

Technical Paper No. 313

**Subsistence Salmon Harvest Monitoring Report,
Kuskokwim Fisheries Management Area, Alaska,
2004**

by

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and

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August 2007

Alaska Department of Fish and Game

Division of Subsistence



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The Division of Subsistence Technical Paper Series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions. Technical Paper Series reports are available through the Alaska State Library and on the Internet: <http://www.subsistence.adfg.state.ak.us/>

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TABLE OF CONTENTS

	Page
TABLE OF CONTENTS	i
LIST OF TABLES.....	ii
LIST OF FIGURES.....	iii
ABSTRACT	1
INTRODUCTION.....	1
The Study Area.....	3
Background: Kuskokwim area Subsistence Salmon Harvest Monitoring	3
Program History.....	3
1960-1987	3
1988-2003	4
Regulatory Context.....	5
Licenses, Permits, and Harvest Limits	5
Fishing Gear.....	6
Subsistence Salmon Fishing Schedule	6
2004 Subsistence Salmon Fishing Season.....	7
Subsistence Closures During the Commercial Fishery	7
PROJECT OBJECTIVES.....	7
HARVEST MONITORING METHODS.....	8
Harvest Calendars.....	11
Household Surveys: Interviews	11
Postcard Surveys.....	13
2004 SAMPLING SUMMARY	13
Communities and Households Contacted.....	13
Harvest Calendars.....	14
Households Interviews (Surveys)	14
Postcards.....	14
2004 Regional Sampling	14
2004 Sampling Compared to 1989-2003 Monitoring Efforts.....	16
RESULTS OF SUBSISTENCE SALMON HARVEST MONITORING FOR 2004	16
Areawide Harvest Estimates Summary, 2004	16
Salmon for Dog Food	17
Fishing Gear.....	17
Salmon Retained from Commercial Fishing for Subsistence Use	18
Regional Harvest Summary, 2004.....	18
Other Fish Harvested	19
Bethel Non-Salmon Fish Harvests, 2004.....	19
DISCUSSION AND CONCLUSIONS	20

2004 Harvest Estimates Compared to 1989-2003 Subsistence Salmon Harvest Monitoring Estimates.....	20
Areawide Subsistence Salmon Harvest Assessment, 2004.....	20
Chinook Salmon.....	20
Chum Salmon.....	20
Sockeye Salmon.....	21
Coho Salmon.....	21
Regional Harvest Assessment, 2004.....	21
Chinook Salmon.....	21
Chum Salmon.....	22
Sockeye Salmon.....	23
Coho Salmon.....	24
Interregional Salmon Harvest Composition Comparisons among Species, 2004.....	25
Non-Salmon Fish Harvests.....	26
RECOMMENDATIONS.....	27
Monitoring Harvests.....	27
Assessment.....	28
ACKNOWLEDGEMENTS.....	29
LITERATURE CITED.....	30
APPENDIX A. HARVEST CALENDAR FOR 2004.....	57
APPENDIX B. KUSKOKWIM AREA VILLAGE SURVEY FORM, 2004 (LOWER RIVER EXAMPLE).....	63
APPENDIX D. POSTCARD SURVEY FOR 2004.....	71

LIST OF TABLES

Table	Page
1. Kuskokwim area community sampling rates, 2004.....	34
2. Kuskokwim area harvest monitoring program sampling summaries, 1989-2004.....	35
3. Kuskokwim community harvest monitoring participation, 1989-2004.....	36
4. Subsistence salmon harvest by community, Kuskokwim area, 2004.....	37
5. Estimated and reported subsistence harvest of Chinook salmon, Kuskokwim area, 2004.....	38
6. Estimated and reported subsistence harvest of chum salmon, Kuskokwim area, 2004.....	39
7. Estimated and reported subsistence harvest of sockeye salmon, Kuskokwim area, 2004.....	40
8. Estimated and reported subsistence harvest of coho salmon, Kuskokwim area, 2004.....	41
9. Gear types used for subsistence salmon fishing, Kuskokwim area, 2004.....	42
10. Subsistence Chinook salmon gillnet mesh sizes used by residence of communities (number of households).....	43
11. Commercially harvested salmon retained for subsistence use, Kuskokwim area, 2004.....	44
12. Estimated subsistence salmon and non-salmon harvest, Bethel, 2004.....	45
13. Historic subsistence salmon harvest, Kuskokwim area, 1989-2004.....	46
14. Kuskokwim area community subsistence Chinook salmon harvest estimates, 1989-2004.....	47
15. Kuskokwim area community subsistence chum salmon harvest estimates, 1989-2004.....	48
16. Kuskokwim area community subsistence sockeye salmon harvest estimates, 1989-2004.....	49
17. Kuskokwim area community subsistence coho salmon harvest estimates, 1989-2004.....	50

LIST OF FIGURES

Figure		Page
1.	Kuskokwim Management Area commercial fishing districts.....	51
2.	Bethel non-salmon fish relative harvest contribution by species and pounds usable weight, 2004.	52
3.	Composition of estimated subsistence salmon harvest, north Kuskokwim Bay, 2004.....	53
4.	Composition of estimated subsistence salmon harvest, lower Kuskokwim River, 2004.....	53
5.	Composition of estimated subsistence salmon harvest, middle Kuskokwim River, 2004.....	54
6.	Composition of estimated subsistence salmon harvest, upper Kuskokwim River, 2004.....	54
7.	Composition of estimated subsistence salmon harvest, south Kuskokwim Bay, 2004.	55

ABSTRACT

This final report documents subsistence salmon harvest estimates for the Kuskokwim Fisheries Management Area for the year 2004, on the basis of surveys in 30 communities along the Kuskokwim River and Kuskokwim Bay, including Nelson Island. Methods used to collect salmon harvest information included household surveys, harvest calendars and postcard surveys; household surveys in Bethel also gathered information on non-salmon fish harvested for subsistence purposes. Data include numbers of salmon harvested for subsistence uses, gear used, numbers of salmon used for dog food, and numbers of salmon retained from commercial catches. Estimates of the subsistence salmon harvest for communities contacted in the Kuskokwim area in 2004 were 85,086 Chinook salmon (*Oncorhynchus tshawytscha*), 55,575 chum salmon (*O. keta*), 34,892 sockeye salmon (*O. nerka*), and 39,406 coho salmon (*O. kisutch*), for a total of 214,959 salmon. These harvest estimates were within, or were higher than, the amounts that the Alaska Board of Fisheries considered reasonably necessary to provide for customary and traditional uses. Compared to 2003 harvest estimates, harvests increased, with the exception of sockeye salmon, demonstrating again the importance of salmon for subsistence in this area. In Bethel, non-salmon fish comprised about 18% of total fish harvested for subsistence. This salmon harvest monitoring research continues to be critical for fisheries managers for their use in planning for adequate salmon escapement and providing continued uses of salmon for subsistence purposes.

Key words: Kuskokwim River, Kuskokwim Bay, Yukon-Kuskokwim Delta, Bethel, subsistence, salmon harvest monitoring, Chinook, *Oncorhynchus tshawytscha*, coho, *Oncorhynchus kisutch*, pink, *Oncorhynchus gorbuscha*, chum, *Oncorhynchus keta*, sockeye, *Oncorhynchus nerka*.

INTRODUCTION

This report presents the results of the subsistence salmon harvest monitoring program in the Kuskokwim Fisheries Management Area for the 2004 salmon fishing season, following the methods established by Alaska Department of Fish and Game (ADF&G), Division of Subsistence (Subsistence) in 1988 and 1989 (Francisco et al. 1989; Walker and Coffing 1993).

The Kuskokwim area (Figure 1) subsistence salmon fishery is one of the largest in the state in terms of amounts harvested. From June through October, the daily activities of many Kuskokwim area households revolve around harvesting, processing, and preserving salmon for “customary and traditional uses,” or subsistence. The movement of families from permanent winter residences to summer fish camps situated along rivers and sloughs continues to be very important in annual subsistence harvest efforts.

The significance of salmon and other fish harvested and used for subsistence in this area is well documented by ADF&G Subsistence studies in the region. They indicate that fish contribute 68% to 85% of the total pounds of fish and wildlife harvested in a community; salmon contribute 49% to 53% of the total annual wild food harvest. The harvest of salmon for subsistence ranges from 241 lbs usable weight per capita in some communities (e.g., Nunapitchuk, 1983) to 446 lbs (e.g., Kwethluk, 1986) and 649 lbs (e.g., Akiachak, 1998) per capita in other Kuskokwim River communities (e.g., Andrews 1989, 1994; Coffing 1991; Coffing et al. 2001; see also Community Subsistence Information System [CSIS] [ADF&G 2007]). Kuskokwim area communities are heavily reliant upon the annual returns of salmon, not only for basic nutrition, but also for maintenance of cultural identity and cultural values, in addition to economic opportunities for commercial sales (e.g., Andrews 1989:154; Andrews and Coffing 1986; Barker 1993; Coffing 1991; Fienup-Riordan 1990:184ff, 1994:120, 123; Himmelheber 1987:32; Oswalt 1963a, 1963b, 1990; Pete 1993; Senecal-Albrecht 1990, 1998; Walker and Coffing 1993; Wolfe et al. 1984).

The significance of subsistence salmon fisheries to residents of the Kuskokwim Management Area becomes much more obvious when compared to estimates of U.S. per capita salmon

consumption. For example, Professor Gunnar Knapp of the University of Alaska's Institute of Social and Economic Research, has estimated U.S. salmon consumption in 1990 at less than 1 lb per person, increasing during the 1990s to almost 2 lbs per person in 1999 (Knapp 2000). The U.S. National Marine Fisheries Service estimated the U.S. consumption of fishery products (not just salmon) at 17 lbs of edible meat per person in 2004 (U.S. National Marine Fisheries Service 2005).

Between 1989 and 2003, an average of 1,443 households annually subsistence fished for salmon, representing an average of 39% of the estimated total households in the Kuskokwim Management Area. In 2004, an estimated 1,503 households subsistence fished for salmon (Table 1). Many people not directly involved in harvesting salmon assisted family and friends with cutting, drying, smoking, and other associated preservation activities, such as salting, canning, and freezing. Annual household subsistence surveys, like the 2004 harvest survey reported in this publication, gather summary harvest data on Chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*O. keta*), sockeye salmon (*O. nerka*), and coho salmon (*O. kisutch*), including numbers of fish of each species harvested and types of fishing gear. Because of the relatively low harvest of pink salmon (*O. gorbuscha*), data on this species have not been collected (Walker and Coffing 1993:58).

The results of these surveys are important for state and federal fisheries management to plan for adequate salmon escapement and continued uses of salmon for subsistence purposes. In those streams of the Kuskokwim Management Area in which no commercial fishing occurs, subsistence salmon harvest estimates provide information on the exploitation of salmon runs to those particular streams. Without estimates of subsistence salmon harvests, fishery managers are not able to estimate escapement for those streams.

Data on non-salmon fish harvests have been collected intermittently in various parts of the Kuskokwim Management Area, but are not a standard component of the annual harvest monitoring program. For example, surveys on subsistence-caught Pacific herring (*Clupea pallasii*) were conducted in the mid-1980s through the early 1990s in the Nelson Island region (Pete 1984, 1989, 1991a, 1991b, 1992). Non-salmon fish harvest estimates also have been provided for communities such as Kwethluk (Coffing et al. 2001), Nunapitchuk (Andrews 1989, 1994; Coffing 1991), Akiachak, Nikolai, McGrath, Telida, and Takotna (Stokes 1985), and Goodnews Bay and Quinhagak (Wolfe et al. 1984) from community baseline surveys conducted in the Kuskokwim region in the 1980s and 1990s. More recently, studies have documented non-salmon fish harvests by residents of Lake Minchumina and Nikolai (Holen et al. 2006), Aniak (Coffing et al. 2003), Bethel (Simon et al. 2007), and both Aniak and Chuathbaluk (Krauthoefer et al. 2007). Some additional information was collected in 2004 on subsistence harvests of freshwater and anadromous non-salmon fish by residents of Bethel.

Information on specific salmon harvest locations has not been annually collected, although ADF&G Subsistence research conducted largely in the 1980s documented harvest location information for a number of Kuskokwim area communities (e.g., Andrews 1989; Brelsford et al. 1987; Coffing 1991; Coffing et al. 2001, 2003; Charnley 1982, 1984; Kari 1983, 1985; Pennoyer et al. 1965; Pete 1984, 1989, 1991a, 1991b, 1992; Stickney 1981; Stokes 1982, 1985; Williams et al. 2005). Rather, the annual Kuskokwim salmon harvest monitoring program focused on estimating total community harvests, with some recent exceptions. For example, limited information on harvest locations and fishing gear has been collected from Aniak and Bethel fishers in recent years (cf. Coffing et al. 2003; Krauthoefer et al. 2007). Despite the absence of

data on specific harvest locations, general harvest areas regularly used by residents of various Kuskokwim area communities are characterized below to provide a context for patterns of subsistence salmon harvests in the region.

THE STUDY AREA

There are 38 communities in the Kuskokwim Management Area. In 2004, the total number of estimated households in these 38 communities was approximately 4,670 (Table 1). Most (77%) are situated within the Kuskokwim River drainage.

Residents in Bethel, the largest community in the region with approximately 1,874 households in 2004, typically harvested salmon from the Kuskokwim River.

Residents of the northern Kuskokwim Bay communities of Kwigillingok, Kongiganak, and Kipnuk, which together had roughly 354 households in 2004, harvested salmon primarily from the Kuskokwim River, but may have also harvested salmon from coastal areas and local tributaries (Himmelheber 1987:7; Stickney 1984:60-61; Walker and Coffing 1993:1).

Residents of Quinhagak, Goodnews Bay, and Platinum, located along the southern shore of Kuskokwim Bay (approximately 227 households in 2004), harvested salmon primarily from the drainages of the Kanektok River, Arolik River, and Goodnews River (e.g., Wolfe et al. 1984:321-322; Walker and Coffing 1993:1).

The Bering Sea coastal communities of Newtok, Tununak, Toksook Bay, Nightmute, and Chefnak (composed of approximately 435 households in 2004), and the village of Mekoryuk (79 households in 2004), located on Nunivak Island, harvested salmon from local rivers and coastal waters, which likely included coastal stocks as well as mixed stocks that were not bound for the Kuskokwim River (e.g., Fienup-Riordan 1983:112; Walker and Coffing 1993:1).

BACKGROUND: KUSKOKWIM AREA SUBSISTENCE SALMON HARVEST MONITORING

Program History

1960-1987

Data on the subsistence harvest of salmon from the Kuskokwim Management Area have been collected by ADF&G annually since 1960 using a variety of methods. The Division of Commercial Fisheries (CF) began conducting subsistence salmon harvest surveys among Kuskokwim River fishers in the early 1960s; surveys were subsequently broadened to include the southern Kuskokwim Bay communities of Quinhagak in 1967 and Goodnews Bay and Platinum in 1979. The Division of Commercial Fisheries first developed harvest estimates through “smokehouse counts” conducted immediately following the Chinook salmon run (e.g., Jonrowe et al. 1979). For example, the CF 1969 “Annual Management Report” presented a discussion of how subsistence salmon harvest was documented along the Kuskokwim River:

The annual survey of the Kuskokwim River subsistence fishery was initiated in 1960. During July and August a Department crew surveys all villages and fish camps from Eek to the fish camps at Swift River belonging to residents of Stony River . . . catch calendars for May through September are mailed to all known families who fish for subsistence purposes in the Kuskokwim River . . . survey methods have changed somewhat over the past few years and the present method, used since 1968, is thought to be the most

accurate and comprehensive means of coverage of the subsistence fishery (Regnart et al. 1970:25).

Information was obtained from families who were known to fish through harvest calendars and household interviews conducted immediately after the Chinook salmon run; the coho salmon harvest was incompletely documented. Prior to 1985, subsistence salmon catches were lumped into one of two categories: “king salmon” and “small salmon” (e.g., Walker and Coffing 1993:49).

The total number of fishing households in a particular community was estimated by comparing the average harvests of households known to fish with the estimated total number of fishing households (see discussion in Walker and Coffing 1993:35). However, during 1983, 1984, 1986, and 1987, funding was insufficient to conduct surveys in all Kuskokwim Management Area communities; instead, subsets of villages were sampled and then these data were expanded to produce an estimate of the salmon harvests by other Kuskokwim area communities. For example, in 1987, due to budget shortfalls, CF researchers were able to interview only those Kuskokwim River drainage fishing families who were available in the first two weeks of August (425 households). These results were expanded to produce an estimate of the total Chinook salmon catch based on previous years’ harvests (Francisco et al. 1988: 28). Therefore, while subsistence salmon harvest information from 1960 to 1988 is available, the data are not necessarily comparable from year to year because the statistical methods used to expand the harvest data and produce total harvest estimates of Kuskokwim area salmon were not fully documented (Andrews and Coffing 1986; Walker and Coffing 1993:5).

1988-2003

The Division of Subsistence assumed responsibility for the annual subsistence salmon harvest monitoring program in the Kuskokwim Management Area in 1988, under an agreement with the Division of Commercial Fisheries, and has collected and analyzed the data since then. Survey methods were refined during the 1988 field season through the development of a comprehensive community household database, as described in the 1988 “Annual Management Report for the Kuskokwim Management Area” (Francisco et al. 1989:7):

This database identified households residing in the study communities and was developed from three sources. First, households identified as “fishing families” in 1987 by the Division of Commercial Fisheries were added to the database. A fishing family represented at least one household unit, but more in some cases. These households were the basis of sampling and estimation of subsistence salmon harvests for the Kuskokwim Area during recent years. Second, any household which had returned Kuskokwim River subsistence salmon catch calendars between 1981 and 1986 was also added. Some attempt was made to eliminate obvious duplications and to associate households with the community in which they were last known to have lived. Finally, researchers within the Division of Subsistence provided community census lists which were used during the course of the surveys conducted during the last few years (Francisco et al. 1989:7).

Subsistence salmon harvests are estimated based on the total number of households in a community, not just the number of fishing households as in the previous method. Not only are households that “usually fish” tracked on an annual basis, but households that “usually do not fish” are also tracked annually as well as sampled during postseason harvest monitoring activities. This stratified method of estimating total community harvests results in more

complete data for all salmon species harvested for most communities in the Kuskokwim Management Area (see discussion in the “Methods” section, below). Walker and Coffing (1993) compared this new method with the previous method and found that the earlier method significantly overestimated subsistence salmon harvests, due likely to the overemphasis on fishing households in the reporting of harvest information. While the degree of reliability was greater for some salmon species harvested and for certain fishing areas, levels of confidence for estimated total salmon harvests in 1989 were within 7% of the estimated totals (Walker and Coffing 1993:58; see Walker and Coffing 1993 for more discussion on this methodological analysis).

In 1989, the postseason survey was refined further to produce more accurate estimates of the total number of the different salmon species harvested for subsistence uses (e.g., Francisco et al. 1990:5; Walker and Coffing 1993). The timing of the postseason household surveys shifted from July and August to October and November, after the coho salmon run, which is the last salmon run of the season. Subsistence and CF “determined that the later survey timing was necessary to get more complete catch data, particularly on coho salmon” (Francisco et al. 1990:5). Harvest monitoring program methods are described in more detail below.

While Subsistence assumed responsibility in 1988 for operating the Kuskokwim postseason subsistence salmon harvest monitoring program, CF continued to provide funding support to operate the program due to the importance of the data for salmon management. Beginning July 1, 2003, however, CF eliminated funding support for the survey program as a result of budget reductions. Subsistence continued the program for the 2003 and 2004 salmon fishing seasons primarily with funds from U. S. Fish and Wildlife (FWS) Fisheries Resource Monitoring Program (FRMP) as well as with special, one-year funding from the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative (AYK SSI).

Regulatory Context

Under federal regulations, individuals must be Kuskokwim-area residents to participate in the Kuskokwim subsistence salmon fishery. Under state regulations, fishers must be Alaskan residents for the preceding 12 months before harvesting salmon for subsistence use. Prior to 1990, there were additional restrictions related to the state’s rural priority for subsistence, which subsequently was determined by the Alaska Supreme Court to be unconstitutional (e.g., Francisco et al. 1989:5). As a result, the federal government established the federal subsistence program to provide continuing subsistence uses for qualified rural residents on applicable federal public lands and in applicable federal public waters. Most subsistence salmon fishers in the region continue to be primarily Kuskokwim area residents, but some who are domiciled in other parts of Alaska return annually to assist family or friends harvest or process salmon.

Licenses, Permits, and Harvest Limits

Licenses and permits have never been required under state or federal subsistence salmon fishing regulations in the Kuskokwim area. However, there are restrictions on the methods and means of salmon harvest, and, in a few cases, there are also seasonal bag limits. Under state regulations, for example, from June 1 through August 31, hook and line subsistence fishers upstream of Doestock Creek on the Aniak River are limited to a combined daily bag limit of six fish. No more than three of these may be salmon, and no more than two of those may be Chinook salmon; further, neither chum salmon nor rainbow trout (*O. mykiss*) may be retained (5 AAC 01.295). Otherwise, there are no restrictions on the number of salmon that may be

harvested by individual fishers or households for subsistence uses in the Kuskokwim Management Area. In the absence of permits that track harvest data, subsistence salmon harvest information is collected through other harvest monitoring methods. Community and household participation in the harvest monitoring effort continues to be voluntary.

Fishing Gear

In 2004, under both state and federal regulations, salmon could be harvested for subsistence use by set and drift gillnets, beach seines, fish wheels, and hook and line attached to a rod or pole, or “rod and reel.” Spears could be used only in the drainages of the Holitna, Kanektok, Arolik, and Goodnews rivers. A set or drift gillnet could not exceed a total length of 50 fathoms (300 feet). Gillnets used for harvesting salmon could have any size mesh. However, nets with 6-inch or smaller mesh could not be more than 45 meshes deep, and nets with mesh greater than 6 inches could not be more than 35 meshes deep. Fishers were required to have their names and addresses attached to their gillnets and fish wheels.

Subsistence Salmon Fishing Schedule

Following declines in Chinook and chum salmon returns to the Kuskokwim River beginning in 1997, and, in anticipation of poor returns in 2001, the Alaska Board of Fisheries (BOF) designated both species as stocks of concern (specifically, “yield concerns”) under the “Policy for the Management of Sustainable Salmon Fisheries” (5 AAC 39.222) in September 2000. To guide the department in the management of these stocks of concern, the Board replaced the “Kuskokwim River Salmon Management Plan” in January 2001 with the “Kuskokwim River Salmon Rebuilding Management Plan” (Rebuilding Plan) (5 AAC 07.365). Under the Rebuilding Plan, Kuskokwim River salmon stocks are to be managed conservatively, especially for the months of June and July. The Federal Subsistence Board (FSB) adopted this designation and Rebuilding Plan in 2001.

The Rebuilding Plan provides direction for implementing a subsistence fishing schedule, which allows salmon net (with mesh size greater than 4 inches) and fish wheel fisheries to operate for four consecutive days per week in June and July, as announced by emergency order (EO), and implemented in association with salmon run-timing in a step-wise progression upstream. The subsistence fishing schedule is based on run strength, and is regulated by EO to achieve escapement goals. Once escapement goals are projected to be met for Chinook and chum salmon, subsistence fishing can be allowed seven days per week.

State and federal fisheries representatives polled communities throughout the Kuskokwim River drainage in 2001 for guidance on which three days would be the most desirable for the subsistence fishing closures. Based on community response, the recommendation of the Kuskokwim River Salmon Management Working Group (Working Group) was to close the Kuskokwim River to subsistence net and fish wheel fisheries Sunday, Monday, and Tuesday. Subsistence fishing with a hook and line attached to a rod or pole, or “rod and reel,” was not included in this schedule, nor were Kuskokwim Bay subsistence salmon fisheries. It is important to note, however, that subsistence salmon fishing prior to 2001 also adhered to a schedule: there were subsistence closures 16 hours before, 16 hours during, and 6 hours after commercial fishing periods (e.g., ADF&G 2001:46; ADF&G 2002:50).

2004 Subsistence Salmon Fishing Season

In 2004, the Kuskokwim River subsistence salmon fishing schedule began June 6 in District 1 (the lower Kuskokwim River), which extended from the mouth of the Kuskokwim River upstream to Bogus Creek, which is 9 miles upstream of Tuluksak, and which included the Eek, Kwethluk, Kisaralik, Kasigluk, and Tuluksak salmon spawning tributaries (Figure 1). On June 13, the schedule was expanded to District 2, which included all waters downstream of Chuathbaluk. There were no subsistence salmon fishing restrictions upstream of Chuathbaluk in 2004.

During the subsistence salmon fishing closures on the lower Kuskokwim River, fishing for fish other than salmon was allowed only with hook and line gear and with gillnets that had 4-inch or smaller mesh and that were 60 feet or less in length. However, subsistence salmon fishing regulations did not apply to fishing for fish other than salmon in non-salmon tributaries 100 yards upstream from their confluences with the Kuskokwim River. Non-salmon tributaries include the Gweek, Johnson, Kinak, Kialik, and Tagayarak rivers (ADF&G 2004).

Based on a recommendation from the Working Group, state and federal managers established a seven-day-per-week subsistence fishing schedule on June 20, when salmon run strength was anticipated to be large enough to meet escapement goals.

Subsistence Closures During the Commercial Fishery

In January 2004, the Alaska Board of Fisheries granted ADF&G discretionary EO authority to close the subsistence salmon fishery before and after commercial salmon fishing periods in Districts 1 and 2. Prior to this action, areas within commercial salmon fishing districts were closed to subsistence salmon net and fish wheel gear 16 hours before, 16 hours during, and 6 hours after commercial fishing periods as described in 5 AAC 01.260. Many fishers participating in the Kuskokwim commercial fisheries were area residents who also subsistence fished. The intent of these closures was to discourage illegal fishing activity, such as the sale of subsistence-caught salmon in the commercial fishery.

On June 28, 2004, the Department issued an EO that decreased the duration of subsistence closures associated with commercial fishing in District 1 to 6 hours before, 6 hours during, and 3 hours after commercial fishing periods. The purpose of this EO was to allow adequate opportunity for fishers to subsistence fish during the commercial fishing season. The specific waters closed to subsistence fishing varied district to district.

In 2004, there were 26 commercial fishing periods in District 1. Four periods occurred between June 30 and July 7, during which fishers harvested Chinook salmon, chum salmon, and sockeye salmon. Subsistence fishing was subject to the June 28, 2004, EO (see above). Twenty-two commercial periods targeting coho salmon occurred in District 1 between July 28 and September 8. There were also weekly scheduled commercial periods and associated subsistence fishing closures in both District 4 (Quinhagak) and District 5 (Goodnews Bay and Platinum) from June through September.

PROJECT OBJECTIVES

This study addressed the following research objectives:

1. Determine the total number of households in each community within the Kuskokwim Fisheries Management Area.

2. Identify the number of households that harvested salmon as well as the number of households that did not harvest salmon for subsistence use.
3. Estimate the number of Chinook salmon, chum salmon, sockeye salmon, and coho salmon harvested for subsistence use by each community.
4. In Bethel and Aniak, estimate the amount and species of non-salmon fish harvested.
5. Update the community household lists so that subsistence fishing households can be mailed subsistence salmon harvest calendars the following season.
6. Identify the types of salmon fishing gear used by residents.
7. In Bethel and Aniak, identify harvest locations used when fishing with hook and line gear through the ice and also in open water.

Five of the seven objectives were met. However, Aniak non-salmon fish harvest information was not collected and harvest locations for hook and line gear were not collected in Bethel or Aniak. Reasons for this are addressed in the “Discussion” section of this report.

HARVEST MONITORING METHODS

The Division of Subsistence conducts an annual postseason harvest monitoring program to document the majority of Kuskokwim River subsistence salmon harvests using the individual household as the primary unit of data collection (see “Background” discussion, above). Community subsistence harvest monitoring research uses a household survey instrument as the primary means of collecting data, although some data are also gathered through harvest calendars and postcard surveys. Households in the Kuskokwim Management Area are assigned a “household identification number” (HHID) to aid in tracking an individual household’s subsistence harvest over time. Household level data remain confidential, and household participation is voluntary. Household data are analyzed to develop estimates of subsistence salmon harvests by each participating community in the Kuskokwim Management Area. If no households are contacted in a community, then a community estimate is not developed.

Harvest information collected from postseason surveys is compared to harvest calendars. If a household was surveyed and also returned a harvest calendar, the reported harvest in the postseason survey is used for estimating total harvest. Where double information exists (postseason survey and harvest calendar), harvest calendars provide harvest timing data only. If a harvest calendar was returned for a household not surveyed, the calendar data are used for estimating household harvest. If a calendar could not be matched to a household, only the harvest timing information is used. In the rare instance that data are collected on both calendars and postcard surveys, project analysts manually assess whether this information can be combined, or whether one source of information should supersede the other (Walker *in prep*).

The development of community subsistence harvest estimates for the Kuskokwim Management Area relies upon a stratified sampling design which categorizes a community’s households into two strata: “usually fish” and “usually do not fish.” This is done to improve precision by ensuring that known fishing households are contacted without violating the “random sample” assumption (Walker and Coffing 1993:12).

Stratification is updated annually. Based on knowledge of a household’s fishing activities from previous years’ surveys, survey technicians, in consultation with community representatives,

place households in the “usually fish” stratum immediately if they have fished in the most recent survey year. Households are placed in the “usually do not fish” stratum immediately if they had not fished during each of the most recent three consecutive survey years. Households that have not fished in two of the past three years are placed in the “usually do not fish” stratum unless additional household harvest history implies the household is most appropriately assigned to the “usually fish” stratum. Households that are surveyed for the first time are asked to identify if their household usually fishes or does not fish for subsistence salmon, and are placed accordingly in the appropriate stratum (Walker *in prep*).

The harvest information collected from households allows researchers to calculate for particular communities: 1) the mean household harvest for each species of salmon, and 2) the total community harvest estimate of each species of salmon as well as for all salmon combined. If no households are contacted in a particular community, then no community estimate is developed.

The mean household harvest is calculated by adding the combined reported harvests of a particular resource by all the surveyed households, R , in a particular stratum, k , and dividing that total by the number of surveyed households, n , in each stratum, as expressed by the following formula:

$$\bar{h}_k = \frac{\sum R_k}{n_k} \quad (1)$$

Estimates are computed independently for each stratum and then summed to develop a single community subsistence salmon harvest estimate. Total community estimates, E , are extrapolated by the application of weighted means: mean household harvest calculations are weighted based upon the size of the samples, n (e.g., Cochran 1977), as illustrated in the following formula:

$$E_{i,j} = \sum_{k=1}^2 \left(\left(\frac{N_{i,k}}{n_{i,k}} \right) R_{i,j,k} \right) \quad (2)$$

where j represents species of salmon harvested by a particular community, I ; and E is the estimated harvest; R represents the reported harvest; N represents the total number of households in the stratum; n equals the number of sampled households in the stratum; and k represents each of the two strata, “usually fish” and “usually do not fish” households (see also Brown et al. 2005:211, where these methods were previously identified). The estimated total community harvest of all species is a summation of each individual species.

When applying this method of expansion, the project information manager requires that the sample size be at least 30 households or be greater than 50% of the total number of households assigned to the stratum. Subsistence harvest data are not normally distributed; as a result, these rules are applied to ensure that sample sizes are large enough to assume the data approximate a normal distribution. This assumption allows computation of a confidence interval for the estimate. When the sample size is not large enough to compute a confidence interval, no expansion is done because there is no measure for its accuracy; as a result, only reported harvests

are presented in these cases. The rule of 30 households comes from the Central Limit Theorem.¹ In cases where the community is too small for the Central Limit Theorem to apply, the rule of 50% is applied. In study years subsequent to the development of this analysis methodology (Walker and Coffing 1993), the 30 household rule was presumably created based upon known community characteristics. The Division of Subsistence intends to revisit the application of this rule as part of a larger departmental review of subsistence fisheries harvest monitoring programs.

The step-by-step process by which subsistence salmon harvest estimates are produced can be recapitulated as follows:

1. Each species of salmon harvested is computed separately by stratum and community.
2. The total number of households sampled in the stratum is verified to be either greater than 30, or the sample is verified to have more than 50% of the households in the stratum.
3. If step 2 is verified, the total number of households in a stratum is multiplied by the average harvest of that stratum. If step 2 is not verified, then the number of sampled households is instead multiplied by the average. This is done for each stratum in a community, and for each community for which harvest data are obtained.
4. The two stratum estimates are summed for each species and for each community.
5. The individual species estimates are summed in order to arrive at the total salmon harvest estimate for each community.
6. If no household harvest data were obtained for a community, then a community estimate is not developed, since total area estimated harvest amounts do not include communities lacking household harvest data.

The principal assumption associated with extrapolating harvest estimates is that the portion of the community not sampled has the same distribution of successfully harvesting households as the portion of the community that was sampled. The reason this assumption is proven is that researchers are careful to ensure that households that participated in group harvest activities have their portion of the harvest counted separately. The missing values associated with unsurveyed households are replaced with the sample mean of the stratum to which they belong. This allows the sample harvest to be expanded to estimate the total harvest of the entire community. The estimate is always calculated after the data have been summed to the stratum level. Using the standard deviation for each stratum, it is also possible to develop confidence intervals and measures of variance. If a confidence interval is required for the entire community, the variance of each stratum is calculated using the formula below.

$$V_i = \frac{1}{N_i^2} \sum_{k=1}^2 N_k (N_k - n_k) \frac{S_k^2}{n_k} \quad (3)$$

Where V_i is the variance for community i ; N_i is the total number of households in the community; N_k is the total number of households in stratum k ; n_k is the sampled households in stratum k ; and S_k^2 is the variance for stratum k .

¹ Further details about the Central Limit Theorem may be found in Box et al. 1978.

HARVEST CALENDARS

In May 2004, subsistence salmon harvest calendars were mailed to all Kuskokwim Management Area households that had been identified as “usually fish” and to those that fished the previous season (see Appendix A). This included 2,199 households; 275 returned their calendars, which represented a return rate of 13% (Table 1).

Three similar harvest calendars were designed to record the daily catches of each salmon species harvested for subsistence. Communities along the Bering Sea coast; north Kuskokwim Bay; and lower, middle, and upper Kuskokwim River areas (as far upstream as Stony River) received one edition of the calendar. A second edition was sent to the remaining households in the upper Kuskokwim River drainage. The third edition was sent to households in Quinhagak, Goodnews Bay, and Platinum. The calendars captured information on species availability, salmon run timing, and seasonal timing of subsistence fishing activities. They were mailed to post office boxes when addresses were available; otherwise, calendars were sent via general delivery to the post office clerk for distribution. Each calendar was postage-paid and return-addressed to the Division of Subsistence office in Bethel. Completed subsistence salmon harvest calendars that had not been returned to the department, if available, were collected during household interviews.

HOUSEHOLD SURVEYS: INTERVIEWS

The primary method of collecting subsistence salmon harvest information in 2004 was postseason household interviews (see Appendix B). In 2004, 2,297 Kuskokwim area households were surveyed; Bethel households (956) were 42% of the interviewed households (Table 1).

Surveyors traveled to communities and conducted house-to-house interviews with residents about their fishing efforts. Kuskokwim communities were grouped into four categories based on geographic location: 1) lower Kuskokwim, 2) middle Kuskokwim, 3) upper Kuskokwim, and 4) Bering Sea coast. Color-coded forms were used to survey the majority of the communities. Except for local names used for the salmon species, identical survey questions were asked in each region. This survey also asked questions to clarify gear types used for subsistence harvesting and the salmon harvest from each gear type. Bethel surveys also included questions about subsistence harvest of non-salmon species (see Appendix C).

In 2004, Subsistence researchers and technicians conducted house-to-house interviews in 30 communities (Table 2). As has been true since 1991, Kasigluk, along with Kipnuk and Kwigillingok, did not consent to participate in the survey program in 2004 (Table 3). However, for the first time in the history of the program, household salmon surveys were conducted in the Nelson Island community of Toksook Bay. This community was added in order to begin to develop baseline salmon harvest information from Nelson Island and the central Bering Sea region.

The Division of Subsistence implemented the postseason subsistence salmon harvest monitoring program from 1988 to 1998 without the involvement of other Kuskokwim area organizations. Then, in 1999, the Orutsarmiut Native Council (ONC) began surveying Bethel households in partnership with ADF&G, using federal funding administered through the Alaska Department of Community and Regional Affairs (Burkey et al. 2000). Since then, ONC has continued Bethel household surveys with funding received from the FRMP (e.g., Study No. FIS 00-009, Study No. FIS 01-024, Study No. FIS 04-359). The Kuskokwim Native Association (KNA) began

conducting annual household harvest surveys in Aniak in 2002 (Coffing et al. 2003; Ward et al. 2003), and has continued to do so since, again in partnership with ADF&G and with funding received from FRMP (e.g., Study No. FIS 02-036, Study No. FIS 04-359). Subsistence staff continues to conduct the household surveys in most Kuskokwim Management Area communities (other than the communities of Bethel and Aniak). In recent years, this annual harvest monitoring program has been largely funded by FRMP.

Orutsararmiut Native Council hired two survey technicians to conduct house-to-house surveys in Bethel in 2004. Similarly, KNA received funding through this project to hire technicians for postseason surveys in Aniak. Subsistence trained the technicians for both projects and oversaw their survey efforts. Data collected by both ONC and KNA followed methods and protocols developed by Subsistence. Project funds received through the FRMP were, and continue to be instrumental in supporting such capacity-building efforts.

In 2004, interviews in the Kuskokwim Management Area communities occurred over two months, beginning in early October. By this time, most residents had completed salmon fishing for the season and most hunters had returned from fall moose and caribou hunts. Communities in which residents usually harvest salmon through October were surveyed in November. Prior to beginning community surveys, efforts were made to inform and prepare residents for the arrival of surveyors. This was done weeks or days in advance through letters to city, tribal, or traditional council offices; radio announcements; posters placed in public buildings; and telephone calls to community officials. Prior to traveling to each community, surveyors identified households that had already returned their salmon harvest calendars.

Upon arrival in a community, the surveyors introduced themselves to local community officials and outlined their task. Household checklists were used to identify residents to contact for surveys. Each checklist included all known households in the community, identified those households that were reported to have subsistence fished for salmon during the previous year (2003), and indicated which households were mailed 2004 harvest calendars. Knowledgeable individuals in the community helped to update the community household list, identified households that “usually fish” and households that “usually do not fish,” and households that subsistence fished for salmon in 2004. Following review of the household list with community officials, surveyors began the door-to-door survey.

Attempts were made to contact all households in each community, and, in particular, those households identified as “usually fish” or known to have fished for salmon for subsistence use during 2004. Time spent on community surveys varied from one-half to two days per community, depending on community size, with the exception of Bethel, the largest community with the largest number of subsistence salmon fishers in the area.

In Bethel, house-to-house interviews were conducted over an 11-week period. Unlike other communities, Bethel had no agency or organization that could provide a current household list. While Subsistence often uses Alaska Permanent Fund Dividend (PFD) applications to generate household lists, these data are not sufficient to provide a household list for Bethel due to the high level of transience in that community: 35% between 2001 and 2002, for example (Walker *in prep*:13). A map of the community, originally developed by the Bethel Fire Department, was used to identify household street addresses and to organize survey efforts according to housing subdivisions. All Bethel households identified through previous surveys, as well as those that had returned harvest calendars, were categorized by subdivision. Each of the two surveyors was

then assigned responsibility for specific subdivisions. As with the smaller communities, an effort was made to contact every occupied household in Bethel.

POSTCARD SURVEYS

The third method of collecting subsistence salmon harvest information was postcard surveys that collected data on how many salmon of each species were caught for subsistence, the type of fishing gear used, and each household's qualitative evaluation of the subsistence fishery (see Appendix D). The return portion of the postcard was postage-paid and addressed to the Division of Subsistence in Bethel. Postcard surveys were the primary method for obtaining harvest data from households in Newtok, Tununak, Cheforak, and Nightmute, as well as from households in Kuskokwim area communities where there was no face-to-face contact. In 2004, 265 households in the region were mailed postcard surveys; 81 were returned, which represented a good return rate (31%) compared with previous years (Table 1). No postcards were distributed in Bethel or Aniak in 2004 because household surveyors were conducting face-to-face interviews.

2004 SAMPLING SUMMARY

COMMUNITIES AND HOUSEHOLDS CONTACTED

At least some form of contact was made in 2004 in the 38 communities located in the Kuskokwim Management Area, although this contact was limited to a small number of returned postcards for a number of communities (Table 1). During the 15-year period from 1989 to 2003, the average number of Kuskokwim area communities contacted was 34, and ranged from a low of 29 communities contacted in 1995 to a high of 38 in 2004, which is the only year since 1989 when some form of contact occurred with each Kuskokwim Management Area community (Table 2).

Of an estimated 4,670 households in the Kuskokwim Management Area in 2004, contact was made with a little more than one-half (2,432 households, or 52%), through a combination of household surveys, returned calendars and/or postcards (Table 1).² Relative to household contact rates during the previous 15 years of the monitoring program, the number of households contacted during the 2004 survey season was typical: an average of 2,087 Kuskokwim area households were contacted annually between 1989 and 2003, representing an average contact rate of 56% during this 15-year period (Table 2).

Of the 2,432 households contacted in 2004, harvest data were obtained from 2,396 households, which included those households that fished and those that did not fish, which represented a high degree of cooperation from community residents. The remaining 36 contacted households did not provide any fishing or harvest data, returning only address and household demographic information. Based on community and household participation in the survey, 1,503, or nearly one-third (32%), of total estimated Kuskokwim area households were identified as having subsistence fished for salmon in 2004 (Table 1), which is consistent with the 15-year annual average of 1,443 households estimated to have subsistence fished in the Kuskokwim

² In many instances, households that returned calendars were also surveyed in person. However, the numbers under "Total Contacts" in Table 1 are not a summation of the total number of calendars returned, postcards returned, and households surveyed since a household is only counted once as a contact.

Management Area, or an average of 39% of area households annually from 1989 to 2003 (Table 2).

Harvest Calendars

Thirteen percent (275) of the 2,199 subsistence salmon harvest calendars mailed in 2004 were returned or were obtained during household surveys (Table 1). The recent 5-year average (1999-2003) return rate of harvest calendars is 14%, with a mean of 274 returned calendars. The return rate ranges from a low of 12% in 2001, when 290 calendars were returned, to a high of 17% in 1999, when 252 calendars were returned. The 15-year average harvest calendar return rate is 15%, with an average of 270 calendars returned (Table 2).

Households Interviews (Surveys)

Of the 38 communities in the Kuskokwim Management Area, household surveys were conducted in 30 (79%) in 2004 (Table 2). Compared to the previous 15 years of monitoring program data, the 2004 survey effort was exceptional. In no other year were household surveys conducted in 30 communities: the 15-year average is 26 communities, or 68% of area communities (Table 2).

In 2004, 2,297 Kuskokwim-area households were interviewed, including 956 households in Bethel, which represented 42% of the total survey sample (Table 1). Compared to the 15-year average of 1,463 households interviewed, the 2004 survey effort was significant, as it was the third largest number of households interviewed in any single year since 1989; the only years when more household surveys were conducted were 2000 and 2002. It is important to note, however, that the average number of households interviewed from 1989-1998 was only 1,040 (Table 2). In 1999, the Kuskokwim subsistence salmon harvest monitoring program was expanded to include household surveys of all Bethel households, whereas Bethel salmon harvests had previously been estimated based upon postcard returns or telephone surveys alone. The result was a dramatic increase in the number of Kuskokwim area households surveyed: between 1999 and 2003, the average number of households surveyed annually increased to 2,308 households, more than double the average number of households surveyed between 1989 and 1998 (Table 2).

Postcards

Of the 265 postcards mailed to Kuskokwim area households in 2004, 81 (31%) were returned (Table 1). From 1989 to 2003, an average of 1,313 postcards were mailed annually. The 15-year average (1989-2003) return rate of postcard surveys was 18%, and ranges from a low of 6% in 2001, when 1,638 postcards were mailed, to a high of 50% in 1990, when 609 postcards were mailed (Table 2). Beginning in 2003, the number of postcards produced and distributed was significantly reduced due to costs of production and mailing, the fact that Bethel households began to be interviewed in 1999, as well as the historically low postcard return rates. The result in 2003 was that, of the 368 postcards distributed, only 28 were returned. In contrast, the dramatic increase in the 2004 postcard return rate was surprising.

2004 REGIONAL SAMPLING

Within the Kuskokwim River drainage, 2,185 (56%) of 3,929 households were contacted in 2004, including communities in north Kuskokwim Bay, which represented 90% of the total households contacted from all regions combined (Table 1). This area had 84% of the estimated total households, and its households were heavily involved with salmon fishing for subsistence.

Eighty-seven percent of the households identified as fishing in the Kuskokwim area, or 1,308 of 1,503, were in the north Kuskokwim Bay area. Eighty-eight percent of the harvest calendars returned in 2004 originated from households that regularly harvested salmon from the Kuskokwim River. Of the total number of Kuskokwim area households that were interviewed (2,297), 90% were households that regularly subsistence fished for salmon in the Kuskokwim River. Finally, of the 81 postcards returned, 72% came from Kuskokwim River fishers.

Thus, the majority of salmon fishing for subsistence takes place by residents of communities located on the lower Kuskokwim River. This area had an estimated total of 2,962 households, or 63% of all Kuskokwim-area households. In 2004, 65% of returned harvest calendars, 70% of interviewed households, and 35% of returned postcards were from lower Kuskokwim River communities. Of the 1,503 identified households that subsistence fished for salmon in 2004, 960, or 64%, were from lower Kuskokwim River communities (Table 1).

The north Kuskokwim Bay communities of Kipnuk, Kwigillingok, and Kongiganak together contained an estimated 354 households, which represented 8% of the estimated total households in the Kuskokwim area. Forty-nine households (14%) were contacted in 2004, representing 2% of the total households contacted. In 2004, two harvest calendars were received from north Kuskokwim Bay communities; 37 households were interviewed, which represented 2% of all interviewed households; and 12 postcard surveys were received, which represented 15% of all returned postcards. Of the 1,503 identified households that subsistence fished for salmon in 2004, 40, or 3%, were from north Kuskokwim Bay communities (Table 1).

The middle Kuskokwim communities of Lower Kalskag, Upper Kalskag, Aniak, and Chuathbaluk contained an estimated 305 households, or 7% of the estimated total households in the Kuskokwim Management Area. Two hundred twenty-nine households (75%) were contacted in 2004, which represented 9% of the total households contacted. In 2004, 15% of returned harvest calendars, 9% of interviewed households, and 4% of returned postcard surveys were from middle Kuskokwim River communities. Of 1,503 identified households that subsistence fished for salmon in 2004, 176, or 12%, were from middle Kuskokwim River communities (Table 1).

Similarly, the upper portion of the river, consisting of nine communities, contained approximately 308 households, or 7% of the estimated total number of households in the Kuskokwim area. In this area, 240 households (78%) were contacted in 2004, which represented 10% of total households contacted. In 2004, 7% of returned harvest calendars, 10% of interviewed households, and 19% of returned postcard surveys were from upper Kuskokwim River communities. Of the 1,503 identified households that subsistence fished for salmon in 2004, 132, or 9%, were from upper Kuskokwim River communities (Table 1).

In the south Kuskokwim Bay region (Quinhagak, Goodnews Bay, and Platinum), 159 (70%) of 227 households were contacted in 2004, which represented 7% of Kuskokwim area households contacted. This area had 5% of the estimated total households in the Kuskokwim Management Area. Of the estimated total of 227 households in south Kuskokwim Bay, 124 households (55%) subsistence fished in 2004, which represented 8% of total identified subsistence salmon fishing households in the Kuskokwim area. Ten percent of harvest calendars returned in 2004 originated from south Kuskokwim Bay households. Of the total number of Kuskokwim area households that were interviewed, 7% were south Kuskokwim Bay households. Finally, of the 81 postcards returned, 5% came from south Kuskokwim Bay fishers (Table 1).

The Bering Sea coastal communities of Mekoryuk, Newtok, Nightmute, Toksook Bay, Tununak, and Chefornak contained 514 estimated households, or 11% of the estimated total households in the Kuskokwim Management Area. In 2004, contact was made with a total of 88 households (17%), which represented 11% of the total Kuskokwim area households contacted. Of the estimated 514 households in the Bering Sea coastal region, 71 households (14%) subsistence fished for salmon in 2004, which represented 5% of total identified subsistence salmon fishing households in the Kuskokwim area. Two percent of harvest calendars returned in 2004 originated from households on the Bering Sea coast. Of the total number of Kuskokwim area households that were interviewed, 68 (3%) were households in Bering Sea coastal communities, and all were from Toksook Bay. Finally, of the 81 postcards returned, 23% came from fishers from the Bering Sea coast (Table 1).

For many years, Bering Sea coastal communities had not been surveyed door-to-door (Tables 2 and 3). However, in 2004, ADF&G conducted household surveys in Toksook Bay in response to a reported strong community desire to participate. This also provided an opportunity to expand knowledge about the subsistence salmon fishery on the Bering Sea coast. Subsistence salmon fishing data from other coastal communities were obtained by postcard surveys and calendar returns. However, based on the low sampling rate, participation in salmon fishing by residents of Bering Sea coastal communities was likely significantly greater than was reported.

2004 SAMPLING COMPARED TO 1989-2003 MONITORING EFFORTS

Table 2 provides historical sampling data for the annual harvest monitoring program from 1989 to 2004 for each community in the Kuskokwim Management Area, including the total number of households contacted, total number of households that returned harvest calendars, total number of households interviewed, total number of households that returned postcard surveys, and estimated total number of fishing households.

Table 3 summarizes the history of community participation in the Kuskokwim subsistence harvest monitoring program from 1989 to 2004. This table illustrates, for each of the 38 communities in the management area, when 100% of the subsistence salmon harvest was reported; when sufficient household data were collected to warrant extrapolating total harvest estimates for particular communities; when sample sizes were insufficient such that only reported harvests were presented; and when no contact was made for specific communities. This table provides a comprehensive summary of monitoring program consistency and the relative contribution of communities to total annual subsistence salmon harvest estimates from 1989 to 2004.

RESULTS OF SUBSISTENCE SALMON HARVEST MONITORING FOR 2004

AREAWIDE HARVEST ESTIMATES SUMMARY, 2004

A summary of the subsistence salmon harvest estimates by community and fishing area is presented in Table 4. The estimated 2004 subsistence salmon harvest for the communities contacted in the Kuskokwim Management Area was 85,086 Chinook salmon, 55,575 chum salmon, 34,892 sockeye salmon, and 39,406 coho salmon, for a minimum estimated total of 214,959 salmon. These total estimates represent minimums for the management area because they include both reported household harvests and expanded community harvest estimates, and because they do not include subsistence salmon harvest information from communities where

there was no contact with households. Tables 5, 6, 7, and 8 summarize 2004 Kuskokwim Management Area harvest estimates of Chinook, chum, sockeye, and coho salmon, respectively. Tables 5, 6, 7, and 8 also include the number of households assigned to the “do not usually fish” and “usually fish” strata, as well as the number of households contacted in 2004 from each stratum; also included are standard deviations for each stratum and confidence intervals for each community estimate.

In 2004, estimates of all salmon species harvested in the subsistence fisheries fell within or surpassed the ranges of the amounts reasonably necessary for subsistence uses (ANS), which was determined by the Alaska Board of Fisheries in 2001 and codified in 5 AAC 01.286.³ The Alaska Board of Fisheries set ANS ranges based in part on the results of the harvest monitoring program described in this report.

Salmon for Dog Food

Historically, salmon (usually chum or coho) harvested for dog food was a significant portion of the total harvest. In the last 15 years, however, the number of households reporting the harvest of salmon specifically for dog food has declined. This may be related to decreased use of dog teams for transportation; reduced abundance, in some years, of salmon used for dog food; and the availability of commercial dog food.

During 2004, 97 households reported harvesting salmon specifically for dog food. These harvests included 6,381 chum salmon, 4,367 coho salmon, and 892 sockeye salmon. While households do not specifically target Chinook salmon for dog food, some Chinook salmon unfit for human consumption is given to dogs. People commonly feed scraps, backbones, and entrails to their dogs, and 271 households reported using salmon this way in 2004.

Fishing Gear

Fishing households often use more than one type of gear (i.e., set gillnet, drift gillnet, fish wheel, or rod and reel) when harvesting salmon (Table 9). During 2004, most households (1,004) used drift gillnets for subsistence salmon harvests; others used rod and reel (366) or set gillnets (261). The drift gillnet was the primary fishing gear used by households from Crooked Creek downstream to the coastal communities of Kuskokwim Bay. Set gillnets were generally used when fishers were targeting Chinook salmon early in the run. Interestingly, upper Kuskokwim River fishing households reported more use of set gillnets than other regions within the Kuskokwim Management Area: 54 out of 132 (41%) fishing households used set gillnets. In contrast, only 14% of lower Kuskokwim River fishing households used set gillnets, while 75% used drift gillnets. Fishing households along the Bering Sea coast also preferred using drift gillnets (63%), as did north Kuskokwim Bay fishing households (83%), and middle Kuskokwim River fishing households (56%) (Table 9).

Gillnet mesh size information was collected in 2004, including the number of households that reported using a net with a mesh sized to catch Chinook salmon for subsistence. From the estimated total of 1,503 Kuskokwim area subsistence salmon fishing households in 2004, 846 households provided gear size data. The most popular mesh size used to harvest Chinook

³ ANS ranges are 64,500-83,000 Chinook salmon, 39,500-75,500 chum salmon, 27,500-39,500 sockeye salmon, and 24,500-35,000 coho salmon in the Kuskokwim River drainage and 7,500-13,500 salmon (all species combined) in the remainder of the Kuskokwim area.

salmon was 8-inch (46%), followed by 6-inch mesh (13%), 5 ½-inch mesh (9%), and then 8 ¼-inch mesh (8%). Forty-two percent (357 households) of reporting Kuskokwim area households harvested Chinook salmon with gillnets with mesh sizes smaller than 8 inches in 2004; 58% reported harvesting Chinook salmon with 8-inch or larger gear, and 36 households reported using 8 ½-inch gear (Table 10).

Households throughout the area also used rod and reel for subsistence fishing. Rods and reels were used by families who had no access to other gear types, by fishers in areas where other gear types are not as effective, or by fishers who chose them as a more selective gear type to harvest just a few fish. In 2004, 366 Kuskokwim area households in 29 communities reported using rod and reel gear for subsistence salmon fishing, 43% of which were from lower Kuskokwim River communities (67 Bethel households), 20% from the middle Kuskokwim, 17% from the upper Kuskokwim, 16% from south Kuskokwim Bay, and 4% from fishing households along the Bering Sea coast; no rod and reel subsistence fishing was reported from north Kuskokwim Bay communities (Table 9).

Only one household reported using fish wheel gear for harvesting subsistence salmon in 2004 (Table 9). Generally, one or two fish wheels were operated by households in Aniak and McGrath. In 2004, surveyors were unable to contact any other household that usually operated a fish wheel. One household in Napaskiak reported using seine gear to harvest salmon for subsistence, and one household in Aniak reported the use of spears for harvesting subsistence salmon. A total of 233 fishing households did not report the type of gear they used for subsistence fishing, which represented 16% of the estimated total number of subsistence salmon fishing households in 2004.

Salmon Retained from Commercial Fishing for Subsistence Use

Households involved in commercial salmon fishing sometimes keep a portion of their catch for subsistence use; however, the number of salmon retained is usually relatively small (Table 11). During 2004, 17% of commercial fishing households (55 of 317) reported retaining a total of 582 commercially-caught salmon for subsistence use. In total, 118 Chinook salmon, 49 chum salmon, 90 sockeye salmon, and 325 coho salmon were retained from commercial harvests.

REGIONAL HARVEST SUMMARY, 2004

Lower Kuskokwim River communities, including Bethel, which represented 64% of the estimated total number of subsistence fishing households in 2004, harvested 74% of the estimated total 2004 subsistence salmon harvest in the Kuskokwim Management Area, including 78% of the Chinook salmon, 71% of the chum salmon, 73% of the sockeye salmon, and 71% of the coho salmon (Tables 4, 5, 6, 7, and 8). In 2004, Bethel households alone, which represented 26% of the total fishing households in 2004, harvested 30% of the total Kuskokwim Management Area subsistence salmon catch, including 32% of the total Chinook salmon, 22% of the total chum salmon, 30% of the total sockeye salmon, and 38% of the total coho salmon (Tables 4, 5, 6, 7, and 8).

The middle Kuskokwim River communities, which represented approximately 12% of the total subsistence fishing households in the area, harvested 10% of the estimated total 2004 subsistence salmon harvest in the Kuskokwim area, including 9% of the Chinook salmon, 12% of the chum salmon, 7% of the sockeye salmon, and 9% of the coho salmon (Tables 4, 5, 6, 7, and 8).

The upper Kuskokwim River communities, which represented 9% of the subsistence fishing households identified in 2004, harvested 7% of the estimated total 2004 subsistence harvest in the Kuskokwim area, including 4% of the total Chinook salmon, 7% of the chum salmon, 9% of the sockeye salmon, and 9% of the coho salmon (Tables 4, 5, 6, 7, and 8).

North Kuskokwim Bay communities, which represented 3% of fishing households identified in 2004, harvested 3% of the estimated total 2004 subsistence harvest in the Kuskokwim Management Area, including 2% of the Chinook salmon, 3% of the chum salmon, 3% of the sockeye salmon, and 2% of the coho salmon (Tables 4, 5, 6, 7, and 8).

South Kuskokwim Bay communities, which represented 8% of the subsistence salmon fishing households identified in 2004, harvested 5% of the estimated total 2004 subsistence harvest in the Kuskokwim Management Area, including 6% of the Chinook salmon, 2% of the chum salmon, 6% of the sockeye salmon, and 7% of the total coho salmon (Tables 4, 5, 6, 7, and 8).

Finally, the Bering Sea coastal communities, which represented 5% of area subsistence salmon fishing households in 2004, harvested 2% of the estimated total 2004 subsistence salmon harvest in the Kuskokwim Management Area, which included less than 1% of the Chinook salmon, 3% of the chum salmon, 1% of the sockeye salmon, and 2% of the total coho salmon (Tables 4, 5, 6, 7, and 8).

OTHER FISH HARVESTED

One of the project objectives was to arrive at an estimate of the number of non-salmon fish, by species, harvested by residents of Bethel and Aniak. These data were collected only in Bethel in order to be certain that there were enough resources to complete the salmon survey and resulting data analysis.

Bethel Non-Salmon Fish Harvests, 2004

Bethel residents harvested an estimated 35,430 non-salmon fish of various species, or an estimated total of 136,241 lbs usable weight of non-salmon fish, as summarized in Table 12 and Figure 2. By far the most significant non-salmon fish harvested by Bethel residents was northern pike (*Esox lucius*): a total estimate of 20,631 pike were harvested in 2004, representing 59% of the total non-salmon fish harvest by usable weight. Smelt (*Thaleichthys pacificus*) and burbot (*Lota lota*) represented the second and third most harvested non-salmon species. An estimated total of 3,005 burbot and 2,454 gallons of smelt were harvested, which represented 10% and 9%, respectively, of the overall non-salmon Bethel harvest in 2004 by usable weight. Bethel residents also harvested an estimated total of 2,597 broad whitefish (*Coregonus nasus*) and 4,849 humpback whitefish (*C. oidschian*), which represented 7% and 6%, respectively, of the 2004 non-salmon fish harvest by usable weight. Bering cisco (*C. laurettae*), round whitefish (*Prosopium cylindraceum*), unknown whitefish (*Prosopium* or *Coregonus* sp.), Arctic grayling (*Thymallus arcticus*), rainbow trout, lake trout (*Salvelinus namaycush*), and lamprey (*Lampetra* sp.) each represented less than 1% of the 2004 Bethel non-salmon fish harvest by usable weight (Table 12, Figure 2).

Bethel fishers used drift gillnets to harvest only 3% of the total number of non-salmon species harvested; most (62%) non-salmon fish were caught by hooking through the ice with jigging

gear⁴, or by rod and reel in open water, especially northern pike and burbot (Table 12). Twenty-six percent of the non-salmon fish harvest came from the use of set gillnets in open water (mainly targeting whitefishes and northern pike). Ten percent of the non-salmon fish harvest came from the use of gillnets set under the ice (mainly targeting northern pike and humpback whitefish). Smelt were harvested exclusively with dipnets, and Alaska blackfish (*Dallia pectoralis*) were harvested using small, locally-made fish traps called *taluuuyaq*.

DISCUSSION AND CONCLUSIONS

2004 HARVEST ESTIMATES COMPARED TO 1989-2003 SUBSISTENCE SALMON HARVEST MONITORING ESTIMATES

Areawide Subsistence Salmon Harvest Assessment, 2004

Estimated subsistence salmon harvests in the Kuskokwim Management Area in 2004 exceeded those of 2003, with the exception of sockeye salmon (Table 13). The estimated 2004 total salmon harvest in the Kuskokwim area of 214,959 fish exceeded the recent 5-year (1999-2003) average of 203,908 salmon harvested, but fell below the 10-year average harvest of 216,617, and the 15-year average harvest of 239,443 salmon (Table 13). This trend was largely driven by chum salmon subsistence harvests, as discussed below. It is important to note that the total subsistence harvest estimates discussed here represent minimum totals because the harvest figures for the entire management area included both expanded community estimates and some reported household harvests. Furthermore, these total estimates represent minimums because they did not include subsistence salmon harvests from communities in which no households were contacted.

Chinook Salmon

The estimated 2004 Chinook salmon subsistence harvest of 85,086 fish exceeded the previous 5-year (1999-2003) average of 73,358 Chinook salmon harvested, as well as the 10-year (1994-2003) average of 81,854, and the 15-year (1989-2003) of 83,146 Chinook salmon harvested in the Kuskokwim area (Table 13). The 2004 Chinook salmon subsistence harvest was 17% larger than the estimated 2003 harvest - Kuskokwim subsistence fishers harvested 12,588 more Chinook salmon in 2004 than in 2003 - and it was the largest since 1998 (Table 14).

Chum Salmon

The estimated 2004 chum salmon subsistence harvest of 55,575 fish exceeded the recent 5-year average harvest of 54,725 chum salmon, but fell below the recent 10-year and 15-year averages of 61,841 and 76,840 chum salmon, respectively (Tables 13 and 15). Kuskokwim subsistence salmon fishers harvested 9,284 more chum salmon in 2004 than in 2003 (Tables 13 and 15). The 2004 chum salmon harvest continued a trend that differed significantly from the much higher annual chum salmon harvests documented in the late 1980s and early 1990s (Tables 13 and 15). The decrease in chum salmon harvests for subsistence uses was likely related to the reduction in the number of dogs kept for transportation, the availability of commercial dog food, and the possible shifting of subsistence patterns resulting from recent years of poor chum salmon returns. However, many more factors may have been involved; for example, given the importance of

⁴ Jigging gear consists of a line or lines with lures or baited hooks that are operated during periods of ice cover from holes cut in the ice and which are drawn through the water by hand (5 AAC 01.010(2)).

chum salmon as a dried fish product, an increased use of freezers may also help to explain lower chum salmon harvests. This is a question for additional research.

Sockeye Salmon

The estimated 2004 sockeye salmon subsistence harvest of 34,892 fish fell below the recent 5-year (1993-2003) average of 42,162 sockeye salmon harvested, as well as the 10-year (1994-2003) average of 39,258 fish and the 15-year average of 40,750 sockeye salmon harvested in the Kuskokwim area. Kuskokwim subsistence salmon fishers harvested 2,002 fewer sockeye salmon in 2004 than in 2003. The 2004 estimated sockeye salmon harvest was the fourth-lowest harvest documented since 1989; sockeye salmon harvests were estimated to be lower only in 1992, 1995, and 2002 (Tables 13 and 16).

Coho Salmon

The estimated 2004 coho salmon subsistence harvest of 39,406 fish exceeded the recent 5-year average harvest of 33,663 coho salmon harvested, the recent 10-year average of 33,664 fish, and the 15-year average harvest of 38,707 coho salmon harvested in the Kuskokwim area. Kuskokwim salmon fishers harvested an estimated 615 more coho salmon in 2004 than in 2003, and had the largest coho harvest since 1992. The 2004 harvest was the fifth-largest subsistence coho harvest documented by the harvest monitoring program, following larger harvests documented in 1989-1992 (Tables 13 and 17).

Regional Harvest Assessment, 2004

Data describing the harvest of salmon for subsistence differed interregionally for a variety of reasons, including differences in stock migration patterns, run abundances, run timings, community dietary preferences, and other cultural patterns, such as different salmon preservation techniques (e.g., Chinook salmon were frozen and chum salmon were dried). While specific causes of different patterns of salmon fishing methods, harvest, and uses were not investigated through the Kuskokwim harvest monitoring program, interregional harvest patterns are summarized below and compared to previous harvest monitoring results to provide an overall regional assessment of 2004 subsistence salmon harvests. It is important to note that the total salmon harvest for subsistence estimates discussed here represent minimum totals because the harvest figures included both reported household harvests and some expanded community estimates.

Chinook Salmon

Chinook salmon harvests in 2004 exceeded historical averages in all regions of the Kuskokwim Management Area, which suggests that 2004 Chinook salmon harvest levels reflected overall stock abundance (Table 14).

Chinook salmon subsistence harvests from the Kuskokwim River drainage in 2004 (including harvests by north Kuskokwim Bay communities) were estimated at 80,065 fish, which exceeded the recent 5-year average of 69,258 Chinook salmon harvested, as well as the 10-year average harvest of 77,687 fish and the 15-year average harvest of 78,892 fish (Table 14).

With respect to Chinook salmon harvested by the residents of north Kuskokwim Bay communities, total community harvest estimates were developed only for Kongiganak because the sample size of contacted households in Kipnuk and Kwigillingok was too small to warrant data expansion. Kongiganak salmon fishing households harvested an estimated total of 1,872

Chinook salmon in 2004, which exceeded the recent 5-year average harvest of 1,294 fish, as well as the 10-year average of 1,266 fish and the 15-year average of 1,244 Chinook salmon harvested (Table 14).

Lower Kuskokwim River communities harvested an estimated 66,687 Chinook salmon in 2004, which exceeded the recent 5-year average harvest of 59,063 fish, as well as the recent 10-year and 15-year average harvests of 64,901 and 65,466 Chinook salmon, respectively (Table 14).

The Middle Kuskokwim River communities of Lower Kalskag, Upper Kalskag, Aniak, and Chuathbaluk harvested an estimated total of 8,007 Chinook salmon in 2004, which exceeded the recent 5-year and 10-year average harvests of 6,383 and 8,009 fish, respectively; but which did not exceed the 15-year average harvest of 8,447 fish (Table 14).

Those Kuskokwim River communities upstream of Crooked Creek harvested an estimated total of 3,499 Chinook salmon in 2004, which exceeded the recent 5-year average harvest of 2,519 fish, but not the recent 10-year and 15-year average harvests of 3,512 and 3,636 Chinook salmon, respectively (Table 14).

The south Kuskokwim Bay communities of Quinhagak, Goodnews Bay, and Platinum harvested an estimated total of 4,680 Chinook salmon in 2004, which exceeded the recent 5-year, 10-year, and 15-year average harvests of 3,926 fish, 4,017 fish, and 4,216 Chinook salmon, respectively (Table 14).

Bering Sea coastal communities reported harvesting 341 Chinook salmon in 2004 (Table 14); however, given the fact that the Kuskokwim area harvest monitoring program rarely contacted these communities, development of total community harvest estimates was infrequent. In fact, total community harvest estimates have been developed only twice in the history of the existing harvest monitoring program: both of which were for Toksook Bay, first in 2000 and then again in 2004 (Table 3). The lack of total community estimates in the Bering Sea coastal region means that an assessment of 2004 Chinook salmon (and other species harvests) was not possible.

Chum Salmon

Chum salmon subsistence harvests from the Kuskokwim River drainage in 2004 (including harvests by north Kuskokwim Bay communities) was estimated at 52,374 fish, which exceeded the recent 5-year average of 51,502 chum salmon harvested, but fell below the 10-year average harvest of 58,988 fish and the 15-year average harvest of 73,668 fish (Table 15).

With respect to chum salmon harvested by residents of north Kuskokwim Bay communities, total community harvest estimates were developed only for Kongiganak because sample sizes of contacted households in Kipnuk and Kwigillingok were too small to warrant data expansion. Kongiganak salmon fishing households harvested an estimated total of 1,587 chum salmon in 2004, which was identical to the recent 5-year average and which exceeded the 10-year and 15-year average harvests of 1,443 and 1,383 chum salmon (Table 15). The increase in chum harvest in the north Kuskokwim Bay may have been attributable to a relatively more abundant chum run in 2004. Run size had been increasing since 2001, which had resulted in above-average to record escapements in recent years as well as underutilized harvestable surpluses (e.g., Linderman and Bergstrom 2006); however, this increase may have also reflected different fishing practices as well.

Lower Kuskokwim River communities harvested an estimated 39,540 chum salmon in 2004, which fell below the recent 5-year average harvest of 40,998 fish, as well as below the 10-year and 15-year average harvests of 45,720 fish and 56,142 chum salmon (Table 15).

The Middle Kuskokwim River communities of Lower Kalskag, Upper Kalskag, Aniak, and Chuathbaluk harvested an estimated total of 6,930 chum salmon in 2004, which exceeded the recent 5-year average harvest of 6,025 fish, but not the recent 10-year and 15-year average harvests of 7,406 fish, and 10,004 chum salmon, respectively (Table 15).

Upper Kuskokwim River communities upstream of Crooked Creek harvested an estimated total of 4,001 chum salmon in 2004, which exceeded the recent 5-year average harvest of 2,831 fish, but not the recent 10-year and 15-year average harvests of 4,328 fish, and 5,975 chum salmon, respectively. Chum salmon are the most harvested species of salmon by Upper Kuskokwim River communities (Table 15).

The South Kuskokwim Bay communities of Quinhagak, Goodnews Bay, and Platinum harvested an estimated total of 1,369 chum salmon in 2004, which fell below the recent 5-year, 10-year, and 15-year average harvests of 1,578 fish, 1,430 fish, and 1,733 chum salmon, respectively (Table 15).

Bering Sea coastal communities reported harvesting 1,832 chum salmon in 2004; however, a community estimate was developed only for Toksook Bay (938 chum salmon) due to insufficient household contact in other Bering Sea coastal communities. The lack of total community estimates in the Bering Sea coast region meant that an assessment of 2004 chum salmon harvest relative to previous years was not possible (Table 15).

Sockeye Salmon

The fact that subsistence sockeye harvests fell below regional average harvests throughout the management area suggested that 2004 harvest levels likely resulted from a decreased run abundance (Tables 13 and 16).

Sockeye salmon subsistence harvests from the Kuskokwim River drainage in 2004 (including harvests by north Kuskokwim Bay communities) were estimated at 32,433 fish, which fell below the recent 5-year, 10-year, and 15-year average harvests of 39,695 fish, 37,314 fish, and 38,602 sockeye salmon, respectively (Table 16).

With respect to sockeye salmon harvested by residents of north Kuskokwim Bay communities, total community harvest estimates were developed only for Kongiganak because sample sizes of contacted households in Kipnuk and Kwigillingok were too small to warrant data expansion. Kongiganak salmon fishing households harvested an estimated total of 876 sockeye salmon in 2004, which fell below the recent 5-year average harvest of 1,130 fish and the 10-year average harvest of 962 fish, but exceeded the 15-year average harvest of 856 sockeye salmon (Table 16).

Lower Kuskokwim River communities harvested an estimated total of 25,606 sockeye salmon in 2004, which fell below the recent 5-year average harvest of 32,254 fish, as well as below the 10-year and 15-year average harvests of 29,406 fish and 29,806 sockeye salmon (Table 16).

The Middle Kuskokwim River communities of Lower Kalskag, Upper Kalskag, Aniak, and Chuathbaluk harvested an estimated total of 2,528 sockeye salmon in 2004, which fell below the recent 5-year average harvest of 2,800 fish, but not below the recent 10-year and 15-year average harvests of 2,830 fish, and 2,632 sockeye salmon, respectively (Table 16).

Kuskokwim River communities upstream of Crooked Creek harvested an estimated total of 3,264 sockeye salmon in 2004, which fell below the recent 5-year, 10-year, and 15-year average harvests of 3,461 fish, 4,054 fish, and 4,740 sockeye salmon, respectively (Table 16).

The south Kuskokwim Bay communities of Quinhagak, Goodnews Bay, and Platinum harvested an estimated total of 2,046 sockeye salmon in 2004, which fell below the recent 5-year average harvest of 2,251 fish, but which exceeded the recent 10-year and 15-year average harvests of 1,783 fish and 1,964 sockeye salmon, respectively (Table 16).

Bering Sea coastal communities reported harvesting 413 sockeye salmon in 2004; however, a community estimate was developed only for Toksook Bay (359 sockeye salmon) due to insufficient household contact in other Bering Sea coastal communities. The lack of total community estimates in the Bering Sea coastal region means that an assessment of 2004 sockeye salmon harvest relative to previous years was not possible (Table 16).

Coho Salmon

Coho harvests in 2004 exceeded historical averages in all regions of the Kuskokwim Management Area, which suggested that the 2004 subsistence coho salmon harvest levels reflected overall run abundance.

Coho salmon subsistence harvests from the Kuskokwim River drainage in 2004 (including harvests by north Kuskokwim Bay communities) was estimated at 35,735 fish, which exceeded the recent 5-year, 10-year, and 15-year average harvests of 31,263 fish, 31,228 fish, and 35,484 coho salmon, respectively (Table 17).

North Kuskokwim Bay subsistence fishers harvested at least 856 coho salmon in 2004; however, total community harvest estimates were developed only for Kongiganak because sample sizes of contacted households in Kipnuk and Kwigillingok were too small to warrant data expansion. Kongiganak salmon fishing households harvested an estimated total of 551 coho salmon in 2004, which fell below the recent 5-year average harvest of 570 fish, as well as the 10-year average harvest of 534 fish and the 15-year average of 527 coho salmon (Table 17).

Lower Kuskokwim River communities harvested an estimated 28,025 coho salmon in 2004, which exceeded the recent 5-year average harvest of 24,598 fish, as well as the recent 10-year and 15-year average harvests of 23,592 and 27,045 coho salmon, respectively (Table 17).

The middle Kuskokwim River communities of Lower Kalskag, Upper Kalskag, Aniak, and Chuathbaluk harvested an estimated total of 3,487 coho salmon in 2004, which exceeded the recent 5-year, 10-year, and 15-year average harvests of 3,172 fish, 3,171 fish, and 3,179 coho salmon, respectively (Table 17).

Those Kuskokwim River communities upstream of Crooked Creek harvested an estimated total of 3,367 coho salmon in 2004, which exceeded the recent 5-year average harvest of 2,834 fish, but fell below the 10-year and 15-year average harvests of 3,855 fish, and 4,630 coho salmon, respectively (Table 17).

The south Kuskokwim Bay communities of Quinhagak, Goodnews Bay, and Platinum harvested an estimated total of 2,826 coho salmon in 2004, which exceeded the recent 5-year and 10-year average harvests of 2,222 fish and 2,274 fish respectively, but which fell below the recent 15-year average harvest of 3,067 coho salmon (Table 17).

Bering Sea coastal communities reported harvesting 845 coho salmon in 2004; however, given the fact that little contact had occurred with these communities during annual harvest monitoring activities, development of total community harvest estimates was infrequent. The lack of total community estimates in the Bering Sea coastal region meant that an assessment of 2004 coho salmon harvests relative to previous years' harvests was not possible (Table 17).

Interregional Salmon Harvest Composition Comparisons among Species, 2004

Salmon harvests by residents of north Kuskokwim Bay, the lower Kuskokwim River, and the middle Kuskokwim River communities demonstrated a similar species composition pattern among these three regions. Chinook salmon and chum salmon comprised approximately 70% of the harvest in each region, and coho salmon and sockeye salmon represented the remaining 30% (Figures 3, 4 and 5).

Harvests in the upper Kuskokwim River and south Kuskokwim Bay regions were markedly different from other regions. In the upper Kuskokwim, for example, each of the four species of salmon harvested in the area accounted for nearly 25% of the total harvest (Figure 6). South Kuskokwim Bay subsistence salmon harvest was largely Chinook salmon (42%), and residents of this area had the largest proportion of coho salmon harvests (26%) in the Kuskokwim Management Area (Figure 7).

Despite the dramatic decline in chum salmon subsistence harvests in the Kuskokwim area, not all regions were harvesting fewer chum salmon. The north Kuskokwim Bay communities experienced greater chum salmon harvests in 2004 than their historical 5-year, 10-year, and 15-year average harvests (Table 15). On the other hand, lower Kuskokwim River communities and south Kuskokwim Bay communities harvested fewer chum salmon for subsistence uses in 2004 than their historical 5-year, 10-year, and 15-year averages. This interregional pattern suggests that investigations into the causes of the dramatic decline in chum salmon harvests during the past two decades should focus on the lower Kuskokwim River and south Kuskokwim Bay communities. Such investigations, however, also should attempt to evaluate the effect of "windowed" subsistence fishing on decreased chum salmon harvests in the lower river relative to the increasing harvests of chum salmon in the middle and upper Kuskokwim River communities.

Harvest compositions varied dramatically, reflecting a community's access to each species. For example, households in Lime Village, located along the Stony River, harvested an estimated 66 Chinook salmon, 189 chum salmon, 831 sockeye salmon, and 220 coho salmon; while those in Nikolai, who have no access to sockeye salmon runs, harvested an estimated 510 Chinook salmon, 260 chum salmon, and 156 coho salmon in 2004 (Tables 14, 15, 16, and 17). The differences between these two examples were likely attributable to the large number of sockeye salmon that spawn in the drainages of the Stony and Holitna rivers, both of which are tributaries of the Kuskokwim River well downstream of the communities of Nikolai, McGrath, Telida, and Takotna. The significance of comparisons like these is that species run strengths, viewed from an areawide perspective, affected communities in different ways, depending on customary and traditional dependence on particular salmon stocks.

Tables 14, 15, 16, and 17 provide harvest estimates for each community in the Kuskokwim Management Area from 1989 through 2004, and illustrate the recent 5-year, 10-year and 15-year harvest averages for each Kuskokwim area community that had a consistent total community estimate during the 15 years of the harvest monitoring program. The Bering Sea coastal communities, however, were not associated with average harvest rates due to the fact that most

harvest monitoring data represent sample sizes were not large enough to estimate total community harvests. Tables 14, 15, 16, and 17 provide a means to assess specific community harvest estimates from 1989 through 2004.

NON-SALMON FISH HARVESTS

Although the focus of this project was on collecting salmon subsistence harvest information, non-salmon fish subsistence harvest information was also collected in the hub community of Bethel (see the “Results” section of this report). The non-salmon harvest data collected in Bethel represent the only non-salmon fish subsistence harvest information collected in the Kuskokwim area in 2004. The Bethel household survey data suggested that 82% (695,637 lbs) of the total fish subsistence harvested by usable weight (850,761 lbs) were salmon, while non-salmon comprised 18% (155,124 lbs) of the total fish harvest by weight.

The results of the non-salmon fish survey indicated that, in 2004, non-salmon fish species contributed significantly to Bethel area subsistence fish harvests (Table 12). Previous research in other communities on the Kuskokwim River also demonstrated the significance of non-salmon to Kuskokwim area subsistence fishers (e.g., Andrews 1989, 1994; Coffing 1991; Coffing et al. 2001; Coffing et al. 2003; Holen et al. 2006; Krauthoefer et al. 2007; Pete 1984, 1989, 1991a, 1991b, 1992; Simon et al. 2007; Stokes 1985; Wolfe et al. 1984). However, it is important to note that much of this research was timed to survey residents at times other than immediately after the conclusion of the salmon fishing season. Recently, Brown, Burr, Elkin, and Walker (2005) compared non-salmon harvest estimates identified during a postseason salmon survey with estimates from a non-salmon harvest assessment project that took place in the lower- and middle-Yukon regions (specifically, Grayling, Anvik, Shageluk, and Holy Cross) at approximately the same time period. The comparison found that postseason household surveys implemented immediately following the salmon fishing season may not have produced the most reliable results for non-salmon harvest given the considerable differences in non-salmon harvest estimates resulting from the two harvest assessment projects (Brown et al. 2005:154).

Additionally, the postseason salmon survey program along the Kuskokwim River and in Bethel targeted those households that usually participated in salmon fishing for subsistence. It may be that these households differed from those involved in fishing for non-salmon, and thus using a similar method would not have produced accurate estimates of non-salmon fish subsistence harvest. The harvest estimates for non-salmon fish resulting from this project should therefore be viewed as minimum totals; furthermore, a project focused on assessing the annual subsistence harvest and use patterns of non-salmon fish might lead to more accurate estimates of non-salmon harvest. It is recommended that further methodological assessment of salmon and non-salmon fish harvest estimates be considered in future research.

Finally, as previously stated, this project did not achieve two of the investigation plan objectives, both of which were related to non-salmon harvest monitoring. These included estimating the amount and species of non-salmon fish harvested in Aniak, and identifying harvest locations for hook and line gear for Bethel and Aniak households. The lack of harvest estimates and harvest location information for Aniak was partially offset by the results of Study No. FIS 01-112, “The harvest of non-salmon fish by residents of Aniak and Chuathbaluk, Alaska, 2001-2003” (Krauthoefer et al. 2007).

ADF&G emphasized documenting salmon subsistence harvests in the Kuskokwim Management Area in 2004, recognizing that salmon harvest data were the primary information need identified

by the Yukon-Kuskokwim Delta Regional Advisory Council, the Kuskokwim Fisheries Resource Coalition, and FRMP. ADF&G determined that there was insufficient time and resources to conduct the data entry and analysis necessary to complete all objectives. While originally intending to also document Bethel and Aniak non-salmon fish harvest and non-salmon fishing locations, the loss of Commercial Fisheries' financial support after the proposal for this project had been submitted necessitated exercising cost-savings measures to account for the decrease in state funds available for this program. Additional challenges included the fact that Division of Subsistence investigators and information management staff were new to the project at the time of implementation. Furthermore, information management staff concluded that time was insufficient to create a new database for analysis of the Aniak non-salmon fish and hook and line harvest location information in addition to revising the existing Bethel non-salmon fish harvest location database.

In spite of these unmet objectives, this project successfully accomplished the principal objectives identified in the investigation plan: to document subsistence harvests of Kuskokwim salmon in 2004 in one of the largest subsistence fisheries in Alaska in terms of amounts harvested. The 2004 salmon harvest monitoring efforts resulted in a higher-than-average number of communities from which subsistence salmon harvest information was collected. Household surveys were conducted in more Kuskokwim area communities than in any previous year since the program began in 1989; similarly, the number of households interviewed in 2004 was the third largest since 1989. In conclusion, the 2004 Kuskokwim area subsistence salmon harvest monitoring program resulted in representative harvest estimates that were comparable to previous harvest monitoring results, with the exception of the Bering Sea coastal region and a few communities in the other regions.

RECOMMENDATIONS

Subsistence salmon harvest surveys of one type or another have been conducted in the Kuskokwim region for a number of decades. The current annual Kuskokwim area postseason subsistence salmon harvest monitoring program and its associated methods have been in place since 1989. There are several recommendations related to monitoring harvests, and four recommendations related to assessment of these salmon resources.⁵

MONITORING HARVESTS

Considering the magnitude and importance of this fishery, and the need for management consistent with the sustained yield principle and other statutory requirements, a scientifically-based annual harvest monitoring program is necessary for managing Kuskokwim Management Area salmon. It is, therefore, recommended that the annual subsistence salmon harvest in the Kuskokwim Management Area should continue to be monitored by ADF&G. Survey data on subsistence salmon harvests should be collected annually, using the methods developed by Subsistence to ensure data comparability through time.

State and federal agencies should continue to partner in funding the Kuskokwim area subsistence salmon harvest monitoring program as monitoring results are vital to both state fisheries

⁵ The American Heritage Dictionary defines "monitoring" as keeping track of systematically with a view to collecting information. In contrast, "assessment" refers to the evaluation of the information.

management and federal subsistence programs. Cost efficiencies should continue to be explored, but in keeping with the existing methodology to ensure data comparability across years.

Chinook and chum salmon, in particular, are major food sources for residents in the Kuskokwim Management Area and account for a significant part of the total harvest of wild resources in any given year (ADF&G 2007). Most of the Chinook salmon caught in the state for subsistence purposes are harvested here; one of every two subsistence-caught Chinook in the state is harvested in the Kuskokwim Management Area. Their escapement numbers often fluctuate, sometimes considerably in any 10-year period (Whitmore et al. 2005). It is important for fisheries management purposes to know what the total harvest of these species is relative to total run size on an annual basis and to identify trends in the fishery. It is, therefore, also recommended that biological monitoring of escapement numbers in index streams be continued and expanded.

It is also recommended that information about the subsistence harvest of non-salmon fish should be collected whenever possible, given their significance in the annual subsistence harvest in the Kuskokwim area, as demonstrated in this survey and in others. A survey, independent of salmon surveys, should be conducted in representative communities throughout the Kuskokwim Management Area. The FRMP-funded study No. FIS 01-112, which documented the harvest of non-salmon fish by residents of Aniak and Chuathbaluk from 2001-2003, provided information for a portion of the middle Kuskokwim River region. Similarly, FRMP Study No. FIS 06-351 documented subsistence harvests of non-salmon fish for one year by residents of Eek, Nunapitchuk, and Tuntutuliak on the lower Kuskokwim River. Residents have also expressed concerns about changes in whitefish populations, which would be better understood through additional research in harvest monitoring and traditional ecological knowledge, as well as through the continuation of stock status and trends projects.

ASSESSMENT

Many of the tables included in this report compare the 2004 harvest monitoring results (sampling results and harvest estimates) with previous monitoring results by area, region, and salmon species to annually assess 1) the relative efficacy of community samples and resulting harvest estimates, 2) the relative contribution of a particular region's or a particular community's subsistence salmon harvests to the areawide estimate, and 3) whether any trends could be observed in a particular subsistence salmon fishery. Future harvest monitoring efforts should continue to build upon this effort in order to contribute to the evaluation and assessment of the annual harvest monitoring program sampling results and harvest estimates.

A research project should be designed to identify the variables that contribute to temporal changes in the magnitude of subsistence salmon harvests. For example, is the magnitude of salmon harvests related to changes in population size in a community? Is there a certain per capita subsistence use of salmon that is maintained by adjusting harvests of individual species to run strength? The Division of Subsistence is considering the development of a retrospective patterns and trends project proposal to pursue this line of investigation in the Kuskokwim Management Area.

Comparing Kuskokwim subsistence chum salmon harvests in 2004 with historical chum salmon harvest estimates demonstrated a dramatic decrease in the number of chum salmon harvested for subsistence uses on the Lower Kuskokwim River, but increased harvests in the Upper Kuskokwim region. One hypothesis posed is that this trend relates to a decline in the number of

dogs kept for transportation purposes. A research project could be designed to investigate why Kuskokwim area households no longer harvest the numbers of chum salmon that they did in the 1980s and early 1990s.

Finally, mineral and gas development in the area need to be monitored in terms of its potential impacts on the Kuskokwim salmon fishery, given the significance of salmon to residents.

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Table 1. – Kuskokwim area community sampling rates, 2004.

Community	Total HH'S	Calendars		Postcards			Total Contacts ¹	Subsistence Fished ¹	Harvest Data ²
		Mailed	Returned	Mailed	Returned	Surveyed			
Kipnuk	175	1	0	10	10	0	10	7	10
Kwigillingok	95	0	0	2	2	0	2	2	2
Kongiganak	84	67	2	44	0	37	37	31	37
N KUSKOKWIM BAY	354	68	2	56	12	37	49	40	49
Tuntutuliak	82	66	12	14	0	66	66	58	66
Eek	81	60	18	1	1	58	61	51	61
Kasigluk	129	8	2	12	12	0	13	9	13
Nunapitchuk	109	79	13	5	3	69	74	59	74
Atmautluak	63	39	3	2	2	42	45	35	44
Napakiak	85	56	6	6	1	57	58	49	58
Napaskiak	85	61	9	6	0	50	52	41	52
Oscarville	13	11	5	0	0	8	8	8	7
Bethel	1874	835	75	0	0	956	980	388	968
Kwethluk	164	124	16	13	6	105	113	90	113
Akiachak	124	100	10	1	1	87	88	78	88
Akiak	72	50	6	2	2	47	51	45	50
Tuluksak	81	64	3	2	0	57	58	49	58
LOWER KUSKOKWIM	2,962	1,553	178	64	28	1,602	1,667	960	1,652
Lower Kalskag	67	42	6	2	2	48	51	36	51
Upper Kalskag	65	37	6	21	0	39	40	35	40
Aniak	139	108	29	0	0	108	117	90	99
Chuathbaluk	34	20	1	2	1	21	21	15	21
MIDDLE KUSKOKWIM	305	207	42	25	3	216	229	176	211
Crooked Creek	40	27	3	15	0	24	24	21	24
Red Devil	13	9	2	0	0	10	11	8	11
Sleetmute	30	21	7	2	2	21	23	17	23
Stony River	18	13	0	1	0	16	16	13	15
Lime Village	15	10	0	2	0	11	11	5	11
McGrath	131	69	7	26	7	96	104	40	104
Takotna	19	6	0	0	0	19	19	8	19
Nikolai	40	23	1	15	6	25	31	19	31
Telida	2	0	0	0	0	1	1	1	1
UPPER KUSKOKWIM	308	178	20	61	15	223	240	132	239
KUSKOKWIM RIVER	3,929	2,006	242	206	58	2,078	2,185	1,308	2,151
Quinhagak	147	98	13	3	2	92	96	75	96
Goodnews Bay	64	44	13	14	1	47	50	39	50
Platinum	16	12	2	2	1	12	13	10	12
S KUSKOKWIM BAY	227	154	28	19	4	151	159	124	158
Mekoryuk	79	22	3	7	7	0	8	8	8
Newtok	79	4	0	1	1	0	1	0	1
Nightmute	46	2	0	1	1	0	1	1	1
Toksook Bay	115	5	2	23	2	68	70	56	69
Tununak	104	5	0	5	5	0	5	3	5
Cheforak	91	1	0	3	3	0	3	3	3
BERING SEA COAST	514	39	5	40	19	68	88	71	87
TOTALS	4,670	2,199	275	265	81	2,297	2,432	1,503	2,396

¹ Households directly contacted by returning a calendar or postcard or by being interviewed in a face-to-face survey.² Households that did not fish and those households which did fish and provided harvest numbers.

Table 2. – Kuskokwim area harvest monitoring program sampling summaries, 1989-2004.

YEAR	COMMUNITIES		HOUSEHOLDS				HARVEST CALENDARS		POSTCARDS	
	CONTACTED	SURVEYED	TOTAL	CONTACTED	INTERVIEWED	FISHED	MAILED	RETURNED	MAILED	RETURNED
1989	36	28	3,422	2,135	969	1,501	1,745	267	1,581	348
1990	35	29	3,317	1,830	1,022	1,331	1,547	250	609	303
1991	36	29	3,347	2,024	1,224	1,507	1,561	281	1,429	335
1992	34	25	3,314	1,724	1,026	1,353	1,574	233	1,031	240
1993	35	25	3,274	1,816	976	1,400	1,700	284	1,456	306
1994	36	26	3,179	1,821	1,069	1,262	1,714	277	1,511	286
1995	29	25	3,652	1,894	1,021	1,291	1,634	265	1,909	524
1996	32	24	3,643	1,837	984	1,214	1,569	297	1,083	163
1997	30	25	3,510	1,831	1,034	1,426	1,889	278	1,171	161
1998	36	25	3,495	1,849	1,080	1,439	1,663	252	1,389	190
1999	34	28	4,180	2,523	2,116	1,512	1,528	252	1,254	217
2000	34	26	4,441	2,627	2,432	1,729	1,788	253	1,605	161
2001	33	28	4,483	2,218	2,070	1,570	2,450	290	1,638	95
2002	34	27	4,339	2,798	2,631	1,696	2,504	304	1,655	139
2003	34	26	4,535	2,375	2,289	1,417	2,088	271	368	28
2004	38	30	4,670	2,432	2,297	1,503	2,199	275	265	81
5-Year (99-03) Average	34	27	4,396	2,508	2,308	1,585	2,072	274	1,304	128
10-Year (94-03) Average	33	26	3,946	2,177	1,673	1,456	1,883	274	1,358	196
15-Year (89-03) Average	34	26	3,742	2,087	1,463	1,443	1,797	270	1,313	233

SOURCE: ADF&G Subsistence, Alaska Subsistence Fisheries Database, Version 3.5

Table 3. – Kuskokwim community harvest monitoring participation, 1989-2004.

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Kipnuk																
Kwigillingok																
Kongiganak																
N. KUSKOKWIM BAY																
Tuntutuliak																
Eek																
Kasigluk																
Nunapitchuk																
Atmautluak																
Napakiak																
Napaskiak																
Oscarville																
Bethel																
Kwethluk																
Akiachak																
Akiak																
Tuluksak																
LOWER KUSKOKWIM																
Lower Kalskag																
Upper Kalskag																
Aniak																
Chuathbaluk																
MIDDLE KUSKOKWIM																
Crooked Creek																
Red Devil																
Sleetmute																
Stony River																
Lime Village																
McGrath																
Takotna																
Nikolai																
Telida																
UPPER KUSKOKWIM																
Quinhagak																
Goodnews Bay																
Platinum																
S. KUSKOKWIM BAY																
Mekoryuk																
Newtok																
Nightmute																
Toksook Bay																
Tununak																
Chefornak																
BERING SEA COAST																

* If less than 30 or 50% of households in a community stratum were contacted, then reported harvest is not expanded.

LEGEND No Contact =  Reported Harvest* =  Expanded Harvest =  100% Reported = 

Table 4. – Subsistence salmon harvest by community, Kuskokwim area, 2004.

	Chinook		Chum		Sockeye		Coho		Total			
	Total HH's Contacted	HH's	Reported Harvest	Est.* Total								
Kipnuk	175	10	49	49	156	156	89	89	250	250	544	544
Kwigillingok	95	2	345	345	160	160	70	70	55	55	630	630
Kongiganak	84	37	1105	1478	1184	1587	654	876	412	551	3355	4492
N. KUSKOKWIM BAY	354	49	1499	1872	1500	1903	813	1035	717	856	4529	5666
Tuntutuliak	82	66	2850	3402	1914	2262	1223	1446	1029	1205	7016	8315
Eek	81	61	2212	2636	495	587	393	472	633	764	3733	4459
Kasigluk	129	13	1229	1526	780	906	283	336	671	690	2963	3458
Nunapitchuk	109	74	3340	4104	3435	4200	1145	1381	344	416	8264	10101
Atmautluak	63	45	1494	1701	1575	1793	766	874	492	561	4327	4929
Napakiaik	85	58	1888	2060	1594	1746	973	1068	1143	1259	5598	6133
Napaskiak	85	52	2650	3220	2123	2569	727	883	499	613	5999	7285
Oscarville	13	8	665	998	570	855	236	354	204	306	1675	2513
Bethel	1874	980	16032	27504	7085	12162	6154	10598	8773	15068	38044	65332
Kwethluk	164	113	5045	6119	2933	3597	2256	2741	2365	2907	12599	15364
Akiachak	124	88	5508	6647	3001	3635	2386	2894	1767	2130	12662	15306
Akiak	72	51	2675	3653	2444	3211	854	1162	896	1236	6869	9262
Tuluksak	81	58	2657	3117	1715	2017	1186	1397	740	870	6298	7401
LOWER KUSKOKWIM	2962	1667	48245	66687	29664	39540	18582	25606	19556	28025	116047	159858
Lower Kalskag	67	51	1630	1918	1107	1225	593	673	266	295	3596	4111
Upper Kalskag	65	40	1888	2442	1187	1559	465	603	984	1288	4524	5892
Aniak	139	117	2241	2606	2008	2331	745	867	1434	1655	6428	7459
Chuathbaluk	34	21	774	1041	1315	1815	282	385	181	249	2552	3490
MIDDLE KUSKOKWIM	305	229	6533	8007	5617	6930	2085	2528	2865	3487	17100	20952
Crooked Creek	40	24	614	1003	1023	1662	467	760	403	670	2507	4095
Red Devil	13	11	130	165	81	103	78	97	42	54	331	419
Sleetmute	30	23	530	618	740	863	518	604	279	325	2067	2410
Stony River	18	16	580	621	625	670	750	804	571	612	2526	2707
Lime Village	15	11	54	66	155	189	680	831	180	220	1069	1306
McGrath	131	104	427	500	218	254	144	168	924	1079	1713	2001
Takotna	19	19	16	16	0	0	0	0	51	51	67	67
Nikolai	40	31	388	510	198	260	0	0	119	156	705	926
Telida	2	1	0	0	0	0	0	0	200	200	200	200
UPPER KUSKOKWIM	308	240	2739	3499	3040	4001	2637	3264	2769	3367	11185	14131
KUSKOKWIM RIVER	3929	2185	59016	80065	39821	52374	24117	32433	25907	35735	148861	200607
Quinhagak	147	96	3077	3726	924	1112	903	1086	986	1209	5890	7133
Goodnews Bay	64	50	698	851	185	221	674	805	1200	1411	2757	3288
Platinum	16	13	96	103	33	36	144	155	191	206	464	500
S. KUSKOKWIM BAY	227	159	3871	4680	1142	1369	1721	2046	2377	2826	9111	10921
Mekoryuk	79	8	3	3	881	881	8	8	126	126	1018	1018
Newtok	79	1	0	0	0	0	0	0	0	0	0	0
Nightmute	46	1	0	0	0	0	10	10	0	0	10	10
Toksook Bay	115	70	322	327	923	938	353	359	649	661	2247	2285
Tununak	104	5	5	5	0	0	10	10	40	40	55	55
Chefornak	91	3	6	6	13	13	26	26	18	18	63	63
BERING SEA COAST	514	88	336	341	1817	1832	407	413	833	845	3393	3431
TOTALS	4,670	2,432	63,223	85,086	42,780	55,575	26,245	34,892	29,117	39,406	161,365	214,959

* If less than 30 or 50% of households in a stratum in a community were contacted, then reported harvest is used for estimated harvest. The total community harvest is the minimum estimate.

NOTE: Includes harvests using rod and reel and the removal of salmon from commercial harvests as well as subsistence nets.

Table 5. – Estimated and reported subsistence harvest of Chinook salmon, Kuskokwim area, 2004.

	Do Not Usually Fish				Usually Fish				TOTAL						
	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Mean	Reported Harvest	Est. Total*	Confid. +/-	Interval % +/-
Kipnuk	168	8.00	3.0	5.0	7	2	12.5	10.6	175	10	0.3	49	49	NA	NA
Kwigillingok	92	2	172.5	109.6	3	0	0.0	0.0	95	2	3.6	345	345	NA	NA
Kongiganak	41	5.00	3.8	6.9	43	32	33.9	35.5	84	37	17.6	1105	1478	361	24.4%
N. KUSKOKWIM BAY	301	15	1.3	118.0	53	34	28.0	136.5	354	49	5.3	1499	1872	361	19.3%
Tuntutuliak	28	18	25.3	32.8	54	48	49.9	41.0	82	66	41.5	2850	3402	335	9.9%
Eek	23	12	2.0	6.6	58	49	44.7	37.8	81	61	32.5	2212	2636	254	9.6%
Kasigluk	122	9	92.6	133.9	7	4	99.0	35.6	129	13	11.8	1229	1526	NA	NA
Nunapitchuk	38	17	13.6	21.5	71	57	54.5	63.8	109	74	37.7	3340	4104	609	14.8%
Atmautluak	23	10	4.0	9.7	40	35	41.5	34.4	63	45	27.0	1494	1701	195	11.5%
Napakiak	33	11	23.9	46.3	52	47	34.6	32.9	85	58	24.2	1888	2060	768	37.3%
Napaskiak	37	13	13.5	22.3	48	39	63.4	51.0	85	52	37.9	2650	3220	501	15.6%
Oscarville	1	0	0.0	0.0	12	8	83.1	60.4	13	8	76.8	665	998	296	29.6%
Bethel	1063	501	1.7	13.4	811	479	31.7	48.5	1874	980	14.7	16032	27504	2478	9.0%
Kwethluk	60	29	18.3	43.1	104	84	53.7	59.2	164	113	37.3	5045	6119	907	14.8%
Akiachak	28	9	24.0	32.0	96	79	67.0	53.6	124	88	53.6	5508	6647	693	10.4%
Akiak	21	11	34.7	35.1	51	40	57.3	46.0	72	51	50.7	2675	3653	461	12.6%
Tulusak	22	8	12.8	35.3	59	50	51.1	56.2	81	58	38.5	2657	3117	571	18.3%
LOWER KUSKOKWIM	1499	648	3.8	825.8	1463	1019	41.7	1301.1	2962	1667	22.5	48245	66687	3082	4.6%
Lower Kalskag	26	13	13.3	25.1	41	38	38.3	47.8	67	51	28.6	1630	1918	309	16.1%
Upper Kalskag	25	10	22.5	33.7	40	30	55.4	87.9	65	40	37.6	1888	2442	763	31.3%
Aniak	38	29	7.3	19.4	101	88	23.1	47.4	139	117	18.7	2241	2606	390	15.0%
Chuathbaluk	10	4	31.3	62.5	24	17	38.1	68.3	34	21	30.6	774	1041	647	62.1%
MIDDLE KUSKOKWIM	99	56	9.8	349.5	206	173	34.1	435.9	305	229	26.3	6533	8007	1117	14.0%
Crooked Creek	11	6	10.5	13.0	29	18	30.6	27.6	40	24	25.1	614	1003	246	24.5%
Red Devil	4	4	1.8	2.9	9	7	17.6	13.6	13	11	12.7	130	165	44	26.5%
Sleetmute	9	5	0.0	0.0	21	18	29.4	48.3	30	23	20.6	530	618	181	29.2%
Stony River	3	2	0.0	0.0	15	14	41.4	55.6	18	16	34.5	580	621	115	18.5%
Lime Village	4	2	0.0	0.0	11	9	6.0	8.5	15	11	4.4	54	66	26	40.1%
McGrath	60	43	0.3	1.2	71	61	6.8	13.5	131	104	3.8	427	500	93	18.5%
Takotna	9	9	0.1	0.3	10	10	1.5	3.1	19	19	0.8	16	16	NA	NA
Nikolai	15	12	0.9	2.2	25	19	19.8	34.2	40	31	12.8	388	510	192	37.7%
Telida	1	0	0.0	0.0	1	1	0.0	0.0	2	1	0.0	0	0	NA	NA
UPPER KUSKOKWIM	116	83	1.4	40.1	192	157	17.4	192.3	308	240	11.4	2739	3499	393	11.2%
KUSKOKWIM RIVER	2015	802	3.6	905.3	1914	1383	38.1	1392.3	3929	2185	20.4	59016	80065	3322	4.1%
Quinhagak	64	29	12.4	21.3	83	67	40.6	45.8	147	96	25.3	3077	3726	553	14.9%
Goodnews Bay	22	14	6.4	13.7	42	36	16.9	18.7	64	50	13.3	698	851	139	16.3%
Platinum	2	0	0.0	0.0	14	13	7.4	10.0	16	13	6.4	96	103	21	20.1%
S. KUSKOKWIM BAY	88	43	5.7	193.0	139	116	30.1	210.2	227	159	20.6	3871	4680	571	12.2%
Mekoryuk	79	8	0.4	1.1	0	0	0.0	0.0	79	8	0.0	3	3	NA	NA
Newtok	79	1	0.0	0.0	0	0	0.0	0.0	79	1	0.0	0	0	NA	NA
Nightmute	46	1	0.0	0.0	0	0	0.0	0.0	46	1	0.0	0	0	NA	NA
Toksook Bay	59	15	1.8	3.0	56	55	5.4	5.7	115	70	2.8	322	327	80	24.4%
Tununak	104	5	1.0	2.2	0	0	0.0	0.0	104	5	0.0	5	5	NA	NA
Chefomak	90	3	2.0	3.5	1	0	0.0	0.0	91	3	0.1	6	6	NA	NA
BERING SEA COAST	457	33	0.1	39.5	57	55	5.3	5.7	514	88	0.7	336	341	80	23.4%
TOTALS	2560	878	3.0	926.5	2110	1554	36.7	1408.1	4670	2432	18.2	63223	85086	3371	4.0%

* If less than 30 or 50% of households in a stratum in a community were contacted, then reported harvest is used for estimated harvest. The total community harvest is the minimum estimate.

NOTE: Includes harvests using rod and reel and the removal of salmon from commercial harvests as well as subsistence nets.

Table 6. – Estimated and reported subsistence harvest of chum salmon, Kuskokwim area, 2004.

	Do Not Usually Fish				Usually Fish				TOTAL						
	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Reported Mean Harvest	Est. Total*	Confid. +/-	Interval % +/-	
Kipnuk	168	8	16.4	34.2	7	2	12.5	10.6	175	10	0.9	156	156	NA	NA
Kwigillingok	92	2	80.0	7.1	3	0	0.0	0.0	95	2	1.7	160	160	NA	NA
Kongiganak	41	5	2.4	4.3	43	32	36.6	45.1	84	37	18.9	1184	1587	377	23.8%
N. KUSKOKWIM BAY	301	15	1.0	73.5	53	34	30.2	173.6	354	49	5.4	1500	1903	377	19.8%
Tuntutuliak	28	18	14.1	22.1	54	48	34.6	40.5	82	66	27.6	1914	2262	273	12.1%
Eek	23	12	0.1	0.3	58	49	10.1	20.2	81	61	7.2	495	587	132	22.5%
Kasigluk	122	9	68.0	83.5	7	4	42.0	42.3	129	13	7.0	780	906	NA	NA
Nunapitchuk	38	17	18.9	42.2	71	57	54.6	70.3	109	74	38.5	3435	4200	824	19.6%
Atmaultluak	23	10	4.8	11.0	40	35	43.6	43.3	63	45	28.5	1575	1793	239	13.3%
Napakiak	33	11	14.3	30.0	52	47	30.6	43.0	85	58	20.5	1594	1746	528	30.2%
Napaskiak	37	13	14.7	35.6	48	39	49.5	91.7	85	52	30.2	2123	2569	848	33.0%
Oscarville	1	0	0.0	0.0	12	8	71.3	111.9	13	8	65.8	570	855	548	64.1%
Bethel	1063	501	0.8	6.7	811	479	14.0	30.6	1874	980	6.5	7085	12162	1523	12.5%
Kwethluk	60	29	4.8	9.2	104	84	33.2	66.6	164	113	21.9	2933	3597	679	18.9%
Akiachak	28	9	6.2	12.2	96	79	37.3	46.0	124	88	29.3	3001	3635	458	12.6%
Akiak	21	11	13.5	19.2	51	40	57.4	235.1	72	51	44.6	2444	3211	1769	55.1%
Tuluksak	22	8	4.6	12.3	59	50	33.6	31.5	81	58	24.9	1715	2017	256	12.7%
LOWER KUSKOKWIM	1499	648	2.0	566.7	1463	1019	24.9	1325.4	2962	1667	13.3	29664	39540	2883	7.3%
Lower Kalskag	26	13	2.5	5.2	41	38	28.3	50.5	67	51	18.3	1107	1225	189	15.4%
Upper Kalskag	25	10	7.0	14.9	40	30	37.2	67.6	65	40	24.0	1187	1559	526	33.8%
Aniak	38	29	5.6	18.9	101	88	21.0	52.0	139	117	16.8	2008	2331	422	18.1%
Chuathbaluk	10	4	25.0	50.0	24	17	71.4	111.6	34	21	53.4	1315	1815	801	44.2%
MIDDLE KUSKOKWIM	99	56	4.5	225.3	206	173	31.5	482.3	305	229	22.7	5617	6930	1065	15.4%
Crooked Creek	11	6	10.3	17.0	29	18	53.4	91.7	40	24	41.6	1023	1662	779	46.9%
Red Devil	4	4	1.0	2.0	9	7	11.0	18.7	13	11	7.9	81	103	60	58.1%
Sleetmute	9	5	0.0	0.0	21	18	41.1	104.7	30	23	28.8	740	863	392	45.4%
Stony River	3	2	0.0	0.0	15	14	44.6	71.6	18	16	37.2	625	670	148	22.1%
Lime Village	4	2	0.0	0.0	11	9	17.2	32.4	15	11	12.6	155	189	101	53.6%
McGrath	60	43	0.0	0.0	71	61	3.6	9.3	131	104	1.9	218	254	63	24.9%
Takotna	9	9	0.0	0.0	10	10	0.0	0.0	19	19	0.0	0	0	NA	NA
Nikolai	15	12	1.1	2.9	25	19	9.7	14.0	40	31	6.5	198	260	79	30.6%
Telida	1	0	0.0	0.0	1	1	0.0	0.0	2	1	0.0	0	0	NA	NA
UPPER KUSKOKWIM	116	83	1.2	51.7	192	157	20.1	446.0	308	240	13.0	3040	4001	898	22.4%
KUSKOKWIM RIVER	2015	802	2.0	616.4	1914	1383	25.3	1489.4	3929	2185	13.3	39821	52374	3224	6.2%
Quinhagak	64	29	4.7	9.2	83	67	11.7	17.1	147	96	7.6	924	1112	222	20.0%
Goodnews Bay	22	14	0.9	1.7	42	36	4.8	7.6	64	50	3.5	185	221	42	18.9%
Platinum	2	0	0.0	0.0	14	13	2.5	4.4	16	13	2.3	33	36	9	25.3%
S. KUSKOKWIM BAY	88	43	1.8	80.8	139	116	8.7	79.0	227	159	6.0	1142	1369	226	16.5%
Mekoryuk	79	8	110.1	128.1	0	0	0.0	0.0	79	8	11.2	881	881	NA	NA
Newtok	79	1	0.0	0.0	0	0	0.0	0.0	79	1	0.0	0	0	NA	NA
Nightmute	46	1	0.0	0.0	0	0	0.0	0.0	46	1	0.0	0	0	NA	NA
Toksook Bay	59	15	6.0	12.6	56	55	15.1	16.9	115	70	8.2	923	938	333	35.5%
Tununak	104	5	0.0	0.0	0	0	0.0	0.0	104	5	0.0	0	0	NA	NA
Chefornak	90	3	4.3	5.1	1	0	0.0	0.0	91	3	0.1	13	13	NA	NA
BERING SEA COAST	457	33	2.2	165.5	57	55	14.9	17.0	514	88	3.6	1817	1832	333	18.2%
TOTALS	2560	878	2.0	643.3	2110	1554	23.9	1491.6	4670	2432	11.9	42780	55575	3249	5.8%

* If less than 30 or 50% of households in a stratum in a community were contacted, then reported harvest is used for estimated harvest. The total community harvest is the minimum estimate.

NOTE: Includes harvests using rod and reel and the removal of salmon from commercial harvests as well as subsistence nets.

Table 7. – Estimated and reported subsistence harvest of sockeye salmon, Kuskokwim area, 2004.

	Do Not Usually Fish				Usually Fish				TOTAL						
	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Mean	Reported Harvest	Est. Total*	Confid. +/-	Interval % +/-
Kipnuk	168	8	7.4	11.9	7	2	15.0	7.1	175	10	0.5	89	89	NA	NA
Kwigillingok	92	2	35.0	14.1	3	0	0.0	0.0	95	2	0.7	70	70	NA	NA
Kongiganak	41	5	1.8	2.9	43	32	20.2	26.7	84	37	10.4	654	876	229	26.1%
N. KUSKOKWIM BAY	301	15	0.5	50.7	53	34	16.9	102.6	354	49	2.9	813	1035	229	22.1%
Tuntutuliak	28	18	9.0	14.6	54	48	22.1	32.7	82	66	17.6	1223	1446	205	14.2%
Eek	23	12	0.8	2.3	58	49	7.8	12.9	81	61	5.8	393	472	87	18.3%
Kasigluk	122	9	23.6	30.0	7	4	17.8	12.7	129	13	2.6	283	336	NA	NA
Nunapitchuk	38	17	10.9	25.9	71	57	16.8	20.5	109	74	12.7	1145	1381	394	28.5%
Atmautluak	23	10	0.8	1.8	40	35	21.6	27.2	63	45	13.9	766	874	131	15.0%
Napakiak	33	11	6.6	14.2	52	47	19.1	28.6	85	58	12.6	973	1068	267	25.0%
Napaskiak	37	13	3.7	7.3	48	39	17.4	23.0	85	52	10.4	727	883	195	22.0%
Oscarville	1	0	0.0	0.0	12	8	29.5	44.7	13	8	27.2	236	354	219	61.9%
Bethel	1063	501	0.8	5.6	811	479	12.0	22.5	1874	980	5.7	6154	10598	1136	10.7%
Kwethluk	60	29	7.4	20.0	104	84	24.3	60.6	164	113	16.7	2256	2741	683	24.9%
Akiachak	28	9	3.0	6.2	96	79	29.9	41.9	124	88	23.3	2386	2894	393	13.6%
Akiak	21	11	10.5	13.1	51	40	18.5	22.9	72	51	16.1	854	1162	206	17.7%
Tuluksak	22	8	1.6	2.6	59	50	23.5	31.9	81	58	17.2	1186	1397	210	15.0%
LOWER KUSKOKWIM	1499	648	1.4	348.2	1463	1019	16.0	687.6	2962	1667	8.6	18582	25606	1542	6.0%
Lower Kalskag	26	13	2.8	6.5	41	38	14.7	21.8	67	51	10.0	593	673	102	15.2%
Upper Kalskag	25	10	5.2	9.5	40	30	13.8	17.3	65	40	9.3	465	603	172	28.5%
Aniak	38	29	2.4	6.9	101	88	7.7	13.3	139	117	6.2	745	867	114	13.1%
Chuathbaluk	10	4	7.5	15.0	24	17	14.8	20.8	34	21	11.3	282	385	175	45.4%
MIDDLE KUSKOKWIM	99	56	2.5	91.8	206	173	11.1	111.6	305	229	8.3	2085	2528	289	11.4%
Crooked Creek	11	6	5.8	9.7	29	18	24.0	34.2	40	24	19.0	467	760	294	38.7%
Red Devil	4	4	2.5	5.0	9	7	9.7	9.9	13	11	7.5	78	97	32	32.7%
Sleetmute	9	5	0.0	0.0	21	18	28.8	49.2	30	23	20.1	518	604	184	30.5%
Stony River	3	2	0.0	0.0	15	14	53.6	61.6	18	16	44.7	750	804	127	15.9%
Lime Village	4	2	0.0	0.0	11	9	75.6	79.9	15	11	55.4	680	831	250	30.1%
McGrath	60	43	0.0	0.0	71	61	2.4	9.2	131	104	1.3	144	168	63	37.4%
Takotna	9	9	0.0	0.0	10	10	0.0	0.0	19	19	0.0	0	0	NA	NA
Nikolai	15	12	0.0	0.0	25	19	0.0	0.0	40	31	0.0	0	0	NA	NA
Telida	1	0	0.0	0.0	1	1	0.0	0.0	2	1	0.0	0	0	NA	NA
UPPER KUSKOKWIM	116	83	0.6	29.4	192	157	16.6	223.9	308	240	10.6	2637	3264	452	13.8%
KUSKOKWIM RIVER	2015	802	1.3	364.9	1914	1383	15.6	738.9	3929	2185	8.3	24117	32433	1648	5.1%
Quinhagak	64	29	4.7	9.3	83	67	11.4	13.9	147	96	7.4	903	1086	205	18.9%
Goodnews Bay	22	14	3.3	5.9	42	36	17.4	18.8	64	50	12.6	674	805	108	13.4%
Platinum	2	0	0.0	0.0	14	13	11.1	31.8	16	13	9.7	144	155	66	42.6%
S. KUSKOKWIM BAY	88	43	2.4	84.5	139	116	13.2	85.9	227	159	9.0	1721	2046	241	11.8%
Mekoryuk	79	8	1.0	1.6	0	0	0.0	0.0	79	8	0.1	8	8	NA	NA
Newtok	79	1	0.0	0.0	0	0	0.0	0.0	79	1	0.0	0	0	NA	NA
Nightmute	46	1	10.0	0.0	0	0	0.0	0.0	46	1	0.2	10	10	NA	NA
Toksook Bay	59	15	1.1	2.8	56	55	6.1	8.6	115	70	3.1	353	359	75	20.9%
Tununak	104	5	2.0	4.5	0	0	0.0	0.0	104	5	0.1	10	10	NA	NA
Chefornak	90	3	8.7	7.1	1	0	0.0	0.0	91	3	0.3	26	26	NA	NA
BERING SEA COAST	457	33	0.2	36.5	57	55	6.0	8.6	514	88	0.8	407	413	75	18.2%
TOTALS	2560	878	1.1	376.3	2110	1554	15.2	743.9	4670	2432	7.5	26245	34892	1667	4.8%

* If less than 30 or 50% of households in a stratum in a community were contacted, then reported harvest is used for estimated harvest. The total community harvest is the minimum estimate.

NOTE: Includes harvests using rod and reel and the removal of salmon from commercial harvests as well as subsistence nets.

Table 8. – Estimated and reported subsistence harvest of coho salmon, Kuskokwim area, 2004.

	Do Not Usually Fish				Usually Fish				TOTAL						
	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Mean	Std. Dev.	Total HH's	HH's Contctd	Reported Mean Harvest	Est. Total*	Confrd. +/-	Interval % +/-	
Kipnuk	168	8	22.5	22.8	7	2	35.0	21.2	175	10	1.4	250	250	NA	NA
Kwigillingok	92	2	27.5	24.7	3	0	0.0	0.0	95	2	0.6	55	55	NA	NA
Kongiganak	41	5	1.4	1.5	43	32	12.7	20.2	84	37	6.6	412	551	164	29.7%
N. KUSKOKWIM BAY	301	15	0.8	26.1	53	34	11.6	77.7	354	49	2.4	717	856	164	19.1%
Tuntutuliak	28	18	6.2	14.0	54	48	19.1	30.9	82	66	14.7	1029	1205	195	16.2%
Eek	23	12	1.7	3.7	58	49	12.5	22.8	81	61	9.4	633	764	153	20.0%
Kasigluk	122	9	71.8	165.7	7	4	6.3	12.5	129	13	5.3	671	690	NA	NA
Nunapitchuk	38	17	3.1	12.1	71	57	5.1	11.0	109	74	3.8	344	416	189	45.5%
Atmautluak	23	10	0.3	0.9	40	35	14.0	27.2	63	45	8.9	492	561	131	23.3%
Napakiaik	33	11	4.8	10.2	52	47	23.2	40.6	85	58	14.8	1143	1259	253	20.1%
Napaskiak	37	13	0.2	0.4	48	39	12.7	27.8	85	52	7.2	499	613	185	30.2%
Oscarville	1	0	0.0	0.0	12	8	25.5	40.5	13	8	23.5	204	306	198	64.8%
Bethel	1063	501	1.0	6.5	811	479	17.3	32.0	1874	980	8.0	8773	15068	1584	10.5%
Kwethluk	60	29	2.9	6.6	104	84	27.1	67.9	164	113	17.7	2365	2907	684	23.5%
Akiachak	28	9	8.9	18.3	96	79	21.4	41.0	124	88	17.2	1767	2130	467	21.9%
Akiak	21	11	13.5	19.6	51	40	18.7	23.9	72	51	17.2	896	1236	248	20.0%
Tuluksak	22	8	2.1	5.2	59	50	14.5	18.5	81	58	10.7	740	870	137	15.7%
LOWER KUSKOKWIM	1499	648	1.7	313.3	1463	1019	17.5	885.1	2962	1667	9.5	19556	28025	1878	6.7%
Lower Kalskag	26	13	0.7	1.7	41	38	6.8	20.8	67	51	4.4	266	295	77	26.1%
Upper Kalskag	25	10	7.2	13.7	40	30	30.4	65.7	65	40	19.8	984	1288	508	39.5%
Aniak	38	29	2.0	4.6	101	88	15.6	47.2	139	117	11.9	1434	1655	366	22.1%
Chuathbaluk	10	4	3.8	4.8	24	17	9.8	17.1	34	21	7.3	181	249	114	45.7%
MIDDLE KUSKOKWIM	99	56	1.8	87.8	206	173	16.0	308.3	305	229	11.4	2865	3487	641	18.4%
Crooked Creek	11	6	15.5	23.7	29	18	17.2	23.1	40	24	16.8	403	670	242	36.1%
Red Devil	4	4	0.3	0.5	9	7	5.9	8.4	13	11	4.2	42	54	27	49.7%
Sleetmute	9	5	0.0	0.0	21	18	15.5	49.5	30	23	10.8	279	325	185	57.0%
Stony River	3	2	0.0	0.0	15	14	40.8	38.0	18	16	34.0	571	612	79	12.8%
Lime Village	4	2	0.0	0.0	11	9	20.0	31.9	15	11	14.7	180	220	100	45.4%
McGrath	60	43	0.4	2.3	71	61	14.9	42.9	131	104	8.2	924	1079	294	27.2%
Takotna	9	9	0.0	0.0	10	10	5.1	6.7	19	19	2.7	51	51	NA	NA
Nikolai	15	12	0.4	1.2	25	19	6.0	9.2	40	31	3.9	119	156	52	33.4%
Telida	1	0	0.0	0.0	1	1	200.0	0.0	2	1	100.0	200	200	NA	NA
UPPER KUSKOKWIM	116	83	1.7	72.8	192	157	16.5	210.6	308	240	10.9	2769	3367	446	13.2%
KUSKOKWIM RIVER	2015	802	1.5	334.5	1914	1383	17.0	963.8	3929	2185	9.1	25907	35735	2040	5.7%
Quinhagak	64	29	1.8	4.4	83	67	13.9	27.5	147	96	8.2	986	1209	257	21.2%
Goodnews Bay	22	14	2.0	4.2	42	36	32.6	88.1	64	50	22.0	1200	1411	467	33.1%
Platinum	2	0	0.0	0.0	14	13	14.7	20.1	16	13	12.9	191	206	42	20.3%
S. KUSKOKWIM BAY	88	43	1.1	41.4	139	116	19.6	264.0	227	159	12.4	2377	2826	535	18.9%
Mekoryuk	79	8	15.8	15.1	0	0	0.0	0.0	79	8	1.6	126	126	NA	NA
Newtok	79	1	0.0	0.0	0	0	0.0	0.0	79	1	0.0	0	0	NA	NA
Nightmute	46	1	0.0	0.0	0	0	0.0	0.0	46	1	0.0	0	0	NA	NA
Toksook Bay	59	15	0.9	1.6	56	55	11.6	13.6	115	70	5.7	649	661	51	7.7%
Tununak	104	5	8.0	11.0	0	0	0.0	0.0	104	5	0.4	40	40	NA	NA
Chefornak	90	3	6.0	4.0	1	0	0.0	0.0	91	3	0.2	18	18	NA	NA
BERING SEA COAST	457	33	0.4	21.6	57	55	11.4	13.7	514	88	1.6	833	845	51	6.1%
TOTALS	2560	878	1.3	337.7	2110	1554	17.1	999.4	4670	2432	8.4	29117	39406	2110	5.4%

* If less than 30 or 50% of households in a stratum in a community were contacted, then reported harvest is used for estimated harvest. The total community harvest is the minimum estimate.

NOTE: Includes harvests using rod and reel and the removal of salmon from commercial harvests as well as subsistence nets.

Table 9. – Gear types used for subsistence salmon fishing, Kuskokwim area, 2004.

Community	Fishing HH'S*	Gear Types**						Not Reported	
		Setnet	Drift Net	Fish Wheel	Rod and Reel	Seine	Spear		
Kipnuk	7	1	6	0	0	0	0	0	
Kwigillingok	2	2	2	0	0	0	0	0	
Kongiganak	31	1	25	0	0	0	0	6	
N KUSKOKWIM BAY	Totals	40	4	33	0	0	0	6	
Tuntutuliak	58	1	45	0	0	0	0	13	
Eek	51	11	30	0	8	0	0	6	
Kasigluk	9	0	8	0	0	0	0	1	
Nunapitchuk	59	1	45	0	0	0	0	14	
Atmautluak	35	3	27	0	1	0	0	7	
Napakiak	49	16	30	0	1	0	0	14	
Napaskiak	41	14	27	0	5	1	0	11	
Oscarville	8	3	6	0	0	0	0	0	
Bethel	388	10	299	0	67	0	0	45	
Kwethluk	90	28	67	0	31	0	0	12	
Akiachak	78	13	71	0	12	0	0	3	
Akiak	45	15	33	0	13	0	0	10	
Tuluksak	49	17	35	0	21	0	0	6	
LOWER KUSKOKWIM	Totals	960	132	723	0	159	1	0	142
Lower Kalskag	36	9	22	0	3	0	0	11	
Upper Kalskag	35	8	24	0	7	0	0	8	
Aniak	90	10	42	0	56	0	1	15	
Chuathbaluk	15	3	11	0	7	0	0	1	
MIDDLE KUSKOKWIM	Totals	176	30	99	0	73	0	1	35
Crooked Creek	21	8	17	0	7	0	0	3	
Red Devil	8	3	2	0	2	0	0	3	
Sleetmute	17	3	13	0	7	0	0	1	
Stony River	13	6	3	0	8	0	0	0	
Lime Village	5	5	1	0	3	0	0	0	
McGrath	40	18	3	0	18	0	0	6	
Takotna	8	0	0	0	8	0	0	0	
Nikolai	19	10	1	1	7	0	0	3	
Telida	1	1	0	0	1	0	0	0	
UPPER KUSKOKWIM	Totals	132	54	40	1	61	0	0	16
Quinhagak	75	9	38	0	31	0	0	15	
Goodnews Bay	39	12	20	0	18	0	0	7	
Platinum	10	4	6	0	8	0	0	0	
S KUSKOKWIM BAY	Totals	124	25	64	0	57	0	0	22
Mekoryuk	8	4	1	0	3	0	0	1	
Newtok	0	0	0	0	0	0	0	0	
Nightmute	1	0	1	0	1	0	0	0	
Toksook Bay	56	8	41	0	11	0	0	11	
Tununak	3	2	1	0	0	0	0	0	
Chefornak	3	2	1	0	1	0	0	0	
BERING SEA COAST	Totals	71	16	45	0	16	0	0	12
TOTAL		1503	261	1004	1	366	1	1	233

* Data from returned harvest calendars, household surveys, and returned postcards.

** A household may use multiple gear types.

Table 10. – Subsistence Chinook salmon gillnet mesh sizes used by residence of communities (number of households).

COMMUNITY	MESH SIZE ^{1,2} (inches)																						Total	
	4	4 1/2	4 5/8	5	5 1/4	5 3/8	5 1/2	5 5/8	5 3/4	5 7/8	6	6 1/4	6 1/2	7	7 1/4	7 1/2	7 3/4	7 7/8	8	8 1/8	8 1/4	8 3/8		8 1/2
Akiachak	0	0	0	0	0	0	7	0	0	0	14	0	1	4	2	8	0	1	24	0	0	0	3	64
Akiak	0	0	0	0	0	0	3	0	1	0	0	0	0	1	0	0	0	0	20	0	1	0	3	29
Aniak	0	1	0	0	0	0	10	1	0	0	2	0	0	1	0	1	0	0	35	0	0	0	0	51
Atmautluak	0	0	0	0	0	0	0	0	3	2	3	0	0	0	0	0	0	0	10	0	3	0	0	21
Bethel	1	0	0	2	1	0	7	1	1	2	27	1	5	5	5	15	1	0	114	1	35	0	17	241
Chuathbaluk	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6	0	0	0	0	8
Crooked Creek	1	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	5	0	0	2	0	15
Eek	1	0	0	0	0	1	5	0	1	3	8	0	0	0	1	0	0	0	9	0	2	0	0	31
Goodnews Bay	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	1	0	0	9	0	0	0	3	17
Kongiganak	0	0	0	1	0	0	1	0	2	0	1	0	0	1	0	0	0	2	3	0	0	0	0	11
Kwethluk	0	0	0	0	1	0	1	1	0	2	12	0	0	1	0	1	0	0	30	0	7	0	1	57
Lime Village	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	2
Lower Kalskag	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	19
McGrath	2	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	12
Napakiak	0	0	0	2	0	0	0	0	0	1	7	0	1	1	0	0	0	0	10	0	4	0	3	29
Napaskiak	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	5	10	0	0	0	0	18
Nikolai	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Nunapitchuk	0	0	0	0	0	0	2	0	1	0	6	0	0	0	0	2	0	0	16	0	2	0	1	30
Oscarville	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	5	0	0	0	0	7
Platinum	0	0	0	0	0	0	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	5
Quinhagak	0	0	0	0	2	0	6	0	1	5	3	0	0	0	0	0	0	0	10	0	0	0	0	27
Red Devil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Sleetmute	0	0	1	0	0	0	5	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	9
Stony River	1	0	0	1	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Telida	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Toksook Bay	2	0	0	8	4	0	12	0	0	0	2	0	0	2	1	3	0	0	5	0	2	0	0	41
Tuluksak	1	0	0	0	0	0	0	0	1	3	10	0	0	1	1	0	0	0	13	0	2	0	2	34
Tuntutuliak	0	0	0	0	0	0	1	0	0	0	7	0	1	0	1	0	0	0	17	0	4	0	1	32
Upper Kalskag	0	0	0	1	0	0	1	0	0	0	4	0	0	0	0	0	1	0	12	0	1	0	2	22
Total	15	4	1	19	8	2	79	4	11	20	109	1	8	20	13	33	2	8	385	1	65	2	36	846

¹For households indicating they harvested chinook with two different mesh sizes, only the larger of the two is included in this table.

²Some households listed mesh size by species rather than in inches, e.g. "king net" or "dog net." The following default mesh sizes were used where this happened: king/chinook = 8; chum/dog, chum/dog, sockeye/red, or coho salmon = 5.5; whitefish = 4.

Table 11. – Commercially harvested salmon retained for subsistence use, Kuskokwim area, 2004.

	FACE-TO FACE SURVEYS	HOUSEHOLDS		FISH RETAINED FROM COMMERCIAL CATCH					TOTAL
		COMMERCIAL FISHING	RETAINING CATCH	CHINOOK	CHUM	SOCKEYE	COHO		
Kipnuk	0	0	0	0	0	0	0	0	
Kwigillingok	0	0	0	0	0	0	0	0	
Kongiganak	37	6	0	0	0	0	0	0	
N. KUSKOKWIM BAY	37	6	0	0	0	0	0	0	
Tuntutuliak	66	24	8	10	0	3	51	64	
Eek	58	23	5	13	33	5	17	68	
Kasigluk	0	0	0	0	0	0	0	0	
Nunapitchuk	69	22	6	1	1	1	95	98	
Atmautluak	42	11	2	0	0	0	2	2	
Napakiak	57	14	3	0	0	0	22	22	
Napaskiak	50	14	3	0	0	0	7	7	
Oscarville	8	3	0	0	0	0	0	0	
Bethel	956	0	0	0	0	0	0	0	
Kwethluk	105	34	2	0	0	0	4	4	
Akiachak	87	53	4	14	0	9	13	36	
Akiak	47	17	1	0	0	2	0	2	
Tuluksak	57	17	2	2	0	0	45	47	
LOWER KUSKOKWIM	1602	232	36	40	34	20	256	350	
Lower Kalskag	48	0	0	0	0	0	0	0	
Upper Kalskag	39	0	0	0	0	0	0	0	
Aniak	108	1	0	0	0	0	0	0	
Chuathbaluk	21	0	0	0	0	0	0	0	
MIDDLE KUSKOKWIM	216	1	0	0	0	0	0	0	
Crooked Creek	24	0	0	0	0	0	0	0	
Red Devil	10	0	0	0	0	0	0	0	
Sleetmute	21	0	0	0	0	0	0	0	
Stony River	16	0	0	0	0	0	0	0	
Lime Village	11	0	0	0	0	0	0	0	
McGrath	96	0	0	0	0	0	0	0	
Takotna	19	0	0	0	0	0	0	0	
Nikolai	25	0	0	0	0	0	0	0	
Telida	1	0	0	0	0	0	0	0	
UPPER KUSKOKWIM	223	0	0	0	0	0	0	0	
KUSKOKWIM RIVER	2078	239	36	40	34	20	256	350	
Quinhagak	92	39	9	48	5	22	45	120	
Goodnews Bay	47	19	6	11	10	28	24	73	
Platinum	12	4	2	17	0	0	0	17	
S. KUSKOKWIM BAY	151	62	17	76	15	50	69	210	
Mekoryuk	0	0	0	0	0	0	0	0	
Newtok	0	0	0	0	0	0	0	0	
Nightmute	0	0	0	0	0	0	0	0	
Toksook Bay	68	16	2	2	0	20	0	22	
Tununak	0	0	0	0	0	0	0	0	
Chefornak	0	0	0	0	0	0	0	0	
BERING SEA COAST	68	16	2	2	0	20	0	22	
TOTAL	2297	317	55	118	49	90	325	582	

NOTE: Data are based upon surveyed households only without expansion to the community as a whole.

Table 12. – Estimated subsistence salmon and non-salmon harvest, Bethel, 2004.

TOTAL NUMBER OF HOUSEHOLDS: 1,874

Species	Conversion Factor* (# to Pounds)	Households**		Number of Fish Harvested for Subsistence***							Useable Pounds of Fish Harvested for Subsistence***						
		Number	%	Set Net	Drift Net	Net Under Ice	Other Gear	Hooking Thru Ice	Rod & Reel	TOTAL	Set Net	Drift Net	Net Under Ice	Other Gear	Hooking Thru Ice	Rod & Reel	TOTAL
Chinook	17	508	27.12%	338	26,740		0		427	27,504	5,740	454,574		0		7,254	467,568
Chum	6	383	20.45%	99	11,931		0		133	12,162	591	71,583		0		797	72,972
Sockeye	6	416	22.17%	127	10,409		0		63	10,598	761	62,452		0		375	63,588
Coho	6	437	23.31%	139	13,055		0		1,874	15,068	833	78,330		0		11,246	90,408
Pink	2.9	85	4.55%	34	267		0		79	380	99	774		0		228	1,101
TOTAL SALMON				736	62,401		0		2,575	65,712	8,024	667,713		0		19,901	695,637
Northern Pike	4.5	227	12.12%	1,175	243	2,547	12	16,133	521	20,631	5,288	1,094	11,462	54	72,599	2,345	92,840
Burbot	4.5	163	8.68%	466	2	0	8	2,082	447	3,005	2,097	9	0	36	9,369	2,012	13,523
Least Cisco	0.75	29	1.57%	1,587	0	0	0	20	292	1,899	1,190	0	0	0	15	219	1,424
Bering Cisco	0.75	8	0.42%	59	0	0	0	20	0	79	44	0	0	0	15	0	59
Humpback Whitefish	2	147	7.84%	3,015	212	881	0	300	441	4,849	6,030	424	1,762	0	600	882	9,698
Broad Whitefish	4	121	6.48%	2,033	339	0	0	55	170	2,597	8,132	1,356	0	0	220	680	10,388
Round Whitefish	1.5	6	0.31%	20	2	0	0	0	59	81	30	3	0	0	0	89	122
Unknown Whitefish	3	8	0.42%	0	82	0	0	0	43	125	0	246	0	0	0	129	375
Sheefish	6.5	110	5.85%	686	127	10	0	12	65	900	4,459	826	65	0	78	423	5,850
Grayling	1.5	43	2.30%	0	0	0	0	0	274	274	0	0	0	0	0	411	411
Dolly Varden	1.5	45	2.40%	0	0	0	0	0	731	731	0	0	0	0	0	1,097	1,097
Rainbow Trout	2	33	1.78%	2	0	0	0	0	194	196	4	0	0	0	0	388	392
Lake Trout	1	10	0.52%	0	0	0	0	0	63	63	0	0	0	0	0	63	63
TOTAL NON-SALMON				9,043	1,007	3,438	20	18,622	3,300	35,430	27,274	3,957	13,289	90	82,896	8,736	136,241
TOTAL FISH BY GEAR TYPE				9,779	63,408	3,438	20	18,622	5,875	101,142	35,298	671,670	13,289	90	82,896	28,636	831,877

	Conversion Factor	Households		Rate	
		No.	%	No.	lbs
Lamprey	6 lbs per gal	1.96	0.10%	0	0
Blackfish	6 lbs per gal	Households		Trap	
		No.	%	(Gallons)	lbs
		58.77	3.14%	693	4,158
Smelt	6 lbs per gal	Households		Dipnet	
		No.	%	(Gallons)	lbs
		270.33	14.43%	2,454	14,724

* Conversion Factors from Coffing, Brown, Jennings and Utermohle 2001

** Household number and percentage estimates expanded from household surveys only; total number of households is 1,874.

*** Salmon harvest estimates from all sources reallocated to gear types according to survey distribution.

NOTE: Salmon harvest data are for summer 2004. Data for other species is from 1 October 2003 to 30 September 2004.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence and Orutsamiut Native Council, Household Surveys, 2004.

Table 13. – Historic subsistence salmon harvest, Kuskokwim area, 1989-2004.

YEAR	HOUSEHOLDS		ESTIMATED SALMON HARVEST				
	TOTAL	SURVEYED	CHINOOK	SOCKEYE	COHO	CHUM	TOTAL
1989	3,422	2,135	85,323	37,088	57,846	145,106	325,363
1990	3,317	1,830	92,675	39,659	50,708	131,470	314,512
1991	3,347	2,024	90,226	56,401	55,620	96,314	298,561
1992	3,314	1,724	68,706	34,159	44,494	99,577	246,936
1993	3,274	1,816	91,722	51,362	35,295	61,724	240,103
1994	3,179	1,821	98,378	39,280	36,504	76,949	251,111
1995	3,652	1,894	100,157	28,622	39,165	68,941	236,885
1996	3,643	1,837	81,597	35,037	34,699	90,239	241,572
1997	3,510	1,831	85,506	41,251	30,717	40,993	198,467
1998	3,495	1,849	86,113	37,579	27,240	67,664	218,596
1999	4,180	2,523	77,660	49,388	27,753	47,612	202,413
2000	4,441	2,627	68,841	44,832	35,670	55,371	204,714
2001	4,483	2,218	77,570	51,965	31,686	51,117	212,338
2002	4,339	2,798	70,219	27,733	34,413	73,234	205,599
2003	4,535	2,375	72,498	36,894	38,791	46,291	194,474
2004	4,670	2,432	85,086	34,892	39,406	55,575	214,959
5-Year (99-03) Average	4,396	2,508	73,358	42,162	33,663	54,725	203,908
10-Year (94-03) Average	3,946	2,177	81,854	39,258	33,664	61,841	216,617
15-Year (89-03) Average	3,742	2,087	83,146	40,750	38,707	76,840	239,443

SOURCE: ADF&G Subsistence, Alaska Subsistence Fisheries Database, Version 3.5

Table 14. – Kuskokwim area community subsistence Chinook salmon harvest estimates, 1989-2004.⁶

Community	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	5-Yr Avg	10-Yr Avg	15-Yr Avg
Kipnuk	54	108	80		348	150				119	29	170	1	1		49	n/a	n/a	n/a
Kwigillingok				9	80	7		15		100						345	n/a	n/a	n/a
Kongiganak	1,412	1,442	778	904	781	1,271	843	830	1,609	1,250	1,320	1,299	1,454	808	1,386	1,478	1,253	1,207	1,159
N KUSKOKWIM BAY	1,466	1,550	858	913	1,209	1,428	843	845	1,609	1,469	1,349	1,469	1,455	809	1,386	1,872	1,294	1,266	1,244
Tuntutuliak	3,781	4,044	4,143	3,524	3,633	4,679	4,023	4,027	3,730	4,008	3,645	2,939	2,993	3,632	3,095	3,402	3,261	3,677	3,726
Eek	1,580	4,920	2,360	2,232	2,619	2,917	3,535	2,568	2,253	2,131	1,816	2,112	1,728	2,432	2,364	2,636	2,090	2,386	2,504
Kasigluk	2,173	3,167	2,955	94	548	694	392	579	880	541	480	731	588	381	356	1,526	n/a	n/a	n/a
Nunapitchuk	3,170	3,199	4,106	3,575	3,810	4,746	4,400	3,234	4,086	4,934	4,521	3,354	3,250	3,883	3,763	4,104	3,754	4,017	3,869
Atmautluak	1,227	2,569	1,784	1,422	1,818	1,819	1,918	1,801	1,768	1,452	1,469	1,174	740	1,282	1,396	1,701	1,212	1,482	1,576
Napakiak	3,710	4,158	2,543	3,328	3,972	3,545	3,902	3,784	2,873	3,504	2,380	2,178	2,290	1,931	2,105	2,060	2,177	2,849	3,080
Napaskiak	4,699	4,972	3,864	4,133	5,671	6,356	4,984	4,453	4,887	5,452	3,827	4,309	4,662	3,856	5,012	3,220	4,333	4,780	4,742
Oscarville	1,591	898	1,422	122	1,475	1,385	1,438	996	512	981	2,289		1,753	953	1,073	998	n/a	n/a	n/a
Bethel	24,655	19,641	28,817	17,196	22,083	24,515	29,568	20,783	21,253	23,963	24,996	22,515	27,209	19,305	21,475	27,504	23,100	23,558	23,198
Kwethluk	7,562	9,218	7,511	6,504	9,181	9,262	8,931	9,183	6,872	7,940	6,081	4,925	6,127	6,429	4,938	6,119	5,700	7,069	7,378
Akiachak	5,504	7,168	5,657	4,163	7,231	8,081	6,571	5,209	7,414	6,507	5,373	6,124	6,445	6,860	5,346	6,647	6,030	6,393	6,243
Akiak	4,811	5,178	3,247	3,207	4,280	4,759	4,118	4,569	3,378	3,311	2,356	2,190	3,369	3,340	3,896	3,653	3,030	3,529	3,734
Tuluksak	3,791	1,878	3,351	2,382	3,755	4,534	4,333	3,143	5,627	3,701	2,348	2,432	2,451	2,364	3,678	3,117	2,655	3,461	3,318
LOWER KUSKO RIVER	68,256	71,008	71,761	51,881	70,076	77,293	78,111	64,331	65,533	68,425	61,581	54,983	63,605	56,648	58,497	66,687	59,063	64,901	65,466
Lower Kalskag	3,337	2,493	3,947	2,269	3,930	3,976	5,321	2,870	3,549	2,041	1,787	1,822	2,181	1,210	2,016	1,918	1,803	2,677	2,850
Upper Kalskag	1,256	1,558	1,105	1,366	1,679	1,340	1,396	1,351	1,107	1,244	1,688	1,237	1,014	1,420	1,128	2,442	1,297	1,292	1,326
Aniak	3,406	3,189	3,261	3,955	4,618	3,413	3,422	3,204	3,794	3,508	2,596	3,117	2,524	2,994	2,077	2,606	2,662	3,065	3,272
Chuathbaluk	403	1,674	791	933	1,447	1,043	2,615	880	1,290	810	1,110	303	627	663	399	1,041	620	974	999
MIDDLE KUSKO RIVER	8,401	8,914	9,105	8,525	11,675	9,772	12,754	8,304	9,740	7,602	7,181	6,479	6,346	6,287	5,620	8,007	6,383	8,009	8,447
Crooked Creek	451	929	947	472	771	968	934	864	944	772	681	575	508	790	831	1,003	677	787	762
Red Devil	189	273	168	328	487	379	425	337	452	262	161	94	175	248	72	165	150	260	270
Sleetmute	420	711	770	801	1,767	1,327	885	1,230	1,171	947	447	430	473	516	685	618	510	811	839
Stony River	692	498	586	233	445	359	559	597	863	445	55	21	139	293	111	621	124	344	393
Lime Village	105	240	60	0	41	216	144	48	59	241	155	45	262		65	66	n/a	n/a	n/a
McGrath	418	1,231	880	1,038	567	1,052	800	1,203	974	769	1,295	642	360	700	506	500	701	830	829
Takotna	62	62	0	0	0	0	0	0	2	0	0	0	5	9		16	3	2	9
Nikolai	716	560	421	605	475	449	979	305	232	330	288	155	282	507	15	510	249	354	421
Telida	1			0						0						0	n/a	n/a	n/a
UPPER KUSKO RIVER	3,052	4,504	3,833	3,476	4,553	4,750	4,726	4,583	4,695	3,768	3,082	1,962	2,204	3,063	2,285	3,499	2,519	3,512	3,636
KUSKO RIVER TOTAL	81,175	85,976	85,556	64,794	87,513	93,243	96,435	78,062	81,577	81,264	73,194	64,893	73,610	66,807	67,788	80,065	69,258	77,687	78,792
Quinhagak	3,542	6,013	3,693	3,447	3,368	3,995	2,746	3,075	3,433	4,041	3,167	3,106	2,923	2,475	3,898	3,726	3,114	3,286	3,528
Goodnews Bay	419	351	894	318	628	712	858	403	437	713	805	601	859	703	649	851	723	674	623
Platinum	48	188	23	56	80	72	25	12	12	5	66	102	36	154	88	103	89	57	64
S KUSKOKWIM BAY	4,010	6,552	4,610	3,821	4,076	4,779	3,629	3,490	3,882	4,758	4,038	3,809	3,818	3,332	4,635	4,680	3,926	4,017	4,216
Mekoryuk	0	0	0	0	0	6		0		1	15	2		12	10	3	n/a	n/a	n/a
Newtok	5	1	0		0	2						19	12	13	0	0	n/a	n/a	n/a
Nightmute	0	3	20			8					6	8			4	0	n/a	n/a	n/a
Toksook Bay	127	143	25	49	128	341	94	45	47	48	407	58	130	54	51	327	n/a	n/a	n/a
Tununak	5	0	15		5	0				40	0	52	0	1	5	5	n/a	n/a	n/a
Chefornak			0	21						2					5	6	n/a	n/a	n/a
BERING SEA COAST	137	147	60	70	133	357	94	45	47	91	428	139	142	80	75	341	n/a	n/a	n/a
TOTAL ESTIMATE	85,322	92,675	90,226	68,685	91,722	98,378	100,157	81,597	85,506	86,113	77,660	68,841	77,570	70,219	72,498	85,086	73,358	81,854	83,145

⁶ Blank cells represent communities where no household contact occurred such that there is no reported or extrapolated harvest estimate.

Table 15. – Kuskokwim area community subsistence chum salmon harvest estimates, 1989-2004.⁷

Community	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	5-Yr Avg	10-Yr Avg	15-Yr Avg
Kipnuk	0	540	205		601	214				114	31	269	2	5		156	n/a	n/a	n/a
Kwigillingok				0	200	5		30		250						160	n/a	n/a	n/a
Kongiganak	1,967	980	1,036	1,524	811	1,340	1,275	1,331	902	1,643	1,152	1,850	1,998	1,965	970	1,587	1,587	1,443	1,383
N KUSKOKWIM BAY	1,967	1,520	1,241	1,524	1,612	1,559	1,275	1,361	902	2,007	1,183	2,119	2,000	1,970	970	1,903	1,648	1,535	1,547
Tuntutuliak	5,068	6,250	4,755	6,052	2,899	5,232	3,488	5,852	2,877	3,774	1,862	2,735	2,621	3,845	2,514	2,262	2,715	3,480	3,988
Eek	972	3,090	814	1,397	244	624	815	923	649	787	508	636	347	1,259	621	587	674	717	912
Kasigluk	3,007	3,406	3,137	26	374	537	457	1,196	1,278	218	350	930	550	306	297	906	n/a	n/a	n/a
Nunapitchuk	6,923	5,240	6,055	8,229	4,854	4,587	4,297	5,833	2,794	5,389	4,742	4,694	4,749	6,917	4,139	4,200	5,048	4,814	5,296
Atmaultuak	3,014	4,006	2,394	3,183	1,345	1,455	3,466	2,672	1,484	1,916	1,667	1,819	1,350	2,189	1,539	1,793	1,713	1,956	2,233
Napakiaik	7,068	8,389	2,340	4,401	2,281	4,096	3,084	4,249	1,458	4,556	1,573	2,987	1,723	2,391	1,384	1,746	2,012	2,750	3,465
Napaskiak	13,079	8,166	6,582	6,061	3,622	5,605	4,271	4,983	2,589	4,227	2,687	2,848	2,399	3,720	2,893	2,569	2,909	3,622	4,916
Oscarville	1,341	925	1,141	29	566	676	1,018	1,552	35	420	1,906		2,097	1,121	704	855	n/a	n/a	n/a
Bethel	25,581	18,436	22,770	14,908	9,172	12,341	15,821	16,403	8,790	12,057	11,163	10,616	11,319	15,082	9,829	12,162	11,602	12,342	14,286
Kwethluk	10,128	11,102	5,497	7,647	3,491	6,102	6,050	11,870	3,554	4,786	3,449	5,048	4,365	7,434	2,348	3,597	4,529	5,501	6,191
Akiachak	7,747	9,133	5,994	5,771	3,492	6,286	4,074	4,993	1,768	2,467	2,741	4,589	2,872	5,048	3,943	3,635	3,839	3,878	4,728
Akiak	13,000	8,235	6,668	5,907	7,549	4,599	1,878	4,640	1,725	2,231	1,202	2,456	2,093	2,527	2,715	3,211	2,199	2,607	4,495
Tuluksak	9,796	5,845	5,695	4,798	3,834	2,476	2,609	3,167	2,887	3,224	1,566	2,504	1,862	3,042	1,555	2,017	2,106	2,489	3,657
LOWER KUSKO RIVER	106,725	92,225	73,843	68,409	43,722	54,614	51,327	68,333	31,887	46,051	35,417	41,862	38,347	54,881	34,481	39,540	40,998	45,720	56,142
Lower Kalskag	4,932	4,212	2,886	2,758	3,062	2,758	1,455	3,357	1,487	977	759	1,641	1,316	1,187	1,569	1,225	1,294	1,650	2,290
Upper Kalskag	3,427	1,321	2,357	2,843	578	864	1,351	1,621	405	487	665	1,558	1,187	2,333	485	1,559	1,246	1,096	1,432
Aniak	10,404	9,089	3,492	7,870	2,900	2,612	3,566	8,447	1,747	5,023	1,764	1,943	1,982	3,002	1,160	2,331	1,970	3,125	4,333
Chuathbaluk	2,051	4,510	1,912	2,502	2,895	1,615	1,807	2,089	1,244	1,027	729	704	2,338	1,553	2,249	1,815	1,515	1,535	1,948
MIDDLE KUSKO RIVER	20,813	19,131	10,648	15,974	9,435	7,847	8,179	15,514	4,883	7,514	3,916	5,846	6,823	8,075	5,463	6,930	6,025	7,406	10,004
Crooked Creek	779	2,884	1,367	904	715	649	358	347	311	2,561	806	812	943	1,266	889	1,662	943	894	1,039
Red Devil	1,376	1,466	1,236	1,523	1,004	1,220	882	787	551	565	193	53	335	325	49	103	191	496	771
Sleetmute	1,813	1,874	1,862	3,151	681	1,533	1,758	1,215	417	981	367	390	328	1,105	408	863	520	850	1,192
Stony River	1,352	1,132	602	1,335	775	932	1,375	443	591	897	358	99	143	560	275	670	287	567	725
Lime Village	2,100	2,500	715	0	508	2,080	920	500	251	964	1,012	294	683		140	189	n/a	n/a	n/a
McGrath	1,276	2,839	1,068	2,854	590	1,294	1,486	206	131	1,462	260	161	199	665	610	254	379	647	1,007
Takotna	250	56	0	0	0	0	0	10	0	15	0	0	8	1		0	2	3	23
Nikolai	1,221	882	495	818	353	293	301	249	65	519	89	60	65	171	35	260	84	185	374
Telida	15			0						0						0	n/a	n/a	n/a
UPPER KUSKO RIVER	10,166	13,633	7,345	10,584	4,625	8,001	7,080	3,758	2,316	7,964	3,085	1,869	2,704	4,093	2,406	4,001	2,831	4,328	5,975
KUSKO RIVER TOTAL	139,672	126,509	93,077	96,491	59,394	72,022	67,861	88,966	39,987	63,537	43,601	51,696	49,874	69,019	43,320	52,374	51,502	58,988	73,668
Quinhagak	1,568	3,234	1,593	1,833	1,008	1,452	686	930	600	1,448	1,810	912	747	1,839	1,129	1,112	1,287	1,155	1,386
Goodnews Bay	620	193	144	921	188	425	152	214	133	285	250	280	182	312	126	221	230	236	295
Platinum	164	139	5	85	0	45	3	5	0	31	31	84	44	95	50	36	61	39	52
S KUSKOKWIM BAY	2,352	3,566	1,743	2,838	1,196	1,923	841	1,149	733	1,763	2,092	1,276	973	2,246	1,305	1,369	1,578	1,430	1,733
Mekoryuk	2,915	1,067	1,178	0	808	2,337		0		2,176	1,583	2,120		1,292	1,484	881	n/a	n/a	n/a
Newtok	20	4	0		0	0						16	36	20	9	0	n/a	n/a	n/a
Nightmute	30	35	60			7					10	2			15	0	n/a	n/a	n/a
Toksook Bay	86	224	103	246	296	660	239	124	273	171	326	217	234	657	133	938	n/a	n/a	n/a
Tununak	16	65	150		30	0				0	0	44	0	0	10	0	n/a	n/a	n/a
Cheformak			3	1						17					15	13	n/a	n/a	n/a
BERING SEA COAST	3,067	1,395	1,494	247	1,134	3,004	239	124	273	2,364	1,919	2,399	270	1,969	1,666	1,832	n/a	n/a	n/a
TOTAL ESTIMATE	145,091	131,470	96,314	99,576	61,724	76,949	68,941	90,239	40,993	67,664	47,612	55,371	51,117	73,234	46,291	55,575	54,725	61,841	76,839

⁷ Blank cells represent communities where no household contact occurred such that there is no reported or extrapolated harvest estimate.

Table 16. – Kuskokwim area community subsistence sockeye salmon harvest estimates, 1989-2004.⁸

Community	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	5-Yr Avg	10-Yr Avg	15-Yr Avg
Kipnuk	402	175	136		90	132				107	54	179	4	11		89	n/a	n/a	n/a
Kwigillingok				0	140	5		10		125						70	n/a	n/a	n/a
Kongiganak	658	423	533	905	705	702	530	722	1,128	888	991	1,789	1,460	774	637	876	1,130	962	856
N KUSKOKWIM BAY	1,060	598	669	905	935	839	530	732	1,128	1,120	1,045	1,968	1,464	785	637	1,035	1,180	1,025	961
Tuntutuliak	1,173	1,954	1,768	1,894	955	3,185	1,134	1,526	2,048	1,275	2,048	1,236	1,701	972	1,555	1,446	1,502	1,668	1,628
Eek	170	1,177	489	671	406	461	283	478	584	382	625	878	923	748	714	472	778	608	599
Kasigluk	235	810	1,421	81	122	275	165	588	499	53	183	666	320	59	210	336	n/a	n/a	n/a
Nunapitchuk	1,026	1,097	2,277	2,273	2,545	1,555	882	1,735	2,330	2,250	3,493	2,111	2,583	1,382	2,521	1,381	2,418	2,084	2,004
Atmautluak	1,143	1,501	881	1,304	1,387	796	1,099	1,456	724	1,050	1,874	1,516	958	1,015	868	874	1,246	1,136	1,172
Napakiaik	1,752	1,375	1,176	1,315	1,150	1,627	959	1,083	1,455	1,705	2,115	2,026	1,861	1,201	1,223	1,068	1,685	1,526	1,468
Napaskiak	721	1,227	2,673	2,428	3,495	1,933	1,605	2,446	2,329	1,617	2,058	2,611	3,428	1,292	2,420	883	2,362	2,174	2,152
Oscarville	404	153	711	35	932	324	414	212	78	288	2,165		1,620	377	700	354	n/a	n/a	n/a
Bethel	7,316	6,392	17,669	7,173	10,503	8,563	8,190	7,112	10,868	8,134	13,145	12,536	15,709	7,350	10,542	10,598	11,856	10,215	10,080
Kwethluk	2,414	4,055	3,723	1,829	3,790	3,742	2,504	4,035	3,581	4,036	3,112	3,685	3,960	1,993	1,776	2,741	2,905	3,242	3,216
Akiachak	2,420	3,176	4,123	3,095	4,545	3,323	2,019	2,607	3,014	2,654	3,130	3,597	4,300	2,436	3,016	2,894	3,296	3,010	3,164
Akiak	2,492	1,739	1,708	1,458	3,558	1,786	643	1,449	1,398	1,478	1,145	970	1,916	1,195	1,698	1,162	1,385	1,368	1,642
Tuluksak	2,314	1,120	3,595	2,034	2,492	1,393	1,244	1,075	1,558	1,490	1,490	2,207	1,759	1,011	1,333	1,397	1,560	1,456	1,741
LOWER KUSKO RIVER	23,579	25,775	42,212	25,589	35,878	28,964	21,141	25,803	30,468	26,413	36,584	34,039	41,038	21,031	28,576	25,606	32,254	29,406	29,806
Lower Kalskag	767	851	1,092	467	2,339	950	681	1,144	1,455	574	605	885	824	247	714	673	655	808	906
Upper Kalskag	338	287	276	333	349	298	55	294	251	245	614	636	304	485	483	603	504	366	350
Aniak	959	1,356	2,031	1,180	1,578	571	975	1,277	1,124	1,151	1,310	1,143	2,223	723	670	867	1,214	1,117	1,218
Chuathbaluk	215	1,178	1,246	471	823	995	472	661	881	248	460	515	537	337	287	385	427	539	622
MIDDLE KUSKO RIVER	2,279	3,672	4,644	2,451	5,090	2,813	2,183	3,376	3,710	2,218	2,989	3,179	3,888	1,792	2,154	2,528	2,800	2,830	3,096
Crooked Creek	436	1,556	998	489	831	512	192	304	350	716	690	505	476	413	747	760	566	490	614
Red Devil	356	445	426	315	717	311	620	977	697	346	568	107	361	92	289	97	283	437	442
Sleetmute	776	1,060	1,164	855	1,609	1,158	1,083	1,304	1,458	1,398	946	759	940	603	668	604	783	1,032	1,052
Stony River	1,084	835	1,912	1,462	1,488	802	1,342	1,218	1,607	433	1,230	266	138	460	139	804	447	764	961
Lime Village	5,653	2,333	956	0	2,800	1,760	700	500	660	2,782	2,550	918	1,516		1,000	831	n/a	n/a	n/a
McGrath	0	0	0	0	0	0	0	0	0	0	74	42	244	323	242	168	185	92	62
Takotna	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nikolai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Telida	0			0						0						0	n/a	n/a	n/a
UPPER KUSKO RIVER	8,306	6,229	5,457	3,121	7,445	4,543	3,937	4,303	4,772	5,675	6,059	2,597	3,675	1,891	3,085	3,264	3,461	4,054	4,740
KUSKO RIVER TOTAL	35,224	36,274	52,982	32,065	49,347	37,159	27,792	34,214	40,078	35,426	46,677	41,783	50,065	25,499	34,452	32,433	39,695	37,314	38,602
Quinhagak	633	1,950	1,772	1,264	1,082	1,000	573	400	556	1,490	1,639	1,341	914	855	1,622	1,086	1,274	1,039	1,139
Goodnews Bay	710	970	1,132	669	784	669	219	411	472	483	770	1,028	921	794	672	805	837	644	714
Platinum	151	153	150	158	51	101	34	7	137	25	102	177	53	256	111	155	140	100	111
S KUSKOKWIM BAY	1,493	3,074	3,054	2,090	1,917	1,770	826	818	1,165	1,998	2,511	2,546	1,888	1,905	2,405	2,046	2,251	1,783	1,964
Mekoryuk	0	50	1	0	1	87		0		21	2	7		204	2	8	n/a	n/a	n/a
Newtok	10	3	0		0	20						124	0	85	0	0	n/a	n/a	n/a
Nightmute	0	10	210			15					5	71			20	10	n/a	n/a	n/a
Toksook Bay	277	242	105	1	66	228	5	5	8	101	193	253	12	32	0	359	n/a	n/a	n/a
Tununak	83	7	50		30	0				20	0	48	0	8	5	10	n/a	n/a	n/a
Chefornak			0	1						13					10	26	n/a	n/a	n/a
BERING SEA COAST	370	312	366	2	97	350	5	5	8	155	200	503	12	329	37	413	n/a	n/a	n/a
TOTAL ESTIMATE	37,088	39,659	56,401	34,158	51,362	39,280	28,622	35,037	41,251	37,579	49,388	44,832	51,965	27,733	36,894	34,892	42,162	39,258	40,750

⁸ Blank cells represent communities where no household contact occurred such that there is no reported or extrapolated harvest estimate.

Table 17. – Kuskokwim area community subsistence coho salmon harvest estimates, 1989-2004.⁹

Community	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	5-Yr Avg	10-Yr Avg	15-Yr Avg
Kipnuk	200	460	30		25	185				85	75	223	74	69		250	n/a	n/a	n/a
Kwigillingok				0	80	0		5		40						55	n/a	n/a	n/a
Kongiganak	562	413	540	544	502	566	605	421	618	275	222	339	925	596	768	551	570	534	527
N KUSKOKWIM BAY	762	873	570	544	607	751	605	426	618	400	297	562	999	665	768	856	658	609	630
Tuntutuliak	508	1,135	729	761	820	441	365	1,339	669	935	331	3,435	337	1,153	2,329	1,205	1,517	1,133	1,019
Eek	349	1,620	343	531	206	426	347	389	80	306	258	488	207	904	1,493	764	670	490	530
Kasigluk	772	958	1,769	174	228	387	518	368	518	140	92	1,667	344	142	134	690	n/a	n/a	n/a
Nunapitchuk	469	573	1,167	2,226	321	781	641	1,310	872	427	391	366	392	790	676	416	523	665	760
Atmautluak	971	350	254	518	426	411	566	537	531	425	205	224	369	591	407	561	359	427	452
Napakiaik	1,757	1,700	597	1,237	590	920	390	600	168	749	487	502	644	578	1,098	1,259	662	614	801
Napaskiak	1,130	922	754	866	783	2,012	580	398	658	540	355	889	466	716	1,522	613	790	814	839
Oscarville	430	43	136	0	0	49	0	19	60	2	970		42	119	27	306	n/a	n/a	n/a
Bethel	22,390	19,341	28,136	15,902	13,764	12,258	19,906	12,929	15,108	11,294	12,414	13,794	14,949	12,966	13,237	15,068	13,472	13,886	15,893
Kwethluk	3,736	3,928	2,380	2,325	1,838	1,816	1,304	3,195	1,193	1,731	2,993	3,271	1,688	2,515	1,933	2,907	2,480	2,164	2,390
Akiachak	1,890	1,621	2,393	2,108	1,351	1,531	677	850	441	477	663	2,509	1,633	1,620	2,611	2,130	1,807	1,301	1,492
Akiak	4,959	1,591	2,231	1,137	1,315	1,110	501	972	846	674	254	483	564	1,113	1,135	1,236	710	765	1,259
Tuluksak	1,483	946	1,903	1,544	412	285	531	1,116	434	879	307	523	971	1,181	1,523	870	901	775	936
LOWER KUSKO RIVER	40,843	34,725	42,792	29,328	22,054	22,428	26,325	24,022	21,580	18,579	19,721	28,151	22,606	24,388	28,125	28,025	24,598	23,592	27,045
Lower Kalskag	981	375	510	469	778	845	718	1,022	652	347	302	428	539	241	375	295	377	547	572
Upper Kalskag	688	300	493	931	354	184	167	360	781	812	153	288	416	1,032	605	1,288	499	480	504
Aniak	2,640	1,484	1,143	1,844	1,091	1,682	1,265	2,671	1,494	1,308	1,418	1,922	1,906	2,616	1,552	1,655	1,883	1,783	1,736
Chuathbaluk	272	813	93	349	366	795	84	395	217	55	137	469	541	607	313	249	413	361	367
MIDDLE KUSKO RIVER	4,581	2,971	2,238	3,593	2,588	3,506	2,234	4,448	3,145	2,522	2,010	3,107	3,402	4,496	2,845	3,487	3,172	3,171	3,179
Crooked Creek	530	886	277	413	409	581	381	171	261	392	515	132	70	420	430	670	313	335	391
Red Devil	1,591	866	1,132	1,160	1,812	994	1,557	1,274	1,391	425	455	158	427	413	209	54	332	730	924
Sleetmute	1,009	1,023	1,557	1,132	880	649	1,075	846	419	301	226	552	452	689	678	325	519	589	766
Stony River	611	423	502	744	512	505	1,083	571	450	429	511	10	347	517	879	612	453	530	539
Lime Village	2,025	538	336	300	618	960	246	0	277	776	600	362	590		164	220	n/a	n/a	n/a
McGrath	537	2,408	882	2,780	1,989	2,558	2,225	919	753	924	553	700	420	1,067	1,099	1,079	768	1,122	1,321
Takotna	40	0	0	0	0	0	0	0	0	3	0	21	26	20		51	13	7	7
Nikolai	328	73	83	173	267	119	545	64	141	113	117	31	165	105	43	156	92	144	158
Telida	60			0						0						200	n/a	n/a	n/a
UPPER KUSKO RIVER	6,731	6,216	4,768	6,702	6,487	6,366	7,112	3,846	3,692	3,363	2,976	1,966	2,497	3,231	3,502	3,367	2,834	3,855	4,630
KUSKO RIVER TOTAL	52,917	44,786	50,369	40,167	31,737	33,050	36,276	32,742	29,035	24,864	25,004	33,786	29,504	32,780	35,240	35,735	31,263	31,228	35,484
Quinhagak	3,787	4,174	3,232	2,958	2,152	2,739	2,561	1,467	1,264	1,702	2,021	1,088	1,525	1,099	2,047	1,209	1,556	1,751	2,254
Goodnews Bay	830	1,556	1,789	1,163	1,197	435	296	293	343	312	439	414	508	202	1,110	1,411	535	435	726
Platinum	77	90	39	190	29	77	9	59	54	19	143	103	108	95	209	206	132	88	87
S KUSKOKWIM BAY	4,694	5,820	5,060	4,310	3,378	3,251	2,867	1,819	1,661	2,034	2,603	1,605	2,141	1,396	3,366	2,826	2,222	2,274	3,067
Mekoryuk	106	52	130	2	53	87		3		178	64	78		114	112	126	n/a	n/a	n/a
Newtok	15	4	0		0	0						64	0	0	0	0	n/a	n/a	n/a
Nightmute	70	0	20			0					0	2			0	0	n/a	n/a	n/a
Toksook Bay	35	46	1	15	57	116	22	135	21	97	83	112	16	74	58	661	n/a	n/a	n/a
Tununak	9	0	0		70	0				60	0	23	25	49	0	40	n/a	n/a	n/a
Chefornak			39	0						7					15	18	n/a	n/a	n/a
BERING SEA COAST	235	102	190	17	180	203	22	138	21	342	147	279	41	237	185	845	n/a	n/a	n/a
TOTAL ESTIMATE	57,846	50,708	55,620	44,494	35,295	36,504	39,165	34,699	30,717	27,240	27,753	35,670	31,686	34,413	38,791	39,406	33,663	33,664	38,707

⁹ Blank cells represent communities where no household contact occurred such that there is no reported or extrapolated harvest estimate.



Figure 1. – Kuskokwim Management Area commercial fishing districts.

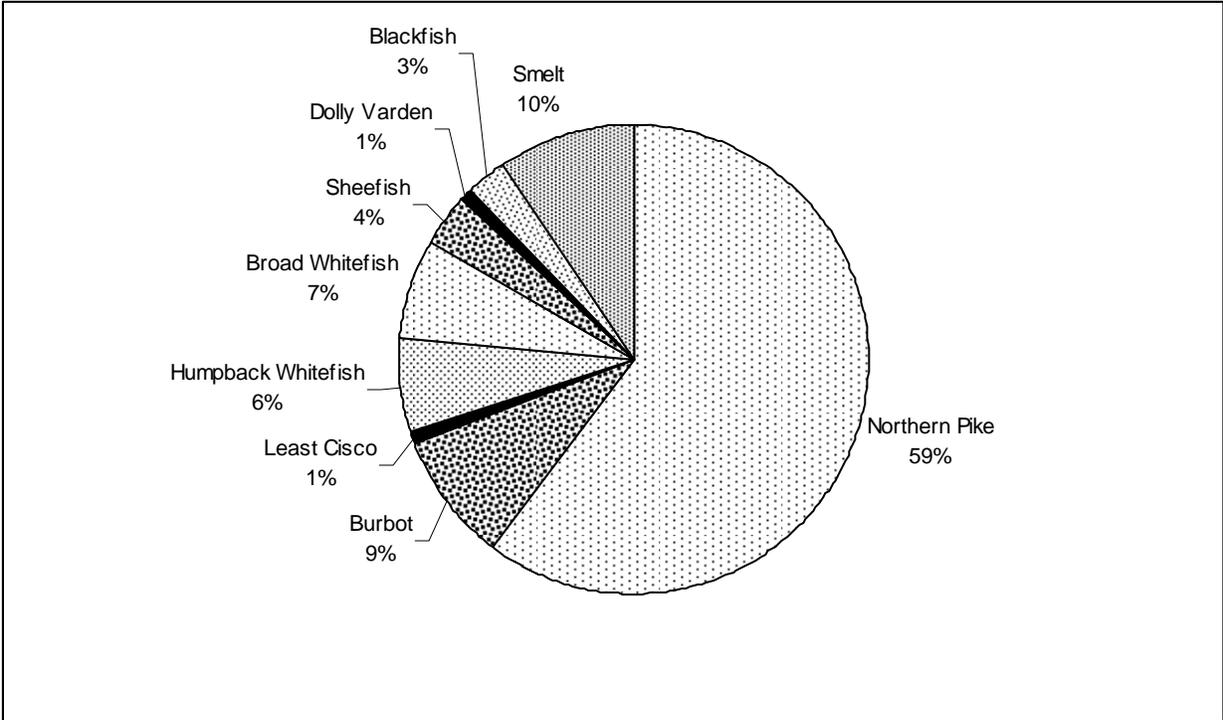


Figure 2. – Bethel non-salmon fish relative harvest contribution by species and pounds usable weight, 2004.

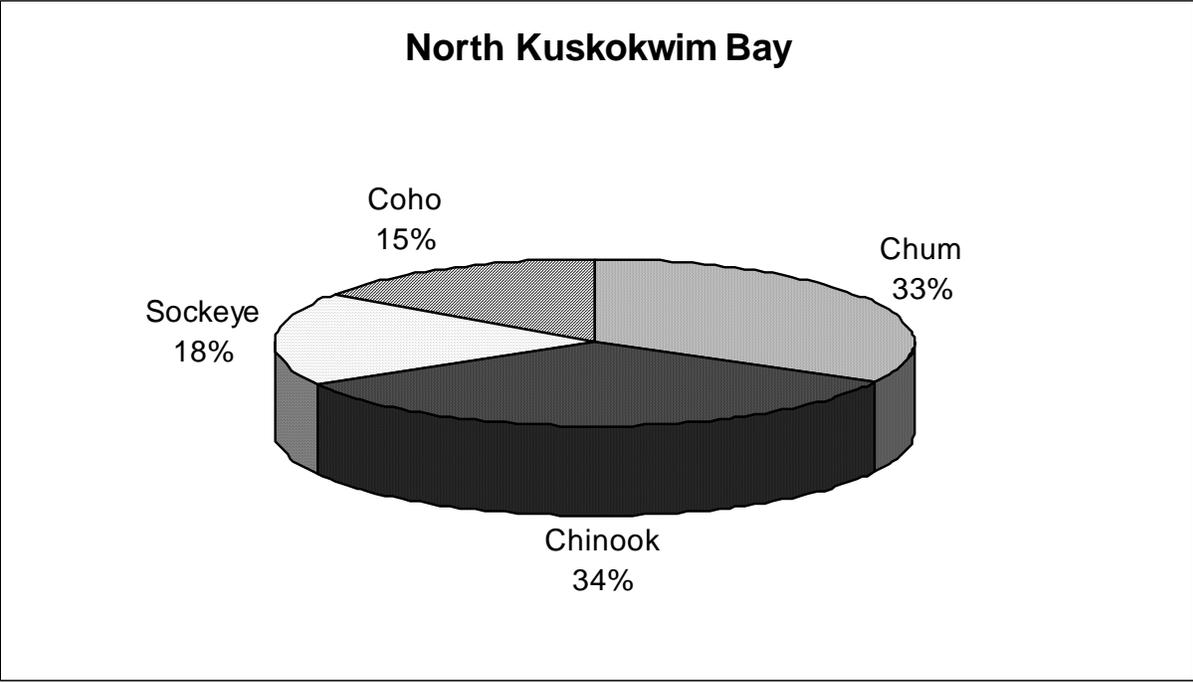


Figure 3. – Composition of estimated subsistence salmon harvest, north Kuskokwim Bay, 2004.

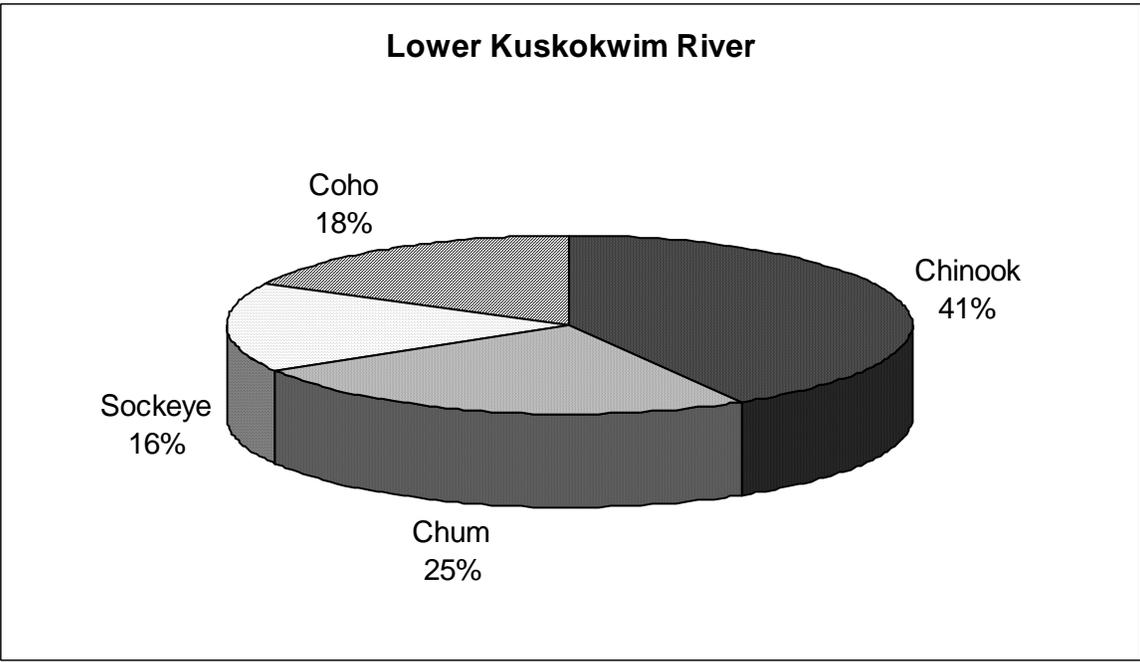


Figure 4. – Composition of estimated subsistence salmon harvest, lower Kuskokwim River, 2004.

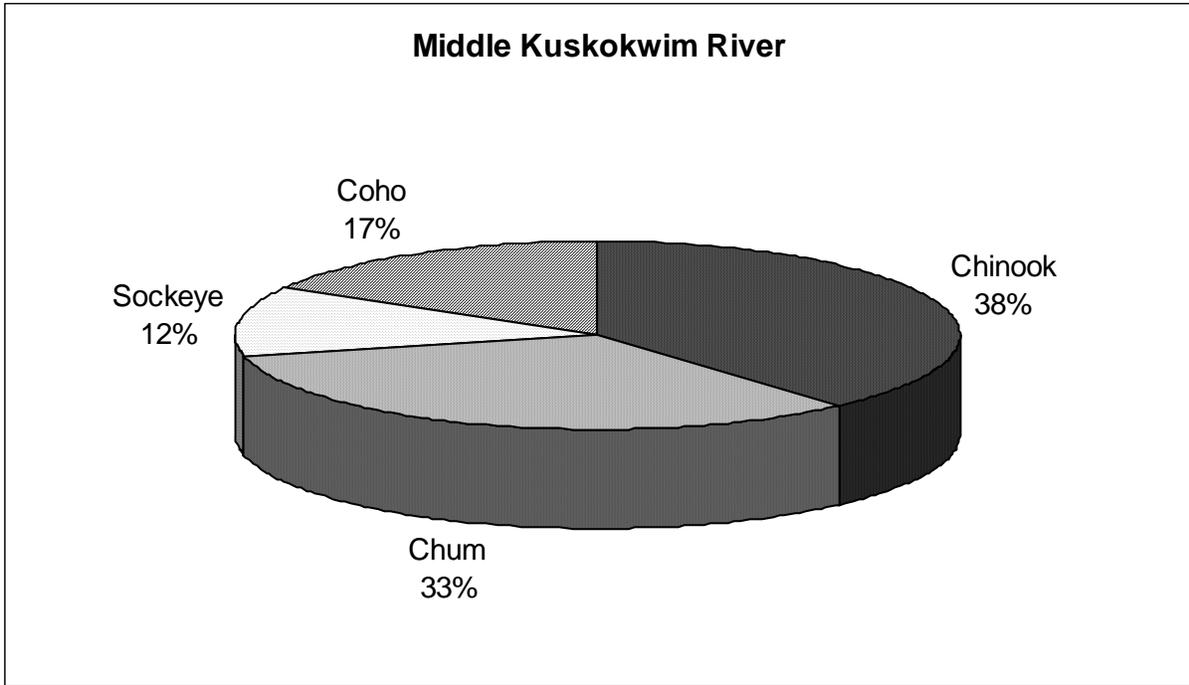


Figure 5. – Composition of estimated subsistence salmon harvest, middle Kuskokwim River, 2004.

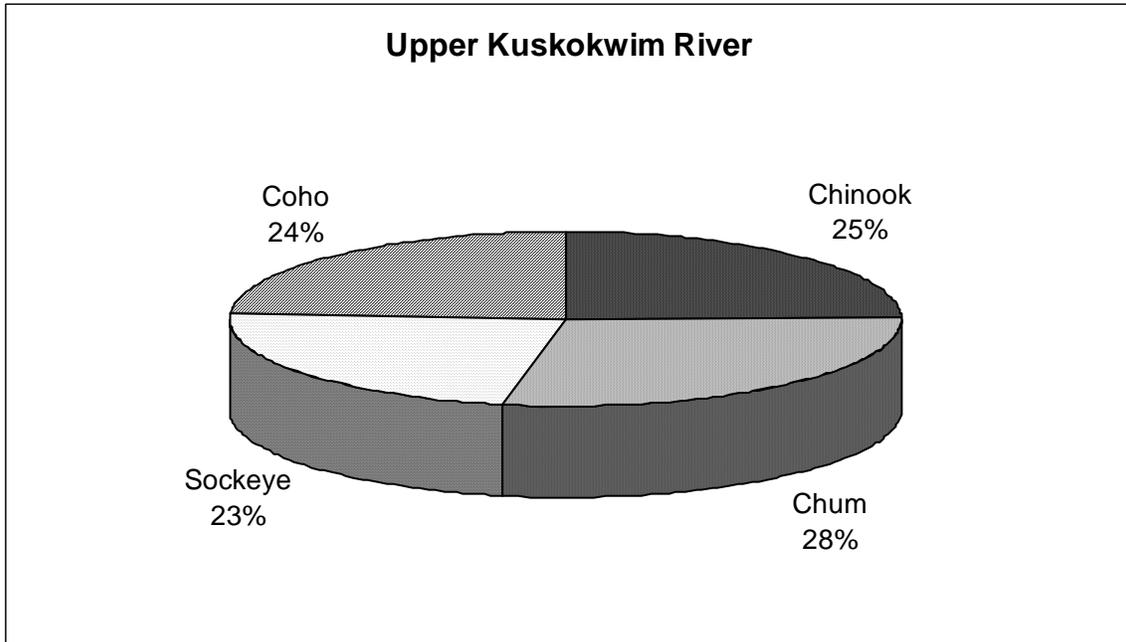


Figure 6. – Composition of estimated subsistence salmon harvest, upper Kuskokwim River, 2004.

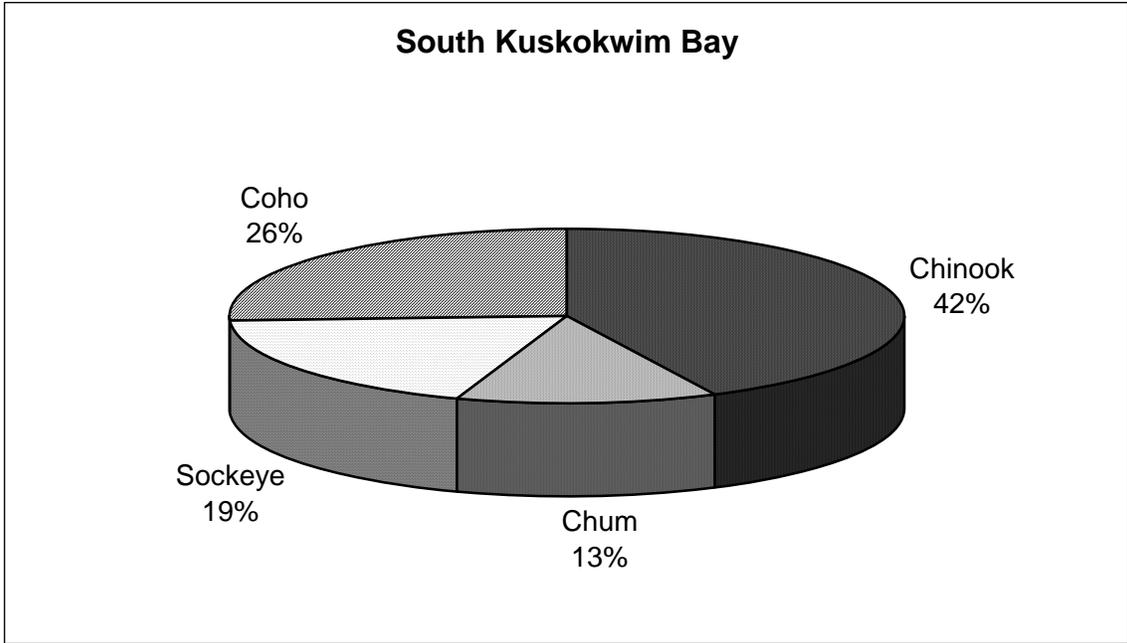


Figure 7. – Composition of estimated subsistence salmon harvest, south Kuskokwim Bay, 2004.

APPENDIX A. HARVEST CALENDAR FOR 2004

Subsistence Division, ADFG
 PO Box 1789
 Bethel, AK 99559-1789

May 2004
 Dear Subsistence Fishers:

Please write in the number of salmon that people in your household caught for subsistence. Include all subsistence salmon that were caught, including those you gave to others and those you may have caught for dog food. DO NOT include salmon that you sold when commercial fishing.

Our address is on the back of this calendar. When finished fishing, you can fold the calendar so that our return address is visible. We have paid the postage. (kb)

Presorted Standard
 U.S. Postage Paid
 Fairbanks, AK
 Permit No. 88



MAY 2004 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDA	THURSDAY	FRIDAY	SATURDAY
	16	17	18	19	20	21	22
TARYAQVAK =	King _____						
KANGITNEQ =	Chum _____						
SAYAK =	Sockeye _____						
	23	24	25	26	27	28	29
CHINOOK =	King _____						
	Chum _____						
"RED SALMON" =	Sockeye _____						
	30	31					
	King _____	King _____					
	Chum _____	Chum _____					
	Sockeye _____	Sockeye _____					

JUNE 2004 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4	5
TARYAQVAK =			King _____				
KANGITNEQ =			Chum _____				
SAYAK =			Sockeye _____				
	6	7	8	9	10	11	12
CHINOOK =	King _____						
	Chum _____						
"RED SALMON" =	Sockeye _____						
	13	14	15	16	17	18	19
	King _____						
	Chum _____						
	Sockeye _____						
	20	21	22	23	24	25	26
	King _____						
	Chum _____						
	Sockeye _____						
	27	28	28	28			
	King _____	King _____	King _____	King _____			
	Chum _____	Chum _____	Chum _____	Chum _____			
	Sockeye _____	Sockeye _____	Sockeye _____	Sockeye _____			

THANK YOU FOR USING THIS CALENDAR TO RECORD YOUR SUBSISTENCE SALMON HARVESTS

.....

FOLD HERE FIRST

DIVISION OF SUBSISTENCE
ALASKA DEPT. FISH & GAME
PO BOX 1789
BETHEL, AK 99559-1789

NO POSTAGE
NECESSARY
IF MAILED IN
THE UNITED
STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 50 FAIRBANKS, AK
POSTAGE WILL BE PAID BY ADDRESSEE



STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
PO BOX 1789
BETHEL, AK 99559-9990

.....

FOLD HERE SECOND

APPLY TAPE
HERE TO CLOSE

APPLY TAPE
HERE TO CLOSE

Thank you for helping to document subsistence harvests. If you have any questions, please call (907) 543-3100. Please return the calendar when you are finished subsistence salmon fishing for 2003. (kb)

JULY 2004 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 King _____ Chum _____ Sockeye _____	2 King _____ Chum _____ Sockeye _____	3 King _____ Chum _____ Sockeye _____	4 King _____ Chum _____ Sockeye _____	5 King _____ Chum _____ Sockeye _____
TARYAQVAK = KAGITNEQ = SAYAK =	6 King _____ Chum _____ Sockeye _____	7 King _____ Chum _____ Sockeye _____	8 King _____ Chum _____ Sockeye _____	9 King _____ Chum _____ Sockeye _____	10 King _____ Chum _____ Sockeye _____	11 King _____ Chum _____ Sockeye _____	12 King _____ Chum _____ Sockeye _____
CHINGOK = "REDS" = "SILVERS" =	13 King _____ Chum _____ Sockeye _____ Coho _____	14 King _____ Chum _____ Sockeye _____ Coho _____	15 King _____ Chum _____ Sockeye _____ Coho _____	16 King _____ Chum _____ Sockeye _____ Coho _____	17 King _____ Chum _____ Sockeye _____ Coho _____	18 King _____ Chum _____ Sockeye _____ Coho _____	19 King _____ Chum _____ Sockeye _____ Coho _____
QAKIYAK =	20 King _____ Chum _____ Sockeye _____ Coho _____	21 King _____ Chum _____ Sockeye _____ Coho _____	22 King _____ Chum _____ Sockeye _____ Coho _____	23 King _____ Chum _____ Sockeye _____ Coho _____	24 King _____ Chum _____ Sockeye _____ Coho _____	25 King _____ Chum _____ Sockeye _____ Coho _____	26 King _____ Chum _____ Sockeye _____ Coho _____
	27 King _____ Chum _____ Sockeye _____ Coho _____	28 King _____ Chum _____ Sockeye _____ Coho _____	29 King _____ Chum _____ Sockeye _____ Coho _____	30 King _____ Chum _____ Sockeye _____ Coho _____	31 King _____ Chum _____ Sockeye _____ Coho _____		

AUGUST 2004 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 King _____ Chum _____ Sockeye _____ Coho _____	2 King _____ Chum _____ Sockeye _____ Coho _____
TARYAQVAK = KAGITNEQ = SAYAK = QAKIYAK =	3 King _____ Chum _____ Sockeye _____ Coho _____	4 King _____ Chum _____ Sockeye _____ Coho _____	5 King _____ Chum _____ Sockeye _____ Coho _____	6 King _____ Chum _____ Sockeye _____ Coho _____	7 King _____ Chum _____ Sockeye _____ Coho _____	8 King _____ Chum _____ Sockeye _____ Coho _____	9 King _____ Chum _____ Sockeye _____ Coho _____
"RED SALMON" = "SILVERS" =	10 Chum _____ Sockeye _____ Coho _____	11 Chum _____ Sockeye _____ Coho _____	12 Chum _____ Sockeye _____ Coho _____	13 Chum _____ Sockeye _____ Coho _____	14 Chum _____ Sockeye _____ Coho _____	15 Chum _____ Sockeye _____ Coho _____	16 Chum _____ Sockeye _____ Coho _____
	17 Chum _____ Sockeye _____ Coho _____	18 Chum _____ Sockeye _____ Coho _____	19 Chum _____ Sockeye _____ Coho _____	20 Chum _____ Sockeye _____ Coho _____	21 Chum _____ Sockeye _____ Coho _____	22 Chum _____ Sockeye _____ Coho _____	23 Chum _____ Sockeye _____ Coho _____
	24 Chum _____ Sockeye _____ Coho _____	25 Chum _____ Sockeye _____ Coho _____	26 Chum _____ Sockeye _____ Coho _____	27 Chum _____ Sockeye _____ Coho _____	28 Chum _____ Sockeye _____ Coho _____	29 Chum _____ Sockeye _____ Coho _____	SAT 30 SUN 31 Chum _____ Sockeye _____ Coho _____

SEPTEMBER 2004 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
KAGITNEQ = SOCKEYE = QAKIYAK =	"Hi" to David, Fannie, Emma, John and Lilly	1 Chum _____ Sockeye _____ Coho _____	2 Chum _____ Sockeye _____ Coho _____	3 Chum _____ Sockeye _____ Coho _____	4 Chum _____ Sockeye _____ Coho _____	5 Chum _____ Sockeye _____ Coho _____	6 Chum _____ Sockeye _____ Coho _____
"RED SALMON" = "SILVERS" =	7 Chum _____ Sockeye _____ Coho _____	8 Chum _____ Sockeye _____ Coho _____	9 Chum _____ Sockeye _____ Coho _____	10 Chum _____ Sockeye _____ Coho _____	11 Chum _____ Sockeye _____ Coho _____	12 Chum _____ Sockeye _____ Coho _____	13 Chum _____ Sockeye _____ Coho _____
	14 Chum _____ Sockeye _____ Coho _____	15 Chum _____ Sockeye _____ Coho _____	16 Chum _____ Sockeye _____ Coho _____	17 Chum _____ Sockeye _____ Coho _____	18 Chum _____ Sockeye _____ Coho _____	19 Chum _____ Sockeye _____ Coho _____	20 Chum _____ Sockeye _____ Coho _____
	21 Chum _____ Sockeye _____ Coho _____	22 Chum _____ Sockeye _____ Coho _____	23 Chum _____ Sockeye _____ Coho _____	24 Chum _____ Sockeye _____ Coho _____	25 Chum _____ Sockeye _____ Coho _____	26 Chum _____ Sockeye _____ Coho _____	27 Chum _____ Sockeye _____ Coho _____
	28 Chum _____ Sockeye _____ Coho _____	29 Chum _____ Sockeye _____ Coho _____	30 Chum _____ Sockeye _____ Coho _____	"THANK YOU" Please mail in this subsistence salmon fishing calendar after you are all done fishing for Coho salmon. During October and November, we plan on going to most communities to do a short survey with you and can also collect your salmon harvest calendar at that time.			

OCTOBER 2004 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 Chum _____ Sockeye _____ Coho _____	2 Chum _____ Sockeye _____ Coho _____	3 Chum _____ Sockeye _____ Coho _____	4 Chum _____ Sockeye _____ Coho _____
Kawerak Sukkora Quchak	5 Chum _____ Sockeye _____ Coho _____	6 Chum _____ Sockeye _____ Coho _____	7 Chum _____ Sockeye _____ Coho _____	8 Chum _____ Sockeye _____ Coho _____	9 Chum _____ Sockeye _____ Coho _____	10 Chum _____ Sockeye _____ Coho _____	11 Chum _____ Sockeye _____ Coho _____
	12 Chum _____ Sockeye _____ Coho _____	13 Chum _____ Sockeye _____ Coho _____	14 Chum _____ Sockeye _____ Coho _____	15 Chum _____ Sockeye _____ Coho _____	16 Chum _____ Sockeye _____ Coho _____	17 Chum _____ Sockeye _____ Coho _____	18 Chum _____ Sockeye _____ Coho _____
"RECSALMON" "SILVER SALMON"	19 Chum _____ Sockeye _____ Coho _____	20 Chum _____ Sockeye _____ Coho _____	21 Chum _____ Sockeye _____ Coho _____	22 Chum _____ Sockeye _____ Coho _____	23 Chum _____ Sockeye _____ Coho _____	24 Chum _____ Sockeye _____ Coho _____	25 Chum _____ Sockeye _____ Coho _____
	26 Chum _____ Sockeye _____ Coho _____	27 Chum _____ Sockeye _____ Coho _____	28 Chum _____ Sockeye _____ Coho _____	29 Chum _____ Sockeye _____ Coho _____	30 Chum _____ Sockeye _____ Coho _____	31 Chum _____ Sockeye _____ Coho _____	"THE END"

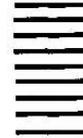
THANK YOU FOR USING THIS CALENDAR TO RECORD YOUR SUBSISTENCE SALMON HARVESTS

FOLD HERE FIRST

DIVISION OF SUBSISTENCE
ALASKA DEPT. FISH & GAME
PO BOX 1789
BETHEL, AK 99559-1789

NO POSTAGE
NECESSARY
IF MAILED IN
THE UNITED
STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 50 FAIRBANKS, AK
POSTAGE WILL BE PAID BY ADDRESSEE



STATE OF ALASKA
DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
PO BOX 1789
BETHEL, AK 99559-9990

FOLD HERE SECOND

APPLY TAPE
HERE TO CLOSE

APPLY TAPE
HERE TO CLOSE

**APPENDIX B. KUSKOKWIM AREA VILLAGE SURVEY
FORM, 2004 (LOWER RIVER EXAMPLE)**

Chinook= "taryaqvak,"
"qakiiyaq" HHID# _____

Chum= "iqalluk,"

Sockeye= "sayak," Coho=

KUSKOKWIM AREA 2004

POSTSEASON SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

- (Questions marked with an asterisk are asked of all households interviewed) lk

Community: _____ Household Head Name: _____
Survey Date: 10 11, 2004 Name of Person Interviewed: HH, _____
Interviewer: SM CB Household P.O. Box: _____
Was this household in community last year?: No ___ Yes ___

***1. Did this household catch salmon for subsistence use this year?** No ___ (go to # 3) Yes ___

2. May I have your salmon calendar? (If household fished without using calendar, go to # 7)

Picked up by interviewer _____ Mailed it to ADFG _____ Didn't get one _____
(go to # 10) Didn't use _____ Lost or unavailable _____

***3. Does this household usually subsistence fish for salmon?** No ___ Yes ___

HOUSEHOLD DIDN'T FISH (Household was not involved in harvesting/catching salmon)

4. Did this household help another household process ("put up") salmon?
No ___ Yes ___: (Names, HHIDs)
(go to # 17)

5. Please estimate how many salmon all of you processed ("put up").
CHINOOK _____ CHUM _____ SOCKEYE _____ COHO _____
Could not estimate _____
("silvers") ("kings") ("dogs") ("reds")

6. Please estimate how many salmon were for your household only.
CHINOOK _____ CHUM _____ SOCKEYE _____ COHO _____
("silvers") ("kings") ("dogs") ("reds")
(Go to Question 17).....

HOUSEHOLD FISHED, ADF&G DOES NOT HAVE CALENDAR

7. Did other households fish with you? No ____ Yes ____: (Names, HHIDs) _____

8. Please estimate how many salmon your household (or all households together) caught.

(Ask about Coho salmon and also salmon already eaten, frozen, given to other households, sent to friends, and dog food)

CHINOOK____ CHUM____ SOCKEYE____ COHO____ Salmon are included with

Households....

("silvers") ("kings") ("dogs") ("reds")

9. Please estimate how many salmon were for your household only.

CHINOOK____ CHUM____ SOCKEYE____ COHO____

ALL____ PERCENT____ ("kings") ("dogs") ("reds")

("silvers")

(Go to Question 15)

HOUSEHOLD FISHED, ADF&G DOES HAVE CALENDAR

10. Are all of the salmon this household caught written on the calendar? No ____ Yes ____

(Ask about Coho salmon and also salmon already eaten, frozen, given to other households, sent to friends, and dog food)

11. How many additional salmon, not written on the calendar, were caught?

CHINOOK____ CHUM____ SOCKEYE____ COHO____

("silvers") ("kings") ("dogs") ("reds")

12. Did other households fish with you? No ____ (go to # 15) Yes ____: (Names, HHIDs)

(This Block is continued on back side) COFFING, ADFG Sep. 2004

13. Are the salmon they caught written on your calendar? No ____ Yes ____

14. Please estimate how many salmon were for your household only.

All____ Percent____

CHINOOK____ CHUM____ SOCKEYE____ COHO____

(Go to Question 15)

FISHING GEAR (For subsistence fishing households only)

15A. What type(s) of fishing gear was used for catching subsistence salmon this year?

Drift net ____, Set Net ____, Rod and Reel ____, Fishwheel ____, Spear ____, Seine ____

15B. What mesh size (gill net) was used for catching King Salmon this year? _____(inches)

16. How many salmon did your household catch and keep with Rod and Reel this year?

CHINOOK____ CHUM____ SOCKEYE____ COHO____

COMMERCIAL FISHING

*17. Does this household commercial fish? No ____ (go to # 21), Yes ____
If yes, where ? ____Kuskokwim River or Bay ____Yukon Area ____Bristol Bay

18. Were all of the salmon caught when commercial fishing sold or were some brought home to eat or processed for subsistence? All were sold ____ Some were used for subsistence ____

19. How many commercially caught salmon were used for subsistence?
CHINOOK____ CHUM____ SOCKEYE____ COHO____

20. Are those salmon listed on the calendar or included in the catch numbers you gave me?
Yes____, No ____

HOUSEHOLD

SIZE

*21. How many people live in this household now ? _____

DOG FOOD (For subsistence fishing households only)

22. Did this household catch salmon for dog food?
Yes ____ No ____ (go to # 25) Only backbones/heads/guts/scraps ____ (go to # 25)

23. How many salmon? CHUM____ SOCKEYE____ COHO____ (“dogs”)
 (“reds”) (“silvers”)

24. Are the salmon caught for dog food included on your calendar or in the estimates you gave me ?
Yes _____, No _____

25. Do you have any comments, suggestions, or questions? (for example about the windows schedule)

26. (For subsistence fishing households only)

How would you describe subsistence salmon fishing for your household this year for:

Kings: _____

Chums: _____

Sockeye: _____

Coho: _____

A summary of this survey will be sent to you next spring (May).Thank You!

**APPENDIX C. BETHEL HOUSEHOLD SURVEY INSTRUMENT,
2004**

Household Street Address: _____

SubDivision

Street Name

House Number / Apartment Number

HHID#

Household Name: _____

Household PO Box Number: _____

Interviewer Initials: _____

Survey Date: Oct. Nov. 2004

BETHEL HOUSEHOLD SURVEY: Alaska Fish and Game Subsistence and Orutsaramiut Native Council

Household participation is voluntary, Survey forms will be turned in to Alaska Dept of Fish and Game, Subsistence. Household data will not be released without permission of Household Head.
 Covering Harvest Periods of: October 1, 2003 - September 30, 2004.

1. Did this household catch ANY KIND OF FISH FOR SUBSISTENCE during the past year ? YES NO (If NO, the survey is done.)
2. Did this household catch SUBSISTENCE salmon this year ? YES NO (If NO, go to back side and complete survey for other fish).

FOR SALMON FISHING HOUSEHOLDS ONLY

3. Did you use a salmon harvest calendar? YES NO (If NO then get estimates , Gear types, Rod and Reel harvest locations)
4. Are all of the salmon you harvested on the calendar ? YES NO (If NO then get estimates of additional fish)
 If YES, Place a check mark for each gear type used,
 Get mesh size for Chinook, Ask for number harvested and locations for salmon caught with Rod and Reel.

**NON-COMMERCIAL USE OF SALMON, DO NOT INCLUDE SALMON THAT WERE SOLD
 NUMBER OF SALMON THIS HOUSEHOLD HARVESTED**

KEY TO ROD AND REEL HARVEST LOCATIONS	
A.	Kuskokwim River
B.	Kanektok River drainage
C.	Kwethluk River drainage
D.	Kasigluk River drainage
E.	Kisaralik River drainage
F.	Aniak River drainage
G.	Holitna River drainage
H.	Stony River drainage
I.	Hoholitna River drainage
J.	Goodnews River drainage

SPECIES	HARVESTED Y/N	SET	Mesh	DRIFT	Mesh	OTHER GEAR		Fish Kept From Commercial Fishing (number)	ROD AND REEL HARVESTS	
		NET (number)	Size Inches	NET (number)	Size Inches	Write in gear type	Number (of fish)		(number)	Location
CHINOOK SALMON King Taryaqvak										
CHUM SALMON Dog Iqalluk										
SOCKEYE SALMON Red Sayak										
COHO SALMON Coho, Silver Qakiiyak										
PINK SALMON Pink, humpy Amaqaayak										

5. How was subsistence salmon fishing for your household this year ?
- Kings: Very Good Average Poor If poor, Why ? _____
- Chums: Very Good Average Poor If poor, Why ? _____
- Sockeye (reds) Very Good Average Poor If poor, Why ? _____
- Coho (silvers) Very Good Average Poor If poor, Why ? _____

88

KUSKOKWIM AREA: BETHEL

HOUSEHOLD FISH HARVEST SURVEY: Alaska Fish and Game Subsistence and Orutsamiut Native Council

Participation is voluntary, Survey forms will be turned in to Alaska Dept of Fish and Game, Subsistence. Household data will not be released without permission of Household Head.
 Covering Harvest Periods of: October 1, 2003 - September 30, 2004.

DO NOT WRITE IN THE GRAY AREAS

Do not include fish that were released

* Use **CF** if caught while commercial fishing and used for Subsistence

NON- SALMON FISH

NUMBER OF FISH HOUSEHOLD HARVESTED

SPECIES	HARVESTED Y/N	SET NET (number)	DRIFT NET (number)	NET UNDER ICE (number)	OTHER GEAR *		HOOKING Thru Ice (number)	ROD & REEL Open water (number)	KEY TO HARVEST LOCATIONS
					Write in gear type	Number (of fish)			
Northern Pike (luqruuyak)									A. Kuskokwim River
Burbot (lush)									B. Kanektok River drainage
Least cisco (qassayagaq)									C. Kwethluk River drainage
Bering Cisco (naptaq)									D. Kasigluk River drainage
Humpback Whitefish (cingiqeggliq)									E. Kisaralik River drainage F. Aniak River drainage
Broad Whitefish (akakiik)									G. Holitna River drainage
Round Whitefish									H. Stony River drainage
Unknown Whitefish									I. Hoholitna River drainage
Sheefish (ciiq)									J. Goodnews River drainage
Grayling (culugpauk)									K. Bethel Seawall
Dolly Varden (Yugyatk)									L. Mouth of Johnson River
Rainbow Trout (Talaariq)									M. In Johnson River drainage
Lake Trout (cikigniq)									O. Mouth of Gweek River
Lamprey						Rake			P. In Gweek River drainage
Blackfish						Taluyaq	gal		R. Kialik River drainage
Smelt						Dipnet	gal		S. Atchuelinguk River (Yukon) T. Other Yukon Areas

APPENDIX D. POSTCARD SURVEY FOR 2004

mailing label

Subsistence Division
Alaska Dept. of Fish and Game
P.O. Box 1789
Bethel, AK 99559
ADDRESS CORRECTION REQUESTED
DO NOT FORWARD

.....
(correct your address if necessary)

NAME:

P.O. BOX:

CITY, STATE:

ZIPCODE:

Kuskokwim Area Subsistence Salmon Harvest Survey

Complete and return this survey card even if your household didn't harvest salmon

Please estimate the number of salmon your household harvested for subsistence use.
(include salmon eaten, given away, frozen, dried, smoked, canned, or for dog food)

Chinook	Chum	Sockeye	Coho
(King salmon)	(Dog salmon)	(Red salmon)	(Silver salmon)

What type(s) of gear did your household use to catch subsistence salmon ?

Set net	Drift net	Fishwheel	Rod and reel
---------	-----------	-----------	--------------

How was subsistence salmon fishing for your household this year?

King:	Very good	Average	Poor, If Poor, why
Sockeye:	Very good	Average	Poor, If Poor, why
Chum:	Very good	Average	Poor, If Poor, why
Coho:	Very good	Average	Poor, If Poor, why

Dear Kuskokwim Area Resident,

Please take a moment to answer the questions on the back of this card and drop it in the mail to us. No stamp is necessary, postage is already paid. We will mail you a subsistence salmon harvest summary in Spring after the survey data is compiled.

We appreciate your help to document subsistence salmon harvests. We use this information to help the Board of Fisheries and the Department of Fish and Game make informed management decisions affecting the Kuskokwim Area. Your household harvest information remains confidential. Please call if you have any questions.

Thank you,

Subsistence Division, ADFG
Room 214, BNC Complex
Bethel (543-3100)

Division of Subsistence
Alaska Dept. of Fish and Game
P.O. Box 1789
Bethel, AK 99559

BUSINESS REPLY MAIL
First Class Mail Permit No. 50 Fairbanks, AK.

Postage Will Be Paid By Addressee

State of Alaska
Department of Fish and Game
Subsistence Division
P.O. Box 1789
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UNITED
STATES

