Fishery Management Report No. 11-29

Annual Management Report for the Yukon and Northern Areas, 2006

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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Month Year

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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 2006 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 are 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
4. Northern Area

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

ABSTRACT

The 2006 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 in 2006 with reference to historical data, presents an outlook for the 2007 fishing season, and provides data on the utilization of salmon species by commercial and subsistence (aboriginal) harvests, personal use (domestic) and sport (recreational) fishery. Alaska and Canada fisheries are summarized as the Yukon River is a transboundary river. The report further compiles summaries of selected Yukon River projects (e.g., mark–recapture, sonar, stock identification) and a review of salmon bycatch in the groundfish and pollock 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 of the data presented are preliminary and may be presented with minor differences in future reports. The Yukon Area report is organized into the following sections: 1) *Salmon Fishery*: this section presents a description of the area, fishery resources, and fisheries management practices, and a comprehensive report of the 2006 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 2006 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, Chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *Oncorhynchus keta*, coho salmon, *Oncorhynchus kisutch*, Pacific herring, *Clupea pallasi*, escapement, commercial harvest, subsistence harvest, season outlookYukon area

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 2006. 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 2006 season summary and 2007 season outlook* (JTC 2007). 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.

In this report, catch per unit effort (CPUE) is obtained by dividing the catch by the total fishermen hours for the corresponding period of time. Commercial fishing effort has been computed using the assumption that if a permit holder delivers fish in a given fishing period, that permit holder fished the entire period. The total number of permit holders who made at least one delivery during the corresponding period of time (e.g. a given fishing period, summer season, fall season or for the entire fishing season) are presented. There are fishermen who may make only one delivery during the entire fishing season.

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 *Oncorhynchus tshawytscha*, chum *O. keta*, coho *O. kisutch*, pink *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, ADF&G, Fairbanks, personal communication 1988), Tanana River upstream of confluence with Kantishna River (B. Borba, ADF&G, Fairbanks, personal communication 2004), Anvik (M. Erickson, ADF&G, Anchorage, personal communication 1989), Andreafsky (Tobin and Harper 1995) and Gisasa (Wiswar 1999) river drainages.

MANAGEMENT

ADF&G policy is to manage the salmon runs, to the extent possible, for maximum sustained yield, unless otherwise directed by State regulation (*5 AAC 39.22 Policy for the Management of Sustainable Salmon Fisheries).* ADF&G has managed the salmon fisheries in the Yukon Area over the past few decades with the dual goal of maintaining important fisheries while at the same time achieving desired escapements consistent with the *Sustainable Salmon Fisheries Policy*. Management of the Yukon River salmon fishery is complex due to the inability to determine stock specific abundance and timing, overlapping multispecies salmon runs, the increasing efficiency of the fishing fleet, allocation issues, and the immense size of the Yukon River drainage. The Alaska State Legislature and the Alaska Board of Fisheries (BOF) have designated subsistence use as the highest priority among beneficial uses of the resource. To maintain the subsistence priority and to provide for spawning escapements to ensure sustainable yields, Yukon River salmon fisheries must be managed conservatively.

Salmon fisheries within the Yukon River drainage may harvest stocks that are 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. Beginning in 1983, a summer season closure of July 15 was established in the Lower Yukon Area to protect the early portion of the fall chum salmon run and to provide more time to evaluate fall chum salmon run strength. Additionally, a set gillnet only area (Figure 10) along the coastal area of District 1 was established in 1983 where only set gillnets are allowed during commercial fishing periods. 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.adfg.alaska.gov/index.cfm?adfg=commercialbyareayukon.salmon) and an e-mail is sent to select communities, processors, buyers and fishermen. Additionally, select processors, buyers, and fishermen are notified of the emergency order 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 River 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.

Regulatory actions adopted by the BOF to protect the Yukon River stocks of concern included a 70% reduction of commercial fishing timed during the South Peninsula/Area M June fishery, the adoption of the Yukon River King Salmon Management Plan, changes to the 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. The Toklat River and Fishing Branch River fall chum salmon stocks were removed as stocks of management concern. Additionally, there were no changes to Yukon Area state fisheries regulations in 2006.

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 2006 (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, Division of Fish and Wildlife Protection (FWP).

State of Alaska funding for the Yukon Area salmon management and research program from July 1, 2005 through June 30, 2006 was approximately one million dollars 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 Substistence 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 U.S. Fish & Wildlife Service (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 2006–2007). 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 (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 Panel agreed to the first 6 years of a rebuilding plan for Canadian mainstem Chinook salmon stocks. The 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* (The 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 Panel is on salmon stocks that spawn in the Canadian portion of the Yukon River drainage. The Panel makes recommendations to management agencies in Alaska and Canada and also administers the 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 Panel as a whole based on recommendations by the JTC as a whole.

The Yukon River Panel meets each fall to resume management recommendations. The Panel advises the United States and Canadian Governments on conservation and management of salmon originating in the Canadian portion of the Yukon River. In recognition of the changing

dynamics of the fishery and the spirit of the agreement, interim management objectives are reviewed and agreed upon jointly each spring prior to the salmon returns.

AREA SALMON REPORT

TOTAL YUKON DRAINAGE SALMON HARVEST 2006

The total 2006 estimated harvest for the Yukon River drainage, including Canada, was approximately 104,300 Chinook, 184,900 summer chum, 270,500 fall chum, and 85,700 coho salmon (Appendix A5). The 2006 estimated total Yukon River drainage harvests compared to the recent 5-year averages (2001–2005) were as follows: Chinook, 11% above average; summer chum, 128% above average; fall chum, 161% above average; and coho salmon, 95% above average (Appendices B3–B8).

COMMERCIAL FISHERY–ALASKA

TOTAL COMMERCIAL SALMON HARVEST 2006

A total of 45,829 Chinook, 92,116 summer chum, 174,542 fall chum, and 64,942 coho salmon were harvested by 622 permit holders in the Yukon Area in Alaska (Appendix A6). The 2006 estimated total Yukon River drainage harvests compared to the recent 5-year averages (2001–2005) were as follows: Chinook, 50% above average; summer chum, 401% above average; fall chum, 347% above average; and coho salmon, 213% above average (Appendix B2-B5). Harvest by statistical area for 2006 in the Yukon Area and by gear type in the Upper Yukon Area is shown in Appendix A7–A10. Total ex-vessel value was $3.7 million, which is 99% above the recent 5-year average (Appendix A11). Salmon buyers and processors operating in the Yukon Area in 2006 are listed in Appendix A12. The salmon harvest was processed as a fresh or frozen product.

CHINOOK AND SUMMER CHUM SALMON

Preseason, a management strategy was developed in cooperation with USFWS federal subsistence managers that outlined run and harvest outlooks along with the regulatory subsistence salmon fishing schedule described in an information sheet. The 2006 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 non-salmon species, such as whitefish, sheefish, pike, and suckers. Additionally, the informational sheet was 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 subsistence survey and permit databases. State and federal staff presented the management strategy to the Yukon River Drainage Fisheries Association (YRDFA), State of Alaska Advisory Committees, Federal Regional Advisory Councils, and other interested and affected parties.

Chinook Salmon

In 2002–2005, preseason management strategies were developed to not allow commercial fishing until near the midpoint of the Chinook salmon run. 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 is concentrated on stocks migrating during the latter half of the run, thus the harvest is not spread out over the entire run. Further, if the run is strong, delaying commercial fishing results in foregone commercial harvest opportunities. The preferred strategy for managing commercial fisheries is to fish during the middle 50% of the run, starting near the first quarter point of the run. This strategy was in place before the decline in salmon abundance beginning in 1998. Additional harvest after this point can occur late in the season based on information from escapement projects. In 2006, based on the preseason projections and inseason run assessments, a commercial fishing period was scheduled on the historic first quarter point (June 15) for Chinook salmon, and the commercial harvest was spread over the middle 50% of the run. Additional harvest after the third quarter point is dependent on information from assessment projects and the availability of commercial markets.

Emmonak test fishing indices, subsistence harvest reports, and Pilot Station sonar passage estimates provide information ADF&G uses to assess the inseason salmon run. As the run progresses upriver, other projects provide additional run assessment information.

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. Assuming an approximately normal return of 5-year-old and 6-year-old fish, the 2006 run was expected to be average to below average and similar to the 2005 run. Given the uncertainties associated with 1999 and 2000 declines in escapement, it was anticipated the run would provide for escapements, support a normal subsistence harvest, and a below average commercial harvest; and therefore, ADF&G developed a conservative preseason management strategy in 2006 with a potential harvest ranging from 30,000 to 60,000 Chinook salmon.

The lower Yukon River was ice-free on May 29, 7 days later than the historic average of May 22 (1979–2004). The first subsistence catch of Chinook salmon was reported from Mountain Village on June 4. ADF&G's test fishing project recorded its first Chinook salmon catch on June 6. 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.

According to test fishing CPUE data, approximately 50% (the midpoint) of the Chinook salmon run had entered the lower river by June 24, 5 days later than the average date for the midpoint (Figure 11 and Appendix A13). The Pilot Station sonar preliminary passage estimate was approximately 169,000 Chinook salmon. The cumulative set gillnet test fishery CPUE in 2006 was 21.81. Compared to previous years, this CPUE was above the 2001–2005 average of 20.54, but below the 1989–1997 (before the run decline) and 2003–2004 average of 25.74 (Figure 11).

As the run developed, it became clear the 2006 Chinook salmon run was developing as expected and was similar to the run observed in 2005. The border passage estimate from the Eagle sonar project was approximately 74,000 Chinook salmon. However, the escapement target into Canada based on the Canadian fishwheel mark–recapture border passage estimate, currently at a rebuilding level of 28,000 Chinook salmon, was not met in 2006 (27,990 escapement estimate). However, relatively good escapements were observed in most Canadian tributaries, at the Whitehorse fishway, and the 74,000 fish estimated at Eagle sonar. This discrepancy could be due to problems associated with the Canadian fish wheel border passage estimate for 2006. However, the escapement target had been achieved consistently during the 5 years prior to 2006.

In summary, the 2006 Chinook salmon run was slightly stronger than the run of 2005, but still below the 1989–1998 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, 5 AAC 05.362*. 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) Pilot Station sonar passage estimate, 3) test fishing indices, 4) age and sex composition, 5) subsistence and commercial harvest reports, and 6) escapement monitoring projects.

The summer chum salmon entry was characterized as being 2 days early in run timing. The 2006 summer chum salmon run passage at Pilot Station was the highest on record (approximately 3.8 million fish), exceeding the previous record observed in 1995 (Appendix A14). By June 20, the summer chum salmon run at Pilot Station had exceeded one million fish, a level that would have allowed a directed summer chum salmon fishery. Most summer chum harvest was incidental to fishing directed at Chinook salmon, due to the lack of a summer chum market. However, one short fishing period was directed at chum salmon in District 2 and 6 fishing periods were directed at chum salmon in District 6. The total commercial harvest was 92,116 summer chum salmon; there were no sales of salmon roe (Appendix A6).

Harvest and Value

A total of 45,829 Chinook and 92,116 summer chum salmon were commercially harvested (Appendix A6) sold in the round in the Alaska portion of the Yukon River drainage in 2006. 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 Chinook salmon harvest was the sixth lowest commercial harvest since statehood and 14% below the 1996–2005 average harvest of 53,000 fish. The summer chum salmon harvest was the tenth lowest since 1967 and 22% below the 1996–2005 average harvest of 119,000 fish, which is attributed to market conditions rather than harvestable surplus (Appendices B1-B8).

A total of 594 permit holders participated in the Chinook and summer chum salmon fishery, which was 6% below the 1996–2005 average of 631 permit holders. The Lower Yukon Area (Districts 1–3) and Upper Yukon Area (Districts 4–6) in Alaska are separate Commercial Fisheries Entry Commission (CFEC) permit areas. A total of 569 permit holders fished in the Lower Yukon Area in 2006, which was 4% below the 1996–2005 average of 592 permit holders. In the Upper Yukon Area in Alaska, 25 permit holders fished, which was [i]44% below the 1996–2005 average of 45 permit holders (Appendix A16).

Yukon River fishermen in Alaska received an estimated $3.4 million for their Chinook and summer chum salmon harvest in 2006, approximately double the 2001–2005 average of $1.7 million (Appendix A11).

Results by District

Districts 1–3

A short commercial opening was scheduled on the pre-selected average historical quarter-point of June 15 to assist in salmon marketing efforts (Appendix A16). Run assessment indications and late run timing indicated that the short commercial opening would harvest a limited amount of

fish. A small, early commercial harvest would not impact the run based on the preseason run outlook. District 2 was opened to commercial opening for 3 hours on June 15, which was the shortest commercial opening targeting Chinook salmon on record. Although this commercial period was controversial, it worked out well with a small harvest of approximately 900 Chinook salmon, of which 63% were males.

ADF&G then delayed opening the next commercial period until June 19 in District 1. On June 17, ADF&G estimated the first quarter of the run for the lower river test fishing project to be around June 19, and based on this run timing, projected the Pilot Station sonar passage for Chinook salmon would be near 170,000 for the year and the cumulative lower river test fishery CPUE would reach 22–24 fish.

Commercial fishing was again delayed until the start of the second Chinook salmon pulse identified by the lower river test fishery project on June 23–26 with a total CPUE of 7.62 and Pilot Station sonar on June 25–27 with a passage estimate of approximately 44,400 Chinook salmon.

In 2006, ten unrestricted mesh size commercial fishing periods were scheduled in Districts 1 and 2 combined and one restricted mesh size (6-inch or less) commercial fishing period in District 2. The harvest from this 2-hour restricted mesh size fishing period was 478 Chinook and 11,785 summer chum salmon. This was the first restricted mesh size opening since 1998 (Appendix A17). However, market conditions for summer chum salmon in the lower river remained weak and no additional restricted commercial periods were scheduled. Additionally, 2 commercial fishing periods occurred in District 3 with unrestricted mesh size, which were the first scheduled commercial openings in this district since 1999.

The combined Chinook salmon for Districts 1, 2, and 3 was 43,906 fish. The average weight of Chinook salmon in Districts 1, 2, and 3 commercial harvest was 19.0 pounds. Estimated age composition of Chinook salmon samples collected from the lower river commercial harvest was 1.8% age-4, 49.7% age-5, 47.0% age-6, and 1.4% 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 48.3% females and 51.7% males.

The combined commercial summer chum salmon harvest in Districts 1, 2, and 3 was 47,475 fish. Average weight of summer chum salmon in Districts 1, 2, and 3 commercial harvest was 6.8 pounds.

Districts 4–6

Historically, the Subdistrict 4-A fishery targets summer chum salmon. The dominant gear type, fish wheels, and the location of the fishery, result in a very high chum-to-Chinook salmon ratio. No commercial deliveries were reported in 2006 in Subdistrict 4-A because of weak market conditions for summer chum salmon.

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 remained closed to commercial fishing in 2006 because of a lack of markets for summer chum salmon.

Although the commercial fishing season in District 4 was opened with commercial periods scheduled 5 days per week to foster interest by catcher/sellers, and one buyer was registered, no commercial deliveries were recorded due to the lack of commercial interest in the area.

Five commercial fishing periods were allowed in Subdistricts 5-B and 5-C for a total of 60 hours of fishing time. A total of 15 fishermen harvested 1,839 Chinook salmon (Appendix A16). This number was 15% below the lower end of the guideline harvest range of 2,150 fish. 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 only 20 summer chum salmon were harvested commercially in 2006. No commercial fishing periods were announced for Subdistrict 5-D due to a lack of buyers.

Commercial fishing in District 6 consisted of 6 periods for a total of 390 hours in 2006. Summer chum salmon were targeted during these commercial fishing periods with some Chinook salmon incidental harvested. Test fish wheel and commercial catches indicated that the summer chum salmon run in the Tanana River was above average (Appendix A18). The total estimated commercial harvest was 84 Chinook and 44,621 summer chum salmon harvested by 10 fishermen. The Chinook salmon harvest was well below the guideline harvest range of 600–800 fish.

The age and sex of Chinook salmon from the upper river commercial harvests in Alaska (District 5) was 10.2% age-4, 67.9% age-5, 21.1% age-6, and 0.8% age-7 fish. Sex composition was 38.6% females and 61.4% 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.

A summary of emergency orders issued during the Chinook and summer chum salmon fishing season is provided in Appendix A19 and A20.

FALL CHUM AND COHO SALMON

Assessment of fall chum and coho salmon runs begin from the time the fish enter the mouth of the Yukon River and continue until they reach their spawning grounds in Alaska and Canada. Fall chum salmon typically take 34 days to migrate as far as the U.S./Canada border. In managing the fall chum salmon fishery, ADF&G follows guidelines provided by the BOF in 5 AAC 01.249 *Yukon River Drainage Fall Chum Salmon Management Plan*. Coho salmon within the Yukon River have a slightly later, but overlapping, run timing with fall chum salmon and ADF&G follows guidelines adopted by the BOF in 5 AAC 05.369 *Yukon River Coho Salmon Management Plan*.

The preseason outlook for the 2006 fall commercial fishery did anticipate commercial harvest opportunity based on the record large return of 4-year-old fall chum salmon in 2005. Although both parent year escapements were less than 400,000 fall chum salmon, the 2001 brood year resulted in tremendous production providing a record run in 2005 and also provided the majority of the 2006 run which was above average. In 2006, limited markets, along with inseason run assessment resulted in fishing time that was well above normal levels. Nevertheless, a large surplus remained unharvested because of the uncertainty in market location, assessment, and lower market demand and fishing effort.

Fall Chum Salmon Management Overview

Good returns of fall chum salmon continued in the 2006 season as a consequence of exceptionally high production from the 2001 brood year. As a result, subsistence fishing was again off the windowed schedule from the beginning of the season and was further relaxed as the season progressed. Commercial fishing periods were scheduled to maximize available markets through close cooperation of salmon buyers with fishery managers. The commercial harvest was

managed in accordance with established guideline harvest ranges. However, fishing effort and prices remain low and most escapement goals were exceeded.

The *Yukon River Drainage Fall Chum Salmon Management Plan* incorporates the U.S./Canada treaty obligations for border passage of fall chum salmon and provides guidelines, 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 objectives. Commercial fishing is generally only allowed on the portion of the surplus above the upper end of the drainagewide biological escapement goal (BEG) range of 300,000 to 600,000. The intent of the plan aligns management objectives with established BEGs, provides flexibility in managing subsistence harvest when stocks are low, and bolsters salmon escapement as run abundance 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 onshore wind events and/or high tides. Consequently, assessing the run strength is difficult when pulse size and run timing vary so drastically.

The 2006 preseason run projection ranged from 1.0 to 1.4 million fall chum salmon. A point estimate of 1.2 million was derived by utilizing the 1974 to 1983 odd/even maturity schedules to represent the recent trend of higher production. The projection range was based on the upper and lower values of the 80% confidence bounds for the point projection. The 2006 run size was anticipated to provide for escapement requirements and for subsistence and personal use fisheries with a surplus of 100,000 to 400,000 fall chum salmon available for commercial harvest.

With an expectation of continued strong production, the 2006 preseason management strategy was to begin the fall season on the pre-2001 subsistence fishing regulations in accordance with the management plan. Commercial fishing was anticipated to begin near the first quarter point in run timing for the lower river dependent upon early run assessment. This would allow time for late summer chum to move out of the area thereby improving market quality and it allowed some of the earlier upriver fall chum salmon stocks to pass through the area unharvested. Initial inseason assessment of fall chum salmon for 2006 was influenced by the exceptional performance of the summer chum salmon run that had an estimated run size of 3.8 million, which was well above the average of 1.8 million. The historical relationship between the summer and fall chum salmon (1993–1995, 1997–2005) suggested the fall run would perform similarly and thereby increased confidence in the fall chum salmon preseason projection.

The fall chum salmon run was assessed inseason by the drift gillnet test fishery index projects located at 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 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 2006, each pulse of fall chum salmon appeared to correlate well between assessment projects for run timing and relative magnitude of each pulse except for some discrepancy of a fourth pulse at the end of August, which may have been missed by Pilot Station sonar. 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 run was strong from the beginning of the season. The first significant pulse began entering the mouth of the Yukon River on July 16 and lasted one day. The abundance was estimated to be approximately 85,000 fish by the Pilot Station sonar and was suspected to contain a large proportion of summer chum. The pulse was followed by 8 days of low passage rates before the second pulse began entering on July 27. The size of the second pulse was approximately 284,000 fish and lasted 6 days. A third pulse began entering the river on August 12, lasted 2 days, and was estimated by the Pilot Station sonar to include approximately 128,000 fall chum salmon. The Pilot Station sonar cumulative total estimate of fall chum for the 2006 season was 791,000 fish through August 31 (Appendix A14). The Mountain Village test fish project indicated the passage of a fourth pulse on August 29 which was not reflected by increased passage at Pilot Station sonar during the last days of the project. The end of season run reconstruction of 1.1 million fall chum salmon suggests that the total run size may have been as many as 200,000 fish more than accounted for in Pilot Station sonar estimate when considering harvest removal. However, confidence intervals for the various estimation methods overlap and it is assumed that approximately 5% of the run passes after the sonar is shut down for the season.

The early inseason run assessment indicated that the fall chum salmon run was on track for an above average total run size near the preseason projection. The fall chum salmon management plan went into effect on July 16 by regulation and subsistence fishing management actions, initiated during the summer season, were continued into the fall season. Thus, the Coastal District, Districts 1–4 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 Alaskan Upper Yukon Area districts as the fall chum salmon run migrated into those areas.

The first pulse 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. District 1 and Subdistrict 6-B had buyer commitments prior to the season with additional buyers expressing interest in purchasing salmon in District 2 and Subdistrict 5-C. The first commercial period was opened in the lower river District 1 on July 30 when buyers were confident few summer chum salmon would be mixed in the directed fall chum salmon fishery (Appendix A21 and A22). The Pilot Station sonar cumulative count through July 30 of 299,000 was significantly above the historical average of 156,000 for that date and was projecting a total season run size of 1 million fish.

Commercial market interest increased as the season progressed and District 2 had their first open period on August 2. Fisheries managers worked closely with commercial fish buyers to maximize processing capacity and available transportation opportunities. Frequent short periods were planned based on daily market capacity. Buyers and fishermen also worked together to improve the quality of their harvest by more careful handling, improved icing techniques, and quicker deliveries. Furthermore, in an effort to maximize fishing efficiency, fishing times in District 1 were scheduled to coincide with daily high tides, which typically carry new fish into the river where they become available for harvest. However, late season night-time darkness becomes a factor, so daylight fishing times were scheduled to maintain fishermen safety.

Beginning on August 1, in Districts 1, 2, and 3, subsistence fishing was open 7-days a week, 24-hours a day except for closures around each commercial salmon fishing period. The length of closed subsistence fishing time was reduced in the lower river districts to compensate for lost subsistence opportunity because of frequent commercial periods. With the increased frequency of commercial fishing periods, the amount of subsistence fishing closure time around commercial periods was reduced from 12 hours to 6 hours before, during, and 6 hours after each commercial fishing period.

The commercial salmon fishing season in the lower Yukon River normally closes on or before September 1 by regulation. The first half of the season was strong with the projected run size to exceed market capacity. However, the rate fall chum salmon were entering the river had slowed beginning in mid August. Furthermore, the majority of the Tanana River stocks tend to enter the Yukon River later in the season. Since the second half of the fall chum salmon was not as strong as the first half, early indications were that there might be some weakness in the Tanana River stocks. In addition, a project in development by USFWS, that uses genetic samples taken at the Pilot Station sonar site to apportion the stock composition by spawning ground origin inseason, supported the assessment that Tanana River fall chum salmon abundance might not be as strong as other stocks. Even though there was continued market interest for both fall chum and coho salmon, the fall season was extended by only 2 additional commercial periods through September 5 in District 1 to assure there would be adequate commercial fishing opportunity in upriver areas based on guideline harvest ranges (GHR) specified in regulations.

The increased strength of recent fall chum salmon runs has renewed interests for commercial fishing in upriver districts. In an effort to rebuild market interest in Subdistrict 4-A, commercial fishing periods were opened 5 days a week beginning in the summer season and continued through the fall season, but no commercial landings were made. Subsistence fishing was open 7-days/week and was concurrent with commercial periods in Subdistrict 4-A. There was also a market to land commercial fish in District 5 at the Yukon River bridge. A harvest of up to 30,000 fall chum salmon was allocated for Subdistricts 5-B and 5-C combined. However, only 10,030 fish were landed by 5 fishermen and a high-water event coincided with the peak of the fall chum salmon passage through that area which made fishing effort unproductive. Subsistence fishing time in Subdistricts 5-A, 5-B, and 5-C was increased to 7-days a week after commercial fishing activity ceased.

Commercial salmon fishing in District 6 began September 1 on a schedule of two 42-hour periods a week. The Tanana River is managed under the *Tanana River Salmon Management Plan*, which provides guidelines to manage District 6 as a terminal fishery based on the assessed strength of the stocks in the Tanana drainage. The Tanana River commercial harvest of 23,353 fall chum salmon was allowed to exceed the upper end of the GHR of 2,750 to 20,500. It was anticipated that after the closure of the commercial season in District 6, subsistence fishing activities would continue which would spread harvest throughout the run. Subsistence fishing was further increased to 7-days a week after September 30 in accordance with the Tanana River management plan. Even with an increased subsistence harvest, which was attributed to the availability of subsistence fishermen using efficient commercial fishing gear already in place and the commercial fishery exceeding the upper end of the GHR, the postseason assessment indicated that escapement goals were exceeded in the Tanana River.

The 2006 total run of fall chum salmon was approximately 1.1 million fish which was within the projected range. The commercial harvest of 175,000 fall chum salmon was the second highest since

1995 and preliminary indications are the subsistence harvest of approximately 80,000 was the second highest since 1999. The preliminary Yukon River drainagewide escapement of 870,000 fall chum is the second largest since 1995. The above average escapement in 2006 followed the 2005 escapement of 1.8 million, which was the largest in the past 30 years.

Overall, the above average run of 1.1 million fall chum salmon and moderate harvest level, caused by limited market capacity and low subsistence effort, resulted in an exploitation rate of 24%. This rate is above the previous 10-year average from 1996 to 2005 of 17% and below the 10-year average from 1986 to 1995 of 38%. The amount of commercial opportunity was exceptionally high and subsistence opportunity was very liberal. All escapement goals throughout the drainage, including those for Canadian-origin stocks, were attained or exceeded.

Coho Salmon Management Overview

The 2006 coho salmon run was managed to provide for escapement needs, subsistence use, and allow some commercial harvest. However, the commercial harvest of coho salmon was largely dependent upon the abundance of fall chum salmon and accompanying management strategies used to harvest fall chum salmon. The 2006 coho salmon outlook was for a continuation in the trend of above average runs, below average subsistence harvests because of low effort, and an expected commercial harvest of 50,000 to 70,000 fish.

The coho salmon run passage began early and slowed to a near-average total run size 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 assessments of magnitude and run timing. The run size estimate at Pilot Station sonar through August 31 was approximately 132,000 fish (Appendix A14), which was below the historical average (1995–2005) passage estimate of 147,000 coho salmon (Appendix B14).

The preseason market outlook favored fall chum salmon, but readily accepted coho salmon and paid a similar price per pound. Even though the primary focus of commercial fishing was on fall chum salmon, fishing periods were also controlled to spread harvest impacts throughout the run of the smaller coho salmon stock. 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 the lower river Districts 1 and 2 and upriver Subdistrict 6-B near Nenana. Fishermen had to weigh the price of gas in relation to the benefits of potential commercial harvests. The extended commercial season and liberalized subsistence fishing time increased fishing opportunity for coho salmon throughout the drainage.

Harvest and Value

The 2006 Alaskan commercial harvest of 174,542 fall chum salmon was the second largest landing since 1995 and the commercial harvest of 64,942 coho salmon was the largest landing since 1991 (Appendix A6). The Yukon Area commercial fall chum salmon harvest was approximately 3.6 times greater than the 1996–2005 average of 38,000 fall chum salmon and the coho salmon harvest was approximately 2.3 times greater than the 10-year average of 19,800 coho salmon (Appendix B4 and B5). However, weak market conditions and limited buying capacity limited the commercial harvest in portions of the drainage.

There were 28 commercial fishing periods (Appendix A21) in the lower river Districts 1 and 2 combined (17 periods in Y-1; 11 periods in Y-2) with no periods opened in District 3 due to lack of a market. Subdistrict 4-A had weekly 5-day long periods from July 4 until October 1 with no

reported commercial harvest. Subdistricts 5-B and 5-C began the fall season with two 48-hour periods followed by one 216-hour period. In the Tanana River, District 6, there were five 42-hour commercial salmon fishing periods beginning September 1 until September 17 when the catch exceeded the upper end of the guideline harvest range.

The preliminary 2006 commercial season value of fall chum and coho salmon for the Yukon Area was $298,000 (Appendix A11); $253,000 for the Lower Yukon Area and $45,000 for the Upper Yukon Area. The previous 5-year average value for the Yukon Area was $102,000 ($85,000 for the Lower Yukon Area, $17,000 for the Upper Yukon Area).

Yukon River fishermen received an average price of $0.20 per pound for fall chum salmon in the Lower Yukon Area and $0.14 per pound in the Upper Yukon Area in 2006. This compares to the 1996–2005 average of $0.22 per pound and $0.13 per pound, respectively, for years when commercial sales occurred. For coho salmon, fishermen received an average price of $0.20 per pound and $0.19 per pound in the Lower and Upper Yukon Areas compared to the recent 10-year average price of $0.29 and $0.10 per pound, respectively.

In 2006, 302 permit holders fished the fall chum and coho salmon fishery (285 for the Lower Yukon Area, 17 for the Upper Yukon Area) (Appendix A21). The number of participants was well above the recent 10-year average (1996–2005) of 117 (110 for the Lower Yukon Area, 7 for the Upper Yukon Area), which was plagued by low markets and poor returns. In comparison, the 1980s had much larger numbers of participating permit holders ranging from 619 to 833.

The preseason outlook for the 2006 fall commercial fishery did anticipate commercial harvest opportunity based on the record large return of 4-year-old fall chum salmon in 2005. Although both the 4-year and 5-year old parent year escapements were less than 400,000 fall chum salmon, the 2001 brood year resulted in tremendous production providing a record return in 2005 and also provided the majority of the 2006 run which was above average (Appendix A34). In 2006, limited markets, along with inseason run assessment resulted in fishing time that was well above normal levels. Nevertheless, a large surplus remained unharvested primarily due to market conditions, lack of tendering, and lower fishing effort than in the 1980s. A summary of emergency orders issued during the fall salmon fishing season is provided in Appendix 22.

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 monitor subsistence, personal use, and commercial fisheries within the Yukon Area.

Between June 15 and June 30, troopers from St. Mary's and Bethel patrolled the commercial and subsistence salmon fisheries along the Lower Yukon and Kuskokwim rivers. Patrols were conducted in Districts 1–3 along the Yukon as well as along the Kuskokwim River and in Kuskokwim Bay. Two PA-18s as well as numerous skiffs and stakeouts were utilized during the patrols. In all, a total of 550 resource users were contacted with 67 warnings and 44 citations being issued. The most common violations observed included boating safety issues, failing to properly mark commercial vessels, fishing during a closed period and in closed waters and crew license issues. In the Upper Yukon Area, patrols were conducted by skiff. Several contacts were made with warnings issued for boat registration and gear marking.

COMMERCIAL FISHERY–CANADA

CHINOOK SALMON

A preliminary total of 2,332 Chinook, 4,096 fall chum and one coho salmon was harvested in the Canadian Yukon River commercial fishery in 2006 (Appendix A23). The combined species catch of 6,429 salmon was 39% below the 1996–2005 average commercial harvest of 10,508 salmon. Since 1997, there has been a marked decrease in commercial catches of Upper Yukon River Chinook and fall chum salmon. This has been the result of a limited market as well as reduced fishing opportunities in some years due to below average run sizes. Canadian Upper Yukon commercial, non-commercial and Porcupine River Chinook salmon harvests for the 1961 to 2006 period are presented in Appendix B7, while similar information for fall chum salmon is presented in Appendix B8. Twenty of the 21 eligible commercial fishing licenses were issued in 2006, the same as in 2005. Twenty-one commercial licenses were issued in both 2003 and 2004.

The 2006 preseason outlook for Canadian-origin Yukon River Chinook salmon was a below average to average run of approximately 93,000 fish. Uncertainty regarding recent outlooks is apparent by the poor total run sizes of Upper Yukon Chinook salmon in the 1998 to 2001 period, which were significantly lower than expected despite healthy brood year escapements.

The key elements of the 2006 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 2006 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.

ii) Commercial, recreational and domestic fisheries would be given opportunities to fish if inseason run projections indicated that 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 2006 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 fish. In the Yellow Zone, described as a run size projection in the 19,000 to 37,000 range, only the First Nations 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 Nations fisheries and consideration for harvest opportunities in the commercial, domestic and recreational fisheries depending on abundance and international harvest sharing provisions.

Given a total run outlook of 93,000 Upper Yukon Chinook salmon (at the river mouth) and upon considering proposed management actions in Alaska, it was expected the border escapement

would be at least 43,000 Chinook salmon and Canadian fisheries would be managed in the Green Zone. The 2006 season commenced with closures in place for both the commercial and domestic fisheries. The recreational fishery remained open during the early part of the summer season. If there was a need for restrictive recreational management actions, they would have been implemented prior to significant numbers of salmon reaching the primary fishing areas.

Throughout most of June and the first few days of July, 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 US border escapement obligations, U.S. subsistence fishing, and a limited U.S. commercial harvest. Chinook salmon were first caught in the Fisheries and Oceans Canada (DFO) fish wheels on July 4, 6 days later than the 1996–2005 average date of June 29. Since 1985, there have been 7 years when the first Chinook salmon has been caught in early July; 4 of 7 of these late returns have occurred since 1999. A total of 1,231 Chinook salmon were caught in fish wheels, 74% of the 1996–2005 average catch of 1,663 Chinook.

The primary purpose of DFO fish wheels is to live-capture salmon throughout the run for tagging purposes; fish are tagged and subsequently 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, also referred to as "border escapement", are developed by expanding the point estimates of run size developed from the mark–recapture data by historical run timing information. The projections are a key component in Canadian management decisions.

In recent years, the opening of the commercial fishery has frequently been delayed in response to conservation concerns and/or uncertainties about the status of the run. When tag recoveries are unavailable due to the absence of a commercial fishery, there is a need to implement a test fishery to provide stock assessment data for inseason run assessment as there is little else upon which to rely for inseason run projections. The option of using just the DFO fish wheel catch has not been chosen because of a poor historical relationship between the fish wheel catch and run size estimates. In 2006, 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 suggested that the Canadian Chinook salmon escapement target would likely be achieved and a TAC would be established. It was deemed unlikely that First Nation fisheries would be restricted and fishing opportunities would likely be available for the Canadian commercial, domestic[1] and recreational fisheries. Because of the favorable inseason run abundance indicators in Alaska, and considering the cost and effort required to mobilize a test fishery, it was not necessary to conduct a test fishery. Instead, a limited commercial fishery early in the 2006 season was initiated to determine the status of the Chinook salmon run. If managers assessed the run to be of sufficient strength to meet the spawning escapement goal and First Nation requirements, subsequent openings in the commercial fishery and other fisheries would be scheduled.

The first opening in the Chinook salmon commercial fishery occurred during a 4-day period from July 14 to July 18 with an average of 7 fishermen participating. Three additional openings subsequently took place: a 3-day fishery opening, which started at noon July 21, a 2-day fishery opening, which started at noon July 28, and finally, a 3-day fishery opening, which started at

[1] The domestic fishery is opened on the same schedule as the commercial fishery.

noon August 4. The peak weekly catch of 720 Chinook salmon occurred during the July 21–24 opening. Weekly catch and effort for all openings are summarized in Appendix A5.

Inseason border escapement run projections were usually produced 2 times a week throughout the 2006 season. Early in the season, the run size projections were very sensitive to the run timing information used because early timing information represented a very small proportion of the total run. The border escapement run projections are expanded based on what is considered to be the likely timing scenario (i.e., early, average or late timing) given the information at hand (U.S. fishery and assessment data, and early indications in Canada). The intent of applying different expansions is to ensure that the projections cover an appropriate range of potential differences in run timing. An example of one of the early 2006 inseason projections was a border escapement estimate of 6,200 fish (95% CI range of 4,200–9,200) on July 23. This estimate projected a total season abundance of 38,700 fish to the border based on historical DFO fish wheel timing data and a 6-day late timing scenario. Inseason run projections through August 10 ranged from approximately 42,000 to 50,000 fish.

The total catch of Chinook salmon in the commercial fishery was 2,332 fish of which 2,229 were taken in the "Dawson area" fishery, downstream of the confluence of the Yukon and White rivers, and 103 Chinook salmon were caught in the "upper fishing area" (Appendix A23).

The Chinook salmon commercial fishery was open for a total of 12 days and total fishing effort was 93 boat-days (Appendix A23). For comparison, the previous 10-year average (1996–2005) commercial catch was 3,512 Chinook salmon; this average does not include year 2000, when the fishery was closed, however it includes very low catches in 1998 and 2002 when the commercial fishery was severely restricted. Generally, commercial catch levels in 2006 were hampered by limited markets.

FALL CHUM AND COHO SALMON

The preseason expectation for 2006 Upper Yukon River fall chum salmon was an average run. Spawning escapements in 2001 and 2002, the primary brood years contributing to the 2006 run, were 33,500 and 98,700 fall chum salmon, respectively. Although spawning escapement was excellent for the 1994 to 1996 period (averaging 126,300 and ranging from 98,400 to 158,100 fish), the cycle year returns from these escapements were well below average and appeared to have been significantly affected by poor marine survival. However, there was improvement in the run sizes observed in 2003 and 2004 and an exceptional run occurred in 2005; based on age data, over 90% of the 2005 return was comprised of 4-year-old fish from the 2001 brood year.

The Canadian fall chum salmon management plan for 2006 acknowledged the recent improvements in run size from 2003 through 2005 and the likelihood of an average run in 2006. The plan contained the following key elements:

i) A minimum spawning escapement target of >80,000 Upper Yukon River fall chum salmon, which was consistent with the Yukon Panel recommendation of March 2006;

ii) A limited commercial fall chum salmon fishery was expected, which would likely be initiated early in the 2006 season for inseason run projections if managers thought that the spawning escapement goal and First Nation's requirements would likely be achieved; and

iii) A minimum spawning escapement target of 28,000 Fishing Branch River fall chum salmon, which was consistent with the Yukon Panel recommendation of March 2006.

In 2006, funding was available from the Yukon River Restoration and Enhancement fund for a live-release fall 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. Prior to 2002, projections of fall chum salmon border escapement were developed from either the DFO fish wheel catch data, or from catch and tag recovery data collected from the Tr'ondek Hwech'in First Nation fishery and the commercial fishery located in the Dawson area.

Similar to the decision matrix developed for Chinook salmon, a fall chum salmon decision matrix was developed in the 2006 Integrated Fisheries Management Plan. Red, Yellow and Green management zones were described by specific reference points (run sizes into Canada) and expected management actions. The 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. The Yellow Zone included run projections in the 40,000 to 83,000 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. The Green Zone included run size projections greater than 83,000 fall 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 (>80,000) and the trigger point for the Green Zone was 3,000 fall chum salmon, which would fully satisfy the needs of the Canadian aboriginal fishery. Management discretion is used when the inseason projections are close to the trigger points.

The total fall chum salmon catch in the DFO fish wheels in 2006 (6,283) was approximately 29% higher than the 1996 to 2005 average of 4,881. Information from U.S. stock assessment projects, including the Pilot Station sonar program, the Rampart Rapids fish wheel program and inseason analyses of Pilot Station DNA samples, indicated that the Canadian Upper Yukon fall chum salmon run escapement target would likely be achieved and a TAC would be established. Given the early indications of average to above average run abundance, a live-release test fishery was considered unnecessary in 2006. A 4-day commercial fishery was initiated on September 3, followed in successive weeks by another 4 day opening, two 5-day openings, and two 7-day openings. The domestic fishery was opened on the same schedule as the commercial fishery. Despite the liberal fishing opportunities, the number of fishermen participating in the 2006 commercial fishery was low and no domestic fishermen fished for fall chum salmon (Appendix A23).

The total commercial fall chum salmon catch of 4,096 fish was 50.2% of the 1996 to 2005 average of 8,161 fall chum salmon (Appendix B8). During this period, the catch has ranged from zero fall chum salmon in 1998 (when the fishery was closed due to conservation concerns) to 20,069 fall chum salmon in 1996. The fall 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 fall chum salmon and salmon caviar. One coho salmon was recorded in the commercial catch in 2006.

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

ALASKA

Subsistence Salmon Fishery

Yukon Area subsistence fishermen use drift gillnets, set gillnets, and fish wheels to harvest salmon. Set gillnets are utilized throughout the Yukon Area, whereas drift gillnets are only allowed from the mouth of the Yukon River to 18 miles below the community of Galena. Although fish wheels are a legal gear type for subsistence fishing throughout the drainage, they are essentially only used in the Upper Yukon Area. Federal regulations allow federally qualified subsistence users to operate drift gillnets in waters where federal regulations apply in Subdistricts 4-B and 4-C.

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 community. Extended family groups, representing 2 or more households, often work together to harvest, cut, and preserve salmon for subsistence use. Some households from communities not located along the mainstem Yukon River operate fish camps along the mainstem Yukon River.

Throughout the drainage most Chinook salmon harvested for subsistence use are dried, smoked or frozen for later human consumption. Summer chum, fall chum and coho salmon harvested in the lower Yukon Area are primarily utilized for human consumption and are also dried, smoked, or frozen for later use. In the upper Yukon Area, small Chinook (jack), summer chum, fall chum, and coho salmon are all an important source of food for humans, but a larger portion of the harvest is fed to dogs which are 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 2006, all salmon runs were judged sufficient to provide for escapement and subsistence needs, as well as border passage commitments to Canada. Subsistence fishing for Chinook and summer chum salmon was open 7 days a week prior to commencement of the regulatory window fishing schedule beginning June 1 in the lower Yukon Area District 1. The window schedule was in place for approximately 3 weeks and implemented sequentially in upriver districts according to dates consistent with the Chinook salmon migratory timing. Once the Chinook and summer chum salmon runs were assessed to have a surplus above escapement needs and subsistence use, the subsistence salmon fishing schedule reverted back to the pre-2001 BOF subsistence fishing regulations, and the commercial fishing season was opened. Subsequently, the subsistence salmon fishing schedule was liberalized to provide additional fishing opportunities. The inseason management strategy for the fall season was to continue the liberalized subsistence summer fishing schedule into the fall season. This management decision was based on the strong performance of the summer chum salmon run, which provided confidence in the 2006 preseason projection that the fall chum salmon run would be more than sufficient to meet escapement goals, subsistence uses, and provide for commercial fishing opportunities. Coho salmon abundance was also determined large enough to meet escapement objectives and provide for additional subsistence and commercial salmon fishing opportunities. As the fall season developed, much of the drainage was open 7 days per week for subsistence salmon fishing. In

districts and subdistricts where commercial salmon fishing took place, the amount of subsistence salmon fishing time was increased by allowing additional openings around the commercial fishing periods. Throughout the summer and fall fishing season, fishing opportunities for non-salmon fish species were also available during subsistence salmon closed periods. Stipulations for harvesting non-salmon species during closed salmon periods allowed the use of gillnets with 4 inch or less stretch mesh and a maximum length of 60 feet, but prohibited the operation of fish wheels.

Inseason fishermen reports suggested that, in general, most Yukon Area subsistence households met their subsistence needs for salmon in 2006. Subsistence households in the Lower Yukon Area reported good catches of Chinook and summer chum salmon, and commonly reported meeting their needs. However, many middle Yukon and Koyukuk River households reported having trouble meeting their needs for Chinook salmon because of difficulties in catching them due to high water and debris conditions. The fishermen that did meet their subsistence household needs for Chinook salmon reported they had to work harder than normal to harvest the fish. In addition to the poor fishing conditions from high water, many fishermen indicated fishing efforts were further hampered because the fishing schedule and Chinook salmon run timing in their area did not coincide. Another commonly cited reason was that the fishing schedule conflicted with work opportunities, and when the fishing schedule was subsequently liberalized, most of the "good" Chinook salmon had already traveled by their area. On the other hand, fishermen reported more success in harvesting summer chum salmon because of the extremely large run, despite the high water conditions. Other reported factors that influenced success in meeting subsistence salmon needs included the high price of gasoline, fuel shortages, health, lack of fishing gear, and mechanical problems. Fishermen in many communities avoided repetitive travel to fish camps because of high fuel cost. In most cases, they fished near their home community or waited until the peak of the run occurred in their area before attempting to fish. Similarly, as in the past couple years, many individuals took advantage of work opportunities on fire-fighting crews within and outside of Alaska, and consequently did not fish.

Postseason subsistence surveys are conducted annually to provide an estimate of salmon harvested by subsistence fishing households in the Alaskan portion of the Yukon River drainage. Typically, surveys are conducted in 33 communities beginning in early September and continuing through to early November. Surveyed households are selected randomly based on recent historical harvest patterns. Survey data are expanded to estimate total subsistence harvest in surveyed communities. In addition to postseason surveys, subsistence "catch calendars" are mailed to approximately 1,500 households in the non-permit portions of the Yukon River drainage. The calendars augment the survey information and provide harvest reports for households that 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. Subsistence permit areas include the portion of Yukon River from the downstream end of Garnet Island upriver to the mouth of the Dall River, and includes the community of Rampart and Yukon River Bridge area. Additionally, a subsistence permit is required for the portion of the Yukon River from upstream mouth of Twenty-two Mile Slough upriver to the U.S.-Canada border, and includes the communities of Circle and Eagle. Yukon River subsistence fishing permit types issued are: SR, Rampart area; SY, Yukon River Bridge area; and SE, Circle to Eagle area. The entire Tanana River is also a subsistence permit required area, except for the portion within the Fairbanks Nonsubsistence Area. Tanana River subsistence fishing permit types includes SA, Manley

area; SB, Minto and Nenana areas; SK, Kantishna River drainage; and SU, upper Tanana River area upstream of Delta Junction and includes the communities of Dot Lake, Healy Lake, Northway, Tanacross, and Tok. Data collected from the subsistence permits are added to the total estimate of the subsistence salmon harvest provided by the survey portion. Subsistence harvest totals also include fish harvested from test fisheries and distributed to residents of communities near the projects.

Combining the results of the survey program, returned subsistence permits, and numbers of fish given away by test fishing projects, an estimated 1,580 households from over 40 communities harvested 48,700 Chinook, 115,000 summer chum, 84,000 fall chum, and 20,000 coho salmon in the Alaska Yukon Area in 2006 (Appendix A24). Busher et al. (*In prep)* documents the subsistence harvest estimation methodology and provides historical subsistence harvests by village and species. Of the total subsistence harvest, the coastal communities of Hooper Bay and Scammon Bay had an estimated subsistence harvest of 883 Chinook, 24,171 summer chum, 187 fall chum, and 335 coho salmon. A chum salmon tagging study conducted in June and July 1986 indicated that residents of Hooper Bay harvest chum salmon bound primarily to the Yukon River, but some Norton Sound and Kotzebue chum salmon were also harvested (Kerkvliet *Unpublished*[2]). Reported salmon harvest by permit area is presented in Appendix A25. Historical subsistence harvest is presented in Appendix B2–B5. The estimated subsistence totals also included 265 Chinook salmon harvested during the District 6 commercial salmon fishery. These fish were [ii]retained or given away by the commercial fishermen during the predominately summer chum salmon fishery. This information is based on the District 6 commercial fishery reporting requirement that stipulates that all fish caught and not sold by commercial fishermen must be reported on harvest fish tickets.

Personal Use Fishery

The Fairbanks Nonsubsistence Area, located in the middle portion of the Tanana River, contains the only personal use fishery within the Yukon River drainage, and includes the surrounding communities from Fairbanks to Delta Junction. 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.

Subdistrict 6-C is completely within the Fairbanks Nonsubsistence Area, and therefore falls under personal use fishing regulations. Personal use salmon (PC) and whitefish/sucker (PW) permits and a valid resident sport fishing license are required 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.

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[2] Kerkvliet, C. M. *Unpublished*. Hooper Bay salmon tagging study, 1986. Bering Sea Fishermen's Association. Located at: Alaska Department of Fish and Game, Division of Commercial Fisheries, 333 Raspberry Road, Anchorage, Alaska.

In 2006, the personal use salmon fishery followed the regulatory fishing time of two 42-hour periods per week. In 2006, 60 personal use salmon and 7 personal use whitefish and sucker household permits were issued. A total of 35 personal use salmon household permit holders fished with a reported harvest of 89 Chinook, 262 summer chum, 333 fall chum, and 279 coho salmon in Subdistrict 6-C (Appendix A25).

Sport Fishery

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

Most of the drainage's sport fishing effort occurs in the Tanana River drainage along the road system. From 2001 to 2005 the Tanana River on average made up 87% of the total Yukon River drainage Chinook salmon harvest, 23% of the summer chum salmon harvest, and 65% of the coho salmon harvest. Most Chinook and chum salmon are harvested from the Chena, Salcha, and Chatanika rivers, while most coho salmon are harvested from the Delta Clearwater and Nenana river systems.

Alaskan sport fishing effort and harvests are monitored annually through a statewide sport fishery postal survey. The total sport harvest of salmon in the Alaskan portion of the Yukon River drainage in 2006 was estimated at 739 Chinook, 1,059 summer chum, and 1,000 coho salmon (Appendix B2, B3, and B5). The 2006 harvest of Chinook salmon was lower than average due to lower than average abundance of Chinook salmon in the Chena River. However, an emergency order was issued which liberalized the daily bag and possession limit of Chinook salmon in the Salcha River from 1 Chinook salmon >20 inches per day to 2 Chinook salmon >20 inches per day (effective July 27). This action was warranted because the Salcha River Chinook salmon escapement was well above the upper end of the BEG range.

CANADA

Aboriginal Fishery

In 2006, as part of the implementation of the Yukon Final Agreements (comprehensive land claim agreements), the collection of inseason harvest information for the Upper Yukon River was conducted by First Nations within their respective Traditional Territories. Before the start of the fishing season, locally hired surveyors distributed catch calendars to known fishermen and asked them to voluntarily record catch and effort information on a daily basis. Interviews were then conducted inseason to obtain more detailed catch, effort, gear, location and tag recovery information at fish camps or in the communities, 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. Late or incomplete information was obtained postseason and reviewed by First Nation staff in conjunction with DFO.

With a below average to average preseason outlook for Upper Yukon Chinook salmon and an average outlook for Upper Yukon fall chum salmon, it was anticipated that aboriginal fisheries

would not likely be restricted by conservation concerns. Recent run size trends and harvest levels suggested that 2006 Chinook and fall chum salmon escapement goals and aboriginal catch requirements would be achieved. However, a strategy was developed whereby aboriginal fisheries could be restricted, if required, to address conservation concerns. For both Chinook and fall chum salmon, early run assessment information indicated that there were no apparent conservation concerns and First Nations were notified that a normal harvest level would be permitted.

Fishermen and First Nation staff commented that although the Chinook salmon run was late, it was a fair fishing season overall and needs were mostly met in communities. Some individuals commented that their harvests were lower than usual because they had scheduled holidays based on normal run timing and did not have the opportunity to fish when the run was at its peak.

The 2006 Upper Yukon Chinook salmon catch in the aboriginal fishery was 5,757, 16% below the recent 10-year average of 6,843 and 10% below the 2005 total of 6,376 (Appendix B7).

The total fishing effort for the 2006 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 5,268 net-hours, which is higher than the estimate of 4,420 net-hours reported in 2005. In the Mayo area, the estimate of effort provided by the Na-Cho Nyak Dun First Nation was 3,360 net-hours in 2006 compared to 3,048 net-hours in 2005. Data provided by the Selkirk First Nation shows an estimated effort of 4,978 net-hours in 2006 in the Pelly Crossing area compared to 4,678 net-hours in 2005.

The 2006 Upper Yukon fall chum salmon harvest in the aboriginal fishery was 2,521 fish (Appendix B8). This total is slightly higher than the previous 10-year average of 2,246 fall chum salmon and does not include harvest data from Carmacks area, which is currently unavailable. Participants in the 2006 fall chum salmon fishery described fishing as very good.

The estimate of total fishing effort reported in the Dawson area, where the majority of the fall chum harvest occurs, is 1,080 net-hours compared 408 net-hours recorded in 2005. There was also a small fall chum fishery on the mainstem Yukon River near Minto Landing where members of the Selkirk First Nation, based in Pelly Crossing, reported a total fishing effort of 437 net-hours in 2006 compared to 312 net-hours in 2005.

There was a continued conservation concern for the Porcupine fall chum salmon return prior to the 2006 season. The 2006 outlook for the total run size of Fishing Branch chum salmon predicted 42,800 fish. This outlook was based on an estimated return per spawner value of 2.5 and represented a poor return expected to fall below the escapement goal range of 50,000 to 120,000 fish to the Fishing Branch weir. Escapement counts in the 2 dominant brood years were 21,669 in 2001 and 13,563 in 2002. A pattern of observed run sizes being lower than preseason outlooks, which was evident for the 1998 to 2002 period, was attributed to poor marine survivals. However, the estimated runs in 2003 through 2005 were higher than the respective preseason outlooks; anecdotal information suggests there was improved marine survival in this period. Conservation measures implemented by the Vuntut Gwitchin Government (VGG) effectively reduced the aboriginal fishery catch at Old Crow within the 2002–2004 period, thus improving the escapement to the Fishing Branch River in these years. In 2002, the conservation initiative involved an effort to reduce the fall chum harvest to ~1,500 fish, approximately 25% of the

recent harvest of 6,000; this effort was successful and the harvest was reduced to 1,860 chum salmon. In 2003 and 2004, the VGG endorsed a voluntary closure throughout the fall chum fishing season reducing the harvest to 382 and 205, respectively. These voluntary closures were an extremely effective way to improve spawning escapement. Lost harvest opportunities were offset by a fishery substitution program, which involved the purchase, transport and distribution of dog food[3] to community members for their sled dogs. This program was funded through a Yukon River Restoration and Enhancement Program.

In 2006, with assistance from the Yukon Restoration and Enhancement Fund, the VGG conducted a mark–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 fall chum run size inseason and enable effective local management of the Old Crow aboriginal fishery. In addition, the VGG discussed options to guide harvesting activity at various run sizes as well as minimum escapement thresholds for the Fishing Branch River with the Yukon Salmon Committee and DFO. For example, if the mark–recapture program estimate indicated a low abundance of fall chum salmon, the allowable harvest could be lowered accordingly. This approach mirrors the abundance-based management system used on the mainstem Yukon River in Canada for both Chinook and fall chum salmon. Early in the season, estimates from the mark–recapture program combined with information from fisheries and assessment programs in the U.S. portion of the Yukon River indicated that the Porcupine River fall chum salmon run was close to the preseason outlook. As a result, restrictions in the aboriginal fishery at Old Crow were not required.

Catch estimates for the Porcupine River near Old Crow are determined from locally conducted interviews using the catch calendar and voluntary recording system described above. During the fall chum salmon fishing season, data collection effort was intensive as timely catch and tag recovery information was useful in generating inriver mark–recapture estimates. Interviews were conducted with individual fishermen up to 4 times weekly. Chinook and coho salmon harvest estimates were derived from the catch calendar information and postseason interviews.

A total of 5,179 fall chum salmon were harvested in the 2006 Old Crow aboriginal fishery; the 1996–2005 average harvest was 3,811[4] chum salmon. Fall chum salmon fishing was described as being excellent. An estimated 314 Chinook salmon were harvested; the 1996–2005 average was 256. The coho harvest was 111 compared to the 1996–2005 average of 222 fish.

Domestic Fishery

The preliminary estimate of the total domestic fishery catch is 63 Chinook salmon (Appendix B7). The domestic fishery followed the same fishing schedule as the commercial fishery and 7 domestic licenses were issued in 2006. This fishery was opened for 12 days during the summer season for Chinook salmon and 32 days during the fall season for fall chum salmon. All fishing effort took place during the summer season.

Recreational Fishery

In 1999, the Yukon Salmon Committee (YSC) introduced a mandatory Yukon Salmon Conservation Catch Card (YSCCC) in an attempt to improve harvest estimates and to serve as a

[3] Fall chum salmon harvested in the Old Crow aboriginal fishery are used primarily to feed recreational dog teams.

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

statistical base to ascertain the importance of salmon to the Yukon recreational fishery. Anglers were required to report their catch via mail by late fall. The information requested includes the number, sex, size, date and location of salmon caught and released.

The preliminary estimate of the 2006 recreational harvest included 606 Chinook salmon, which were retained (Appendix B7); an additional 220 Chinook salmon were caught and released. The YSCCC program often involves some data interpretation and censoring, which in 2006 involved approximately 1% of retained catch data submitted. For example, in 2006 sockeye and coho salmon were both reported as a retained catch, however the catch of this species is highly unlikely based on the date and/or location reported.

The YSCCC includes a location code that outlines 16 Yukon locations, 4 Alsek River locations and a code for all other locations and a request that fishers "please specify" the other location. In 2006, 77.7% (471 fish) of the total retained recreational catch of 606 Chinook salmon were recorded from an area located within 1 km of either side of Tatchun Creek. Chinook salmon catches were also recorded from the Big Salmon River (2 fish), Klondike River (5 fish), Little Salmon River (1 fish), Mayo River (15 fish), Morley River (1 fish), Nisutlin River (3 fish), Quiet Lake (1 fish), Takhini River (1 fish), Teslin Lake (6 fish), Teslin River (64 fish), Yukon River downstream of Tatchun Creek (28 fish), Yukon River upstream of Tatchun Creek (7 fish) and another unspecified location (1 fish), which was assumed to be within the Yukon River drainage.

One hundred sixty-two (73.6%) of the 220 Chinook salmon caught and released were recorded in the area within 1 km of either side of Tatchun Creek. The number of Chinook salmon caught and subsequently released in other areas was as follows: Blind Creek (2 fish), Klondike River (2 fish), Nisutlin River (1 fish), Takhini River (9 fish), Teslin Lake (2 fish), Teslin River (25 fish), Yukon River downstream of Tatchun Creek (13 fish), Yukon River upstream of Tatchun Creek (1 fish) and other unspecified locations (3 fish), which were assumed to be within the Yukon River.

STATUS OF SPAWNING STOCKS IN 2006

Alaskan and Canadian researchers have developed projects to monitor escapement and determine genetic composition, relative abundances, run characteristics, and other information pertinent to the annual salmon migration. Main river sonar, tributary sonar, weir, counting tower projects, and aerial surveys are used to monitor escapement. Other information collected at ground based projects may include, but are 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 (2002–2006). These include 2 biological escapement goals (BEGs) and 5 sustainable escapement goals (SEGs) established by ADF&G for U.S. tributaries and a rebuilding escapement target for Canadian mainstem passage negotiated by members of the U.S./Canada Yukon River Panel (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 (2002–2006) average

harvest approximately 40% 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 60% 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 2006 Yukon River Chinook salmon escapement in most tributaries was within or exceeded escapement goals. This assessment is based on escapement counts and estimates from selected tributaries. SEG for aerial survey assessments have been established for the East and West Fork Andreafsky, Anvik, Nulato and Gisasa rivers. All aerial survey escapement indices either were within or exceeded their SEGs, except for the East Fork Andreafsky River, which was incomplete. BEG have been established for the Chena and Salcha rivers located in the Tanana River drainage. In 2006, the Chena River Chinook salmon escapement estimate was 2,936 fish counted at the tower project and was within the established BEG (2,800–5,700) for this system. In the Salcha River, Chinook salmon escapement was estimated to be 10,400 fish (BEG 3,300–6,500) by the counting tower project. The large difference in escapement between the Chena and Salcha rivers was atypical. A summary of escapements can be found in Appendix A26, B9, and B10.

Improved production has continued, as was evident by an above average percentage of the 5-year old age class in 2006. The relative proportion of 6-year old fish returns in the 2006 age, sex, and length (ASL) samples, although lower than historical averages, suggests good production from the low escapements for the 2000 brood year (Appendix A27 and A28). Age and sex composition data collected from escapement projects in 2006 are presented in Appendix A29.

Canada

The preliminary mark–recapture estimate of the total spawning escapement for the Canadian portion of the Upper Yukon River drainage is 27,990 Chinook salmon, which is close to the 2006 target escapement of 28,000 Chinook and is 7.9% below the 1996–2005 average of 30,405 Chinook salmon (Appendix B11). Similar to 2005, the escapement estimate derived from mark–recapture data appears biased low when compared to estimates derived from the border sonar program located near the community of Eagle, Alaska.

Aerial surveys of the Little Salmon, Big Salmon, Wolf, and Nisutlin River index areas were conducted by Fisheries and Oceans Canada (Appendix B11). Single (or multiple) aerial surveys do not count the entire escapement within an aerial index area as runs are usually protracted with the early spawning fish disappearing before the late ones arrive. Weather and water conditions, the density of spawning fish, as well as observer experience and bias also affect survey accuracy. 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 Appendix B11. Survey results for 2006, relative to the previous cycle averages, are summarized below.

The Little Salmon aerial survey was flown on August 18th. Survey conditions were rated as being excellent. The count of 1,381 Chinook salmon was the third highest recorded for this index area; the 1996–2005 average count was 896 Chinook salmon.

The Big Salmon, Nisutlin, and Wolf river index areas were surveyed on August 16 under fair to good survey conditions. The Big Salmon count of 1,140 was 96.1% of the 10-year average of 1,186 fish. The Nisutlin River index count of 601 was 47.3% higher than the 10-year average count of 408 fish. The Wolf River count of 114 was 50.2% of the 10-year average count of 227 Chinook salmon.

The Blind Creek weir was operational from July 16 to August 17, 2006 when 677 Chinook salmon were counted (Appendix B11); the 1996 to 2005 average count is 776 Chinook salmon. A total of 101 fish were sampled for age-sex-length data with 41 (40.6%) being female.

The Whitehorse Rapids Fishway Chinook salmon count of 1,720 fish, provided by the Yukon Fish and Game Association, was 12.6% higher than the 1996–2005 average of 1,527 fish (Appendix B11). The overall sex composition observed at the fishway was 47.6% female. Hatchery-produced fish (fish with adipose fins removed) accounted for 46.8% of the return and consisted of 503 males and 302 females. Wild fish (fish with adipose fins intact) accounted for 53.2% of the return and consisted of 398 males and 517 females. Historical fishway counts appear in Appendix B11.

SUMMER CHUM SALMON ALASKA

Since the poor runs of 2000 and 2001, Yukon River summer chum salmon have rebounded substantially, averaging a total run of approximately 2.0 million fish per year, with the Yukon River drainagewide Optimum Escapement Goal (OEG) of 600,000 fish exceeded each year beginning in 2002. Individual spawning tributary escapement goals were met in the Anvik River in 2002 and 2004 through 2006, and in the East Fork Andreafsky in 2006, and were within 2% of the lower end of the range in 2004. The exploitation rate on Andreafsky River fish is assumed to be lower than that of other spawning stocks since it is located near the Yukon River mouth and subsequently subjected to less fishing pressure. To date, no specific management measures have been taken to manage East Fork Andreafsky River escapement. Failure to meet escapement objectives in some years in the Andreafsky River is believed to be the result of continued poor parent-year production caused by factors beyond ADF&G's control, such as the recent large runs of pink salmon spawning along with chum salmon in this system. However, production estimates from the poor 2000 and 2001 escapements to the Andreafsky River indicates that even this system is experiencing increased production along with the rest of the Yukon River drainage. Although the Yukon River subsistence and commercial harvests from 1999 through 2003 were significantly below the 1989–1998 average, a near average surplus was available for harvest during 2004–2006, which has not been taken due primarily to the lack of commercial markets.

The 2006 summer chum salmon run was near record levels. The upper end of the drainagewide escapement objective for the Yukon River of 800,000–1,600,000 fish based on the Pilot Station sonar project was exceeded with an estimated 3.8 million summer chum salmon passing the sonar site (Appendix A14), which is more than twice the 1997–2005 average of 1,130,044 fish.

The 2006 summer chum salmon escapement levels were above average in most tributaries (Appendix B12). The Anvik River sonar-based escapement project estimated 992,378 summer chum salmon, which was above the BEG range of 350,000 to 700,000. The Anvik River project was hampered by water in 2006. The estimated escapement of 101,465 summer chum salmon for East Fork Andreafsky River was within the BEG range of 65,000–135,000. Spawning escapements were well above average in the Koyukuk and Tanana River drainages, and Salcha River escapement of approximately 112,000 fish was the second largest on record, with 2005

being the largest recorded. It appears escapement was lower than average for lower river spawning areas such as the Andreafsky and Anvik rivers, whereas escapement was much higher for spawning areas upstream of Anvik. Age and sex composition data collected from escapement projects in 2006 are presented in Appendix A30.

FALL CHUM SALMON

Fall chum salmon run strength was poor from 1998 through 2002 however steady improvement has been observed since 2003 (JTC 2006). The 2005 run was the largest in 30 years and 2006 was above average for an even-numbered year run. Although the fall chum salmon escapement goals for both the Sheenjek and Fishing Branch Rivers were not met during 2002–2004, other tributary goals as well as the drainage-wide OEG of 300,000 fall chum salmon have been achieved in all of the last 5 years (2002–2006). Further, all Yukon River fall chum salmon escapement goals were exceeded in 2005 and either exceeded or met in 2006, excluding the Toklat River which was not surveyed. The recent 5-year average (2002–2006) total reconstructed run of approximately 950,000 fish is greater than the 1989–1998 10-year average of approximately 818,000 fish, indicating a return to historical run levels. Recent subsistence and commercial harvests continue to be below average and do not fully utilize the available surplus. However, based on the much improved run size since 2002, large available surpluses in 2003, 2005 and 2006 were near the historical yield.

Alaska

Major fall chum salmon spawning areas are located in the Chandalar, Tanana, and Porcupine River drainages and within the Canadian portion of the mainstem Yukon River drainage (Figure 13). The preliminary Yukon River drainagewide escapement of 870,000 fall chum salmon is well above the drainagewide escapement goal range of 300,000 to 600,000 fish. Fishery management initially places a considerable amount of weight on the Pilot Station sonar abundance 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 790,563 fish (SE 38,125) (Appendix A14; 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 140,000 fish), and an estimated 5% for fall chum salmon that pass into the river after termination of the project (August 31). Therefore, the preliminary total run size for the Yukon River drainage, primarily calculated from the main river sonar at Pilot Station, is estimated to be approximately 970,000 fall chum salmon. Based on the location of the project, in this case, Pilot Station (river mile 123), 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 2006, this method results in a preliminary estimate of 1,135,000 fall chum salmon. This method however does not include 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. This years estimates for the U.S./Canada border were provided by 2 methods: 1) the border mark–recapture project, and 2) Eagle sonar project. Both estimates appeared very similar for this first year of evaluation. The estimate of run size based on individual projects is typically higher than that based on Pilot Station sonar. The estimated escapement based on individual projects minus appropriate harvests is within the preseason projection based on normal production rates.

The 2006 fall chum salmon run resulted in the second highest return of age-5 fish since collections began in 1977, with 1992 being the only higher year. The run was dominated by age-5 fish as was expected due to the odd-even cycle of fall chum salmon and the exceptional run of age-4 fish observed the previous year. This was also only the second time in history that an even-numbered year returned 1 million fish, the first being in 1996. The summer and fall chum salmon runs are split by a calendar date (July 15, at the mouth of the Yukon River), where overlap is known to occur. In 2006, the first pulse occurred at the transition date. Thereafter, the run is characterized by a strong pulse during the first quartile (July 29) followed by a substantial pulse on August 12, and another peak occurring on August 19, resulting in average run timing overall. Pilot Station sonar operations only detected 3 substantial pulses of fish in 2006, with one smaller pulse detected at the end of the run, whereas projects downstream (Mt. Village drift test fish) and upstream (Kaltag drift test fish and 2 fish wheels on the mainstem Tanana River) detected additional strength at the end of the run. On August 29, a substantial pulse passed Mt. Village. The low magnitude of the last pulse, as detected by Pilot station sonar in combination with genetic stock identification results, caused the Tanana River stocks to appear weaker than was anticipated and as a result, corresponding management actions were taken.

The strength of the return appeared to benefit most stocks in both the upper Yukon River (non-Tanana) and Tanana River run components; however there still appeared to be some weakness in the Porcupine River system. All areas monitored that have BEG were exceeded. Weakness in the Fishing Branch River was anticipated and the interim goal was established at 28,000 fish preseason. The weir passage was approximately 30,849 fish.

The Chandalar River sonar project ran from August 8 through September 26, 2006. The preliminary escapement estimate was approximately 245,090 fall chum salmon, approximately 45% higher than the 1996–2005 average of 168,657 fish. Chandalar River sonar estimates of fall chum salmon range from a low of 65,894 fish in 2000, to a high of 496,484 fish in 2005. High water interrupted counting for 8 days on both banks, and 22 days total on the right bank. The ratio estimator method was used to predict the missing counts for the right bank when the left bank was still operational. When both banks were down counts were interpolated. The 2006 estimated escapement in the Chandalar River was 61% above the upper end of the BEG range of 74,000 to 152,000 fall chum salmon (Appendix A26 and B13).

The Sheenjek River sonar project operated from August 9 through September 24, 2006. For the 47-day period of operation, the cumulative count at termination was approximately 160,178 chum salmon. As in 2005, the Sheenjek River project was operated by using Dual-Frequency Identification Sonar (DIDSON^{TM}), which was operated on both right and left banks. The project experienced a high water event between August 20–31 which represents the early portion of the run and extrapolations had to be made for the right bank. It was observed prior to total shut down the fish began cutting the corner and primarily migrated on the right bank as the water levels rose. Once the water level receded and left bank operations were once again deployed, 29% of the passage was occurring at that location. However, passage increased up to 53% on the left bank through the later half of the run. Overall, not including the days operations were compromised by high water, the left bank represented 38% of the cumulative passage estimate. The right bank estimate of escapement was only 5% higher than the upper end of the BEG range of 50,000 to 104,000 fall chum salmon. 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, with the high of 438,253 fish observed on both banks in 2005 (Appendix B13).

The Eagle sonar was operated for the first time into the fall season enumerating chum salmon. The estimate of 236,386 fall chum salmon (Appendix A26) can be used as a surrogate for the U.S./Canada Border passage estimate after exclusion of the harvests from the community of Eagle. The preliminary subsistence harvest for all of Eagle residents is estimated to be approximately 17,000 fish, resulting in a preliminary border passage estimate of 219,386 fall chum salmon. The estimated border passage, based on the DFO mark–recapture project is 217,810 fall chum salmon and is approximately 1.7 times higher than the mainstem goal of greater than 80,000 fall chum salmon. Overall the relative contribution of Canadian origin stock represents approximately 28% to the total run.

The 2006 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 for the Kantishna River drainage (approximately 71,000 fish) and one for the upper Tanana River drainage (approximately 202,000 fish). The Tanana River established BEG range of 61,000 to 136,000 includes the Toklat River index areas 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 2006, estimate of fall chum salmon abundance in the upper Tanana River was 96% 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 estimate of abundance of fall chum salmon in the Toklat River based on migratory time-density curves applied to a single ground survey of the index area typically conducted in October was discontinued in 2006. One aerial survey of the Toklat River was attempted on November 2 but only 1,931 live fish and 33 chum salmon carcasses were counted before having to vacate the area due to inclement weather (Appendix A26). The 2006 combined population estimates for the Tanana River, minus appropriate harvests, is approximately 226,000 fish which is 66% higher than the upper end of the BEG range of 61,000 to 136,000 fall chum salmon. Overall the relative contribution of Tanana River stock represents 30% to the total run in 2006.

The 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 2006 was based on 8 replicate foot surveys conducted between October 6 and November 30. The Delta River escapement was estimated to be 14,055 fall chum salmon based on the area under the curve method. This level of escapement was slightly higher than the upper end of the BEG range (Appendix A26 and B13).

Canada

The preliminary fall chum salmon spawning escapement estimate based on mark–recapture data is 211,193 fish. Details are presented in project summary later in this report. This is the second highest chum spawning escapement estimate on record and is 71% above the previous 10-year average of 123,315 chum salmon (including the 2005 record 437,733 chum estimate).

Aerial surveys of the Kluane and mainstem Yukon index areas were both conducted on October 16 and the Teslin River index area was surveyed on October 30. All survey dates were approximately 1 week earlier than the dates these surveys were conducted prior to 2003. The timing of surveys in recent years appeared to occur after the peak spawning period; therefore, the 2003 though 2006 survey dates were advanced to better correspond with the peak spawning. The

Kluane and mainstem Yukon survey areas both involve a large number of discrete spawning areas (sloughs and side channels) with a range from low to high numbers of fish. In contrast, the Teslin River index area is a single spawning area, which usually involves a low number of fish.

The Kluane River index count was 18,208 fish, 33.2% higher than the 1996–2005 average of 13,666 fall chum salmon. A record count of 39,347 fall chum salmon was observed in 2003 in an aerial survey database going back to 1973. The count of the mainstem Yukon River index was 6,553 fall chum salmon, 26.4% higher than the average count of 5,185 fish for the 1996–2005 period. The Teslin River index count was 620 fish, approximately 2.8 times higher than the 1996–2005 average count of 219 fall chum salmon. Historical data are presented in Appendix B13.

In the Porcupine River drainage, the Fishing Branch River weir count of 21,942 fall chum salmon to October 14 was adjusted to a total of 30,849 fall chum salmon. It was necessary to adjust the weir count because high water conditions delayed weir installation and made the structure inoperable for a protracted length time during the peak of the run. The adjusted count (30,849) is 90.1% of the 1996–2005 average of 34,220 fall chum salmon, but is approximately 10% above the escapement target of 28,000 fall chum salmon established for 2006. Details of the 2006 weir operation are presented in project summary later in this report. In 2005, the Fishing Branch River count exceeded the upper end of the interim escapement goal range of 50,000 to 120,000 fall chum salmon for the first since 1975.

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 (Figure 7). This goal was exceeded from 2001–2005. The 2006 boat count survey of the Delta Clearwater River estimated 16,748 coho salmon which is near the upper end of the SEG range. The 2006 Pilot Station sonar passage index of 131,900 was below the 2001–2005 average of 180,000 fish. Although the 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

ALASKA

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.

Prior to 1993, ADF&G used dual-beam sonar equipment that operated at 420 kHz. In 1993, ADF&G changed the existing sonar equipment to operate at a frequency of 120 kHz to allow for a 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 fish detection at long range.

Up until 1995, ADF&G attempted to identify direction of travel of detected targets 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 refinements to the species apportionment process and implementation of an aiming strategy designed to consistently maximize fish detection. Because of these changes in methodology, data collected from 1995 to 2006 are not directly comparable to previous years.

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

Early in the 2005 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 detection of fish with the split beam sonar within 20m of shore on the left (south) bank. On June 19, a DIDSON was deployed in this area to supplement estimates generated with the split-beam sonar. With its wider beam angle, the DIDSON system was able to detect fish passage within 20 m despite high water levels and problematic erosion nearshore, and was operated for the remainder of the season (Figure 14).

In 2006, the DIDSON was integrated into the sampling routine on left bank for the whole season, operating side-by-side with the split-beam sonar. The DIDSON sampled the first 20m offshore; the remainder of the 250 m range was sampled by the split-beam. The DIDSON estimates accounted for 28% of Chinook, 27% of summer chum, and 16% of fall chum total passage estimates, which was similar to the contribution seen in 2005.

Though proportions of passage detected nearshore with the DIDSON were significant in 2005 and 2006, the left bank had been monitored in previous years and the profile and fish distributions did not appear to be as problematic prior to 2005. Therefore, estimates for fish passage prior to 2005 have not been adjusted or changed. The DIDSON was also deployed on the right bank in 2005 as an assessment of nearshore detection, and the counts were comparable to those obtained with the split-beam. This was an expected result because the rocky, stable substrate on the right bank has maintained a consistently good profile throughout the project's history.

Fish passage estimates at Pilot Station are based upon a sampling design in which sonar equipment is operated daily in three 3 h intervals, and drift gillnets are fished twice each day between sonar periods to apportion the sonar counts to species. During most seasons, on designated days, the sonar sampling period is expanded to a 24 h period as a simple qualitative assessment to compare the estimates obtained in the 3 h intervals with those found when the sonar runs continuously. Results of these 24 h sonar periods have historically shown relatively close agreement with the established three 3 h sampling schedule. In 2006, continuous 24 h sonar periods were not sampled due to budget constraints and scheduling conflicts with commercial fishing openers, but all other standard methods of qualitative assessment of the sonar systems were employed.

The 2006 season was characterized by a late break-up of the Yukon, with ice jamming at the Andreafsky River causing a delay in sonar camp set-up. However, the right bank sonar was operating from June 4, and sonar was running without any significant data loss on both banks from June 10 through August 31, 2006. Test fishing began on June 3, 3 days before the first Chinook was caught at the Pilot Station camp.

An assortment of gillnets, 25 fathoms long with mesh sizes ranging from 7.0 cm to 21.6 cm (2.75 in to 8.5 in), were drifted through the sonar sampling areas twice daily between sonar data collection periods. Drift gillnetting resulted in a catch of 10,977 fish during the 2006 season, including 557 Chinook salmon, 5,403 summer chum salmon, 2,559 fall chum salmon, 658 coho salmon, and 1,802 other species. Chinook salmon were sampled for age, sex and length, and genetic samples were taken from both Chinook and chum salmon. Any captured fish that were not successfully released alive were distributed daily to nearby residents in Pilot Station.

The left bank substrate continued to be 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 limits of the cabling. To alleviate this problem in 2006, the left bank sonar site was relocated approximately 200m downstream where suitable profiles were found and deployment options were increased. As in previous years, the right bank deployment site was consistently stable.

The 2006 passage estimates for Pilot Station are 169,403 Chinook; 3,767,044 summer chum; 790,563 fall chum; 131,919 coho; and 875,899 other species. Detailed historical passage estimates for 1995 and 1997–2006, are listed in Appendix A14. Historical passage estimates were revised in 2006 using the most current apportionment model to allow direct comparison between the years 1995 and 1997–2006.

Yukon River Chinook Salmon Stock Identification

Scale pattern analysis, age composition estimates, and geographic distribution of harvests has been used by ADF&G on an annual basis from 1981 through 2003 to estimate stock composition of Chinook salmon in Yukon River harvests. Three region-of-origin groupings of Chinook salmon, or stock groups, have been identified within the Yukon River drainage. The lower and middle stock groups spawn in Alaska and the upper stock group spawns in Canada.

Beginning in 2004, genetic analysis replaced scale pattern analysis as the primary method for stock identification. During 2006, field crews collected tissue samples (axillary processes preserved in ethanol) from Chinook salmon harvested by subsistence and commercial fisheries in the U.S. portion of the Yukon River. Tissue collections consisted of 1,801 samples from the subsistence harvest in Districts 1, 4, and 5 and 3,939 samples from the commercial harvest in Districts 1, 2, 3, and 5. No sampling of the test fishery at Emmonak was conducted during the 2006 field season. However, 278 Chinook salmon were sampled from nets at the Eagle sonar site.

ADF&G in cooperation with US Fish and Wildlife Service (USFWS) collected paired data at Pilot Station from 556 Chinook salmon samples during the 2006 field season. Baseline samples from spawning Chinook salmon in the Sheenjek River were collected by field crews from the Council of Athabascan Tribal Governments. These samples, combined with previous collections from the Sheenjek, were used to augment the baseline in 2006. Additional samples from the upper U.S. portion of the Yukon River drainage are needed to close gaps in the present genetic baseline.

Tissue samples collected from fish in mixed stock harvests from Districts 1 through 5 and paired with age data. Genetic analysis was performed on these samples by age group, age-1.3 and -1.4; and results from these analyses were combined with specific harvest age composition to provide stock composition by harvest. Age groups not used for genetic analysis, age-1.1, -1.2, -2.2, -2.3, -2.4, -1.5, -1.6, and -2.5, were apportioned to stock groups using stock composition of analogous

age groups, harvest age composition, and escapement age composition. Harvests from the Tanana River, the upper Koyukuk River, and 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 drainage wide Chinook salmon harvest (U.S. and Canada) is presented in Appendix A31. All fish from the lower and middle stock groups were harvested only in Alaskan fisheries. Analysis from 2006 shows drainage wide harvest proportions were: 0.175 from the lower stock group, 0.279 from the middle stock group, 0.460 from the upper stock group in Alaska, 0.087 from the upper stock group in Canada, and 0.546 from the upper stock group total (Appendix A31). Comparing 2006 proportions of harvested salmon to the average proportions (1981–2005), the representation of the lower stock group was slightly less, the middle was slightly more, and the upper stock group was slightly less represented.

The Alaskan harvest proportion of fish attributed to lower, middle, and upper river stock groups is shown in Appendix A32. In 2006, the Alaskan harvest proportions from the lower, middle and upper stock groups were 0.192, 0.305, and 0.503, respectively. Comparing 2006 Alaskan proportions with the average proportions (1981–2005) the lower and the upper stock groups were slightly less and the middle stock group was slightly more represented.

The harvest proportion of the upper river stock group harvested in Alaskan and Canadian fisheries is shown in Appendix A33. The 2005 proportion of the upper river stock group harvested in Alaska and Canada were 0.841 and 0.159, respectively. Comparing these 2006 proportions to the 1981–2005 average, the Alaskan proportion was slightly above average and the Canadian proportion was slightly below average.

Yukon River Chum Salmon Mixed-Stock Analysis

ADF&G in cooperation with USFWS collected paired data at Pilot Station from 4,308 chum salmon samples during the 2006 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 2005. These 4,308 axillary process tissues are archived in ethanol at the USFWS laboratory and a DNA subset will be shared with ADF&G Gene Conservation Laboratory for future genetic stock identification. In addition, 225 chum salmon were sampled from fish passing the Eagle sonar site. The baseline of SNP information from Yukon River chum salmon populations was increased to 24 populations surveyed for 51 SNPs developed for use in western Alaska.

Since 2004, the stock compositions of chum salmon have been estimated from samples collected from Pilot Station sonar test fisheries for the period spanning July 1 through the end of August. A baseline of standardized data collected at 21 microsatellite loci was constructed from 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). Results from this analysis were reported for each pulse or time strata and distributed by e-mail to fishery managers within 24–48 hours of receiving the samples. 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 were concordant for 2004 and 2005. Data analysis for 2006 is ongoing, and preparations are underway to continue the project for the 2007 season.

Tanana and Kantishna River Fall Chum Salmon Mark–Recapture Study

A cooperative fall chum salmon mark–recapture project was initiated in 1995 on the Tanana River, and it has operated annually through 2006. Western Alaska Disaster Relief Grant (WADG) funds were provided to the AYK region because of poor salmon runs in Western Alaska in 1997 and 1998. In 1999, WADG funding was used to expand the scope of the project and begin a fall chum mark–recapture study on the Kantishna River (Cleary and Bromaghin, 2001). Although funding sources have changed, sufficient financial support for the project has assisted operation of fall chum mark–recapture studies on both the Tanana and Kantishna River. Present cooperators include the Bering Sea Fishermen's Association, the National Park Service and the Yukon River Drainage Fisheries Association.

The objectives for the 2006 season were to: 1) provide inseason and postseason abundance estimates of fall chum in the Tanana River (above the mouth of the Kantishna River) and Kantishna River; 2) estimate migration rates of fall chum in the Kantishna River drainage; 3) count tagged and untagged fall chum and other species using digital video at the Tanana tag recovery wheel near Nenana; and 4) estimate run timing in Kantishna drainage.

In the Tanana River, tags were deployed from a fish wheel approximately 9 km upstream of the Kantishna River mouth and recovered (counted using digital video) 73 km upstream. In the Kantishna River, tags were deployed from a fish wheel on the lower Kantishna River and recovered at 2 sites each with 2 fish wheels on opposite banks. One site was 89 km upstream on the Toklat River and the second was 148 km upstream on the upper Kantishna River. All fish wheels began operation on August 16 and continued for approximately 6 weeks. A total of 3,270 chum salmon were tagged in the Tanana River and 3,217 were tagged in the Kantishna River. The Tanana River tag recovery fish wheel catch was 12,665 chum salmon of which 194 tagged. In the Toklat River recovery fish wheels a total of 5,905 chum salmon were captured of which 270 were tagged (both wheels combined). In the upper Kantishna River, 891 chum salmon were captured of which 38 were tagged (both wheels combined). Preliminary fall chum abundance estimates are 202,669 (SE=16,545) for the Tanana River and 71,135 (SE=4,972) fall chum for the Kantishna River. Both estimates of fall chum abundance are above the long-term average for their respective drainages.

Eight foot surveys of the Delta River were conducted during October and November 2006. The fall chum abundance estimate of 14,055 fish in the Delta River was determined based on the "area under the curve" method. During the weekly surveys, 73 tags were observed on fish that were unrecoverable and throughout the course of the surveys 41 tags were recovered.

ICHTHYOPHONUS

A 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. The YRDFA hosted a meeting in October 2004 to discuss *Ichthyophonus* research goals, at which time YRDFA assumed leadership of future meetings, with ADF&G's continued participation. A Sustainable Fisheries Grant from the National Oceanic and Atmospheric Administration was awarded to ADF&G to conduct *Ichthyophonus* research. Additionally, Treaty Implementation funding has been used to supplement completion of data collection and report writing.

Ichthyophonus is a protozoan parasite of marine and anadromous fishes with a global distribution (McVicar 1982; Woo and Bruno 1999). The current taxonomic position of *Ichthyophonus* is in the class Mesomycetozoea, a highly diverse class that includes other difficult to categorize organisms having characteristics of both animals and fungi (Mendoza et al. 2002). The infection is systemic within salmon, infecting the muscle, heart, kidney, spleen, and other vascular organs.

Ichthyophonus was first identified in Chinook salmon within the Yukon River drainage in 1988 (ADF&G Anchorage Divison of Commercial Fisheries Pathology Laboratory Disease History Database, June 1988). Approximately 25 other locations within Alaska have also been determined to have Chinook salmon infected with *Ichthyophonus*, as well as other species, such as sockeye and coho salmon. A pilot study conducted in 1999 indicated approximately 30% of the Chinook salmon sampled in the lower Yukon River in late June were infected with *Ichthyophonus*. Samples of Chinook salmon at south side Tanana village showed significant increases in disease severity as they moved upstream (Kocan and Hershberger 1999). Research on the effects of *Ichthyophonus* on Yukon River Chinook salmon has been conducted annually since 1999 (Kocan et al. 2003). ADF&G studies in 2004 suggest that high infection rates observed at this location and differences between genders at the Tanana site were possibly a function of selection for fish by gear type (Kahler et al. 2007).

During the 2006 field season, approximately 533 Chinook salmon were sampled from 3 locations, the lower Yukon in Emmonak, as the fish entered the river and on the spawning grounds of both the Chena and Salcha Rivers. Heart tissue samples from all sites were tested by both culture and PCR methods. The spawning ground samples were collected based on the criteria, clear eyes and some red/pink color in the gills.

The 2006 results based on heart culture indicated the infection prevalence was higher in the lower river at 16% and decreased slightly on the spawning grounds to 12% (Table 1). In contrast, samples taken in 2004 indicated 22% prevalence in Emmonak and mixed infection prevalence on the spawning grounds. During 2005, infection prevalence in Emmonak was 24%, similar to the previous year, and approximately 14% on the spawning grounds. The 2006 infection prevalence in the Chena and Salcha Rivers was 12.8% and 11.4%, respectively. As described in other studies (e.g., Kocan et al. 2003) clinical signs of the disease become more prominent as the fish migrate up river and the organism spreads throughout the body. Infection prevalence by gender was not statistically significantly in 2004 through 2006 at Emmonak or on the spawning grounds. Difference by gender was only significant in 2004 at the Tanana site where a fish wheel was used for collecting samples thereby introducing a gear bias.

Table 1.–Preliminary results from Chinook salmon sampled for *Ichthyophonus* in 2006, by test methodology, Yukon Area.

	Heart Culture			Heart PCR		
Sample Site	Sample Size	Number of Positives	Percent Infected	Sample Size	Number of Positives	Percent Infected
Emmonak	104	17	16%	104	13	13%
Chena River	163	21	13%	169	19	11%
Salcha River	244	28	11%	260	29	11%

As in 2004 and 2005, spawning success was evaluated for males and females based on 3 established categories, i.e., spawned out, partially spawned, and did not spawn. Preliminary results based on spawn-out classes of both infected and uninfected individuals in 2004 and 2005 suggest that Chinook salmon counted past escapement enumeration projects are spawning successfully. Results for female Chinook salmon collected on both the Chena and Salcha River spawning grounds in 2006 are presented in Table 2. The 2006 samples resulted in a marginal difference between infected and uninfected fish in the spawned out and partially spawned categories for the Chena River. However, samples sizes for infected fish are small as 2006 had the lowest infection prevalence for this 3-year study (JTC 2006a).

Table 2.–Preliminary results of infection prevalence by spawn out category for female Chinook salmon sampled for *Ichthyophonus* on the spawning grounds in 2006, Yukon Area.

	Infected		Uninfected	
Spawn Out Category	Sample Size	Infection Rate	Sample Size	Infection Rate
Spawned Out	21	78%	171	94%
Partially Spawned	5	19%	8	4%
Did Not Spawn	1	4%	2	1%
Total Sampled	27		181	

Other factors of importance for any *Ichthyophonus* monitoring program include that all samples should be paired with age, sex, and length data for each individual specimen and that water temperatures should be collected annually at the Yukon River mouth and key spawning tributaries, such as the Chena and Salcha rivers. Okamoto et al. (1987) found that the mortality rate of *Ichthyophonus* infected rainbow trout significantly increased at temperatures above 15ºC. Temperatures above this range were observed in 2004 in the Chena and Salcha rivers. It is conceivable, that a combination of high water temperatures and high infection prevalence may have an affect on spawning success. Fieldwork for ADF&G's study is concluded and the work is currently concentrated on data analysis and report writing with a goal for report completion by June 30, 2007.

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 Alaska/Canada Border. This effort was initiated in response to concerns about the current assessment methodologies and the importance of accurate border passage information when reviewing whether the annual objectives of the United States/Canada salmon treaties 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). It was found that Six-Mile Bend was the preferred site, that 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 salmon passage. Sonar equipment was deployed on both banks at the site and the project was operational from July 12 to August 10, 2005. The passage estimate for 2005 was 81,528 Chinook salmon. The split-beam and DIDSON systems performed well over the entire season with no technical difficulties or malfunctions. The DIDSON was the ideal system for the right bank, where the profile is steep and less linear than the left bank. The split-beam system worked well on the left bank and appeared to have a satisfactory detection rate nearshore, while still adequately detecting targets out to 150 m.

In 2006 both Chinook and fall chum salmon passage were estimated at the same location, and with the same equipment. Estimated Chinook salmon passage from July 8 to August 17 was 73,691, while 236,386 fall chum were estimated between August 18 and October 6. Again, both sonar systems worked well at this location.

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 the sonar site. Standard ASL data, and genetic samples were collected from captured Chinook and chum salmon. Six gillnets, 25 fathoms in length and with mesh sizes ranging from 2.75” to 8.5”, were fished in an effort to effectively capture all size classes of fish present and detectable by the hydroacoustic equipment. Set nets were also deployed with varied results to investigate nearshore passage.

Though there are some chum salmon present in the river during the Chinook run and vice versa, Chinook and chum salmon runs appear to be largely discrete in time based on test fish results, local knowledge of catches, data collected in Canada, and past projects in the area. Chum salmon and non-salmon species such as whitefish are locally known to migrate near shore, and based on test fish results and information collected by the sonar this appears to be true. Information from the DIDSON™ also suggests that other species such as whitefish appear to be present in small numbers (10%). A preliminary examination shows that the split-beam sonar is only detecting 50% of the smaller non-salmon species, leaving only 5% non-salmon counted as salmon, so it is unlikely they would affect the utility of the Chinook and chum salmon estimates.

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 it 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 Dual Frequency Identification Sonar (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 that are 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, it 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. It is unlikely that the late-season data is representative of the typical relationship since the ping-rate was lower than usual.

Historically, due to unfavorable conditions for transducer placement on the left bank, only the right bank of the Sheenjek River has been used to estimate fish passage. Drift gillnet studies in the early 1980s suggested that 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 2003, a DIDSON was deployed on the left bank to better understand the distribution of migrating chum salmon. Results showed that approximately 33% of the fish were migrating up the left bank. Due to large numbers of fish observed on the left bank, ADF&G began operating DIDSON on both banks in 2005.

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 new equipment was both easier to use and produced more accurate estimates. 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 estimate represented 39% of the total passage.

In 2006, the combined passage estimate for both banks was 160,178 chum salmon, with an estimate for the right bank alone of 106,397 chum salmon. This estimate was adjusted for an 11-day period when the sonar was not operational because of a flooding situation. The left bank estimate represented 34% (including interpolated flood period) to 39% (excluding flood period) 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 smoothly and this equipment will continue to provide accurate escapement estimates in future years.

Chinook Salmon Size Trends

Concerns over changing trends in the age, sex ratio, and size of Yukon River Chinook salmon populations have recently emerged. In response to these concerns, the JTC Salmon Size Subcommittee compiled relevant literature and existing analyses pertaining to these trends and potential causes of these trends in their Potential Causes of Size Trends in Yukon River Chinook Salmon Populations report (JTC 2006b). This informational summary was divided into 6 sections: history of the Alaskan Yukon River Chinook salmon harvest and fishery sampling, history of the Canadian Yukon River Chinook salmon harvest, summary of prior age, sex and size investigations, summary of Yukon River gillnet selectivity, heritability of traits and potential effects of selective fisheries, and oceanic influences on salmon size. There is some evidence that Yukon River Chinook salmon have undergone phenotypic alteration over time. Analyses document a decrease in the weight of commercial harvests (Bigler et al. 1996) and a reduction in the prevalence of the largest fish (Hyer and Schleusner 2005). Whether the changes observed within Yukon River Chinook salmon have resulted from environmental or fishery-induced selective pressures, or a combination of both, is difficult to determine with certainty. The report recognizes several factors that may contribute to these trends, including environmental changes in the Bering Sea and Gulf of Alaska, fishery induced selective pressures and increased competition in the ocean from large numbers of hatchery fish. The JTC Salmon Size Subcommittee is committed to continue monitoring of size and age trends in Yukon River Chinook salmon populations. They will use this summary report as a means to develop hypotheses for further study.

CANADA

Upper Yukon River Salmon Tagging Program (Yukon Territory)

Fisheries and Oceans Canada has conducted a tagging program on salmon stocks in the Canadian section of the Upper Yukon River drainage since 1982 (excluding 1984). The objectives of this program are to provide inseason estimates of the border escapement of Chinook and fall chum salmon for management purposes and to provide postseason estimates of the total spawning escapements, harvest rates, migration rates and run timing. Spaghetti tags are applied to salmon live-captured in 2 fish wheels located upstream from the Canada/US border. The 2 fish wheels, White Rock and Sheep Rock, are situated approximately 7 kilometers apart on the right bank of the river. With the exception of short periods for maintenance or repair, in 2006 both fish wheels ran 24 hours per day for an operational period that started in late June and ended in early October. Tagging methodology for many years involved 2 daily tagging events, morning and evening. In recent years, additional tagging shifts have been implemented for both the Chinook and fall chum salmon migration periods to reduce the time fish are held in the live-boxes prior to tagging. In 2006, Chinook salmon were tagged every 6 hours throughout most of the run while fall chum salmon were tagged 3 times per day (morning, afternoon and evening) throughout most of the run. Subsequent tag recoveries are made in a number of different fisheries located upstream and infrequently in downstream fisheries and spawning areas. Population estimates were developed in 2006 using spaghetti tag recoveries from the Canadian commercial fishery located downstream of the Stewart River, the area where most intensive fishing activity and catch monitoring is conducted.

Commercial fishermen are legally required to report catches, tag recovery and associated data no later than 8 hours after the closure of each fishery and there is also a requirement that catch

forms be either received by the Whitehorse office or post-marked within 10 business days after the closure of each commercial opening. A toll-free telephone catch line is available for catch reporting.

Consistency in the fish wheel sites and fishing methods permits some inter-annual and inseason comparisons, although the primary purpose of the fish wheels is to live-capture salmon for the mark–recapture program. Fish wheel catch data in the absence of recapture information is generally not useful to assess run abundance. Fish wheel counts have limited correlation with border escapement estimates derived from mark–recapture estimates, particularly with respect to the Chinook salmon run. Chinook salmon catches tend to be highest during high water conditions when the fish are most vulnerable to the shore-based gear and lower during low water conditions. Similarly, fall chum salmon fish wheel catches are often directly related to water levels rather than true abundance, although the fish wheels are highly efficient at capturing fall chum salmon, which migrate close to shore. The fish wheels appear to be less efficient during the latter part of the fall chum salmon migration period, late September and early October, when the Yukon River becomes less turbid. During this period most fish are caught overnight; there is an assumption that migrating fall chum salmon are better able to avoid the gear during the daylight hours due to an increase in water clarity associated with less turbid water conditions.

Chinook Salmon

The first Chinook salmon were caught in both the White Rock and Sheep Rock fish wheels on July 4, 6 days later than average. The combined total fish wheel catch of 1,231 Chinook salmon in 2006 was 74.0% of the 1996–2005 average of 1,663 fish. The sex composition observed in the fish wheel catches was 27.8% female. A peak weekly catch of Chinook salmon (444) was recorded in statistical week 31, i.e., week ending August 5. As in previous years, the catch and tag recovery component of the Chinook salmon mark–recapture study used data from the Yukon River commercial fishery downstream of the Stewart River.

The preliminary border escapement estimate for 2006 is 36,748 Chinook salmon. This estimate was expanded from a point estimate of 29,509 Chinook through August 5 (95% confidence interval of 17,008 to 42,110 fish), using 2006 timing data from the DFO fish wheels. Very limited Chinook catch and tag recovery data after the August 4–7 commercial opening precluded using mark–recapture data after this point in time. Additional analyses of the mark–recapture data are still in progress. Preliminary information from the 2006 mark–recapture program suggests that total run size was consistent with the upper end of the preseason outlook. After subtracting the Upper Yukon harvest of 8,758 (2,332 commercial, 5,757 aboriginal, 63 domestic and 606 recreational), 27,990 Chinook salmon were estimated to have reached spawning areas. This estimate is very close to the escapement goal of 28,000 adopted by the Yukon Panel for the 2006 season (Appendix B11).

The postseason mark–recapture estimate was lower than the inseason run size projections. The reasons for this appear to be related to: a) an unexpected increase in the proportion of tags in the recapture sample later in the run; and b) an earlier than expected end to what was considered to be an overall late run.

Comparative border and spawning escapement estimates from the tagging program for 1982 through 2006 are presented in Appendix B11. The 2005 and 2006 border escapement estimates appear to be biased low when compared to estimates of Chinook salmon derived from the border sonar program located near the community of Eagle, Alaska. Additional years of paired data are

required to compare the mark–recapture and sonar estimates before it can be determined if there is a systemic problem associated with the fish wheel tagging program that consistently biases the estimates low.

Fall Chum Salmon

The total fish wheel catch was 6,283 fall chum salmon, 28.5% higher than the 1996 to 2005 average of 4,888 fall chum salmon. The first fall chum salmon was captured at the White Rock fish wheel on July 26. On average during the previous 10 years, the first fall chum salmon has been captured July 21 (range July 6 to August 2). The midpoint of the fish wheel catch occurred on September 16. The average midpoint date over the previous 10 years occurred on September 12; however, the midpoint dates have been variable, ranging from September 5 to September 23. The peak weekly catch of fall chum salmon in 2006 (1,802 fish) occurred in statistical week 38 (September 17–23).

In 2006, 92% of the fall chum salmon captured in the DFO fish wheels were tagged with spaghetti tags. One of the tagged fish moved downstream and was recovered in the U.S. fishery located near Eagle Alaska.

Catch and tag recovery information from the fall commercial fishery was used for the tag recovery component of the fall chum salmon mark–recapture program. The 2006 fall chum mark recapture data analysis involved a relatively low number of fish examined for tags (4,096) and a low number of tag recoveries (104). Numerous iterations involving temporal stratification were explored before a preliminary pooling of data was used. The preliminary 2006 Upper Yukon postseason border escapement estimate is 217,810 chum salmon with a 95% confidence interval range from 164,136 to 271,484 fish. After subtracting the estimated catch of 6,617 (4,096 commercial and 2,521 aboriginal), the estimated spawning escapement was 211,193 fall chum salmon. This estimate exceeded the rebuilding goal of >80,000 Upper Yukon fall chum salmon adopted by the Yukon Panel for 2006. Comparative border and spawning escapement estimates from the tagging program for 1980 through 2006 are presented in Appendix B13.

Big Salmon River Sonar

A long range dual frequency identification sonar (DIDSON-LR) was used to enumerate the Chinook salmon return to the Big Salmon River in 2006, as well as run timing, and diel migration patterns. This was the second year a sonar program operated at this site with funding provided by the Yukon Panel's Restoration and Enhancement Fund. The sonar site was located on the Big Salmon River approximately 1.5 km upstream of the Yukon River confluence, the same location used for the 2005 program. Partial weirs placed on both sides of the river were used to deflect fish movement through a 34 m opening. The sonar unit was configured to provide a 29º conical ensonified field that was 40 m wide and covered the water column within the fish passage opening.

A total of 7,308 (7,298 counted plus 10 extrapolated) targets identified as Chinook salmon were counted past the sonar station between July 15 and August 23, 2006. A peak daily migration of 496 fish occurred on August 5th, and 90% of the run had passed the station by August 12. The cumulative daily run pattern exhibited a normal distribution. The 2006 run timing was approximately 3 days later than the 2005 run.

A carcass sampling program conducted over the total length of the Big Salmon River yielded 234 Chinook salmon carcass samples. Each carcass was sexed, and sampled for scales (age

determination), length, tags, and DNA samples. Of the 234 fish sampled, 110 (47%) were male and 124 (53%) were female. The mean fork length of males and females sampled was 825 mm and 891 mm, respectively. Of the fish sampled, 90% were from the combined age-5 and age-6 age classes. A total of 7 spaghetti tags was collected.

Whitehorse Rapids Fishway Chinook Salmon Enumeration

A total of 1,720 Chinook salmon ascended the Whitehorse Rapids Fishway between July 20 and September 5, 2006. This total was 12.6% higher than the 1996–2005 average count of 1,527 fish (Appendix B11). The sex composition was 47.6% female (819 fish). Hatchery-produced fish accounted for 46.8% of the return: 503 males and 302 females. The non-hatchery count consisted of 398 wild males and 517 wild females. The run midpoint occurred on August 18 and the peak daily count occurred on August 20 when 158 fish were counted.

In 2006, Chinook salmon were not specifically removed from the fishway for coded-wire tag sampling, but several samples were obtained from the brood stock collected. No weirs (i.e., Wolf or Michie creeks) were operated in the drainage upstream of the fishway in 2006, although more effort was placed on the recovery of coded wire tags from Michie Creek and the M'Clintock River and some coded wire tags were recovered from Wolf Creek.

Whitehorse Hatchery Operations

All 156,779 fry from the 2005 brood year (BY) Chinook salmon reared at the Whitehorse Rapids Fish Hatchery were released between June 4 and June 14, 2006. The fry[5] were released into various locations upstream of the Whitehorse Rapids hydroelectric dam. The numbers of fry released and release location were as follows:

Wolf Creek:	42,876 fry
Michie Creek:	43,508 fry
M'Clintock River	35,059 fry
Mainstem Yukon River	35,336 fry
TOTAL	156,779 fry

The 2006 release was the eleventh year, 1995–2005 brood years (BY), in which all fit fish released from the Whitehorse Rapids Fish Hatchery into the Yukon River were marked (JTC 2007). With the exception of all fish released from the 1998 BY (1999 release year), which were adipose-clipped but not tagged, all of the fry releases from the 1995–2005 brood years involved adipose fin removal and application of coded wire tags to all 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.

The total 2006 release of 156,779 fry included: an estimated 147,500 adipose-clipped fry with coded-wire tags (CWT); 1,621 fry which were estimated to have lost their tags (tag retention was calculated to be 98.9%) these fish were adipose clipped; and 7,658 small (or assessed to be unfit) fish, which were adipose clipped but not coded wire tagged. The latter group was released into Wolf Creek on June 11, 2006.

[5] The juvenile 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 presmolts.

The total 2006 Wolf Creek release was higher than usual. This resulted because Wolf Creek was the recipient of a slow growing group of fry, which was tagged during a second (later) tagging session. A developmental problem associated with some fry was attributed to the fish food used. This problem was also observed in other Chinook hatcheries using the same feed, however it did not seem to affect other species and the overall mortality rate for the Whitehorse Rapids Chinook salmon fry was low (Vano, personal communication). A summary of releases of Chinook salmon into the Upper Yukon River from instream incubation and rearing sites is presented in JTC 2007.

In August 2006, brood stock collection for the 2006 egg take began after 78 Chinook salmon had migrated through the Whitehorse Rapids Fishway. Brood stock was collected from August 10 to August 27. An attempt was made to collect 2 males for each female to allow matrix spawning. Matrix spawning has been used for 18 years in an attempt to maintain genetic diversity.

A total of 32 males were retained and used for the brood stock program; 10 of these fish had adipose clips (hatchery origin) and 22 had intact adipose fins (wild). An additional 37 hatchery males were collected from, and later returned to the fishway, for a total male brood stock of 69 fish. In total, 7.6% of the total male return of 901 through the fishway was used for the brood stock program.

A total of 34 females were used for brood stock including: 9 adipose-clipped (hatchery origin) fish; 19 fish which had intact adipose fins (wild fish). An additional 6 females (5 hatchery and 1 wild) were collected after they failed to migrate through the fishway. In total, 4.2% of the total female return of 819 through the fishway was used for the brood stock program. Egg takes began on August 15 and were completed on August 29. An estimated 189,764 green eggs were collected from the 34 females. Average fecundity was estimated at 5,581 eggs/female and the fertilization rate was estimated to be 99%. Shocking and taking of the second inventory of the eggs began on October 4 and was completed by October 14.

The eggs began to hatch on November 7 and hatching was completed by November 29, 2006 at an average accumulated thermal unit (ATU) value of 545. An estimate of the number of alevins as of January 15, 2007 was 161,843. Approximately 160,000 fry were ponded in late January to early February 2007.

Fishing Branch River Fall Chum Salmon Weir

Fall chum salmon returns to the Fishing Branch River have been assessed since 1971 when an aerial survey count of 115,000 was adjusted to a total estimated return of ~250,000 to 300,000 fish. A weir established to enumerate fall chum salmon escapement to the Fishing Branch River has operated during the following periods: 1972 to 1975; 1985–1989; and, annually since 1991 when Fisheries and Oceans, Canada and the Vuntut Gwitchin Government (Vuntut Gwitchin First Nation) conducted the weir program cooperatively. Escapement estimates for the Fishing Branch River, including aerial expansions for years lacking complete weir counts, have ranged from approximately 5,100 chum salmon in 2000, to 353,300 chum salmon in 1975 (Appendix B13).

In 2006, the weir was in operation from September 2 to October 14, during which time a total of 21,942 chum salmon was counted. However, this was considered to be an incomplete count as a small portion of the run was known to have arrived prior to the installation of the weir and it was likely that many fish were not counted when the weir was breached for a protracted time period later in the run (September 24–October 2). Using the recent 10-year average timing data, the

weir count was expanded by 1,509 fish to account for the fish missed early in the season. In addition, the weir count was adjusted by an additional 7,173 fish for a period of approximately 11 days during high water conditions using a linear relationship between the closest days having complete counts. These adjustments and some additional minor adjustments resulted in a final 2006 estimate of 30,849 fall chum salmon.

The peak daily count (1,848 chum salmon) occurred on September 17 and the midpoint of the run occurred on September 18. The expanded 2006 count (30,849) was 90.2% of the recent 10-year average of 34,220 chum salmon, but exceeded the escapement target of 28,000 chum salmon established for 2006.

Generally, a low number of coho salmon are observed at the weir each year. However, the weir was not in operation long enough to obtain quantitative information on coho salmon escapement. No coho salmon were counted during operation in 2006.

Porcupine River Fall Chum Salmon Mark–Recapture Program

A mark–recapture program, funded by the Yukon Panel's Restoration and Enhancement Fund, was conducted on the Porcupine River near the community of Old Crow, Yukon, in 2006 by the VGG and a consulting firm, Environmental Dynamics Incorporated (EDI). The purpose of this project was to continue the development of an inseason fall chum salmon management tool for the community of Old Crow and DFO fishery managers. It was hoped that inseason information from this program and the Fishing Branch River weir could be used to determine inseason harvest opportunities and promote conservation of the Fishing Branch chum salmon returns.

In 2006, 1,615 chum salmon were captured by gillnet, tagged, and released downstream of the community of Old Crow. A total of 578 chum salmon were caught in a test fishery of which 58 fish[6] were observed with tags. Weekly mark–recapture estimates were developed throughout this program as well as a total estimate of 15,858 (95% CI 12,115 to 19,600) (Table 3).

Table 3.–Estimation of the number of fall chum salmon at Old Crow, Yukon Territory, derived from a mark–recapture program.

Week	# Tagged	# Test	Tags Recovered	Chapman's Estimate	Var (Nc)	95% CI	95% Run Est (-)	95% Run Est (+)
1	5	0	0	5	0	0	5	5
2	143	14	0	2,159	2,162,160	2,889	-730	5,048
3	71	112	1	4,067	5,268,060	4,510	-443	8,577
4	320	73	9	2,374	429,818	1,288	1,086	3,663
5	357	103	10	3,384	827,489	1,787	1,596	5,171
6	501	206	31	3,246	252,928	988	2,258	4,235
7	218	70	7	1,943	358,842	1,177	766	3,120
Week 4-7 Total	1,396	452	57	10,910	1,686,414	2,552	8,358	13,462
Project Total	1,615	578	58	15,858	3,627,076	3,742	12,115	19,600

Note: These estimates include only the test fishery catch and tag recovery data. Weeks 4 through 7 were the only weeks during the project with sufficient number of recoveries to enable a mark-recapture program estimate.

[6] The spaghetti tag numbers of all tagged fish observed in the test fishery were recorded and all test fish were released including those with tags. The aboriginal catch (and associated tags) were retained.

One limitation of this program was the relatively low number of tag recoveries (n=58) observed in the test fishery catch. Since additional catch and tag recovery information was available from the aboriginal fishery centered in close proximity to the community of Old Crow, catch and tag recovery information from this fishery was added to the existing data and a second population estimate was calculated (Table 4). The combined data included an examined catch of 3,556 (578 test fishery catch and 2,978 aboriginal fishery catch) and 127 associated tag recoveries. The total estimate using the combined fishery data was 44,906 (95% CI 37,586 to 52,226) (Table 4).

Table 4.–Estimation of the number of fall chum salmon at Old Crow, Yukon Territory, derived from a mark–recapture program.

Week	# Tagged	# Test	Tags recovered	Chapman's Estimate	Var (Nc)	95% CI	95% Run Est (-)	95% Run Est (+)
1	5	0	0	0	0	2	0	0
2	143	14	0	0	2,162,160	2,889	-2,889	2,889
3	71	112	1	4,067	5,268,060	4,510	-443	8,577
4	320	986	38	8,123	1,382,164	2,319	5,804	10,441
5	357	748	17	14,896	10,825,863	6,465	8,430	21,361
6	501	317	33	4,694	524,408	1,423	3,271	6,117
7	218	70	7	1,943	358,842	1,177	766	3,120
Wk. 4-7 Total	1,396	2,121	95	30,879	8,740,662	5,809	25,069	36,688
Project Total	1,615	3,556	127	44,906	13,876,693	7,320	37,586	52,226

Note: These estimates include test fishery and VGG aboriginal fishery catch and tag recovery data.

The preceding estimates attempt to quantify all populations of fall chum salmon within the Porcupine River upstream of Old Crow. Based on the tag recovery information presented, there potentially were 1,488 tags at large; however, additional tag recoveries were likely recorded in the Old Crow aboriginal fishery catch, which were not combined with the test fishery data. The aboriginal fishery catch that was combined with the mark–recapture estimate (2,978) was 57.7% of the total recorded aboriginal catch of 5,179 fall chum salmon.

A total of 326 tags was observed and/or recovered during the operation of the Fishing Branch weir in 2006; this total represents only 21.9% of the tags, which potentially moved upstream of Old Crow. The proportion of tags observed at the weir is much lower than in previous years; this may be the result of high water levels as well as the recovery of additional tags in the Old Crow aboriginal fishery, as mentioned above[7]. Tagged fish were likely not readily detected during turbid water associated with high water conditions and some likely moved through undetected during the protracted period when the weir was breached. The Fishing Branch weir count through October 14, including adjustments to account for days when the weir was not in operation, was 30,849 chum salmon. The 2006 tagging program also encountered operation problems associated with high water for much of the season. The high water limited the locations available to conduct both the mark and recapture activities effectively and resulted in nets that were littered with debris.

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

Stock identification of the 2006 Chinook and fall chum salmon migration past the DFO fish wheel program at Bio Island, near the Yukon-Alaska border, was conducted through analysis of

[7] Additional tag recoveries will be available when the Old Crow catch data is finalized.

microsatellite variation. Variation at 13 microsatellite loci was surveyed for 747 Chinook salmon and variation at 14 microsatellite loci was surveyed for 728 fall chum salmon; samples were collected from the fish wheel program. The seasonal sample[8] for each species was structured in a manner that migrating salmon were sampled in proportion to run abundance on a weekly basis.

For fall chum salmon, 54.9% were estimated to have been from the regional reporting group, which spawns within the White River drainage and 41.0% were from the reporting group, which includes a number of mainstem Yukon River spawning populations (Table 5). The 2 remaining reporting groups contributing to the run were the Teslin River (3.1%) and the Yukon early group, which is represented by the Chandindu River population (1.0%).

Table 5.–Estimated percentage stock composition of fall chum salmon migrating past the fish wheel tagging program at Bio Island, 2006.

Stat Week	30-34		35		36		37		38		39		40		30-40	
Date	Aug 6-26		Aug 27-Sept 2		Sept 3-9		Sept 10-16		Sept 17-23		Sept 24-30		Oct 1-7		All	
Sample Size	16		25		63		120		267		175		62		728	
Region		SD		SD		SD		SD		SD		SD		SD		SD
Yukon Early	28.1	(10.8)	0.2	(1.7)	0.6	(1.6)	0.1	(0.6)	0.1	(0.3)	0.0	(0.2)	0.1	(0.9)	1.0	(0.5)
Canadian Mainstem	29.1	(11.7)	26.6	(9.3)	35.4	(6.4)	32.2	(4.7)	44.6	(3.4)	44.6	(4.3)	44.5	(7.5)	41.0	(2.0)
White	42.7	(11.7)	72.9	(9.3)	63.9	(6.4)	66.8	(4.6)	50.7	(3.2)	51.0	(4.0)	49.0	(6.6)	54.9	(1.9)
Teslin	0.1	(2.2)	0.2	(1.8)	0.0	(0.6)	0.9	(1.3)	4.5	(1.6)	4.5	(2.2)	6.5	(4.4)	3.1	(0.9)

Note: Stock compositions were estimated using 13 microsatellite loci and the baseline outlined in Table 7. Standard deviations of the estimates are in parentheses.

For Chinook salmon, the 8 regional reporting groups contributing to the run were Carmacks area tributaries (Big Salmon River, Little Salmon River, Tatchun Creek), (33.0%), Stewart River (13.4%), Teslin River (13.0%), Pelly River (12.4%), North Yukon Mainstem Tributaries (10.3%), Mid-mainstem Tributaries (10.2%), Upper Yukon tributaries (6.0%) and White River (1.7%) (Table 6).

Table 6.–Estimated percentage stock composition of Chinook salmon migrating past the fish wheel tagging program at Bio Island, 2006.

Stat Week	27-28		29		30		31		32-38		27-38	
Date	July 2-15		July 16-22		July 23-29		July 30-Aug 5		Aug 6-12		All	
Sample Size	49		103		215		231		149		747	
Region		SD		SD		SD		SD		SD		SD
North Yukon Tribs.	43.5	(7.2)	25.3	(4.7)	9.9	(2.9)	6.9	(3.3)	1.3	(3.0)	10.3	(1.7)
Mid-mainstem Tribs.	0.4	(1.8)	1.2	(1.7)	4.1	(3.1)	16.7	(4.3)	20.7	(6.8)	10.2	(2.0)
Carmacks Area Tribs.	6.1	(5.1)	1.9	(3.2)	32.4	(4.7)	40.5	(4.7)	52.0	(7.2)	33.0	(2.9)
White River	0.0	(0.4)	1.5	(2.0)	3.3	(1.5)	1.3	(1.0)	0.0	(0.2)	1.7	(0.6)
Stewart River	16.4	(7.5)	19.4	(7.0)	15.6	(4.0)	6.5	(3.8)	9.1	(3.8)	13.4	(2.2)
Pelly River	18.0	(7.3)	24.0	(6.4)	15.6	(3.5)	3.5	(1.7)	7.2	(3.4)	12.4	(1.9)
Upper Yukon Tribs.	0.1	(1.0)	1.0	(1.2)	6.5	(1.9)	12.0	(2.6)	4.3	(2.2)	6.0	(1.0)
Teslin River	15.5	(5.8)	25.7	(6.6)	12.7	(4.2)	12.5	(3.5)	5.4	(3.3)	13.0	(1.9)

Note: Stock compositions were estimated using 14 microsatellite loci and the baseline outlined in Table 8. Standard deviations of the estimates are in parentheses.

[8] Adipose punch samples collected from all Chinook and fall chum salmon caught at the DFO fish wheel tagging program were grouped by statistical week; sub-samples of the weekly samples were then structured and analyzed proportional to the estimated run abundance of each species.

The populations and regional reporting groups for fall chum and Chinook salmon are outlined in Tables 7 and 8, respectively.

Table 7.–Baseline used to estimate stock compositions of fall chum salmon from the fish wheel tagging program at Bio Island, 2006.

Region	Populations
Yukon Early	Chandindu River
White River	Kluane River, Donjek River
Mainstem Yukon River	Mainstem Yukon River at Pelly River, Tatchun Creek, Big Creek, Minto
Teslin River	Teslin River

Table 8.–Baseline used to estimate stock compositions of Chinook salmon from the fish wheel tagging program at Bio Island, 2006.

Region	Populations
North Yukon Tributaries	Chandindu River, Klondike River
White River	Tincup Creek
Stewart River	Mayo River, Stewart Rivers
Pelly River	Big Kalzas, Little Kalzas, Earn, Pelly River, Glenlyon River, Blind Creek
Mid-mainstem Tributaries	Mainstem Yukon River, Nordenskiold River
Carmacks Area Tributaries	Little Salmon River, Big Salmon River, Tatchun Creek
Upper Yukon Tributaries	Wolf Creek, Michie Creek, Whitehorse Hatchery, Takhini River

YUKON RIVER SALMON RUN OUTLOOKS 2007

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 2006 was below average, whereas 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.

Spawning ground escapements in 2001 were above average throughout the drainage, while 2002 escapements were above average in Canada, but generally below average in Alaska. The BASIS (Bering-Aleutian Salmon International Survey) study has observed significant increases in juvenile Chinook salmon in the Bering Sea. Further, Bering Sea trawl bycatch has observed increases in adult Chinook salmon. Although not all of these fish are bound for Western Alaska, higher bycatch may be an indicator of favorable ocean conditions and Chinook salmon ocean survival may have increased significantly. Assuming an approximately normal return of 5-year-old and 6-year-old fish, the 2007 run is expected to be average to below average and similar to the 2006 run. It is anticipated that the run will provide for escapements, support a normal subsistence harvest, and a below average commercial harvest. Fishery management will be based on 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

The strength of the summer chum salmon runs in 2007 will be dependent on production from the 2003 (age-4 fish) and 2002 (age-5-fish) escapements. Though the 2001 run of summer chum salmon was one of the poorest on record and none of the escapement goals were met, the return resulted in the near record run observed in 2006. Summer chum salmon runs have exhibited steady improvements since 2001 with harvestable surpluses in each of the last 5 years (2002–2006). However, it appears that production has shifted from spawning tributaries in the lower portion of the drainage, such as the Andreafsky and Anvik Rivers over the last 5 years, to higher production in spawning tributaries upstream of the Anvik River, such as the Gisasa and Salcha Rivers. Weak returns for chum salmon from 1998 through 2001 were attributed to reduced productivity and not the result of low levels of parent year escapements as 1995 was one of the highest escapements on record. In 2006, a large number of 5-year-old summer chum salmon returns were observed throughout the AYK Region.

The BASIS study has observed significant increases in juvenile chum in the Bering Sea. Further, Bering Sea trawl bycatch has observed increases in adult chum. Although not all of these fish are bound for Western Alaska, higher bycatch may be an indicator of favorable ocean conditions and chum ocean survival may have increased significantly.

The 2007 run is anticipated to be near average and provide for escapements and support a normal subsistence and commercial harvest. If inseason indicators of run strength suggest sufficient abundance exists to allow for a commercial fishery, the commercial harvest surplus in Alaska could range from 500,000 to 900,000 summer chum salmon. The actual commercial harvest of summer chum salmon in 2007 will likely be dependent on market conditions for chum salmon and not the amount of surplus available for commercial uses.

Fall Chum Salmon

Yukon River drainagewide estimated escapements of fall chum salmon for the period 1974 through 2002 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 2,900,000 (2001 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 (1974–2000).

A considerable amount of uncertainty has been associated with these run projections because of unexpected run failures (1997 to 2002) which were followed by a strong improvement in productivity from 2003 through 2006. Weakness in salmon runs prior to 2003 have 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 (Table 9). 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. Methods used to provide a range around the point estimate in 2006 and 2007 are described below.

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 2007 run will be comprised of parent years 2001 to 2004 (Table 10). Estimates of return per spawner based on brood year return were used to estimate production for 2001 and 2002 and an auto-regressive Ricker spawner-recruit model was used to predict returns from 2003 and 2004. The point estimate utilizes 1974 to 1983 even/odd maturity schedules to represent years of higher production. The 2007 projected point estimate is 1.0 million fall chum salmon with the following approximate age composition given in Table 10.

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 2006. Therefore, the 2007 run size projection is expressed as a range from 900,000 to 1.2 million fall chum salmon.

Escapements for the 2001 and 2002 parent years, that will contribute age-6 and age-5 fish respectively in the 2007 run, were below the midpoint of the drainagewide escapement goal of 300,000 to 600,000 fall chum salmon. The 2003 escapements were above the upper end of the drainagewide escapement goal range. The major contributor to the 2007 fall chum salmon run is anticipated to be age-4 fish returning from the 2003 parent year. Based on a combination of high production and a fair showing of age-3 fish returning last season there was optimism for an above average return of age-4 fish in the 2007 run. Age-3 fish are typically a small portion of the return but a projection of 6% is higher than average for an odd-numbered year (Appendix A34).

Table 9.–Preseason drainagewide fall chum salmon outlooks and observed run sizes for the Yukon River, 1998–2006.

Year	Expected Run Size (Preseason)	Estimated Run Size (Postseason)	Proportion of Expected Run
1998	880,000	334,000	0.38
1999	1,197,000	420,000	0.35
2000	1,137,000	239,000	0.21
2001	962,000	382,000	0.40
2002	646,000	425,000	0.66
2003	647,000	775,000	1.20
2004	672,000	614,000	0.91
2005	776,000	2,163,000	2.79
2006	1,211,000	1,141,000	0.94
Average	(1998 to 2006)		0.87

Table 10.–Projected return of fall chum salmon based on parent year escapement for each brood year and predicted return per spawner (R/S) rates, Yukon River, 2001–2004.

Brood Year	Escapement	Estimated production (R/S)	Estimated Production	Contribution based on age	Current Return
2001	337,765	8.46	2,857,492	0.8%	8,987
2002	397,977	1.34	533,289	11.1%	119,364
2003	695,363	1.64	1,140,395	82.1%	881,908
2004	537,873	1.72	925,142	5.9%	63,881
Total expected run (unadjusted)					1,074,139
Total expressed as a range based on the forecasted vs. observed returns from 1987 to 2006 (80% CI):					900,000 to 1.2 million

The 2001 brood year produced exceptionally well with a return of nearly 3 million fish including record contributions in nearly all age classes. Return of age-4 fish from odd-numbered brood years during the time period 1974 to 2000 typically average 720,000 chum salmon, and ranges from a low of 175,000 for brood year 1988 to a high of 2 million for brood year 2001. Based on the high production years from 1974 to 1983, the return of odd-numbered brood years averages 979,000 chum salmon. Return of age-5 fish from odd-numbered brood years during the time period 1974 to 2000 typically averages 212,000 chum salmon, and ranges from a low of 57,000 for brood year 1998 to a high of 674,000 for brood year 2001. The estimated 2002 brood year return appears to be near average for an even-numbered year and the 2003 brood year contributed a slightly less than average return of age-3 fish in 2006.

If the 2007 run size is near the projected range of 900,000 to 1.2 million, it will be well above the upper end of the BEG range of 600,000 fall chum salmon. A run of this projected size should support normal subsistence fishing activities and should provide opportunity for commercial ventures where markets exist. The strength of the run will be monitored in season to determine appropriate management actions and levels of harvest based on stipulations in the Alaska Yukon River Drainage Fall Chum Salmon Management Plan.

Coho Salmon

Although there is little comprehensive escapement information on Yukon River drainage coho salmon, 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 2007 coho salmon run will be the age-4 fish returning from the 2003 parent year. Based on Pilot Station sonar operations from 1995, and 1997 through 2006, the 2003 passage estimate of 269,000 coho salmon was the highest on record. The Delta Clearwater River (DCR) is the major producer of coho salmon in the upper Tanana River drainage, and the parent year escapement of 102,000 fish was 6 times the upper end of the SEG range of 5,200 to 17,000 coho salmon. Although 2003 was the peak escapement count, DCR abundance has been on the increase since 1972, in particular within the last decade. Evaluations of coho salmon escapements in the Andreafsky, Nenana, and Richardson Clearwater rivers also indicated the run was average to above average. Assuming average survival, the 2007 coho salmon run, is anticipated to be average to above average based on good escapements in 2003.

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

CANADA

Canadian-Origin Upper Yukon Chinook Salmon

The total run size of the Canadian-origin Upper Yukon River Chinook salmon in 2007 is expected to be approximately 93,700 fish, which constitutes an average run. This outlook is based on the average of a stock/recruitment (S/R) outlook and a sibling outlook. The outlook derived from the S/R model developed from the 1982 to 2000 brood years is 74,500 fish, while the outlook from the sibling relationship is 112,900 fish.

Three of the four primary brood year escapements that will contribute to the 2007 run exceeded the interim rebuilding goal of 28,000 Chinook salmon (Appendix A35) and achieved or exceeded the escapement goal range of 33,000 to 43,000 Chinook salmon for rebuild stocks. These included estimated escapements of 42,438 Chinook salmon in 2001; 40,145 in 2002; and 47,486 in 2003. The weighted average (by age) brood escapement that will contribute to the 2007 Upper Yukon Chinook salmon run derived from the 2000 to 2003 brood years is 39,400 fish[9].

The 2007 run outlook, estimated using the S/R model, involved calculating the total expected return from each brood year escapement and then apportioning the returns by a 10-year average age composition. The estimated production from each brood year was then summed to produce the estimated run size of 74,500 for 2007. The S/R relationship projects very high return per spawner values for low escapement years and much lower returns per spawner for high escapement years. The estimated return/spawner for each of the principal brood years is as follows: 8.7 for 2000; 1.7 for 2001; 1.9 for 2002; and 1.3 for 2003. Over the 1995–2006 period, the average age composition of brood year returns is as follows: 0.02% age-3, 3.1% age-4, 27.5% age-5, 61.1% age-6, 8.4% age-7, and 0.01% age-8.

The 2007 run outlook that was based on a sibling methodology involved preliminary analyses of the return in 1 year and the return from the same brood year the next year to determine which relationships were significant. The data used in the analyses involved the 1979 to 2000 brood year returns. The relationship between the return of 5-year old fish and the estimated return the following year of 6-year old fish was highly significant. The return of 4-year-old fish and the estimated return the following year of 5-year old fish were significant. Usually 5-year old and 6-year old Chinook salmon account for ~90% of total Canadian run. The 2007 sibling outlook involved a combined estimated return of ~101,600 age-5 and 6-year old Chinook salmon, which was then expanded to ~112,900 to account for the other age classes.

As in previous years, the outlook relies largely on spawning escapement estimates derived from mark–recapture data. Information from the Eagle sonar program in 2005 and 2006 suggests that this data may be biased low. However, additional years of overlap between sonar and mark–recapture are required before conclusions can be drawn about the consistency, magnitude and overall nature of the potential bias. The S/R and sibling relationships do not capture the uncertainty associated with rapid changes in marine and/or freshwater survival. An additional consideration for spawner-recruitment relationships is that they are usually developed from

[9] The brood year escapements from 2000 to 2003 represent 99.8% of the brood year escapement used to determine the base level escapement. The 2000 spawning escapement (11,344), which will contribute to the age-7 age component of the 2007 run, was lower than the lower lend of the target range. However, for a rebuilt run, base level escapement calculations using different brood year escapements expanded for other age classes exceed the lower end of the target range for rebuilt stocks. For example, the base level escapement derived using the age-4 to age-7 components, age-5 to age 7 components, and age-5 and age-6 components is 39,400, 39,100, and 41,700, respectively.

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. The performance of run outlooks, developed from S/R models for the 1998 to 2006 period, are shown in Table 11.

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 that the low returns observed resulted from poor marine survival.

Table 11.–Preseason Upper Yukon Chinook salmon outlooks and observed run sizes for the 1998–2006 period.

Year	Expected Run Size (Preseason)	Observed Run Size (Postseason)	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	86,900	0.81
2006	93,000	89,400	0.96
Average (1998 to 2006)			0.85

Canadian-Origin Upper Yukon Fall Chum Salmon

The outlook for the 2007 Upper Yukon fall chum salmon run is a below average to average run of 94,600 to 147,600 fish. For odd-years returns, on average, 69% of Upper Yukon adult fall chum salmon return as age-4 and 29% return as age-5. These percentages suggest the major portion of the 2007 fall chum salmon run will originate from the 2002 and 2003 brood years. The estimated escapements for these years were 98,695 and 142,683, respectively; both years exceeded the escapement goal for rebuilt Upper Yukon fall chum salmon of >80,000 fish (Appendix A35). The weighted average (by age) brood escapement that will contribute to the 2007 Upper Yukon fall chum salmon run is 127,700 fish.

Prior to 2002, preseason outlooks for Upper Yukon fall 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/US Upper Yukon fall chum salmon rebuilding model. This return rate is similar to the 1982–2000 average of 2.4, but is lower than the 1982–2001 average rate of 3.2 R/S; the rate increases when 2001 data is included due to the exceptional fall chum salmon run of 2005. There was very low survival for the 1994 to 1998 brood years; the R/S values calculated for 4 of the 5 years within this period was equal to, or below, the replacement value, i.e., R/S=1.0; the estimated R/S for brood years 1994 to 1998 were 0.8, 0.7, 0.3, 1.0 and 1.6, respectively. The R/S for the brood years within the 1999–2001 period were 4.0, 2.4 and 19.3, respectively; the R/S value for brood year 2001 was an unprecedented high.

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 US catches. Although insufficient stock identification data was available for accurately estimating the annual US catch of Upper Yukon fall chum salmon, estimates have usually[10] been made with the following assumptions:

1) Thirty percent of the total U.S. catch of fall chum salmon is composed of Canadian-origin fish;

2) The U.S. catch of Canadian-origin Upper Yukon and Canadian-origin Porcupine River fall chum salmon is proportional to the ratio of their respective border escapements; and

3) The Porcupine River border escapement consists of the Old Crow aboriginal fishery catch plus the Fishing Branch River weir count.

All of these assumptions require additional evaluation as some recent Porcupine River mark–recapture data are available and advances in genetic stock ID (DNA) should permit more accurate estimates of the proportion of Canadian fall chum salmon run, which is harvested in U.S. fisheries.

The 2007 Upper Yukon fall chum salmon outlook was developed by estimating the total production for the 2001–2004 brood years. These brood years will produce the 3- to 6-year-old fish returning in 2007. Each brood year has a calculated R/S rate, which is dependent upon the escapement level. The expected production in 2007 was further estimated by assuming each brood year would produce an average age composition for odd year returns, i.e., 1.2% age-3, 68.9% age-4, 28.7% age-5, and 1.2% age-6. For example, the estimated R/S for the brood escapement of 98,695 in 2002 is 1.26. The total production from the 2002 escapement is therefore expected to be ~124,300 fish. If 28.7% of this production returns at age-5, it is expected that ~35,700 fish from the 2002 escapement will contribute to the 2007 run. Summing the estimated production from the 2001 to 2004 brood year escapements produces a total expected run size of 94,600 in 2007. This outlook is lower than expected given the magnitude of the brood year escapements and the trend observed over the 2003–2006 period, during which the estimated run sizes consistently exceeded preseason outlooks. An upper outlook of 147,600 was therefore developed by expanding the 94,600 outlook by 1.56, the average preseason outlook / postseason estimate for the 2003–2006 period (excluding 2005). The outlook range is therefore a below average to average run of 94,600 to 147,600. A summary of preseason outlooks, postseason run size estimates and proportion of the expected run size observed for the 1998 to 2006 period is presented in Table 12.

The 1998 to 2002 Canadian-origin Upper Yukon fall chum runs consistently failed to meet the preseason outlooks and it appears that the assumed adult production of 2.5 R/S was too high for these years. However, the estimated run sizes have shown improvement since 2003 and exceptional survival of the 2001 brood year appears to have bolstered both the 2005 and 2006 returns.

[10] Recent tagging information has been incorporated into the Porcupine run reconstruction and there has been minor deviation from the assumption that 30% of the total U.S. catch of fall chum salmon is composed of Canadian-origin fish.

Table 12.–Preseason Upper Yukon fall chum salmon outlooks and observed run sizes for the 1998–2006 period.

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	179,800	1.18
2004	146,500	181,300	1.24
2005	126,000	515,200	4.09
2006	126,000	284,200	2.26
Average	(1998 to 2006)		1.17

Canadian-Origin Porcupine River Fall Chum Salmon

Serious conservation concerns for the Fishing Branch River fall chum salmon arose in the late 1990's and were heightened in 2000 when the count through the Fishing Branch weir was only 5,053 fish, the lowest on record. However, some improvements have been observed since that time with counts ranging from 13,563 in 2002 to 121,413 in 2005.

The 2007 fall chum salmon run to Canadian portions of the Porcupine River drainage should originate primarily from the 2002 and 2003 escapements. The Fishing Branch River weir counts for these years were 13,563 and 29,519 fall chum salmon, respectively. These counts were 49.6% and 86.3% of the 1996–2005 average of 34,220 fish. The 2002 and 2003 counts both fell below the lower end of the Fishing Branch River escapement goal range for a rebuilt stock of 50,000 to 120,000 (Appendix A35) fall chum salmon. The weighted average (by age) base year escapement for the 2007 Fishing Branch River fall chum run is 25,500[11].

Assuming a return/spawner value of 2.5, and using the average 10-year (odd year) age at maturity for Fishing Branch fall chum salmon of 72.8.% age-4 and 24.9% age-5 fish, as indicated in the Table 13, an above average return of 63,600 fall chum salmon is expected in 2007 (Table 13).

[11] The base level escapements from 2002 and 2003 represented 24.9% and 72.8% of the weighted average, respectively for odd year returns; the base level escapement derived from these years was then adjusted for the small proportion of age classes from other years.

Table 13.–Outlook for the 2007 Fishing Branch River fall chum salmon run developed using brood year escapement data, a return/spawner value of 2.5 and an average age composition.

Brood Year	Escapement	Estimated Production @ 2.5 (R/S)	Contribution based on age	Expected 2007 Run
2002	13,563	33,908	24.9%	8,443
2003	29,519	73,798	72.8%	53,725
Sub-total				62,168
Total expected run (expanded for other age classes and rounded)				63,600

The 2007 outlook is the estimated number of fish entering the mouth of the Yukon River and this number will be decreased by US and Canadian fisheries prior to the fish being counted at the Fishing Branch weir. It has been difficult to accurately estimate the US harvest rate (and catch) of Porcupine stocks, although DNA analyses may improve this situation in the near future. Nevertheless, the 2007 Fishing Branch River fall chum salmon run may be sufficiently strong to exceed the 1996–2005 average weir escapement of 34,220 chum salmon. As was observed with the Upper Yukon fall chum salmon stocks, the postseason estimates of the estimated Porcupine fall chum salmon run sizes were consistently below preseason outlooks throughout the 1998 to 2002 period; however, the postseason estimates have been close to, or higher than, preseason outlooks since 2003, with the exception of 2006, as is presented in Table 14.

Table 14.–Preseason Porcupine River fall chum salmon outlooks and observed run sizes for the 1998–2006 period.

Year	Expected Run Size (Preseason)	Estimated Run Size (Post season)	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
2006	53,500	48,200	0.90
Average - 1998 to 2006			1.02

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

After reviewing the 2005 Chinook escapement target of 28,000 and the similar return expected for 2006, the JTC noticed insufficient differences in the 2006 outlook to justify changing the escapement target and therefore recommended it remain at 28,000 fish for 2006 (JTC 2006a). During the spring 2006 meeting, the Panel recommended to forego the 33,000-44,000 Chinook salmon Canadian mainstem escapement objective and agreed to a spawning escapement target of 28,000 Chinook salmon. The Panel agreed to a fall chum salmon Canadian Yukon River Mainstem spawning escapement objective of greater than 80,000 fish, and an interim spawning escapement goal of 28,000 chum salmon into the Fishing Branch River. Management plans were laid out to rebuild the Fishing 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.

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 (5AAC 39.222) and Policy for Statewide Salmon Escapement Goals (5AAC 39.223) adopted in 2001. Under these policies ADF&G sets either a BEG or a SEG (ADF&G 2004; Brannian et al. 2006). Biological escapement goal (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 ADF&G 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.

In preparation for the January 2007 BOF meeting, ADF&G again reviewed escapement goals. Formal meetings, open to agencies and the public, were held in April and November of 2005. Draft analyses were widely distributed for review and comment starting in January 2006 and a public review draft of recommendations for changes was distributed in March 2006. A final document summarizing the escapement goal review was submitted to the BOF on April 10, 2006. No changes were recommended for Yukon River escapement goals in 2007.

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[12]. In the case of Nulato River, the goals for the 2 forks were combined into a single goal (Table 15). The escapement goal team recommended no changes to these escapement goals for 2007 and anticipates none will be adopted by the BOF.

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

Table 15.–Yukon River escapement goals set for Chinook salmon in 2005 were continued in 2006 and will be in effect for 2007.

Chinook Salmon Stock	Previous Goal (Type) Year Established	Goal Adopted in 2005 (Type)	Goal Adopted in 2007
E. Fork Andreafsky River	>1,500 (EO[a]) 1992	960–1,700 (SEG)	No Change
W. Fork Andreafsky River	>1,400 (EO[a]) 1992	640–1,600 (SEG)	No Change
Anvik River	>1,300 (EO[a]) 1992	1,100–1,700 (SEG)	No Change
Gisasa River	>600 (EO[a]) 1992	420–1,100 (SEG)	No Change
Nulato N. and S. combined	None	940–1,900 (SEG)	No Change
Chena River	2,800–5,700 (BEG) 2001	No Change	No Change
Salcha River	3,300–6,500 (BEG) 2001	No Change	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 Pacific Scientific Advice Review Committee (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 SEG. Available information on the return per spawner information for Yukon River Chinook salmon is presented in Appendix A27 and Figure 15.

SUMMER CHUM SALMON

In 2005, 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 to a range of 350,000 to 700,000 as measured by the Anvik River sonar (Table 16). The escapement goal team recommended no changes to these escapement goals for 2007 and anticipates none will be adopted by the BOF.

Table 16.–Yukon River escapement goals set for summer chum salmon in 2005 were continued in 2006 and will be in effect for 2007.

Summer Chum Salmon Stock	Previous Goal and Year Established	Goal Adopted in 2005 (Type)	Goal Adopted in 2007 (Type)
E. Fork Andreafsky R.	65,000–130,000 (BEG) 2001	No Change (weir)	No Change (weir)
E. Fork Andreafsky R.	35,000–70,000 (BEG) 2001	Discontinued (aerial)[a]	No Change (aerial)[a]
W. Fork Andreafsky R.	65,000–130,000 (BEG) 2001	Discontinued (aerial)[a]	No Change (aerial)[a]
W. Fork Andreafsky R.	35,000–70,000 (BEG) 2001	Discontinued (aerial)[a]	No Change (aerial)[a]
Anvik R.	400,000–800,000 (BEG) 2001	350,000–700,000 (sonar)	No Change (sonar)

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

FALL CHUM SALMON

Analyses for all biological escapement goals for Alaskan fall chum salmon stocks were updated in 2005 using the most recent data and no change was recommended for any of the goals (Table 17). The escapement goal team recommended no changes to these escapement goals for 2007 and anticipates none will be adopted by the BOF. There are no fall chum salmon BEGs for Canadian origin stocks to the upper Yukon River mainstem and Porcupine Rivers. Goals developed by ADF&G in 2001 were not accepted by PSARC in 2002 because of concerns for data quality.

Table 17.–Yukon River escapement goals set for fall chum salmon in 2005 were continued in 2006 and will be in effect for 2007.

Fall Chum Salmon Stock	Previous Goal (Type) Year Established	Goal Adopted in 2005	Goal Adopted in 2007
Yukon Drainage	300,000–600,000 (BEG) 2001	No Change	No Change
Tanana River	61,000–136,000 (BEG) 2001	No Change	No Change
Delta River	6,000–13,000 (BEG) 2001	No Change	No Change
Toklat River	15,000–33,000 (BEG) 2001	No Change	No Change
Upper Yukon tributaries	152,000–312,000 (BEG) 2001	No Change	No Change
Chandalar River	74,000–152,000 (BEG) 2001	No Change	No Change
Sheenjek River	50,000–104,000 (BEG) 2001	No Change	No Change

COHO SALMON

For coho salmon in 2005, the Delta Clearwater River boat survey goal was revised from >9,000 to a sustainable escapement goal range of 5,200–17,000 using the Bue and Hasbrouck (*Unpublished*) method. The escapement goal team recommended no change to this escapement goal for 2007 and anticipates none will be adopted by the BOF.

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 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 mothership 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").

The South Unimak and Shumagin Islands June fisheries occur along the south side of the Alaska Peninsula and from 1975 through 2000 they were managed based on forecasted Bristol Bay sockeye salmon inshore harvests. These fisheries also harvest chum salmon, which are destined for a wide range of locations. Consequently, the BOF placed a chum salmon harvest cap on both South Alaska Peninsula June fisheries to protect AYK Region chum salmon stocks in 1986 and from 1986 through 2000. In 2001, the BOF designated several AYK chum stocks plus Kvichak River sockeye salmon as stocks of concern. From 2001 to 2003, the South Peninsula June fisheries were limited to no more than 9 fishing days for seine and drift gillnet gear but with no harvest limits for sockeye and chum salmon. Beginning in the 2004 fishing season, many of the restrictions in place from 2001 to 2003 were replaced by a set fishing schedule, allowing more fishing time and with no harvest limits or caps, which is currently still in effect. Sockeye salmon harvests from 2004 through 2006 averaged 1,094,920 fish (Appendix A36). This average total harvest was lower than the 1975–2000 average, but above the 2001–2003 average. Chum salmon harvests from 2004 through 2006 for the South Unimak and Shumagin Islands June fisheries average 123,480 and 279,842, respectively. The average chum salmon harvest was below the 1975–2000 average total harvest, and above the 2001–2003 average.

A small portion of Yukon River bound Chinook and chum salmon are known to be intercepted in the eastern Norton Sound coastal fisheries (Gaudet and Schaefer 1982). Chinook salmon runs have been weak to the Eastern Norton Sound since 1998. The Chinook commercial harvest was 12 fish and the subsistence harvest was 2,539 fish in 2006. The subsistence harvest includes fish taken in the Unalakleet River. Recent subsistence harvests in eastern Norton Sound are well below harvests taken in the 1980s and 1990s.

Salmon runs were substantially better in 2003, 2004, 2005 and 2006 than in previous years across a broad region of western Alaska, including the Yukon River in Alaska and Canada. However, the world catch of Chinook salmon has dropped significantly since the late 1970's, but has rebounded some since the low in 2001 (JTC 2007). The world chum salmon catch remains high with most of the harvest by Japan. The causes for the production failures are not known, but attention has focused on the marine environment because of the broad scope of the production failures. Likely factors that have received the most attention to date have included 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 is now due to hatchery releases (JTC 2007).

BERING SEA AND GULF OF ALASKA GROUNDFISH FISHERY

History and Management of the Groundfish Fishery

The 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 NPFMC, and are regulated by the NMFS.

In general, the groundfish fisheries of the GOA are managed and regulated separately from those in the BSAI. Both major areas contain a number of smaller regulatory areas, which are numbered. The groundfish fisheries east of 170° west longitude and north of the Alaska Peninsula are considered to be in the BSAI (Figures 10 and 11). The groundfish fisheries operating in waters south of the Alaska Peninsula and east of 170° west longitude are considered to be in the GOA.

The 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, the U.S. groundfish harvest off Alaska amounted to 2,300 metric tons (mt, 1 mt = 2,204.6 pounds), or 0.2% of the total groundfish harvest off Alaska by all nations. Most of that U.S. catch was Pacific halibut 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 the 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. The joint-venture fishery, in turn, was replaced by an entirely U.S. fishery.

The U.S. groundfish fisheries use 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 the BSAI and GOA groundfish fisheries was a NMFS biological opinion, which concluded that continued fishing for groundfish, including pollock, Atka mackerel and Pacific cod, under the agency's existing rules is likely to jeopardize the western population of Steller sea lions and adversely affect its 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 communities that are eligible, expanded from pollock only to all federally managed BSAI groundfish species. Currently, the CDQ program has allocated portions of the groundfish fishery that range from 10% for pollock to 7.5% for most other species. On January 1, 2000, the License Limitation Program (LLP) required that any person who wished to deploy a harvesting vessel in the king and Tanner crab fisheries in the BSAI and in the directed groundfish fisheries (except for IFQ sablefish, and for

demersal shelf rockfish east of 140 degrees West longitude) in the GOA or the BSAI must hold a valid groundfish or crab license (as appropriate) issued under the LLP.

Observer Program

Under U.S. law and regulations, salmon are a prohibited species and 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, there was little information on the accidental or incidental catch of salmon by the U.S. groundfish fishery.

In 1990, the United States began a scientific observer program for the U.S. groundfish fishery off the coast of Alaska. 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 the 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 the length of the vessel or the amount of fish processed by a shoreside plant or mothership 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% 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. Mothership 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.

In addition to the 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 the observer reports and the weight of groundfish caught. Observers are instructed to collect random samples of each net haul before it has been sorted, and to gather information from each salmon in a haul. Observers record the species caught and the number of each species, determine the sex of dead or dying salmon, record the 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 then use the number of salmon of each species caught in each haul sampled, the weight of groundfish caught in each haul sampled, and the total weight of groundfish harvested during the 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 the estimated numbers of Chinook and other salmon caught by the U.S. groundfish fisheries from 1990 through 2006. Appendix A37 indicates that the number of salmon caught by the groundfish fisheries varies considerably by species of salmon, by year, and between the BSAI and the GOA. For the most part, Chinook and chum salmon make up most of the catch, with coho a distant third, and sockeye and pink salmon minor components.

The catch of salmon in the BSAI in 2006 was 85,764 Chinook and 326,296 other salmon and in the GOA the salmon catch was 17,577 Chinook and 4,746 other salmon.[13] Certain areas in the BSAI have been declared salmon savings areas for both chum and Chinook salmon based on high rates of catch 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, the NPFMC lowered the allowable bycatch of Chinook salmon in the BSAI trawl fishery.

Because of the record numbers of salmon taken in the BSAI in 2003 and 2004 and information from the fishing fleet indicating that catch was exacerbated by the savings areas the NPFMC is evaluating BSAI salmon management measures. In December 2004, the 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." The full 326-page document can be viewed at the NPFMC web site:
http://www.fakr.noaa.gov/npfmc/current_issues/bycatch/bycatch.htm

Basically, 3 alternatives are being considered:

Alternative 1. Status Quo. Alternative 1 maintains the 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 Chinook and BSAI trawl chum salmon would be eliminated, and would no longer trigger savings area closures. The annual closure of the Chum Salmon Savings Area would also be eliminated. Salmon would remain a prohibited species under this (and all) alternative.

Alternative 3. Suspend the regulatory salmon savings area closures and allow pollock cooperatives and CDQ groups to utilize their voluntary rolling hot spot closure system to avoid salmon bycatch. Under Alternative 3, the catch limits for the Bering Sea subarea trawl Chinook and BSAI trawl chum salmon would be suspended, and would no longer trigger savings area closures. The 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 voluntary rolling "hot spot" (VRHS) closure system to avoid salmon bycatch.

[13] Information on past and present bycatch of salmon in the BSAI and GOA groundfish fisheries can be obtained from the NMFS Alaska Region web page at www.fakr.noaa.gov

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

The Endangered Species Act (ESA) incidental take statement from the 1999 Salmon Biological Opinion is 55,000 Chinook salmon in the BSAI and 40,000 Chinook salmon in the 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 the 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 that 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 (JTC 2007). In addition, 10 Chinook salmon that have been 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

The 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 the 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.

The primary findings from the past 5 years (2002–2006) indicate that there were special variations in distribution among species: juvenile coho salmon and Chinook salmon tended to be distributed nearshore and juvenile sockeye salmon, chum salmon and pink salmon tended to be distributed further offshore. In general, juvenile salmon were largest during 2002 and 2003, and smallest during 2006, particularly in the northeast Bering Sea region. Fish, including age-0 pollock and Pacific sand lance were important components of the diets for all species of juvenile salmon in some years. However, annual comparisons of juvenile salmon diets indicated a shift in primary prey for many of the salmon species during 2006 in both the northeast and southeast Bering Sea regions. In addition, the average CPUE of juvenile salmon fell sharply during 2006 in the southeast Bering Sea region. We speculate that spring Sea Surface Temperatures (SSTs) on the eastern Bering Sea shelf likely impact growth rate of juvenile western Alaska salmon through

bottom up control in the ecosystem. Cold spring SSTs lead to lower growth and marine survival rates for juvenile western Alaska salmon, while warm spring SSTs have the opposite effect.

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 that 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 US 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.

Sato et al. (2006) used mitochondrial (mt) DNA and single nucleotide polymorphism (SNP) markers to estimate the stock origins of chum salmon caught in the western North Pacific Ocean and central Gulf of Alaska (JTC 2007). Kate Myers of the University of Washington, Fisheries Research Institute has summarized the results of high seas salmon tagging data from 1954 to 2005 and this information is provided in JTC 2007.

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 C1). Pacific herring *Clupea harengus pallasi* 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 fishers 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 C2). 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. 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.

Historical Cape Romanzof herring fishery data were reviewed for this report and corrections incorporated in tables and figures presented.

COMMERCIAL FISHERY 2006

In 2006, a total of 91.6 tons of herring were harvested by 8 fishermen in the Cape Romanzof District (Appendices C2 and C3). The commercial harvest was near the recent 5-year-average (2001 to 2005) of 94 tons. The entire catch was sold as sac roe herring with an average sac roe recovery of 10.3%.

The commercial harvest did not achieve the preseason projected harvest range of 500 to 700 tons due to reductions in fishing effort similar to recent years. In addition, larger mesh gillnets have been utilized recently in the Cape Romanzof commercial herring fishery to selectively harvest larger (older) herring and a higher percentage of females. This change in the mesh size has increased the harvest quality, but also resulted in lower harvest rates. Harvest of a high percentage of males and partially spawned out herring have historically contributed to low roe recovery rates in the Cape Romanzof fishery.

Traditionally, short commercial herring fishing openings have been scheduled around high tide events in the Cape Romanzof District. Beginning with the 2004 season, opening and closing the commercial herring fishery based on tide events was modified by opening fishing in the district on a continuous basis. Opening the commercial fishery on a continual basis was justified based on the reduced commercial fishing effort, limited tendering capacity, and decreased processor interest in the area. Conducting commercial fisheries this way allows fishers the maximum opportunity to explore the district to find marketable quality of sac roe herring and allows the buyer to direct when fishing will occur based on current harvest information.

In 2006, ADF&G managed the commercial fishery in a similar manner to the approach used in 2004 and 2005 by opening the commercial on a continuous basis beginning 8:00 a.m. Saturday, June 3 by emergency order 3-H-Y-01-06. The commercial opening date and time was based on roe quality of a small sample of herring from commercial fishermen participating in a test fishery conducted prior to the commercial opening. Commercial fishing ended at 7:00 p.m. Thursday, June 8, when the last tender operating in Kokechik Bay ceased buying operations.

Although commercial fishing was open continuously, the actual fishing time in 2006 was 89 hours, which reflects the fishing time that was set by the buyer in consultation with ADF&G staff (Appendices C2 and C3).

Because of the limited fishing effort in the Cape Romanzof District in 2006, restricting fishing gear to one 50 fathom gillnet per vessel, which has been the practice in previous years, was liberalized to 2 gillnets per vessel and no more than 100 fathoms in aggregate through emergency order 3-H-Y-02-06.

The estimated exvessel value of the 2006 harvest was approximately $15,200 (Appendix C2). The inseason price for herring sac roe was $100 per ton at 10% roe recovery. In addition to the price paid by the buyer in the Cape Romanzof fishery, Coastal Villages Seafoods paid fishermen an incentive based on the roe quality of the herring delivered. This incentive, combined with the price paid by the buyer, resulted in an average price of $166 per ton in 2006. One company purchased herring and was represented by 3 tenders during the fishery (Appendix C4). Residents from Scammon Bay and Hooper Bay accounted for 100% of the commercial fishing effort and harvest.

The overall exploitation rate of herring was estimated postseason to be approximately 3% of the available biomass (Appendix C2). A total of 477 herring were sampled from the commercial harvest, of which 408 were readable for aging. The estimated age composition of the commercial samples based on scale analysis was: ≤age-7: 1.2%; age-8: 7.4%; age-9: 48.8%; age-10: 18.9%; age-11: 9.6%; age-12: 4.9%; age-13 and older: 8.0% (Appendices C5 and C6).

Fish and Wildlife Protection officers were not present at Cape Romanzof in 2006 and no citations were issued.

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 2006, an estimated subsistence harvest of 2.5 tons of herring was taken by 14 fishing families from Hooper Bay, Chevak, and Scammon Bay (Appendix C7). In addition, 5 households harvested 220 pounds

of herring spawn-on-kelp for subsistence purposes (Appendix C8). A total of 196 mail-out questionnaires were sent to households in the communities of Hooper Bay, Chevak, and Scammon Bay. A total of 32 (16%) households responded.

STOCK STATUS

Qualitative spawn deposition surveys were conducted from 1992 through 2003. Although these surveys were discontinued in 2004 because of budget limitations, ADF&G has continued to make periodic observations of spawn deposition near our field camp. ADF&G crews arrived on site on May 19 and, during subsequent beach walks, no spawn or herring carcasses were found until June 2. Thus spawning occurred about 2 weeks later than average. A beach survey conducted on June 10 estimated that overall, the spawn observed on the beach would have been considered moderate compared to historical levels. 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 is comparable to historic sampling efforts.

Due to excessive water turbidity in the Cape Romanzof area, it is usually not possible to estimate herring biomass using aerial survey techniques. Herring biomass has been estimated using a combination of information from aerial surveys, test and commercial catches, spawn deposition, and age composition. Fortunately, useful aerial surveys were flown during the 2006 season. Two aerial surveys were flown using a chartered 207 Cessna aircraft. The first aerial survey was flown on June 3 under marginal conditions and resulted in a biomass estimate of 353 tons (Appendix C9). The second survey was flown on June 5 under excellent weather conditions and good visibility resulting in an estimated biomass of 4,783 tons. The total herring biomass estimate for 2006 in the Cape Romanzof District was 4,813 tons, which included the biomass estimate from the June 5 survey plus 30 tons of commercial harvest taken prior to the survey. The 2006 preseason projected herring biomass of 2,500–3,500 tons was well below the post season herring biomass estimate of 4,813 tons.

VARIABLE MESH GILLNET TEST FISHERY

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 31 through June 8, 2006. A total of 504 herring were sampled for biological data, of which 446 were aged. Herring comprised 100% 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 1.8%, 25.3%, 10.1%, 8.3%, 4.5%, 13.5%, 24.9%, 7.2%, 3.1%, and 0.7% of test fishing samples, respectively (Appendix C10 and C11). Age-13 and older herring comprised 0.6% test fishing samples. Age 8 and 9 herring made up 38.4% of the test fish samples.

Results from the test fish information indicate that the next major year class of herring that will recruit into the fishery is represented by 4-year-old fish from the 2002 spawning year. The increase in 4-year-old fish may have lowered the anticipated proportion of 9 and 10-year old fish seen in the variable mesh gillnet test fishery.

HERRING OUTLOOK FOR 2007

The 2007 projected biomass is expected to be 4,489 tons. Because of the predominance of age-4, age-8, and age-9 herring in 2006, it is anticipated that the herring biomass in 2007 will be composed of predominately age-5, age-9, and age-10 fish. Based on the *Bering Sea Herring Fishery Management Plan* (5AAC 27.060), the exploitation rate shall not exceed 20% of the estimated biomass. Therefore, the 2007 allowable harvest is between 800 and 1,000 tons with a mid point of 900 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, inseason assessment of stock abundance will be made using information collected from test fishing, commercial harvest rates if available, herring distribution, age composition, and if possible, aerial surveys.

Commercial fishing periods will be determined by the amount of fishing effort present and roe quality. However, no commercial buyers are anticipated to be available in 2007. If a commercial market develops in 2007, ADF&G will likely open the fishery on a continuous basis to allow fishermen the maximum opportunity to explore the district to find marketable quality of sac roe herring and allow the buyer to direct when fishing will occur based on current harvest information. Commercial fishing will be opened when it is determined that marketable percentage of sac roe herring and a commercial buyer is present. Fishermen are encouraged to bring more than one mesh size of gillnet 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 ADF&G obtain the highest roe recovery possible.

Because of the lower fishing effort in recent years it is likely that 100 fathoms (2 shackles of gear) per vessel may be permitted in 2007, as was allowed in 2006. Two shackles of gear were allowed for several openings in 2003, 2004, and 2006, but few fishermen took advantage of the opportunity. Fishermen should be prepared and bring 2 nets to the fishing grounds if a market develops.

OTHER MARINE AND FRESHWATER FINFISH FISHERIES

SUBSISTENCE FISHERY 2006

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 drainage wide 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 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 2006 are presented in Appendices D1 and D2. Subsistence catches of freshwater finfish taken under authority of a permit in the Upper Yukon Area in 2006 are presented in Appendix D3.

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. A limited number of sheefish are harvested during late May and early June in the lower Yukon River as sheefish 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 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 conjuction with ADF&G, has an ongoing radiotelemetry projects 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; Scanlon 2009). 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 2006

In 2006, the personal use salmon fishery followed the regulatory fishing time of two 42-hour periods per week. Sixty personal use salmon and 7 personal use whitefish and sucker household permits were issued in 2006. Four personal use whitefish and sucker permit holders, combined with the incidental harvest from 35 personal use salmon fishers, reported harvesting 287 whitefish, 5 sheefish, 4 burbot, 2 pike, 1 grayling, and 184 suckers (Appendix D3).

COMMERCIAL FRESHWATER FINFISH 2006

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 beginning 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 D4. In the Upper Yukon Area, commercial freshwater fisheries targeting primarily whitefish have been permitted in prior years (Appendix D5), 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 commercial salmon fishing (Appendix D6).

In 2006, a buyer was permitted to purchase up to 10,000 pounds of whitefish in the Lower Yukon River. A total of 19 fishermen harvested 11,263 pounds of whitefish (Bering cisco, least cisco, broad whitefish, humpback whitefish, and miscellaneous unidentified whitefish species) and inconnu (referred to as sheefish) in District 1 of the lower Yukon River Appendix D4. There were 61 deliveries made for a total of 6,901 fish. The 2006 fishery targeted Bering cisco. Fishing commenced on September 8 and the last delivery was recorded on September 21 for a total fishing time of approximately 14 days. However, the majority of the harvest occurred over a period of 3 days (September 18 through 20) when approximately 60% of the commercial harvest was delivered. Fishing gear was restricted to one gillnet up to 150 feet in length with a maximum of 6 inch stretch mesh or hand line/hook and line in 2005 and 2006.

Estimated value of the harvest to fishers was $8,431 ($1.00/pound for cisco and $0.50/pound for other whitefish species). The fishing effort consisted of local residents from Emmonak, Nunam Iqua, Alakanuk, and Kotlik and was conducted near these villages.

Harvest Sampling

A total of 297 commercially harvested whitefish were sampled for age, sex or length data in 2006. Otoliths were collected from 104 Bering cisco, 14 least cisco, 84 humpback whitefish, and 15 broad whitefish. Scales were also collected from the Bering and least cisco. Fish were sexed by examining the gonads. Sheefish (n=80) were not sexed in 2006. Lengths (mid eye to fork of tail) were collected from all fish sampled.

Least and Bering cisco, with mean lengths of 327 mm and 359 mm, were smaller on average than humpback and broad whitefish, which had mean lengths of 370 mm and 384 mm, respectively. Sheefish, the largest of the whitefish species sampled, had a mean length of 667 mm.

A Kolmogorov-Smirnov (KS) test (α=0.05) was used to test for differences in the length frequency distributions by sex for Bering cisco (n=37 male and 67 female) and humpback whitefish (n=39 male and 41 female). These comparisons revealed the Bering cisco size distribution by sex was significantly different, with males being smaller ($p<0.000$). Male Bering cisco mean length was 336 mm and female mean length was 371 mm. Many of the smaller (<330 mm) Bering cisco were male and many of the larger (>400 mm) fish were female. No significant difference ($p=0.445$) was detected for humpback whitefish, however many of the larger fish (>400 mm) harvested were female. Male humpback whitefish mean length was 360 mm and female mean length was 372 mm. KS tests were not performed for least cisco and broad whitefish because sample sizes were too small. Similar to Bering cisco and humpback whitefish,

mean lengths of least cisco and broad whitefish males (312 mm and 335 mm, respectively) were smaller than females (324 mm and 357 mm, respectively).

Bering cisco ages ranged from 3 to 8 years and both sexes had a median age of 4. Least cisco ages ranged from 2 to 9 years and both sexes had a median age of 3. Humpback whitefish ages ranged from 2 to 16 years and both sexes had a median age of 5. Broad whitefish ages ranged from 2 to 13 years. Male broad whitefish had a median age of 3 and females had a median age of 4. Chi-square analysis (α=0.05) was used to test for differences in the age frequency distributions between males and females for Bering cisco (n=36 male and 64 female) and humpback whitefish (n=36 male and 37 female). The Chisquare analysis did not detect any differences in age by sex for Bering cisco (df=3, p=0.320) or humpback whitefish (df=3, p=0.252). Sample sizes were too small to perform the analysis for least cisco and broad whitefish.

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 has been allowed the last 2 years 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 and middle Yukon River areas with TEK being useful in providing run timing information.

In 2006, a test fishing project was conducted with the aid of the YDFDA to assess the species composition of the catch, run timing of various species, and to establish a baseline of information for possible future abundance estimates. This test fishery was conducted by commercial fishers using standardized nets and methods.

Initially, 4 fishermen were selected by YDFDA to record information from their harvest during commercial fishing. YDFDA supplied test fishers gillnets that were 150 feet in length, 8 feet in depth, and 3.5 inch stretched mesh. The commercial fishermen that participated in the test fishery choose the location for net placement based on their own knowledge and experience and recorded this location using GPS technology. Additionally, ADF&G staff aided these test fishermen and the buyer by providing training and the necessary materials to identify the different whitefish species. After commercial fishing ended on September 21, the test fishermen continued fishing once to twice a week, typically for 24-hour duration during the next 2 to 4 weeks. All fish harvested after the commercial fishery were to be used for local subsistence purposes.

An effort was made to collect the following information: location fished, hours fished, fish harvested (by species), fish released (by species), and notes on fishing conditions and observations. This information was entered on catch forms supplied by the buyer to the commercial fishermen. However, being that this was a new test fishery and there was little supervision, some data forms were incomplete and some fish were not identified to species. Thus

it was difficult to fully evaluate the results. The test fishery was operational from September 12 through October 25, 2006 and the total harvest results are summarized in Appendix D7. In general the harvest of all species appeared to be less in sloughs located farther away from the mainstem. Whitefish appear to be widespread in the delta during the time period of this study based on the results of fishing in north mouth near Kotlik and south mouth near Nunam Iqua.

ARCTIC LAMPREY FISHERY SUMMARY

The winter of 2003 marked the first year for a directed Arctic lamprey commercial fisheries in the Yukon Area. No commercial Arctic lamprey fishery was prosecuted in 2004 due to lack of buyer interest. One permit was issued for up to 5,000 pounds of lamprey in 2005, but there was no harvest due to poor ice conditions.

In 2006, a freshwater commercial fishery permit (FWN-02-06) was issued to Kwikpak Fisheries allowing the harvest of up to 40,000 pounds of Arctic lamprey. 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.

A total of 12 fishermen delivered 8,196 pounds of Arctic lamprey to onshore buying stations located in Saint Mary's and Grayling. The price paid per pound was $1.00 and the estimated value of the harvest to fishers was $8,196. Harvest gear was restricted to one hand held dip net or one "eel" stick per permit holder, though most fishermen reported using dip nets. The commercial harvest was conducted by dipping fishing gear into medium sized holes cut through near-shore ice.

The fishery began on November 13 when the processor received 3 deliveries at the Saint Mary's buying station, totaling 715 pounds. One of the deliveries was harvested in Mountain Village and the remaining 2 were harvested in Saint Mary's. By November 15, commercial fishers in Mountain Village communicated that the bulk of the run had most likely passed. Individuals in Saint Mary's continued to fish through November 19, although no additional commercial deliveries were made. Fishermen in the area reported that high water and a lack of stable near-shore ice limited their ability to utilize traditional fishing sites.

On November 20, residents of Russian Mission reported their first subsistence harvests of lamprey and surmised a pulse was most likely present between Marshall and Russian Mission. Fishers in Russian Mission estimated that peak lamprey passage lasted for approximately 4 days, although reports of subsistence lamprey harvests in the area continued through November 29.

On December 1, the Grayling buying station received 10 deliveries totaling 7,481 pounds. Successful harvests were reported for a 4–5 hour period on December 1 and then passage at the fishing sites dropped off. Although a few individuals traveled upriver to Fox Point in an attempt to harvest additional lamprey, the majority of the harvest was obtained in Grayling. Local individuals reported that ice conditions were good and traditional dip netting sites were fished. The processor discontinued purchasing lamprey on December 6.

ADF&G provided the processor with data collection sheets to hand out to commercial fishermen in order to obtain harvest and effort information. However, the effort to collect this information was unsuccessful.

Harvest Sampling

Samples from the commercial harvest were shipped by the processor to ADF&G in Anchorage. A total of 500 lamprey were sampled, 250 from the commercial harvest in Mountain Village and Saint Mary's and 250 from the commercial harvest in Grayling. Length, weight and sex information were collected.

Lamprey harvested in Mountain Village and Saint Mary's had an average weight of 106 g and average length of 411 mm. The average weight for females was 114 g and average length was 421 mm. Male lamprey average weight was 97 g and average length was 401 mm.

Lamprey harvested in Grayling had an average weight of 100 g and average length of 398 mm. The average weight for females was 109 g and average length was 407 mm. Male lamprey average weight was 91 g and average length was 389 mm.

Female lamprey harvested in 2006 tended to be larger then male lamprey. However, data indicate a decrease in the overall size of lamprey harvested in 2006 when compared to lamprey sampled in previous years. Possible explanations include a shift in age class and/or unknown ocean conditions affecting growth.

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. Mary's 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. Mary's and Grayling.

The 2006 commercial and subsistence lamprey catch rates varied depending on harvest location. Fishers in Russian Mission, Pilot Station, and Grayling communicated a relatively strong run, while Saint Mary's and Mountain Village fishermen communicated a low harvest and weak run. The difference in catch rates may be a result of fluctuating water levels and ice conditions, varying effort levels and fishing time, and/or efficiency of fishing site locations. The estimated lamprey travel speed between Mountain Village and Grayling was 13 miles per day.

In 2006, the processor restricted their lamprey purchase to between 5,000 and 10,000 pounds in an attempt to test market conditions. The 8,196 pounds of lamprey harvested was well below the 40,000 pounds allowed by the commercial permit, resulting in a conservative harvest.

Methodology to assess Arctic lamprey abundance is in the developmental stage and no assessment of abundance is available to gauge exploitation rates. In 2004, ADF&G operated a DIDSON sonar unit through the ice near Grayling to determine if sonar could be used to observe lamprey migrating under the ice. The results indicated that sonar could be utilized to estimate passage of lamprey, at least during periods of lower passage, which occurred in 2004.

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 E1).

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, 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 et al 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 E2). 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.

ACKNOWLEDGEMENTS

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FIGURES

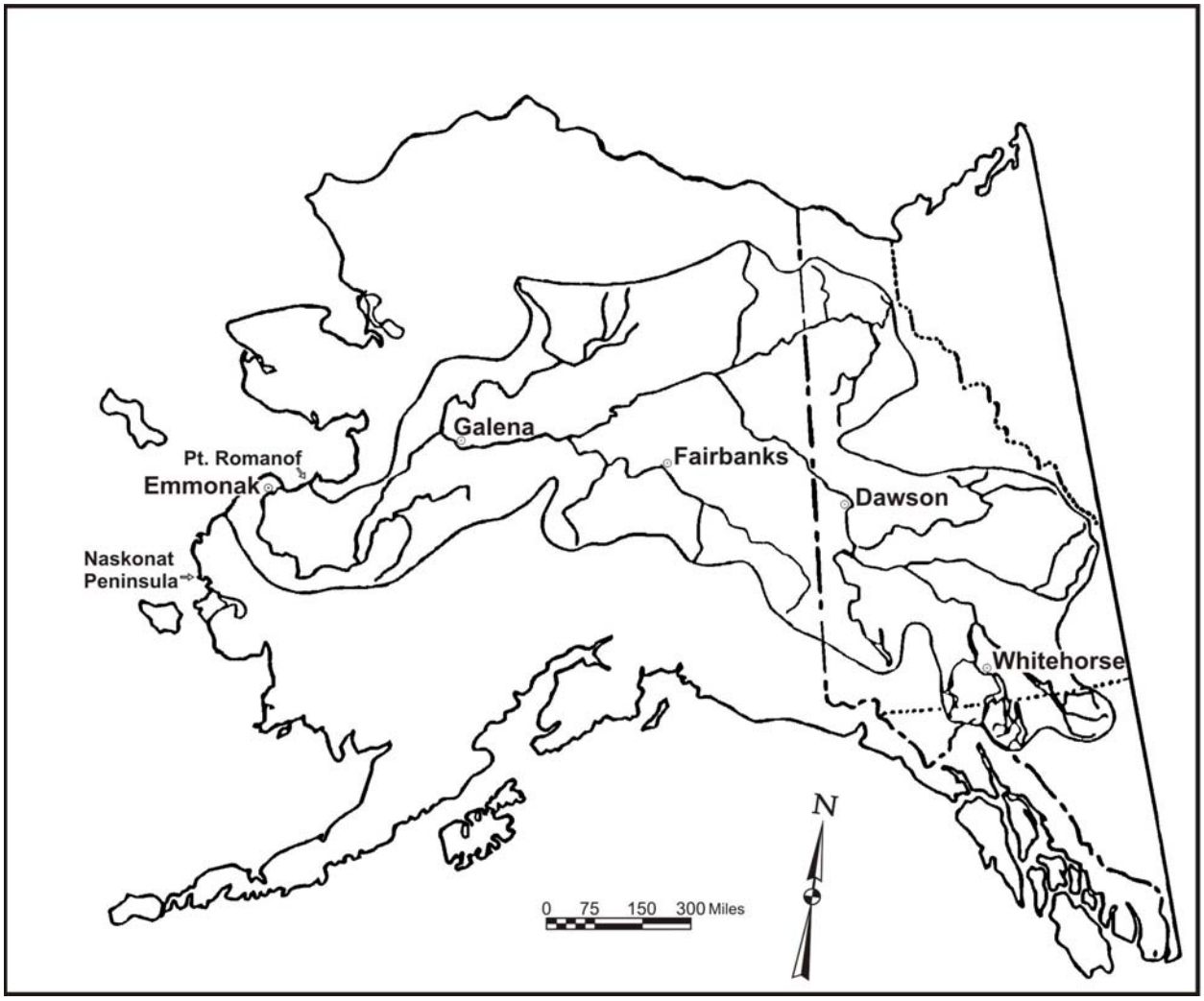


Figure 1.–Map of the Yukon River Drainage.

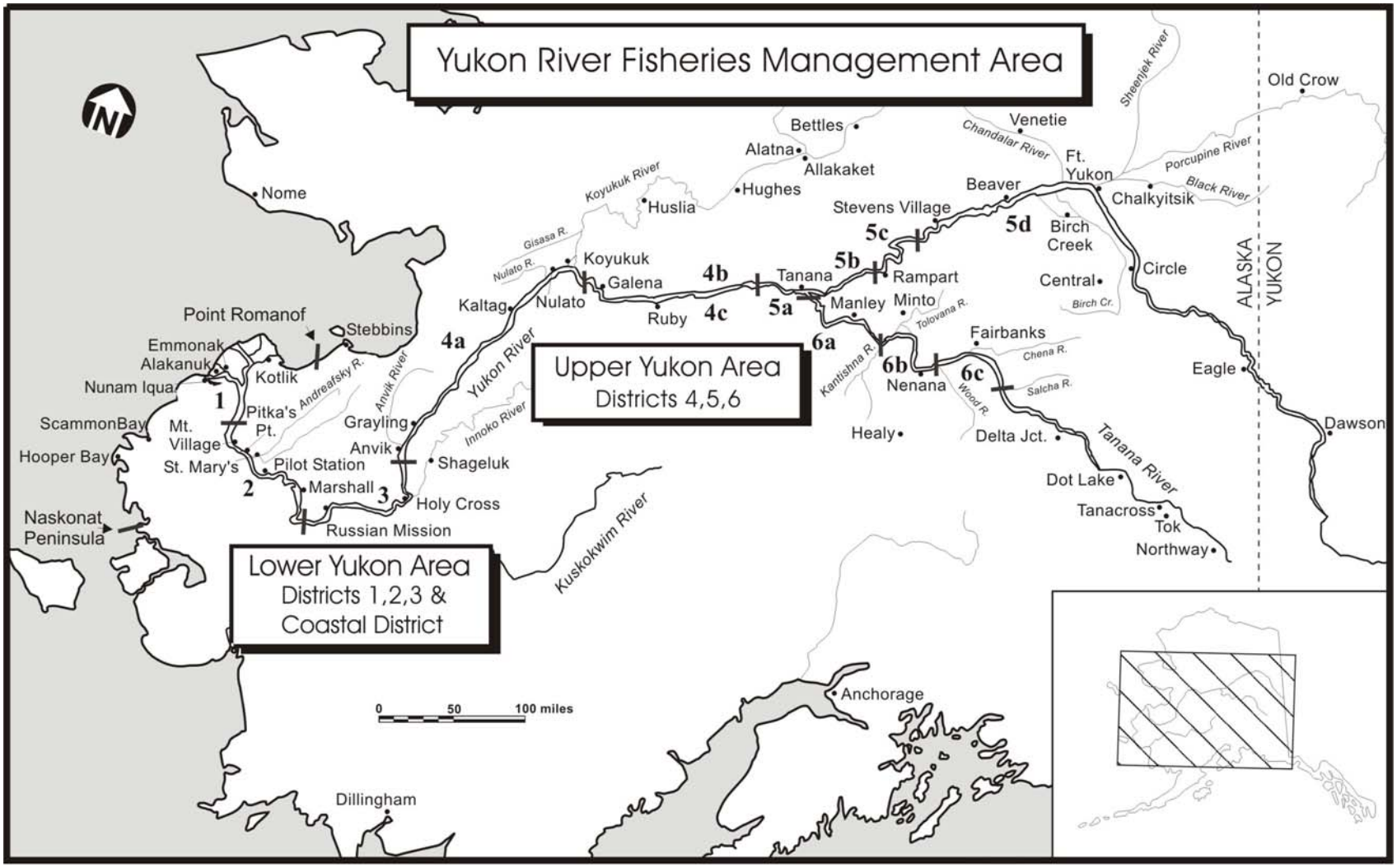


Figure 2.–Alaskan portion of the Yukon River drainage showing communities and fishing districts.

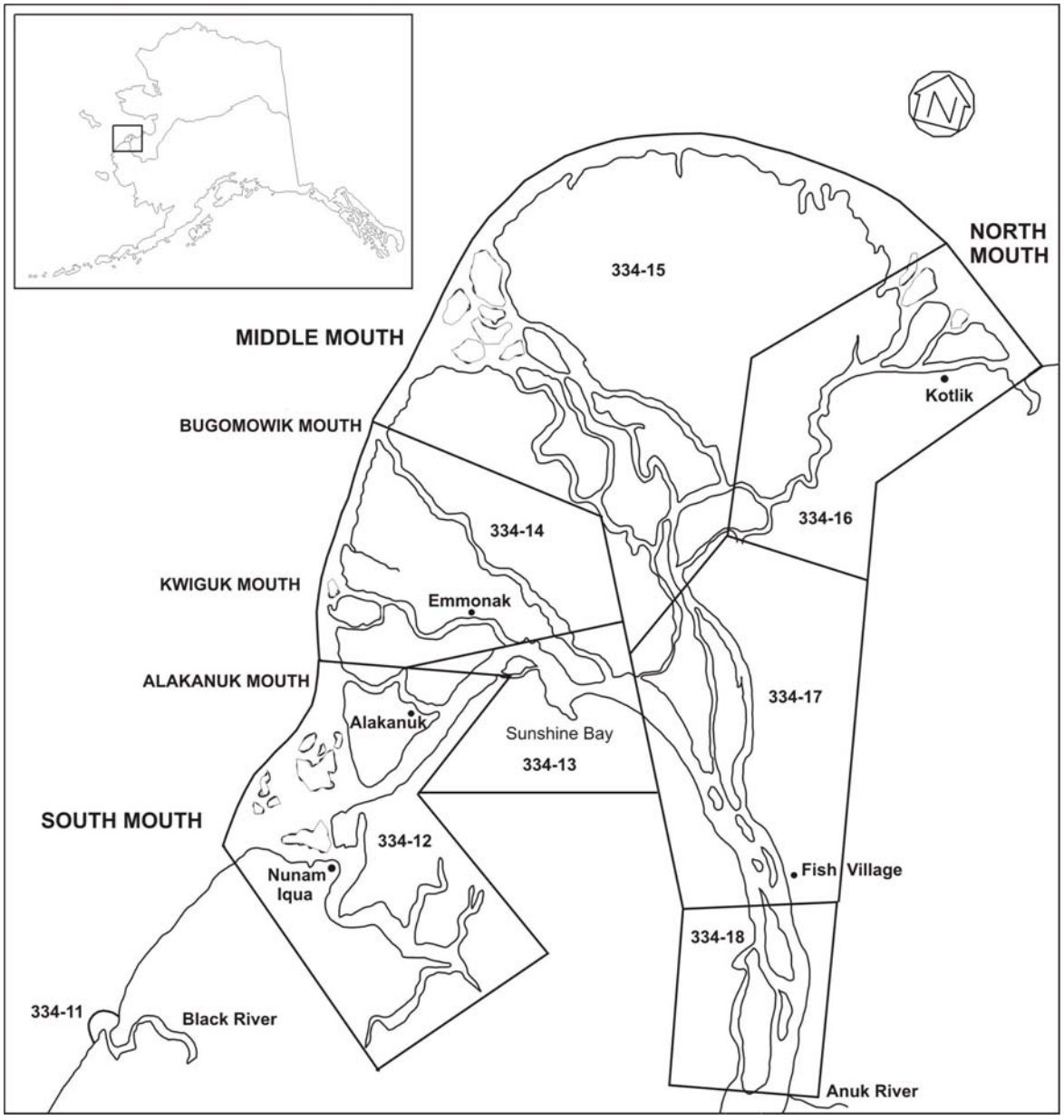


Figure 3.–District 1 showing statistical areas, Yukon Area.

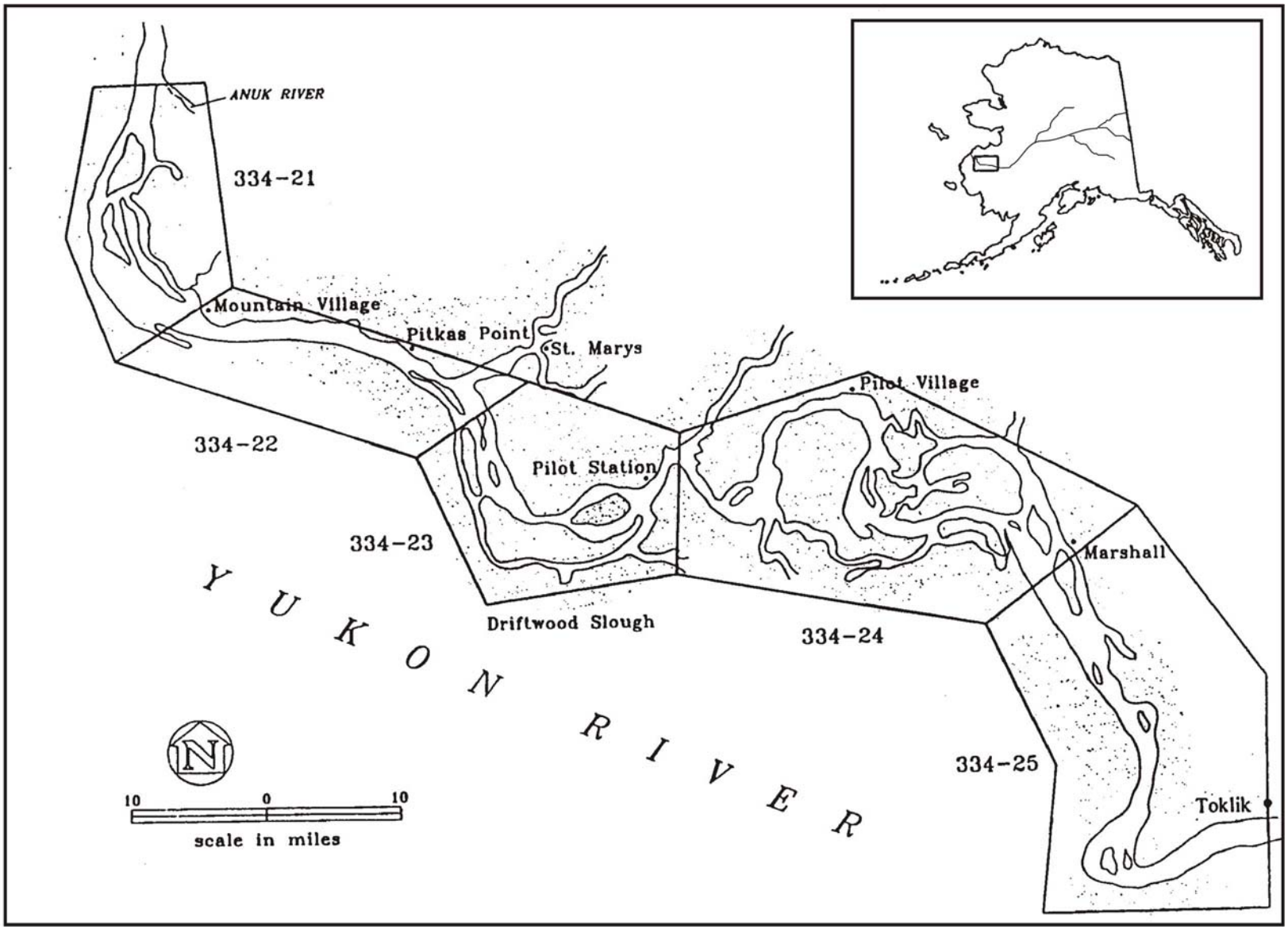


Figure 4.–District 2 showing statistical areas, Yukon Area.

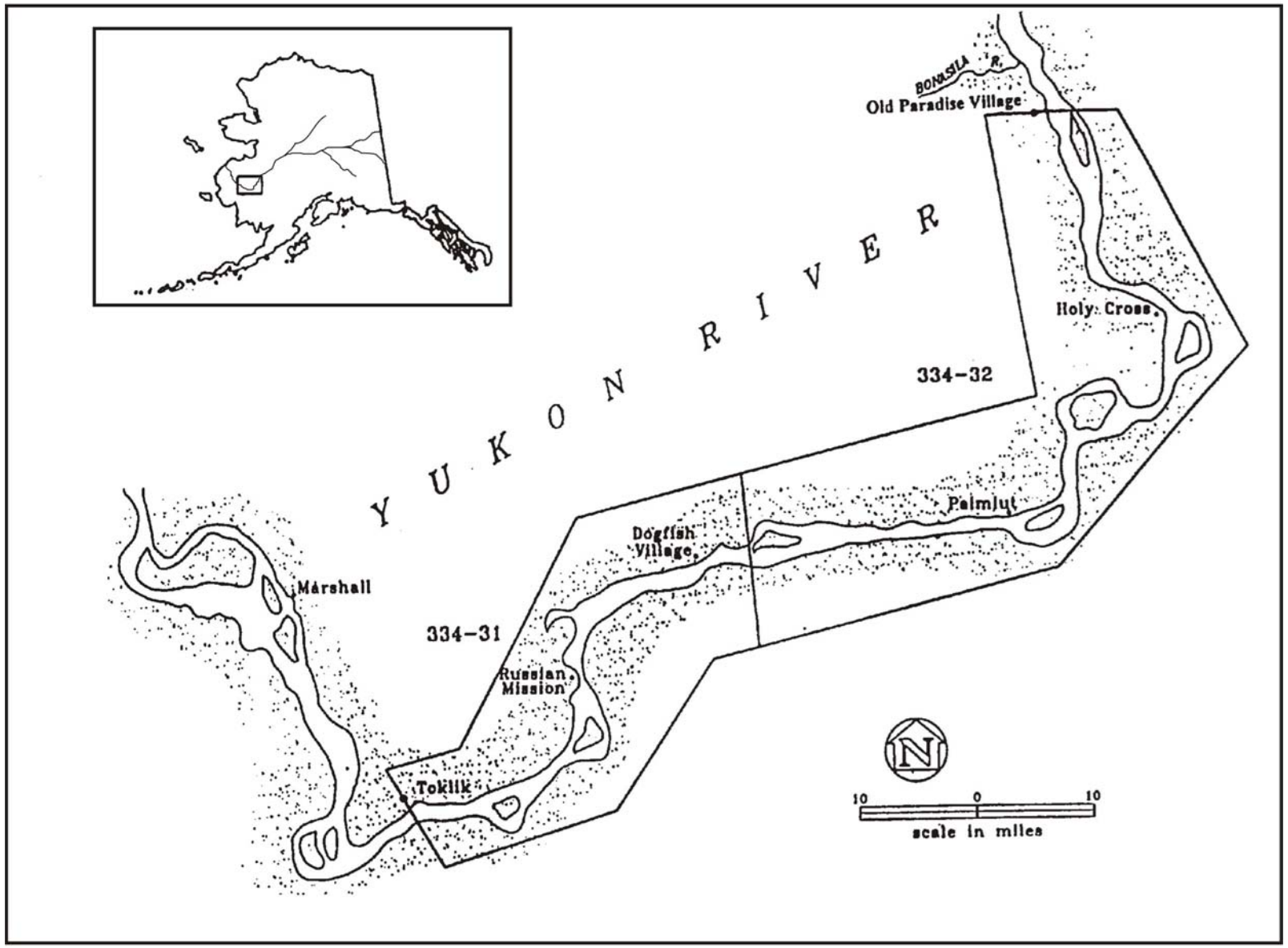


Figure 5.–District 3 showing statistical area, Yukon Area.

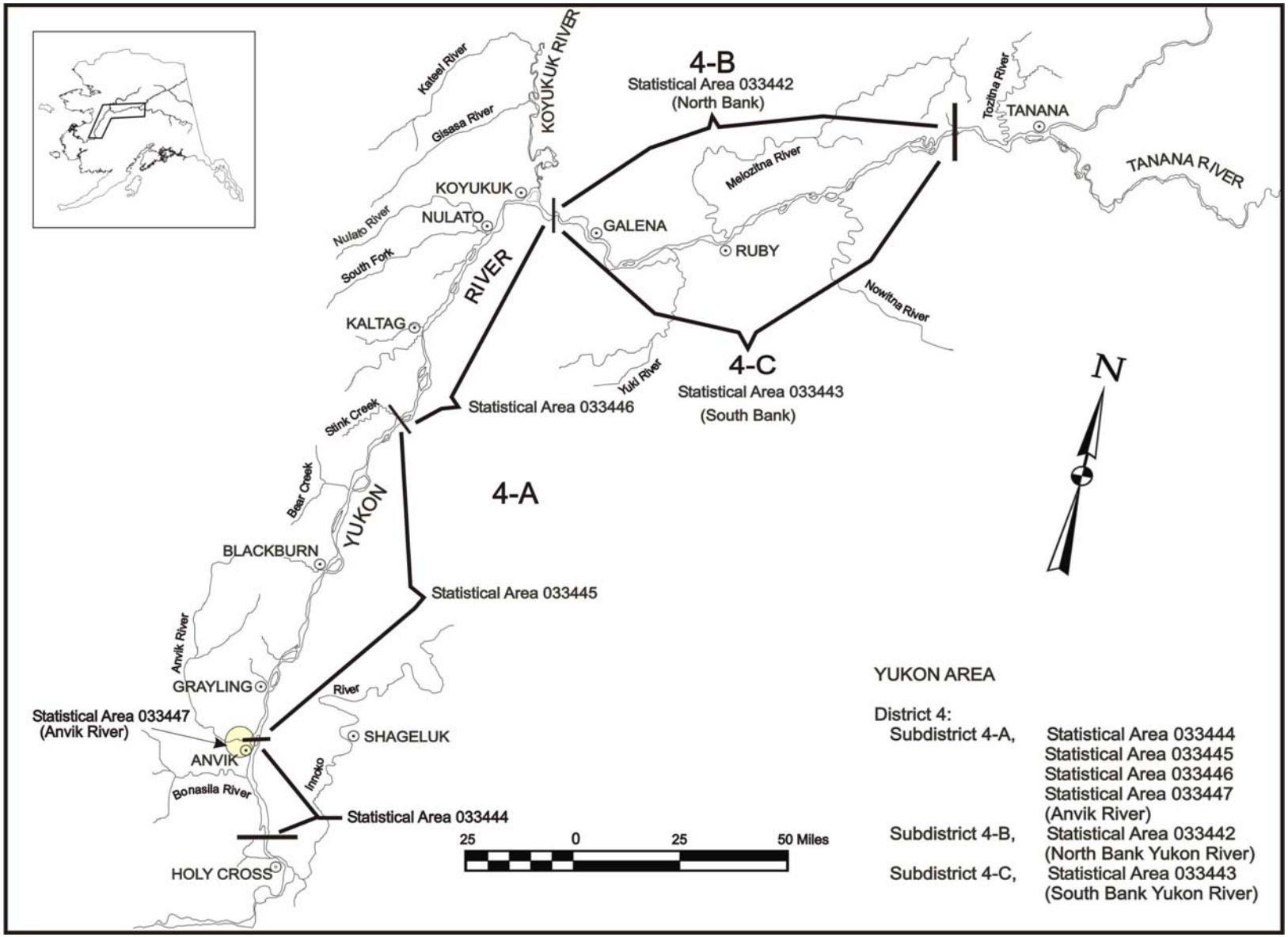


Figure 6.–District 4 showing statistical areas, Yukon Area.

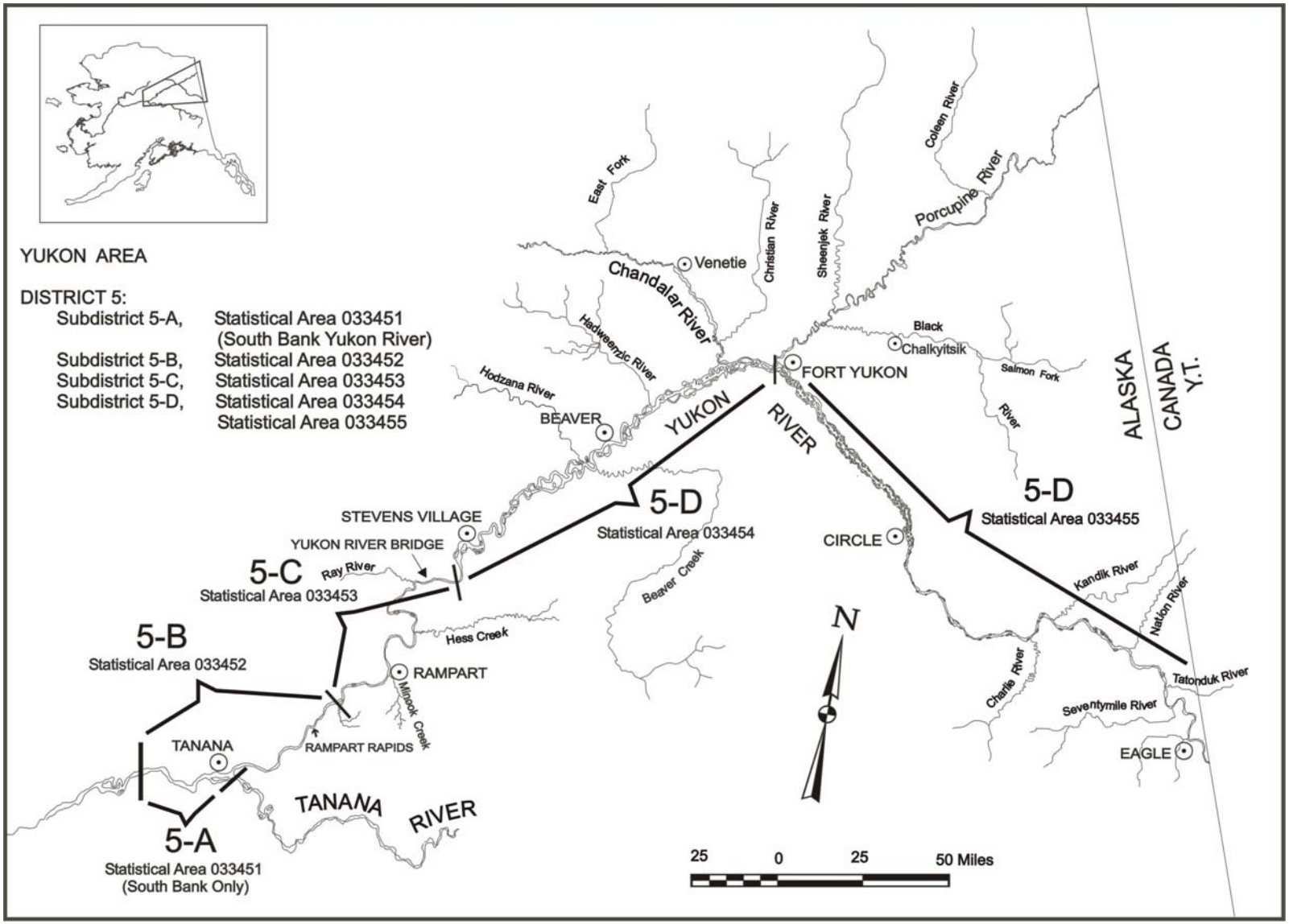


Figure 7.–District 5 showing statistical areas, Yukon Area.

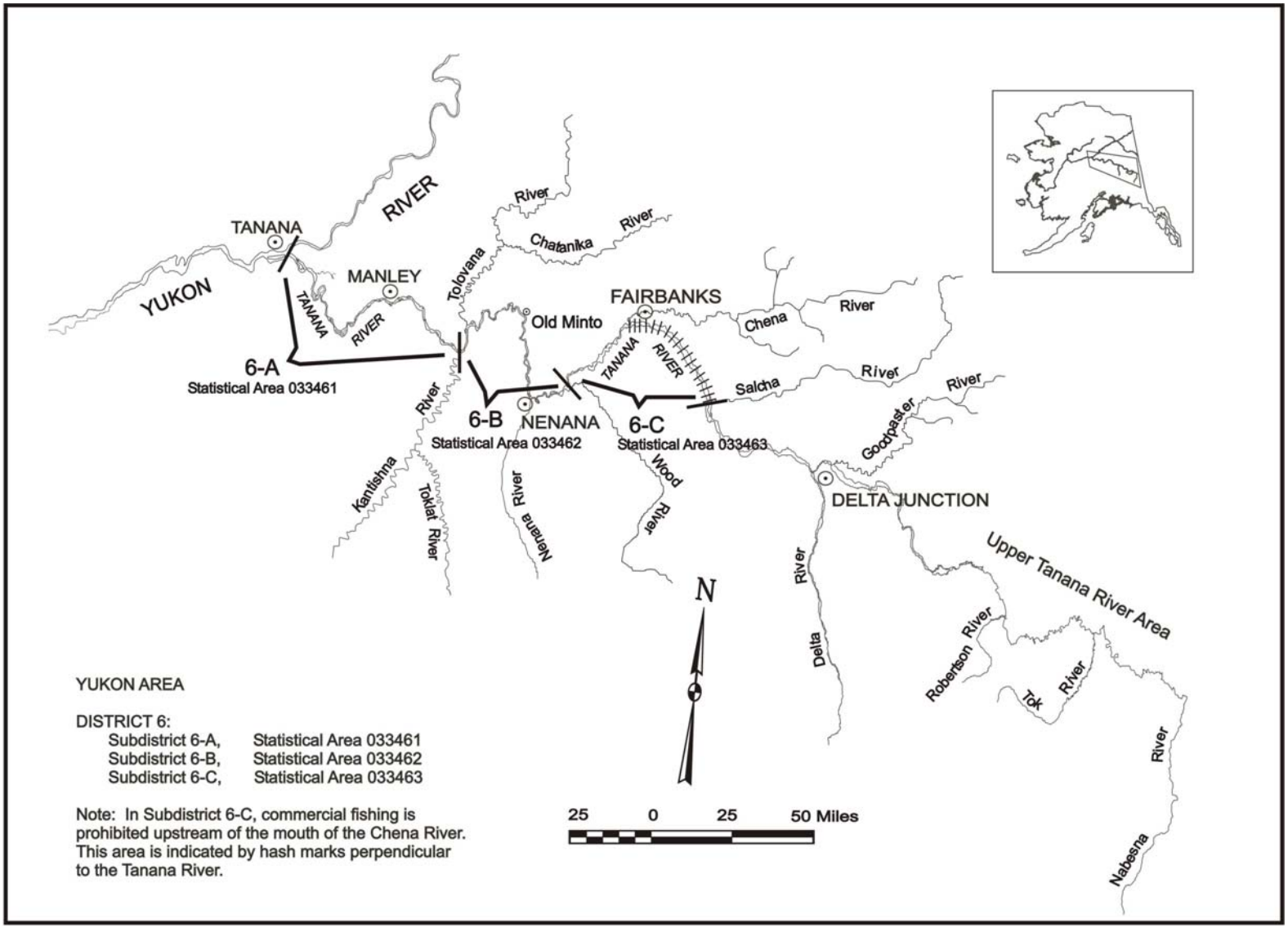


Figure 8.–District 6 showing statistical areas, Yukon Area.

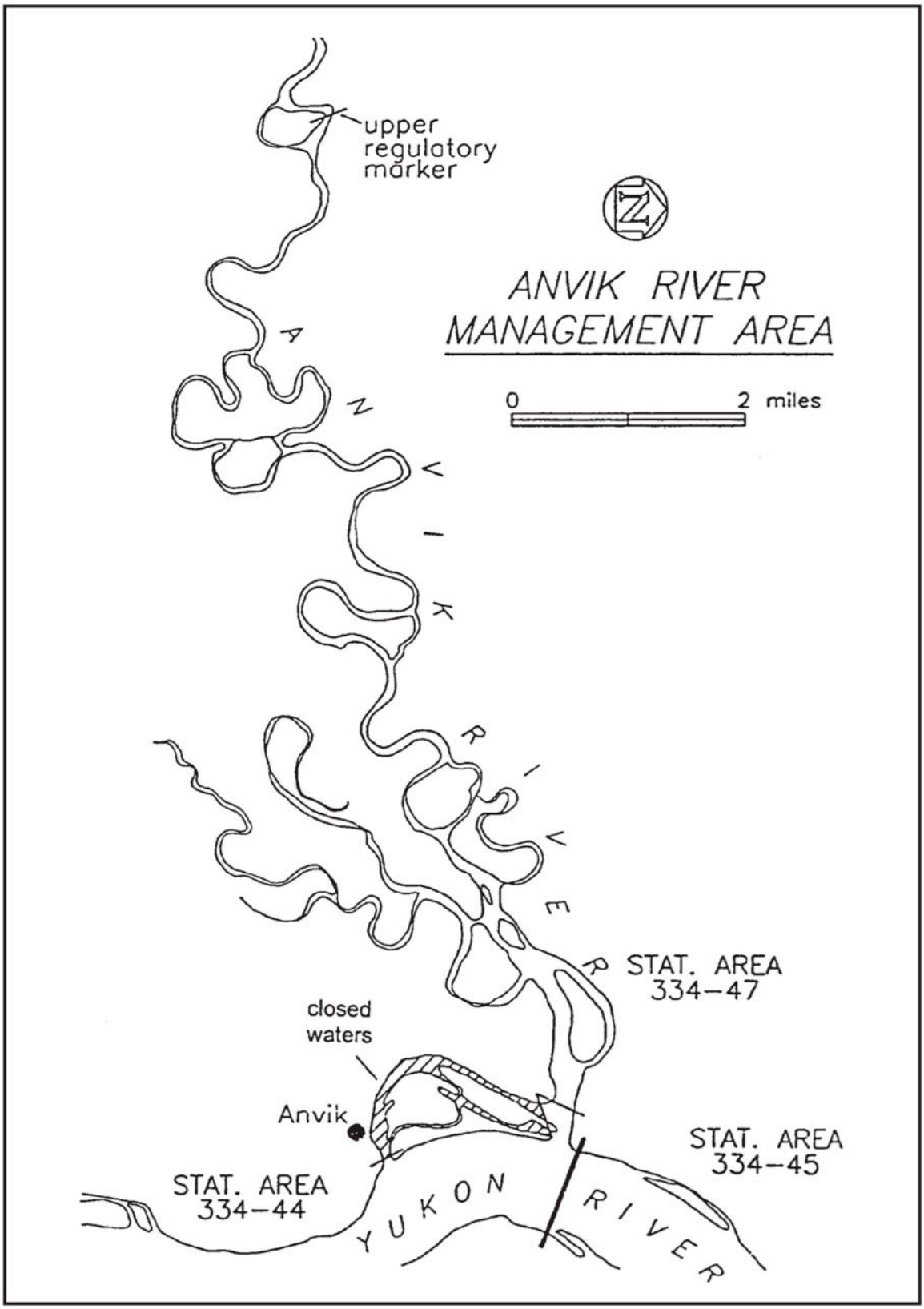


Figure 9.–Anvik River Management Area, Yukon Area.

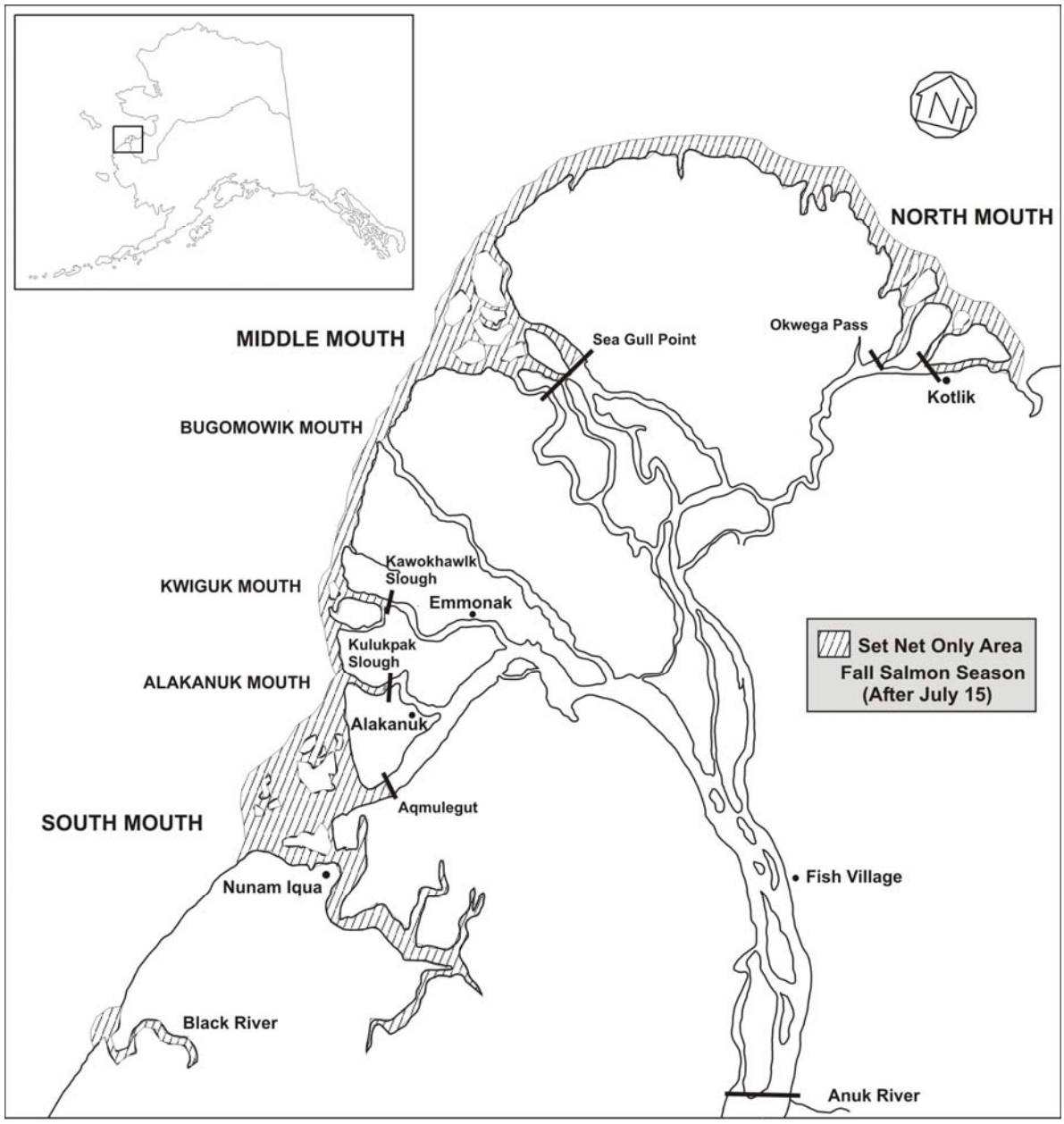
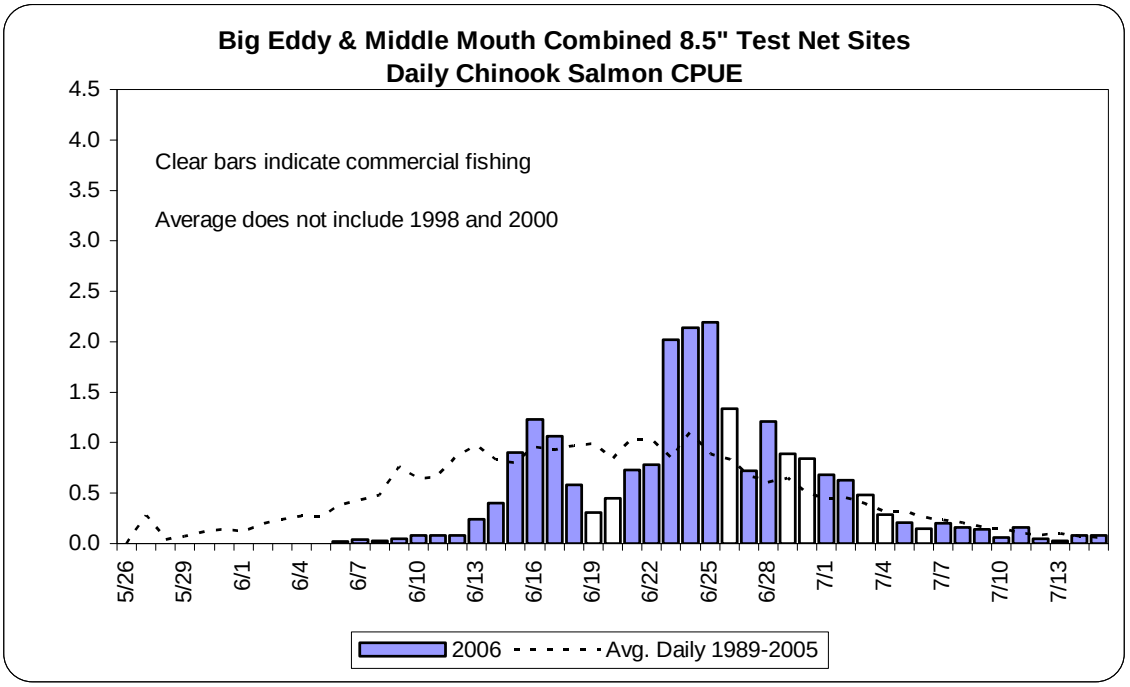
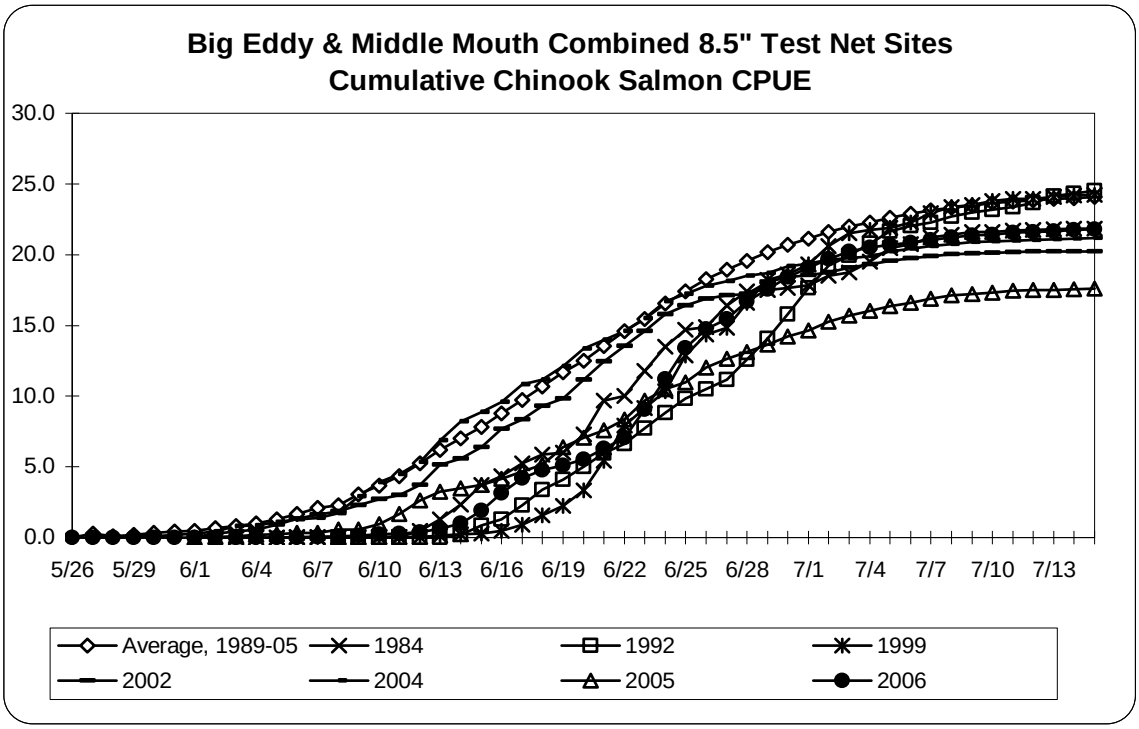


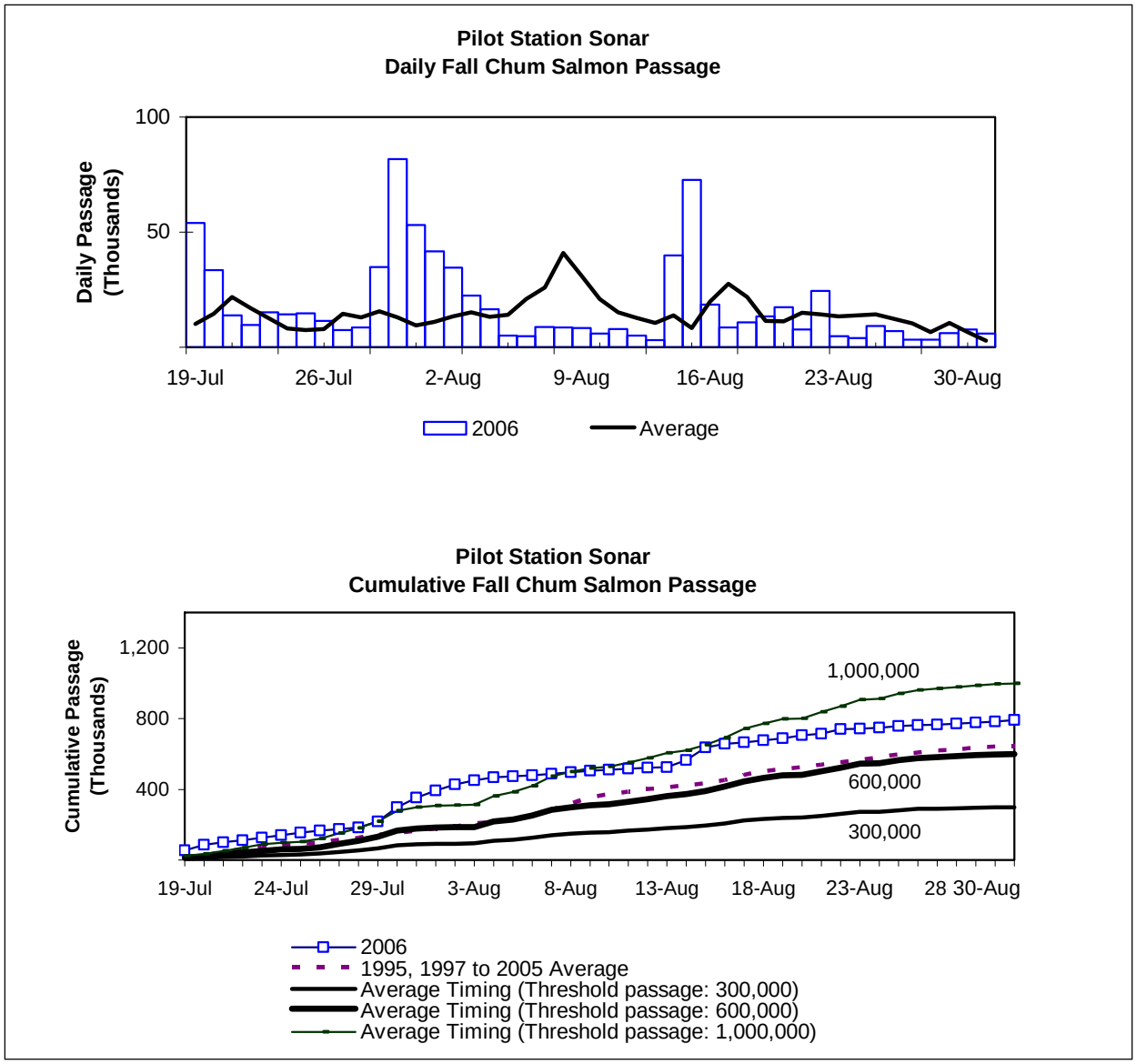
Figure 10.–Set Gillnet Only Area of District 1, Lower Yukon Area.





Note: 2006 Cumulative test fish CPUE for Chinook salmon test fish sites (bottom) compared to the1989–2005 average CPUE. Average is without 1998 and 2000.

Figure 11.–Daily test fish CPUE for Chinook salmon test fish sites 2006 compared to the 1989–2005 average (top).



Note: Cumulative Pilot Station sonar passage counts attributed to fall chum salmon in 2006 (bottom), compared to 1995 and 1997 through 2005 average.

Figure 12.–Daily Pilot Station sonar passage counts attributed to fall chum salmon in 2006 (top), compared to 1995 and 1997 through 2005 average.

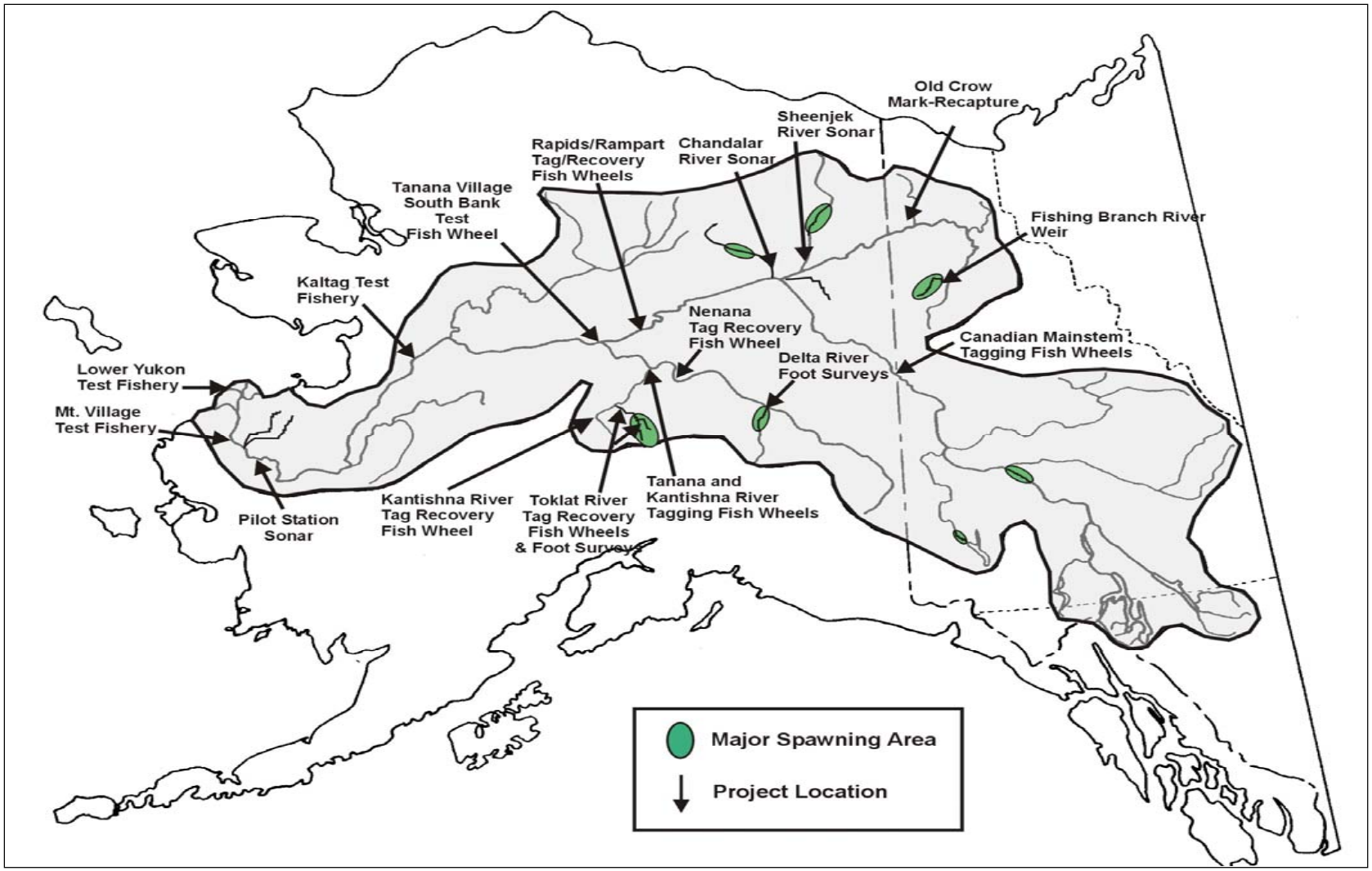


Figure 13.–Select fall chum salmon monitoring projects, Yukon River drainage.

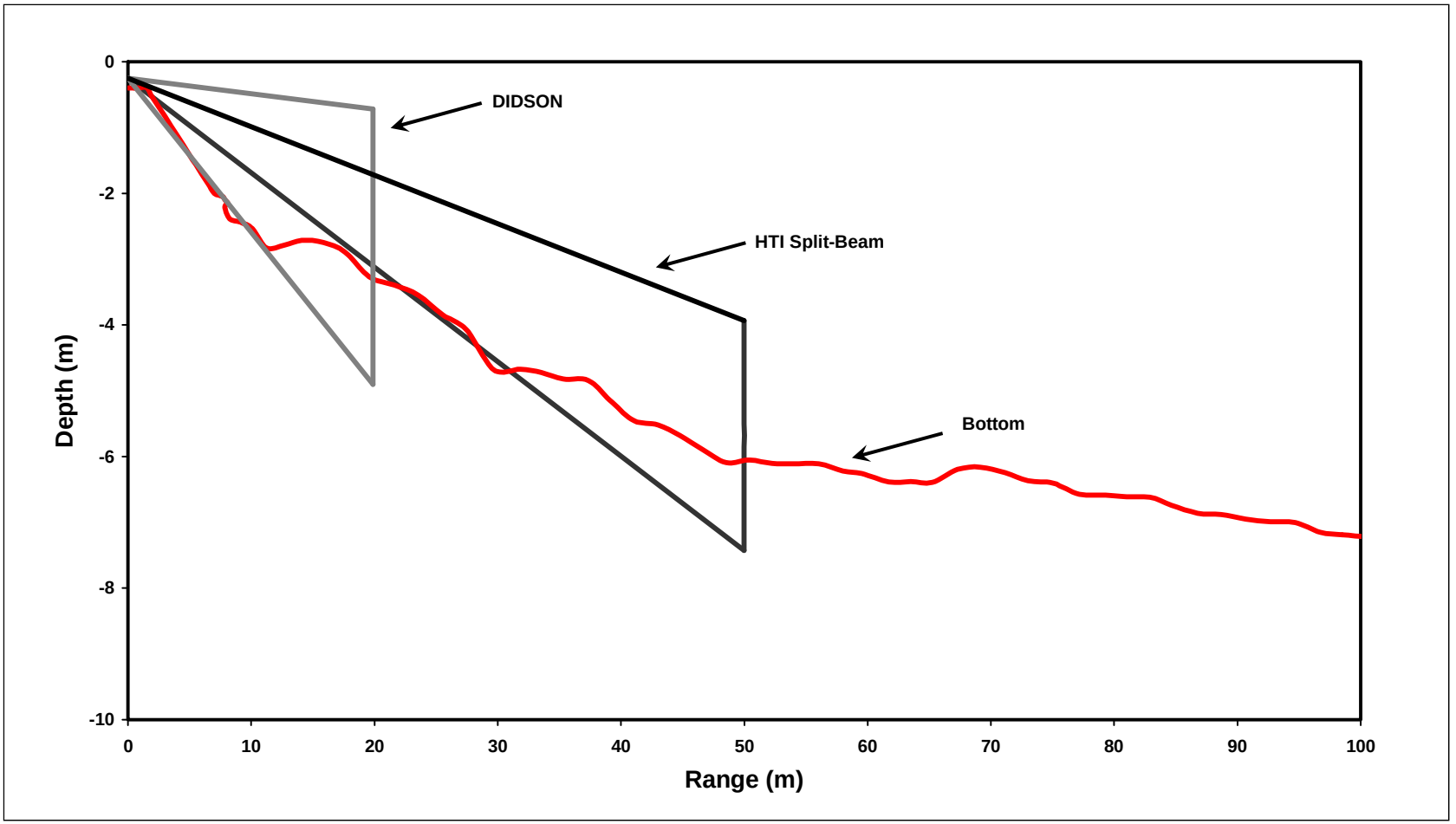


Figure 14.–Schematic representation for the approximate river profile for Yukon River Sonar at Pilot Station and associated nominal beam-width of the DIDSON™ and split-beam sonar of the first sampling stratum on the left bank, 2005.

APPENDIX A: DRAINAGE OVERVIEW AND SALMON TABLES

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 three-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	301
(District 3/4 Boundary)	
Mouth, Bonasila River	306
Anvik	317
Mouth, Anvik River	318
Grayling	336
Mouth, Thompson Creek	349
Blackburn	370
Eagle Slide	402
Mouth, Rodo River	447
Kaltag	450
Mouth, Nulato River	483
Nulato	484
Koyukuk	502
Mouth, Koyukuk River	508
Mouth, Gisasa River	564
Huslia	711
Mouth, Dakli River	755
Mouth, Hogatza River	780
Hughes	881
Mouth, Kanuti River	935
Alatna (Mouth, Alatna R.)	956
Allakaket	956
Mouth, South Fork	986
Mouth, John River	1,117
Bettles	1,121
Middle Fork	1,141
Cold Foot	1,174
Wiseman	1,186
Bishop Rock	514
Prospect Point	519
Galena	530
Whiskey Creek	555
Mouth, Yuki River	562
Ruby	581
Mouth, Melozitna River	583
Horner Hot Springs	605
Kokrines	608
Mouth, Nowitna River	612
Birches	647
Kallands-Mouth of Illinois Creek	664
(District 4/5 Boundary)	
Mouth, Tozitna River	681
Tanana Village	695
Mouth, Tanana River	695
(District 5/6 Boundary)	
Manley Hot Springs	765
Mouth, Kantishna River	793
Mouth, Toklat River	838
Mouth, Sushana R.	850
Mouth, Bearpaw River	887
Outlet, L. Minchumina	959

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

Appendix A3.–Salmon fishery projects conducted in the Alaskan portion of the Yukon River drainage in 2006.

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

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Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Lower Yukon River Drift Test Fishing	South, Middle, and North mouths of the Yukon River delta, RM 20	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

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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 the Yukon River drainage in 2006.

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Upper Yukon Tagging Program (mark-recapture)	Downstream of Dawson City	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 2006) To provide ASL samples The Chinook test fishery uses nets, while the chum test fishery uses live release fish wheels	July-Oct	YRCFA, THFN	all aspects
Commercial Catch Monitoring	Near Dawson City	To determine weekly catches and effort in the Canadian commercial fishery (CM and CK); recovery of tags To provide ASL 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 and AFS	July - Oct	YFN's DFO	joint project
Recreational Catch Monitoring	Yukon R. mainstem and tributaries	To determine the recreation harvest, landed and retained, of salmon caught in the Yukon 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 and DNA Collection	Throughout upper Yukon R. drainage	To conduct surveys of spawning fish by foot, boat and air etc. To enumerate and recover tags in terminal areas To collect DNA samples from spawning population and aggregate samples from fisheries and large migration corridors	July - Oct	various R&E Fund recipients, consultants YFN's AFS	all aspects
Fishing Branch Chum Salmon Weir	Fishing Branch R.	To enumerate chum salmon returning to the Fishing Branch River and obtain age, size, tag and sex composition data	Aug - Oct	DFO VGG	joint project
Whitehorse Rapids 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	To enumerate Chinook escapement and recover tags To collect ASL data and DNA samples	July-Aug	JW&A RRDC	all aspects
Big Salmon Sonar	Big Salmon River	Installation and operation of a DIDSON sonar program for Chinook Carcass survey for tags, ASL, and DNA	July-Aug	JW&A M&A	all aspects
Escapement Sampling	various tributaries	To collect ASL data and DNA samples	Aug -Oct	DFO	all aspects
Porcupine Mark-Recapture Program	Porcupine River	To conduct chum marking and test fishery program To establish method of conducting in-season local management	Aug -Oct	VGG & EDI	all aspects
Whitehorse Rapids Fish Hatchery and Coded-Wire Tagging Project	Whitehorse	To rear and release ~150K Chinook fry from broodstock collected at the Whitehorse Rapids Fishway To mark fry with CWT, adipose clip, 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 rear up to 120K Chinook fry from broodstock collected from the Takhini River and/or Tatchun Creek To mark fry with CWT, adipose clip, and release at natal sites	ongoing	DFO YC NRI	technical support field work, project monitoring

Acronyms:

AFS = Aboriginal Fisheries Strategy
DFO = Department of Fisheries and Oceans Canada
EDI = Environmental Dynamics Incorporated
JW&A = Jane Wilson & Associates
M&A = Mercer and Asociates Ltd.
NRI = Northern Research Institute
RR = Government of Yukon- Renewable Resources
THFN = Tr'ondek Hwech'in First Nation
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, 2006.

		Summer		Fall	
District	Fishery [a]	Chinook	Chum	Chum	Coho
1	Subsistence	5,122	27,881	3,902	1,177
	Commercial	23,748	21,816	101,254	39,323
	Test Fish Sales	817	502	0	0
	Total	29,687	50,199	105,156	40,500
2	Subsistence	8,039	31,655	4,015	2,459
	Commercial	19,843	25,543	39,905	14,482
	Test Fish Sales	0	0	0	0
	Total	27,882	57,198	43,920	16,941
3	Subsistence	5,374	3,534	480	83
	Commercial	315	116	0	0
	Commercial Related [b]	0	0	0	0
	Total	5,689	3,650	480	83
Total	Subsistence	18,535	63,070	8,397	3,719
Lower	Commercial	43,906	47,475	141,159	53,805
Yukon	Commercial Related [b]	0	0	0	0
Area	Test Fish Sales	817	502	0	0
	Total	63,258	111,047	149,556	57,524
4	Subsistence	12,022	14,997	6,335	1,302
	Commercial	0	0	0	0
	Commercial Related [b]	0	0	0	0
	Test Fish Sales	0	0	0	0
	Total	12,022	14,997	6,335	1,302
5	Subsistence	15,924	11,845	52,143	3,779
	Commercial	1,839	20	10,030	0
	Commercial Related [b]	0	0	0	0
	Total	17,763	11,865	62,173	3,779
6	Subsistence	1,229	1,010	16,925	10,571
	Commercial	84	44,621	23,353	11,137
	Commercial Related [b]	0	0	0	0
	Personal use	89	262	333	279
	Total	1,402	45,893	40,611	21,987
Total	Subsistence	29,175	27,852	75,403	15,652
Upper	Commercial	1,923	44,641	33,383	11,137
Yukon	Commercial Related [b]	0	0	0	0
Area	Personal use	89	262	333	279
	Total	31,187	72,755	109,119	27,068
Total	Subsistence	47,710	90,922	83,800	19,371
Yukon	Commercial	45,829	92,116	174,542	64,942
Area	Commercial Related [b]	0	0	0	0
(Alaska)	Personal use	89	262	333	279
	Test Fish sales	817	502	0	0
	Sport Fish [c]	739	1,059	0	1,000
	Total	95,184	184,861	258,675	85,592
	Domestic	63			
Total	Aboriginal (mainstem)	5,757	0	2,521	0
Canada	Sport Fish	606	0	0	0

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District	Fishery	Summer Chinook	Summer Chum	Fall Chum	Fall Coho
	Test Fish harvest [d]	0	0	0	0
	Commercial	2,332	0	4,096	1
	Subtotal	8,758	0	6,617	1
	Porcupine Aboriginal	314	0	5,179	111
	Total	9,072	0	11,796	112
Grand Total		104,256	184,861	270,471	85,704

[a] Commercial harvest includes only fish sold in the round. Does not include subsistence harvest from coastal communities of Hooper and Scammon Bays.

[b] Commercial related is the estimated harvest of females to produce roe sales.

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

[d] The Canadian test fishery is for management purposes. Chinook salmon that are retained are given to Aboriginal and Domestic users, but are not reported under those categories. Chum salmon caught in the test fishery are all intended to be released, but any that are retained are reported under the Porcupine Aboriginal harvest.

Appendix A6.–Alaskan commercial salmon sales and estimated harvest by district 2006.

District/ Subdistrict	Number of Fishermen[a]	Chinook Sold in Round	Chinook Pounds of Roe	Chinook Estimated Harvest[b]	Summer Chum Sold in Round	Summer Chum Pounds of Roe	Summer Chum Estimated Harvest[b]	Fall Chum Sold in Round	Fall Chum Pounds of Roe	Fall Chum Estimated Harvest[b]	Coho Sold in Round	Coho Pounds of Roe	Coho Estimated Harvest[b]
1	396	23,748	0	23,748	21,816	0	21,816	101,254	0	101,254	39,323	0	39,323
	224	19,843	0	19,843	25,543	0	25,543	39,905	0	39,905	14,482	0	14,482
Subtotal	571	43,591	0	43,591	47,359	0	47,359	141,159	0	141,159	53,805	0	53,805
3	6	315	0	315	116	0	116	0	0	0	0	0	0
Total Lower Yukon	574	43,906	0	43,906	47,475	0	47,475	141,159	0	141,159	53,805	0	53,805
Anvik River	0	0	0	0	0	0	0	0	0	0	0	0	0
4-A	0	0	0	0	0	0	0	0	0	0	0	0	0
4-BC	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal District 4[c]	0	0	0	0	0	0	0	0	0	0	0	0	0
5-ABC	20	1,839	0	1,839	20	0	20	10,030	0	10,030	0	0	0
5-D	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal District 5	20	1,839	0	1,839	20	0	20	10,030	0	10,030	0	0	0
6	16	84	0	84	44,621	0	44,621	23,353	0	23,353	11,137	0	11,137
Total Upper Yukon	36	1,923	0	1,923	44,641	0	44,641	33,383	0	33,383	11,137	0	11,137
Total Alaska	610	45,829	0	45,829	92,116	0	92,116	174,542	0	174,542	64,942	0	64,942

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.

[b] Unless otherwise noted, estimated harvest is the number of fish sold in the round plus the estimated number of females harvested to produce roe sold (pounds of roe sold divided by weighted average roe weight per female).

[c] Estimated harvest includes both males and females harvested to produce roe sold (pounds of roe sold divided by weighted average roe weight per female divided by average percent females in the harvest). Summer chum salmon sold in the round in District 4 are assumed to be males and are included in the estimated harvest calculation.

Appendix A7.–Commercial salmon and salmon roe sales by statistical area, Yukon Area, 2006.

Statistical Area	Chinook			Summer Chum			Fall Chum			Coho			Total Salmon		
	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]
334-11	2,252	0	2,252	4,310	0	4,310	163	0	163	7	0	7	6,732	0	6,732
12	2,106	0	2,106	3,181	0	3,181	16,212	0	16,212	3,034	0	3,034	24,533	0	24,533
13	1,558	0	1,558	1,915	0	1,915	9,929	0	9,929	2,467	0	2,467	15,869	0	15,869
14	928	0	928	899	0	899	9,973	0	9,973	2,315	0	2,315	14,115	0	14,115
15	3,507	0	3,507	2,315	0	2,315	7,538	0	7,538	3,508	0	3,508	16,868	0	16,868
16	2,476	0	2,476	1,441	0	1,441	9,568	0	9,568	15,280	0	15,280	28,765	0	28,765
17	6,201	0	6,201	4,382	0	4,382	32,200	0	32,200	10,196	0	10,196	52,979	0	52,979
18	4,720	0	4,720	3,373	0	3,373	15,671	0	15,671	2,516	0	2,516	26,280	0	26,280
Subtotal District 1	23,748	0	23,748	21,816	0	21,816	101,254	0	101,254	39,323	0	39,323	186,141	0	186,141
334-21	3,750	0	3,750	6,325	0	6,325	3,362	0	3,362	2,138	0	2,138	15,575	0	15,575
22	8,457	0	8,457	10,523	0	10,523	21,069	0	21,069	7,250	0	7,250	47,299	0	47,299
23	2,700	0	2,700	2,080	0	2,080	11,060	0	11,060	3,745	0	3,745	19,585	0	19,585
24	3,425	0	3,425	5,805	0	5,805	4,414	0	4,414	1,349	0	1,349	14,993	0	14,993
25	1,511	0	1,511	810	0	810	0	0	0	0	0	0	2,321	0	2,321
Subtotal District 2	19,843	0	19,843	25,543	0	25,543	39,905	0	39,905	14,482	0	14,482	99,773	0	99,773
334-31	315	0	315	116	0	116							431	0	431
32	0	0	0	0	0	0			NO COMMERCIAL FISHING				0	0	0
Subtotal District 3	315	0	315	116	0	116	0	0	0	0	0	0	431	0	431
Total Lower Yukon	43,906	0	43,906	47,475	0	47,475	141,159	0	141,159	53,805	0	53,805	286,345	0	286,345

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Statistical	Chinook			Summer Chum			Fall Chum			Coho			Total Salmon		
Area	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]	Numbers	Roe	Estimated Harvest [a]
334-42															
43							NO COMMERCIAL FISHING								
44							0	0	0	0	0	0	0	0	0
45							0	0	0	0	0	0	0	0	0
46							0	0	0	0	0	0	0	0	0
47		NO COMMERCIAL FISHING					0	0	0	0	0	0	0	0	0
Subtotal District 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
334-51						NO COMMERCIAL FISHING							0	0	0
52	1,394	0	1,394	20	0	20	0	0	0	0	0	0	1,414	0	1,414
53	445	0	445	0	0	0	10,030	0	10,030	0	0	0	10,475	0	10,475
54													0	0	0
55						NO COMMERCIAL FISHING							0	0	0
Subtotal District 5	1,839	0	1,839	20	0	20	10,030	0	10,030	0	0	0	11,889	0	11,889
334-61						NO COMMERCIAL FISHING							0	0	0
62	0	0	0	37,758	0	37,758	23,353	0	23,353	11,137	0	11,137	72,248	0	72,248
63	84	0	84	6,863	0	6,863	0	0	0	0	0	0	6,947	0	6,947
Subtotal District 6	84	0	84	44,621	0	44,621	23,353	0	23,353	11,137	0	11,137	79,195	0	79,195
Total Upper Yukon	1,923	0	1,923	44,641	0	44,641	33,383	0	33,383	11,137	0	11,137	91,084	0	91,084
Grand Total Yukon Area	45,829	0	45,829	92,116	0	92,116	174,542	0	174,542	64,942	0	64,942	377,429	0	377,429

Note: Sales reported in numbers of fish sold in the round and pounds of unprocessed roe. Does not include ADF&G test fishery sales.

[a] Estimated harvest includes the estimated number of females to produce the roe sold.

Appendix A8.–Commercial salmon sales and estimated harvest by statistical area, all gears combined, Upper Yukon Area, 2006.

Beach Seine, Purse Seine, Set Gillnet and Fish Wheel Combined													
Statistical	Number of	Chinook			Summer Chum			Fall Chum			Coho		
Area	Fishermen [b]	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest
334-42						NO COMMERCIAL FISHING							
334-43													
334-44	0	0	0	0	0	0	0	0	0	0	0	0	0
334-45	0	0	0	0	0	0	0	0	0	0	0	0	0
334-46	0	0	0	0	0	0	0	0	0	0	0	0	0
334-47	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal													
District 4	0	0	0	0	0	0	0	0	0	0	0	0	0
334-51						NO COMMERCIAL FISHING							
334-52	10	1,394	0	1,394	20	0	20	0	0	0	0	0	0
334-53	11	445	0	445	0	0	0	10,030	0	10,030	0	0	0
334-54													
334-55						NO COMMERCIAL FISHING							
Subtotal													
District 5	20	1,839	0	1,839	20	0	20	10,030	0	10,030	0	0	0
334-61	0	0	0	0	0	0	0	0	0	0	0	0	0
334-62	14	0	0	0	37,758	0	37,758	23,353	0	23,353	11,137	0	11,137
334-63	3	84	0	84	6,863	0	6,863	0	0	0	0	0	0
Subtotal													
District 6	16	84	0	84	44,621	0	44,621	23,353	0	23,353	11,137	0	11,137
Total Upper													
Yukon Area	36	1,923	0	1,923	44,641	0	44,641	33,383	0	33,383	11,137	0	11,137

Note: The estimated harvest is the number of fish sold in the round plus estimated number of females harvested to produce roe sold.

[a] The 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 sales and estimated harvest by statistical area, Upper Yukon Area, 2006.

Set Gillnet													
Statistical Area	Number of Fishermen [a]	Chinook			Summer Chum			Fall Chum			Coho		
		Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest
334-42													
334-43													
334-44	0	0	0	0	0	0	0	0	0	0	0	0	0
334-45	0	0	0	0	0	0	0	0	0	0	0	0	0
334-46	0	0	0	0	0	0	0	0	0	0	0	0	0
334-47	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal District 4	0	0	0	0	0	0	0	0	0	0	0	0	0
334-51													
334-52	3	152	0	152	0	0	0	0	0	0	0	0	0
334-53	5	370	0	370	0	0	0	484	0	484	0	0	0
334-54													
334-55													
Subtotal District 5	8	522	0	522	0	0	0	484	0	484	0	0	0
334-61	0	0	0	0	0	0	0	0	0	0	0	0	0
334-62	2	0	0	0	870	0	870	0	0	0	0	0	0
334-63	1	10	0	10	466	0	466	0	0	0	0	0	0
Subtotal District 6	2	10	0	10	1,336	0	1,336	0	0	0	0	0	0
Total Upper Yukon Area	10	532	0	532	1,336	0	1,336	484	0	484	0	0	0

Note: The estimated harvest is the number of fish sold in the round plus estimated number of females harvested to produce roe sold.

[a] The 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 sales and estimated harvest by statistical area, Upper Yukon Area, 2006.

Fish Wheel													
Statistical Area	Number of Fishermen [a]	Chinook			Summer Chum			Fall Chum			Coho		
		Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest	Number	Roe	Estimated Harvest
334-42						NO COMMERCIAL FISHING							
334-43													
334-44	0	0	0	0	0	0	0	0	0	0	0	0	0
334-45	0	0	0	0	0	0	0	0	0	0	0	0	0
334-46	0	0	0	0	0	0	0	0	0	0	0	0	0
334-47	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal District 4	0	0	0	0	0	0	0	0	0	0	0	0	0
334-51						NO COMMERCIAL FISHING							
334-52	7	1,206	0	1,206	20	0	20	0	0	0	0	0	0
334-53	6	111	0	111	0	0	0	9,546	0	9,546	0	0	0
334-54						NO COMMERCIAL FISHING							
334-55													
Subtotal District 5	12	1,317	0	1,317	20	0	20	9,546	0	9,546	0	0	0
334-61	0	0	0	0	0	0	0	0	0	0	0	0	0
334-62	12	0	0	0	36,888	0	36,888	23,353	0	23,353	11,137	0	11,137
334-63	2	74	0	74	6,397	0	6,397	0	0	0	0	0	0
Subtotal District 6	14	74	0	74	43,285	0	43,285	23,353	0	23,353	11,137	0	11,137
Total Upper Yukon Area	26	1,391	0	1,391	43,305	0	43,305	32,899	0	32,899	11,137	0	11,137

Note: The estimated harvest is the number of fish sold in the round plus estimated number of females harvested to produce roe sold.

[a] The 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, 1977–2006.

	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
2006	3,290,367	32,631	3,322,998	23,862	42,988	66,850	3,389,848
2001-2005 Average	1,715,617	24,881	1,740,498	5,163	7,236	12,399	1,752,897

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

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Fall Season							
Fall Chum			Coho				
Lower Yukon	Upper Yukon		Lower Yukon	Upper Yukon		Total	Total
Value	Value	Subtotal	Value	Value	Subtotal	Season	Value
718,571	102,170	820,741	140,914	2,251	143,165	963,906	4,267,466
691,854	103,091	794,945	96,823	6,105	102,928	897,873	5,740,191
1,158,485	347,814	1,506,299	83,466	6,599	90,065	1,596,364	7,171,515
394,162	198,088	592,250	17,374	2,374	19,748	611,998	5,789,752
1,503,744	356,805	1,860,549	87,385	4,568	91,953	1,952,502	10,020,605
846,492	53,258	899,750	135,828	18,786	154,614	1,054,364	6,675,742
591,011	128,950	719,961	17,497	11,472	28,969	748,930	6,964,229
374,359	103,417	477,776	256,050	12,823	268,873	746,649	5,669,624
634,616	178,125	812,741	176,254	26,797	203,051	1,015,792	7,019,369
399,321	30,309	429,630	211,942	556	212,498	642,128	6,261,115
0	0	0	0	0	0	0	7,202,358
638,700	151,300	790,000	734,400	34,116	768,516	1,558,516	13,379,691
713,400	223,996	937,396	323,300	33,959	357,259	1,294,655	10,179,350
238,165	174,965	413,130	137,302	37,026	174,328	587,458	6,517,794
438,310	157,831	596,141	300,182	21,556	321,738	917,879	9,552,796
0	54,161	54,161	0	19,529	19,529	73,690	11,331,871
0	0	0	0	0	0	0	5,427,795
0	8,517	8,517	0	8,739	8,739	17,256	4,786,687
185,036	167,571	352,607	80,019	11,292	91,311	443,918	7,150,405
48,579	45,438	94,017	96,795	13,020	109,815	203,832	4,797,993
86,526	7,252	93,778	79,973	1,062	81,035	174,813	5,889,300
0	0	0	0	0	0	0	1,955,891
35,639	876	36,515	3,620	0	3,620	40,135	5,086,539
0	0	0	0	0	0	0	734,239
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1,722,367
5,993	3,398	9,391	18,168	5,095	23,263	32,654	1,953,277
1,126	848	1,974	2,774	6,372	9,146	11,120	3,131,606
316,698	48,159	364,857	83,793	19,182	102,975	467,832	2,468,839
202,637	33,806	236,443	50,299	11,137	61,436	297,879	3,687,727
64,763	10,481	75,244	20,947	6,130	27,077	102,321	1,855,218

Appendix A12.–Salmon processors, buyers, catcher-sellers, and associated data, Yukon Area, 2006.

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 118535 Marshall, AK 99585 (Marshall)	Fresh Salmon Chinook, Chum Salmon Roe	2 and 3
B. B. Kings 1518 Valarian Street Anchorage, AK 99508 (St. Mary's)	Fresh Salmon Chinook, Chum Coho	1, 2, and 3
Interior Alaska Fish Processors, Inc. 2400 Davis Road Fairbanks, AK 99701 (Fairbanks, Nenana, North Pole, Rapids)	Frozen Salmon Chinook, Chum, Coho Salmon Roe	4, 5, and 6
Great Ruby Fish Company 2005 Saratoga Avenue Anchorage, AK 99517 (Kaltag and Nenana)	Fresh Salmon Chinook, Chum, Coho Salmon Roe	4 and 6
Linda Johnson (catcher/seller) PO Box 57 Manley Hot Springs, AK 99756 (Rapids)	Frozen Salmon Fresh Salmon Chinook, Chum	5
Inlet Fish Producers, Inc. PO Box 114 Kenai, AK 99611 (Nenana)	Frozen Salmon Fresh Salmon Chinook, Chum, Coho Salmon Roe	6

Appendix A13.–Historical daily and cumulative CPUE for Chinook salmon, Lower Yukon River set net test fishery, 1989–2005 average and 2005 compared to 2006.

	Chinook Salmon in 8.5" Set Gillnets							
	2006				2005		1989–2005 Average	
Date	Daily Catch	Daily CPUE	Cumulative CPUE	Comm/period Hrs Fished District 1	Daily CPUE	Cumulative CPUE	Daily CPUE	Cumulative [a] CPUE
26 May								
27 May							0.000	
28 May							0.000	0.12
29 May							0.000	0.19
30 May							0.000	0.32
31 May							0.001	0.43
1 Jun					0.00	0.00	0.003	0.47
2 Jun					0.04	0.04	0.006	0.68
3 Jun					0.05	0.09	0.011	0.81
4 Jun	0	0 [b]	0.00		0.09	0.18	0.018	1.02
5 Jun	0	0 [b]	0.00		0.07	0.25	0.024	1.29
6 Jun	1	0.02 [b]	0.02		0.07	0.32	0.031	1.67
7 Jun	4	0.04 [c]	0.06		0.02	0.34	0.039	2.09
8 Jun	3	0.03	0.09		0.22	0.56	0.050	2.29
9 Jun	5	0.05	0.14		0.03	0.59	0.065	3.05
10 Jun	8	0.08	0.22		0.36	0.95	0.088	3.70
11 Jun	8	0.08	0.30		0.70	1.65	0.117	4.36
12 Jun	8	0.08	0.38		0.96	2.61	0.150	5.23
13 Jun	23	0.24	0.62		0.61	3.22	0.193	6.20
14 Jun	38	0.40	1.02		0.27	3.49	0.249	7.02
15 Jun	86	0.90	1.92		0.21	3.70	0.306	7.82
16 Jun	118	1.23	3.15		0.46	4.16	0.359	8.78
17 Jun	102	1.06	4.21		0.51	4.67	0.412	9.71
18 Jun	56	0.58			0.49	5.16	0.461	10.69
19 Jun	30	0.31	5.10	3	1.22	6.38	0.505	11.67
20 Jun	43	0.45	5.55	3	0.68	7.06	0.540	12.51
21 Jun	70	0.73	6.28		0.52	7.58	0.572	13.55
22 Jun	75	0.78	7.06		0.79	8.37	0.604	14.58
23 Jun	194	2.02	9.08		1.29	9.66	0.631	15.43
24 Jun	205	2.14	11.22		0.81	10.47	0.666	16.53
25 Jun	210	2.19	13.41		0.48	10.95	0.718	17.42
26 Jun	129	1.34	14.75	6	1.07	12.02	0.770	18.25
27 Jun	69	0.72	15.47		0.64	12.66	0.805	18.92
28 Jun	116	1.21	16.68		0.46	13.12	0.828	19.53
29 Jun	85	0.89	17.57	6	0.53	13.65	0.849	20.18
30 Jun	81	0.84	18.41	3	0.57	14.22	0.871	20.68
1 Jul	65	0.68	19.09		0.44	14.66	0.888	21.13
2 Jul	60	0.63	19.72		0.58	15.24	0.900	21.58
3 Jul	46	0.48	20.20	6	0.44	15.68	0.912	21.98
4 Jul	28	0.29	20.49	3	0.36	16.04	0.921	22.29
5 Jul	20	0.21	20.70		0.32	16.36	0.931	22.62
6 Jul	14	0.15	20.85	6	0.23	16.59	0.942	22.88
7 Jul	19	0.20	21.05		0.28	16.87	0.954	23.11
8 Jul	15	0.16	21.21		0.24	17.11	0.967	23.32
9 Jul	13	0.14	21.35		0.09	17.20	0.977	23.49
10 Jul	6	0.06	21.41		0.11	17.31	0.984	23.64
11 Jul	15	0.16	21.57		0.15	17.46	0.989	23.74
12 Jul	5	0.05	21.62		0.06	17.52	0.992	23.83
13 Jul	3	0.03	21.65		0.00	17.52	0.995	23.93
14 Jul	8	0.08	21.73		0.03	17.55	0.997	24.01
15 Jul	8	0.08	21.81		0.05	17.60	1.000	24.07
Total	2,092		21.81			17.60		24.07

[a] The box within the column indicates the first to the third quartile of the cumulative index. The median date of the cumulative index is also highlighted.

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

[c] Big Eddy test nets only.

[d] Middle Mouth set nets operational and included.

Appendix A14.–Pilot Station sonar project passage estimates, Yukon River drainage, 1995, 1997–2006.

	1995	1997 [a]	1998	1999	2000	2001 [b]	2002	2003	2004	2005 [c]	2006		
Species	Passage Estimates										Passage Estimate	Lower 90% Confidence Interval	Upper 90% Confidence Interval
Large Chinook [d]	130,271	118,121	71,177	127,809	39,233	85,511	92,584	245,037	110,236	142,007	145,553	124,405	166,701
Small Chinook	32,674	77,526	16,675	16,914	5,195	13,892	30,629	23,500	46,370	17,434	23,850	18,370	29,330
Chinook Total	162,945	195,647	87,852	144,723	44,428	99,403	123,213	268,537	156,606	159,441	169,403	147,557	191,249
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	3,767,044	3,607,810	3,926,278
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	790,563	727,848	853,278
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	4,557,607	4,386,467	4,728,747
Coho [e]	101,806	104,343	136,906	62,521	175,421	137,769	122,566	269,081	188,350	184,718	131,919	112,381	151,457
Pink	24,604	2,379	66,751	1,801	35,501	665	64,891	4,656	243,375	37,932	115,624	98,206	133,042
Other Species [f]	1,011,855	621,857	277,566	465,515	361,222	353,431	557,779	502,878	637,257	593,248	875,899	783,367	968,431
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	5,850,452		

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

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

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

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

[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, 2006.

District	Residence	Gillnet Permits (S04Y)
1, 2, and 3	Alakanuk	78
	Anchorage	41
	Aniak	1
	Bethel	16
	Chevak	3
	Dillingham	1
	Eagle River	2
	Elim	1
	Emmonak	97
	Fairbanks	9
	Fortuna Ledge	3
	Girdwood	1
	Glennallen	1
	Holy Cross	8
	Homer	1
	Hooper Bay	2
	Juneau	2
	Kalskag	1
	Kotlik	75
	Kotzebue	1
	Kwethluk	1
	Manley Hot Springs	2
	Marshall	37
	Mountain Village	80
	Newhalen	1
	Newtok	1
	Ninilchik	2
	Nome	3
	Nunam Iqua	13
	Palmer	1
	Pilot Station	52
	Pitkas Point	1
	Russian Mission	13
	Scammon Bay	35
	Shageluk	1
	Shaktoolik	1
	Sitka	1
	St. Marys	70
	St. Michael	3
	Stebbins	8
	Sutton	1
	Talkeetna	1
	Tuluksak	1
	Wasilla	7
	Willow	1
	Rock Hill, SC	1
	Everett, WA	1
	Snohomish, WA	1
	Twisp, WA	1
Total Lower Yukon Area		685

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District	Residence	Gillnet Permits (S04P)	Fish Wheel Permits (S08P)	Total
4, 5, and 6	Anchorage	3	5	8
	Anchor Pt.	0	2	2
	Aniak	0	0	0
	Anvik	5	7	12
	Circle City	0	1	1
	Dot Lake	0	1	1
	Eagle River	0	1	1
	Fairbanks	28	24	52
	Fort Wainwright	0	1	1
	Ft. Yukon	0	1	1
	Galena	3	8	11
	Grayling	4	5	9
	Holy Cross	1	0	1
	Huslia	0	1	1
	Kaltag	2	8	10
	Koyukuk	0	0	0
	Manley Hot Springs	2	5	7
	Nenana	6	18	24
	North Pole	2	3	5
	Nulato	0	9	9
	Palmer	0	0	0
	Rampart	1	1	2
	Ruby	1	5	6
	Salcha	1	0	1
	Soldotna	1	1	2
	Stevens Village	0	3	3
	Tanana	2	14	16
	Valdez	0	1	1
	Wasilla	1	2	3
	Valley Village, CA	1	0	1
	Lusk, WY	1	1	2
Total Upper Yukon Area		65	128	193
Grand Total Yukon Area		750	128	878

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, 2006.

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	9:00 PM	19 Jun	3:00 AM	20 Jun	U	6	306	4,726	87,842	18.6	6,894	48,422	7.0
2	Midnight	25 Jun	6:00 AM	26 Jun	U	6	335	7,219	139,887	19.4	5,957	40,529	6.8
3	6:00 PM	29 Jun	3:00 AM	30 Jun	U	9	339	7,654	149,483	19.5	6,018	41,081	6.8
4	6:00 PM	3 Jul	3:00 AM	4 Jul	U	9	319	3,096	61,269	19.8	2,325	15,724	6.8
5	6:00 PM	6 Jul	Midnight	6 Jul	U	6	246	1,033	20,648	20.0	622	4,013	6.5
		Chinook salmon sold in the fall season						20	351	17.6			
Guideline Harvest Range 1 and 2 Combined	60,000 to 120,000												
District 1 Subtotal:						36	379	23,748	459,480	19.3	21,816	149,769	6.9

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	6:00 PM	15 Jun	9:00 PM	15 Jun	U	3	139	917	17,097	18.6	1,091	8,546	7.8
2	10:00 PM	22 Jun	Midnight	22 Jun	R	2	83	478	4,942	10.3	11,785	79,180	6.7
3	6:00 PM	24 Jun	Midnight	24 Jun	U	6	186	5,911	111,461	18.9	5,078	35,519	7.0
4	6:00 PM	27 Jun	Midnight	27 Jun	U	6	186	7,144	132,608	18.6	4,011	26,877	6.7
5	6:00 PM	2 Jul	Midnight	2 Jul	U	6	191	3,903	73,667	18.9	2,281	15,213	6.7
6	6:00 PM	6 Jul	Midnight	6 Jul	U	6	147	1,481	27,265	18.4	1,297	8,491	6.5
		Chinook salmon sold in the fall season						9	61	6.8			
Guideline Harvest Range 1 and 2 Combined	60,000 to 120,000												
District 2 Subtotal:						29	214	19,843	367,101	18.5	25,543	173,826	6.8

District 3

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	2:00 PM	21 Jun	8:00 PM	21 Jun	U	6	6	232	4,269	18.4	77	575	7.5
2	6:00 PM	26 Jun	Midnight	26 Jun	U	6	4	83	1,527	18.4	39	269	6.9
Guideline Harvest Range 1,800 to 2,200													
District 3 Subtotal:						12	6	315	5,796	18.4	116	843	7.3
Lower Yukon Area, Summer Season, Districts 1 and 2 Subtotal:						65		43,591	826,581	19.0	47,359	323,595	6.8
Districts 3 Subtotal:						12		315	5,796	18.4	116	843	7.3
Districts 1,2 and 3 Subtotal:						77	569	43,906	832,377	19.0	47,475	324,438	6.8

U=UNRESTRICTED, R=6" MAXIMUM MESH SIZE

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Subdistrict 4 A[a]

Period Number	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Chinook Salmon Numbers	Chinook Salmon Pounds of Roe	Chinook Salmon Estimated Harvest \a	Summer Chum Salmon Numbers	Summer Chum Salmon Pounds of Roe	Summer Chum Salmon Estimated Harvest \a
1	6:00 PM	4 Jul	6:00 PM	9 Jul	120	0	0	0	0	0	0	0
2	6:00 PM	11 Jul	6:00 PM	16 Jul	120	0	0	0	0	0	0	0
3	6:00 PM	18 Jul	6:00 PM	23 Jul	120	0	0	0	0	0	0	0
Subdistrict 4 A Subtotal:					360		0	0	0	0	0	0

Subdistricts 5 B, and 5 C

Period Number	Starting Time	Start Date	Ending Time	End Date	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	7 Jul	6:00 AM	8 Jul	12	9	271	3,525	13.0	0	0	0.0
2	6:00 PM	8 Jul	6:00 AM	9 Jul	12	12	458	6,098	13.3	20	140	7.0
3	6:00 PM	11 Jul	6:00 AM	12 Jul	12	11	447	6,248	14.0	0	0	0.0
4	6:00 PM	12 Jul	6:00 AM	13 Jul	12	9	357	4,458	12.5	0	0	0.0
5	6:00 PM	14 Jul	6:00 AM	15 Jul	12	9	306	4,249	13.9	0	0	0.0
Subdistricts 5 B, and 5 C Subtotals:					60	15	1,839	24,577	13.4	20	140	7.0

Subdistricts 6 A, 6 B, and 6 C

Period Number	Starting Time	Start Date	Ending Time	End Date	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	7 Jul	12 Noon	9 Jul	42	0	0	0	0.0	0	0	0.0
2	6:00 PM	14 Jul	12 Noon	16 Jul	42	4	82	584	7.1	1,813	10,878	6.0
3	12 Noon	22 Jul	12 Noon	23 Jul	24	6	0	0	0.0	5,108	30,648	6.0
4	6:00 PM	24 Jul	12 Noon	26 Jul	42	8	1	7	7.1	7,733	46,380	6.0
5	6:00 PM	28 Jul	6:00 PM	2 Aug	120	10	0	0	0.0	24,065	144,390	6.0
6	6:00 PM	4 Aug	6:00 PM	9 Aug	120	8	1	7	0.0	5,902	41,068	7.0
District 6 Subtotal:					390	10	84	598	7.1	44,621	273,364	6.1
Upper Yukon Area, Summer Season, Districts 4, 5, and 6 Subtotals:					810	25	1,923	25,175	13.1	44,641	273,504	6.1
Yukon Area, Summer Season, All Districts Total:					887	594	45,829	857,552	18.7	92,116	597,942	6.5

Note: No commercial fishing occurred in Subdistricts 4-B, 4-C, 5-A, and 5-D

[a] Commercial periods were scheduled in 4-A to provide an opportunity for a potential market. No market was established and there was no participation in the scheduled commercial periods.

Appendix A17.–Commercial catches of Chinook and summer chum salmon by mesh size, Districts 1 and 2, Lower Yukon Area, 1961–2006.

	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 [f]	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 [g]	32,180	21,494	53,674	126,360	38,548	765,233
1990 [g]	42,092	24,000	66,092	99,588	18,147	281,418
1991 [g]	52,074	36,290	88,364	108,986	4,145	205,610
1992 [g]	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 [h]	61,633	41,692	103,325	39,832	608	15,369
1995	74,827	39,607	114,434	113,860	3,098	112,223
1996	56,642	30,209	86,851	123,233	0	0
1997	63,062	39,052	102,114	49,953	3,611	28,204
1998	24,202	16,806	41,008	20,314	1,211	7,804
1999	37,145	27,119	64,264	27,883	0	0
2000	4,735	3,783	8,518	6,624	0	0
2001 [k]	0	0	0	0	0	0
2002	11,087	11,434	22,521	10,354	0	0
2003	22,709	14,220	36,929	6,162	0	0
2004	28,403	24,145	52,548	20,652	0	0
2005	16,619	13,413	30,032	32,278	0	0
2006	23,728	19,356	43,084	35,574	478	11,785
10 Year Average 1986-1995	50,232	32,579	82,811	120,201	17,103	322,449
10 Year Average 1996-2005	26,460	18,018	44,479	29,745	482	3,601

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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.

[f] Six inch maximum mesh size regulation by emergency order during commercial fishing season became effective in 1985.

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

[h] 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.

[k] No commercial fishery in 2001.

Appendix A18.–Summary of test fish wheel projects conducted in the Upper Yukon Area, 2006.

TEST FISH WHEEL PROJECTS	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
YUKON RIVER									
Tanana Village Test Fish Wheel	BSFA								
Left Bank	P. Moore	690	Jun 24 to Aug 23	61	281	11,112	972	-	Summer season added in 2002. Also operated as Toklat CWT recovery wheel (1996-2000). Project ceased operations prior to the end of the Fall Season.
Yukon River (Rapids) Tag Deployment Fish Wheels	USFWS								
Left Bank [c, d]	S. Zuray	731	Jun 16 to Sep 19	96	2,917	4,438	53,698	-	Left bank wheel uses 24 hr video camera counts.
TANANA RIVER									
Lower Tanana Tag Deployment Fish Wheel	ADF&G								
Right Bank	C. Boulding	793	Aug 16 to Sep 25	43	-	-	4,351	896	Project operation as the fall chum salmon tag deployment fish wheel 1995-current.
Nenana Test and Recovery Fish Wheel	ADF&G								
Right Bank [e]	Paul Kleinschmidt	859	Jul 3 to Aug 9	38	761	10,472	-	-	Project started in 1988 as CPUE fish wheel.
			Aug 16 to Oct 3	48	-	-	14,354	22,513	Also operates as a fall chum salmon tag recovery.
KANTISHNA / TOKLAT RIVERS									
Lower Kantishna River Tag Deployment Fish Wheel	BSFA/ADF&G								
Left Bank	C. Boulding	802	Aug 16 to Sep 25	41	-	-	4,115	622	Project operation 1999-current.
Upper Kantishna River Tag Recovery Fish Wheels									
Right Bank	M. Turner	880	Aug 16 to Oct 6	52	-	-	544	223	Project operation 2000-current.
Left Bank	M. Turner	880	Aug 15 to Oct 5	52	-	-	353	414	Left bank operation 2003-2006. Operated in 2007 for subsistence purposes.
Toklat River Tag Recovery Fish Wheels									
Right Bank	ADF&G Crew	846	Aug 16 to Sep 29	48	-	-	2,284	841	Operated as a mark-recapture recovery wheel 1999-current.
Left Bank	ADF&G Crew	846	Aug 16 to Sep 30	47	-	-	3,626	216	Project operation 1996-current. Also operated as Toklat CWT recovery wheel 1996-2000.

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

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

[c] Video Counts expanded to estimate a 24-hour passage (missing daily counts interpolated for days not fished). Summer and fall chum salmon separated by August 1. Chinook counts terminated August 2.

[d] Estimated summer chum salmon totals include all chum salmon caught through August 4.

[e] Estimated summer chum salmon totals include all chum salmon caught through August 9. Estimated fall chum salmon totals include all chum salmon caught beginning August 16.

Appendix A19.–Summer season emergency order summary for the Lower Yukon River pertaining to the Chinook and summer chum salmon fishery, Yukon Area, 2006.

EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-LY-01-06	Implements the subsistence salmon fishing schedule in District 1 from 8:00 p.m. Mondays until 8:00 a.m. Wednesdays and from 8:00 p.m. Thursdays until 8:00 a.m. Saturdays. Issued May 23, 2006	8:00 p.m. May 29, 2006 Exp. Dec 31, 2006	None	
3-S-LY-02-06	Implements the subsistence salmon fishing schedule in District 2 from 8:00 p.m. Wednesdays until 8:00 a.m. Fridays and from 8:00 p.m. Sundays until 8:00 a.m. Tuesdays. Issued May 23, 2006	8:00 p.m. May 31, 2006 Exp. Dec 31, 2006	None	3-S-LY-01-06
3-S-LY-03-06	Implements the subsistence salmon fishing schedule in District 3 from 8:00 a.m. Fridays until 8:00 p.m. Saturdays and from 8:00 a.m. Tuesdays until 8:00 p.m. Wednesdays. Issued May 23, 2006	8:00 a.m. June 2, 2006 Exp. Dec 31, 2006	None	3-S-LY-01-06 3-S-LY-02-06
3-S-LY-04-06	Restricts non-salmon subsistence fishing gear in Districts 1-3 to gillnets with 4-inch or less mesh, max length 60 ft. Issued May 23, 2006	8:00 p.m. May 29, 2006 Exp. Dec. 31, 2006	None	3-S-LY-01-06 3-S-LY-02-06 3-S-LY-03-06
3-S-LY-05-06	Allows 7 days per week subsistence salmon fishing in the Innoko River. Issued June 1, 2006	8:00 a.m. June 1, 2006 Exp. Dec. 31, 2006	Amended 3-S-LY-03-06	3-S-LY-01-06 3-S-LY-02-06 3-S-LY-03-06 3-S-LY-04-06

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EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-LY-06-06	Opens the commercial fishing season in District 2. Issued June 14, 2006	6:00 p.m. June 15, 2006 Exp. Dec. 31, 2006	None	3-S-LY-01-06 3-S-LY-02-06 3-S-LY-03-06 3-S-LY-04-06
3-S-LY-07-06	Establishes first commercial fishing period in District 2 from 6:00 p.m. Thursday, June 15, 2006 until 9:00 p.m. Thursday, June 15, with unrestricted mesh size. Issued June 14, 2006	6:00 p.m. June 15, 2006 Exp. June 15, 2006	None	3-S-LY-01-06 3-S-LY-02-06 3-S-LY-03-06 3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06
3-S-LY-08-06	Subsistence fishing time adjusted in District 2 from 8:00 p.m. Wednesday, June 14, for 4 hours and close at 12:00 midnight Wednesday, June 14. Subsistence salmon fishing in District 2 will reopen again at 12:00 noon Saturday, June 17, and remain open until 8:00 a.m. Tuesday, June 20. Issued June 14, 2006	8:00 p.m. June 14, 2006 Exp. June 20, 2006	None	3-S-LY-01-06 3-S-LY-02-06 3-S-LY-03-06 3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06
3-S-LY-09-06	Opens the commercial fishing season in District 1. Issued June 18, 2006	9:00 p.m. June 19, 2006 Exp. Dec. 31, 2006	3-S-LY-01-06	3-S-LY-02-06 3-S-LY-03-06 3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06
3-S-LY-10-06	Establishes first commercial fishing period in District 1 from 9:00 p.m. Monday, June 19, until 3:00 a.m. Tuesday, June 20, with unrestricted mesh size. Issued June 18, 2006	9:00 p.m. June 19, 2006 Exp. June 20, 2006	None	3-S-LY-02-06 3-S-LY-03-06 3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06

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EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-LY-11-06	Opens the commercial fishing season in District 3. Issued June 20, 2006	2:00 p.m. June 21, 2006 Exp. Dec. 31, 2006	3-S-LY-03-06	3-S-LY-02-06 3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06
3-S-LY-12-06	Establishes first commercial fishing period in District 3 from 2:00 p.m. Wednesday, June 21, until 8:00 p.m. Wednesday, June 21, with unrestricted mesh size. Issued June 20, 2006	2:00 p.m. June 21, 2006 Exp. June 21, 2006	None	3-S-LY-02-06 3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-13-06	Rescinds the subsistence salmon fishing schedule in District 2. June 22, 2006	10:00 p.m. June 22, 2006 Exp. Dec. 31, 2006	3-S-LY-02-06	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-14-06	Establishes 2nd 2-hour commercial fishing period in District 2 from 10:00 p.m. Thursday, June 22, until 12:00 midnight Thursday, June 22, with mesh restricted to 6-inch. Issued June 22, 2006	10:00 p.m. June 22, 2006 Exp. June 22, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-15-06	Establishes 3rd commercial fishing period in District 2 from 6:00 p.m. Saturday, June 24, 2006 until 12:00 midnight Saturday, June 24, with unrestricted mesh size. Issued June 23, 2006	6:00 p.m. June 24, 2006 Exp. June 24, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-16-06	Establishes 2nd commercial fishing period in District 1 from 12:00 midnight Sunday, June 25, until 6:00 a.m. Monday, June 26, with unrestricted mesh size. Issued June 24, 2006	12:00 midnight June 25, 2006 Exp. June 26, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06

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EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-LY-17-06	Establishes 2nd commercial fishing period in District 3 from 6:00 p.m. Monday, June 26, until 12:00 midnight Monday, June 26, with unrestricted mesh size. Issued June 25, 2006	6:00 p.m. June 26, 2006 Exp. June 26, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-18-06	Establishes 4th commercial fishing period in District 2 from 6:00 p.m. Tuesday, June 27, until 12:00 midnight Tuesday, June 27, with unrestricted mesh size. June 26, 2006	6:00 p.m. June 27, 2006 Exp. June 27, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-19-06	Establishes 3rd commercial fishing period in District 1 from 6:00 p.m. Thursday, June 29, until 3:00 a.m. Friday, June 30, with unrestricted mesh size. Issued June 28, 2006	6:00 p.m. June 29, 2006 Exp. June 30, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-20-06	Establishes 5th commercial fishing period in District 2 from 6:00 p.m. Sunday, July 2, until 12:00 midnight Sunday, July 2, with unrestricted mesh size. Issued July 1, 2006	6:00 p.m. July 2, 2006 Exp. July 2, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-21-06	Establishes 4th commercial fishing period in District 1 from 6:00 p.m. Monday, July 3, until 3:00 a.m. Tuesday, July 4, with unrestricted mesh size. Issued July 2, 2006	6:00 p.m. July 3, 2006 Exp. July 4, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06
3-S-LY-22-06	Establishes a commercial fishing period in Districts 1 and 2 from 6:00 p.m. Thursday, July 6, until 12:00 midnight Thursday, July 6, with unrestricted mesh size. Issued July 5, 2006	6:00 p.m. July 6, 2006 Exp. July 6, 2006	None	3-S-LY-04-06 3-S-LY-05-06 3-S-LY-06-06 3-S-LY-09-06 3-S-LY-11-06

Appendix A20.–Summer season emergency order summary for the Upper Yukon River pertaining to the Chinook and summer chum salmon fishery, Yukon Area, 2006.

EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-UY-01-06	Implements two 48-hour subsistence fishing periods in District 4-A from 6:00 p.m. Sundays to 6:00 p.m. Tuesdays and from 6:00 p.m. Wednesdays to 6:00 p.m. Fridays. Issued June 8, 2006	6:00 p.m. June 11, 2006 Exp. Dec 31, 2006	None	
3-S-UY-02-06	Implements two 48-hour subsistence fishing periods in District 4-B & 4-C from 6:00 p.m. Sundays to 6:00 p.m. Tuesdays and from 6:00 p.m. Wednesdays to 6:00 p.m. Fridays. Issued June 8, 2006	6:00 p.m. June 11, 2006 Exp. Dec 31, 2006	None	3-S-UY-01-06
3-S-UY-03-06	Non-salmon subsistence fishing gear to gillnets with 4-inch or less mesh, max length 60 ft. Issued June 8, 2006	6:00 p.m. June 11, 2006 Exp. Dec 31, 2006	None	3-S-UY-01-06 3-S-UY-02-06
3-S-UY-04-06	Implements two 48-hour subsistence fishing periods in District 5 from 6:00 p.m. Tuesdays to 6:00 p.m. Thursdays and from 6:00 p.m. Fridays to 6:00 p.m. Sundays. Issued June 18, 2006	6:00 p.m. June 20, 2006 Exp. Dec 31, 2006	None	3-S-UY-01-06 3-S-UY-02-06 3-S-UY-03-06
3-S-UY-05-06	Opens the commercial salmon fishing season in Subdistrict 4-A which schedules subsistence fishing to 5 days per week from 6:00 p.m. Tuesdays to 6:00 p.m. Sundays. Issued June 27, 2006	6:00 p.m. June 28, 2006 Exp. Oct. 1, 2006	3-S-UY-01-06	3-S-UY-02-06 3-S-UY-03-06 3-S-UY-04-06

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EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-UY-06-06	Opens the commercial salmon fishing season in Subdistrict 4-B and 4-C and schedules subsistence fishing 5 days per week from 6:00 p.m. Sundays to 6:00 p.m. Fridays. Issued June 29, 2006	6:00 p.m. July 2, 2003 Exp. Oct. 1, 2006	3-S-UY-02-06	3-S-UY-03-06 3-S-UY-04-06 3-S-UY-05-06
3-S-UY-07-06	Schedules commercial salmon fishing periods 5 days per week concurrent with subsistence fishing periods in Subdistrict 4-A. Issued June 30, 2006	6:00 p.m. June 30, 2006 Exp. Oct. 1, 2006	None	3-S-UY-03-06 3-S-UY-04-06 3-S-UY-05-06 3-S-UY-06-06
3-S-UY-08-06	Opens commercial fishing season in District 5 and schedules two 12- hour periods in Subdistricts 5-B and 5-C from 6:00 p.m. Friday, July 7, until 6:00 a.m. Saturday, July 8, and from 6:00 p.m. Saturday, July 8, until 6:00 a.m. Sunday, July 9. Issued July 3, 2006	6:00 p.m. July 7, 2006 Exp. Oct. 1, 2006	3-S-UY-04-06	3-S-UY-03-06 3-S-UY-05-06 3-S-UY-06-06 3-S-UY-07-06
3-S-UY-09-06	Opens commercial salmon fishing season in District 6 and schedules one 42-hour commercial period from 6:00 p.m. Friday, July 7, until 12:00 noon Sunday, July 9 concurrent with subsistence and personal use fishing District 6. Issued July 4, 2006	6:00 p.m. July 7, 2006 Exp. Oct.1, 2006	None	3-S-UY-03-06 3-S-UY-05-06 3-S-UY-06-06 3-S-UY-07-06 3-S-UY-08-06
3-S-UY-10-06	Implements 7 days per week subsistence schedule in District 4. Issued July 6, 2006	6:00 p.m. July 6, 2006 Exp. Oct. 1 2006	Modified 3-S-UY-06-06 3-S-UY-07-06	3-S-UY-03-06 3-S-UY-05-06 3-S-UY-07-06 3-S-UY-08-06 3-S-UY-09-06

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EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-UY-11-06	Establishes two additional 12-hour commercial fishing periods in Subdistricts 5-B and 5-C from 6:00 p.m. Tuesday, July 11, until 6:00 a.m. Wednesday, July 12, and from 6:00 p.m. Wednesday, July 12, until 6:00 a.m. Thursday, July 13. Issued July 10, 2006	6:00 p.m. July 11, 2006 Exp. July 13, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06
3-S-UY-12-06	Establishes one 42-hour commercial fishing period from 6:00 p.m. Friday, July 14, until 12:00 noon Sunday, July 16, which is concurrent with the subsistence fishing and personal use schedule in District 6. Issued July 10, 2006	6:00 p.m. July 14, 2006 Exp. July 16, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-11-06
3-S-UY-13-06	Extends subsistence drift fishing schedule for 7 days in District 4-A. Issued July 12, 2006	12:00 a.m. July 14, 2006 Exp. July 21, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-12-06
3-S-UY-14-06	Establishes one 12-hour commercial fishing period in Subdistricts 5-B and 5-C and implements the subsistence fishing schedule for District 5 from 6:00 p.m. Friday, July 14, until 6:00 a.m. Saturday, July 15. Issued July 14, 2006	6:00 p.m. July 14, 2006 Exp. July 15, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06 3-S-UY-12-06 3-S-UY-13-06
3-S-UY-15-06	Schedules one 24-hour commercial period from 12:00 noon Saturday, July 22, until 12:00 noon Sunday, July 23, which is concurrent with the subsistence and personal use fishing schedule District 6. Issued July 20, 2006	12:00 p.m. July 22, 2006 Exp. July 23, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06 3-S-UY-13-06

-continued-

EO Number	DESCRIPTION	Effective Date - Expiration Date	Rescind	EO Still In EFFECT
3-S-UY-16-06	Schedules one 42-hour commercial period in District 6 from 6:00 p.m. Monday, July 24, until 12:00 noon Wednesday, July 26, which is concurrent with the subsistence and personal use fishing. Issued July 23, 2006	6:00 p.m. July 24, 2006 Exp. July 26, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06
3-S-UY-17-06	Schedules one 120-hour commercial salmon fishing period from 6:00 p.m. Friday, July 28, until 6:00 p.m. Wednesday, August 2, in District 6 and establishes subsistence fishing season schedule concurrent with commercial fishing. Issued July 27, 2006	6:00 p.m. July 28, 2006 Exp. Aug 2, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06
3-S-UY-18-06	Extends the personal use fishery in Subdistrict 6-C to one 120-hour opening that is concurrent with the commercial fishing period. Issued July 27, 2006	6:00 p.m. July 28, 2006 Exp. Aug. 2, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06 3-S-UY-03-06 3-SY-05-06
3-S-UY-19-06	Schedules one 120-hour commercial salmon fishing period from 6:00 p.m. Friday, August 4, until 6:00 p.m. Wednesday, August 9 in District 6 concurrent with the subsistence fishing schedule. Issued Aug. 3, 2006	6:00 p.m. Aug. 4, 2006 Exp. Aug. 9, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06 3-S-UY-03-06 3-SY-05-06
3-S-UY-20-06	Extends the personal use fishery in Subdistrict 6-C to one 120-hour opening that is concurrent with the commercial fishing period. Issued Aug. 3, 2006	6:00 p.m. Aug. 4, 2006 Exp. Aug. 9, 2006	None	3-S-UY-03-06 3-S-UY-05-06 Through 3-S-UY-10-06 3-S-UY-03-06 3-SY-05-06

Appendix A21.–Preliminary fall season commercial harvest summary, Yukon Area, 2006.

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	6:00 AM	30 Jul	3:00 PM	30 Jul	6	9	132	16,579	117,978	7.1	946	6,008	6.4	5.4%
2	6:00 AM	1 Aug	3:00 PM	1 Aug	6	9	116	6,288	44,598	7.1	843	5,279	6.3	11.8%
3	6:00 AM	3 Aug	3:00 PM	3 Aug	6	9	57	1,219	8,420	6.9	410	2,526	6.2	25.2%
4	9:00 PM	6 Aug	6:00 AM	7 Aug	9	9	103	7,534	55,619	7.4	1,719	10,519	6.1	18.6%
5	9:00 PM	8 Aug	6:00 AM	9 Aug	9	9	80	2,931	20,907	7.1	1,185	7,230	6.1	28.8%
6	6:00 AM	10 Aug	3:00 PM	10 Aug	9	9	51	1,510	10,763	7.1	792	4,740	6.0	34.4%
7	6:00 AM	13 Aug	3:00 PM	13 Aug	9	9	120	21,869	159,553	7.3	5,650	34,262	6.1	20.5%
8	6:00 AM	15 Aug	3:00 PM	15 Aug	9	9	92	6,526	48,663	7.5	6,085	38,537	6.3	48.3%
9	6:00 AM	17 Aug	3:00 PM	17 Aug	9	9	96	5,907	42,978	7.3	3,077	19,103	6.2	34.2%
10	11:00 AM	20 Aug	8:00 PM	20 Aug	9	9	110	10,488	75,860	7.2	5,201	33,078	6.4	33.2%
11	11:00 AM	22 Aug	8:00 PM	22 Aug	9	9	68	1,979	14,415	7.3	1,822	11,371	6.2	47.9%
12	11:00 AM	24 Aug	8:00 PM	24 Aug	9	9	88	4,599	32,432	7.1	3,014	18,597	6.2	39.6%
13	1:00 PM	27 Aug	10:00 PM	27 Aug	9	9	91	7,366	52,512	7.1	3,511	21,961	6.3	32.3%
14	1:00 PM	29 Aug	10:00 PM	29 Aug	9	9	52	788	5,426	6.9	1,355	8,399	6.2	63.2%
15	1:00 PM	31 Aug	10:00 PM	31 Aug	9	9	82	5,361	37,758	7.0	3,054	19,456	6.4	36.3%
16	10:00 AM	3 Sep	7:00 PM	3 Sep	9	9	15	207	1,381	6.7	440	2,717	6.2	68.0%
17	10:00 AM	5 Sep	7:00 PM	5 Sep	9	9	19	103	688	6.7	219	1,361	6.2	68.0%
District 1 Subtotal:					144	153	218	101,254	729,951	7.2	39,323	245,144	6.2	28.0%

District 2

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon			Coho Salmon			Percent Coho
							Number	Pounds	Average Weight	Number	Pounds	Average Weight	
1	3:00 PM	2 Aug	7:00 PM	2 Aug	4	23	2,915	20,475	7.0	63	397	6.3	2.1%
2	8:00 AM	8 Aug	2:00 PM	8 Aug	6	17	1,914	13,824	7.2	198	1,166	5.9	9.4%
3	8:00 AM	10 Aug	3:00 PM	10 Aug	9	17	2,081	15,043	7.2	618	3,715	6.0	22.9%
4	6:00 AM	14 Aug	3:00 PM	14 Aug	9	37	10,248	73,393	7.2	621	3,864	6.2	5.7%
5	6:00 AM	16 Aug	3:00 PM	16 Aug	9	40	6,875	49,375	7.2	2,560	15,411	6.0	27.1%
6	6:00 AM	18 Aug	12:00 PM	18 Aug	6	27	3,632	26,431	7.3	1,886	10,807	5.7	34.2%

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District 2

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
7	6:00 AM	21 Aug	12:00 PM	21 Aug	6	30	3,690	26,144	7.1	1,759	10,665	6.1	32.3%
8	6:00 AM	23 Aug	3:00 PM	23 Aug	9	32	3,004	21,377	7.1	3,034	18,114	6.0	50.2%
9	8:00 AM	25 Aug	2:00 PM	25 Aug	6	30	2,322	16,036	6.9	1,673	10,008	6.0	41.9%
10	8:00 AM	28 Aug	2:00 PM	28 Aug	6	20	804	5,623	7.0	894	6,530	7.3	52.7%
11	8:00 AM	30 Aug	2:00 PM	30 Aug	6	27	2,420	15,947	6.6	1,176	7,476	6.4	32.7%
District 2 Subtotal:					76	71	39,905	283,668	7.1	14,482	88,153	6.1	26.6%

District 3

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
NO COMMERCIAL FISHING													
District 3 Subtotal:													

	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:	220	153	285	141,159	1,013,619	7.2	53,805	333,297	6.2	27.6%

District 4

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished		Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
					4 Aa	4 BC								
1	6:00 PM	25 Jul	6:00 PM	30 Jul	120	No Commercial	0	0	0	0	0	0		
2	6:00 PM	1 Aug	6:00 PM	6 Aug	120	No Commercial	0	0	0	0	0	0		
3	6:00 PM	8 Aug	6:00 PM	13 Aug	120	No Commercial	0	0	0	0	0	0		
4	6:00 PM	15 Aug	6:00 PM	20 Aug	120	No Commercial	0	0	0	0	0	0		
5	6:00 PM	22 Aug	6:00 PM	27 Aug	120	No Commercial	0	0	0	0	0	0		
6	6:00 PM	29 Aug	6:00 PM	3 Sep	120	No Commercial	0	0	0	0	0	0		
7	6:00 PM	5 Sep	6:00 PM	10 Sep	120	No Commercial	0	0	0	0	0	0		
8	6:00 PM	12 Sep	6:00 PM	17 Sep	120	No Commercial	0	0	0	0	0	0		
9	6:00 PM	19 Sep	6:00 PM	24 Sep	120	No Commercial	0	0	0	0	0	0		
10	6:00 PM	26 Sep	6:00 PM	1 Oct	120	No Commercial	0	0	0	0	0	0		
District 4 Subtotal:					1,200		0	0	0	0	0	0		

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Appendix A21.–Page 3 of 3.

Subdistrict 5 A

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
NO COMMERCIAL FISHING													
Subdistrict 5 A Subtotal:													

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	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
1	6:00 PM	15 Aug	6:00 PM	17 Aug	48	No Harvest							
2	6:00 PM	18 Aug	6:00 PM	20 Aug	48	3	1,667	11,423	6.9	0	0		
3	6:00 PM	22 Aug	6:00 PM	31 Aug	216	4	8,363	58,541	7.0	0	0		
Subdistricts 5 B and 5 C			Current as of:	31 Aug	312	5	10,030	69,964	7.0	0	0		

Subdistrict 5 D

Period Ending	Starting Time	Start Date	Ending Time	End Date	Hours Fished	Number of Fishermen	Fall Chum Salmon Number	Fall Chum Salmon Pounds	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
NO COMMERCIAL FISHING													
Subdistrict 5 D													

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	Fall Chum Salmon Average Weight	Coho Salmon Number	Coho Salmon Pounds	Coho Salmon Average Weight	Percent Coho
1	6:00 PM	1 Sep	12:00 PM	3 Sep	42	42	7	2,215	15,505	7.0	808	4,040	5.0	26.7%
2	6:00 PM	4 Sep	12:00 PM	6 Sep	42	42	4	1,692	11,844	7.0	1,019	5,095	5.0	37.6%
3	6:00 PM	8 Sep	12:00 PM	10 Sep	42	42	9	3,128	21,896	7.0	2,896	14,980	5.2	48.1%
4	6:00 PM	11 Sep	12:00 PM	13 Sep	42	42	8	7,572	52,990	7.0	2,393	11,965	5.0	24.0%
5	6:00 PM	15 Sep	12:00 PM	17 Sep	42	42	11	8,746	61,222	7.0	4,021	21,125	5.3	31.5%
District 6 Subtotal:						210	12	23,353	163,457	7.0	11,137	57,205	5.1	42.3%
Upper Yukon Area, Fall Season, Districts 4, 5, and 6 Subtotals:						522	17	33,383	233,421	7.0	11,137	57,205	5.1	42.3%
Yukon Area, Fall Season, Districts 1 Through 6 Total:						742	302	174,542	1,247,040	7.1	64,942	390,502	6.0	27.1%

Appendix A22.–List of emergency orders pertaining to the fall chum and coho salmon fishery, Yukon Area, 2006.

E.O. Number	Effective Date	Action Taken	Comments
3-S-YF-01-06	July 30, 06	Opened one commercial salmon fishing period in District 1. Coastal Set Net Only Area: 6:00 am to 3:00 pm. Remainder of District 1: 9:00 am to 3:00 pm.	Pilot Station sonar cumulative passage estimate through July 27 was 173,000 fall chum salmon. Passage estimate was above average for the date and on track for a total run of 1 million fish. The Fall Chum Salmon Management Plan allows a commercial harvest of salmon that is a surplus above 600,000 fish. Because projections indicated a surplus of fall chum would be available for harvest, the first fall season commercial salmon fishing period was opened. The coastal fishing time allowed less mobile set net fishermen to fish an incoming tide which often brings new fish into the river.
3-S-YF-02-06	August 1	Reduced the closed subsistence fishing time in Districts 1, 2, 3 from 12 hours to 6 hours immediately before, during and after each commercial fishing period.	With a passage estimate of 298,000 fall chum salmon past Pilot Station Sonar at the project's first quarter point in run timing, the run size was projected to be adequate for escapement needs and would support subsistence and commercial harvest. Because commercial fishing periods were expected to be closely scheduled, the length of subsistence fishing closures before, during and after each commercial fishing period was decreased to allow more subsistence fishing opportunity.
3-S-YF-03-06	August 1	Opened two commercial salmon fishing periods in District 1 on Tuesday, August 1 and on Thursday, August 3. Coastal Set Net Only Area: 6:00 am to 3:00 pm. Remainder of District 1: 9:00 am to 3:00 pm.	The Pilot Station Sonar cumulative passage estimate through July 30 of 298,000 fall chum salmon was well above the average passage of 150,000 for the date. Drift test fish projects at Emmonak and Mountain Village supported the relative passage strength and travel speed. Opportunity for commercial harvest was made available according to the Yukon River Fall Chum Salmon Management Plan.
3-S-YF-04-06	August 2	Opened one 4-hour commercial salmon fishing period in District 2 from 3:00 pm until 7:00 pm.	Pilot Station Sonar cumulative passage estimate through July 31 was 351,000 fall chum salmon. The run size was consistent with the preseason projection and a total run size of 1 million fish was expected based on average run timing. The early portion of the run passed the lower river districts with little exploitation which was expected to benefit escapement and upriver fishers. The first commercial salmon fishing period in District 2 was opened.
3-S-YF-05-06	August 6	Opened one 9-hour commercial salmon fishing period in District 1, including the Coastal Set Net Only Area, from 9:00 pm Sunday, August 6 to 6:00 am Monday, August 7.	Pilot Station Sonar cumulative passage estimate through August 3 was 450,000 fall chum and 14,400 coho salmon. Preliminary cumulative harvest for the first three District 1 commercial fishing periods was 24,166 chum and 2,215 coho salmon. Based on the inseason run size projection and fishing effort, the fourth commercial salmon fishing period was opened in District 1. Fishing time was increased to provide flexibility for drift fishing and safety in low light conditions during the tide cycle.

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E.O. Number	Effective date	Action taken	Comments
3-S-YF-06-06	August 8	Opened one 6-hour commercial salmon fishing period in District 2 from 8:00 am to 2:00 pm.	Pilot Station Sonar passage estimate through August 6 was 476,000 fall chum, well above the historical average to date of 243,000 fish. The passage estimate of 19,000 coho salmon was also well above the historical average of 4,000 fish to date. The second fall season commercial fishing period was opened in District 2 based on chum salmon abundance and anticipated fishing effort.
3-S-YF-07-06	August 8	Opened one 9-hour commercial salmon fishing period in both the Coastal Set Net Only Area and in remainder of District 1 from 9:00 pm Tuesday, August 8 to 6:00 am Wednesday, August 9.	Preliminary cumulative total harvest for the first four District 1 commercial fishing periods was 31,700 chum and 3,900 coho salmon. Inseason run size projections for fall chum and the fishing effort continued to allow for commercial fishing periods in accordance with drainage-wide guideline harvest ranges
3-S-YF-08-06	August 10	Opened one 9-hour commercial salmon fishing period in Districts 1 and 2 from 6:00 am until 3:00 pm	Pilot Station Sonar passage estimate through August 8 was 493,000 fall chum and 23,700 coho salmon. Preliminary cumulative total commercial harvest through August 9 was 39,400 chum and 5,500 coho salmon. The Yukon River Fall Chum Salmon Management Plan allowed commercial salmon fishery to harvest the surplus of fall chum above 600,000 fish.
3-S-YF-09-06	August 15	Established a commercial fishing schedule of two 48-hour periods per week in Subdistricts 5-B and 5-C from 6:00 pm Tuesdays to 6:00 pm Thursdays and from 6:00 pm Fridays to 6:00 pm Sundays.	Pilot Station Sonar passage estimate was 508,000 fall chum and 29,000 coho salmon, and preliminary cumulative total commercial harvest was 43,035 chum and 6,904 coho salmon through August 10. Subdistricts 5-B and 5-C fall chum salmon guideline harvest range was 4,000 to 36,000 fish. The strong fall chum salmon run indicated that fishing times might be altered dependent on run development, harvest rate and buying capacity.
3-S-YF-10-06	August 13	Opened three 9-hour commercial salmon fishing periods in District 1 from 6:00 am to 3:00 pm on Sunday, August 13, Tuesday, August 15, and Thursday, August 17.	Passage estimates for both fall chum and coho salmon were above average for the date, and projections for a total run size of 1 million fall chum was on track. Additional commercial fishing was warranted.
3-S-YF-11-06	August 14	Opened two 9-hour commercial salmon fishing periods in District 2 from 6:00 am to 3:00 pm on Monday, August 14 and Wednesday, August 16.	Pilot Station Sonar passage estimate through August 11 was approximately 517,000 fall chum and 30,000 coho salmon. Commercial salmon fishing periods were opened as an adequate surplus of fish was anticipated.
3-S-YF-12-06	August 18	Opened one 6-hour commercial salmon fishing period in District 2 from 6:00 am to 12:00 noon.	Pilot Station Sonar passage estimate through August 15 was approximately 657,000 fall chum and 44,000 coho salmon. Preliminary total fall season commercial harvest through August 16 was 79,000 fall chum and 20,000 coho salmon. Passage estimates for both fall chum and coho salmon were above average for the date.

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E.O. Number	Effective date	Action taken	Comments
3-S-YF-13-06	August 20	Opened one 9-hour commercial salmon fishing period in District 1 from 11:00 am to 8:00 pm.	Pilot Station Sonar passage estimate through August 17 was 667,000 fall chum and 54,000 coho salmon. Preliminary total fall season commercial harvest through August 17 was 88,000 fall chum and 23,000 coho salmon.
3-S-YF-14-06	August 21	Opened one 6-hour commercial salmon fishing period in District 2 from 6:00 am to 12:00 noon.	Pilot Station Sonar passage estimate through August 19 was approximately 688,000 fall chum and 61,000 coho salmon. Preliminary total fall season commercial harvest through August 18 was approximately 91,000 fall chum and 25,000 coho salmon.
3-S-YF-15-06	August 22	Opened two 9-hour commercial salmon fishing periods in District 1 from 11:00 am to 8:00 pm on Tuesday, August 22 and Thursday, August 24.	Pilot Station Sonar passage estimate of approximately 708,000 fall chum continued to be above average, and the total passage of 68,000 coho salmon was average through August 20. Preliminary total fall season commercial harvest through August 20 was approximately 102,000 fall chum and 30,000 coho salmon.
3-S-YF-16-06	August 23	Opened one 9-hour commercial salmon fishing period in District 2 from 6:00 am to 3:00 pm.	Pilot Station Sonar passage estimate through August 21 was approximately 718,000 fall chum and 75,000 coho salmon. Preliminary total fall season commercial harvest through August 21 was approximately 106,000 fall chum and 32,000 coho salmon.
3-S-YF-17-06	August 22	Established a 5-day per week commercial salmon fishing schedule in Subdistricts 5-B and 5-C from 6:00 pm Tuesdays to 6:00 pm Sundays.	The fall chum salmon passage estimate was above average for this date and on track for a total run of between 900,000 to 1 million fish. The fall chum salmon guideline harvest range for Subdistricts 5-B and 5-C was 4,000 to 36,000 fish and the reported commercial harvest of fall chum for these subdistricts through August 20 was 1,703.
3-S-YF-18-06	August 25	Opened one 6-hour commercial salmon fishing period in District 2 from 8:00 am to 2:00 pm.	Pilot Station Sonar passage estimate through August 23 was approximately 747,000 fall chum and 86,000 coho salmon. Preliminary total fall season commercial harvest through August 23 was approximately 108,000 fall chum and 34,000 coho salmon.
3-S-YF-19-06	August 27	Increased subsistence fishing time in Subdistricts 5-B and 5-C to seven days per week.	Pilot Station Sonar passage estimate through August 24 was 750,000 fall chum and 102,000 coho salmon. Subsistence fishing opportunity was increased due to difficulty in harvesting salmon presented by rainy conditions that led to high water levels and heavy debris in the upper Yukon River.
3-S-YF-20-06	August 27	Scheduled the last commercial fishing period of the season in Subdistricts 5-B and 5-C from 6:00 pm Sunday, August 27 to 6:00 pm Thursday, August 31.	The commercial fishing period was shifted to increase the efficiency of the buying operation during difficult fishing conditions as a result of persistent rain.

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E.O. Number	Effective date	Action taken	Comments
3-S-YF-21-06	August 27	Opened one 9-hour commercial salmon fishing period in District 1 from 1:00 pm to 10:00 pm Sunday, August 27. Opened one 6-hour commercial salmon fishing period in District 2 from 8:00 am to 2:00 pm on Monday, August 28.	Preliminary total fall season commercial harvest through August 25 was approximately 115,000 fall chum and 38,000 coho salmon.
3-S-YF-22-06	August 29	Opened two 9-hour commercial salmon fishing periods in District 1 from 1:00 pm to 10:00 pm Tuesday, August 29 and Thursday, August 31. Opened one 6-hour commercial salmon fishing period in District 2 from 8:00 am to 2:00 pm on Wednesday, August 30.	Pilot Station Sonar passage estimate through August 27 was approximately 774,000 fall chum and 114,000 coho salmon. Preliminary total fall season commercial harvest through August 26 was approximately 118,000 fall chum and 41,000 coho salmon.
3-S-YF-23-06	September 3	Extended the commercial salmon fishing season in District 1 to 7:00 pm September 5. Opened two 9-hour commercial salmon fishing periods in District 1 from 10:00 am to 7:00 pm Sunday, September 3 and Tuesday, September 5	Pilot Station Sonar passage estimate through August 29 was approximately 782,000 fall chum and 123,000 coho salmon and the preliminary total fall season commercial harvest through August 29 was approximately 126,000 fall chum and 47,000 coho salmon. Salmon run assessment information indicated that fall chum and coho salmon runs were near average and a portion of the fall chum guideline harvest range remained for the lower river districts. Salmon quality was declining, but some market interest continued. Based on the harvest rate for the last three years in September, the available surplus of salmon could meet the anticipated harvest.
3-S-YF-24-06	September 1	Established the commercial fishing schedule in Subdistricts 6-A and 6-B of two 42-hour periods per week from 6:00 pm Fridays to 12:00 noon Sundays and from 6:00 pm Mondays to 12:00 noon Wednesdays.	Both the fall chum and coho salmon tracked near average for the Yukon River drainage, but the Tanana River fall chum run appeared not as strong as the mainstem upper Yukon stocks. The Tanana River Salmon Management Plan stipulated a guideline harvest range (GHR) of 2,750 to 20,500 fall chum to meet escapement and subsistence needs. The commercial fishery began the fall season on the two 42-hour periods a week, and fishing time was adjustable based on run strength and harvest rate as the season progressed.

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E.O. Number	Effective date	Action taken	Comments
3-S-YF-25-06	September 17	Closed the commercial salmon fishing season in District 6 at 12:00 noon.	The fall chum and coho salmon runs tracked near average as they moved to the upper Yukon River and in the Tanana River. Based on the current assessment, the fall chum salmon run in the Tanana River was expected to support a commercial harvest near the upper end of the GHR and meet escapement and subsistence needs. Total commercial harvest through September 13 was 16,154 fall chum and 7,116 coho salmon. The commercial fishery was anticipated to exceed the guideline harvest range by the end of the fishing period of September 17. An increase in the subsistence harvest was expected through the end of the run which would spread the harvest throughout the run.
3-S-YF-26-06	October 2	Increased the subsistence fishing time in Subdistricts 5-A, 6-A and 6-B, including the Old Minto Area, to seven days per week.	Run assessment indicated that the fall chum and coho salmon escapements were near or above average in the Tanana River drainage. In accordance with the Tanana River Salmon Management Plan as amended in 2004, subsistence salmon fishing time was increased after September 30 because it was projected that salmon escapement goals would be met in the Tanana River.

Appendix A23.–Canadian weekly commercial catches of Chinook, fall chum, and coho salmon in the Yukon River in 2006.

Statistical Week	Week Ending	Start Date	Finish Date	Days Fished	Number Fishing	Boat Days	Chinook Salmon	Chum Salmon	Coho Salmon
28	15 Jul	14 Jul	18 Jul	4	8	31	562	0	0
29	22 Jul	21 Jul	24 Jul	3	8	23	720	0	0
30	29 Jul	28 Jul	30 Jul	2	10	19	427	3	0
31	05 Aug	04 Aug	07 Aug	3	7	20	516	17	0
32	12 Aug			0	0	0	0	0	0
33	19 Aug			0	0	0	0	0	0
34	26 Aug			0	0	0	0	0	0
35	02 Sep			0	0	0	0	0	0
36	09 Sep	03 Sep	07 Sep	4	2	6	2	173	0
37	16 Sep	10 Sep	14 Sep	4	1	4	2	505	0
38	23 Sep	17 Sep	22 Sep	5	2	10	0	2,782	1
39	30 Sep	24 Sep	29 Sep	5	0	2	0	265	0
40	07 Oct	01 Oct	08 Oct	7	1	7	0	351	0
41	14 Oct	08 Oct	15 Oct	7	0	0	0	0	0
Dawson Area Subtotal				0	0	0	2,229	4,096	1
Upriver Commercial Subtotal				0	0	0	103	0	0
TOTAL COMMERCIAL HARVEST				0	0	0	2,332	4,096	1
Chinook Test Fishery and Chum Live Release Test							0	0	0
Domestic Harvest							63	0	0
Estimated Recreational Harvest							606	0	0
Aboriginal Fishery Catch							5,757	2,521	0
TOTAL UPPER YUKON HARVEST							8,758	6,617	1
Old Crow Aboriginal Fishery							314	5,179	111
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, 2006.

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	11/15-18	150	272	376	19,468	146	175	42	4	0	0	46
Scammon Bay	9/12-14	48	125	507	4,703	41	160	22	0	0	0	22
Coastal District Total		198	397	883	24,171	187	335	64	4	0	0	68
Nunam Iqua [e]	9/11-12	23	43	371	2,903	735	392	18	3	0	0	21
Alakanuk [f]	9/9-10	83	148	690	7,790	624	101	9	27	0	0	36
Emmonak [f]	9/6-9	104	171	2,311	11,899	2,056	450	7	53	0	1	61
Kotlik [f]	9/9-11	68	95	1,750	5,289	487	234	16	19	0	0	35
District 1 Subtotal		278	457	5,122	27,881	3,902	1,177	50	102	0	1	153
Mountain Village [f]	9/17-18	109	221	1,659	13,119	2,398	1,856	6	44	0	0	50
Pitkas Point	9/16	13	46	274	680	5	16	1	9	0	0	10
St. Mary's	9/13-16,19	80	112	2,233	7,394	417	171	2	44	0	1	47
Pilot Station [f]	9/19-22	60	63	1,976	6,070	785	225	2	29	0	0	31
Marshall [f]	9/23-25	66	170	1,897	4,392	410	191	4	21	0	0	25
District 2 Subtotal		328	612	8,039	31,655	4,015	2,459	15	147	0	1	163
Russian Mission	9/25	46	153	1,851	1,328	251	19	3	11	0	1	15
Holy Cross	9/20	44	66	3,165	825	224	16	9	15	0	0	24
Shageluk	9/21	17	69	358	1,381	5	48	6	9	0	0	15
District 3 Subtotal		107	288	5,374	3,534	480	83	18	35	0	1	54
Lower Yukon River Total		713	1,357	18,535	63,070	8,397	3,719	83	284	0	3	370
Anvik	9/22	16	66	958	387	118	0	10	5	0	0	15
Grayling	9/23	43	82	1,702	644	691	224	1	12	0	0	13
Kaltag [f]	9/30-10/2	51	67	2,833	159	823	106	0	17	0	0	17
Nulato	10/3-4	70	223	2,707	838	751	214	3	23	0	0	26
Koyukuk	10/5-6	17	70	835	394	1,147	330	1	12	0	0	13
Galena	10/6-10/9	77	154	2,380	1,205	1,632	137	7	20	1	0	28
Ruby	10/5-6	13	124	304	1,714	227	11	6	0	2	0	8
District 4 Yukon River Subtotal		287	786	11,719	5,341	5,389	1,022	28	89	3	0	120
Huslia	10/10	17	200	258	1,122	313	105	7	0	0	0	7
Hughes	10/11	7	68	8	3,254	240	150	6	0	0	0	6
Allakaket	10/10-12	14	132	23	5,170	393	25	8	0	0	0	8
Alatna	10/10-12	3	9	14	110	0	0	2	0	0	0	2
Bettles	10/13-14	0	56	0	0	0	0	0	0	0	0	0
Koyukuk River Subtotal		41	465	303	9,656	946	280	23	0	0	0	23
District 4 Subtotal		328	1,251	12,022	14,997	6,335	1,302	51	89	3	0	143
Tanana	10/16-18	49	674	3,794	5,474	23,167	3,619	12	1	14	0	27
Rampart	permits	5	50	429	135	250	0	4	0	1	0	5
Fairbanks NSB [g]	permits	63	175	2,184	1,341	5,269	79	61	0	2	0	63
Stevens Village [h]	10/18, permits	15	55	1,245	972	50	0	8	0	1	0	9
Birch Creek	10/24-25	3	10	174	30	0	0	1	0	0	0	1
Beaver	10/18-20	14	26	830	117	0	0	10	0	2	0	12
Fort Yukon	10/21-23	39	336	3,144	2,165	5,178	35	8	0	12	0	20
Circle	permits	11	63	694	58	664	22	5	0	6	0	11
Central	permits	5	7	130	2	0	0	4	0	1	0	5
Eagle [f]	permits	34	263	2,303	989	16,786	0	25	0	8	0	33
Other District 5 [i]	permits	8	38	330	87	44	0	8	0	0	0	8
District 5 Yukon River Subtotal		246	1,697	15,257	11,370	51,408	3,755	146	1	47	0	194
Venetie	10/20-21	16	128	667	475	520	24	6	0	0	0	6
Chalkyitsik	10/23-24	3	28	0	0	215	0	2	0	0	1	3
Chandalar and Black Rivers Subtotal		19	156	667	475	735	24	8	0	0	1	9
District 5 Subtotal		265	1,853	15,924	11,845	52,143	3,779	154	1	47	1	203

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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	12	185	361	89	3,374	1,671	10	0	2	0	12
Minto	permits	5	102	31	460	242	14	2	0	3	0	5
Nenana[f]	permits	21	256	712	388	10,530	7,032	7	0	15	0	22
Healy	permits	4	131	0	0	1,408	1,109	3	0	0	0	3
Fairbanks NSB[j]	permits	50	268	214	335	1,644	1,024	45	0	4	0	49
Other District 6[k]	permits	19	85	0	0	60	0	15	0	1	3	19
District 6 Tanana River Subtotal[l]		111	1,027	1,318	1,272	17,258	10,850	82	0	25	3	110
Upper Yukon River Total		704	4,131	29,264	28,114	75,736	15,931	287	90	75	4	456
Survey Village Subtotal		1,378	4,262	39,199	107,866	41,212	8,456	245	378	32	4	659
Subsistence Permit Subtotal[m]		202	1,623	6,976	3,607	39,779	10,283	155	0	42	3	197
Subsistence Test Fish Subtotal[n]		-	-	2,153	3,620	2,996	967	-	-	-		
District 6 Commercial Related[o]				265	0	0	0	-	-	-		
Subsistence Harvests Subtotal		1,580	5,885	48,593	115,093	83,987	19,706	400	378	74	7	856
Personal Use Permit Subtotals		35	-	89	262	333	279	34	0	1	0	35
Alaska, Yukon River Total[p]		1,417	5,488	47,799	91,184	84,133	19,650	370	374	75	7	826
Alaska, Yukon Area Total		1,615	5,885	48,682	115,355	84,320	19,985	434	378	75	7	894
AK, Yukon Area Percentages of the Total		-	-	18%	43%	31%	7%	49%	42%	8%	1%	

[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 May 1, 2007.

[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 survey information or from permits issued 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.

[j] "Other District 5" includes residents of Anderson, Healy, Manley, Minto, 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] Fairbanks North Star Borough (FNSB) households that obtained a subsistence and/or personal use permit and indicated they fished in the Tanana River permit required area.

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

[l] 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.

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

[n] Test fish given away for subsistence use.

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

[p] Does not include Coastal District.

Appendix A25.–Reported subsistence and personal use salmon harvested under the authority of subsistence and personal use permits, listed by permit area, Yukon area, 2006.

Permit Fishing Area	Type	Permit [a] Issued [c]	Returned	Percent Returned	Number of Permits Returned that Fished [d]	Reported Harvest [b] Chinook	Summer Chum	Fall Chum	Coho
Subsistence									
Koyukuk Middle and South Fork Rivers	SF	1	1	100%	1	0	0	0	0
Yukon River Rampart Area	SR	19	19	100%	16	1,083	647	318	0
Yukon River near Haul Road Bridge	SY	68	66	97%	53	1,952	1,063	4,855	79
Yukon River near Circle and Eagle [e]	SE	85	82	96%	59	3,302	1,034	17,866	22
Tanana River Subdistrict 6A	SA	19	19	100%	15	362	85	3,355	1,546
Tanana River Subdistrict 6B [f]	SB	78	76	97%	42	423	885	13,047	7,897
Tanana River Upstream of Subdistrict 6C	SU	23	22	96%	17	0	0	19	0
Kantishna River Subdistrict 6A	SK	5	5	100%	3	141	29	339	737
Tolovana River Pike Subdistrict 6B	ST	101	97	96%	56	0	11	6	2
Subsistence Permit Subtotals		399	387	97%	262	7,263	3,754	39,805	10,283
Personal Use									
Tanana River Salmon Subdistrict 6C	PC	60	60	100%	35	89	262	333	279
Tanana River Whitefish Upstream of Subdistrict 6C	PW	7	7	100%	4	0	0	0	0
Personal Use Permit Subtotals		67	67	100%	39	89	262	333	279
Permit Totals		466	454	97%	301	7,352	4,016	40,138	10,562

[a] Permits returned as of May 1, 2007.

[b] Does not include 265 Chinook commercial related salmon "not sold" during commercial fishing but retained for subsistence use.

[c] Includes 33 households that were "issued" permits for more than one area. Additionally, includes two households that were issued duplicate permits for same area.

[d] Includes 10 households that "fished" in two different permit areas.

[e] Does not include fish distributed to community households from ADF&G Eagle Sonar test fish project (20 Chinook and 15 summer chum salmon).

[f] Does not include fish distributed to community households from ADF&G Nenana test fish wheel project (38 Chinook, 159 fall chum, and 389 coho salmon).

Appendix A26.–Detailed salmon spawning escapement estimates for the Yukon River drainage, 2006.

Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Andreafsky River						
East Fork (weir) [a]	6/28-7/27	--	6,463	102,260	--	--
East Fork (aerial) [b]	7/23	Incomplete	(591)	(3,100)	--	--
West Fork (aerial)	7/23	Fair	824	617	--	--
	Andreafsky Aerial Subtotal		1,415	3,717	0	0
Yukon River (Pilot Station)						
Main River (HTI and DIDSON Sonar)	6/10-8/31	--	169,403	3,767,044	790,563	131,919
Anvik River [b]						
Sonar site to Yellow R.	7/23	Incomplete	--	--	--	--
Yellow R. to McDonald Cr. (index) [c]	7/23	Fair	1,776	--	--	--
Swift River	7/23	Good	18	--	--	--
Beaver Creek	--	--	--	--	--	--
Otter Creek	7/23	Good	92	--	--	--
HTI Sonar Estimate	6/27-7/26	--	--	605,486	--	--
	Anvik Subtotal		1,886	605,486	0	0
Kaltag River (tower) [d]	--	--	--	--	--	--
Nulato River [e]						
North Fork	7/21	Fair	620	7,772	--	--
South Fork	7/21	Fair	672	11,658	--	--
Nulato River (mainstem to forks)	7/21	--	--	--	--	--
	Nulato Subtotal		1,292	19,430	0	0
Total Monitored Lower Yukon River (downstream of Koyukuk River)			9,641	727,176	0	0
Koyukuk River Drainage						
Gisasa River (weir) [a]	6/28-7/29	--	3,030	261,305	--	--
Gisasa River (aerial)	7/22	Fair	843	1,000	--	--
Hogatza River drainage						
Clear Creek (video) [f]	6/27-8/4	--	--	29,166	--	--
Caribou Creek (video) [f]	6/30-7/26	--	--	25,534		
Henshaw Creek (weir) [g,h]	--	--	--	--	--	--
Henshaw Creek (aerial) [d]	--	--	--	--	--	--
South Fork Koyukuk River						
Jim River (aerial) [d]	--	--	--	--	--	--
Total Koyukuk River			3,030	316,005	0	0
Tozitna River (Dagislakhna Creek to mouth) [f]	7/26	Incomplete	--	--	--	--
Tozitna River (aerial above weir) [f]	7/26	Good	(844)	(4,120)		
Tozitna River (weir) [f]	6/23-8/9	--	533	22,629	--	--
	Tozitna Subtotal		533	22,629	--	--
Total Monitored Yukon River (downstream of Tanana River)			13,204	1,065,810	0	0

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Stream (drainage)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Tanana River Drainage						
Kantishna River Drainage						
Kantishna River (mark-recapture)	8/16-9/29	--	--	--	71,135	--
Toklat Springs (aerial)	11/2	Good	--	--	(1,964)	0
Bearpaw River	8/1	Fair	24	1	--	--
Moose Creek [e]	--	--	--	--	--	--
	Kantishna Subtotal		24	1	71,135	0
Upper Tanana River (mark-recapture) [i]	8/16-9/27	--	--	--	202,669	--
Chatanika River (aerial)	8/3	Poor	168	114	--	--
Tower Estimate [e]	--	--	--	--	--	--
Nenana River Drainage						
Teklanika River						
Teklanika Springs (vicinity of Comma Lake)	--	--	--	--	--	--
Nenana mainstem upstream of Teklanika R. (aerial) [j]	10/18	Fair	--	--	--	160
Seventeen Mile Slough	8/1, 10/18	Good	223	24	--	1,916
Julius Creek	10/18	Good	--	--	--	0
Wood Creek	10/18	Good	--	--	--	634
Clear Creek	8/1, 10/18	Good	120	0	--	972
Glacier Creek	8/1, 10/18	Good	82	--	--	14
Lost Slough (western floodplain)	10/18	Fair	--	--	--	194
June Creek (foot survey)	9/22	Fair	--	--	--	66
Lignite Spring (foot survey)	9/22	Good	--	--	--	168
	Nenana Subtotal		425	24	0	4,124
Chena River						
Chena River (outside index area)	7/21	Fair	(45)	0		
Chena Dam to Middle Fk (aerial index)	7/21	Fair	(583)	(469)	--	--
Tower Estimate [k]	6/30-8/6	--	2,936	35,109	--	--
	Chena Subtotal		2,936	35,109	0	0
Salcha River						
Salcha River (outside index area)	7/17	Fair	(175)	(62)	--	--
TAPS to Caribou Cr (aerial/index area)	7/17	Fair	(317)	(90)	--	--
Tower Estimate [j,l]	6/29-8/9	--	10,679	111,869	--	--
	Salcha Subtotal		10,679	111,869	0	0
Richardson Clearwater River [m]	11/11	Good/Late	--	--	86	271
Mainstem Tanana sloughs (aerial) [m]						
Benchmark 735 Slough	11/11	Incomplete	--	--	--	--
BM 735 to Little Delta River	11/11	Fair	--	--	60	4
Little Delta River to Delta Creek	11/11	Fair	--	--	46	1
Delta Creek to Delta River	11/11	Incomplete	--	--	--	--
Providence (Timber) vicinity	11/11	Incomplete	--	--	--	--
Whitestone Slough	11/11	Poor	--	--	0	12
Rika's Roadhouse vicinity to Blue Creek	11/11	Fair	--	--	670	0
Blue Creek to Bluff Cabin Creek	11/11	Fair	--	--	145	0
Bluff Cabin Island Slough	11/11	Fair	--	--	50	0
Bluff Cabin to Clearwater Lake Outlet Slough	11/11	Fair	--	--	50	0
Clearwater Lake Outlet Slough	11/11	Good	--	--	680	9
Upstream of Clearwater Lake Outlet Slough	11/11	Good	--	--	146	0
Onemile Slough	11/11	Incomplete	--	--	--	--
Pearse Slough and vicinity	11/11	Fair	--	--	101	0
	Mainstem Subtotal		0	0	1,948	26

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Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Tanana River						
Goodpaster River						
(Eisenmenger Frk. To mouth)	8/1	Fair	(917)	60	--	--
South Fork	8/1	Fair	(3)	--	--	--
Central Creek	--	--	--	--	--	--
Tower Estimate (upstream of forks) [g]	7/7-8/2	--	2,365	--	--	--
	Goodpaster Subtotal		2,365	60	0	0
Delta River						
Foot Survey (peak count)	11/6	Fair	--	--	(8,201)	38
Population Estimate [n]			--	--	14,055	--
Blue Creek (aerial)	11/11	Poor	--	--	245	11
Bluff Cabin Slough (foot)	11/20	Poor	--	--	(703)	0
Bluff Cabin Slough (aerial)	11/11	Good	--	--	1,180	59
Bluff Cabin Creek (aerial)	11/11	Good	--	--	330	41
Delta Clearwater River Index Area [k,o]	10/24	Fair	--	--	2,300	16,748
Tributaries [k,p]	10/24	Fair	--	--	--	4,281
Clearwater Lake Outlet [k,o]	10/24	Fair	--	--	75	4,375
	Delta Subtotal		0	0	18,185	25,553
Total Monitored Tanana River			16,597	147,177	294,023	29,974
Upper Yukon River						
Chandalar River splitbeam sonar [a]	8/8-9/26	--	--	--	245,090	--
Charley River (W.Fork to mouth) [d,q]	--	--	--	--	--	--
Porcupine River Drainage						
Sheenjek River						
DIDSON Sonar Estimate	8/9-9/24	--	--	--	160,178	--
Porcupine River (mark-recapture) [r]						
Test Fish Tag Recoveries [s]	--	--	--	--	(15,858)	--
Test Fish Tag & Harvest Recoveries	--	--	--	--	(44,906)	--
Fishing Branch River (weir) [r]	9/2-10/14	--	--	--	30,849	--
Total Porcupine River			--	--	191,027	--
Total Alaskan Portion of Drainage [t]			29,801	1,212,987	699,291	29,974
Yukon Territory Streams [r]						
White River						
Kluane River (aerial)	10/16	--	--	--	18,208	--
Pelly River						
Blind Creek (weir)	7/11-8/21	--	677	--	--	--
Canadian Mainstem Yukon River (aerial)	--	--	--	--	6,553	--
Little Salmon River (index area)	8/18	Good	1,381	--	--	--
Big Salmon River (index area)	8/16	Fair-Good	(1,140)	--	--	--
Big Salmon River (sonar)	7/15-8/23	--	7,308	--	--	--
Teslin River Drainage						
Mainstem (index area)	10/30	--	--	--	620	--
Nisutlin River	8/16	Fair-Good	601	--	--	--
Wolf River	8/16	Fair-Good	114	--	--	--
	Teslin Subtotal		715		620	
Whitehorse Fishway	7/20-9/5	--	1,720	--	--	--
Total Yukon Territory (observed)	--	--	11,801	0	25,381	0

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Stream/Drainage (method)	Date	Survey Rating	Chinook	Summer Chum	Fall Chum	Coho
Canadian Mainstem Yukon River						
Border Passage Estimate [k,u]	--	--	(36,748)	--	(217,810)	--
Eagle Sonar Estimate	7/8-10/6	--	(73,691)	--	(236,386)	--
Total Yukon Territory (mark-recapture) [v]	--	--	27,990	--	211,193	--
Yukon River Drainage Monitored Escapement Totals			57,791	1,212,987	941,333	29,974
Yukon River Drainage Survey Totals			12,173	29,087	41,710	29,974
Yukon River Drainage Project Totals			53,996	1,193,358	921,114	0

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. Dashes (--) indicate data is not available.

[a] Estimate made by USFWS.

[b] Aerial survey incomplete, missing the upper 10-20% due to recorder failure.

[c] May include counts from sonar site to Yellow River.

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

[e] Counts not reported by correct index areas, counts by fork (north and south) contain "mouth to fork" area and total summer chum salmon were divided 60% south and 40% north to estimate forks.

[f] Estimate made by BLM.

[g] Estimate made by Tanana Chiefs Conference.

[h] Project was deployed, however, high water resulted in a lack of counts.

[i] Population estimate based upon mark and recapture.

[j] Estimate made by Yukon River Drainage Fisheries Association.

[k] Estimate made by Division of Sport Fish.

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

[m] Helicopter survey unless otherwise noted.

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

[o] Boat survey.

[p] 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.

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

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

[s] Minimal estimate due to low numbers of recoveries.

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

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

[v] 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), 1982–2004.

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	5	106,282	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	
2006								27,990	
Average (1982-1999)							108,525	23,881	4.54
							Contrast	4.43	

Appendix A28.–Percent age composition of combined commercial and subsistence salmon harvest by species, Yukon River drainage, 1982–2006.

Species	Year	Sample Size	Age In Years (Percent) 3	4	5	6	7	8	Total[a]
Chinook	1982	3,795	0.2	6.8	18.5	58.3	15.9	0.3	100.0
Salmon	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
	2006	4,470	0.0	4.2	53.6	40.7	1.5	0.0	100.0
5-Year Average (2001-2005)		3,937	0.0	7.3	30.6	55.9	6.2	0.0	100.0
Summer	1982	3,419	5.3	0.0	88.6	6.1	0.0		100.0
Chum	1983	4,110	1.0	53.8	44.4	0.8	0.0		100.0
Salmon	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
	2006	2,799	0.1	18.6	81.1	0.2	0.0		100.0
5-Year Average (2001-2005)		1,591	0.4	48.8	48.2	2.6	0.0		100.0

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Appendix A28.–Page 2 of 2.

Species	Year	Sample Size	Age in Years (Percent) 3	4	5	6	7	8	Total[a]
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
	2006	2,340	1.4	43.1	55.4	0.1			100.0
Average (2001, 2003-2005)		1,619	4.9	71.5	23.1	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
	2006	1,231	14.7	80.7	4.6				100.0
Average (2001, 2003-2005)		656	19.5	76.9	3.6				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.

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

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

Appendix A29.–Chinook salmon age and sex percentages from selected Yukon River escapement projects, 2006.

Location	Sample Size		Age 3	4	5	6	7	8	Total
Anvik River [a]	169	Males	0.0	10.7	39.6	6.5	0.0	0.0	56.8
		Females	0.0	0.0	8.3	34.9	0.0	0.0	43.2
		Total	0.0	10.7	47.9	41.4	0.0	0.0	100.0
Chena River [a]	362	Males	0.0	12.7	32.3	8.3	0.8	0.0	54.1
		Females	0.0	0.0	13.3	32.3	0.3	0.0	45.9
		Total	0.0	12.7	45.6	40.6	1.1	0.0	100.0
East Fork Andreafsky River [b]	454	Males	0.0	14.2	36.2	7.0	0.0	0.0	57.4
		Females	0.0	2.8	18.7	21.1	0.0	0.0	42.6
		Total	0.0	17.0	54.9	28.1	0.0	0.0	100.0
Gisasa River [b]	530	Males	0.0	13.5	54.3	3.9	0.1	0.0	71.8
		Females	0.1	5.4	12.9	9.7	0.1	0.0	28.2
		Total	0.1	18.9	67.2	13.6	0.2	0.0	100.0
Salcha River [a]	509	Males	0.0	5.7	40.5	9.8	0.6	0.0	56.6
		Females	0.0	0.0	8.8	33.2	1.4	0.0	43.4
		Total	0.0	5.7	49.3	43.0	2.0	0.0	100.0
Tozitna River [b]	69	Males	0.0	13.0	72.5	2.9	0.0	0.0	88.4
		Females	0.0	0.0	10.1	1.5	0.0	0.0	11.6
		Total	0.0	13.0	82.6	4.4	0.0	0.0	100.0
Sheenjek River [c]	35	Males	0.0	5.7	51.4	5.7	0.0	0.0	62.9
		Females	0.0	2.9	25.7	8.6	0.0	0.0	37.1
		Total	0.0	8.6	77.1	14.3	0.0	0.0	100.0

[a] Samples were collected from carcasses.

[b] Samples were collected from a weir trap.

[c] Samples were collected with 8.0" mesh gillnets.

Appendix A30.–Summer chum salmon age and sex percentages from selected Yukon River escapement projects, 2006.

Location	Sample Size		Age 3	4	5	6	7	Total
Anvik River [a]	482	Males	0.7	15.7	32.9	0.0	0.0	49.3
		Females	0.6	24.1	26.0	0.0	0.0	50.7
		Total	1.3	39.8	58.9	0.0	0.0	100.0
East Fork Andreafsky River [b]	658	Males	0.0	12.1	39.2	0.1	0.0	51.4
		Females	0.6	15.2	32.8	0.0	0.0	48.6
		Total	0.6	27.3	72.0	0.1	0.0	100.0
Gisasa River [b]	496	Males	0.0	6.3	41.5	0.0	0.0	47.8
		Females	0.1	5.1	47.0	0.0	0.0	52.2
		Total	0.1	11.4	88.5	0.0	0.0	100.0
Tozitna River [b]	543	Males	0.0	12.8	33.4	0.0	0.0	46.2
		Females	0.1	22.2	31.4	0.0	0.0	53.8
		Total	0.1	35.0	64.9	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, 1981–2006.

Year [a]	Lower [b]	Middle [c]	Upper [d]		
			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	0.207	0.214	0.464	0.115	0.579
2006 [f]	0.175	0.279	0.460	0.087	0.546
Average (1981-2005)	0.206	0.235	0.459	0.101	0.560

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

[b] From 1981 through 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 through 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 through 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.

[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.

[f] 2006 data are preliminary.

Appendix A32.–Yukon River Chinook salmon harvest proportion by stock group in Alaska, 1981–2006.

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
2006 [f]	0.192	0.305	0.503
Average (1981-2005)	0.229	0.261	0.510

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

[b] From 1981 through 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 through 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 through 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.

[f] 2006 data are preliminary.

Appendix A33.–Upper stock group proportion, by country, from the Yukon River Chinook salmon harvest, 1981–2006.

	Upper Stock Group [b]	
Year [a]	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
2006 [c]	0.837	0.163
2005	0.801	0.199
2006 [d]	0.841	0.159
Average (1981-2005)	0.820	0.180

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

[b] From 1981 through 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.

[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.

[d] 2006 data are preliminary.

Appendix A34.–Yukon River fall chum salmon estimated brood year production and return per spawner estimates 1974–2006.

	(P)		Estimated Brood Year Return									(R)	(R/P)
				Number of Salmon [a]				Proportion				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										
2006	873,987	266,813	1,140,800										
Average-05	538,676	319,913	858,589										

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(P)			Estimated Brood Year Return								(R)	(R/P)
			Number of Salmon [a]				Proportion					
Escapement	Catch	Return	Age 3	Age 4	Age 5	Age 6	Age 3	Age 4	Age 5	Age 6	Total Brood Year Return[a]	Return/ Spawner
496,132	All Brood Years (1974-2000)		28,335	545,946	192,108	6,130	0.0331	0.6897	0.2683	0.0089	772,519	1.84
354,737	Even Brood Years (1974-2000)		21,788	384,315	187,321	27,130	0.0364	0.6550	0.2982	0.0104	585,926	1.89
632,195	Odd Brood Years (1974-2000)		35,386	720,011	211,707	6,361	0.0296	0.7270	0.2360	0.0074	973,465	1.79
512,698	All Brood Years (1974-1983)		58,796	707,358	168,412	2,751	0.0611	0.7401	0.1960	0.0027	937,317	2.20
293,551	Even Brood Years (1974-1983)		47,125	435,624	134,260	1,623	0.0692	0.7046	0.2238	0.0023	618,632	2.29
731,845	Odd Brood Years (1974-1983)		70,467	979,092	202,565	3,879	0.0530	0.7756	0.1682	0.0031	1,256,002	2.11
503,615	All Brood Years (1984-2000)		10,417	450,998	206,046	8,117	0.0167	0.6600	0.3107	0.0126	675,579	1.64
412,142	Even Brood Years (1984-2000)		7,712	355,810	195,936	8,299	0.0182	0.6274	0.3396	0.0148	567,756	1.67
569,914	Odd Brood Years (1984-2000)		13,461	558,085	217,420	7,912	0.0150	0.6966	0.2783	0.0101	796,879	1.60

[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, 1985–2006.

	Canadian Origin Stock Targets					
	Chinook Salmon		Fall Chum Salmon			
Year	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
2006	33,000-43,000	28,000	80,000	80,000	50,000-120,000	28,000

Appendix A36.–South Unimak and Shumagin Islands June commercial sockeye and chum salmon harvest, all gear combined, by year, 1980–2006.

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
2006	932,291	299,827
Average 86-05	1,288,853	408,907
Average 96-05	1,011,986	303,217

Source: Poetter 2006.

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 2006.

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	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
2006	1,974,920	85,764	----------326,296----------				412,060
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	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
2006	195,356	17,577	----------4,746----------				22,323

Source: Berger 2003 and NMFS Alaska Region Catch Accounting.

APPENDIX B: HISTORICAL SALMON HARVEST AND ESCAPEMENT

Appendix B1.–Alaskan and Canadian total utilization of Yukon River Chinook, chum and coho salmon, 1903–2006.

	Alaska			Canada[c]			Total		
Year	Chinook	Other Salmon[a,b]	Total	Chinook	Other Salmon	Total	Chinook	Other Salmon	Total
1903				4,666		4,666	4,666		4,666
1904									
1905									
1906									
1907									
1908				7,000		7,000	7,000		7,000
1909				9,238		9,238	9,238		9,238
1910									
1911									
1912									
1913				12,133		12,133	12,133		12,133
1914				12,573		12,573	12,573		12,573
1915				10,466		10,466	10,466		10,466
1916				9,566		9,566	9,566		9,566
1917									
1918	12,239	1,500,065	1,512,304	7,066		7,066	19,305	1,500,065	1,519,370
1919	104,822	738,790	843,612	1,800		1,800	106,622	738,790	845,412
1920	78,467	1,015,655	1,094,122	12,000		12,000	90,467	1,015,655	1,106,122
1921	69,646	112,098	181,744	10,840		10,840	80,486	112,098	192,584
1922	31,825	330,000	361,825	2,420		2,420	34,245	330,000	364,245
1923	30,893	435,000	465,893	1,833		1,833	32,726	435,000	467,726
1924	27,375	1,130,000	1,157,375	4,560		4,560	31,935	1,130,000	1,161,935
1925	15,000	259,000	274,000	3,900		3,900	18,900	259,000	277,900
1926	20,500	555,000	575,500	4,373		4,373	24,873	555,000	579,873
1927		520,000	520,000	5,366		5,366	5,366	520,000	525,366
1928		670,000	670,000	5,733		5,733	5,733	670,000	675,733
1929		537,000	537,000	5,226		5,226	5,226	537,000	542,226
1930		633,000	633,000	3,660		3,660	3,660	633,000	636,660
1931	26,693	565,000	591,693	3,473		3,473	30,166	565,000	595,166
1932	27,899	1,092,000	1,119,899	4,200		4,200	32,099	1,092,000	1,124,099
1933	28,779	603,000	631,779	3,333		3,333	32,112	603,000	635,112
1934	23,365	474,000	497,365	2,000		2,000	25,365	474,000	499,365
1935	27,665	537,000	564,665	3,466		3,466	31,131	537,000	568,131
1936	43,713	560,000	603,713	3,400		3,400	47,113	560,000	607,113
1937	12,154	346,000	358,154	3,746		3,746	15,900	346,000	361,900
1938	32,971	340,450	373,421	860		860	33,831	340,450	374,281
1939		327,650	355,687	720		720	28,757	327,650	356,407
1940	32,453	1,029,000	1,061,453	1,153		1,153	33,606	1,029,000	1,062,606
1941	47,608	438,000	485,608	2,806		2,806	50,414	438,000	488,414
1942	22,487	197,000	219,487	713		713	23,200	197,000	220,200
1943	27,650	200,000	227,650	609		609	28,259	200,000	228,259
1944	14,232		14,232	986		986	15,218		15,218
1945	19,727		19,727	1,333		1,333	21,060		21,060
1946	22,782		22,782	353		353	23,135		23,135
1947	54,026		54,026	120		120	54,146		54,146
1948	33,842		33,842				33,842		33,842
1949	36,379		36,379				36,379		36,379
1950	41,808		41,808				41,808		41,808
1951	56,278		56,278				56,278		56,278
1952	38,637	10,868	49,505				38,637	10,868	49,505
1953	58,859	385,977	444,836				58,859	385,977	444,836
1954	64,545	14,375	78,920				64,545	14,375	78,920
1955	55,925		55,925				55,925		55,925
1956	62,208	10,743	72,951				62,208	10,743	72,951
1957	63,623		63,623				63,623		63,623
1958	75,625	337,500	413,125	11,000	1,500	12,500	86,625	339,000	425,625
1959	78,370		78,370	8,434	3,098	11,532	86,804	3,098	89,902
1960	67,597		67,597	9,653	15,608	25,261	77,250	15,608	92,858

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	Alaska			Canada [c]			Total		
Year	Chinook	Other Salmon [a,b]	Total	Chinook	Other Salmon	Total	Chinook	Other Salmon	Total
1961	141,152	461,597	602,749	13,246	9,076	22,322	154,398	470,673	625,071
1962	105,844	434,663	540,507	13,937	9,436	23,373	119,781	444,099	563,880
1963	141,910	429,396	571,306	10,077	27,696	37,773	151,987	457,092	609,079
1964	109,818	504,420	614,238	7,408	12,187	19,595	117,226	516,607	633,833
1965	134,706	484,587	619,293	5,380	11,789	17,169	140,086	496,376	636,462
1966	104,887	309,502	414,389	4,452	13,192	17,644	109,339	322,694	432,033
1967	146,104	352,397	498,501	5,150	16,961	22,111	151,254	369,358	520,612
1968	118,632	270,818	389,450	5,042	11,633	16,675	123,674	282,451	406,125
1969	105,027	424,399	529,426	2,624	7,776	10,400	107,651	432,175	539,826
1970	93,019	585,760	678,779	4,663	3,711	8,374	97,682	589,471	687,153
1971	136,191	547,448	683,639	6,447	16,911	23,358	142,638	564,359	706,997
1972	113,098	461,617	574,715	5,729	7,532	13,261	118,827	469,149	587,976
1973	99,670	779,158	878,828	4,522	10,135	14,657	104,192	789,293	893,485
1974	118,053	1,229,678	1,347,731	5,631	11,646	17,277	123,684	1,241,324	1,365,008
1975	76,883	1,307,037	1,383,920	6,000	20,600	26,600	82,883	1,327,637	1,410,520
1976	105,582	1,026,908	1,132,490	5,025	5,200	10,225	110,607	1,032,108	1,142,715
1977	114,494	1,090,758	1,205,252	7,527	12,479	20,006	122,021	1,103,237	1,225,258
1978	129,988	1,615,312	1,745,300	5,881	9,566	15,447	135,869	1,624,878	1,760,747
1979	159,232	1,596,133	1,755,365	10,375	22,084	32,459	169,607	1,618,217	1,787,824
1980	197,665	1,730,960	1,928,625	22,846	23,718 [d]	46,564	220,511	1,754,678	1,975,189
1981	188,477	2,097,871	2,286,348	18,109	22,781 [d]	40,890	206,586	2,120,652	2,327,238
1982	152,808	1,265,457	1,418,265	17,208	16,091 [d]	33,299	170,016	1,281,548	1,451,564
1983	198,436	1,678,597	1,877,033	18,952	29,490 [d]	48,442	217,388	1,708,087	1,925,475
1984	162,683	1,548,101	1,710,784	16,795	29,767 [d]	46,562	179,478	1,577,868	1,757,346
1985	187,327	1,657,984	1,845,311	19,301	41,515 [d]	60,816	206,628	1,699,499	1,906,127
1986	146,004	1,758,825	1,904,829	20,364	14,843 [d]	35,207	166,368	1,773,668	1,940,036
1987	188,386	1,246,176	1,434,562	17,614	44,786 [d]	62,400	206,000	1,290,962	1,496,962
1988	148,421	2,311,214	2,459,635	21,427	33,915 [d]	55,342	169,848	2,345,129	2,514,977
1989	157,606	2,281,566	2,439,172	17,944	23,490 [d]	41,434	175,550	2,305,056	2,480,606
1990	149,433	1,053,351	1,202,784	19,227	34,302 [d]	53,529	168,660	1,087,653	1,256,313
1991	154,651	1,335,111	1,489,762	20,607	35,653 [d]	56,260	175,258	1,370,764	1,546,022
1992	168,191	863,575	1,031,766	17,903	21,310 [d]	39,213	186,094	884,885	1,070,979
1993	160,289	341,953	502,242	16,611	14,150 [d]	30,761	176,900	356,103	533,003
1994	170,829	554,643	725,472	21,198	38,342	59,540	192,027	592,985	785,012
1995	177,663	1,437,837	1,615,500	20,884	46,109	66,993	198,547	1,483,946	1,682,493
1996	138,562	1,121,181	1,259,743	19,612	24,395	44,007	158,174	1,145,576	1,303,750
1997	174,625	544,879	719,504	16,528	15,880	32,408	191,153	560,759	751,912
1998	99,369	199,735	299,104	5,937 [e]	8,165	14,102	105,306	207,900	313,206
1999	124,315	234,221	358,536	12,468	19,736	32,204	136,783	253,957	390,740
2000	45,308	106,936	152,244	4,879 [f]	9,273	14,152	50,187	116,209	166,396
2001	53,738	116,477	170,215	10,139	9,822	19,961	63,877	126,299	190,176
2002	67,888	122,360	190,248	9,257	8,493	17,750	77,145	130,853	207,998
2003	99,150	199,882	299,032	9,619	11,885	21,504	108,769	211,767	320,536
2004	112,232	206,099	318,331	11,238	9,930	21,168	123,470	216,029	339,499
2005	85,507	478,749	564,256	11,371	18,348	29,719	96,878	497,097	593,975
2006 [g]	95,184	477,190	572,374	9,072	11,907	20,979	104,256	489,097	593,353
Average									
1903-05	90,994	740,914	726,023	8,752	18,042	18,940	87,626	733,019	689,474
1996-05	100,069	333,052	433,121	11,105	13,593	24,698	111,174	346,645	457,819
2001-05	83,703	224,713	308,416	10,325	11,696	22,020	94,028	236,409	330,437

[a] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe.

[b] Commercial, subsistence, personal-use, test fish retained for subsistence, and sport catches combined. Totals do not include the Coastal District communities of Hooper Bay and Scammon Bay.

[c] Catch in number of salmon. Commercial, Aboriginal, domestic and sport catches combined.

[d] Includes the Old Crow Aboriginal fishery harvest of coho salmon.

[e] Catch includes 761 Chinook salmon taken in the mark–recapture test fishery.

[f] Catch includes 737 Chinook salmon taken in the test fishery.

[g] Data are preliminary.

Appendix B2.–Alaskan catch of Yukon River Chinook salmon, 1961–2006.

Year	Commercial	Commercial Related [a]	Total Commercial	Subsistence [b]	Personal Use [c]	Test Fish Sales [d]	Sport Fish [e]	Total
1961	119,664	0	119,664	21,488				141,152
1962	94,734	0	94,734	11,110				105,844
1963	117,048	0	117,048	24,862				141,910
1964	93,587	0	93,587	16,231				109,818
1965	118,098	0	118,098	16,608				134,706
1966	93,315	0	93,315	11,572				104,887
1967	129,656	0	129,656	16,448				146,104
1968	106,526	0	106,526	12,106				118,632
1969	91,027	0	91,027	14,000				105,027
1970	79,145	0	79,145	13,874				93,019
1971	110,507	0	110,507	25,684				136,191
1972	92,840	0	92,840	20,258				113,098
1973	75,353	0	75,353	24,317				99,670
1974	98,089	0	98,089	19,964				118,053
1975	63,838	0	63,838	13,045				76,883
1976	87,776	0	87,776	17,806				105,582
1977	96,757	0	96,757	17,581			156	114,494
1978	99,168	0	99,168	30,785			523	130,476
1979	127,673	0	127,673	31,005			554	159,232
1980	153,985	0	153,985	42,724			956	197,665
1981	158,018	0	158,018	29,690			769	188,477
1982	123,644	0	123,644	28,158			1,006	152,808
1983	147,910	0	147,910	49,478			1,048	198,436
1984	119,904	0	119,904	42,428			351	162,683
1985	146,188	0	146,188	39,771			1,368	187,327
1986	99,970	0	99,970	45,238			796	146,004
1987	134,760	0	134,760 [f]	55,039	1,706		502	192,007
1988	100,364	0	100,364	45,495	2,125	1,081	944	150,009
1989	104,198	0	104,198	48,462	2,616	1,293	1,053	157,622
1990	95,247	413	95,660	48,587	2,594	2,048	544	149,433
1991	104,878	1,538	106,416	46,773		689	773	154,651
1992	120,245	927	121,172	47,077		962	431	169,642
1993	93,550	560	94,110	63,915	426	1,572	1,695	161,718
1994	113,137	703	113,840	53,902		1,631	2,281	171,654
1995	122,728	1,324	124,052	50,620	399	2,152	2,525	179,748
1996	89,671	521	90,192	45,671	215	1,698	3,151	140,927
1997	112,841	769	113,610	57,117	313	2,811	1,913	175,764
1998	43,618	81	43,699	54,124	357	926	654	99,760
1999	69,275	288	69,563	53,305	331	1,205	1,023	125,427
2000	8,518		8,518	36,404	75	597	276	45,870
2001	0		0	55,819	122		679	56,620
2002	24,128		24,128	43,742	126	528	486	69,010
2003	40,438		40,438	56,959	204	680	2,719	101,000
2004	56,151		56,151	55,713	201	792	1,513	114,370
2005	32,029		32,029	53,409	138	296	483	86,355
2006 [g]	45,829		45,829	48,593	89	817	739	96,067
1989-1998 Average	100,011	684	100,695	51,625	989	1,578	1,502	156,092
Average 2001-2005	30,549		30,549	53,128	158	574	1,176	85,471
2002-2006	39,715		39,715	51,683	152	623	1,188	93,360

[a] Includes salmon harvested for subsistence and an estimate of the number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence. These data are only available since 1990.

[b] Includes harvest from the Coastal District and test fish harvest that were utilized for subsistence.

[c] Prior to 1987, and 1990, 1991, and 1994 personal use was considered part of subsistence.

[d] Includes only test fish that were sold commercially.

[e] Sport fish harvest for the Alaskan portion of the Yukon River drainage. Most of this harvest is believed to have been taken within the Tanana River drainage (see Schultz et al. 1993: 1992 Yukon Area AMR).

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

[g] Subsistence and personal use data are preliminary.

Appendix B3.–Alaskan catch of Yukon River summer chum salmon, 1970–2006.

Year	Subsistence [a]	Commercial	Commercial Related [b]	Personal Use	Test Fish Sales [c]	Sport Fish [d]	Total
1970	166,504	137,006	0				303,510
1971	171,487	100,090	0				271,577
1972	108,006	135,668	0				243,674
1973	161,012	285,509	0				446,521
1974	227,811	589,892	0				817,703
1975	211,888	710,295	0				922,183
1976	186,872	600,894	0				787,766
1977	159,502	534,875	0			316	694,693
1978	171,383	1,052,226	25,761			451	1,249,821
1979	155,970	779,316	40,217			328	975,831
1980	167,705	928,609	139,106			483	1,235,903
1981	117,629	1,006,938	272,763			612	1,397,942
1982	117,413	461,403	255,610			780	835,206
1983	149,180	744,879	250,590			998	1,145,647
1984	166,630	588,597	277,443			585	1,033,255
1985	157,744	516,997	417,016			1,267	1,093,024
1986	182,337	721,469	467,381			895	1,372,082
1987	170,678	442,238	180,303	4,262		846	798,327
1988	196,599	1,148,650	468,032	2,225	3,587	1,037	1,820,130
1989	167,155	955,806	496,934	1,891	10,605	2,132	1,634,523
1990	115,609	302,625	214,552	1,827	8,263	472	643,348
1991	118,540	349,113	308,989		3,934	1,037	781,613
1992	125,497	332,313	211,264		1,967	1,308	672,349
1993	104,776	96,522	43,594	674	1,869	564	247,999
1994	109,904	80,284	178,457		3,212	350	372,207
1995	118,723	259,774	558,640	780	6,073	1,174	945,164
1996	102,503	147,127	535,106	905	7,309	1,854	794,804
1997	97,109	95,242	133,010	391	2,590	475	328,817
1998	86,004	28,611	187	84	3,019	421	118,326
1999	70,323	29,389	24	382	836	555	101,509
2000	64,895	6,624	0	30	648	161	72,358
2001	58,385	0	0	146	0	82	58,613
2002	72,260	13,558	19	175	218	384	86,614
2003	68,304	10,685	0	148	119	1,638	80,894
2004	69,672	26,410	0	231	217	203	96,733
2005	93,259	41,264	0	152	134	435	135,244
2006 [e]	115,093	92,116	0	262	502	1,059	209,032
2001-2005 Average	72,376	18,383	4	170	138	548	91,620
1996-2005 Average	78,271	39,891	66,835	264	1,509	621	187,391

[a] Includes harvest from the Coastal District and test fish harvest that were utilized for subsistence.

[b] Includes salmon harvested for subsistence and an estimate of the number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence.

[c] Includes only test fish that were sold commercially.

[d] The majority of the sport-fish harvest is believed to be taken in the Tanana River drainage. Sport fish division does not differentiate between the two races of chum salmon. Sport fish harvest is assumed to be primarily summer chum salmon caught incidental to directed Chinook salmon fishing.

[e] Subsistence and personal use data are preliminary.

Appendix B4.–Alaskan catch of Yukon River fall chum salmon, 1961–2006.

Year	Estimated Subsistence Use [a]	Harvest		
		Subsistence [b]	Commercial [c]	Total [d]
1961	101,772 [e,f]	101,772	42,461	144,233
1962	87,285 [e,f]	87,285	53,116	140,401
1963	99,031 [e,f]	99,031	0	99,031
1964	120,360 [e,f]	120,360	8,347	128,707
1965	112,283 [e,f]	112,283	23,317	135,600
1966	51,503 [e,f]	51,503	71,045	122,548
1967	68,744 [e,f]	68,744	38,274	107,018
1968	44,627 [e,f]	44,627	52,925	97,552
1969	52,063 [e,f]	52,063	131,310	183,373
1970	55,501 [e,f]	55,501	209,595	265,096
1971	57,162 [e,f]	57,162	189,594	246,756
1972	36,002 [e,f]	36,002	152,176	188,178
1973	53,670 [e,f]	53,670	232,090	285,760
1974	93,776 [e,f]	93,776	289,776	383,552
1975	86,591 [e,f]	86,591	275,009	361,600
1976	72,327 [e,f]	72,327	156,390	228,717
1977	82,771 [f]	82,771 [f]	257,986	340,757
1978	94,867 [f]	84,239 [f]	247,011	331,250
1979	233,347	214,881	378,412	593,293
1980	172,657	167,637	298,450	466,087
1981	188,525	177,240	477,736	654,976
1982	132,897	132,092	224,992	357,084
1983	192,928	187,864	307,662	495,526
1984	174,823	172,495	210,560	383,055
1985	206,472	203,947	270,269	474,216
1986	164,043	163,466	140,019	303,485
1987	361,663	361,663 [g]	0	361,663
1988	158,694	155,467	164,210	319,677
1989	230,978	216,229	301,928	518,157
1990	185,244	173,076	143,402	316,478
1991	168,890	145,524	258,154	403,678
1992	110,903	107,602	20,429 [h]	128,031
1993	76,925	76,925	0	76,925
1994	127,586	123,218	7,999	131,217
1995	163,693	131,369	284,178	415,547
1996	146,154	129,222	107,347	236,569
1997	96,899	95,425	59,054	154,479
1998	62,869	62,869	0	62,869
1999	89,999	89,998	20,371	110,369
2000	19,307	19,307	0	19,307
2001	35,154	35,154	0	35,154
2002	19,393	19,393	0	19,393
2003	57,178	57,178	10,996	68,174
2004	62,436	62,436	4,110	66,546
2005	91,597	91,597	180,249	271,846
2006 [i]	84,133	84,133	174,542	258,675
Average				
1961-05	113,369	109,622	140,021	249,643
1996-05	68,099	66,258	38,213	104,471
2001-05	53,152	53,152	39,071	92,223

-continued-

[a] Includes salmon harvested for subsistence and personal use purposes, and an estimate of number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence. These data are only available since 1990. Does not include harvest from the Coastal District.

[b] Includes salmon harvested for subsistence and personal use. Does not include harvest form the Coastal District.

[c] Includes ADF&G test fish sales, fish sold in the round, and estimated numbers of female salmon commercially harvested for production of salmon roe (see Bergstrom et al. 1992: 1990 Yukon Area AMR).

[d] Does not include sport-fish harvest. The majority of the sport-fish harvest is believed to be taken in the Tanana River drainage. Sport fish division does not differentiate between the two races of chum salmon. However, most of this harvest is believed to be summer chum salmon.

[e] Catches estimated because catches of species other than Chinook salmon were not differentiated.

[f] Minimum estimates because surveys were conducted prior to the end of the fishing season.

[g] Includes an estimated 95,768 and 119,168 fall chum salmon illegally sold in Districts 5 (Yukon River) and 6 (Tanana River), respectively.

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

[i] Subsistence and personal use data are preliminary.

Appendix B5.–Alaskan catch of Yukon River coho salmon, 1961–2006.

Year	Estimated Subsistence Use [a]	Harvest			
		Subsistence [b]	Commercial [c]	Sport [d]	Total
1961	9,192 [e,f]	9,192 [e,f]	2,855		12,047
1962	9,480 [e,f]	9,480 [e,f]	22,926		32,406
1963	27,699 [e,f]	27,699 [e,f]	5,572		33,271
1964	12,187 [e,f]	12,187 [e,f]	2,446		14,633
1965	11,789 [e,f]	11,789 [e,f]	350		12,139
1966	13,192 [e,f]	13,192 [e,f]	19,254		32,446
1967	17,164 [e,f]	17,164 [e,f]	11,047		28,211
1968	11,613 [e,f]	11,613 [e,f]	13,303		24,916
1969	7,776 [e,f]	7,776 [e,f]	15,093		22,869
1970	3,966 [e,f]	3,966 [e,f]	13,188		17,154
1971	16,912 [e,f]	16,912 [e,f]	12,203		29,115
1972	7,532 [e,f]	7,532 [e,f]	22,233		29,765
1973	10,236 [e,f]	10,236 [e,f]	36,641		46,877
1974	11,646 [e,f]	11,646 [e,f]	16,777		28,423
1975	20,708 [e,f]	20,708 [e,f]	2,546		23,254
1976	5,241 [e,f]	5,241 [e,f]	5,184		10,425
1977	16,333 [f]	16,333 [f]	38,863	112	55,308
1978	7,787 [f]	7,787 [f]	26,152	302	34,241
1979	9,794	9,794	17,165	50	27,009
1980	20,158	20,158	8,745	67	28,970
1981	21,228	21,228	23,680	45	44,953
1982	35,894	35,894	37,176	97	73,167
1983	23,905	23,905	13,320	199	37,424
1984	49,020	49,020	81,940	831	131,791
1985	32,264	32,264	57,672	808	90,744
1986	34,468	34,468	47,255	1,535	83,258
1987	84,894	84,894 [g]	0	1,292	86,186
1988	69,080	69,080	99,907	2,420	171,407
1989	41,583	41,583	85,493	1,811	128,887
1990	47,896	44,641	46,937	1,947	93,525
1991	40,894	37,388	109,657	2,775	149,820
1992	53,344	51,921	9,608 [h]	1,666	63,195
1993	15,772	15,772	0	897	16,669
1994	48,926	44,594	4,451	2,174	51,219
1995	29,716	28,642	47,206	1,278	77,126
1996	33,651	30,510	57,710	1,588	89,808
1997	24,579	24,295	35,818	1,470	61,583
1998	17,781	17,781	1	758	18,540
1999	20,970	20,970	1,601	609	23,180
2000	14,717	14,717	0	554	15,271
2001	21,654	21,654	0	1,248	22,902
2002	15,261	15,261	0	1,092	16,353
2003	24,129	24,129	25,243	1,477	50,849
2004	20,965	20,965	20,232	1,623	42,820
2005	27,078	27,078	58,311	627	86,016
2006 [k]	19,650	19,650	64,942	1,000	85,592
Average					
1961-05	24,446	24,068	25,684	1,081	50,448
1996-05	22,079	21,736	19,892	1,105	42,732
2001-05	21,817	21,817	20,757	1,213	43,788

-continued-

[a] Includes salmon harvested for subsistence and personal use purposes, and an estimate of the number of salmon harvested for the commercial production of salmon roe and the carcasses used for subsistence. These data are only available since 1990. Does not include harvest from the Coastal District.
[b] Includes salmon harvested for subsistence and personal use. Does not include harvest from the Coastal District.
[c] Includes ADF&G test fish sales, fish sold in the round, and estimated numbers of female salmon commercially harvested for the production of salmon roe (see Bergstrom et al. 1992: 1990 Yukon Area AMR).
[d] Sport fish harvest for the Alaskan portion of the Yukon River drainage. The majority of this harvest is believed to have been taken within the Tanana River drainage (see Schultz et al. 1993: 1992 Yukon Area AMR).
[e] Catches estimated because catches of species other than Chinook were not differentiated.
[f] Minimum estimates because surveys were conducted before the end of the fishing season.
[g] Includes an estimated 5,015 and 31,276 coho salmon illegally sold in Districts 5 and 6 (Tanana River), respectively.
[h] Commercial fishery operated only in District 6, the Tanana River.
[k] Subsistence and personal use data are preliminary.

Appendix B6.–Alaskan and Canadian total utilization of Yukon River Chinook and fall chum salmon, 1961–2006.

	Chinook			Fall Chum		
Year	Canada [a]	Alaska [b,c]	Total	Canada [a]	Alaska [b,c]	Total
1961	13,246	141,152	154,398	9,076	144,233	153,309
1962	13,937	105,844	119,781	9,436	140,401	149,837
1963	10,077	141,910	151,987	27,696	99,031 [d]	126,727
1964	7,408	109,818	117,226	12,187	128,707	140,894
1965	5,380	134,706	140,086	11,789	135,600	147,389
1966	4,452	104,887	109,339	13,192	122,548	135,740
1967	5,150	146,104	151,254	16,961	107,018	123,979
1968	5,042	118,632	123,674	11,633	97,552	109,185
1969	2,624	105,027	107,651	7,776	183,373	191,149
1970	4,663	93,019	97,682	3,711	265,096	268,807
1971	6,447	136,191	142,638	16,911	246,756	263,667
1972	5,729	113,098	118,827	7,532	188,178	195,710
1973	4,522	99,670	104,192	10,135	285,760	295,895
1974	5,631	118,053	123,684	11,646	383,552	395,198
1975	6,000	76,883	82,883	20,600	361,600	382,200
1976	5,025	105,582	110,607	5,200	228,717	233,917
1977	7,527	114,494	122,021	12,479	340,757	353,236
1978	5,881	130,476	136,357	9,566	331,250	340,816
1979	10,375	159,232	169,607	22,084	593,293	615,377
1980	22,846	197,665	220,511	22,218	466,087	488,305
1981	18,109	188,477	206,586	22,281	654,976	677,257
1982	17,208	152,808	170,016	16,091	357,084	373,175
1983	18,952	198,436	217,388	29,490	495,526	525,016
1984	16,795	162,683	179,478	29,267	383,055	412,322
1985	19,301	187,327	206,628	41,265	474,216	515,481
1986	20,364	146,004	166,368	14,543	303,485	318,028
1987	17,614	188,386	209,621	44,480	361,663 [d]	406,143
1988	21,427	148,421	171,436	33,565	319,677	353,242
1989	17,944	157,606	175,566	23,020	518,157	541,177
1990	19,227	149,433	168,660	33,622	316,478	350,100
1991	20,607	154,651	175,258	35,418	403,678	439,096
1992	17,903	168,191	186,094	20,815	128,031 [e]	148,846
1993	16,611	160,289	176,900	14,090	76,925 [d]	91,015
1994	21,198	170,829	192,027	38,008	131,217	169,225
1995	20,884	177,663	198,547	45,600	415,547	461,147
1996	19,612	138,562	158,174	24,354	236,569	260,923
1997	16,528	174,625	191,153	15,580	154,479	170,059
1998	5,937	99,369	105,306	7,951	62,869	70,820
1999	12,468	124,315	136,783	19,636	110,369	130,005
2000	4,879	45,308	50,187	9,236	19,307	28,543
2001	10,139	53,738	63,877	9,822	35,154 [d]	44,976
2002	9,257	67,888	77,145	8,018	19,393	27,411
2003	9,619	99,150	108,769	11,355	68,174	79,529
2004	11,238	112,232	123,470	9,750	66,546	76,296
2005	11,371	85,507	96,878	18,337	271,846	290,183
2006 [f]	9,072	95,184	104,256	11,796	258,675	270,471
Average						
1961-05	12,159	132,541	144,816	18,609	249,643	268,252
1995-05	11,105	100,069	111,174	13,404	104,471	117,875
2001-05	10,325	83,703	94,028	11,456	92,223	103,679

Note: Canadian managers do not refer to chum as fall chum.

[a] Catches in number of salmon. Includes commercial, Aboriginal, domestic, and sport catches combined.

[b] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe (see Bergstrom et al. 1992: 1990 Yukon Area AMR) Totals does not include the Coastal District communities of Hooper Bay and Scammon Bay.

[c] Commercial, subsistence, personal-use, and sport catches combined.

[d] Commercial fishery did not operate within the Alaskan portion of the drainage.

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

[f] Data are preliminary.

Appendix B7.–Canadian catch of Yukon River Chinook salmon, 1961–2006.

	Mainstem Yukon River Harvest							Porcupine River Aboriginal	Total
Year	Commercial	Domestic	Aboriginal Fishery	Sport [a]	Test Fishery	Combined Non-Commercial	Total	Fishery Harvest	Canadian Harvest
1961	3,446		9,300			9,300	12,746	500	13,246
1962	4,037		9,300			9,300	13,337	600	13,937
1963	2,283		7,750			7,750	10,033	44	10,077
1964	3,208		4,124			4,124	7,332	76	7,408
1965	2,265		3,021			3,021	5,286	94	5,380
1966	1,942		2,445			2,445	4,387	65	4,452
1967	2,187		2,920			2,920	5,107	43	5,150
1968	2,212		2,800			2,800	5,012	30	5,042
1969	1,640		957			957	2,597	27	2,624
1970	2,611		2,044			2,044	4,655	8	4,663
1971	3,178		3,260			3,260	6,438	9	6,447
1972	1,769		3,960			3,960	5,729		5,729
1973	2,199		2,319			2,319	4,518	4	4,522
1974	1,808	406	3,342			3,748	5,556	75	5,631
1975	3,000	400	2,500			2,900	5,900	100	6,000
1976	3,500	500	1,000			1,500	5,000	25	5,025
1977	4,720	531	2,247			2,778	7,498	29	7,527
1978	2,975	421	2,485			2,906	5,881		5,881
1979	6,175	1,200	3,000			4,200	10,375		10,375
1980	9,500	3,500	7,546	300		11,346	20,846	2000	22,846
1981	8,593	237	8,879	300		9,416	18,009	100	18,109
1982	8,640	435	7,433	300		8,168	16,808	400	17,208
1983	13,027	400	5,025	300		5,725	18,752	200	18,952
1984	9,885	260	5,850	300		6,410	16,295	500	16,795
1985	12,573	478	5,800	300		6,578	19,151	150	19,301
1986	10,797	342	8,625	300		9,267	20,064	300	20,364
1987	10,864	330	6,069	300		6,699	17,563	51	17,614
1988	13,217	282	7,178	650		8,110	21,327	100	21,427
1989	9,789	400	6,930	300		7,630	17,419	525	17,944
1990	11,324	247	7,109	300		7,656	18,980	247	19,227
1991	10,906	227	9,011	300		9,538	20,444	163	20,607
1992	10,877	277	6,349	300		6,926	17,803	100	17,903
1993	10,350	243	5,576	300		6,119	16,469	142	16,611
1994	12,028	373	8,069	300		8,742	20,770	428	21,198
1995	11,146	300	7,942	700		8,942	20,088	796	20,884
1996	10,164	141	8,451	790		9,382	19,546	66	19,612
1997	5,311	288	8,888	1,230		10,406	15,717	811	16,528
1998	390	24	4,687	0	737	5,448	5,838	99	5,937
1999	3,160	213	8,804	177		9,194	12,354	114	12,468
2000	[b]	[b]	4,068	[b]	761	4,829	4,829	50	4,879
2001	1,351	89	7,416	146	767	8,418	9,769	370	10,139
2002	708	59	7,138	128	1,036	8,361	9,069	188	9,257
2003	2,672	115	6,121	275	263	6,774	9,446	173	9,619
2004	3,785	88	6,483	423	167	7,161	10,946	292	11,238
2005	4,066	99	6,376	436		6,911	10,977	394	11,371
2006	2,332	63	5,757	606		6,426	8,758	314	9,072
Average									
1961-05	5,915	416	5,569	366	622	6,142	11,926	250	12,159
1996-05	3,512	124	6,843	401	622	7,688	10,849	256	11,105
2001-05	2,516	90	6,707	282	558	7,525	10,041	283	10,325

[a] Sport fish harvest unknown before 1980.

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

Appendix B8.–Canadian catch of Yukon River fall chum salmon, 1961–2006.

	Mainstem Yukon River Harvest						Porcupine River	
				Aboriginal	Combined		Aboriginal	Total
Year	Commercial	Domestic	Test	Fishery	Non-Commercial	Total	Fishery Harvest	Canadian Harvest
1961	3,276			3,800	3,800	7,076	2,000	9,076
1962	936			6,500	6,500	7,436	2,000	9,436
1963	2,196			5,500	5,500	7,696	20,000	27,696
1964	1,929			4,200	4,200	6,129	6,058	12,187
1965	2,071			2,183	2,183	4,254	7,535	11,789
1966	3,157			1,430	1,430	4,587	8,605	13,192
1967	3,343			1,850	1,850	5,193	11,768	16,961
1968	453			1,180	1,180	1,633	10,000	11,633
1969	2,279			2,120	2,120	4,399	3,377	7,776
1970	2,479			612	612	3,091	620	3,711
1971	1,761			150	150	1,911	15,000	16,911
1972	2,532				0	2,532	5,000	7,532
1973	2,806			1,129	1,129	3,935	6,200	10,135
1974	2,544	466		1,636	2,102	4,646	7,000	11,646
1975	2,500	4,600		2,500	7,100	9,600	11,000	20,600
1976	1,000	1,000		100	1,100	2,100	3,100	5,200
1977	3,990	1,499		1,430	2,929	6,919	5,560	12,479
1978	3,356	728		482	1,210	4,566	5,000	9,566
1979	9,084	2,000		11,000	13,000	22,084		22,084
1980	9,000	4,000		3,218	7,218	16,218	6,000	22,218
1981	15,260	1,611		2,410	4,021	19,281	3,000	22,281
1982	11,312	683		3,096	3,779	15,091	1,000	16,091
1983	25,990	300		1,200	1,500	27,490	2,000	29,490
1984	22,932	535		1,800	2,335	25,267	4,000	29,267
1985	35,746	279		1,740	2,019	37,765	3,500	41,265
1986	11,464	222		2,200	2,422	13,886	657	14,543
1987	40,591	132		3,622	3,754	44,345	135	44,480
1988	30,263	349		1,882	2,231	32,494	1,071	33,565
1989	17,549	100		2,462	2,562	20,111	2,909	23,020
1990	27,537			3,675	3,675	31,212	2,410	33,622
1991	31,404			2,438	2,438	33,842	1,576	35,418
1992	18,576			304	304	18,880	1,935	20,815
1993	7,762			4,660	4,660	12,422	1,668	14,090
1994	30,035			5,319	5,319	35,354	2,654	38,008
1995	39,012			1,099	1,099	40,111	5,489	45,600
1996	20,069			1,260	1,260	21,329	3,025	24,354
1997	8,068			1,218	1,218	9,286	6,294	15,580
1998 [a]				1,792	1,792	1,792	6,159	7,951
1999	10,402			3,234	3,234	13,636	6,000	19,636
2000	1,319			2,917	2,917	4,236	5,000	9,236
2001	2,198	3	1 [b]	3,027	3,030	5,228	4,594	9,822
2002	3,065		2,756 [b]	3,093	3,093	6,158	1,860	8,018
2003	9,030		990 [b]	1,943	1,943	10,973	382	11,355
2004	7,365		995 [b]	2,180	2,180	9,545	205	9,750
2005	11,931	13	0 [b]	1,800	1,813	13,744	4,593	18,337
2006	4,096			2,521	2,521	6,617	5,179	11,796
Average								
1961-05	11,354	1,029	948	2,532	2,887	13,989	4,726	18,609
1996-05	8,161	8	948	2,246	2,248	9,593	3,811	13,404
2001-05	6,718	8	948	2,409	2,412	9,130	2,327	11,456

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

[b] Because the test fishery releases their catch live, the test fishery catch is not included in the harvest totals.

Appendix B9.–Chinook salmon aerial survey indices for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1961–2006.

	Andreafsky River		Anvik River		Nulato River			
Year	East Fork	West Fork	Drainage Wide Total	Index Area	North Fork	South Fork	Both Forks	Gisasa River
1961	1,003		1,226		376 [a]	167		266 [a]
1962	675 [a]	762 [a]						
1963								
1964	867	705						
1965		344 [a]	650 [a]					
1966	361	303	638					
1967		276 [a]	336 [a]					
1968	380	383	310 [a]					
1969	274 [a]	231 [a]	296 [a]					
1970	665	574 [a]	368					
1971	1,904	1,682						
1972	798	582 [a]	1,198					
1973	825	788	613					
1974		285	471 [a]		55 [a]	23 [a]	[a]	161
1975	993	301	730		123	81		385
1976	818	643	1,053		471	177		332
1977	2,008	1,499	1,371		286	201		255
1978	2,487	1,062	1,324		498	422		45 [a]
1979	1,180	1,134	1,484		1,093	414		484
1980	958 [a]	1,500	1,330	1,192	954 [a]	369 [a]	[a]	951
1981	2,146 [a]	231 [a]	807 [a]	577 [a]		791		
1982	1,274	851						421
1983			653 [a]	376 [a]	526	480		572
1984	1,573 [a]	1,993	641 [a]	574 [a]				
1985	1,617	2,248	1,051	720	1,600	1,180		735
1986	1,954	3,158	1,118	918	1,452	1,522		1,346
1987	1,608	3,281	1,174	879	1,145	493		731
1988	1,020	1,448	1,805	1,449	1,061	714		797
1989	1,399	1,089	442 [a]	212 [a]				
1990	2,503	1,545	2,347	1,595	568 [a]	430 [a]	[a]	884 [a]
1991	1,938	2,544	875 [a]	625 [a]	767	1,253		1,690
1992	1,030 [a]	2,002 [a]	1,536	931	348	231		910
1993	5,855	2,765	1,720	1,526	1,844	1,181		1,573
1994	300 [a]	213 [a]		913 [a]	843	952		2,775
1995	1,635	1,108	1,996	1,147	968	681		410
1996		624	839	709		100		
1997	1,140	1,510	3,979	2,690				144 [a]
1998	1,027	1,249 [a]	709 [a]	648 [a]	507	546		889 [a]
1999	[a]	870 [a]	[a]	950 [a]	[a]	[a]		[a]
2000	1,018	427	1,721	1,394	[a]	[a]		[a]
2001	1,065	570	1,420	1,172			1,884 [b]	1,298
2002	1,447	917	1,713	1,329			1,584	506
2003	1,116 [a]	1,578 [a]	1,100 [a]	973 [a]				
2004	2,879	1,317	3,679	3,475			1,321	731
2005	1,715	1,492	2,421	2,421			553	958
2006	590 [a]	824	1,876	1,776			1,292	843
SEG [c]	960-1,700	640-1,600		1,100-1,700			940-1,900	420-1,100

Note: Aerial survey counts are peak counts only. Survey rating was fair or good unless otherwise noted.

[a] Incomplete, poor timing and/or poor survey conditions resulting in minimal or inaccurate counts.

[b] In 2001, the Nulato River escapement goal was established for both forks combined.

[c] Sustainable Escapement Goal.

Appendix B10.–Chinook salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1986–2006.

	Nulato River Tower		Gisasa River Weir			Chena River w/corrected percent females		Salcha River w/corrected percent females	
Year	No. Fish	% Female	No. Fish	No. Fish	% Female	No. Fish	% Female	No. Fish	% Female
1986	1,530	23.3 [a]				9,065	20.0 [b]		35.8
1987	2,011	56.1 [a]				6,404	43.8 [b]	4,771	47.0 [b]
1988	1,339	38.7 [a]				3,346	46.0 [b]	4,562	36.6 [b]
1989		13.6				2,666	38.0 [b]	3,294	46.8 [b]
1990		41.6				5,603	35.0 [b]	10,728	35.4 [b]
1991		33.9				3,025	31.5 [b]	5,608	34.0 [b]
1992		21.2				5,230	27.8 [b]	7,862	27.3 [b]
1993		29.9				12,241	11.9 [a]	10,007	24.2 [a]
1994	7,801	35.5 [c,d]	1,795 [d]	2,888	[d]	11,877	34.9 [a]	18,399	35.2 [a]
1995	5,841	43.7 [c]	1,412	4,023	46.0	9,680	50.3	13,643	42.2 [a]
1996	2,955	41.9 [c]	756	1,991	19.5	7,153	27.0	7,570	26.3
1997	3,186	36.8 [c]	4,766	3,764	26.0	13,390	17.0 [a]	18,514	36.3 [a]
1998	4,034	29.0 [c]	1,536	2,414	16.2	4,745	30.5 [a]	5,027	22.4 [a]
1999	3,444	28.6 [c]	1,932	2,644	26.4	6,485	47.0 [a]	9,198	38.8 [a]
2000	1,609	54.3 [c]	908	2,089	34.4	4,694	20.0 [b]	4,595	29.9 [a]
2001		[d]	[d]	3,052	49.2 [d]	9,696	32.4 [a]	13,328	27.9 [a]
2002	4,123	21.1 [c]	2,696	2,025	20.7	6,967	27.0 [b]	4,644	34.8 [a]
2003	4,336	45.3 [c]	1,716 [d]	1,901	38.1	8,739	34.0 [d]	15,500	31.8 [d,e]
2004	8,045	37.3	[f]	1,774	30.1	9,645	47.0	15,761	47.0
2005	2,239	50.2	[f]	3,111	34.0		[d]	5,988	54.3
2006	6,463	42.6	[f]	3,030	28.2	2,936	34.0 [d]	10,679	33.0
BEG [g]						2,800-5,700		3,300-6,500	

[a] Tower counts.

[b] Mark–recapture population estimate.

[c] Weir counts.

[d] Incomplete count because of late installation, early removal of project or inoperable.

[e] Expanded counts based on average run timing.

[f] Project did not operate.

[g] Biological Escapement Goals (BEG) established by the Alaska Board of Fisheries, Jan. 2001.

Appendix B11.–Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961-2006.

										Whitehorse Fishway		Canadian Mainstem		
Year	Tincup Creek [a]	Tatchun Creek [b]	Little Salmon River [a]	Big Salmon River [a, c]	Nisutlin River [a, d]	Ross River [a, e]	Wolf River [a, f]	Blind Creek	Chandindu River	Count	Percent Hatchery Contribution	Border Passage Estimate	Harvest	Spawning Escapement Estimate [g]
1961										1,068	0			
1962										1,500	0			
1963										483	0			
1964										595	0			
1965										903	0			
1966		7 [h]								563	0			
1967										533	0			
1968			173 [h]	857	407 [h]	104 [h]				414	0			
1969			120	286	105					334	0			
1970		100		670	615		71 [h]			625	0			
1971		130	275	275	650		750			856	0			
1972		80	126	415	237		13			391	0			
1973		99	27 [h]	75 [h]	36 [h]					224	0			
1974		192		70 [h]	48 [h]					273	0			
1975		175		153 [h]	249		40 [h]			313	0			
1976		52		86 [h]	102					121	0			
1977		150	408	316 [h]	77					277	0			
1978		200	330	524	375					725	0			
1979		150	489 [h]	632	713		183 [h]			1,184	0			
1980		222	286 [h]	1,436	975		377			1,383	0			
1981		133	670	2,411	1,626	949	395			1,555	0			
1982		73	403	758	578	155	104			473	0	36,598	16,808	19,790
1983	100	264	101 [h]	540	701	43 [h, i]	95			905	0	47,741	18,752	28,989
1984	150	153	434	1,044	832	151 [h]	124			1,042	0	43,911	16,295	27,616
1985	210	190	255	801	409	23 [h]	110			508	0	29,881	19,151	10,730
1986	228	155	54 [h]	745	459 [h]	72 [j]	109			557	0	36,479	20,064	16,415
1987	100	159	468	891	183	180 [h]	35			327	0	30,823	17,563	13,260
1988	204	152	368	765	267	242	66			405	16	44,445	21,327	23,118
1989	88	100	862	1,662	695	433 [j]	146			549	19	42,620	17,419	25,201
1990	83	643	665	1,806	652	457 [h]	188			1,407	24	56,679	18,980	37,699 [k]
1991			326	1,040		250	201 [l]			1,266 [m]	51 [m]	41,187	20,444	20,743 [k]
1992	73	106	494	617	241	423	110 [l]			758 [m]	84 [m]	43,185	17,803	25,382 [k]
1993		183	184	572	339	400	168 [l]			668 [m]	73 [m]	45,027	16,469	28,558 [k]
1994	101 [h]	477	726	1,764	389	506	393 [l]			1,577 [m]	54 [m]	46,680	20,770	25,910 [k]
1995	121	397	781	1,314	274	253 [h]	229 [l]			2,103	57	52,353	20,088	32,265 [k]
1996	150	423	1,150	2,565	719	102 [h]	705 [l]			2,958	35	47,955	19,546	28,409
1997	193	1,198	1,025	1,345	277		322 [l]	957		2,084	24	53,400	15,717	37,683
1998	53	405	361	523	145		66	373	132	777	95	22,588	5,838	16,750
1999		252	495	353	330		131	892	239	1,118	74	23,716 [n]	12,354	11,362

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Year	Tincup Creek [a]	Tatchun Creek [b]	Little Salmon River [a]	Big Salmon River [a, c]	Nisutlin River [a, d]	Ross River [a, e]	Wolf River [a, f]	Blind Creek	Chandindu River	Whitehorse Fishway Count	Whitehorse Fishway Percent Hatchery Contribution	Canadian Mainstem Border Passage Estimate	Canadian Mainstem Harvest	Canadian Mainstem Spawning Escapement Estimate [g]
2000	19 [o]	277 [p]	46	113	20		32		4 [q]	677	69	16,173 [n]	4,829	11,344
2001	39 [o]		1,035	1,020	481		154		129 [r]	988	36	52,207 [n]	9,769	42,438
2002			526	1,149	280		84		[s]	605	39	49,214 [n]	9,069	40,145 [k]
2003			1,658	3,075	687		292	1,115	185 [t]	1,443	70	56,929 [n]	9,443	47,486
2004			1,140	762	330		226	792		1,989	76	48,111 [n]	10,946	37,165
2005			1,519	952	807	363	260	525		2,632	57	42,245	10,977	31,268
2006 [u]			1,381	1,140	601		114			1,720	47	36,748	8,758	27,990
Escapement Objective														28,000
Average														
1961-03	120	235	479	907	434	279	196			872	19	42,265	11,760	30,505
1996-05	91	511	896	1,186	408	232	227			1,527	58	41,254	10,849	30,405
2001-05	39		1,176	1,392	517	363	203			1,531	56	49,741	10,041	39,700

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Survey rating is fair to good, unless otherwise noted.
[b] All foot surveys prior to 1997 except 1978 (boat survey) and 1986 (aerial survey).
[c] For 1968, 1970, and 1971 counts are from mainstem Big Salmon River. For all other years counts are from the mainstem Big Salmon River between Big Salmon Lake and the vicinity of Souch Creek.
[d] One Hundred Mile Creek to Sidney Creek.
[e] Big Timber Creek to Lewis Lake.
[f] Wolf Lake to Red River.
[g] Estimated total spawning escapement excluding Porcupine River (estimated border escapement minus the Canadian catch).
[h] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[i] Information on area surveyed is unavailable.
[j] Counts are for Big Timber Creek to Sheldon Lake.
[k] Interim escapement objective. Stabilization escapement objective for years 1990-1995 was 18,000 salmon. Rebuilding step escapement objective for 2002 was 25,000 salmon if there was only a subsistence fishery and 28,000 salmon if a commercial fishery
[l] Counts are for Wolf Lake to Fish Lake outlet.
[m] Counts and estimated percentages may be slightly exaggerated. In some or all of these years a number of adipose-clipped fish ascended the fishway, and were counted more than once. These fish would have been released into the fishway as fry between 1989 and 1994.
[n] The 1999 to 2004 Chinook border estimates were revised using a stratified "SPAS" analyses.
[o] Foot survey.
[p] Flood conditions caused early termination of this program.
[q] High water delayed project installation, therefore, counts are incomplete.
[r] Conventional weir July 1-September 8, but was breached from July 31 to August 7.
[s] RBW tested for 3 weeks.
[t] Combination RBW and conduit weir tested and operational from July 10-30.
[u] Data are preliminary.

Appendix B12.–Summer chum salmon ground based escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1973–2006.

	East Fork Andreafsky R.		Anvik R. Sonar		Kaltag Crk. Tower	Nulato R. Tower		Gisasa R. Weir		Clear Crk. Weir		Chena R. Tower	Salcha R. Tower
Year	No. Fish	% Female	No. Fish	% Female	No. Fish	No. Fish	% Female	No. Fish	% Female	No. Fish	% Female	No. Fish	No. Fish
1980			492,676	60.7									
1981	147,312		1,486,182	54.7									
1982	181,352	64.6 [a]	444,581	69.4									
1983	110,608	57.4 [a]	362,912	56.5									
1984	70,125	50.7 [a]	891,028	60.9									
1985		58.1 [b]	1,080,243	55.8									
1986	167,614	55.4 [c]	1,189,602	57.8									
1987	45,221	58.6 [c]	455,876	65.1			44.9						
1988	68,937	49.3 [c]	1,125,449	66.1			60.9						
1989			636,906	65.6									
1990			403,627	51.3									
1991			847,772	57.9									
1992			775,626	56.6									
1993		48.6	517,409	52.0								5,400	5,809
1994	200,981	65.2 [b, d]	1,124,689	59.1	47,295	148,762	47.7 [b]	51,116	[b]			9,984	39,450
1995	172,148	48.9 [d]	1,339,418	40.1	77,193	236,890	55.6	136,886	45.7	116,735	62.1	3,519 [b]	30,784
1996	108,450	51.4 [d]	933,240	47.3	51,269	129,694	51.9	157,589	49.3	100,912	59.0	12,810 [b]	74,827
1997	51,139	[d]	609,118	53.6	48,018	157,975	51.9	31,800		76,454		9,439 [b]	35,741
1998	67,591	57.3 [d]	471,865	55.9	8,113	49,140	64.2	18,228	50.8	212	[b]	5,901 [b]	17,289
1999	32,229	56.4 [d]	437,631	58.1	5,300	30,076	63.0	9,920	53.1	11,283	[b]	9,165 [b]	23,221
2000	22,918	48.2 [d]	196,349	61.6	6,727	24,308	62.6	14,410	49.9	19,376	43.6	3,515	20,516
2001		52.0 [b]	224,058	55.3	[b]		[b]	17,936	50.3 [b]	3,674	32.4	4,773 [b]	14,900
2002	45,019	52.9	462,101	60.2	13,583	72,232	27.0	32,943	47.7	13,150	51.6	1,021 [b]	20,837 [b]
2003	22,603	44.8	251,358	55.3	3,056 [b]	17,814	[d]	24,379	45.9	5,230	40.5	573 [b]	[b]
2004	62,730	51.4	365,691	53.3	5,247		[e]	37,851	44.9	15,661	44.5	15,162	47,861
2005	20,127	44.0	525,391	48.0	22,093		[e]	172,259	46.3	26,420	45.8	[b]	193,085
2006	101,465	48.6	992,378	50.7 [f]	[e]		[e]	225,225	52.2	29,166	43.4 [g]	35,109 [b]	111,869
BEG [h]	65-130		350-700										

[a] Sonar count.
[b] Incomplete count caused by late installation and/or early removal of project, or high water events.
[c] Tower count.
[d] Weir count.
[e] Project did not operate.
[f] HTI and Didson sonar equipment were both used in 2006. The estimate reported is Didson derived while the % female was calculated using the previously reported HTI estimate.
[g] Videography count
[h] Biological Escapement Goals (in thousands of fish) established by the Alaska Board of Fisheries, Jan. 2001.

Appendix B13.–Fall chum salmon abundance estimates or escapement estimates for selected spawning areas in Alaskan and Canadian portions of the Yukon River Drainage, 1971–2006.

	Alaska							
	Tanana River Drainage					Upper Yukon River Drainage		
Year	Toklat River[a]	Kantishna River Abundance Estimate[b]	Delta River[c]	Bluff Cabin Slough[d]	Upper Tanana River Abundance Estimate[e]	Rampart Rapids Abundance Estimate[f]	Chandalar River[g]	Sheenjek River[h]
1971								
1972			5,384					
1973			10,469					
1974	41,798		5,915					89,966 [i]
1975	92,265		3,734 [j]					173,371 [i]
1976	52,891		6,312 [j]					26,354 [i]
1977	34,887		16,876 [j]					45,544 [i]
1978	37,001		11,136					32,449 [i]
1979	158,336		8,355					91,372 [i]
1980	26,346 [k]		5,137	3,190 [l]				28,933 [i]
1981	15,623		23,508	6,120 [l]				74,560
1982	3,624		4,235	1,156				31,421
1983	21,869		7,705	12,715				49,392
1984	16,758		12,411	4,017				27,130
1985	22,750		17,276 [j]	2,655 [l]				152,768
1986	17,976		6,703 [j]	3,458			59,313	84,207 [m]
1987	22,117		21,180	9,395			52,416	153,267 [m]
1988	13,436		18,024	4,481 [l]			33,619	45,206 [m]
1989	30,421		21,342 [j]	5,386 [l]			69,161	99,116 [m]
1990	34,739		8,992 [j]	1,632			78,631	77,750 [m]
1991	13,347		32,905 [j]	7,198				86,496 [n]
1992	14,070		8,893 [j]	3,615 [l]				78,808
1993	27,838		19,857	5,550 [l]				42,922
1994	76,057		23,777 [j]	2,277 [l]				150,565
1995	54,513 [k]		20,587	19,460	268,173		280,999	241,855
1996	18,264		19,758 [j]	7,074 [j]	134,563	654,296	208,170	246,889
1997	14,511		7,705 [j]	5,707 [j]	71,661	369,547	199,874	80,423 [o]
1998	15,605		7,804 [j]	3,549 [j]	62,384	194,963	75,811	33,058
1999	4,551	27,199	16,534 [j]	7,037 [j]	97,843	189,741	88,662	14,229
2000	8,911	21,450	3,001 [j]	1,595	34,844	[p]	65,894	30,084 [q]
2001	6,007 [r]	22,992	8,103 [j]	1,808 [l]	96,556 [s]	201,766	110,971	53,932
2002	28,519	56,719	11,992 [j]	3,116	109,970	196,186	89,850	31,642
2003	21,492	87,359	22,582 [j]	10,600 [l]	193,418	485,102	214,416	44,047
2004	35,480	76,163	25,073 [j]	10,270 [l]	123,879	618,597 [t]	136,706	37,878
2005[u]	17,779 [k]	96,926	28,132 [j]	11,964 [l]	318,527	1,987,982	496,494	438,253 [v]
2006		71,135	14,055 [j]		202,669		245,090	160,178 [v]
BEG[w]	15,000-33,000		6,000-13,000		46,000- [x] 103,000		74,000-152,000	50,000-104,000
Average								
1971-05	31,243	55,544	13,865	5,963	137,438	544,242	141,312	90,434
1996-05	17,112	55,544	15,068	6,272	124,365	544,242	168,685	101,044
2001-05	21,855	68,032	19,176	7,552	168,470	697,927	209,687	121,150

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	Canada							
						Canadian Mainstem		
Year	Fishing Branch River [y,l]	Mainstem Yukon River Index [l,z]	Koidern River [l]	Kluane River[l,aa]	Teslin River[l,ab]	Border Passage Estimate	Harvest	Spawning Escapement Estimate[ac]
1971	312,800							
1972	35,125[ad]			198[ae, d]				
1973	15,989[af]	383		2,500				
1974	31,525[af]			400				
1975	353,282[af]	7,671		362[f]				
1976	36,584			20				
1977	88,400			3,555				
1978	40,800			0[f]				
1979	119,898			4,640[f]				
1980	55,268			3,150		39,130	16,218	22,912
1981	57,386[z]			25,806		66,347	19,281	47,066[ai]
1982	15,901	1,020[ah]		5,378		47,049	15,091	31,958
1983	27,200	7,560		8,578[f]		118,365	27,490	90,875
1984	15,150	2,800 [aj]	1,300	7,200	200	81,900	25,267	56,633[ai]
1985	56,016[af]	10,760	1,195	7,538	356	99,775	37,765	62,010
1986	31,723[af]	825	14	16,686	213	101,826	13,886	87,940
1987	48,956[af]	6,115	50	12,000		125,121	44,345	80,776
1988	23,597[af]	1,550	0	6,950	140	69,280	32,494	36,786
1989	43,834[af]	5,320	40	3,050	210[ae]	55,861	20,111	35,750
1990	35,000[af]	3,651	1	4,683	739	82,947	31,212	51,735
1991	37,733[af]	2,426	53	11,675	468	112,303	33,842	78,461
1992	22,517[af]	4,438	4	3,339	450	67,962	18,880	49,082
1993	28,707[af]	2,620	0	4,610	555	42,165	12,422	29,743
1994	65,247[af]	1,429[v]	20[ae]	10,734	209[ae]	133,712	35,354	98,358
1995	51,971[af, al]	4,701	0	16,456	633	198,203	40,111	158,092
1996	77,278[af]	4,977		14,431	315	143,758	21,329	122,429
1997	26,959[af]	2,189		3,350	207	94,725	9,286	85,439
1998	13,564[af]	7,292		7,337	235	48,047	1,742	46,305
1999	12,904[af]			5,136	19[ae]	72,188[am]	13,506	58,682
2000	5,053[af]	933[ae]		1,442	204	57,978[am]	4,236	53,742
2001	21,669[af]	2,453		4,884	5	38,769[am]	4,918	33,851
2002	13,563[af]	973		7,147	64	104,853[am]	6,158	98,695
2003	29,519[af]	7,982		39,347	390	153,656[am]	10,973	142,683
2004	20,274[af]	3,440		18,982	167	163,625[am]	9,545	154,080
2005	121,413[af]	16,425		34,600	585	451,477	13,744	437,733
2006	30,849[af]	6,553		18,208	620	217,810	6,617	211,193
EO[an]	50,000-120,000							>80,000
Average								
1971-05	56,937	4,397	223	8,711	303	106,578	19,969	86,608
1996-05	34,220	5,185	--	13,666	219	132,908	9,544	123,364
2001-05	41,288	6,255	--	20,992	242	182,476	9,068	173,408

-continued-

Note: Canadian managers refer to summer and fall chum salmon as chum salmon. Latest table revision March 31, 2007.

[a] Expanded total abundance estimates for upper Toklat River index area using stream life curve (SLC) developed with 1987–1993 data. Index area includes Geiger Creek, Sushana River, and mainstem floodplain sloughs from approximately 0.25 mile upstream of roadhouse.

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

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

[d] Foot survey, unless otherwise indicated.

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

[f] Fall chum salmon abundance estimate for the upper Yukon River drainage is based on a mark–recapture program. Tag deployment occurs at two fish wheels (one fish wheel in 2004) located at the "Rapids" and recaptures are collected from a fish wheel (two fish wheels in 1996 to 1999) located downstream from the village of Rampart.

[g] Side-scan sonar estimate for 1986–1990, split-beam sonar estimate 1995 to present.

[h] Side-scan sonar estimate beginning in 1981, split-beam sonar estimate 2002 to 2004, DIDSON sonar since 2005.

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

[j] Population estimate generated from replicate foot surveys and stream life data (area under the curve method).

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

[l] Aerial survey count, unless otherwise indicated.

[m] Expanded estimates for period approximating second week August through middle fourth week Sept, using Chandalar River run timing data.

[n] Total abundance estimates are for the period approximating second week August through middle fourth week of September. Comparative escapement estimates before 1986 are considered more conservative; approximating the period end of August through mid week of September.

[o] Data interpolated due to high water from 29 August until 3 September 1997, during buildup to peak passage.

[p] Project ended early, population estimate through 19 August 2000 was 45,021 on average this represents 0.24 percent of the run.

[q] Project ended early (September 12) because of low water.

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

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

[t] Preliminary estimate for 2004 was 618,597 fall chum salmon with a high standard error (SE 60,714).

[u] Data are preliminary.

[v] In addition to the historical right bank count, the left bank was enumerated with DIDSON (right bank count for 2005 and 2006 was 266,963 and 106,397, respectively).

[w] Biological Escapement Goal (BEG) ranges recommended to the Board of Fisheries 2001.

[x] The BEG for the Tanana River as a whole is 61,000 to 136,000. However it includes the Toklat plus and the Upper Tanana which was broke out for comparison to the upper Tanana River abundance estimates.

[y] Located within the Canadian portion of the Porcupine River drainage. Total escapement estimated using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.

[z] Index area includes Tatchun Creek to Fort Selkirk.

[aa] Index area includes Duke River to end of spawning sloughs below Swede Johnston Creek.

[ab] Index area includes Boswell Creek area (5 km below to 5 km above confluence).

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

[ad] Weir installed Sept 22. Estimate consists of weir count of 17,190 after Sept 22, and tagging passage estimate of 17,935 before weir installation.

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

[af] Weir count.

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

[ah] Boat survey.

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

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

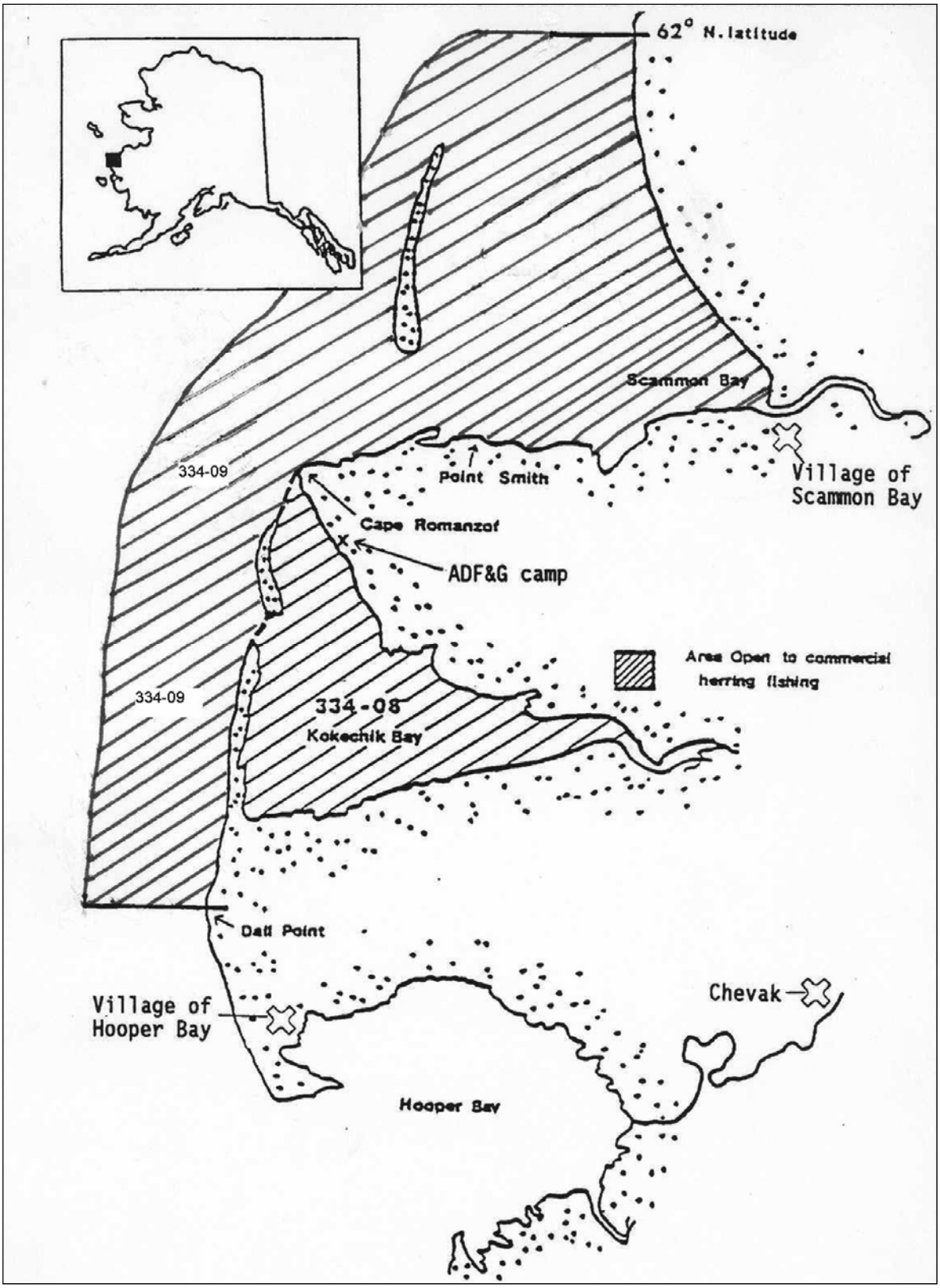
[ak] Weir not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approximately 27,000 fish was made through date of survey, based upon historic average aerial-to-weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000–40,000 fish considering aerial survey timing.

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

[am] 1999 to 2004 border passage estimates were revised using a stratified "SPAS" analysis.

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

APPENDIX C: HERRING



Appendix C1.–Cape Romanzof District areas open to commercial herring fishing.

Appendix C2.–Commercial herring fishery data, Cape Romanzof District, 1980–2006.

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
2006	92	89.0	10.3	407	0.02	1	8	8		100	100	4,813	1.9
5 Yr. Avg (2001-2005)	94	85.0	10.2	396	0.02	1	15	15		100	100	3,375	2.9
10 Yr. Avg (1996-2005)	386	55.0	9.9	380	0.13	2	35	35		98	99	3,967	8.9
All Yr. Avg (1980-2005)	660	61.3	9.3	322	0.30	3	65	60		90	86	4,776	12.8

[a] Average weight from department'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 and 2006.

[e] Exclusive Use Regulation into effect.

[f] Last year hydraulic shakers were allowed.

Appendix C3.–Commercial herring catch and effort data by fishing period, Cape Romanzof District, 2006.

			Number				Harvest (tons)					
Period [a]	Date	Time of Fishery [a]	Hours Fished [a]	Fishermen	Vessels	Landings	Bait	Roe %	Sac Roe	Sac Roe %	Total	Roe %
1	3-Jun	0800-1000	2	5	5	13	0.0	0.0	8.8	10.1	8.8	10.1
2		1900-2300	4									
3	4-Jun	0600-1800	12	5	5	16	0.0	0.0	21.1	10.4	21.1	10.4
4		2000-0200	6									
5	5-Jun	0900-2000	11	5	5	35	0.0	0.0	33.1	10.0	33.1	10.0
6		1900-0200	7									
7	6-Jun	0900-2000	11	6	6	14	0.0	0.0	11.7	11.3	11.7	11.3
8		2200-0700	9									
9	7-Jun	0900-2100	12	7	7	23	0.0	0.0	13.1	9.6	13.1	9.6
10	8-Jun	0200-0900	7	3	3	10	0.0	0.0	3.8	11.7	3.8	11.7
11		1400-2200	8									
Total			89	8	8	111	0.0	0.0	91.6	10.3	91.6	10.3

Note: Data from ADF&G fish ticket system, except for periods, fishing time and hours fished provided by buyer.

[a] Commercial fishing was opened by emergency order 8:00 a.m. June 3 until further notice. Number of periods and fishing time was determined by the buyer.

Appendix C4.–Pacific herring processors and associated data, Cape Romanzof District, 2006.

Commerical 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 Maverick M/V Shypoke

Appendix C5.–Percent age composition of herring sampled from commercial harvest, Cape Romanzof District, 1980–2006.

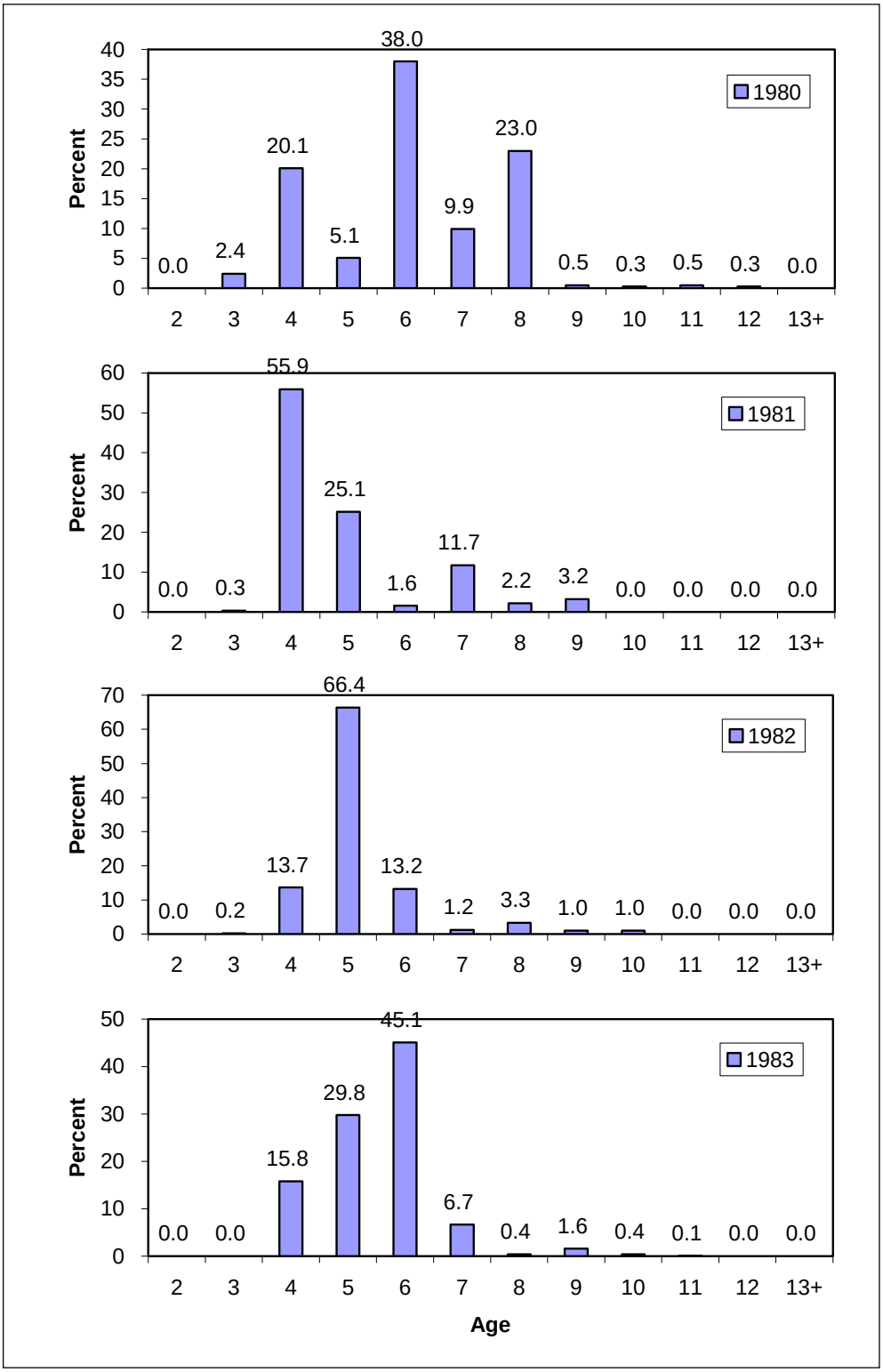
		Age in Years												
Year	Number Sampled [a]	2	3	4	5	6	7	8	9	10	11	12	13+	Total [b]
1980	374	0.0	2.4	20.1	5.1	38.0	9.9	23.0	0.5	0.3	0.5	0.3	0.0	100.1
1981	315	0.0	0.3	55.9	25.1	1.6	11.7	2.2	3.2	0.0	0.0	0.0	0.0	100.0
1982	604	0.0	0.2	13.7	66.4	13.2	1.2	3.3	1.0	1.0	0.0	0.0	0.0	100.0
1983	913	0.0	0.0	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 [d]	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
2006	408	0.0	0.0	0.0	0.2	1.0	1.2	7.4	48.8	18.9	9.6	4.9	8.0	100.0

[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 C6.–Age composition of Pacific herring sampled from the commercial harvest, Cape Romanzof District, 1980–2006.



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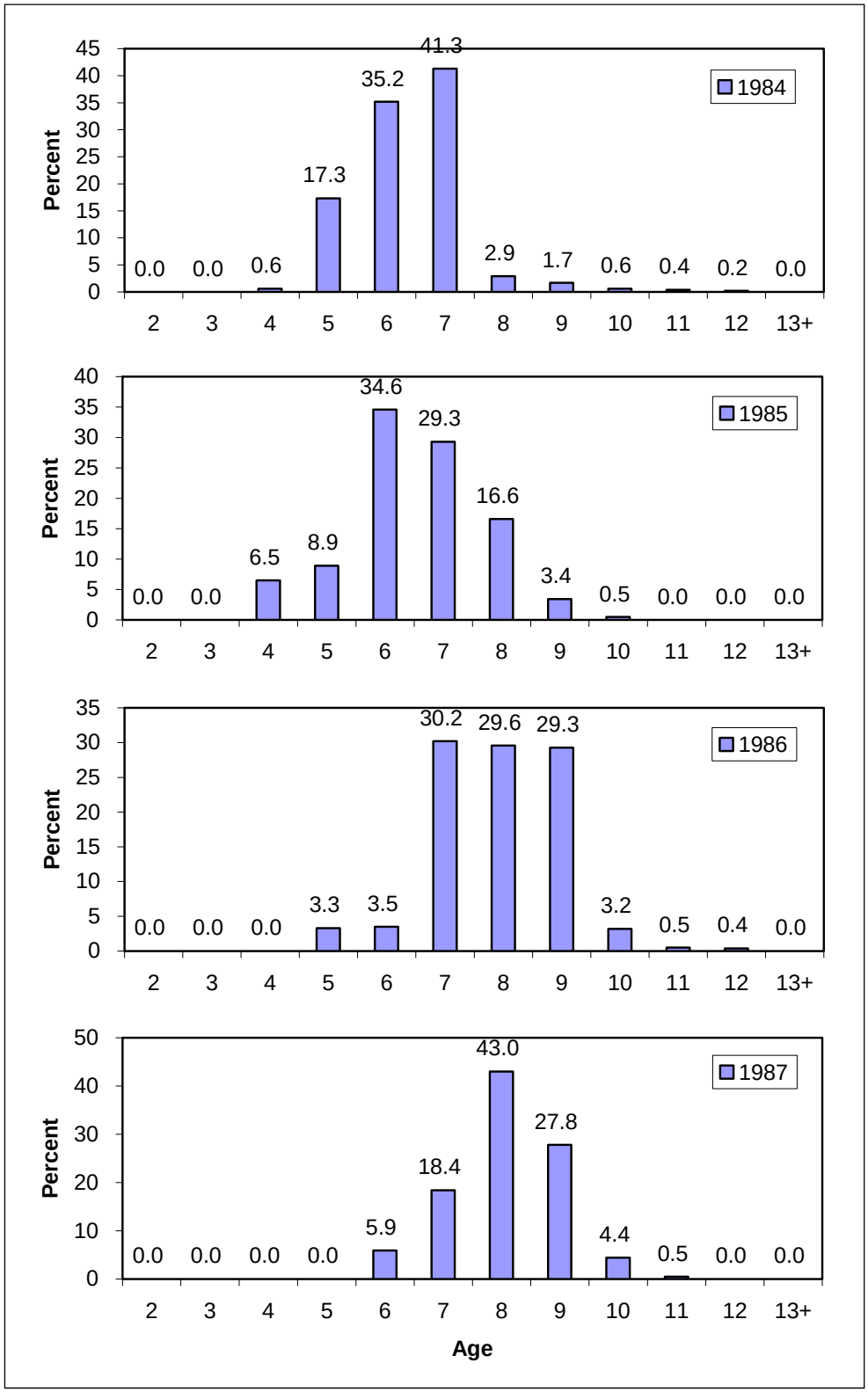
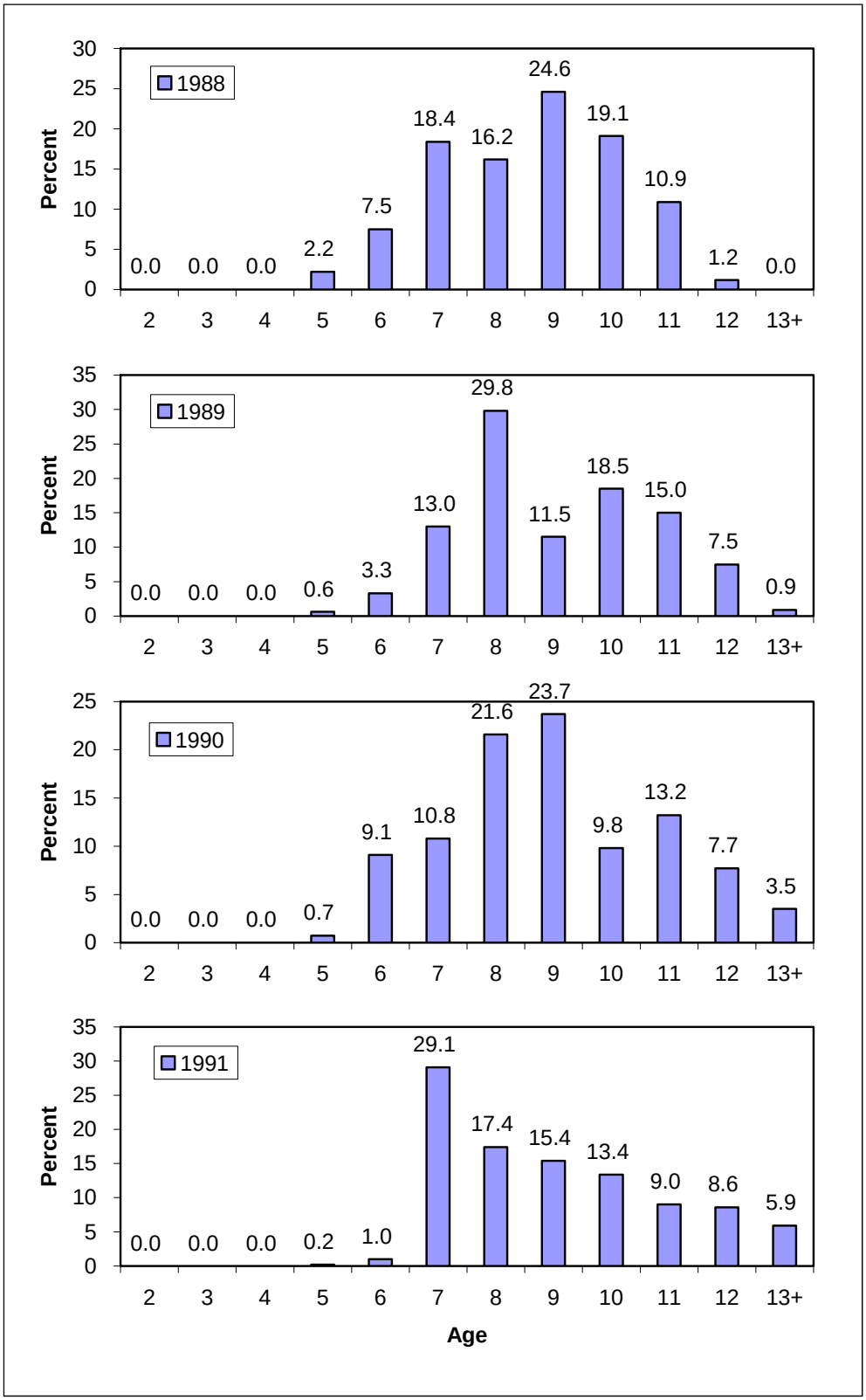
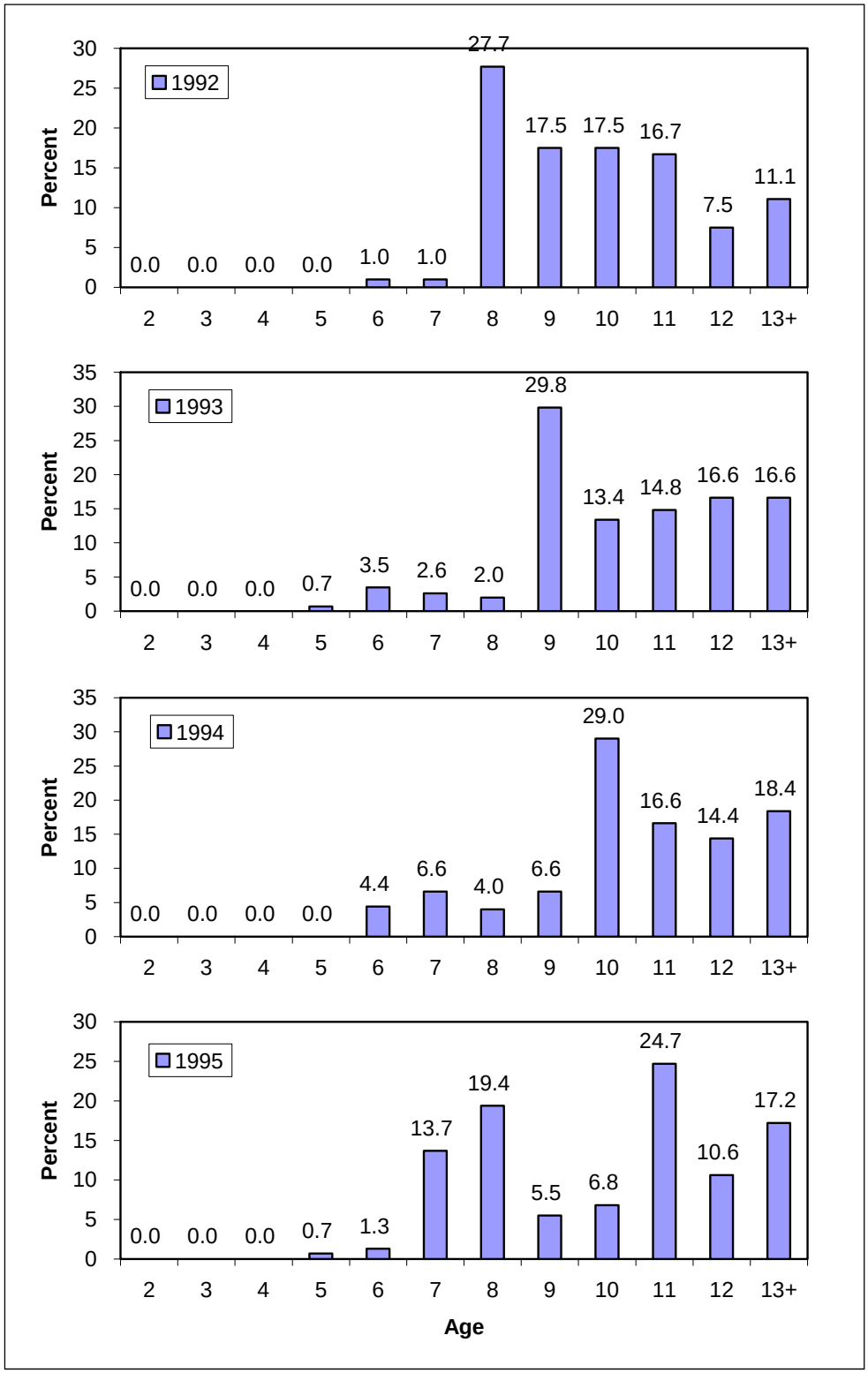

1984
Percent
0.0 0.0 0.6 17.3 35.2 41.3 2.9 1.7 0.6 0.4 0.2 0.0
2 3 4 5 6 7 8 9 10 11 12 13+
1985
Percent
0.0 0.0 6.5 8.9 34.6 29.3 16.6 3.4 0.5 0.0 0.0 0.0
2 3 4 5 6 7 8 9 10 11 12 13+
1986
Percent
0.0 0.0 0.0 3.3 3.5 30.2 29.6 29.3 3.2 0.5 0.4 0.0
2 3 4 5 6 7 8 9 10 11 12 13+
1987
Percent
0.0 0.0 0.0 0.0 5.9 18.4 43.0 27.8 4.4 0.5 0.0 0.0
2 3 4 5 6 7 8 9 10 11 12 13+
Age

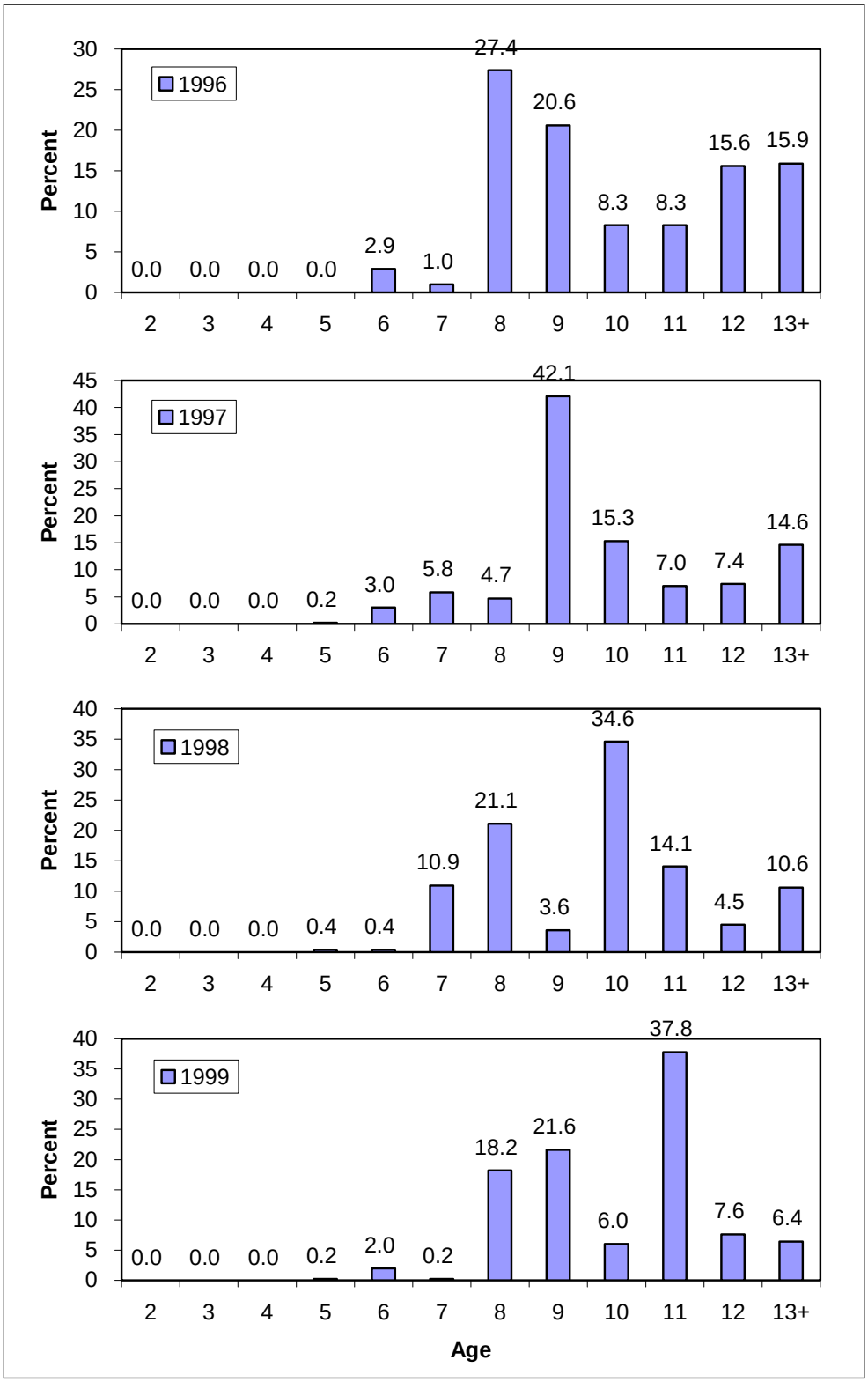
-continued-


1988
Percent
0.0 0.0 0.0 2.2 7.5 18.4 16.2 24.6 19.1 10.9 1.2 0.0
1989
Percent
0.0 0.0 0.0 0.6 3.3 13.0 29.8 11.5 18.5 15.0 7.5 0.9
1990
Percent
0.0 0.0 0.0 0.7 9.1 10.8 21.6 23.7 9.8 13.2 7.7 3.5
1991
Percent
0.0 0.0 0.0 0.2 1.0 29.1 17.4 15.4 13.4 9.0 8.6 5.9
2 3 4 5 6 7 8 9 10 11 12 13+
Age

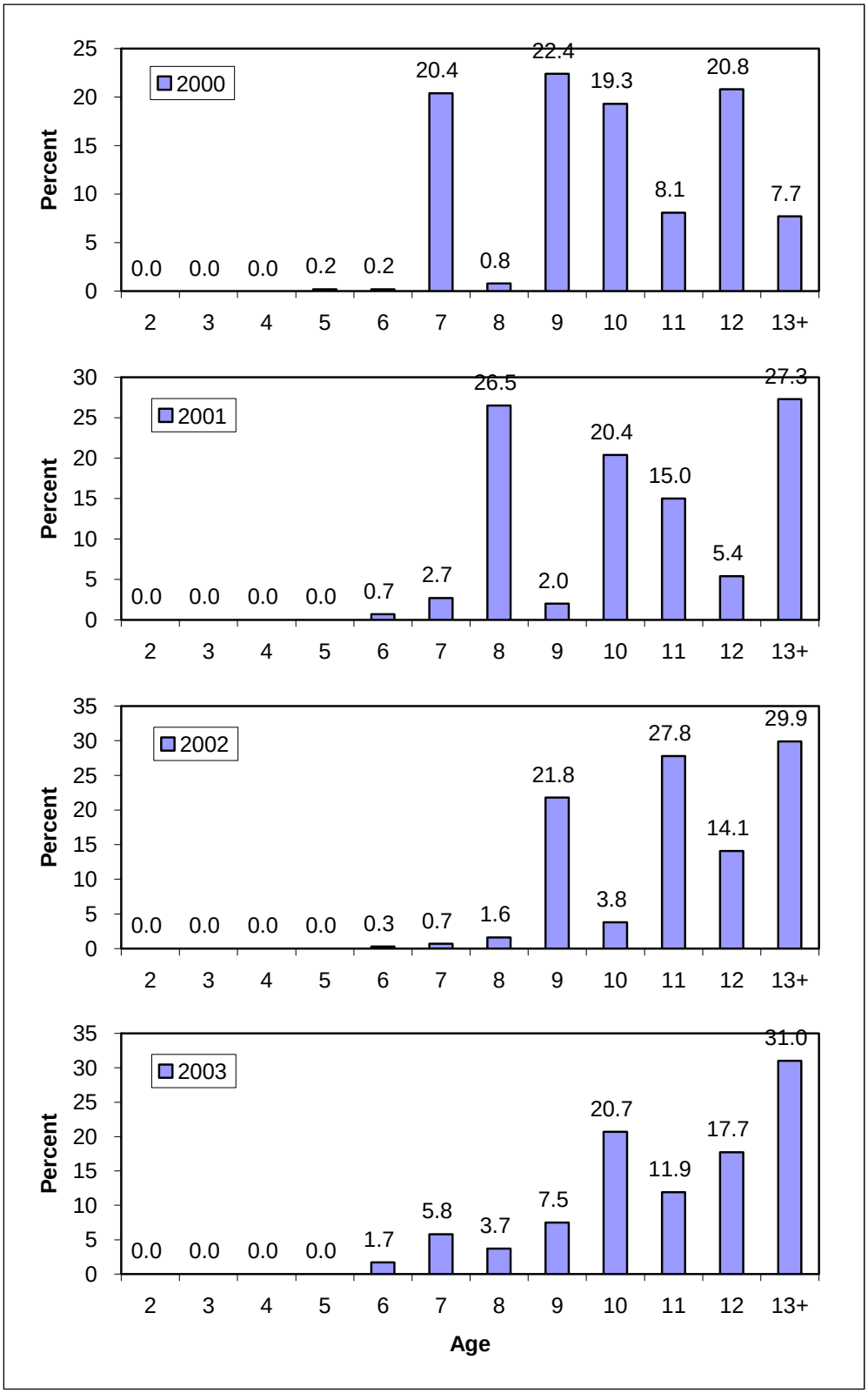
-continued-


1992
Percent
0.0 0.0 0.0 0.0 1.0 1.0 27.7 17.5 17.5 16.7 7.5 11.1
1993
Percent
0.0 0.0 0.0 0.7 3.5 2.6 2.0 29.8 13.4 14.8 16.6 16.6
1994
Percent
0.0 0.0 0.0 0.0 4.4 6.6 4.0 6.6 29.0 16.6 14.4 18.4
1995
Percent
0.0 0.0 0.0 0.7 1.3 13.7 19.4 5.5 6.8 24.7 10.6 17.2
2 3 4 5 6 7 8 9 10 11 12 13+
Age

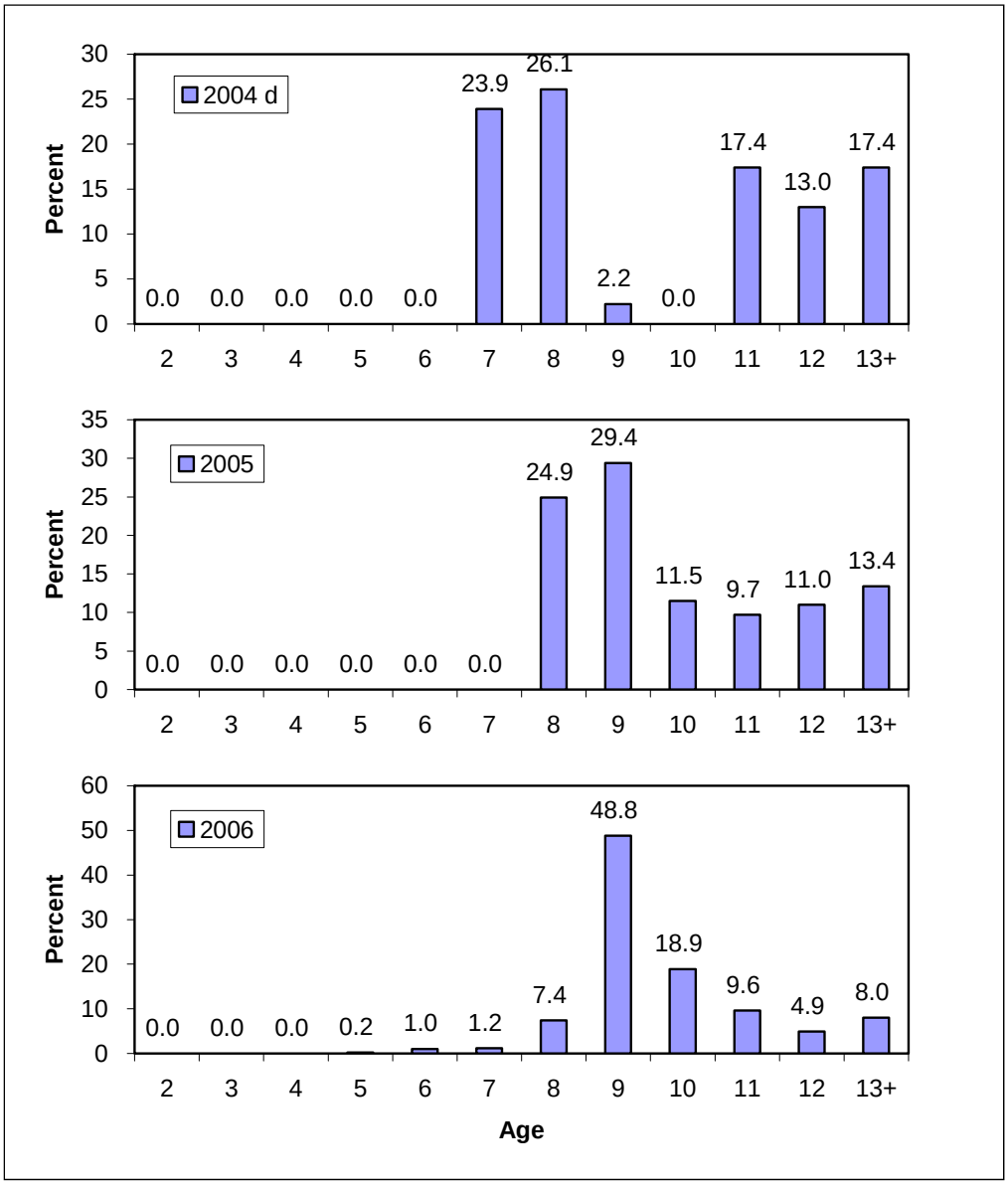
-continued-


1996
Percent
0.0 0.0 0.0 0.0 2.9 1.0 27.4 20.6 8.3 8.3 15.6 15.9
2 3 4 5 6 7 8 9 10 11 12 13+
1997
Percent
0.0 0.0 0.0 0.2 3.0 5.8 4.7 42.1 15.3 7.0 7.4 14.6
2 3 4 5 6 7 8 9 10 11 12 13+
1998
Percent
0.0 0.0 0.0 0.4 0.4 10.9 21.1 3.6 34.6 14.1 4.5 10.6
2 3 4 5 6 7 8 9 10 11 12 13+
1999
Percent
0.0 0.0 0.0 0.2 2.0 0.2 18.2 21.6 6.0 37.8 7.6 6.4
2 3 4 5 6 7 8 9 10 11 12 13+
Age

-continued-


2000
Percent
0.0 0.0 0.0 0.2 0.2 20.4 0.8 22.4 19.3 8.1 20.8 7.7
2001
Percent
0.0 0.0 0.0 0.0 0.7 2.7 26.5 2.0 20.4 15.0 5.4 27.3
2002
Percent
0.0 0.0 0.0 0.0 0.3 0.7 1.6 21.8 3.8 27.8 14.1 29.9
2003
Percent
0.0 0.0 0.0 0.0 1.7 5.8 3.7 7.5 20.7 11.9 17.7 31.0
2 3 4 5 6 7 8 9 10 11 12 13+
Age

-continued-


2004 d
Percent
0.0 0.0 0.0 0.0 0.0 23.9 26.1 2.2 0.0 17.4 13.0 17.4
2005
Percent
0.0 0.0 0.0 0.0 0.0 0.0 24.9 29.4 11.5 9.7 11.0 13.4
2006
Percent
0.0 0.0 0.0 0.2 1.0 1.2 7.4 48.8 18.9 9.6 4.9 8.0
2 3 4 5 6 7 8 9 10 11 12 13+
Age

Appendix C7.–Subsistence herring harvest (st) and effort data by village, Cape Romanzof, 1975–2006.

	Scammon Bay		Chevak		Hooper Bay		Totals	
Year	Harvest	Number of Fishermen	Harvest	Number of Fishermen	Harvest	Number of Fishermen	Harvest	Number of Fishermen
1975	-	-	-	-	2.8	34	2.8	34
1976	0.7	4	0.7	9	3.0	28	4.4	41
1977	-	-	0.2	2	2.4	28	2.5	30
1978	0.7	1	-	-	3.9	29	4.5	30
1979	6.0	21	2.3	21	3.1	42	11.4	84
1980	3.1	18	3.6	20	3.7	23	10.4	61
1981	7.7	16	1.8	9	4.0	20	13.5	45
1982	3.9	15	1.9	10	4.7	18	10.5	43
1983	2.5	14	1.5	5	5.2	18	9.2	37
1984	4.3	16	2.6	7	4.2	24	11.1	47
1985	2.4	11	2.2	13	3.4	20	8.0	44
1986	2.8	17	0.7	4	2.5	19	6.0	40
1987	1.4	8	0.5	5	1.1	10	3.0	23
1988	2.0	7	1.5	6	3.6	19	7.2	32
1989	1.1	7	0.1	1	1.8	16	3.0	24
1990	1.7	5	0.6	3	5.6	24	7.9	32
1991	1.7	7	0.4	3	1.1	8	3.2	18
1992	1.2	10	0.4	4	2.5	16	4.1	30
1993	2.7	17	0.1	1	2.4	24	5.1	42
1994	1.4	9	2.0	16	3.1	23	6.5	48
1995	1.1	11	1.2	9	3.8	22	6.1	42
1996	1.0	10	0.5	4	1.7	15	3.1	29
1997	0.9	10	0.2	3	2.2	21	3.2	34
1998	0.7	7	0.1	2	0.9	7	1.7	16
1999	6.0	24	2.3	12	4.2	31	12.5	67
2000	3.9	26	1.0	10	1.3	14	6.2	50
2001	1.5	8	1.0	10	0.1	5	3.1	24
2002	0.6	7	0.2	3	1.1	10	1.9	20
2003	3.0	13	1.0	8	2.0	13	6.0	34
2004	3.5	14	1.2	8	1.3	12	6.0	34
2005	6.2	9	0.1	2	0.6	2	6.9	13
2006	1.7	9	0.3	3	0.5	2	2.5	14
5 Year Average (2001-2005)	3.0	10	0.7	6	1.0	8	4.8	25

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

Appendix C8.–Subsistence harvest of herring roe-on-kelp by village, Cape Romanzof District, 1993–2006.

Year	Scammon Bay		Chevak		Hooper Bay		Totals	
	Number of Fishermen	Pounds Roe-on-Kelp	Number of Fishermen	Pounds Roe-on-Kelp	Number of Fishermen	Pounds Roe-on-Kelp	Number of Fishermen	Pounds Roe-on-Kelp
1993	9	300			10	213	19	513
1994	7	104	4	135	12	417	23	656
1995	12	298	1	25	13	383	26	706
1996	7	113	2	31	9	480	18	624
1997	6	130	1	25	13	400	20	555
1998	2	420	2	105	3	60	7	585
1999	15	416	5	160	22	549	42	1,125
2000	19	644	3	155	8	220	30	1,019
2001	2	25	3	113	2	50	7	188
2002	2	56	0	0	4	105	6	161
2003	8	185	2	130	7	185	17	500
2004	7	354	1	50	1	5	9	409
2005	5	1,125	0	0	0	0	5	1,125
2006	3	170	1	20	1	30	5	220
5 Year Average (2001-2005)	5	349	1	59	3	69	9	477

Appendix C9.–Aerial survey biomass estimates of herring, Cape Romanzof District, 2006.

Date	Flight No.	Flight Hrs.	Survey Rating [b]	Spawn No.	Spawn Length (miles)	Biomass (tons) Estimates by Index Area [a] KOK	SCB	HPB	Total
3-Jun	1	1.00	4	0	0.00	353.0	0.0	-	353.0
5-Jun	2	1.00	2	1	0.25	727.0	4,056.0	-	4,783.0
Total		2.00		1	0.25				4,813.0 [c]

[a] Index Areas: KOK-Kokechik Bay and offshore waters from Cape Romanzof to Hooper Bay SCB-Scammon Bay (Cape Romanzof to Kun River), HPB - Hooper Bay.

[b] Survey Rating:

1=Excellent (calm, no glare)

2=Good (light ripple, uneven lighting, easy to see schools)

3=Fair (light chop, some glare or shadows, relatively easy to see schools)

4=Poor (rough seas, strong glare, difficult to see schools)

5=Unsatisfactory

[c] Total biomass estimate including 30 tons of commercial harvest prior to peak survey date of June 5.

Appendix C10.–Percent age composition of herring sampled from variable mesh gillnet catches, Cape Romanzof District, 1980–2006.

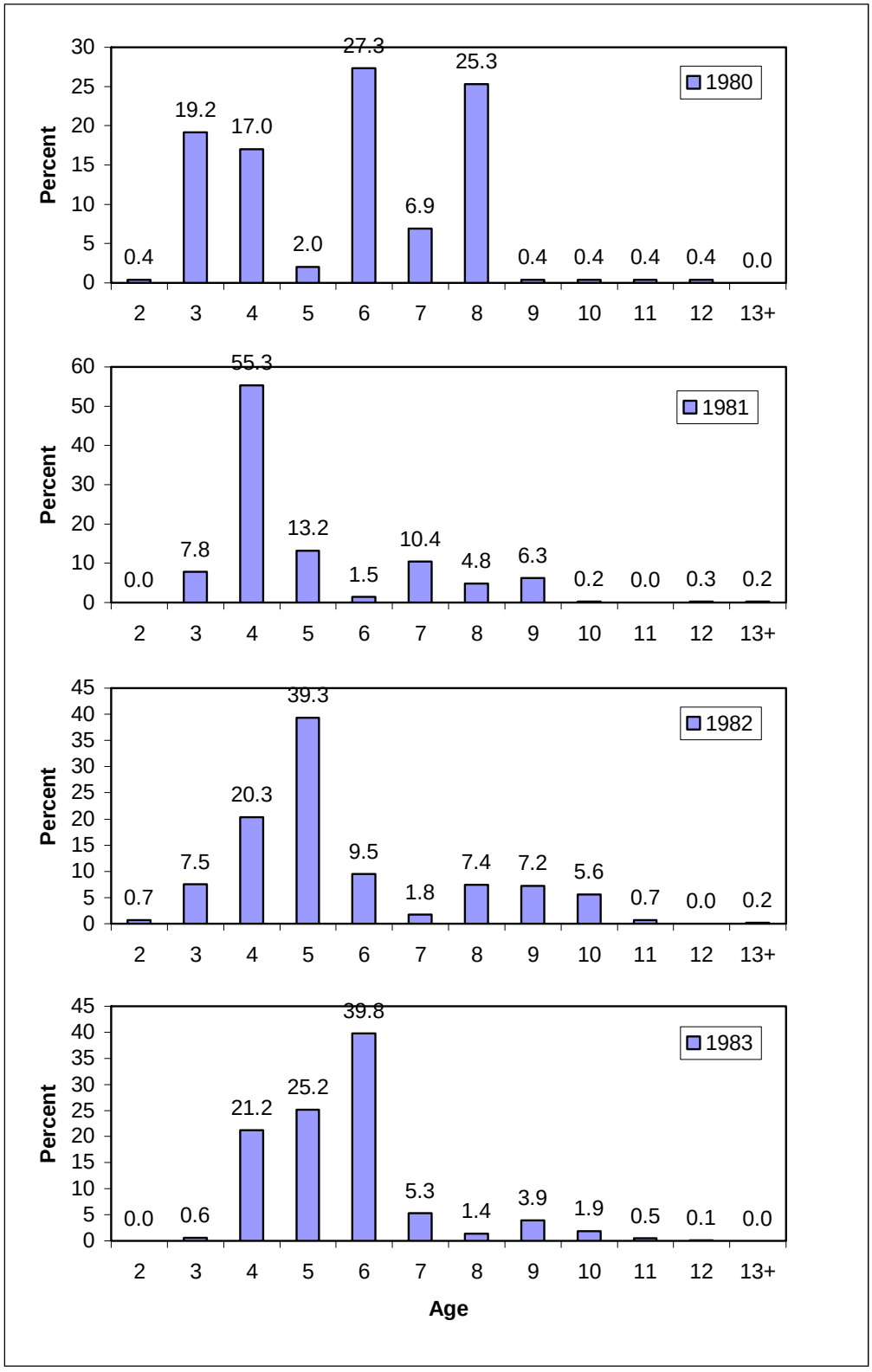
Year	Number Sampled [a]	Age in Years 2	3	4	5	6	7	8	9	10	11	12	13+	Total [b]
1980	447	0.4	19.2	17.0	2.0	27.3	6.9	25.3	0.4	0.4	0.4	0.4	0.0	99.7
1981	589	0.0	7.8	55.3	13.2	1.5	10.4	4.8	6.3	0.2	0.0	0.3	0.2	100.0
1982	611	0.7	7.5	20.3	39.3	9.5	1.8	7.4	7.2	5.6	0.7	0.0	0.2	100.2
1983	829	0.0	0.6	21.2	25.2	39.8	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
2006	446	0.0	1.8	25.3	10.1	8.3	4.5	13.5	24.9	7.2	3.1	0.7	0.6	100.0

Note: 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 C11.–Age composition of Pacific herring sampled from variable mesh gillnet, Cape Romanzof District, 1987-2006.



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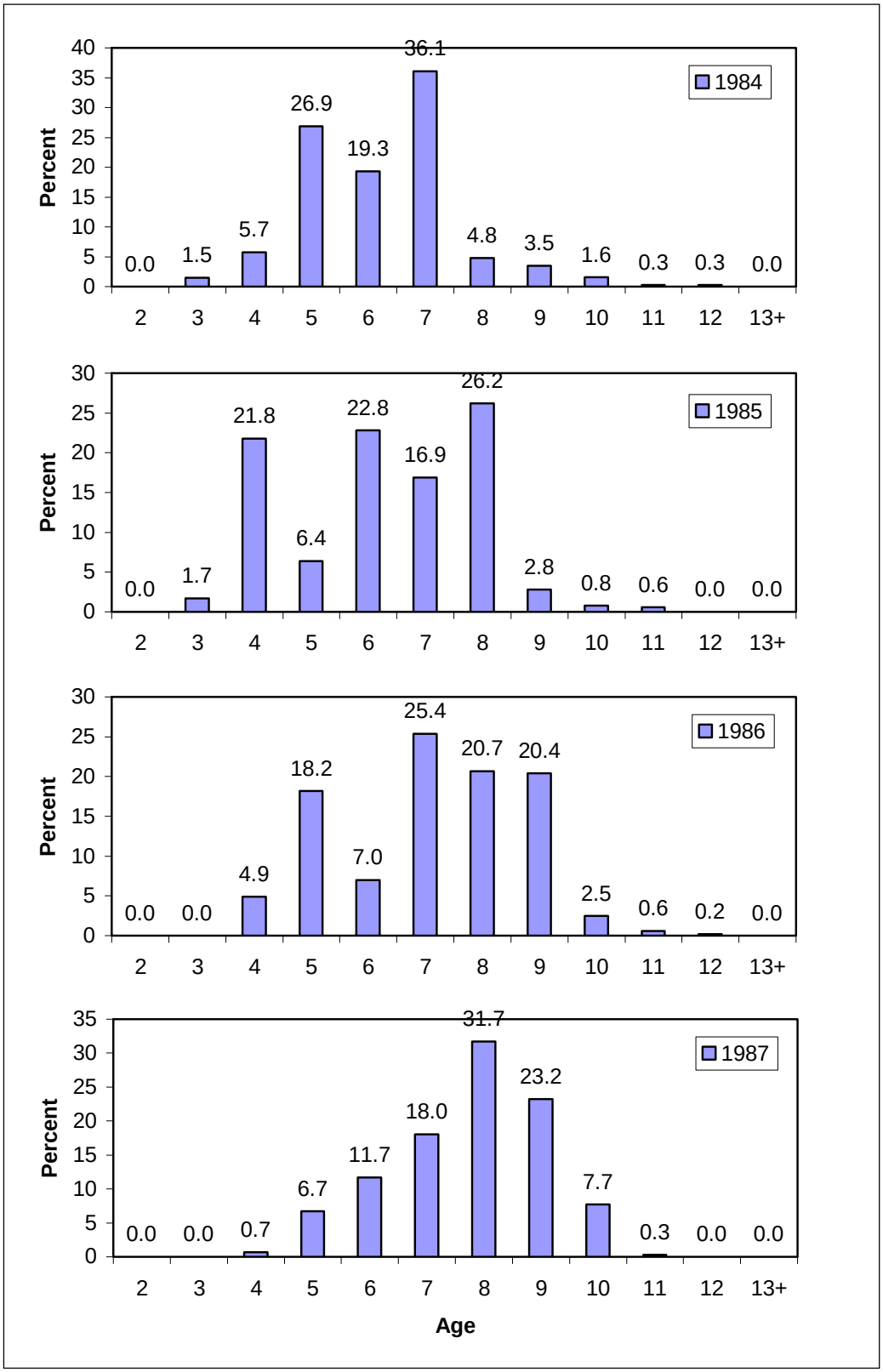
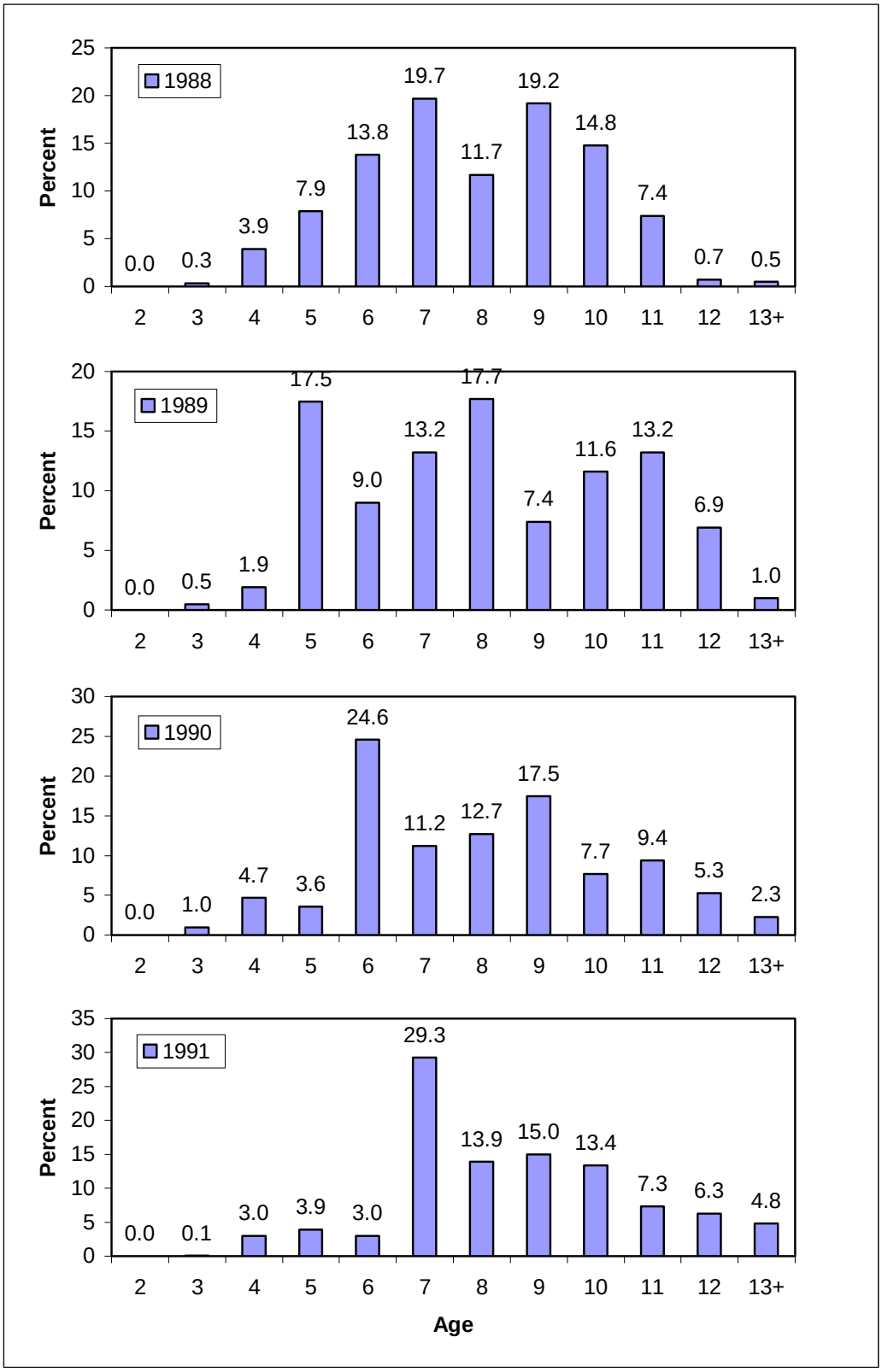
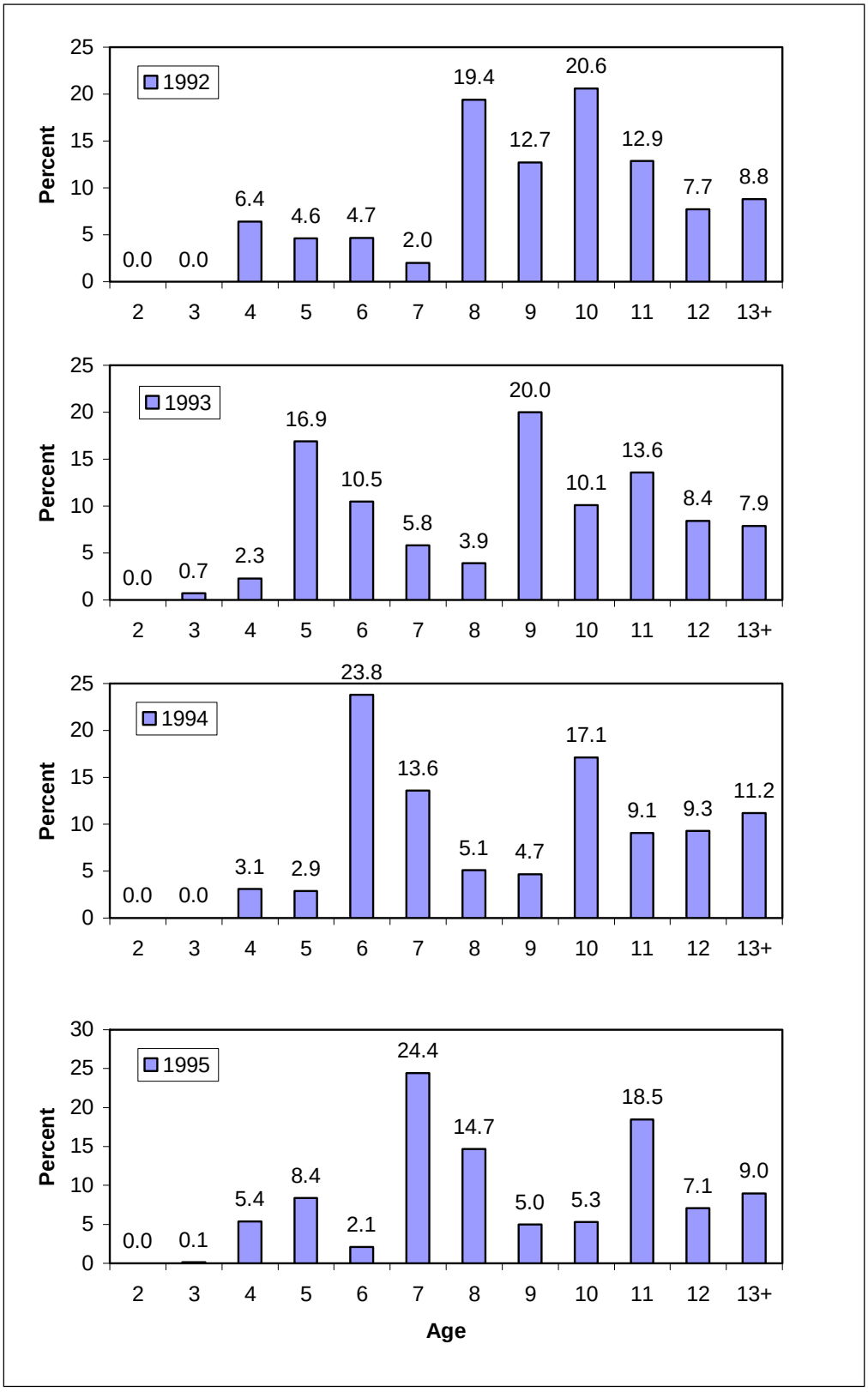

1984
Percent
0.0 1.5 5.7 26.9 19.3 36.1 4.8 3.5 1.6 0.3 0.3 0.0
1985
Percent
0.0 1.7 21.8 6.4 22.8 16.9 26.2 2.8 0.8 0.6 0.0 0.0
1986
Percent
0.0 0.0 4.9 18.2 7.0 25.4 20.7 20.4 2.5 0.6 0.2 0.0
1987
Percent
0.0 0.0 0.7 6.7 11.7 18.0 31.7 23.2 7.7 0.3 0.0 0.0
2 3 4 5 6 7 8 9 10 11 12 13+
Age

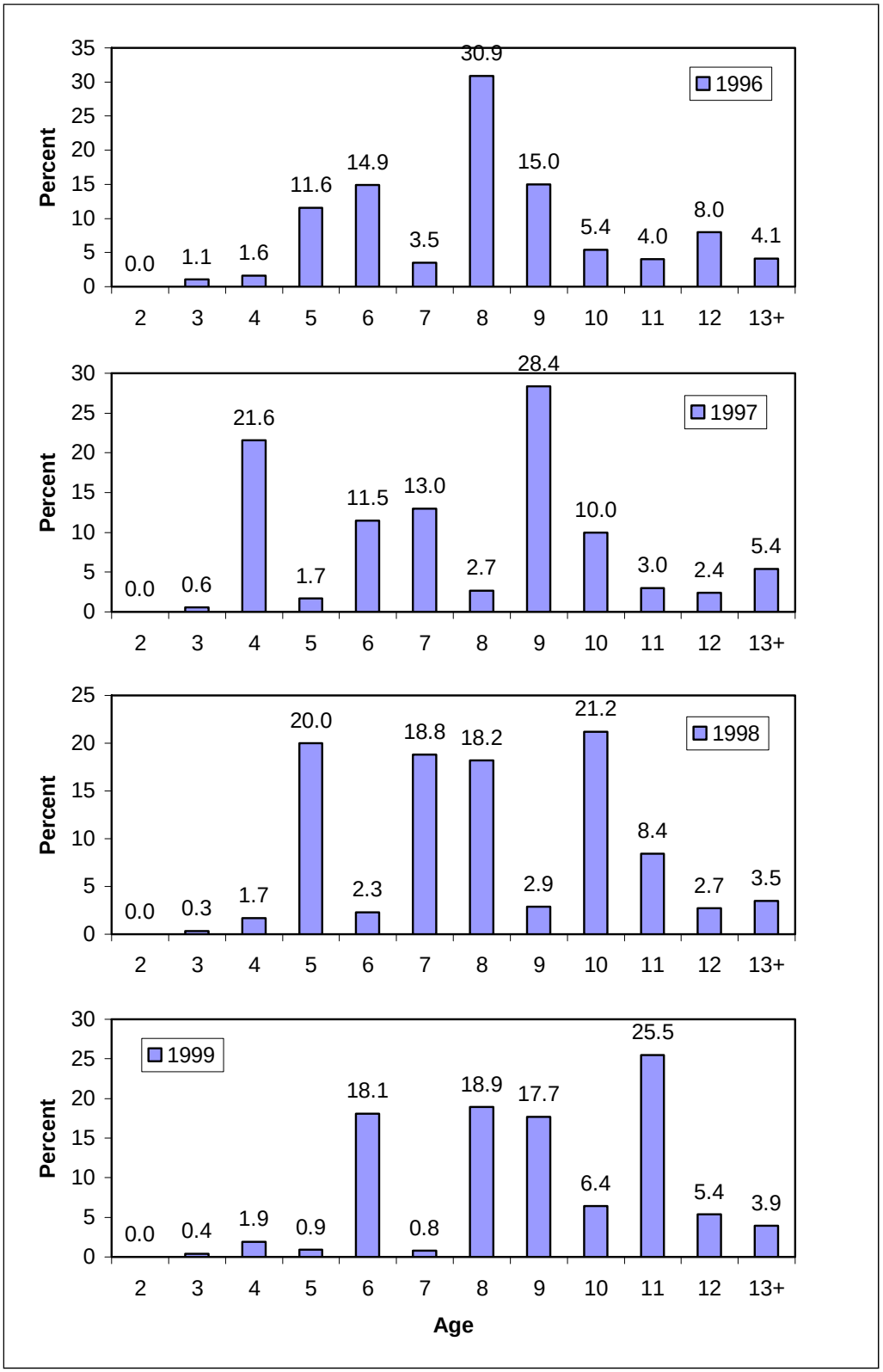
-continued-


1988
Percent
0.0 0.3 3.9 7.9 13.8 19.7 11.7 19.2 14.8 7.4 0.7 0.5
1989
Percent
0.0 0.5 1.9 17.5 9.0 13.2 17.7 7.4 11.6 13.2 6.9 1.0
1990
Percent
0.0 1.0 4.7 3.6 24.6 11.2 12.7 17.5 7.7 9.4 5.3 2.3
1991
Percent
0.0 0.1 3.0 3.9 3.0 29.3 13.9 15.0 13.4 7.3 6.3 4.8
2 3 4 5 6 7 8 9 10 11 12 13+
Age

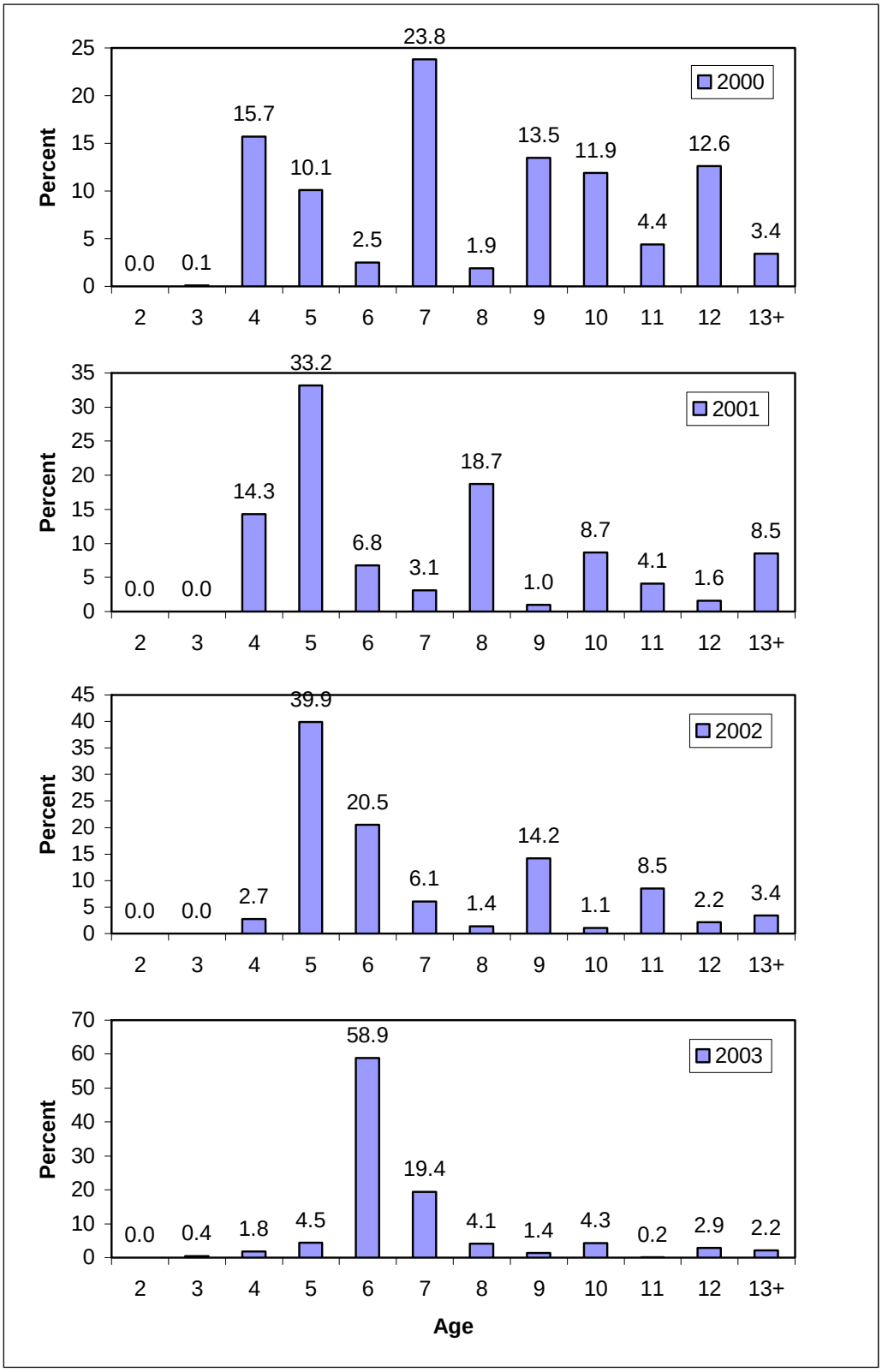
-continued-


1992
Percent
0.0 0.0 6.4 4.6 4.7 2.0 19.4 12.7 20.6 12.9 7.7 8.8
2 3 4 5 6 7 8 9 10 11 12 13+
1993
Percent
0.0 0.7 2.3 16.9 10.5 5.8 3.9 20.0 10.1 13.6 8.4 7.9
2 3 4 5 6 7 8 9 10 11 12 13+
1994
Percent
0.0 0.0 3.1 2.9 23.8 13.6 5.1 4.7 17.1 9.1 9.3 11.2
2 3 4 5 6 7 8 9 10 11 12 13+
1995
Percent
0.0 0.1 5.4 8.4 2.1 24.4 14.7 5.0 5.3 18.5 7.1 9.0
2 3 4 5 6 7 8 9 10 11 12 13+
Age

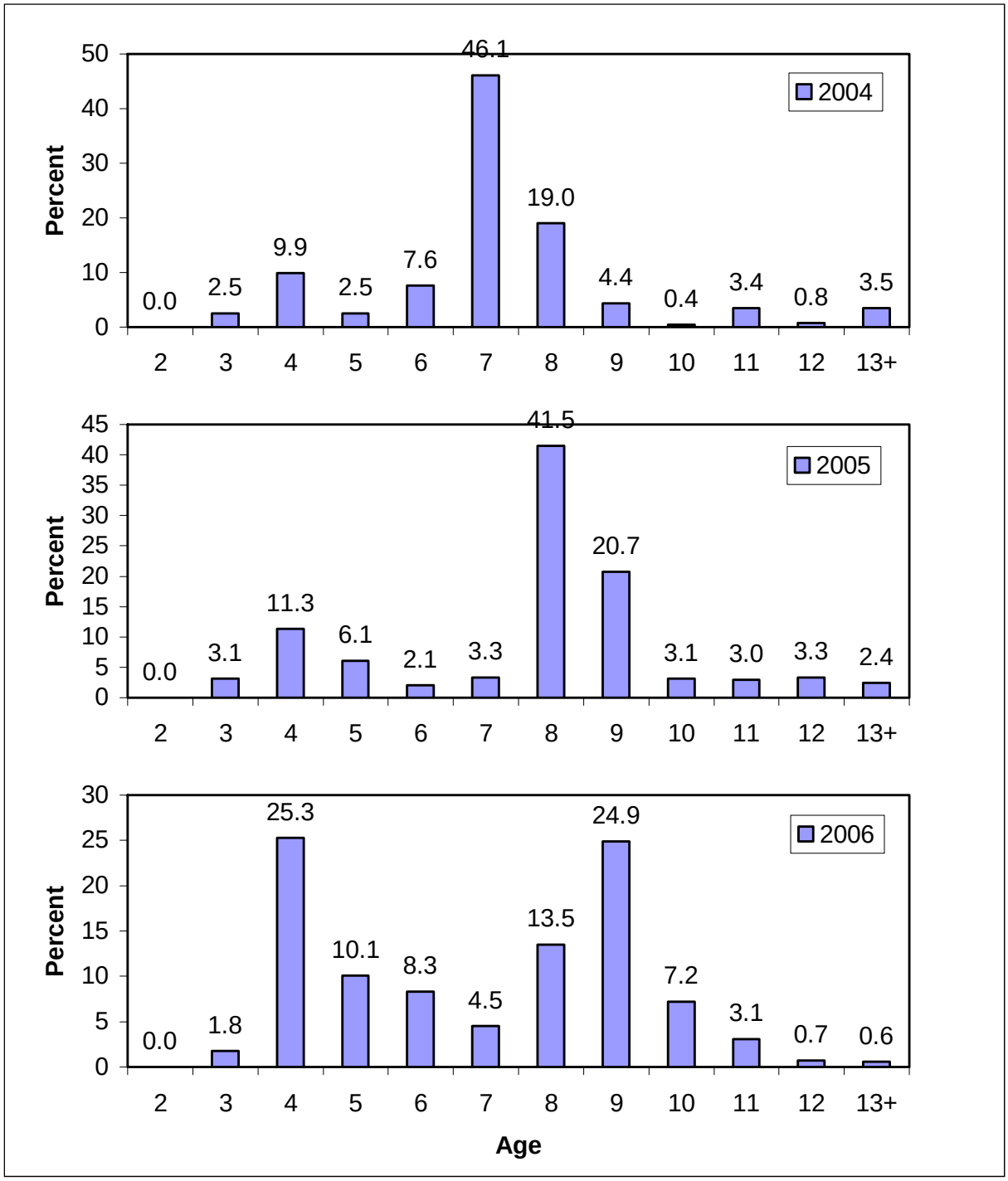
-continued-


1996
Percent
0.0 1.1 1.6 11.6 14.9 3.5 30.9 15.0 5.4 4.0 8.0 4.1
1997
0.0 0.6 21.6 1.7 11.5 13.0 2.7 28.4 10.0 3.0 2.4 5.4
1998
0.0 0.3 1.7 20.0 2.3 18.8 18.2 2.9 21.2 8.4 2.7 3.5
1999
0.0 0.4 1.9 0.9 18.1 0.8 18.9 17.7 6.4 25.5 5.4 3.9
2 3 4 5 6 7 8 9 10 11 12 13+
Age

-continued-


2000
Percent
0.0 0.1 15.7 10.1 2.5 23.8 1.9 13.5 11.9 4.4 12.6 3.4
2001
Percent
0.0 0.0 14.3 33.2 6.8 3.1 18.7 1.0 8.7 4.1 1.6 8.5
2002
Percent
0.0 0.0 2.7 39.9 20.5 6.1 1.4 14.2 1.1 8.5 2.2 3.4
2003
Percent
0.0 0.4 1.8 4.5 58.9 19.4 4.1 1.4 4.3 0.2 2.9 2.2
2 3 4 5 6 7 8 9 10 11 12 13+
Age

-continued-


2004
Percent
0.0
2.5
9.9
2.5
7.6
46.1
19.0
4.4
0.4
3.4
0.8
3.5
2005
Percent
0.0
3.1
11.3
6.1
2.1
3.3
41.5
20.7
3.1
3.0
3.3
2.4
2006
Percent
0.0
1.8
25.3
10.1
8.3
4.5
13.5
24.9
7.2
3.1
0.7
0.6
2 3 4 5 6 7 8 9 10 11 12 13+
Age

APPENDIX D: FRESHWATER FINFISH

Appendix D1.–Estimated subsistence harvest of pink salmon, whitefish, pike, and sheefish fish, by surveyed villages, Yukon Area, 2006.

			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%) (+/-)	Miscellanous Fish Harvest
Hooper Bay	196	59	1,433	787	337	347	5,845	2,512	2,769	2,272	68	104	10,452
Scammon Bay	78	30	1,381	339	718	206	1,364	364	3,410	1,669	139	58	7,012
Coastal District	274	89	2,814	857	1,055	404	7,209	2,538	6,179	2,819	207	119	17,464
Nunam Iqua	34	31	555	122	464	133	1,059	215	392	110	781	147	3,251
Alakanuk	123	47	115	117	1,136	431	2,355	1,062	1,908	815	1,175	760	6,689
Emmonak	163	90	225	186	1,504	502	5,239	1,692	3,538	730	1,545	321	12,051
Kotlik	98	49	219	117	2,628	2,401	3,678	1,209	1,904	853	1,171	499	9,600
District 1	418	217	1,114	277	5,732	2,494	12,331	2,345	7,742	1,392	4,672	975	31,591
Mountain Village	150	65	616	251	2,667	1,307	1,895	905	3,175	891	989	573	9,342
Pitkas Point	27	22	44	25	891	313	237	104	197	55	97	65	1,466
St. Mary's	124	61	236	324	2,173	1,218	704	149	2,152	766	298	58	5,563
Pilot Station	108	50	1	1	1,443	580	713	354	1,116	401	623	314	3,896
Marshall	75	28	3	0	512	300	453	731	3,458	2,868	469	233	4,895
District 2	484	226	900	410	7,686	1,928	4,002	1,230	10,098	3,126	2,476	700	25,162
Russian Mission	58	20	8	12	790	444	160	0	1,198	448	131	59	2,287
Holy Cross	65	33	17	0	245	62	318	43	324	85	47	0	951
Shageluk	32	26	0	0	149	67	130	64	227	41	30	14	536
District 3	155	79	25	12	1,184	453	608	77	1,749	458	208	61	3,774
Anvik	37	32	0	0	70	28	60	18	89	25	81	27	300
Grayling	49	13	0	0	188	189	0	0	86	86	76	68	350
Kaltag	62	21	0	0	269	237	35	57	84	41	111	87	499
Nulato	89	32	1	1	473	234	18	29	56	34	1,581	960	2,129
Koyukuk	38	24	0	0	234	15	0	0	134	4	115	25	483
Galena	155	49	0	0	406	134	148	54	212	130	249	176	1,015
Ruby	53	17	0	0	333	219	202	2	52	66	50	16	637
Huslia	66	21	0	0	292	104	190	0	138	31	112	101	732
Hughes	29	22	0	0	572	73	2,600	63	45	0	156	30	3,373
Allakaket	44	17	0	0	3,925	3,393	3,300	1,358	480	174	875	809	8,580
Alatna	13	8	0	0	60	0	100	0	40	0	76	14	276
Bettles	27	11	0	0	0	0	0	0	4	6	0	0	4
District 4	662	267	1	1	6,822	3,427	6,653	1,362	1,420	252	3,482	1,278	18,378

-continued-

Community	Total Households	Households Contacted [c]	Estimated Subsistence Harvest with Corresponding Confidence Intervals (CI) (Expanded to Estimate Survey Village Harvest) [a] Pink Salmon Estimated Total	Pink Salmon CI (95%) (+/-)	Large Whitefish [b] Estimated Total	Large Whitefish CI (95%) (+/-)	Small Whitefish Estimated Total	Small Whitefish CI (95%) (+/-)	Pike Estimated Total	Pike CI (95%) (+/-)	Sheefish Estimated Total	Sheefish CI (95%) (+/-)	Total Expanded Miscellanous Fish Harvest
Tanana	104	49	0	0	3,900	639	2,366	675	298	261	1,300	384	7,864
Stevens Village	25	14	0	0	48	28	0	0	115	83	64	33	227
Birch Creek	8	5	0	0	275	213	0	0	81	52	13	11	369
Beaver	28	25	0	0	56	40	0	0	83	50	40	39	179
Fort Yukon	152	48	0	0	363	150	359	249	211	170	222	94	1,155
Venetie	56	13	0	0	50	0	32	0	0	0	0	0	82
Chalkyitsik	32	23	0	0	1	1	191	87	157	70	61	70	410
District 5	405	177	0	0	4,693	692	2,948	725	945	337	1,700	404	10,286
Survey Totals	2,398	1,055	4,854	990	27,172	4,746	33,751	3,980	28,133	4,477	12,745	1,804	106,655

[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 approximately 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 D2.–Reported subsistence harvest of other miscellaneous fish species by surveyed villages, Yukon Area, 2006.

Community	Total Households	Households Contacted [a]	Reported Harvest of Miscellaneous Fish Species, (Not Expanded)								Total Not Expanded Miscellanous Fish Harvest
			Burbot	Lamprey	Tomcod	Grayling	Sucker	Arctic Char	Blackfish	Sockeye Salmon [b]	
Hooper Bay	196	58	307	0	5,667	0	0	0	20,380	19	26,373
Scammon Bay	78	29	143	0	3,607	0	0	45	16,300	11	20,106
Coastal District	274	87	450	0	9,274	0	0	45	36,680	30	46,479
Nunam Iqua	34	29	394	100	1,356	0	0	0	17,750	16	19,616
Alakanuk	123	46	191	0	120	0	0	9	60,900	17	61,237
Emmonak	163	87	509	0	1,976	0	0	0	37,010	53	39,548
Kotlik	98	48	415	0	701	0	0	9	6,590	34	7,749
District 1	418	210	1,509	100	4,153	0	0	18	122,250	120	128,150
Mountain Village	150	59	620	405	125	20	0	0	17,740	45	18,955
Pitkas Point	27	20	87	6	0	0	0	0	7,350	5	7,448
St. Mary's	124	57	973	530	20	4	0	1	9,310	26	10,864
Pilot Station	108	47	667	45	80	0	0	0	18,900	4	19,696
Marshall	75	27	316	420	0	0	0	0	2,150	4	2,890
District 2	484	210	2,663	1,406	225	24	0	1	55,450	84	59,853
Russian Mission	58	17	102	0	0	0	0	0	2,800	2	2,904
Holy Cross	65	32	14	0	0	5	0	0	0	18	37
Shageluk	32	25	0	0	0	0	0	0	200	14	214
District 3	155	74	116	0	0	5	0	0	3,000	34	3,155
Anvik	37	30	0	246	0	12	0	0	20	9	287
Grayling	49	13	50	340	0	15	5	0	0	2	412
Kaltag	62	19	1	0	0	71	0	5	0	0	77
Nulato	89	32	49	0	0	495	0	258	0	4	806
Koyukuk	38	24	22	0	0	0	0	0	0	0	22
Galena	155	47	65	0	0	10	20	0	1,275	12	1,382
Ruby	53	17	0	0	0	0	0	0	0	0	0
Huslia	66	21	3	0	0	0	1	5	0	15	24
Hughes	29	22	32	0	0	12	28	0	0	15	87
Allakaket	44	17	1	0	0	23	0	10	0	0	34
Alatna	13	8	0	0	0	0	0	0	20	0	20
Bettles	27	11	0	0	0	23	0	3	0	0	26
District 4	662	261	223	586	0	661	54	281	1,315	57	3,177

-continued-

Community	Total Households	Households Contacted [a]	Reported Harvest of Miscellaneous Fish Species, (Not Expanded)								Total Not Expanded Miscellanous Fish Harvest
			Burbot	Lamprey	Tomcod	Grayling	Sucker	Arctic Char	Blackfish	Sockeye Salmon [b]	
Tanana	104	45	59	0	0	37	21	0	0	2	119
Stevens Village	25	14	25	0	0	0	0	0	0	5	30
Birch Creek	8	4	0	0	0	0	0	0	0	0	0
Beaver	28	23	0	0	0	0	0	0	0	0	0
Fort Yukon	152	45	24	0	0	11	30	0	0	1	66
Venetie	56	13	0	0	0	407	0	0	0	0	407
Chalkyitsik	32	23	0	0	0	0	0	0	0	0	0
District 5	405	167	108	0	0	455	51	0	0	8	622
Survey Totals	2,398	1,009	5,069	2,092	13,652	1,145	105	345	218,695	333	241,436

[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] 2006 is fourth year that sockeye salmon harvest information was included in post season survey. Due to low sockeye numbers, infrequent harvest, and difficulties with species identification by fishermen, the harvest is not estimated.

Appendix D3.–Reported subsistence and personal use non-salmonid freshwater finfish fish harvested under the authority of subsistence fishing and personal use permits, listed by permit area, Yukon Area, 2006.

Permit Fishing Area	Type	Permit [a] Issued [b]	Returned	Percent Returned	Number of Permits Returned that Fished [c]	Whitefish	Sheefish	Burbot	Pike	Suckers	Grayling
Subsistence											
Koyukuk Middle and South Fork Rivers	SF	1	1	100%	1	0	0	0	0	0	1
Yukon River Rampart Area	SR	19	19	100%	16	177	0	6	11	10	30
Yukon River near Haul Road Bridge	SY	68	66	97%	53	69	10	6	6	0	4
Yukon River near Circle and Eagle [d]	SE	85	82	96%	59	191	50	23	55	83	384
Tanana River Subdistrict 6A	SA	19	19	100%	15	12	1	1	0	0	0
Tanana River Subdistrict 6B [e]	SB	78	76	97%	42	763	12	26	88	21	4
Tanana River Upstream of Subdistrict 6C	SU	23	22	96%	17	1,756	0	0	28	181	83
Kantishna River Subdistrict 6A	SK	5	5	100%	3	27	0	34	30	282	0
Tolovana River Pike Subdistrict 6B	ST	101	97	96%	56	117	2	27	788	9	0
Subsistence Permit Subtotals		399	387	*97%*	262	3,112	75	123	1,006	586	506
Personal Use											
Tanana River Salmon Subdistrict 6C	PC	60	60	100%	35	14	5	1	2	0	0
Tanana River Whitefish Upstream of Subdistrict 6C	PW	7	7	100%	4	273	0	3	0	184	1
Personal Use Permit Subtotals		*67*	*67*	*100%*	*39*	*287*	*5*	*4*	*2*	*184*	*1*
Permit Totals		466	454	97%	301	3,399	80	127	1,008	770	507

[a] Permits returned as of May 1, 2007.

[b] Includes 33 households that were "issued" permits for more than one area. Additionally, includes two households that were issued duplicate permits for same area.

[c] Includes 10 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 (20 Chinook and 15 summer chum salmon).

[e] Does not include fish distributed to community households from ADF&G Nenana test fish wheel project (38 Chinook, 159 fall chum, and 389 coho salmon).

Appendix D4.–Commercial freshwater finfish harvest, combined Lower Yukon River Districts 1, 2, and 3, 1978-2006.

	Sheefish		Whitefish		Burbot		Pike	Lamprey		Blackfish
Year	Number	Pounds	Number	Pounds	Number	Pounds	Pounds	Number	Pounds	Pounds
1978	0	0	19	87	0	0	0	0	0	0
1979	5	39	23	55	0	0	0	0	0	0
1980	283	2,265	78	250	0	0	0	0	0	293
1981	299	2,812	779	2,875	0	0	9	0	0	0
1982	754	6,161	1,633	6,214	102	482	0	0	0	0
1983	395	2,692	163	648	0	0	0	0	0	0
1984	94	762	794	2,362	0	0	0	0	0	0
1985	358	3,081	1,514	4,586	0	0	0	0	0	0
1986	0	0	1,533	5,845	0	0	0	- [a]	80	0
1987	0	0	2,144	7,564	0	0	0	0	0	0
1988	0	0	696	2,171	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	180	260	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	0	0	95	640	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0
1994	0	0	157	471	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	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	0	0	0	0
2003	0	0	0	0	0	0	0	84,665 [b]	23,960	0
2004	0	0	0	0	0	0	0	0	0	0
2005	266	1,688	2,910	4,627	0	0	0	0	0	0
2006	472	2,912	6,429	8,351	0	0	0	3,149 [c]	715	0
1996-2005 Average	27	169	291	463	0	0	0	8,467	2,396	0

[a] Information not available.

[b] Number of lamprey equals pounds of lamprey divided by the average lamprey weight (0.283). Harvest took place in St. Mary's area.

[c] Number of lamprey equals pounds of lamprey divided by the average lamprey weight (0.227). A few deliveries were made in Mountain Village and St. Mary's.

Appendix D5.–Commercial freshwater finfish harvest, Upper Yukon Area, 1971–2006.

	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	Number	Pounds
1971	-	-	3,277	9,831	0	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	0
1973	2,187	3,915	1,697	5,037	0	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	0
1975	1,357	2,375	0	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	0
1977	0	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	0
1979	1,336	2,306	0	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	0
1981	0	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	0
1983	0	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	0
1985	0	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	0
1987	0	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	0
1989	0	0	0	0	0	0	0	0	1	0	0	2,070	0	0
1990	0	0	0	0	1	0	809	0	0	0	985	2,078	0	0
1991	0	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	0
1993	0	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	0
1995	0	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	0
1997	0	0	0	0	0	0	908	1,160	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0 [b]	0	0	0	0	0	0
1999	0	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	0
2001	0	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	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	99,988 [c]	25,697
2004	0	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	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	32,943 [d]	7,481
2001-2005 Average	0	0	0	0	0	0	0	0	0	0	0	0	19,998	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.

[c] Number of lamprey equals pounds of lamprey divided by the average lamprey weight (0.257). Harvest took place in Grayling area.

[d] Number of lamprey equals pounds of lamprey divided by the average lamprey weight (0.227). The majority of the harvest took place in the Grayling area.

Appendix D6.–Freshwater finfish sales during the commercial salmon fishing season by district, Upper Yukon Area, 1988–2006.

	District 4		District 5				District 6	
	Whitefish		Whitefish		Sheefish		Whitefish	
Year	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
1988	170	977	1,432	1,497	94	689	205	208
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	2,635	2,455	1,864	1,379 [a]	0	0	199	499
1993	0	0	59	48	0	0	140	300
1994	1	4	108	215	0	0	209	433
1995	0	0	95	95	0	0	183	387
1996	0	0	22	66	0	0	103	292
1997	0	0	270	301	0	0	4	8
1998	0	0	116	88	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	60	120
2003	40	113	0	0	0	0	129	297
2004	0	0	4	15	0	0	53	112
2005	0	0	0	0	0	0	66	175
2006	0	0	0	0	0	0	99	397
2001-2005 Average	8	23	1	3	0	0	62	141

[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 (.74 lbs.) to estimate number of fish.

Appendix D7.–2006 Lower Yukon whitefish 3.5" set gillnet test fishery summary.

Location [a] (Dates of operation)	Time Hours Fished	Harvest by Species								
		Bering Cisco	Least Cisco	General Cisco [b]	Broad Whitefish	Humpback Whitefish	General Whitefish [c]	Sheefish	Pike	Other [d]
Kotlik (9/12-10/25)	310	766	4	736	6	64	49	44	0	19
Nunam Iqua (9/12-10/21)	328	1,352	77	174	31	1,074	57	98	31	64
Emmonak (9/12-10/10)	168	0	0	0	2	0	152	2	44	7
Total	806	2,118	81	910	39	1,138	258	144	75	90

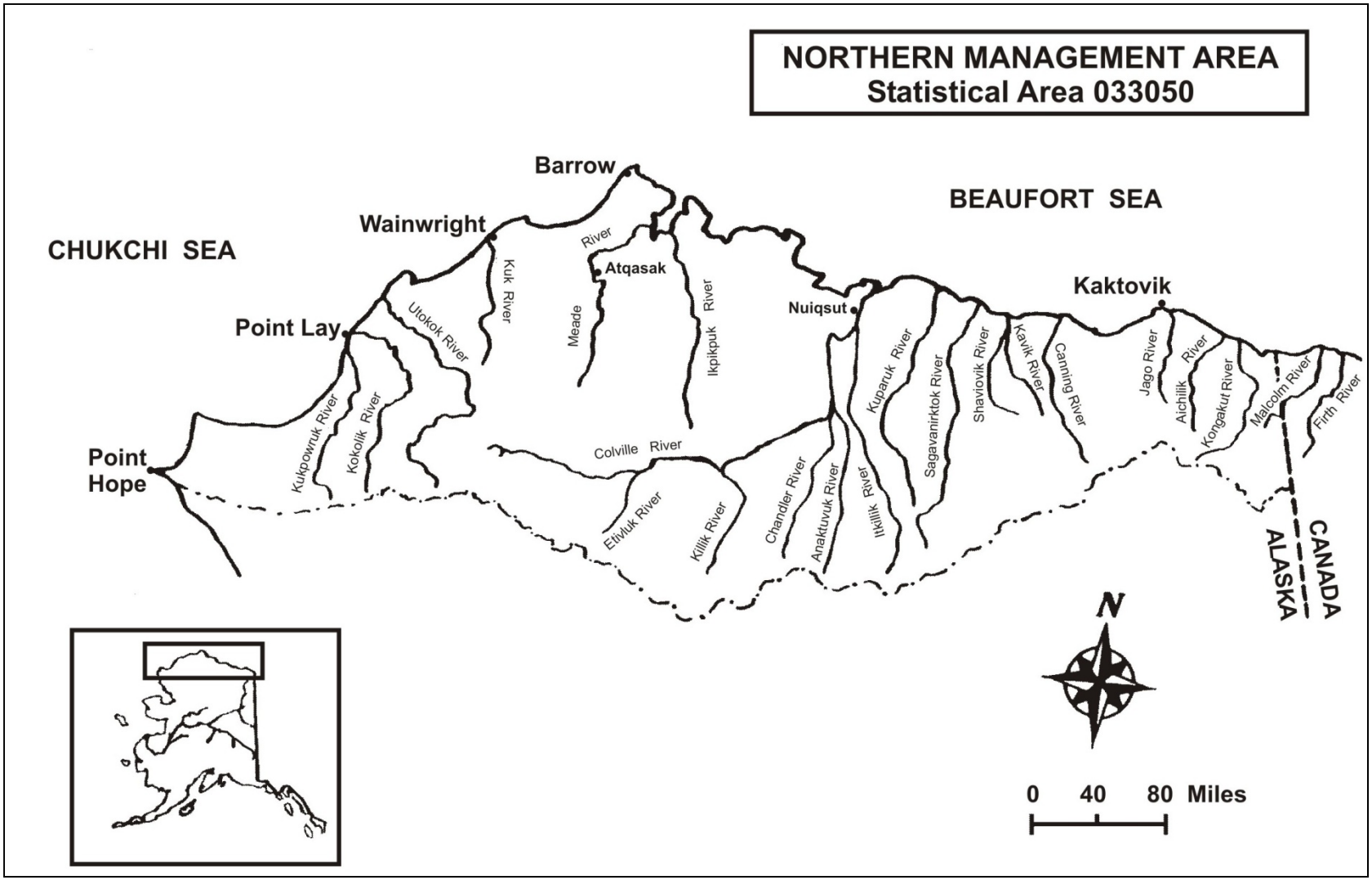
[a] The net length (l) and depth (d) utilized varied between the test fishery locations in response to the specific conditions such as water level and size of the eddy that was found at each site. At Kotlik 150 ft. (l) and 8 ft. (d), was employed for the entire season. At Nunam Iqua 150 ft. (l) and 8 ft. (d) was used primarily, but on occasion 75 ft. (l) and 5 ft. (d) was used. At the Emmonak site, 20-35 ft. (l) and 8 ft. (d) was utilized.

[b] Includes both Least and Bering Cisco when the cisco catch was not identified to species.

[c] Includes both Broad and Humpback when the whitefish catch was not identified to species.

[d] Includes burbot and chum, pink, and coho salmon.

APPENDIX E: NORTHERN AREA



Appendix E1.–Northern Management Area, AYK Region.

Appendix E2.–Commercial freshwater finfish harvest and sales, Colville River, Northern Area, 1964–2006.

	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
2006	0	1,188 [i]	4,995	3,293	9,476	1,482 [h]	3,655
5 Year Average 2001-2005	0	3,672	3,810	4,741	12,223	1,613	3,067
10 Year Average 1996-2005	0	4,197	6,072	7,340	17,609	4,210	4,407

-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 .92 pounds for Arctic cisco and .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.