Fishery Management Report No. 11-76

Lower Kuskokwim River Inseason Subsistence Salmon Catch Monitoring, 2006 to 2009

Final Report for Study 06-306
USFWS Office of Subsistence Management
Fisheries Resource Monitoring Program

by

Eva Patton

and

Holly C. Carroll

December 2011

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY MANAGEMENT REPORT NO. 11-76

LOWER KUSKOKWIM RIVER INSEASON SUBSISTENCE SALMON CATCH MONITORING, 2006 TO 2009

by
Eva Patton
Orutsararmiut Native Council, Bethel

and

Holly C. Carroll,
Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage

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

December 2011

Development and publication of this manuscript were partially financed by the U.S. Fish and Wildlife Service, Office of Subsistence Management (Project No. 06-306), Fisheries Resource Monitoring Program, under agreement 701816J619.

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

Eva Patton
Orutsararmiut Native Council,
P.O. Box 927 Bethel, AK 99559, USA

and

Holly C. Carroll,
Alaska Department of Fish and Game, Division of Commercial Fisheries,
333 Raspberry Rd, Anchorage, AK 99518

This document should be cited as:
Patton, E., and H. C. Carroll. 2011. Lower Kuskokwim River inseason subsistence salmon catch monitoring, 2006 to 2009. Alaska Department of Fish and Game, Fishery Management Report No. 11-76, Anchorage.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF APPENDICES

Appendix **Page**

ABSTRACT

The objectives of this project were: to assess if the harvest goals of subsistence fishermen primarily from Bethel were being met for Chinook, chum, and sockeye salmon; to characterize run timing and relative abundance for Chinook, chum, and sockeye salmon via harvest patterns; to determine if subsistence fishermen were selectively harvesting specific salmon species using particular mesh sizes or harvest methods; and to determine if there were factors other than fish abundance affecting the relative success of subsistence fishermen in achieving their harvest goals. A weekly survey of subsistence users in each fish camp in the primary fishing area of Bethel residents was attempted from June 1 to July 12, 2009. Survey results were reported immediately to members of the Kuskokwim River Salmon Management Working Group. In 2009, the majority of fishermen reported that catches were very good or normal compared to past years. Fishermen predominantly used drift nets of greater than 6 inch mesh size for targeting Chinook salmon, although some used set nets and a mix of other mesh sizes for capture of Chinook and other salmon species. Fishermen reported that the run timing for Chinook, chum, and sockeye salmon was normal and only a few people commented that the run was late at various times in the season. Some commented specifically that the Chinook salmon run got off to a slow start but was very strong in the middle of the run which allowed families to easily meet their harvest goals. A few felt the sockeye run was early. Overall, in 2009 fishing families reported that they were satisfied with their catches, the fish were in good condition, and drying conditions were sufficient for preserving fish for the year. The results for 2009 were compared findings from 2006 to 2008.

Key words: Bethel, Kuskokwim River, Chinook, *Oncorhynchus tshawytscha*, sockeye, *O. nerka*, chum, *O. keta*, coho, *O. kisutch*, salmon, subsistence, Orutsararmiut Native Council, Kuskokwim River Salmon Management Working Group.

INTRODUCTION

This final report documents the *Lower Kuskokwim River Inseason Subsistence Salmon Catch Monitoring* program (hereafter called Inseason Catch Monitoring program) for 2009 and briefly summarizes the preceding 3 years of the U.S. Fish and Wildlife Service (USFWS) Office of Subsistence Management (OSM) Project No. 06-306. This project has been a collaborative effort between Orutsararmiut Native Council (ONC) and the Alaska Department of Fish and Game (ADF&G) since its inception in 2001, with goals to provide local input on salmon management decision-making during the fishing season and to increase ONC's capacity to engage in fisheries management activities.

Researchers collected information from fishermen about their subsistence salmon catches during a 6-week period in 2009 and presented the information to the *Kuskokwim River Salmon Management Working Group* (hereafter referred to as Working Group) at weekly meetings. Members of the Working Group and fishery managers worked together to make inseason management decisions for the salmon fisheries in the Kuskokwim River drainage (Figure 1; Smith and Linderman 2008). Study activities were coordinated through the *Inseason Catch Monitoring* program at ONC. Participants were families using fish camps in the Bethel area between the mouth of the Gweek River and the village of Napaskiak (Figure 2). This is the final report for a 4-year study that began in 2006.

The Kuskokwim River drainage covers an extensive area in western Alaska originating in the Alaska Range in central Alaska and emptying into the Bering Sea (Figure 1). Hundreds of smaller tributary rivers and streams drain into the mainstem of the Kuskokwim River making up the entire drainage. Five species of salmon migrate to the Kuskokwim River drainage in spring, summer, and fall to spawn: Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, sockeye *O. nerka*, coho *O. kisutch*, and pink salmon *O. gorbuscha*.

Historically and contemporarily, people residing in the Kuskokwim River drainage have relied on salmon as the mainstay of their diet. In 2009, about 38 communities, ranging in size from small villages of less than 200 people, such as Oscarville, to larger subregional hub communities such as Aniak with 572 people, were located in the drainage (U.S. Census 2010). The largest community in the drainage, Bethel, had a population of 5,471 in 2000 according to the U.S. Census. Studies indicated that fish accounted for up to 85%, in pounds usable weight, of the wild resources harvested for subsistence in Kuskokwim River drainage communities, with salmon specifically accounting for up to 53% of total wild resources consumed (Coffing 1991). The annual harvest of salmon for home use, or subsistence, was up to 650 pounds per capita in some of these communities (Coffing 1991; Fall et al. 2009).

In 2009, three types of salmon fisheries were prosecuted in the Kuskokwim River drainage mainly by the people who resided in the drainage: the subsistence fishery, the commercial fishery, and the much smaller sport fishery. The focus of this research was the subsistence fishery. From 2000 to 2009, the subsistence fishery regularly harvested more Chinook, chum, sockeye, and coho salmon than the commercial and sport fisheries, combined (Appendices A1 to A4).

The study area was located on the lower river where most of the subsistence salmon harvest in the Kuskokwim River drainage has occurred (Simon et al. 2007). An estimated 187,502 salmon were harvested from the Kuskokwim River drainage for subsistence purposes in 2007, the most recent year for which postseason harvest data were available, of which an estimated 159,701 fish (85%) were taken by the residents of the lower river area. The lower river area was also the area in which the most people resided and included the regional hub community of Bethel.

This research focused on the Bethel area subsistence salmon fishery for two main reasons: 1) the higher harvest of salmon by the subsistence fishery compared to the commercial and sport fisheries, and 2) the higher subsistence harvest of salmon in the area compared to other areas of the drainage.

This report summarizes results from inseason surveys conducted with salmon fishermen in the Bethel area of the lower Kuskokwim River in 2009, and is the final report for Project No. 06-306 supported in part by the USFWS, Office of Subsistence Management. This project was a continuation of Project No. 06-306 conducted in 2006, 2007, and 2008 and previous projects 05-307 (2005), 04-353 (2004), and 01-132 (2001–2003; Carroll and Patton 2010; Smith and Dull 2008; Dull and Shelden 2007; Martz and Dull 2006; Martz and Whitmore 2005; Whitmore et al. 2008).

The report begins with background to the project, project objectives, and methods, followed by results. A section describing the demographic and cultural history of the people living in the area was included to add context and relevance to the research results. The results section is a description and analysis of the information collected during interviews with subsistence fishermen. The discussion begins with a look at the meaning of these findings in the larger context of fisheries management, and ends with a description of the contemporary subsistence salmon fishing patterns in the Bethel area. The discussion also highlights survey feedback from the previous report years 2006–2008. A recommendation section describes changes to the project that could improve outcomes in the future.

BACKGROUND

This research began in 2001 in response to local public and fishery management staff concerns. Salmon returns to the Kuskokwim River were generally below average from 1997 to 2001 and in 2000 both Chinook and chum salmon were designated stocks of concern by the Alaska Board of Fish (BOF) (Whitmore et al. 2008). At the beginning of this project in 2001, 2002, and 2003, the project goals applied to the entire extent of the Kuskokwim River. However, beginning in 2004 only the Bethel area subsistence fishery has been included in the project. Additionally, in 2001, 2002, 2003, and 2004, the project was in effect from late May through August during the peak migration periods of all salmon species. However, beginning in 2005 the study period was reduced to late May through early July during the peak Chinook salmon migration. These changes reflected 1) the increased difficulty of meeting study objectives in the entire drainage, 2) the higher expense of meeting study objectives in the entire drainage, and 3) the higher significance placed on run abundance and timing of Chinook salmon over other species of salmon. Since 2001, project objectives have been achieved by staff from ONC, which is the Bethel tribal council, in collaboration with the Bethel office of ADF&G, Division of Commercial Fisheries.

In 2002, Chinook and chum salmon returns to the Kuskokwim River began to rebound and reached near record abundances from 2004 through 2007 (Estensen et al. 2009). This led the BOF to discontinue the stock of concern status for both species. However, inseason management was still conducted in the same manner each year using all available assessment tools to ensure that escapement and subsistence priorities were met.

During the 2006–2009 study period, the Kuskokwim River salmon fisheries were managed according to the *Kuskokwim River Salmon Management Rebuilding Plan* (5 AAC 07.365 adopted by the BOF in 2001). The plan set guidelines for the sustained yield of salmon stocks large enough to meet escapement goals, provided fishermen with a reasonable opportunity to harvest amounts necessary for subsistence, and provided for commercial and sport fisheries (Whitmore et al. 2008). The Rebuilding Plan provided direction to establishing a subsistence fishing schedule that allowed salmon net and fish wheel fisheries to be open for 4 consecutive days per week in June and July as announced by emergency order. The schedule was implemented in a step wise progression up the river consistent with salmon run timing and could be altered based on run strength to achieve escapement goals. Once escapement goals were assured for Chinook and chum salmon, subsistence fishing could be allowed 7 days per week. Implementation of the subsistence fishing schedule was established in an effort to provide reasonable opportunity for fishermen to harvest Chinook and chum salmon for subsistence use, while meeting escapement goals.

The subsistence fishing schedule (locally referred to as “windows” as it allowed windows of subsistence fishing for 3 to 4 days at a time and then was closed the remainder of each week) was also a management tool used in an effort to spread the subsistence harvest out across the run, allowing periods of greater fish passage from the lower to upper river so that subsistence fishermen had equalized access to salmon in villages along the entire river (Whitmore et al. 2008. For the years 2006 to 2009, “windows” management for subsistence fishing was only implemented in 2006, and only for a portion of the season. The salmon returns in 2007, 2008, and 2009 were deemed strong enough that subsistence fishing was open continuously throughout the season except for closures around commercial fishery openings.

Much of the management direction in the Rebuilding Plan relied on inseason indicators of run strength. These inseason indicators consisted of the evaluation of the following:

1. Subsistence fishery information;
2. Sport fishery harvest information;
3. Bethel test fishery catch rates;
4. Commercial harvest catch rates;
5. Weir passage (as fish begin reaching clear water tributary streams);
6. Sonar passage counts; and
7. Numbers of salmon on spawning grounds estimated in aerial surveys.

As directed by the Rebuilding Plan, the Kuskokwim River commercial fishery could only be conducted in June and July if it was determined that escapement goals and amounts necessary for subsistence would be achieved. Generally, this was a limited chum and sockeye salmon fishery (Whitmore et al. 2008). A directed coho salmon fishery generally occurred in late July and August. Coho salmon accounted for the largest number of salmon harvested in the Kuskokwim commercial salmon fishery (Appendices A1 to A4). Following coho salmon in decreased commercial catch numbers were sockeye, chum, and Chinook salmon. The directed Chinook salmon commercial fishery in the Kuskokwim River was discontinued in 1987 by regulation. However, if Chinook salmon were harvested in this fishery during late June and July, commercial fishermen were allowed to sell this catch.

During the 2006–2009 study period, the Kuskokwim Management Area had no formal forecast for salmon runs. Broad expectations were developed based on an evaluation of parent-year escapements, and trends in harvest and productivity. Salmon run timing and run strength were monitored through comparisons of current year information to historic information.

Alaska Statute Title 16.05.258., *Subsistence Use and Allocation of Fish and Game*, established the subsistence use priority for reasonable harvest opportunity consistent with sustained yield, when resources were deemed not large enough to provide for all consumptive uses. Federally managed waters also provided for subsistence priority. In 1993, the BOF made a positive finding for Customary and Traditional Use for all salmon in the entire Kuskokwim Area. In 2001, the BOF revised findings of amounts necessary for subsistence for the Kuskokwim Area using updated subsistence harvest data through 1999. Amounts necessary for subsistence have been determined by species for the Kuskokwim River (Bergstrom and Whitmore 2004). During the 2006–2009 study periods, the ranges for Kuskokwim River drainage by species were: 64,500 to 83,000 Chinook; 39,500 to 75,500 chum; 27,500 to 39,500 sockeye; and 24,500 to 35,000 coho salmon.

The *Inseason Catch Monitoring Program* described in this report monitored subsistence harvesting during the salmon run in order to assess inseason salmon run timing and relative success of catch rates. In addition, the program helped managers assess whether subsistence salmon needs were being met prior to prosecuting a commercial fishery in the lower Kuskokwim River.

In addition to the inseason salmon harvest monitoring, an annual postseason household survey was conducted in the majority of Kuskokwim River drainage communities in order to estimate salmon harvest levels in the subsistence salmon fishery (Fall et al. 2009; Appendices A1–A4). However, harvest estimates are not available until after the fishing season is concluded, and therefore, are not timely for informing inseason management actions. Consequently, inseason

surveys with local fishermen at selected seasonal fishing locations, or fish camps in the Kuskokwim River drainage were conducted each year through the *Inseason Catch Monitoring Program*. Historically, fisheries managers collected inseason information about the subsistence salmon fishery ad hoc from fishermen. This project has increased the number, frequency, and quality of fishing-family reports. A less tangible measure but very important aspect of this project was that it facilitated communications between subsistence fishermen and area managers, fostered better understanding between people with different perspectives, and enhanced the range of knowledge available to make sound management decisions.

DEMOGRAPHIC AND CULTURAL HISTORY

The community of Bethel is located approximately 60 miles from where the Kuskokwim River meets the Bering Sea, and 390 miles from Anchorage, Alaska. The community can be accessed only by boats and planes and is not connected overland by road to any other community. All cash commodities are delivered either via river barge in summer or by year-round air service.

Bethel is located in the heartland of the traditional territory of Central Yup'ik Eskimos. Moravian missionaries established Bethel at an unoccupied site in 1885 across the river from the village of *Mumtreglak*. The missionaries ran an orphanage, school, church, store, post office, and sawmill in Bethel. Periodically, gold seekers, trappers, and merchants spent time in Bethel awaiting supplies (Henkelman and Vitt 1985). More and more people residing in the region moved to Bethel for the school and church and to trade. By 1960, the population had increased to 1,258 people; it doubled in 1970 to 2,416 people, and has continued to show increases each census year, numbering 5,471 people in the 2000 census (U.S. Census 2010). In comparison, the 2 villages in the study area, Oscarville and Napaskiak, had 61 and 390 people, respectively, in 2000. The population of contemporary Bethel includes numerous government and private sector employees recruited locally and from outside the area involved in teaching, school district management, the local hospital and college, Alaska Native non-profit organizations, and other services. An estimated 62% of the population of Bethel is of Alaska Native descent (U.S. Census 2010). This includes both Bethel ONC members and many tribal members of other Yukon-Kuskokwim Delta villages who have relocated to Bethel for employment (Krauthoefer 2005).

Before 1900, extended families of up to 30 members generally followed a seasonal cycle (seasonal round) of resource gathering beginning in spring with marine mammal and bird hunting after which families moved to salmon fish camps at the mouth of salmon-bearing sloughs and streams. Salmon were harvested with nets made of imported twine, thongs cut from bearded seal skin and the inner bark of willow, and by dip net and spear. Salmon was the mainstay of the diet with large numbers preserved by drying and smoking. This time-consuming method of preserving salmon required specialized skills. In fall, families moved to hunting and berry picking camps in the mountains and by December families retired to winter settlements of up to several hundred people and began the ceremonial season. The territorial boundaries recognized during the seasonal round were family-based rather than geography-based. Individuals stayed with their extended family and married into the larger group sharing the same settlements.

The 1900 influenza epidemic was remembered by residents of the area because of the death of many extended family members. Surviving members gathered in new settlements. The rules regarding marriage were adjusted to accommodate the new situation and marriage outside of one's pre-influenza settlement group became common. Since 1900 there has been a gradual but

steady migration of people from seasonal settlements to permanent communities for reasons such as allowing children to attend school and employment. Cultural history of the lower Kuskokwim area has been described previously in the oral histories of local residents and by authors such as Andrew (2008), Fienup-Riordan (1984, 2005, and 2007), Kilbuck (1988), and Mather (1985). The contemporary subsistence economy has been described by authors such as Coffing (1991, 2001) and Fienup-Riordan (1986).

OBJECTIVES

The overall goals of this project were to contribute to management decision-making during the fishing season and to increase ONC's capacity to engage in fisheries management activities.

The objectives for this project were to:

1. Assess whether the harvest goals of subsistence fishermen were being met for Chinook, chum, and sockeye salmon;
2. Characterize run timing and relative abundance for Chinook, chum, and sockeye salmon through subsistence harvest reports;
3. Determine if fishermen were selectively harvesting specific salmon species using particular mesh sizes or harvest methods; and
4. Determine if there were factors other than fish abundance that may have affected the relative success of subsistence fishermen in achieving their harvest goals.

METHODS

The primary method of data collection was a weekly census survey in each fish camp in an area from the village of Napaskiak to the mouth of the Gweek River, approximately 24 river miles. This survey zone represented the primary fishing area for Bethel residents and included the overlapping fishing areas for the nearby villages of Oscarville and Napaskiak. Participation in the survey was voluntary, and the results were confidential. Results were reported for the entire project area, and individuals were not identified in the findings.

A survey instrument, also called a questionnaire, was used to collect information during survey interviews (see Appendix B1). The survey instrument asked questions relating specifically to each of the objectives outlined above.

For Objective 1: To assess if the harvest goals of subsistence fishermen are being met for Chinook, chum, and sockeye salmon, the survey instrument asked:

- What are your family's harvest goals this year?
- Were your family's salmon harvest goals achieved?
- When did your family stop fishing for Chinook "king", chum, and sockeye salmon?

For Objective 2: To characterize run timing and abundance for Chinook, chum, and sockeye salmon, the survey instrument asked:

- Compared with this time in a "normal" year, how were catch rates for salmon this week?
- Does the salmon run appear to be running early, late, or normal?

For Objective 3: To determine if fishermen were selectively harvesting specific salmon species using particular mesh sizes or harvest methods, the survey instrument asked:

- Salmon fishing gear used this week?

For Objective 4: To determine if there were factors other than fish abundance that may have affected the relative success of subsistence fishermen in achieving their harvest goals, the survey instrument asked for:

- Comments, including comments about the weather affecting fishing, water levels, drying conditions, et cetera.

The survey instrument was developed in conjunction with staff from ADF&G, USFWS, and ONC, and has undergone only minor changes since the first year the survey instrument was used in 2001. ADF&G staff took the lead in coordinating and finalizing the interview format and protocols. Interview questions included family name, community of residence, date the family began fishing each year, fish camp location, and fishing area.

Fishermen were specifically asked, "Compared with this time in a normal year, how were your catch rates for salmon this week?" Answers were categorized as "Very Good," "Normal," or "Poor," and the summarized answers were viewed as an index of relative salmon abundance. Additionally, in order to provide a general characterization of salmon run timing, fishermen were asked the question: "Does the salmon run appear to be running early, late, or normal?" All information was compiled by ONC and presented in an anonymous format to state and federal managers, Working Group members and via local radio news stations to the general public.

ONC hired a fishery technician to (1) conduct weekly interviews with subsistence fishermen at fish camps in the Bethel area, (2) summarize those data for Working Group meetings, and (3) assist another ONC technician collecting biological data from Chinook salmon taken in the subsistence fishery. The biological data characterized the age, sex, and length (ASL) composition of the harvest by gear type as part of Project FIS 08-302 (Molyneaux et al. 2010). Both ONC technicians worked together conducting inseason subsistence surveys and collecting Chinook salmon biological data in the study area between Napaskiak and the mouth of the Gweek River.

This project relied on voluntary participation by Bethel-area subsistence fishermen, and most respondents have participated since 2001 when the project began. The majority of participants were lifelong residents of the Kuskokwim Area, representing some of the most experienced and knowledgeable fishermen. Most of these families were of Alaska Native descent at seasonal fish camps that have been maintained across generations. Interviewees typically had between 10 and 50 years of adult experience fishing in the region. The ONC lead technician for 2009, Justin Crow, had worked on the project for 2 years, was born and raised in Bethel and had approximately 15 years of subsistence fishing experience in the Kuskokwim River. Both ONC technicians had many family relations and community connections in the Bethel area, facilitating the trust and familiarity that was essential to the success of the program.

Nearly all participants were interviewed at seasonal fish camps in the areas of Gweek River, Church Slough, Steamboat Slough, Straight Slough, Old Bethel Airport, Oscarville Slough, Napaskiak Slough, the main stem Kuskokwim River, and adjacent to Bethel (Figure 2). When

the inseason surveys were first developed, subsistence fishing families were contacted at their camps, informed about the goals and objectives of the program and asked if they were interested in participating. For each week of the survey period, technicians attempted to contact each family on a list, maintained since 2001, of 50 or more families that had expressed interest in participating. All participation was voluntary and anonymous and the information sought was qualitative. While ONC tracked which families had been contacted each week, their feedback to the survey questions and additional comments were combined and presented in both written documents and verbal reports without any identifying information. In 2009, many families on the list of contacts had participated in the survey each year since 2001. However, some original contact families appeared to have discontinued fishing in the area as some fish camps were now vacant. Some new subsistence fishermen that were not contacted in the past were also interviewed and added to the routine survey route. People interviewed were selected based on their salmon processing sites being within the study area, self-identification as long-term subsistence fishermen, and interest in participating in the program. Subsistence fishermen were sometimes interviewed at the Bethel boat ramp because it provided an easy opportunity to meet with people as they returned from fishing. The number of interviews reported each week included everybody who was interviewed and this number varied depending on how many fishermen the technicians were able to contact.

In 2009, ONC technicians interviewed an average of 36 families per week at their fish camps, during opportunistic encounters at the Bethel boat ramp, or by phone. Some Bethel fishermen who have long been a part of the survey program were amenable to being contacted by phone at their homes. In general, fishermen responsible for the majority of the harvest were asked about catch rates and run timing. This person usually represented a larger group of people participating in salmon harvesting, processing, and preserving. Others who processed the fish contributed information on fish health, drying conditions, or other important environmental details. For consistency, when possible, the same family member of a fish camp was interviewed each week as was interviewed in past years. Because most of the interviewing took place at fish camp and many fishermen came and went from their fish camps returning to town, finding people at their camp during the survey hours was opportunistic, and thus the number of individuals surveyed varied each week. Also, because most fishermen and their families were extremely busy working hard to process dryfish, the ONC technicians strived to be sensitive to this and conducted interviews in an unobtrusive manner. At times interviewees who had agreed to participate in the past may have declined to comment because they were simply too busy to be bothered; all participation was voluntary and all families were treated with respect with no pressure to respond.

In 2009, field season preparations began on May 27 and subsistence catch monitoring interviews began on June 4. Two ONC technicians worked together as a team, traveling by boat to the many fish camps on the sloughs and main channel of the Kuskokwim River to interview fishermen. Technicians conducted interviews Thursday through Sunday of every week from June 1 through July 12. Weekly written reports summarizing the responses of the subsistence fishermen were completed by ONC and sent to ADF&G staff the Monday following the interview week.

RESULTS

2009 INSEASON SURVEY

During 2009, the subsistence fishery was only closed for a period 6 hours before, during, and 3 hours after each commercial fishery opening (Table 1 and Figure 3). Subsistence interviews were conducted over a 6 week period beginning June 1 through July 12, 2009. On average, 36 families were interviewed weekly regarding their subsistence fishing activities, and a total of 215 interviews were conducted in 2009 (Tables 2 and 3). In all, 6 weekly interview summaries were presented at Working Group meetings during June and July 2009 (Appendices C1–C6).

The most concentrated subsistence fishing activity in the study area occurred during the period from June 8 through June 28. This period coincided with the highest Chinook salmon abundance, as indicated by the Bethel test fishery (Carroll and Bradley 2010). During the 3 week most intensive fishing effort period, a total of 123 interviews were conducted and 92% of those interviewed reported fishing. The percentage of interviewed families who reported fishing each week ranged from 86% to 100% during this 3 week peak period (Table 3). Thirty-six percent of fishermen reported Chinook salmon fishing as "Very Good," 46% reported Chinook salmon fishing as "Normal," and 16% reported Chinook salmon fishing as "Poor."

Throughout the study period, June 1 to July 12, the majority of families that were actively fishing reported using gillnets, with only one of the families surveyed using rod and reel as a harvest method. From June 1 to July 12, of the families using gillnets, 79% used only drift gillnet gear, 8% used only set gillnets, and 13% used a combination of set and drift gillnets (Table 4). Of the fishermen using gillnets, 87% used nets with a mesh size greater than 6 inches during the study period, as gillnets of this size are used primarily to target Chinook salmon. Slightly over 10% of interviewed fishermen reported using only gillnets with mesh sizes 6 inches or smaller, and 3% reported using a combination of net sizes. A few respondents did not comment on the mesh size of nets they used.

Interviewees declined to comment on the chum and sockeye salmon runs until after June 8 either because they felt it was too early in the run to make an assessment or they were not yet fishing for those species specifically (Table 2). From June 8 through June 28, the period of the most fishing effort, 113 families reported fishing; chum salmon fishing was classified as "Very Good" by 1%, "Normal" by 94%, and "Poor" by 5% of the respondents. In the same interviews, 2% of the respondents' classified sockeye salmon fishing as "Very Good," 87% classified sockeye fishing as "Normal," and 11% classified sockeye fishing as "Poor."

Of the 36 families interviewed in the final survey week ending July 12, only 2 families were still fishing for salmon. Of these 2 fishing families, one family used nets with 6 inch mesh or less, and one family used a combination of net sizes (Table 4). Because the majority of the salmon runs had concluded, run timing questions were not asked of the interviewees during this time.

Fishermen were asked to compare the run timing of each species of salmon to what they considered normal for the majority of years they had fished (Table 5). Of the 113 interviews conducted from June 8 through June 28, no fishermen classified Chinook salmon run timing as early, 95% classified it as normal, and 5% classified it as late. No fishermen classified chum salmon run timing as early, 93% classified it as normal, and 7% classified it as late. During the same time period 4% of fishermen classified sockeye salmon run timing as early, 69% classified it as normal, and 27% of fishermen classified the run as late.

In addition to run timing and abundance of salmon, weather conditions to sufficiently dry fish on open-air racks was critical to preserving the harvest in order for it to last the year. In some past years of the survey, rainy weather created difficulty for families drying fish during the beginning of the Chinook salmon run. For example, in 2008 a few fishermen indicated that some of their fish soured on the drying racks and had to be replaced, requiring additional fishing effort. Respondents in 2009 indicated that after a bit of a slow start, overall the Chinook salmon catches were good and weather conditions were conducive for drying fish, with sufficient wind that also helped prevent flies from laying eggs on their fish during the time it was exposed on the open air drying racks. River ice breakup in spring of 2009 caused flooding in the Bethel area and deposited a layer of silt on the land and high up into the vegetation at many fish camps. This proved to be problematic for some people who had difficulty protecting their drying fish from the fine river silt being blown in the wind. A few families also incurred structural damage to their fish camps due to the flood and were delayed in beginning their fishing until repairs to fish racks or smokehouses were completed. However, these families also stated that the strength of the middle part of Chinook salmon run this year allowed them to still easily meet their subsistence harvest goals.

DISCUSSION

Information used to manage the Kuskokwim River fisheries and presented weekly to the Working Group includes: subsistence harvest reports; test fishery summaries; and reports of salmon abundance from weir, sonar, and aerial survey programs as salmon reach spawning grounds. The inseason catch monitoring interviews provide an early indication of salmon run timing, harvest effort and relative catch rates in the subsistence fishery. Comparisons of inseason catch information can be made among weeks, within a year and among years (Tables 2–5 and Appendices D1–D2). If the majority of interviewed fishermen rated fishing as "Very Good" for a given species and week, this may have indicated that a particular run was performing well for that time. Or, if the majority of interviewed fishermen rated subsistence fishing as "Poor," the run abundance may have been low, or the run timing may have been different relative to previous years. The source of any relative change in subsistence fishing success was not always clear because environmental conditions, run strength or run timing may have had an effect. However, with many years of catch monitoring reports, it is possible to compare responses between years and observe trends over time.

During study years 2006 to 2009, decisions of families to fish involved many factors including catch rates, but also weather conditions conducive for fishing as well as drying fish. In general, high winds and wave action prevented fishermen from going out by boat, and many fishermen delayed fishing if ongoing or heavy rain would have prevented fish from drying properly. For some fishing families that were employed, time off was planned for in advance to put up subsistence fish when the desired salmon species was thought to be most abundant in the run. Also, individual fishermen employed different methods for fishing including use of different size mesh, drift fishing or setnet fishing, and different locations and time of fishing effort. Thus, different fishermen had different levels of catch success, which is evaluated based on their own experience in previous years. Additional data was recorded in the notes of the inseason survey that highlighted feedback from people on weather conditions, success of different mesh sizes or techniques, or relative success during different times of the day. For example, a few long-time fishermen often noted that catches were better late at night, but many fishermen did not stay out that late to fish.

2009 INSEASON SURVEY

For 2009, most survey respondents indicated that the Chinook salmon run timing was normal and the majority said their catches were either very good or normal compared to past years (Table 2). Subsistence fishing effort for Chinook salmon was highest during the last 3 weeks of June and dropped sharply after harvest goals were met by most in the week ending June 28 (Table 2). The majority of fishermen surveyed were fishing in the last 3 weeks of June, with over 86% fishing during the time period that the Bethel test fishery indicated the Chinook run abundance was increasing to the 50% passage point, which occurred on June 23 (Carroll and Bradley 2010). This is consistent with information from 2007 and 2008, which suggested that the highest subsistence fishing effort for Chinook salmon occurred in the last 2 to 3 weeks of June (Smith and Linderman 2008).

During reconnaissance of the survey route at the start of the season in 2009, technicians observed numerous set nets and only a few fishermen out on the river with drift nets. Some fishermen interviewed who reported using less than 6-inch mesh set nets indicated they were specifically targeting whitefish with 4- or 5-inch mesh; however, only salmon-targeting nets were included in the final survey data. Many of the families interviewed who were fishing for Chinook salmon with drift gillnets felt the run was strong with good catches of large salmon, favored for making dryfish "strips." At numerous fish camps, women who were processing the fish often commented that the Chinook salmon were in good condition, being robust with a high oil content in the flesh that was desirable for making traditional dryfish.

During 2009, inseason harvest monitoring report summaries were presented at Working Group meetings and compared with historical data (Appendices C and D). In conjunction with inseason run assessment projects such as the Bethel test fishery (Carroll and Bradley 2010), subsistence surveys were used to determine if a reasonable expectation could be made that adequate Chinook salmon abundance existed to meet escapement goals, provide sufficient subsistence opportunity, and support a salmon-directed commercial fishery. By the third week of June, ADF&G biologists determined that available data indicated a harvestable surplus of chum and sockeye salmon in the Kuskokwim River and recommended a commercial opening to the Working Group. A total of 16 commercial openings were held in District 1B during the 2009 salmon run including the coho run in August (Table 1).

2008 INSEASON SURVEY

Rainy weather in 2008 influenced many participating fishermen to delay fishing activity until after June 11, but fishing effort increased over the following 3 weeks (Table 2 and Figure 8 in Carroll and Patton 2010. Survey responses indicated low Chinook salmon harvest relative to fishing effort early in the season and higher harvest relative to effort during late June and early July. The majority of fishermen surveyed in the last 2 weeks of June were fishing at this time with over 80% fishing in the weeks ending June 22 and June 29. This is consistent with information from 2007, which suggested that the highest subsistence fishing effort for Chinook salmon occurred approximately in the last 2 weeks of June (Smith and Linderman 2008).

Many fishermen interviewed indicated that their initially low salmon catches influenced their decision to wait to begin fishing until later in the second week of June when catch rates increased. During reconnaissance of the survey route at the start of the season, technicians observed numerous set gillnets and only a few fishermen out on the river with drift gillnets.

Some fishermen interviewed who were using less than 6 inch mesh set gillnets indicated they were harvesting whitefish. Over half the interviewed families who were fishing for Chinook salmon with drift gillnets during the second week of June indicated that many Chinook salmon were smaller than average and that there was a high percentage of males being caught.

In the first few weeks of fishing in 2008, most fishermen interviewed indicated the Chinook salmon run was late. The midpoint of the run (June 24) was 2 days later than average, as determined postseason by the Bethel test fishery (Carroll and Patton 2010.

During 2008, inseason subsistence survey report summaries were presented at Working Group meetings and compared with historical data (Carroll and Patton 2010. By the third week of June, ADF&G biologists determined that there was a harvestable surplus of chum and sockeye salmon in the Kuskokwim River and recommended a commercial opening to the Working Group. The Working Group voted by narrow margin to support a commercial opening; however, there was much discussion expressing concern that subsistence harvest for Chinook had not yet picked up in the lower river and upriver subsistence fishermen had not yet seen many Chinook salmon.

2007 INSEASON SURVEY

Late Chinook salmon arrival in 2007 influenced participating fishermen to delay fishing activity until after the first week of the 2007 surveys, but fishing effort increased over the following 3 weeks (Smith and Dull 2008). Survey responses for the entire season indicated low Chinook salmon harvest relative to fishing effort early in the season and higher harvest relative to effort during late June and early July. Subsistence fishing effort for Chinook salmon was highest during the first 3 weeks of June, but decreased in late June and July. This is consistent with information from 2006, which suggested that the highest subsistence fishing effort for Chinook salmon occurred in June.

From June 4 to 24, fishermen reported that they believed that Chinook salmon were avoiding fishing nets and the low water level caused problems with snagging the nets, both of which decreased catchability. Fishermen attributed the abnormal Chinook behavior to a combination of low water levels and clear water conditions. Data collected from the USGS water gauge at Crooked Creek and the Bethel test fishery indicated record low water levels for the Kuskokwim River drainage in 2007 (Doug Bue, Commercial Fisheries Biologist, ADF&G, Bethel; personal communication). In addition, data from Bethel test fishery and other Kuskokwim River salmon monitoring projects suggest that the early portion of the Chinook salmon run was 4 to 8 days later than average (Doug Molyneaux, Commercial Fisheries Biologist, ADF&G, Anchorage; personal communication).

2006 INSEASON SURVEY

The majority of families interviewed during 2006 inseason subsistence surveys in the Lower Kuskokwim area indicated that Chinook, chum, and sockeye salmon fishing were at least "Normal" or "Very Good." The majority (greater than 60%) of interviewed fishermen reported Chinook salmon fishing as "Very Good" for the first 2 to 3 weeks of the survey from 2001 to 2005 (Appendix D1). In 2006, no families described Chinook salmon fishing during the first week of the interview period (week ending June 4) as "Very Good." Eleven families interviewed in mid-June reported that high water levels and low temperatures were causing Chinook salmon to run deep, possibly affecting catchability. Chinook abundance seemed low and drift net success was below average. Five fishermen reported that they would be switching to set nets in an

attempt to target Chinook in shallower water. Later, these low initial catches were attributed to a late run of Chinook in 2006. Similarly, the Chinook salmon catches in the Bethel test fishery were roughly 4 to 5 days late (Dull and Sheldon 2007). Additionally, surface water temperatures for the first week in June (measured by the Bethel test fishery) were 2º–3º Celsius below historical averages, and water levels at the USGS gauge station were also fairly high (Doug Bue, Commercial Fisheries Biologist, ADF&G, Bethel; personal communication).

During each year of this study, more than 50% of families surveyed typically went fishing during each of the first 4 weeks of the survey. However, because of the late arrival of Chinook salmon in 2006, no participating fishermen were actively fishing during the first week of the 2006 survey (Dull and Sheldon 2007).

In 2006 the subsistence-fishing schedule was implemented according to the *Kuskokwim River Salmon Rebuilding Management Plan* and was put into effect June 4 from Bogus Creek downstream and June 11 from Chuathbaluk downstream. The subsistence fishing schedule was discontinued on June 18. Subsistence fishing remained open for the remainder of the season with the exception of closed periods 6 hours before, during, and 3 hours after commercial fishing periods. Subsistence harvest was described as good to very good for Chinook, chum, and sockeye salmon and amounts necessary for subsistence use was expected to have been achieved (John Linderman, Commercial Fisheries Biologist, ADF&G, Anchorage; personal communication 9/25/2006).

CONTEMPORARY SUBSISTENCE SALMON FISHING PATTERNS

The use of seasonal fish camps in the Bethel Area to process and preserve salmon has been well documented (Coffing 1991; Kilbuck 1988). The Bethel area fish camps that were the focus of this study were used mainly by people residing in Bethel, Oscarville, or Napaskiak, researchers for this study observed. From June through August, the daily activities of many households revolved around harvesting, processing, and preserving salmon for home use, or subsistence. Families processed and hung their catch to dry at fish camps making traditional style “dryfish” and smoked strips. Smaller amounts of the salmon catch were preserved for the year by freezing or canning. Households not directly involved in catching salmon assisted family and friends with processing and shared in the harvest. Fish camps provided for extended families, and often the youngest to the elders all took part in fish camp activities. This family time together, gathering local food and being out on the land, was considered integral to good health, a sense of well-being, and transmission of local knowledge. The use of family fish camps had been, and remained, an important part of subsistence activities in the area.

Researchers observed that many families either owned or had access to sites in the study area and had inherited the right to occupy them seasonally. Additionally, families used various strategies to participate at fish camp, for example, by sharing camps with others, or using camps after the owners were done for the season. Fish camps were inherited, for example, in the form of Native allotments or other privately-held land. Some river lots were rented for an annual fee from the Bethel Native Corporation. Fish camps were usually made up of a simple fish rack and smoke house made of tree branches, plywood and other lumber and plastic tarps. Numerous other structures included a plywood cabin, outhouse, steam bath, and storage shed. Some long-term fish camps had a larger house that was lived in throughout the summer with a few having solar panels or generators for electricity. Many families spent the majority of the Chinook salmon fishing season and other parts of the summer at fish camp. Other families rotated through in

shifts with different members helping out at different times. Many Bethel families with full time jobs routinely went back and forth to their fish camps to process and tend their fish while it was drying and smoking. If fishermen were not able to take time off from their wage labor often they fished and processed dry fish at camp in the evening after work, returning to Bethel late at night to go to work the next day.

Researchers observed fish camps near Napaskiak were often occupied by large extended families for most of the summer (June–August). People at fish camps near Oscarville and at Napaskiak Slough were of mixed residency, about half from the nearby communities of Oscarville or Napaskiak and half from Bethel. Bethel residents had fish camps wherever they could secure the land and be near a water source. Some fishermen indicated they wanted to be "away from civilization, dust, and chemicals," while others had fish camps "in town" in their own backyards if sufficiently protected from the pervasive windblown road dust in Bethel. The majority of Bethel area fish camps were located along the river for ease of transferring the fish catch from the boat, and because of better drying conditions due to the river breeze reducing flies and dust, and close proximity to water needed to clean the fish. Some people from Napaskiak and Oscarville, who were living in Bethel at the time of the study, went to their families' fish camps near those communities. Researchers noted that Bethel residents generally harvested salmon between the villages of Akiachak and Napaskiak as they usually made good fish catches within this zone without having to travel farther.

Researchers observed that Bethel residents used drift gillnets to harvest the majority of their salmon. A variety of mesh sizes were commonly used depending on what each fisherman owned or could borrow. Mesh sizes typically used for salmon ranged from 8 inches (locally called "king gear") to 6 inches or less. Some people who possessed multiple nets of different sizes rotated between them depending on what species and size of fish they desired to catch and which mesh size was most effective. Set nets were more commonly used to target Chinook salmon, early in the run. This was a more efficient means of fishing when fish were just beginning the upriver migration and were less abundant. Some families fished using only drift or only set nets depending on their financial resources and what worked best for them. Many families employed both methods, tailoring their mesh size, method, and catch to the size and run timing so that they got a specific quantity of each desired species and could process and dry them in a timely manner.

Both drift and set net fishing required costly equipment such as a skiff, boat motor, gas, and gill net; thus, sharing of resources was important for many families, and for some, rod and reel fishing along the river's edge was the only economic option available. Some of the rod and reel fishing occurring during the 6 week study period was at the Bethel sea wall, which is "a popular activity during the summer months and affords people an opportunity to harvest fish for subsistence use without requiring the investment of a boat and motor or a gill net" (Coffing 2001). Rod and reel fishing occurring after the inseason harvest survey, in large part, probably coincided with summer berry picking and late summer-early fall hunting activities (Coffing 2001).

Researchers observed that how long people fished often depended on the size of their families, their fish harvest goals, and success in meeting those goals. For example, fish camps harvesting for extended families fished throughout the run to meet their needs; or at times when the fish returns were low all fishermen usually took longer to meet their catch goals for the year. Fishing for salmon began in spring when weather conditions were likely to be at their best for drying and

smoking salmon. Sometimes, salmon spoiled due to poor weather for drying and due to fly infestations. In these cases families extended their fishing to the very end of the Chinook or sockeye salmon run or make up more of their catch with a larger quantity of coho salmon arriving later in the summer. How much families harvested and preserved was based on their obligations throughout the winter. Salmon were preserved as a main food source to feed the family all year, shared at festivals, holiday gatherings, memorial feasts (see Mather 1985), and sometimes traded for other subsistence goods, such as seal oil from the coast, or moose and caribou meat.

CONCLUSIONS

Each year of this report period from 2006 through 2009, ONC presented 6 inseason subsistence fishing summaries to the Working Group. The ONC inseason fisheries technicians were trained in subsistence data collection and reporting skills for this project and mentored in fisheries management decision-making through participation in these Working Group meetings.

The information gathered by the *Inseason Subsistence Catch Monitoring Program* has become integral to the Working Group process and considered a key element by state and federal area managers in making fisheries management decisions, though it is hard to measure the usefulness or any direct effects of the inseason subsistence reports to the decision-making process of the Working Group. However, these data provide one of the first indications of the relative run strength for Chinook, chum, and sockeye salmon, and are the only data collected during the fishing season which help to characterize subsistence fishing. In addition to providing information regarding salmon availability, fishing effort, qualitative catch rates, and fishermen's perceptions of salmon run timing, this program provided feedback from fishermen regarding the subsistence fishing schedule and subsistence fishing closures around commercial fishing periods. Though the salmon runs in 2006 through 2009 were generally of sufficient abundance to support subsistence and commercial harvest, it was important for the ADF&G fishery managers and the Working Group members to hear the subsistence harvest reports each week because they help paint a more complete picture of the salmon runs than just the inseason abundance indices provided by the Bethel test fishery project. Many Working Group members have commented throughout the meetings that the data provided by the inseason subsistence reports is valuable, helps them to make informed decisions, and that they would like to see similar programs for middle and upper river communities implemented.

The program has also been well-received by the subsistence fishermen interviewed each year. Most participants appreciated the opportunity to provide information that assisted sound management of Kuskokwim River fisheries. This forum provided an excellent opportunity to discuss subsistence fishing issues with fishermen and work collaboratively toward common management goals. The ONC *Inseason Subsistence Catch Monitoring Program* has facilitated these communications by providing an avenue for subsistence fishermen comments and concerns to be heard at inseason management meetings as well as relaying information back to fishermen while conducting weekly surveys at their fish camp. The regular fish camp visits by ONC technicians and the long-term consistency of the *Inseason Subsistence Catch Monitoring Program* has fostered a familiarity among Bethel area subsistence fishermen that allows for ongoing communications between fishermen and managers throughout the Chinook, chum, and sockeye salmon run.

The weekly reporting process resulted in discussions of survey data from the lower Kuskokwim River area, which drew comments from Working Group members and fishermen from the middle and upper river areas where surveys were not conducted. These briefings on harvest success, run timing and health of subsistence salmon caught in the lower river subsistence fishery generated dialog about differences in fish availability (particularly Chinook salmon) in the middle and upper Kuskokwim River. In addition to discussions focused on the success of subsistence fishermen during the month of June, rainy weather influence on fish drying conditions, the abundance of Chinook, chum, and sockeye salmon in the Bethel test fishery, and potential impacts of early commercial fisheries openings on upriver subsistence harvests, subsistence fishermen also discussed among themselves how to ensure that subsistence fish were available for residents all along the length of the Kuskokwim River.

RECOMMENDATIONS

1. A similar inseason subsistence survey program upriver may help to provide a broader range of input from fishermen along the entire length of the Kuskokwim salmon run. This may enhance the inclusion of local knowledge, observations, and concerns throughout the watershed for area managers to consider in their decision making and serve to facilitate dialog between upriver and downriver fishermen, promoting self-management of the subsistence fishery.
2. Additional outreach via local newspaper articles and radio programs to highlight the program activities and accomplishments will enhance public understanding of opportunities for engagement in the fisheries management process. This public media outreach may introduce more area subsistence fishermen to the program who have not been participants in the past.

ACKNOWLEDGEMENTS

We wish to thank the many subsistence fishermen and families who generously volunteer time from their busy fishing schedule to provide the detailed local information that is critical to making inseason management decisions for the Kuskokwim River fisheries. We extend great appreciation and regard for the Kuskokwim River Salmon Management Working Group members many of whom have volunteered years of dedicated service to facilitating this local input and a cooperative management process.

We wish to thank ONC fishery technician, Justin Crow, for his second year on this project and a very successful first year as the project crew leader. His knowledge of families and fish camps in the Bethel area and excellent interviewing skills has greatly facilitated subsistence fishermen involvement in the management process. Thanks to Shannon Royse (ADF&G); Greg Roczicka (ONC); and Pippa Kenner (Office of Subsistence Management) who reviewed this document. Pippa Kenner also contributed a large portion of the historic context information for this report. Special thanks to Greg Roczicka and Bev Hoffman for their valuable input of additional comments by local area subsistence fishermen throughout the project season and for facilitating the sharing of this information via their role as Chair Members of the Kuskokwim River Salmon Management Working Group meetings.

ADF&G and ONC wishes to thank the USFWS, Office of Subsistence Management for providing $47,128 in funding support for this project (06-306) through the Fisheries Resource Monitoring Program, under agreement 701816J619. The ADF&G and ONC provided matching funds for this project.

REFERENCES CITED

Andrew, F. 2008. Paitarkiutenka, my legacy to you. University of Washington Press, Seattle and London, in conjunction with Calista Elders Council and the Anchorage Museum Association.

Bergstrom, D. J., and C. Whitmore. 2004. Kuskokwim River Chinook and chum salmon stock status and action plan. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A04-02, Anchorage.

Carroll, H. C., and N. D. Bradley. 2010. Activities of the Kuskokwim River Salmon Management Working Group, 2009. Alaska Department of Fish and Game, Fishery Management Report No. 10-42, Anchorage.

Carroll, H. C., and E. Patton. 2010. Lower Kuskokwim River inseason subsistence salmon catch monitoring 2008. Alaska Department of Fish and Game, Fishery Management Report No. 10-09, Anchorage.

Coffing, M. W. 1991. Kwethluk Subsistence: contemporary land use patterns, wild resource harvest and use, and the subsistence economy of a Lower Kuskokwim River Area community. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 157, Juneau. http://www.subsistence.adfg.state.ak.us/TechPap/tp157.pdf

Coffing, M. W. 2001. Bethel postseason subsistence fisheries harvest surveys, 2000. U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring Program, final report (Study No. 00-009). Alaska Department of Fish and Game, Division of Subsistence, Juneau.

Dull, B. S., and C. A. Shelden. 2007. Lower Kuskokwim River inseason subsistence salmon catch monitoring, 2006. Alaska Department of Fish and Game, Fishery Management Report No. 07-50, Anchorage.

Estensen, J. L., D. B. Molyneaux, and D. J. Bergstrom. 2009. Kuskokwim River salmon stock status and Kuskokwim area fisheries, 2009: a Report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Special Publication No. 09-21, Anchorage.

Fall, J. A., C. Brown, M. F. Turek, N. Braem, J. J. Simon, A. Russell, W. E. Simeone, D. L. Holen, L. Naves, L. Hutchinson-Scarbrough, T. Lemons, V. Ciccone, T. M. Krieg, and D. Koster. 2009. Alaska subsistence salmon fisheries 2006 annual report. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 344, Juneau.

Fienup-Riordan, A. 1984. Regional groups on the Yukon-Kuskowim Delta. Etudes Inuit Studies 8(2):63-93.

Fienup-Riordan, A. 1986. When our bad season comes: a cultural account of subsistence harvesting and harvest disruption on the Yukon Delta. Alaska Anthropological Association. Anchorage.

Fienup-Riordan, A. 2005. Wise words of the Yup'ik people. Translations from Yup'ik by Alice Rearden. University of Nebraska Press, Lincoln, Nebraska.

Fienup-Riordan, A. 2007. The way we genuinely live Yuungnaqpiallerput: masterworks of Yup'ik science and survival. University of Washington Press, Seattle and London, in conjunction with Calista Elders Council and the Anchorage Museum Association.

Henkelman, J. W., and K. H. Vitt. 1985. Harmonious to dwell: the history of the Alaska Moravian Church 1885–1985. The Moravian Seminary and Archives. Bethel, Alaska.

Kilbuck, J. 1988. The Yup'ik Eskimos as described in the travel journals and ethnographic accounts of John and Edith Kilbuck who served with the Alaska mission of the Moravian church, 1985-1900. Edited by A. Fienup-Riordan. The Limestone Press. Kingston, Ontario.

Krauthoefer, T. 2005. Performance report for Project Number 05-356. Submitted to the FWS, OSM, Fisheries Resources Monitoring Program December 1, 2005. Alaska Department of Fish and Game, Division of Subsistence, Anchorage.

Martz, M., and B. S. Dull. 2006. Lower Kuskokwim River inseason subsistence salmon catch monitoring, 2005. Alaska Department of Fish and Game, Fishery Management Report No. 06-44, Anchorage.

REFERENCES CITED (Continued)

Martz, M., and C. Whitmore. 2005. Lower Kuskokwim River inseason subsistence salmon catch monitoring, 2004. Alaska Department of Fish and Game, Fishery Management Report No. 05-27, Anchorage.

Mather, E. P. 1985. Cauyarnariuq. Lower Kuskokwim School District Bilingual/Bicultural Dept. Bethel, Alaska.

Molyneaux, D. B., A. R. Brodersen, and C. A. Shelden. 2010. Salmon age, sex, and length catalog for the Kuskokwim Area, 2009. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 3A10-05, Anchorage.

Simon, J., T. Krauthoefer, D. Koster, and D. Caylor. 2007. Subsistence salmon harvest monitoring report, Kuskokwim Fisheries Management Area, Alaska, 2004. Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 313. Juneau.

Smith, E. A., and B. S. Dull. 2008. Lower Kuskokwim River inseason subsistence salmon catch monitoring, 2007. Alaska Department of Fish and Game, Fishery Management Report No. 08-75, Anchorage.

Smith, E. A., and J. C. Linderman Jr. 2008. Activities of the Kuskokwim River salmon management working group, 2007. Alaska Department of Fish and Game, Fishery Management Report No. 08-74, Anchorage.

U.S. Census. 2010. http://www.census.gov/main/www/cen2000.html

Whitmore, C., M. Marz, J. C. Linderman Jr., R. L. Fisher, and D. G. Bue. 2008. Annual management report for the subsistence and commercial fisheries of the Kuskokwim area, 2004. Alaska Department of Fish and Game, Fisheries Management Report No. 08-25, Anchorage.

TABLES AND FIGURES

Table 1.–District 1, Kuskokwim River, commercial fishing periods and subsistence closures, 2009.

Period Number	Date	Subdistrict	Length of Commercial Opening (h)	Subsistence Closure Total (h)
1	Jun 23	1-B	4	13
2	Jun 26	1-B	4	13
3	Jul 01	1-B	4	13
4	Jul 11	1-B	4	13
5	Jul 14	1-B	4	13
6	Jul 18	1-B	6	15
7	Jul 28	1-B[a]	4	13
8	Aug 01	1-B[a]	4	13
9	Aug 04	1B[a]	4	13
10	Aug 06	1-B	12	21
11	Aug 08	1-B[a]	4	13
12	Aug 11	1-B[a]	6	15
13	Aug 13	1-B	6	15
14	Aug 16	1-B	6	15
15	Aug 18	1-B[a]	6	15
16	Aug 22	1-B[a]	6	13

[a] Fishing was open 2 hours earlier in Statistical Area 335-11 (Lower Section of Subdistrict 1-B).

Table 2.–Lower Kuskokwim River area subsistence fishermen's qualitative characterizations of their weekly salmon catch rates compared with years past, by number of respondents categorizing their catch rates as: "Very Good", "Normal" and "Poor", 2009.

	Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon		
Survey Week	Interviewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
Jun 1–7	20	6	14	0	4	2	[a]	[a]	[a]	[a]	[a]	[a]
Jun 8–14	43	38	5	11	19	8	0	38	0	0	38	0
Jun 15–21	44	44	0	18	16	10	0	44	0	0	38	6
Jun 22–28	36	31	5	12	17	2	1	24	6	2	22	7
Jun 29–Jul 5	36	5	31	0	5	0	0	5	0	0	5	0
Jul 6–12	36	2	34	0	2	0	0	2	0	0	2	0
Total [b]	215	126	89									
Average	36	21	15									

Note: Table represents responses to the question: "Compared with this time in a 'Normal' year how were catch rates for salmon this week?"

[a] Indicates interviewees declined to comment.

[b] Represents the total number of interviews conducted during the survey year; most families were interviewed more than once.

Table 3.–Lower Kuskokwim River area subsistence fishermen qualitative characterizations of their weekly salmon catch rates compared with years past, by proportion of respondents categorizing their catch rates as: “Very Good”, “Normal” and “Poor”, 2009.

	Number		%	% Describing Chinook Fishing as			% Describing Chum Fishing as			% Describing Sockeye Fishing as		
Survey Week	Interviewed	Fishing	Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
Jun 1–7	20	6	30%	0	67%	33%	[a]	[a]	[a]	[a]	[a]	[a]
Jun 8–14	43	38	88%	29%	50%	21%		100%			100%	
Jun15–21	44	44	100%	41%	36%	23%		100%			100%	
Jun 22–28	36	31	86%	39%	55%	6%	3%	77%	19%	6%	71%	23%
Jun 29–Jul 5	36	5	14%		100%			100%			100%	
Jul 6–12	36	2	1%		100%			100%			100%	
Total [b]	215	126										
Average	36	21										

Note: Table represents responses from the question: “Compared with this time in a ‘Normal’ year how were catch rates for salmon this week?"

[a] Indicates respondents declined to comment.

[b] Represents the total number of interviews conducted during the survey year, most families were interviewed more than once.

Table 4.–Number of Lower Kuskokwim River area subsistence fishermen, by week, that indicated which type of salmon fishing gear they were using, 2009.

Survey Week	Number of Families		Fishing with Only		Using Both		Fishing with Only		Using Both
	Interviewed	Fishing	Driftnet	Setnet	Drift & Setnet	Rod & Reel	> 6" mesh	≤ 6" mesh	>6" and ≤6"
Jun 1–7	20	6	3	1	2	0	6	0	0
Jun 8–14	43	38	31	2	5	0	35	3	0
Jun 15–21	44	44	32	5	7	0	41	3	0
Jun 22–28	36	31	26	2	3	0	25	4	2
Jun 29–Jul 5	36	5	5	0	0	0	3	1	1
Jul 6–12	36	2	2	0	0	1	0	1	1
Total	215	126							
Average	36	21							

Note: Table represents the total number of interviews conducted during the survey year; most families were interviewed more than once.

Table 5.–Number of Lower Kuskokwim River area subsistence fishermen, by week, that indicated their characterization of the salmon run timing (by species) was “Early”, “Normal”, or “Late”, 2009.

Survey Week	Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon		
	Interviewed	Fishing	Not Fishing	Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
Jun 01 - 07	20	6	14	0	4	2	NA	NA	NA	NA	NA	NA
Jun 08 - 14	43	38	5	0	35	3	0	38	0	5	33	0
Jun 15 - 21	44	44	0	0	43	1	0	43	1	0	25	19
Jun 22 - 28	36	31	5	0	29	2	0	24	7	0	20	11
Jun 29 - Jul 05	36	5	31	0	5	0	0	5	0	0	5	0
Jul 06 - 12	36	2	34	0	2	0	0	2	0	0	2	0
Total	215	126	89									
Average	36	21	15									

Note: Table represents the total number of interviews conducted during the survey year; most families were interviewed more than once.
NA Indicates “No Answer” because fishermen declined to respond if it was too early in the run for them to evaluate the question.

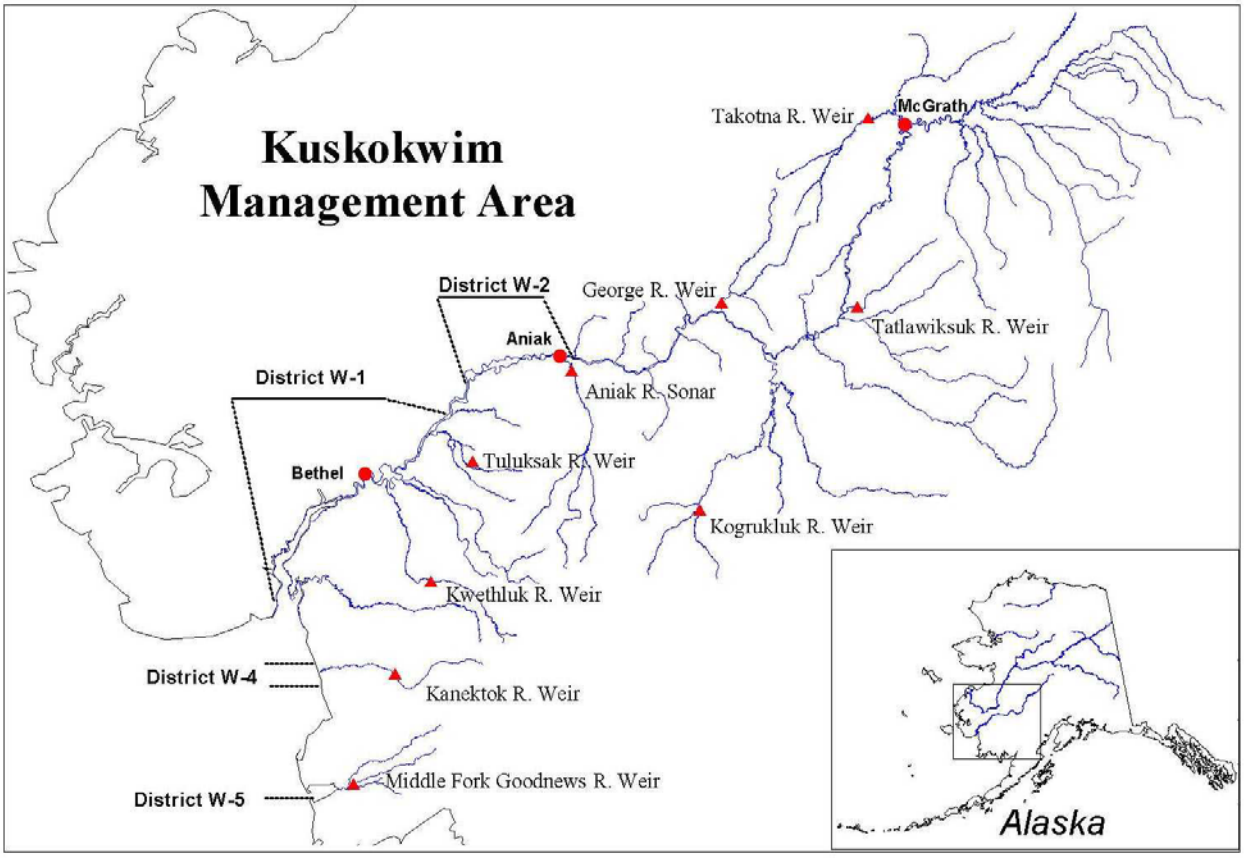
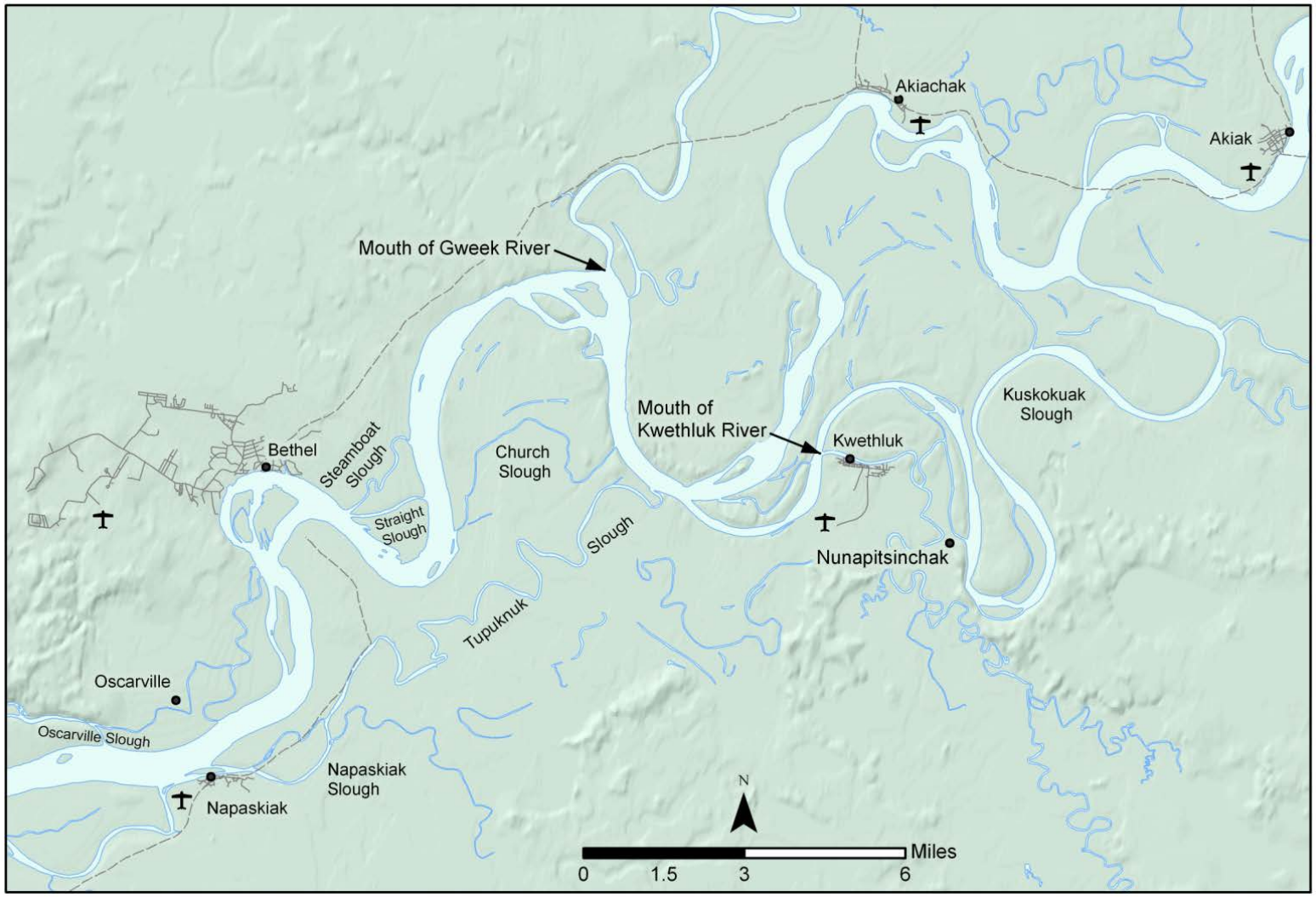
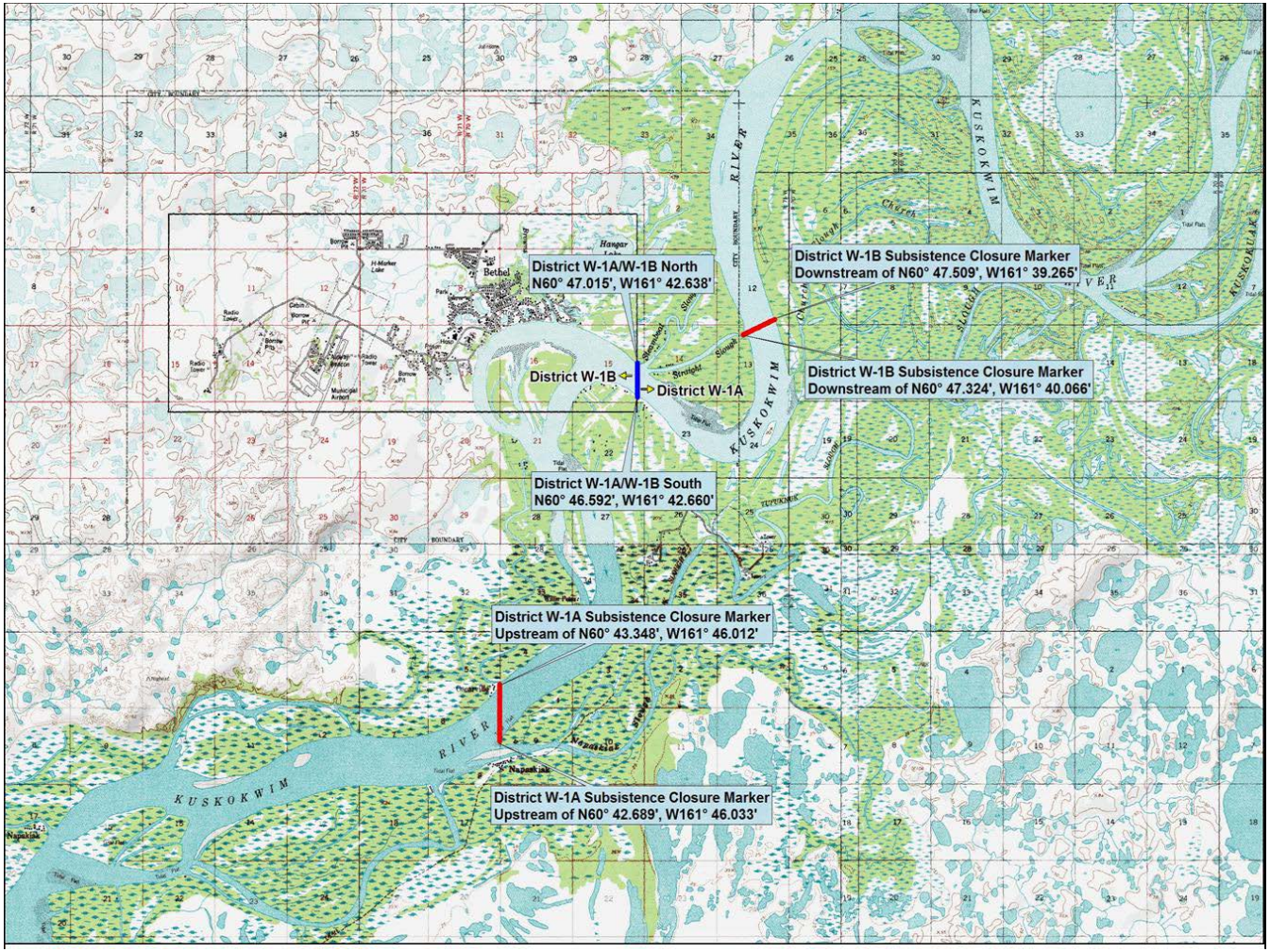


Figure 1.–Kuskokwim management area.



Note: Survey fish camps are located along the main channel of the Kuskokwim River and numerous sloughs located between the mouth of the Gweek River and the village of Napaskiak.

Figure 2.–Inseason subsistence harvest monitoring survey area, 2009.



Note: Bethel Area commercial salmon subdistrict W-1A and W-1B boundary and subsistence salmon fishing closure boundaries during subdistrict W1-A and W-1B commercial openings (ADF&G 2004).
Source: Map not to scale. © 2002 DeLorme (www.delorme.com) 3-D TopoQuads®.

Figure 3.–District W1, Subdistricts W1-A and W1-B boundaries and subsistence salmon fishing closure boundaries of the Kuskokwim River.

APPENDIX A. KUSKOKWIM RIVER SALMON UTILIZATION

Appendix A1.–Historical utilization of Chinook salmon in the Kuskokwim River, 1960–2009.

Year	Commercial Harvest [a]				Subsistence Harvest [b]		Test-Fish Harvest	Sport Fish Harvest	Total Utilization	10-Year Average
	Dist W1	Dist W2	Total	10-yr Ave	Annual	10-yr Ave				
1960	5,969	0	5,969		18,887				24,856	
1961	18,918	0	18,918		28,934				47,852	
1962	15,341	0	15,341		13,582				28,923	
1963	12,016	0	12,016		34,482				46,498	
1964	17,149	0	17,149		29,017				46,166	
1965	21,989	0	21,989		24,697				46,686	
1966	25,545	0	25,545		49,325		285 [c]		75,155	
1967	29,986	0	29,986		59,913		766 [c]		90,665	
1968	34,278	0	34,278		32,942		608 [c]		67,828	
1969	43,997	0	43,997	20,132	40,617	32,420	833 [c]		85,447	52,737
1970	39,290	0	39,290	22,519	69,612	33,240	857 [c]		109,759	56,008
1971	40,274	0	40,274	25,851	43,242	38,312	756 [c]		84,272	64,498
1972	39,454	0	39,454	27,987	40,396	39,743	756 [c]		80,606	68,140
1973	32,838	0	32,838	30,398	39,093	42,424	577 [c]		72,508	73,308
1974	17,711	953	18,664	32,480	27,139	42,885	1,236 [c]		47,039	75,909
1975	20,816	1,319	22,135	32,632	48,448	42,698	704 [c]		71,287	75,997
1976	27,418	3,317	30,735	32,646	58,606	45,073	1,206 [c]		90,547	78,457
1977	31,659	4,171	35,830	33,165	56,580	46,001	1,264 [c]	33	93,707	79,996
1978	43,553	2,088	45,641	33,750	36,270	45,668	1,445 [c]	116	83,472	80,300
1979	36,053	2,913	38,966	34,886	56,283	46,000	979 [c]	74	96,302	81,864
1980	34,184	1,697	35,881	34,383	59,892	47,567	1,033 [c]	162	96,968	82,950
1981	42,392	5,271	47,663	34,042	61,329	46,595	1,218 [c]	189	110,399	81,671
1982	45,449	2,785	48,234	34,781	58,018	48,404	542 [d]	207	107,001	84,284
1983	30,343	2,831	33,174	35,659	47,412	50,166	1,139 [d]	420	82,145	86,923
1984	29,947	1,795	31,742	35,692	56,930	50,998	231 [d]	273	89,176	87,887
1985	36,159	1,730	37,889	37,000	43,874	53,977	79 [d]	85	81,927	92,100
1986	18,510	904	19,414	38,576	51,019	53,519	130 [d]	49	70,612	93,164
1987	33,907	2,272	36,179	37,443	67,325	52,761	384 [d]	355	104,243	91,171
1988	53,810	1,906	55,716	37,478	70,943 [e]	53,835	576 [d]	528	127,763	92,225

-continued-

Appendix A1.–Page 2 of 2.

Year	Commercial Harvest [a] Dist W1	Dist W2	Total	10-yr Ave	Subsistence Harvest [b] Annual	10-yr Ave	Test-Fish Harvest	Sport Fish Harvest	Total Utilization	10-Year Average
1989	41,834	1,383	43,217	38,486	81,175 [f]	57,303	543 [d]	1,218	126,153	96,654
1990	51,883	1,621	53,504	38,911	85,976 [f]	59,792	512 [d]	394	140,386	99,639
1991	36,706	1,072	37,778	40,673	85,556 [f]	62,400	117 [d]	401	123,852	103,981
1992	44,677	2,195	46,872	39,685	64,794 [f]	64,823	1,380 [d]	367	113,413	105,326
1993	8,714	21	8,735	39,549	87,513 [f]	65,500	2,483 [d]	587	99,318	105,967
1994	16,201	10	16,211	37,105	93,243 [f]	69,511	1,937 [d]	1,139	112,530	107,684
1995	28,054	2,792	30,846	35,552	96,435 [f]	73,142	1,421 [d]	541	129,243	110,020
1996	6,972	447	7,419	34,847	78,062 [f]	78,398	247 [d]	1,432	87,160	114,751
1997	10,436	5	10,441	33,648	81,577 [f]	81,102	340 [d]	1,227	93,585	116,406
1998	17,356	3	17,359	31,074	81,264 [f]	82,527	210 [d]	1,434	100,267	115,340
1999	4,705	0	4,705	27,238	73,194 [f]	83,560	98 [d]	252	78,249	112,591
2000	444	0	444	23,387	64,893 [f]	82,761	64 [d]	105	65,506	107,800
2001	90	0	90	18,081	73,610 [f]	80,653	86 [d]	290	74,076	100,312
2002	72	0	72	14,312	66,807 [f]	79,459	288 [d]	319	67,486	95,335
2003	158	0	158	9,632	67,788 [f]	79,660	409 [d]	401	68,756	90,742
2004	2,305	0	2,305	8,775	80,065 [f]	77,687	691 [d]	857	83,918	87,686
2005	4,784	0	4,784	7,384	70,393 [f]	76,370	608 [d]	572	76,357	84,825
2006	2,777	0	2,777	4,778	63,177 [f]	73,765	352 [d]	444	66,750	79,536
2007	179	0	179	4,314	72,097 [f]	72,277	503 [d]	1,397	74,176	77,495
2008	8,865	0	8,865	3,287	98,521 [g]	71,329	420 [d]	708	108,514	75,554
2009	6,664	0	6,664	2,438	78,491 [g]	73,054	470	917	86,542	76,379
2010	2,731	0	2,731	2,634	[h]	73,584	292	[h]	[h]	77,208
10 Yr Ave	2,634	0	2,634	2,634	73,584	76,701	389	601	77,208	87,566
1990s Ave	22,570	817	23,387		82,761	72,075	875	777	107,800	109,170

[a] Districts 1 and 2; also includes harvests in District 3 from 1960 to 1965.

[b] Estimated subsistence harvest expanded from villages surveyed. Includes N. Kuskokwim Bay (all years except 2007), but not S. Kuskokwim Bay

[c] Kwegooyuk Test Fish.

[d] Bethel Test Fish.

[e] Beginning in 1988, estimates based on a new formula. Data since 1988 not comparable with previous years.

[f] Estimates from Simon et al. 2007. Include N. Kuskokwim Bay and S. Kuskokwim Bay.

[g] Numbers reported here are preliminary subsistence harvest estimates generated by the Division of Commercial Fisheries. Methodology to estimate harvest has changed slightly since 2007 with the incorporation of stratified sampling. A comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

[h] Not available at time of publication.

Appendix A2.–Historical utilization of chum salmon in the Kuskokwim River, 1960–2009.

Year	Commercial Harvest[a]				Subsistence Harvest[b]		Test-Fish Harvest		Sport Fish Harvest	Total Utilization	10-Year Average
	Dist W1	Dist W2	Total	10-yr Ave	Annual	10-yr Ave					
1960	0	0	0		301,753 [c]					301,753	
1961	0	0	0		179,529 [c]					179,529	
1962	0	0	0		161,849 [c]					161,849	
1963	0	0	0		137,649 [c]					137,649	
1964	0	0	0		190,191 [c]					190,191	
1965	0	0	0		250,878 [c]					250,878	
1966	0	0	0		175,735 [c]		502	[d,f]		176,237	
1967	148	0	148		208,445 [c]		338	[f]		208,931	
1968	187	0	187		275,008 [c]		562	[f]		275,757	
1969	7,165	0	7,165	37	204,105 [c]	209,004	384	[f]		211,654	209,197
1970	1,664	0	1,664	750	246,810 [c]	208,514	1,139	[d,f]		249,613	209,443
1971	68,914	0	68,914	916	116,391 [c]	203,020	254	[f]		185,559	204,229
1972	78,619	0	78,619	7,808	120,316 [c]	196,706	486	[f]		199,421	204,832
1973	148,746	0	148,746	15,670	179,259 [c]	192,553	675	[f]		328,680	208,589
1974	171,199	688	171,887	30,544	277,170 [c]	196,714	2,021	[f]		451,078	227,692
1975	181,786	2,385	184,171	47,733	176,389 [c]	205,412	1,062	[f]		361,622	253,781
1976	176,727	1,137	177,864	66,150	223,792 [c]	197,963	2,101	[f]		403,757	264,855
1977	232,681	16,040	248,721	83,937	198,355 [c]	202,769	576	[f]	129	447,781	287,607
1978	247,219	1,437	248,656	108,794	118,809 [c]	201,760	2,153	[f]	555	370,173	311,492
1979	258,516	3,358	261,874	133,641	161,239 [c]	186,140	412	[f]	259	423,784	320,934
1980	467,134	16,617	483,751	159,112	165,172 [c]	181,853	2,058	[f]	324	651,305	342,147
1981	410,542	8,135	418,677	207,320	157,306 [c]	173,689	1,793	[f]	598	578,374	382,316
1982	259,254	19,052	278,306	242,297	190,011 [c]	177,781	504	[g]	1125	469,946	421,598
1983	267,936	8,762	276,698	262,265	146,876 [c]	184,750	1,069	[g]	922	425,565	448,650
1984	396,031	27,687	423,718	275,061	142,542 [c]	181,512	1,186	[g]	520	567,966	458,339
1985	191,208	8,270	199,478	300,244	94,750	168,049	616	[g]	150	294,994	470,027
1986	304,201	5,012	309,213	301,774	141,931 [c]	159,885	1,693	[g]	245	453,082	463,365
1987	566,999	7,337	574,336	314,909	70,709	151,699	2,302	[g]	566	647,913	468,297
1988	1,361,982	19,692	1,381,674	347,471	151,967 [e]	138,935	4,379	[g]	764	1,538,784	488,310

-continued-

Appendix A2.–Page 2 of 2.

Year	Commercial Harvest[a] Dist W1	Dist W2	Total	10-yr Ave	Subsistence Harvest[b] Annual		10-yr Ave	Test-Fish Harvest		Sport Fish Harvest	Total Utilization	10-Year Average
1989	728,236	20,946	749,182	460,773	139,672	[h]	142,250	2,082	[g]	2,023	892,959	605,171
1990	439,539	22,085	461,624	509,503	126,509	[h]	140,094	2,107	[g]	533	590,773	652,089
1991	394,334	37,468	431,802	507,291	93,077	[h]	136,227	931	[g]	378	526,188	646,036
1992	333,136	11,467	344,603	508,603	96,491	[h]	129,804	15,330	[g]	608	457,032	640,817
1993	42,718	619	43,337	515,233	59,394	[h]	120,452	8,451	[g]	359	111,541	639,526
1994	269,426	1,689	271,115	491,897	72,022	[h]	111,704	11,998	[g]	1,280	356,415	608,123
1995	588,250	17,668	605,918	476,636	67,861	[h]	104,652	17,473	[g]	226	691,478	586,968
1996	202,827	5,050	207,877	517,280	88,966	[h]	101,963	2,864	[g]	280	299,987	626,617
1997	17,003	23	17,026	507,147	39,987	[h]	96,667	852	[g]	86	57,951	611,307
1998	207,698	111	207,809	451,416	63,537	[h]	93,595	1,140	[g]	291	272,777	552,311
1999	23,006	0	23,006	334,029	43,601	[h]	84,752	562	[g]	180	67,349	425,710
2000	11,570	0	11,570	261,412	51,696	[h]	75,145	1,038	[g]	26	64,330	343,149
2001	1,272	0	1,272	216,406	49,874	[h]	67,663	1,743	[g]	112	53,001	290,505
2002	1,900	0	1,900	173,353	69,019	[h]	63,343	2,666	[g]	53	73,638	243,186
2003	2,764	0	2,764	139,083	43,320	[h]	60,596	1,713	[g]	53	47,850	204,847
2004	20,150	0	20,150	135,026	52,374	[h]	58,988	1,810	[g]	84	74,418	198,478
2005	69,139	0	69,139	109,929	46,777	[h]	57,024	4,459	[g]	500	120,875	170,278
2006	44,070	0	44,070	56,251	64,206	[h]	54,915	3,547	[g]	13	111,836	113,218
2007	10,763	0	10,763	39,871	51,308	[h]	52,439	3,237	[g]	391	65,699	94,402
2008	30,516	0	30,516	39,244	69,039	[i]	53,571	2,473	[g]	121	102,149	95,177
2009	76,790	0	76,790	21,515	43,734	[i]	54,121	2,746		285	123,555	78,114
2010	93,148	0	93,148	26,893		[j]	54,135	2,872		[j]	[j]	83,735
10 Yr Ave	26,893	0	26,893	119,209	54,135		59,780	2,543		164	83,735	183,135
1990s Ave	251,794	9,618	261,412	481,904	75,145		111,991	6,171		422	343,149	598,950

[a] Districts 1 and 2 only; no chum salmon harvests were reported in District 3.

[b] Estimated subsistence harvest expanded from villages surveyed. Includes N. Kuskokwim Bay (all years except 2007), but not S. Kuskokwim Bay

[c] Includes small numbers of small Chinook, sockeye and coho salmon.

[d] Includes small numbers of sockeye salmon.

[e] Beginning in 1988, estimates based on a new formula. Data since 1988 not comparable with previous years.

[f] Kwegooyuk Test Fish.

[g] Bethel Test Fish.

[h] Estimates from Simon et al. 2007. Include N. Kuskokwim Bay and S. Kuskokwim Bay.

[i] Numbers reported here are preliminary subsistence harvest estimates generated by Commercial Fisheries Division. Methodology to estimate harvest has changed slightly since 2007 with the incorporation of stratified sampling. A comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

[j] Not available at time of publication.

Appendix A3.–Historical utilization of sockeye salmon in the Kuskokwim River, 1960–2009.

	Commercial Harvest				Subsistence Harvest		Test Fish	Sport Fish	Total	10-Year
Year	Dist W1	Dist W2	Annual	10-yr Ave	Annual	10-yr Ave	Harvest	Harvest	Utilization	Average
1960	0	0								
1961	0	0								
1962	0	0								
1963	0	0								
1964	0	0								
1965	0	0								
1966	0	0								
1967	0	0								
1968	0	0								
1969	322	0	322						322	
1970	117	0	117	322					117	
1971	2,606	0	2,606	220					2,606	
1972	102	0	102	1,015					102	
1973	369	0	369	787					369	
1974	136	0	136	703					136	
1975	23	0	23	609					23	
1976	2,971	0	2,971	525					2,971	
1977	9,369	10	9,379	831					9,379	
1978	733	0	733	1,781					733	
1979	460	594	1,054	1,676					1,054	1,676
1980	360	0	360	1,749					360	1,749
1981	48,246	129	48,375	1,773					48,375	1,773
1982	31,233	1,921	33,154	6,350					33,154	6,350
1983	67,681	1,174	68,855	9,655				41	68,896	9,655
1984	46,571	2,004	48,575	16,504					48,575	16,508
1985	104,353	2,294	106,647	21,348				72	106,719	21,352
1986	93,175	2,258	95,433	32,010				196	95,629	32,022
1987	134,631	1,971	136,602	41,257				217	136,819	41,287
1988	89,764	2,261	92,025	53,979				291	92,316	54,031

-continued-

Appendix A3.–Page 2 of 2.

	Commercial Harvest				Subsistence Harvest		Test Fish	Sport Fish	Total	10-Year
Year	Dist W1	Dist W2	Annual	10-yr Ave	Annual	10-yr Ave	Harvest	Harvest	Utilization	Average
1989	41,651	1,096	42,747	63,108	35,224 [a]			33	78,004	63,190
1990	82,413	2,457	84,870	67,277	36,274 [a]			61	121,205	70,885
1991	105,420	3,526	108,946	75,728	52,982 [a]			38	161,966	82,969
1992	89,956	2,262	92,218	81,785	32,065 [a]			131	124,414	94,328
1993	27,003	5	27,008	87,692	49,347 [a]			348	76,703	103,454
1994	49,362	3	49,365	83,507	37,159 [a]			359	86,883	104,235
1995	90,026	2,474	92,500	83,586	27,792 [a]			95	120,387	108,066
1996	33,404	474	33,878	82,171	34,214 [a]			315	68,407	109,433
1997	21,988	1	21,989	76,016	40,078 [a]		564	423	63,054	106,710
1998	60,906	0	60,906	64,555	35,426 [a]	38,348		178	96,510	99,334
1999	16,976	0	16,976	61,443	46,677 [a]	38,056		54	63,707	99,753
2000	4,130	0	4,130	58,866	41,783 [a]	39,201		46	45,959	98,323
2001	84	0	84	50,792	50,065 [a]	39,752	510	231	50,890	90,799
2002	84	0	84	39,905	25,499 [a]	39,461	228	42	25,853	79,691
2003	282	0	282	30,692	34,452 [a]	38,804	0	140	34,874	69,835
2004	8,532	0	8,532	28,019	32,433 [a]	37,314	742	400	42,107	65,652
2005	27,645	0	27,645	23,936	34,129 [a]	36,842	1,062	636	63,472	61,175
2006	12,618	0	12,618	17,451	30,226 [a]	37,476	519	231	43,594	55,483
2007	703	0	703	15,325	33,233 [a]	37,077	488	322	34,746	53,002
2008	15,601	0	15,601	13,196	58,182 [b]	36,392	584	273	74,640	50,171
2009	25,673	0	25,673	8,666	35,160 [b]	38,668	515	162	61,510	47,984
2010	22,428	0	22,428	9,535	[c]	37,516	495	[c]	[c]	47,765
10 Yr Ave	9,535	0	9,535	28,685	37,516	38,099	514	248	47,765	67,212
1990s Ave	57,745	1,120	58,866	76,376	39,201	38,202	564	200	98,323	97,917

[a] Estimated subsistence harvest expanded from villages surveyed. Includes N. Kuskokwim Bay (all years except 2007), but not S. Kuskokwim Bay.

[b] Numbers reported here are preliminary subsistence harvest estimates generated by the Division of Commercial Fisheries. Methodology to estimate harvest has changed slightly since 2007 with the incorporation of stratified sampling. A comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

[c] Not available at time of publication.

Appendix A4.–Historical utilization of coho salmon, Kuskokwim River, 1960–2009.

	Commercial Harvest				Subsistence Harvest		Test Fish	Sport Fish	Total	10-Year
Year	Dist W1	Dist W2	Annual	10-yr Ave	Annual	10-Yr Ave	Harvest	Harvest	Utilization	Average
1960	2,498	0	2,498							
1961	5,044	0	5,044							
1962	12,432	0	12,432							
1963	15,660	0	15,660							
1964	28,613	0	28,613							
1965	12,191	0	12,191							
1966	22,985	0	22,985							
1967	56,313	0	56,313							
1968	127,306	0	127,306							
1969	83,765	0	83,765	31,449						
1970	38,601	0	38,601	36,681						
1971	5,253	0	5,253	40,291						
1972	22,579	0	22,579	40,312						
1973	130,876	0	130,876	41,327						
1974	144,851	2,418	147,269	52,848						
1975	81,945	0	81,945	64,714						
1976	87,933	568	88,501	71,689						
1977	237,659	3,705	241,364	78,241						
1978	210,790	2,603	213,393	96,746						
1979	215,430	3,630	219,060	105,355						
1980	219,144	2,868	222,012	118,884						
1981	207,868	3,383	211,251	137,225						
1982	435,357	11,760	447,117	157,825						
1983	195,816	471	196,287	200,279				1,375	197,662	
1984	605,098	18,349	623,447	206,820				1,442	624,889	
1985	329,948	5,658	335,606	254,438				136	335,742	
1986	643,189	16,799	659,988	279,804				1,222	661,210	
1987	385,321	14,146	399,467	336,953				1,767	401,234	
1988	508,417	15,879	524,296	352,763				927	525,223	

-continued-

Appendix A4.–Page 2 of 2.

	Commercial Harvest				Subsistence Harvest		Test Fish	Sport Fish	Total	10-Year
Year	Dist W1	Dist W2	Annual	10-yr Ave	Annual	10-Yr Ave	Harvest	Harvest	Utilization	Average
1989	462,935	16,921	479,856	383,853	52,857 [a]			2,459	535,172	
1990	396,516	13,816	410,332	409,933	44,786 [a]			581	455,699	
1991	486,245	14,690	500,935	428,765	50,369 [a]			1,003	552,307	
1992	631,594	34,576	666,170	457,733	40,167 [a]			1,692	708,029	
1993	586,330	24,409	610,739	479,638	31,737 [a]			980	643,456	499,717
1994	690,396	34,293	724,689	521,084	33,050 [a]			1,925	759,664	544,296
1995	455,269	16,192	471,461	531,208	36,276 [a]			1,497	509,234	557,774
1996	930,119	7,180	937,299	544,793	32,742 [a]			3,423	973,464	575,123
1997	129,601	1,202	130,803	572,524	29,035 [a]		1,118	2,408	163,364	606,348
1998	210,168	313	210,481	545,658	24,864 [a]			2,419	237,764	582,561
1999	23,593	0	23,593	514,277	25,004 [a]	37,588	213	1,998	50,808	553,815
2000	259,703	1,676	261,379	468,650	33,786 [a]	34,803	2,828	1,689	299,682	505,379
2001	192,998	0	192,998	453,755	29,504 [a]	33,703	1,723	1,204	225,429	489,777
2002	83,463	0	83,463	422,961	32,780 [a]	31,617	2,484	2,030	120,757	457,089
2003	284,064	0	284,064	364,691	35,240 [a]	30,878	2,377	3,244	324,925	398,362
2004	435,407	0	435,407	332,023	35,735 [a]	31,228	2,259	4,996	478,397	366,509
2005	142,319	0	142,319	303,095	27,613 [a]	31,497	1,499	3,539	174,970	338,382
2006	185,598	0	185,598	270,181	30,706 [a]	30,630	1,186	1,474	218,964	304,956
2007	141,049	0	141,049	195,011	25,107 [a]	30,427	1,557	2,355	170,068	229,506
2008	142,862	0	142,862	195,875	48,841 [b]	30,034	2,984	3,755	198,442	230,176
2009	104,546	0	104,546	195,875	30,358 [b]	32,432	2,394	3,257	140,555	226,244
2010	58,031	0	58,031	195,875	[c]	32,967	1,020	[c]	[c]	235,219
10 Yr Ave	197,201	168	197,369	320,212	32,967	31,725	2,129	2,754	235,219	354,638
1990s Ave	453,983	14,667	468,650	500,561	34,803	37,588	666	1,793	505,379	559,948

[a] Estimated subsistence harvest expanded from villages surveyed. Includes N. Kuskokwim Bay (all years except 2007), but not S. Kuskokwim Bay

[b] Numbers reported here are preliminary subsistence harvest estimates generated by the Division of Commercial Fisheries. Methodology to estimate harvest has changed slightly since 2007 with the incorporation of stratified sampling. A comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

[c] Not available at time of publication.

APPENDIX B. EXAMPLE OF SURVEY INSTRUMENT

Appendix B1.–Example of Lower Kuskokwim River subsistence salmon fishing survey form.

Family Name: Lastname Firstname Community

Fishcamp Location

Date family started salmon fishing this year (month, day)

Primary Subsistence Salmon Fishing Areas

What are your family's salmon harvest goals this year ? (number of salmon) King _____, (Chinook) Chum _____, Sockeye _____, (" Red ")

		Salmon Fishing Gear Used This Week						Compared with this time in a "NORMAL" year, how were catch rates for salmon this week?									Does the salmon run appear to be running early, late, or normal?								
		Net Type		Mesh ?				King Salmon			Chum Salmon			Sockeye Salmon			King Salmon			Chum Salmon			Sockeye Salmon		
Staff initials	Week Ending	Drift Net	Set Net	6" or Less	More than 6"	Rod Reel	Fish Wheel	Very Good	OK Normal	Poor	Very Good	OK Normal	Poor	Very Good	OK Normal	Poor	Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
	28-May																								
	4-Jun																								
	11-Jun																								
	18-Jun																								
	25-Jun																								
	2-Jul																								
	9-Jul																								
	16-Jul																								
	31-Jul																								

Staff initials	Week Ending	Comments
		Few fish ? Lot of fish ? Weather affecting fishing? Water levels? Size of Fish ? Fish look healthy ? Fishing harder this year ? Drying condidtions? Fishing in more places/areas than usual
	28-May	
	4-Jun	
	11-Jun	
	18-Jun	
	25-Jun	
	2-Jul	
	9-Jul	
	16-Jul	
	31-Jul	

Were your family's salmon harvest goals achieved ? Kings _____, Chum _____, Sockeye_____.

When did your family stop subsistence fishing for: King Salmon_____, (month, day) Chum Salmon_____, (month, day) Sockeye Salmon_____, (month, day)

APPENDIX C. LOWER KUSKOKWIM RIVER INSEASON SUBSISTENCE SALMON CATCH MONITORING WEEKLY REPORTS, 2009

Appendix C1.–Lower Kuskokwim River inseason subsistence salmon harvest weekly report, Orutsararmiut Native Council, June 7, 2009.

Fishing ending the week of June 7, 2009.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Set nets	Both	Gillnets More than 6" mesh	Gillnets 6" mesh or less	Both
20	14	3	1	2	6		

Compared with this time in a normal year, how are catch rates for salmon this week?

Chinook			Chum			Sockeye		
Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
	4	2	N/A	N/A	N/A	N/A	N/A	N/A

Does the salmon run appear to be running early, late, or normal?

Chinook			Chum			Sockeye		
Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
	4	2	N/A	N/A	N/A	N/A	N/A	N/A

Comments: 20 families were surveyed this week starting Thursday June 4. 14 families did not fish this week, of the 14 families that did not fish 12 said they usually wait until the run gets stronger to begin fishing and 2 families were fixing their fish camps after the winter and flood damage. Many families indicated they wait for the run numbers to increase in order to save on boat gas use for their fishing effort. 6 families reported fishing this week. 3 families reported fishing with drift nets. 1 family reported using only a set net. 2 families reported using both set and drift nets. In the beginning of the survey week the inseason harvest monitor/ASL team organized survey forms, put together ASL kits, and prepared the boat for the season. Efforts focused on re-contacting past or previous ASL samplers as families prepare their camps for their harvests for the coming season. There are a few camps with a small amount of fish hanging to dry. Many respondents indicated they expected fishing to pick up to full speed over the coming week. On Sunday, observing the fishing activity on the river from the mouth of Church slough down to Oscarville, there were only 11 set nets, and drifting activity appeared light with only 4 boats fishing at the regular sites. Fishing families noted water levels are a little higher compared to last year with water clarity about average for this time of year.

Chinook: No families reported their Chinook catches as very good. 4 families reported their catches as normal. 2 families reported their catches as poor. Those fishermen with set nets out report their catches picking up dramatically in the past couple days with an average catch of 15 overnight. Drifters reported catching one or two per couple drifts and commented that they will wait until the run picks up for better catch rates. Two fishermen report their catches as smaller on average for first catches but expect a strong return of Chinook this year. 4 families reported the salmon run timing as normal. 2 fishermen report compared to on average over prior years the run appears to be late.

Chum: Still too early in the season to assess the run. N/A indicates not asked specifically at this time due to it being too early for the question to be relevant to fishing families.

Sockeye: N/A indicates not asked specifically at this time, as it is too early for the question to be relevant to fishing families.

Appendix C2.–Lower Kuskokwim River inseason subsistence salmon harvest weekly report, Orutsararmiut Native Council, June 14, 2009.

Fishing ending the week of June 14, 2009.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Gillnets More than 6" mesh	Gillnets 6" mesh or less	Both
43	5	31	2	5	35	3	0

Compared with this time in a normal year, how are catch rates for salmon this week?

Chinook			Chum			Sockeye		
Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
11	19	8	0	38	0	0	38	0

Does the salmon run appear to be running early, late, or normal?

Chinook			Chum			Sockeye		
Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
0	35	3	0	38	0	5	33	0

Comments: This week the inseason crew had distributed a total of 28 ASL sampling kits, with many repeat samplers from previous years and a handful of new samplers this year. 43 families were surveyed this week for the inseason subsistence monitoring program. 38 families reported fishing this week. 5 families did not fish this week. 31 families reported fishing with drift nets. 2 families reported using only set nets. 5 families reported using both set and drift nets. Half of the families surveyed this week have been fishing towards their harvest goals for Chinook this week. Some families are just beginning their fishing after fixing and cleaning fish camp from the winter flooding or waiting for better weather and higher fish catches. Observing the fishing activity on the river from the upper mouth of Church slough down to Oscarville, there were 31 set nets, and drifting activity has been increasing at the regular fishing sites. Some fisherman noted the river was very busy with fishermen over the weekend and a few shared instances of corking (dropping a net in front of another fishermen's drift). These fishermen indicated the corking was unusual and people were normally respectful of others fishing.

A couple fishermen interviewed noted that the Chinook salmon are in good condition, robust with a good layer of fat under the skin. Several families said they try to get fish put up early as possible, when the wind conditions are good for drying and the flies have not yet fully emerged. A couple families indicated that the flood left a layer of silt in their fish camps, which was problematic because it was blowing up into their drying fish.

Chinook: 11 families reported their Chinook catches as very good. 19 families reported their catches as normal. 8 families reported their catches as poor. 5 families that have not started their Chinook harvests are just finishing up their repairs on their camps. 8 families reported their catches as smaller on average with a higher number of males in their catch with the kings passing right through. One fisherman switched out their 8" mesh to a smaller mesh cause the fish were hitting but getting away. 16 families reported on Saturday that the larger and more female fish are just starting to be caught. 1 family reported their Chinook harvest goal is complete and it's all in the smoke house.

-continued-

No families reported the run return as early. 35 families reported the salmon run timing as normal. 3 families report the run to be late compared to previous years.

Chum: No families reported their chum catches as very good. 38 families reported their catches as normal. No families reported their chum catches as poor. The majority of families are still using their Chinook gear and assessments made on the chum run are a reflection of by-catch rates compared to a normal year. No families reported the run return as early. 38 families report the salmon run timing as normal. No families report the run to be late compared to previous years.

Sockeye: No families reported their sockeye catches as very good. 38 families reported their catches as normal. No families reported their sockeye catches as poor. The majority of families are still using their Chinook gear and assessments made on the sockeye run are a reflection of by-catch rates compared to a normal year. 5 families reported the run return as early. 33 families report the salmon run timing as normal. No families report the run to be late compared to previous years.

Appendix C3.–Lower Kuskokwim River inseason subsistence salmon harvest weekly report, Orutsararmiut Native Council, June 21, 2009.

Fishing ending the week of June 21, 2009.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Gillnets More than 6" mesh	Gillnets 6" mesh or less	Both
44	0	32	5	7	41	3	0

Compared with this time in a normal year, how are catch rates for salmon this week?

Chinook			Chum			Sockeye		
Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
18	16	10	0	44	0	0	38	6

Does the salmon run appear to be running early, late, or normal?

Chinook			Chum			Sockeye		
Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
0	43	1	0	43	1	0	25	19

Comments: This week the ONC subsistence monitoring technicians interviewed 44 families. 32 families (73%) reported using drift nets. 5 families (11%) reported using only a set net. 7 families (16%) reported using both drift and set nets. 41 fishermen (93%) reported using more than 6-inch mesh and 3 families (7%) reported using 6-inch or less mesh this week. 6 families reported just starting this week. 6 families on the survey route were complete with their Chinook salmon harvests. 10 families reported being close to their harvest goals for Chinook this season. This week has been very busy for subsistence fishermen as families work to finish putting up king salmon for the winter. So far no families reported any loss to souring fish, and some families commented the winds have been good for drying fish. A couple people commented that the kings had good high oil content this year. The families that are finished or finishing up with their king harvest said they would soon switch to using smaller mesh nets to start to fish specifically for chum and sockeye.

Chinook: 18 families (41%) reported the fishing as very good. 16 families (36%) reported the fishing as normal. 10 families (23%) reported the fishing as poor. 43 families (98%) reported the run timing was normal and 1 family (2%) reported the run appeared to be late. The families interviewed were happy the big kings were starting to pick up since last week. 13 families reported the larger Chinook are finally here. It was noted by fishermen that fishing at the night tide has better catch rates than the morning tide.

Chum: No families report the fishing as very good. 44 families (100%) reported the fishing as normal. No families report the fishing as poor. 43 families (98%) reported chum run timing as normal. 1 family (2%) reported chum run timing as late. Most fishermen surveyed are still using larger mesh Chinook gear and report their chum catches as bycatch in comparison to previous years.

Sockeye: No families reported their sockeye catches as very good. 38 families (86%) reported the fishing as normal. 6 families (14%) reported the fishing as poor. Most fishermen were using larger mesh Chinook gear and reported their sockeye catches as bycatch in comparison to previous years. No families reported fishing as early. 25 families (57%) reported the run timing as normal and 19 families (43%) reported the run as late. Those fishermen who reported the sockeye run appeared to be late also expressed some concern about the delay.

Appendix C4.–Lower Kuskokwim River inseason subsistence salmon harvest weekly report, Orutsararmiut Native Council, June 28, 2009.

Fishing ending the week of June 28, 2009.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Rod & Reel	Gillnets More than 6" mesh	Gillnets 6" mesh Or less	Both
36	5	26	2	3	0	25	4	2

Compared with this time in a normal year, how are catch rates for salmon this week?

Chinook			Chum			Sockeye		
Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
12	17	2	1	24	6	2	22	7

Does the salmon run appear to be running early, late, or normal?

Chinook			Chum			Sockeye		
Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
0	29	2	0	24	7	0	20	11

Comments: 36 families were interviewed this week for the ONC inseason subsistence program. Of the families contacted 31 families reported fishing this week and 5 families reported not fishing this week. 26 families (84%) reported using drift nets. 2 families (6%) reported using only a set net. 3 families (10%) reported using both drift and set nets. No families reported using rod and reel. 25 families (81%) reported using greater than 6-inch mesh. 4 families (13%) reported using 6-inch mesh or less. And 2 families (6%) reported using both.

Subsistence fishing was closed at and below Bethel on Friday June 26th from 7 a.m. to 8 p.m. around a scheduled 4 hour commercial fishery opening that day.

Chinook: 12 families (34%) reported the fishing as very good. 17 families (55%) reported the fishing as normal. 2 families (6%) reported the fishing as poor. No families reported the Chinook run being early. 29 families (94%) reported the run being normal and 2 families (6%) reported the run being late. Many of the families interviewed reported that the King run had very good catches with many large females compared to past years.

Chum: 1 family (3%) reported the fishing as very good. 24 families (77%) reported the fishing as normal. 6 families (19%) reported the fishing as poor. No families reported the chum run being early. 24 families (77%) reported the run as normal and 7 families (23%) reported run as late.

Sockeye: 2 families (6%) reported the fishing as very good. 22 families (71%) reported the fishing as normal. 7 families (23%) reported the fishing as poor. No families reported the run as early. 20 families (65%) reported the run as normal and 11 families (35%) reported the run as late.

Appendix C5.–Lower Kuskokwim River inseason subsistence salmon harvest weekly report, Orutsararmiut Native Council, July 5, 2009.

Fishing ending the week of July 5, 2009.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Rod & Reel	Gillnets More than 6" mesh	Gillnets 6" mesh Or less	Both
36	31	5	0	0	0	3	1	1

Compared with this time in a normal year, how are catch rates for salmon this week?

Chinook			Chum			Sockeye		
Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
0	5	0	0	5	0	0	5	0

Comments: Of the 36 families contacted; 5 (14%) families reported fishing this week. 5 (100%) families reported using drift nets. No families reported using only setnets. No families reported using both drift and setnets. 3 (60%) families reported using gillnets with greater than 6" mesh. 1 (20%) family reported using gillnets with 6" mesh or less. 1 (20%) family reported using both larger and smaller than 6" mesh. 31 (86%) families reported they are all finished with their harvests of Chinook, Chum, and Sockeye harvests for the season. This week families have been finishing up their salmon harvest goals. 3 (60%) families plan to go out a couple more time for freezer fish, then they expect to be finished for the year.

Chinook: No families reported the fishing as very good. 5 (100%) families reported the fishing as normal. No families reported the fishing as poor. Out of all the families surveyed, Only 2 (40%) families are still trying to meet their harvest goals because they had a late start. However, they also said it was a good strong year and there not worried about reaching their harvest goal.

Chum: No families reported the fishing as very good. 5 (100%) families reported the fishing as normal. No families reported the fishing as poor. Those families that fished with Chinook drift gear reported fewer chums as by catch compared to previous years.

Sockeye: No families reported the fishing as very good. 5 (100%) families reported the fishing as normal. No families reported the fishing as poor. Fishermen noted that the sockeye run was about the same as last year, in by catch rates. Most families didn't even have to switch their gear to smaller mesh because they caught the Sockeye they needed when fishing with Chinook gear.

Appendix C6.–Lower Kuskokwim River inseason subsistence salmon harvest weekly report, Orutsararmiut Native Council, July 13, 2009.

Fishing ending the week of July 12, 2009.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Rod & Reel	Gillnets More than 6" mesh	Gillnets 6" mesh Or less	Both
36	34	2	0	0	1	0	1	1

Compared with this time in a normal year, how are catch rates for salmon this week?

Chinook			Chum			Sockeye		
Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
0	2	0	0	2	0	0	2	0

Comments: Of the 36 families contacted; 2 families reported fishing this week. 2 families reported using drift nets. No families reported using only setnets. No families reported using both drift and setnets. 1 family reported using Rod and Reel. 1 family reported using gillnets with 6" mesh or less. 1 family reported using both larger and smaller than 6" mesh. All 36 families reported they are all finished with their harvests of Chinook, Chum, and Sockeye harvests for the season. The families that started late reported it being easy to achieve their goal even with the late start. 2 families plan to go out fishing until they get what they need for their dogs. One family plans to go rod & reeling if the weather is good next week, as they had ok catches fishing this past weekend. The fisherman noted this was an excellent year for drying the fish, as it was not a rainy season like last year.

Chinook: No families reported the fishing as very good. 2 families reported the fishing as normal. No families reported the fishing as poor. All families on our survey list are complete with their Chinook harvests. Overall, the run of Chinook this year was an average year noted by many fishermen. Many of the catches made by fisherman were large Chinook, which made it easier to reach their goal because they didn't need to put up as much.

Chum: No family reported the fishing as very good. 2 families reported the fishing as normal. No families reported the fishing as poor. Those families that are fishing for dog food said their catch rate in their smaller mesh gear has a high abundance of chum. 2 families reported their chum catches are starting to show color, an indication that the run is ending.

Sockeye: No families reported the fishing as very good. 2 families reported the fishing as normal. No families reported the fishing as poor. All families on our survey list are complete with their sockeye harvests. Some fishermen noted that this was a below average year for sockeye, taking some extra effort to catch, but they still caught the amount needed for their subsistence harvest goal.

APPENDIX D. LOWER KUSKOKWIM RIVER SUBSISTENCE CATCH MONITORING HISTORICAL INFORMATION PRESENTED AT KUSKOKWIM RIVER SALMON MANAGEMENT WORKING GROUP MEETINGS

Appendix D1.–Lower Kuskokwim River area subsistence fishermen's qualitative characterizations of their weekly salmon catch rates, by species, compared with years past, by number of respondents categorizing their catch rates as: "Very Good", "Normal" and "Poor", 2001–2009.

Summary of Subsistence Salmon Information Collected by ONC Technicians [a]																
		Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon			Coho Salmon		
Year	Week Ending	Interviewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2001	Jun 09	16	16	0	6	6	4									
	Jun 16	39	ND	ND	18	15	6	1	19	15	13	24	1			
	Jun 23	35	ND	ND	27	7	1	0	15	20	24	11	0	0	0	0
	Jun 30	40	25	15	8	7	8	5	12	8	19	6	0	0	0	0
	Jul 07	44	7	37	0	1	5	4	1	1	0	5	2	0	0	0
	Jul 14	44	6	38	0	0	4	4	2	0	0	0	4	0	0	0
	Jul 21	44	0	44	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Jul 28	44	9	35	0	0	0	1	7	0	0	0	0	0	7	1
	Aug 04	42	20	22				0	1	17				18	2	0
	Aug 11	37	3	34				0	0	0				2	1	0
	Aug 18	37	3	34				0	0	3				1	2	0
	Aug 25	37	3	34				0	0	3				3	0	0
Total [b]		459														
Average		38	9	29	8	5	4	2	6	7	9	8	1	3	1	0
2002	Jun 08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Jun 15	27	23	4	21	2	0	3	8	7	3	11	3			
	Jun 22	33	25	8	17	5	3	12	9	3	2	10	10			
	Jun 29	34	22	12	16	6	0	21	0	0	0	3	16			
	Jul 06	34	5	29	0	2	3	3	2	0	0	0	5			
	Jul 13	36	10	26	0	3	5	8	0	0	0	0	8	0	0	0
	Jul 20	40	9	31	0	9	0	1	7	1	0	0	9	0	0	0
	Jul 27	35	31	4	0	31	0	0	31	0	0	31	0	9	22	0
	Aug 03	37	13	24	0	0	0	0	10	2	0	0	0	9	4	0
	Aug 10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total [b]		276														
Average		35	17	17	7	7	1	6	8	2	1	7	6	5	7	0
2003	Jun 07	18	9	9	7	2	0									
	Jun 14	33	24	9	22	2	0	0	2	0	0	3	0			

-continued-

Appendix D1.–Page 2 of 4.

Year	Week Ending	Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon			Coho Salmon		
		Interviewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2003	Jun 21	48	32	14	30	2	1	1	0	0	7	18	3			
	Jun 28	50	34	16	30	4	0	3	9	13	27	7	0			
	Jul 05	45	21	24	16	5	0	8	13	0	16	5	0			
	Jul 12	46	14	32	0	12	2	13	1	0	0	12	2			
	Jul 19	48	5	43	0	5	0	5	0	0	0	5	0	2	3	0
	Jul 26	48	7	41	0	7	0	4	3	0	0	7	0	6	1	0
	Aug 09	49	11	38	0	0	0	0	0	0	0	0	0	10	1	0
	Aug 16	48	10	38	0	0	0	0	0	0	0	0	0	9	1	0
Total [b]		433														
Average		43	17	26	11	4	0	4	3	1	6	6	1	7	2	0
2004	Jun 05	31	10	21	6	4	0									
	Jun 12	41	37	4	27	8	2									
	Jun 19	35	31	4	23	8	0	4	27	0	4	27	0			
	Jun 26	43	31	12	19	12	0	24	7	0	5	22	4			
	Jul 03	44	22	22	3	17	0	10	10	0	0	13	7			
	Jul 10	44	13	31	0	10	0	8	2	0	0	4	6			
	Jul 17	35	6	29	0	6	0	0	6	0	0	6	0	0	6	0
	Jul 24	46	8	38										0	8	0
	Jul 31	47	7	40										7	0	0
	Aug 07	58	22	36										19	3	0
	Aug 14	44	16	28										16	0	0
	Aug 21	52	8	44										8	0	0
Total [b]		520														
Average		43	18	26	11	9	0	9	10	0	2	14	3	8	3	0
2005	Jun 04	34	12	22	0	12	0									
	Jun 11	39	26	13	20	6	0									
	Jun 18	48	42	6	36	6	0	14	28	0	31	11	0			
	Jun 25	48	34	14	25	5	0	19	15	0	28	6	0			
	Jul 02	32	3	29	3	0	0	2	1	0	3	0	0			

-continued-

Appendix D1.–Page 3 of 4.

Year	Week Ending	Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon			Coho Salmon		
		Interviewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2005	9 Jul	22	2	20	0	2	0	1	1	0	1	1	0			
Total [b]		223														
Average		37	20	17	14	5	0	9	11	0	16	5	0	ND	ND	ND
2006	3 Jun	22	0	22	0	0	0									
	10 Jun	32	19	13	6	13	0	0	0	0						
	17 Jun	36	30	6	28	2	0	18	12	0	16	14	0			
	24 Jun	48	43	5	34	9	0	39	4	0	8	24	11			
	1 Jul	46	14	32	3	11	0	10	4	0	6	8	0			
	8 Jul	38	8	30	0	8	0	2	6	0	3	5	0			
	15 Jul	26	5	21	0	5	0	5	0	0	0	5	0			
Total [b]		248														
Average		35	17	18	10	7	0	12	4	0	7	11	2	ND	ND	ND
2007	3 Jun	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
	12 Jun	39	28	11	0	8	20	[d]	[d]	[d]	[d]	[d]	[d]			
	17 Jun	40	33	7	0	10	23	[d]	[d]	[d]	[d]	[d]	[d]			
	24 Jun	44	40	4	0	14	26	[d]	[d]	[d]	[d]	[d]	[d]			
	2 Jul	36	20	12	9	9	2	16	4	0	0	8	12			
	8 Jul	33	10	23	6	4	0	8	2	0	3	7	0			
	14 Jul	33	6	27	0	0	6	0	2	4	0	1	5			
Total [b]		225														
Average		38	23	14	3	8	13	8	3	1	1	5	6	ND	ND	ND
2008	8 Jun	27	5	22	1	3	0	[c]	[c]	[c]	[c]	[c]	[c]			
	15 Jun	34	17	17	0	13	4	0	17	0	0	17	0			
	22 Jun	32	27	5	15	12	0	0	20	7	22	5	0			
	29 Jun	33	27	6	14	13	0	4	23	0	15	12	0			
	06 Jul	35	15	20	3	12	0	0	15	0	7	8	0			
	13 Jul	32	3	29	0	3	0	1	2	0	0	3	0			
Total [b]		193														
Average		32	16	17	6	9	1	1	15	1	9	9	0			

-continued-

Appendix D1.–Page 4 of 4.

		Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon			Coho Salmon		
Year	Week Ending	Interviewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2009	7 Jun	20	6	14	0	4	2	[c]	[c]	[c]	[c]	[c]	[c]			
	14 Jun	43	38	5	11	19	8	0	38	0	0	38	0			
	21 Jun	44	44	0	18	16	10	0	44	0	0	38	6			
	28 Jun	36	31	5	12	17	2	1	24	6	2	22	7			
	5 Jul	36	5	31	0	5	0	0	5	0	0	5	0			
	12 Jul	36	2	34	0	2	0	0	2	0	0	2	0			
Total [b]		215														
Average		36	21	15	7	11	4	0	23	1	0	21	3	ND	ND	ND

[a] Represents responses from the question "Compared with this time in a "Normal" year how were catch rates for salmon this week?"

[b] Represents the total number of interviews conducted during the survey year; most families were interviewed more than once.

[c] Indicates interviewees declined to comment.

Appendix D2.–Lower Kuskokwim River area subsistence fishermen's qualitative characterizations of their weekly salmon catch rates, by species, compared with years past, by proportion of respondents categorizing their catch rates as: "Very Good", "Normal" and "Poor", 2001–2009.

Summary of Subsistence Salmon Information Collected by ONC Technicians [a]																
					% Describing Chinook fishing as			% Describing Chum fishing as			% Describing Sockeye fishing as			% Describing Coho fishing as		
Year	Week Ending	Number Interviewed	Fishing	Percent Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2001	Jun 09	16	16	100%	38%	38%	25%									
	Jun 16	39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
	Jun 23	35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Jun 30	40	25	63%	32%	28%	32%	20%	48%	32%	76%	24%	0%	0%	0%	0%
	Jul 07	44	7	16%	0%	14%	71%	57%	14%	14%	0%	71%	29%	0%	0%	0%
	Jul 14	44	6	14%	0%	0%	67%	67%	33%	0%	0%	0%	67%	0%	0%	0%
	Jul 21	44	0	0%	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Jul 28	44	9	20%	0%	0%	0%	11%	78%	0%	0%	0%	0%	0%	78%	11%
	Aug 04	42	20	48%				0%	5%	85%				90%	10%	0%
	Aug 11	37	3	8%				0%	0%	0%				67%	33%	0%
	Aug 18	37	3	8%				0%	0%	100%				33%	67%	0%
	Aug 25	37	3	8%				0%	0%	100%				100%	0%	0%
Total [b]		459														
Average		38	9													
2002	Jun 08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Jun 15	27	23	85%	91%	9%	0%	13%	35%	30%	13%	48%	13%			
	Jun 22	33	25	76%	68%	20%	12%	48%	36%	12%	8%	40%	40%			
	Jun 29	34	22	65%	73%	27%	0%	95%	0%	0%	0%	14%	73%			
	Jul 06	34	5	15%	0%	40%	60%	60%	40%	0%	0%	0%	100%			
	Jul 13	36	10	28%	0%	30%	50%	80%	0%	0%	0%	0%	80%	0%	0%	0%
	Jul 20	40	9	23%	0%	100%	0%	11%	78%	11%	0%	0%	100%	0%	0%	0%
	Jul 27	35	31	89%	0%	100%	0%	0%	100%	0%	0%	100%	0%	29%	71%	0%
	Aug 03	37	13	35%	0%	0%	0%	0%	77%	15%	0%	0%	0%	69%	31%	0%
	Aug 10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total [b]		276														
Average		35	17													
2003	Jun 07	18	9	50%	78%	22%	0%									
	Jun 14	33	24	73%	92%	8%	0%	0%	8%	0%	0%	13%	0%			

-continued-

Appendix D2.–Page 2 of 4.

Year	Week Ending	Number Interviewed	Fishing	Percent Fishing	% Describing Chinook fishing as Very Good	Normal	Poor	% Describing Chum fishing as Very Good	Normal	Poor	% Describing Sockeye fishing as Very Good	Normal	Poor	% Describing Coho fishing as Very Good	Normal	Poor
2003	Jun 21	48	32	67%	94%	6%	3%	3%	0%	0%	22%	56%	9%			
	Jun 28	50	34	68%	88%	12%	0%	9%	26%	38%	79%	21%	0%			
	Jul 05	45	21	47%	76%	24%	0%	38%	62%	0%	76%	24%	0%			
	Jul 12	46	14	30%	0%	86%	14%	93%	7%	0%	0%	86%	14%			
	Jul 19	48	5	10%	0%	100%	0%	100%	0%	0%	0%	100%	0%	40%	60%	0%
	Jul 26	48	7	15%	0%	100%	0%	57%	43%	0%	0%	100%	0%	86%	14%	0%
	Aug 09	49	11	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	91%	9%	0%
	Aug 16	48	10	21%	0%	0%	0%	0%	0%	0%	0%	0%	0%	90%	10%	0%
Total [b]		433														
Average		43	17	0												
2004	Jun 05	31	10	32%	60%	40%	0%									
	Jun 12	41	37	90%	73%	22%	5%									
	Jun 19	35	31	89%	74%	26%	0%	13%	87%	0%	13%	87%	0%			
	Jun 26	43	31	72%	61%	39%	0%	77%	23%	0%	16%	71%	13%			
	Jul 03	44	22	50%	14%	77%	0%	45%	45%	0%	0%	59%	32%			
	Jul 10	44	13	30%	0%	77%	0%	62%	15%	0%	0%	31%	46%			
	Jul 17	35	6	17%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
	Jul 24	46	8	17%										0%	100%	0%
	Jul 31	47	7	15%										100%	0%	0%
	Aug 07	58	22	38%										86%	14%	0%
	Aug 14	44	16	36%										100%	0%	0%
	Aug 21	52	8	15%										100%	0%	0%
Total [b]		520														
Average		43	18	0												
2005	Jun 04	34	12	35%	0%	100%	0%									
	Jun 11	39	26	67%	77%	23%	0%									
	Jun 18	48	42	88%	86%	14%	0%	33%	67%	0%	74%	26%	0%			
	Jun 25	48	34	71%	74%	15%	0%	56%	44%	0%	82%	18%	0%			

-continued-

Appendix D2.–Page 3 of 4.

Year	Week Ending	Number Interviewed	Fishing	Percent Fishing	% Describing Chinook fishing as			% Describing Chum fishing as			% Describing Sockeye fishing as			% Describing Coho fishing as		
					Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2005	2 Jul	32	3	9%	100%	0%	0%	67%	33%	0%	100%	0%	0%			
	9 Jul	22	2	9%	0%	100%	0%	50%	50%	0%	50%	50%	0%			
Total [b]		223														
Average		37	20	0												
2006	3 Jun	22	0	0%	0%	0%	0%									
	10 Jun	32	19	59%	32%	68%	0%	0%	0%	0%						
	17 Jun	36	30	83%	93%	7%	0%	60%	40%	0%	53%	47%	0%			
	24 Jun	48	43	90%	79%	21%	0%	91%	9%	0%	19%	56%	25%			
	1 Jul	46	14	30%	21%	79%	0%	71%	29%	0%	43%	57%	0%			
	8 Jul	38	8	21%	0%	100%	0%	25%	75%	0%	38%	62%	0%			
	15 Jul	26	5	19%	0%	100%	0%	100%	0%	0%	0%	100%	0%			
Total [b]		248														
Average		35	17													
2007	3 Jun															
	12 Jun	39	28	59%	0%	29%	71%									
	17 Jun	40	33	83%	0%	30%	70%									
	24 Jun	44	40	91%	0%	35%	65%									
	2 Jul	36	20	56%	45%	45%	10%	80%	20%	0%	0%	40%	60%			
	8 Jul	33	10	30%	60%	40%	0%	80%	20%	0%	30%	70%	0%			
	14 Jul	33	6	18%	0%	0%	100%	0%	33%	67%	0%	17%	83%			
Total [b]		225														
Average		38	23													
2008	8 Jun	27	5	19%	20%	60%	0%									
	15 Jun	34	17	50%	0%	76%	24%	0%	100%	0%	0%	100%	0%			
	22 Jun	32	27	84%	56%	44%	0%	0%	74%	26%	81%	19%	0%			
	29 Jun	33	27	82%	52%	48%	0%	15%	85%	0%	56%	44%	0%			
	6 Jul	35	15	43%	20%	80%	0%	0%	100%	0%	47%	53%	0%			
	13 Jul	32	3	9%	0%	100%	0%	33%	67%	0%	0%	100%	0%			
Total [b]		193														
Average		32	16													

-continued-

Year	Week Ending	Number Interviewed	Fishing	Percent Fishing	% Describing Chinook fishing as Very Good	Normal	Poor	% Describing Chum fishing as Very Good	Normal	Poor	% Describing Sockeye fishing as Very Good	Normal	Poor	% Describing Coho fishing as Very Good	Normal	Poor
2009	7-Jun	20	6	30%	0%	67%	33%	NA	NA	NA	NA	NA	NA	NA	NA	NA
	14-Jun	43	38	88%	29%	50%	21%	0%	100%	0%	0%	100%	0%			
	21-Jun	44	44	100%	41%	36%	23%	0%	100%	0%	0%	86%	14%			
	28-Jun	36	31	86%	39%	54%	3%	3%	77%	19%	6%	71%	23%			
	5-Jul	36	5	14%	0%	100%	0%	0%	100%	0%	0%	100%	0%			
	12-Jul	36	2	1%	0%	100%	0%	0%	100%	0%	0%	100%	0%			
Total [b]		215	126													
Average		36	21													

Notes: NA indicates "No Answer" as it is too early in the run for fishermen to evaluate or "Not Asked" for coho which arrive after the current inseason survey program ends.

[a] Represents responses from the question "Compared with this time in a "Normal" year, how were catch rates for salmon this week?"

[b] Represents the total number of interviews conducted during the survey year; most families were interviewed more than once.