Fishery Management Report No. 12-34

Inseason Subsistence Salmon Catch Monitoring, Lower Kuskokwim River, 2010

Annual Report for Study 10-354
USFWS Office of Subsistence Management
Fisheries Resource Monitoring Program

by

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and

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October 2012

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

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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October 2012

Development and publication of this manuscript were partially financed by the US Fish and Wildlife Service, Office of Subsistence Management (Project No. 10-354), Fisheries Resource Monitoring Program, under agreement #70181AJO38.

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.

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This document should be cited as:
Patton, E., and H. C. Carroll. 2012. Inseason subsistence salmon catch monitoring, Lower Kuskokwim River, 2010. Alaska Department of Fish and Game, Fishery Management Report No. 12-34, Anchorage.

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ABSTRACT

The *Kuskokwim Inseason Subsistence Catch Monitoring* project is a collaborative effort between Orutsararmiut Native Council (ONC) and the Alaska Department of Fish and Game since 2001. The objective of the project is to provide input regarding salmon run timing, strength, and subsistence harvest from local Kuskokwim Area subsistence fishermen to the salmon management process during the fishing season. This objective was achieved in 2010. ONC conducted weekly in-person interviews of 30 Bethel area subsistence fishing families at fish camps during the peak of salmon fishing activity (June 1 to July 11, 2010). Overall, fishermen in the lower Kuskokwim River felt there was a late Chinook salmon run made up of smaller sized fish than normal, with difficult fish drying conditions due to abnormally rainy weather throughout the summer. Most fishermen also indicated they increased their fishing effort and harvested more sockeye and chum salmon to reach their subsistence salmon harvest goals for the year. Other data gathered include fishing method, mesh sizes used, and relative run timing and catch rates for Chinook (*Oncorhynchus tshawytscha*), chum (*O. keta*) and sockeye (*O. nerka*) salmon. Families were also asked about salmon harvest goals, whether salmon subsistence needs were being met, and to comment on fish health, weather conditions, and other factors that affect harvest and processing of fish. Data from these surveys were used to qualitatively assess salmon run timing, relative abundance, fishermen's success in achieving subsistence harvest goals, and fishing gear usage. Surveys were summarized weekly and relayed to area fishery managers. An oral report was presented at each *Kuskokwim River Salmon Management Working group* meeting. Fishery managers and research staff used the survey information in conjunction with other fisheries monitoring projects as an early indication of salmon run strength, run timing and subsistence harvest trends.

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

INTRODUCTION

This report describes the findings of a collaborative study conducted by Orutsararmiut Native Council (ONC) and the Alaska Department of Fish and Game (ADF&G). Researchers collected information from fishermen about their subsistence salmon catches during a 6-week period in June and July of 2010 and presented the information at meetings of the *Kuskokwim River Salmon Management Working Group* (hereafter referred to as Working Group). Members of the Working Group and fishery managers work together to make inseason management decisions for the salmon fisheries in the Kuskokwim River drainage (Figure 1; Brodersen and Carroll 2011; Smith and Linderman 2008). Study activities were coordinated through the *Kuskokwim Inseason Subsistence 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).

Historically and contemporarily, people residing in the Kuskokwim River drainage have relied on salmon as the mainstay of their diet. Studies indicate that fish account for up to 85% of the wild resources harvested for subsistence (pounds usable weight) 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, is up to 650 pounds per capita in some of these communities (Coffing 1991; Fall et al. 2009). There are three types of salmon fisheries in the Kuskokwim River drainage prosecuted mainly by the people who reside in the drainage: the subsistence fishery, the commercial fishery, and the much smaller sport fishery.

The focus of this research is the subsistence fishery. The average (2000–2009) subsistence fishery harvest of Chinook accounted for 95% of the average total utilization of Chinook, 66% of chum, and 78% of sockeye salmon (Appendices A1 to A4). The subsistence fishery harvested more Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, and sockeye *O. nerka* salmon than the other two fisheries in the Kuskokwim River drainage combined. An estimated 197,923 salmon

were harvested for subsistence purposes in 2009 in the Kuskokwim area, of which an estimated 151,822 (77%) were taken by the residents of the lower river area (Carroll and Hamazaki 2011a).

In addition to inseason salmon harvest monitoring, an annual postseason household survey was conducted in 2010 in the majority of Kuskokwim River drainage communities, to estimate subsistence salmon harvest (Carroll and Hamazaki 2011b). However, harvest estimates were not available until after the fishing season is concluded, and therefore, were not timely for informing inseason management actions. The *Kuskokwim Inseason Subsistence Catch Monitoring Program*, as described in this report, monitored subsistence harvests during the salmon run in 2010 in order to qualitatively assess inseason salmon run timing, success of catch rates, and whether subsistence fishermen' needs were being met prior to prosecuting a commercial fishery in the lower Kuskokwim River. A very important aspect of this project was that it facilitated communications between subsistence fishermen and area managers, fostered better understanding between different perspectives, and enhanced the range of knowledge available from which to make sound management decisions.

This study was first initiated 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). 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), which led to the BOF discontinuing stock of concern status for both species. The information collected by this study has proven valuable for managers in assessing relative abundance and harvest success in a timely manner. Therefore, both managers and stakeholders have sought to continue this project to facilitate this information exchange.

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 the project was limited to the Bethel area subsistence fishery. Additionally, in from 2001 to 2004 the project was in effect from late May through August during the peak migration periods of all salmon species, including coho salmon. However, beginning in 2005 the study period was reduced to late May through early July during the peak Chinook salmon migration. These changes resulted from the higher significance placed on run abundance and timing of Chinook salmon over other species of salmon, and recognition that most harvest does occur in the area around Bethel. We reasoned that surveying the Bethel area only could still result in adequately meeting the objectives of the study. Otherwise, since 2001, the project objectives and study design have changed very little. The project is managed and conducted by staff from ONC, which is the Bethel Indian Reorganization Act (IRA) tribal council, in collaboration with the Bethel office of ADF&G, Division of Commercial Fisheries.

In 2010, the Kuskokwim River salmon fisheries were managed according to the *Kuskokwim River Salmon Management Rebuilding Plan* (hereafter referred to as Rebuilding Plan; 5 AAC 07.365) adopted by the BOF in 2001. This plan provides guidelines for the sustained yield of salmon stocks large enough to meet escapement goals, provide fishermen with a reasonable opportunity to harvest amounts necessary for subsistence, and to provide for commercial and sport fisheries (Whitmore et al. 2008).

Much of the management direction in the Rebuilding Plan relies on inseason indicators of run strength. These inseason indicators consist 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 estimates as fish begin reaching tributary streams,
6. Sonar passage estimates on the Aniak River, and
7. Numbers of salmon on spawning grounds estimated in aerial surveys.

Both the Alaska legislature and U.S. Congress have passed laws to protect customary and traditional uses of fish and wildlife in Alaska, and subsistence hunting and fishing harvest opportunity must be provided for before other uses such as commercial or sport harvest. Therefore, inseason fisheries management in the Kuskokwim management area must ensure that "reasonable opportunity" to meet subsistence needs is provided for during the season prior to allowing commercial fishing periods to open. The information provided by this study provides a useful inseason input for determining whether "reasonable opportunity" is being provided and, in part, satisfies the need for subsistence fishery information, in the first indicator in the list above.

Generally, the commercial fishery in the Kuskokwim River is a limited chum and sockeye salmon fishery (Whitmore et al. 2008). A directed coho *O. kisutch* salmon fishery generally occurs in late July and August. Kuskokwim River coho salmon commercial fishing accounts for the largest number of salmon harvested of all the Kuskokwim area commercial fisheries. The coho fishery is not much impacted by subsistence harvest patterns as these generally occur well before the bulk of the coho salmon run arrives in the Kuskokwim River.

Smaller commercial catches of sockeye and chum occur earlier in the season and include incidental catches of Chinook salmon, and these tend to occur contemporaneously with subsistence harvest. If Chinook salmon are caught in the commercial salmon fishery, commercial fishermen are allowed to sell them. A total of 16 commercial fishery openings occurred on the Kuskokwim River in 2010 from June 25 through August 12. The information collected by this study has the power to influence decisions about commercial fishing opportunity for these species during the June fishing period each year.

Subsistence fishing was open on the Kuskokwim River throughout the study period in 2010, with the exception of lower river closures occurring 6 hours prior, during, and 3 hours after commercial fishing periods. Effective June 10, 2010, the U.S. Fish and Wildlife Service (USFWS) took special action to close the Chinook salmon subsistence fishery on the Tuluksak and Kwethluk rivers (tributaries of the Kuskokwim River) from July 10 to July 31 because of conservation concern for Chinook salmon stocks on those rivers. The effects of these closures on subsistence fishing activities were not measured in this study as they occurred after as study period concluded.

STUDY AREA

The Kuskokwim River drainage covers an extensive area in western Alaska originating in the Alaska Range in central Alaska, emptying into the Bering Sea. Hundreds of smaller tributary rivers and streams drain into the main stem of the Kuskokwim River. Five species of salmon

migrate to the Kuskokwim River drainage in spring, summer, and fall to spawn: Chinook or "king" salmon, chum or "dog" salmon, sockeye or "red" salmon, coho or "silver" salmon, and pink or "humpy" salmon *O. gorbuscha.* There are about 38 communities located in the drainage ranging in size from small villages of less than 200 people, such as Oscarville, to large subregional hub communities, such as Aniak with 572 people. The largest community in the drainage, Bethel, had a population 5,471 in 2000 according the U.S. Census[1]. The study area was located on the lower river where the majority of the harvest of salmon for subsistence in the Kuskokwim River drainage occurs. The lower river area is the area in which the most people reside and includes the regional hub community of Bethel.

OBJECTIVES

The overall goals of this project were to contribute information for the management of Chinook, chum, and sockeye salmon fisheries in the Kuskokwim River drainage and to increase ONC's capacity to participate in fisheries research and management. The objectives for this project were:

1. Characterize salmon run timing and relative abundance in May, June and July through weekly interviews with Bethel area subsistence salmon fishermen;
2. Characterize fishing activity and gear use through weekly interviews with Bethel area subsistence salmon fishermen in May, June and July;
3. Gather additional information from harvest survey participants to provide qualitative assessments of harvest quality, fishing methods in relation to catch, and other factors influencing fishing success in 2010;
4. Build management capacity by providing local input into the management process for the subsistence salmon fishery in May, June and July through the presentation of weekly summaries of interviews with Bethel area subsistence salmon fishermen at *Kuskokwim River Salmon Management Working Group* meetings;
5. Build local capacity to participate in fisheries research and management by providing ONC fisheries technicians with additional training opportunities on other Kuskokwim cooperative subsistence fisheries monitoring projects.

METHODS

The primary method of data collection was a weekly census survey in each occupied fish camp in an area from the village of Napaskiak to the mouth of the Gweek River, approximately 24 river miles (Figure 2). This study area represented the primary fishing area for Bethel residents and included the overlapping fishing areas for the nearby villages of Oscarville and Napaskiak.

A survey instrument, or questionnaire, was used to collect information during survey interviews (see Appendix B1). The survey instrument was developed collaboratively with staff from ADF&G, USFWS, and ONC, and has undergone only minor changes since 2001, the first year the survey instrument was used. All information was compiled by ONC and presented in a summarized format to state and federal fishery managers, Working Group participants, and via local radio news stations to the general public. Interview questions included family name,

[1] Census 2000 Gateway. [Internet]. 2000. Washington D.C.: United States Census Bureau. [revised May 2012; cited Aug 2010]. Available from: http://www.census.gov/main/www/cen2000.html

community of residence, date the family began fishing this year, fish camp location, and fishing area. Participation in the survey was voluntary, and the results were kept confidential. Results were reported for the entire project area, and individuals were not identified in the findings.

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?” These responses were presented in a weekly written report that summarized total responses for each question for each salmon species targeted. Fishermen were also asked what gillnet net mesh size and type of fishing gear they used that week. Additional interviewee comments on the health, condition and behavior of the fish, or weather patterns and other factors influencing fishing effort and success were included in each weekly report.

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. Subsequently, for each week of the survey period, technicians attempted to contact each family on the participant list. The contact list changed over time, when new families were contacted and decided to participate in the program or people on the list moved away, discontinued fishing at their fish camp, or declined to participate.

Many families have been participating in the survey each year for the duration of the program. However, in the past two survey years some of the families that have been involved since the inception of the program appear to have discontinued fishing in the area as their fish camps were vacant during the 2010 survey. A few subsistence fishermen that were not contacted in the past agreed to interviews in 2010 and were added to the weekly survey route. People that wished to participate in the program were included if their salmon processing sites were within the study area, and they self-identified as long-term subsistence fishermen.

Subsistence fishermen were sometimes interviewed at the Bethel boat ramp when they returned from fishing. Some Bethel fishermen who had long been a part of the survey program were contacted by phone at their homes if they were not encountered at their fish camp or the boat ramp. The number of interviews reported each week was variable, and included everyone who was interviewed whether at their fish camp, at the boat harbor, or in town. Most fishermen who were interviewed represented a larger extended family group participating in salmon harvesting, processing, and preserving. Others who processed the fish contributed information on fish health, drying conditions, or other important environmental details.

In 2010, field season preparations began on May 26 and subsistence catch monitoring interviews began on June 3. Two technicians conducted interviews Thursday through Sunday of every week from June 3 through July 11. 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

The subsistence salmon fishery in the mainstem Kuskokwim River was open all season except for closures from six hours before until three hours after each commercial fishery opening in District W1 (Table 1, Figure 3). On average, 30 families were interviewed weekly regarding their subsistence fishing activities, with a total of 179 interviews conducted in 2010 (Tables 2 and 3). In all, six weekly interview summaries were compiled for Working Group packets and presented verbally by ONC staff at Working Group meetings during June and July 2010 (Appendices C1–C6). Fewer families were interviewed this year than in previous years because fewer people were encountered at their fish camps. In some fish camps, participants from past years were notably absent this year for the whole season, and in some others small amounts of fish were drying but the occupants were not present during the survey rounds. Overall, the summer of 2010 was unusually cool, windy and rainy for the region and many subsistence fishing families noted that the weather caused them to delay the start of their fishing and spend less time at fish camp. Economic hindrances to fishing were also noted by many fishermen with high gas prices preventing some families from fishing as much as they would have otherwise.

WEEKLY CHARACTERIZATIONS OF SALMON CATCH RATES

Chinook salmon

For the first survey week 100% of respondents reported catch rates were "Normal". In the second survey week, 50% reported the catches were "Normal" and 46% reported the catches were "Poor". In the third survey week, respondents reporting "Normal" catches increased to 65% and those reporting "Poor" catches decreased to 26%. This pattern continued in the fourth survey, with 73% reporting that catches were "Normal" and 24% reported that catch rates were "Poor". Similarly, in the fifth survey week, 69% reported their catches were "Normal", and 22% reported their catches were "Poor". In the sixth survey week 91% reported their Chinook salmon catches were "Normal" and the rest declined to comment.

Chum salmon

For the first survey week respondents declined to comment on their chum catch rates. In the second survey week 72% reported the catch rates were "Normal" and 28% reported the catch rates were "poor". In the third survey week, 100% reported their chum salmon catch rates were "Normal". In the fourth, fifth and sixth survey weeks, the percentage of respondents reporting "Normal" catches was 92%, 78%, and 64%; with increasing percentages of respondents reporting "Very Good:" 3%, 14%, and 27% respectively.

Sockeye salmon

For the first two survey weeks, all respondents declined to comment on their sockeye salmon catch rates. In the third survey week, 96% reported their sockeye salmon catches rates were "Normal." In the fourth survey week, 81% reported their catches were "Normal". In the fifth survey week, 69% reported their catches were "Normal", with about equal proportions reporting "Very Good" and "Poor" catches. In the sixth survey week, the percentage of respondents reporting "Very Good" catches increased (27%), 64% characterized their catch rates as "Normal" and no one characterized their sockeye salmon catch rates as "Poor".

WEEKLY CHARACTERIZATION OF SALMON RUN TIMING

Chinook salmon

For the first survey week 100% of the people characterized Chinook salmon run timing as "Normal". In the second survey week, the percentage of recipients reporting the run as "Normal" dropped substantially (57%); with 39% reporting the run as "Late". In the third survey week, the percentage of respondents reporting the run as "Normal" continued to drop (48%); with an increasing percentage reporting the run as "Late" (52%). In the fourth survey week, 68% reported the run timing was "Normal" and 32% reported the run was "Late". In the fifth and sixth survey weeks, 89% and 73% percent reported the run timing as "Normal".

Chum salmon

For the first survey week no fishing families commented on the timing of the chum salmon run. In the second survey week, 54% reported the run timing was "Normal" and 11% reported the run was "Late." In all subsequent weeks, respondents reported the run timing for chum salmon as largely "Normal". For the third, fourth, fifth and sixth weeks respectively, the percentage of respondents reporting "Normal" run timing was 96%, 97%, 100%, and 91%.

Sockeye salmon

For the first two survey weeks, no one commented on the sockeye salmon run timing. In the third survey week, 65% reported the run timing was "Normal." In the fourth and fifth survey weeks, this increased to 100% of respondents. In the sixth survey week, 73% reported the run timing was "Normal," and the remaining respondents reported the run was "Late".

WEEKLY FISHING ACTIVITY AND GEAR USE

This objective quantifies how many of the people that were surveyed each week were actively fishing and what type of gear they were using. Gear categories included the most common methods of capturing salmon for subsistence use in the Bethel area including drift net, set net, use of *both* drift and set net (during the survey week), and rod and reel. Because most people are targeting large quantities of salmon to feed their families for the year, rod and reel in the Bethel area is usually only used for salmon when one or a few additional fish are desired. In 2010 no fishermen surveyed used rod and reel as a method to catch Chinook, chum, or sockeye salmon. For those using gillnets, respondents were asked whether they were using "greater than 6 inch mesh," "equal to or less than 6 inches," or using both size categories within the survey week.

With reference to net type, fishermen made greater use of drift gillnets throughout the survey period. In the first survey week, 50% of respondents reported fishing exclusively with drift net and 33% report fishing exclusively with set net. In the second survey week, the percentage of drift net users increased to 68% and the percentage of set net users decreased proportionately (21%). I the third survey week, the percentage of drift net users reached 87% and remained high through the remaining weeks of the survey. In the fourth, fifth, and sixth weeks, fishermen reported exclusive use of drift net at 81%, 83%, and 91% respectively.

With reference to mesh size, fishermen shifted use by mesh size throughout the survey period. In the first survey week, 67% reported using only mesh size *greater* than 6 inches. In the second week of survey, there was a shift to smaller mesh gear: 71% of respondents reported using mesh size equal to or *less* than 6 inches. In the third week, the focus shifted again to larger mesh gear

(87%). In the fourth week, fishermen appeared to be favoring the smaller mesh gear (89%) and in the fifth and sixth weeks, fishermen were using larger mesh gear again (86%, 73%).

LOCAL INPUT INTO THE MANAGEMENT PROCESS THROUGH WEEKLY SURVEY SUMMARIES TO THE KUSKOKWIM SALMON MANAGEMENT WORKING GROUP

ONC subsistence fisheries biologist and fisheries technicians wrote 6 summaries of the survey results from subsistence fishing families interviewed during the *Kuskokwim Inseason Subsistence Catch Monitoring Program* survey period from June 1 to July 12 (Appendices C1 to C6). These weekly reports were sent via email to all Working Group participants. The ONC staff and fisheries technicians publicly interpreted these reports, provided additional discussion based on subsistence fishermen feedback, and answered questions about the project data during the Working Group meetings. Additional information can be found in the discussion section regarding qualitative assessments based on information conveyed during the interview process and shared during Working Group meetings.

LOCAL CAPACITY BUILDING

ONC fisheries technicians were trained and mentored throughout the *Kuskokwim Inseason Subsistence Harvest Monitoring Program* in interviewing methods, data recording, and summary report writing. Additionally the technicians learned specifics about area subsistence fisheries management through reading reports, participating in ongoing discussion about management issues during the field season, and receiving mentorship from Working Group members on various aspects of engagement in subsistence fisheries research, monitoring, and management.

In addition to the inseason harvest surveys, the ONC fisheries technicians also worked with area fishermen on subsistence Chinook salmon age, sex, and length sampling and had two weeks of training at other salmon monitoring projects on the Kuskokwim River. In 2010, the technicians worked at the George River weir with ADF&G biologists for exposure to fisheries field research skills and to learn about salmon escapement monitoring on the Kuskokwim River.

DISCUSSION

This project relies on voluntary participation by Bethel-area subsistence fishermen, and most respondents have participated since 2001 when the project began. The majority of participants are lifelong residents of the Kuskokwim area, representing some of the most experienced and knowledgeable fishermen. Most of these families are of Alaska Native descent, and harvest and process salmon at seasonal fish camps that have been maintained across generations. Interviewees typically have between 10 and 50 years of adult experience fishing in the region. Both ONC technicians who participated in this project have many years of local subsistence fishing experience themselves. Their family relations and community connections on the Kuskokwim River provide the trust and familiarity that is essential to the success of the program.

Information used to manage the Kuskokwim River fisheries early in the season consisted of Bethel test fishery indices of salmon abundance (e.g. Bue and Martz 2006) and subsistence harvest reports. Later in the season, reports of salmon abundance from weir, sonar, and aerial survey programs became available as salmon began to reach their spawning grounds. The inseason catch monitoring interviews provided an early indication of salmon run timing, harvest

effort and relative success of catch rates in the subsistence fishery and whether families' subsistence salmon harvest goals are being met for the season.

CHINOOK SALMON

In the first week of survey, which coincided with the first passage of Chinook salmon in the Bethel area, most fishermen thought the run timing was normal. However, by the second week of the survey season, when more people began actively fishing and when, in most years the Chinook salmon run typically picks up, nearly half of the respondents reported their catches as poor. Also during this time, 39% of the fishermen felt the run was late. This delay in the run caused concern and stress for families who normally would have much of their Chinook salmon on the drying rack and would be close to meeting their harvest goals by late June. Bethel test fishery data also showed lower than average Chinook salmon catch per unit of effort (CPUE) early in the season and run timing lagged about a week behind the 10 year average (Brodersen and Carroll 2011). Some fishermen felt that the low winter snow pack and low spring water levels may have contributed to a delay in the salmon return. Many fishermen noted clear water early in the season and that perhaps with the good visibility salmon were avoiding the nets. In addition to this feedback, many longtime Bethel area subsistence fishermen commented that the Chinook salmon often begin to arrive once the spring wind direction shifts and blows a strong tide upriver. This observation concurs with information shared by downriver subsistence members at Working Group meetings.

In addition to the standard survey responses, additional comments by fishermen were also indicative of what they were experiencing. Rainy, windy weather made it a challenge for fishermen to get out on the river and fish consistently, but most people noted that after an initial delay, they were able to make a steady effort to gradually build up to their harvest goal for the season and make up for a late start and poor catches that they had indicated earlier in the season. Despite the poor weather early on, by the end of the season most of the women interviewed at fish camp noted that they had enough sunny, dry days with good wind to dry their fish well.

Many fishermen noted that an unusually high number of Chinook salmon they were catching were very small, including some tiny "jacks" and even quite small females. Some people thought the greater percentage of small Chinook salmon in the run may have played a role in their low catches and were trying different mesh sizes in an attempt to increase catchability. This gillnet mesh size-switching strategy appears to be reflected in the weekly inseason surveys which showed that the predominant mesh size used to target Chinook salmon was not as consistent as it usually is (Table 5). In previous years of the *Kuskokwim Inseason Subsistence Catch Monitoring Program*, use of the larger mesh size category was far more prevalent than was reported for 2010. Typically most fishermen use 8 inch mesh nets early in the season for Chinook salmon and then switch to smaller mesh such as 6 inch or less to target sockeye salmon, but that pattern was not seen in the 2010 season (Table 5). Many fishermen noted that catchability for Chinook salmon was better with the smaller mesh sizes. Many fishing families commented that the Chinook salmon were smaller than average this year. This may also explain why there was an increase in the number of people using smaller mesh sizes throughout the salmon fishing season over other years, when larger mesh gear was preferred. Some fishermen specifically reported having poor catches when using their 8 inch gear, with fish hitting but getting through the net. These same fishermen noted that they got fairly good catches of smaller kings when using their 6 inch or less gear typically reserved for targeting sockeye salmon. This year many fishermen

noted that in the early part of the run many of the chum were larger than the Chinook salmon. Other fishermen noted that they got better catches with their smaller nets this year because they caught all species at the same time (Chinook, chum, and sockeye) and they achieved the mix of fish they were seeking to harvest for the year. However, nets are an expensive investment and not all fishermen have multiple nets of differing mesh sizes. Additionally, if smaller fish are caught it takes more fishing effort to harvest enough to generate the same quantity by weight that each family would normally need for the year. More fishing effort takes more gas and with very high gas prices on the Kuskokwim River, this was a limiting factor for some families.

Most fishermen noted that later in the season they had good catch rates of larger Chinook salmon (what they referred to as "normal" catches and average size) and that this helped them to ultimately meet their harvest goals for the year even after an initial slow start. Some of the women processing the Chinook salmon commented that overall the flesh was in very good condition with a high oil content which is desirable for making dryfish. A few people also pointed out that more fish had "eel bite" marks (lamprey feeding scars) than usual. During the last week of the survey season, many families that were still fishing noted that Chinook were still coming upriver and they were still getting some good catches of large Chinook salmon in good condition, still bright and with firm flesh. Typically subsistence fishermen in the Bethel area feel the end of the Chinook salmon run corresponds with catches of fish predominantly in more advanced spawning condition.

SOCKEYE AND CHUM SALMON

Throughout the sockeye and chum salmon run the majority of survey respondents felt the run timing was normal and catch rates were normal for both species. The overall response for sockeye salmon during the last two weeks of the survey season indicates fish were passing through the Bethel area in discrete "clumps." Some fishermen commented on their nets getting "plugged" with sockeye after just a short drift, while others seemed to miss the sockeye salmon, getting only a few fish late in the run. Most subsistence fishermen reported sockeye salmon run timing as normal and the majority also reported the catch rates as normal with some periods of mixed responses when fishermen caught either many or hardly any fish. The sockeye catches in the Bethel test fishery reflected this somewhat with some wide variance in CPUE, from high CPUEs of 100 to 200 fish alternating with very small CPUEs of 10 to 20 fish (Doug Bue, Commercial Fisheries Biologist, ADF&G, Bethel; personal communication). In the last week of the survey ending July 4, most families were content with their sockeye and chum harvest but some fishermen planned to keep fishing, hoping to catch more sockeye salmon to meet their harvest goals for the year.

By the end of the inseason survey period most subsistence fishermen did indeed meet their basic harvest needs for the year even though they were concerned at the outset by the initial delay with low catch rates in the Chinook salmon run. Some fishing families commented that they did not have as much Chinook salmon preserved for the year as they would normally have but they were content enough and grateful that the run did pick up and catches were better at the end of the run. While most subsistence families strive to put up Chinook salmon as the primary fish food source for the year, the majority actively seek a combination of all salmon species for their total annual harvest. Most families commented that if they didn't meet their Chinook harvest goals they could likely make up some of it with extra sockeye and chum salmon harvests.

While the *Kuskokwim Inseason Subsistence Catch Monitoring Program* no longer extends through the August coho run, subsistence coho salmon harvest is an important part of meeting many families' subsistence salmon needs for the year. At the end of the inseason surveys in 2010 many families commented that they would also be attempting to harvest more coho salmon to make up for their smaller Chinook salmon harvests this year. For long-term fisheries management purposes, it is important to consider that a reduced harvest of one species may result in a greater compensation harvest of another species in order to meet subsistence needs for the year.

The weather remained a challenge throughout the summer but most families said they dealt with this by exercising extra diligence in drying their fish. These efforts included different ways such as putting up smaller batches that could be dried in the smokehouse with a low fire or "baby sitting" the fish by frequently adjusting the drying rack tarps to prevent rain from blowing in when the wind shifted. These actions often do take extra resources either in the form of additional wood to keep a constant drying fire or gas for more frequent fishing trips to catch just a little bit of fish at a time that can fit in the smoke house or limited just to the central interior area of the drying rack. More frequent trips to fish camp may also be required to diligently watch over the drying fish to protect it from blowing rain. Extra fishing trips for smaller, but more frequent fish catches, and more frequent trips to fish camp to adjust the tarps or rotate fish, incur extra costs in gas or in lost wages, as a result of family members needing to reside longer at fish camps. However, while many families commented on the additional challenge of safely preserving their fish, most were able to attend to it and very few noted any problems of spoilage.

The *Kuskokwim Inseason Subsistence Catch Monitoring Program* has helped facilitate a dialogue between subsistence fishermen and area fisheries managers. Not only did the ONC fisheries technicians gather the primary survey data, but they also gathered a full range of comments from subsistence fishermen on their experiences, observations, or concerns as they harvest salmon each week. Topics of these comments included the health of salmon, environmental conditions, fishing gear use, and socio-economic factors that have bearing on fishing activities. The program has served as a regular point of contact for subsistence fishermen to ask questions about Kuskokwim fisheries research and management while residing at their fish camps. Many people do not have the opportunity to engage in the information sharing or discussions that take place in Working Group meetings in Bethel; these meetings usually occur during office work hours and during the most active subsistence fishing period of the year. ONC fisheries technicians also distributed ADF&G fish harvest calendars to families at their fish camps and explained the importance and use of this documentation for understanding salmon run timing on the Kuskokwim River.

ONC and ADF&G staff highlighted the program and provided fisheries information updates via radio and local news media, including local radio station KYUK, which airs updates on the proceedings of the Working Group meetings. In 2010, many subsistence fishermen participating in the inseason surveys expressed concern about the low Chinook catches and what they felt appeared to be a late run overall. Several families, having heard reports from upriver subsistence fishermen, expressed concern and said they hoped enough salmon would pass Bethel to provide for the upriver communities too.

Some elders, invoking traditional Yup'ik values of sharing, asked ONC to relay to the upriver villages via the Working Group teleconference that they personally would harvest less fish in an effort to make sure all families on the Kuskokwim could meet their subsistence needs. By

facilitating communications with people throughout the watershed who otherwise would not have had a chance for dialog, the inseason survey program may be an avenue to foster proactive salmon conservation measures among subsistence fishermen themselves.

CONCLUSIONS

In 2010 many subsistence fishermen reported late run timing for Chinook salmon, which caused concern for some fishing families in the first half of the fishing season. Catch rates of Chinook salmon were lower than average in the first half of the run and most fishermen reported catching higher numbers of very small Chinook salmon than normal. Many fishermen reported switching from their usual 8-inch mesh gear to 6 inch and smaller meshes to target the small-sized Chinook salmon. Fishermen felt this helped them to catch the amount of salmon needed for the year but they had to fish more and harvest more small Chinook salmon to make up to the total amount in mass that was needed. Overall sockeye salmon catch rates and run timing were reported as normal for the season but some fluctuation in passage caused variation in the overall success of sockeye salmon harvest among families. Chum salmon catch rates and run timing were reported as normal by the majority of survey respondents this year.

Although there was some concern for the delay in the Chinook run timing experienced by subsistence fishermen this year, all respondents indicated in the final survey week that they had fished longer and were able to ultimately meet their family's salmon needs for the year with a combination of Chinook, sockeye, and chum salmon, and, if needed, additional coho salmon harvest.

ACKNOWLEDGEMENTS

We wish to thank the many subsistence fishermen and families who generously volunteered 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 Working Group members, many of whom have volunteered years of dedicated service to facilitating this local cooperative management process.

We wish to thank ONC fishery technician, Justin Crow, for his third year on this project and role as the project crew leader. We also wish to thank ONC inseason fisheries technician Alissa Joseph for her very enthusiastic first year on the project and especially her detailed contributions to the Working Group reports. The ONC interns' knowledge of families and fish camps in the Bethel area and excellent interviewing skills have greatly facilitated subsistence fishermen involvement in the management process. Thanks to Christopher Shelden and Shannon Royse (ADF&G) for finalizing the report for publication; and Jan Conitz (ADF&G), Greg Roczicka (ONC), and Pippa Kenner (Office of Subsistence Management) who reviewed this document. Special thanks to Greg Roczicka and Bev Hoffman for their valuable input of additional comments from local area subsistence fishermen throughout the project season and for facilitating the sharing of this information via their role as Co-Chairs of the Working Group.

ADF&G and ONC wish to thank the USFWS, Office of Subsistence Management for providing $37,636 in funding support for this project (10-354) through the Fisheries Resource Monitoring Program, under agreement #70181AJO38. The ADF&G and ONC provided matching funds for this project.

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TABLES AND FIGURES

Table 1.–District W-1 Kuskokwim River, commercial fishing periods and subsistence closures, 2010.

Period Number	Date	Subdistrict	Length of Commercial Opening (h)	Subsistence Closure Total (h)
1	Jun 25	1-A	4	13
2	Jun 28	1-B	4	13
3	Jul.06	1-A	6	15
4	Jul 9	1-B	4	13
5	Jul 14	1-A	2	11
6	Jul 16	1-B	2	11
7	Jul 19	1-A	4	13
8	Jul 21	1-B	4[a]	13
9	Jul 23	1A	4	13
10	Jul 26	1-B	6	15
11	Jul 28	1-A	6	15
12	Jul 30	1-B	4[a]	13
13	Aug 4	1-A	4	13
14	Aug 6	1-B	4[a]	13
15	Aug 10	1-A	4	13
16	Aug 12	1-B	4[a]	13

[a] Does not include 2-hour extension in statistical area 335-11 (Lower Section of Subdistrict 1-B)

Table 2.–Number of Lower Kuskokwim area subsistence fishermen characterizing their weekly salmon catch rates, as "Very Good", "Normal", or "Poor", 2010.

	Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon		
Week Ending	Interviewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
Jun 06	19	6	13	0	6	0	[a]	[a]	[a]	[a]	[a]	[a]
Jun 13	39	28	11	1	14	13	0	13	5	[a]	[a]	[a]
Jun 20	26	23	3	2	15	6	0	23	0	0	22	1
Jun 27	37	37	0	1	27	9	1	34	2	2	30	5
Jul 04	38	36	2	3	25	8	5	28	3	1	25	10
Jul 11	20	11	9	0	10	0	3	7	0	2	6	2
Total [b]	179	141	38									
Average	30	24	6									

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

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

[b] Indicates interviewees declined to comment, often because it is too early in the run to assess.

Table 3.–Proportion of Lower Kuskokwim River area subsistence fishermen characterizing their weekly salmon catch rates as "Very Good", "Normal," and "Poor," 2010.

Week	Number		%	% Describing Chinook Fishing as			% Describing Chum Fishing as			% Describing Sockeye Fishing as		
Ending	Interviewed	Fishing	Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
Jun 06	19	6	32%	0	100%	0	[a]	[a]	[a]	[a]	[a]	[a]
Jun 13	39	28	72%	4%	50%	46%	0	72%	28%	[a]	[a]	[a]
Jun 20	26	23	88%	9%	65%	26%	0	100%	0	0	96%	4%
Jun 27	37	37	100%	3%	73%	24%	3%	92%	5%	5%	81%	14%
Jul 04	38	36	95%	8%	69%	22%	14%	78%	8%	3%	69%	28%
Jul 11	20	11	55%	0	91%	0	27%	64%	0	18%	55%	18%
Total [b]	179	141										
Average	30	24										

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

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

[b] Indicates respondents declined to comment, often because it is too early in the run to assess.

Table 4.–Number of Lower Kuskokwim River area subsistence fishermen, by week, that characterized the salmon run timing (by species) as "Early", "Normal", or "Late", 2010.

Week	Number of Families			Chinook Salmon			Chum Salmon			Sockeye Salmon		
Ending	Interviewed	Fishing	Not Fishing	Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
Jun 06	19	6	13	0	6	0	[a]	[a]	[a]	[a]	[a]	[a]
Jun 13	39	28	11	1	16	11	0	15	3	[a]	[a]	[a]
Jun 20	26	23	3	0	11	12	0	22	1	6	15	2
Jun 27	37	37	0	0	25	12	0	36	1	0	37	0
Jul 04	38	36	2	0	32	4	0	36	0	0	36	0
Jul 11	20	11	9	0	8	2	0	10	0	0	8	2
Total [b]	179	141	38									
Average	30	24	6									

Note: Represents responses from the question "Compared with this time in a 'Normal' year how was salmon run timing this week?"

[a] Indicates respondents declined to comment, often because it is too early in the run to assess.

[b] 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 which type and size of salmon fishing gear they were using, 2010.

Week	Number of Families		Fishing with Only:		Using Both:		Fishing with Only:		Using Both:
Ending	Interviewed	Fishing	Driftnet	Setnet	Drift & Setnet	Rod & Reel	> 6" mesh	≤ 6" mesh	>6" and ≤6"
Jun 06	19	6	3	2	1	0	4	1	1
Jun 13	39	28	19	6	3	0	7	20	1
Jun 20	26	23	20	2	1	0	20	2	1
Jun 27	37	37	30	3	4	0	3	33	1
Jul 04	38	36	30	6	0	0	31	5	0
Jul 11	20	11	10	0	1	0	8	0	3
Total [a]	179	141							
Average	30	24							

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

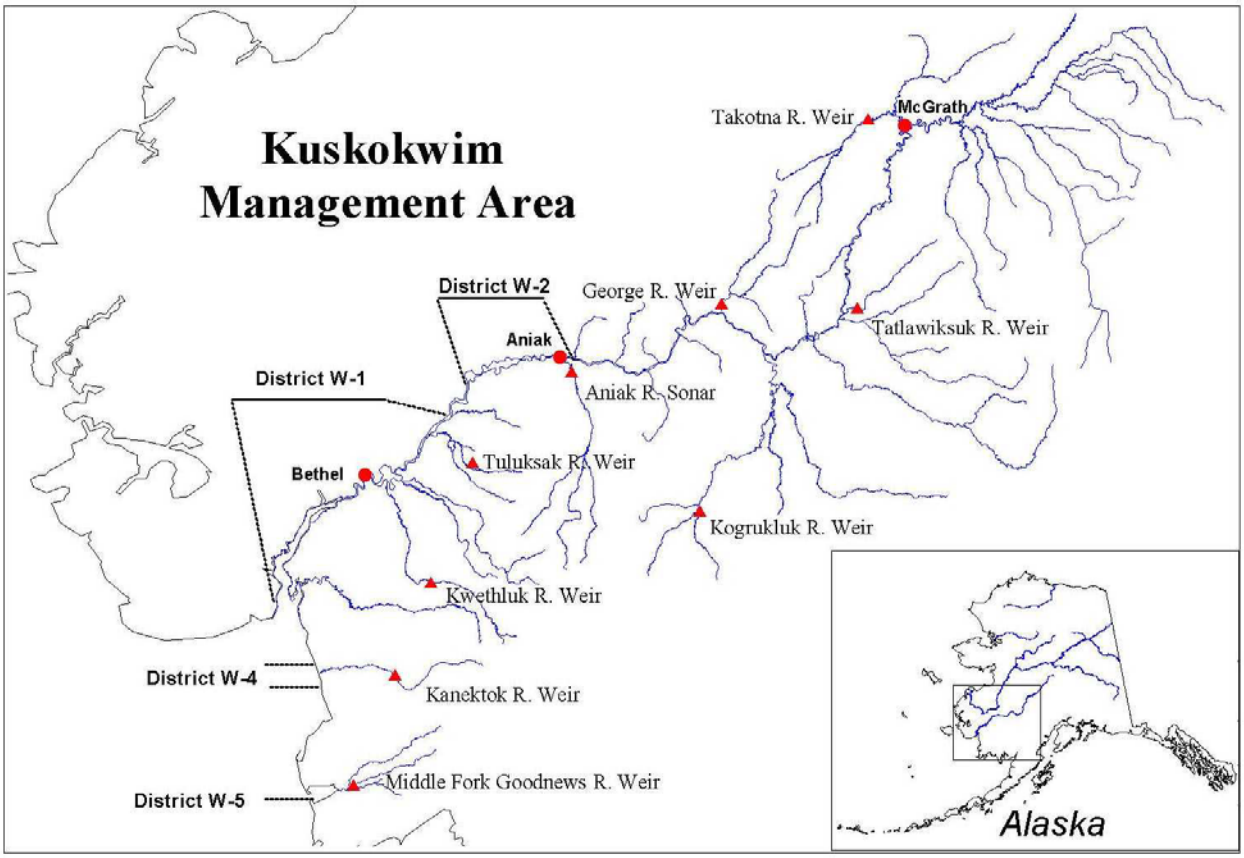
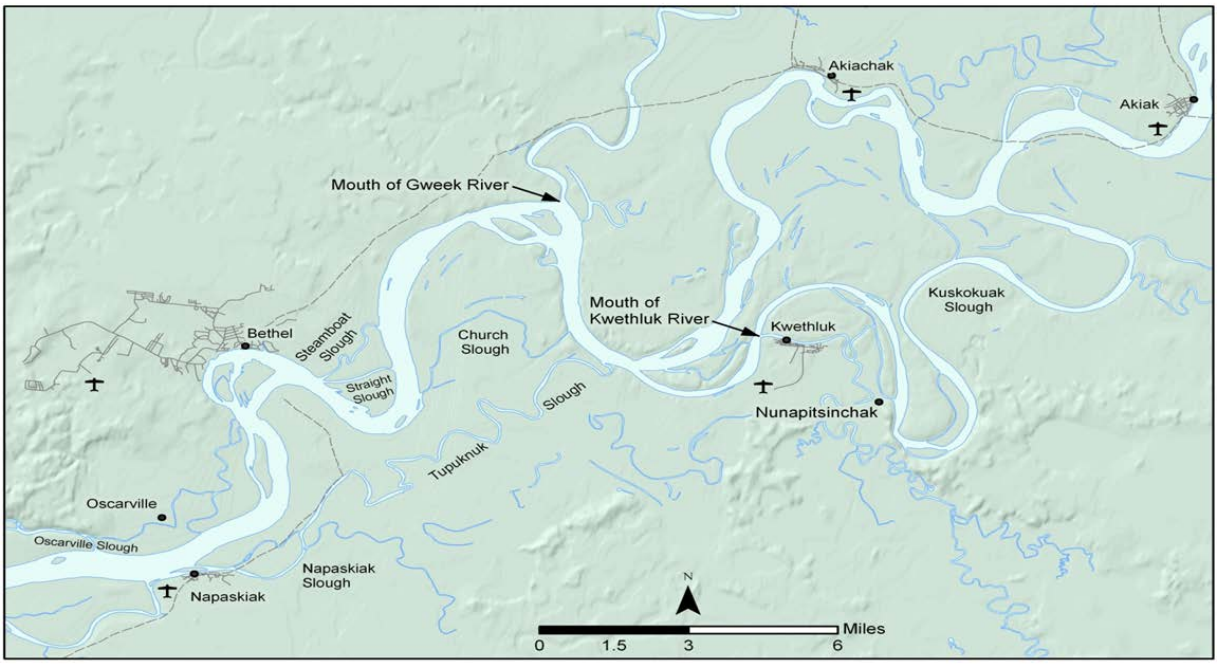
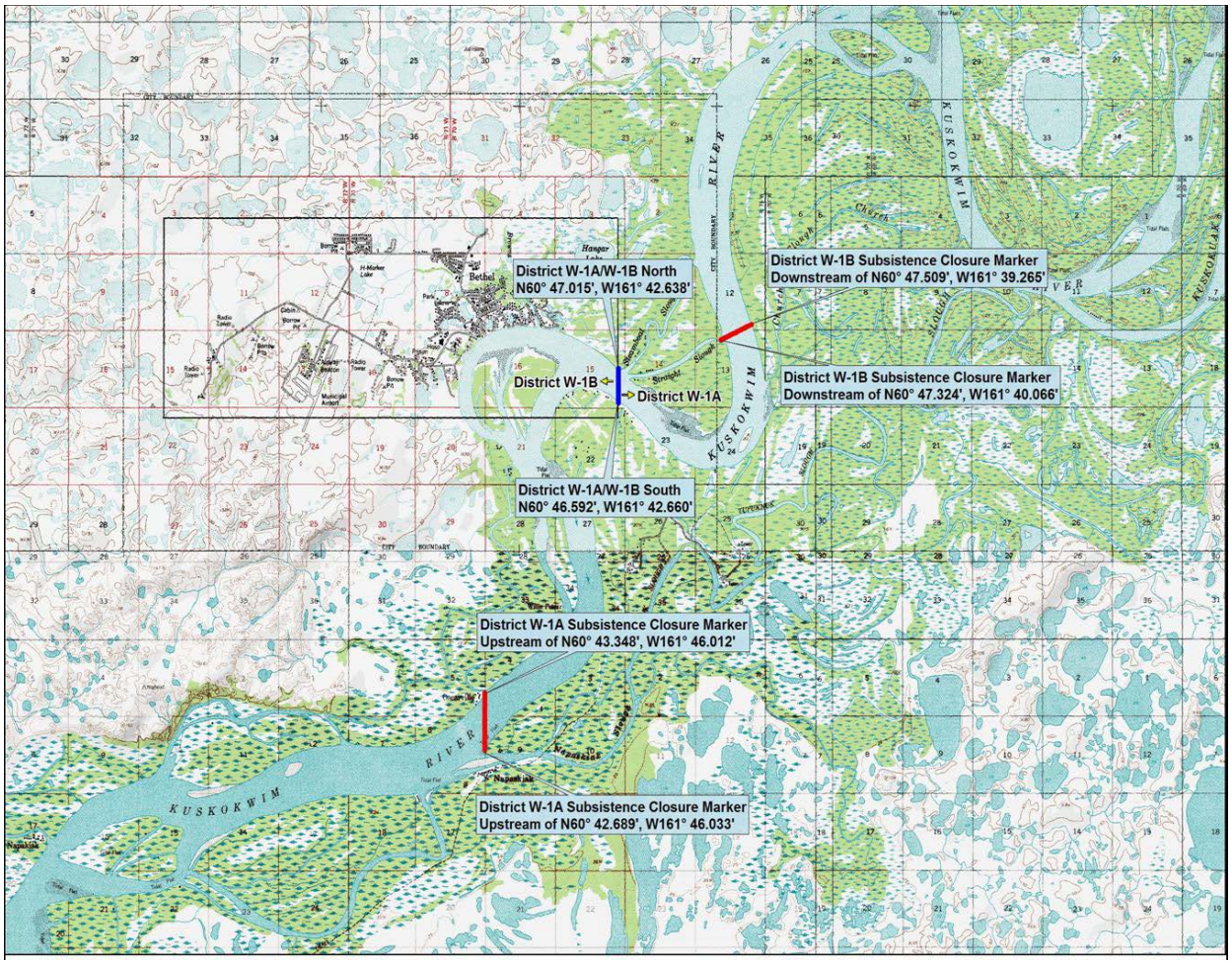


Figure 1.–Kuskokwim management area.



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, 2010.



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: HISTORICAL SALMON UTILIZATION 1960–2010

Appendix A1.–Historical utilization of Chinook salmon in the Kuskokwim River, 1960–2010.

	Commercial Harvest[a]		Subsistence Harvest[b]		Test Fish	Sport Fish	Total	10 yr Avg
Year	Annual	10 yr Avg[c]	Annual	10 yr Avg[c]	Harvest	Harvest	Utilization	Utilization[c]
1960	5,969		18,887				24,856	
1961	18,918		28,934				47,852	
1962	15,341		13,582				28,923	
1963	12,016		34,482				46,498	
1964	17,149		29,017				46,166	
1965	21,989		24,697				46,686	
1966	25,545		49,325		285		75,155	
1967	29,986		59,913		766		90,665	
1968	34,278		32,942		608		67,828	
1969	43,997		40,617		833		85,447	
1970	39,290	22,519	69,612	33,240	857		165,517	56,008
1971	40,274	25,851	43,242	38,312	756		148,435	70,074
1972	39,454	27,987	40,396	39,743	756		148,335	80,132
1973	32,838	30,398	39,093	42,424	577		145,330	92,073
1974	18,664	32,480	27,139	42,885	1,236		122,404	101,956
1975	22,135	32,632	48,448	42,698	704		146,616	109,580
1976	30,735	32,646	58,606	45,073	1,206		168,266	119,573
1977	35,830	33,165	56,580	46,001	1,264	33	93,707	128,884
1978	45,641	33,750	36,270	45,668	1,445	116	83,472	129,189
1979	38,966	34,886	56,283	46,000	979	74	96,302	130,753
1980	35,881	34,383	59,892	47,567	1,033	162	96,968	131,839
1981	47,663	34,042	61,329	46,595	1,218	189	110,399	124,984
1982	48,234	34,781	58,018	48,404	542	207	107,001	121,180
1983	33,174	35,659	47,412	50,166	1,139	420	82,145	117,047
1984	31,742	35,692	56,930	50,998	231	273	89,176	110,728
1985	37,889	37,000	43,874	53,977	79	85	81,927	107,405
1986	19,414	38,576	51,019	53,519	130	49	70,612	100,936
1987	36,179	37,443	67,325	52,761	384	355	104,243	91,171
1988	55,716	37,478	70,943 [d]	53,835	576	528	127,763	92,225
1989	43,217	38,486	81,175	57,303	543	1,218	126,153	96,654
1990	53,504	38,911	85,976	59,792	512	394	140,386	99,639
1991	37,778	40,673	85,556	62,400	117	401	123,852	103,981
1992	46,872	39,685	64,794	64,823	1,380	367	113,413	105,326
1993	8,735	39,549	87,513	65,500	2,483	587	99,318	105,967
1994	16,211	37,105	93,243	69,511	1,937	1,139	112,530	107,684
1995	30,846	35,552	96,435	73,142	1,421	541	129,243	110,020
1996	7,419	34,847	78,062	78,398	247	1,432	87,160	114,751
1997	10,441	33,648	81,577	81,102	332	1,227	93,577	116,406
1998	17,359	31,074	81,264	82,527	210	1,434	100,267	115,340
1999	4,705	27,238	73,194	83,560	98	252	78,249	112,590

continued

Appendix A1.–Page 2 of 2.

Year	Commercial Harvest[a] Annual	Commercial Harvest[a] 10 yr Avg[c]	Subsistence Harvest[b] Annual	Subsistence Harvest[b] 10 yr Avg[c]	Test Fish Harvest	Sport Fish Harvest	Total Utilization	10 yr Avg Utilization[c]
2000	444	23,387	64,893	82,761	64	105	65,506	107,800
2001	90	18,081	73,610	80,653	86	290	74,076	100,312
2002	72	14,312	66,807	79,459	288	319	67,486	95,334
2003	158	9,632	67,788	79,660	409	401	68,756	90,741
2004	2,305	8,775	80,065	77,687	691	857	83,918	87,685
2005	4,784	7,384	70,393	76,370	557	572	76,306	84,824
2006	2,777	4,778	63,177	73,765	352	444	66,750	79,530
2007	179	4,314	72,097	72,277	305	1,478	74,059	77,489
2008	8,865	3,287	98,521 [e]	71,329	420	708	108,514	75,537
2009	6,664	2,438	78,491 [e]	73,055	470	917	86,542	76,362
2010	2,731	2,634		73,584	292			77,191
10 Yr Avg	2,634	9,639	73,584	76,702	364	609	77,191	87,561

Source: Brazil et al. 2011.

Note: Blank cells indicate no data.

[a] Districts 1 and 2; also includes harvests in District 3 from 1960 to 1965. Does not include personal use.

[b] Estimated subsistence harvest expanded from villages surveyed.

[c] Running 10 year average does not include most recent year.

[d] Beginning in 1988, estimates made using new formula. Data since 1988 is not comparable with previous years.

[e] 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. See Hamazaki 2011 for revision of historical estimates published by Division of Subsistence from 1990 to 2007. Comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

Appendix A2.–Historical utilization of chum salmon in the Kuskokwim River, 1960–2010.

	Commercial Harvest[a]		Subsistence Harvest[b]		Test Fish	Sport Fish	Total	10 yr
Year	Annual	10 yr Avg[c]	Annual	10 yr Avg[c]	Harvest	Harvest	Utilization	Average[c]
1960	0		301,753 [d]				301,753	
1961	0		179,529 [d]				179,529	
1962	0		161,849 [d]				161,849	
1963	0		137,649 [d]				137,649	
1964	0		190,191 [d]				190,191	
1965	0		250,878 [d]				250,878	
1966	0		175,735 [d]		502 [e]		176,237	
1967	148		208,445 [d]		338		208,931	
1968	187		275,008 [d]		562		275,757	
1969	7,165		204,105 [d]		384		211,654	
1970	1,664	750	246,810 [d]	208,514	1,139 [e]		458,877	209,443
1971	68,914	916	116,391 [d]	203,020	254		389,495	225,155
1972	78,619	7,808	120,316 [d]	196,706	486		403,935	246,152
1973	148,746	15,670	179,259 [d]	192,553	675		536,903	270,360
1974	171,887	30,544	277,170 [d]	196,714	2,021		678,336	310,286
1975	184,171	47,733	176,389 [d]	205,412	1,062		614,767	359,100
1976	177,864	66,150	223,792 [d]	197,963	2,101		667,870	395,489
1977	248,721	83,937	198,355 [d]	202,769	576	129	447,781	444,652
1978	248,656	108,794	118,809 [d]	201,760	2,153	555	370,173	468,537
1979	261,874	133,641	161,239 [d]	186,140	412	259	423,784	477,979
1980	483,751	159,112	165,172 [d]	181,853	2,058	324	651,305	499,192
1981	418,677	207,320	157,306 [d]	173,689	1,793	598	578,374	518,435
1982	278,306	242,297	190,011 [d]	177,781	504	1,125	469,946	537,323
1983	276,698	262,265	146,876 [d]	184,750	1,069	922	425,565	543,924
1984	423,718	275,061	142,542 [d]	181,512	1,186	520	567,966	532,790
1985	199,478	300,244	94,750	168,049	616	150	294,994	521,753
1986	309,213	301,774	141,931 [d]	159,885	1,693	245	453,082	489,776
1987	574,336	314,909	70,709	151,699	2,302	566	647,913	468,297
1988	1,381,674	347,471	151,967 [f]	138,935	4,379	764	1,538,784	488,310
1989	749,182	460,773	139,672	142,250	2,082	2,023	892,959	605,171
1990	461,624	509,503	126,509	140,094	2,107	533	590,773	652,089
1991	431,802	507,291	93,077	136,227	931	378	526,188	646,036
1992	344,603	508,603	96,491	129,804	15,330	608	457,032	640,817
1993	43,337	515,233	59,394	120,452	8,451	359	111,541	639,526
1994	271,115	491,897	72,022	111,704	11,998	1,280	356,415	608,123
1995	605,918	476,636	67,861	104,652	17,473	226	691,478	586,968
1996	207,877	517,280	88,966	101,963	2,864	280	299,987	626,617
1997	17,026	507,147	39,987	96,667	790	86	57,889	611,307
1998	207,809	451,416	63,537	93,595	1,140	291	272,777	552,305
1999	23,006	334,029	43,601	84,752	562	180	67,349	425,704

continued

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Year	Commercial Harvest[a] Annual	Commercial Harvest[a] 10 yr Avg[c]	Subsistence Harvest[b] Annual	Subsistence Harvest[b] 10 yr Avg[c]	Test Fish Harvest	Sport Fish Harvest	Total Utilization	10 yr Avg Utilization[c]
2000	11,570	261,412	51,696	75,145	1,038	26	64,330	343,143
2001	1,272	216,406	49,874	67,663	1,743	112	53,001	290,499
2002	1,900	173,353	69,019	63,343	2,666	53	73,638	243,180
2003	2,764	139,083	43,320	60,596	1,713	53	47,850	204,841
2004	20,150	135,026	52,374	58,988	1,810	84	74,418	198,471
2005	69,139	109,929	46,777	57,024	4,459	500	120,875	170,272
2006[e]	44,070	56,251	64,206	54,915	3,547	13	111,836	113,211
2007	10,763	39,871	51,308	52,439	3,237	391	65,699	94,396
2008	30,516	39,871	69,039 [g]	53,571	2,472	121	102,148	95,177
2009	76,790	21,515	43,734 [g]	54,121	2,741	285	123,550	78,114
2010	93,148	26,893		54,135	2,872			83,735
10 Yr Avg	26,893	119,272	54,135	59,780	2,573	164	83,735	183,130

Source: Brazil et al. 2011.

Note: Blank cells indicate no information available.

[a] Districts 1 and 2 only; no chum harvests were reported in District 3. Does not include personal use.

[b] Estimated subsistence harvest expanded from villages surveyed.

[c] Running 10 year average does not include most recent year.

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

[e] Includes small numbers of sockeye salmon.

[f] Beginning in 1988, estimates made using new formula. Data since 1988 is not comparable with previous years.

[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. See Hamazaki 2011 for revision of historical estimates published by Division of Subsistence from 1990 to 2007. Comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

Appendix A3.–Historical utilization of sockeye salmon in the Kuskokwim River, 1969–2010.

	Commercial Harvest[a]		Subsistence Harvest[b]		Test Fish	Sport Fish	Total	10 yr Avg
Year	Annual	10 yr Avg[c]	Annual	10 yr Avg[c]	Harvest	Harvest	Utilization	Utilization[c]
1969	322						322	
1970	117						117	
1971	2,606						2,606	
1972	102						102	
1973	369						369	
1974	136						136	
1975	23						23	
1976	2,971						2,971	
1977	9,379						9,379	
1978	733						733	
1979	1,054	1,676					2,730	1,676
1980	360	1,749					2,109	1,917
1981	48,375	1,773					50,148	2,116
1982	33,154	6,350					39,504	6,870
1983	68,855	9,655				41	78,551	10,810
1984	48,575	16,504					65,079	18,628
1985	106,647	21,348				72	128,067	25,123
1986	95,433	32,010				196	127,639	37,927
1987	136,602	41,257				217	178,076	50,394
1988	92,025	53,979				291	146,295	67,264
1989	42,747	63,108	35,224			33	98,365	81,820
1990	84,870	67,277	36,274			61	103,612	91,383
1991	108,946	75,728	52,982			38	128,748	101,534
1992	92,218	81,785	32,065			131	113,981	109,394
1993	27,008	87,692	49,347			348	137,387	116,841
1994	49,365	83,507	37,159			359	121,025	122,725
1995	92,500	83,586	27,792			95	111,473	128,320
1996	33,878	82,171	34,214			315	116,700	126,660
1997	21,989	76,016	40,078			423	116,517	125,566
1998	60,906	64,555	35,426			178	100,159	119,410
1999	16,976	61,443	46,677	38,056		54	163,206	114,797
2000	4,130	58,866	41,783	39,201		46	144,026	121,281
2001	84	50,792	50,065	39,752	510	231	50,890	125,322
2002	84	39,905	25,499	39,461	228	42	25,853	117,536
2003	282	30,692	34,452	38,804	0	140	34,874	108,724
2004	8,532	28,019	32,433	37,315	742	400	42,107	98,472
2005	27,645	23,936	34,129	36,842	1,062	636	63,472	90,580
2006	12,618	17,451	30,226	37,476	519	231	43,594	85,780
2007	703	15,325	33,233	37,077	488	322	34,746	78,470
2008	15,601	13,196	58,182 [d]	36,392	584	273	74,640	70,293
2009	25,673	8,666	35,160 [d]	38,668	515	162	61,510	67,741
2010	22,428	9,535		37,516	495			57,571
10 Yr Avg	9,535	28,685	37,516	38,099	514	248	57,571	96,420

continued

Source: Brazil et al. 2011.

Note: Blank cells indicate no information available.

[a] Districts 1 and 2 only. Harvest does not include personal use.

[b] Estimated subsistence harvest expanded from villages surveyed.

[c] Running 10 year average does not include most recent year.

[d] 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. See Hamazaki 2011 for revision of historical estimates published by Division of Subsistence from 1990 to 2007. Comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

Appendix A4.–Historical utilization of coho salmon in the Kuskokwim River 1960–2010.

Year	Commercial Harvest[a] Annual	Commercial Harvest[a] 10 yr Avg[c]	Subsistence Harvest[b] Annual	Subsistence Harvest[b] 10 yr Avg[c]	Test Fish Harvest	Sport Fish Harvest	Total Utilization	10 yr Avg Utilization[c]
1960	2,498						2,498	
1961	5,044						5,044	
1962	12,432						12,432	
1963	15,660						15,660	
1964	28,613						28,613	
1965	12,191						12,191	
1966	22,985						22,985	
1967	56,313						56,313	
1968	127,306						127,306	
1969	83,765						83,765	
1970	38,601	36,681					38,601	
1971	5,253	40,291					5,253	
1972	22,579	40,312					22,579	
1973	130,876	41,327					130,876	
1974	147,269	52,848					147,269	
1975	81,945	64,714					81,945	
1976	88,501	71,689					88,501	
1977	241,364	78,241					241,364	
1978	213,393	96,746					213,393	
1979	219,060	105,355					219,060	
1980	222,012	118,884					222,012	
1981	211,251	137,225					211,251	
1982	447,117	157,825					447,117	
1983	196,287	200,279				1,375	197,662	
1984	623,447	206,820				1,442	624,889	
1985	335,606	254,438				136	335,742	
1986	659,988	279,804				1,222	661,210	
1987	399,467	336,953				1,767	401,234	
1988	524,296	352,763				927	525,223	
1989	479,856	383,853	52,917			2,459	482,315	
1990	410,332	409,933	44,786			581	410,913	
1991	500,935	428,765	50,369			1,003	501,938	
1992	666,170	457,733	40,167			1,692	667,862	
1993	610,739	479,638	31,737			980	611,719	480,899
1994	724,689	521,084	33,050			1,925	726,614	522,305
1995	471,461	531,208	36,276			1,497	472,958	532,477
1996	937,299	544,793	32,742			3,423	940,722	546,199
1997	130,803	572,524	29,035		33,703	2,408	195,949	574,150
1998	210,481	545,658	24,864			2,419	237,764	553,621
1999	23,593	514,277	25,004	37,594	213	1,998	50,808	524,875
2000	261,379	468,650	33,786	34,803	2,828	1,689	299,682	481,725
2001	192,998	453,755	29,504	33,703	1,723	1,204	225,429	470,602
2002	83,463	422,961	32,780	31,617	2,484	2,030	120,757	442,951
2003	284,064	364,691	35,240	30,878	570	3,244	323,118	388,240
2004	435,407	332,023	35,735	31,228	2,259	4,996	478,397	359,380
2005	142,319	303,095	27,613	31,497	1,499	3,539	174,970	334,558
2006	185,598	270,181	30,706	30,630	1,186	1,474	218,964	304,760
2007	141,049	195,011	25,107	30,427	1,557	2,355	170,068	232,584
2008	142,862	196,035	48,841[d]	30,034	2,984	3,755	198,442	232,584
2009	104,546	189,273	30,358[d]	32,432	2,394	3,257	140,555	229,996
2010	58,031	197,369		32,967	1,020	[e]		226,064
10 Yr Avg	197,369	319,567	32,967	31,725	1,948	2,754	235,038	347,738

continued

Source: Brazil et al. 2011.

Note: Blank cells indicate no information available.

[a] Districts 1 and 2 only. Harvest does not include personal use.

[b] Estimated subsistence harvest expanded from villages surveyed.

[c] Running 10 year average does not include most recent year.

[d] 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. See Hamazaki 2011 for revision of historical estimates published by Division of Subsistence from 1990 to 2007. Comparison of 2008 and 2009 estimates with those prior to 2007 should be done cautiously.

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																								

Comments	
Staff initials	Week Ending
	28-May
	4-Jun
	11-Jun
	18-Jun
	25-Jun
	2-Jul
	9-Jul
	16-Jul
	31-Jul

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

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, 2010

Appendix C1.–Lower Kuskokwim River Inseason Subsistence Catch Monitoring Weekly Report Orutsararmiut Native Council, June 6, 2010.

Fishing ending the week of June 6, 2010.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Gillnets More than 6" mesh	Gillnets 6" mesh or less	Both
19	13	3	2	1	4	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	6	0	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
0	6	0	N/A	N/A	N/A	N/A	N/A	N/A

Comments: The first week of the ONC inseason subsistence monitoring program surveys officially began on Thursday June 3rd through Sunday June 6th. During the four-day survey period a total of 19 families were interviewed in Bethel and at area fish camps. Most fish camps were still vacant this weekend and only few drift fishermen were present on the river below Bethel. 13 (68%) of the families interviewed did not fish this week and the majority of them indicated they were waiting for the salmon run to pick up. 6 (32%) families reported beginning fishing this week but half of those families noted they were going to wait for the fish run to increase before full fishing effort. 3 families reported fishing with drift nets. 2 families reported using only a set net. 1 family reported using both set and drift nets. At 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 fresh salmon hanging to dry. One active camp said they had started early and had a total of 47 kings using only set nets. ONC Fisheries Technician's observation of fishing activity on the Kuskokwim river from the mouth of Church slough down to Oscarville counted a total of 42 set nets, and drifting activity appeared to be picking up with a total of 10 drifters out Sunday afternoon. Fishing families noted water levels are a lot lower compared to last year with water clarity about average for this time of year. Some families noted higher numbers of sheefish were being caught this year with their first efforts at catching kings.

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Chinook: No families reported their Chinook catches as very good. The 6 families who were fishing (100%) reported their catches as normal. No families reported their catches as poor. Those fishermen with set nets out report their catches being normal for this time compared to previous years, catching an average of 10 fish overnight. Drifters reported their catches as normal with 1 or 2 Kings every couple drifts. The fishermen surveyed noted that the first kings caught were small but say this is normal for the start of the run. All 6 families who were fishing (100%) reported the salmon run timing as normal. One fisher suggested the first early pulse of kings likely had already passed and that this was normal for kings that are destined for the upper Kuskokwim.

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 Catch Monitoring Weekly Report, Orutsararmiut Native Council, June 13, 2010.

Fishing ending the week of June 13, 2010.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Gillnets More than 6" mesh	Gillnets 6" mesh or less	Both
39	11	19	6	3	7	20	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
1	14	13	0	13	5	NA	NA	NA

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

Chinook			Chum			Sockeye		
Early	Normal	Late	Early	Normal	Late	Early	Normal	Late
1	16	11	0	15	3	NA	NA	NA

Comments: This week the ONC inseason subsistence fishery technicians distributed a total of 20 ASL sampling kits. Most kits were distributed to people who had sampled for the ASL program in previous years and a few kits and training were provided to new families that expressed interest in sampling this year. 39 families were surveyed this week for the inseason subsistence monitoring program. 28 of the families (72%) interviewed reported fishing this week. 11 (28%) families did not fish this week. 19 families (68%) reported fishing with drift nets. 6 (21%) families reported using only set nets. 3 families (11%) reported using both set and drift nets. 7 of the fishing families (25%) used gillnets larger than 6-inch mesh size referred to as "King gear", 20 families (71%) reported using 6-inch mesh or less, and one family used both mesh sizes to fish this week. Some families had not yet started fishing and said they were later than usual in getting their camp ready for the fishing season. Many families are just beginning their fishing after fixing and cleaning fish camp from the winter and waiting for better fishing weather and the fish run to increase. ONC technician's observations of fishing activity on the river from the upper mouth of Church slough down to Oscarville counted 45 set nets (some of which may be whitefish nets). Drifting activity had been slowly increasing over the week with a sharp increase in drift fishermen noted on the river on Saturday June 12th.

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Detailed feedback from fishermen on the health, timing, and abundance of the Chinook run varied this week. A couple fishermen interviewed expressed that the Chinook salmon they caught so far are very healthy and that they hadn't seen flesh in such good condition for some years.

These fishermen described the Chinook as being fat with a high oil content like the Yukon Kings. A couple of fishermen also noted in their catches that the mix of small fish running with the larger fish is an indication that the run is going to be good this year and should be strong once it picks up. Two families completed fishing and have reached their harvest goals for the year. One of these families started fishing early in the Bethel area with set nets but the other had traveled to the mouth of the Kuskokwim to get their harvest since catch rates were still low around Bethel at this time.

Several families responded that in a "normal" fishing year they would have been half-way done or nearly done subsistence fishing by now. Some of the fish camps that provide for elders or a large family were concerned that the Chinook run was late and worried that they may not be able to meet their family's needs for the year if the run did not increase soon. Many fishermen interviewed suggested the weather conditions play a big part in the timing of the fish runs. Specifically these fishermen indicated that the low winter snowpack, little spring rain, and resulting low water levels on the Kuskokwim River were likely the cause of the slow or late Chinook run. Some fishermen also said the clear water was making it difficult to catch Chinook because the fish can see and avoid the nets. Many noted that the recent shift in wind from the north to blowing from the southwest would bring up the tide on the river and the fish with it.

Chinook: Of the 28 families fishing this week, 1 family reported their Chinook catches as very good, 14 families (50%) reported their catches as normal, and 13 families (46%) reported their catches as poor. 11 families that have not started their Chinook harvests are just finishing up their repairs on their camps. 14 families reported the fish harvested as smaller in size than average with a higher number of males in their catch and some of the smaller kings passing right through their nets. Many fishermen are switching back and forth from a larger mesh to a smaller mesh net because the fish were hitting but getting away. 2 families reported their Chinook harvest goal is complete and drying. Of the 28 families that reported fishing this week, 1 family reported the run return as early, 16 families (57%) reported the salmon run timing as normal, 11 families (39%) report the run to be late compared to previous years.

Chum: No families reported their chum catches as very good. 13 families (46%) reported their catches as normal. 5 families (18%) reported their chum catches as poor. Many families are still using their King gear and assessments made on the chum run are a reflection of by-catch rates compared to a normal year. Of the families that felt they could comment on the chum run at this time no families reported the run return as early, 15 families report the chum run timing as normal. 3 families report the run to be late compared to previous years.

Sockeye: It is still early for most fishermen to comment on the sockeye run, although a few fish camps interviewed had recently caught one or two. Assessments made on the sockeye run at this time are a reflection of by-catch rates compared to a normal year. No families reported their sockeye catches as very good. No families reported their catches as normal. No families reported their sockeye catches as poor. No families reported the run return as early. No families report the salmon run timing as normal. No families report the run to be late compared to previous years.

Fishing ending the week of June 20, 2010.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Gillnets More than 6" mesh	Gillnets 6" mesh or less	Both
26	3	20	2	1	20	2	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
2	15	6	0	23	0	0	22	1

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	11	12	0	22	1	6	15	2

Comments: This week the ONC subsistence monitoring technicians interviewed 26 families. Usually at this time of the fishing season most fishcamps would be active but fewer families have been available to interview on the survey route this week, although drift fishing picked up considerably by Sunday. 20 families (87%) reported using drift nets. 2 families (9%) reported using only a set net. 1 family (4%) reported using both drift and set nets. 20 fishers (87%) reported using more than 6-inch mesh and 2 families (9%) reported using 6-inch or less mesh this week. 1 family (4%) used both mesh sizes this week. 11 families reported just starting this week. 4 families on the survey route were complete with their Chinook salmon harvests. Many people noted that at this time in a normal year they would have had half their rack filled by now but were just beginning to put fish on the rack this year due to the late run and poor drying conditions. 3 families reported being close to their harvest goals for Chinook this season.

This week has been very busy for subsistence fishers as many families have just begun fishing and other families work to finish putting up king salmon for the winter. For approximately the past two weeks the heavy rain and wet wind has made for poor fish drying conditions. Many people contacted have waited to start fishing until this weekend when the weather cleared to

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safely put up dry fish without risk of spoilage. Numerous families that have long been a regular part of the inseason subsistence survey program have not yet been out at their fish camps and may be waiting for better weather to begin fishing but were not available via telephone to confirm this. Many families reported the run being a mix of some large and many small kings but that catches of large Chinook were picking up. 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. Throughout the season so far, many families have reported they were prepared for the delay in all species of fish. The number of set nets on the river dropped considerably and this weekend there was a large jump in the number of people out drifting for fish. There were a couple comments from fishers about finding other people checking and taking fish from their set nets. A few families reported that round "eel bite" scars have been frequent on their fish catch this year.

Chinook: 2 families (9%) reported the fishing as very good. 15 families (65%) reported the fishing as normal. 6 families (26%) reported the fishing as poor. 11 families (48%) reported the run timing was normal and 12 families (52%) reported the run appeared to be late. Some of the families interviewed were happy be catching more big kings after the first pulse of smaller males. Many families favor the large female kings specifically for making strips. 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. 23 families (100%) reported the fishing as normal. No families report the fishing as poor. 22 families (96%) reported chum run timing as normal. 1 family (4%) 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. 22 families (96%) reported the fishing as normal. 1 families (4%) 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. 6 families (26%) reported fishing as early. 15 families (65%) reported the run timing as normal and 2 families (9%) reported the run as late. Several fishers reported catches of sockeye picking up and that they would soon switch nets to target them specifically.

Appendix C4.–Lower Kuskokwim River Inseason Subsistence Catch Monitoring Weekly Report, Orutsararmiut Native Council, June 27, 2010.

Fishing ending the week of June 27, 2010.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Rod & Reel	Gillnets More than 6" mesh	Gillnets 6" mesh Or less	Both
37	0	30	3	4	0	3	33	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
1	27	9	1	34	2	2	30	5

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	25	12	0	36	1	0	37	0

Comments: 37 families were interviewed this week for the ONC in-season subsistence program. Of the families contacted, all families reported fishing this week and no families reported not fishing this week. 30 families (81%) reported using drift nets. 3 families (8%) reported using only a set net. 4 families (11%) reported using both drift and set nets. No families reported using rod and reel. 33 families (89%) reported using greater than 6-inch mesh. 3 families (8%) reported using 6-inch mesh or less. And 1 family (3%) reported using both.
Subsistence fishing was closed at and below Bethel on Friday June 25th from 6 a.m. to 7 p.m. around a scheduled 4 hour commercial fishery opening that day in Subdistrict 1A.

Area fishing families provided a wide range of feedback this week. One subsistence fisherman contacted clearly stated that he had cut back on fishing this week so that the fish can go up river to share. He said he didn't want to start a war with the upriver villages, that's how they did it back in the old days and he continues to follow that law. "If people up river weren't catching any fish for food, then we cut back on fishing so that the fish can go upriver and we can share food. Everybody has to eat, everybody; it doesn't matter exactly who are. You could be black, white, red, brown, or native everybody has to eat."

Many families at fish camps near the surrounding local villages are still fishing and putting up fish while many Bethel residents are now reporting that they have nearly met their harvest goals. Some families reported that they were still just getting started because they wanted to wait for the larger size kings to arrive. One family noted that due to the late run and poor weather in

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previous weeks they would normally have 100 fish drying by now but currently only had 7 this year. A few fishermen commented that they had started late and may have missed an early pulse of kings after breakup but were still expecting a second pulse of kings to pass Bethel and hoped to meet their harvest goals at that time. Some of the women we talked with at fish camp noted that they had enough sunny dry days with good wind recently to dry their fish well.

There have been more reports of people taking out their set nets, because of other people checking them and taking fish. On average about 5 setnets and 31 drift fishermen have been observed each day of inseason survey observations this week.

Chinook: 1 family 3% reported the fishing as very good. 27 families (73%) reported the fishing as normal. 9 families (24%) reported the fishing as poor. No families reported the Chinook run being early. 25 families (68%) reported the run being normal and 12 families (32%) reported the run being late.

Many families interviewed reported that they had a lot of smaller size kings and tiny jacks in their catches so far this year. Many families also reported that they were waiting on the second pulse of kings still to finish their subsistence harvest and indeed by the end of the survey week some reported that the second pulse had arrived. These recent king catches were said to be big and plentiful, better than any other fishing so far this year.

Chum: 1 family (3%) reported the fishing as very good. 34 families (92%) reported the fishing as normal. 2 families (5%) reported the fishing as poor. No families reported the chum run being early. 36 families (97%) reported the run as normal and 1 family (3%) reported run as late.

It has been reported by many fisherman that the chums were bigger than the kings they had caught so far. They also expressed the chum run seemed stronger than both the Chinook and Sockeye run this year.

Sockeye: 2 families (5%) reported the fishing as very good. 30 families (81%) reported the fishing as normal. 5 families (14%) reported the fishing as poor. No families reported the run as early. 37 families (100%) reported the run as normal and no families reported the run as late.

Some families noted a strong sockeye run with good catch rates early in the survey week but that it had tapered off and many chums were being caught by Thursday night before the commercial opening on Friday.

Appendix C5.–Lower Kuskokwim River Inseason Subsistence Catch Monitoring Weekly Report, Orutsararmiut Native Council, July 4, 2010.

Fishing ending the week of July 4, 2010.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Rod & Reel	Gillnets More than 6" mesh	Gillnets 6" mesh Or less	Both
38	2	30	6	0	0	31	5	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
3	25	8	5	28	3	1	25	10

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	32	4	0	36	0	0	36	0

Comments: 38 families were interviewed this week for the ONC inseason subsistence program. Of the families contacted 36 families reported fishing this week and 2 families reported not fishing this week. 30 families (83%) reported using drift nets. 6 families (17%) reported using only a set net. No families reported using both drift and set nets. No families reported using rod and reel. 31 families (86%) reported using greater than 6-inch mesh. 5 families (14%) reported using 6-inch mesh or less. No families reported using both mesh sizes this week.

Subsistence fishing was closed at and below Bethel on Monday June 28th from 6 a.m. to 7 p.m. around a scheduled 4-hour commercial fishery opening that day.

Many of the families noted that they started late, are now caught up and finishing with fish in the smoker. Some larger family units along with families that have large gatherings or traditional feasts to attend are still fishing for strips and will be fishing for the later "fall" chum once the fish currently drying on the racks can be transferred to the smokehouse. All families that were interviewed this week were asked if they had met their harvest goals and fish needs from this year's run so far. All respondents said yes, but some indicated that the Chinook harvest was comprised of smaller size fish this year, so they had to fish more on the second pulse to make up for the total amount needed for the year. Other families had waited for the second pulse of kings to complete their harvest needs because they had waited out the earlier poor drying weather to avoid losing any fish to spoilage. While harvest goals vary widely by family in general village harvesters near Bethel have indicated that their goals are over 100 fish (all species included) and

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some were indicating there catches to be met were over 100 kings alone. Many Bethel resident respondents (many of whom have greater access to local markets) all indicated a catch number (all species included) 50-70 fish harvested and were done. By the end of the survey week 14 of the 36 families interviewed had completed their salmon fishing for the year. A few families commented they will still put up some Coho salmon as "freezer fish" when they arrive.

Chinook: 3 families (8%) reported the fishing as very good. 25 families (69%) reported the fishing as normal. 8 families (22%) reported the fishing as poor. No families reported the Chinook run being early. 32 families (89%) reported the run being normal and 4 families (11%) reported the run being late. Run timing and catch rates responses this week were referring specifically to the observed recent "second pulse" of kings which most respondents indicate is typical for there to be a distinct early pulse and a later second pulse. Many of the families interviewed reported that the second pulse of Kings had arrived and that this pulse had a larger portion of larger size kings than the first pulse. Some families that had fished the first pulse felt the catch rates were about the same but that this time they were getting bigger fish, which helped to meet their harvest goals. Many families that had missed the first pulse due to weather conditions at that time said they were able to put up enough fish with the second pulse to still meet their families needs for the year.

Chum: 5 families (14%) reported the fishing as very good. 28 families (78%) reported the fishing as normal. 3 families (8%) reported the fishing as poor. No families reported the chum run being early. 36 families (100%) reported the run as normal and no families reported run as late. Some families noted that they were getting lots of very large chum and their chum catches far outnumbered the sockeye catch.

Sockeye: 1 family (3%) reported the fishing as very good. 25 families (69%) reported the fishing as normal. 10 families (28%) reported the fishing as poor. No families reported the run as early. 36 families (100%) reported the run as normal and no families reported the run as late. Some families commented that the sockeye run was very poor this year, as they had gotten very few as bycatch or when targeting them specifically. Some respondents were still hoping to get more sockeye yet this year.

Appendix C6.–Lower Kuskokwim River Inseason Subsistence Catch Monitoring Weekly Report, Orutsararmiut Native Council, July 11, 2010.

Fishing ending the week of July 11, 2010.

Families Surveyed	Families Not Fishing	Using Driftnets	Using Setnets	Both	Rod & Reel	Gillnets More than 6" mesh	Gillnets 6" mesh Or less	Both
20	9	10	0	1	0	8	0	3

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	10	0	3	7	0	2	6	2

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	8	2	0	10	0	0	8	2

Comments: 20 families were interviewed this week for the ONC inseason subsistence program. Of the families contacted 11 families reported fishing this week and 9 families reported not fishing this week. 10 families (91%) reported using drift nets. No families reported using only a set net. 1 family (9%) reported using both drift and set nets. No families reported using rod and reel. 8 families (73%) reported using greater than 6-inch mesh. This included 5 fishermen who noted they used 6 ½ - inch mesh, 1 fisher who used 7 ½ - inch mesh and 4 used 8-inch king gear. No families reported using only 6-inch mesh or less but 3 families (27%) reported using both mesh sizes categories this week.

Subsistence fishing was closed at and below Bethel on Friday July 9th from 7 a.m. to 8 p.m. around a scheduled 4-hour commercial fishery opening that day.
Many of the families noted that they started late either due to the late King run, poor weather or other circumstances that kept them from fishing early in the run. All of these families indicated that although they were concerned at the beginning due to the late start, they managed to get enough fish put up for the year even if it wasn't as much as they usually would have at this time. Of those families still fishing, about half of them indicated they would still fish next week if the kings and sockeye were still running in order to meet their family harvest goals. Several fishermen commented they had heard of good catch rates still for king and sockeye in the downriver

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communities and so thought it worthwhile to keep fishing next week. Some fishermen were going to still harvest chums and other indicated they would target more silver salmon to make up for their poor sockeye catch this year. Some of the families still fishing this week stated they had met their salmon needs by this weekend. All families contacted at fish camp were tending their smokehouses and finishing drying fish on the racks. Most were able to dry their fish adequately, even during the wet weather by putting fish in the smokehouse early and keeping a low fire going or placing extra tarp on the sides of the fish rack. There were only a couple reports of small amounts of spoilage due to the wet weather, which caused poor fish drying conditions earlier.

Ten of the twenty families interviewed this week had completed their salmon harvest for the year. Overall most families were relieved that the later run of kings was good and the larger size of the fish that came later made up for poor catches in the beginning. All families interviewed indicated they had gotten or expected to get an adequate amount of fish even if it was not as much as they would put up in a normal year of harvest.

Chinook: No families reported the fishing as very good. 10 families (91%) reported the fishing catch rates as normal for this week. No families reported the fishing as poor this week. No families reported the Chinook run being early. 8 families (73%) reported the run being normal and 2 families (18%) reported the run being late. Most respondents indicated that the start of the run had been late but that kings were still running now and so those that had not yet completed their harvest goals thought they would still meet them as they were still catching kings. Many families noted that the early run of kings were very small in size with small skinny females mistaken for jacks until cutting them open to verify eggs. All families noted that the later part of the king run had larger size fish, which helped to catch up with their harvest goals for the year. Many families that were still fishing noted that kings were still coming upriver and they were still getting some good catches of large kings in good condition, still bright and with firm flesh with only a couple reports of “mushy” flesh at this time.

Chum: 3 families (27%) reported the fishing as very good. 7 families (64%) reported the fishing as normal. No families reported the fishing as poor. No families reported the chum run being early. 10 families (91%) reported the run as normal and no families reported run as late. Some families noted that they were getting a lot of large chum this year.

Sockeye: 2 families 18(%) reported the fishing as very good. 6 families (55%) reported the fishing as normal. 2 families (18%) reported the fishing as poor. No families reported the run as early. 8 families (73%) reported the run as normal and 2 families (18%) reported the run as late. Sockeye reports this week were varied with some families getting very good catches and large size sockeye whereas other families were catching very few. Of the families still fishing this week some were still hoping to catch more sockeye to meet their harvest goals for the year.

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

Appendix D1.–Proportion of Lower Kuskokwim River area subsistence fishermen characterizing their weekly salmon catch rates, by species, as: "Very Good", "Normal" and "Poor", 2003–2010.

Year	Week Ending	Number of Families			Proportion of Fishing Respondents								
					Chinook Catch rates:			Chum Catch Rates			Sockeye Catch Rates		
		Inter-viewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2010	Jun 06	19	6	13	0%	100%	0%	[a]	[a]	[a]	[a]	[a]	[a]
	Jun 13	39	28	11	4%	50%	46%	0%	46%	18%	[a]	[a]	[a]
	Jun 20	26	23	3	9%	65%	26%	0%	100%	0%	0%	96%	4%
	Jun 27	37	37	0	3%	73%	24%	3%	92%	5%	5%	81%	14%
	Jul 04	38	36	2	8%	69%	22%	14%	78%	8%	3%	69%	28%
	Jul 11	20	11	9	0%	91%	0%	27%	64%	0%	18%	55%	18%
2009	Jun 07	20	6	14	0	67%	33%	[a]	[a]	[a]	[a]	[a]	[a]
	Jun 14	43	38	5	29%	50%	21%	0	100%	0	0	100%	0
	Jun 21	44	44	0	41%	36%	23%	0	100%	0	0	86%	14%
	Jun 28	36	31	5	39%	55%	6%	3%	77%	9%	6%	71%	23%
	Jul 05	36	5	31	0	100%	0	0	100%	0	0	100%	0
	Jul 12	36	2	34	0	100%	0	0	100%	0	0	100%	0
2008	Jun 08	27	5	22	20%	60%	0	[a]	[a]	[a]	[a]	[a]	[a]
	Jun 16	34	17	17	0	76%	24%	0	100%	0	0	100%	0
	Jun 22	32	27	5	56%	44%	0	0	74%	26%	81%	19%	0
	Jun 29	33	27	6	52%	48%	0	15%	85%	0	56%	44%	0
	Jul 08	35	15	20	20%	80%	0	0	100%	0	47%	53%	0
	Jul 13	32	3	29	0	100%	0	33%	67%	0	0	100%	0
2007	Jun 03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Jun 12	39	28	11	0	29%	71%	ND	ND	ND	ND	ND	ND
	Jun 17	40	33	7	0	30%	70%	ND	ND	ND	ND	ND	ND
	Jun 24	44	40	4	0	35%	65%	ND	ND	ND	ND	ND	ND
	Jul 02	36	20	12	45%	45%	10%	80%	20%	0	0	40	60%
	Jul 08	33	10	23	60%	40%	0	80%	20%	0	30%	70%	0
	Jul 14	33	6	27	0	0	100	0	33%	67%	0	17%	83%

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Year	Week Ending	Number of Families			Proportion of Fishing Respondents								
					Chinook Catch rates:			Chum Catch Rates			Sockeye Catch Rates		
		Inter-viewed	Fishing	Not Fishing	Very Good	Normal	Poor	Very Good	Normal	Poor	Very Good	Normal	Poor
2006	Jun 03	22	0	22	0	0	0	ND	ND	ND	ND	ND	ND
	Jun 10	32	19	13	32%	68%	0	0	0	0	ND	ND	ND
	Jun 17	36	30	6	60%	40%	0	60%	40%	0	53%	47%	0
	Jun 25	48	43	5	79%	21%	0	91%	9%	0	19%	56%	26%
	Jul 02	46	14	32	21%	79%	0	71%	29%	0	43%	57%	0
	Jul 09	38	8	30	0	100%	0	25%	75%	0	37%	63%	0
	Jul 17	26	5	21	0	100%	0	100	0	0	0	100%	0
2005	Jun 06	34	12	22	0	12	0	ND	ND	ND	ND	ND	ND
	Jun 11	39	26	13	77%	23%	0	ND	ND	ND	ND	ND	ND
	Jun 18	48	42	6	86%	14%	0	33%	67%	0	74%	26%	0
	Jun 25	48	34	14	74%	15%	0	56%	44%	0	82%	18%	0
	Jul 02	32	2	30	3	0	0	67%	33%	0	3	0	0
	Jul 09	22	2	20	0	100	0	50%	50%	0	50%	50%	0
2004	Jun 05	31	10	21	60%	40%	0	ND	ND	ND	ND	ND	ND
	Jun 12	41	37	4	73%	22%	5%	ND	ND	ND	ND	ND	ND
	Jun 19	35	31	4	74%	26%	0	13%	87%	0	13%	87%	0
	Jun 26	43	31	12	61%	39%	0	77%	23%	0	16%	71%	13%
	Jul 03	44	22	22	14%	77%	0	45%	45%	0	0	59%	32%
	Jul 10	44	13	31	0	77%	0	62%	15%	0	0	31%	46%
2003	Jun 07	18	9	9	78%	22%	0	ND	ND	ND	ND	ND	ND
	Jun 14	33	24	9	92%	8%	0	0	8%	0	0	13%	0
	Jun 21	48	32	14	94%	6%	0	3%	0	0	23%	56%	9%
	Jun 28	50	34	16	88%	12%	0	8%	26%	38%	79%	21%	0
	Jul 05	45	21	24	76%	24%	0	38%	62%	0	76%	24%	0
	Jul 12	46	14	32	0	86%	14%	93%	7%	0	0	86%	14%

Note: Only reports from the month of June and the first two weeks of July were used for comparison between years. ND indicates no data was collected, or that respondents did not give comment for that category. Responses from the question: "Compared with this time in a "Normal" year, how were catch rates for salmon this week"?

[a] The question was asked, but respondents declined to comment, often because it was too early in the season, or they were not targeting those species.