Fishery Management Report No. 11-36

Annual Management Report Yukon and Northern Areas 2005

by

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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, Special Publications and the Division of Commercial Fisheries Regional Reports. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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The 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.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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PREFACE

This report summarizes the 2005 season and 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.

This report is organized into major sections:

1) Salmon Fishery,
2) Cape Romanzof District Herring Fishery,
3) Other Marine and Freshwater Finfish Fisheries, and
4) Northern Area.

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

ABSTRACT

The 2005 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 2005, provides data on the utilization of salmon species by commercial, subsistence, personal use, and sport fisheries, and presents an outlook for the 2006 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 and a review of salmon bycatch in the groundfish fisheries of the Bering Sea and the Gulf of Alaska. 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 Yukon Area report is organized into 4 sections: 1) *Salmon Fishery:* this section presents a description of the area, fishery resources, and fisheries management practices, and a comprehensive report of the 2005 salmon fisheries, by summer and fall season, and makes comparisons with previous years, 2) *Cape Romanzof District Herring Fishery:* this section presents a description of the area, fishery resources, fisheries and management practices, and summary of the 2005 herring fishery, and 3) *Other Marine and Freshwater Finfish Fisheries:* this section presents 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, Yukon Area, 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

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. This annual management report details the activities of ADF&G in the Yukon Area during 2005. The Yukon River is a transboundary river and as such, information is provided on fishery management, harvests, and projects in the Canadian portion of the drainage. Much of the information related to salmon in this report is directly taken from the annual Joint Technical Committee of the U.S. Canada Panel report, *Yukon River salmon 2005 season summary and 2006 season outlook* (JTC 2006). Historical salmon harvest and escapement data are provided in JTC 2006. For a more historical perspective pertaining to the Yukon Area fisheries, see the *Annual management report for the Yukon and Northern areas 2002–2004* (Hayes et al. 2008).

The Yukon Area includes all waters of the Yukon River drainage in Alaska and all coastal waters of Alaska from Point Romanof 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 Alaskan 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 Canadian portion of the Yukon River drainage. The Canadian Department of Fisheries and Oceans (DFO) conducts the corresponding fishery management activities in Canada.

FISHERY RESOURCES

Five species of Pacific salmon are 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 Alaskan 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 Ruby, river mile 601 (ADF&G 1983). In the past decade, pink salmon have exhibited a high and low abundance 2-year-cycle. High abundance has typically occurred during the even numbered years.

Sockeye salmon are 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 communications 2004), Anvik (M. Erickson, ADF&G, Anchorage, personal communication 1989), Andreafsky (Tobin and Harper 1995) and Gisasa (Wiswar 1999) River drainages.

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* hereafter referred to as Sustainable Salmon Fisheries Policy). 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 fishing associated with Chinook and summer chum salmon migrations and fall season refers to fishing associated with 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 mesh size restrictions. Guideline harvest ranges have been established for Chinook, summer chum, and fall chum salmon commercial fisheries throughout the Alaskan portion of the drainage. ADF&G attempts to manage the commercial salmon fisheries so the 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 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. Generally, 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 includes abundance indices from test fisheries, passage estimates from various sonar, mark–recapture 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.cf.adfg.state.ak.us/region3/finfish/salmon/salmhom3.php), and email to select communities, processors, buyers and fishermen. Additionally, select processors, buyers, and fishermen are notified of the EO by telephone and VHF radio where available.

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 January 2001 BOF meeting, action plans were developed through public process to guide ADF&G in managing each stock of concern. The action plans contained goals, measurable

and implementable objectives, and provisions including fishery management actions needed to achieve rebuilding goals and objectives, in proportion to each fishery's use of, and hazards posed to, a salmon stock (Vania 2000).

Regulatory actions adopted by the BOF to protect Yukon River stocks of concern included adoption of the *Yukon River King Salmon Management Plan*, changes to Yukon River summer chum and fall chum salmon management plans, and adoption of a subsistence salmon fishing schedule for the Yukon River. The BOF determined that the subsistence-fishing schedule should provide a reasonable opportunity for subsistence fishermen during years of normal to below average salmon run strength. The schedule was enacted to spread the harvest throughout the river, to reduce the impact on a particular stock, and spread subsistence harvest opportunity among users. The goal of the schedule is to provide windows of time during which salmon migrate upriver unexploited.

The subsistence salmon schedule is based on current, or past, fishing schedules and is implemented chronologically, consistent with migratory timing, as the salmon run progresses upstream. The commissioner may alter this schedule for conservation by EO, if preseason, or inseason, run indicators show this is necessary. The schedule for subsistence salmon fishing is as follows:

(1) Coastal District, Koyukuk River and Subdistrict 5-D: 7 days per week;

(2) Districts 1 – 3: two 36-hour periods a week;

(3) District 4 and Subdistricts 5-A, 5-B, and 5-C: two 48-hour periods a week;

(4) District 6: two 42-hour periods a week; and

(5) District 6 Old Minto Area: 5 days per week.

If inseason run strength assessment projects indicate that there is sufficient surplus, above escapement and subsistence uses to allow a commercial fishery, the subsistence fishing schedule reverts to the pre-2001 subsistence fishing schedule.

During the January 2004 BOF meeting, Yukon River stocks of concern were re-evaluated. The Chinook salmon stock was continued as a yield concern, the summer chum salmon stock was continued as management concern, and the fall chum salmon stock was continued as a yield concern (Lingnau and Bergstrom 2003; Salomone and Bergstrom 2004; Bue et al. 2004). The Toklat River and Fishing Branch River fall chum salmon stocks were removed as stocks of management concern. There were no changes to Yukon Area state fisheries regulations in 2005.

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 2005 (Appendix 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 (one summer, one fall), 2 assistant area management biologists, 9 research biologists, and one field office assistant. In addition, approximately 30 seasonal employees annually assist in conducting various management and research projects. ADF&G staff also assist with enforcement of regulations in cooperation with the Department of Public Safety, Alaska Bureau of Wildlife Enforcement.

State of Alaska funding for the Yukon Area salmon management and research program from July 1, 2004 through June 30, 2005 was approximately $1 million annually. Approximately

$1 million was received annually for the same time period by ADF&G through a federal U.S./Canada grant for *Yukon River Salmon Negotiation Studies*, which includes support for participation in related meetings. Additional projects were funded through federal funding for *Yukon River Salmon Treaty Implementation*.

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 Alaskan 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 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 the Yukon River Drainage Fisheries Association (YRDFA), the Yukon River Coordinating Fisheries 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 2005–2006). 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. A federal subsistence drift gillnet fishery is allowed in Subdistricts 4-B and 4-C, while state regulations do not allow the use of drift gillnet gear in these subdistricts. In 2005, the FSB adopted new regulations allowing a drift gillnet fishery between June 10 and July 14 during the last 18 hours of the each subsistence salmon fishing opening in waters where federal rules apply in Subdistricts 4-B and 4-C. Participation in this new fishery was open to qualified rural residents under a federal subsistence

permit using gillnets limited to less than 150 feet in length, 35 meshes deep, and unrestricted mesh size to target Chinook salmon. 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 Canadian portion of the Yukon River drainage. The United States and Canada Joint Technical Committee (JTC) was established in 1985 and serves as a scientific advisory body to the Yukon River Panel. The JTC meets semi-annually to discuss harvest and escapement goals, management trends, preseason outlooks and postseason reviews, and results of cooperative research projects.

In the mid-1990s, the realization was that while reaching a comprehensive long term agreement remained a formidable challenge given some of the key unresolved issues, there would be benefits that could be realized by more formally implementing the areas of agreement to date. In February 1995, an Interim Yukon River Salmon Agreement went into effect and a Yukon River Panel was formed to implement the Interim Agreement.

A 6-year stabilization plan was completed in 1995 for Canadian Yukon River mainstem Chinook salmon. The objective of the 6-year stabilization plan was to prevent further declines in spawning escapement by achieving an escapement of at least 18,000 Chinook salmon for each year through 1995. In April 1996, the Yukon River Panel agreed to the first 6 years of a rebuilding plan for Canadian mainstem Chinook salmon stocks. The Yukon River Panel agreed to an interim minimum spawning escapement objective for Canadian mainstem Yukon River Chinook salmon of 28,000 fish for 6 years beginning in 1996. The U.S. contribution to this effort was to endeavor to deliver 44,800 to 47,800 Chinook salmon to the Canadian mainstem Yukon River. The Canadian contribution to this effort was to endeavor to manage the harvest of Chinook salmon in the mainstem Yukon River drainage in Canada by all user groups combined within a guideline harvest range of 16,800 to 19,800 Chinook salmon.

For Canadian Yukon River mainstem fall chum salmon, a 12-year rebuilding plan was agreed upon during the negotiation process beginning with the 1990 season. The objective of this plan was to rebuild the stock by achieving a spawning escapement of more than 80,000 fall chum salmon for all brood years in the 4-year cycle by 2001. The U.S. contribution to this effort was to endeavor to deliver to the Canadian border on the mainstem Yukon River an agreed to number of fall chum salmon which varied by year based upon the rebuilding schedule. The Canadian contribution to this effort was to endeavor to manage the harvest of fall chum salmon in the mainstem Yukon River drainage in Canada by all user groups combined within a guideline harvest range of 23,600 to 32,600 fall chum salmon.

The Interim Agreement was in place through March 31, 1998. During negotiations in April 2000, most of the details were worked out on a framework agreement, with the exception of a harvest share proposal that was presented by the Canadian delegation. 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* (Agreement). The Agreement 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 Canadian

mainstem of the Yukon River. The escapement objective and harvest sharing of Canadian-origin Yukon River Chinook salmon is:

1) The Parties agree that the spawning escapement objective for the rebuilt Chinook salmon stock in the Mainstem Yukon River shall be 33,000 to 43,000 Chinook salmon.
2) Harvest of Mainstem Yukon River Chinook salmon shall be shared beginning in 2001, and continuing until amended by the Parties, on the following basis:
    a. when the Total Allowable Catch (TAC) is between zero and 110,000 Chinook salmon, the guideline harvest range for Canada shall be between 20% and 26% of the TAC;
    b. 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.

The escapement objective and harvest sharing of Canadian-origin Yukon River fall chum salmon is:

1) The Parties agree that the escapement objective for the rebuilt chum salmon stock:
    a. in the Mainstem Yukon River in Canada shall be greater than 80,000 chum salmon; and
    b. upstream from the Fishing Branch River weir site shall be 50,000 to 120,000 chum salmon.
2) Harvest of mainstem Yukon River chum salmon shall be shared beginning in 2001, and continuing until amended by the Parties, on the following basis:
    a. when the Total Allowable Catch (TAC) is between zero and 120,000 chum salmon, the guideline harvest range for Canada shall be between 29% and 35% of the TAC;
    b. 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 River Panel was re-established to implement the Agreement. The focus of the Yukon River Panel is on the salmon stocks that spawn in the Canadian portion of the Yukon River drainage. The Panel makes recommendations to the management agencies in Alaska and Canada and 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 Canadian 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. Monies from the R&E Fund shall be disbursed by the Yukon River Panel according to the following rules:

1) 50% of the annual available funds shall be disbursed on Canadian programs and projects approved by the Canadian section of the Yukon River Panel based on recommendations by the Canadian section of the JTC and found by the Panel as a whole to be consistent with the **Principles and Guidelines for Restoration, Conservation and Enhancement Programs and Projects** until amended by the parties; and
2) The balance of annual available funds shall be disbursed at the direction of the Yukon River Panel as a whole based on recommendations by the JTC as a whole.

The Yukon River Panel meets each fall and spring to develop management recommendations and advise the United States and Canadian Governments on conservation and management of the salmon originating in the Canadian 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.

AREA SALMON REPORT

TOTAL YUKON DRAINAGE SALMON HARVEST 2005

The total 2005 harvest for the Yukon River drainage, including Canada, was 96,892 Chinook, 120,887 summer chum, 290,418 fall chum, and 86,027 coho salmon (Appendix A5). The 2005 total Yukon River drainage harvests compared to the recent 5-year averages (2000–2004) were as follows: Chinook, 14% above average; summer chum, 71% above average; fall chum, 465% above average; and coho salmon, 190% above average (JTC 2006). An additional 848 Chinook, 14,357 summer chum, 70 fall chum, and 279 coho salmon were caught for subsistence use in the Coastal District outside the drainage (Appendix A24).

COMMERCIAL FISHERY–ALASKA

TOTAL COMMERCIAL SALMON HARVEST 2005

A total of 32,029 Chinook, 41,264 summer chum, 180,162 fall chum, and 58,311 coho salmon were harvested by 603 permit holders in the Yukon Area in Alaska (Appendix A6). The 2005 Yukon Area commercial harvests compared to the recent 5-year averages (2001–2005) were as follows: Chinook, 24% above average; summer chum, 260% above average; fall chum, 24 times the average; and coho salmon, nearly 3 times the average (JTC 2006). Harvest by statistical area for 2005 in the Yukon Area and by gear type in the Upper Yukon Area is shown in Appendices A7–A10. Total exvessel value was approximately $2.5 million, which is 64% above the recent 5-year average (Appendix A11). Salmon buyers and processors operating in the Yukon Area in 2005 are listed in Appendix A12. The salmon harvest was processed as a fresh or frozen product.

CHINOOK AND SUMMER CHUM SALMON

The Yukon River drainage is divided into fishery districts and subdistricts for management purposes (Figure 1). ADF&G uses an adaptive management strategy that evaluates inseason run strength to determine allowable harvest where escapement and subsistence uses are the priority. A preseason management strategy was developed in cooperation with federal subsistence managers that outlined run and harvest outlooks along with the regulatory subsistence salmon fishing schedule described in an information sheet. The 2005 strategy was to implement the subsistence salmon fishing schedule as salmon began to arrive in each district or subdistrict in a stepwise manner. Before implementing this schedule, subsistence fishing would be allowed 7 days a week to provide opportunity to harvest resident species, such as whitefish *Coregonus* sp., sheefish *Stenodus leucichthys*, northern pike *Esox lucius*, and longnose suckers *Catostomus catostomus*. The informational sheet was also used to prepare fishermen for possible reductions to the subsistence salmon fishing schedule or to allow for a small commercial fishery contingent on how the runs developed. The information sheet was mailed to Yukon River commercial permit holders and approximately 2,800 families identified from ADF&G's survey and permit databases. State and federal staff presented the management strategy to the YRDFA, State of

Alaska Fish and Game Advisory Committees, Federal Regional Advisory Councils, and other interested and affected parties.

Chinook Salmon

A conservative component of recent preseason management plans was to wait until near the midpoint of the Chinook salmon run before determining if the run was strong enough to support a commercial fishery. This interim strategy was designed to pass fish upstream for escapement, cross-border commitments to Canada, and subsistence uses in the event of a very poor run as occurred in 2000. However, a drawback of this approach is commercial fishing occurs on stocks migrating during the latter half of the run, thus the harvest is not spread out over the run. Further, if the run is strong, delaying commercial fishing results in foregone commercial harvest opportunities. The preferred strategy for a commercial fishery is to fish during the middle 50% of the run, a strategy in place before the runs began to decline in 1998. Additional harvest can occur late in the season depending on information from escapement projects. Since the runs were improving, but expected to be weaker than 2004, the management strategy was to provide for passage of a portion of the early run segment through the lower river districts before commercial fishing started.

Lower river test fishing indices, subsistence harvest reports, and Pilot Station sonar passage estimates were used by ADF&G to assess the salmon run inseason. As the run progressed upriver, other projects provided additional run assessment information. The age-5 fish from the low run of 2000 were expected to dominate the 2005 run; therefore the department developed a conservative preseason management strategy in 2005 with a potential harvest ranging from 20,000 to 60,000 Chinook salmon.

The lower Yukon River was ice-free on May 17, five days earlier than the historic average of May 22 (1979–2004). The first subsistence catch of Chinook salmon was reported in Aproka Slough on May 25 and the first catch of chum salmon was reported on June 1 near Emmonak. ADF&G test fishing project recorded its first Chinook salmon catch on June 2. The conditions in the lower river during the early portion of the season were characterized by high water. As snowmelt in the middle and upper portions of the Yukon River decreased, the water level dropped to normal levels.

Early in the season, the 2005 Chinook run appeared weaker than expected and weaker than the 2004 run, based on set gillnet test fishing CPUE and preliminary Pilot Station sonar estimates. Significant high water throughout the first half of June lowered efficiency of the test nets and development of a near shore cut bank caused the Pilot Station sonar to miss fish, which resulted in underestimating run strength during the first half of the run.

As the run developed, it became apparent the 2005 Chinook salmon run was stronger than earlier assessment indicated and management of the fishery became more liberal. Based on set gillnet test fishing catch per unit effort (CPUE) and preliminary Pilot Station sonar estimates, the run was stronger than the 2001 and 2002 runs. According to test fishing CPUE data, approximately 50% (the midpoint) of the Chinook salmon run had entered the lower river by June 23, three days later than the average date for the midpoint (Figure 11). The Pilot Station sonar passage estimate was 159,441 Chinook salmon (Appendix A14).The cumulative set gillnet test fishery CPUE in 2005 was 17.60 (Appendix A13). Compared to previous years, this CPUE was below the 2000 to 2004 average of 19.44 and well below the 1989 to 1997 (before the run decline) and 2003 to 2004 average of 25.74.

Border passage information also indicated high numbers of Chinook salmon migrating into Canada. The mark and recapture border passage estimate was 42,245 Chinook salmon. The escapement objective into Canada has been met consistently for 5 years, and since objectives were set, 11 of 14 years.

In summary, the 2005 Chinook salmon run was lower than the run of 2004 and below the 1989 to 1998 and 2003 average run size.

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

The Pilot Station sonar project provides an estimate of the number of salmon passing the sonar site; an estimate of the total Yukon River run size requires an estimate of the harvest and escapement below Pilot Station. The inseason East Fork Andreafsky River escapement estimate (multiplied by two, to account for the West Fork Andreafsky River) and the estimated summer chum salmon subsistence harvest and the current year commercial harvest taken below Pilot Station was added to the 2005 inseason Pilot Station passage projection. The corresponding total run size estimate was applied to the summer chum salmon management plan to determine appropriate management actions.

The summer chum salmon entry was characterized as average in run timing. By June 29, the summer chum salmon run at Pilot Station reached a level that allowed a directed summer chum salmon fishery. Before the 2005 season, ADF&G informed buyers and commercial fishermen of the potential for a directed summer chum salmon commercial fishery. However, because of poor market conditions and infrastructure problems, the summer chum salmon harvest was incidental to Chinook salmon directed harvests, except in District 6 where harvests were directed at summer chum salmon.

Harvest and Value

Total summer season commercial harvest was 32,029 Chinook and 41,264 summer chum salmon (Appendix A6 and A16) sold in the round for the Alaska portion of the Yukon River drainage in 2005. The historical commercial harvest includes the number of salmon sold in the round and the estimated number of salmon harvested to produce roe sold. The commercial Chinook salmon harvest included 75 Chinook salmon harvested in the fall season (Appendix A16). The 2005 Chinook salmon harvest was the third lowest harvest since statehood and 50% below the 1995 to 2004 (excluding 2001) average harvest of 63,408 Chinook salmon. The summer chum salmon harvest was the ninth lowest since 1967 and 80% below the 1994-2004 (excluding 2001) average harvest of 204,198 fish, but this may be attributed to market conditions rather than harvestable surplus.

A total of 595 commercial permit holders participated in the Chinook and summer chum salmon fishery during 2005 (Appendix A16), 10% below the 1994 to 2004 average of 665 permit holders. The Lower Yukon Area (Districts 1–3) and Upper Yukon Area (Districts 4–6) are

separate Commercial Fisheries Entry Commission (CFEC) permit areas. A total of 578 permit holders fished in the Lower Yukon Area in 2005, 5% below the 1994 to 2004 average of 607 permit holders. In the Upper Yukon Area, 17 permit holders fished, 69% below the 1994 to 2004 average of 64 permit holders.

Yukon River fishermen in Alaska received an estimated $2.0 million for their Chinook and summer chum salmon harvest in 2005 (Appendix A11), approximately 48% below the 1995 to 2004 average of $3.5 million. Although the 2005 average price per pound paid to lower river fishermen was 26% above the 1995–2004 average of $2.72, the decrease in exvessel value was caused by the reduced harvest of Chinook salmon.

Results by District

Districts 1, 2 and 3

Lower river test fishing indicated the Chinook salmon migration exhibited steady passage rates from June 11 to June 30, declining thereafter. Catch rates during the first half of June were conservative because high water conditions during the early portion of the run reduced the catchability of the test fishing nets. Additional nets were deployed to increase coverage.

The commercial fishing periods in Districts 1 and 2 had no mesh size restrictions. Small mesh size gear was not utilized because a summer chum salmon market in the lower Yukon River was lacking. There were 4 commercial fishing periods in District 1 and 3 periods in District 2 (Appendices A16, A17, and A19). No commercial fishing occurred in District 3 because of the late start of the commercial fishery.

Marketable quality of Chinook salmon was an issue in the lower Yukon River in 2005. Waiting until near the midpoint of the Chinook salmon run before opening the commercial fishery spreads the harvest out over the later portion of the run, which tends to be of lesser quality. Buyers informed ADF&G of these issues and the limitations placed on them. The department worked closely with buyers to arrange openings to better suit their needs while spreading out the harvest. Because of quality concerns, only 3 commercial fishing periods occurred in District 2 compared to 4 periods in District 1.

The combined total harvest of 30,107 Chinook salmon for Districts 1 and 2 was 50% below the 1995 to 2004 (excluding 2001) average harvest of 59,698 fish. The average weight of Chinook salmon in the 2005 commercial harvest was 18.9 pounds. Estimated age composition of Chinook salmon samples collected from the lower river commercial harvest was 2.2% age-4, 45.7% age-5, 48.9% age-6, and 3.2% age-7 fish. The lower than average weight was in part caused by the higher than average proportion of 5-year-old fish in the harvest. Sex composition of the samples was 57.0% females and 43.0% males.

The combined commercial summer chum salmon harvest in Districts 1 and 2 was 32,278 fish and 45% below the 1995 to 2004 (excluding 2001) average harvest of 58,657 fish. Average weight of summer chum salmon in the 2005 commercial harvest was 6.8 pounds.

Districts 4, 5 and 6

Historically, the Subdistrict 4-A fishery targets summer chum salmon. The dominant gear type, fish wheels, and the location of the fishery result in a very high chum to Chinook salmon ratio. Despite a proactive approach by ADF&G, no market was found; hence, no commercial openings were allowed in Subdistrict 4-A.

The Anvik River met the minimum escapement of 500,000 summer chum salmon required to allow an inriver commercial fishery, however, the Anvik River Management Area (Figure 9) remained closed to commercial fishing in 2005 because of a lack of markets for summer chum salmon. Commercial fishermen in Subdistrict 4-A, including the Anvik River management area were greatly impacted by the lack of commercial fishing. Although the commercial fishing season in District 4 was opened, no commercial fishing periods were announced because no buyer was available (Appendices A16 and A20).

The commercial fishing season in District 5 was opened on July 5. Three commercial fishing periods were allowed in Subdistricts 5-B and 5-C for a total of 36 hours of fishing time. In 2005, a total of 12 fishermen harvested 1,469 Chinook salmon (Appendix A16) in 33 deliveries. Typically, the harvest of summer chum salmon is low in these subdistricts as they are located far above the vast majority of summer chum spawning areas and no commercial harvest occurred in 2005. No commercial fishing periods were announced for Subdistrict 5-D because of a lack of buyers.

Commercial fishing in District 6 was opened for five 42-hour periods in 2005. Summer chum salmon were targeted during these 5 commercial fishing periods with some Chinook salmon incidental harvest. Test fish wheel and commercial catches indicated the summer chum salmon run in the Tanana River was above average and warranted commercial fishing. The total commercial harvest was 453 Chinook and 8,986 summer chum salmon harvested by 5 fishermen making 23 deliveries in District 6. The Chinook salmon harvest was below the guideline harvest range of 600 to 800 fish.

The age of Chinook salmon from the upper river commercial harvests (Districts 5 and 6) was 9.9% age-4, 48.2% age-5, 40.8% age-6, and 1.1% age-7 fish. Sex composition was 34.8% females and 65.2% males. Fish wheels, the dominant gear type in the Upper Yukon River Area, are generally biased in their harvests, tending to catch a higher number of smaller Chinook salmon, which are mostly males.

FALL CHUM AND COHO SALMON

Fall Chum Salmon Management Overview

The 2005 Yukon River fall chum salmon run was much stronger than expected. The preseason run projection ranged from 584,000 to 776,000 fish. The high end of the range was derived from normal run size expectations for the parent-year escapements realized throughout the drainage in 2000 and 2001. The low end of the range was primarily based upon the expectations of poor production (average proportion of 0.75) observed in recent fall chum salmon returns (2001 to 2004). The run size was anticipated to provide for escapement needs and subsistence harvest with a surplus of 20,000 to 150,000 fall chum salmon available for commercial harvest. However, the 2005 total run was approximately 2 million fall chum salmon, the commercial harvest was the highest since 1995, and preliminary indications are the subsistence harvests were the highest since 1999. The preliminary Yukon River drainagewide escapement of 1.8 million is the largest on record, which has been reconstructed back to 1974 (Appendix A34).

ADF&G follows guidelines provided by the BOF in 5 AAC 01.249. *Yukon River Drainage Fall Chum Salmon Management Plan*, amended by the BOF in January 2004. This plan incorporates the U.S./Canada treaty obligations for border passage of fall chum salmon, which are necessary for escapement and prioritized uses. There are incremental provisions in the plan to allow

varying levels of subsistence salmon fishing balanced with requirements to attain escapement goals. Commercial fishing is generally only allowed once the run size is projected to exceed 600,000 fish. The intent of the plan is to provide more flexibility in managing subsistence harvest when the stocks are low, and to increase the amount of salmon escapement as run size increases.

Most fall chum salmon typically enter the Yukon River from mid-July through early September in unpredictable pulses that usually last 2 to 3 days. Generally, 4 or 5 such pulses occur each season. These pulses are often associated with on-shore wind events and/or high tides. Consequently, assessing run strength is difficult when pulse size and run timing vary so drastically.

With an expectation of improving production, the 2005 preseason management strategy was to begin the fall season on the pre-2001 subsistence fishing regulations in accordance with the management plan. Based on the low fall chum salmon runs observed from 1998 through 2002, and the irregular entry pattern, managers expected to delay the decision to open a commercial fishery until near the midpoint in the fall chum salmon run around late July or early August in the lower river to build confidence in run assessment. The delayed commercial opening was expected to be in line with the higher market demand for coho salmon that overlap in migration timing with the second half of the fall chum salmon run. Thereby, concerns for fall chum salmon would be less likely to curtail the coho salmon commercial harvest because the harvest of both species would be concurrent.

Initial inseason assessment of fall chum salmon for 2005 was influenced by the performance of the summer chum salmon return, which improved substantially with an estimated run size of 2.7 million well above the average of 1.5 million. The linear relationship (1993–1995, 1997–2004) between the summer and fall chum salmon (r^2=0.92) suggested the fall run would perform similarly and thereby would likely exceed the upper end of the preseason projection.

The fall chum salmon run was assessed in season by the drift gillnet test fisheries index projects located near Emmonak (operated by ADF&G), Mountain Village (operated by Asacarsarmiut Traditional Council) and in the middle Yukon River at Kaltag (operated by the City of Kaltag). The Pilot Station sonar project, located in the lower river, provided actual daily passage estimates of fall chum salmon used to derive run size projections which triggered management actions as dictated by the fall chum salmon management plan. Relationships in run timing and run strength from the various index projects and subsistence fishing reports were compared for consistency with the Pilot Station sonar estimates as a method to check if projects appeared to be operating correctly. In 2005, each pulse of fall chum salmon was detected by the Emmonak and Mountain Village drift gillnet test fishery projects. The catch rates at these lower Yukon River projects appeared to correlate well with other assessment projects for run timing and relative magnitude of each pulse. Individual pulses were tracked as they moved up river and the Pilot Station sonar was used to estimate the abundance of each pulse (Figure 12).

The fall chum salmon management plan went into effect on July 16 by regulation. Subsistence fishing management actions, initiated during the summer season, were continued into the fall season. The Coastal District, Districts 1, 2, and 3 and the Innoko River were open 7 days per week. Similar management, consistent with the pre-2001 subsistence salmon fishing regulations, continued sequentially in the Upper Yukon Area districts as the fall chum salmon run migrated into those areas.

The fall chum salmon run was strong from the beginning of the season. Each pulse of fall chum salmon typically takes approximately 20 days to reach the confluence of the Tanana River and another 10 days to migrate to the Canadian Border. The first significant pulse began entering the mouth of the Yukon River on July 18 and lasted 2 days (Figure 12). The abundance was estimated to be approximately 180,000 fish by the Pilot Station sonar and was suspected to contain a large proportion of summer chum. This pulse was followed by 8 days of very low passage rates before the second pulse began entering on July 29. The second pulse was also approximately 180,000 fish and lasted 3 days. The third pulse began entering the river on August 5, lasted 4 days, and was estimated by the Pilot Station sonar to include approximately 810,000 fall chum salmon. The third pulse was exceptionally large and set a new record for highest single day passage rate for either summer or fall chum salmon. August 8 is the average midpoint for fall chum salmon passage at the Pilot Station sonar project (2005 was August 9). The 2005 cumulative passage estimate of 1.1 million to that date was significantly above the historical average of 260,000 for the project. Following the third pulse, daily passage remained slow for 10 days until August 18 when the fourth pulse began to enter the river. The pulse was not as abrupt as the first 3 days, but was steady over a 7 day period and accumulated an estimated total of 340,000 fall chum salmon. No additional significant pulses were detected and the total cumulative run size was estimated to be approximately 2 million for the season.

The first 2 pulses of fall chum salmon passed through the Lower Yukon Area with little exploitation which was expected to benefit escapement and upriver fishermen. Commercial salmon markets were known to be weak and limited to District 1 with no buyers expressing interest in purchasing salmon in Districts 2 and 3. The first commercial period was opened earlier than previously planned, near the average first quarter point of the run on July 27, to maximize the market potential since the projected surplus exceeded the known available market capacity (Appendices A21 and A22). The preseason management strategy was to wait until near the midpoint in the run before opening the commercial fishery. However, the abundance of fall chum salmon was apparent from the beginning, so the fishery began nearly 2 weeks earlier than planned. Over 250,000 fall chum salmon had passed through the lower river by that time and the action was intended to help spread out opportunity and harvest impacts throughout the run.

When the third pulse arrived, managers became certain the run would exceed all expectations; escapement and subsistence needs, and all available market capacity. Subsistence fishing time was further liberalized. Because of the frequency of commercial fishing periods, subsistence fishing openings coincided with commercial periods in District 1 to provide more opportunity, but remained closed immediately before and after each period. In upriver districts, subsistence fishing time and commercial periods were both increased concurrently. Fisheries managers worked closely with commercial fish buyers to maximize processing capacity and available transportation opportunities. Periods were planned to avoid the warmest part of the day, which tends to degrade flesh quality rapidly. Commercial fishermen in District 1 cooperated well in curtailing their fishing time on 2 occasions when very high harvest rates exceeded the available processing capacity and on a third occasion when a period was canceled to allow additional time to process a back-log of fish. Buyers and fishermen also worked together to improve the quality of their harvest by more careful handling, improved icing techniques, and quicker deliveries. The commercial salmon fishing season in the lower Yukon River normally closes by regulation on September 1, but was extended through September 9 to allow additional opportunity to harvest the abundant fall chum salmon.

Reports of the strong run renewed interests for commercial fishing in other districts. Buyers in Districts 2 and 3 made attempts, but were not able to arrange affordable transportation on short notice. Although there was initial market interest and commercial opportunity was provided in District 4 and Subdistricts 5-B and 5-C, no commercial landings were made. The District 6 fall commercial fishing season began August 26 on a schedule of two 42-hour periods a week with very limited market interest. On September 5, market interest increased and the scheduled period was extended an additional 30 hours in Subdistricts 6-A and 6-B, to increase opportunity to harvest fall chum and coho salmon during the time of high passage rate and good quality. Beginning with the period on September 9, the Subdistricts 6-A and 6-B commercial schedule was lengthened to 5-days a week and was followed by an EO to extend the commercial fishing season in Subdistricts 6-A and 6-B. However, the fifth period was later extended by 48 hours to increase opportunity because the primary buyer had informed ADF&G they planned to cease operations well before the end of the season. The last 3 scheduled commercial periods of the season had no reported harvest because there were no markets.

Overall, the exceptionally large run of 2 million fall chum salmon and moderate harvest level, caused by limited market capacity and low subsistence effort, resulted in a low exploitation rate of 14%. This rate is slightly below the previous 10-year average from 1995 to 2004 of 19% and well below the 10-year average from 1985 to 1994 of 39%. In contrast, the amount of commercial opportunity was exceptionally high and subsistence opportunity was very liberal. All escapement goals throughout the drainage, including Canadian interim goals, were exceeded.

Coho Salmon Management Overview

The coho salmon run was managed to provide for escapement. The commercial harvest was dependent to a large extent upon the abundance of fall chum salmon and accompanying management strategies used to harvest fall chum salmon. The 2005 coho salmon outlook was for a continuation in the trend of above average returns, below average subsistence harvests because of low effort, and an expected commercial harvest of 10,000 to 75,000 fish.

The 2005 coho salmon run timing appeared to be near average based on the run timing at Pilot Station sonar. Test fish 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 August 31 was approximately 184,718 fish (Appendix A14). This number was 35% above the historical average passage estimate of 135,000 fish for the project. Although the Andreafsky weir assessment project in the lower river had a below average passage count, the Delta Clearwater River escapement estimate was above average as were most of the upriver test fishing indices. Pilot Station sonar does not operate for the entire coho salmon run because of expense and many other assessment projects are terminated early because of icing conditions. Therefore, the coho salmon run is not completely assessed.

The preseason market outlook favored coho salmon and the expectation was the allowable fall chum salmon harvest would limit the amount of opportunity to harvest coho salmon as it had in the past. However, by the beginning of the coho salmon run, the fall chum salmon run was near the midpoint and on track for a near-record run. Even though there was a large surplus of fall chum salmon available, commercial fishing periods were controlled to spread harvest impacts throughout the duration of the smaller coho salmon run.

As with fall chum salmon, transportation costs were a major limiting factor in the coho salmon fishery. Fish buyers only operated near the transportation hubs in District 1 near Emmonak and

Subdistrict 6-B near Nenana. Fishermen had to weigh the price of gas in relation to the benefits of potential subsistence and commercial harvests. The extended commercial season and liberalized subsistence fishing time increased fishing opportunity for coho salmon throughout the drainage.

The Delta Clearwater River has the only established escapement goal for coho salmon in the Yukon River drainage, a sustainable escapement goal (SEG) of 5,200–17,000 fish. The 2005 boat count survey estimated an above average escapement of 34,293 coho salmon. The Pilot Station sonar passage index of 184,718 fish was the third highest since 1995, only behind 2003 and 2004 indicating coho salmon stocks are continuing their trend of above average returns (Appendix A14).

Harvest and Value

Commercial fishing for fall chum and coho salmon has become sporadic because of very poor runs from 1998 to 2002 with commercial fishing occurring in 6 of the past 10 years. The 2005 commercial season was managed to maximize efficiency and opportunity to utilize the unanticipated large surplus of fall chum salmon. The total fall season commercial harvest included 130,525 fall chum and 36,533 coho salmon harvested in the Lower Yukon Area and 49,637 fall chum and 21,778 coho salmon harvested in the Upper Yukon Area (Appendix A5 and A21). All salmon were sold in the round with no salmon roe sold separately.

The 2005 Alaskan commercial harvest of fall chum salmon was the largest landing since 1995 and the commercial harvest of coho salmon was the largest landing since 1991. The fall chum salmon commercial harvest of 180,162 was approximately 274% above the 1995–2004 average of 48,200 fish and coho salmon harvest of 58,311 was 215% above the 10-year average of 18,500 fish. However, weak market conditions and limited buying capacity limited the commercial harvest throughout the drainage.

The 2005 commercial fall chum and coho salmon season exvessel value for the Yukon Area was $467,832 (Appendix A11). The previous 10-year average value for the Yukon Area was $90,647 ($64,425 for the Lower Yukon Area, $26,222 for the Upper Yukon Area). Yukon River fishermen received an average price of $0.32 per pound for fall chum salmon in the Lower Yukon Area and $0.14 per pound in the Upper Yukon Area in 2005. This compares to the 1995–2004 average of $0.19 per pound and $0.13 per pound, respectively. For coho salmon, fishermen received an average price of $0.32 per pound and $0.13 per pound in the Lower and Upper Yukon Areas compared to the recent 10-year average price of $0.29 and $0.11 per pound, respectively.

A total of 184 commercial permit holders (177 for the Lower Yukon Area, 7 for the Upper Yukon Area) participated in the fall chum and coho salmon fishery in 2005 compared to the previous 10-year average of 138 permit holders (128 for the Lower Yukon Area, 10 for the Upper Yukon Area).

The magnitude of the 2005 fall chum salmon run was much larger than expected. The primary parent year escapements were among the lowest on record, yet they produced the largest run in 30 years. The 2005 commercial harvest is primarily a reflection of what the market could support because allowable fishing time was well above normal levels and a large surplus remained unharvested resulting in very large escapements. Decline in both subsistence and commercial harvest effort in recent years is at least in part a result of the series of poor salmon returns before

2003, which has led to changing subsistence fishing and use patterns and loss of commercial markets.

ENFORCEMENT

The primary enforcement authority for violations of Fish and Game regulations is the Department of Public Safety Alaska Bureau of Wildlife Enforcement (ABWE). State ABWE officers monitored subsistence, personal use, and commercial fisheries within the Yukon Area.

ABWE conducted patrols in Districts 1 and 2 with the use of float planes and skiffs during the Chinook salmon fishery in 2005. In general, compliance was good. Multiple contacts were made with citations being issued for fishing during closed periods, fishing in closed waters, improper vessel numbers, no crew member licenses, fishing without valid CFEC permits and the unlawful purchase of salmon. Additional investigations that did not result in citations being issued were for the sale of subsistence caught salmon. One fisherman was charged with DWI during an opening. Boating safety patrols were conducted in conjunction with commercial enforcement and citations/warnings were issued for lack of personal floatation devices and vessel registrations. ABWE Troopers also sold multiple crew member licenses prior to the first openings.

COMMERCIAL FISHERY–CANADA

CHINOOK SALMON

A total of 4,066 Chinook and 11,931 fall chum salmon was harvested in the Canadian Yukon River commercial fishery in 2005 (Appendix A23). The combined species catch of 15,997 salmon was 14.9% above the previous 10-year average commercial harvest of 13,924 salmon. Since 1997, there has been a reduction in the commercial catch of both Upper Yukon River Chinook and chum salmon because of a limited market and below average run sizes in most years. Twenty of 21 eligible commercial licenses were issued in 2005. Twenty-one commercial licenses were issued in 2003 and 2004.

The 2005 preseason outlook for Canadian-origin Yukon River Chinook salmon was a below average return of approximately 107,000 fish[1]. An outlook range from 69,600 to 107,000 was used for the 2005 outlook because of uncertainty associated with marine survival of the fish that spawned between 1995 and 2000. The potential for reduced marine survival has been made apparent by the poor total run sizes of Upper Yukon Chinook salmon in the 1998 to 2002 period, which were significantly lower than expected despite healthy brood year escapements.

Key elements of the 2005 Canadian Integrated Fisheries Management Plan (IFMP) for Yukon Chinook salmon as developed by the Yukon Salmon Committee (YSC) were as follows:

i) A target spawning escapement goal of 28,000 Chinook salmon. This goal was consistent with the Yukon River Panel recommendation from the March 2005 Yukon Panel meeting. The YSC recommended allowing First Nation fisheries to occur as long as the spawning escapement was greater than 18,000 Chinook salmon and the First Nation catch was consistent with the Yukon River Salmon Agreement harvest sharing provisions.

[1] The 2005 outlook of 107,000 was expressed as a range from 69,600 to 107,000 determined from the relationship between forecasted and observed returns for the 1998 to 2003 period.

ii) Commercial, recreational and domestic fisheries would be given opportunities to fish if inseason run projections indicated requirements for conservation, i.e. the target spawning escapement goal of 28,000, and First Nations harvests would likely be achieved.

Similar to previous years since 2001, the 2005 IFMP established a series of color coded categories (Red, Yellow and Green Zones) bound by specific reference points (run sizes into Canada) and were associated with anticipated management actions. For example, the Red Zone included run projections of less than 19,000 Chinook salmon. The anticipated management action for projections falling in the Red Zone would result in all fisheries being closed with the exception of the test fishery. A test fishery would not be allowed if the run projection was less than 11,000. In the Yellow Zone, described as a run size projection in the 19,000 to 37,000 range, only the First Nation fishery and an assessment test fishery would operate. Restrictions in the First Nation fishery would depend upon the run abundance and be increasingly more severe the closer the run projection was to 19,000, the lower end of the Yellow Zone. The Green Zone included run size projections greater than 37,000 Chinook salmon. The anticipated management actions for run projections in the Green Zone include unrestricted First Nation fisheries and consideration for harvest opportunities in the commercial, domestic and recreational fisheries depending on abundance and international harvest sharing provisions.

A total run outlook of 69,600 to 107,000 Upper Yukon Chinook salmon (at the river mouth) and proposed management actions in Alaska suggested border escapement would exceed 45,000 Chinook salmon which falls in the Green Zone. This number suggested the likelihood of an unrestricted First Nation fishery and fishing opportunities in the commercial, domestic and recreational fisheries. The 2005 season commenced with closures in place for the commercial and domestic fisheries.

Throughout most of June, before Chinook salmon entered the Canadian section of the upper Yukon River, Alaskan test fisheries and the Pilot Station sonar project located near the river mouth indicated to U.S. managers that run abundance was adequate to provide for U.S. border escapement obligations, U.S. subsistence fishing, and a small U.S. commercial harvest. Chinook salmon were first caught in the DFO fish wheels on June 28, the same day as the most recent 10-year average. A total of 1,485 Chinook salmon were caught in the fish wheels, 85.5% of the 1995–2004 average catch of 1,736 fish. In addition to the fish wheels, small-mesh gillnets were fished on an experimental basis from July 10 to August 4, 2005 to augment the number of tags deployed. The gillnet catch was 145 Chinook salmon, 140 of which were subsequently tagged and released.

The primary purpose of DFO fish wheels is to live-capture salmon throughout the run for tagging purposes; fish are tagged and then released. Recoveries of tagged fish, primarily in the Dawson area commercial fishery, are used to estimate the abundance of fish throughout the season. Inseason projections of the total run into Canada, which are also referred to as “border escapement”, are developed by expanding the point estimates of run size generated from the mark–recapture data by historical run timing information. These projections are a key component in Canadian management decisions.

In recent years, the opening of the commercial fishery was frequently delayed in response to conservation concerns. The resulting lack of tag recoveries from the commercial fishery created the need to implement a test fishery to provide stock assessment data for inseason run forecasting. Without tagging data during commercial closures, little else exists to rely upon for

inseason run assessment. The option of using just the DFO fish wheel catch has not been exercised because of the poor historical relationship between fish wheel catch and run size estimates. In 2005, information from the U.S. test fishery at Emmonak, the Pilot Station sonar program, and the initiation of a U.S. commercial fishery on the lower Yukon River indicated that the Canadian Chinook salmon escapement target would likely be achieved and a TAC would be established. With this in mind, it was apparent First Nation fisheries would not be asked to undertake conservation measures and fishing opportunities would likely be available within the Canadian commercial, domestic[2] and recreational fisheries. Because of the cost and effort required to mobilize a test fishery, the Test Fishery Steering Committee recommended that instead of a test fishery, a "limited" commercial fishery early in 2005 season should be initiated to determine the status of the Chinook salmon return if managers felt the run would likely be of sufficient strength to meet the spawning escapement goal. Subsequent openings in the commercial and other fisheries would then be determined from the information provided by the limited commercial fishery.

Inseason border escapement run projections were usually produced twice weekly throughout the 2005 season. Early in the season, run size projections were very sensitive to the particular run timing model being used because early timing information represented only a small proportion of the entire run. Mark–recapture estimates were expanded based on what were considered to be likely timing scenarios (early, late timing, etc.) given information at hand (U.S. fishery and assessment data and early indications in Canada). The intent of applying different expansions was to ensure projections covered an appropriate range of potential differences in run timing. An example of one early inseason projection was a border escapement estimate July 18 of 8,300 projected forward to a total season projection of 41,800 based on historical fish wheel timing data at the tagging site.

The first Chinook salmon commercial fishery operated for a 2 day period from July 10 to July 12 (Appendix A23). Eleven fishermen participated in the fishery; the highest weekly number of fishermen that participated in the commercial fishery. A second 2-day commercial fishery opening started at noon July 17. Commencing July 24, weekly fishing periods were increased to 4 days per week for the remainder of the Chinook salmon season. The peak weekly catch of 1,829 Chinook salmon occurred during the July 24–28 opening. Weekly catch and effort for all openings are summarized in Appendix A23. The total catch of Chinook salmon in the commercial fishery was 4,066 fish of which 3,998 was taken in the "Dawson area" fishery, downstream of the confluence of the Yukon and White rivers, and 68 Chinook salmon were caught in the "upper fishing area".

The Chinook salmon commercial fishery was open for a total of 16 days and total fishing effort was 170 boat-days. For comparison, the previous 10-year average (1995–2004) commercial catch was 4,299 Chinook salmon. This average, however, includes data from 1998 to 2003, excluding 2000, when the commercial fishery was severely restricted or hampered by limited market conditions. The Chinook salmon fishery was closed during the 2000 season and open for only 5 days in 2002.

[2] Domestic fishery openings were on the same schedule as commercial fishery openings.

CHUM AND COHO SALMON

The preseason expectation for Upper Yukon River chum salmon was an average return. Spawning escapements in 2000 and 2001, the primary brood years contributing to the 2005 run, were 53,700 and 33,900 chum salmon, respectively. Although spawning escapement was excellent for the 1994 to 1997 period (averaging 116,100 and ranging from 85,400 to 158,100), the cycle year returns from these escapements were well below average and appeared to have been significantly impacted by poor marine survival. Canadian managers surmised that poor survival could once again result in a depressed run in 2005 because of below average escapement in 2001, the dominant cycle year. To capture this uncertainty, the total run outlook was expressed as a range from 59,000 (below average) to 126,000 (average) Upper Yukon River chum salmon. Given the improvement in run size observed in 2003 and 2004 and incidental information that the bycatch of immature chum salmon had been exceptional in the U.S. domestic trawl fishery in 2004, managers thought the upper end of this range was more likely. The Canadian IFMP for chum salmon in 2005 acknowledged the likelihood of an average return and contained the following key elements:

1) A minimum spawning escapement target of 65,000 Upper Yukon River chum salmon consistent with the Yukon Panel recommendation of March 2005; and
2) Given the expectation for an average run and uncertainty associated with recent returns, the commercial chum salmon fishery would be limited until inseason run projections indicated that the spawning escapement goal and First Nation's requirements would be likely achieved.

In 2005, funding was approved from the Yukon River Restoration and Enhancement fund for a live-release chum salmon test fishery in the Dawson City area to obtain tagging data for population estimates. A similar project was conducted jointly by the Yukon River Commercial Fishing Association and the Tr'ondek Hwech'in First Nation in 2002, 2003 and 2004. Before 2002, projections of chum salmon border escapement were generated either from DFO fish wheel catch data, or from mark–recapture data collected from the First Nation and commercial fisheries located in the Dawson area.

Similar to the decision matrix developed for Chinook salmon, a chum salmon decision matrix was developed in the IFMP. Red, Yellow and Green management zones were described by specific reference points (run sizes into Canada) and expected management actions. Red Zone included run projections of less than 40,000 fish when closures in all fisheries except for the live release test fishery could be expected. Yellow Zone included run projections in the 40,000 to 68,000 range; within this zone, the commercial, domestic and recreational fisheries would be closed and the First Nation fishery would be reduced with restrictions increasingly more severe the closer the run projection was to the lower end of the Yellow Zone. Green Zone included run size projections greater than 68,000 chum salmon and indicated that First Nation fisheries would be unrestricted and that harvest opportunities in the commercial, recreational and domestic fisheries would be considered depending on run abundance and international harvest sharing provisions. The difference between the escapement goal (65,000) and the trigger point for the Green Zone was 3,000 chum salmon, a total which would fully satisfy the needs of the Canadian aboriginal fishery. Management discretion is used when season projections are close to trigger points.

Chum salmon catches in the DFO fish wheels in 2005 were approximately three times the 10-year average throughout the migration period. Information from the Pilot Station sonar program, the Rampart Rapids mark–recapture program and inseason DNA analyses conducted by the USFWS indicated that the Canadian Upper Yukon chum salmon run escapement target would likely be achieved and a TAC would be established. Given the early indications of strong run abundance, a live-release test fishery was considered to be unnecessary in 2005. A 5-day commercial fishery was initiated on August 27. This fishery was followed by 6, 7-day openings thus both the commercial and domestic fisheries were continuously open from September 3 to October 15. Despite the liberal fishing opportunities the number of fishermen participating in the commercial fishery was very low and no one participated in the domestic chum salmon fishery.

The total commercial chum salmon catch of 11,931 fish (Appendix A23) was 6.8% above the 1995 to 2004 average of 11,170 chum salmon (JTC 2006). During this period, the catch has ranged from zero chum salmon in 1998 to 39,012 chum salmon in 1995. The chum salmon commercial fishery is somewhat of a misnomer since virtually all of the commercial 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 processing capability and a move towards the sale of value-added products such as smoked chum salmon and salmon caviar. No coho salmon were recorded in the commercial catch in 2005.

SUBSISTENCE, PERSONAL USE, ABORIGINAL, DOMESTIC, AND SPORT FISHERIES

ALASKA

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 two 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 also 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). Most subsistence salmon used for dog food are dried (summer chum salmon) or frozen in the open air "cribbed" (fall chum and coho salmon).

In 2005, all salmon runs were judged adequate to provide for normal levels of subsistence harvest throughout the Yukon Area. In fact, subsistence fishing opportunity in most areas was greatly increased. Subsistence fishing for Chinook and summer chum salmon was 7 days a week prior to commencement of the BOF window schedule in the lower river on May 30. The regulatory schedule was in place for approximately 3 weeks and implemented sequentially upriver by predetermined dates consistent with the Chinook salmon migratory timing. As the

Chinook and summer chum salmon runs were assessed to have a surplus above escapement needs and for subsistence use, the subsistence fishing schedule was liberalized to provide additional subsistence opportunities, and commercial fishing activities were allowed. The inseason management strategy for the fall season was to continue the liberalized subsistence summer fishing schedule during the fall season. This strategy was based on the strong performance of the summer chum salmon run that provided confidence in the 2005 preseason projection that the fall chum salmon run would be more than sufficient to meet escapement goals and subsistence use. Coho salmon abundance was also high and provided for additional subsistence and commercial fishing opportunities. As the fall season progressed, much of the drainage was open 7 days per week for subsistence fishing.

Inseason fishermen reports suggested most Yukon Area subsistence fishermen probably met their subsistence needs for salmon in 2005. However, reports indicated instances of some fishermen throughout the Yukon Area drainage who had to work harder to harvest their salmon. In some interior villages, local conditions were unfavorable for harvesting salmon and work opportunities conflicted with fishing. Other factors that influenced meeting subsistence needs included high price of gasoline, high water levels and debris in some locations, and severe wildfire conditions. Fishermen in many villages avoided extensive travel to fish camps because of high fuel cost, and in most cases, waited until the peak of the run occurred in their area before attempting to fish. For the second year in a row, fire conditions in interior Alaska resulted in severe smoke conditions that made river travel hazardous. Some residents of interior villages located off the mainstem Yukon River, Venetie for example, had difficulties traveling to the Yukon River to fish because of the extreme smoky conditions. Many interior communities were shrouded for most of the summer in a blanket of thick smoke that prevented travel to traditional fishing areas. Other residents who did not fish took advantage of work opportunities on fire-fighting crews for much of the summer.

Postseason subsistence surveys are conducted annually to estimate the number of salmon taken in the subsistence salmon fisheries of the Alaskan portion of the Yukon Area. These surveys are typically conducted through September and October. Approximately 33 villages are visited and fishermen from randomly selected households are interviewed based on recent historical harvest patterns. These data are expanded to estimate total subsistence harvest. In addition to postseason interview surveys, subsistence "catch calendars" are mailed to approximately 1,300 households in the non-permit portions of the Yukon River drainage. These calendars augment the survey information, or provide harvest information when households are unavailable to be surveyed. In portions of the upper Yukon and Tanana River drainages that are road accessible, fishermen are required to obtain subsistence or personal use fishing permits. Data collected from these permits are added to the total estimate of the subsistence and personal use salmon harvest. Subsistence harvest totals also include fish from test fisheries given away to residences in communities near the projects.

Based on the survey program, an estimated 1,097 households fished for salmon from 31 communities in 2005 (not including the Coastal District communities of Hooper Bay and Scammon Bay) (Busher et al. 2007). Additionally, 181 subsistence salmon and 27 personal use salmon permit holders fished for salmon. The estimated 2005 subsistence and personal use salmon harvest in the Alaska portion of the Yukon River drainage totaled approximately 52,699 Chinook, 79,054 summer chum, 91,597 fall chum, and 27,078 coho salmon (Appendix A24). Included in the estimated subsistence harvest are 138 Chinook, 152 summer chum, 133 fall

chum, and 107 coho salmon taken in the personal use salmon fishery. Also, included in the estimated subsistence harvest are approximately 2,308 Chinook, 3,379 summer chum, 3,441 fall chum, and 580 coho salmon from the various test fish projects given away for subsistence use.

Not represented in 2005 subsistence totals was a significant amount of fall chum and coho salmon carcasses from the District 6 fall season commercial salmon fishery. Commercial processor/buyers purchased fall chum and coho salmon in the round, extracted the salmon roe, and gave away most of approximately 11,000 fall chum and coho salmon carcasses for subsistence use. Because this harvest was already recorded on fish tickets, these fish were not included in the total subsistence and personal use harvest estimates. However, the carcasses were utilized by subsistence users primarily for dog food.

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 non-subsistence areas.

The area known as Subdistrict 6-C is completely within the Fairbanks Non-subsistence Area and therefore 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 2005, the personal use salmon fishery followed the regulatory fishing time of two 42-hour periods per week. Final results for the 2005 season included 63 personal use salmon permits issued and 27 fishermen reported harvesting 138 Chinook, 152 summer chum, 133 fall chum, and 107 coho salmon in Subdistrict 6-C (Appendix A25). The personal use salmon harvest is included with the subsistence harvest in Appendix A24.

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 the 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 along the road system in the Tanana River valley. From 2000 to 2004 the Tanana River on average made up 85% of the total Yukon River drainage Chinook salmon harvest, 24% of the summer chum salmon harvest, and 67% of the coho salmon harvest. Most Chinook and chum salmon are harvested from the Chena, Salcha, and

Chatanika rivers, and most coho salmon are harvested from the Delta Clearwater and Nenana River systems.

Alaskan sport fishing effort and harvests are monitored annually through a statewide sport fishery postal survey. Harvest estimates are typically not available until approximately one calendar year after the fishing season. The preliminary total sport harvest of salmon in the Alaskan portion of the Yukon River drainage in 2005 was estimated at 483 Chinook, 435 summer chum, and 627 coho salmon (Appendix A5). The recent 5 year (2000–2004) average Yukon River drainage sport salmon harvest was estimated at 1,135 Chinook, 494 summer chum and 1,190 coho salmon.

In 2005 there were no emergency orders issued or additional restrictions applied to any of the salmon sport fisheries in the Yukon River drainage.

CANADA

Aboriginal Fishery

In 2005, as part of implementation of the Yukon Final Agreements (comprehensive land claim agreements), collection of inseason harvest information for the Upper Yukon River was conducted by First Nations within their respective Traditional Territories. Before start of the 2005 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 conducted in season to obtain more detailed catch, effort, gear, location and tag recovery information at fish camps or in the community, 1 to 3 times weekly. In most cases, weekly summaries were completed by the surveyors and sent to the DFO office in Whitehorse by fax or e-mail. Any outstanding information was obtained post season and reviewed by First Nation staff in conjunction with DFO.

With a below average preseason outlook for Upper Yukon Chinook salmon and an average outlook for Upper Yukon chum salmon, it was not anticipated aboriginal fisheries would be restricted by conservation concerns. Recent harvest levels suggested 2005 escapement goals would be achieved. However, plans were developed whereby aboriginal fisheries would be restricted if required to address conservation concerns. For both Chinook and chum salmon, early run assessment information confirmed conservation concerns were not applicable and First Nations were notified a normal harvest level would be permitted.

Fishermen and First Nation staff commented 2005 was a very good fishing season and for the most part, their needs were met. Fishermen along the Pelly and Stewart rivers added that many fish camps targeting Chinook salmon closed earlier in the season than usual because of an infestation of yellow-jackets (wasps) in those areas; these insects made fish processing difficult and camp life unpleasant.

The 2005 Upper Yukon Chinook salmon catch in the aboriginal fishery was 6,376 (Appendix A5), 8.9% below the recent 10-year average of 7,000 and slightly below (1.7%) the 2004 total of 6,483 fish (JTC 2006). No harvest reports are available for the Whitehorse area and reporting from the Carmacks area is considered to be incomplete.

A total fishing effort for the 2005 Chinook salmon season is not available because several communities did not report fishing effort. Comparative effort information is, however, available from communities where consistent survey methodology was applied. To the middle of August

(statistical week 29), effort in the Dawson area Chinook salmon fishery was estimated by Tr'ondek Hwech'in First Nation to be approximately 4,420 net-hours, similar to a total of 4,467 recorded in 2004. In the Mayo area, the estimate of effort provided by the Na-Cho Nyak Dun First Nation was 4,368 net-hours in 2005 compared to 3,048 in 2004. Data provided by the Selkirk First Nation show an estimated effort of 4,978 net-hours in 2005 in the Pelly Crossing area compared to 9,138 in 2004.

The 2005 Upper Yukon chum salmon harvest in the aboriginal fishery was 2,035 fish (Appendix A5). This total is 15.4% below the 1995–2004 average of 2,127 chum salmon. Participants in the 2005 chum salmon fishery described fishing as being excellent. Estimate of total fishing effort for the Dawson area during the chum salmon season (statistical week 30 and later) is 408 net-hours, approximately 30.6% below 588 net-hours logged in 2004. Detailed effort information was not available for the Pelly or Carmacks area fisheries at the time of writing.

In recent years, the Fishing Branch River chum salmon run has been depressed. In 2005, the Vuntut Gwitchin Government (VGG) submitted a proposal to the Yukon River R&E Fund to conduct a mark and recapture program on the Porcupine River near the community of Old Crow, Yukon. The main purpose of this project was to develop a tool to quantify the chum run size in season and enable effective local management of the Old Crow area aboriginal fishery. In addition, the Vuntut Gwitchin Government worked with the Yukon Salmon Committee and DFO in developing decision rules to guide harvesting activity at various run sizes and meet minimum escapement thresholds. For example, if the mark and recapture program estimate indicated a low abundance of chum salmon, fishing pressure and allowable harvest would be lowered accordingly. Early in the season, estimates from the mark and recapture program combined with information coming from fisheries and assessment programs conducted in the U.S. portion of the Yukon River indicated that the Porcupine River chum salmon run was better than expected. As a result no restrictions were required in the aboriginal fishery at Old Crow.

Catch estimates for the Porcupine River near Old Crow are determined from locally conducted interviews and by using the catch calendar and voluntary recording system described above. During the chum salmon fishing season, data collection effort was intensive since timely catch and tag recovery information was useful in generating inriver population estimates for the Porcupine River mark and recapture program. Interviews were conducted with individual fishermen up to four times weekly. Chinook and coho harvest estimates were derived from the catch calendar information combined with postseason interviews.

A total of 4,593 chum salmon was harvested in the Old Crow aboriginal fishery. This harvest is 17.7% above the recent 10-year average 3,901 fish[3]. Fishing was described as being excellent. An estimated 394 Chinook salmon were taken in the Vuntut Gwitchin aboriginal fishery, compared to the recent 10-year average of 323 fish. Eleven coho salmon were also harvested.

Domestic Fishery

The total domestic fishery catch was 99 Chinook and 13 fall chum salmon (Appendix A5). Because preseason expectation was for an average run, the domestic fishery did not open until it was determined that more than 28,000 Chinook salmon would likely reach the spawning grounds. This determination was made in early July to allow the fishery to open for 2 days

[3] This average includes below average catches within the 2002 to 2004 period when voluntary restrictions were used to conserve Fishing Branch River chum salmon.

starting July 10. The domestic fishery was opened for a total 16 days over 5 fishing periods, in concert with commercial fishery openings. Seven domestic licenses were issued in 2005.

Recreational Fishery

In 1999, the YSC introduced a mandatory Yukon Salmon Conservation Catch Card (YSCCC) in an attempt to improve harvest estimates and to serve as a statistical base to ascertain the importance of salmon to the Yukon recreational fishery. Anglers were required to report their catch by mail by late fall. Information requested includes the number, sex, size, date and location of salmon caught and released.

The 2005 recreational harvest was 436 Chinook salmon (Appendix A5). An additional 133 Chinook salmon were caught and released. The YSCCC program often involves some data interpretation and censoring which in 2005 involved approximately 7% of data submitted. For example, in 2005 sockeye and coho salmon were reported as a retained catch, however the catch of this species is highly unlikely based on the date and location they were reported to have been caught.

STATUS OF ESCAPEMENT GOALS

ADF&G undertakes a triennial review of salmon escapement goals in preparation for its triennial BOF meeting. 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 the department sets either a biological escapement goal (BEG) or a sustainable escapement goal (SEG) (ADF&G 2004). BEG refers to a level of escapement that provides the highest potential to produce maximum sustainable yield. SEG identifies a level of escapement known to provide for sustainable yield over a 5 to 10 year period.

Most AYK Region escapement goals were originally set in the late 1970s or early 1980s. These goals were first documented by Buklis (1993) as required under ADF&G's original escapement goal policy signed in 1992. The next changes to these goals were adopted in 2001 when BEGs were set for Yukon fall chum salmon (Eggers 2001), Anvik River summer chum salmon (Clark and Sandone 2001), and Andreafsky River summer chum salmon (Clark 2001). These 2001 goals were adopted prior to passage of the policies, but were consistent with the policies.

Beginning in December of 2002, ADF&G undertook the first full review of its escapement goals following the adoption of the policies. An escapement goal review team, consisting of staff from Sport Fish and Commercial Fisheries Divisions, met 5 times over a 14-month period. Federal agency biologists and representatives of Tribal and fishing groups were invited to attend and participate in the meetings. The team's recommendations were presented to the BOF in January 2004 and formally adopted by the department in 2005. During this review, analyses for escapement goals established in 2001 were updated with the latest information and most goals were brought into compliance with the policies by making them ranges, rather than point goals.

CHINOOK SALMON

Five Chinook salmon aerial survey goals were converted to ranges and formally adopted in 2005 using the method devised by Bue and Hasbrouck (hereafter referred to as Bue and Hasbrouck

method)[4]. In the case of Nulato River, the goals for the 2 forks were combined into a single goal (Table 1).

Table 1.–Escapement goals for Chinook salmon, 2005.

Chinook Salmon Stock	Previous Goal (Type) Year Established	Goal Adopted in 2005 (Type)
E. Fork Andreafsky River	>1,500 (EO[a]) 1992	960–1,700 (SEG)
W. Fork Andreafsky River	>1,400 (EO[a]) 1992	640–1,600 (SEG)
Anvik River	>1,300 (EO[a]) 1992	1,100–1,700 (SEG)
Gisasa River	>600 (EO[a]) 1992	420–1,100 (SEG)
Nulato N. and S. combined	None	940–1,900 (SEG)
Chena River	2,800–5,700 (BEG) 2001	No Change
Salcha River	3,300–6,500 (BEG) 2001	No Change

[a] Goals were called escapement objectives (EO) because they were inconsistent with definitions BEG and SEG within the policy.

A comprehensive BEG for Canadian origin Upper Yukon River Chinook salmon cannot be developed using available data and the Chinook Technical Committee criteria. At this time, the data are insufficient to warrant a PSARC review. The JTC will continue to reconcile minor differences in harvest and escapement estimates and investigate other methods to develop a less comprehensive BEG or a spawning escapement goal. Available information on the return per spawner information for Yukon River Chinook salmon is presented in Figure 15 and Appendix A27.

SUMMER CHUM SALMON

Aerial survey goals for summer chum salmon were discontinued for the East and West Forks of the Andreafsky River in favor of using the East Fork Andreafsky River weir escapement goal as an index of escapement into the system. No change was recommended for the East Fork Andreafsky River weir goal. The BEG for Anvik River summer chum salmon was revised from the 400,000 to 800,000 fish range to a range of 350,000 to 700,000 as measured by the Anvik River sonar (Table 2).

Table 2.–Escapement goals for summer chum salmon, 2005.

Summer Chum Salmon Stock	Previous Goal and Year Established	Goal Adopted in 2005 (Type)
E. Fork Andreafsky River	65,000–130,000 (BEG) 2001	No Change (weir)
E. Fork Andreafsky River	35,000–70,000 (BEG) 2001	Discontinued (aerial)[a]
W. Fork Andreafsky River	65,000–130,000 (BEG) 2001	Discontinued (pop. Est.)[a]
W. Fork Andreafsky River	35,000–70,000 (BEG) 2001	Discontinued (aerial)[a]
Anvik River	400,000– 800,000 (BEG) 2001	350,000–700,000 (sonar)

[a] Discontinued because of difficulty conducting aerial surveys for summer chum salmon.

[4] Bue, B. G. and J. J. Hasbrouck. Unpublished. Escapement goal review of salmon stocks of Upper Cook Inlet, Report to the Alaska Board of Fisheries, 2001. Alaska Department of Fish and Game, Anchorage.

FALL CHUM SALMON

Analyses for all BEGs for Alaskan fall chum salmon stocks were updated using the most recent data and no change was recommended for any of the goals (Table 3).

Table 3.–Escapement goals for fall chum salmon, 2005.

Fall Chum Salmon Stock	Previous Goal (Type) Year Established	Goal Adopted in 2005
Yukon Drainage	300,000–600,000 (BEG) 2001	No Change
Tanana River	61,000–136,000 (BEG) 2001	No Change
Delta River	6,000–13,000 (BEG) 2001	No Change
Toklat River	15,000–33,000 (BEG) 2001	No Change
Upper Yukon tributaries	152,000–312,000 (BEG) 2001	No Change
Chandalar River	74,000–152,000 (BEG) 2001	No Change
Sheenjek River	50,000–104,000 (BEG) 2001	No Change

COHO SALMON

For coho salmon, the Delta Clearwater River boat survey goal was revised from >9,000 to range of 5,200–17,000 using the Bue and Hasbrouck method.

STATUS OF SPAWNING STOCKS IN 2005

Alaskan and Canadian researchers have developed projects to monitor escapement and to determine genetic composition, relative abundances, run characteristics, and other information pertinent to the annual salmon migration. Main river sonar, tributary sonar, weir, and counting tower projects and aerial surveys are used to monitor escapement. Other information collected at ground based projects may include, but is not limited to, salmon sex and length composition, scales 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 (Appendix A3 and A4).

CHINOOK SALMON

Chinook salmon escapement goals were generally met throughout the Alaska portion of the Yukon River drainage (Figure 1) the past 5 years (2001–2005). These include 2 BEGs and 5 SEGs established by ADF&G for U.S. tributaries and a rebuilding escapement target for Canadian mainstem passage negotiated by the U.S./Canada Yukon River Panel. Inseason management actions have contributed to success in achieving escapement goals. However, total Chinook salmon harvests have decreased substantially, with the most recent 5-year (2001–2005) average harvest approximately 45% below the historic base 10-year (1989–1998) average of 156,092 fish. With annual subsistence harvests fairly stable near 50,000 Chinook salmon, this decline is largely represented by smaller commercial harvests, which have decreased over 70% for the same time periods. The extremely poor run in 2000 dictates continued conservative management strategies, and only the 2003 run provided an available surplus within the range of expected yield.

Alaska

The 2005 Yukon River Chinook salmon escapement in most tributaries either was within or exceeded goals. This assessment is based on escapement counts and estimates from selected tributaries. SEGs for aerial survey assessments have been established for the East and West Fork Andreafsky, Anvik, Nulato and Gisasa rivers. All aerial survey escapement indices were either within or exceeded their SEGs, except for the Nulato River. BEG have been established for the Chena and Salcha rivers located in the Tanana River drainage. In 2005, the Chena River Chinook salmon escapement was a minimum of 1,608 fish observed during an aerial survey rated as fair to poor. An estimated 564 Chinook salmon were counted at the Chena River tower project; (BEG 2,800–5,700) the tower only operated a few days due to high turbid water conditions. In the Salcha River, Chinook salmon escapement was estimated at 5,988 fish (BEG 3,300–6,500) by the tower project and 5,489 were observed during an aerial survey that was rated as excellent. A summary of 2005 escapements can be found in Appendix A26 and historical information in JTC (2006).

Good production from the 2000 parent year continued as was evidenced by a predominance of the 5-year-old fish in 2005 and the strong 4-year-old return in 2004. ASL samples from healthy 6-year-old fish return in the 2005 suggest good production from the 1999 brood year (Appendix A27). Age and sex composition data collected from escapement projects in 2005 are presented in Appendix A29.

Canada

Preliminary mark–recapture estimate of the total spawning escapement for the Canadian portion of the upper Yukon River drainage is 31,268 Chinook salmon, 3.5% above the 1995–2004 average of 30,505 Chinook salmon (Appendix A26). Aerial surveys of the Little Salmon, Big Salmon, Wolf, and Nisutlin river index areas were conducted by Department of Fisheries and Oceans Canada. Survey results relative to the previous cycle averages are presented below. Index surveys are rated according to survey conditions. Potential ratings include excellent, good, fair and poor. Surveys ratings other than poor are considered useful for inter-annual comparisons. Historical counts are documented in JTC (2006).

The Little Salmon aerial survey was flown on August 12 and countability was rated as excellent. The count of 1,519 Chinook salmon was the second highest recorded for this system; the 1995–2004 average count is 822. Big Salmon, Nisutlin, and Wolf river index areas were flown on August 15. Fair to good survey conditions were encountered for these surveys. The Big Salmon count of 952 was 77.9% of the 10-year average of 1,222. The Nisutlin River index count of 807 was 2.3 times higher than the 10-year average count of 354 fish. The Wolf River count of 260 was 16.1% higher than the 10-year average count of 224 fish.

Based on observations made in 2002, 2003 and 2004, it may be prudent to continue conducting 2 surveys of the Little Salmon, Big Salmon, Nisutlin and Wolf river index areas with the first survey taking place no later than August 15. It has become apparent peak spawning is more closely matched to the earliest spawning date chosen in the years when 2 surveys were conducted. Single aerial surveys do not count the entire escapement since runs are usually protracted with the early spawning fish disappearing before the late ones arrive. Weather and water conditions, the density of spawning fish, and observer experience and bias also affect survey accuracy.

Blind Creek was operational from July 15 to August 15, 2005 when 525 Chinook salmon were counted. A total of 161 fish was sampled for ASL data and 78 of these (48.4%) were female. Previous operation periods and counts are as follows:

- 2004 July 11 to August 15 792;
- 2003 July 31 to August 18 1,115;
- 1999 Aug. 01 to August 22 892;
- 1998- 373; and
- 1997- 957.

Whitehorse Rapids Fishway Chinook salmon count of 2,632 fish, provided by the Yukon Fish and Game Association, was 78.6% higher than the recent average (1995–2004) of 1,474 fish. Overall sex composition observed at the Fishway was 19.8% female. Hatchery-produced fish (fish with adipose fins removed) accounted for 57.3% of the return and consisted of 1,247 males and 262 females. Wild fish (fish with adipose fins intact) accounted for 42.7% of the return and consisted of 863 males and 260 females.

SUMMER CHUM SALMON ALASKA

Data analysis indicates 2005 summer chum salmon escapement levels were above average. The drainagewide minimum optimum escapement objective for the Yukon River of 600,000 fish was exceeded. The Pilot Station passage estimate was 2,439,616 summer chum salmon (Appendix A14), well above the 1995, 1997–2004 average of 1,412,206 fish.

Anvik River sonar-based escapement count of 525,391 summer chum salmon (Appendix A26) was within the BEG range of 350,000 to 700,000. The estimated escapement of 20,127 summer chum salmon for East Fork Andreafsky River was below the BEG of 65,000–135,000. Spawning escapements were well above average in the Koyukuk and Tanana River drainages, and Salcha River escapement of 193,085 fish was the largest on record. It appears escapement was lower than average for spawning areas closer to the ocean such as the Andreafsky and Anvik rivers, whereas escapement was much higher for spawning areas upstream of Anvik.

In 2003, concern developed about the relationship between the Pilot Station and Anvik River estimates. The general trend was for Anvik River summer chum salmon estimates to be roughly half of the Pilot Station estimate. In response to a lower percentage of Anvik River escapements relative to Pilot Station in 2003, a pilot program to radiotag summer chum salmon was initiated in 2004. The radiotagging was conducted at the same location as the Chinook salmon radiotagging near Russian Mission. Results showed roughly 30% of summer chum salmon tagged were of Anvik River origin, the same proportion observed in 2003. Surprisingly, it appears a large number of fish ended up in the Bonasilla River, suggesting a population that could be as large as 100,000 summer chum salmon. At this time, the significance of this production shift is difficult to evaluate, except to confirm the relationship between Pilot Station and the Anvik River in 2003 had shifted away from the historic trend. Results of escapement monitoring projects in 2005 are described in Appendix A26.

FALL CHUM SALMON

Major fall chum salmon spawning areas are located in the Chandalar, Tanana, and Porcupine river drainages and within the Canadian mainstem Yukon River drainage (Figure 12). Fall chum salmon runs were very poor from 1998 through 2002. The 2003 and 2004 fall chum salmon runs

showed significant improvement over the recent trend of poor production and the 2005 Yukon River run was much stronger than expected. Fall chum salmon parent year escapements that produced the 2005 run were exceptionally poor; however the run size was phenomenal, producing the largest run on record. The Yukon River drainagewide escapement of 1.8 million is well above the drainagewide escapement goal range of 300,000 to 600,000 fish.

Alaska

Assessments of overall fall chum salmon run size can be made using several methods. Initially, a considerable amount of weight is placed on the Pilot Station sonar passage estimate until upriver monitoring projects can provide data. The preliminary fall chum salmon passage estimate, based on Pilot Station sonar for the period July 19 through August 31, was 1,813,589 fish (note standard error not available because of using combination Dual Frequency Identification Sonar (DIDSON) and Split beam technologies at site in 2005) (Appendix A26, Figure 12). One method to determine total run size is based on the Pilot Station sonar abundance estimate with the addition of estimated commercial and subsistence harvests downstream of the sonar site, including test fisheries (approximately 135,000 fish), and an estimated five percent for fall chum salmon that pass into the river after termination of the project on August 31. Therefore preliminary total run size for the Yukon River drainage, primarily calculated from the main river sonar at Pilot Station, is estimated to be approximately 2,040,000 fall chum salmon. Based on the location of the project, in this case Pilot Station, the abundance estimate includes Koyukuk River drainage stocks.

A second method to calculate run size is by using the individually monitored systems in the upper Yukon and Tanana River including the estimated U.S. and Canadian harvests. For 2005, this method results in a preliminary estimate of 2,081,000 fall chum salmon. This method however does not include the escapement estimate of approximately 25,000 for stocks located in tributaries downstream of the confluence of the Tanana River such as in the Koyukuk River. The individual project estimate is slightly higher than that based on Pilot Station sonar, but both represent estimations well above the upper end of the preseason projection based on normal production rates.

The 2005 fall chum salmon run is characterized as the largest run on record, only slightly higher than 1975. The run was dominated by 4-year-old fish from the 2001 parent year. The run still experienced typical lulls between the first 3 pulses, but each pulse was substantive and after August 18 fish moved in fairly steady. All of the Lower and Upper Yukon Area monitoring projects provided similar assessments of the record run. The only project that did not reflect the record run in relative abundance was the Subdistrict 5-A test fish wheel, which was having difficulties operating because of changes in water levels and channels. However, the project did provide representative timing information.

A review of upper river test fish data and escapement information suggests run strengths of both the upper Yukon River (non-Tanana) and Tanana River run components all benefited from the large return. The USFWS Rampart-Rapids mark–recapture inseason abundance estimate for chum salmon migrating to the Upper Yukon Area was approximately 1,988,000 fish (SE 60,000) through September 16. This estimate was higher than the abundance estimate provided by Pilot Station sonar, which also includes Tanana and Koyukuk River stocks. In 2005 the first strata contained an estimated 200,000 summer chum salmon based on dates of project operation and entry timing. The 2005 Rampart-Rapids estimate represents the largest return followed by an

estimated 654,000 fall chum salmon observed in 1996, the first year of the project. Typically a third method of looking at total return to the upper Yukon River drainage is to add Tanana mark–recapture estimates to the upper Yukon mark–recapture estimate. However, in 2005 this method resulted in an estimate of over 2,581,000 fall chum salmon. This was inordinately high compared to the other methods and was most likely because of the abundance of summer chum salmon in the first strata and possibly slower migration rates later in the season not being enumerated by upstream projects that were pulled out at the onset of winter.

The Chandalar River sonar project ran from August 8 through September 25, 2005. The escapement estimate was approximately 496,484 upstream fall chum salmon (Appendix A26), approximately 3.4 times higher than the 1995–2004 average of 146,488 fish. Chandalar River sonar estimates of fall chum salmon range from a low of 65,894 fish in 2000 to the previous high of 280,999 fish in 1995. The 2005 estimated escapement in the Chandalar River was well above the BEG range of 74,000 to 152,000 fall chum salmon.

The Sheenjek River sonar project operated from August 8 through September 24, ending early relative to passage as substantial numbers of fish (10,000) were migrating on the last day of counts. The 48-day period of operation the cumulative count at termination was 438,253 chum salmon. This figure was expanded to estimate passage of fish after the project was terminated for a final estimate of 561,863 fish. This escapement is over 5 times higher than the upper end of the BEG range of 50,000 to 104,000 fall chum salmon. In 2005 the Sheenjek River sonar operations were different than in the past in that besides transitioning from Bendix side-scan sonar to split-beam sonar on the right bank from 2002 to 2004, additional testing lead to a switch in 2005 to DIDSON which was operated on both right and left banks. Some of the increase in counts can be explained by the large return in 2005, but additionally preliminary tests between DIDSON and Split beam systems indicated that DIDSON counts are slightly higher. The passage estimates were dominated by the left bank passage through September 5, however once the bulk of the fish arrived, the right bank dominated, and overall the left bank represented 39% of the cumulative passage estimate. Only right bank data were used inseason to compare to historical counts for management and resulted in an estimate of 266,373 fish, which was the largest estimate of escapement on record and 61% higher than the upper end of the BEG range. Historical Sheenjek River escapement estimates, most of which only estimated from the right bank, ranged from 14,229 in 1999 to 246,889 fall chum salmon in 1996 (JTC 2006).

The 2005 inseason monitoring of the Tanana River drainage consisted of estimating fall chum salmon run abundance from mark–recapture techniques. Two population estimates were generated, one in the Kantishna River drainage and the other in the Tanana River drainage (upstream of the Kantishna River). The 2005 upper Tanana River mark–recapture abundance estimate through September 30 was 337,755 fall chum salmon. Upper Tanana River estimates have ranged from a low of 34,844 in 2000 to a previous high of 268,173 in 1995. The estimate for the Kantishna River drainage as a whole through September 29 was 107,719 fall chum salmon. Kantishna River estimates have ranged from a low of 21,450 in 2000 to 87,359 in 2003.

The Tanana River established BEG range of 61,000 to 136,000 includes the Toklat River index area BEG range of 15,000 to 33,000 fall chum salmon. To represent the Upper Tanana River, the Toklat River range is subtracted out leaving a BEG range of 46,000 to 103,000 fall chum salmon used to compare with the mark–recapture estimate. In 2005, the upper Tanana River estimated fall chum salmon abundance was 3.1 times higher than the upper end of the goal. The Toklat River, a tributary of the Kantishna River, is an important fall chum salmon spawning area within

the Kantishna River drainage and has represented on average 36% of the Kantishna River estimate. The abundance of fall chum salmon in the Toklat River is estimated based on a single ground survey of the index area that was conducted from October 25 to 27, 2005. Abundance of fall chum salmon was estimated to be 17,779 fall chum salmon derived from the expansion of stream survey count using the migratory time-density curve. This level of escapement is only 18% above the lower end of the BEG range and represents the lowest ratio of all projects. Several issues contribute to the inordinately low observed escapement including the survey being conducted late relative to peak spawning because of water and channel conditions, heavy predation, snow cover, and the possibility of an early portion of the run being washed out, buried or disintegrated by the time the survey was conducted. The Toklat fish wheels indicated the run to the Toklat River was 8 days earlier than average (1997 to 2004).

Delta River, in the upper Tanana River drainage, has a BEG range of 6,000 to 13,000 fall chum salmon. Evaluation of returns to the Delta River in 2005 was based on 8 replicate foot surveys conducted between October 12 and December 2. The Delta River escapement was estimated to be 28,132 fall chum salmon based on the area under the curve method. This level of escapement was the second largest on record and 2.2 times higher than the upper end of the BEG range.

Canada

The chum salmon spawning escapement estimate based on mark–recapture data is 437,733 fish (Appendix A26). Aerial surveys of the Kluane and mainstem Yukon River index areas were conducted on October 12 and 13, respectively; the Teslin River index area was flown on October 27. All survey dates were approximately one week earlier than the dates these surveys were flown before 2003. The timing of surveys in recent years appeared to occur after the peak spawning period; therefore the 2003 though 2005 survey dates were advanced to better correspond with the peak spawning. The Kluane and mainstem Yukon River survey areas both involve a large number of discrete spawning areas (sloughs and side channels) with a range from low to high densities of fish; whereas, the Teslin River index area is a single spawning area.

The Kluane River index count was 34,600 chum salmon, which is 2.9 times higher than the 1995–2004 average of 11,851 fish. A record count of 39,347 chum salmon was observed in 2003 based on a database which goes back to 1973. The index count of the mainstem Yukon River was 16,425 chum salmon; the average count for the 1995–2004 period, excluding 1999 when the area was not surveyed, is 3,882 fish. The Teslin River index count was 585 chum salmon; the 1995–2004 average count for this index area is 224 fish.

In the Porcupine River drainage, the Fishing Branch River weir count of 118,690 chum salmon to October 15 was adjusted to 121,413 fish. This adjustment was based on the average cumulative proportion of the run counted to October 15 for the 1995–2004 period. The adjusted count was 4.45 times higher than the 1995–2004 average of 27,275 chum salmon. The 2005 outlook for total return of Fishing Branch River chum salmon return was only 38,200. This outlook, based on an estimated return per spawner value of 2.5, represented a poor return. Escapement counts in the 2 dominant brood years were a record low count of 5,053 in 2000 and below average count 21,669 in 2001. The pattern of observed returns being lower than forecast returns, evident for the 1998 to 2002 period, was attributed to poor marine survivals. However, observed returns were higher than the preseason outlooks in 2003 through 2005; anecdotal information suggests that there has been improvement in marine survival. Conservation measures implemented by the Vuntut Gwitchin Government (VGG) for the aboriginal fishery at Old Crow

significantly improved escapement to the Fishing Branch River in 2003 and 2004. The VGG endorsed a voluntary closure throughout the chum fishing season in these years. Lost harvest opportunities were offset by a fishery substitution program, which involved the purchase, transport and distribution of dog food[5] to community members for their sled dogs. This program was funded through a Yukon River R&E Fund Program. The 2005 Fishing Branch River count exceeded the upper end of the Yukon River Salmon Agreement escapement goal range which is 50,000 to 120,000 chum salmon; this is the first time this has occurred since 1975. No coho salmon were counted through the weir in 2005.

COHO SALMON ALASKA

There is only one 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. This goal was exceeded from 2001 to 2005. The 2005 boat count survey of the Delta Clearwater River estimated 34,293 coho salmon (Appendix A26) which is two times larger than the upper end of the SEG range. The 2005 Pilot Station sonar passage index of 185,000 was above the 2000–2004 average of 177,000 fish. Although other lower Yukon River assessment projects indicated the coho salmon run was below average, the upper Tanana River projects suggested the run was fairly strong.

PROJECT SUMMARIES

Various government and non-government agencies operate many projects in the Yukon Area to obtain the biological information necessary for management of the salmon runs. The following are select project highlights. See JTC (2006) for other project summaries and Appendix A3 and A4 provide a complete list of salmon fishery projects conducted in Alaska and Canadian portions of the Yukon River drainage in 2005.

PILOT STATION SONAR

The goal of the Yukon River sonar project at Pilot Station is to estimate the daily upstream passage of Chinook and chum salmon. The project has been in operation since 1986. Sonar equipment is used to estimate total fish passage, and CPUE from the drift gillnet test fishing portion of the project is used to estimate species composition. Before 1992, ADF&G used dual-beam sonar equipment which operated at 420 kHz. In 1993, ADF&G changed the existing sonar equipment to operate at a frequency of 120 kHz to allow greater ensonification range and to minimize signal loss. The newly configured equipment's performance was verified using standard acoustic targets in the field in 1993. Use of lower frequency equipment increased our ability to detect fish at long range.

Before 1994, ADF&G attempted to classify detected targets as to direction of travel by aiming the acoustic beam at an upstream or downstream angle relative to fish travel. This technique was discontinued in 1995. Significant enhancements that year included further refinements to the species apportionment process and implementing an aiming strategy designed to consistently maximize fish detection. Because of these recent changes in methodology, data collected from 1995 to 2005 are not directly comparable to previous years.

In 2001 the equipment was converted to the current split-beam sonar system. This technology allows better testing of assumptions about direction of travel and vertical distribution, and to

[5] Chum salmon harvested in the Old Crow aboriginal fishery are used primarily to feed recreational dog teams.

study sediment related attenuation. In 2005, as in previous years, electronic data were collected to explore obtaining passage estimates using computer generated counts, rather than hand counts. Electronic data have the potential to minimize some of the subjectivity associated with employing paper chart recordings and should at the same time reduce operating expenses.

The sonar project was in continuous operation from May 29 through August 31 during 2005. Early in the season the Yukon River experienced high water levels and erosion in the river bottom profile which, along with a combination of changes in fish movement and distribution, affected traditional split-beam sonar detection within 20m of shore on the left (south) bank. On June 19, staff confirmed that a portion of the fish run was passing the site undetected. A DIDSON imaging sonar unit was deployed in this area to supplement estimates generated with the traditional split-beam sonar (Figure 14). The concurrent use of the DIDSON along with the split-beam sonar added approximately 52,000 Chinook salmon, 516,000 summer chum salmon, and 169,000 fall chum salmon to total passage estimates. Overall, this represents approximately 32% of the Chinook, 21% of the summer chum and 9% of the fall chum salmon passage estimates during the entire season. Passage estimates before June 19 are considered conservative.

Fish passage estimates at Pilot Station are based upon a sampling design in which sonar equipment is operated daily in three 3 hour intervals, and drift gillnets are fished twice each day to apportion the sonar counts to species. In 2005, the sonar equipment was operated continuously for 24 hours on 5 occasions: June 18, June 30, July 13, July 27, and August 9. During these expanded operations the normal three 3 hour sample periods estimated passage within ±5% of the continuous 24 hour periods on all but one occasion August 9. On that day an extremely large pulse of chum salmon entered the area and, relative to the 24 hour counts, the three 3 hour counts overestimated total passage by approximately 48%.

An assortment of gillnets, 25 fathoms long with mesh sizes ranging from 7.0 cm to 21.6 cm (2.75 inch to 8.5 inch), were drifted through the sonar sampling areas twice daily between sonar data collection periods. Drift gillnetting resulted in a catch of 12,135 fish during the 2005 season, including 729 Chinook salmon, 5,499 summer chum salmon, 3,609 fall chum salmon, 900 coho salmon, and 1,398 other species. Chinook salmon were sampled for age, sex, length, girth and weight, and genetic samples were taken from both Chinook and chum salmon. Any captured fish that were not successfully released alive were distributed daily to nearby residents in Pilot Station.

The past season was characterized by above normal streamflow during the first half of June, steadily falling water levels from mid-June through mid-August, and extremely low flow during the last half of August. Erosion of the left bank substrate, occurring in the vicinity of the sonar site, continued throughout this past season. The substrate was unstable throughout most of the summer, with the cutbank advancing past the region where the transducer was typically deployed in previous years. In 2005 the transducer was located approximately 50m downstream of the 2004 deployment site, to the downstream limits of the cabling. For 2006 the entire sonar site will be relocated approximately 200m downstream. As in previous years, the right bank deployment site was consistently stable throughout the summer.

Passage estimates for 2005 and final passage estimates for 1995 and 1997–2004, as listed in Appendix A14 were generated using the most current apportionment model. This model, modified from earlier years, was first used for the 2004 season. Historical passage estimates have been revised to allow direct comparison among the years 1995 and 1997–2005.

CHANDALAR RIVER SONAR

Chandalar River sonar project operated from August 8 through September 26, 2005. The 2005 escapement estimate is 496,484 upstream chum salmon (Appendix A26). This estimate is the highest estimate documented since this project began and is more than 175% of the next highest estimate of 280,999. Underwater video was deployed to validate the appearance of fish sonar traces when water visibility was greater than half a meter. Analyzing data to determine the trace signature of the whitefish allowed for the removal of least cisco from the inseason count. Daily passage rates exceeded 10,000 fish for 14 of the 50 counting days. The right bank was shut down for 19 days because of high water, and the ratio estimator method was used to predict the missing count on the right bank for this time.

Increased interest in the size of the Chinook salmon run into the Chandalar River has led to a feasibility project to enumerate Chinook salmon. DIDSON was deployed at a site approximately 300 meters upstream of the fall chum split-beam sight. Some advantages of DIDSON are: it can be deployed over a wider range of site conditions then split-beam; it provides a more straightforward visual image that requires less training for technicians; easier setup and deployment than split-beam; and increased potential for species determination. The major limitations of DIDSON include: less range than split-beam; and very large data files. The upstream site was chosen to accommodate the shorter range limits of the DIDSON. The 2005 season was primarily intended to test the ability to operate the DIDSON throughout the entire Chinook season at the selected site, and to evaluate potential complications that could impact the ability to obtain accurate counts, including fish detection ability, species determination, and range distributions.

The DIDSON was operated from July 1 to August 1. Some difficulties were encountered with deployment and stability of the DIDSON units during moderately high water flows at this site. A preliminary total of 5,591 upstream fish were counted during that time. Since it is known that the fall chum salmon run overlaps with the later portion of the Chinook salmon run, and that chum salmon have been captured with gill nets in the Chandalar River during mid-July, there is little doubt that some of the counted targets were chum salmon. Attempts to collect data to help us evaluate the ability to differentiate species were ineffective during 2005. Turbidity associated with higher water flows prevented deployment of video cameras. Furthermore, gill netting and beach seining near the DIDSON locations were hampered by the abundance of large woody debris and strong currents, and catches were very low for all species. Work for 2006 will focus on evaluating the ability to differentiate species and continue to evaluate site conditions and attempt to resolve deployment difficulties.

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 Alaskan and the upper stock group spawns in Canada.

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-1.2, -1.3, -1.4, and -1.5; and results from these analyses were combined with specific harvest age composition to provide stock composition by harvest. Age groups not sampled in the harvests, age-1.1, -2.2, -2.3, -2.4, -1.6, and -2.5, were apportioned to stock group using stock composition of analogous age groups, harvest age composition, and escapement age composition. Harvests from the Tanana River, the upper Koyukuk River, and Alaskan 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 these fish were bound for Canada.

The historical proportion by stock group in the total drainagewide Chinook salmon harvest (U.S. and Canada) is shown in Appendix A31. All fish from the lower and middle stock groups were harvested in Alaskan fisheries. Preliminary analysis from 2005 shows drainagewide harvest proportions were: 0.261 from the lower stock group, 0.214 from the middle stock group, 0.464 from the upper stock group in Alaska, 0.115 from the upper stock group in Canada, and 0.579 from the total upper stock group total. Comparing 2005 with average (1981–2004) proportions the lower was greater, the middle was less, and the upper was slightly more.

The Alaskan harvest proportion of fish attributed to lower, middle, and upper river stock groups from 1981 through 2005 is shown in Appendix A32. The Alaskan harvest proportions from the lower, middle and upper stock groups were 0.234, 0.242, and 0.524, respectively. Comparing 2005 Alaskan proportions with average (1981–2004) proportions the lower was less, the middle was less, and the upper was greater.

Similarly, the harvest proportion of the upper river stock group harvested in Alaskan and Canadian fisheries is shown in Appendix A33. The proportion of the upper river stock group harvested in 2005 in Alaska and Canada were 0.801 and 0.199, respectively. Comparing these 2005 proportions to the 1981–2004 averages, the Alaskan proportion was below average and the Canadian proportion was above average.

LOWER YUKON RIVER CHINOOK AND CHUM SALMON GENETIC SAMPLING

During the 2005 field season, field crews collected genetics samples from Chinook salmon harvested in the U.S. portion of the Yukon River from subsistence, commercial, and test fisheries. Tissues collected during the 2005 field season are axillary processes preserved in ethanol. Actual tissue collections consisted of the following samples: 339 subsistence (District 1), 3,039 commercial (Districts 1, 2, and 5), and 339 test fish harvested at Emmonak. ADF&G staff and field crew collected Chinook salmon samples during early June to mid-August.

In District 4, 939 Chinook salmon were sampled from the subsistence harvest as part of a project funded by the Yukon River Drainage Fisheries Association. This study was designed to compare the stock composition of harvests between shore-based gear and the recently approved drift gillnet fishery. Samples were collected in Kaltag, Nulato, Galena, Ruby, and Bishop Rock.

In addition, 182 Chinook salmon were sampled from fish passing the Eagle sonar site and 200 Chinook were sampled from the Kantishna River for addition to the baseline. Baseline collections from spawning Chinook salmon in the Chandalar and Sheenjek rivers in the United States portion of the Yukon River were not collected. Samples from the upper U.S. portion of the Yukon River drainage are needed to close gaps in the present genetic baseline.

The single nucleotide polymorphism (SNP) baseline of 18 SNP markers was used to estimate the stock composition of the 2004 fishery harvests. This baseline has been augmented to more than 30 markers and used to analyze 2005 samples.

ADF&G in cooperation with USFWS collected paired data at Pilot Station from 6,112 chum salmon samples during the 2005 field season. The Pilot Station samples were collected from June 27 to late August from the species apportionment gillnetting at the Pilot Station sonar site. Pilot Station samples will complement the previous sampling over the 6-year span from 1999 to 2004. These 6,112 axillary process tissues are archived in ethanol at the USFWS laboratory and a DNA subset shared with ADF&G Gene Conservation Laboratory for future genetic stock identification. Fifteen Yukon River chum salmon populations were analyzed as part of a coast wide survey of 31 SNPs developed for use in western Alaska.

YUKON RIVER CHUM SALMON MIXED-STOCK ANALYSIS

During the summer of 2004, the USFWS, Conservation Genetics Laboratory (CGL) applied an 11 microsatellite baseline to estimate the chum salmon stock composition of Pilot Station Sonar pulses during the fall management season. Results from this analysis were reported for each pulse and distributed by email within 24 to 48 hours of receiving the samples at the CGL. Stock abundance estimates were derived by combining the 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 data are highly concordant.

In 2005, the CGL and the Department of Fisheries and Oceans Canada, Molecular Genetics Laboratory expanded and standardized the baseline, which consisted of 22 microsatellite loci assayed in the following stocks: Andreafsky River (N=261), Chulinak River (N=100), Anvik River (N=100), Nulato River (N=100), Gisasa River (N=200), Henshaw River (N=200), South Fork Koyukuk River (N=200), Jim Creek (N=160), Melozitna River (N=146), Tozitna River (N=200), Chena River (N=172), Salcha River (N=185), Big Salt River (N=71), Kantishna River (N=161), Toklat River (N=192), Delta River (N=80), Chandalar River (N=338), Sheenjek River (N=263), Black River (N=112), Fishing Branch (N=481), Big Creek (N=200), Minto River (N=166), Pelly River (N=84), Tatchun River (N=175), Kluane River (N=462), Donjek River (N=72), and Teslin River (N=143). Beginning on July 1, this baseline was applied to estimate in season the chum salmon stock compositions of the 2005 run from samples collected in Pilot Station sonar test fisheries. Results from this analysis were reported for each pulse or time strata and distributed by email to fishery managers within 24 to 48 hours of receiving the samples at the CGL. A study to assess the concordance of the 2005 data is ongoing, and preparations are underway to continue the project for the 2006 season.

CHINOOK SALMON RADIOTELEMETRY PROGRAM

Yukon River Chinook salmon radiotelemetry program was initiated in 2000 by ADF&G and National Marine Fisheries Service in response to dramatic declines in Chinook salmon returns to the basin. The purpose of the study was to improve management and facilitate conservation efforts by providing information on migratory patterns, distribution and run abundance. Work in 2000 and 2001 focused on development of capture methods, tracking techniques, and infrastructure necessary for a study of this size and scope. A full scale, basinwide tagging and monitoring program was conducted from 2002 to 2004. In addition to efforts by the 2 lead agencies, support

for the project has also been provided by USFWS, Bureau of Land Management, Fisheries and Oceans Canada, Bering Sea Fishermen's Association, Yukon River Drainage Fisheries Association, National Park Service and organizations funded through the Yukon River Panel R&E Fund. This study has provided information on run characteristics of Yukon River Chinook salmon, and helped evaluate data provided by other assessment projects within the basin.

Of the 5,755 Chinook salmon captured at the lower river tagging sites from 2002 to 2004, 2,860 fish were radiotagged. Most (2,790, 97.6%) fish resumed upriver movement and were tracked to upriver reaches (1,920, 68.8%) or were caught in upriver fisheries (870, 31.2%). Radiotagged fish traveled an average of 51 km/day, although regional differences were observed with upper basin fish moving substantially faster than lower river stocks. Stock composition estimates indicate Canadian stocks averaged around 50% of the return. Tanana River fish comprised about 20-25% of the return, and were the most abundant U.S. stock. Canadian Yukon River and Tanana River stocks were present throughout the return, but were most abundant during the early and middle run, and fish traveling to lower basin tributaries were more abundant during late June and July. U.S. stocks in the upper basin (upriver of the Yukon-Tanana River confluence) were more abundant than previously thought, with most of these fish returning to reaches of the Chandalar and Sheenjek rivers.

In 2005, additional work was conducted on the Tanana River to identify potential tracking station sites in preparation for proposed telemetry studies that would require more refined information on salmon migrations and distribution within this section of the drainage.

TANANA AND KANTISHNA RIVER FALL CHUM SALMON MARK–RECAPTURE STUDY

A cooperative fall chum salmon mark–recapture stock assessment project was initiated in 1995 on the Tanana River and has operated annually through 2005. Western Alaska Disaster Relief Grant (WADG) funds were provided to the AYK region as a result of poor salmon runs in Western Alaska in 1997 and 1998. In 1999, WADG funding was used to begin a fall chum salmon mark–recapture project on the Kantishna River. Although funding sources change often, sufficient financial support has provided abundance estimates for both the Tanana and Kantishna rivers. Present cooperators include the Bering Sea Fishermen's Association, Yukon River Drainage Fisheries Association, and the National Park Service.

The objectives for the 2005 season were to: 1) provide management staff with inseason and postseason abundance estimates of fall chum salmon in the Tanana River (above the mouth of the Kantishna River) and Kantishna River; 2) estimate migration rates of fall chum salmon in the Kantishna River drainage; 3) count tagged and untagged fall chum salmon and other species using digital video at the Tanana tag recovery wheel; and 4) estimate run timing of fall chum salmon to the Delta, Toklat, and Kantishna rivers.

In the Tanana River tags were deployed from a wheel approximately 9 km upstream of the Kantishna River mouth and recovered (counted using digital video) 76 km upstream. In the Kantishna River tags were deployed from a wheel on the lower Kantishna River and recovered at 2 sites each with 2 fish wheels. One site was 139 upstream on the upper Kantishna River and the second was 113 km upstream on the Toklat River tributary. All fish wheels were equipped with a live box, and operated 24 hours a day. A 4-person crew deployed tags at the Tanana and Kantishna River tag deployment wheels. Chum salmon were tagged with individually numbered

spaghetti tags, and adipose fins were removed from tagged fish to estimate tag loss. In the Tanana River 5,486 fall chum salmon were tagged between August 16 and September 27, 2005. In the Kantishna River 4,070 fall chum salmon were tagged from August 16 through September 24, 2005.

In the Tanana River, the tag recovery fish wheel operated from August 16 through October 3, 2005. A total of 17,087 fall chum salmon were examined of which 274 were tagged. Most tagged fish at this site were viewed using digital video methods. The Toklat River recovery fish wheels operated from August 16 through September 29 on the right bank and August 16 through September 30 on the left bank. A total of 6,233 fall chum salmon were examined, of which 245 were tagged (both wheels combined). Recovery wheels on the upper Kantishna River operated from August 16 through October 9 on the right bank and August 16 through October 4 on the left bank. A combined total of 550 fall chum salmon were examined at the Kantishna recovery wheels, of which 20 were tagged.

Fall chum salmon abundance estimates are 337,755 for the Tanana River and 107,719 for the Kantishna River (Appendix A26). These estimates are the highest for the Tanana and Kantishna rivers since inception of each phase of the project.

Delta River abundance estimate, based on the area under the curve method, was 28,132 fall chum salmon. Eight replicate foot surveys of the Delta River were conducted from October 12 through December 2, 2005. During the surveys 85 live fish with tags were counted and 22 were recovered from carcasses. The Toklat Springs abundance estimate, based on a migratory time density curve, was 17,779 fall chum salmon. Foot surveys of Toklat River were conducted October 25–27 which was late relative to peak spawning. Low counts (with respect to the Kantishna River abundance estimate) can be attributed to late timing of survey, predation, snow cover, or washing out, burying and decomposition of carcasses from the early portion of the run. Toklat fish wheel catch indicated the fall chum salmon run was 8 days earlier than the 1997–2004 average. During the survey 79 live fish with tags were counted and 132 tags were recovered from carcasses.

ICHTHYOPHONUS

JTC *Ichthyophonus* Subcommittee was established at the February 20–22, 2002 JTC meeting in Anchorage. The subcommittee was formed to develop research recommendations to support individual researchers with project design and to prioritize goals for *Ichthyophonus* research in the Yukon River drainage for the years ahead. YRDFA hosted a meeting October 2004 to discuss *Ichthyophonus* research goals and assumed leadership of future meetings. ADF&G said they would participate but not lead an *Ichthyophonus* Subcommittee in the future. Currently, a Sustainable Fisheries Grant ($500K) from the National Oceanic and Atmospheric Administration is funding ADF&G *Ichthyophonus* research. Eric Volk, ADF&G Yukon River Regional Research Supervisor, is the principal investigator and administrator for the grant.

Ichthyophonus is a common pathogen of many species of wild marine fishes. Infection is prevalent in some species, and the organism has caused severe disease and mortality in some fishes such as Pacific salmon and herring. Although initially considered a fungus, it is actually related to Dermocystidium and the rosette agent, choanoflagellate parasites. The infection is systemic within salmon, infecting the muscle, heart, kidney, spleen, and other organs.

Ichthyophonus was first detected in Yukon River Chinook salmon in 1988 (T. Burton, ADF&G, Fish Pathology Lab, Anchorage, personal communication). A pilot study conducted in 1999 indicated approximately 30% of the Chinook salmon sampled in Lower Yukon River in late June were infected with *Ichthyophonus* and samples of Chinook salmon at Tanana village showed significant increases in disease severity as they moved upstream (Kocan and Hershberger 1999). Research on the effects on *Ichthyophonus* on Yukon River Chinook salmon has been conducted annually since 1999 (Kocan et al. 2003).

During the 2005 field season, approximately 1,000 Chinook salmon were sampled from 3 locations, the lower Yukon in Emmonak as the fish enter the river and in the escapements on both the Chena and Salcha rivers. Sampling methods included heart samples for both explant culture and PCR tests. The escapement samples were collected based on 2 different criteria in attempts to standardize the sampling. Criteria 1 included clear eyes and some color in the gills, and criteria 2 consisted of clear eyes and a firm heart and these fish typically had negligible color in the gills.

The 2005 results indicate the infection rate was higher in the lower river at 24% and decreased on the spawning grounds to 14%. In contrast samples taken in 2004 indicated 22% in Emmonak with mixed infection rates on the spawning grounds. The 2005 infection rates in Chena and Salcha rivers were 36.05% and 13.73% respectively. As in other studies clinical signs of the disease increase as the fish migrate up river as the organism spreads throughout their bodies. As in 2004 infection rates are slightly higher in females than males but they are also the largest component of the run returning as age-6 fish. Based on the 2005 samples by criteria it appears although the heart culture test results can be turned around faster, PCR heart tests were more sensitive and able to detect presence in criteria 2 samples. Results from the 2005 samples are summarized by site and test type (Table 4).

Table 4.–Chinook salmon sampled for the presence of *Ichthyophonus* in 2005, by test methodology, Yukon Area.

	Heart Culture			Heart PCR		
Sample Site	N	n	%	N	n	%
Emmonak	104	25	24.04	105	25	23.81
Chena River						
Criteria 1	294	34	11.56	300	40	13.33
Criteria 2	23	1	4.35	24	3	12.50
Salcha River						
Criteria 1	297	36	12.12	300	43	14.33
Criteria 2	267	20	7.49	271	31	11.44

Note: N = sample size tested, n = number of positive samples, and % = percent infected.

An evaluation of spawning success for both males and females was measured based on classification of spawn-out rates including spawned out, partially spawned out, and did not spawn. Female escapement ground samples from 2005 resulted in 44% infected and 43% uninfected classified as spawned out, 10% infected and 6% uninfected were classified as partially spawned out, and 1% infected and 2% uninfected were classified as did not spawn. These results are similar to observations in 2004 Chena River samples. Preliminary results based on spawn-out rates of both infected and uninfected individuals suggest Chinook salmon counted

past escapement enumeration projects are spawning successfully. As a result, BEG on the Chena and Salcha rivers will not need to be reevaluated based on an affect from this disease. Although there is some evidence of decreased survival during migration, for management purposes, these mortalities may be considered the same as harvests or drop outs.

Third year of the study will be conducted in 2006 and will concentrate on samples from Emmonak as a baseline and escapements in the Chena and Salcha rivers.

EAGLE SONAR

In 2003, ADF&G began investigating the feasibility of using sonar to estimate Chinook and fall chum salmon passage in the Yukon River near the U.S./Canada Border. This effort was initiated in response to concerns about the current assessment methodologies and the importance of obtaining accurate border passage information when reviewing whether the annual objectives of the U.S/Canada Yukon River Panel have been met. A suitable section of river was identified near Eagle, Alaska for a potential sonar project. In 2004, ADF&G carried out a 2-week study to evaluate the performance of sonar at 2 preferred sites, Calico Bluff and Six-Mile Bend (Carroll et al. 2007). Six-Mile Bend was found to be the preferred site. A DIDSON should be deployed on the shorter, steeper right bank, and a split-beam unit should be deployed on the longer, more linear left bank.

A full-scale project was initiated at Six-Mile Bend in 2005 to estimate Chinook passage. Sonar equipment was deployed on both banks at the site and the project was fully operational from July 12 to August 10, 2005. The preliminary passage estimate for 2005 was 81,528 (SE 353) Chinook salmon (Appendix A26). The split-beam and DIDSON systems performed well over the entire season with no technical difficulties or malfunctions. DIDSON was the ideal system for the right bank, where the profile is steep and slightly less linear than the left bank. The split-beam system worked well on the left bank where it appeared to have a satisfactory detection rate nearshore, and still adequately detected targets out to 150 m.

In addition to operating the sonar, a drift gillnet program was initiated in the same section of river to gain a better understanding of species composition, behavior and spatial distribution of the fish passing during this period. Standard ASL data, genetic samples and fecundity information were collected from captured Chinook salmon. Six gillnets, 25 fathoms in length and with mesh sizes ranging from 2.75 inch to 8.5 inch, were fished in an effort to effectively capture all size classes of fish present and detectable by the hydroacoustic equipment. A total of 179 Chinook salmon were captured with the drift gillnets: 121 males and 58 females. From July 10 to August 10 the drift gillnets were fished daily for a season total of 853 fathom hours. A single whitefish was also captured. Two chum salmon were caught in a set gillnet that fished for 48 hours beginning August 4. All captured fish were distributed daily to nearby residents.

Though some chum salmon are present in the river during the Chinook run, Chinook and chum salmon runs appear to be largely discrete in time based on local knowledge of catches, data collected in Canada, and past projects in the area. Information from the DIDSON also suggest other species such as whitefish appear to be present in very small numbers and for the most part were not usually detected by the split-beam sonar. No chum salmon were caught in the drift gillnets. Chum salmon and non-salmon species such as whitefish are locally known to migrate near shore, so other methods of fishing will be investigated in future years.

SHEENJEK RIVER SONAR

The Sheenjek River sonar project has estimated fall chum salmon escapement since 1981 and has undergone a number of changes in recent years. The project originally operated Bendix single-beam sonar equipment, and although the Bendix sonar functioned well, the manufacturer ceased production in the mid-1990s and no longer supports the system. In 2000, ADF&G purchased an HTI model 241 split-beam digital echosounder system for use on the Sheenjek River to continue providing the best possible data to fishery managers. In 2000 and 2002 the new system was deployed alongside the existing single-beam sonar and produced results comparable to the Bendix equipment (Dunbar 2004). In 2003 and 2004 the split-beam sonar system was used exclusively to enumerate chum salmon in the Sheenjek River.

In 2002, ADF&G began testing a new DIDSON for counting salmon in small rivers. Based on the results of these tests, which showed this equipment to be easier to use, more accurate, and capable of operating with substrate profiles unacceptable for split-beam systems (Maxwell and Gove 2004), the Sheenjek River was selected as an ideal candidate for this system. In 2004, the project began transitioning to DIDSON, and in preparation was operated side-by-side with the split-beam sonar on the right bank. The DIDSON produced an estimate 29% greater than the split-beam system during this initial testing.

Because of the large discrepancy with the side-by-side comparison in 2004, the DIDSON was again operated next to the split-beam in 2005. For the 2005 study, the DIDSON produced an estimate 18% larger than the split-beam on the right bank over the period August 18 through September 5. The split-beam sonar was operated at a constant slow ping-rate throughout the season, which resulted in lower detection rates after September 5 when chum salmon were observed swimming noticeably faster. This happened to coincide with peak passage for the Sheenjek River, with data collected after September 5 included, the right bank DIDSON count was 32% higher than the split-beam. We do not believe this late-season data are representative of the typical relationship since the ping-rate was lower than usual.

Historically, unfavorable conditions for transducer placement on the left bank made only the right bank of the Sheenjek River useful to estimate fish passage. Drift gillnet studies in the early 1980s suggested distribution of the upstream migrant chum salmon was primarily concentrated on the right bank of the river at the sonar site, with only a small but unknown proportion passing on the left bank (Barton 1985). In an effort to estimate the proportion of fish passing on the left bank, a DIDSON was deployed there in 2003. The imaging capabilities of the DIDSON allows for placement in areas where a steep or uneven substrate, submerged logs or vegetation are problematic for other systems. Results indicated approximately 33% of the fish were migrating up the left bank. Because of large numbers of fish observed on the left bank, ADF&G anticipates operating DIDSON on both banks in the future.

The 2005 season marked a successful transition from a single split-beam system on the right bank to DIDSON systems deployed on both banks. The project was fully operational from August 10 to September 24. The new equipment was both easier to use and produced more accurate estimates. This is the first year since 1987 chum salmon passage was estimated on both banks of the Sheenjek River over the entire season (Barton 1995). The combined passage estimate for both banks was 438,253 chum salmon, with an estimate for the right bank alone of 266,962 chum salmon. In 2005 the left bank estimates represented 39% of the total passage. It will take several more years of data collection to determine how best to treat the historical

estimates, but in order to provide the best escapement number possible, the left bank must continue to be monitored. The transition from split-beam to DIDSON has gone very smoothly and this equipment will continue to provide accurate escapement estimates in future years.

CHINOOK SALMON AGE, SEX AND LENGTH ANALYSIS OF SELECTED ESCAPEMENT PROJECTS ON THE YUKON RIVER

USFWS, Office of Subsistence Management, Fisheries Information Service (FIS) analyzed 6 long-term (9 or more years) ASL escapement data sets from 5 Yukon River tributaries: 2 lower (Andreafsky and Anvik) rivers, 3 middle (Gisasa, Salcha, and Chena) rivers and one upper (Big Salmon) river (Hyer and Schleusner 2005). These data sets were obtained from 2 weir projects (Andreafsky and Gisasa) and 5 carcass surveys (Andreafsky, Anvik, Chena, Salcha and Big Salmon). Sample size varied among escapement projects and years, and data sets contained 9 to 28 years of samples.

To determine whether sex composition, length, age, and length-at-age of Chinook salmon in these spawning escapements have changed over time, FIS staff examined trends in the data sets for changes in

- proportion of female Chinook salmon,
- proportion of large Chinook salmon (greater than 900 mm),
- proportion of 6- and 7-year-old Chinook salmon, and
- lengths of 6- and 7-year-old Chinook salmon.

Results from the analysis were presented in context of basinwide trends.

One basinwide trend was identified, a decrease in the proportion of large (greater than 900 mm) Chinook salmon in most of the sampled tributaries. These data sets represent a small percent of the spawning population over a relatively short time period during which both fisheries and environmental changes have occurred. It is not possible to determine whether the decrease in the proportion of large Chinook salmon was caused by selectivity of the gillnet fishery. Changing environmental conditions could have caused these trends or confounded our ability to discern selectivity effects of the fishery.

WHITEHORSE HATCHERY OPERATIONS

All 112,839 of BY 2004 Chinook salmon reared and marked at the Whitehorse Rapids Fish Hatchery were released between May 31 and July 7, 2005. All fish released were marked with an adipose fin clip. Fry[6] were released into various locations upstream of the Whitehorse Rapids hydroelectric dam. Numbers of fry released and release location:

Wolf Creek:	17,368
Michie Creek:	45,125
Byng Creek	10,430
M'Clintock River	10,632
Mainstem Yukon River	29,284
TOTAL	112,839

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

Included in the above numbers were 614 fry considered to be too small or unfit for tagging. These fish had their adipose fins removed (no coded wire tag inserted) and were released in Wolf Creek on July 7, 2005.

A small occurrence of "whitefin" was observed on some of the fry before release. Samples were sent to the Pacific Biological Station in Nanamio B.C. for analysis but no casual organisms were found. All fry were deemed good candidates for release.

The 2005 release was the tenth year, 1995–2004 BYs, in which all fit fish released from the Whitehorse Rapids Fish Hatchery into the Yukon River were marked. With the exception of all fish released from the 1998 BY (1999 release year), which were adipose-clipped but not tagged, all releases within the 1995–2005 period involved adipose fin removal and application of coded wire tags to all of the fit fish. Approximately 94% of the 1994 BY release was tagged with coded wire tags. The initiative to mark all hatchery releases has provided an opportunity to more accurately determine the contribution of hatchery reared fish as they migrate through the Whitehorse Rapids Fishway and to allow a more selective brood stock program.

Tag retention for the 112,225 fish tagged from the 2004 brood year release was calculated to be 99.2%. This high percentage means an estimated 898 of the tagged fish did not retain their tag. The total 2005 release therefore includes 111,327 adipose-clipped with tags, 898 fish which were estimated to have lost their tags and 614 small (or unfit) fish which were clipped but not tagged for a total release of 112,839 fish.

In August 2005, brood stock collection began after 125 adult Chinook salmon had migrated through the Whitehorse Rapids Fishway. Brood stock was collected from August 5th to August 24. An attempt was made to collect 2 males for each female during brood stock collection to allow matrix spawning. Matrix spawning has been used for 17 years in an attempt to maintain genetic diversity.

A total of 42 males was retained and used for the brood stock program; 5 of these fish were adipose-clipped (hatchery) and 37 had intact adipose fins (wild). An additional 10 hatchery males and 10 wild males collected from the Fishway were used for brood stock and subsequently released back into the Fishway. In total, 2.9% of the total male return of 2,110 was used for the brood stock program.

A total of 31 females were used for brood stock including: 15 adipose-clipped (hatchery) fish; 13 fish which had intact adipose fins (wild fish); and 3 females (2 hatchery and 1 wild) which were collected after they failed to migrate through the fishway. In total, 5.9% of the total female return of 522 was used for the brood stock program. Egg takes began on August 18 and were completed on August 25. In total, an estimated total of 178,037 green eggs were collected from the 31 females. Average fecundity was estimated to be 5,743 eggs. Fertilization rate was estimated to be 98%. Shocking and second inventory of the eggs began on September 30 and was completed by October 14.

Eggs began to hatch on November 4 and were completed by November 23, 2005 at an average Accumulated Thermal Unit (ATU) value of 530. An estimate of the number of alevins as of January 15, 2005 was 161,843. Approximately 160,000 fry were ponded in late January to early February 2006.

YUKON RIVER SALMON RUN OUTLOOKS 2006

ALASKA

Chinook Salmon

Yukon River Chinook salmon return primarily as age-5 and age-6 fish, although age-4 and age-7 fish also contribute to the run. The 4-year-old component in 2005 was below average and the 5-year-old component was above average. The previous 2 years (2004 and 2005) runs have been near average indicating good production from the poor runs of 1999 and 2000. Spawning ground escapements in 2000, the brood year producing 6-year-old fish returning in 2006 were well below escapement goals throughout the drainage; however, the 2000 low return year produced a strong age-5 class that exceeded most escapement objectives in 2005.

Assuming an approximately normal return of 5-year-old and 6-year-old fish, the 2006 run is expected to be average to below average and similar to the 2005 run. Given the uncertainties associated with 2000 and 2001 declines in escapement, it is anticipated the run will provide for escapements, support a normal subsistence harvest, and a below average commercial harvest. Fishery management will be based upon inseason assessments of the run. If inseason indicators of run strength suggest sufficient abundance exists to have a commercial fishery, the commercial harvest in Alaska could range from 30,000 to 60,000 Chinook salmon. This range of commercial catch is below the 10-year (1996–2005, not including the low return years of 2000–2001) average of approximately 66,053 Chinook salmon.

Summer Chum Salmon

Strength of the summer chum salmon runs in 2006 will be dependent on the production of the escapements from 2002 (age-4 fish) and 2001 (age-5-fish). The 2001 run of summer chum salmon was one of the poorest on record and none of the escapement goals were met. Summer chum salmon runs have exhibited steady improvements since 2001 with harvestable surpluses in each of the last 4 years (2002–2005). However, it appears production was poorer for spawning tributaries in the lower portion of the drainage such as the Andreafsky and Anvik rivers the last 4 years, whereas production was much higher for spawning tributaries upstream of Anvik River. Weak returns in chum salmon runs from 1998 through 2001 are attributed to reduced productivity, and not the result of low levels of parent year escapements. In 2005, a large number of 4-year-old summer chum salmon returns were observed throughout the AYK Region. The BASIS (Bering-Aleutian Salmon International Survey) study has observed significant increases in juvenile chum in the Bering Sea. Further, Bering Sea trawl bycatch has observed increases in adult chum. Although all of these fish are not bound for Western Alaska, higher bycatch is an indicator of favorable ocean conditions and chum ocean survival may have increased significantly.

If ocean conditions are more conducive to survival, the run is anticipated to be average and provide for escapements and support a normal subsistence and commercial harvest. If inseason indicators of run strength suggest sufficient abundance exists to have a commercial fishery, the commercial harvest in Alaska could range from 500,000 to 900,000 summer chum salmon depending on salmon market conditions.

Fall Chum Salmon

Yukon River drainagewide estimated escapements of fall chum salmon for the period 1974 through 2001 have ranged from approximately 180,000 (1982) to 1,500,000 (1975), based upon expansion of escapement assessments for selected stocks to approximate overall abundance (Eggers 2001). Escapements in these years resulted in subsequent returns that ranged in size from approximately 312,000 (1996 production) to 1,400,000 (1975 production) fish, using the same approach to approximating overall escapement. Corresponding return per spawner rates range from 0.3 to 3.2, averaging 1.8 for all years combined (1974–1999).

A considerable amount of uncertainty has been associated with these run projections because unexpected run failures (1997 to 2002) were followed by a strong improvement in productivity from 2003 through 2005. Weakness in salmon runs before 2003 has generally been attributed to reduced productivity in the marine environment and not a result of low levels of parental escapement. Likewise, the recent improvements in productivity may be attributed to the marine environment. Projections have been presented as ranges since 1999 to allow for adjustments based on more recent trends in production. Historical ranges included the normal point projection as the upper end and the lower end was determined by reducing the projection by the average ratio of observed to predicted returns from 1998 to each consecutive current year through 2004. In 2005 the average ratio of the years 2001 to 2004 was used, in attempts to capture some of the observed improvement in the run.

Yukon River fall chum salmon return primarily as age-4 and age-5 fish, although age-3 and age-6 fish also contribute to the run (Appendix A34). The 2006 run will be comprised of parent years 2000 to 2003. Estimates of return per spawner based on brood year return were used to estimate production for 2000 and 2001, and an auto-regressive Ricker spawner-recruit model was used to predict returns from 2002 and 2003. The point estimate utilizes 1974 to 1983 odd/even maturity schedules to represent years of higher production. The 2006 projected point estimate is 1.2 million fall chum salmon (Table 5).

Table 5.–Estimated escapement, production, and age composition of fall chum salmon, 2000–2003.

Brood Year	Escapement	Estimated production (R/S)	Estimated Production	Contribution based on age	Current Return
2000	212,376	1.87	397,143	0.1%	933
2001	337,904	8.04	2,716,748	37.7%	455,847
2002	384,932	2.52	970,029	56.5%	684,126
2003	684,310	1.92	1,313,875	5.8%	69,771
Total expected run (unadjusted)					1,210,676
Total expressed as a range based on the forecasted vs. observed returns from 1987 to 2005 (80% CI)					1.0 to 1.4 million

The forecast range is based on the upper and lower values of the 80% confidence bounds for the point projection. Confidence bounds were calculated using deviation of point estimates and observed returns from 1987 through 2005. Therefore the 2006 run size projection is expressed as a range from 1.0 to 1.4 million fall chum salmon.

Escapements for the 2000 parent year that will contribute age-6 fish in the 2006 run were extremely poor and below the minimum drainagewide escapement goal of 300,000 fall chum salmon. Both 2001 and 2002 escapements were within the drainagewide escapement goal range but in the lower third. The major contributor to the 2006 fall chum salmon run is anticipated to be age-4 fish returning from the 2002 parent year. This is the second year of returns from the 2002 brood year however stocks within the Tanana River drainage may have been affected by a magnitude 7.9 earthquake which occurred November 3, 2002. The epicenter was located within the Alaska Range on the Denali fault line and could have affected fall chum and coho salmon eggs incubating in gravels from the Toklat River in the Kantishna River drainage to the upper Tanana River mainstem including the Delta River area.

Age-3 fish are typically a small portion of the return, however of concern was the total lack of them in the 2005 return (Appendix A34). In 2004, an exceptional return of approximately 130,000 age-3 fish, followed by a return of approximately 1.9 million age-4 fish in 2005 from the 2001 brood year may indicate a significant contribution of age-5 fish returning in 2006. Age-3 fish return in 2004 represented the second highest return on record and age-4 return in 2005 represented the highest return on record, both from the 2001 brood year. Return of age-4 fish from even-numbered brood years during the time period 1974 to 1999 typically averages 390,000 chum salmon, and ranges from a low of 175,000 for brood year 1988 to a high of 653,000 for brood year 1992. Based on the high production years from 1974 to 1983, the return of even-numbered brood years averages only 619,000 chum salmon. Return of age-5 fish from even-numbered brood years during the time period 1974 to 1999 typically averages 179,000 chum salmon, and ranges from a low of 57,000 for brood year 1998 to a high of 418,000 for brood year 1990. Reduction in age-5 fish could be a function of competition with pink salmon or an indication during years of extremely high production fish come back earlier as indicated by extremely high percentages of age-3 and age-4 fish observed in the last 3 years. If the 2006 run materializes within the projected range it will be only the second time an even-numbered year will exceed 1.0 million fish, the only other being 1996.

The projection for 2006 is based on evident improvements in production observed in 2003, 2004 and the exceptional return in 2005. If the return is anywhere near the projected range, it will be well above the upper end of the BEG of 600,000 fall chum salmon. The 2006 projected range of run size should support normal subsistence fishing activities and should provide opportunity for commercial ventures where markets exist. The run will be monitored in season to determine strength in relation to estimated range and what amount of harvest can be provided based on the levels stipulated in the Alaska fall chum salmon management plan.

Coho Salmon

Although comprehensive escapement information on Yukon River drainage coho salmon is lacking, it is known coho salmon primarily return as age-4 fish and overlap in run timing with fall chum salmon. The major contributor to the 2006 coho salmon run will be the age-4 fish returning from the 2002 parent year. Based on Pilot Station sonar operations from 1995, and 1997 through 2005, the 2002 return was below average and near average in run timing. The Delta Clearwater River (DCR) was well above average in abundance in 2002; however evaluations of escapement in the Andreafsky (second lowest weir count), Nenana, and Richardson Clearwater rivers were average to below average. DCR is the major producer of coho salmon in the upper Tanana River drainage, and the parent year escapement of 38,625 fish was more than double the upper end of the SEG range of 5,200 to 17,000 coho salmon. Based on

coho salmon escapements in the DCR, abundance has been on the increase since 1972, in particular within the last decade. Assuming average survival, the 2006 coho salmon run is anticipated to be average to above average based on good escapements in 2002.

The Alaska 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 of return of both coho and fall chum salmon since they migrate together.

CANADA

Canadian-Origin Upper Yukon Chinook Salmon

Total run size of the Canadian-origin Upper Yukon River Chinook salmon return in 2006 is expected to be below average to average with a preseason outlook of 93,000 fish. This outlook is based on a stock/recruitment (S/R) model developed from the 1982 to 1999 brood years. Annual returns were reconstructed using U.S. and Canadian catch data, ADF&G scale pattern and DNA analyses, and Fisheries and Oceans Canada tagging results. The escapement for 1984 was estimated by expanding a cumulative 5-area escapement index (Tatchun Cr., Big Salmon R., Nisutlin R., Wolf R., and the non-hatchery returns to the Whitehorse Fishway) by the average proportion the index represented of the total escapement estimates. Mark–recapture results were used to estimate the Canadian border escapement in 1982, 1983 and from 1985 onwards.

Two of the four primary brood years contributing to the 2006 return exceeded the interim rebuilding goal of 28,000 Chinook salmon. These returns involved an estimated escapement of 42,438 Chinook salmon in 2001 and 40,145 in 2002. Both of these returns were within, and close to the upper end of the interim escapement goal range of 33,000 to 43,000 for rebuilt stocks. The other two primary brood years contributing to the 2006 return had estimated escapements well below the lower end of the rebuilding goal. The estimated escapement in 1999 was 11,362, and the estimate in 2000 was 11,344. The weighted (by age) brood escapement for the 2006 Upper Yukon Chinook salmon run is 20,800 fish.

The 2006 run outlook was estimated by first using the S/R model to calculate the total expected returns from each brood year escapement and then, apportioning these returns by the 10-year average age composition of brood year returns. The estimated production from each brood year was summed to produce the estimated run size of 93,000 for 2006. The S/R relationship projects very high return per spawner values for the low escapement years and much lower returns per spawner for the high escapement years. The estimated return/spawner for each of the principal brood years is as follows: 9.0 for 1999; 9.0 for 2000; 1.7 for 2001; and 1.9 for 2002. Over the 1996-2005 period, the average age composition of brood year returns is as follows: <0.02% age-3, 3.2% age-4, 28.6% age-5, 59.4% age-6, 8.7% age-7, and 0.01% age-8.

In recent years, expected run sizes were frequently lower than the observed run sizes and a numerical outlook range was used to demonstrate uncertainty. The S/R relationships developed should be viewed as an index and they do not capture the uncertainty associated with rapid changes in marine and/or freshwater survival. An additional consideration is spawner-recruitment relationships are usually developed from density-dependent relationships developed for a single stock rather than the aggregate of a number of stocks as is used for Yukon River Chinook salmon outlooks.

Performance of run outlooks based on unadjusted S/R models for the 1998 to 2005 period have been updated (Table 6).

Table 6.–Canadian-Origin upper Yukon Chinook salmon performance, 1998-2005.

Year	Expected Run Size (Preseason)	Observed Run Size (Post season)	Proportion of Expected Run
1998	143,000	69,500	0.49
1999	84,700	83,800	0.99
2000	128,000	36,100	0.28
2001	124,000	77,500	0.63
2002	95,000	110,700	1.17
2003	90,300	117,600	1.30
2004	107,200	109,100	1.02
2005	107,000	90,200	0.84
Average (1998 to 2005)			0.84

A review of the past performance of preseason outlooks is an attempt to take into account a recent decline in the Upper Yukon Chinook salmon return per spawner values. Despite good brood year escapements, the observed run sizes within the 1998 to 2001 period were relatively low. Available information suggests low returns observed resulted from poor marine survival.

Interim escapement goal range for rebuilt Upper Yukon Chinook salmon, excluding Porcupine River drainage stocks, is 33,000 to 43,000 fish[7]. In recognition that Chinook salmon escapements were depressed, the Yukon River Panel developed an interim rebuilding goal of >28,000[8] for the 1996 through 2002 period toward which both Parties (U.S. and Canada) have been endeavoring to manage.

Canadian-Origin Upper Yukon Chum Salmon

Outlook for the 2006 Upper Yukon chum salmon run is an average return. On average, 60% of upper Yukon adult chum salmon return as age-4 and 37% return as age-5. These percentages suggest the major portion of the 2006 chum salmon run will originate from the 2001 and 2002 brood years. The estimated escapements for these years were 33,851 and 98,695, respectively. Therefore, one of the two primary brood years, which will contribute to the 2006 run exceeded 80,000 fish, the escapement goal for rebuilt Upper Yukon River chum salmon. The weighted (by age) brood escapement for the 2006 Upper Yukon chum salmon run is 74,400 fish.

[7] The development of a more comprehensive Biological Escapement Goal based criteria developed by the Chinook Technical Committee of the Pacific Salmon Commission requires additional information.

[8] The 2001 outlook was for a poor run. There was a desire to provide harvest opportunities for the subsistence fishery in Alaska and the aboriginal fishery in Canada. The Yukon River Panel expected limited fishing opportunities would provide a maintenance harvest and a Canadian spawning population exceeding 18,000 Chinook salmon. In 2003, the escapement target for Canadian-origin Upper Yukon Chinook salmon was 25,000. This target was increased to 28,000 in the event a U.S. commercial fishery was initiated. In 2004, the escapement target for Canadian-origin Upper Yukon Chinook salmon was 28,000 Chinook salmon. This goal was consistent with the Yukon River Panel recommendation from the March 2004 Yukon Panel meeting. If the run was gauged to be sufficiently strong, the escapement target could range up to 38,000 Chinook salmon, although the Panel did not describe what constitutes a "strong" run. In 2005, the escapement target for Canadian-origin Upper Yukon Chinook salmon was 28,000 Chinook salmon.

Before 2002, preseason outlooks for upper Yukon chum salmon were based on an assumed productivity of 2.5 returning adults per spawner (R/S); this was the same productivity used in the joint Canada/U.S. Upper Yukon chum salmon rebuilding model. This return rate was similar to the estimated 1982–1995 average drainagewide chum salmon R/S rate of 2.6. The average R/S for the 1990 to 1995 brood years was also 2.6. There was, however, very low survival from the 1994 to 1998 brood years; the R/S values calculated for these brood years were below average and the rate for 4 of 5 years within this period were below or equal to the replacement value. For example, the estimated R/S rates for brood years 1994 to 1998 were 0.8, 0.7, 0.3, 1.0 and 1.6, respectively. Long term average R/S for brood years 1982 to 2000 is 2.34 and the recent average for brood years 1986 to 2000 is 1.73.

Since 2002, preseason outlooks have been based on stock/recruitment models which incorporate escapement and subsequent associated adult return by age data. Annual runs were reconstructed using mark–recapture data and assumed contributions to U.S. catches. Although insufficient stock identification data were available for accurately estimating the annual U.S. catch of Upper Yukon chum salmon, rough estimates were made using the following assumptions:

1) Thirty percent of the total U.S. catch of chum salmon was composed of Canadian-origin fish;
2) U.S. catch of Canadian-origin Upper Yukon and Canadian-origin Porcupine River chum salmon were proportional to the ratio of their respective border escapements; and
3) Porcupine River border escapement consisted of the Old Crow aboriginal fishery catch plus the Fishing Branch River weir count.

All of these assumptions require additional evaluation because some recent Porcupine River mark–recapture data has become available and advances in genetic stock identification should permit more accurate catch estimates.

S/R models were used to predict return per spawner for individual brood years. Total production from each brood year was estimated by applying the calculated R/S to the escapements in 2001 and 2002. Expected production in 2006 was estimated by assuming each brood year would produce an average age composition, i.e. 1.2% age-3, 60.2% age-4, 37.4% age-5, and 1.6% age-6. For example, the estimated R/S for the brood escapement of 98,695 in 2002 is 1.25. The total production from the 2002 escapement is therefore expected to be 123,800 fish. If 60.2% of this production returns at age-4, it is expected 74,500 fish from the 2002 escapement will contribute to the 2006 run. Summing the estimated production from the 2000 to 2003 brood year escapements produces a total expected run size of 126,000 in 2006 (Table 7).

Table 7.Preseason outlooks, postseason run size estimates, and proportion of expected run size observed for upper Yukon chum salmon, 1998 to 2005.

Year	Expected Run Size (Preseason)	Estimated Run Size (Postseason)	Proportion of Expected Run
1998	198,000	61,400	0.31
1999	336,000	98,400	0.29
2000	334,000	62,900	0.19
2001	245,000	45,100	0.18
2002	144,000	109,900	0.76
2003	145,000	170,800	1.18
2004	146,500	181,300	1.24
2005	126,000	504,500	4.00
Average (1998 to 2005)			1.02

The 1998 to 2002 Canadian-origin Upper Yukon chum runs consistently failed to meet preseason outlooks and it appears the assumed adult production of 2.5 R/S was far too high in most of these years. However, exceptional marine survival appears to have bolstered the run in 2005. This corresponded with far above average encounter rates of chum salmon in the U.S. domestic trawl fishery in 2004. It should be noted encounter rates in 2005 were even higher suggesting marine survival may also be high for the 2006 run.

Canadian-Origin Porcupine River Chum Salmon

Fishing Branch River has been a recent conservation concern for chum salmon. The 2000 return was only 5,053 fish. However, some improvement was observed in 2003 when 29,519 chum salmon were counted, in 2004 when 20,274 were counted, and remarkable improvement in 2005 when 121,413 were counted.

The 2006 chum salmon run to Canadian portions of the Porcupine River drainage should originate primarily from the 2001 and 2002 escapements. The Fishing Branch River weir counts for these years were 21,669 and 13,563 chum salmon, respectively. These counts were 47.5% and 67.2%, respectively, below the 2001–2005 average of 41,288 fish. The 2001 and 2002 counts both fall below the lower end of the Fishing Branch River interim escapement goal range of 50,000 to 120,000 chum salmon. The weighted (by age) brood year escapement for the 2006 Fishing Branch River chum run is 17,105 fish.

Assuming a return/spawner value of 2.5, and using the average 10-year (even year) age at maturity for Fishing Branch River chum salmon of 54.9% age-4 and 42.6% age-5 fish (Table 8) a return of 42,800 chum salmon is expected in 2006.

Table 8.–Projected return of chum salmon to the Fishing Branch River, 2006.

Brood Year	Escapement	Estimated Production @ 2.5 (R/S)	Contribution based on age	2006 Return
2001	21,669	54,173	42.6%	23,077
2002	13,563	33,908	54.9%	18,615
Sub-total				41,692
Total expected run (expanded for other age classes and rounded)				42,800

However, a return/spawner value of 2.5 may be conservative given improved production in recent years and remarkable run size observed in 2005. For example, assuming the 2005 Fishing Branch River count (121,413) represented 80% of the total Fishing Branch River run size, the R/S for the weighted brood year escapement (15,285) was 9.9 adults per spawner. The 2005 return was composed of approximately 91% 4-year-old fish; therefore, most fish were produced from the 2001 escapement of 21,669.

The outlook for the 2006 Fishing Branch River chum salmon return is for a below average return. However, the 2006 outlook is similar to the 2005 outlook and it is anticipated survival which contributed to the exceptional 2005 return will continue to some extent. The 2006 outlook is therefore viewed as a conservative outlook.

As was observed with the Upper Yukon chum salmon stocks, Porcupine chum salmon run sizes were consistently below the preseason outlook throughout the 1998 to 2002 period (Table 9).

Table 9.–Projection and return of chum salmon to the Porcupine River, 1998–2005.

Year	Expected Run Size (Preseason)	Estimated Run Size (Postseason)	Proportion of Expected Run
1998	112,000	24,700	0.22
1999	124,000	23,600	0.19
2000	150,000	12,600	0.08
2001	101,000	32,800	0.32
2002	41,000	19,300	0.47
2003	29,000	46,100	1.59
2004	22,000	31,700	1.44
2005	48,000	189,700	3.95
Average–1998 to 2005			1.03

Spawning Escapement Targets in 2006: Canadian Origin Chinook and Fall Chum Salmon

Negotiations were initiated in 1985 between the U.S. and Canada regarding a Yukon River salmon treaty. In December 2002, the United States and Canada signed an agreement that set salmon harvest share target ranges based on a postseason assessment of run strength for Chinook and fall chum salmon into the Canadian mainstem of the Yukon River. The Alaskan and Canadian fisheries will be managed consistent with stock rebuilding and conservation objectives that have been jointly developed.

For the 2006 season, the U.S./Canada Panel has recommended to forego the Canadian Yukon River Mainstem Chinook salmon escapement goal of 33,000–44,000 and have agreed to a rebuilding spawning escapement goal of 28,000 Chinook salmon (for escapement options see JTC 2006). The Yukon River Panel agreed to a fall chum salmon Canadian Yukon River Mainstem spawning escapement objective of 80,000 chum salmon, and an interim spawning escapement goal of 28,000 chum salmon into the Fishing Branch River. Management plans were laid out to rebuild the Canadian Mainstem Chinook salmon stocks over 2 life cycles and rebuild the Canadian Branch River fall chum salmon stock over 3 lifecycles which is considered a 12-year period. The intent of these interim goals is to minimize hardships in the subsistence and aboriginal fisheries while continuing efforts towards rebuilding the stocks to higher levels.

MARINE FISHERIES INFORMATION

INTRODUCTION

Yukon River salmon migrate as juveniles out of the river and into the Bering Sea. Where they go once they enter the ocean is only partly understood, but evidence from tagging studies and the analysis of scale patterns indicate that these salmon spread throughout the Bering Sea, some move considerably south of the Aleutian Island chain into the Gulf of Alaska and North Pacific Ocean, and some move north into the Chukchi Sea. While in the ocean, they mix with salmon stocks from Asia and elsewhere in North America.

While in the ocean, some of these salmon are caught by commercial fisheries that take place in marine waters. Marine commercial fisheries with a bycatch that likely included some Yukon River salmon included: (1) the U.S. groundfish trawl fisheries in the Bering Sea-Aleutian Islands management area (BSAI) and in the Gulf of Alaska, (2) the purse seine and gill net salmon fishery in the South Alaska Peninsula ("False Pass") area, and (3) Norton Sound gillnet fisheries.

Until 1992, five large commercial fisheries in the ocean caught large numbers of salmon, some of which were likely Yukon River salmon. However, under international agreements, those fisheries no longer operate. They were (in order of decreasing salmon catches): (1) the Japanese high-seas mother ship and land-based salmon gill net fisheries; (2) the high-seas squid gillnet fisheries in the North Pacific Ocean of Japan, the Republic of Korea, and the Republic of China (Taiwan); (3) the foreign groundfish fisheries of the Bering Sea and Gulf of Alaska, (4) the joint venture groundfish fisheries of the Bering Sea and the Gulf of Alaska, and (5) the groundfish trawl fishery by many nations in the international waters area of the Bering Sea ("the Doughnut Hole").

South Alaska Peninsula June fishery is thought to harvest large numbers of western Alaska chum salmon. Catch figures for this fishery from 1980 to 2005 are shown in Appendix A36. Substantial changes were made to this fishery in 2001 to reduce catch. The 20 year average before 2001 was 1,566,000 sockeye salmon and 489,000 chum salmon. The 4 year average since 2001 has been 849,000 sockeye salmon and 393,000 chum salmon. A small commercial salmon gill net fishery operates in subdistricts at various river mouths in Norton Sound, and is managed by the ADF&G and the Alaska Board of Fisheries. A small portion of Chinook and chum salmon caught in the southern subdistricts may be bound for the Yukon River. In 2005, the commercial catch of Chinook and chum salmon for all of the Norton Sound subdistricts combined totaled <1,000 Chinook and 4,000 chum salmon. The prior 5-year (1997–2001) average commercial catch was 4,695 Chinook and 15,112 chum salmon.

Salmon runs were substantially better in 2003, 2004 and 2005 than in previous years across a broad region of western Alaska, including the Yukon River in Alaska and Canada. However, many stocks were still below average. The world catch of Chinook salmon has dropped significantly since the late 1970s, and the world chum catch is high, most of the harvest by Japan. Causes for production failures are not known, but attention has focused on the marine environment because of the broad scope of production failures. Most likely factors to date include the effects of El Nino, ocean and climate regime shifts, and competition relative to ocean carrying capacity (i.e. hatchery/wild interactions). Nearly half the abundance of chum salmon in the North Pacific Ocean are now hatchery releases.

BERING SEA AND GULF OF ALASKA GROUNDFISH FISHERY

History and Management of the Groundfish Fishery

U.S. groundfish fisheries in the BSAI and in the Gulf of Alaska (GOA) are managed under the Magnuson-Stevens Fisheries Conservation and Management Act by the North Pacific Fishery Management Council (NPFMC), and are regulated by the National Marine Fisheries Service (NMFS).

In general, groundfish fisheries of GOA are managed and regulated separately from those in BSAI. Both major areas contain a number of smaller regulatory areas, which are numbered. Groundfish fisheries east of 170° west longitude and north of the Alaska Peninsula are considered to be in BSAI. Groundfish fisheries operating in waters south of the Alaska Peninsula and east of 170° west longitude are considered to be in GOA.

U.S. groundfish fishery off the coast of Alaska expanded rapidly during the last 15 years. In 1977, the year after the Magnuson Act went into effect, U.S. groundfish harvest off Alaska amounted to only 2,300 metric tons (mt, 1 mt = 2,204.6 pounds), or only 0.2% of the total

groundfish harvest off Alaska by all nations. Most of that U.S. catch was Pacific halibut *Hippoglossus stenolepis* caught with hook-and-line gear.

The Magnuson Act, which claimed exclusive fishery jurisdiction by the United States of waters to a distance 200 nautical miles seaward from the coast, allowed the U.S. to gradually replace foreign groundfish fisheries by "joint-venture" fisheries, in which U.S. fishermen caught the fish and delivered them at sea to foreign fish processing vessels. Joint-venture fishery, in turn, was replaced by an entirely U.S. fishery.

U.S. groundfish fisheries use basically 3 types of fishing gear: trawls, hook-and-line (including longline and jig), and pots. Of these types of fisheries, trawlers have by far the greatest impact on salmon bycatch numbers.

A major issue affecting BSAI and GOA groundfish fisheries was a NMFS biological opinion which concluded continued fishing for groundfish, including Pollock *Theragra chalcogramma*, Atka mackerel *Pleurogrammus monopterygius*, and Pacific cod *Gadus macrocephalus*, under the agency's existing rules is likely to jeopardize the western population of Steller sea lions and adversely affect their critical habitat. Many of the NPFMC actions in 2001 were related to Steller sea lion protection measures establishing temporal and spatial dispersion of harvest and protection of Steller sea lion critical habitat. There will now be 2 seasons for the pollock, Atka mackerel and Pacific cod fisheries and the amount taken within sea lion critical habitat will be limited. Among several documents prepared in accordance with the National Environmental Policy Act of 1969, NMFS published a Final Programmatic SEIS for the Alaska Groundfish Fisheries, a Final SEIS for Steller Sea Lion Protection Measures in the Alaska Groundfish Fisheries, and a Draft EIS for the essential fish habitat components of the several fishery management plans. The Western Alaska Community Development Quota (CDQ) Program, which has 6 groups representing the 65 western Alaska eligible communities expanded from pollock only to all federally managed BSAI groundfish species. Currently, the CDQ program is allocated portions of the groundfish fishery range from 10% for pollock to 7.5% for most other species. On January 1, 2000, the License Limitation Program (LLP) required any person who wished to deploy a harvesting vessel in the king and Tanner crab fisheries in BSAI and in the directed groundfish fisheries (except for IFQ sablefish, and for demersal shelf rockfish east of 140 degrees West longitude) in GOA or BSAI must hold a valid groundfish or crab license (as appropriate) issued under LLP.

Observer Program

Under U.S. law and regulations, salmon may not be retained by the U.S. groundfish fishery and must be returned to the sea. One exception is the voluntary Salmon Donation Program, which allows for distribution of Pacific salmon taken as bycatch in the groundfish trawl fisheries off Alaska to economically disadvantaged individuals by tax exempt organizations through a NMFS authorized distributor. This action supports industry initiatives to reduce waste from discard in the groundfish fisheries by processing salmon bycatch for human consumption. The groundfish observer program began in 1977 on foreign groundfish vessels operating within the U.S. Exclusive Economic Zone (200 nautical miles from the U.S. shore). It continued with the joint-venture fishery until its end. Until 1990, however, information on the accidental or incidental catch of salmon by the U.S. groundfish fishery was sparse.

In 1990, the United States began a scientific observer program for the U.S. groundfish fishery off the Alaska coast. In general, a groundfish harvesting or processing vessel must carry a NMFS

certified observer on board whenever fishing or fish processing operations are conducted if the operator is required by NMFS Administrator, Alaska Region, NMFS, (Regional Administrator) to do so, and a shoreside groundfish processing plant must have a NMFS certified observer present whenever groundfish is received or processed if the plant is required to do so by the Regional Administrator.

The amount of observer coverage is usually related to length of the vessel or amount of fish processed by a shoreside plant or mother ship processing-vessel. Groundfish harvesting vessels having a length of 125 feet or more are required to carry observers at all times when they are participating in the fishery. Vessels with lengths between 60 through 124 feet are required to carry observers during 30 percent of their fishing days during trips when they fish more than 3 days. Vessels shorter than 60 feet do not have to carry observers unless required to do so by the Regional Administrator. Mother ship or shoreside processing plants processing 1,000 metric tons (mt) or more per month are required to have 100 percent observer coverage, those processing between 500 and 1,000 mt per month are required to have 30 percent coverage, and those processing less than 500 mt per month need no observer coverage unless it was required specifically by the Regional Administrator.

Observers must be trained and certified. To be certified as an observer by NMFS, an applicant must have a bachelor's degree in fisheries, wildlife biology, or a related field of biology or natural resource management. Observers must be capable of performing strenuous physical labor, and working independently without direct supervision under stressful conditions. Because observers are not employees of the Federal Government but instead hired by certified contractors, applicants must apply directly to a certified contractor. If hired, the contractor will arrange for them to attend a 3-week observer training course in Seattle or Anchorage. Upon successful completion of the course, they will be certified as a groundfish observer.

In addition to observer coverage, all groundfish harvesters over 60 feet and processors must maintain and submit logbooks on their groundfish harvests and their catch of the prohibited species, including crabs, halibut, herring, and salmon.

Estimated Catch of Salmon in the Groundfish Fisheries

NMFS estimates the number of salmon caught in the groundfish fisheries from observer reports and weight of groundfish caught. Observers are instructed to collect random samples of each net haul before it is sorted, and to gather information from each salmon in a haul. Observers record the species caught and number of each species, determine sex of dead or dying salmon, record weight and length of each salmon, collect scales, and check for missing adipose fins. If a salmon is missing its adipose fin, the observer removes and preserves the snout, which may contain a coded-wire tag.

NMFS scientists use the number of salmon of each species caught in each haul sampled, weight of groundfish caught in each haul sampled, and total weight of groundfish harvested during sampling period to estimate the total number of salmon of each species caught by the entire groundfish fleet. Appendix A37 and Figure 16 present a summary of estimated numbers of Chinook and other salmon caught by the U.S. groundfish fisheries from 1990 through 2005. The number of salmon caught by the groundfish fisheries varies considerably by species of salmon, by year, and between BSAI and GOA. For the most part, Chinook and chum salmon make up most of the catch; coho is a distant third, and sockeye and pink salmon minor components.

Catch of salmon in BSAI in 2005 was 74,843 Chinook and 701,741 other salmon and in GOA the salmon catch was 31,896 Chinook and 6,841 other salmon. Certain areas in BSAI have been declared salmon savings areas for both chum and Chinook salmon based on high catch rates in the past. After the 1998 season, because of the concerns regarding Chinook salmon conservation in western Alaska and in response to a proposal submitted by BSFA, NPFMC lowered allowable bycatch of Chinook salmon in the BSAI trawl fishery.

Because of record numbers of salmon taken in BSAI in 2003 and 2004 and information from the fishing fleet indicating catch was exacerbated by the savings areas, NPFMC is evaluating BSAI salmon management measures. In December 2004, NPFMC approved a draft problem statement and 5 alternatives for initial consideration to address the salmon catch problem. In January 2006, the NPFMC staff released a Public Review Draft entitled "Environmental Assessment/Regulatory impact Review/Initial Regulatory Flexibility Analysis for Modifying Existing Chinook and Chum Salmon Savings Areas."

Alternative 1. Status Quo

Alternative 1 Maintains existing regulatory measures for Chinook and chum salmon savings area closures.

Alternative 2. Eliminate the regulatory salmon savings area closures

Under Alternative 2, the catch limits for the Bering Sea subarea trawl for Chinook salmon and BSAI trawl chum salmon would be eliminated, and would no longer trigger savings area closures. Annual closure of the Chum Salmon Savings Area would also be eliminated. Salmon would remain a prohibited species under this (and all) alternatives.

Alternative 3. Suspend the regulatory salmon savings area closures and allow pollock cooperatives and CDQ groups to utilize their voluntary rolling "hot spot" (VRHS) closure system to avoid salmon bycatch

Under Alternative 3, catch limits for Bering Sea subarea trawl, Chinook and BSAI trawl chum salmon would be suspended, and no longer trigger savings area closures. Annual closure of the Chum Salmon Savings Area would also be suspended. The suspension will go into effect so long as the pollock cooperatives and CDQ groups have in place an effective salmon bycatch VRHS closure system to avoid salmon bycatch.

In addition, a motion introduced in October, 2005 states, "The Council and NMFS have initiated action to exempt AFA qualified and CDQ vessels participating in the intercooperative VRHS from regulatory Bering Sea salmon bycatch savings areas.".

The ESA incidental take statement from the 1999 Salmon Biological Opinion is 55,000 Chinook salmon in BSAI and 40,000 Chinook salmon in GOA. On December 1, 2004, NMFS, Alaska Region reinitiated formal Section 7 consultation with NMFS, Northwest Region on the ESA listed Chinook salmon incidental takes in the BSAI groundfish fishery because groundfish fisheries exceeded the amount stated in the incidental take statement in 2004.

One of the big unanswered questions is, what stocks of salmon are being caught by the U.S. groundfish fisheries and how many of each stock. Some information comes from coded-wire tagged salmon recovered by observers, but that information only shows certain coded-wire tagged stocks are caught, it says nothing specific about the many stocks without coded-wire tags. Canada has coded wire tagged upper Yukon River Chinook salmon for a number of years. To date, 16 have been recovered in the Bering Sea groundfish fisheries and 3 were picked up by the U.S. BASIS cruise in 2003. In addition, 10 Chinook salmon captured on the high seas and tagged have returned to the Yukon River Drainage.

BERING SEA RESEARCH

Background

Extensive research has begun in the Bering Sea in the last few years focusing on physical and biological oceanography and climate change. Many different organizations from several countries have been involved, and several international organizations have been formed to try to coordinate this research. The discussion that follows will concentrate on those studies directed towards Pacific salmon.

Bering-Aleutian Salmon International Survey

Bering-Aleutian Salmon International Survey (BASIS) is an NPAFC-coordinated program of ecosystem research on salmon in the Bering Sea. The major goal of this program, which was developed in 2001, is to clarify how changes in ocean conditions affect the survival, growth, distribution, and migration of salmon in the Bering Sea. Research vessels from U.S. (F/V *Sea Storm*, F/V *Northwest Explorer*), Japan (R/V *Kaiyo maru*, R/V *Wakatake maru*), and Russia (R/V *TINRO*), have participated in synoptic BASIS research surveys in Bering Sea since in 2002.

BASIS surveys have provided information on the distribution and abundance of fish occupying the pelagic ecosystem of the Bering Sea, with detailed information on salmon and juvenile life-history stages of Atka mackerel and walleye pollock. Salmon biomass in the western Bering Sea was the highest recorded in 2003 since Russian scientists began conducting salmon trawl surveys in the 1980s. Chum salmon constituted most of this biomass and were also the predominate species throughout the Bering Sea and adjacent North Pacific waters. Relative abundance of maturing pink salmon in 2003 was about eighty times higher than 2002 in the central Bering Sea. Juvenile sockeye were consistently the most abundant juvenile species on the eastern Bering Sea shelf, followed by chum, pink, coho, and Chinook salmon. New information on the distribution, migration and ecology of juvenile life-history stages of walleye pollock and Atka mackerel from BASIS surveys are providing insight into factors affecting the survival of these 2 keystone species of the Bering Sea and Aleutian Island ecosystems.

Stock mixtures of salmon from BASIS surveys in the Bering Sea have provided new information on oceanic migration and distribution of regional stock groups in the Bering Sea. Recent results from Japanese surveys indicate 81% of the immature chum salmon in the Bering Sea basin were from Asian (Russia and Japan) populations during August-September in 2002. Results from U.S. surveys on the Bering Sea shelf and Aleutian chain indicate considerable spatial variation in stock mixtures; however, when pooled over location mixtures were very similar to mixtures present in the basin with 80% of the immature chum salmon from Asian populations. Immature chum salmon from western Alaska comprised 2% and 8% of immature chum salmon on the southern Bering Sea shelf and northern Bering Sea shelf, respectively. Stock mixtures of juvenile

chum salmon have identified where migratory routes of western Alaska and Russian chum salmon stocks overlap and has helped identify the contribution of Russian stocks to the total biomass of juvenile chum salmon on the eastern Bering Sea shelf.

BASIS surveys on the eastern Bering Sea shelf have identified relatively large numbers of healthy juvenile salmon outmigrating from western Alaska river systems since 2002. Growth of juvenile sockeye salmon has been significantly higher since 2002 compared to 1999–2001. Average sizes of juvenile salmon are larger than other regions where early marine growth does not appear to be limited, such as southeast Alaska. Coho salmon in the Bering Sea had the highest energy density in 2003 compared to other populations in the Gulf of Alaska and Canadian coastal waters.

CAPE ROMANZOF DISTRICT HERRING FISHERY

INTRODUCTION

The Cape Romanzof Herring District consists of all state waters from Dall Point to 62 degrees north latitude (Appendix B1). Pacific herring *Clupea 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 greatly 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 utilize 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 has occurred in the Cape Romanzof District since 1980. Commercial harvests increased steadily after inception of the fishery, reaching a peak harvest of 1,865 tons in 1986 (Appendix B2). Since 2002, the harvest has greatly decreased because of declining markets resulting in lower prices paid and lower fishing effort. In 1982, the BOF reduced the area open to commercial fishing by closing the waters outside of Kokechik Bay. In 2004, the BOF opened the Cape Romanzof District for commercial herring fishing to the pre-1982 boundaries because of the decrease in fishing effort. Gillnets are the only legal commercial gear type. 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 2005

In 2005, a total of 125.1 tons of herring were harvested by 10 fishermen (Appendix B3). The commercial harvest was 49% below the recent 5-year-average (2000 to 2004) of 244 tons. The entire catch was sold as sac roe herring with no reported sales of bait quality herring (8% or less

roe recovery). The average sac roe recovery was 10.4%. The commercial harvest did not reach the preseason harvest projection range of 700 to 900 tons. The harvest projection range was not reached because fishing effort in recent years has dropped considerably. Larger mesh gillnets have been utilized in the Cape Romanzof commercial herring fishery in recent years to selectively harvest older (larger) unspawned herring with minimal impact on the younger age classes and spawned out fish. Use of larger mesh sizes has reduced the harvest of recruit age and spawned out herring that have historically contributed to low roe recovery rates in the Cape Romanzof fishery and increased the harvests quality.

The traditional pattern for opening commercial fishing periods in the Cape Romanzof District has been to schedule individual fishing periods around high tide events. During the 2004 season, the Cape Romanzof commercial herring fishery was opened until further notice on May 16. Opening the commercial fishery on a continual basis was justified because of the reduced commercial fishing effort, limited tendering capacity, and decreased processor interest in the area. The 2005 commercial fishery occurred in a slightly different manner than in 2004. In 2005, there were 3 commercial herring fishing periods scheduled by emergency order (Appendix B3). The initial 2 commercial fishing periods were 2 and 3 hours in duration before the Cape Romanzof District was opened until further notice from May 27 to June 2. These first 2 commercial periods helped department determine that a harvestable surplus of herring was available for commercial harvest in the Cape Romanzof District. Conducting commercial fisheries this way allows fishermen the maximum opportunity to explore the district to find marketable quality of sac roe herring. This increase in opportunity is justified because of the decrease in participation by fishermen in recent years. Total fishing time was 134 hours (Appendix B2). Similar to past years, fishing was limited to one 50 fathom gillnet per vessel.

The estimated exvessel value of the 2005 harvest was approximately $19,000 (Appendix B2). The inseason price for herring sac roe was $150 per ton at 10% roe recovery. This excludes any incentives, bonuses, or retroactive adjustments that may have been paid to fishermen after the season. One company purchased herring and was represented by 3 tenders during the fishery (Appendix B4). Residents from Scammon Bay and Hooper Bay accounted for 100% of the effort and harvest.

The overall exploitation rate of herring was estimated postseason to be approximately 3.7% of the available biomass. A total of 482 herring were sampled from the commercial harvest, of which 401 were able to be aged. The estimated age composition of the commercial samples based on scale analysis was: <age-7: 0.0%; age-8: 24.9%; age-9: 29.4%; age-10: 11.5%; age-11: 9.7%; age-12: 11.0%; age-13 and older: 13.4% (Appendix B5).

SUBSISTENCE FISHERY

The subsistence harvest and effort figures represent only the harvest which was reported. Therefore, the reported harvest is a minimum estimate since not all fishing families were contacted and not all households who received questionnaires returned them. During 2005, an estimated subsistence harvest of 6.9 tons of herring was harvested by 13 fishing families from Hooper Bay, Chevak, and Scammon Bay (Appendix C6). In addition, 5 families harvested 1,125 pounds of herring spawn-on-kelp for subsistence purposes (Appendix C7). A total of 228 mail-out questionnaires were sent to households in the communities of Hooper Bay, Chevak, and Scammon Bay. A total of 44 (19%) households responded.

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 as was the case in 2005. Herring biomass has been estimated using a combination of information from aerial surveys, test and commercial catches, spawn deposition, and age composition. Unfortunately, due to budget restraints and water turbidity, no useful aerial surveys were flown during the 2005 season.

The estimated 2005 postseason biomass was 3,388 tons. Approximately 54% of the total biomass was composed of age-8 and 9 herring based on test fishing samples. The ADF&G crews arrived on site May 11 and no fresh spawn was discovered during initial reconnaissance on May 13. The first herring caught, or spawn found on the beach, occurred on May 25. The arrival time for the crew was within the normal window, which is timed to allow the camp to be set up before the arrival of the fish using historic run timing information. Since no spawn was present on the beach when the crew arrived it is assumed that test fishing targeted the majority of the run and was comparable to historic run timing for herring in the Cape Romanzof District. In recent years, the crew had encountered spawn on the beach in the Cape Romanzof Area during the initial beach reconnaissance suggesting the early portion of the run was missed the last few years. Herring spawning in the Cape Romanzof area had a later run timing than in recent years (Appendix B2).

Test fishing with variable mesh gillnets has been conducted since 1978 to determine distribution, timing and relative abundance of spawning herring, and to collect samples for age, sex, size, and relative maturity information. ADF&G conducted test fishing from May 14 through June 5, 2005. A total of 660 herring were sampled for biological data, of which 576 were aged. Herring comprised 100 percent of the total catch of schooling species.

The age composition of the variable mesh test gillnet samples was composed of Age-3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 herring accounting for 3.1%, 11.3%, 6.1%, 2.1%, 3.3%, 41.5%, 20.7%, 3.1%, 3.0%, and 3.3% of test fishing samples, respectively (Appendix B8). Age-13 and older herring comprised 2.4% test fishing samples. Age 8 and 9 herring made up 62.4% of the test fish samples.

Qualitative spawn deposition surveys were not conducted in 2004 or 2005 because of budget cuts. ADF&G crews arrived in camp on May 11 and during subsequent beach walks no spawn or herring carcasses were found until May 24.

HERRING OUTLOOK FOR 2006

The 2006 projected biomass is expected to be between 2,500 and 3,500 tons with a midpoint of 3,000 tons. Because of the predominance of age-8 and -9 herring in 2005 it is anticipated that the herring return in 2006 will be composed of predominately age-9 and 10 fish. Based on the *Bering Sea Herring Fishery Management Plan* (5 AAC 27.060), the exploitation rate shall not exceed 20% of the estimated biomass. Therefore, the 2006 allowable harvest is between 500 and 700 tons with a midpoint of 600 tons.

Normally it is not possible to determine herring abundance using aerial survey methods in the Cape Romanzof District due to turbid water conditions. Therefore, assessment of stock abundance will be made using information collected from test fishing, commercial harvest rates, herring distribution, age composition, and if possible, aerial surveys.

Fishing periods will be established by emergency order. Emergency order authority provides ADF&G the opportunity to allow harvest during the period of optimal sac roe recovery, maintain management control, and provide for an orderly fishery. Generally, a countdown prior to each period opening and closure will be provided on VHF channel 7.

It is likely that gear will initially be restricted to no more than 50 fathoms and one gillnet (one shackle of gear) per vessel. However, because of the lower fishing effort in recent years it is possible that 100 fathoms (2 shackles of gear) per vessel may be permitted in 2006. Two shackles of gear were permitted for several openings in 2003 and 2004, but few fishermen took advantage of the opportunity. Fishermen should be prepared and bring 2 nets to the fishing grounds.

Commercial fishing periods will be determined by the amount of fishing effort present and roe quality. However, fishing effort is anticipated to be lower than the historical average. This decrease in fishing effort may allow ADF&G to open the fishery on a continuous basis in 2006. Commercial fishing will be opened when it is determined that marketable sac roe herring is present. Fishermen are encouraged to bring more than one mesh size of gillnet gear if they are available. The quality of roe is dependent on size and maturity of the herring, thus it would benefit fishermen to have some flexibility. It is important that fishermen, buyers, and the department obtain the highest roe recovery possible. Buyers are expected to report roe recovery obtained from deliveries during commercial fishing periods in a timely manner. Fishermen are strongly urged to sample their catch for sex ratio and roe quality while commercial fishing to determine if they should relocate their gear to a different location.

OTHER MARINE AND FRESHWATER FINFISH FISHERIES

SUBSISTENCE FISHERY 2005

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. In areas where salmon are not available, or when salmon stocks are weak, an increase in reliance on non-salmon species occurs. Subsistence fisheries, which target non-salmon species (e.g. pike, sheefish, whitefish, blackfish, etc.), are known to contribute to subsistence needs in most areas. Non-salmon harvest information is documented yearly during the ADF&G postseason subsistence salmon harvest surveys, but secondarily 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 (GASH) of the Yukon River drainage were extensively surveyed in 2 studies by ADF&G (Division of Subsistence and Sport Fish) and Tanana Chiefs Conference (TCC). The studies documented traditional ecological knowledge (TEK) of the behavior, harvest, and use of non-salmon fish in these areas of Alaska

and found that non-salmon species are harvested by a high percentage of households in these areas (Brown et al. 2005; Andersen et al 2004).

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. Estimated and reported subsistence catches of pink salmon and freshwater finfish from subsistence surveys in 2005 are presented in Appendix C1 and C2. Subsistence catches of freshwater finfish taken under authority of a permit in the Upper Yukon Area in 2005 are presented in Appendix C3.

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, and "tomcod" (saffron cod) are frequently taken through the ice using hand lines. Dip nets are used in late May to early June to harvest smelt 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 from the subsistence and commercial salmon fishery.

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 NMFS and ADF&G. The 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 and broad whitefish 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 2005

In 2005, the personal use salmon fishery followed the regulatory fishing time of two 42-hour periods per week. Household permits issued in 2005 are as follows: 63 personal use salmon and 10 personal use whitefish and sucker. Permit holders reported 5 personal use whitefish and sucker, combined with the incidental harvest of 27 personal use salmon fishermen who reported harvesting 84 whitefish, 3 sheefish, 7 burbot, 2 pike, 3 grayling, and 403 suckers (Appendix C3).

COMMERCIAL FRESHWATER FINFISH 2005

Whitefish Fishery Summary

Regulations adopted by the 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. Commercial fisheries for species other than salmon have been allowed in widely scattered locations throughout the Yukon and Tanana River drainages. Most of these fisheries are limited or experimental operations and occur sporadically. During years of very poor salmon runs, freshwater fisheries permits have been denied. Since the mid-1990s there has not been much interest in freshwater commercial fisheries. However, beginning in 2003, a major buyer has been permitted in the Lower Yukon River to purchase Arctic lamprey and, in 2005, up to 10,000 pounds of whitefish.

Permits for the taking of non-salmon species have been issued for various locations in the Lower Yukon Area. Set gillnets are primarily used for taking whitefish and sheefish in the Lower Yukon Area. Historically, the catch was marketed in local community stores or in Bethel. The most recent commercial fisheries for whitefish in the Lower Yukon Area have occurred in September. The reported historical harvests for all Lower Yukon Area freshwater fisheries are presented in Appendix C4. In the Upper Yukon Area, commercial freshwater fisheries targeting primarily whitefish have been permitted in prior years (Appendix C5), although since 2002 only 3 requests for permit applications were received and no permits were utilized. Permit authorization is not required for the sale of these species when taken incidentally during the commercial salmon fishing season. To date, such sales of incidental whitefish and sheefish during the commercial salmon fishery have only occurred in Districts 4–6 (Appendix C6).

In 2005, one buyer was permitted to purchase up to 10,000 pounds of whitefish in the Lower Yukon River under the authority of a Commissioner's permit. A total of 13 fishermen harvested 6,315 pounds of sheefish and miscellaneous whitefish species at one buying station in Emmonak. Least Cisco was the most numerous whitefish harvested. Fishing commenced on October 15 and closed on October 28 for a total fishing time of approximately 13 days. Fishing gear was restricted to one set net or drift gillnet up to 150 feet in length with a maximum of 6 inch stretch mesh, or one hand line/hook and line per commercial permit holder.

The estimated value of the harvest to fishermen was $6,315 at $1.00 per pound. The average value per fisherman was $486. The fishing effort consisted of local Alaskan residents of Emmonak, Alakanuk and Kotlik. A combined total of 34 deliveries of 3,176 fish with a total weight of 6,315 pounds were made:

	Sheefish	Unknown Whitefish	Least Cisco	Bering Cisco	Broad Whitefish	Humpback Whitefish	Total
Number	266	781	1,694	241	163	31	3,176
Pounds	1,688	1,419	2,294	362	411	141	6,315

Harvest Sampling

Samples were collected from the commercial harvest and shipped to Anchorage in order to collect basic biological information. A total of 58 broad whitefish were sampled with mean length of 360 mm and consisted of 44% males. Sixty humpback whitefish were sampled with a mean length of 350 mm and consisted of 50% males. Forty least cisco were sampled with a mean length of 354 mm. Fifty sheefish were sampled with a mean length of 675 mm and consisted of 20% males.

Assessment

Although 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. A fishery was allowed in 2005 with a harvest cap of 10,000 pounds to test market conditions, as well as to evaluate operational and catch characteristics of gear. The harvest cap for whitefish was based on the historical commercial harvest of sheefish and whitefish in the lower Yukon Area from limited commercial fisheries conducted from 1980 through the early 1990s.

Because of limited knowledge concerning whitefish biology and life history patterns for the Yukon River drainage, ADF&G managed this fishery conservatively. 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. The department does not foresee this commercial fishery to be developed to harvest more than the current 10,000 pound limit in the near future.

ARCTIC LAMPREY FISHERY SUMMARY

The fall of 2003 marked the first year for a directed Arctic lamprey commercial fisheries in the Yukon Area (Appendix C4 and C5). 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. No commercial Arctic lamprey fishery was prosecuted in 2004 due to lack of buyer interest and fishermen were unable to locate lamprey during the commercial fishery in 2005.

Commercial Fishery

One commercial fish processor was permitted to purchase 5,000 pounds of Arctic lamprey in 2005. The purpose of this experimental permit was to determine species distribution and abundance evaluate operational and catch characteristics of gear, and to test market conditions. Originally the buying station was to be located in Mountain Village, but due to poor ice conditions and open water the processor chose to relocate the buying station upriver to Grayling. The ice conditions in Grayling also proved to be a problem. Rough ice and open water prohibited travel to traditional sites. Locations with suitable glare ice, preferred by fisherman, were limited or not accessible. A few traditional fishing sites were monitored with limited effort. No significant subsistence catches were reported in Grayling. In early December, a meeting was held in Grayling with 7 permit holders and other concerned members of the community to discuss the prospects of the commercial fishery. It was concluded that the lampreys had most likely passed earlier in the season during high flows and the fishermen were not motivated to increase the

monitoring effort. On December 12 the processor decided not to pursue this fishery any further. The permit was valid through December 31, 2005.

Historical Yukon River commercial harvest of Arctic Lamprey is shown in Appendix C4 and C5.

Subsistence Fishery

ADF&G started monitoring subsistence catches on November 2, 2005. Phone contacts were established in the villages of Mountain Village, St. Marys, Marshall, Russian Mission, Holy Cross and Grayling to record subsistence catches and gain run timing information. Contacts in Mountain Village reported high, open water and very little fishing effort. There were no reported subsistence catches in Mountain Village or St. Marys in 2005. Subsistence fishermen reported catching 8 lampreys on November 4 downriver of Marshall. On November 13, ten lampreys were caught in Russian Mission. No catch was reported in Holy Cross. A screen mesh trap was employed at Grayling in addition to traditional dip netting methods and one lamprey was caught. Several subsistence fishermen mentioned that a warming trend often proceeds periods of high lamprey passage. In 2005, persistent cold temperatures were recorded during the normal migration period.

Assessment

The life history of Arctic lamprey in the Yukon drainage is not well documented and a firm understanding of lamprey distribution and abundance trends is lacking. Although TEK provides an indication of lamprey run timing, there continue to be questions as to how the run develops. Based on local knowledge, the lamprey run usually begins near the end of October in the Mt. Village and St. Marys area. During recent years, such as in 2003, the lamprey run has begun near mid-November because of the warm fall weather. Information from local residents indicates strong passage rates typically occur over several days. Fishermen report that there may be from 1 to 3 pulses of passage, and normally the lamprey run is very condensed lasting only 2 to 4 days, but sometimes up to a week. From harvest reports in 2003, the estimated travel speed of lamprey was 18 miles per day between the communities of St. Marys and Grayling.

In 2005, subsistence fishermen from St. Marys to Grayling commented that high water and rough ice conditions hindered their ability to travel and fish traditional sites. Furthermore, many subsistence fishermen commented that it is not uncommon for entire communities to miss the very short window of opportunity to fish on the lamprey pulses due to poor ice conditions. High water in early November may have affected lamprey migration behavior. It is possible that the lamprey traveled deeper or through areas not traditionally fished and passed undetected by the subsistence fishery. With limited subsistence fishery information the status of the 2005 lamprey run is unclear.

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 (Appendix D1).

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 ADF&G's 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* sp., salmon, and Arctic cod. (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 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 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 (Appendix D2). 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. However 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 are harvested 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 the 2005 season, the harvest included 490 humpback whitefish, 2,870 least cisco, and 9,343 Arctic cisco. Of these totals, 2,975 Arctic cisco and 2,170 whitefish went into commercial sales.

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FIGURES

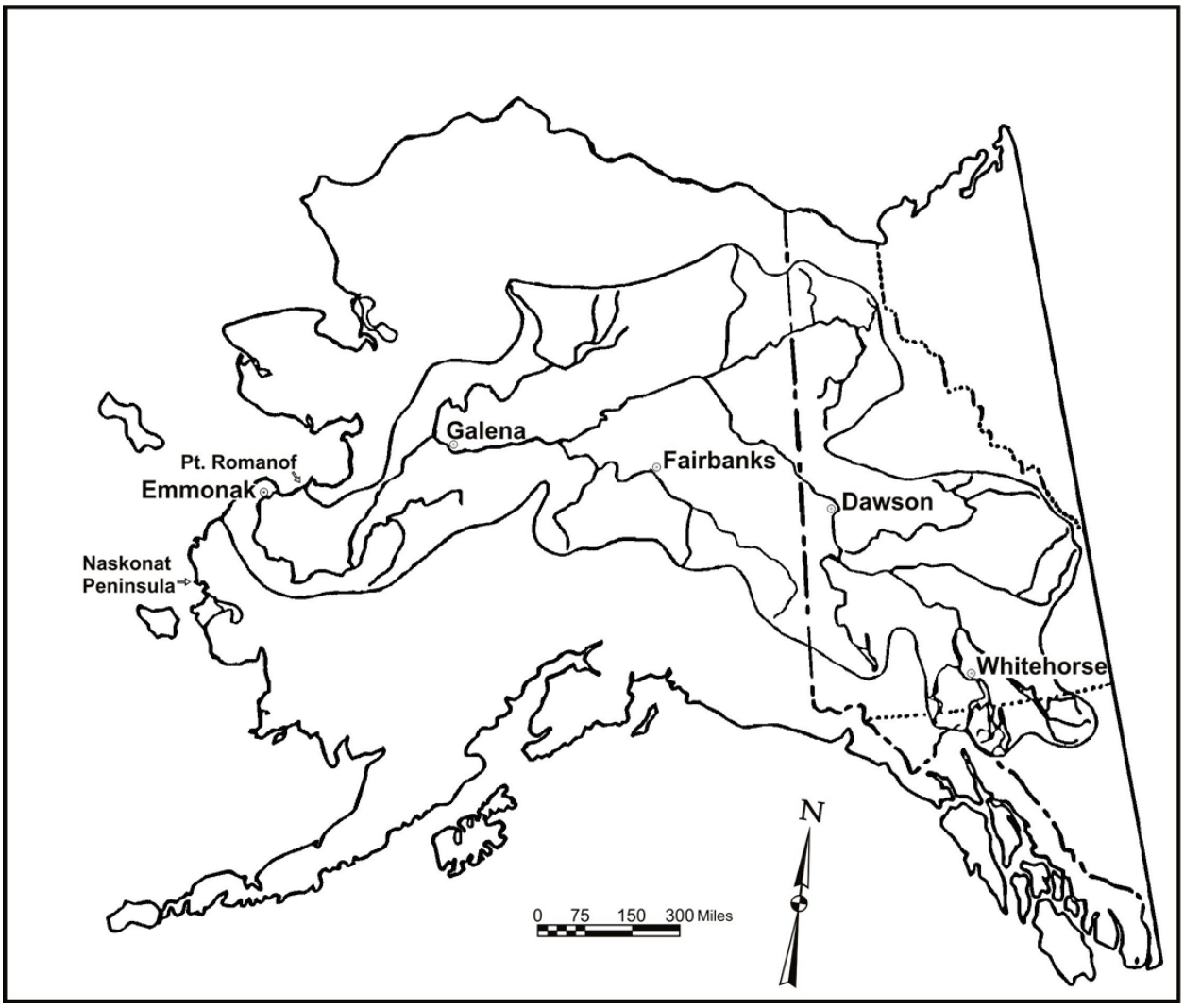


Figure 1.–Map of the Yukon River drainage.

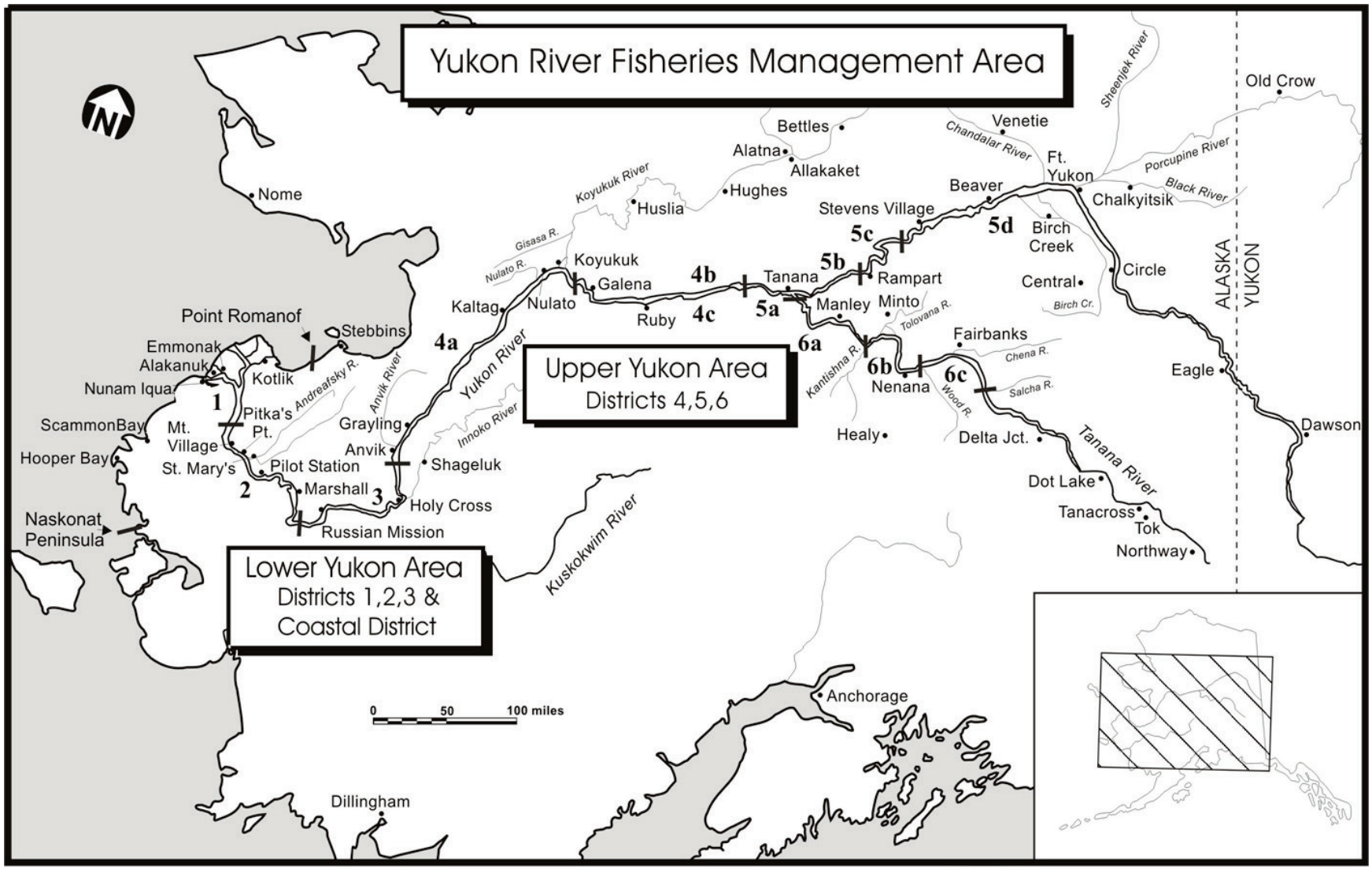


Figure 2.–Alaskan portion of the Yukon River drainage showing communities and fishing districts.

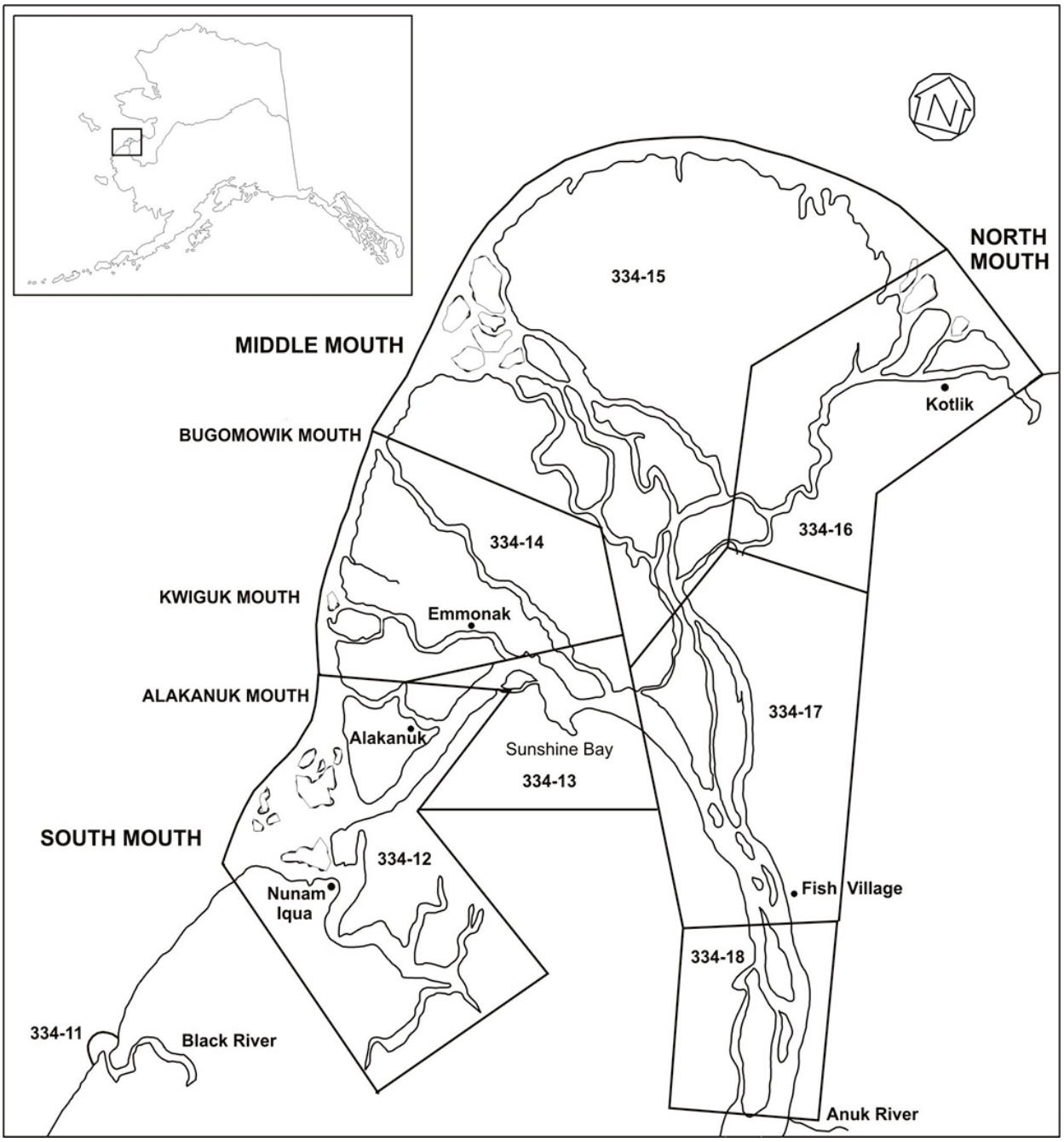


Figure 3.–District 1 showing statistical areas, Yukon area.

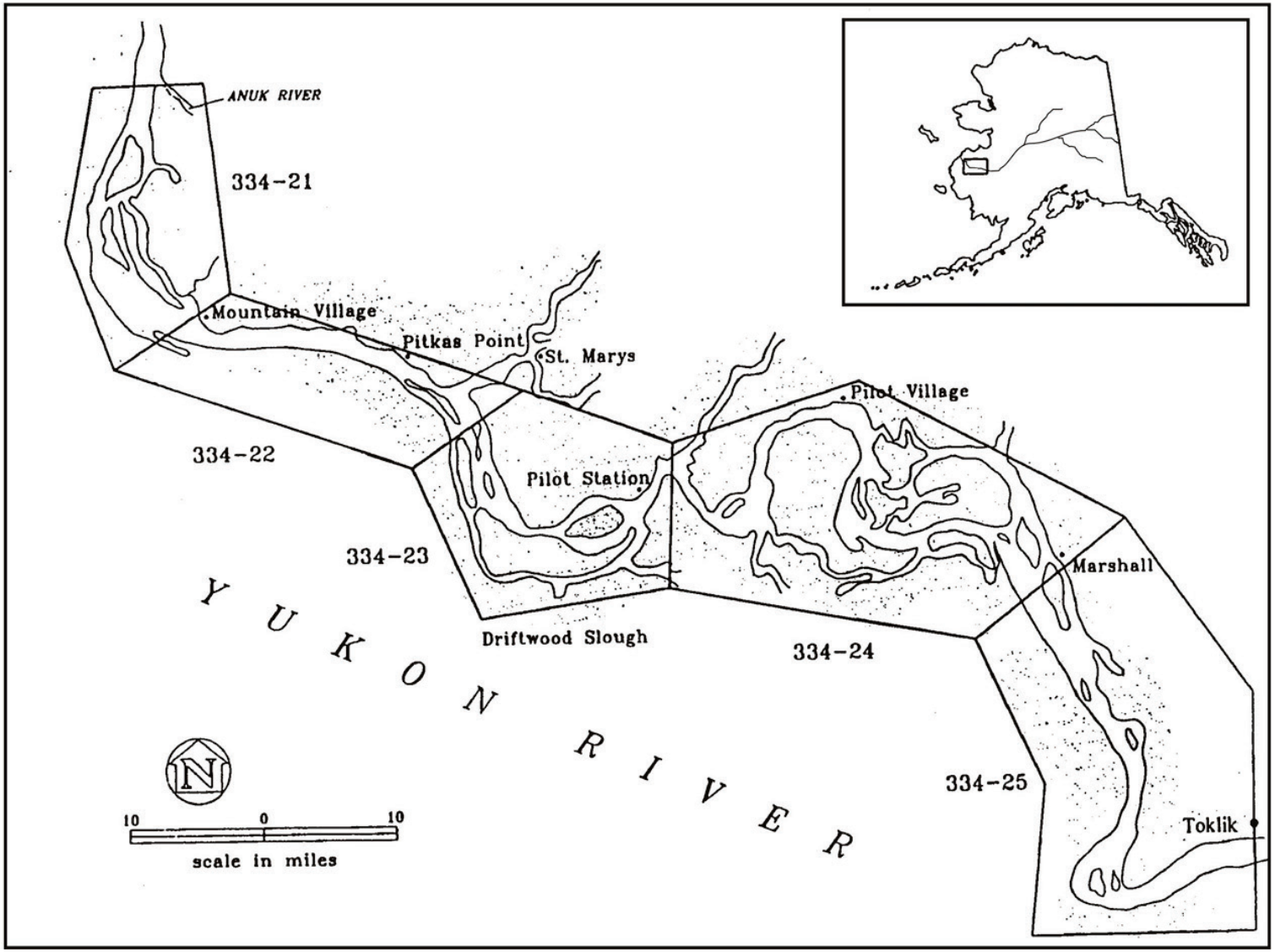


Figure 4.–District 2 showing statistical areas, Yukon area.

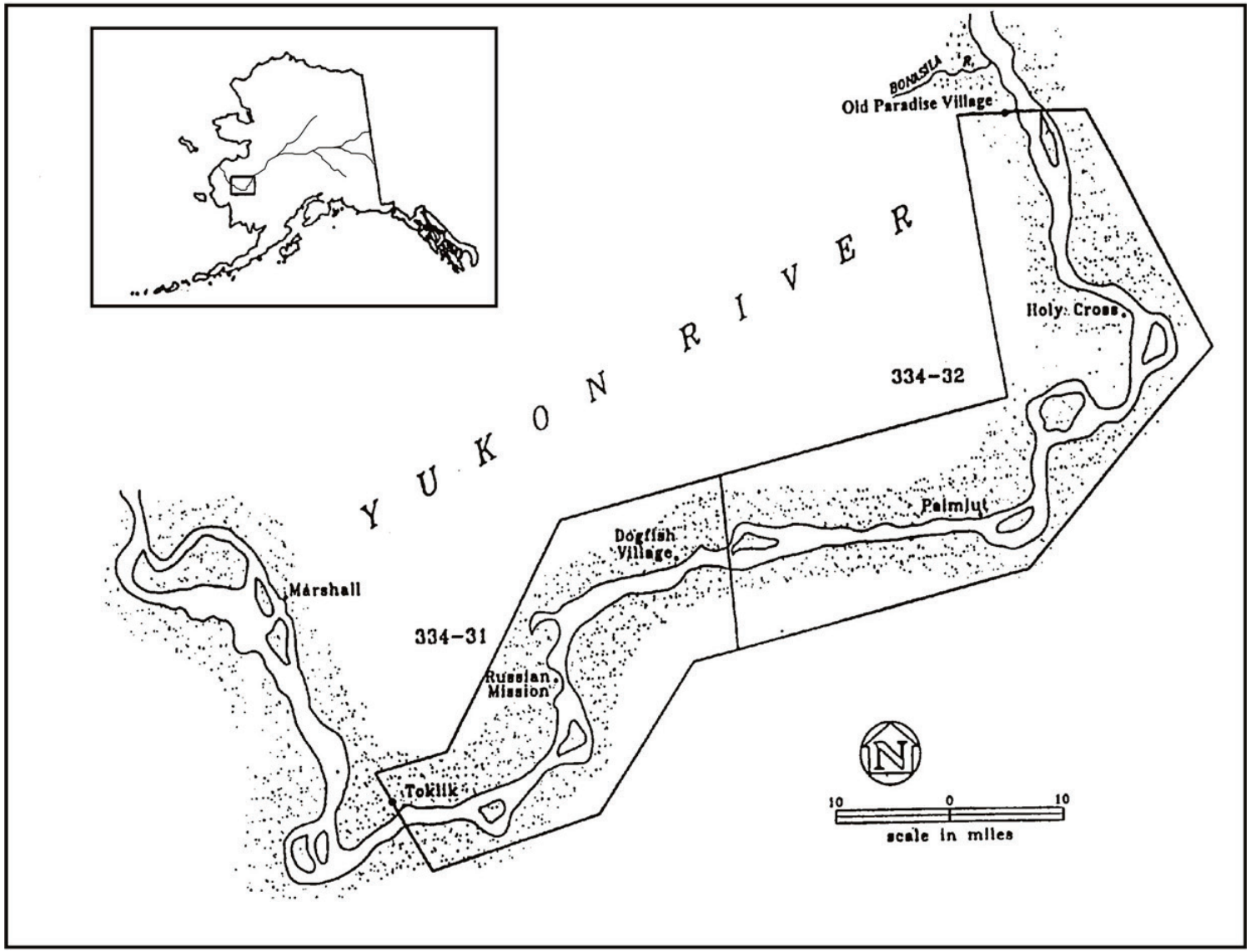


Figure 5.–District 3 showing statistical areas, Yukon area.

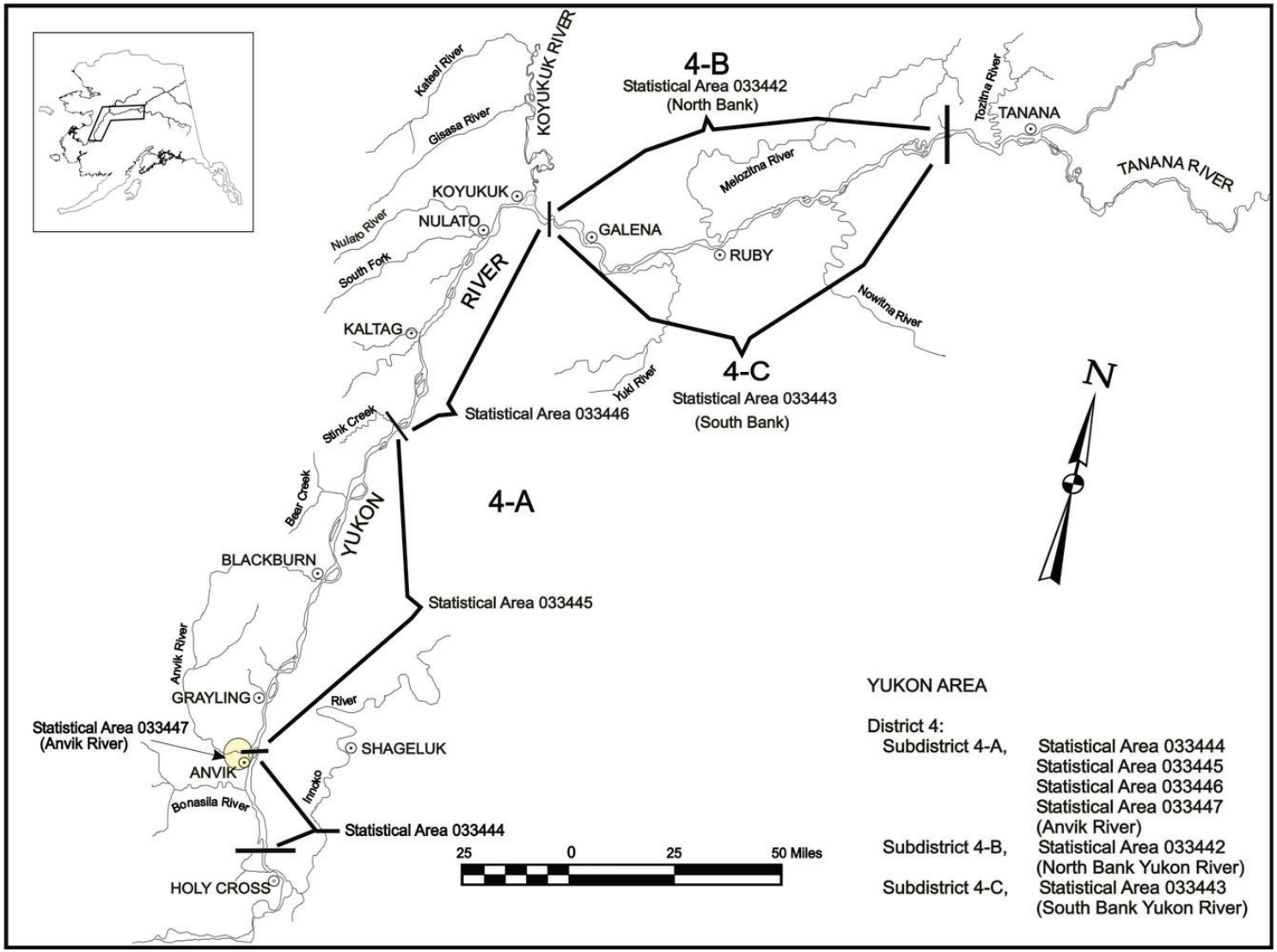


Figure 6.–District 4 showing statistical areas, Yukon area.

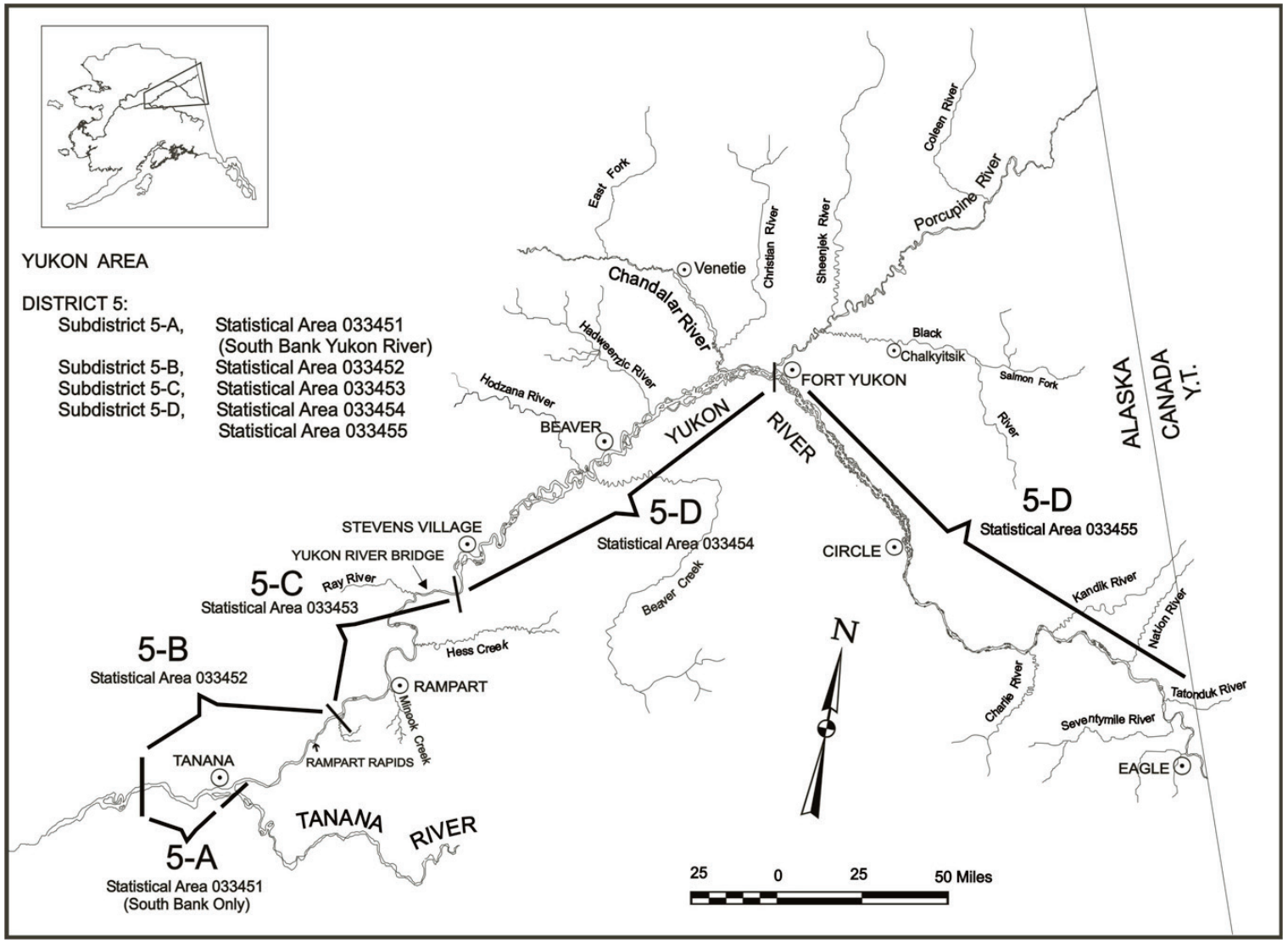


Figure 7.–District 5 showing statistical areas, Yukon area.

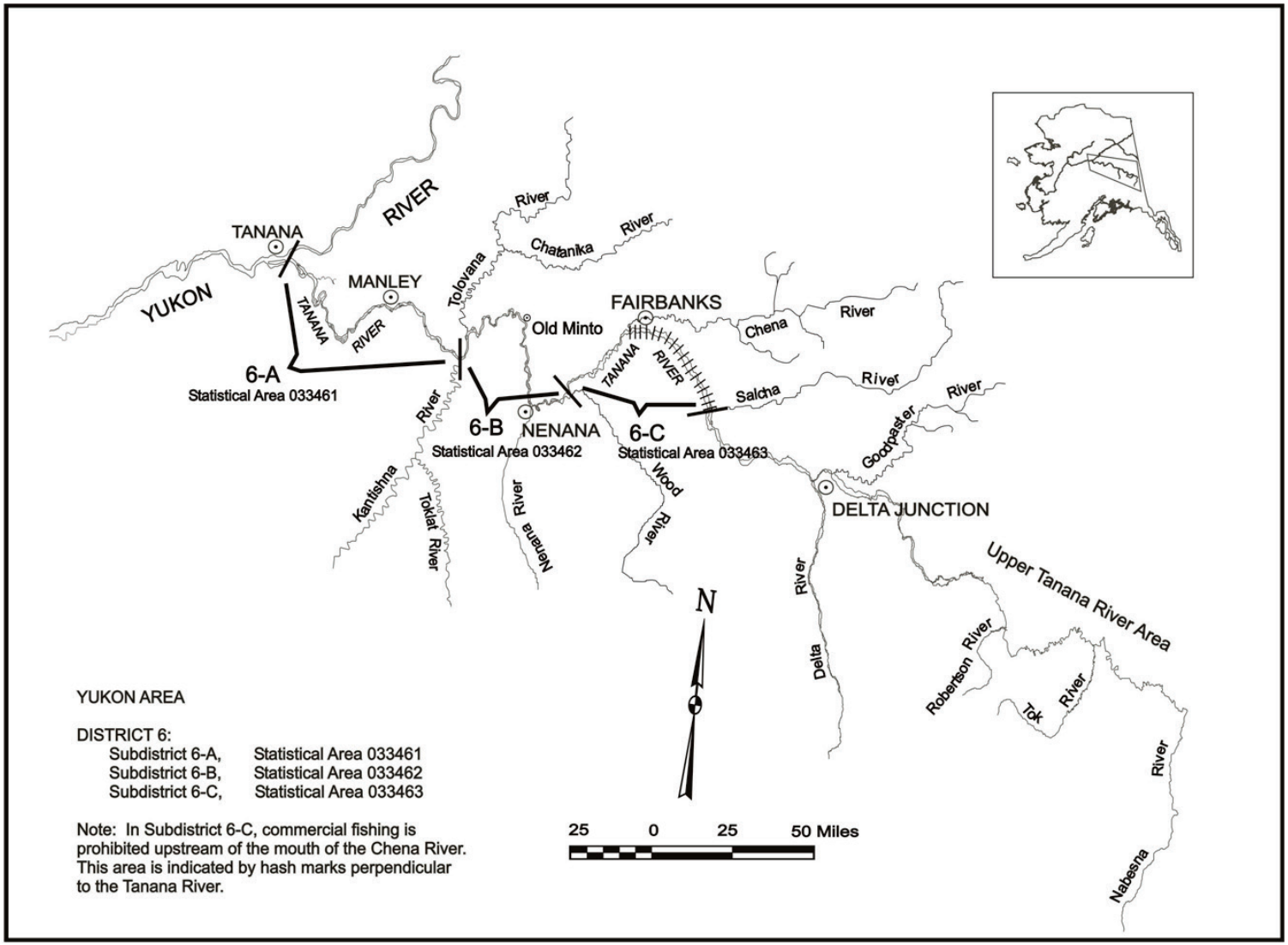


Figure 8.–District 6 showing statistical areas, Yukon area.

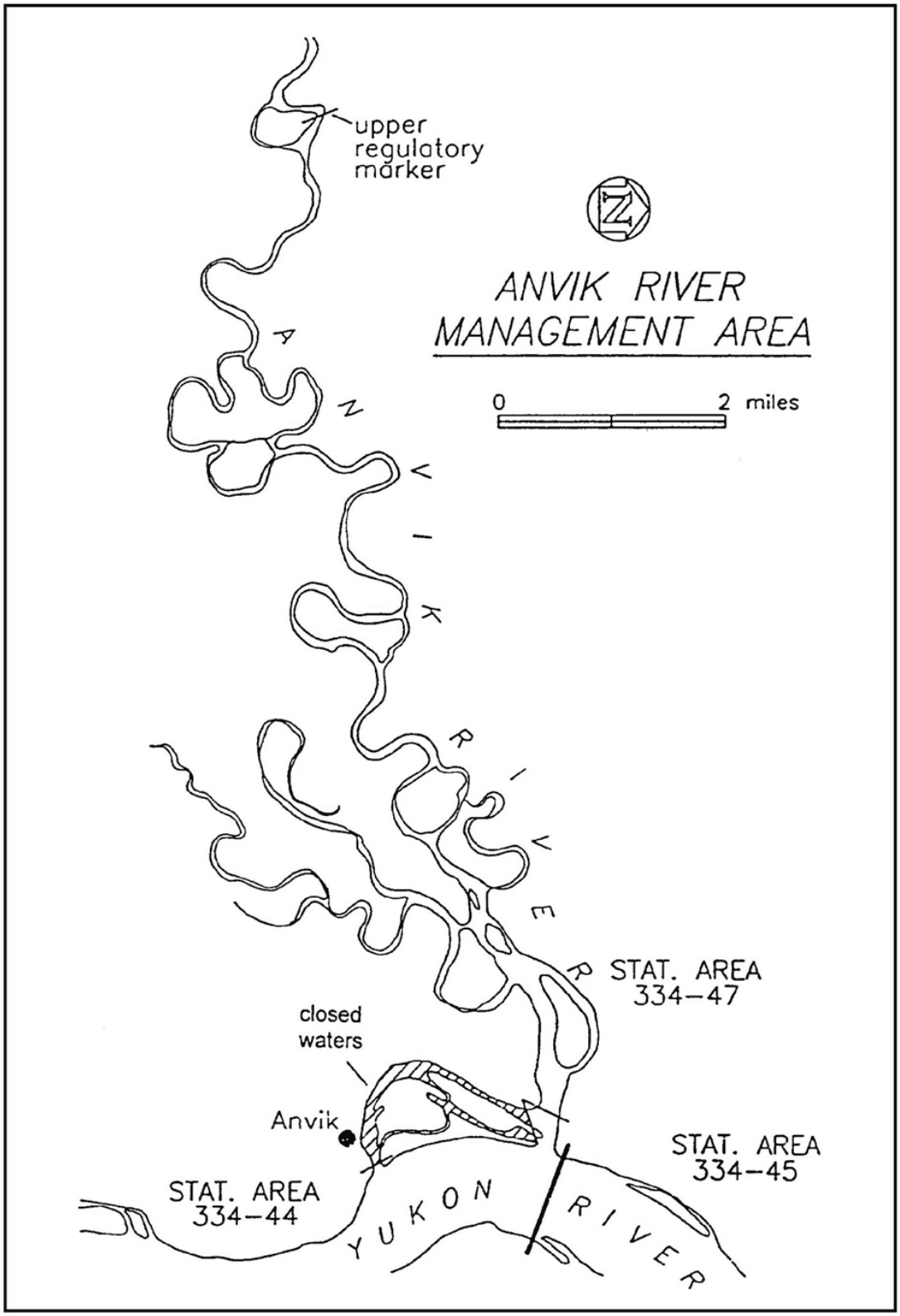


Figure 9.–Anvik River management area, Yukon area.

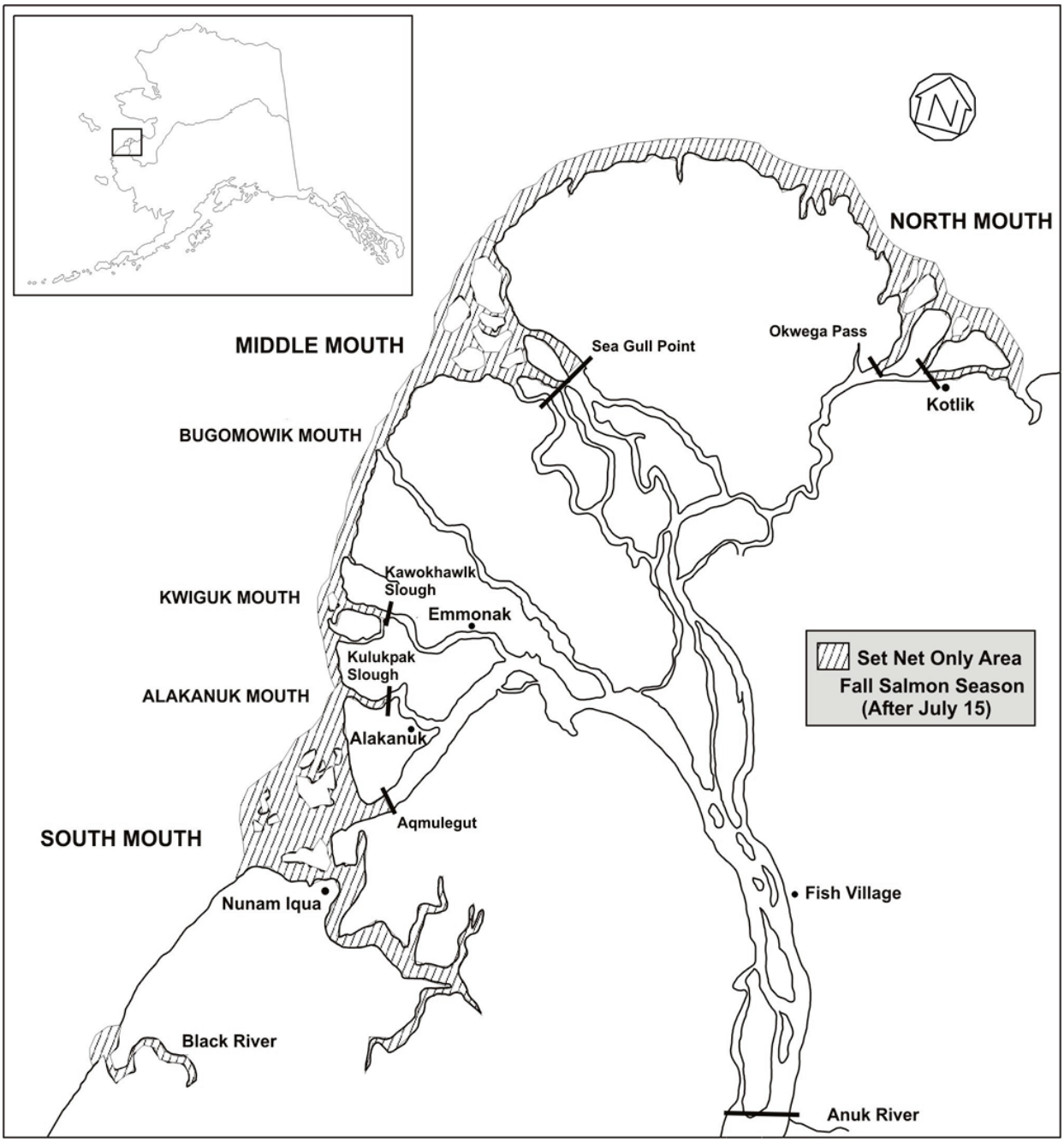
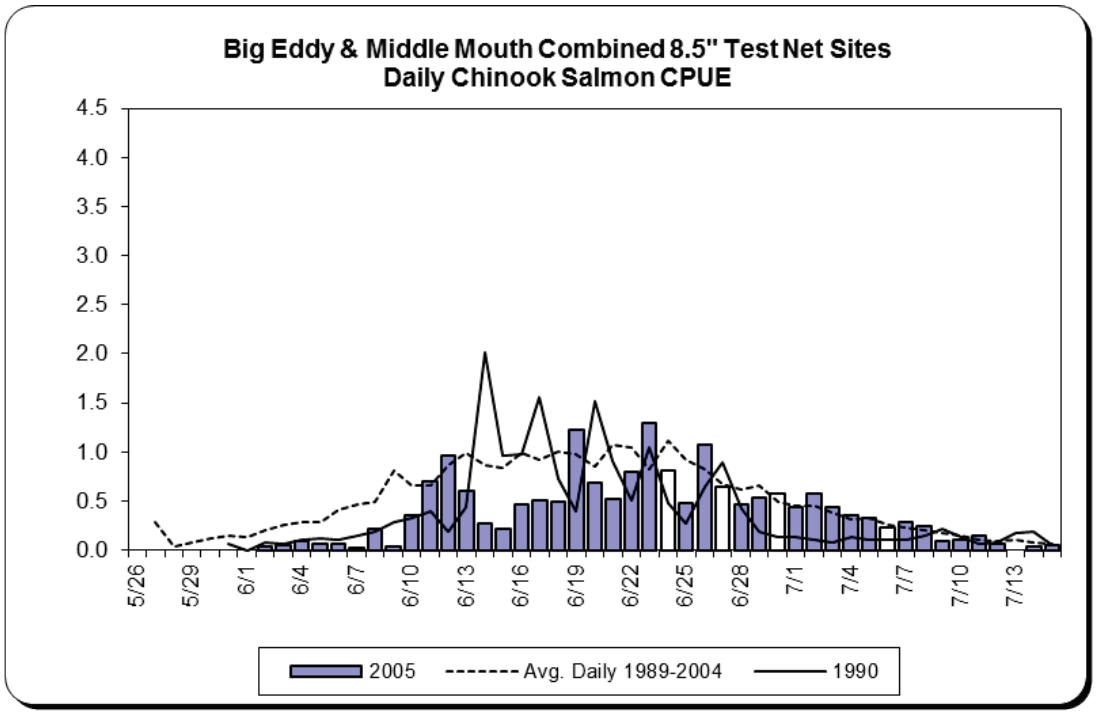


Figure 10.–Set gillnet only area of District 1, Lower Yukon area.



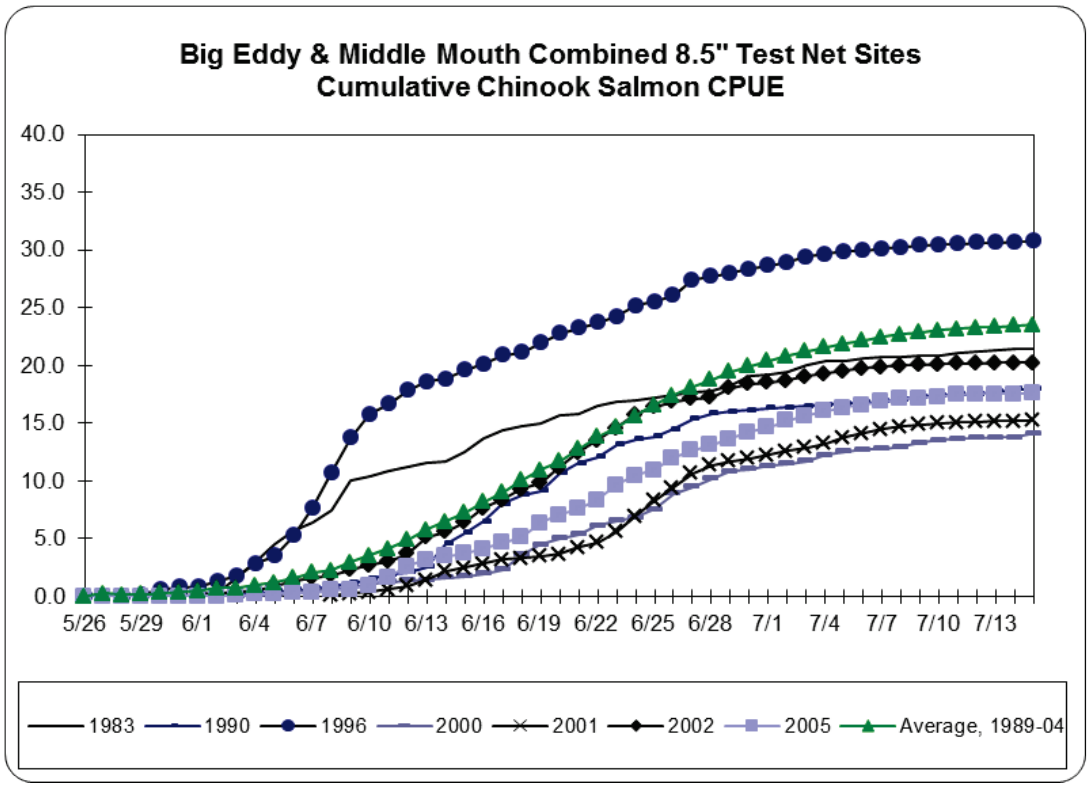
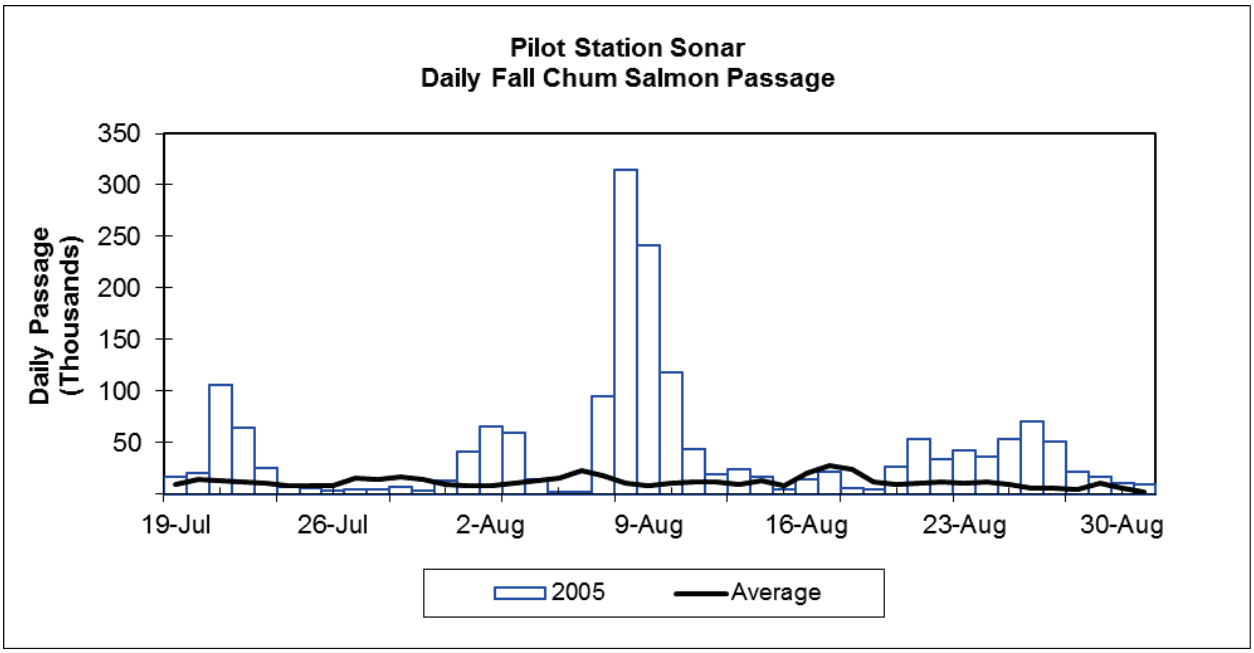


Figure 11.–Daily test fish CPUE for Chinook salmon test fish sites 2005 compared to the 1989–2004 average (above). 2005 Cumulative test fish CPUE for Chinook salmon test fish sites (below) compared to the1989–2004 average CPUE.



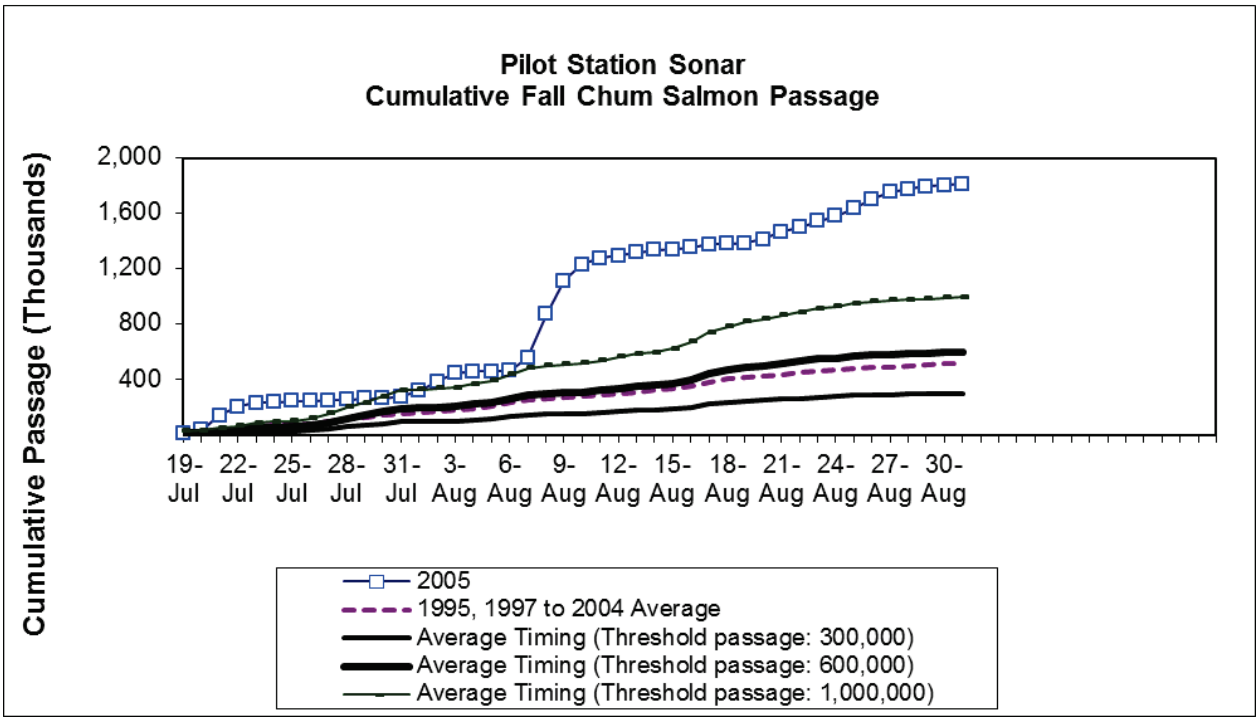


Figure 12.–Daily Pilot Station sonar passage counts attributed to fall chum salmon in 2005 (top figure), compared to 1995 and 1997 through 2004 average. Cumulative Pilot Station sonar passage counts attributed to fall chum salmon in 2005 (bottom figure), compared to 1995 and 1997 through 2004 average.

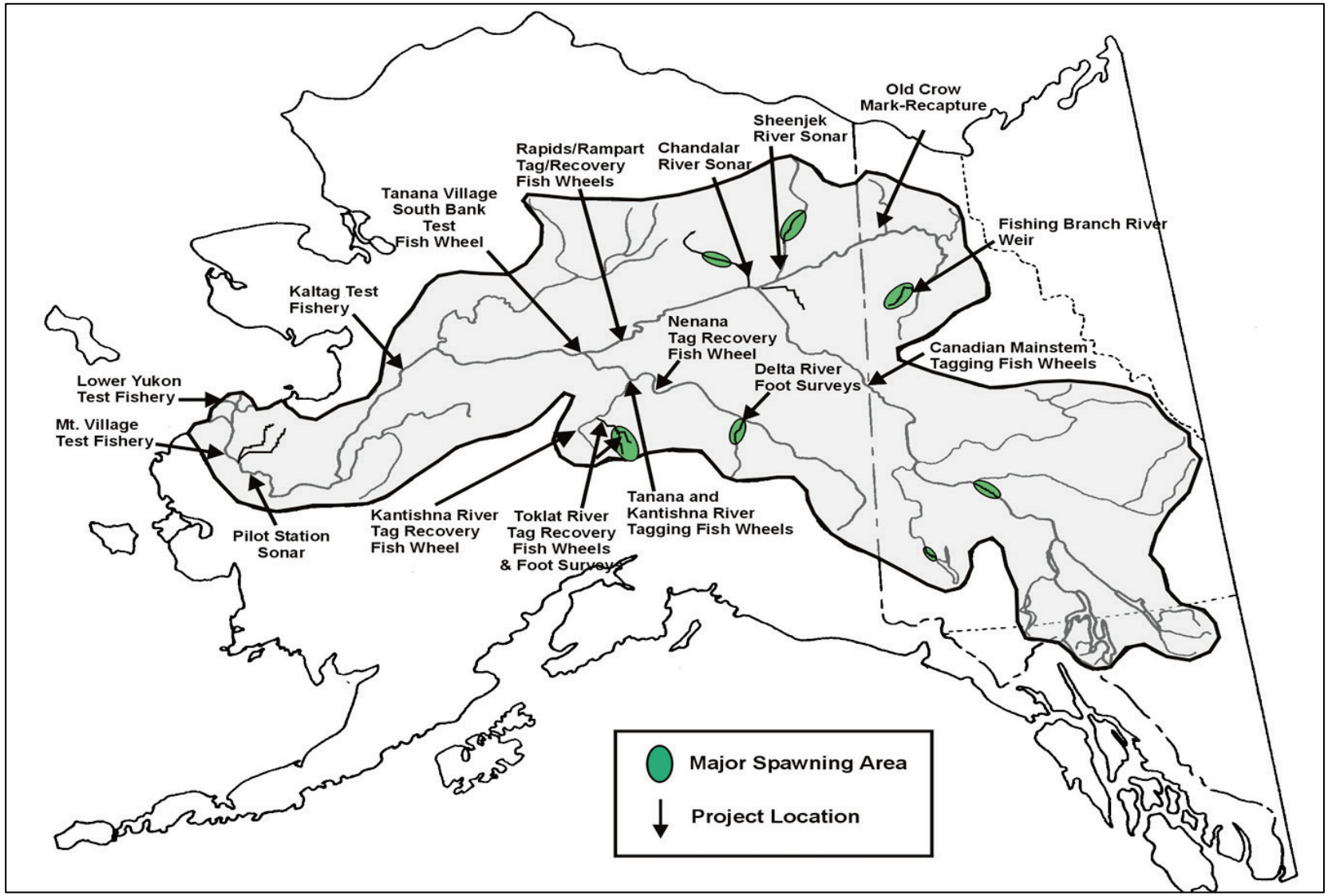


Figure 13.–Select fall chum salmon monitoring projects, Yukon River drainage.

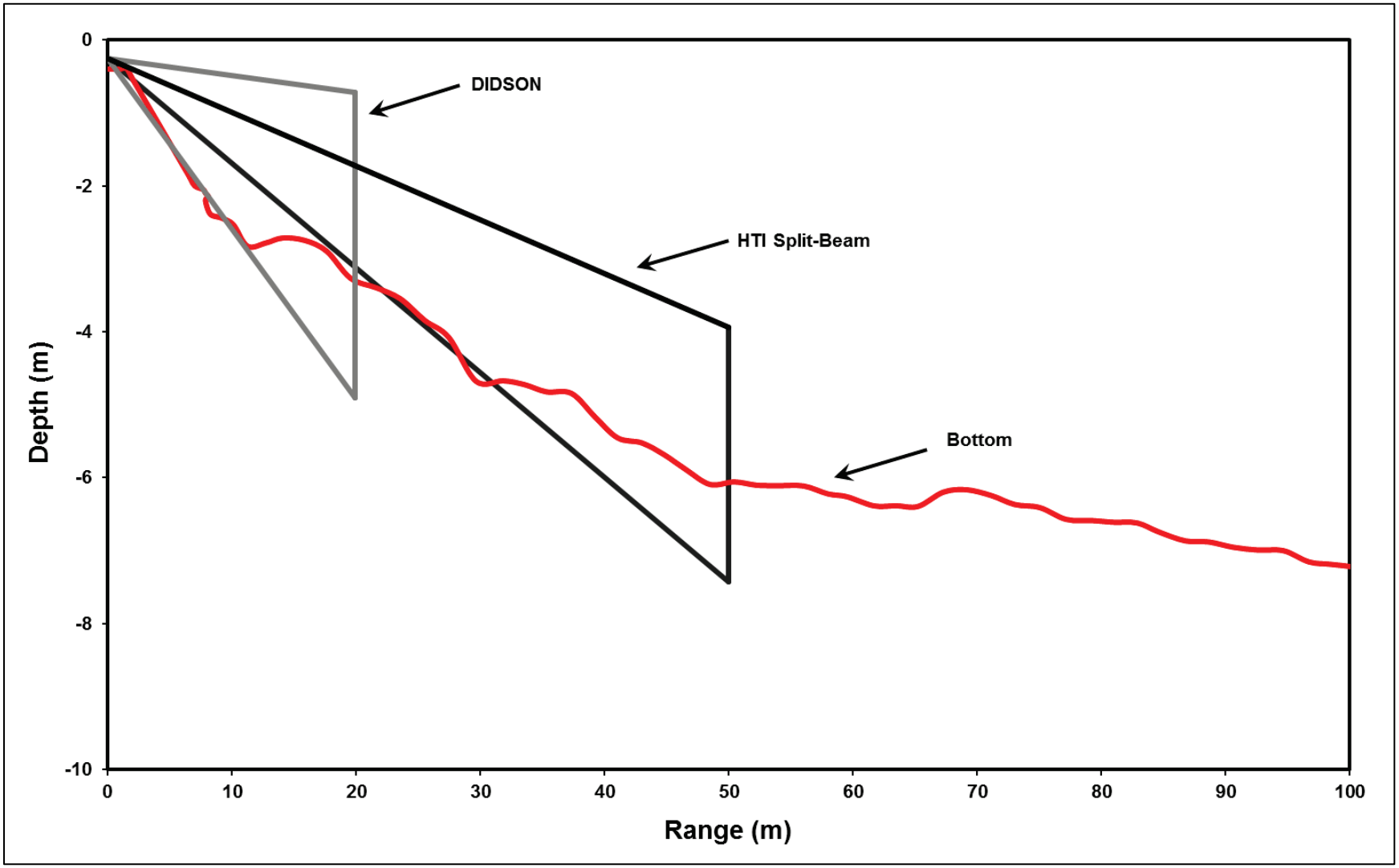


Figure 14.–Schematic representation for the approximate river profile for Yukon River Sonar at Pilot Station and associated nominal beam-width of the DIDSON and split-beam sonar of the first sampling stratum on the left bank, 2005.

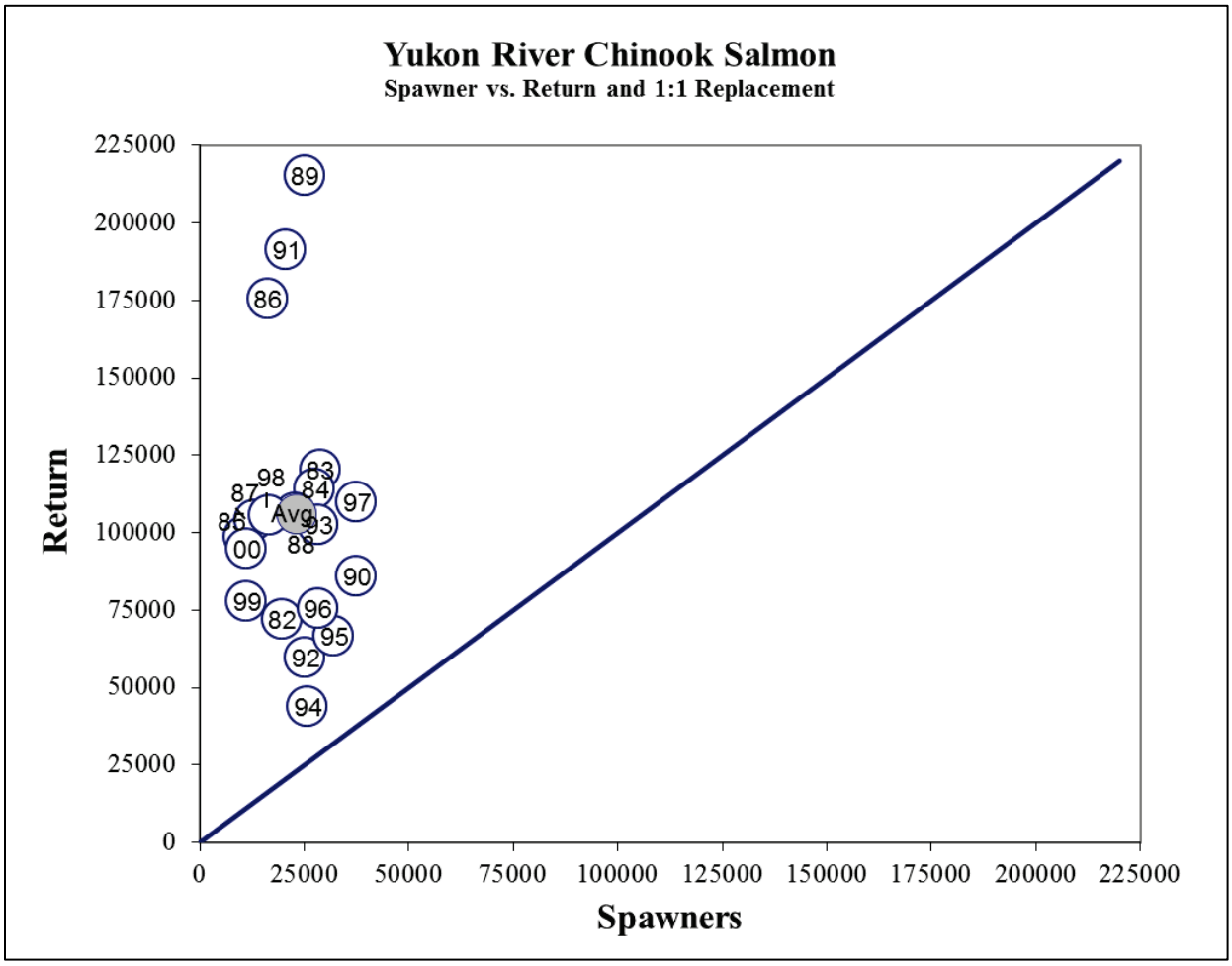


Figure 15.–Yukon River mainstem Canadian Chinook salmon spawners vs. estimated returns and the 1:1 replacement line. The years in the figure represent the brood years.

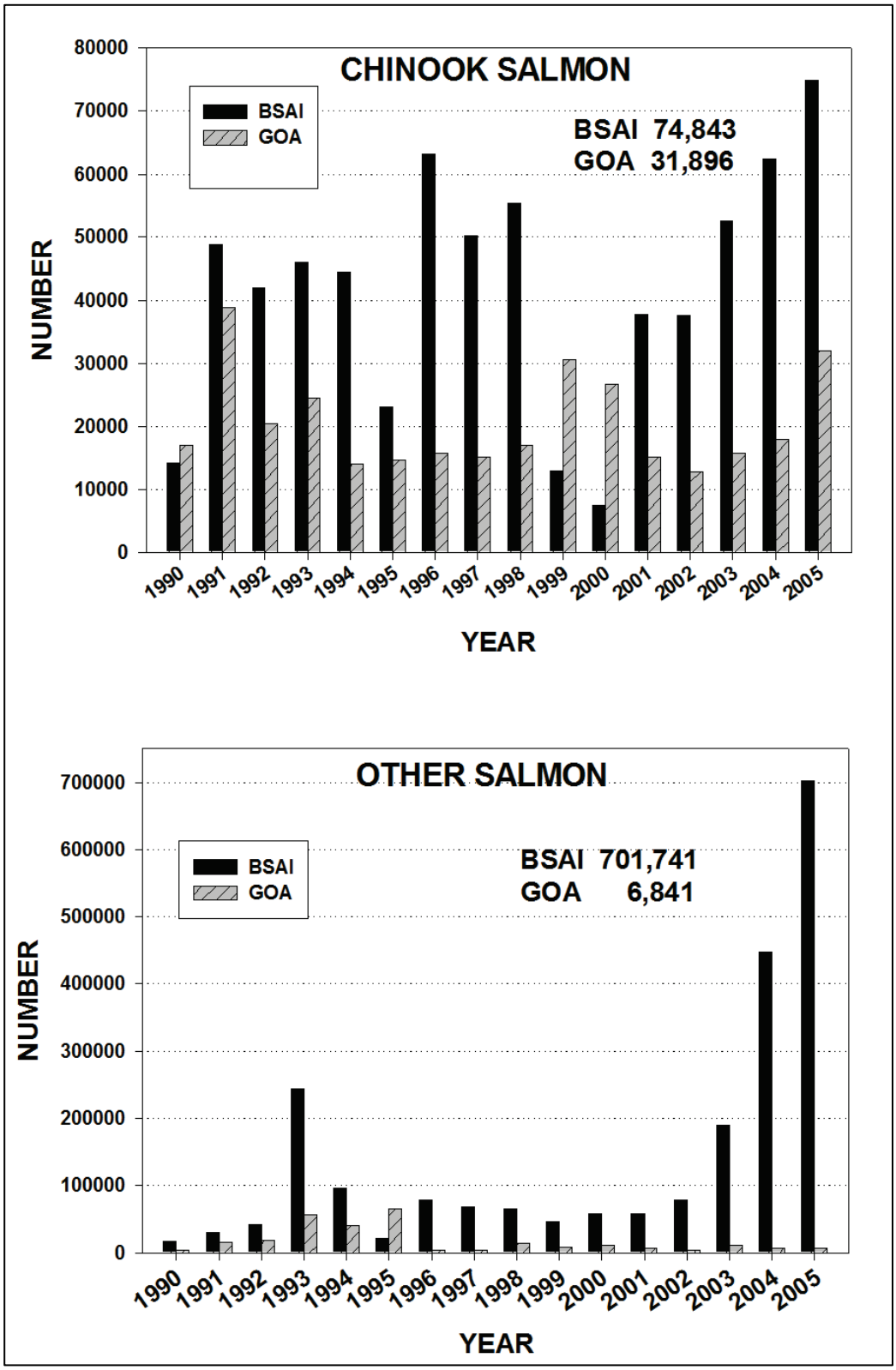


Figure 16.–Salmon bycatch in the Gulf of Alaska and Bering Sea groundfish fishery, 1990–2005.

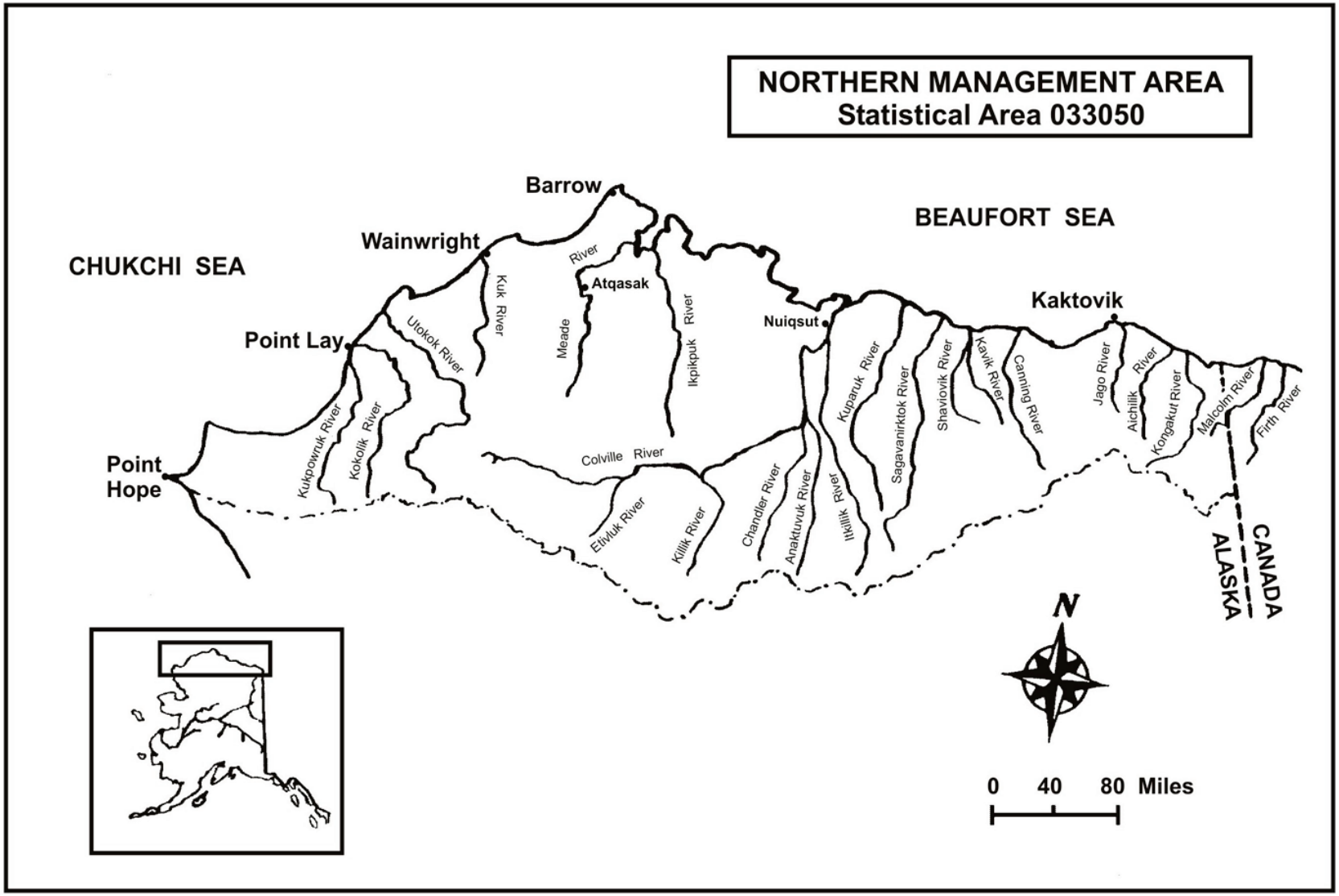


Figure 17.–Northern management area, AYK region.

APPENDIX A: 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 camtschatica*	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. Marys	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 (South Slough)	274
Shageluk	328
Holikachuk	383
Holy Cross	279
Mouth, Koserefski River	286
Old Paradise Village (District 3/4 Boundary)	301
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
Kallands-Mouth of Illinois Creek	664
(District 4/5 Boundary)	
Mouth, Tozitna River	681
Tanana Village	695
Mouth, Tanana River	695

-continued-

Location	Mileage from Mouth
(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	1,015
(Richardson-Clearwater)	
Mouth, Shaw Creek	1,021
Mouth, Delta River	1,031
(Big Delta)	
Delta Junction	1,041
Mouth, Goodpaster River	1,049
Bluff Cabin Slough	1,050
Outlet, Clearwater Lake	1,052
Outlet, Clearwater Crk	1,053
(Delta Clearwater)	
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 -	820
Pipeline Crossing	
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. - Canadian Border	1,219
Old Crow	1,259
Fishing Branch R.	1,600
spawning area	
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.-Canadian 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
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

-continued-

Location	Mileage from Mouth	Location	Mileage from Mouth
Carmacks	1,547	Outlet, Nisutlin Lake	1,892
Mouth, Little Salmon River	1,583	Outlet, Lake Laberge	1,679
Mouth, Big Salmon River	1,621	Inlet, Lake Laberge	1,712
Mouth, N. Big Salmon R.	1,641	Mouth, Takhini River	1,718
Mouth, S. Big Salmon R.	1,657	Whitehorse	1,745
Outlet, Big Salmon Lake	1,714	Outlet, Marsh Lake	1,764
Mouth, Teslin River	1,654	Mouth, M'Clintock River	1,769
Roaring Bull Rapids	1,707	Outlet, Little Atlin L.	1,788
Johnson's Crossing		Outlet, Atlin Lake	1,812
(Outlet, Teslin L.)	1,756	Atlin	1,844
Teslin	1,780	Tagish	1,786
Mouth Nisutlin River	1,788	Outlet, Tagish Lake	1,788
Mouth, Sidney Creek	1,837	Carcross	1,810
Mouth, Hundred Mi. Creek	1,851	(Outlet L.Bennett)	
Mouth, NcNeil River	1,887	Bennett	1,835

Appendix A3.–Salmon fishery projects conducted in the Alaskan portion of the Yukon River drainage in 2005.

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Commercial Catch and Effort Assessment	Alaskan portion of the Yukon River drainage	document and estimate the catch and associated effort of the Alaskan Yukon River commercial salmon fishery via receipts (fish tickets) of commercial sales of salmon or salmon roe.	June - Sept.	ADF&G	all aspects
Commercial Catch Sampling and Monitoring	Alaskan portion of the Yukon River drainage	determine age, sex, and size of Chinook, chum and coho salmon harvested in Alaskan Yukon River commercial fisheries;monitor Alaskan commercial fishery openings and closures.	June - Sept.	ADF&G; ADPS	all aspects enforcement
Subsistence and Personal Use Catch and Effort Assessment	Alaskan portion of the Yukon River drainage	document and estimate the catch and associated effort of the Alaskan 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	all aspects
Sport Catch, Harvest and Effort Assessment	Alaskan portion of the Yukon River drainage	document and estimate the catch, harvest, and associated effort of the Alaskan Yukon River sport fishery via post-season mail-out questionnaires.	post season	ADF&G	all aspects
Yukon River Chinook Microsatellite Baseline	Yukon River drainage	Survey standardized microsatellites and Yukon River Chinook salmon populations.	ongoing	ADF&G; DFO	US populations Canada populations
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
Yukon River Chum and Chinook Mixed-Stock Analysis	Pilot Station, RM 123	estimate the stock compositions of Chinook and chum salmon using samples collected from Pilot Station sonar test fisheries.	May-Aug	USFWS	all aspects
Yukon River Coho Salmon Population Structure	Yukon River drainage	assess the genetic diversity and population structure of Coho salmon using samples collected from 11 locations distributed throughout the Yukon River OSM 2005-2006	ongoing	USFWS	all aspects
YRDFA Weekly Teleconference	Yukon River drainage	acts as a forum for fishers along the Yukon River to interact with state and federal managers for the collection and dissemination of fisheries information	May - Sept.	YRDFA	all aspects
Lower Yukon River Set Gillnet Test Fishing	South, Middle, and North mouths of the Yukon River delta, RM 20	index Chinook salmon run timing and abundance using set gillnets. sample captured salmon for age, sex, size composition information.	June - Aug.	ADF&G	all aspects

-continued-

Appendix A3.–Page 2 of 5.

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	index Chinook, summer and fall chum, and coho salmon run timing and abundance using drift gillnets. 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	index fall chum and coho salmon run timing and relative abundance using drift gillnets. Sample captured salmon for age, sex, size composition info.	July - Sept.	Asa'carsarmiut Trad. Council	all aspects; implementation with R&E
East Fork Weir, Andreafsky River	mile 20 East Fork RM 124	estimate daily escapement, with age, sex and size composition, of Chinook and summer chum salmon into the East Fork of the Andreafsky River.	June - Sept.	USFWS; Yupiit of Andreafsky; Algaaciq Tribal Council	all aspects; partial funding from BSFA
Yukon River Sonar	Pilot Station, RM 123	estimate Chinook and summer and fall chum salmon passage in the mainstem Yukon River. Apportionment of species including coho salmon and other finfish.	June - Aug-	ADF&G; AVCP	all aspects
Anvik River Sonar	mile 40 Anvik River, RM 358	estimate daily escapement of summer chum salmon to the Anvik River; estimate age, sex, and size composition of the summer chum salmon escapement.	June - July	ADF&G	all aspects
Kaltag Creek Tower	mile 1 Kaltag Creek, RM 451	estimate daily escapement of Chinook and summer chum salmon into Kaltag Creek; estimate age, sex, and size composition of the summer chum salmon escapement.	June - July	City of Kaltag; ACES; BSFA	all aspects provided funding R&E funding
Gisasa River Weir	mile 3 Gisasa River, Koyukuk River drainage, RM 567	estimate daily escapement of Chinook and summer chum salmon into the Gisasa River; estimate age, sex, and size composition of the Chinook and summer chum salmon escapements.	June - Aug.	USFWS	all aspects
Henshaw Creek Weir	mile 1 Henshaw Creek, RM 976	estimate daily escapement of Chinook and summer chum salmon into Henshaw Creek; estimate age, sex, and size composition of the Chinook and summer chum salmon escapements. OSM 2005-2007	June - Aug.	TCC; BSFA; USFWS-OSM	all aspects; Federal Subsistence Funding oversite
Chandalar River Sonar	mile 14 Chandalar River, RM 996	Feasibility to estimate Chinook salmon passage.	July	USFWS	all aspects
Chandalar River Sonar	mile 14 Chandalar River, RM 996	estimate fall chum salmon passage using split-beam sonar in the Chandalar River. Investigate feasibility of using underwater video documenting presence of non-salmon species. Estimate sex and size composition of fall chum salmon escapement.Collect ASL data including vertebra.	Aug. - Sept.	USFWS	all aspects
Sheenjek River Sonar	mile 6 Sheenjek River, Porcupine River drainage, RM 1,060	estimate daily escapement of fall chum salmon into the Sheenjek River using DIDSON sonar and counted both left and right banks. Estimate age, sex, and size composition of the fall chum salmon escapement.	Aug. - Sept.	ADF&G	all aspects
Eagle Sonar	Mainstem Yukon River Eagle, RM 1,213	estimate daily passage of Chinook and chum salmon in the mainstem Yukon River using both split-beam and DIDSON. Estimate age, sex, and size composition of salmon captured in the test nets.	Jul.-Oct.	ADF&G; DFO	all aspects; technical support

-continued-

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Kaltag Village Drift Gillnet Test Fishing	Mainstem Yukon River Kaltag, RM 451	index fall chum and coho salmon run timing and relative abundance using drift gillnets. Sample captured salmon for age, sex, size composition information.	July - Sept.	City of Kaltag	all aspects; implementation with R&E
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; USFWS-OSM	all aspects; implementation with R&E funding
Nenana River Escapement Surveys	Nenana River drainage, above RM 860	aerial and ground surveys for numbers and distribution of coho and chum salmon in ten tributaries of the Nenana below Healy Creek.	Sept. - Oct.	YRDFA; ADF&G	all aspects; database
Tanana Village South bank Yukon River Fish Wheel, Test Fishing	Mainstem Yukon River Tanana, RM 695	index the timing of Chinook, summer and 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 systems.	Jun. - Aug.	ADF&G; USFWS	all aspects; R&E partial funding
Rapids Fish Wheel Test Fishing	Mainstem Yukon River RM 730	index run timing of Chinook and fall chum salmon runs as well as non-salmon species using video monitoring techniques.	June-Sept.	Zuray; USFWS	all aspects; implementation with R&E funding
Nenana Test Fish Wheel Test Fishing Tag Recovery	mainstem Tanana River Nenana, RM 860	index the timing of Chinook, summer chum, fall chum, and coho salmon runs using test fish wheels. Tag recovery fish wheel for fall chum salmon for Tanana Tagging mark-recapture project.	June - Sept.	ADF&G; OSM	all aspects; partial funding
Tanana Tagging Mark-recapture	mainstem Tanana River between RM 793 and 860.	estimate the population size of the Tanana River fall chum salmon run above the confluence of the Kantishna River using mark-recapture methodology;	Aug. - Sept.	ADF&G; OSM	all aspects
Tozitna River Weir	Mile 50 Tozitna River Yukon River, RM 681	estimate daily escapement of Chinook and summer chum salmon into the Tozitna River, estimate age, sex and size comp of the Chinook and summer chum escapement	June-Aug.	BLM; TTC	all aspects
Kantishna River Mark-recapture	Kantishna River RM 800	provides a mark-recapture abundance estimate for fall chum salmon within the Kantishna River drainage.	Aug - Oct.	ADF&G; BSFA; NPS	all aspects; funding for tagging fish wheel fund recovery fish wheels
Toklat River Tag Recovery	Toklat River Recovery RM 848	index run timing of fall chum and coho salmon using test fish wheels. Recover tags from fall chum salmon for the Kantishna mark-recapture project.	Aug - Oct.	ADF&G	all aspects
Kantishna River Tag Recovery	Kantishna River RM 880	index run timing of fall chum and coho salmon using test fish wheels. Recover tags from fall chum salmon for the Kantishna mark-recapture project.	Aug - Oct.	ADF&G; NPS	all aspects funding for fish wheel contract
Toklat River Survey	Toklat River, between RM 848 and 853	sample fall chum salmon carcasses for age, sex, and size composition information. Aerial survey of spawning grounds.	mid-Oct.	ADF&G	all aspects
Delta River Ground Surveys	Tanana River drainage, RM 1,031	estimate fall chum spawning escapement in Delta River. Recover tags from Upper Tanana mark-recapture program. Sample fall chum salmon carcasses for age, sex, and size composition information.	Oct.-Dec.	ADF&G	all aspects

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
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; implementation with R&E
Goodpaster River Tower	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 funded by Pogo Mine
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. OSM 2006-2008	June - Oct	USFWS	all aspects
Effects of *Ichthyophonus* on Survival and Reproductive Success	Emmonak, RM 20, Tanana River drainage, Chena River RM 902 and Salcha River RM 965	Determine the effects of *Ichthyophonus* on survival and reproductive success in Chinook salmon in the Yukon River. Final reports will complete project.	June-Dec.	ADF&G	all aspects, funding
Marshall Test Fish	Mainstem Yukon River, RM 161	index Chinook, summer and fall chum, and coho salmon run timing and abundance using drift gillnets. Sample captured salmon for age, sex, size composition information.	June - July	AVCP	all aspects
Clear Creek Videography	Mile 1 Clear Creek, Hogatza River drainage	estimate daily escapement of summer chum salmon into Clear Creek using video monitoring equipment. Estimate sex composition of summer chum escapement.	June - Aug.	BLM	all aspects
Yukon River Inseason Salmon Harvest Interviews	Emmonak, Holy Cross, Nulato, Huslia, Galena, and Beaver Primary	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, microsatellites, allozyme. Can. Collections, microsatellites.	June-Aug.	USFWS; ADFG; DFO; USFWS-OSM	all aspects
Juvenile Chinook Rearing in non-natal streams	Yukon River downstream of the Canadian border	Capture juvenile Chinook salmon in non-natal Yukon River tributary streams; determine whether Canadian-origin juvenile Chinook salmon rear in Yukon River tributary streams of the United States using genetic techniques; and describe non-natal stream rearing habitat characteristics for Yukon River Chinook salmon.	July-August	USFWS	all aspects

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Agency Acronyms:

ACES = Alaska Cooperative Extension Service
ADF&G = Alaska Department of Fish and Game
ADPS = Alaska Department of Public Safety
AVCP = Association of Village Council Presidents, Inc.
BSFA = Bering Sea Fishermen's Association
BLM = Bureau of Land Management
CATG = Council of Athabascan Tribal Governments
DFO = Department of Fisheries and Oceans (Canada)
NMFS = National Marine Fisheries Service
NTC = Nulato Tribal Council
TCC = Tanana Chiefs Conference, Inc.
TTC = Tanana Tribal Council
U of I = University of Idaho
U of W = University of Washington
USFWS = United States Fish and Wildlife Service
USFWS-OSM = United States Fish and Wildlife Service, Office of Subsistence Management
USGS-ACS = United States Geological Survey - Alaska Science Center
USGS-BRD= United States Geological Survey - Biological Resource Division
YRDFA = Yukon River Drainage Fisheries Association

Appendix A4.–List of harvest/escapement monitoring and incubation/rearing projects involving salmon in the Canadian portion of Yukon River drainage in 2005.

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Upper Yukon Tagging Program	downstream of the Stewart River	to obtain population, and escapement estimates of Chinook and chum salmon in the Canadian section of the mainstem Yukon River to collect stock ID, age, size, sex composition data to participate in Eagle Sonar Program	June - Oct	DFO	all aspects
Chinook and Chum Test Fishery Fisheries	near Dawson City	to provide catch and tag recovery information for the mark recapture program as required (not required in 2005) to provide AWL samples the Chinook test fishery uses nets while the chum test uses fish wheels and a live release technique	July-Oct	YRCFA, THFN	all aspects
Commercial Catch Monitoring	near Dawson City	to determine weekly catches and effort in the Canadian commercial fishery; recovery of tags to provide AWL information and DNA samples	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	July - Oct	YFN's DFO	joint project
Recreational Catch Monitoring	Yukon tributaries	to determine the recreation harvest, landed and retained, of salmon caught in the Yukon T through a catch card program	June-Oct	YSC/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	throughout upper Yukon R. drainage	to conduct surveys of spawning fish by foot, boat and aerial etc. to enumerate chum salmon in Minto area to enumerate chum salmon in Telin River and Teslin Lake area	July - Oct	various R&E Fund recipients and YFN's including SFN TTC	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 Fishway	Whitehorse	to enumerate wild and hatchery reared chinook returns to the Whitehorse area and obtain age, size, sex and tag composition data	July - Aug	YFGA	all aspects

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Blind Creek Weir	Pelly River	enumerate Chinook return and recover tags	July-Aug	JW&A RRDC	all aspects
Big Salmon Sonar	Big Salmon River	installation and operation of a DIDSON sonar program	July-Aug	JW&A M&A	all aspects
Escapement Sampling	various tributaries	to obtain age and size composition, and DNA samples	Aug -Oct	DFO	all aspects
Porcupine Mark-Recapture Program	Porcupine River	conduct chum marking and test fishery porgram establish method of conducting in-season local management	Aug -Oct	VGG & EDI	all aspects
Porcupine River Coho Radio Telemetry Program	Porcupine Drainage	to track coho salmon tagged with transmitters at Old Crow using aerial tracking	Oct-March	VGG & EDI	all aspects
Whitehorse Rapids Fish Hatchery and Coded-Wire Tagging Project	Whitehorse	to incubate ~150K Chinook eggs obtained at the Whitehorse Fishway to rear fry until spring, then mark, tag, and release upstream of Whitehorse hydroelectric facility	ongoing	RR, YEC YFGA DFO	all aspects coded-wire tagging
MacIntyre Incubation Box and Coded-Wire Tagging Project	Whitehorse	to incubate up to 120K Chinook fry obtained from the Takhini River and/or Tatchun Creek to rear fry to taggable size, then mark, tag, and release at natal site	ongoing	DFO YC NRI	technical support field work, project monitoring

Acronyms:

DFO = Department of Fisheries and Oceans Canada
EDI = Environmental Dynamics Incorporated
JW&A = Jane Wilson & Associates
M&A = Mercer and Associates Ltd.
NRI = Northern Research Institute
RR = Government of Yukon- Renewable Resources
RRDC = Ross River Dena Council
SFN = Selkirk First Nation
THFN = Tr'ondek Hwech'in First Nation
TTC = Teslin Tlingit Council
UFA = Umbrella Final Agreement
VGG = Vuntut Gwitchin Government
YC = Yukon College
YEC = Yukon Energy Corporation
YFN's = Yukon First Nation's
YFGA = Yukon Fish and Game Association
YRCFA = Yukon River Commercial Fishers Association
YSC = Yukon Salmon Committee

Appendix A5.–Total utilization in numbers of salmon by district and country, Yukon River drainage, 2005.

District	Fishery	Chinook	Summer Chum	Fall Chum	Coho
1	Subsistence	5,058	27,695	2,889	976
	Commercial	16,694	23,965	130,525	36,533
	Test Fish Sales	310	134	87	0
	Total	22,062	51,794	133,501	37,509
2	Subsistence	9,156	24,277	3,257	1,110
	Commercial	13,413	8,313	0	0
	Test Fish Sales	0	0	0	0
	Total	22,569	32,590	3,257	1,110
3	Subsistence	5,131	5,766	1,304	217
	Commercial	0	0	0	0
	Total	5,131	5,766	1,304	217
Subtotal	Subsistence	19,345	57,738	7,450	2,303
Lower	Commercial	30,107	32,278	130,525	36,533
Yukon	Test Fish Sales	310	134	87	0
Area	Total	49,762	90,150	138,062	38,836
4	Subsistence	13,964	12,350	9,405	2,971
	Commercial	0	0	0	0
	Test Fish Sales	0	0	0	0
	Total	13,964	12,350	9,405	2,971
5	Subsistence	17,424	6,800	51,663	2,159
	Commercial	1,469	0	0	0
	Total	18,893	6,800	51,663	2,159
6	Subsistence	1,828	2,014	22,946	19,538
	Commercial	453	8,986	49,637	21,778
	Personal use	138	152	133	107
	Total	2,419	11,152	72,716	41,423
Subtotal	Subsistence	33,216	21,164	84,014	24,668
Upper	Commercial	1,922	8,986	49,637	21,778
Yukon	Personal use	138	152	133	107
Area	Total	35,276	30,302	133,784	46,553
Total	Subsistence	52,561	78,902	91,464	26,971
Yukon	Commercial	32,029	41,264	180,162	58,311
River	Personal use	138	152	133	107
(Alaska)	Test Fish sales	310	134	87	0
	Sport Fish[a]	483	435	0	627
	Total	85,521	120,887	271,846	86,016
	Domestic	99	0	13	0
Total	Aboriginal (mainstem)	6,376	0	2,035	0
Canada	Sport Fish	436	0	0	0
	Commercial	4,066	0	11,931	0
	Subtotal	10,977	0	13,979	0
	Porcupine Aboriginal	394	0	4,593	11
	Total	11,371	0	18,572	11
Grand Total		96,892	120,887	290,418	86,027

Note: Subsistence harvest does not include Coastal District harvest from Hooper Bay and Scammon Bay.

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

Appendix A6.–Alaskan commercial salmon sales and estimated harvest by district 2005.

District/ Subdistrict	Number of Fishermen[a]	Chinook	Summer Chum	Fall Chum	Coho
1	392	16,694	23,965	130,525	36,533
2	228	13,413	8,313	0	0
Subtotal	582	30,107	32,278	130,525	36,533
3	0	No commercial fishing periods in 2005			
Total Lower Yukon	582	30,107	32,278	130,525	36,533
Anvik River	0	0	0	0	0
4-A	0	0	0	0	0
4-BC	0	0	0	0	0
Subtotal District 4	0	0	0	0	0
5-ABC	12	1,469	0	0	0
5-D	0	0	0	0	0
Subtotal District 5	12	1,469	0	0	0
6	9	453	8,986	49,637	21,778
Total Upper Yukon	21	1,922	8,986	49,637	21,778
Total Alaska	603	32,029	41,264	180,162	58,311

Note: Does not include ADF&G test fishery sales.

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

Appendix A7.–Commercial salmon harvested by statistical area, Yukon area, 2005.

Statistical Area	Chinook	Summer Chum	Fall Chum	Coho	Total Salmon
334-11	2,137	4,260	117	98	6,612
12	1,531	2,791	16,840	4,249	25,411
13	944	1,658	8,735	1,069	12,406
14	592	2,697	25,330	4,020	32,639
15	2,580	3,631	8,253	1,560	16,024
16	1,650	1,985	31,864	17,728	53,227
17	3,926	3,970	29,546	6,615	44,057
18	3,334	2,973	9,840	1,194	17,341
Subtotal District 1	16,694	23,965	130,525	36,533	207,717
334-21	3,292	2,852	0	0	6,144
22	5,905	3,978	0	0	9,883
23	1,397	850	0	0	2,247
24	347	105	0	0	452
25	2,472	528	0	0	3,000
Subtotal District 2	13,413	8,313	0	0	21,726
334-31					
32		NO COMMERCIAL FISHING			
Subtotal District 3	0	0	0	0	0
Total Lower Yukon	30,107	32,278	130,525	36,533	229,443
334-42			0	0	0
43			0	0	0
44			0	0	0
45	NO COMMERCIAL FISHING		0	0	0
46			0	0	0
47			NO COMMERCIAL FISHING		0
Subtotal District 4	0	0	0	0	0
334-51		NO COMMERCIAL FISHING			0
52	1,297	0	0	0	1,297
53	172	0	0	0	172
54					0
55		NO COMMERCIAL FISHING			0
Subtotal District 5	1,469	0	0	0	1,469
334-61	0	0	0	0	0
62	391	5,404	49,637	21,778	77,210
63	62	3,582	NO COMMERCIAL FISHING		3,644
Subtotal District 6	453	8,986	49,637	21,778	80,854
Total Upper Yukon	1,922	8,986	49,637	21,778	82,323
Grand Total Yukon Area	32,029	41,264	180,162	58,311	311,766

Note: Does not include ADF&G test fishery sales.

Appendix A8.–Commercial salmon harvest by statistical area, all gears combined, Upper Yukon Area, 2005.

BEACH SEINE, PURSE SEINE, SET GILLNET AND FISH WHEEL COMBINED [a]					
Statistical Area	Number of Fishermen [b]	Chinook	Summer Chum	Fall Chum	Coho
334-42	0			0	0
334-43	0			0	0
334-44	0			0	0
334-45	0	NO COMMERCIAL FISHING		0	0
334-46	0			0	0
334-47	0			NO COMMERCIAL FISHING	
Subtotal District 4	0	0	0	0	0
334-51		NO COMMERCIAL FISHING			
334-52	9	1,297	0	0	0
334-53	3	172	0	0	0
334-54					
334-55		NO COMMERCIAL FISHING			
Subtotal District 5	12	1,469	0	0	0
334-61	0	0	0	0	0
334-62	8	391	5,404	49,637	21,778
334-63	1	62	3,582	NO COMMERCIAL FISHING	
Subtotal District 6	9	453	8,986	49,637	21,778
Total Upper Yukon Area	21	1,922	8,986	49,637	21,778

Note: Commercial fishing was not opened in some areas because no buyers were available. Some areas were opened in the fall season in case buyers were interested, but no harvest occurred.

[a] Harvest by gear type can be identified in the Upper Yukon, because fishing permits distinguish gear type. No beach or purse seines were used in 2005.

[b] Number of fishermen is the unique number of permits fished i.e., some fishermen may fish multiple areas, therefore the subtotals will not necessarily add up by district.

Appendix A9.–Commercial set gillnet salmon harvest by statistical area, Upper Yukon Area, 2005

SET GILLNET [a]					
Statistical Area	Number of Fishermen [b]	Chinook	Summer Chum	Fall Chum	Coho
334-42				0	0
334-43				0	0
334-44		NO COMMERCIAL FISHING		0	0
334-45				0	0
334-46				0	0
334-47				NO COMMERCIAL FISHING	
Subtotal District 4	0	0	0	0	0
334-51			NO COMMERCIAL FISHING		
334-52	3	337	0	0	0
334-53	3	172	0	0	0
334-54			NO COMMERCIAL FISHING		
334-55					
Subtotal District 5	6	509	0	0	0
334-61	0	0	0	0	0
334-62	0	0	0	0	0
334-63	0	0	0	NO COMMERCIAL FISHING	
Subtotal District 6	0	0	0	0	0
Total Upper Yukon Area	6	509	0	0	0

Note: Commercial fishing was not opened in some areas because no buyers were available. Some areas were opened in the fall season in case buyers were interested, but no harvest occurred.

[a] Harvest by gear type can be identified in the Upper Yukon, because fishing permits distinguish gear type. No beach or purse seines were used in 2005.

[b] Number of fishermen is the unique number of permits fished i.e., some fishermen may fish multiple areas, therefore the subtotals will not necessarily add up by district.

Appendix A10.–Commercial fish wheel salmon harvest by statistical area, Upper Yukon area, 2005.

FISH WHEEL [a]					
Statistical Area	Number of Fishermen [b]	Chinook	Summer Chum	Fall Chum	Coho
334-42				0	0
334-43				0	0
334-44		NO COMMERCIAL FISHING		0	0
334-45				0	0
334-46				0	0
334-47				NO COMMERCIAL FISHING	
Subtotal District 4	0	0	0	0	0
334-51		NO COMMERCIAL FISHING			
334-52	6	960	0	0	0
334-53	0	0	0	0	0
334-54		NO COMMERCIAL FISHING			
334-55					
Subtotal District 5	6	960	0	0	0
334-61	0	0	0	0	0
334-62	8	391	5,404	49,637	21,778
334-63	1	62	3,582	NO COMMERCIAL FISHING	
Subtotal District 6	9	453	8,986	49,637	21,778
Total Upper Yukon Area	15	1,413	8,986	49,637	21,778

Note: Commercial fishing was not opened in some areas because no buyers were available. Some areas were opened in the fall season in case buyers were interested, but no harvest occurred.

[a] Harvest by gear type can be identified in the Upper Yukon, because fishing permits distinguish gear type. No beach or purse seines were used in 2005.

[b] Number of fishermen is the unique number of permits fished i.e., some fishermen may fish multiple areas, therefore the subtotals will not necessarily add up by district.

Appendix A11.–Value of commercial salmon fishery to Yukon area fishermen, 1977–2005.

	Summer Season						
	Chinook			Summer Chum			
	Lower Yukon	Upper Yukon		Lower Yukon	Upper Yukon		Total
Year	Value	Value	Subtotal	Value	Value	Subtotal	Season
1977	1,841,033	148,766	1,989,799	1,007,280	306,481	1,313,761	3,303,560
1978	2,048,674	66,472	2,115,146	2,071,434	655,738	2,727,172	4,842,318
1979	2,763,433	124,230	2,887,663	2,242,564	444,924	2,687,488	5,575,151
1980	3,409,105	113,662	3,522,767	1,027,738	627,249	1,654,987	5,177,754
1981	4,420,669	206,380	4,627,049	2,741,178	699,876	3,441,054	8,068,103
1982	3,768,107	162,699	3,930,806	1,237,735	452,837	1,690,572	5,621,378
1983	4,093,562	105,584	4,199,146	1,734,270	281,883	2,016,153	6,215,299
1984	3,510,923	102,354	3,613,277	926,922	382,776	1,309,698	4,922,975
1985	4,294,432	82,644	4,377,076	1,032,700	593,801	1,626,501	6,003,577
1986	3,165,078	73,363	3,238,441	1,746,455	634,091	2,380,546	5,618,987
1987	5,428,933	136,196	5,565,129	1,313,618	323,611	1,637,229	7,202,358
1988	5,463,800	142,284	5,606,084	5,001,100	1,213,991	6,215,091	11,821,175
1989	5,181,700	108,178	5,289,878	2,217,700	1,377,117	3,594,817	8,884,695
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	0	725,606	8,633	0	8,633	734,239
2001 [a]	0	0	0	0	0	0	0
2002	1,691,105	20,744	1,711,849	4,342	6,176	10,518	1,722,367
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
2000-2004 Average	1,470,316	19,998	1,490,314	4,689	4,540	9,229	1,499,543

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	Fall Season							
	Fall Chum			Coho				
Year	Lower Yukon Value	Upper Yukon Value	Subtotal	Lower Yukon Value	Upper Yukon Value	Subtotal	Total Season	Total Value
1977	718,571	102,170	820,741	140,914	2,251	143,165	963,906	4,267,466
1978	691,854	103,091	794,945	96,823	6,105	102,928	897,873	5,740,191
1979	1,158,485	347,814	1,506,299	83,466	6,599	90,065	1,596,364	7,171,515
1980	394,162	198,088	592,250	17,374	2,374	19,748	611,998	5,789,752
1981	1,503,744	356,805	1,860,549	87,385	4,568	91,953	1,952,502	10,020,605
1982	846,492	53,258	899,750	135,828	18,786	154,614	1,054,364	6,675,742
1983	591,011	128,950	719,961	17,497	11,472	28,969	748,930	6,964,229
1984	374,359	103,417	477,776	256,050	12,823	268,873	746,649	5,669,624
1985	634,616	178,125	812,741	176,254	26,797	203,051	1,015,792	7,019,369
1986	399,321	30,309	429,630	211,942	556	212,498	642,128	6,261,115
1987	0	0	0	0	0	0	0	7,202,358
1988	638,700	151,300	790,000	734,400	34,116	768,516	1,558,516	13,379,691
1989	713,400	223,996	937,396	323,300	33,959	357,259	1,294,655	10,179,350
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	0	0	0	0	0	0	0	1,955,891
1999	35,639	876	36,515	3,620	0	3,620	40,135	5,086,539
2000	0	0	0	0	0	0	0	734,239
2001 [a]	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	1,722,367
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
2000-2004 Average	1,424	849	2,273	4,188	2,293	6,482	8,755	1,508,298

[a] No commercial salmon fisheries occurred in the Yukon River in 2001.

Appendix A12.–Salmon processors, buyers, catcher–sellers, and associated data, Yukon Area, 2005.

Commercial operation (Processing location/ buying station)	Product	District
Kwik'pak Fisheries, LLC 2200 6th Avenue Suite 707 Seattle, WA 98121 (Emmonak, Mt. Village)	Frozen Salmon Fresh Salmon Chinook Chum, Coho Salmon Roe	1 and 2
Boreal Fisheries P.O. Box 561 Graham, WA 98338 (St. Mary's)	Frozen Salmon Fresh Salmon Chinook Chum, Coho Salmon Roe	1 and 2
Bering Sea Fisheries, Inc. 4413 83rd Avenue. SE Snohomish, WA 98290 (Lamont Slough)	Frozen Salmon Chinook Chum, Coho Salmon Roe	1 and 2
Maserculiq Fish Processors P.O. Box 90 Marshall, AK 99585 (Marshall)	Fresh Salmon Chinook Chum Salmon Roe	1, 2, and 3
New Sagaya 1011 Whitney Road Anchorage, AK 99501	Fresh Salmon Chinook	1 and 2
B. B. Kings 1518 Valarian Street Anchorage, AK 99508 (St. Mary's)	Fresh Salmon Chinook, Chum Coho	1and 2
B^2 Construction 1518 Valarian Street Anchorage, AK 99508 (St. Mary's)	Fresh Salmon Chinook, Chum Coho	1and 2

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Commercial operation (Processing location/ buying station)	Product	District
Interior Alaska Fish Processors, Inc. 2400 Davis Road Fairbanks, AK 99701 (Fairbanks, Nenana, North Pole, Rapids)	Frozen Salmon Chinook, Chum, Coho Salmon Roe	5 and 6
Great Ruby Fish Company 2005 Saratoga Avenue Anchorage, AK 99517 (Nenana)	Fresh Salmon Chinook, Chum, Coho Salmon Roe	6
Inlet Fish Producers, Inc. PO Box 114 Kenai, AK 99611 (Nenana)	Frozen Salmon Fresh Salmon Chum, Coho Salmon Roe	6

Appendix A13.–Historical daily and cumulative CPUE for Chinook salmon, Lower Yukon River set net test fishery, 1989–2004 average and compared to 2005.

Date	Chinook Salmon in 8.5" SET Gillnets								
	2005				2004		Average 1989-2004 [a]		
	Daily Catch	Daily CPUE	Cumulative CPUE	Comm/period Hrs Fished District 1	Daily CPUE	Cumulative CPUE	Prop	Cumulative CPUE	Date
26 May							0.00	0.00	26 May
27 May					0.00	0.00	0.00	0.28	27 May
28 May					0.04	0.04	0.00	0.11	28 May
29 May					0.04	0.08	0.00	0.18	29 May
30 May					0.00	0.08	0.01	0.30	30 May
31 May					0.13	0.21	0.01	0.40	31 May
01 Jun	0 [b]	0	0.00		0.10	0.31	0.01	0.49	01 Jun
02 Jun	2 [b]	0.04	0.04		0.14	0.45	0.02	0.71	02 Jun
03 Jun	5 [b]	0.05	0.09		0.38	0.83	0.02	0.75	03 Jun
04 Jun	9 [b]	0.09	0.18		0.03	0.86	0.03	0.97	04 Jun
05 Jun	7 [b]	0.07	0.25		0.25	1.11	0.04	1.22	05 Jun
06 Jun	7 [b]	0.07	0.32		0.19	1.30	0.05	1.60	06 Jun
07 Jun	2 [b,c]	0.02	0.34		0.07	1.37	0.07	2.05	07 Jun
08 Jun	21 [b]	0.22	0.56		0.33	1.70	0.08	2.23	08 Jun
09 Jun	3 [b]	0.03	0.59		1.19	2.89	0.10	2.94	09 Jun
10 Jun	35 [b]	0.36	0.95		1.00	3.89	0.12	3.52	10 Jun
11 Jun	67 [b]	0.7	1.65		0.61	4.50	0.15	4.15	11 Jun
12 Jun	92 [b]	0.96	2.61		0.83	5.33	0.17	4.91	12 Jun
13 Jun	59 [b]	0.61	3.22		1.52	6.85	0.21	5.77	13 Jun
14 Jun	26 [b]	0.27	3.49		1.33	8.18	0.24	6.50	14 Jun
15 Jun	20 [b]	0.21	3.70		0.70	8.88	0.27	7.26	15 Jun
16 Jun	44 [b]	0.46	4.16		0.69	9.57	0.31	8.17	16 Jun
17 Jun	49 [b]	0.51	4.67		0.71	10.28	0.35	9.02	17 Jun
18 Jun	47 [b]	0.49	5.16		0.31	10.59	0.39	10.04	18 Jun
19 Jun	117 [b]	1.22	6.38		0.95	11.54	0.43	10.98	19 Jun
20 Jun	65 [b]	0.68	7.06		1.25	12.79	0.47	11.75	20 Jun
21 Jun	50 [b]	0.52	7.58		0.63	13.42	0.51	12.75	21 Jun
22 Jun	76 [b]	0.79	8.37		0.60	14.02	0.55	13.81	22 Jun

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Date	Chinook Salmon in 8.5" SET Gillnets									
	2005				2004		Average 1989-2004 [b]			
	Daily Catch	Daily CPUE	Cumulative CPUE	Comm/period Hrs Fished District 1	Daily CPUE	Cumulative CPUE	Prop	Cumulative CPUE	Date
23 Jun	124 [b]	1.29	9.66		0.89	14.91	0.59	14.64	23 Jun
24 Jun	78 [b]	0.81	10.47	4	1.21	16.12	0.63	15.65	24 Jun
25 Jun	46 [b]	0.48	10.95	2	0.53	16.65	0.68	16.57	25 Jun
26 Jun	103	1.07	12.02		0.56	17.21	0.72	17.40	26 Jun
27 Jun	61	0.64	12.66	6	0.34	17.55	0.75	18.12	27 Jun
28 Jun	44	0.46	13.12	3	0.38	17.93	0.78	18.75	28 Jun
29 Jun	51 [c]	0.53	13.65		0.19	18.12	0.81	19.46	29 Jun
30 Jun	55 [c]	0.57	14.22	6	0.50	18.62	0.83	19.94	30 Jun
01 Jul	42 [c]	0.44	14.66	3	0.19	18.81	0.85	20.39	01 Jul
02 Jul	56 [c]	0.58	15.24		0.27	19.08	0.87	20.84	02 Jul
03 Jul	42 [c]	0.44	15.68		0.09	19.17	0.89	21.24	03 Jul
04 Jul	35 [c]	0.36	16.04		0.16	19.33	0.91	21.57	04 Jul
05 Jul	31 [c]	0.32	16.36		0.32	19.65	0.92	21.91	05 Jul
06 Jul	22 [c]	0.23	16.59	6	0.17	19.82	0.94	22.21	06 Jul
07 Jul	27 [c]	0.28	16.87		0.21	20.03	0.95	22.45	07 Jul
08 Jul	23 [c]	0.24	17.11		0.15	20.18	0.96	22.68	08 Jul
09 Jul	9 [c]	0.09	17.20		0.15	20.33	0.97	22.89	09 Jul
10 Jul	11 [c]	0.11	17.31		0.04	20.37	0.98	23.06	10 Jul
11 Jul	14 [c]	0.15	17.46		0.05	20.42	0.98	23.17	11 Jul
12 Jul	6 [c]	0.06	17.52		0.04	20.46	0.99	23.27	12 Jul
13 Jul	0 [c]	0	17.52		0.03	20.49	0.99	23.38	13 Jul
14 Jul	3 [c]	0.03	17.55		0.06	20.55	1.00	23.46	14 Jul
15 Jul	5 [c]	0.05	17.60		0.04	20.59	1.00	23.54	15 Jul
	1,691		17.60					23.54	

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 enclosed in a bold border.

[a] Average is without 1998 and 2000.

[b] Conservative estimate due to high water.

[c] Big Eddy Site 1 moved to a location down river due to lack of eddy at original site.

Appendix A14.–Pilot Station sonar project passage estimates, Yukon River drainage, 1995, 1997–2005.

Species	Passage Estimates									
	1995	1997 [a]	1998	1999	2000	2001 [b]	2002	2003	2004	2005 [c]
Large Chinook [d]	130,271	118,121	71,177	127,809	39,233	85,511	92,584	245,037	110,236	142,007
Small Chinook	32,674	77,526	16,675	16,914	5,195	13,892	30,629	23,500	46,370	17,434
Chinook Total	162,945	195,647	87,852	144,723	44,428	99,403	123,213	268,537	156,606	159,441
Summer Chum	3,556,445	1,415,641	826,385	973,708	456,271	441,450	1,088,463	1,168,518	1,357,826	2,439,616
Fall Chum [e]	1,053,245	506,621	372,927	379,493	247,935	376,182	326,858	889,778	594,060	1,813,589
Chum Total	4,609,690	1,922,262	1,199,312	1,353,201	704,206	817,632	1,415,321	2,058,296	1,951,886	4,253,205
Coho [e]	101,806	104,343	136,906	62,521	175,421	137,769	122,566	269,081	188,350	184,718
Pink	24,604	2,379	66,751	1,801	35,501	665	64,891	4,656	243,375	37,932
Other Species [f]	1,011,855	621,857	277,566	465,515	361,222	353,431	557,779	502,878	637,257	593,248
Season Total	5,910,900	2,846,488	1,768,387	2,027,761	1,320,778	1,408,900	2,283,770	3,103,448	3,177,474	5,228,544

Note: Estimates for all years were generated with the most current apportionment model and may differ from earlier estimates.

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

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

[a] The Yukon River sonar project did not operate at full capacity in 1996 and therefore there are no passage estimates.

[d] Chinook salmon >655 mm.

[e] This estimate may not include the entire run.

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

Appendix A15.–Commercial Fisheries Entry Commission salmon gear permits issued by residence, Yukon area, 2005.

District	Residence	Gillnet Permits (S04Y)
1, 2, and 3	Alakanuk	79
	Anchorage	38
	Aniak	1
	Bethel	15
	Chevak	3
	Dillingham	1
	Eagle River	2
	Elim	1
	Emmonak	90
	Fairbanks	10
	Fortuna Ledge	4
	Glennallen	1
	Holy Cross	7
	Homer	1
	Hooper Bay	2
	Kalskag	1
	Kotlik	73
	Kotzebue	1
	Manley Hot Springs	2
	Marshall	33
	Mountain Village	77
	Newhalen	1
	Newtok	1
	Nightmute	1
	Ninilchik	2
	Nome	4
	Nunam Iqua	16
	Palmer	1
	Pilot Station	53
	Pitkas Point	1
	Russian Mission	12
	Scammon Bay	35
	Shageluk	1
	Shaktoolik	1
	Sitka	2
	St. Marys	63
	St. Michael	3
	Stebbins	8
	Sutton	1
	Talkeetna	3
	Tuluksak	1
	Unalakleet	1
	Wasilla	6
	Jonesboro, AR	1
	Kamaih, ID	1
	Rock Hill, SC	1
	Evertt, WA	1
	Snohomish, WA	1
	Twisp, WA	1
Total Lower Yukon Area		665

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District	Residence	Gillnet Permits (S04P)	Fish Wheel Permits (S08P)	Total
4, 5, and 6	Anchorage	4	5	9
	Anchor Pt.	0	2	2
	Aniak	1	0	1
	Anvik	4	9	13
	Barrow	0	1	1
	Circle City	0	1	1
	Dot Lake	0	1	1
	Eagle River	0	1	1
	Fairbanks	26	24	50
	Fort Wainwright	0	1	1
	Ft. Yukon	0	1	1
	Galena	3	12	15
	Grayling	4	5	9
	Holy Cross	1	0	1
	Huslia	0	1	1
	Kaltag	2	8	10
	Manley Hot Springs	2	5	7
	Nenana	7	19	26
	North Pole	1	2	3
	Nulato	0	9	9
	Rampart	1	1	2
	Ruby	1	5	6
	Salcha	1	0	1
	Soldotna	1	1	2
	Stevens Village	1	3	4
	Tanana	2	15	17
	Valdez	0	1	1
	Wasilla	2	2	4
	Valley Village, CA	1	0	1
	Lusk, WY	1	1	2
Total Upper Yukon Area		66	136	202
Grand Total Yukon Area		731	136	867 [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.–Summer season commercial harvest summary, Yukon area, 2005.

District 1

Period Number	Starting Time	Start Date	Ending Time	End Date	Mesh Size	Hours Fished	Number of Fishermen	Chinook Salmon Numbers	Chinook Salmon Pounds	Chinook Salmon Average Weight	Summer Chum Salmon Numbers	Summer Chum Salmon Pounds	Summer Chum Salmon Average Weight
1	8:00 PM	24 Jun	2:00 AM	25 Jun	U	6	315	5,006	96,404	19.3	4,313	29,293	6.8
2	6:00 PM	27 Jun	3:00 AM	28 Jun	U	9	347	7,644	146,504	19.2	10,183	69,376	6.8
3	6:00 PM	30 Jun	3:00 AM	1 Jul	U	9	239	2,923	56,627	19.4	7,046	46,641	6.6
4	12:00 PM	5 Jul	6:00 AM	6 Jul	U	6	234	1,046	20,848	19.9	2,423	16,185	6.7
		Chinook salmon sold in the fall season						75	1,211	16.1			
District 1 Subtotal:						30	370	16,694	321,594	19.3	23,965	161,495	6.7

District 2

Period Number	Starting Time	Start Date	Ending Time	End Date	Mesh Size	Hours Fished	Number of Fishermen	Chinook Salmon Numbers	Chinook Salmon Pounds	Chinook Salmon Average Weight	Summer Chum Salmon Numbers	Summer Chum Salmon Pounds	Summer Chum Salmon Average Weight
1	8:00 PM	23 Jun	2:00 AM	24 Jun	U	6	222	6,420	117,270	18.3	2,992	21,759	7.3
2	6:00 PM	26 Jun	12:00 Midnight	26 Jun	U	6	203	4,887	90,880	18.6	2,686	19,109	7.1
3	6:00 PM	2 Jul	12:00 Midnight	2 Jul	U	6	164	2,106	39,384	18.7	2,635	17,711	6.7
			No more Commercial fishing periods in District Y-2 after July 2 due to quality concerns.										
District 2 Subtotal:						18	228	13,413	247,534	18.5	8,313	58,579	7.0
Lower Yukon Area, Summer Season, Districts 1 and 2 Subtotal:						48	578	30,107	569,128	18.9	32,278	220,074	6.8

U=UNRESTRICTED, R=6" MAXIMUM MESH SIZE

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Subdistricts 5-B and 5-C

Period Number	Starting Time	Start Date	Ending Time	End Date	Mesh Size	Hours Fished	Number of Fishermen	Chinook Salmon Numbers	Chinook Salmon Pounds	Chinook Salmon Average Weight	Summer Chum Salmon Numbers	Summer Chum Salmon Pounds	Summer Chum Salmon Average Weight
1	6:00 PM	5 Jul	6:00 AM	6 Jul		12	10	396	6,126	15.5	0	0	0.0
2	6:00 PM	6 Jul	6:00 AM	7 Jul		12	10	518	7,977	15.4	0	0	0.0
3	6:00 PM	9 Jul	6:00 AM	10 Jul		12	10	555	7,581	13.7	0	0	0.0
Subdistricts 5-B, and 5-C Subtotals:						36	12	1,469	21,684	14.8	0	0	0.0

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

Period Number	Starting Time	Start Date	Ending Time	End Date	Mesh Size	Hours Fished	Number of Fishermen	Chinook Salmon Numbers	Chinook Salmon Pounds	Chinook Salmon Average Weight	Summer Chum Salmon Numbers	Summer Chum Salmon Pounds	Summer Chum Salmon Average Weight
1	6:00 PM	15 Jul	12 Noon	17 Jul		42	4	352	4,899	13.9	1,712	10,272	6.0
2	6:00 PM	18 Jul	12 Noon	20 Jul		42	5	42	501	11.9	2,024	12,144	6.0
3	6:00 PM	22 Jul	12 Noon	24 Jul		42	5	38	680	17.9	3,087	18,522	6.0
4	6:00 PM	25 Jul	12 Noon	27 Jul		42	1	21	300	14.3	2,163	12,978	6.0
5	6:00 PM	29 Jul	12 Noon	31 Jul		42	0	0	0	0.0	0	0	0.0
District 6 Subtotal:						210	5	453	6,380	14.1	8,986	53,916	6.0
Upper Yukon Area, Summer Season, Districts 5 and 6 Subtotals:						246	17	1,922	28,064	14.6	8,986	53,916	6.0
Yukon Area, Summer Season, All Districts Total:						294	595	32,029	597,192	18.6	41,264	273,990	6.6

Note: No commercial fishing effort occurred in Districts 3, 4 and Subdistrict 5-D.

Appendix A17.–Commercial catches of Chinook and summer chum salmon by mesh size, Districts 1 and 2, Lower Yukon Area, 1961–2005.

	Unrestricted Mesh Size [a]				6 inch Maximum Mesh Size [b]	
	Chinook			Summer Chum	Chinook	Summer Chum
Year	District 1	District 2	Total	Districts 1 and 2	Districts 1 and 2	Districts 1 and 2
1961	84,466	29,026	113,492	-	-	-
1962	67,099	22,224	89,323	-	-	-
1963	85,004	24,221	109,225	-	-	-
1964	67,555	20,246	87,801	-	-	-
1965	89,268	23,763	113,031	-	-	-
1966	70,788	16,927	87,715	-	-	-
1967	104,350	20,239	124,589	10,919	-	-
1968	79,465	21,392	100,857	14,402	-	-
1969	70,588	14,756	85,344	41,418	97	15,437
1970	56,469	17,141	73,610	104,705	57	16,623
1971	84,397	19,226	103,623	42,189	1,176	57,851
1972	68,059	17,317	85,376	78,698	1,991	37,881
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

-continued-

Year	Unrestricted Mesh Size [a]				6 inch Maximum Mesh Size [b]	
	Chinook			Summer Chum	Chinook	Summer Chum
	District 1	District 2	Total	Districts 1 and 2	Districts 1 and 2	Districts 1 and 2
1999	37,145	27,119	64,264	27,883	0	0
2000	4,735	3,783	8,518	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
10 yr avg 1985-1994	50,360	32,438	82,798	125,850	19,038	337,751
10 yr avg 1995-2004	32,281	20,638	52,919	37,904	792	14,823

Note: ADF&G test fishery sales included, 1961–1990. ADF&G test fishery sales not included, 1991–2004.

[a] Primarily 8 to 8-1/2 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] Six inch maximum mesh size regulation beginning late June to early July became effective in 1973.

[d] Six inch maximum mesh size regulation by EO 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.

Appendix A18.–Summary of test fish wheel projects conducted in the Upper Yukon Area, 2005.

CONTRACTOR/ Operator	River Mile [a]	Operational Dates	Total Days of Operation	Estimated Total Salmon Captured [b] Chinook	Summer Chum	Fall Chum	Coho	Historical Data / Comments
BSFA								Fall season considered beginning August 13 (1993-current).
R&E Funded								Summer season added in 2002.
P. Moore	690	Jun 20 to Sep 30	102	131	1,720	8,683	1,349	Video Operations
USFWS								
R&E Funded								Chum salmon are considered fall after August 1 at this site.
S. Zuray	731	Jun 16 to Sep 19	95	2,066	8,142	70,485	-	Video Operations
ADF&G								
C. Boulding	793	Aug 16 to Sep 27	42	-	-	23,252	688	Project operation as the fall chum salmon tag deployment fish wheel 1995-current.
ADF&G								
Paul Kleinschmidt	859	Jun 25 to Aug 7	43	464	4,366	-	-	Project started CPUE in 1988, video operations since 2003.
		Aug 16 to Oct 3	48	-	-	18,096	12,605	Also operates as a fall chum salmon tag recovery 1995-current.
BSFA/ADF&G								
C. Boulding	802	Aug 16 to Sep 25	40	-	-	5,468	379	Project operation 1999-current.
NPS/ADF&G								
M. Turner	880	Aug 16 to Oct 9	54	-	-	356	360	Project operation 2000-current.
M. Turner	880	Aug 15 to Oct 4	50	-	-	204	975	Left bank operation 2003-current. Operated as a CWT recovery wheel 1996-2000.
ADF&G Crew	846	Aug 16 to Sep 29	44	-	-	2,505	469	Operated as a mark-recapture recovery wheel 1999-current.
ADF&G Crew	846	Aug 16 to Sep 30	45	-	-	3,728	392	Operated as a mark-recapture recovery wheel 1999-current.

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

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

Appendix A19.–Summer season emergency order summary for the Lower Yukon River pertaining to the Chinook and summer chum salmon fishery, Yukon Area, 2005.

EO# 3-S-LY-##-05	DESCRIPTION	Effective Date -Expiration Date	Rescind EO#	EO Still In EFFECT
3-S-LY-01-05	Implements the subsistence salmon fishing schedule in District 1. Issued May 25, 2005	8:00 p.m. May 30, 2005 Exp. Dec 31, 2005	None	
3-S-LY-02-05	Implements the subsistence salmon fishing schedule in District 2. Issued May 25, 2005	8:00 p.m. June 1, 2005 Exp. Dec 31, 2005	None	3-S-LY-01-05
3-S-LY-03-05	Implements the subsistence salmon fishing schedule in District 3. Issued May 25, 2005	8:00 p.m. June 3, 2005 Exp. Dec 31, 2005	None	3-S-LY-01-05 3-S-LY-02-05
3-S-LY-04-05	Restricts non-salmon subsistence fishing gear inY1-3 to gillnets with 4-inch or less mesh, max length 60 ft. Issued May 25, 2005	8:00 a.m. June 2, 2005 Exp. Dec 31, 2005	None	3-S-LY-01-05 3-S-LY-02-05 3-S-LY-03-05
3-S-LY-05-05	Amends District 3 fishing schedule to relax the Innoko River fishing schedule to 7 days a week. Issued June 1, 2005	8:00 a.m. June 3, 2005 Exp. Dec 31, 2005	3-S-LY-03-05 (amended)	3-S-LY-01-05 3-S-LY-02-05 3-S-LY-04-05
3-S-LY-06-05	Opens the commercial fishing season in District 2. Issued June 21, 2003	8:00 p.m. June 23, 2005 Exp. Sept 1, 2005	3-S-LY-02-05	3-S-LY-01-05 3-S-LY-04-05 3-S-LY-05-05
3-S-LY-07-05	Establishes first commercial fishing period in District 2. (6 hours) Issued June 21, 2005	8:00 p.m. June 23, 2005 Exp. June 24, 2005	None	3-S-LY-01-05 3-S-LY-04-05 3-S-LY-05-05 3-S-LY-06-05
3-S-LY-08-05	Opens the commercial fishing season in District 1. Issued June 22, 2005	9:00 p.m. June 24, 2005 Exp. Sept 1, 2005	3-S-LY-01-05	3-S-LY-04-05 3-S-LY-05-05 3-S-LY-06-05 3-S-LY-07-05
3-S-LY-09-05	Establishes first commercial fishing period in District 1. (6 hours) Issued June 22, 2005	6:00 p.m. June 24, 2005 Exp. June 25, 2005	3-S-LY-07-05	3-S-LY-04-05 3-S-LY-05-05 3-S-LY-06-05 3-S-LY-08-05
3-S-LY-10-05	Removes window schedule. Subsistence fishing now 7 days a week in District 3. Issued June 22, 2005	8:00 a.m. June 24, 2005 Exp. Dec 31, 2005	3-S-LY-05-05	3-S-LY-04-05 3-S-LY-06-05 3-S-LY-08-05 3-S-LY-09-05

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Appendix A19.–Page 2 of 2.

EO# 3-S-#Y-##-05	DESCRIPTION	Effective Date -Expiration Date	Rescind EO#	EO Still In EFFECT
3-S-LY-11-05	Establishes 2nd commercial fishing period in District 1. (6 hours) Issued June 25, 2005	6:00 p.m. June 26, 2005 Exp. June 26, 2005	3-S-LY-09-05	3-S-LY-04-05 3-S-LY-06-05 3-S-LY-08-05 3-S-LY-10-05
3-S-LY-12-05	Establishes 2nd commercial fishing period in District 2. (6 hours) Issued June 26, 2005	6:00 p.m. June 27, 2005 Exp. June 28, 2005	3-S-LY-11-05	3-S-LY-04-05 3-S-LY-06-05 3-S-LY-08-05 3-S-LY-10-05
3-S-LY-13-05	Establishes 3rd commercial fishing period in District 1. (9 hours) Issued June 29, 2005	6:00 p.m. June 30, 2005 Exp. July 1, 2005	3-S-LY-12-05	3-S-LY-04-05 3-S-LY-06-05 3-S-LY-08-05 3-S-LY-10-05
3-S-LY-14-05	Establishes 3rd commercial fishing period in District 2. (6 hours) Issued July 1, 2005	6:00 p.m. July 2, 2005 Exp. July 2, 2005	3-S-LY-13-05	3-S-LY-04-05 3-S-LY-06-05 3-S-LY-08-05 3-S-LY-10-05
3-S-LY-15-05	Establishes 4th commercial fishing period in District 1. (6 hours) Issued July 4, 2005	12:00 p.m. July 5, 2005 Exp. July 6, 2005	3-S-LY-14-05	3-S-LY-04-05 3-S-LY-06-05 3-S-LY-08-05 3-S-LY-10-05

Appendix A20.–Summer season emergency order summary for the Upper Yukon River pertaining to the Chinook and summer chum salmon fishery, Yukon Area, 2005.

EO# 3-S-LY-##-05	DESCRIPTION	Effective Date -Expiration Date	Rescind EO#	EO Still In EFFECT
3-S-UY-01-05	Implements the subsistence fishing schedule in Subdistrict 4-A. Issued June 10, 2005	6:00 p.m. June 12, 2005 Exp. Dec 31, 2005	None	
3-S-UY-02-05	Implements the subsistence fishing schedule in Subdistrict 4-B and 4-C. Issued June 10, 2004	6:00 p.m. June 12, 2004 Exp. Dec 31, 04	None	3-S-UY-01-05
3-S-UY-03-05	Non-Salmon Gear restrictions in District 4 Issued June 10, 2005	6:00 p.m. June 12, 2005 Exp. Dec 31, 2005	None	3-S-UY-01-05 3-S-UY-02-05
3-S-UY-04-05	Implements subsistence fishing schedule in Subdistricts 5-A, 5-B, and 5-C Issued June 20, 2005	6:00 p.m. June 21, 2005 Exp. Dec 31, 2005	None	3-S-UY-01-05 3-S-UY-02-05 3-S-UY-03-05
3-S-UY-05-05	Allows subsistence fishing for non-salmon species during subsistence salmon fishing closures in District 5 with gillnets having maximum length of 60 feet and 4 inch maximum mesh size. Issued June 20, 2005	6:00 p.m. June 21, 2005 Exp. Dec 31, 2005	None	3-S-UY-01-05 3-S-UY-02-05 3-S-UY-03-05
3-S-UY-06-05	Opens the commercial fishing season in Subdistricts 4-A, 4-B, and 4-C Issued June 27,2005	6:00 p.m. June 29, 2005 Exp. Oct. 1	3-S-UY-01-05 3-S-UY-02-05	3-S-UY-03-05 3-S-UY-04-05
3-S-UY-07-05	Opens the commercial fishing season in District 5 Issued July 5, 2005	6:00 p.m. July 5, 2005 Exp. July 5, 04	3-S-UY-04-05	3-S-UY-03-05 3-S-UY-06-05
3-S-UY-08-05	Establishes Commercial periods 1 and 2 in Subdistrict 5-B and 5-C Issued July 5, 2004	6:00 p.m. July 5, 2004 Exp. July 7, 04	None	3-S-UY-03-05 3-S-UY-06-05 3-S-UY-07-05
3-S-UY-09-05	Establishes commercial period 3 in Subdistrict 5-B and 5-C Issued July 8, 2004	6:00 p.m. July 9, 2004 Exp. July 10, 04	None	3-S-UY-03-05 3-S-UY-06-05 3-S-UY-07-05
3-S-UY-10-05	Opens commercial fishing season in District 6 Issued July 10, 2005	6:00 p.m. July 11, 2005 Exp. Oct. 1, 05	None	3-S-UY-03-05 3-S-UY-06-05 3-S-UY-07-05
3-S-UY-11-05	Establishes Commercial periods 1 through 5 in District 6 Issued July 13, 2005	6:00 p.m. July 15, 2005 Exp. July 31, 05	None	3-S-UY-03-05 3-S-UY-06-05 3-S-UY-07-05 3-S-UY-10-05

Appendix A21.–Fall season commercial harvest summary by period, Yukon Area, 2005.

District 1

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished		Number of Fishermen	Fall Chum Salmon			Coho Salmon			Percent Coho
					Drift	Set		Number	Pounds	Average Weight	Number	Pounds	Average Weight	
1	8:00 PM	27 Jul	8:00 AM	28 Jul	12	12	23	399	2,799	7.0	50	352	7.0	11.1%
2	8:00 PM	29 Jul	8:00 AM	30 Jul	12	12	62	8,156	63,078	7.7	309	2,316	7.5	3.7%
3	8:00 PM	31 Jul	8:00 AM	1 Aug	12	12	115	24,311	194,911	8.0	187	1,357	7.3	0.8%
4	8:00 PM	3 Aug	8:00 AM	4 Aug	12	12	46	746	5,652	7.6	233	1,685	7.2	23.8%
5 [a]	9:00 PM	5 Aug	9:00 AM	6 Aug	7	12	113	32,602	255,439	7.8	2,048	15,166	7.4	5.9%
6	8:00 AM	9 Aug	5:00 PM	9 Aug	6	9	66	4,184	30,800	7.4	1,002	6,992	7.0	19.3%
7	8:00 AM	11 Aug	5:00 PM	11 Aug	6	9	63	3,537	26,228	7.4	1,153	8,116	7.0	24.6%
8	8:00 AM	14 Aug	5:00 PM	14 Aug	6	9	56	3,181	24,124	7.6	1,132	8,012	7.1	26.2%
9	8:00 AM	16 Aug	5:00 PM	16 Aug	6	9	48	628	4,693	7.5	1,765	12,751	7.2	73.8%
10	8:00 AM	18 Aug	5:00 PM	18 Aug	6	9	76	5,649	43,517	7.7	3,595	26,179	7.3	38.9%
11	8:00 AM	21 Aug	5:00 PM	21 Aug	6	9	71	9,730	78,816	8.1	4,497	32,795	7.3	31.6%
12 [b]	8:00 AM	22 Aug	5:00 PM	22 Aug	5	5	65	4,549	35,245	7.7	806	5,749	7.1	15.1%
13	8:00 AM	23 Aug	5:00 PM	23 Aug	Cancelled because buyer capacity exceeded					-			-	-
14	8:00 AM	24 Aug	5:00 PM	24 Aug	6	9	64	8,445	64,386	7.6	2,810	20,305	7.2	25.0%
15	8:00 AM	25 Aug	5:00 PM	25 Aug	6	9	41	4,228	31,655	7.5	1,673	11,871	7.1	28.4%
16	8:00 AM	26 Aug	5:00 PM	26 Aug	6	9	64	5,921	45,341	7.7	4,575	31,088	6.8	43.6%
17	8:00 AM	29 Aug	5:00 PM	29 Aug	6	9	59	4,433	31,858	7.2	3,680	26,165	6.8	45.4%
18	8:00 AM	30 Aug	5:00 PM	30 Aug	6	9	47	2,886	21,857	7.6	2,215	14,986	6.8	43.4%
19	8:00 AM	31 Aug	5:00 PM	31 Aug	6	9	38	2,712	19,956	7.4	1,584	11,231	7.1	36.9%
20	8:00 AM	1 Sep	5:00 PM	1 Sep	6	9	25	1,420	10,540	7.4	1,139	7,563	6.6	44.5%
21	8:00 AM	2 Sep	5:00 PM	2 Sep	6	9	18	569	4,485	7.9	481	3,372	7.0	45.8%
22	8:00 AM	3 Sep	5:00 PM	3 Sep	6	9	16	523	4,086	7.8	418	2,954	7.1	44.4%
23	8:00 AM	4 Sep	5:00 PM	4 Sep	6	9	10	353	2,466	7.0	297	2,013	6.8	45.7%
24	8:00 AM	5 Sep	5:00 PM	5 Sep	6	9	11	275	1,867	6.8	159	1,116	7.0	36.6%
25	8:00 AM	6 Sep	5:00 PM	6 Sep	6	9	9	291	2,084	7.2	198	1,355	6.8	40.5%
26	8:00 AM	7 Sep	5:00 PM	7 Sep	6	9	13	797	5,888	7.4	527	3,785	7.2	39.8%
District 1 Subtotal:					174	236	177	130,525	1,011,771	7.8	36,533	259,274	7.1	21.9%

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	Hours Fished		Number of Fishermen	Number	Pounds	Average Weight	Number	Pounds	Average Weight	Percent Coho
	Drift	Set								
Lower Yukon Area, Fall Season, Districts 1, 2, and 3 Subtotal:	174	236	177	130,525	1,011,771	7.8	36,533	259,274	7.1	21.9%

Districts 1, 2, and 3 Guideline Harvest Range: 60,000 to 220,000 fall chum salmon.

District 4

								Fall Chum Salmon			Coho Salmon			
Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished		Number of Fishermen	Number	Pounds	Estimated Harvest [a]	Number	Pounds	Estimated Harvest \a	Percent Coho
					4-A	4-BC								
1	6:00 PM	14 Aug	6:00 PM	19 Aug	120	120	No Harvest							-
2	6:00 PM	21 Aug	6:00 PM	26 Aug	120	120	No Harvest							-
3	6:00 PM	26 Aug	6:00 PM	2 Sep	168	168	No Harvest							-
4	6:00 PM	2 Sep	6:00 PM	9 Sep	168	168	No Harvest							-
5	6:00 PM	9 Sep	6:00 PM	16 Sep	168	168	No Harvest							-
6	6:00 PM	16 Sep	6:00 PM	23 Sep	168	168	No Harvest							-
7	6:00 PM	23 Sep												-
District 4 Subtotal:					912	912	-	-	-	-	-	-	-	-

District 4 Guideline Harvest Range: 5,000 to 40,000 fall chum salmon.

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Subdistricts 5-B and 5-C

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds of Roe	Fall Chum Salmon Estimated Harvest \a	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Estimated Harvest \a	Percent Coho
1	6:00 PM	16 Aug	6:00 PM	21 Aug	120	120 No Harvest							-
2	6:00 PM	23 Aug	6:00 PM	28 Aug	120	120 No Harvest							-
3	6:00 PM	28 Aug	6:00 PM	4 Sep	168	168 No Harvest							-
4	6:00 PM	4 Sep	6:00 PM	11 Sep	168	168 No Harvest							-
5	6:00 PM	11 Sep	6:00 PM	18 Sep	168	168 No Harvest							-
6	6:00 PM	18 Sep	6:00 PM										-
Subdistricts 5-B and 5-C						744	-	-	-	-	-	-	-	-

Subdistricts 5-B and 5-C Guideline Harvest Range: 4,000 to 36,000 fall chum salmon.

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

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished 6-A	Hours Fished 6-BC	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds of Roe	Fall Chum Salmon Estimated Harvest \a	Coho Salmon Number	Coho Salmon Pounds of Roe	Coho Salmon Estimated Harvest \a	Percent Coho
1	6:00 PM	26 Aug	12:00 PM	28 Aug	42	42	1	64		64	5		5	7.2%
2	6:00 PM	29 Aug	12:00 PM	31 Aug	42	42	1	552		552	30		30	5.2%
3	6:00 PM	2 Sep	12:00 PM	4 Sep	42	42	1	160		160	6		6	3.6%
4	6:00 PM	5 Sep	12:00 PM	8 Sep	72	72	3	5,042		5,042	2,326		2,326	31.6%
5	6:00 PM	9 Sep	6:00 PM	16 Sep	174	174	7	20,610		20,610	10,377		10,377	33.5%
6	6:00 PM	16 Sep	6:00 PM	21 Sep	120	120	7	18,986		18,986	6,138		6,138	24.4%
7	6:00 PM	23 Sep	11:59PM	30 Sep	180	180	5	4,223		4,223	2,896		2,896	40.7%
8	12:01AM	1 Oct	12:00PM	2 Oct	36	36	No Harvest							
9	6:00PM	3 Oct	12:00PM	5 Oct	42	42	No Harvest							
10	6:00PM	7 Oct	12:00PM	9 Oct	42	42	No Harvest							
District 6 Subtotal:					792	792	7	49,637	-	49,637	21,778	-	21,778	30.5%
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:						2448	7	49,637	-	49,637	21,778	-	21,778	30.5%
Yukon Area, Fall Season, Districts 1 Through 6 Total:						2622	184	180,162		180,162	58,311		58,311	24.5%

[a] Drift period was shortened from 12 to 7 hours by buyer.

[b] Drift period was shortened from 6 to 5 hours and setnet period shortened from 9 to 5 hours by buyer.

Appendix A22.–List of emergency orders pertaining to the fall chum and coho salmon fishery, Yukon Area, 2005.

E.O. Number	Effective Date	Action Taken	Comments
3-S-YF-01-05	July 27	Scheduled two 12-hour commercial salmon fishing periods in District 1: From 8:00 pm Wednesday, July 27 to 8:00 am Thursday, July 28; and from 8:00 pm Sunday, July 31 to 8:00 am Monday, August 1.	The 2005 preseason projection was for a run size between 584,000 to 776,000 fall chum salmon. The first significant pulse to enter the mouth on July 18 was estimated by Pilot Station Sonar at approximately 204,000. The sonar cumulative passage through July 24 was 248,523, as compared to average passage of 67,000 by this date for the project. The strong start of the fall season increased confidence that the 2005 fall chum salmon run size would be at or above the preseason projection of 776,000. Based on the Fall Chum Salmon Management Plan, this run size was adequate for escapement, subsistence, and commercial needs The first pulse experienced little exploitation in the lower river districts, which provided for upriver subsistence use and escapement. Commercial salmon markets were weak and limited to District 1. Additional commercial fishing periods were to be scheduled around market interest and fishing effort.
3-S-YF-02-05	July 30	Allowed the use of drift gillnet subsistence fishing gear in Subdistrict 4-A upstream from the mouth of Stink Creek beginning at 6:00 am.	The first fall chum salmon pulse was in the middle river section. Pilot Station sonar fall chum salmon passage estimate was well above average. Most king salmon had passed out of the area. Starting the fall subsistence drift gillnet fishery three days early provided additional opportunity to harvest quality salmon from the present pulse and spread the harvest throughout the run.
3-S-YF-03-05	July 29	Opened one additional 12-hour commercial salmon fishing period in District 1 and continued with the planned commercial salmon fishing period on July 31: From 8:00 pm Friday, July 29 to 8:00 am Saturday, July 30; and from 8:00 pm Sunday, July 31 to 8:00 am Monday, August 1.	The preliminary commercial harvest for the first District 1 period was approximately 400 chum and 40 coho salmon. The low catch rate was attributed to low numbers of salmon entering the river at the time of the open period. The two commercial salmon fishing periods increased opportunity to harvest surplus fall chum salmon. Due to lack of market interest, no commercial salmon fishing periods were scheduled in Districts 2 and 3.

E.O. Number	Effective Date	Action Taken	Comments
3-S-YF-04-05	August 3	Opened one 12-hour commercial salmon fishing period in District 1: From 8:00 pm Wednesday, August 3 to 8:00 am Thursday, August 4.	A second significant pulse had entered the Yukon River and was believed to be larger than the first. Total harvest from three commercial salmon fishing periods in District 1 was approximately 31,000 fall chum and 678 coho salmon. Total passage estimate of 313,000 past Pilot Station Sonar as of August 1 was above average for the project. Commercial fishing was directed on the second pulse as upriver districts were not expected to significantly harvest this pulse.
3-S-YF-05-05	August 5	Reduced the length of subsistence fishing time closures in Districts 1, 2, and 3 to 6 hours immediately before, during and after each commercial fishing period.	Approximately 32,000 fall chum and 675 coho salmon were harvested in District 1 by 112 fishermen in four commercial salmon fishing periods. Pilot Station Sonar passage estimate through August 3 was 440,000 fall chum salmon. Total run size was anticipated to exceed the preseason projection of 776,000 fall chum salmon and could reach above 900,00 based on average run timing. Additional commercial salmon fishing periods were warranted. Subsistence opportunity was expanded to offset fishing closures required for the additional commercial fishing periods by reducing the required 12 hour closure to 6 hours.
3-S-YF-06-05	August 5	Opened one 12-hour commercial salmon fishing period in District 1. Coastal Set Net Only Area: from 9:00 pm Friday, August 5 to 9:00 am Saturday, August 6. Remainder of District 1: from 8:00 am Saturday, August 6 to 8:00 pm Saturday, August 6.	Fall chum salmon run strength and adequate market interest warranted an additional commercial salmon fishing period. The Set Net Only Area schedule allowed fishing during preferred night-time tides while the daylight hours in the remainder of the District benefited drift fishing operations.
3-S-YF-07-05	August 8	Opened three commercial salmon fishing periods in District 1 on Tuesday, August 9, Thursday, August 11 and Sunday, August 14. Coastal Set Net Only Area: 8:00 am to	Preliminary total commercial harvest through August 6 was 64,400 fall chum and 2,800 coho salmon in District 1. Pilot Station Sonar passage estimate through August 7 was 546,000 fall chum salmon. Commercial salmon fishing periods continued to be warranted. The Set Net Only Area had more fishing time than the rest of the district due to use of less efficient gear type, fewer participants, and the effect of

E.O. Number	Effective Date	Action Taken	Comments
		5:00 pm. Remainder of District 1: 8:00 am to 2:00 pm	coastal tides on actual fishing time.
3-S-YF-08-05	August 14	Opened commercial salmon fishing periods in District 4 to five days each week: From 6:00 pm Sundays to 6:00 pm Fridays.	The preliminary total commercial harvest through August 11 was 72,400 fall chum and 5,026 coho salmon for District 1. Pilot Station Sonar passage estimate through August 11 was 1,273,610 fall chum salmon. The cumulative daily passage estimate exceeded the preseason projection of 776,000 fall chum salmon and was on track for a total run size similar to 1975 based on average run timing. The weekly commercial salmon fishing period provided opportunity to harvest and deliver fish to market according to available transportation schedules.
3-S-YF-09-05 3-S-YF-09-05	August 14	Removed required closed subsistence periods immediately before, during and after each commercial fishing period in Subdistrict 4-A, and immediately before and after each commercial fishing period in 4-B and 4-C. Subdistrict 4-A: salmon may be taken any time and concurrent with commercial fishing periods Subdistricts 4-B and 4-C: salmon may be taken concurrent with commercial fishing periods from August 16 to September 30, from 6:00 pm Tuesdays to 6:00 pm Sundays.	The commercial and subsistence fishing times were liberalized to provide greater fishing opportunities due to fall chum salmon run strength and limited commercial market interest. Maintained the 7-days per week subsistence salmon fishing schedule in Subdistrict 4-A that by regulation would be placed on 12 hour subsistence fishing closures before, during and after each commercial fishing period. Also, maintained the 5-days per week subsistence salmon fishing schedule in 4-B and 4-C that by regulation would be reduced to a maximum of two 48 hour subsistence salmon fishing periods per week when commercial fishing periods were scheduled.
3-S-YF-10-05	August 16	Opened five-day commercial salmon fishing periods each week in Subdistricts 5-B and 5-C: From 6:00 pm Tuesdays to 6:00 pm Sundays.	Provided opportunity to harvest and deliver fish to market at favorable times to coincide with available transportation schedules.
3-S-YF-11-05	August 16	Allowed 5-days per week subsistence salmon fishing schedule to remain in effect concurrent with commercial fishing periods in District 5, excluding Tozitna River drainage and 5-D: From 6:00 pm Tuesdays to 6:00 pm Sundays.	Continued liberalizing the subsistence fishing schedule for maximum subsistence and commercial fishing opportunities.
3-S-YF-12-05	August 16	Opened three commercial salmon fishing	The preliminary total commercial harvest through August 13 was 72,588

E.O. Number	Effective Date	Action Taken	Comments
		periods in District 1 on Tuesday, August 16, Thursday, August 18, and Sunday, August 21: Coastal Set Net Only Area: 8:00 am to 5:00 pm. Remainder of District 1: 8:00 am to 2:00 pm.	fall chum and 5,026 coho salmon for District 1. The Pilot Station sonar passage estimate through August 13 was 1,316,390 fall chum and 62,559 coho salmon. The total run size of fall chum salmon was more than double the amount required to allow a commercial fishery and was on track for the largest run since 1975, based on average run timing.
3-S-YF-13-05	August 22	Opened two commercial salmon fishing periods in District 1 on Monday, August 22 and Tuesday, August 23: Coastal Set Net Only Area: 8:00 am to 5:00 pm. Remainder of District 1: 8:00 am to 2:00 pm.	The preliminary total harvest through August 18 was 81,968 fall chum and 11,449 coho salmon. The Pilot Station passage estimate through August 20 was 1,412,000 fall and 99,000 coho salmon. One buyer requested the fishing times to maximize their limited processing capacity and transportation opportunities.
3-S-YF-14-05	August 22	Cancelled the Tuesday, August 23 commercial salmon fishing period in District 1 scheduled to begin 8:00 am.	The only commercial salmon buyer in District 1 reached their daily processing capacity and could not take deliveries during the next scheduled commercial fishing period. The subsistence fishing was allowed to continue.
3-S-YF-15-05	August 24	Opened one commercial salmon fishing period in District 1 on Wednesday, August 24. Coastal Set Net Only Area: 8:00 am to 5:00 pm. Remainder of District 1: 8:00 am to 2:00 pm.	Preliminary total commercial harvest through August 22 was 96,165 fall chum and 16,752 coho salmon. The Pilot Station sonar passage estimate through August 22 was 1,464,000 fall chum and 107,000 coho salmon. The only buyer in operation requested the fishing times to coordinate their limited processing capacity and transportation opportunities.
3-S-YF-16-05	August 26	Opened commercial salmon fishing 7 days a week in District 4 beginning 6:00 pm.	Provided opportunity to harvest and deliver fish to market at favorable times that coincided with the available transportation schedules.
3-S-YF-17-05	August 26	Increased subsistence fishing in Subdistricts 4-B and 4-C from 5 days to 7 days per week and allowed subsistence fishing to run concurrent with commercial fishing periods in all District 4 beginning at 6:00 pm.	Strength of the fall chum salmon run and limited commercial market interest allowed continued liberalization of subsistence and commercial fishing times for maximum opportunity to harvest and deliver fish to market when scheduled transportation was available.
3-S-YF-18-05	August 26	Established two 42-hour commercial salmon	The fall chum salmon run was sufficient to the Tanana River. The

E.O. Number	Effective Date	Action Taken	Comments
		fishing periods in District 6: From 6:00 pm Friday to 12:00 noon Sunday and from 6:00 pm Monday to 12:00 noon Wednesday.	announced commercial fishing times were consistent with prior years to provide opportunity to harvest and deliver fish to market.
3-S-YF-19-05	August 25	Relaxed the subsistence fishing closure restriction at times of commercial fishing periods in Districts 1, 2, and 3. Subsistence fishing closed the 6 hours immediately before a commercial fishing period, opened during each commercial fishing period and closed at the end of the commercial period to reopen beginning 6:00 pm.	Subsistence fishing was normally closed 12 hours before, during and 12 hours after a commercial fishing period in the district. The August 5 emergency order reduced the closure time to 6 hours. This action further reduced those hours to compensate for the increased commercial fishing periods by providing more subsistence fishing oppportunity.
3-S-YF-20-05	August 25	Established a weekly commercial salmon fishing schedule in District 1. Coastal Set Net Only Area: Open daily 8:00 am to 5:00 pm Monday through Friday. Remainder of District: Open daily 8:00 am to 2:00 pm Monday through Friday.	The only buyer in operation requested the fishing times to maximize their limited processing capacity and transportation opportunities.
3-S-YF-21-05	August 28	Increased subsistence fishing in Subdistricts 5-B and 5-C from 5 days per week to 7 days per week and to run concurrent with commercial fishing beginning 6:00 pm	Preliminary total commercial harvest through August 24 was 104,660 fall chum and 19,562 coho salmon. Pilot Station sonar passage estimate through August 25 was 1,473,000 fall and 132,000 coho salmon. The commercial and subsistence fishing times were liberalized to provided harvest opportunity and maximize delivery to commercial markets by available transportation schedules.
3-S-YF-22-05	August 28	Opened commercial salmon fishing to 7 days per week in Subdistricts 5-B and 5-C beginning at 6:00 pm.	Provided additional opportunity to harvest and deliver fish to market at favorable times that coincided with available transportation schedules.
3-S-YF-23-05	September 1	Extended the fall commercial fishing season in District 1: From 12:01 am September 1 to 11:59 pm	The fall chum salmon run strength was sufficient, the coho salmon run was well above average and a commercial processor expressed interest in buying fall chum and coho salmon in District 1. The previously announced

E.O. Number	Effective Date	Action Taken	Comments
		Friday, September 9.	five days per week commercial salmon fishing schedule from Monday through Friday remained in effect.
3-S-YF-24-05	September 3	Opened two additional commercial salmon fishing periods in District 1 on September 3 and 4.	The preliminary total commercial harvest through August 31 was 125,281 fall chum and 33,299 coho salmon. The Pilot Station sonar passage estimate through August 29 was 1,792,000 fall chum and 176,000 coho salmon. Additional opportunity was provided to take advantage of fish quality and available market.
3-S-YF-25-05	September 7	Extended the current commercial salmon fishing period in Subdistricts 6-A and 6-B for an additional 30 hours beginning 12:00 noon Wednesday, September 7 to 6:00 pm Thursday, September 8.	The preliminary total commercial harvest through September 1 was 126,701 fall chum and 34,438 coho salmon. The preliminary final Pilot Station sonar passage estimate through August 31 was 1,811,762 fall chum and 184,071 coho salmon. The additional 30 hours of commercial fishing opportunity were warranted for District 6 because the fall chum salmon run strength was adequate to the Tanana River.
3-S-YF-26-05	September 9	Increased the length of the weekly commercial salmon fishing period to 5 days per week in Subdistricts 6-A and 6-B effective 6:00 pm. Open 6:00 pm Fridays to 6:00 pm Wednesdays.	The fall chum salmon strength to the Tanana River provided for subsistence use and for the commercial market. The increase in subsistence and commercial fishing times was consistent with prior years to provide fishing opportunities.
3-S-YF-27-05	September 14	Extended the commercial salmon fishing period for an additional 48 hours in Subdistricts 6-A and 6-B beginning 6:00 pm Wednesday, September 14 to 6:00 pm Friday, September 16.	The preliminary total commercial harvest through September 9 was 129,509 fall chum and 36,518 coho salmon for District 1. The subsistence harvest was anticipated to be normal for the time of year and the commercial harvest had potential to be significant if the market continued to buy.
3-S-YF-28-05	September 28	Extended the commercial salmon fishing period in Subdistricts 6-A and 6-B from 6:00 pm Wednesday, September 28 to 11:59 pm Friday, September 30.	The preliminary total commercial harvest through September 20 was 44,650 fall chum and 18,957 coho salmon for District 6. By regulation, beginning October 1, subsistence fishing time was allowed 7 days per week in Subdistricts 6-A and 6-B upon assessment of the Tanana River run. If commercial markets still existed after October 1, the

E.O. Number	Effective Date	Action Taken	Comments
			subsistence and commercial fishing times were to be scheduled concurrently.
3-S-YF-29-05	October 1	Extended the commercial salmon fishing season in Subdistricts 6-A and 6-B to 12 noon Sunday, October 9 and announced 3 commercial salmon fishing periods: 12:01 am Saturday, October 1 to 12:00 noon Sunday, October 2; 6:00 pm Monday, October 3 to 12:00 noon Wednesday, October 5; and 6:00 pm Friday, October 7 to 12:00 noon Sunday, October 9.	The Yukon River coho salmon run was above average and the fall chum salmon run was projected to be the highest since 1975. The preliminary total commercial harvest through September 28 was 48,089 fall chum and 20,596 coho salmon for District 6. The commercial salmon fishing season was extended to allow for additional commercial salmon harvest Following conclusion of the commercial salmon fishing season, subsistence fishing in District 6 was to open 24-hours a day, 7-days a week in accordance with the Tanana River Salmon Management Plan

Appendix A23.–Canadian weekly commercial catches of Chinook, chum and coho salmon in the Yukon River in 2005.

Statistical Week	Week Ending	Start Date	Finish Date	Days Fished	Number Fishing	Boat Days	Chinook Salmon	Chum Salmon	Coho Salmon
29	16 Jul	10 Jul	12 Jul	2	11.0	22	407	0	0
30	23 Jul	17 Jul	19 Jul	2	11.0	22	920	0	0
31	30 Jul	24 Jul	28 Jul	4	10.3	41	1,829	1	0
32	06 Aug	31 Jul	04 Aug	4	6.3	25	722	5	0
33	13 Aug	07 Aug	11 Aug	4	1.0	4	95	6	0
34	20 Aug			0	0.0	0			
35	27 Aug			0	0.0	0			
36	03 Sep	27 Aug	01 Sep	5	1.8	9	12	774	0
37	10 Sep	03 Sep	10 Sep	7	1.0	7	10	897	0
38	17 Sep	10 Sep	17 Sep	7	0.9	6	2	2,229	0
39	24 Sep	17 Sep	24 Sep	7	1.7	12	0	2,218	0
40	01 Oct	24 Sep	01 Oct	7	1.3	9	0	4,259	0
41	08 Oct	01 Oct	08 Oct	7	1.4	10	0	1,271	0
42	15 Oct	08 Oct	15 Oct	7	0.4	3	1	271	0
Dawson Area Subtotal				63	48.1	170	3,998	11,931	0
Upriver Commercial Subtotal							68	0	0
TOTAL COMMERCIAL HARVEST							4,066	11,931	0
Chinook Test Fishery and Chum Live Release Test (Not Conducted in 2005)									
Domestic Harvest							99	13	0
Estimated Recreational Harvest							436	0	0
Aboriginal Fishery Catch							6,376	2,035	0
TOTAL UPPER YUKON HARVEST							10,977	13,979	0
Old Crow Aboriginal Fishery							394	4,593	11
Old Crow Test Fishery (all fish were released)									

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, 2005.

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	other	sum
Hooper Bay	11/14-18	118	217	157	9,771	1	0	44	1	0	0	45
Scammon Bay	9/10-11	56	158	691	4,586	69	279	22	1	0	0	23
Coastal District Total		174	375	848	14,357	70	279	66	2	0	0	68
Nunam Iqua [e]	9/8-9	22	65	338	2,794	310	241	15	1	0	0	16
Alakanuk [f]	9/8-10	83	199	860	5,687	627	322	16	22	0	0	38
Emmonak [f]	9/6-8	97	158	1,730	12,594	1,436	191	7	44	0	0	51
Kotlik [f]	10/4-6	50	60	2,130	6,620	516	222	16	7	0	0	23
District 1 Subtotal		252	482	5,058	27,695	2,889	976	54	74	0	0	128
Mountain Village [f]	9/12-14	105	157	2,383	8,861	1,290	246	9	41	0	0	50
Pitkas Point	9/17	18	42	618	1,023	6	30	3	12	0	0	15
St. Mary's	9/14-17	91	114	2,693	6,877	490	252	2	42	0	1	45
Pilot Station [f]	9/17-19	45	61	1,658	4,333	838	241	5	22	0	0	27
Marshall	9/20-22	48	189	1,804	3,183	633	341	3	20	0	0	23
District 2 Subtotal		307	563	9,156	24,277	3,257	1,110	22	137	0	1	160
Russian Mission	9/17-19	42	90	1,894	925	667	133	0	16	0	0	16
Holy Cross	9/20-22	39	70	2,817	760	582	84	8	16	0	0	24
Shageluk	9/25-26	15	54	420	4,081	55	0	8	4	0	0	12
District 3 Subtotal		96	214	5,131	5,766	1,304	217	16	36	0	0	52
Lower Yukon River Total		655	1,259	19,345	57,738	7,450	2,303	92	247	0	1	340
Anvik	9/23-24	18	81	1,206	529	497	406	10	6	0	0	16
Grayling	9/19-20	37	65	1,878	783	1,009	234	1	15	0	0	16
Kaltag [f]	10/4-5	44	51	3,367	680	1,089	307	1	14	0	0	15
Nulato	10/5-6	51	163	2,749	634	421	60	4	16	0	0	20
Koyukuk	10/4	11	51	396	537	803	37	1	7	0	0	8
Galena	10/1-10/4	75	277	2,864	1,013	2,695	607	12	14	2	0	28
Ruby	10/7-8	22	78	1,193	967	559	361	3	1	2	0	6

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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	other	sum
Huslia	10/5-6	18	239	207	2,433	1,614	734	11	0	0	0	11
Hughes	10/6-7	8	70	33	2,230	111	20	8	0	0	0	8
Allakaket	9/26-27	8	139	68	2,535	557	205	6	0	0	0	6
Alatna	9/26-27	1	2	0	5	0	0	1	0	0	0	1
Bettles	9/27-28	4	109	3	4	50	0	1	1	0	1	3
Koyukuk River Subtotal		39	559	311	7,207	2,332	959	27	1	0	1	29
District 4 Subtotal		297	1,325	13,964	12,350	9,405	2,971	59	74	4	1	138
Tanana	10/12-13	41	566	3,729	4,832	20,545	1,616	17	0	12	0	29
Rampart	permits	4	31	411	315	358	10	4	0	0	0	4
Fairbanks NSB [g]	permits	64	216	2,584	780	1,682	10	61	0	3	0	64
Stevens Village [h]	10/27-28, permits	16	58	1,570	442	246	0	8	0	1	0	9
Birch Creek	10/14-16 tele	3	7	131	0	0	0	2	0	0	0	2
Beaver	10/25-26	14	25	957	68	179	0	9	0	0	0	9
Fort Yukon	10/10-11	53	391	3,591	67	8,088	394	12	0	15	0	27
Circle	permits	11	66	1,283	3	918	100	5	0	6	0	11
Central	permits	6	7	175	5	36	1	5	0	1	0	6
Eagle [f]	permits	32	252	2,566	235	17,356	15	25	0	7	0	32
Other District 5 [i]	permits	7	49	315	53	117	13	7	0	0	0	7
District 5 Yukon River Subtotal		251	1,668	17,312	6,800	49,525	2,159	155	0	45	0	200
Venetie	10/24-25	13	139	59	0	1,801	0	6	0	0	1	7
Chalkyitsik	10/27-28	5	43	53	0	337	0	4	0	0	0	4
Chandalar and Black rivers Subtotal		18	182	112	0	2,138	0	10	0	0	1	11
District 5 Subtotal		269	1,850	17,424	6,800	51,663	2,159	165	0	45	1	211

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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	other	
Manley	permits	10	205	289	163	2,985	2,510	8	0	2	0	10
Minto	permits	4	163	35	21	600	0	4	0	0	0	4
Nenana [j]	permits	16	350	533	1,771	10,594	12,395	5	0	11	0	16
Healy	permits	5	96	0	14	2,061	1,601	5	0	0	0	5
Fairbanks NSB [k]	permits	36	270	1,109	197	6,824	3,139	35	0	1	0	36
Other District 6 [l]	permits	13	91	0	0	15	0	12	0	1	0	13
District 6 Tanana River Subtotal [m]		84	1,175	1,966	2,166	23,079	19,645	69	0	15	0	84
Upper Yukon River Total		650	4,350	33,354	21,316	84,147	24,775	293	74	64	2	433
Survey Village Subtotal		1,271	4,188	42,118	86,477	44,680	6,983	275	323	32	3	633
Subsistence Permit Subtotal [n]		181	1,796	8,983	3,403	40,166	12,467	150	0	31		181
Subsistence Test Fish Subtotal [o]				2,308	3,379	3,441	580					
District 6 Commercial Related [p]				0	0	3,247	7,220					
Subsistence Harvests Subtotal		1,452	5,984	53,409	93,259	91,534	27,250	425	323	63	3	814
Personal Use Permit Subtotals		27	-	138	152	133	107	26	0	1	0	27
Alaska, Yukon River Total [q]		1,305	5,609	52,699	79,054	91,597	27,078	385	321	64	3	773
Alaska, Yukon Area Total		1,479	5,984	53,547	93,411	91,667	27,357	451	323	64	3	841
AK, Yukon Area Percentages of the Total		-	-	20%	35%	34%	10%	54%	38%	8%		

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[a] Data collected by Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries. Survey data is expanded for number of fishing households, number of dogs, and harvest. Permit data is unexpanded, and is from all permits received as of June 1, 2006.

[b] Estimated number of households that fished in surveyed communities or number of permit households who reported fishing in permit required areas.

[c] The number of dogs is based on information obtained from permits issued, while the number of fishing households and their harvest is based on returned permits.

[d] Primary Fishing Gear is not expanded for households that were not surveyed.

[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 Anderson, Manley, Minto, Eagle River, and the Upper Tanana River drainage villages of Northway and Tok who obtained a household permit and fished in a Yukon River permit required area.

[j] Includes 3,247 fall chum and 7,220 coho salmon "not sold" during commercial fishing but kept for subsistence use (commercial related harvest) .

[k] 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.

[l] "Other District 6" includes the Upper Tanana River drainage communities of Delta Junction, Tanacross, Tok, and Northway who obtained a permit and fished in the Tanana River.

[m] Does not include harvest of coho and chum salmon sold commercially for roe and carcass returned to fishermen for dog food in Subdistrict 6-B.

[n] Subsistence Permit Subtotal does not include Stevens Village.

[o] Test fish given away for subsistence use.

[p] District 6 "Commercial Related" included fish caught during commercial fishing but "not sold" but retained for subsistence use.

[q] Does not include Coastal District.

Appendix A25.–Reported subsistence and personal use fish harvested under the authority of a permit area, Yukon Area, 2005.

Permit Fishing Area	Permit [a]			Percent Returned	Number of Permits Returned that Fished [c]	Reported Harvest			
	Type	Issued [b]	Returned			Chinook	Summer Chum	Fall Chum	Coho
Subsistence									
Koyukuk Middle and South Fork rivers	SF	2	1	50%	1	0	0	0	0
Yukon River Rampart Area	SR	22	19	86%	17	1,721	663	2,023	10
Yukon River near Haul Road Bridge	SY	76	72	95%	57	1,847	643	17	9
Yukon River near Circle and Eagle [d]	SE	89	81	91%	55	4,004	241	18,427	130
Tanana River Subdistrict 6A	SA	18	16	89%	11	291	166	3,015	2,414
Tanana River Subdistrict 6B [e]	SB	70	67	96%	29	1,403	1,846	15,367	9,659
Tanana River Upstream of Subdistrict 6C	SU	29	24	83%	13	0	0	15	0
Kantishna River Subdistrict 6A	SK	6	6	100%	4	133	2	1,302	245
Tolovana River Pike Subdistrict 6B	ST	79	69	87%	31	1	0	0	0
Subsistence Permit Subtotals		391	355	91%	218	9,400	3,561	40,166	12,467

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Permit Fishing Area	Permit [a] Type	Issued [b]	Returned	Percent Returned	Number of Permits Returned that Fished [c]	Reported Harvest Chinook	Summer Chum	Fall Chum	Coho
Personal Use									
Tanana River Subdistrict 6C	PC	63	59	94%	27	138	152	133	107
Tanana River Whitefish Upstream of Subdistrict 6C	PW	10	10	100%	5	0	0	0	0
Personal Use Permit Subtotals		73	69	95%	32	138	152	133	107
Permit Totals		464	424	91%	250	9,538	3,713	40,299	12,574

[a] Permits retained as of June 1, 2006.

[b] Includes 37 households that were "issued" permits for more than one area. Additionally, includes two households that were issued duplicate permits for same area.

[c] Includes 9 households that "fished" in two different permit areas.

[d] Does not include fish distributed to community households from ADF&G Eagle Sonar test fish project (179 Chinook and 2 summer chum salmon).

[e] Does not include 3,247 fall chum and 7,220 coho salmon commercial related fish "not sold" during commercial fishing but retained for subsistence use.

Appendix A26.–Detailed salmon spawning escapement estimates for the Yukon River drainage, 2005.

Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Andreafsky River						
East Fork (weir) [a]	6/26-9/11	--	2,239	20,127	--	5,303
East Fork (aerial)	7/21	Good	(1,715)	--	--	--
West Fork (aerial)	7/21	Good	1,492	--	--	--
	Andreafsky Aerial Subtotal		3,207	--	--	--
	Andreafsky Subtotal		3,731	20,127	--	5,303
Yukon River (Pilot Station)						
Main River (HTI and DIDSON Sonar)	5/31-8/31		159,441	2,439,616	1,813,589	184,718
Anvik River (aerial)						
Sonar site to Yellow R.	7/20	Good	311	--	--	--
Yellow R. to McDonald Cr. (index area)	7/20	Good	1,922	--	--	--
Swift River	7/20	Good	32	--	--	--
Beaver Creek	7/20	Good	100	--	--	--
Otter Creek	7/20	Good	45	--	--	--
McDonald Creek	7/20	Good	11	--	--	--
HTI Sonar Estimate	6/26-7/26	--	--	525,391	--	--
	Anvik Subtotal		2,421	525,391	--	--
Kaltag River (tower)	--	--	--	22,093	--	--
Nulato River (aerial)						
North Fork (aerial)	7/22	Good	318	--	--	--
South Fork (aerial)	7/22	Good	230	--	--	--
Nulato River (mainstem to forks -aerial)	7/22	Good	5	--	--	--
	Nulato Subtotal		553	0	0	0
Total Monitored Lower Yukon River (downstream of Koyukuk River)			6,705	567,611	0	5,303
Koyukuk River Drainage						
Gisasa River (weir) [a]	6/29-7/31	--	3,111	172,259	--	--
Gisasa River (aerial)	7/22	Good	(958)	--	--	--
Hogatza River drainage						
Clear Creek (weir) [b]	6/22-8/1	--	9	26,420	--	--
Henshaw Creek (weir) [c]	6/26-8/8	--	1,059	237,481	--	--
Henshaw Creek (aerial) [d]	--	--	--	--	--	--
South Fork Koyukuk River						
Jim River (aerial) [d]	--	--	--	--	--	--
Total Koyukuk River			4,179	436,160	0	0
Tozitna River (Dagislakhna Creek to mouth -aerial) [d]	--	--	--	--	--	--
Tozitna River (weir) [b]	6/29-8/12	--	1,611	39,700	--	--
	Tozitna Subtotal		1,611	39,700	--	--
Total Monitored Yukon River (downstream of Tanana River)			12,495	1,043,471	0	5,303

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Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Tanana River Drainage						
Kantishna River Drainage						
Kantishna River (mark-recapture)	8/16-9/29	--	--	--	107,719	--
Toklat Springs						
Aerial Survey	10/16	Fair-Poor	--	--	(5,124)	(26)
Floodplain Sloughs (foot survey) [a]	10/25-10/27	Fair	--	--	(12,349)	48
Geiger Creek (foot survey) [a]	10/25-10/27	Fair	--	--	(5,210)	625
Population Estimate [e]	10/25-10/27	--	--	--	(17,779)	--
Bearpaw River (aerial)	7/23	Good	150	0	--	--
Moose Creek (aerial)	7/23	Fair	41	0	--	--
	Toklat Foot Survey Subtotal		--	--	17,559	673
Total Kantishna River			--	--	107,719	673
Upper Tanana River (mark-recapture) [f]	8/16-9/30	--	--	--	337,755	--
Chatanika River (aerial) [d]	--	--	--	--	--	--
Tower Estimate [f]	6/29-8/7	Incomplete	--	--	--	--
Nenana River Drainage (aerial)						
Teklanika River						
Teklanika Springs (vicinity of Comma Lake) [d]	--	--	--	--	--	--
Nenana mainstem upstream of Teklanika R. [g,h]	10/18	Good	--	--	0	325
Seventeen Mile Slough [g, h]	7/23,10/18	Good/Good	644	0	0	3,890
Julius Creek [g, h]	7/23,10/18	Fair/Good	3	0	--	280
Wood Creek [g, h]	10/18	Good	--	--	--	1,030
Clear Creek [g, h]	7/23,10/18	Good/Good	135	0	--	35
Glacier Creek [g, h]	7/23,10/18	Good/Good	223	0	--	70
Lost Slough (western floodplain) [g, h]	10/18	Good	--	--	--	430
June Creek (foot survey) [h]	10/6	Poor	--	--	--	201
Lignite Spring (foot survey)	10/16	Good	--	--	1	400
	Nenana Subtotal		1,005	0	1	6,661
Chena River						
Chena Dam to Middle Fk (aerial index)	7/27	Fair/Poor	1,608	(219)	--	--
Tower Estimate [g]	6/29-8/4	Incomplete	(564)	16,875	--	--
	Chena Subtotal		1,608	16,875	--	--
Salcha River						
Mainstem River (aerial outside index area)	7/27	Good	(194)	(1,023)	--	--
TAPS to Caribou Cr (aerial/index area)	7/27	Good	(5,295)	(3,297)	--	--
Tower Estimate [i, j]	6/30-8/25	--	5,988	193,085	--	--
	Salcha Subtotal		5,988	193,085	--	--
Richardson Clearwater River (aerial)	11/7	Fair	--	--	0	2,024
Mainstem Tanana sloughs (aerial) [j]						
Benchmark 735 Slough	11/7	Good	--	--	3,585	131
BM 735 to Little Delta River	11/7	Good	--	--	1,476	0
Little Delta River to Delta Creek	11/7	Good	--	--	98	1
Delta Creek to Delta River	11/7	Good	--	--	329	14

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Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Providence (Timber) vicinity	11/7	Poor	--	--	115	0
Whitestone Slough	11/7	Fair	--	--	121	0
Rika's Roadhouse vicinity to Blue Creek	11/7	Good	--	--	10,161	0
Blue Creek to Bluff Cabin Creek	11/7	Good	--	--	200	0
Bluff Cabin Island Slough	11/7	Good	--	--	193	0
Bluff Cabin to Clearwater Lake Outlet Slough	11/7	Good	--	--	1,045	2
Clearwater Lake Outlet Slough	11/7	Good	--	--	6,552	5
Upstream of Clearwater Lake Outlet Slough	--	--	--	--	--	--
Onemile Slough	11/7	Good	--	--	4,371	12
Pearse Slough and vicinity	11/7	Poor	--	--	5	0
	Mainstem Subtotal		0	0	28,251	165
Tanana River Drainage						
Goodpaster River						
Mainstem (Liscum Slough to Slate Creek -aerial)	7/24	Good	441	1	--	--
South Fork	--	--	--	--	--	--
Central Creek	--	--	--	--	--	--
Tower Estimate (upstream of forks) [c]	7/1-7/31	Incomplete	--	--	--	--
	Goodpaster Subtotal		441	1	0	0
Delta River						
Foot Survey (peak count)	11/4	Good/Fair	--	--	(27,679)	69
Population Estimate [j]	10/12-12/2	--	--	--	28,132	--
Blue Creek (aerial) [g]	11/7	Good	--	--	1,221	108
Bluff Cabin Slough (foot survey)	11/18	Good/Fair	--	--	6,253	32
Bluff Cabin Slough (aerial) [g]	11/7	Good	--	--	11,964	11
Bluff Cabin Creek (aerial) [g]	11/7	Good	--	--	860	511
Delta Clearwater River Index Area [f, k]	10/25	Good	--	--	2,000	34,293
Tributaries [f, l]	10/25	Good	--	--	0	8,766
Clearwater Lake Outlet [f, k]	10/25	Good	--	--	200	2,100
	Delta Subtotal		0	0	50,630	45,890
Total Monitored Tanana River			9,042	209,961	445,474	60,716
Upper Yukon River						
Chandalar River (splitbeam sonar) [a]	8/8-9/26	--	--	--	496,484	--
Charley River (W. Fork to mouth) [d, m]	--	--	--	--	--	--

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Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Upper Yukon River						
Chandalar River (splitbeam sonar) [a]	8/8-9/26	--	--	--	496,484	--
Charley River (W. Fork to mouth) [d, m]	--	--	--	--	--	--
Porcupine River Drainage						
Sheenjek River						
DIDSON Sonar Estimate	8/8-9/24	--	--	--	(438,253)	--
Sonar Estimate with Expansion [n]	--	--	--	--	561,863	--
Porcupine River (mark-recapture) [o]						
Test Fish Tag Recoveries	--	--	--	--	(128,497)	--
Test Fish Tag & Harvest Recoveries	--	--	--	--	(113,415)	--
Fishing Branch River (weir)[o]	8/20-10/16	--	--	--	121,413	--
	Porcupine Subtotal		--	--	683,276	--
Total Alaskan Portion of Drainage[q]	--	--	21,537	1,253,432	1,503,821	66,019
White River						
Kluane River (aerial)	10/12	--	--	--	34,600	--
Pelly River						
Blind Creek (weir)	7/15-8/15	--	525	--	--	--
Ross River (aerial)	--	Good/Fair	363	--	--	--
Canadian Mainstem Yukon River (aerial)	--	--	--	--	16,425	--
Little Salmon River (aerial index area)	8/12	Excellent	1,519	--	--	--
Big Salmon River (aerial index area)	8/15	Good/Fair	(952)	--	--	--
Big Salmon River (sonar)	7/15-8/23		5,584	--	--	--
Teslin River Drainage						
Mainstem (aerial index area)	10/27	--	--	--	585	--
Nisutlin River (aerial)	8/15	Good/Fair	807	--	--	--
Wolf River (aerial)	8/15	Good/Fair	260	--	--	--
	Teslin Subtotal		1,067	--	585	--
Whitehorse Fishway	7/29-9/6	--	2,632	--	--	--
Total Yukon Territory (observed)	--	--	11,690	0	51,610	0
Canadian Mainstem Yukon River						
Border Passage Estimate[q]	6/24-10/10	--	(42,245)	--	(451,477)	--
Eagle Sonar Estimate	7/12-8/10	--	(81,528)	--	--	--
Total Yukon Territory (mark-recapture) [r]	--	--	31,268	--	437,733	--
Yukon River Drainage Monitored Escapement Totals			52,805	1,253,432	2,062,967	66,019
Yukon River Drainage Survey Totals			19,774	4,540	148,271	55,413
Yukon River Drainage Project Totals			45,849	1,231,338	2,062,967	5,303

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Note: Estimates are from aerial surveys (peak count) unless otherwise indicated; carcass counts included. Varying data collection methods do not allow for standard totals and subtotals, carefully note what is contained in each section. Data in parentheses is not included in totals or subtotals where more than one type of method exists for an individual assessment project. Dashes (--) indicate data is not available.

[a] Estimate made by U.S. Fish and Wildlife Service.

[d] Project did not operate, no survey conducted.

[b] Estimate made by Bureau of Land Management.

[c] Estimate made by Tanana Chiefs Conference.

[e] Population estimate based on timing of ground (foot) surveys at Toklat Springs and streamlife data.

[f] Estimate made by Division of Sport Fish.

[g] October estimate made by Yukon River Drainage Fisheries Association.

[h] Helicopter survey unless otherwise noted.

[i] Population estimate based upon expanded counting tower observations.

[j] Population estimate based upon replicate foot surveys and salmon stream life data.

[k] Boat survey.

[l] Estimated tributary escapement based on expansion factor derived from 5-years (1994-1998) of aerial surveys of tributaries. Average tributary proportion estimated to be 20.4% of the total escapement.

[m] Estimate made by National Park Service (NPS).

[n] Project ended while still counting greater than 10,000 fish per day, estimate was expanded based on run timing (73%) at Rampart.

[o] Estimates made by Canadian Department of Fisheries and Oceans.

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

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

[r] Canadian "spawning escapement" estimate for Yukon Territory streams (excluding the Fishing Branch River); from DFO tagging study (border passage estimate minus Canadian harvest).

Appendix A27.–Yukon River Canadian Chinook salmon total run by brood year and escapement by year, and recruits per spawner (R/S), 1982–1998.

Brood	Age Group by Brood Year								Return per
Year	3	4	5	6	7	8	Total Return	Escapement	Spawner
1974						596			
1975					27,199	162			
1976				75,458	19,698	30			
1977			15,436	100,941	16,171	593			
1978		3,616	20,758	51,613	22,839	1,136			
1979	1,534	3,159	16,001	80,761	39,130	851	141,436		
1980	15	4,830	10,413	58,879	27,603	3,409	105,149		
1981	0	1,050	29,283	97,369	49,079	1,348	178,129		
1982	0	5,083	13,907	32,119	20,417	334	71,860	19,790	3.63
1983	560	6,283	31,679	68,304	13,110	134	120,070	28,988	4.14
1984	69	12,586	28,841	61,586	10,591	114	113,787	27,615	4.12
1985	223	10,160	34,439	49,235	4,171	91	98,319	10,731	9.16
1986	347	20,207	40,128	99,601	14,798	138	175,219	16,414	10.67
1987	0	2,309	30,007	63,125	8,298	18	103,757	13,260	7.82
1988	0	6,491	32,391	60,038	7,393	68	106,381	23,118	4.60
1989	61	13,392	67,329	114,496	19,778	0	215,056	25,200	8.53
1990	45	6,185	22,572	48,488	8,586	9	85,885	37,700	2.28
1991	357	6,897	66,055	109,487	8,533	0	191,329	20,743	9.22
1992	6	2,459	22,318	33,018	1,556	0	59,357	25,381	2.34
1993	6	5,172	27,364	65,264	4,666	0	102,472	28,559	3.59
1994	0	597	16,123	21,496	5,290	0	43,506	25,889	1.68
1995	16	1,675	11,955	45,883	6,865	10	66,403	32,262	2.06
1996	6	194	20,831	43,183	11,230	2	75,446	28,410	2.66
1997	6	3,527	25,679	73,716	6,852	14	109,795	37,684	2.91
1998	0	3,419	30,372	69,404	3,082		106,277	16,751	6.34
1999	126	1,542	26,626	52,966				11,362	
2000	0	5,555	29,016					11,344	
2001	0	1,476						42,438	
2002	42							40,145	
2003								47,486	
2004								37,165	
2005								31,268	
Average (1982-1998)							108,525	24,617	5.05

Appendix A28.–Percent age composition of combined commercial and subsistence salmon harvest by species, 'Yukon River drainage, 1982–2005.

Species	Year		Sample Size	Age In Years (Percent) 3	4	5	6	7	8	Total[a]
Chinook Salmon	1982		3,795	0.2	6.8	18.5	58.3	15.9	0.3	100.0
	1983		3,801	0.0	6.6	21.0	62.9	9.4	0.0	100.0
	1984		3,700	0.0	3.7	27.0	56.0	13.1	0.1	100.0
	1985		4,567	0.1	5.7	13.2	69.4	11.3	0.3	100.0
	1986		5,785	0.3	3.9	27.2	42.8	25.1	0.6	100.0
	1987		5,300	0.0	4.2	8.4	72.5	14.5	0.3	100.0
	1988		5,108	0.1	14.8	22.8	31.5	29.4	1.4	100.0
	1989		3,901	0.5	7.2	30.3	51.1	10.2	0.6	99.9
	1990		3,416	0.0	17.2	26.9	49.4	6.3	0.2	100.0
	1991		3,879	0.0	5.8	45.1	42.6	6.4	0.1	100.0
	1992		3,772	0.1	8.1	20.1	68.6	3.1	0.0	100.0
	1993		4,034	0.2	15.8	25.4	50.5	8.0	0.0	100.0
	1994		3,692	0.3	4.1	47.2	44.5	3.8	0.0	99.9
	1995		5,559	0.0	7.8	13.7	74.7	3.6	0.2	100.0
	1996		5,861	0.0	2.4	44.0	35.6	17.9	0.2	100.1
	1997		5,134	0.0	7.5	17.8	70.5	4.2	0.1	100.1
	1998		3,122	0.7	5.2	55.1	31.4	7.6	0.0	100.0
	1999		4,285	0.1	3.8	17.7	76.7	1.7	0.0	100.0
	2000		1,201	0.0	1.0	29.9	60.5	8.6	0.0	100.0
	2001	[b]	1,182	0.1	9.0	27.2	57.6	6.1	0.0	100.0
	2002		3,580	0.0	8.2	27.0	53.9	10.9	0.0	100.0
	2003		3,850	0.1	3.4	32.3	56.5	7.7	0.0	100.0
	2004		6,556	0.0	9.9	23.3	63.1	3.6	0.0	100.0
	2005		4,515	0.0	5.8	43.0	48.5	2.6	0.0	100.0
		5-Year Average (2000-2004)	3,274	0.0	6.3	27.9	58.3	7.4	0.0	100.0
Summer Chum Salmon	1982		3,419	5.3	0.0	88.6	6.1	0.0		100.0
	1983		4,110	1.0	53.8	44.4	0.8	0.0		100.0
	1984		2,722	2.0	73.7	23.9	0.5	0.0		100.0
	1985		2,472	1.4	68.6	29.2	0.8	0.0		100.0
	1986		3,473	0.1	29.1	69.8	1.0	0.0		100.0
	1987		2,184	0.4	60.8	31.8	6.9	0.0		100.0
	1988		5,112	0.0	70.1	29.1	0.8	0.0		100.0
	1989		3,778	0.4	38.7	60.5	0.4	0.0		100.0
	1990		3,155	0.4	38.3	58.9	2.4	0.0		100.0
	1991		5,015	1.3	48.0	49.8	0.9	0.0		100.0
	1992		4,303	0.2	31.0	65.0	3.8	0.0		100.0
	1993		2,011	0.4	47.5	47.7	4.5	0.0		100.1
	1994		3,820	0.1	51.3	46.6	2.0	0.0		100.0
	1995		4,740	0.6	51.9	45.3	2.1	0.0		99.9
	1996		3,863	0.4	46.2	48.8	4.5	0.1		100.0
	1997		3,195	0.2	29.0	67.2	3.6	0.0		100.0
	1998		1,147	0.3	62.8	34.2	2.7	0.0		100.0
	1999		1,627	0.2	40.7	58.2	0.9	0.0		100.0
	2000		442	0.0	44.2	53.4	2.4	0.0		100.0
	2001	[b]	586	0.0	15.4	81.9	2.7	0.0		100.0
	2002		1,103	0.1	52.9	44.4	2.6	0.0		100.0
	2003		1,144	0.3	55.4	39.2	5.1	0.0		100.0
	2004		2,742	1.3	37.2	60.4	1.0	0.1		100.0
	2005		2,381	0.2	83.2	15.2	1.5	0.0		100.0
		5-Year Average (2000-2004)	1,203	0.3	41.0	55.9	2.8	0.0		100.0

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Species	Year		Sample Size	Age in Years (Percent) 3	4	5	6	7	8	Total[b]
Fall	1982		2,918	6.5	58.6	34.5	0.3			100.0
Chum	1983		1,735	0.7	91.4	8.0	0.0			100.0
Salmon	1984		1,902	6.6	55.6	37.5	0.4			100.0
	1985		2,801	5.2	83.4	11.0	0.4			100.0
	1986		1,715	7.4	89.6	2.5	0.5			100.0
	1987		1,513	5.0	77.1	17.5	0.4			100.0
	1988		4,030	4.1	45.7	46.6	3.5			99.9
	1989		4,939	1.0	87.0	11.8	0.2			100.0
	1990		2,351	2.8	74.9	21.7	0.6			100.0
	1991		5,314	2.7	75.4	21.7	0.2			100.0
	1992		3,069	1.2	45.9	51.8	1.1			100.0
	1993		1,616	0.1	62.8	35.2	1.8			99.9
	1994		1,295	2.4	66.4	31.1	0.1			100.0
	1995		1,731	0.8	59.2	37.4	2.6			100.0
	1996		1,391	0.3	52.3	43.9	3.5			100.0
	1997		1,245	0.3	57.2	41.6	0.9			100.0
	1998	[c]	0	-	-	-	-			-
	1999		371	0.0	79.2	20.5	0.3			100.0
	2000	[c]	0	-	-	-	-			-
	2001	[b]	295	0.0	54.2	45.4	0.3			100.0
	2002	[c]	0	-	-	-	-			-
	2003		1,596	0.1	79.6	19.4	0.9			100.0
	2004		1,449	19.6	54.7	25.7	0.0			100.0
	2005		4,754	0.0	97.6	2.1	0.3			100.0
		Average (2001, 2003-2004)	835	6.6	62.8	30.2	0.4			100.0
Coho	1982		320	4.1	87.3	8.6				100.0
Salmon	1983		121	4.1	91.7	4.1				100.0
	1984		619	12.9	73.7	13.4				100.0
	1985		462	14.1	76.3	9.6				100.0
	1986		491	2.2	88.6	9.2				100.0
	1987		0	-	-	-				-
	1988		1,091	12.2	85.5	2.3				100.0
	1989		749	20.0	74.5	5.5				100.0
	1990		428	28.9	67.1	3.9				99.9
	1991		615	8.3	91.6	0.1				100.0
	1992		920	24.1	74.4	1.6				100.1
	1993		522	15.5	83.5	1.0				100.0
	1994		752	22.9	76.2	0.9				100.0
	1995		664	41.7	58.0	0.3				100.0
	1996		944	10.4	87.2	2.4				100.0
	1997		516	6.1	92.0	2.0				100.1
	1998	[c]	0	-	-	-				-
	1999		40	7.5	85.0	7.5				100.0
	2000	[c]	0	-	-	-				-
	2001	[b]	18	22.2	77.8	0.0				100.0
	2002	[c]	0	-	-	-				-
	2003		753	25.1	69.8	5.1				100.0
	2004		590	22.3	75.0	2.7				100.0
	2005		1,921	8.3	84.8	6.8				100.0
		Average (2001, 2003-2004)	340	23.2	74.2	2.6				100.0

Note: Age composition was estimated from samples collected from each gear type, by district and fishery, or from adjacent fisheries and test fisheries of similar gear type. Fisheries for which no appropriate samples were available were not included.

[a] Total may not equal 100% due to rounding errors.

[b] No commercial fishing occurred and subsistence harvests for fall chum and coho salmon were not sampled.

[c] No commercial fishing, samples were from subsistence harvests.

Appendix A29.–Chinook salmon age and sex percentages from selected Yukon River escapement projects, 2005.

			Age						
Location	Sample Size		3	4	5	6	7	8	Total
Anvik River [a]	227	Males	0.0	8.8	30.8	8.8	0.4	0.0	48.9
		Females	0.0	0.0	30.4	18.9	1.8	0.0	51.1
		Total	0.0	8.8	61.2	27.8	2.2	0.0	100.0
Chena River [a]	553	Males	0.0	6.3	32.9	16.8	1.6	0.0	57.6
		Females	0.0	0.2	17.0	22.7	2.5	0.0	42.4
		Total	0.0	6.5	49.9	39.5	4.1	0.0	100.0
East Fork	389	Males	0.0	12.2	31.2	6.4	0.0	0.0	49.8
Andreafsky River [b]		Females	0.0	2.8	33.1	13.8	0.5	0.0	50.2
		Total	0.0	15.0	64.3	20.2	0.5	0.0	100.0
Gisasa River [b]	591	Males	0.0	25.1	37.0	3.9	0.0	0.0	66.0
		Females	0.0	3.4	18.3	11.9	0.4	0.0	34.0
		Total	0.0	28.5	55.3	15.8	0.4	0.0	100.0
Henshaw Creek [b]	127	Males	0.0	21.9	29.2	7.5	0.0	0.0	58.6
		Females	0.0	6.0	20.1	15.3	0.0	0.0	41.4
		Total	0.0	27.9	49.3	22.8	0.0	0.0	100.0
Salcha River [a]	602	Males	0.0	9.3	23.6	12.1	0.7	0.0	45.7
		Females	0.0	0.0	17.9	34.1	2.3	0.0	54.3
		Total	0.0	9.3	41.5	46.2	3.0	0.0	100.0
Tozitna River [b]	296	Males	0.1	29.0	43.7	0.0	0.0	0.0	72.8
		Females	0.0	0.0	26.5	0.7	0.0	0.0	27.2
		Total	0.1	29.0	70.2	0.7	0.0	0.0	100.0

[a] Samples were collected from carcasses.

[b] Samples were collected from a weir trap.

Appendix A30.–Summer chum salmon age and sex percentages from selected Yukon River escapement projects, 2005.

Location	Sample Size		Age 3	4	5	6	7	Total
Anvik River [a]	600	Males	0.0	49.0	2.1	0.4	0.0	51.6
		Females	0.0	47.6	0.8	0.1	0.0	48.4
		Total	0.0	96.6	2.9	0.5	0.0	100.0
Clear Creek [b]	805	Males	0.0	42.9	11.1	0.2	0.0	54.2
		Females	0.0	40.2	5.5	0.0	0.0	45.8
		Total	0.0	83.2	16.6	0.2	0.0	100.0
East Fork Andreafsky River [b]	658	Males	0.0	51.0	4.8	0.2	0.0	56.0
		Females	0.0	42.3	1.7	0.0	0.0	44.0
		Total	0.0	93.3	6.5	0.2	0.0	100.0
Gisasa River [b]	619	Males	0.0	52.6	1.1	0.0	0.0	53.7
		Females	0.0	45.8	0.5	0.0	0.0	46.3
		Total	0.0	98.4	1.6	0.0	0.0	100.0
Henshaw Creek [b]	693	Males	0.0	56.2	1.2	0.0	0.0	57.4
		Females	0.0	42.0	0.6	0.0	0.0	42.6
		Total	0.0	98.3	1.7	0.0	0.0	100.0
Tozitna River [b]	807	Males	0.0	44.9	2.1	0.0	0.0	46.9
		Females	0.0	52.2	0.9	0.0	0.0	53.1
		Total	0.0	97.0	3.0	0.0	0.0	100.0

[a] Samples were collected by beach seine.
[b] Samples were collected from a weir trap.

Appendix A31.–Total Yukon River Chinook salmon harvest proportion by stock group, 1981–2005.

Year [b]	Lower [c]	Middle [d]	Upper [a]		
			U.S.	Canada	Total
1981	0.054	0.545	0.313	0.088	0.401
1982	0.139	0.247	0.513	0.101	0.614
1983	0.129	0.337	0.446	0.087	0.533
1984	0.253	0.402	0.251	0.094	0.345
1985	0.276	0.223	0.409	0.092	0.501
1986	0.195	0.096	0.587	0.122	0.709
1987	0.159	0.196	0.560	0.086	0.645
1988	0.218	0.158	0.498	0.126	0.625
1989	0.244	0.159	0.494	0.102	0.597
1990	0.202	0.252	0.433	0.114	0.547
1991	0.280	0.253	0.349	0.118	0.467
1992	0.163	0.218	0.523	0.096	0.619
1993	0.215	0.254	0.439	0.092	0.531
1994	0.182	0.214	0.494	0.110	0.604
1995	0.179	0.224	0.492	0.105	0.597
1996	0.210	0.104	0.562	0.124	0.686
1997	0.264	0.168	0.482	0.086	0.569
1998	0.327	0.174	0.442	0.056	0.498
1999	0.401	0.063	0.445	0.091	0.536
2000	0.339	0.123	0.441	0.097	0.538
2001	0.316	0.160	0.365	0.159	0.524
2002	0.194	0.292	0.393	0.121	0.514
2003	0.068	0.289	0.554	0.089	0.643
2004 [e]	0.153	0.288	0.468	0.091	0.559
2005	0.261	0.214	0.464	0.115	0.579
Average (1981-2004)	0.206	0.235	0.459	0.101	0.560

[a] From 1981 to 2003, the Upper Stock Group included all stocks spawning upstream of the Yukon and Tanana river confluence. Beginning in 2004, the Upper Stock Group included all Yukon River stocks spawning upstream of Fort Yukon.[b] From 1981 to 2003, the Lower Stock Group included Koyukuk River stocks downstream of and including the Gisasa River, and those stocks spawning in Yukon River tributaries downstream of the Koyukuk River. Beginning in 2004, Yukon River tributaries between the Koyukuk and Tanana rivers were included with the Lower Stock Group.

[c] From 1981 to 2003, the Middle Stock Group included all Tanana River stocks, all Koyukuk River stocks upstream of the Gisasa River, and those stocks spawning in Yukon River tributaries between the Koyukuk and Tanana rivers. Beginning in 2004, those stocks spawning in Alaskan tributaries upstream of the Yukon and Tanana river confluence were added to the Middle Stock Group and Yukon River tributaries between the Koyukuk and Tanana rivers were excluded.[d] Stock identification methods from 1981 to 2003 were based on scale pattern analysis. Beginning in 2004, genetic analysis was used.

[e] Lower, Middle, and Upper stock group boundaries changed in 2004 based on genetic analysis. Commercial harvest samples collected in 2004 from Subdistricts 5-B and 5-C included Lower and Middle stock groups. Previously, fish harvested in these subdistricts were assumed to belong to the Upper Stock Group only.

Appendix A32.–Yukon River Chinook salmon harvest proportion by stock group in Alaska, 1981–2005.

Year [a]	Stock Group		
	Lower [b]	Middle [c]	Upper [d]
1981	0.059	0.598	0.343
1982	0.154	0.275	0.571
1983	0.142	0.370	0.489
1984	0.280	0.443	0.277
1985	0.304	0.246	0.451
1986	0.223	0.109	0.668
1987	0.174	0.214	0.612
1988	0.249	0.181	0.570
1989	0.272	0.177	0.551
1990	0.228	0.284	0.488
1991	0.318	0.287	0.396
1992	0.180	0.241	0.578
1993	0.237	0.280	0.483
1994	0.204	0.241	0.555
1995	0.200	0.250	0.550
1996	0.240	0.118	0.642
1997	0.289	0.183	0.528
1998	0.347	0.185	0.468
1999	0.441	0.069	0.490
2000	0.375	0.136	0.489
2001	0.375	0.190	0.434
2002	0.221	0.332	0.447
2003	0.075	0.317	0.608
2004 [e]	0.169	0.316	0.515
2005	0.234	0.242	0.524
Average (1981-2004)	0.240	0.252	0.508

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

[b] From 1981 to 2003, the Lower Stock Group included Koyukuk River stocks downstream of and including the Gisasa River, and those stocks spawning in Yukon River tributaries downstream of the Koyukuk River. Beginning in 2004, Yukon River tributaries between the Koyukuk and Tanana rivers were included with the Lower Stock Group.

[c] From 1981 to 2003, the Middle Stock Group included all Tanana River stocks, all Koyukuk River stocks upstream of the Gisasa River, and those stocks spawning in Yukon River tributaries between the Koyukuk and Tanana rivers. Beginning in 2004, those stocks spawning in Alaskan tributaries upstream of the Yukon and Tanana river confluence were added to the Middle Stock Group and Yukon River tributaries between the Koyukuk and Tanana rivers were excluded.

[d] From 1981 to 2003, the Upper Stock Group included all stocks spawning upstream from the Yukon and Tanana river confluence. Beginning in 2004, the Upper Stock Group included all Yukon River stocks spawning upstream of Fort Yukon.

[e] Lower, Middle, and Upper stock group boundaries changed in 2004 based on genetic analysis. Commercial harvest samples collected in 2004 from Subdistricts 5-B and 5-C included Lower and Middle stock groups. Previously, fish harvested in these subdistricts were assumed to belong to the Upper Stock Group only.

Appendix A33.–Upper stock group proportion, by country, from the Yukon River Chinook salmon harvest, 1981–2005.

	Upper Stock Group [a]	
Year [b]	Alaska	Canada
1981	0.781	0.219
1982	0.835	0.165
1983	0.837	0.163
1984	0.727	0.273
1985	0.816	0.184
1986	0.827	0.173
1987	0.867	0.133
1988	0.798	0.202
1989	0.829	0.171
1990	0.792	0.208
1991	0.748	0.252
1992	0.845	0.155
1993	0.826	0.174
1994	0.818	0.182
1995	0.824	0.176
1996	0.819	0.181
1997	0.848	0.152
1998	0.888	0.112
1999	0.830	0.170
2000	0.819	0.181
2001	0.698	0.303
2002	0.763	0.235
2003	0.862	0.138
2004 [b,c]	0.843	0.157
2005	0.801	0.199
Average (1981-2004)	0.814	0.186

[s] From 1981 to 2003, the Upper Stock Group included all stocks spawning upstream from the Yukon and Tanana river confluence. Beginning in 2004, the Upper Stock Group included all Yukon River stocks spawning upstream of Fort Yukon.

[b] Stock identification methods from 1981 to 2003 were based on scale pattern analysis. Beginning in 2004, genetic analysis was used.[c] The Upper Stock Group boundary changed in 2004 based on genetic analysis. Commercial harvest samples collected in 2004 from Subdistricts 5-B and 5-C included Lower and Middle stock groups. Previously, fish harvested in these subdistricts were assumed to belong to the Upper Stock Group only.

Appendix A34.–Yukon River fall chum salmon estimated brood year production and return per spawner estimates 1974–2005.

	(P)	Estimated Annual Totals		Estimated Brood Year Return								(R)	(R/P)
				Number of Salmon [a]				Percent				Total	
Year	Escapement	Catch	Return	Age 3	Age 4	Age 5	Age 6	Age 3	Age 4	Age 5	Age 6	Brood Year Return[a]	Return/ Spawner
1974	437,485	478,875	916,360	91,751	497,755	68,693	0	0.139	0.756	0.104	0.000	658,199	1.50
1975	1,465,213	473,062	1,938,275	150,451	1,225,440	61,227	123	0.105	0.853	0.043	0.000	1,437,241	0.98
1976	268,841	339,043	607,884	102,062	585,820	136,358	4,313	0.123	0.707	0.165	0.005	828,553	3.08
1977	514,843	447,918	962,761	102,370	1,069,856	175,578	4,186	0.076	0.791	0.130	0.003	1,351,992	2.63
1978	320,487	434,030	754,517	22,112	332,023	90,532	0	0.050	0.747	0.204	0.000	444,667	1.39
1979	780,818	615,377	1,396,195	41,088	769,082	274,310	3,894	0.038	0.707	0.252	0.004	1,088,374	1.39
1980	261,113	488,305	749,418	8,373	362,199	208,962	3,125	0.014	0.622	0.359	0.005	582,658	2.23
1981	551,192	677,257	1,228,449	45,855	955,725	278,386	8,888	0.036	0.742	0.216	0.007	1,288,853	2.34
1982	179,828	373,175	553,003	11,327	400,323	166,754	678	0.020	0.691	0.288	0.001	579,083	3.22
1983	347,157	525,016	872,173	12,569	875,355	223,322	2,304	0.011	0.786	0.201	0.002	1,113,550	3.21
1984	270,042	412,322	682,364	7,089	407,774	173,546	8,493	0.012	0.683	0.291	0.014	596,902	2.21
1985	664,426	515,481	1,179,907	46,605	871,500	270,268	3,194	0.039	0.731	0.227	0.003	1,191,566	1.79
1986	376,374	318,028	694,402	0	428,614	368,513	4,353	0.000	0.535	0.460	0.005	801,479	2.13
1987	651,943	406,143	1,058,086	12,380	617,519	290,767	7,720	0.013	0.665	0.313	0.008	928,386	1.42
1988	325,137	353,242	678,379	41,003	175,236	152,368	10,894 [b]	0.108	0.462	0.401	0.029	379,501	1.17
1989	506,173	541,177	1,047,350	2,744	282,905	345,136 [b]	20,290	0.004	0.435	0.530	0.031	651,075	1.29
1990	369,654	350,100	719,754	710	579,452 [b]	418,448	30,449	0.001	0.563	0.407	0.030	1,029,059	2.78
1991	591,132	439,096	1,030,228	3,663 [b]	1,024,800	369,103	12,167	0.003	0.727	0.262	0.009	1,409,733	2.38
1992	324,253	148,846	473,099	6,763	653,648	197,073	3,907	0.008	0.759	0.229	0.005	861,392	2.66
1993	352,688	91,015	443,703	7,745	451,327	102,404	3,234	0.014	0.799	0.181	0.006	564,711	1.60
1994	769,920	169,225	939,145	4,322	225,209	149,481	1,603 [b]	0.011	0.592	0.393	0.004	380,615	0.49
1995	1,009,155	461,147	1,470,302	2,371	266,873	68,918 [b]	382	0.007	0.788	0.204	0.001	338,544	0.34
1996	800,022	260,923	1,060,945	420	165,691 [b]	136,796	8,295	0.001	0.532	0.440	0.027	311,201	0.39
1997	494,831	170,059	664,890	3,087 [b]	244,603	118,343	3,332	0.008	0.662	0.320	0.009	369,365	0.75
1998	263,121	70,770	333,891	650	269,653	57,962	6,694	0.002	0.805	0.173	0.020	334,960	1.27
1999	288,962	131,046	420,008	29,097	705,152	174,424	12,979	0.032	0.765	0.189	0.014	921,651	3.19
2000	210,756	28,543	239,299	8,446	297,012	109,240	0	0.020	0.716	0.263	0.000	414,699	1.97
2001	337,765	44,666	382,431	136,038	2,040,954	673,528	6,709	0.048	0.714	0.236		2,857,230 [c]	>8.46
2002	397,977	27,411	425,388	0	443,087	91,625						534,712 [d]	>1.34
2003	695,363	79,529	774,892	24,185									
2004	537,873	76,296	614,169										
2005	1,873,090	290,083	2,163,173										
Average-04	495,630	320,875	816,505										

[a] The estimated number of salmon which returned are based upon annual age composition observed in lower Yukon test nets each year, weighted by test fish CPUE.

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

[c] Brood year return for 3, 4, and 5 year fish, indicate that production (R/P) from brood year 2001 was at least 8.46. Recruits estimated for incomplete brood year.

[d] Brood year return for 3 and 4 year fish, indicate that production (R/P) from brood year 2002 was at least 1.34. Recruits estimated for incomplete brood year.

Appendix A35.–Escapement, rebuilding and interim goals for Canadian origin Chinook and chum salmon stocks, 1985–2005.

Year	Canadian Origin Stock Targets Chinook Salmon		Fall Chum Salmon			
	Escapement Goal	Stabilization/ Rebuilding	Mainstem Escapement Goal	Stabilization/ Rebuilding	Porcupine Escapement Goal	Porcupine Interim Goal
1985	33,000-43,000					
1986	33,000-43,000					
1987	33,000-43,000		90,000-135,000		50,000-120,000	
1988	33,000-43,000		90,000-135,000		50,000-120,000	
1989	33,000-43,000		90,000-135,000		50,000-120,000	
1990	33,000-43,000	18,000	80,000		50,000-120,000	
1991	33,000-43,000	18,000	80,000		50,000-120,000	
1992	33,000-43,000	18,000	80,000	51,000	50,000-120,000	
1993	33,000-43,000	18,000	80,000	51,000	50,000-120,000	
1994	33,000-43,000	18,000	80,000	61,000	50,000-120,000	
1995	33,000-43,000	18,000	80,000	80,000	50,000-120,000	
1996	33,000-43,000	28,000	80,000	65,000	50,000-120,000	
1997	33,000-43,000	28,000	80,000	49,000	50,000-120,000	
1998	33,000-43,000	28,000	80,000	80,000	50,000-120,000	
1999	33,000-43,000	28,000	80,000	80,000	50,000-120,000	
2000	33,000-43,000	28,000	80,000	80,000	50,000-120,000	
2001	33,000-43,000	28,000	80,000	80,000	50,000-120,000	
2002	33,000-43,000	28,000	80,000	60,000	50,000-120,000	
2003	33,000-43,000	28,000	80,000	65,000	50,000-120,000	15,000
2004	33,000-43,000	28,000	80,000	65,000	50,000-120,000	13,000
2005	33,000-43,000	28,000	80,000	65,000	50,000-120,000	24,000

Appendix A36.–South Unimak and Shumagin Islands June commercial sockeye and chum salmon harvest, all gear combined, by year, 1980–2005.

Year	Sockeye	Chum
1980	3,206,275	508,865
1981	1,820,965	563,947
1982	2,118,701	1,095,044
1983	1,961,569	785,631
1984	1,388,203	337,120
1985	1,791,400	433,829
1986	471,397	351,769
1987	792,964	443,019
1988	756,687	526,711
1989	1,744,505	455,163
1990	1,344,529	518,545
1991	1,548,930	772,705
1992	2,457,856	426,203
1993	2,973,744	532,247
1994	1,461,263	582,165
1995	2,105,321	537,433
1996	1,028,970	359,820
1997	1,628,181	322,325
1998	1,288,725	245,619
1999	1,375,399	245,306
2000	1,251,228	239,357
2001	150,632	48,350
2002	591,106	378,817
2003	453,147	282,438
2004	1,348,073	482,309
2005	1,004,395	427,830
Average 85-04	1,328,203	409,207
Average 95-04	1,122,078	314,177

Source of data: Aaron Poetter, ADF&G.

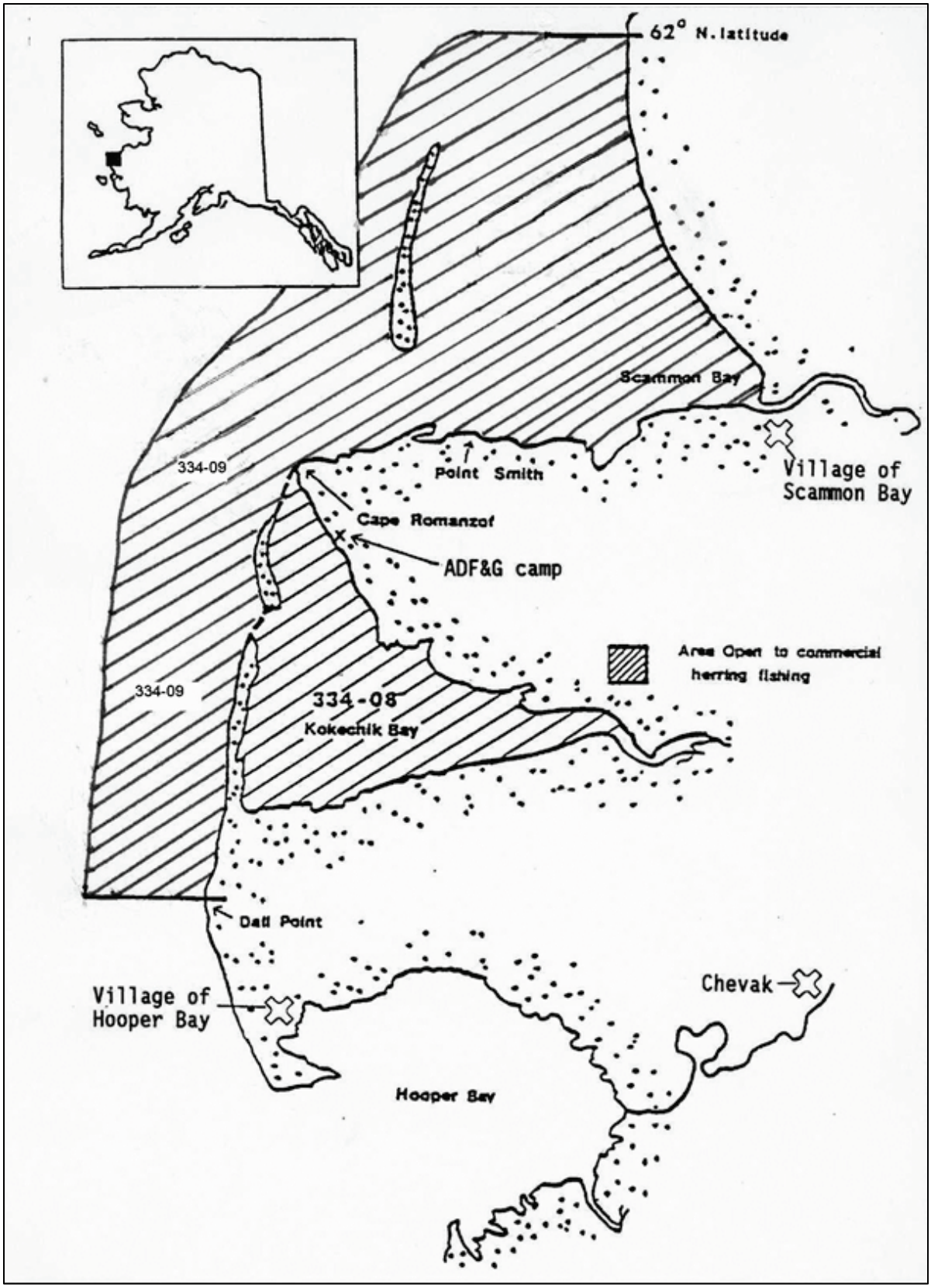
Appendix A37.–Total groundfish catch and estimated number of Chinook and other salmon caught by the groundfish fisheries off the coast of Alaska, 1990 through 2005.

Year	Groundfish Groundfish (mt)	Chinook	Chum	Coho	Sockeye	Pink	Total
BSAI							
1990	1,706,379	14,085	16,202	153	30	31	30,501
1991	2,154,903	48,873	29,706	396	79	79	79,133
1992	2,057,849	41,955	40,090	1,266	14	80	83,405
1993	1,854,216	45,964	242,895	321	22	8	289,210
1994	1,958,788	44,380	95,978	231	20	202	140,811
1995	1,928,073	23,079	20,901	858	0	21	44,859
1996	1,847,631	63,205	77,771	218	5	1	141,200
1997	1,824,188	50,218	67,349	114	3	69	117,753
1998[a]	1,615,685	55,427	----------65,631----------				121,058
1999	1,424,752	12,924	----------46,295----------				59,219
2000	1,607,549	7,470	----------57,600----------				65,070
2001	1,813,924	37,734	----------57,339----------				95,073
2002	1,934,957	37,605	----------78,454----------				116,059
2003	1,970,817	54,763	----------193,981----------				248,744
2004	1,978,721	62,459	----------447,196----------				509,655
2005	1,407,925	74,843	----------701,741----------				776,584
GOA							
1990	244,397	16,913	2,541	1,482	85	64	21,085
1991	269,616	38,894	13,713	1,129	51	57	53,844
1992	269,797	20,462	17,727	86	33	0	38,308
1993	255434	24,465	55,268	306	15	799	80,853
1994	239,503	13,973	40,033	46	103	331	54,486
1995	216,585	14,647	64,067	668	41	16	79,439
1996	202,054	15,761	3,969	194	2	11	19,937
1997	230,448	15,119	3,349	41	7	23	18,539
1998[a]	245,516	16,984	----------13,544----------				30,528
1999	227,614	30,600	----------7,530----------				38,130
2000	204,398	26,705	---------- 10,995----------				37,700
2001	182,011	15,104	---------- 6,063----------				21,167
2002	165,664	12,759	----------3,192----------				15,951
2003	176,433	15,877	----------10,599----------				26,475
2004	168,475	17,832	----------5,893----------				23,725
2005	133,171	31,896	----------6,841----------				38,737

Source: Berger 2002 and NMFS Alaska Region Catch Accounting.

[a] Non-Chinook salmon grouped together since 1998; nearly all are chum salmon.

APPENDIX B: HERRING



Appendix B1.–Cape Romanzof District areas open to commercial herring fishing.

Appendix B2.–Commercial herring fishery data, Cape Romanzof District, 1980–2005.

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 of Boats with Shakers [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
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	134.0	10.4	401	0.02	1	10	10		100	100	3,388	3.7
5 Yr. Avg (2000-2004)	169	56.0	9.8	391	0.0	1	22	22		100	100	3,397	5.0
10 Yr. Avg (1995-2004)	428	40.7	9.9	377	0.2	2	39	39		98	99	4,129	9.6
All Yr. Avg	681	57.4	9.3	319	0.3	3	67	62		90	86	4,831	13.1

[a] Average weight from ADF&G's 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.

[e] Exclusive Use Regulation into effect.

[f] Last year hydraulic shakers were allowed.

Appendix B3.–Commercial herring catch and effort data by fishing period, Cape Romanzof District, 2005.

			Number				Harvest (tons)					
Period	Date	Time of Fishery	Hours Fished	Fishermen	Vessels	Landings	Bait	Roe %	Sac Roe	Sac Roe %	Total	Roe %
1	26 May	1700–1900	2	4	4	4	0.0	0.0	4.1	9.4	4.1	9.4
2	27 May	0300–0600	3	4	4	7	0.0	0.0	10.5	9.5	14.6	9.5
3	27 May to 2 Jun	1500 to 0001	129	10	10	110	0.0	0.0	110.5	10.5	125.1	10.4
Total			134	10	10	121	0.0	0.0	125.1	10.4	125.1	10.4

Appendix B4.–Pacific herring processors and associated data, Cape Romanzof District, 2005.

Commercial Operation (Processing location/ buying station)	Representative	Product	Processing/Tendering Vessels
NorQuest Seafoods, Inc 4225 23rd Ave. W. Seattle, WA 98119 206-281-7022	Richard Pollen	Sac Roe Herring (Frozen)	M/V America Patriot M/V Shypoke M/V Maverick

Appendix B5.–Percent age composition of herring sampled from commercial harvest, Cape Romanzof District, 1980–2005.

Year	Number Sampled [a]	Age in Years 2	3	4	5	6	7	8	9	10	11	12	13+	Total [b]
1980	374	0.0	2.4	20.1	5.1	38.0	9.9	23.0	0.5	0.3	0.5	0.3	0.0	100.1
1981	315	0.0	0.3	55.9	25.1	1.6	11.7	2.2	3.2	0.0	0.0	0.0	0.0	100.0
1982	604	0.0	0.2	13.7	66.4	13.2	1.2	3.3	1.0	1.0	0.0	0.0	0.0	100.0
1983	913	0.0	0.0	15.8	29.8	45.1	6.7	0.4	1.6	0.4	0.1	0.0	0.0	99.9
1984	543	0.0	0.0	0.6	17.3	35.2	41.3	2.9	1.7	0.6	0.4	0.2	0.0	100.2
1985	583	0.0	0.0	6.5	8.9	34.6	29.3	16.6	3.4	0.5	0.0	0.0	0.0	99.8
1986	570	0.0	0.0	0.0	3.3	3.5	30.2	29.6	29.3	3.2	0.5	0.4	0.0	100.0
1987	407	0.0	0.0	0.0	0.0	5.9	18.4	43.0	27.8	4.4	0.5	0.0	0.0	100.0
1988	414	0.0	0.0	0.0	2.2	7.5	18.4	16.2	24.6	19.1	10.9	1.2	0.0	100.1
1989	702	0.0	0.0	0.0	0.6	3.3	13.0	29.8	11.5	18.5	15.0	7.5	0.9	100.1
1990	287	0.0	0.0	0.0	0.7	9.1	10.8	21.6	23.7	9.8	13.2	7.7	3.5	100.1
1991	591	0.0	0.0	0.0	0.2	1.0	29.1	17.4	15.4	13.4	9.0	8.6	5.9	100.0
1992	401	0.0	0.0	0.0	0.0	1.0	1.0	27.7	17.5	17.5	16.7	7.5	11.1	100.0
1993	819	0.0	0.0	0.0	0.7	3.5	2.6	2.0	29.8	13.4	14.8	16.6	16.6	100.0
1994	452	0.0	0.0	0.0	0.0	4.4	6.6	4.0	6.6	29.0	16.6	14.4	18.4	100.0
1995	453	0.0	0.0	0.0	0.7	1.3	13.7	19.4	5.5	6.8	24.7	10.6	17.2	99.9
1996	588	0.0	0.0	0.0	0.0	2.9	1.0	27.4	20.6	8.3	8.3	15.6	15.9	100.0
1997	530	0.0	0.0	0.0	0.2	3.0	5.8	4.7	42.1	15.3	7.0	7.4	14.6	100.1
1998	560	0.0	0.0	0.0	0.4	0.4	10.9	21.1	3.6	34.6	14.1	4.5	10.6	100.2
1999	537	0.0	0.0	0.0	0.2	2.0	0.2	18.2	21.6	6.0	37.8	7.6	6.4	100.0
2000	575	0.0	0.0	0.0	0.2	0.2	20.4	0.8	22.4	19.3	8.1	20.8	7.7	99.9
2001	147	0.0	0.0	0.0	0.0	0.7	2.7	26.5	2.0	20.4	15.0	5.4	27.3	100.0
2002	554	0.0	0.0	0.0	0.0	0.3	0.7	1.6	21.8	3.8	27.8	14.1	29.9	100.0
2003	294	0.0	0.0	0.0	0.0	1.7	5.8	3.7	7.5	20.7	11.9	17.7	31.0	100.0
2004 [c]	46	0.0	0.0	0.0	0.0	0.0	23.9	26.1	2.2	0.0	17.4	13.0	17.4	100.0
2005	401	0.0	0.0	0.0	0.0	0.0	0.0	24.9	29.4	11.5	9.7	11.0	13.4	99.9

Source: Data from ADF&G annual age, size, and sex composition Technical Data and RIR Reports.

[a] Number sampled shown are number of fish which could be aged.

[b] Totals may not equal 100% due to rounding numbers.

[c] Note small sample size in 2004.

Appendix B6.–Subsistence herring harvest (st) and effort data by village, Cape Romanzof, 1975–2005.

	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
5 Year Average (2000-2004)	2.5	14	0.9	8	1.2	11	4.6	32

Note: Subsistence survey results are believed to reflect harvest trends, however, reported catches reflect minimum figures since all fishermen cannot be contacted.

Appendix B7.–Subsistence harvest of herring roe-on-kelp by village, Cape Romanzof District, 1993–2005.

	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
5 Year Average (2000-2004)	8	253	2	90	4	113	14	455

Appendix B8.–Percent age composition of herring sampled from variable mesh gillnet catches, Cape Romanzof District, 1980–2005.

Year	Number Sampled [a]	Age in Years												Total [b]
		2	3	4	5	6	7	8	9	10	11	12	13+	
1980	447	0.4	19.2	17.0	2.0	27.3	6.9	25.3	0.4	0.4	0.4	0.4	0.0	99.7
1981	589	0.0	7.8	55.3	13.2	1.5	10.4	4.8	6.3	0.2	0.0	0.3	0.2	100.0
1982	611	0.7	7.5	20.3	39.3	9.5	1.8	7.4	7.2	5.6	0.7	0.0	0.2	100.2
1983	829	0.0	0.6	21.2	25.2	39.8	5.3	1.4	3.9	1.9	0.5	0.1	0.0	99.9
1984	735	0.0	1.5	5.7	26.9	19.3	36.1	4.8	3.5	1.6	0.3	0.3	0.0	100.0
1985	531	0.0	1.7	21.8	6.4	22.8	16.9	26.2	2.8	0.8	0.6	0.0	0.0	100.0
1986	511	0.0	0.0	4.9	18.2	7.0	25.4	20.7	20.4	2.5	0.6	0.2	0.0	99.9
1987	690	0.0	0.0	0.7	6.7	11.7	18.0	31.7	23.2	7.7	0.3	0.0	0.0	100.0
1988	608	0.0	0.3	3.9	7.9	13.8	19.7	11.7	19.2	14.8	7.4	0.7	0.5	99.9
1989	378	0.0	0.5	1.9	17.5	9.0	13.2	17.7	7.4	11.6	13.2	6.9	1.0	99.9
1990	1,011	0.0	1.0	4.7	3.6	24.6	11.2	12.7	17.5	7.7	9.4	5.3	2.3	100.0
1991	1,152	0.0	0.1	3.0	3.9	3.0	29.3	13.9	15.0	13.4	7.3	6.3	4.8	100.0
1992	994	0.0	0.0	6.4	4.6	4.7	2.0	19.4	12.7	20.6	12.9	7.7	8.8	99.8
1993	1,263	0.0	0.7	2.3	16.9	10.5	5.8	3.9	20.0	10.1	13.6	8.4	7.9	100.1
1994	1,246	0.0	0.0	3.1	2.9	23.8	13.6	5.1	4.7	17.1	9.1	9.3	11.2	99.9
1995	1,398	0.0	0.1	5.4	8.4	2.1	24.4	14.7	5.0	5.3	18.5	7.1	9.0	100.0
1996	1,083	0.0	1.1	1.6	11.6	14.9	3.5	30.9	15.0	5.4	4.0	8.0	4.1	100.1
1997	1,312	0.0	0.6	21.6	1.7	11.5	13.0	2.7	28.4	10.0	3.0	2.4	5.4	100.3
1998	1,262	0.0	0.3	1.7	20.0	2.3	18.8	18.2	2.9	21.2	8.4	2.7	3.5	100.0
1999	846	0.0	0.4	1.9	0.9	18.1	0.8	18.9	17.7	6.4	25.5	5.4	3.9	99.9
2000	738	0.0	0.1	15.7	10.1	2.5	23.8	1.9	13.5	11.9	4.4	12.6	3.4	99.9
2001	733	0.0	0.0	14.3	33.2	6.8	3.1	18.7	1.0	8.7	4.1	1.6	8.5	100.0
2002	1,173	0.0	0.0	2.7	39.9	20.5	6.1	1.4	14.2	1.1	8.5	2.2	3.4	100.0
2003	511	0.0	0.4	1.8	4.5	58.9	19.4	4.1	1.4	4.3	0.2	2.9	2.2	100.1
2004	525	0.0	2.5	9.9	2.5	7.6	46.1	19.0	4.4	0.4	3.4	0.8	3.5	100.1
2005	576	0.0	3.1	11.3	6.1	2.1	3.3	41.5	20.7	3.1	3.0	3.3	2.4	100.0

Note: Data from annual ADF&G age, size, and sex composition Technical Data and RIR reports from 1980 to 2000 and from AYK herring database from 2001 to 2005. Variable mesh test gill net samples include Kokechik Bay and Scammon Bay fish sampled combined.

[a] Number sampled shown are number of fish which could be aged.

[b] Totals may not equal 100% due to rounding errors.

APPENDIX C: FRESHWATER FINFISH

Appendix C1.–Estimated subsistence harvest of pink salmon, whitefish, pike, and sheefish fish, by surveyed villages, Yukon Area, 2005.

			Estimated Subsistence Harvest with Corresponding Confidence Intervals (CI) (Expanded to Estimate Survey Village Harvest) [a]										Total
			Pink Salmon		Large Whitefish [b]		Small Whitefish		Pike		Sheefish		Expanded
Community	Total Households	Households Contacted [c]	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Estimated Total	CI (95%) (+/-)	Miscellaneous Fish Harvest
Hooper Bay	196	66	860	853	115	121	1,885	667	1,078	742	22	7	3,960
Scammon Bay	78	28	1,645	1,252	1,084	556	1,455	748	3,271	2,591	122	140	7,577
Coastal District	274	94	2,505	1,515	1,199	569	3,340	1,002	4,349	2,695	144	140	11,537
Nunam Iqua	33	23	132	75	496	282	2,136	722	161	51	1,126	512	4,051
Alakanuk	123	51	49	35	461	210	2,382	591	1,853	832	1,098	354	5,843
Emmonak	162	80	54	64	874	283	3,881	1,458	2,227	519	1,868	488	8,904
Kotlik	82	31	155	37	301	272	3,696	2,029	1,017	717	1,680	779	6,849
District 1	400	185	390	111	2,132	527	12,095	2,667	5,258	1,216	5,772	1,110	25,647
Mountain Village	135	58	78	0	1,651	1,165	1,083	506	5,276	2,526	1,121	517	9,209
Pitkas Point	24	20	2	2	268	94	30	26	118	71	119	80	537
St. Mary's	104	49	144	61	1,057	303	643	145	1,887	1,392	924	220	4,655
Pilot Station	94	52	0	0	762	271	89	95	681	227	845	264	2,377
Marshall	69	30	6	3	1,476	510	135	62	4,432	1,964	399	128	6,448
District 2	426	209	230	61	5,214	1,338	1,980	539	12,394	3,498	3,408	639	23,226
Russian Mission	56	19	0	0	450	161	359	157	1,233	334	266	59	2,308
Holy Cross	51	31	0	0	208	121	231	175	292	155	57	35	788
Shageluk	29	21	0	0	169	127	310	114	425	70	144	50	1,048
District 3	136	71	0	0	827	238	900	261	1,950	375	467	85	4,144
Anvik	34	30	0	0	80	0	116	46	97	18	226	91	519
Grayling	45	18	3	0	194	88	70	35	208	93	276	139	751
Kaltag	53	18	4	0	103	121	36	61	214	205	169	161	526
Nulato	82	28	0	0	257	183	6	4	114	112	142	98	519
Koyukuk	23	17	0	0	39	14	300	0	139	14	54	3	532
Galena	150	46	0	0	1,220	1,111	789	742	305	204	258	157	2,572
Ruby	59	17	0	0	125	0	0	0	32	28	20	0	177
Huslia	68	23	0	0	2,226	295	636	225	2,441	592	771	601	6,074
Hughes	22	17	0	0	766	78	1,440	235	69	1	310	20	2,585
Allakaket	43	16	0	0	1,030	337	1,310	96	619	60	480	179	3,439
Alatna	5	4	0	0	100	0	0	0	8	0	0	0	108
Bettles	19	13	0	0	0	0	0	0	0	0	6	4	6
District 4	603	247	7	0	6,140	1,223	4,703	821	4,246	679	2,712	694	17,808
Tanana	98	50	0	0	2,883	471	3,174	65	108	43	809	117	6,974
Stevens Village	25	14	0	0	93	107	80	0	215	248	9	12	397
Birch Creek	8	3	0	0	26	29	0	0	0	0	0	0	26
Beaver	29	24	0	0	20	0	50	0	85	71	0	0	155
Fort Yukon	150	57	0	0	2,140	1,474	683	440	655	360	399	122	3,877
Venetie	56	22	0	0	65	0	0	0	37	8	12	0	114
Chalkyitsik	26	19	0	0	1,118	676	0	0	502	431	32	24	1,652
District 5	392	189	0	0	6,345	1,692	3,987	445	1,602	619	1,261	171	13,195
Survey Totals	2,231	995	3,132	1,521	21,857	2,610	27,005	3,058	29,799	4,686	13,764	1,476	95,557

[a] 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.

[b] Large whitefish are considered those four pounds or larger and small whitefish are less than four pounds.

[c] 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, 2005.

Community	Total Households	Households Contacted [a]	Reported Harvest of Miscellaneous Fish Species, (Not Expanded)								Total Not Expanded Miscellaneous Fish Harvest
			Burbot	Lamprey	Tomcod	Grayling	Sucker	Arctic Char	Blackfish	Sockeye Salmon [b]	
Hooper Bay	196	66	115	0	1,234	0	0	0	9,615	0	10,964
Scammon Bay	78	28	36	0	1,552	0	0	2	22,768	23	24,381
Coastal District	274	94	151	0	2,786	0	0	2	32,383	23	35,345
Nunam Iqua	33	23	204	0	700	0	0	0	15,700	21	16,625
Alakanuk	123	51	103	150	255	2	0	1	47,880	20	48,411
Emmonak	162	80	431	2	658	0	0	3	70,384	23	71,501
Kotlik	82	31	124	0	413	16	0	10	8,162	79	8,804
District 1	400	185	862	152	2,026	18	0	14	142,126	143	145,341
Mountain Village	135	58	504	4,185	176	19	0	0	27,625	43	32,552
Pitkas Point	24	20	63	703	0	0	0	0	1,155	3	1,924
St. Mary's	104	49	308	3,373	0	25	0	2	38,050	27	41,785
Pilot Station	94	52	286	7,255	0	0	0	0	4,775	14	12,330
Marshall	69	30	161	3,815	0	0	0	0	8,050	31	12,057
District 2	426	209	1,322	19,331	176	44	0	2	79,655	118	100,648
Russian Mission	56	19	41	10,530	0	2	0	19	1,460	47	12,099
Holy Cross	51	31	21	810	0	15	0	0	150	17	1,013
Shageluk	29	21	2	0	0	0	1	3	0	3	9
District 3	136	71	64	11,340	0	17	1	22	1,610	67	13,121
Anvik	34	30	18	5,190	0	15	0	1	0	24	5,248
Grayling	45	18	35	2,100	0	57	0	8	0	52	2,252
Kaltag	53	18	0	0	0	10	0	0	0	0	10
Nulato	82	28	3	0	0	365	5	71	0	0	444
Koyukuk	23	17	10	0	0	5	0	0	0	0	15
Galena	150	46	106	0	0	16	0	0	700	10	832
Ruby	59	17	2	0	0	0	0	0	0	0	2
Huslia	68	23	45	0	0	10	94	70	3,400	160	3,779
Hughes	22	17	28	0	0	15	750	2	0	0	795
Allakaket	43	16	208	0	0	174	572	1	0	44	999
Alatna	5	4	0	0	0	20	6	0	0	0	26
Bettles	19	13	0	0	0	6	0	4	0	0	10
District 4	603	247	455	7,290	0	693	1,427	157	4,100	290	14,412
Tanana	98	50	122	2	0	41	3	0	0	2	170
Stevens Village	25	14	1	0	0	0	0	0	0	0	1
Birch Creek	8	3	0	0	0	0	0	0	0	0	0
Beaver	29	24	0	0	0	0	0	0	0	0	0
Fort Yukon	150	57	147	0	0	64	17	0	0	5	233
Venetie	56	22	2	0	0	374	4	20	0	0	400
Chalkyitsik	26	19	12	0	0	7	0	0	0	0	19
District 5	392	189	284	2	0	486	24	20	0	7	823
Survey Totals	2,231	976	3,138	38,115	4,988	1,258	1,452	217	259,874	648	309,690

[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] 2005 is second year that sockeye salmon harvest information was included in postseason survey. Due to low sockeye salmon numbers, infrequent harvest, and difficulties with species identification by fishermen the harvest is not estimated.

Appendix C3.–Reported subsistence and personal use fish harvested under the authority of a permit, listed by permit area, Yukon Area, 2005.

Permit Fishing Area	Permit [a]			Percent Returned	Number of Permits Returned that Fished [c]	Reported Harvest					
	Type	Issued [b]	Returned			Whitefish	Sheefish	Burbot	Pike	Suckers	Grayling
Subsistence											
Koyukuk Middle and South Fork rivers	SF	2	1	50%	1	6	0	1	0	22	22
Yukon River Rampart Area	SR	22	19	86%	17	22	0	21	0	2	4
Yukon River near Haul Road Bridge	SY	76	72	95%	57	52	31	11	33	4	0
Yukon River near Circle and Eagle [d]	SE	89	81	91%	55	245	56	17	46	101	741
Tanana River Subdistrict 6A	SA	18	16	89%	11	13	0	0	4	0	0
Tanana River Subdistrict 6B [e]	SB	70	67	96%	29	1,652	7	19	82	64	5
Tanana River Upstream of Subdistrict 6C	SU	29	24	83%	13	1,235	0	2	47	61	25
Kantishna River Subdistrict 6A	SK	6	6	100%	4	58	0	0	41	7	0
Tolovana River Pike Subdistrict 6B	ST	79	69	87%	31	304	58	0	386	30	0
Subsistence Permit Subtotals		*391*	*355*	*91%*	*218*	*3,587*	*152*	*71*	*639*	*291*	*797*
Personal Use											
Tanana River Subdistrict 6C	PC	63	59	94%	27	3	3	3	1	0	0
Tanana River Whitefish Upstream of Subdistrict 6C	PW	10	10	100%	5	81	0	4	1	403	3
Personal Use Permit Subtotals		*73*	*69*	*95%*	*32*	*84*	*3*	*7*	*2*	*403*	*3*
Permit Totals		464	424	91%	250	3,671	155	78	641	694	800

[a] Permits returned as of June 1, 2006.

[b] Includes 37 households that were "issued" permits for more than one area. Additionally, includes two households that were issued duplicate permits for same area.

[c] Includes 9 households that "fished" in two different permit areas.

[d] Does not include fish distributed to community households from ADF&G Eagle Sonar test fish project (179 Chinook and 2 summer chum salmon).

[e] Does not include 3,247 fall chum and 7,220 coho salmon commercial related fish "not sold" during commercial fishing but retained for subsistence use.

Appendix C4.–Commercial freshwater finfish harvest, combined Lower Yukon River Districts 1, 2, and 3, 1978–2005.

	Sheefish		Whitefish		Burbot		Pike	Lamprey	Blackfish
Year	Number	Pounds	Number	Pounds	Number	Pounds	Pounds	Pounds	Pounds
1978	0	0	19	87	0	0	0	0	0
1979	5	39	23	55	0	0	0	0	0
1980	283	2,265	78	250	0	0	0	0	293
1981	299	2,812	779	2,875	0	0	9	0	0
1982	754	6,161	1,633	6,214	102	482	0	0	0
1983	395	2,692	163	648	0	0	0	0	0
1984	94	762	794	2,362	0	0	0	0	0
1985	358	3,081	1,514	4,586	0	0	0	0	0
1986	0	0	1,533	5,845	0	0	0	80	0
1987	0	0	2,144	7,564	0	0	0	0	0
1988	0	0	696	2,171	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0
1990	0	0	180	260	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0
1992	0	0	95	640	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0
1994	0	0	157	471	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	[b] 23,960	0
2004	0	0	0	0	0	0	0	0	0
2005	266	1,688	2,910	4,627	0	0	0	0	0
1995-2004 Average	0	0	0	0	0	0	0	2,396	0

Appendix C5.–Commercial freshwater finfish harvest, Upper Yukon Area, 1971–2005.

	Healy Lake		Lake Minchumina		Tanana River				Yukon River				
	Whitefish		Whitefish		Burbot		Whitefish		Burbot		Whitefish		Lamprey
Year	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Pounds
1971	-	-	3,277	9,831	0	0	0	0	0	0	0	0	0
1972	2,605	3,950	718	2,154	0	0	0	0	0	0	0	0	0
1973	2,187	3,915	1,697	5,037	0	0	0	0	0	0	0	0	0
1974	1,885	3,390	854	2,562	0	0	0	0	0	0	0	0	0
1975	1,357	2,375	0	0	0	0	0	0	0	0	0	0	0
1976	1,440	2,625	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	1,336	2,306	0	0	0	0	0	0	0	0	0	0	0
1980	[a]	[a]	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	76	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	72	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	837	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	1	0	0	2,070	0
1990	0	0	0	0	1	0	809	0	0	0	985	2,078	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	921	1,400	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	908	1,160	0	0	0	0	0
1998	0	0	0	0	0	0	0	0 [b]	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	25,697
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2000-2004													
Average	0	0	0	0	0	0	0	0	0	0	0	0	5,139

Note: Numbers reflect fish harvested with the intent of commercial sale.

[a] Information not available.

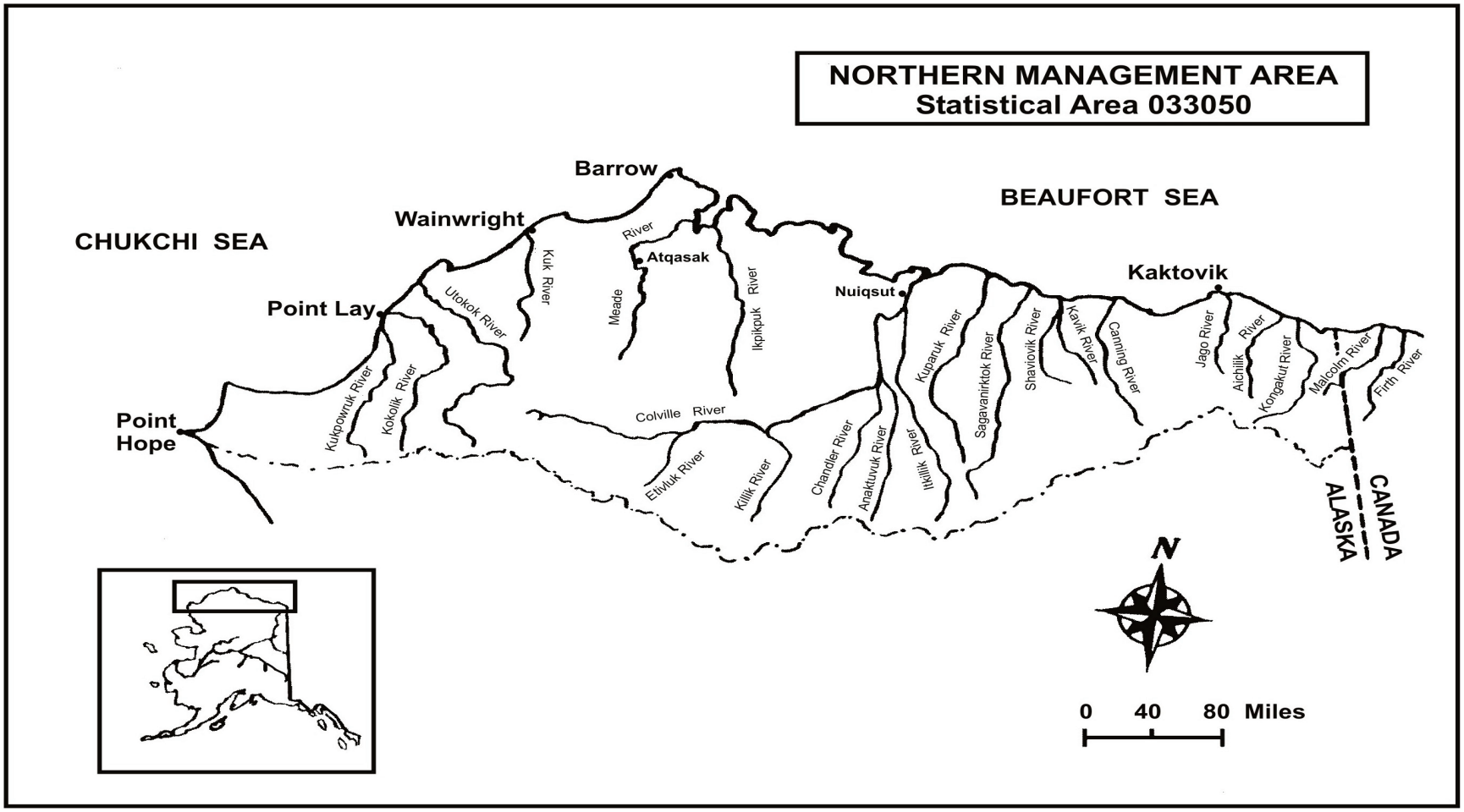
[b] Requests for commercial whitefish fishing permits were denied because of the additional pressure placed on non-salmon species during poor salmon runs.

Appendix C6.–Freshwater finfish sales during the commercial salmon fishing season by district, Upper Yukon Area, 1988–2005.

	District 4		District 5				District 6			
	Whitefish		Whitefish		Sheefish		Whitefish		Sheefish	
Year	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
1988	170	977	1,432	1,497	94	689	205	208	0	0
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	2,635	2,455	1,864	1,379 [a]	0	0	199	499	0	0
1993	0	0	59	48	0	0	140	300	0	0
1994	1	4	108	215	0	0	209	433	0	0
1995	0	0	95	95	0	0	183	387	0	0
1996	0	0	22	66	0	0	103	292	0	0
1997	0	0	270	301	0	0	4	8	0	0
1998	0	0	116	88	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	60	120	0	0
2003	40	113	0	0	0	0	129	297	0	0
2004	0	0	4	15	0	0	53	112	0	0
2005	0	0	0	0	0	0	66	175	4	16
2000-2004 Average	8	23	1	3	0	0	48	106	0	0

[a] The sale of 950 pounds of the total 1,379 pounds of whitefish sold did not include number of fish. Used the average weight (0.74 lbs.) to estimate number of fish.

APPENDIX D: NORTHERN AREA



Appendix D1.–Northern management area, AYK Region.

Appendix D2.–Commercial freshwater finfish harvest and sales. Colville River, Northern Area, 1964–2005.

	Number of Fish Harvested Intended for Commercial Sale[a]					Estimated Commercial Sales Based on Fish Tickets[b]	
Year	Broad Whitefish	Humpback Whitefish	Least Cisco ("herring")	Arctic Cisco ("kaktok")	Total Harvest	Arctic Cisco	Whitefish Species[c]
1964	2,951 [d]	-	9,000	16,000	27,951	-	-
1965	3,000 [d]	-	-	50,000	53,000	-	-
1966	2,500 [d]	-	-	40,000	42,500	-	-
1967	-	-	-	-	0	-	-
1968	3,130	-	18,180	42,055	63,365	-	-
1969	-	-	-	-	0	-	-
1970	2,080 [d]	-	25,930	19,602	47,612	-	-
1971	3,815	132	22,713	38,016	64,676	-	-
1972	3,850	1,497	13,283	37,333	55,963	-	-
1973	2,161	-	25,188	71,569	98,918	-	-
1974	3,117	2,316	13,813	35,601	54,847	-	-
1975	2,201	1,946	20,778	28,291	53,216	-	-
1976	2,172	1,815	34,620	31,659	70,266	-	-
1977	443	1,431	14,961	31,796	48,631	-	-
1978 [e]	20	1,102	21,589	17,292	40,003	-	-
1979	0	1,831	24,984	8,684	35,499	-	-
1980	0	4,231	31,459	14,657	50,347	-	-
1981	1,035	469	16,584	38,206	56,294	-	-
1982	1,662	201	25,746	15,067	42,676	-	-
1983	0	408	35,322	18,162	53,892	-	-
1984	789	179	13,076	27,686	41,730	-	-
1985	401	191	17,595	23,679	41,866	-	-
1986	0	18	9,444	29,895	39,357	-	-
1987	5	1,989	10,922	24,769	37,685	-	-
1988	429	6,733	23,910	10,287	41,359	-	-
1989	71	6,575	23,303	17,877	47,826	-	-
1990	0	5,694	21,003	19,374	46,071	12,571 [f]	14,249 [f]
1991	0	1,240	5,697	13,805	20,742	1,970 [g]	3,307 [g]
1992	126	5,209	6,962	20,939	33,236		10,200 [h]
1993	20	5,339	6,037	31,310	42,706	11,291 [g]	6,170 [g]
1994	0	6,056 [i]	10,176	8,958	25,190	7,434 [g]	4,121 [g]
1995	0	33,794 [j]	-	-	33,794	13,921	6,000
1996	0	6,425 [i]	7,796	21,817	36,038	9,076	4,127
1997	0	1,721 [i]	10,754	9,403	21,878	9,403	4,760
1998	0	4,881 [i]	9,936	7,019	21,836	5,648	7,105
1999	0	6,875 [i]	7,430	8,832	23,137	7,095	6,170
2000	0	3,706 [i]	5,758	2,619	12,083	2,809	6,569
2001	0	6,078 [i]	2,839	1,740	10,657	1,779	7,306
2002	0	4,183 [i]	5,503	3,935	13,621	899	4,093
2003	0	6,463 [i]	4,777	5,627	16,867	0	1,292
2004	0	1,145 [i]	3,061	3,061	7,267	2,412 [h]	476
2005	0	490 [i]	2,870	9,343	12,703	2,975 [h]	2,170
5 Year Average 2000-2004	0	4,315	4,388	3,396	12,099	1,580	3,947
10 Year Average 1995-2004	0	7,527	5,785	6,405	19,718	5,304	4,790

-continued-

[a] Reported on daily catch form returned to ADF&G. Catch reports were returned to ADF&G following the fishing season. All fish reported on the catch report were harvested with the intent to sell. Dashes indicate information is not available.

[b] Fish tickets were often not generated at the time of sale. Since 1990, the commercial harvest is based on fish ticket information. Dashes indicate information is not available.

[c] Whitefish species include mostly Humpback whitefish and Least cisco with some Broad whitefish.

[d] Includes small numbers of Humpback whitefish.

[e] Reported the harvest of 1 Chinook, 2 sockeye, 9 chum, and 118 pink salmon.

[f] Commercial harvest estimate based on one fish ticket average weights of 0.89 pounds (900 Arctic cisco at 800 pounds) and 0.61 pounds (1400 whitefish species at 850 pounds).

[g] Estimated commercial harvest sales based on 1995 to 2001 average weight of 0.92 pounds for Arctic cisco and 0.89 pounds for whitefish species (Humpback and Broad whitefish and Least cisco).

[h] Mixed commercial harvest of mostly Arctic cisco including undetermined amounts of Least cisco.

[i] Humpback whitefish harvest includes undetermined amounts of Broad whitefish.

[j] Humpback whitefish harvest includes undetermined amounts of Broad whitefish, Least cisco, and Arctic cisco.