Kaltag	2	11	13
	Kenai	0	1	1
	Lusk, WY	1	1	2
	Manley Hot Springs	3	6	9
	Nenana	7	19	26
	North Pole	2	3	5
	Nulato	0	13	13
	Palmer	1	1	2
	Portland, OR	0	1	1
	Ruby	1	6	7
	Stevens Village	1	3	4
	Tanana	2	14	16
	Valley Village, CA	1	0	1
	Valdez	0	1	1
	Wasilla	1	2	3
Total Upper Yukon Area		74	166	240
Grand Total Yukon Area		881	166	1,047[a]

Note: Counts are for initial issues only and do not include transfers. Counts include interim entry permits but not interim use or test fish permits.

[a] Total applies to number of permits.

Appendix A16.–Chinook and summer chum salmon commercial harvest by district or subdistrict and by period, set and drift gillnets combined for Districts 1, 2, and 3 and set gillnets and fish wheels combined for Districts 4, 5, and 6, Yukon Area, 2009.

District 1

Period Number	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Mesh Size	Number Fishermen	Chinook Salmon: Number Caught but Not Sold	Chinook Salmon: Number Sold	Chinook Salmon: Pounds	Chinook Salmon: Avg. Wt.	Summer Chum Salmon: Number	Summer Chum Salmon: Pounds	Summer Chum Salmon: Avg. Wt.
1	6:00 PM	29 Jun	12:00 AM	29 Jun	4	R	143	152	–	–	–	14,705	96,719	6.6
2	10:00 AM	2 Jul	4:00 PM	2 Jul	6	R	138	294	–	–	–	13,158	86,195	6.6
3	6:00 PM	4 Jul	12:00 AM	4 Jul	6	R	138	265	–	–	–	19,305	127,386	6.6
4	9:00 PM	7 Jul	6:00 AM	8 Jul	9	R	112	70	–	–	–	6,538	42,338	6.5
5	11:00 PM	10 Jul	8:00 AM	11 Jul	9	R	124	122	–	–	–	7,232	46,245	6.4
6	9:00 PM	14 Jul	6:00 AM	15 Jul	9	R	123	41	–	–	–	10,397	68,636	6.6
		Chinook salmon sold in the fall season [a]							90	1,300	14.4			
District 1 Subtotal:					43		213 [b]	944	90	1,300	14.4	71,335	467,519	6.6

District 2

Period Number	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Mesh Size	Number Fishermen	Chinook Salmon: Number Caught but Not Sold	Chinook Salmon: Number Sold	Chinook Salmon: Pounds	Chinook Salmon: Avg. Wt.	Summer Chum Salmon: Number	Summer Chum Salmon: Pounds	Summer Chum Salmon: Avg. Wt.
1	11:00 AM	29 Jun	2:00 PM	29 Jun	3	R	85	376	–	–	–	10,276	66,522	6.5
2	10:00 AM	1 Jul	4:00 PM	1 Jul	6	R	118	1,135	–	–	–	21,153	136,206	6.4
3	6:00 PM	3 Jul	12:00 AM	3 Jul	6	R	91	447	–	–	–	11,193	76,691	6.9
4	6:00 PM	6 Jul	12:00 AM	6 Jul	6	R	129	338	–	–	–	22,272	143,587	6.4
5	3:00 PM	9 Jul	9:00 PM	9 Jul	6	R	110	242	–	–	–	7,592	48,609	6.4
6	3:00 PM	13 Jul	9:00 PM	13 Jul	6	R	76	58	–	–	–	6,496	41,163	6.3
7	3:00 PM	16 Jul	9:00 PM	16 Jul	6	R	121	0	131	1,629	12.4	7,589	49,414	6.5
			Chinook salmon sold in the fall season [a]						95	1,265	13.3			
District 2 Subtotal:					33		166 [b]	2,596	226	2,894	12.8	86,571	562,192	6.5
Lower Yukon Area, Summer Season, Districts 1, 2, and 3 Subtotal:					76		376 [b]	3,540	316	4,194	13.3	157,906	1,029,711	6.5

-continued-

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Subdistrict 4-A

Period Number	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Mesh Size	Number Fishermen	Chinook Salmon: Number Caught but Not Sold	Chinook Salmon: Number Sold	Chinook Salmon: Pounds	Chinook Salmon: Avg. Wt.	Summer Chum Salmon: Number [c]	Summer Chum Salmon: Pounds of Roe	Summer Chum Salmon: Avg. Wt.[c]
1	6:00 PM	5 Jul	6:00 AM	7 Jul	36	R	3	14	–	–	–	1,392	1,116	5.2
2	6:00 PM	8 Jul	6:00 PM	9 Jul	24	R	4	81	–	–	–	1,011	956	5.2
3	6:00 PM	12 Jul	6:00 PM	13 Jul	24	R	4	88	–	–	–	1,312	1,118	5.2
4	6:00 PM	15 Jul	6:00 PM	16 Jul	24	R	5	17	–	–	–	874	716	5.2
District 4 Subtotal:					108		6 [b]	200	0	0	–	4,589	3,906	5.2

Subdistricts 6-A, 6-B, and 6-C

Period Number	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Mesh Size	Number of Fishermen	Chinook Salmon: Number Caught but Not Sold	Chinook Salmon: Number Sold	Chinook Salmon: Pounds	Chinook Salmon: Avg. Wt.	Summer Chum Salmon: Number	Summer Chum Salmon: Pounds	Summer Chum Salmon: Avg. Wt.
1	12:00 noon	25 Jul	12:00 PM	26 Jul	24	R	3	9	0	0	–	664	3,652	5.5
2	12:00 noon	28 Jul	6:00 AM	30 Jul	42	R	4	2	0	0	–	2,196	12,089	5.5
3	6:00 PM	31 Jul	12:00 PM	2 Aug	42	R	4	1	0	0	–	1,632	8,976	5.5
4	6:00 PM	3 Aug	12:00 PM	5 Aug	42	R	3	0	0	0	–	1,436	7,895	5.5
5	6:00 PM	7 Aug	12:00 PM	9 Aug	42	R	2	0	0	0	–	884	4,861	5.5
6	6:00 PM	10 Aug	12:00 PM	12 Aug	42	R	3	0	0	0	–	965	5,380	5.6
District 6 Subtotal:					234		5 [b]	12	0	0	–	7,777	42,853	5.5
Districts 4, 5, and 6 Subtotals:					342		11 [b]	212	0	0	–	12,366	66,716 [d]	
Yukon Area, Summer Season, Districts 1 Through 6 Total:					418		387 [b]	3,752	316	4,194	13.3	170,272	1,096,427 [d]	6.0

Note: No commercial fishing occurred in Districts 3 and 5. Mesh size R=6 inch maximum mesh size gillnets. En dash indicates no commercial fishing activity occurred.

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

[b] Chinook salmon sales during the fall season were added to the summer season harvest in Districts 1 and 2.

[c] Reported number of females harvested to produce roe sold in Subdistrict 4-A with an estimated average weight of 5.2 pounds.

[d] An estimated 23,863 pounds of summer chum from Subdistrict 4-A is included using average weight of 5.2 pounds and 4,589 females harvested.

Appendix A17.–Commercial catches of Chinook and summer chum salmon by mesh size, Districts 1 and 2, Lower Yukon.

	Unrestricted Mesh Size [a]				6 inch Maximum Mesh Size [b]	
	Chinook			Summer Chum	Chinook	Summer Chum
Year	District 1	District 2	Total	Districts 1 & 2	Districts 1 & 2	Districts 1 & 2
1973 [c]	52,790	12,479	65,269	89,841	5,168	196,540
1974	69,457	17,464	86,921	349,758	1,631	227,507
1975	41,550	9,064	50,614	148,919	4,162	345,472
1976	56,392	15,296	71,688	267,075	7,631	128,431
1977	65,745	15,328	81,073	157,909	4,720	205,634
1978	53,198	28,872	82,070	275,512	7,737	354,603
1979	61,790	33,347	95,137	136,973	22,136	434,188
1980	78,157	42,755	120,912	95,876	19,474	605,679
1981	88,038	37,660	125,698	163,979	18,648	758,767
1982	70,743	35,656	106,399	225,106	6,887	217,563
1983	76,280	30,798	107,078	121,927	31,002	590,329
1984	65,101	29,355	94,456	242,076	16,394	287,531
1985 [d]	76,106	38,194	114,300	170,345	22,445	265,240
1986	42,922	36,603	79,525	231,372	15,307	438,182
1987	62,147	40,127	102,274	128,017	21,827	269,757
1988	32,792	20,009	52,801	225,049	39,469	848,321
1989 [e]	32,180	21,494	53,674	126,360	38,548	765,233
1990 [e]	42,092	24,000	66,092	99,588	18,147	281,418
1991 [e]	52,074	36,290	88,364	108,986	4,145	205,610
1992 [e]	54,569	28,679	83,248	81,458	27,678	242,878
1993	47,084	37,293	84,377	47,488	2,202	45,503
1994 [f]	61,633	41,692	103,325	39,832	608	15,369
1995	74,827	39,607	114,434	113,860	3,098	112,223
1996	56,642	30,209	86,851	123,233	0	0
1997	63,062	39,052	102,114	49,953	3,611	28,204
1998	24,202	16,806	41,008	20,314	1,211	7,804
1999	37,145	27,119	64,264	27,883	0	0
2000	4,735	3,780	8,515	6,624	0	0
2001 [g]	0	0	0	0	0	0
2002	11,087	11,434	22,521	10,354	0	0
2003	22,709	14,220	36,929	6,162	0	0
2004	28,403	24,145	52,548	20,652	0	0
2005	16,619	13,413	30,032	32,278	0	0
2006	23,728	19,356	43,084	35,574	478	11,785
2007	13,558	9,238	22,796	11,311	9,121	164,911
2008 [h]	0	0	0	0	4,348	125,598
2009 [i]	0	0	0	0	316	157,906
Avg. 1989-1998	50,837	31,512	82,349	81,107	9,925	170,424
Avg. 1999-2008	15,798	12,271	28,069	15,084	1,395	30,229

Note: ADF&G test fishery sales included, 1961–1990. ADF&G test fishery sales not included, 1991–2008.

[a] Primarily 8 to 8.5-inch mesh size used during early June to early July.

[b] Catch through July 15–20, relatively few Chinook and summer chum salmon taken after these dates.

[c] 6-inch maximum mesh size regulation beginning late June to early July became effective in 1973.

[d] 6-inch maximum mesh size regulation by emergency order during commercial fishing season became effective in 1985.

[e] Only includes information from fish ticket database; does not include salmon purchased illegally.

[f] 8-inch or greater mesh size restriction was in effect until June 27 and fishermen were requested to take chum salmon home for subsistence use until June 22 in order to reduce the harvest of chum salmon.

[g] No commercial fishery in 2001.

[h] No commercial fishing periods were established in 2008 allowing the use of unrestricted mesh size gillnets.

[i] No commercial fishing periods were established in 2009 allowing the use of unrestricted mesh size gillnets and sale of Chinook salmon was prohibited through July 15.

Appendix A18.–Summary of test fish wheel projects conducted in the Upper Yukon Area, 2009.

TEST FISH WHEEL PROJECTS	Contractor Handler	RM[b]	Operational Dates	Total Days of Operation	Estimated Total Salmon Captured [a]				Historical Data / Comments
					Chinook	Summer Chum	Fall Chum	Coho	
YUKON RIVER									
Tanana Village Test Fish Wheel									
Left Bank	Pat Moore	690	8/12 to 9/30	49	–	–	6,677	1,753	Fall season 1994-2005 and 2008-2009. Summer season 2002-2006 and 2008.
Yukon River (Rapids) Test Fish Wheel									
Left Bank [c]	Stan Zuray	731	6/14 to 9/21	99	1,594	458	19,201	–	Summer season 2001-2009; Fall season 1996-2009.
TANANA RIVER									
Nenana Test Fish Wheel									
Right Bank	Paul Kleinschmidt	859	7/1 to 7/29	28	1,048	1,519	–	–	Summer season 1988-1992 and 1995-2009.
			8/20 to 9/27	38	–	–	6,678	3,004	Fall season 1988-2009. Video since 2003.

Note: En dash indicates no test fishery activity occurred.

[a] Unless otherwise noted, fish wheel catch are adjusted to estimate total catch per day (i.e., less than or greater than 24 hour catches adjusted to reflect a 24 hour catch).

[b] Estimated river miles from the mouth of the Yukon River.

[c] Estimated summer chum salmon totals include all chum salmon caught through August 7.

Appendix A19.–List of emergency orders pertaining to Districts 1-3 Chinook and summer chum salmon fishery, Yukon Area, 2009.

EO Number: 3-S-LY-01-09 Effective Date: June 8, 2009

Implements the reduced subsistence salmon fishing schedule from 8:00 p.m. Mondays until 2:00 p.m. Tuesdays and from 8:00 p.m. Thursdays until 2:00 p.m. Fridays, effective 8:00 p.m. Monday, June 8 in District 1.

EO Number: 3-S-LY-02-09 Effective Date: June 10, 2009

Implements the reduced subsistence salmon fishing schedule from 8:00 p.m. Wednesdays until 2:00 p.m. Thursdays and from 8:00 p.m. Sundays until 2:00 p.m. Mondays, effective 8:00 p.m. Wednesday, June 10 in District 2.

EO Number: 3-S-LY-03-09 Effective Date: June 14, 2009

Implements the reduced subsistence salmon fishing schedule from 8:00 p.m. Wednesdays until 2:00 p.m. Thursdays and from 8:00 p.m. Sundays until 2:00 p.m. Mondays, effective 8:00 p.m. Sunday, June 14 in District 3.

EO Number: 3-S-LY-04-09 Effective Date: June 14, 2009

Allows 7 days per week subsistence salmon fishing in the Innoko River, effective 8:00 p.m. Sunday, June 14.

EO Number: 3-S-LY-05-09 Effective Date: June 8, 2009

Restricts gillnet mesh size to 6-inch or smaller in the Coastal District for subsistence salmon fishing, effective 8:00 p.m. Monday, June 8.

EO Number: 3-S-LY-06-09 Effective Date: June 15, 2009

Cancels the reduced subsistence salmon fishing period scheduled for 8:00 p.m. Monday, June 15 to 2:00 p.m. Tuesday, June 16 in District 1.

EO Number: 3-S-LY-07-09 Effective Date: June 17, 2009

Cancels the reduced subsistence salmon fishing period scheduled for 8:00 p.m. Wednesday, June 17 to 2:00 p.m. Thursday, June 18 in District 2.

EO Number: 3-S-LY-08-09 Effective Date: June 18, 2009

Cancels the reduced subsistence salmon fishing period scheduled for 8:00 p.m. Thursday, June 18 to 2:00 p.m. Friday, June 19 in District 1.

EO Number: 3-S-LY-09-09 Effective Date: June 21, 2009

Cancels the reduced subsistence salmon fishing period scheduled for 8:00 p.m. Sunday, June 21 to 2:00 p.m. Monday, June 22 in District 2.

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EO Number: 3-S-LY-10-09 Effective Date: June 21, 2009

Cancels the reduced subsistence salmon fishing period scheduled for 8:00 p.m. Sunday, June 21 to 2:00 p.m. Monday, June 22 and 8:00 p.m. Wednesday, June 24 to 2:00 p.m. Thursday, June 25 in District 3.

EO Number: 3-S-LY-11-09 Effective Date: June 8, 2009

Restricts gillnet mesh size to 4-inch or smaller and no longer than 60 feet during subsistence salmon fishing closures in Districts 1, 2, and 3, effective 8:00 p.m. Monday, June 8.

EO Number: 3-S-LY-12-09 Effective Date: June 22, 2009

Restricts gillnet mesh size during the reduced subsistence salmon fishing periods in District 1, effective 8:00 p.m. Monday, June 22.

EO Number: 3-S-LY-13-09 Effective Date: June 24, 2009

Restricts gillnet mesh size during the reduced subsistence salmon fishing periods in District 2, effective 8:00 p.m. Wednesday, June 24.

EO Number: 3-S-LY-14-09 Effective Date: June 28, 2009

Restricts gillnet mesh size during the reduced subsistence salmon fishing periods in District 3, effective 8:00 p.m. Sunday, June 28.

EO Number: 3-S-LY-15-09 Effective Date: June 29, 2009

Opens the commercial salmon fishing season in District 2, effective 11:00 a.m. Monday, June 29.

EO Number: 3-S-LY-16-09 Effective Date: June 29, 2009

The amount of closed subsistence salmon fishing time associated with commercial salmon fishing periods in Districts 1 and 2 is being eliminated, effective 11:00 a.m. Monday, June 29.

EO Number: 3-S-LY-17-09 Effective Date: June 29, 2009

Opens the commercial salmon fishing season in District 1, effective Monday, June 29.

EO Number: 3-S-LY-18-09 Effective Date: June 29, 2009

Establishes a 3-hour commercial salmon fishing period from 11:00 a.m. until 2:00 p.m. Monday, June 29 with gillnets 6-inch or smaller mesh size in District 2.

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EO Number: 3-S-LY-19-09 Effective Date: June 28, 2009

Establishes a 4-hour commercial salmon fishing period from 8:00 p.m. until 12:00 midnight Monday, June 29 with gillnets 6-inch or smaller mesh size in District 1.

EO Number: 3-S-LY-20-09 Effective Date: July 1, 2009

Establishes a 6-hour commercial salmon fishing period from 10:00 a.m. until 4:00 p.m. Wednesday, July 1 in District 2.

EO Number: 3-S-LY-21-09 Effective Date: July 2, 2009

Allows the use of unrestricted mesh size gillnets during subsistence salmon fishing periods in District 1, effective 8:00 p.m. Thursday, July 2.

EO Number: 3-S-LY-22-09 Effective Date: July 5, 2009

Allows the use of unrestricted mesh size during gillnets subsistence salmon fishing periods in District 2, effective 8:00 p.m. Sunday, July 5.

EO Number: 3-S-LY-23-09 Effective Date: July 2, 2009

Establishes a 6-hour commercial salmon fishing period from 10:00 a.m. until 4:00 p.m. Thursday, July 2 in District 1.

EO Number: 3-S-LY-24-09 Effective Date: July 3, 2009

Establishes a 6-hour commercial salmon fishing period from 6:00 p.m. until 12:00 midnight Friday, July 3 in District 2.

EO Number: 3-S-LY-25-09 Effective Date: July 4, 2009

Establishes a 6-hour commercial salmon fishing period in District 1 from 6:00 p.m. until 12:00 midnight Saturday, July 4.

EO Number: 3-S-LY-26-09 Effective Date: July 6, 2009

Establishes a 6-hour commercial salmon fishing period from 6:00 p.m. until 12:00 midnight Monday, July 6 in District 2.

EO Number: 3-S-LY-27-09 Effective Date: July 7, 2009

Establishes a 9-hour commercial salmon fishing period from 9:00 p.m. Tuesday, July 7 until 6:00 a.m. Wednesday, July 8 in District 1.

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EO Number: 3-S-LY-28-09 Effective Date: July 9, 2009

Establishes a 6-hour commercial salmon fishing period from 3:00 p.m. until 9:00 p.m. Thursday, July 9 in District 2.

EO Number: 3-S-LY-29-09 Effective Date: July 10, 2009

Establishes a 9-hour commercial salmon fishing period from 11:00 p.m. Friday, July 10 until 8:00 a.m. Saturday, July 11 in District 1.

EO Number: 3-S-LY-30-09 Effective Date: July 12, 2009

Effective 8:00 p.m. Sunday, July 12, subsistence salmon fishing is allowed 7 days per week except for 12 hours before, during and 12 hours after a commercial salmon fishing period in District 3.

EO Number: 3-S-LY-31-09 Effective Date: July 13, 2009

Establishes a 6-hour commercial salmon fishing period from 3:00 p.m. until 9:00 p.m. Monday, July 13 in District 2.

EO Number: 3-S-LY-32-09 Effective Date: July 14, 2009

Effective 9:00 a.m. Tuesday, July 14, subsistence salmon fishing is allowed 7 days per week except for 12 hours before, during and 12 hours after a commercial salmon fishing period in District 2.

EO Number: 3-S-LY-33-09 Effective Date: July 14, 2009

Establishes a 9-hour commercial salmon fishing period from 9:00 p.m. Tuesday, July 14 until 6:00 a.m. Wednesday, July 15 in District 1.

EO Number: 3-S-LY-34-09 Effective Date: July 15, 2009

Effective 6:00 p.m. Wednesday, July 15, subsistence salmon fishing is allowed 7 days per week except for 12 hours before, during and 12 hours after a commercial salmon fishing period in District 1.

EO Number: 3-S-LY-35-09 Effective Date: July 16, 2009

Establishes a 6-hour commercial salmon fishing period from 3:00 p.m. until 9:00 p.m. Thursday, July 16 in District 2.

Appendix A20.–List of emergency orders pertaining to Districts 4-6 Chinook and summer chum salmon fishery, Yukon Area, 2009.

EO Number: 3-S-UY-01-09 Effective Date: June 17, 2009

Implements a reduced subsistence salmon fishing schedule in Subdistrict 4-A, effective 6:00 p.m. Wednesday, June 17. The subsistence salmon fishing schedule for Subdistrict 4-A consists of two 24-hour periods each week. Subsistence salmon fishing in Subdistrict 4-A is allowed from 6:00 p.m. Sundays until 6:00 p.m. Mondays and from 6:00 p.m. Wednesdays until 6:00 p.m. Thursdays.

EO Number: 3-S-UY-02-09 Effective Date: June 24, 2009

Implements a reduced subsistence salmon fishing schedule in Subdistricts 4-B and 4-C, effective 6:00 p.m. Wednesday, June 24. The subsistence salmon fishing schedule for Subdistricts 4-B and 4-C consists of two 24-hour periods each week. Subsistence salmon fishing in Subdistricts 4-B and 4-C is allowed from 6:00 p.m. Sundays until 6:00 p.m. Mondays and from 6:00 p.m. Wednesdays until 6:00 p.m. Thursdays.

EO Number: 3-S-UY-03-09 Effective Date: June 24, 2009

Cancels a subsistence salmon fishing period scheduled for 6:00 p.m. Wednesday, June 24 to 6:00 p.m. Thursday, June 25 in Subdistrict 4-A.

EO Number: 3-S-UY-04-09 Effective Date: June 17, 2009

Restricts mesh size to 4 inches or smaller and no longer than 60 feet during subsistence salmon fishing closures in Districts 4 and 5, effective 6:00 p.m. Wednesday, June 17.

EO Number: 3-S-UY-05-09 Effective Date: June 28, 2009

Cancels a subsistence salmon fishing period scheduled for 6:00 p.m. Sunday, June 28 to 6:00 p.m. Monday, June 29 in Subdistrict 4-A.

EO Number: 3-S-UY-06-09 Effective Date: July 1, 2009

Cancels two subsistence salmon fishing periods in Subdistricts 4-B and 4-C scheduled for 6:00 p.m. Wednesday, July 1 to 6:00 p.m. Thursday, July 2 and from 6:00 p.m. Sunday, July 5 to 6:00 p.m. Monday, July 6.

EO Number: 3-S-UY-07-09 Effective Date: June 30, 2009

Implements a reduced subsistence salmon fishing schedule in Subdistricts 4-A, 4-B, and 4-C, effective 6:00 p.m. Tuesday, June 30. The subsistence salmon fishing schedule for Subdistricts 4-A, 4-B, and 4-C consists of two 24-hour periods each week from 6:00 p.m. Tuesdays until 6:00 p.m. Wednesdays and from 6:00 p.m. Fridays until 6:00 p.m. Saturdays.

EO Number: 3-S-UY-08-09 Effective Date: July 7, 2009

Cancels two subsistence salmon fishing periods in Subdistricts 4-A, 4-B, and 4-C scheduled for 6:00 p.m. Tuesday, July 7 to 6:00 p.m. to Wednesday, July 8 and from 6:00 p.m. Friday, July 10 to 6:00 p.m. Saturday, July 11.

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EO Number: 3-S-UY-09-09 Effective Date: July 5, 2009

Implements a reduced subsistence salmon fishing schedule in Subdistrict 5-D. Effective 6:00 p.m. Sunday, July 5, the subsistence salmon fishing schedule in Subdistrict 5-D consists of one 84-hour period each week from 6:00 p.m. Sundays until 6:00 a.m. Thursdays.

EO Number: 3-S-UY-10-09 Effective Date: July 5, 2009

Opens the commercial salmon fishing season in Subdistricts 4-A, 4-B, and 4-C effective 6:00 p.m. Sunday, July 5. One 36-hour commercial salmon fishing period is scheduled from 6:00 p.m. Sunday, July 5, until 6:00 a.m. Tuesday, July 7, and one 24-hour commercial salmon fishing period is scheduled from 6:00 p.m. Wednesday, July 8 until 6:00 p.m. Thursday, July 9 in Subdistrict 4-A. Subsistence and commercial salmon fishing periods in Subdistrict 4-A will be concurrent.

EO Number: 3-S-UY-11-09 Effective Date: July 6, 2009

Extends the 24-hour subsistence salmon fishing period scheduled to occur in Subdistrict 4-A at 6:00 p.m. Sunday, July 5 to 6:00 p.m. Monday, July 6. The extension provides an additional 12 hours and subsistence salmon fishing period will be allowed for 36-hours from 6:00 p.m. Sunday, July 5 to 6:00 a.m. Tuesday, July 7.

EO Number: 3-S-UY-12-09 Effective Date: July 7, 2009

Cancels one subsistence salmon fishing period in the lower portion of Subdistrict 5-D (below 22 Mile Slough) scheduled for 6:00 p.m. Sunday, July 12 to 6:00 a.m. Thursday, July 16, and cancels one subsistence salmon fishing period in the upper portion of Subdistrict 5-D (above 22 Mile Slough) scheduled for 6:00 p.m. Sunday, July 19 to 6:00 a.m. Thursday, July 23.

EO Number: 3-S-UY-13-09 Effective Date: July 12, 2009

Establishes two 24-hour commercial salmon fishing periods in Subdistrict 4-A. Salmon may be taken for commercial purposes from 6:00 p.m. Sunday, July 12 until 6:00 p.m. Monday, July 13 and from 6:00 p.m. Wednesday, July 15 until 6:00 p.m. Thursday, July 16. Subsistence and commercial salmon fishing periods in Subdistrict 4-A will be concurrent.

EO Number: 3-S-UY-14-09 Effective Date: July 15, 2009

Extends subsistence salmon fishing for king salmon with drift gillnets in Subdistrict 4-A for two additional 24-hour subsistence salmon fishing periods from 6:00 p.m. Wednesday, July 15 to 6:00 p.m. Thursday, July 16 and from 6:00 p.m. Sunday, July 19 to 6:00 p.m. Monday, July 20.

EO Number: 3-S-UY-15-09 Effective Date: July 19, 2009

Rescinds emergency orders 3-S-U1-09 and 3-S-U2-09 and establishes a 5 days per week subsistence salmon fishing schedule in Subdistricts 4-A, 4-B, and 4-C, effective 6:00 p.m. Sunday, July 19. Subsistence salmon fishing in Subdistricts 4-A, 4-B, and 4-C is scheduled from 6:00 p.m. Sundays until 6:00 p.m. Fridays.

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EO Number: 3-S-UY-16-09 Effective Date: July 25, 2009

Opens the commercial salmon fishing season in District 6 effective 12:00 noon Saturday, July 25. One 24-hour commercial salmon fishing period is scheduled from 12:00 noon Saturday, July 25 until 12:00 noon Sunday, July 26**.** The commercial salmon fishing period will be concurrent with the last 24 hours of District 6 subsistence and personal use salmon fishing time.

EO Number: 3-S-UY-17-09 Effective Date: July 26, 2009

Rescinds emergency orders 3-S-UY-9-09 and establishes a 7 days per week, 24 hours per day, subsistence salmon fishing schedule in Subdistrict 5-D, effective 6:00 p.m. Sunday, July 26.

EO Number: 3-S-UY-18-09 Effective Date: July 28, 2009

Rescinds emergency order 3-S-UY-7-09 and establishes a 5 days per week subsistence salmon fishing schedule in Subdistricts 4-A, 4-B, and 4-C, effective 6:00 p.m. Tuesday, July 28. Subsistence salmon fishing in Subdistricts 4-A, 4-B, and 4-C is allowed from 6:00 p.m. Tuesdays until 6:00 p.m. Sundays.

EO Number: 3-S-UY-19-09 Effective Date: July 28, 2009

Establishes a 24-hour commercial salmon fishing period in District 6 from 12:00 noon Tuesday, July 28, until 12:00 noon Wednesday, July 29. The 24-hour commercial salmon fishing period will be concurrent with the last 24 hours of District 6 subsistence and personal use salmon fishing time, except for the Old Minto Area.

EO Number: 3-S-UY-20-09 Effective Date: July 29, 2009

Extends the 42-hour subsistence salmon fishing period scheduled to occur in Subdistricts 6-A and 6-B at 6:00 p.m. Monday, July 27 to 12:00 noon Wednesday, July 29. The extension provides an additional 18 hours and subsistence salmon fishing will be allowed from 12:00 noon Wednesday, July 29 until 6:00 a.m. Thursday, July 30.

This emergency order does not affect personal use fishing time in Subdistrict 6-C.

EO Number: 3-S-UY-21-09 Effective Date: July 29, 2009

Extends the 24-hour commercial salmon fishing scheduled to occur in District 6 from 12:00 noon Tuesday, July 28, until 12:00 noon Wednesday, July 29. The extension provides an 18 hour extension from 12:00 noon Wednesday, July 29 until 6:00 a.m. Thursday, July 30**.**

EO Number: 3-S-UY-22-09 Effective Date: July 31, 2009

Establishes a 42-hour commercial salmon fishing schedule in District 6 from 6:00 p.m. Fridays until 12:00 noon Sundays and from 6:00 p.m. Mondays until 12:00 noon Wednesdays effective 6:00 p.m. Friday, July 31. The commercial salmon fishing schedule is concurrent with District 6 subsistence and personal use salmon fishing time, except for the Old Minto area.

Appendix A21.–Fall season commercial harvest summary, Yukon Area, 2009.

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished Drift	Hours Fished Set	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight
1	9:00 PM	17 Jul	6:00 AM	18 Jul	9	9	122	4,011	26,475	6.6	39	234	6.0
2	1:00 PM	22 Jul	11:00 PM	22 Jul	10	10	85	2,799	19,351	6.9	61	391	6.4
3	8:00 AM	29 Jul	6:00 PM	29 Jul	10	10	60	1,623	11,374	7.0	196	1,293	6.6
4	10:00 AM	5 Aug	8:00 PM	5 Aug	10	10	89	2,558	18,042	7.1	3,223	22,665	7.0
5	12:00 PM	6 Sep	6:00 PM	6 Sep	6	6	46	80	538	6.7	420	2,979	7.1
6	10:00 AM	8 Sep	7:00 PM	8 Sep	9	9	46	680	4,657	6.8	1,273	9,103	7.2
7	10:00 AM	10 Sep	7:00 PM	10 Sep	9	9	39	160	1,047	6.5	780	5,591	7.2
							Coho salmon sold in the summer season	–	–	–	2	18	9.0
	District 1 Subtotal:				63	63	165 [a]	11,911	81,484	6.8	5,994	42,274	7.1
							Boat Hours: 1.72						

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Mesh	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight
1	2:00 PM	20 Jul	10:00 PM	20 Jul	8	R	101	3,629	22,446	6.2	16	104	6.5
2	2:00 PM	27 Jul	10:00 PM	27 Jul	8	R	57	653	4,180	6.4	43	258	6.0
3	10:00 AM	3 Aug	6:00 PM	3 Aug	8	R	101	7,790	49,616	6.4	1,518	9,685	6.4
							Coho salmon sold in the summer season	–	–	–	5	30	6.0
	District 2 Subtotal:				24		130 [a]	12,072	76,242	6.3	1,582	10,077	6.4
							Boat Hours: 4.38						

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight
1	No Fishing Periods											
2												
District 3 Subtotal:												

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	Hours Fished Drift	Hours Fished Set	Number of Fishermen	Number	Pounds	Avg Weight	Number	Pounds	Avg Weight
Lower Yukon Area, Fall Season, Districts 1, 2, and 3 Subtotal:	87	63	292 [a]	23,983	157,726	6.6	7,576	52,351	6.9

							Fall Chum Salmon			Coho Salmon		
Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Number	Pounds	Average Weight	Number	Pounds	Average Weight
					4-A 4-BC							
1												
District 4 Subtotal:												
District 4 Guideline Harvest Range: 5,000 to 40,000 fall chum salmon.												

							Fall Chum Salmon			Coho Salmon		
Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Number	Pounds	Average Weight	Number	Pounds	Average Weight
1												
2												
3												
4												
Subdistrict 5-A Subtotal:												
Subdistrict 5-A Guideline Harvest Range: 0 to 4,000 lbs fall chum salmon roe and 0 to 2,000 lbs coho salmon roe.												

							Fall Chum Salmon			Coho Salmon		
Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Number	Pounds	Average Weight	Number	Pounds	Average Weight
1												
Subdistricts 5-B, 5-C, and 5-D												
Subdistricts 5-B and 5-C Guideline Harvest Range: 4,000 to 36,000 fall chum salmon.												

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Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number [b]	Fall Chum Salmon Pounds of Roe Sold	Fall Chum Salmon Average Weight	Coho Salmon Number [b]	Coho Salmon Pounds of Roe Sold	Coho Salmon Average Weight
1	6:00 PM	18 Sep	12:00 PM	20 Sep	42	2	697	266	6.8 [c]	255	118	5.3 [c]
2	6:00 PM	21 Sep	12:00 PM	23 Sep	42	2	756	149	6.8 [c]	269	72	5.1 [c]
3	6:00 PM	25 Sep	12:00 PM	27 Sep	42	2	440	130	6.8 [c]	218	68	5.1 [c]
4	6:00 PM	28 Sep	12:00 PM	30 Sep	42	0	0	0		0	0	-
District 6 Subtotal:					168	2 [a]	1,893	545	6.8 [c]	742	258	5.2 [c]
Subdistricts 6-A, 6-B, and 6-C Guideline Harvest Range: 2,750 to 20,500 fall chum salmon.												
Upper Yukon Area, Fall Season, Districts 4, 5, and 6 Subtotals:					168	2 [a]	1,893	12,872	6.8 [d]	742	3,858	5.2 [d]
Yukon Area, Fall Season, Districts 1 Through 6 Total:						294 [a]	25,876	170,598	6.6 [d]	8,318	56,209	6.8 [d]

Note: No commercial fishing occurred in Districts 3 and 5. Mesh size R=6 inch maximum mesh size gillnets.

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

[b] Number of females harvested including reported number to produce roe sold in District 6.

[c] Average weight of females harvested and weighed in District 6; a portion of the harvest was reported number of females to produce roe sold.

[d] Estimated pounds of fall chum and coho salmon in District 6 using the estimated average weight for combined periods.

Appendix A22.–List of emergency orders pertaining to the Districts 1–6 fall chum and coho salmon fishery, Yukon Area, 2009.

EO Number: 3-S-FY-01-09	Effective Date: July 16, 2009

Allows for the sale of incidentally caught king salmon during commercial salmon fishing periods for Districts 1-5. Commercial gillnet salmon fishing gear is restricted to 6-inch or smaller mesh in Districts 1 and 2.

EO Number: 3-S-FY-02-09	Effective Date: July 17, 2009

Opens one 9-hour commercial salmon fishing period in District 1 including the Coastal Set Net Only Area from 9:00 p.m. Friday, July 17 until 6:00 a.m. Saturday, July 18.

EO Number: 3-S-FY-03-09	Effective Date: July 20, 2009

Opens one 8-hour commercial salmon fishing period in District 2 from 2:00 p.m. until 10 p.m. Monday, July 20.

EO Number: 3-S-FY-04-09	Effective date: July 22, 2009

Opens one 10-hour commercial salmon fishing period in District 1 including the Set Net Only Area from 1:00 p.m. until 11:00 p.m. Wednesday, July 22.

EO Number: 3-S-FY-05-09	Effective Date: July 27, 2009

Opens one 8-hour commercial salmon fishing period in District 2 from 2:00 p.m. until 10:00 p.m. Monday, July 27.

EO Number: 3-S-FY-06-09	Effective Date: July 29, 2009

Opens one 10-hour commercial salmon fishing period in District 1 including the Set Net Only Area from 8:00 a.m. until 6:00 p.m. Wednesday, July 29.

EO Number: 3-S-FY-07-09	Effective Date: August 3, 2009

Opens one 8-hour commercial salmon fishing period in District 2 from 10:00 a.m. until 6:00 p.m. Monday, August 3.

EO Number: 3-S-FY-08-09	Effective Date: August 5, 2009

Opens one 10-hour commercial salmon fishing period in District 1 including the Set Net Only Area from 10:00 a.m. until 8:00 p.m. Wednesday, August 5.

EO Number: 3-S-FY-09-09	Effective Date: August 18, 2009

Reduces subsistence salmon fishing time in Districts 1, 2, and 3 to two 24-hour periods each week. Subsistence salmon fishing periods in District 1 will be open from 6:00 p.m. Thursdays until 6:00 p.m. Fridays and from 6:00 p.m. Mondays until 6:00 p.m. Tuesdays effective 6:00 p.m. Tuesday, August 18. Subsistence salmon fishing periods in District 2 and 3 will be open from 6:00 p.m. Sundays until 6:00 p.m. Mondays and from 6:00 p.m. Wednesdays until 6:00 p.m. Thursdays effective 6:00 p.m. Thursday, August 20.

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EO Number: 3-S-FY-10-09 Effective Date: August 27, 2009

Reduces subsistence salmon fishing time in District 4. In the main portion of District 4, subsistence salmon fishing will close at 6:00 p.m. Thursday, August 27. Subsistence salmon fishing will reopen at 10:00 a.m. Sunday, August 30 on a reduced fishing schedule of two 32-hour periods per week. Periods will be open from 10:00 a.m. Sundays until 6:00 p.m. Mondays and from 10:00 a.m. Wednesdays until 6:00 p.m. Thursdays.

EO Number: 3-S-FY-11-09 Effective Date: September 2, 2009

Reduces subsistence salmon fishing time in Subdistricts 5-A, 5-B, and 5-C. In Subdistricts 5-A, 5-B, and 5-C, subsistence salmon fishing will close at 6:00 p.m. Wednesday, September 2. Subsistence salmon fishing will reopen at 10:00 a.m. Friday, September 4 on a reduced fishing schedule of two 32-hour periods per week. Periods will be from 10:00 a.m. Fridays until 6:00 p.m. Saturdays and from 10:00 a.m. Tuesdays until 6:00 p.m. Wednesdays. Effective 6:00 p.m. Tuesday, September 15, subsistence salmon fishing in Subdistricts 5-A, 5-B, and 5-C will reopen on a schedule of 5 days per week from 6:00 p.m. Wednesdays until 6:00 p.m. Sundays.

EO Number: 3-S-FY-12-09 Effective Date: September 2, 2009

Closes personal use salmon fishing in Subdistrict 6-C, effective 12:00 noon Wednesday, September 2.

EO Number: 3-S-FY-13-09 Effective Date: September 4, 2009

Reduces subsistence salmon fishing time in Subdistricts 6-A and 6-B. In Subdistricts 6-A and 6-B, subsistence salmon fishing will open at 12:00 noon Friday, September 4 on a reduced fishing schedule of two 28-hour periods per week. Periods will be open from 12:00 noon Fridays until 4:00 p.m. Saturdays and from 12:00 noon Mondays until 4:00 p.m. Tuesdays. This reduced schedule also includes the Old Minto Area and the Kantishna River.

EO Number: 3-S-FY-14-09 Effective Date: September 6, 2009

Reduces subsistence salmon fishing time in the lower portion of Subdistrict 5-D below 22 Mile Slough for two weeks on a schedule of one 4 ½ day period each week. In the lower Subdistrict 5-D from 2 miles below Waldron Creek to 22 Mile Slough, including the Porcupine River, subsistence salmon fishing will close at 8:00 p.m. Sunday, September 6. Subsistence salmon fishing will reopen at 8:00 a.m. Wednesday, September 9 and close at 8:00 p.m. Sunday, September 13. The second subsistence salmon fishing period will open at 8:00 a.m. Wednesday, September 16 and will close at 8:00 p.m. Sunday, September 20. At 8:00 a.m. Wednesday, September 23, the subsistence salmon fishery will return to the 7 days per week schedule. The upper portion of Subdistrict 5-D (including that portion of the Yukon River from 22 Mile Slough below Circle to the US/Canada Border above Eagle) continues to be open 7 days a week, 24 hours a day.

EO Number: 3-S-FY-15-09 Effective Date: September 6, 2009

Opens one 6-hour commercial salmon fishing period in District 1 including the Set Net Only Area, from 12:00 noon until 6:00 Sunday, September 6.

EO Number: 3-S-FY-16-09 Effective Date: September 8, 2009

Opens one 9-hour commercial salmon fishing period in District 1 including the Set Net Only Area, from 10:00 a.m. until 7:00 p.m. Tuesday, September 8.

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EO Number: 3-S-FY-17-09 Effective Date: September 10, 2009

Opens one 9-hour commercial salmon fishing period in District 1 including the Set Net Only Area from 10:00 a.m. until 7:00 p.m. Thursday, September 10.

EO Number: 3-S-FY-18-09 Effective Date: September 15, 2009

Reduces subsistence salmon fishing time in the upper portion of Subdistrict 5-D upstream of 22 Mile Slough to a schedule of one 4 ½ day period each week. In the upper portion of Subdistrict 5-D from 22 Mile Slough to the US/Canada Border, subsistence salmon fishing will close at 8:00 p.m. Tuesday, September 15. Effective Friday, September 18, subsistence salmon fishing will be from 8:00 a.m. Fridays until 8:00 p.m. Tuesdays each week.

There is no change in the previously announced fishing times for the lower portion of Subdistrict 5-D from 2 miles below Waldron Creek to 22 Mile Slough, including the Porcupine River. A subsistence salmon fishing period is scheduled from 8:00 a.m. Wednesday, September 16 until 8:00 p.m. Sunday, September 20. On Wednesday, September 23, the subsistence salmon fishery will return to the 7 days per week schedule.

EO Number: 3-S-FY-19-09 Effective Date: September 13, 2009

Returns subsistence salmon fishing time in Subdistricts 6-A and 6-B to the standard fishing schedules. Effective October 1, all subsistence salmon fishing in District 6 will be open 7 days a week, 24 hours a day.

EO Number: 3-S-FY-20-09 Effective Date: September 18, 2009

Returns personal use salmon fishing in the Subdistrict 6-C to the standard schedule. Effective Friday, September 18, personal use salmon fishing will reopen on the regulatory schedule of two 42-hour periods per week from 6:00 p.m. Fridays until 12:00 noon Sundays and from 6:00 p.m. Mondays until 12:00 noon Wednesdays.

EO Number: 3-S-FY-21-09 Effective Date: September 18, 2009

Opens two 42-hour commercial salmon fishing periods in District 6 from 6:00 p.m. Friday, September 18 until 12:00 noon Sunday, September 20 and from 6:00 p.m. Monday, September 21 until 12:00 noon Wednesday, September 23.

EO Number: 3-S-FY-22-09 Effective Date: September 25, 2009

Returns subsistence salmon fishing time in the upper portion of Subdistrict 5-D of 22 Mile Slough to the standard schedule of 7 days a week, 24 hours a day.

EO Number: 3-S-FY-23-09 Effective Date: September 27, 2009

Increases subsistence salmon fishing time in Subdistricts 5-A, 5-B, and 5-C to open 7 days per week, 24 hours per day effective 6:00 p.m. Sunday, September 27.

EO Number: 3-S-FY-24-09 Effective Date: September 25, 2009

Opens two 42-hour commercial salmon fishing periods in District 6 from 6:00 p.m. Friday, September 25 until 12:00 noon Sunday, September 27 and from 6:00 p.m. Monday, September 28 until 12:00 noon Wednesday, September 30.

Appendix A23.–Canada weekly commercial catches of Chinook, fall chum, and coho salmon in the Yukon River, 2009.

Statistical Week	Week Ending	Start Date	Finish Date	Days Fished	Number Fishing	Boat Days	Chinook Salmon	Chum Salmon	Coho Salmon
27	4 Jul	–	–	closed	–	–	–	–	–
28	11 Jul	–	–	closed	–	–	–	–	–
29	18 Jul	–	–	closed	–	–	–	–	–
30	25 Jul	–	–	closed	–	–	–	–	–
31	1 Aug	30 Jul	31 Jul	1.5	7	10.5	172	0	0
32	8 Aug	5 Aug	7 Aug	2	7	14	132	2	0
33	15 Aug	–	–	closed	–	–	–	–	–
34	22 Aug	–	–	closed	–	–	–	–	–
35	29 Aug	–	–	closed	–	–	–	–	–
36	5 Sep	–	–	closed	–	–	–	–	–
37	12 Sep	–	–	closed	–	–	–	–	–
38	19 Sep	–	–	closed	–	–	–	–	–
39	26 Sep	–	–	closed	–	–	–	–	–
40	3 Oct	–	–	closed	–	–	–	–	–
41	10 Oct	8 Oct	12 Oct	4	2	8	0	291	0
42	17 Oct	–	–	closed	–	–	–	–	–
Dawson Area Commercial				8	7	33	304	293	0
Upriver Commercial				4	1	4	60	0	0
Total Commercial Harvest							364	293	0
Domestic							17	0	0
Recreational							125	0	0
Aboriginal Fishery							3,791	820	0
Total Upper Yukon Harvest							4,297	1,113	0
Old Crow Aboriginal Fishery							461	898	0
Old Crow Live Release Test Fishery								NA	

Source: JTC 2010.

Note: Unless otherwise noted, blank cells indicate no information was collected or harvest numbers were insufficient to generate summary information. En dash indicates no fishing activity occurred.

Appendix A24.–Subsistence and personal use salmon harvest estimates which include commercially related and test fish harvests provided for subsistence use, and related information, Yukon Area, 2009.

Community	Survey Date, Permit Area[a]	Number of Fishing Households[b]	Number of Dogs[c]	Estimated Harvest				Primary Gear Used[d]		
				Chinook	Summer Chum	Fall Chum	Coho	Set Gillnet	Drift Gillnet	Fish Wheels
Hooper Bay	11-13 Sep	101	108	183	9,195	41	24	100	1	0
Scammon Bay	9-10 Sep	35	25	722	3,602	117	222	31	4	0
Coastal District Total		136	133	905	12,797	158	246	131	5	0
Nunam Iqua [e]	10-11 Sep	24	37	200	2,280	41	71	22	1	0
Alakanuk [f]	8-10 Sep	69	165	634	5,152	116	194	11	55	0
Emmonak [f]	5-7 Sep	59	139	1,634	9,038	1,589	401	18	41	0
Kotlik [f]	7-8 Sep	69	49	1,657	7,528	171	181	43	24	0
District 1 Subtotal		221	390	4,125	23,998	1,917	847	94	121	0
Mountain Village [f]	17-18 Sep	98	140	1,482	7,204	926	413	17	80	0
Pitkas Point	16 Sep	15	34	265	994	76	45	0	15	0
St. Mary's [f]	14-19 Sep	77	99	1,929	5,831	106	151	13	60	0
Pilot Station [f]	20-22 Sep	50	82	1,258	4,888	265	203	1	47	0
Marshall [f]	23-24 Sep	48	102	1,201	2,172	190	245	1	47	0
District 2 Subtotal		288	457	6,135	21,089	1,563	1,057	32	249	0
Russian Mission	25 Sep	27	129	978	849	205	96	7	20	0
Holy Cross	21-22 Sep	35	76	1,745	194	627	120	15	20	0
Shageluk	23 Sep	14	32	201	103	105	105	5	8	0
District 3 Subtotal		76	237	2,924	1,146	937	321	27	48	0
Lower Yukon River Total		585	1,084	13,184	46,233	4,417	2,225	153	418	0
Anvik	24-25 Sep	18	67	796	277	176	137	8	9	1
Grayling	23-24 Sep	41	74	1,133	1,429	490	318	1	40	0
Kaltag [f]	6-7 Oct	49	52	1,970	50	200	40	0	48	0
Nulato	7-9 Oct	41	109	1,551	133	552	171	1	40	0
Koyukuk	9-10 Oct	34	81	982	1,378	578	198	3	22	0
Galena	2-5 Oct	72	197	1,370	1,718	4,306	2,353	18	52	2
Ruby	1-2 Oct	18	75	542	603	134	314	8	9	1
District 4 Yukon River Subtotal		273	655	8,344	5,588	6,436	3,531	39	220	4
Huslia	5-6 Oct	20	140	969	2,554	86	323	19	0	0
Hughes	6-8 Oct	9	33	101	1,723	288	89	9	0	0
Allakaket	7-8 Oct	11	83	90	4,924	572	43	11	0	0
Alatna	8 Oct	4	6	10	163	0	0	4	0	0
Bettles	9-10 Oct	3	21	0	6	0	0	3	0	0
Koyukuk River Subtotal		47	283	1,170	9,370	946	455	46	0	0
District 4 Subtotal		320	938	9,514	14,958	7,382	3,986	85	220	4

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Community	Survey Date, Permit Area[a]	Number of Fishing Households[b]	Number of Dogs[c]	Estimated Harvest				Primary Gear Used[d]		
				Chinook	Summer Chum	Fall Chum	Coho	Set Gillnet	Drift Gillnet	Fish Wheels
Tanana	13-15 Oct	45	382	2,950	4,665	19,595	2,373	31	0	14
Rampart	permits	4	5	528	112	1,000	0	3	0	1
Fairbanks NSB [g]	permits	45	148	1,509	44	229	13	43	0	1
Stevens Village [h]	14 Oct, permits	8	54	405	6	770	90	8	0	1
Birch Creek	19-20 Oct	1	15	15	0	0	0	1	0	0
Beaver	15-16 Oct	14	25	516	22	120	0	13	0	1
Fort Yukon	16-19 Oct	49	294	846	275	2,829	2	29	0	19
Circle	permits	9	79	372	0	110	13	1	0	8
Central	permits	5	10	167	2	0	0	4	0	1
Eagle f	permits	15	242	446	0	10,941	0	7	0	8
Other District 5 [i]	permits	12	38	541	29	71	7	12	0	0
District 5 Yukon River Subtotal		207	1,292	8,295	5,155	35,665	2,498	152	0	54
Venetie	16-17 Oct	13	126	622	143	2,373	0	12	0	0
Chalkyitsik	18-19 Oct	3	17	0	0	45	0	2	0	0
Chandalar and Black Rivers Subtotal		16	143	622	143	2418	0	14	0	0
District 5 Subtotal		223	1,435	8,917	5,298	38,083	2,498	166	0	54
Manley	permits	13	116	345	367	4,126	2,308	10	0	3
Minto	permits	1	91	0	1	0	0	1	0	0
Nenana [f]	permits	24	145	463	509	7,623	3,475	9	0	15
Healy	permits	5	32	15	2	773	691	5	0	0
Fairbanks NSB [j]	permits	31	178	518	677	3,538	647	28	0	3
Other District 6 [k]	permits	20	68	71	5	97	0	16	0	0
District 6 Tanana River Subtotal [l]		94	630	1,412	1,561	16,157	7,121	69	0	21
Upper Yukon River Total		637	3,003	19,843	21,817	61,622	13,605	320	220	79
Survey Village Subtotal		1,174	3,068	26,740	75,048	36,919	8,343	465	643	39
Subsistence Permit Subtotal [m]		157	1,152	4,820	1,440	26,192	6,777	114	0	39
Subsistence Test Fish Subtotal [n]	-		-	2,233	4,051	774	579	-	-	-
District 6 Commercial Related [o]	-		-	12	0	2,234	307	-	-	-
Subsistence Harvests Subtotal		1,331	4,220	33,805	80,539	66,119	16,006	579	643	78
Personal Use Permit Subtotals		28	-	127	308	78	70			
Alaska, Yukon River Total [p,q]		1,222	4,087	33,027	68,050	66,039	15,830	473	638	79
Alaska, Yukon Area Total		1,358	4,220	33,932	80,847	66,197	16,076	604	643	79
AK, Yukon Area Percentages of the Total		-	-	17%	41%	34%	8%	45%	48%	6%

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Source: Jallen and Hamazaki 2011.

[a] Data collected by Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries. Survey data are expanded for number of fishing households, number of dogs, and harvest. Permit data is unexpanded, and is from all permits received as of March 26, 2010.

[b] Estimated number of households that fished in surveyed communities or number of permit households who reported fishing in permit required areas. Does not include 51 ST pike permits issued in 2009, except for 1 pike permit reporting a harvest of 1 summer chum.

[c] The number of dogs is based on survey information or from subsistence permits issued.

[d] Primary fishing gear used is based on survey information or from subsistence permits issued. Totals for gear and household may not be equal due to a small number of fishermen using unknown or 'Other' gear types. Primary gear information for surveyed. Communities expanded for households that were not surveyed. Primary gear is based on number of salmon harvested by that gear type.

[e] Formerly known as Sheldon or Sheldons Point.

[f] Test fish have been added to the total fish harvested in a surveyed and permit required communities.

[g] Fairbanks North Star Borough (FNSB) households that obtained a permit and indicated they fished in the Yukon River permit required area.

[h] Permit harvest information from Stevens Village residents was used to complement the information obtained by the survey.

[i] Other District 5 includes residents of Anchorage, Manley, Minto, Nenana, Tok, and Wiseman that obtained a household permit and fished in a Yukon River permit required area.

[j] Fairbanks North Star Borough (FNSB) households that obtained a subsistence and/or personal use permit and indicated they fished in the Tanana River permit required area.

[k] Other District 6 includes residents of the Upper Tanana River drainage communities of Delta Junction, Dot Lake, Northway, Tanacross, and Tok, and the communities of Anderson and Eagle River who obtained a permit and fished in the Tanana River.

[l] Includes harvest of female chum and coho salmon sold commercially for roe and carcasses returned to fishermen for dog food in Subdistrict 6-B.

[m] Subsistence permit subtotal does not include Stevens Village permit information or commercially retained salmon from District 6.

[n] Test fish given away for subsistence use.

[o] District 6 "Commercial Related" included fish caught during commercial fishing and "not sold" but retained for subsistence use. These salmon are included in Manley, Nenana, and Other community harvests above.

[p] Does not include Coastal District.

[q] Based on survey estimates, 1,416 Chinook, 660 summer chum, 100 fall chum, and 49 coho salmon were retained from commercial harvests. Totals also include 600 summer chum, 3,114 fall chum, and 61 coho salmon reported on fish tickets as retained from commercial harvests in Districts 4 and 5.

Appendix A25.–Reported subsistence and personal use salmon harvested under the authority of a permit, listed by permit area, Yukon Area, 2009.

Permit Fishing Area	Permit [a] Type	Permit [a] Issued [b]	Permit [a] Returned	Percent Returned	# of Permits Returned that Fished [c]	Reported Harvest Chinook [d]	Reported Harvest Summer Chum [d]	Reported Harvest Fall Chum [d]	Reported Harvest Coho [d]
Subsistence Permit									
Koyukuk Middle and South Fork Rivers	SF	1	1	100%	1	0	0	0	0
Yukon River Rampart Area	SR	25	24	96%	20	1,404	159	1,070	4
Yukon River near Haul Road Bridge	SY	68	66	97%	38	1,248	28	996	106
Yukon River near Circle and Eagle [e]	SE	45	42	93%	21	710	2	4,056	13
Tanana River Subdistrict 6-A	SEU	28	28	100%	13	382	0	6,995	0
Tanana River Subdistrict 6-B	SA	24	23	96%	16	543	422	4,213	2,369
Tanana River Upstream of Subdistrict 6-C	SB	69	68	99%	37	730	830	9,112	4,064
Kantishna River Subdistrict 6-A	SU	42	40	95%	17	0	0	84	0
Tolovana River Pike Subdistrict 6-B	SK	4	4	100%	3	0	0	436	311
Subsistence Permit Subtotals	ST	113	108	96%	52	0	1	0	0
Personal Use Permit		419	404	96%	218	5,017	1,442	26,962	6,867
Tanana River Salmon Subdistrict 6-C	PC	57	57	100%	22	127	308	71	65
Tanana River Whitefish Upstream of Subdistrict 6-C	PW	11	11	100%	6	0	0	7	5
Personal Use Permit Subtotals		68	68	100%	28	127	308	78	70
Permit Totals		487	472	97%	245	5,144	1,750	27,040	6,937

Source: Jallen and Hamazaki 2011.

[a] Permits returned as of March 26, 2010.

[b] Includes 24 households that were "issued" permits for more than 1 area, 2 households that were issued a duplicate permit for same area, and 5 permit holders issued an additional SE or SEU permit to track harvest above and below Eagle sonar.

[c] Includes 6 households that "fished" in two different permit areas.

[d] Does not include District 6 commercial related harvest of 12 Chinook, 2,234 fall chum, and 307 coho salmon caught but "not sold" during commercial fishing and retained for subsistence use in 2009.

[e] Does not include fish distributed to community households from ADF&G Eagle sonar test fish project (16 Chinook and 4 fall chum salmon).

Appendix A26.–Detailed salmon spawning estimates for the Yukon River, drainage, 2009.

Stream (drainage)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho	Agency
Andreafsky River							
East Fork (weir)	22 Jun - 3 Aug		3,004	8,770			USFWS
East Fork	23 Jul	Poor	(84)	(736)			ADF&G
West Fork	23 Jul	Good	1,678	3,877			ADF&G
	Andreafsky Subtotal		4,682	12,647			
Pilot Station (sonar estimate)	9 Jun - 7 Sep		(144,049)	(1,421,646)	(233,307)	(206,620) [a]	ADF&G
Atchuelinguk River (Chuilnak)	23 Jul	Good	229	2,588			ADF&G
Bonasila River	23 Jul	Good	35	725			ADF&G
Anvik River (sonar estimate)	18 Jun - 29 Jul			193,099			ADF&G
Goblet Creek to Yellow R.	23 Jul	Good	12	(451)			ADF&G
Yellow R. to McDonald Cr. (Chinook index area)[b]	23 Jul	Good	590	(2,010)			ADF&G
Swift River	23 Jul	Good	21	(1,751)			ADF&G
Beaver Creek	23 Jul	Good	140	(917)			ADF&G
Otter Creek	23 Jul	Good	69	(122)			ADF&G
	Anvik Subtotal		832	193,099			
Rodo River	28 Jul	Good	376	621			ADF&G
Kaltag River	28 Jul	Good	31	408			ADF&G
Nulato River							
North Fork [c]	26 Jul	Good	1,418	2,120			ADF&G
South Fork	26 Jul	Good	842	567			ADF&G
Total Lower Yukon River (downstream of Koyukuk River)			8,445	212,775			
Koyukuk River Drainage							

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Stream (drainage)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho	Agency
Gisasa River (weir)	23 Jun - 30 Jul		1,955	25,904			USFWS
Gisasa River (aerial)	26 Jul	Good	(515)	(1,060)			ADF&G
Kateel River (aerial)	28 Jul	Good	123	218			ADF&G
Huslia River [d]							
Billy Hawk Creek	28 Jul	Good	0	170			ADF&G
Hawk River	28 Jul	Good	0	736			ADF&G
Dakli River							
Mainstem Dakli	28 Jul	Good		4,015			ADF&G
Wheeler Creek	28 Jul	Good		4,097			ADF&G
Hogatza River drainage							
Clear Creek	28 Jul	Good		2,566			ADF&G
Caribou Creek	28 Jul	Good		1,415			ADF&G
Henshaw Creek (weir)	5 Jul - 7 Aug		1,637	156,933			TCC
South Fork Koyukuk River							
Mainstem South Fork	29 Jul	Fair	352	55			ADF&G
Jim River	29 Jul	Fair	209	409			ADF&G
Total Koyukuk River			4,276	196,518			
Melozi Hot Springs Creek	28 Jul	Good		3,181			ADF&G
Tozitna River (weir)	30 Jun - 11 Aug		1,112	9,133			BLM
Tozitna River (helicopter survey)	30 Jul	Good	(1,013)	(8,434)			BLM
Total Yukon River (downstream of Tanana River)			13,833	421,607			
Tanana River Drainage							

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Stream (drainage)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho	Agency
Kantishna River Drainage							
Toklat Springs (foot survey)							
Main Channel and Sloughs	6-9 Nov	Fair			2,089	60	TCC
Geiger Creek	6-9 Nov	Fair			252	77	TCC
	Toklat Subtotal				2,341	137	
Total Kantishna River					2,341	137	
Nenana River Drainage							
Teklanika Springs (helicopter survey)							
Seventeen Mile Slough	10/2	Good				680	BSFA
Julius Creek	10/2	Good				2	BSFA
Wood Creek	10/2	Good				470	BSFA
Clear Creek	10/2	Good				0[q]	BSFA
Glacier Creek	10/2	Good				0[q]	BSFA
Lost Slough (western floodplain)	10/2	Good				410	BSFA
Lignite Springs (foot survey)	9/29	Good				113	BSFA
June Creej (foot survey)	9/29	Good				18	BSFA
	Nenana Subtotal		0	0	0	1,693	
Chena River (counting tower estimate) [b]	4 Jul-8 Aug		5,253	16,516			ADF&G
Salcha River (counting tower estimate) [b]	4 Jul-8 Aug		12,774	31,035			BSFA
Richardson Clearwater River	15 Nov	Fair			114	155	ADF&G
Mainstem Tanana Sloughs (helicopter survey)							
Benchmark 735 Slough	15 Nov	Poor			0	0	ADF&G
Little Delta River mouth vicinity	15 Nov	Poor			4	0	ADF&G
Whitestone Slough	15 Nov	Poor			53	10	ADF&G
Rika's Roadhouse vicinity	15 Nov	Poor			1,105	0	ADF&G
Bluff Cabin Island Slough	15 Nov	Poor			0	0	ADF&G
Clearwater Lake Outlet Slough	26 Oct	Fair			25	5,450	ADF&G
Pearse Slough and vicinity	15 Nov	Poor			60	0	ADF&G
Goodpaster River (counting tower estimate)	7-30 Jul		4,280				TCC/BSFA

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Stream (drainage)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho	Agency
Delta River							
Foot Survey (peak count)	6 Nov, 13 Nov	Fair, Good			(12,049)	60	ADF&G
Population Estimate [e]					13,492		ADF&G
Blue Creek (foot survey)	5 Nov	Good			402	31	ADF&G
Bluff Cabin Slough	15 Nov	Fair			2,900	0	ADF&G
Bluff Cabin Creek	15 Nov	Fair			95	53	ADF&G
Delta Clearwater River (boat survey index area)	26 Oct	Fair			10	16,850	ADF&G
Delta Clearwater River Tributaries	26 Oct	Fair			0	4,307	ADF&G
Tok Overflow #1 (foot survey)	21 Oct	Good			0	9	ADF&G
Total Tanana River			22,307	47,551	20,601	28,755	
Chandalar River (aerial)	2 Oct	Poor			(576)		ADF&G
Chandalar River (estimate) [f]					150,000		ADF&G
Porcupine River Drainage							
Sheenjek River (aerial)	2 Oct	Fair			(2,909)		ADF&G
Sheenjek River (Sonar estimate)	15 Aug-24 Sep				54,126		ADF&G
Fishing Branch River (weir) [g]	6 Sep-25 Oct				25,828		DFO
Total Porcupine River					79,954		
Eagle (Sonar estimate) [g]	5 Jul-6 Oct		(69,957)		(101,734) [p]		ADF&G/DFO
Total Alaska Portion of Drainage Observed Escapements [h]			36,140	469,158	224,727	28,755	
Yukon Territory Streams							
Klondike River (sonar estimate)	6 Jul-14 Aug		4,725				DFO [i]
Blind Creek (weir)	20 Jul-19 Aug		716				DFO [i]
Little Salmon River (index area)	13 Aug	Fair	821				DFO

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Stream (drainage)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho	Agency
Big Salmon River (index area)	18 Aug	Good	(1,827)				DFO
Big Salmon River (sonar estimate)	18 Jul-23 Aug		9,261				DFO [i]
Teslin River Drainage							
Nisutlin River	18 Aug	Good	497				DFO
Wolf River	18 Aug	Good	134				DFO
	Teslin Subtotal		631				
Whitehorse Fishway	30 Jul-5 Sep		828				DFO [i]
Subtotal Individual Mainstem Sites			16,982				
Canada Mainstem Yukon River							
Border Passage Estimate (Eagle sonar minus U.S. harvest) [j]			(69,575)		(94,739)		ADF&G/DFO
Canada Escapement Estimate (Border passage minus Canada harvest)			65,278		93,626		ADF&G/DFO
Total Yukon Territory [k]			65,278		119,454		
Yukon River Drainage Totals Observed Escapements			101,418	469,158	344,181	28,755	

Note: Data in parentheses are not included in subtotals or totals. Aerial unless otherwise noted.

[a] Considered to be a conservative estimate due to the project ending before the completion of the salmon run (coho salmon for Pilot and summer chum salmon for Chena and Salcha tower projects).

[b] Anvik River chum salmon index area includes mainstem counts between Goblet Creek and McDonald Creek.

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

[d] Considered a conservative estimate as many bends we not covered.

[e] Population estimate based upon replicate foot surveys and salmon streamlife data.

[f] Project ended early, estimate based on regression of Chandalar to Fishing Branch River plus Mainstem Border from 1995 to 2009.

[g] End of the season was expanded for fish that may have passed after operations ceased.

[h] Total for Alaska portion of drainage does not include Fishing Branch River. Total for Yukon Territory includes Fishing Branch River.

[i] Yukon Territory Counts provided by DFO but are operated by various contractors mostly funded by Restoration and Enhancement Funds.

[j] Canada "border passage" estimate for Yukon Territory streams (excluding the Fishing Branch River). Canada harvest has not been removed.

[k] Yukon Territory counts include Canada mainstem Yukon River escapement estimate plus Fishing Branch River.

Appendix A27.–Yukon River Canada Chinook salmon total run by brood year and escapement by year 1982–2004 based on 3-area index, Eagle sonar (2005–2009), and radiotelemetry (local) (2002–2004).

	Brood								
Year	3	4	5	6	7	8	Return	Spawners	R/S
1974						634			
1975					33,080	175			
1976				88,405	22,026	40			
1977			19,491	111,771	19,734	801	151,797		
1978		4,443	22,845	63,235	29,424	1,493	121,439		
1979	1,534	3,388	21,422	100,503	48,253	1,175	176,274		
1980	15	6,604	13,510	70,415	33,978	4,240	128,763		
1981	0	1,122	33,220	114,180	54,845	1,841	205,208		
1982	0	5,141	17,169	37,883	27,763	376	88,330	43,538	2.03
1983	560	7,558	35,117	89,449	16,408	162	149,253	44,475	3.36
1984	69	13,368	34,379	75,041	13,782	138	136,778	50,005	2.74
1985	223	10,738	38,956	62,142	4,756	91	116,906	40,435	2.89
1986	347	20,408	45,928	109,067	15,843	138	191,731	41,425	4.63
1987	0	2,368	33,542	67,697	11,700	18	115,325	41,307	2.79
1988	0	6,641	34,323	75,396	8,937	68	125,366	39,699	3.16
1989	75	13,517	78,826	128,851	25,841	0	247,109	60,299	4.10
1990	56	6,343	24,873	71,641	10,816	9	113,737	59,212	1.92
1991	501	7,107	82,332	121,590	10,182	0	221,712	42,728	5.19
1992	6	2,608	23,981	41,677	1,831	0	70,103	39,155	1.79
1993	14	5,313	36,363	86,880	5,880	0	134,450	36,244	3.71
1994	0	755	19,932	30,683	6,175	0	57,545	56,449	1.02
1995	34	1,784	15,989	52,720	7,026	10	77,562	50,673	1.53
1996	20	276	23,201	44,462	14,610	2	82,571	74,060	1.11
1997	14	3,567	26,386	94,406	7,828	14	132,216	53,821	2.46
1998	0	3,478	39,260	76,502	4,357	0	123,598	35,497	3.48
1999	134	1,692	30,110	76,649	2,870	0	111,455	37,184	3.00
2000	0	2,798	40,704	63,414	1,509	0	108,424	25,870	4.19
2001	8	1,813	50,877	51,785	2,339	0	106,822	52,564	2.03
2002	75	2,262	28,704	22,035	180	0	53,256	42,359	1.26
2003	63	5,898	39,178	51,013	2,133	0	98,285	80,594	1.22
2004	3	2,475	26,455	23,222	0	0	52,156	48,469	1.08
2005	9	8,097	35,067					68,551	
2006	15	4,100						62,933	
2007	9							34,903	
2008								34,008	
2009								68,500	
2010									
Average							122,107	46,048	2.65

Note: Blank cells indicate no information.

Appendix A28.–Chinook salmon age and sex percentages from selected Yukon River escapement projects, 2009.

Location	Sample Size		Age 2	3	4	5	6	7	8	Total
Anvik River [a]	220	Males	0.0	17.3	13.6	15.9	0.9	0.0	0.0	47.7
		Females	0.0	0.0	2.7	49.1	0.5	0.0	0.0	52.3
		Total	0.0	17.3	16.3	65.0	1.4	0.0	0.0	100.0
Chena River [a]	442	Males	0.0	0.0	14.1	13.2	17.7	0.0	0.0	44.9
		Females	0.0	0.0	0.5	3.9	50.1	0.7	0.0	55.1
		Total	0.0	0.0	14.6	17.0	67.7	0.7	0.0	100.0
East Fork	466	Males	0.0	0.0	3.7	56.6	4.4	0.5	0.0	65.2
Andreafsky River [a]		Females	0.0	0.0	0.1	17.9	15.7	1.0	0.0	34.7
		Total	0.0	0.0	3.8	74.6	20.1	1.5	0.0	100.0
East Fork	2,314	Males	0.1	24.3	13.0	16.5	0.1	0.0	0.0	54.0
Andreafsky River [b]		Females	0.0	0.9	2.4	42.2	0.5	0.0	0.0	46.0
		Total	0.1	25.2	15.4	58.7	0.6	0.0	0.0	100.0
Gisasa River [b]	521	Males	0.0	42.2	21.3	7.2	0.0	0.0	0.0	70.7
		Females	0.0	0.4	2.8	25.9	0.2	0.0	0.0	29.3
		Total	0.0	42.6	24.1	33.1	0.2	0.0	0.0	100.0
Salcha River [a]	458	Males	0.0	31.7	19.2	10.0	0.0	0.0	0.0	60.9
		Females	0.0	0.0	2.2	36.7	0.2	0.0	0.0	39.1
		Total	0.0	31.7	21.4	46.7	0.2	0.0	0.0	100.0
Tozitna River [b]	227	Males	0.0	55.1	18.6	8.3	0.0	0.0	0.0	82.1
		Females	0.0	1.5	0.9	15.5	0.0	0.0	0.0	17.9
		Total	0.0	56.6	19.5	23.8	0.0	0.0	0.0	100.0
Yukon Mainstem [c] at Eagle, Alaska	647	Males	0.0	7.7	29.7	23.0	0.0	0.0	0.0	60.4
		Females	0.0	0.0	3.6	36.0	0.0	0.0	0.0	39.6
		Total	0.0	7.7	33.3	59.0	0.0	0.0	0.0	100.0

[a] Samples were handpicked from carcasses.

[b] Samples were collected from a weir trap.

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

Appendix A29.–Summer chum salmon age and sex percentages from selected Yukon River escapement projects, 2009.

Location	Sample Size		Age 3	4	5	6	7	Total
Anvik River [a]	338	Males	0.5	24.1	18.3	2.4	0.0	45.3
		Females	1.9	33.4	17.8	1.6	0.0	54.7
		Total	2.4	57.5	36.1	4.0	0.0	100.0
East Fork Andreafsky River [b]	718	Males	5.0	18.6	25.6	10.5	0.5	60.2
		Females	4.0	17.5	14.6	3.8	0.0	39.9
		Total	9.0	36.1	40.1	14.3	0.5	100.0
Gisasa River [b]	619	Males	0.8	27.0	16.7	1.6	0.0	46.1
		Females	2.3	34.4	16.4	0.7	0.0	53.8
		Total	3.1	61.5	33.1	2.3	0.0	100.0
Tozitna River [b]	542	Males	1.8	36.4	18.5	0.2	0.0	56.9
		Females	1.6	30.8	10.7	0.0	0.0	43.1
		Total	3.4	67.2	29.2	0.2	0.0	100.0
Salcha River [c]	542	Males	0.0	31.7	19.2	10.0	0.0	60.9
		Females	0.0	0.0	2.2	36.9	0.0	39.1
		Total	0.0	31.7	21.4	46.9	0.0	100.0

Source: JTC 2010.

[a] Samples were collected by beach seine.

[b] Samples were collected from a weir trap.

[c] Samples were handpicked from carcasses, structure is vertebra.

Appendix A30.–Fall chum salmon age and sex percentages from selected Yukon River escapement projects, 2009.

Location	Sample Size		Age 3	4	5	6	7	Total
Chandalar River [a]	180	Males	3.3	23.9	12.8	1.7	0.6	42.3
		Females	5.6	38.9	12.8	0.6	0.0	57.9
		Total	8.9	62.8	25.6	2.3	0.6	100
Yukon Mainstem [b]	334	Males	4.5	42.2	9.9	0.0	0.0	56.6
at Eagle, Alaska		Females	4.5	35.3	3.6	0.0	0.0	43.4
		Total	9.0	77.5	13.5	0.0	0.0	100
Delta River [a]	180	Males	6.7	25.6	20.0	2.2	0.0	54.5
		Females	4.4	22.8	13.3	4.4	0.6	45.5
		Total	11.1	48.4	33.3	6.6	0.6	100
Toklat River [a]	150	Males	6.0	22.0	8.0	3.3	0.7	40.0
		Females	8.0	40.7	8.0	2.7	0.7	60.1
		Total	14.0	62.7	16.0	6.0	1.4	100

Source: JTC 2010.

[a] Samples were handpicked from carcasses, structure is vertebra.

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

Appendix A31.–Total (U.S. and Canada) Yukon River Chinook salmon harvest percentage by stock group, 1981–2009.

	Stock Group [a]		
Year [b]	Lower	Middle	Upper
1981	5.4	54.5	40.1
1982	13.9	24.7	61.4
1983	12.9	33.7	53.3
1984	25.3	40.2	34.5
1985	27.6	22.3	50.1
1986	19.5	9.6	70.9
1987	15.9	19.6	64.5
1988	21.8	15.8	62.5
1989	24.4	15.9	59.7
1990	20.2	25.2	54.7
1991	28.0	25.3	46.7
1992	16.3	21.8	61.9
1993	21.5	25.4	53.1
1994	18.2	21.4	60.4
1995	17.9	22.4	59.7
1996	21.0	10.4	68.6
1997	26.4	16.8	56.9
1998	32.7	17.4	49.8
1999	40.1	6.3	53.6
2000	33.9	12.3	53.8
2001	31.6	16.0	52.4
2002	19.4	29.2	51.4
2003	6.8	28.9	64.3
2004	15.3	28.8	55.9
2005	20.7	21.4	57.9
2006	17.6	27.6	54.9
2007	13.0	30.6	56.4
2008	17.0	28.0	55.0
2009	11.1	31.4	57.5
Average (1981-2008)	20.9	23.3	55.9

Source: JTC 2010.

[a] Upper denotes Canada-origin fish and Lower and Middle denote U.S.-origin fish.

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

Appendix A32.–Yukon River Chinook salmon harvest percentage by stock group in Alaska, 1981–2009.

	Stock Group [a]		
Year [b]	Lower	Middle	Upper
1981	5.9	59.8	34.3
1982	15.4	27.5	57.1
1983	14.2	37.0	48.9
1984	28.0	44.3	27.7
1985	30.4	24.6	45.1
1986	22.3	10.9	66.8
1987	17.4	21.4	61.2
1988	24.9	18.1	57.0
1989	27.2	17.7	55.1
1990	22.8	28.4	48.8
1991	31.8	28.7	39.6
1992	18.0	24.1	57.8
1993	23.7	28.0	48.3
1994	20.4	24.1	55.5
1995	20.0	25.0	55.0
1996	24.0	11.8	64.2
1997	28.9	18.3	52.8
1998	34.7	18.5	46.8
1999	44.1	6.9	49.0
2000	37.5	13.6	48.9
2001	37.5	19.0	43.4
2002	22.1	33.2	44.7
2003	7.5	31.7	60.8
2004	16.9	31.6	51.5
2005	23.4	24.2	52.4
2006	19.2	30.2	50.5
2007	13.7	32.3	54.0
2008	18.2	30.0	51.8
2009	12.7	35.7	51.6
Average (1981-2008)	23.2	25.7	51.0

Source: JTC 2010.

[a] Upper denotes Canada-origin fish and Lower and Middle denote U.S.-origin fish.

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

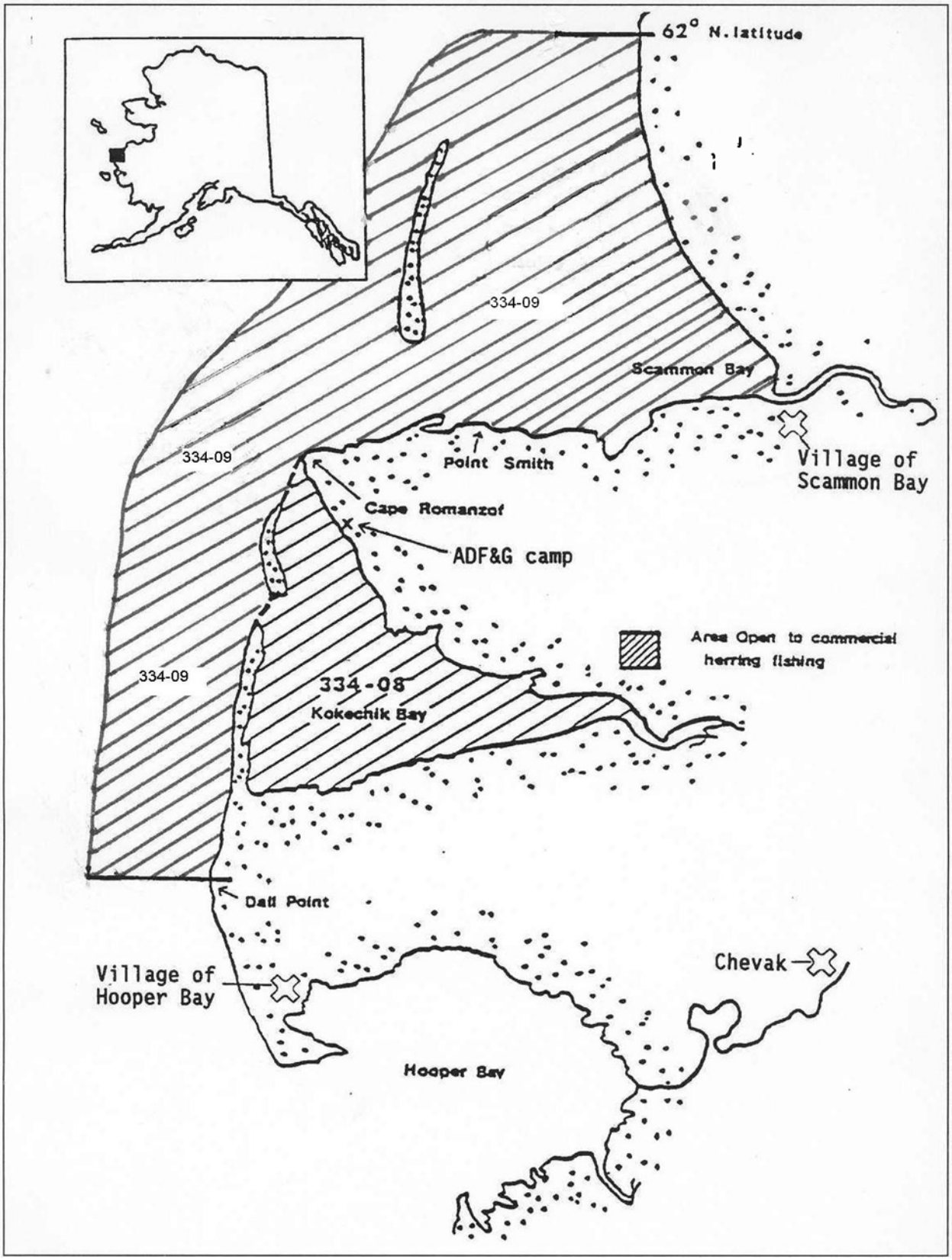
Appendix A33.–Upper stock group percentage, by country, from the Yukon River Chinook salmon harvest, 1981–2009.

	Upper Stock Group	
Year [a]	Alaska	Canada
1981	78.1	21.9
1982	83.5	16.5
1983	83.7	16.3
1984	72.7	27.3
1985	81.6	18.4
1986	82.7	17.3
1987	86.7	13.3
1988	79.8	20.2
1989	82.9	17.1
1990	79.2	20.8
1991	74.8	25.2
1992	84.5	15.5
1993	82.6	17.4
1994	81.8	18.2
1995	82.4	17.6
1996	81.9	18.1
1997	84.8	15.2
1998	88.8	11.2
1999	83.0	17.0
2000	81.9	18.1
2001	69.8	30.3
2002	76.3	23.5
2003	86.2	13.8
2004	83.7	16.3
2005	80.1	19.9
2006	84.1	15.9
2007	90.5	9.5
2008	88.1	11.9
2009	78.8	21.2
Average (1981-2008)	82.0	18.0

Source: JTC 2010.

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

APPENDIX B: HERRING



Appendix B1.–Map of Cape Romanzof herring district.

Appendix B2.–Commercial herring fishery data, Cape Romanzof district, 1980–2009.

Year	Catch (tons)	Hours Fished	Percent Roe Recovery	Avg. Wt. of Fish (grams)[a]	Estimated Value ($ millions)	Number of Buyers	Number of Fishermen	Number of Boats	Number Shaker Boats[b]	% Effort by Local Fishermen[c]	% Harvest by Local Fishermen[c]	Biomass Estimate[d]	Exploitation Rate
1980	611	326.0	9.8	188	0.13	2	69	54	12	70	40	3,000	20.4
1981	720	120.0	8.0	189	0.21	4	111	82	11	81	60	4,850	14.8
1982	657	180.0	9.3	206	0.22	2	75	50	10	85	84	4,850	13.5
1983 [e]	816	144.0	9.0	224	0.37	3	63	57	2	92	88	5,512	14.8
1984	1,185	90.0	8.6	239	0.31	3	66	59	1	99	100	6,063	19.5
1985	1,299	60.0	8.3	240	0.55	2	73	69	2	91	94	7,000	18.6
1986	1,865	42.0	9.2	252	1.14	5	97	90	12	84	70	7,500	24.9
1987 [f]	1,342	8.0	8.9	294	1.00	9	157	152	22	53	33	7,216	18.6
1988	1,119	11.0	9.1	306	1.02	6	113	108	–	63	60	6,600	17.0
1989	926	13.0	9.3	313	0.49	6	115	110	–	87	82	4,400	21.0
1990	329	3.0	8.4	304	0.15	4	95	90	–	76	77	4,500	7.3
1991	526	5.0	8.8	355	0.21	2	80	79	–	96	97	4,500	11.7
1992	530	6.0	8.0	358	0.16	2	73	73	–	97	96	4,500	11.8
1993	371	12.5	9.6	373	0.11	2	41	41	–	95	91	4,000	9.3
1994	456	7.0	9.2	372	0.12	2	55	54	–	95	92	5,000	9.1
1995	541	15.0	10.1	367	0.33	2	49	49	–	98	99	5,000	10.8

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Appendix B2.–Page 2 of 2.

Year	Catch (tons)	Hours Fished	Percent Roe Recovery	Avg. Wt. of Fish (grams)[a]	Estimated Value ($ millions)	Number of Buyers	Number of Fishermen	Number of Boats	Number Shaker Boats[b]	% Effort by Local Fishermen[c]	% Harvest by Local Fishermen[c]	Biomass Estimate[d]	Exploitation Rate
1996	752	34.0	10.6	356	0.64	3	63	63	–	95	96	6,000	12.5
1997	879	29.5	10.2	360	0.19	3	65	65	–	95	95	5,000	17.6
1998	727	35.0	9.6	369	0.13	1	41	41	–	98	98	4,500	16.2
1999	533	13.5	9.2	364	0.13	1	57	57	–	98	99	3,800	14.0
2000	500	13.0	8.1	376	0.08	2	46	46	–	98	98	3,500	14.3
2001	137	13.5	7.6	378	0.01	1	23	23	–	100	100	2,700	5.1
2002	102	41.5	9.8	412	0.01	1	21	21	–	100	100	3,600	2.8
2003	81	64.0	10.9	428	0.01	1	11	11	–	100	100	3,685	2.2
2004	25	148.0	12.4	359	0.01	1	10	10	–	100	100	3,500	0.7
2005	125	158.0	10.4	401	0.02	1	10	10	–	100	100	3,388	3.7
2006	92	89.0	10.3	407	0.02	1	8	8	–	100	100	4,813	1.9
2007 [g]	–	–	–	–	–	–	–	–	–	–	–	4,500	–
2008 [g]	–	–	–	–	–	–	–	–	–	–	–	5,000	–
2009 [g]	–	–	–	–	–	–	–	–	–	–	–	4,852	–
5 Yr. Avg (2004-2008)	48	79	7	233	0	1	6	6	–	60	60	4240	1.3
10 Yr. Avg (1999-2008)	199	68	10	391	0	1	23	23	–	100	100	3849	5.6
All Yr. Avg (1980-2006)	639	62	9	326	0	3	62	58	–	91	87	4778	12.2

[a] Average weight from commercial harvest sampling program.
[b] Numbers of boats using shakers were estimated.
[c] Local fishermen described as residents of Chevak, Scammon Bay, and Hooper Bay.
[d] Biomass estimate is a qualitative estimate of herring abundance, except for aerial survey biomass estimate in 1987 and 2006.
[e] Exclusive Use regulation went into effect.
[f] Final year hydraulic shakers were allowed.
[g] No commercial fishing occurred.

Appendix B3.–Subsistence herring harvest (st) and effort data by village, Cape Romanzof, 1975–2009.

	Scammon Bay		Chevak		Hooper Bay		Totals	
Year	Harvest	Number of Fishermen	Harvest	Number of Fishermen	Harvest	Number of Fishermen	Harvest	Number of Fishermen
1975					2.8	34	2.8	34
1976	0.7	4	0.7	9	3.0	28	4.4	41
1977			0.2	2	2.4	28	2.5	30
1978	0.7	1			3.9	29	4.5	30
1979	6.0	21	2.3	21	3.1	42	11.4	84
1980	3.1	18	3.6	20	3.7	23	10.4	61
1981	7.7	16	1.8	9	4.0	20	13.5	45
1982	3.9	15	1.9	10	4.7	18	10.5	43
1983	2.5	14	1.5	5	5.2	18	9.2	37
1984	4.3	16	2.6	7	4.2	24	11.1	47
1985	2.4	11	2.2	13	3.4	20	8.0	44
1986	2.8	17	0.7	4	2.5	19	6.0	40
1987	1.4	8	0.5	5	1.1	10	3.0	23
1988	2.0	7	1.5	6	3.6	19	7.2	32
1989	1.1	7	0.1	1	1.8	16	3.0	24
1990	1.7	5	0.6	3	5.6	24	7.9	32
1991	1.7	7	0.4	3	1.1	8	3.2	18
1992	1.2	10	0.4	4	2.5	16	4.1	30
1993	2.7	17	0.1	1	2.4	24	5.1	42
1994	1.4	9	2.0	16	3.1	23	6.5	48
1995	1.1	11	1.2	9	3.8	22	6.1	42
1996	1.0	10	0.5	4	1.7	15	3.1	29
1997	0.9	10	0.2	3	2.2	21	3.2	34
1998	0.7	7	0.1	2	0.9	7	1.7	16
1999	6.0	24	2.3	12	4.2	31	12.5	67
2000	3.9	26	1.0	10	1.3	14	6.2	50
2001	1.5	8	1.0	10	0.1	5	3.1	24
2002	0.6	7	0.2	3	1.1	10	1.9	20
2003	3.0	13	1.0	8	2.0	13	6.0	34
2004	3.5	14	1.2	8	1.3	12	6.0	34
2005	6.2	9	0.1	2	0.6	2	6.9	13
2006	1.7	9	0.3	3	0.5	2	2.5	14
2007	1.5	8	1.2	6	0.4	4	3.1	18
2008	1.0	7	1.0	2	0.3	3	2.3	12
2009	0.7	6	0.7	3	0.8	5	2.2	14
5 Year Average (2004-2008)	2.8	9	0.8	4	0.6	5	4.2	18

Note: Blank cells indicate no information. Subsistence survey results are believed to reflect harvest trends, however, reported catches reflect minimum figures because not all fishermen could be contacted.

Appendix B4.–Subsistence harvest of herring roe-on-kelp by village, Cape Romanzof District, 1993–2009.

	Scammon Bay		Chevak		Hooper Bay		Totals	
Year	Number of Fishermen	Pounds Roe-on-Kelp	Number of Fishermen	Pounds Roe-on-Kelp	Number of Fishermen	Pounds Roe-on-Kelp	Number of Fishermen	Pounds Roe-on-Kelp
1993	9	300			10	213	19	513
1994	7	104	4	135	12	417	23	656
1995	12	298	1	25	13	383	26	706
1996	7	113	2	31	9	480	18	624
1997	6	130	1	25	13	400	20	555
1998	2	420	2	105	3	60	7	585
1999	15	416	5	160	22	549	42	1,125
2000	19	644	3	155	8	220	30	1,019
2001	2	25	3	113	2	50	7	188
2002	2	56	0	0	4	105	6	161
2003	8	185	2	130	7	185	17	500
2004	7	354	1	50	1	5	9	409
2005	5	1,125	0	0	0	0	5	1,125
2006	3	170	1	20	1	30	5	220
2007	2	50	1	10	0	0	3	60
2008	3	28	1	2	0	0	4	30
2009	0	0	1	5	0	0	1	5
5 yr avg (2004-2008)	4	345	1	16	0	7	5	369

APPENDIX C: FRESHWATER FINFISH INFORMATION

Appendix C1.–Estimated subsistence harvest of pink salmon, whitefish, pike, and sheefish fish, by surveyed villages, Yukon Area, 2009.

			Pink Salmon		Large Whitefish[a]		Small Whitefish		Pike		Sheefish		Total Expanded
Community	Total Households	Households Contacted[b]	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Misc Fish Harvest
Hooper Bay	204	71	957	799	1,504	686	741	578	143	104	20	33	3,365
Scammon Bay	80	33	1,186	870	234	96	245	0	80	0	0	0	1,745
Coastal District	284	104	2,143	1,181	1,738	692	986	578	223	104	20	33	5,110
Nunam Iqua	31	28	61	9	256	8	1,651	659	86	15	510	134	2,564
Alakanuk	117	46	24	31	565	346	3,826	1,683	1,463	941	2,156	2,043	8,034
Emmonak	150	71	5	8	564	296	2,409	1,623	847	403	687	268	4,512
Kotlik	97	36	42	72	194	199	238	144	375	418	551	532	1,400
District 1	395	181	132	79	1,579	497	8,124	2,433	2,771	1,106	3,904	2,132	16,510
Mountain Village	141	65	6	2	2,511	1,029	113	110	668	334	243	131	3,541
Pitkas Point	27	23	0	0	802	496	108	59	70	47	42	30	1,022
St. Mary's	119	45	5	5	6,183	3,747	71	115	475	314	508	332	7,242
Pilot Station	106	53	3	4	1,937	829	38	37	74	79	77	33	2,129
Marshall	74	30	0	0	1,753	1,666	0	0	437	331	198	96	2,388
District 2	467	216	14	6	13,186	4,337	330	173	1,724	572	1,068	372	16,322
Russian Mission	67	32	0	0	260	159	0	0	345	157	42	47	647
Holy Cross	55	33	0	0	1,578	1,652	0	0	226	144	144	138	1,948
Shageluk	29	21	9	10	2,908	1,988	0	0	115	38	94	41	3,126
District 3	151	86	9	10	4,746	2,590	0	0	686	217	280	152	5,721
Anvik	28	24	2	0	521	37	6	3	192	38	159	28	880
Grayling	46	17	0	0	562	289	250	219	225	213	308	207	1,345
Kaltag	65	18	0	0	31	0	0	0	10	0	92	77	133
Nulato	80	22	0	0	53	0	2	0	2	0	120	81	177
Koyukuk	41	18	0	0	245	197	0	0	126	115	66	41	437
Galena	162	50	0	0	7,827	8,463	0	0	162	214	104	48	8,093
Ruby	57	19	0	0	511	0	0	0	10	0	51	49	572
Huslia	75	26	0	0	876	331	98	125	826	366	265	209	2,065
Hughes	23	19	0	0	512	340	240	192	105	3	362	219	1,219
Allakaket	47	18	0	0	687	117	15	19	109	23	304	12	1,115
Alatna	7	5	0	0	83	13	50	0	30	0	8	0	171
Bettles	20	17	0	0	0	0	0	0	2	1	4	2	6
District 4	651	253	2	0	11,908	8,485	661	318	1,799	490	1,843	393	16,213

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			Estimated Subsistence Harvest										Total
			Pink Salmon		Large Whitefish [a]		Small Whitefish		Pike		Sheefish		Expanded
	Total	Households	Estimated	CI (95%)	Estimated	CI (95%)	Estimated	CI (95%)	Estimated	CI (95%)	Estimated	CI (95%)	Misc
Community	Households	Contacted [b]	Total	(+/-)	Total	(+/-)	Total	(+/-)	Total	(+/-)	Total	(+/-)	Fish Harvest
Tanana	98	51	0	0	5,723	283	1,988	102	172	61	474	127	8,357
Stevens Village	21	15	0	0	74	27	2	1	91	35	32	20	199
Birch Creek	16	12	0	0	40	39	0	0	80	65	13	13	133
Beaver	27	24	0	0	15	11	8	7	71	22	6	5	100
Fort Yukon	171	58	0	0	352	262	283	168	414	269	163	159	1,212
Venetie	58	15	0	0	20	34	0	0	0	0	5	9	25
Chalkyitsik	27	20	0	0	15	7	0	0	30	6	53	8	98
District 5	418	195	0	0	6,239	390	2,281	196	858	286	746	205	10,124
Survey Totals	2,366	1,035	2,300	1,184	39,396	9,919	12,382	2,535	8,061	1,390	7,861	2,215	70,000

Source: Jallen and Hamazaki 2011.

Note: Subsistence whitefish, pike, and sheefish estimates in surveyed communities is based on a stratified random sample of households as designated for the estimation of subsistence salmon harvests.

[a] Large whitefish are considered those approximately 4 pounds or larger and small whitefish are less than 4 pounds.

[b] The number of households contacted per species may vary. The number of households indicated is the greatest number of households contacted for a given species.

Appendix C2.–Reported subsistence harvest of other miscellaneous fish species by surveyed villages, Yukon Area, 2009.

Community	Total Households	Households Contacted[a]	Reported Harvest of Miscellaneous Fish Species (Not Expanded)								Total Not Expanded Miscellaneous Fish Harvest
			Burbot	Lamprey[b]	Tomcod	Grayling	Sucker	Arctic Char	Blackfish	Sockeye Salmon[c]	
Hooper Bay	204	71	8	0	1,376	0	0	0	305	9	1,698
Scammon Bay	80	33	0	0	396	0	0	1	420	50	867
Coastal District	284	104	8	0	1,772	0	0	1	725	59	2,565
Nunam Iqua	31	28	390	0	604	5	0	7	8,070	5	9,081
Alakanuk	117	46	715	0	5	0	0	1	15,680	3	16,404
Emmonak	150	71	171	0	325	0	0	3	4,600	5	5,104
Kotlik	97	36	20	0	3	0	0	0	1,295	22	1,340
District 1	395	181	1,296	0	937	5	0	11	29,645	35	31,929
Mountain Village	141	65	167	2	0	20	0	5	700	50	944
Pitkas Point	27	23	15	0	0	0	0	0	4,900	0	4,915
St. Mary's	119	45	88	5	0	0	0	0	4,300	10	4,403
Pilot Station	106	53	28	20	0	0	0	1	7,050	3	7,102
Marshall	74	30	130	1,500	0	0	40	0	0	24	1,694
District 2	467	216	428	1,527	0	20	40	6	16,950	87	19,058
Russian Mission	67	32	8	0	0	0	0	0	0	15	23
Holy Cross	55	33	23	2	0	18	0	0	0	0	43
Shageluk	29	21	21	0	0	0	0	0	0	0	21
District 3	151	86	52	2	0	18	0	0	0	15	87
Anvik	28	24	5	0	0	15	0	12	0	5	37
Grayling	46	17	7	170	0	195	0	0	0	15	387
Kaltag	65	18	1	0	0	15	0	0	0	0	16
Nulato	80	22	0	0	0	157	0	8	0	0	165
Koyukuk	41	18	3	0	0	0	0	0	0	0	3
Galena	162	50	60	0	0	5	0	0	0	0	65
Ruby	57	19	1	0	0	30	0	0	0	0	31
Huslia	75	26	22	0	0	57	0	0	0	0	79
Hughes	23	19	5	0	0	2	0	0	0	0	7
Allakaket	47	18	10	0	0	1	0	0	0	0	11
Alatna	7	5	0	0	0	17	0	0	0	0	17
Bettles	20	17	0	0	0	4	0	5	0	0	9
District 4	651	253	114	170	0	498	0	25	0	20	827

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Appendix C2.–Page 2 of 2.

Community	Total Households	Households Contacted[a]	Reported Harvest of Miscellaneous Fish Species (Not Expanded)								Total Not Expanded Miscellaneous Fish Harvest
			Burbot	Lamprey[b]	Tomcod	Grayling	Sucker	Arctic Char	Blackfish	Sockeye Salmon[c]	
Tanana	98	51	107	0	0	0	8	0	0	0	115
Stevens Village	21	15	3	0	0	0	5	0	0	0	8
Birch Creek	16	12	0	0	0	0	0	0	0	0	0
Beaver	27	24	1	0	0	18	0	0	0	0	19
Fort Yukon	171	58	18	0	0	19	5	0	0	0	42
Venetie	58	15	0	0	0	89	1	0	0	0	90
Chalkyitsik	27	20	0	0	0	0	0	0	0	0	0
District 5	418	195	129	0	0	126	19	0	0	0	274
Survey Totals	2,366	1,035	2,027	1,699	2,709	667	59	43	47,320	216	54,740

Source: Jallen and Hamazaki 2011.

[a] The number of households contacted per species may vary. The number of households indicated is the greatest number of households contacted for a given species.

[b] Surveys are conducted before the Arctic lamprey fishery occurs in November and December. Consequently totals are for previous year harvest; i.e., the 2009 difficulties with species identification by fishermen the harvest is not estimated. Reported harvest here is for the calendar year 2008.

[c] Due to low harvest numbers of sockeye salmon and difficulties with identification by fishermen, the harvest is not estimated.

Appendix C3.–Reported subsistence and personal use non-salmonid freshwater finfish fish harvested under the authority of subsistence fishing and personal use permits, listed by permit area, Yukon Area, 2009.

Permit Fishing Area	Permit [a] Type	Issued [b]	Returned	Percent Returned	Number of Permits Returned that Fished [c]	Reported Harvest Whitefish	Sheefish	Burbot	Pike	Suckers	Grayling
Subsistence Permit											
Koyukuk Middle and South Fork Rivers	SF	1	1	100%	1	4	0	0	0	13	18
Yukon River Rampart Area	SR	25	24	96%	20	147	0	0	10	0	8
Yukon River near Haul Road Bridge	SY	68	66	97%	38	60	9	37	60	0	0
Yukon River near Circle and Eagle	SE SEU	45 28	42 28	93% 100%	21 13	180 128	30 7	1 8	1 3	62 1	224 15
Tanana River Subdistrict 6-A	SA	24	23	96%	16	105	5	2	9	0	0
Tanana River Subdistrict 6-B	SB	69	68	99%	37	1,073	10	33	25	21	0
Tanana River Upstream of Subdistrict 6-C	SU	42	40	95%	17	2,035	0	0	44	35	98
Kantishna River Subdistrict 6-A	SK	4	4	100%	3	57	0	32	21	71	0
Tolovana River Pike Subdistrict 6-B	ST	113	108	96%	52	202	14	6	560	0	0
Subsistence Permit Subtotals		419	404	96%	218	3,991	75	119	733	203	363
Personal Use Permit											
Tanana River Salmon Subdistrict 6-C	PC	57	57	100%	22	2	1	0	0	1	0
Tanana River Whitefish Upstream of Subdistrict 6-C	PW	11	11	100%	6	46	0	0	0	314	0
Personal Use Permit Subtotals		68	68	100%	28	48	1	0	0	315	0
Permit Totals		487	472	100%	246	4,039	76	119	733	518	363

Source: Jallen and Hamazaki 2011.

[a] Permits returned as of March 26, 2010.

[b] Includes 24 households that were "issued" permits for more than 1 area, 2 households that were issued a duplicate permit for same area, and 5 permit holders issued an additional SE or SEU permit to track harvest above and below Eagle sonar.

[c] Includes 6 households that "fished" in 2 different permit areas.

Appendix C4.–Commercial freshwater whitefish harvest, lower Yukon River, 1978–2009.

	Sheefish		Whitefish		Least Cisco		Bering Cisco		Broad Whitefish		Humpback Whitefish	
Year	Number	lbs	Number	lbs	Number	lbs	Number	lbs	Number	lbs	Number	lbs
1978	0	0	19	87	–	–	–	–	–	–	–	–
1979	5	39	23	55	–	–	–	–	–	–	–	–
1980	283	2,265	78	250	–	–	–	–	–	–	–	–
1981	299	2,812	779	2,875	–	–	–	–	–	–	–	–
1982	754	6,161	1,633	6,214	–	–	–	–	–	–	–	–
1983	395	2,692	163	648	–	–	–	–	–	–	–	–
1984	94	762	794	2,362	–	–	–	–	–	–	–	–
1985	358	3,081	1,514	4,586	–	–	–	–	–	–	–	–
1986	–	–	1,533	5,845	–	–	–	–	–	–	–	–
1987	–	–	2,144	7,564	–	–	–	–	–	–	–	–
1988	–	–	696	2,171	–	–	–	–	–	–	–	–
1989	–	–	–	–	–	–	–	–	–	–	–	–
1990	–	–	180	260	–	–	–	–	–	–	–	–
1991	–	–	–	–	–	–	–	–	–	–	–	–
1992	–	–	95	640	–	–	–	–	–	–	–	–
1993	–	–	–	–	–	–	–	–	–	–	–	–
1994	–	–	157	471	–	–	–	–	–	–	–	–
1995	–	–	–	–	–	–	–	–	–	–	–	–
1996	–	–	–	–	–	–	–	–	–	–	–	–
1997	–	–	–	–	–	–	–	–	–	–	–	–
1998	–	–	–	–	–	–	–	–	–	–	–	–
1999	–	–	–	–	–	–	–	–	–	–	–	–
2000	–	–	–	–	–	–	–	–	–	–	–	–
2001	–	–	–	–	–	–	–	–	–	–	–	–
2002	–	–	–	–	–	–	–	–	–	–	–	–
2003	–	–	–	–	–	–	–	–	–	–	–	–
2004	–	–	–	–	–	–	–	–	–	–	–	–
2005	266	1,688	781	1,419[a]	1,694	2,294	241	362	163	411	31	141
2006	472	2,912	828	1,112[a]	69	81	4,497	5,519	37	104	998	1,535
2007	445	3,363[b]	1,748	3,145[a]	–	–	2,451	2,951	–	–	–	–
2008	–	–	–	–	695	692	8,642	9,380	–	–	–	–
2009	–	–	–	–	750	763	9,185	9,903	–	–	–	–
Average 2004-2008	394	2,654	1,119	1,892	882	1,188	3,958	4,553	100	258	515	838

Note: Unless otherwise indicated an en dash indicates years in which no commercial fishing occurred.

[a] Includes whitefish purchased commercially that were not identified to species.

[b] Includes 416 sheefish sold in the whitefish directed commercial fishery and 29 sheefish sold in the salmon directed commercial fishery.

Appendix C5.–Freshwater finfish sales during the commercial salmon fishing season by district, Upper Yukon area, 1988–2009.

	District 4		District 5				District 6	
	Whitefish		Whitefish		Sheefish		Whitefish	
Year	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
1988	170	977	1,432	1,497	94	689	1,055 [a]	1,078
1989	403	1,331	687	803	47	381	178	444
1990	0	0	266	266	25	170	2	15
1991	2,600	4,055	0	0	0	0	–	–
1992	2,635	2,455	1,864	1,379 [b]	0	0	199	499
1993	0	0	59	48	0	0	140	300
1994	1	4	108	215	0	0	209	433
1995	0	0	95	95	0	0	183	387
1996	0	0	22	66	0	0	103	292
1997	0	0	270	301	0	0	4	8
1998	0	0	116	88	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	–	–	–	–	–	–	–	–
2001	–	–	–	–	–	–	–	–
2002	0	0	0	0	0	0	60	120
2003	40	113	0	0	0	0	129	297
2004	–	–	4	15	0	0	53	112
2005	0	0	0	0	0	0	66	175
2006	–	–	0	0	0	0	99	397
2007	0	0	0	0	0	0	55	152
2008	0	0	276	289	38	338	165 [c]	507
2009	0	0	–	–	–	–	–	–
2004-2008 Average	0	0	56	61	8	68	88	269
1999-2008 Average	7	19	35	38	5	42	78	220

Note: Unless otherwise indicated an en dash indicates years in which no commercial fishing which no commercial fishing occurred.

[a] Includes test fish sales.

[b] The sale of 950 pounds of the total 1,379 pounds of whitefish sold did not include number of fish. The average weight (.74 lbs) was used to estimate number of fish.

[c] The sale of fish sold did not include number of fish; therefore, number of fish were estimated using average weight (3.07 lbs.) from 2007 and 2010 in District 6.

Appendix C6.–Arctic lamprey commercial harvest, Yukon River, 2003–2009.

Year		Arctic Lamprey (lbs)	Number of Fishermen	Exvessel Value
2003		49,657	38	$62,000
2004	[a]			
2005	[b]			
2006		8,196	12	$8,196
2007	[c]	42	1	$42
2008		11,137	10	$11,137
2009		15,210	15	$18,896

[a] There was no commercial fishery in 2004.

[b] A commercial permit was issued in 2005 for the harvest of up to 5,000 lbs of lamprey. However, poor ice conditions and limited run timing information resulted in no commercial harvest.

[c] Permits were issued in 2007 for harvest of up to 47,080 lbs. Poor river ice conditions adversely affected fishing success.