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2003 Kuskokwim Area Subsistence Salmon Surveys

Tracie Krauthoefer
Alaska Department of Fish and Game
Division of Subsistence
PO Box 1789, Bethel, AK 99559 (907) 543-3100
tracie_krauthoefer@fishgame.state.ak.us

Michael Martz
Alaska Department of Fish and Game
Division of Commercial Fisheries
PO Box 1467, Bethel, AK 99559 (907) 543-2433
michael_martz@fishgame.state.ak.us

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ABSTRACT

Using established Division of Subsistence calendar, postcard, and household survey methodology employed on the Kuskokwim since 1989, qualitative and quantitative information regarding subsistence harvest of salmon during the 2003 salmon fishing season was collected in 36 Kuskokwim River and bay communities. Information, gathered during the fall of 2003 and summarized herewithin, includes household harvest amounts for chinook, chum, sockeye, and coho salmon; gear types used; salmon harvested for dogs, subsistence fish retained from the commercial fishery, and harvester perceptions of the quality of the 2003 subsistence salmon fishery. As well, problems and solutions regarding methodological issues with the community of Bethel are presented.

APPROACH

Introduction

The Kuskokwim Area subsistence salmon fishery is one of the largest and most important in the state. From June through August the daily activities of many Kuskokwim Area households revolve around harvesting, processing, and preserving salmon for subsistence use. The movement of families from permanent winter residencies to summer fish camps situated along rivers and sloughs is a significant element of annual subsistence harvests. Alaska Department of Fish and Game (ADF&G), Division of Subsistence studies in the region indicate that fish contribute as much as 85 percent of the total pounds of fish and wildlife harvested in a community and salmon as much as 53 percent of the total annual harvest (Coffing 1991). The harvest of salmon for subsistence use is as much as 650 pounds per capita in some Kuskokwim River communities.

More than 1,500 households in the Kuskokwim Area annually harvest salmon for subsistence use. Many households not directly involved in catching salmon assist family and friends with cutting, drying, smoking, and associated preservation activities (salting, canning, and freezing). Annual subsistence surveys are aimed at gathering harvest data on Chinook, chum, sockeye, and coho salmon.

There are 38 communities consisting of approximately 4,500 households within the Kuskokwim Area. The majority (75 percent) of the households are situated within the Kuskokwim River drainage. Bethel is the largest community in the region, consisting of approximately 1,700 households. The north Kuskokwim Bay communities of Kwigillingok, Kongiganak, and Kipnuk are comprised of roughly 350 households. North Kuskokwim Bay subsistence fishers harvest salmon in the Kuskokwim River as well as from areas closer to their communities. Residents of Quinhagak, Goodnews Bay and Platinum, located along the south shore of Kuskokwim Bay (approximately 220 households) harvest salmon primarily from the Kanektok, Arolik, and Goodnews River drainages. The Bearing Sea Coast communities of Newtok, Tununak, Toksook Bay, Nightmute, and Chefornak are composed of approximately 490 households. The village of Mekoryuk (located on Nunivak Island) is composed of roughly 95 households. Subsistence users from these communities harvest salmon from coastal waters as well as local tributaries.

Data on the harvest of salmon for subsistence uses is collected annually. Commercial Fisheries Division began conducting subsistence salmon harvest surveys in the Kuskokwim River drainage in 1960. Subsistence surveys were first performed in Quinhagak in 1967, while Goodnews Bay and Platinum surveys were initiated in 1979. The Division of Subsistence took over the annual subsistence salmon harvest surveys in 1988 and has been responsible for collecting and analyzing the data since then. During the early survey years, prior to 1985, subsistence salmon catch data were grouped into two primary categories: "king salmon" and "small salmon." Survey methods were further refined during the 1988 field season resulting in a more complete data collection of all harvested salmonid species.

Regulations

Statewide eligibility criteria require individuals to be Alaskan residents (consistent with AS 16.05.940.26) while harvesting salmon for subsistence use. Prior to 1990, there were additional restrictions on participation in the subsistence fishery (Francisco et al. 1990). Most subsistence salmon fishers in the region are Kuskokwim area residents, but some who are domiciled in other parts of Alaska often return to assist family or friends harvest or process salmon.

Licenses and permits have never been required for subsistence salmon fishing in the Kuskokwim Area, nor were any required during 2003. Hook and line fishers upstream of the Doestock River on the Aniak River had a combined daily bag limit of six fish, no more than three of which could be salmon. Otherwise, there were no restrictions on the number of salmon harvestable by individual fishers or households for subsistence uses in the Kuskokwim Area. Salmon could be harvested for subsistence use by set and drift gill nets, beach seines, fish wheels, and rod and reel. Spears could only be used in the Holitna, Kanektok, Arolik, and Goodnews River drainages. Set or drift gill nets in use by an individual fisher could not exceed a total length of 50 fathoms. Gill nets used for harvesting salmon could be of any size mesh, however nets with six-inch or smaller mesh could not be more than 45 meshes deep and nets with mesh greater than six-inches could not be more than 35 meshes deep. Fishers were required to have their name and address attached to their gill nets and fish wheels.

Subsistence Salmon Fishing Schedule

Following declines in Chinook and chum salmon returns to the Kuskokwim since 1997, and in anticipation of poor returns in 2001, the Alaska Board of Fisheries (Board) designated both as stocks of concern (specifically, yield concerns) under the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) in September of 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 were to be managed conservatively for the months of June and July.

The Rebuilding Plan provides direction for implementation of a subsistence-fishing schedule. The fishing schedule allows salmon net (with mesh size greater than four inches) and fish wheel fisheries to be open for four consecutive days per week in June

and July as announced by EO and implemented in a method that 'follows' salmon run-timing in a step-wise progression upstream. The subsistence-fishing schedule is alterable, based on run strength, by EO in a manner to achieve escapement goals. Once escapement goals are assured for Chinook and chum salmon, subsistence fishing can be allowed seven days per week.

The Department polled the 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 have the Kuskokwim River closed to subsistence net and fish wheel fisheries Sunday, Monday, and Tuesday. Subsistence fishing with rod and reel was not included in this schedule nor were other Kuskokwim Area salmon fisheries.

In 2003, the Kuskokwim River subsistence salmon fishing schedule began June 1 in District 1 (all waters downstream of Bogus Creek). On June 8, the schedule was expanded to all waters downstream of Chuathbaluk, and on June 15, the schedule was effective for the entire Kuskokwim River drainage. Some non-salmon tributaries in the Lower and Middle Kuskokwim River drainages were not affected by this schedule nor were waters outside of the Kuskokwim drainage. Based on a recommendation from the Working Group, the Department established a seven-day per week subsistence fishing schedule on July 2, when salmon run strength was anticipated to be large enough to meet escapement goals.

Subsistence Closures during the Commercial Fishery

Areas within commercial salmon fishing districts were initially closed to subsistence salmon net and fish wheel gear 16 hours before, during, and 6 hours after commercial fishing periods as described in 5 AAC 01.260. Many of the fishers that participate in the Kuskokwim commercial fisheries are local residents who subsistence fish. The purpose of these closures was to discourage illegal fishing activity such as the sale of subsistence caught salmon in the commercial fishery. On August 3, 2003, the Department issued an EO that decreased the duration of subsistence closures associated with commercial fishing in District 1 to 6 hours before, during, and 3 hours after commercial fishing periods. The purpose of this EO would allow adequate opportunity for fishers to fulfill their subsistence needs during the commercial fishing season. The specific waters closed to subsistence fishing varied District to District. In 2003, there were 21 commercial fishing periods in District 1. Two periods occurred prior to August 3 when subsistence was subject to closures 16 hours before, during, and six hours after commercial fishing periods. The remaining 19 periods had subsistence closures of 6 hours before, during, and 3 hours after commercial fishing periods. There were weekly scheduled subsistence fishing closures in both District 4 (Quinhagak) and District 5 (Goodnews Bay and Platinum) from June through August.

The Department issued an EO in 2003 that modified the subsistence closures associated with commercial fishing periods in Kuskokuak Slough, similar to an EO issued in 2002. By regulation, Kuskokuak Slough remained open to subsistence salmon fishing seven days per week after July 31. The modified regulation established subsistence salmon fishing closures in Kuskokuak Slough consistent with the remainder of District 1 waters.

This change was also proposed as a 'regulatory change' for the upcoming 2004 Arctic-Yukon-Kuskokwim Board of Fisheries meeting.

Objectives

The objectives for this project were as follows:

A) Collect harvest data that would result in a total harvest estimate for subsistence salmon by species for the Kuskokwim fisheries Management Area by community.

B) Compile information on fishing effort, gear types, participation rates, and timing of the subsistence harvest.

C) Update community household lists and identify fishing households.

D) Determine if subsistence fishing success during 2003 was poor, average, or better than average and, if poor, why.

An additional project objective was identified following the retirement of the principal investigator, Mike Coffing. The additional objective was to redesign the survey strategy and update the operational plan to make the surveys more cost and time effective. In May of 2004, a 6 month extension for this project was granted to allow time to accomplish the survey redesign.

Methods

Three methods are used to gather subsistence salmon harvest data in the Kuskokwim Area. These include: (1) subsistence salmon catch calendars, (2) post-season community household surveys, and (3) postcard surveys. Households in the Kuskokwim area are assigned a 'Household Identification Number' (HHID) to aid in tracking of an individual family's subsistence harvest over time. To aid community harvest estimation, households are stratified into two groups: (1) those that "usually fish" and, (2) those that "usually do not fish."

Catch Calendars

In May 2003, subsistence salmon catch calendars were mailed to all Kuskokwim Area households that had been identified as "usually fish" and to those that fished the previous season. Three similar, but unique, catch calendars were designed to record the daily catch of each salmon species harvested for subsistence use. Communities along the Bering Sea coast, North Kuskokwim Bay, Lower, Middle, and Upper Kuskokwim areas (as far upstream as Stony River) all received one style of calendar. A second style of calendar was sent to the remaining households in the Upper Kuskokwim area. The third style was sent to households in Quinhagak, Goodnews Bay, and Platinum. The different calendars take into account species availability, salmon run timing, and seasonal timing of subsistence fishing activities. The calendars 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. Subsistence salmon catch calendars were mailed to 2,088 households.

Household Surveys

The primary method of collecting subsistence salmon harvest information is the post-season household surveys. Survey staff travel to communities in the Kuskokwim Area and perform house-to-house interviews surveying residents about their fishing efforts. Kuskokwim communities are grouped into four regional categories based on geographic location: (1) Lower Kuskokwim, (2) Middle Kuskokwim, (3) Upper Kuskokwim, and (4) Bering Sea Coast. Similar to the catch calendars, three color-coded survey forms are used to survey the majority of the communities. Except for local names used for the salmon species, the survey questions asked in each region were identical. The survey form used for Bethel and Aniak interviews include a space for recording the household resident's address. Bethel surveys, which were funded under a separate funding agreement with US Fish and Wildlife Service Office of Subsistence Management, include questions aimed at collecting subsistence harvest information for non-salmon species, as well as quantifying harvests by gear type and harvest locations for fish caught with hook and line gear.

In 2003, Division of Subsistence staff conducted house-to-house surveys in 26 communities. Budget constraints precluded attempts to conduct house-to-house surveys in Mekoryuk, Newtok, Tununak, Toksook Bay, Nightmute, and Chefornak. Kipnuk, Kwigillingok, and Kasigluk have not consented to allow surveys be conducted in the village, while Takotna, Nikolai, and Telida were not surveyed due to inclement weather.

Utilizing Arctic Yukon Kuskokwim Sustainable Salmon Initiative (AYK SSI) funding provided for this project, ADF&G Division of Subsistence developed a cooperative agreement with Kuskokwim Native Association (KNA) which enabled KNA to hire technicians to conduct household surveys in Aniak. Through funding administered from the USFWS Federal Office of Subsistence Management (OSM), the Orutsararmiut Native Council (ONC) hired two survey technicians to conduct house-to-house surveys in Bethel. The Division of Subsistence trained the hired technicians for both projects and oversaw the survey efforts. Data collected by both ONC and KNA followed methods and protocols developed by the Division.

Survey efforts in Kuskokwim area communities occurred over a two-month time span beginning in early October. By this time most residents have completed salmon fishing for the season and returned from fall moose and caribou hunts. Communities where residents usually harvest salmon through October, such as McGrath, were surveyed in November. Prior to beginning community household surveys, efforts were made to inform and prepare residents for the arrival of survey staff. This was done weeks or days in advance via letters to City, Tribal, or Traditional Council offices, radio announcements and posters placed in public buildings, and telephone calls to community officials. Prior to traveling to each community, staff identified households that had already mailed in or returned their salmon harvest calendars. Time spent by survey staff on house-to-house interviews varied from one-half to two days dependent on the size of the community.

Upon arrival in a community, the survey staff introduced themselves to the City or Village Council offices and outlined their task. Staff used household checklists to identify residents they needed to contact for household surveys. Each "checklist"

contained a listing of all known households in the community and it identified those households that were reported to have subsistence fished for salmon the previous year (2002). Each "checklist" also reported households that were mailed 2003 catch calendars. Knowledgeable individuals in the community helped staff update the community household list and identify which households "usually fished" and which households "usually did not fish." These individuals also helped to identify households that subsistence fished for salmon in 2003. Attempts were made to contact all households identified as "usually fish" or known to have fished during 2003.

In Bethel, house-to-house surveys were conducted over an 11-week period. A map of the community originally developed by the Bethel Fire Department was used to identify household street addresses and to divide the community into subdivisions. A list of all Bethel households that had been identified through previous surveys and all households that returned their subsistence salmon catch calendars was categorized by subdivision. Each of the two survey staff were then assigned specific subdivisions that they were to survey. In Bethel, an effort was made to contact every household (a census) to provide a more accurate list of the total number of households. Unlike other communities, Bethel has no agency or organization willing to provide a current household list.

Household surveys were conducted in all Kuskokwim area communities that the survey staff was able to get to, provided good travel weather and adequate funding. If available, completed subsistence salmon catch calendars that had not been returned to the Department were collected during the household survey. Other households on the community list were contacted about their subsistence fishing activities if time permitted. In 2003, 2,289 Kuskokwim Area households were surveyed.

Postcard Surveys

The third method of collecting subsistence salmon harvest information is by postcard surveys. Completed postcard surveys report household subsistence salmon harvests from the Kuskokwim Area, type of fishing gear used, and the quality of fishing for each salmon species. Upon completion of the household surveys, postcards are mailed to all residents in villages were survey staff were unable to travel to and to village residents who were unavailable for household surveys at the time survey staff visited. Return postage is pre-paid and postcards are preaddressed to the Division of Subsistence in Bethel. Postcards are the primary method for obtaining harvest data from households in Mekoryuk, Newtok, Nightmute, and those not available to staff during house-to-house surveys.

In 2003, postcards were mailed to all residents in Mekoryuk, Newtok, Nightmute, Toksook Bay, Tununak, Chefornak, Kipnuk, Kwigillingok, and Kasigluk. In Bethel and Aniak, postcard surveys were left at occupied homes where multiple attempts to contact the residents failed. Several postcards were returned with an address correction indicating that the individual had moved away; a follow-up postcard was then sent to determine if the individual harvested salmon in the Kuskokwim Area during 2003. Overall, 1,463 households in the region were mailed postcard surveys.

RESULTS AND FINDINGS

Sampling Summary

From an estimated 4,535 households located in the Kuskokwim Area, contact was established with 2,375 by household surveys, returned calendars and/or postcards (Table 1). For 107 households, subsistence fishing and harvest information was obtained by consultation with village officials or from a different household's survey form. This increased the number of households for which information was available to 2,482. From this total, harvest data were obtained for 2,290 households (i.e. households that fished who also provided harvest numbers and, those that did not fish); community and area harvest estimates are expanded from this data set. From the 2,482 households that Division of Subsistence has information for, 1,417 (31 percent of the total area households) were identified as having subsistence fished for salmon in 2003 (although specific harvest numbers were not available for all fishing households).

Within the Kuskokwim River drainage (including North Kuskokwim Bay communities), 2,186 (59 percent) of the 3,732 households were contacted. This region contains 82 percent of the total households in the Kuskokwim Area and 89 percent of the identified subsistence-fishing households.

In the South Kuskokwim Bay region (Quinhagak, Goodnews Bay, and Platinum), 166 (74 percent) of the 223 households were contacted. One hundred thirty-five households (61 percent) subsistence fished in 2003. Seventy-three percent of the contacted households harvested salmon in 2003 for subsistence use.

The Bering Sea Coast communities of Mekoryuk, Newtok, Nightmute, Toksook Bay, Tununak, and Chefornak have an estimated 580 households. Subsistence salmon fishing data were obtained only by postcard surveys and calendar returns. Twenty-eight households in this region provided information, 19 reported harvesting salmon. Based on previous years data, participation in salmon harvest activities by households in the Bering Sea Coast communities is considered much greater than reported.

Thirteen percent (271) of the 2,088 subsistence salmon calendars that were mailed in 2003 were returned or picked up during household surveys. There were 28 (0.02 percent) responses to the 1,463 postcard surveys mailed to Kuskokwim Area households.

Subsistence Salmon Harvest Summary

A summary of the subsistence salmon harvest estimates by community and fishing area is presented in Table 2. The 2003 subsistence salmon harvest estimates for the Kuskokwim Area were 72,498 chinook, 46,291 chum, 36,894 sockeye and 38,791 coho for 194,474 salmon total. Subsistence harvests of all salmon species fell within or surpassed amounts necessary for subsistence use ranges set under 5AAC 01.286. Lower Kuskokwim area communities accounted for 77 percent of the 2003 subsistence salmon harvests in the Kuskokwim area and 81 percent of the entire Chinook subsistence catch. Residents of Bethel accounted for 28 percent of the Kuskokwim Area subsistence harvests and 30 and 34 percent of all subsistence caught Chinook and coho salmon respectively.

Subsistence salmon harvests in the Kuskokwim area in 2003 differed from previous years. The estimated 2003 Chinook salmon subsistence harvest was increased from 2002

but below recent 5 and 10-year averages, and 14 percent below the 1989-2002 average (Table 3). The 2003 chum salmon subsistence harvest estimate was the second lowest since the surveys were re-formatted in 1988. In 2003 chum salmon subsistence harvests were 22 and 27 percent below the recent 5 and 10-year averages and 41 percent below the 1989-2002 average. The 2003 sockeye salmon harvest estimate was 13 and 9 percent below recent 5 and 10-year averages but 33 percent higher than the 2002 subsistence harvest. Coho salmon subsistence harvests were 24 and 16 percent higher than recent 5 and 10-year averages and nearly equal to the 1989-2002 average.

Kuskokwim area subsistence salmon harvest demographics vary between regions (i.e. South Kuskokwim Bay, Lower, Middle, and Upper Kuskokwim) from year to year. Chinook harvest estimates in the South Kuskokwim Bay communities increased 39 percent while Lower Kuskokwim communities showed a 3 percent increase in estimated Chinook subsistence harvests from 2002. Although Bay and Lower Kuskokwim River communities showed increased Chinook harvests, Middle and Upper Kuskokwim communities experienced decreases of 11 and 25 percent, respectively, from 2002.

The 2003 chum salmon subsistence harvests were down for North and South Kuskokwim Bay by 51 and 42 percent while Lower, Middle, and Upper Kuskokwim communities saw chum subsistence harvest decreases of 37, 32, and 41 percent from 2002. In contrast, sockeye salmon subsistence harvests were much higher than 2002, and the South Kuskokwim Bay; Lower, Middle, and Upper Kuskokwim River areas saw increases of 20 (Middle) to 36 percent (Lower). Coho salmon subsistence harvest estimates in the Kuskokwim area were the most increased compared to recent years. South Kuskokwim Bay communities saw subsistence harvest increases of roughly two and a half times that of 2002 while the Lower, Middle, and Upper Kuskokwim area communities saw increases of 8 (Upper) to 36 percent (Middle).

Dog Food

Historically, the use of salmon for dog food was a significant portion of the overall subsistence salmon harvest, particularly for chum and coho. In recent years, the number of households harvesting salmon specifically for dog food has declined, likely due to decreased use of dog teams for transportation. During 2003, 87 households reported harvesting salmon specifically to process and use as dog food (Table 4). The majority of the reported harvest for dog food was chum salmon at 6,949 fish, while coho salmon accounted for 5,490 fish, and sockeye contributed a reported 625. Households do not target Chinook salmon for dog food; however, some Chinook salmon unfit for human consumption may be fed to dogs so the fish is not wasted. It is common for most households to feed scraps, backbones, entrails, and salmon unfit for human consumption to their dogs. In 2003, 346 households responded that they fed scraps, backbones, and entrails to their dogs, but they did not harvest or put up any salmon specifically for dog food.

Gear Types

Subsistence 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. During 2003, 933 households reported using drift gillnets for subsistence salmon harvests, 250 reported using set nets, 318 reported using rod and reel (Table 5). The most common gear type

used throughout the Kuskokwim Area was the drift gillnet, which is the primary fishing gear used by households from Crooked Creek downstream to the costal communities of Kuskokwim Bay. Set gillnets are also used throughout the Kuskokwim Area and in 2003, Upper Kuskokwim communities report a higher percentage (43 percent) of fishing households using set gillnets than South Kuskokwim Bay (21 percent), and the Lower (15 percent) and Middle Kuskokwim River (17 percent) communities.

Rod and reel gear types are also used for subsistence fishing by many households throughout the area. Rod and reel are used by families who may not have access to other gear types, by fishers in areas where other gear types are not as effective or efficient, and to harvest fewer fish when less are sought. Kwethluk (48 percent), Aniak (47 percent), and McGrath (44 percent) all had a large percentage of subsistence fishing households reporting use of rod and reel in 2003 (Table 5). During 2003, 318 households in 21 communities reported using rod and reel to harvest salmon for subsistence use.

Fish wheels are used in the Middle and Upper Kuskokwim areas for harvesting salmon, most frequently by fishers in Aniak, Stony River, Lime Village, and McGrath. Fish wheels on the Kuskokwim are used primarily for harvesting sockeye, chum, and coho salmon, however in 2003; no households reported using fish wheel gear for harvesting subsistence salmon (Table 5). It is likely that the households that usually use a fish wheel were missed by the 2003 survey staff.

In Platinum, two households reported using seine gear to harvest subsistence salmon. Platinum was also the only community that had a household report the use of spears for harvesting subsistence salmon (Table 5).

Salmon Retained from Commercial Fishing for Subsistence Use

Households involved in commercial salmon fishing sometimes keep a portion of their catch for subsistence use. The number of salmon retained from commercial fishing activities for subsistence use is usually relatively low. During 2003, there were 21 commercial fishing periods in the Kuskokwim River drainage (District 1), the first commercial period occurred July 31. There were scheduled commercial fishing periods in Districts 4 and 5 during June and July as well as August. Overall, 60 households reported retaining salmon for subsistence use from commercial fishing activities in 2003 (Table 6). The amount of salmon reportedly kept for subsistence use amounted to 123 chinook, 19 chum, 112 sockeye, and 2,618 coho salmon, a much more substantial number than reported in previous years. It is likely that these numbers reflect a specific commercial period in District 1 where the commercial tender left the area early and commercial fishers from Eek and Tuntutuliak were left with a large number of unsold fish.

Quality of Fishing

Fishing households interviewed in person and those that were mailed a survey postcard were asked to respond to a qualitative question about their subsistence salmon fishing for the season. The purpose of this question was to learn how households viewed their 2003 subsistence fishing success. Households were asked to rate their subsistence fishing success for each of the four salmon species surveyed (Chinook, sockeye, coho, and chum) as "Very Good," "Average," or "Poor." If a household responded "poor," they

were asked to provide additional comments as to why they felt the fishery was poor that season. These comments are included as Appendix A in this report.

The majority of households responding rated their 2003 subsistence fishing as 'Very Good' or 'Average' (Table 7). Nine hundred ninety-two fishing households commented on Chinook salmon fishing, 88 percent described it as being 'Very Good' or 'Average.' Forty-six percent described Chinook fishing as 'Very Good,' while 115 families (12 percent) described it as being 'Poor.' Twenty-two families that reported 'Poor' Chinook fishing also commented that there simply weren't enough salmon, 11 described gear problems, five reported catching more 'Small Kings,' while five cited problems associated with the Subsistence Fishing Schedule. Other reasons given were of a personal nature.

Six hundred eighty-five subsistence fishers commented on chum salmon fishing, 84 percent described it as being 'Very Good' or 'Average' (Table 8). Forty percent described fishing as 'Very Good' (275) while 16 percent described it as 'Poor' (111). Thirty-four households that described chum salmon fishing as 'Poor' cited low numbers or not enough fish, 11 described gear problems, and four cited problems associated with the Subsistence Fishing Schedule.

Eight hundred subsistence fishers commented on sockeye salmon fishing, 84 percent described it as being 'Very Good' or 'Average'(Table 9). Three hundred fifty-one (44 percent) reported 'Very Good' fishing while 125 households (16 percent) reported 'Poor' sockeye fishing. Forty-two households that described sockeye fishing as 'Poor' cited low numbers or not enough fish, nine reported gear problems, and five cited problems associated with the Subsistence Fishing Schedule.

In 2003, 95 percent of 735 households described coho salmon subsistence as 'Very Good' or 'Average' (Table 10). The majority (67 percent) reported 'Very Good' subsistence while 40 households (5 percent) reported coho subsistence as 'Poor.' Four households cited low numbers as the reason for 'Poor' subsistence, the remainder-cited gear associated problems and personal issues.

Table 1. 2003 Kuskokwim River Subsistence Salmon Project Sampling Summary

Community	Total HH'S	Calendars Mailed	Calendars Returned	Postcards Mailed	Postcards Returned[1]	Surveyed	Total Contacts[2]	Any Info.[3]	Subsistence Fished[2]	Harvest Data[4]
Kipnuk	176	9	0	176	0	0	0	0	0	0
Kwigillingok	95	0	0	95	0	0	0	3	0	0
Kongiganak	84	71	3	0	0	35	36	42	28	36
N KUSKOKWIM BAY	355	80	3	271	0	35	36	45	28	36
Tuntutuliak	79	62	13	0	0	66	66	70	54	62
Eek	78	55	18	0	0	51	58	60	43	57
Kasigluk	135	13	1	134	3	0	4	7	4	4
Nunapitchuk	103	78	15	0	0	76	77	83	64	73
Atmautluak	62	40	3	0	0	44	44	48	33	43
Napakiak	93	61	9	0	0	55	56	60	44	55
Napaskiak	88	64	0	0	0	59	59	69	45	57
Oscarville	14	12	5	0	0	11	11	11	11	9
Bethel	1651	683	75	451	3	1057	1077	1083	439	1046
Kwethluk	159	120	22	0	0	101	104	115	82	92
Akiachak	134	104	7	0	0	78	79	90	64	79
Akiak	73	51	8	0	0	50	51	55	47	50
Tuluksak	80	68	7	0	0	45	45	49	41	43
LOWER KUSKOKWIM	2,749	1,411	183	585	6	1,693	1,731	1,800	971	1,670
Lower Kalskag	73	41	6	0	0	45	47	50	29	47
Upper Kalskag	62	41	8	0	0	37	39	42	26	39
Aniak	150	119	21	33	0	112	118	125	77	112
Chuathbaluk	32	19	4	0	0	25	25	27	18	24
MIDDLE KUSKOKWIM	317	220	39	33	0	219	229	244	150	222
Crooked Creek	38	24	5	0	0	26	26	30	22	26
Red Devil	15	10	0	0	0	11	11	12	5	10
Sleetmute	33	28	8	0	0	26	26	26	18	25
Stony River	15	12	1	0	0	11	11	12	8	10
Lime Village	14	5	0	0	0	13	13	13	9	12
McGrath	139	67	5	0	0	98	101	103	50	98
Takotna	19	6	0	0	0	0	0	0	0	0
Nikolai	36	23	2	0	0	0	2	3	2	2
Telida	2	0	0	0	0	0	0	0	0	0
UPPER KUSKOKWIM	311	175	21	0	0	185	190	199	114	183
Quinhagak	143	94	12	0	0	101	104	107	86	100
Goodnews Bay	64	42	6	0	0	41	42	44	36	39
Platinum	16	10	1	0	0	15	15	15	13	13
S KUSKOKWIM BAY	223	146	19	0	0	157	161	166	135	152
Mekoryuk	94	25	4	90	13	0	17	17	12	17
Newtok	79	9	1	78	2	0	3	3	1	3
Nightmute	68	4	0	68	3	0	3	3	2	2
Toksook Bay	136	10	1	135	2	0	3	3	2	3
Tununak	110	8	0	110	1	0	1	1	1	1
Chefornak	93	0	0	93	1	0	1	1	1	1
BERING SEA COAST	580	56	6	574	22	0	28	28	19	27
TOTALS	4,535	2,088	271	1,463	28	2,289	2,375	2,482	1,417	2,290

[1] Postcards returned with information identifying the community. Postcards returned without identifying information were not usable and are not included.

[2] Households directly contacted by returning a calendar or postcard or by being interviewed in a face-to-face survey.

[3] Includes information for uncontacted households' fishing effort derived from other households' surveys or in consultation with village officials.

[4] Households that did not fish and those households which did fish and provided harvest numbers.

Table 2. 2003 Kuskokwim Subsistence Salmon Harvest

			Chinook		Chum		Sockeye		Coho		Total	
	Total HH's	HH's Contacted	Reported Harvest	Est.* Total	Reported Harvest	Est.* Total	Reported Harvest	Est.* Total	Reported Harvest	Est.* Total	Reported Harvest	Est.* Total
1 Kipnuk	176	0	0	0	0	0	0	0	0	0	0	0
2 Kwigillingok	95	0	0	0	0	0	0	0	0	0	0	0
3 Kongiganak	84	36	1156	1386	804	970	536	637	635	768	3131	3761
N. KUSKOKWIM BAY	355	36	1156	1386	804	970	536	637	635	768	3131	3761
4 Tuntutuliak	79	66	2727	3095	2231	2514	1339	1555	2075	2329	8372	9493
5 Eek	78	58	1787	2364	474	621	544	714	1135	1493	3940	5192
7 Kasigluk	135	4	356	356	297	297	210	210	134	134	997	997
8 Nunapitchuk	103	77	3038	3763	3389	4139	2054	2521	551	676	9032	11099
9 Atmautluak	62	44	1354	1396	1491	1539	841	868	394	407	4080	4210
10 Napakiak	93	56	1888	2105	1244	1384	1104	1223	981	1098	5217	5810
11 Napaskiak	88	59	3318	5012	1906	2893	1603	2420	1004	1522	7831	11847
12 Oscarville	14	11	918	1073	582	704	556	700	24	27	2080	2504
13 Bethel	1651	1077	15787	21475	7199	9829	7694	10542	9613	13237	40293	55083
14 Kwethluk	159	104	4767	4938	2269	2348	1716	1776	1865	1933	10617	10995
15 Akiachak	134	79	3554	5346	2628	3943	2019	3016	1719	2611	9920	14916
16 Akiak	73	51	3337	3896	2254	2715	1459	1698	942	1135	7992	9444
17 Tuluksak	80	45	2597	3678	1096	1555	939	1333	1066	1523	5698	8089
LOWER KUSKOKWIM	2749	1731	45428	58497	27060	34481	22078	28576	21503	28125	116069	149679
18 Lower Kalskag	73	47	1536	2016	1210	1569	551	714	289	375	3586	4674
19 Upper Kalskag	62	39	989	1128	423	485	421	483	550	605	2383	2701
21 Aniak	150	118	1794	2077	1106	1160	631	670	1388	1552	4919	5459
23 Chuathbaluk	32	25	336	399	1924	2249	245	287	261	313	2766	3248
MIDDLE KUSKOKWIM	317	229	4655	5620	4663	5463	1848	2154	2488	2845	13654	16082
25 Crooked Creek	38	26	737	831	788	889	663	747	381	430	2569	2897
27 Red Devil	15	11	54	72	37	49	217	289	157	209	465	619
28 Sleetmute	33	26	593	685	388	408	604	668	613	678	2198	2439
31 Stony River	15	11	89	111	220	275	111	139	703	879	1123	1404
32 Lime Village	14	13	65	65	140	140	1000	1000	164	164	1369	1369
33 McGrath	139	101	424	506	544	610	194	242	964	1099	2126	2457
34 Takotna	19	0	0	0	0	0	0	0	0	0	0	0
36 Nikolai	36	2	15	15	35	35	0	0	43	43	93	93
37 Telida	2	0	0	0	0	0	0	0	0	0	0	0
UPPER KUSKOKWIM	311	190	1977	2285	2152	2406	2789	3085	3025	3502	9943	11278
KUSKOKWIM RIVER	3732	2186	53216	67788	34679	43320	27251	34452	27651	35240	142797	180800
38 Quinhagak	143	104	2953	3898	935	1129	1388	1622	1838	2047	7114	8696
39 Goodnews Bay	64	42	616	649	119	126	635	672	1050	1110	2420	2557
40 Platinum	16	15	88	88	50	50	111	111	209	209	458	458
S. KUSKOKWIM BAY	223	161	3657	4635	1104	1305	2134	2405	3097	3366	9992	11711
41 Mekoryuk	94	17	10	10	1484	1484	2	2	112	112	1608	1608
42 Newtok	79	3	0	0	9	9	0	0	0	0	9	9
43 Nightmute	68	3	4	4	15	15	20	20	0	0	39	39
44 Toksook Bay	136	3	51	51	133	133	0	0	58	58	242	242
45 Tununak	110	1	5	5	10	10	5	5	0	0	20	20
BERING SEA COAST	487	27	70	70	1651	1651	27	27	170	170	1918	1918
46 Chefornak	93	1	5	5	15	15	10	10	15	15	45	45
TOTALS	4,535	2,375	56,948	72,498	37,449	46,291	29,422	36,894	30,933	38,791	154,752	194,474

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

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

Table 3. Kuskokwim Historic Subsistence Salmon Harvest

	HOUSEHOLDS		ESTIMATED SALMON HARVEST					
YEAR	TOTAL	SURVEYED	CHINOOK	SOCKEYE	COHO	CHUM	PINK	TOTAL
1989	3,422	2,135	85,323	37,088	57,846	145,106	0	325,363
1990	3,317	1,830	92,675	39,659	50,708	131,470	0	314,513
1991	3,347	2,024	90,226	56,401	55,620	96,314	0	298,561
1992	3,314	1,724	68,706	34,159	44,494	99,577	0	246,937
1993	3,274	1,816	91,722	51,362	35,295	61,724	0	240,103
1994	3,179	1,821	98,378	39,280	36,504	76,949	0	251,111
1995	3,652	1,894	100,157	28,622	39,165	68,941	0	236,885
1996	3,643	1,837	81,597	35,037	34,699	90,239	0	241,572
1997	3,510	1,831	85,506	41,251	30,717	40,993	0	198,466
1998	3,495	1,849	86,113	37,579	27,240	67,664	0	218,595
1999	4,180	2,523	77,660	49,388	27,753	47,612	0	202,413
2000	4,441	2,750	68,841	44,832	35,670	55,371	0	204,714
2001	4,483	2,297	77,570	51,965	31,686	51,117	0	212,338
2002	4,339	2,798	70,219	27,733	34,413	73,234	0	205,599
2003	4,353	2,375	72,498	36,894	38,791	46,291	NA	194,474
2000-2004 Average	4,404	2,555	72,282	40,356	35,140	56,503	0	204,281
1995-2004 Average	4,011	2,239	80,018	39,256	33,348	60,162	0	212,784
All Years Average	3,730	2,100	83,146	40,750	38,707	76,840	0	239,443

0

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Alaska Subsistence Fisheries Database, Version 3.3.

Table 4. Kuskokwim Households Feeding Subsistence-Caught Salmon to Dogs

		ANY FISH		SCRAPS ONLY		WHOLE FISH				
	SURVEYS	HH	DOGS	HH	DOGS	HH	DOGS	CHUM	SOCKEYE	COHO
Kipnuk	0	0	0	0	0	0	0	0	0	0
Kwigillingok	0	0	0	0	0	0	0	0	0	0
Kongiganak	35	9	9	7	7	2	2	0	2	25
N. KUSKOKWIM BAY	35	9	9	7	7	2	2	0	2	25
Tuntutuliak	66	31	31	28	28	3	3	0	0	1500
Eek	51	8	8	6	6	2	2	0	0	100
Kasigluk	0	0	0	0	0	0	0	0	0	0
Nunapitchuk	76	21	21	20	20	1	1	60	0	0
Atmautluak	44	11	11	10	10	1	1	30	0	0
Napakiak	55	20	20	17	17	3	3	51	0	0
Napaskiak	59	21	21	18	18	3	3	360	50	145
Oscarville	11	7	7	6	6	1	1	75	75	0
Bethel	1057	0	0	0	0	0	0	0	0	0
Kwethluk	101	38	38	30	30	8	8	537	13	642
Akiachak	78	28	28	18	18	10	10	295	100	816
Akiak	50	17	17	15	15	2	2	1500	0	580
Tuluksak	45	21	21	18	18	3	3	31	29	25
LOWER KUSKOKWIM	1693	223	223	186	186	37	37	2939	267	3808
Lower Kalskag	45	6	6	2	2	4	4	378	36	137
Upper Kalskag	37	15	15	9	9	6	6	256	0	85
Aniak	112	19	19	9	9	10	10	607	0	125
Chuathbaluk	25	7	7	3	3	4	4	1697	0	22
MIDDLE KUSKOKWIM	219	47	47	23	23	24	24	2938	36	369
Crooked Creek	26	16	16	10	10	6	6	270	0	45
Red Devil	11	0	0	0	0	0	0	0	0	0
Sleetmute	26	6	6	3	3	3	3	161	5	323
Stony River	11	3	3	1	1	2	2	210	0	100
Lime Village	13	4	4	0	0	4	4	55	300	30
McGrath	98	17	17	12	12	5	5	341	0	420
Takotna	0	0	0	0	0	0	0	0	0	0
Nikolai	0	0	0	0	0	0	0	0	0	0
Telida	0	0	0	0	0	0	0	0	0	0
UPPER KUSKOKWIM	185	46	46	26	26	20	20	1037	305	918
KUSKOKWIM RIVER	2132	325	325	242	242	83	83	6914	610	5120
Quinhagak	101	4	4	2	2	2	2	15	15	0
Goodnews Bay	41	13	13	11	11	2	2	20	0	370
Platinum	15	4	4	4	4	0	0	0	0	0
S. KUSKOKWIM BAY	157	21	21	17	17	4	4	35	15	370
Mekoryuk	0	0	0	0	0	0	0	0	0	0
Newtok	0	0	0	0	0	0	0	0	0	0
Nightmute	0	0	0	0	0	0	0	0	0	0
Toksook Bay	0	0	0	0	0	0	0	0	0	0
Tununak	0	0	0	0	0	0	0	0	0	0
BERING SEA COAST	0	0	0	0	0	0	0	0	0	0
Chefornak	0	0	0	0	0	0	0	0	0	0
TOTAL	**2289**	**346**	**346**	**259**	**259**	**87**	**87**	**6949**	**625**	**5490**

Table 5. 2003 Kuskokwim Subsistence Salmon Gear Used

Community		Fishing HH'S*	Gear Types** Setnet	Drift Net	Fish Wheel	Rod and Reel	Seine	Spear	Not Reported
Kipnuk		0	0	0	0	0	0	0	0
Kwigillingok		0	0	0	0	0	0	0	0
Kongiganak		28	2	24	0	0	0	0	3
N KUSKOKWIM BAY	Totals	28	2	24	0	0	0	0	3
Tuntutuliak		54	6	47	0	2	0	0	6
Eek		43	10	20	0	9	0	0	14
Kasigluk		4	0	0	0	0	0	0	4
Nunapitchuk		64	3	52	0	0	0	0	12
Atmautluak		33	7	24	0	0	0	0	6
Napakiak		44	15	32	0	0	0	0	8
Napaskiak		45	10	37	0	11	0	0	7
Oscarville		11	3	9	0	0	0	0	1
Bethel		439	23	300	0	70	0	0	91
Kwethluk		82	20	62	0	39	0	0	11
Akiachak		64	13	52	0	13	0	0	7
Akiak		47	17	30	0	4	0	0	14
Tuluksak		41	19	32	0	17	0	0	1
LOWER KUSKOKWIM	Totals	971	146	697	0	165	0	0	182
Lower Kalskag		29	5	19	0	2	0	0	7
Upper Kalskag		26	7	19	0	3	0	0	6
Aniak		77	11	52	0	36	0	0	10
Chuathbaluk		18	2	11	0	8	0	0	4
MIDDLE KUSKOKWIM	Totals	150	25	101	0	49	0	0	27
Crooked Creek		22	6	20	0	7	0	0	2
Red Devil		5	4	3	0	2	0	0	0
Sleetmute		18	4	11	0	7	0	0	3
Stony River		8	6	0	0	4	0	0	0
Lime Village		9	5	0	0	7	0	0	0
McGrath		50	24	4	0	22	0	0	8
Takotna		0	0	0	0	0	0	0	0
Nikolai		2	0	0	0	0	0	0	2
Telida		0	0	0	0	0	0	0	0
UPPER KUSKOKWIM	Totals	114	49	38	0	49	0	0	15
Quinhagak		86	14	51	0	33	0	0	16
Goodnews Bay		36	9	17	0	19	0	0	6
Platinum		13	5	5	0	3	2	1	0
S KUSKOKWIM BAY	Totals	135	28	73	0	55	2	1	22
Mekoryuk		12	0	0	0	0	0	0	12
Newtok		1	0	0	0	0	0	0	1
Nightmute		2	0	0	0	0	0	0	2
Toksook Bay		2	0	0	0	0	0	0	2
Tununak		1	0	0	0	0	0	0	1
BERING SEA COAST	Totals	18	0	0	0	0	0	0	18
Chefornak		1	0	0	0	0	0	0	1
OTHER	Totals	1	0	0	0	0	0	0	1
TOTAL		1417	250	933	0	318	2	1	268

* Data on households which subsistence fished based upon in-person surveys, returned postcards, or returned calendars.

** A household may use multiple gear types.

Table 6. 2003 Kuskokwim Retention of Commercially-Caught Salmon for Subsistence Use

		HOUSEHOLDS						
	FACE-TO FACE	COMMERCIAL	RETAINING	FISH RETAINED FROM COMMERCIAL CATCH				
	SURVEYS	FISHING	CATCH	CHINOOK	CHUM	SOCKEYE	COHO	TOTAL
1 Kipnuk	0	0	0	0	0	0	0	0
2 Kwigillingok	0	0	0	0	0	0	0	0
3 Kongiganak	35	5	1	0	0	0	300	300
N. KUSKOKWIM BAY	35	5	1	0	0	0	300	300
4 Tuntutuliak	66	25	7	2	0	0	1720	1722
5 Eek	51	19	6	0	1	0	330	331
7 Kasigluk	0	0	0	0	0	0	0	0
8 Nunapitchuk	76	15	2	0	0	35	57	92
9 Atmautluak	44	15	1	0	0	0	6	6
10 Napakiak	55	9	0	0	0	0	0	0
11 Napaskiak	59	15	3	0	0	0	21	21
12 Oscarville	11	4	1	0	0	0	2	2
13 Bethel	1057	4	4	0	0	0	20	20
14 Kwethluk	101	27	6	3	2	2	4	11
15 Akiachak	78	40	4	0	0	20	37	57
16 Akiak	50	14	5	2	0	0	58	60
17 Tuluksak	45	11	3	0	2	0	7	9
LOWER KUSKOKWIM	1693	198	42	7	5	57	2262	2331
18 Lower Kalskag	45	1	0	0	0	0	0	0
19 Upper Kalskag	37	0	0	0	0	0	0	0
21 Aniak	112	0	0	0	0	0	0	0
23 Chuathbaluk	25	0	0	0	0	0	0	0
MIDDLE KUSKOKWIM	219	1	0	0	0	0	0	0
25 Crooked Creek	26	0	0	0	0	0	0	0
27 Red Devil	11	0	0	0	0	0	0	0
28 Sleetmute	26	0	0	0	0	0	0	0
31 Stony River	11	0	0	0	0	0	0	0
32 Lime Village	13	0	0	0	0	0	0	0
33 McGrath	98	0	0	0	0	0	0	0
34 Takotna	0	0	0	0	0	0	0	0
36 Nikolai	0	0	0	0	0	0	0	0
37 Telida	0	0	0	0	0	0	0	0
UPPER KUSKOKWIM	185	0	0	0	0	0	0	0
KUSKOKWIM RIVER	2132	204	43	7	5	57	2562	2631
38 Quinhagak	101	40	12	60	14	28	31	133
39 Goodnews Bay	41	18	3	52	0	7	25	84
40 Platinum	15	4	2	4	0	20	0	24
S. KUSKOKWIM BAY	157	62	17	116	14	55	56	241
41 Mekoryuk	0	0	0	0	0	0	0	0
42 Newtok	0	0	0	0	0	0	0	0
43 Nightmute	0	0	0	0	0	0	0	0
44 Toksook Bay	0	0	0	0	0	0	0	0
45 Tununak	0	0	0	0	0	0	0	0
BERING SEA COAST	0	0	0	0	0	0	0	0
Chefornak	0	0	0	0	0	0	0	0
TOTAL	**2289**	**266**	**60**	**123**	**19**	**112**	**2618**	**2872**

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

Table 7. Quality of 2003 Kuskokwim Subsistence Chinook Salmon Harvest

Community		Responding HH'S*	Salmon Fishing This Year: Very Good	Average	Poor
Kipnuk		0	0	0	0
Kwigillingok		0	0	0	0
Kongiganak		24	11	9	4
N KUSKOKWIM BAY	Totals	24	11	9	4
Tuntutuliak		46	21	19	6
Eek		23	9	11	3
Kasigluk		2	0	1	1
Nunapitchuk		44	18	19	7
Atmautluak		25	12	13	0
Napakiak		34	12	19	3
Napaskiak		36	23	13	0
Oscarville		9	6	3	0
Bethel		292	157	107	28
Kwethluk		62	39	19	4
Akiachak		55	26	28	1
Akiak		30	15	15	0
Tuluksak		35	20	12	3
LOWER KUSKOKWIM	Totals	693	358	279	56
Lower Kalskag		21	10	7	4
Upper Kalskag		20	10	9	1
Aniak		57	11	33	13
Chuathbaluk		11	4	4	3
MIDDLE KUSKOKWIM	Totals	109	35	53	21
Crooked Creek		20	7	9	4
Red Devil		4	0	2	2
Sleetmute		15	5	9	1
Stony River		4	0	4	0
Lime Village		6	0	4	2
McGrath		23	6	12	5
Takotna		0	0	0	0
Nikolai		0	0	0	0
Telida		0	0	0	0
UPPER KUSKOKWIM	Totals	72	18	40	14
Quinhagak		52	20	26	6
Goodnews Bay		26	11	7	8
Platinum		7	2	1	4
S KUSKOKWIM BAY	Totals	85	33	34	18
Mekoryuk		4	0	2	2
Newtok		0	0	0	0
Nightmute		2	0	2	0
Toksook Bay		1	0	1	0
Tununak		1	0	1	0
BERING SEA COAST	Totals	8	0	6	2
Chefornak		1	0	1	0
OTHER	Totals	1	0	1	0
TOTAL		992	455	422	115
			45.87%	42.54%	11.59%

* Data on households which subsistence fished based upon surveys, and returned postcards.

Table 8. Quality of 2003 Kuskokwim Subsistence Chum Salmon Harvest

Community		Responding HH'S*	Salmon Fishing This Year: Very Good	Average	Poor
Kipnuk		0	0	0	0
Kwigillingok		0	0	0	0
Kongiganak		20	10	7	3
N KUSKOKWIM BAY	Totals	20	10	7	3
Tuntutuliak		33	14	14	5
Eek		13	5	5	3
Kasigluk		2	1	0	1
Nunapitchuk		39	19	7	13
Atmautluak		22	14	8	0
Napakiak		27	8	13	6
Napaskiak		28	14	10	4
Oscarville		10	6	3	1
Bethel		180	71	95	14
Kwethluk		48	15	25	8
Akiachak		46	16	21	9
Akiak		15	7	5	3
Tuluksak		28	11	10	7
LOWER KUSKOKWIM	Totals	491	201	216	74
Lower Kalskag		10	5	5	0
Upper Kalskag		13	9	3	1
Aniak		31	8	13	10
Chuathbaluk		9	6	1	2
MIDDLE KUSKOKWIM	Totals	63	28	22	13
Crooked Creek		18	9	8	1
Red Devil		1	1	0	0
Sleetmute		12	6	4	2
Stony River		3	0	2	1
Lime Village		6	3	2	1
McGrath		7	1	5	1
Takotna		0	0	0	0
Nikolai		0	0	0	0
Telida		0	0	0	0
UPPER KUSKOKWIM	Totals	47	20	21	6
Quinhagak		32	11	17	4
Goodnews Bay		16	2	6	8
Platinum		4	1	1	2
S KUSKOKWIM BAY	Totals	52	14	24	14
Mekoryuk		8	2	5	1
Newtok		0	0	0	0
Nightmute		1	0	1	0
Toksook Bay		1	0	1	0
Tununak		1	0	1	0
BERING SEA COAST	Totals	11	2	8	1
Chefornak		1	0	1	0
OTHER	Totals	1	0	1	0
TOTAL		685	275	299	111
			40.15%	43.65%	16.20%

* Data on households which subsistence fished based upon surveys and returned postcards.

Table 9. Quality of 2003 Kuskokwim Subsistence Sockeye Salmon Harvest

Community		Responding HH'S*	Salmon Fishing This Year: Very Good	Average	Poor
Kipnuk		0	0	0	0
Kwigillingok		0	0	0	0
Kongiganak		22	7	10	5
N KUSKOKWIM BAY	Totals	22	7	10	5
Tuntutuliak		36	16	8	12
Eek		15	4	8	3
Kasigluk		2	0	1	1
Nunapitchuk		37	14	14	9
Atmautluak		24	12	8	4
Napakiak		25	9	11	5
Napaskiak		32	18	13	1
Oscarville		8	4	3	1
Bethel		239	103	119	17
Kwethluk		49	20	21	8
Akiachak		51	26	12	13
Akiak		18	13	3	2
Tuluksak		32	19	6	7
LOWER KUSKOKWIM	Totals	568	258	227	83
Lower Kalskag		10	5	4	1
Upper Kalskag		17	7	5	5
Aniak		46	10	27	9
Chuathbaluk		9	5	1	3
MIDDLE KUSKOKWIM	Totals	82	27	37	18
Crooked Creek		19	11	3	5
Red Devil		3	3	0	0
Sleetmute		16	8	5	3
Stony River		3	1	2	0
Lime Village		6	4	2	0
McGrath		6	2	4	0
Takotna		0	0	0	0
Nikolai		0	0	0	0
Telida		0	0	0	0
UPPER KUSKOKWIM	Totals	53	29	16	8
Quinhagak		36	14	15	7
Goodnews Bay		25	12	12	1
Platinum		8	4	3	1
S KUSKOKWIM BAY	Totals	69	30	30	9
Mekoryuk		2	0	0	2
Newtok		0	0	0	0
Nightmute		2	0	2	0
Toksook Bay		0	0	0	0
Tununak		1	0	1	0
BERING SEA COAST	Totals	5	0	3	2
Chefornak		1	0	1	0
OTHER	Totals	1	0	1	0
TOTAL		800	351	324	125
			43.88%	40.50%	15.63%

* Data on households which subsistence fished based upon surveys and returned postcards.

Table 10. Quality of 2003 Kuskokwim Subsistence Coho Salmon Harvest

Community		Responding HH'S*	Salmon Fishing This Year: Very Good	Average	Poor
Kipnuk		0	0	0	0
Kwigillingok		0	0	0	0
Kongiganak		18	13	4	1
N KUSKOKWIM BAY	Totals	18	13	4	1
Tuntutuliak		28	22	5	1
Eek		21	13	7	1
Kasigluk		2	1	0	1
Nunapitchuk		24	14	8	2
Atmautluak		15	9	5	1
Napakiak		24	14	9	1
Napaskiak		29	22	5	2
Oscarville		2	2	0	0
Bethel		218	154	61	3
Kwethluk		44	30	12	2
Akiachak		37	29	7	1
Akiak		14	12	2	0
Tuluksak		23	16	4	3
LOWER KUSKOKWIM	Totals	481	338	125	18
Lower Kalskag		8	5	3	0
Upper Kalskag		16	12	3	1
Aniak		52	35	16	1
Chuathbaluk		9	6	1	2
MIDDLE KUSKOKWIM	Totals	85	58	23	4
Crooked Creek		14	8	6	0
Red Devil		2	2	0	0
Sleetmute		13	11	1	1
Stony River		6	5	1	0
Lime Village		3	0	1	2
McGrath		18	9	5	4
Takotna		0	0	0	0
Nikolai		0	0	0	0
Telida		0	0	0	0
UPPER KUSKOKWIM	Totals	56	35	14	7
Quinhagak		46	23	18	5
Goodnews Bay		27	17	6	4
Platinum		11	7	4	0
S KUSKOKWIM BAY	Totals	84	47	28	9
Mekoryuk		7	0	6	1
Newtok		0	0	0	0
Nightmute		1	0	1	0
Toksook Bay		1	0	1	0
Tununak		1	0	1	0
BERING SEA COAST	Totals	10	0	9	1
Chefornak		1	0	1	0
OTHER	Totals	1	0	1	0
TOTAL		735	491	204	40
			66.80%	27.76%	5.44%

* Data on households which subsistence fished based upon surveys and returned postcards.

EVALUATION

Prior to implementation, the 2003 Kuskokwim Subsistence Salmon Survey project was met with a number of obstacles. In addition to the loss of annual funding for the project through Reimbursable Services Agreements (RSA) with the Division of Commercial Fisheries, which led the Department to pursue AYK SSI funding, the project investigator retired and his position was not filled until the month prior to project start-up. Fortunately, experienced survey technicians returned for the 2003 field season (one for her 14th season of Kuskokwim Post-Season Salmon Surveys) and were able to train and assist the new project investigator to keep the project online and on schedule.

As such, all stated objectives were achieved, utilizing the methods outlined in the Approach section of this report, and the 2003 Kuskokwim Subsistence Salmon Survey project was successful. However, in the course of the project, a number of issues regarding funding strategies, methodology, and reporting were identified.

First of all, although information reported on subsistence calendars regarding the timing of the subsistence harvest was collected and compiled into a database (thus fulfilling the project objectives regarding this component of the surveys) funding constraints did not allow this data to be processed for inclusion in this report. This inability to process important calendar data for annual reporting is a problem as this information is critical for management and regulatory analysis of the subsistence fishing schedule, also known as the "windows" fishing schedule. As a result of the identification of this issue, need for annual analysis of this information has been included in the redesign of the survey methodology and is now written into the project's Operational Plan (OP).

Second, the 2003 surveys, though implemented using one standard methodology, were funded by a variety of agencies and agreements, each with separate and varied reporting requirements. The Bethel component was funded under a federal contract with USFWS OSM, while the village component was funded under AYK SSI. Additionally, the Aniak component the previous year had been funded under yet another USFWS OSM contact, separate from the Bethel contract, and reporting was still being completed for that contract during the 2003 surveys. This led to confusion for the new project investigator, as well as Division management, and called into question how future years of the project would be funded. As a result, the Division submitted a proposal to the USFWS OSM for one project to include all components of the surveys, and this proposal was accepted, funded, and implemented in 2004.

Finally, and most importantly, it became apparent through the course of the 2003 project that the size and complexity of Bethel make it difficult to complete a census survey, and to compile annual household lists which allow for the tracking of individual households' harvests over time. While this methodology is successful in the smaller villages and no changes have been proposed to that aspect of this project, it is no longer possible to implement in Bethel, a town with a population of approximately 6000 people living in roughly 1700 households. As a result of this realization, an additional objective was added to this project and an extension was given. The additional objective called for a redesign of the Bethel survey methodology. This objective was met and a brief overview of the new methodology is included as an appendix to this report. The new methodology

will be implemented starting with the 2005 Kuskokwim Post Season Subsistence Salmon Survey Project.

PROJECT PRODUCTS

In addition to this final report, the results from this project are being published in the Subsistence Division's annual "Alaska Subsistence Fisheries" report for 2003, which will be available online in pdf at the following website:

http://www.subsistence.adfg.state.ak.us/geninfo/publctns/articles.cfm

A limited number of printed and bound copies of this report will be available upon request following completion of printing.

KEY WORDS

Kuskokwim River, Kuskokwim Bay, Yukon-Kuskokwim Delta, Bethel, Aniak, Kuskokwim Fisheries Management Area, Chinook salmon (*Onchorhynchus tshawytscha*), Sockeye salmon (*O. nerka*), Chum salmon (*O. keta*), Coho salmon (*O. kisutch*), subsistence fishing, harvest assessment and monitoring, cooperative projects

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APPENDIX A

Community	Comments from Households Reporting 'Poor' Chinook Salmon Fishery
Kongiganak	NOT ENOUGH
Kongiganak	NOT ENOUGH
Kongiganak	WE DIDN'T FISH ENOUGH
Tuntutuliak	SCHEDULE
Tuntutuliak	THEY WERE SMALL
Tuntutuliak	TOO SMALL
Tuntutuliak	SOMEONE STOLE OUR 6" NET THIS YEAR-LAST YEAR WE GOT LOTS
Eek	WE USUALLY GET MORE BUT I HAD SURGERY & COULDN'T LIFT
Eek	SET NETS WERE CUT UP BY BEAVERS & LOTS OF DEBRI IN THE WATER & CATCH DIMINISHED.
Eek	LOW NUMBER
Nunapitchuk	SCHEDULE CAUSED US NOT TO GET OUR FISH BEFORE THE MAGGOTS CAME
Nunapitchuk	DIDN'T PUT ANY IN THE FREEZER
Nunapitchuk	WE STARTED LATE & THE FISH SPOILED BY RAIN
Nunapitchuk	BROKEN MOTOR
Nunapitchuk	NOT ENOUGH BECAUSE OF THE SCHEDULE
Nunapitchuk	NOT CATCHING ENOUGH BECAUSE OF SCHEDULE
Nunapitchuk	SCHEDULE & OUR FISH CAMP IS IN BETHEL
Napakiak	NO IDEA, NOT ENOUGH.
Napakiak	DON'T KNOW
Napakiak	WANTED MORE
Bethel	MISSED THE RUN
Bethel	NO TIME FOR FISHING THIS YEAR
Bethel	WRONG SIZE NET
Bethel	CUT SHORT DUE TO FAMILY DEATH
Bethel	NO FISH
Bethel	KINGS OVER FISHED @ HIGH SEAS
Bethel	FISH CAMP ERODED
Bethel	NO FISH - NO MOTOR
Bethel	DID NOT FISH ENOUGH
Bethel	DID NOT FISH AS MUCH
Bethel	OVER FISHED THROUGHOUT
Bethel	I DON'T KNOW

Community	Comments from Households Reporting ‘Poor’ Chinook Salmon Fishery
Bethel	DIDN'T CATCH WHAT I WANTED
Bethel	DID NOT FISH ENOUGH
Bethel	TOO EARLY FOR RUNS
Bethel	FISH WERE TOO SMALL
Bethel	BAD NET
Bethel	NOT ENOUGH FISH
Bethel	BAD SPOT AND WRONG TIME TO FISH
Bethel	SMALL KINGS - CAUGHT IN YUKON
Bethel	NOT ENOUGH FOR STRIPS
Bethel	WASN'T ENOUGH FISH
Bethel	NOT ENOUGH FISHING
Bethel	TOO MANY FISHERMEN ON THE RIVER
Bethel	MISSED THE KING RUN
Bethel	MISSED THE SEASON
Bethel	MISSED RUNS & BAD LUCK
Bethel	DID NOT GO OFTEN
Kwethluk	BUT WE GOT OUR QUOTA
Kwethluk	SIZE OF NET & DIDN'T TRY
Kwethluk	MOST OF MY KINGS WERE SMALL
Akiachak	DON'T KNOW
Tuluksak	NO ENGINE
Tuluksak	DIDN'T KNOW
Lower Kalskag	WE STARTED LATE BECAUSE OF HIGH WATER & BANK ERODING
Lower Kalskag	I WAS GONE THIS SUMMER
Lower Kalskag	NOT MANY
Lower Kalskag	SLOW
Upper Kalskag	MORE EFFORT TO CATCH THEM
Aniak	NOT MANY FISH

Community	Comments from Households Reporting 'Poor' Chinook Salmon Fishery
Aniak	EVERYONE WAS OUT
Aniak	CATCHING MOST DOWN RIVER
Aniak	NOT TO MANY BIG ONE'S.
Aniak	WATER WAS HIGH
Aniak	BAD YEAR
Aniak	TOO BUSY, NOT LUCKY ENOUGH
Aniak	DIDN'T HAVE ENOUGH HELP
Aniak	WHEN OPEN EVERYBODY WORKING LESS SALMON THEN OTHER YRS.
Aniak	NO REASON
Aniak	DIDN'T HIT AS HARD
Aniak	COULDN'T GET OUT
Aniak	SUPPOSE TO BE A GREAT YEAR BUT ALL PEOPLE DOWN RIVER TOOK ALL THE FISH
Chuathbaluk	BROKE DOWN
Chuathbaluk	ALL THESE FISHERMEN DOWNRIVER CATCH THEM
Crooked Creek	NOT RECOVERED YET
Crooked Creek	I WANTED MORE
Crooked Creek	NOT ENOUGH
Crooked Creek	NOT ENOUGH
Red Devil	NOT THAT MANY
Red Devil	HAD TO LEAVE
Sleetmute	WE COULDN'T HARDLY FISH BECAUSE MY SON WAS BUSY W/ THE AIRLINES -(AGENT)
McGrath	DIDN'T GET ENOUGH
McGrath	SLOW
McGrath	SLOW
McGrath	LOW WATER
Quinhagak	BECAUSE I COULDN'T LIFE-SURGERY IN MARCH
Quinhagak	DIDN'T BOTHER TO FISH
Quinhagak	FISH WERE LATE
Quinhagak	WE STARTED VERY LATE BECAUSE WE MOVED OUR HOUSE, & FISH CAMP

Community	Comments from Households Reporting ‘Poor’ Chinook Salmon Fishery
Quinhagak	NO ENGINE
Goodnews Bay	NOT MANY
Goodnews Bay	COMPARED TO LAST YEAR
Goodnews Bay	WE DIDN'T FISH-INJURY
Goodnews Bay	BUSY GETTING READY
Goodnews Bay	NON-FISHER
Goodnews Bay	I HURT MY BACK
Goodnews Bay	NOT ENOUGH
Platinum	ALGA BLOOM
Platinum	ALGA BLOOM
Platinum	ALGA BLOOM
Platinum	NOT AS MANY AS THERE USED TO BE

Community	Comments from Households Reporting 'Poor' Chum Salmon Fishery
Kongiganak	DO NOT KNOW
Tuntutuliak	SCHEDULE
Tuntutuliak	NOT MANY
Tuntutuliak	HAD LESS BECAUSE OUR NET WASN'T HERE YET.
Tuntutuliak	DIDN'T KNOW
Eek	WE USUALLY GET MORE BUT I HAD SURGERY & COULDN'T LIFT
Eek	ONLY WENT ONCE
Eek	USUALLY WE GET TWICE AS MUCH
Nunapitchuk	SCHEDULE CAUSED US NOT TO GET OUR FISH BEFORE THE MAGGOTS CAME
Nunapitchuk	THIS YEAR-WE WERE TOO LATE
Nunapitchuk	DIDN'T GET MUCH
Nunapitchuk	DIDN'T CATCH MUCH-MAYBE THE MESH SIZE
Nunapitchuk	DIDN'T CATCH MUCH
Nunapitchuk	WEATHER SPOILED FISH
Nunapitchuk	NOT ENOUGH FISH IN THE RIVER-LOW WATER
Nunapitchuk	NOT ENOUGH BECAUSE OF THE SCHEDULE
Nunapitchuk	SO-SO
Nunapitchuk	NOT ENOUGH
Nunapitchuk	ONLY FISHED TWICE
Nunapitchuk	NOT GOOD WITH THE NET I HAVE
Napakiak	NON-FISHER
Napakiak	DON'T KNOW
Napakiak	DON'T KNOW
Napakiak	WANTED MORE
Napaskiak	DIDN'T CATCH MUCH
Napaskiak	FISH SPOILED BECAUSE SCHEDULE & WEATHER
Napaskiak	LOW NUMBERS
Napaskiak	DIDN'T KNOW WHY
Bethel	NOT ENOUGH
Bethel	NOT ENOUGH FISH IN RIVER
Bethel	OVER FISHED

Community	Comments from Households Reporting 'Poor' Chum Salmon Fishery
Bethel	NO FISH
Bethel	DIDN'T FISH FOR CHUMS
Bethel	NO FISH - NO MOTOR
Bethel	DID NOT FISH AS MUCH
Bethel	NO CHUM NET
Bethel	WRONG SIZE NET
Bethel	VERY FEW CAUGHT
Bethel	NO BOAT AND MOTOR
Bethel	DID NOT TAKE ADVANTAGE OF OPENINGS
Kwethluk	HARDLY ANY
Kwethluk	LATE
Kwethluk	VERY FEW
Kwethluk	FEW FISH
Kwethluk	NOT MUCH
Akiachak	NOT MANY FISH
Akiachak	WE ARE USED TO MORE
Akiachak	LOW FOR 8 YEARS
Akiachak	DON'T KNOW
Akiachak	DIDN'T FISH FOR THEM
Akiachak	WE DON'T EAT MUCH
Akiachak	NOT ENOUGH
Akiachak	DON'T KNOW
Akiak	USED THE KING NET
Tuluksak	NOT MANY
Tuluksak	NOT ENOUGH
Tuluksak	HARDLY ANY
Tuluksak	NOT MUCH
Tuluksak	DON'T KNOW WHY
Upper Kalskag	FEW FISH
Aniak	NOT AS MANY AS BEFORE
Aniak	CHUM WERE LATE-SEASON WAS CLOSED
Aniak	CATCHING MOST DOWN RIVER

Community	Comments from Households Reporting 'Poor' Chum Salmon Fishery
Aniak	NOT TOO MANY IN RIVER
Aniak	CAUGHT 1/2 AS MANY AS WE USE TO.
Aniak	NOT A GOOD RUN
Aniak	USING KING NET
Aniak	MAYBE TOO EARLY
Aniak	WRONG SIZE MESH
Aniak	WASN'T CATCHING AS MANY
Chuathbaluk	BROKE DOWN
Crooked Creek	NOT ENOUGH FOR US.
Sleetmute	WE COULDN'T HARDLY FISH BECAUSE MY SON WAS BUSY W/ THE AIRLINES -(AGENT)
Sleetmute	HARDLY ANY
Stony River	NOT MANY FISH
Lime Village	I SEEN THEM BETTER.
Quinhagak	NOT ENOUGH
Quinhagak	DIDN'T BOTHER TO FISH
Goodnews Bay	LOW EFFECT
Goodnews Bay	LOW EFFORT
Goodnews Bay	NON-FISHER
Goodnews Bay	NOT ENOUGH
Platinum	NOT ENOUGH
Platinum	ALGA BLOOM

Community	Comments from Households Reporting 'Poor' Sockeye Salmon Fishery
Kongiganak	NOT ENOUGH FISH
Kongiganak	WEATHER ETC.
Kongiganak	NOT FISH ENOUGH
Tuntutuliak	SCHEDULE
Tuntutuliak	WE MISSED IT
Tuntutuliak	SOMEONE STOLE OUR 6" NET THIS YEAR-LAST YEAR WE GOT LOTS
Tuntutuliak	I WAS EXPECTING MORE
Tuntutuliak	PASSED US BECAUSE OUR NET WASN'T HERE YET.
Tuntutuliak	DIDN'T KNOW
Tuntutuliak	IT WAS THE ONLY TIMES I FISHED
Tuntutuliak	WISH WE GOT MORE-STARTED LATE
Eek	WE USUALLY GET MORE BUT I HAD SURGERY & COULDN'T LIFT
Eek	IF I'D KEPT MY NETS IN THE WATER I WOULD'VE CAUGHT THAT MUCH
Eek	LOW NUMBER
Nunapitchuk	SCHEDULE CAUSED US NOT TO GET OUR FISH BEFORE THE MAGGOTS CAME
Nunapitchuk	NOT TOO MUCH
Nunapitchuk	WE MISSED THEM.
Nunapitchuk	NOT ENOUGH FISH IN THE RIVER-LOW WATER
Nunapitchuk	NOT ENOUGH BECAUSE OF THE SCHEDULE
Nunapitchuk	HARDLY ANY
Atmautluak	DIDN'T CATCH MUCH
Atmautluak	DIDN'T CATCH ENOUGH
Napakiak	NOT A MANY AS COULD BE
Napakiak	NOT MANY
Napakiak	DON'T KNOW
Napakiak	NOT ENOUGH
Napakiak	WANTED MORE
Napaskiak	DIDN'T CATCH MUCH
Oscarville	NOT ENOUGH
Bethel	WOULD LIKE TO HAVE MORE
Bethel	WRONG SIZE NET

Community	Comments from Households Reporting ‘Poor’ Sockeye Salmon Fishery
Bethel	NOT ENOUGH
Bethel	DIDN'T FISH FOR SOCKEYE
Bethel	FISH CAMP ERODED
Bethel	NO FISH - NO MOTOR
Bethel	MISSED THE RUN
Bethel	DID NOT FISH AS MUCH
Bethel	OVER FISHED THROUGHOUT
Bethel	NOT ENOUGH REDS IN RIVER
Bethel	DON’T KNOW
Bethel	DID NOT FISH AS MUCH
Bethel	TOO MANY FISHERMAN
Bethel	BAD SPOT AND WRONG TIME TO FISH
Bethel	NOT TOO MUCH OPENINGS
Bethel	MISSED RUNS & BAD LUCK
Kwethluk	LAST YEAR I HAD MORE
Kwethluk	NO IDEA
Kwethluk	SLOW
Kwethluk	WASN'T VERY MUCH
Kwethluk	FEW FISH
Kwethluk	DIDN'T GET MANY
Kwethluk	HARDLY CAUGHT ANY
Kwethluk	NOT ENOUGH
Akiachak	WEREN'T MANY
Akiachak	WE MISSED THEM; THE SCHEDULE.
Akiachak	NOT MANY FISH
Akiachak	WEREN'T MUCH
Akiachak	WE ARE USED TO MORE
Akiachak	NOT ENOUGH
Akiachak	NOT ENOUGH
Akiachak	DIDN'T KNOW
Akiachak	DIDN'T FISH
Akiachak	NOT ENOUGH

Community	Comments from Households Reporting ‘Poor’ Sockeye Salmon Fishery
Akiachak	DON'T KNOW
Akiak	USED THE KING NET
Tuluksak	NOT ENOUGH
Tuluksak	WORSE THAN LAST YEAR
Tuluksak	DIDN’T KNOW
Tuluksak	NOT MANY
Tuluksak	NOT MANY
Tuluksak	LESS THAN LAST YEAR.
Tuluksak	DIDN'T KNOW
Lower Kalskag	HAVEN'T SEEN TOO MUCH
Upper Kalskag	NOT ENOUGH
Upper Kalskag	NOT ENOUGH/HIGH WATER
Upper Kalskag	NOT ENOUGH
Upper Kalskag	LITTLE LOW.
Aniak	WRONG MESH SIZE NET
Aniak	NOT MANY IN RIVER
Aniak	DIDN'T HAVE ENOUGH TIME TO GO OUT
Aniak	TOO BUSY, NOT LUCKY ENOUGH
Aniak	WASN'T CATCHING AS MANY
Aniak	NOT ENOUGH TIME TO GET OUT
Aniak	NO REASON
Chuathbaluk	WE ONLY HAD ONE RUN THIS YEAR
Chuathbaluk	BROKE DOWN
Crooked Creek	LITTLE SLOW FOR US
Crooked Creek	NOT ENOUGH
Crooked Creek	NOT ENOUGH

Community	Comments from Households Reporting ‘Poor’ Sockeye Salmon Fishery
Sleetmute	KING NET
Sleetmute	WE COULDN'T HARDLY FISH BECAUSE MY SON WAS BUSY W/ THE AIRLINES -(AGENT)
Sleetmute	NOT MANY
Quinhagak	NOT ENOUGH
Quinhagak	NOT TOO MANY
Quinhagak	DIDN'T BOTHER TO FISH
Quinhagak	NO ENGINE
Platinum	BAD ALGA

Community	Comments from Households Reporting 'Poor' Coho Salmon Fishery
Eek	WE USUALLY GET MORE BUT I HAD SURGERY & COULDN'T LIFT
Nunapitchuk	SCHEDULE CAUSED US NOT TO GET OUR FISH BEFORE THE MAGGOTS CAME
Nunapitchuk	DIDN'T FISH MUCH
Napakiak	DON'T KNOW
Napaskiak	DIDN'T KNOW
Bethel	NOT ENOUGH FISH
Bethel	MISSED RUNS & BAD LUCK
Bethel	TOO EARLY IN SEASON
Kwethluk	DIDN'T KNOW
Akiachak	DON'T KNOW
Tuluksak	NOT MANY
Tuluksak	NOT ENOUGH
Tuluksak	NOT MANY.
Aniak	NOT MANY FISH
Chuathbaluk	BROKE DOWN
Sleetmute	WE COULDN'T HARDLY FISH BECAUSE MY SON WAS BUSY W/ THE AIRLINES -(AGENT)
Lime Village	MORE THAN NOW.
Lime Village	LOW EFFORT
McGrath	NOT MANY
McGrath	JUST DIDN'T CATCH
McGrath	LOW WATER
Quinhagak	I WAS LATE FOR GETTING THEM-NONE FOR FREEZER
Quinhagak	DIDN'T BOTHER TO FISH
Quinhagak	NOT ENOUGH TIME
Goodnews Bay	DIDN'T FISH
Goodnews Bay	NON-FISHING
Goodnews Bay	NON-FISHER

APPENDIX B

Additional Analysis on Salmon Species Harvest

2003 Kuskokwim River Chinook Salmon Subsistence Harvests

	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 +/-	Confid. Interval % +/-
Kipnuk	168	0.00	0.0	0.0	8	0	0.0	0.0	176	0	0.0	0	0	NA	NA
Kwigillingok	92	0	0.0	0.0	3	0	0.0	0.0	95	0	0.0	0	0	NA	NA
Kongiganak	51	9.00	13.4	23.9	33	27	38.3	34.5	84	36	16.5	1156	1386	759	54.8%
N. KUSKOKWIM BAY	311	9	0.4	368.1	44	27	28.8	93.4	355	36	3.9	1156	1386	759	54.8%
Tuntutuliak	22	15	9.0	17.1	57	51	50.8	43.5	79	66	39.2	2727	3095	250	8.1%
Eek	27	19	12.8	21.6	51	39	39.6	38.6	78	58	30.3	1787	2364	339	14.3%
Kasigluk	128	3	96.0	35.5	7	1	68.0	0.0	135	4	2.6	356	356	NA	NA
Nunapitchuk	36	21	11.8	21.4	67	56	49.8	46.6	103	77	36.5	3038	3763	401	10.7%
Atmautluak	31	14	7.8	14.3	31	30	41.5	38.9	62	44	22.5	1354	1396	193	13.8%
Napakiak	49	17	11.6	19.2	44	39	43.4	34.8	93	56	22.6	1888	2105	405	19.2%
Napaskiak	27	19	24.1	43.4	61	40	71.5	58.2	88	59	57.0	3318	5012	721	14.4%
Oscarville	4	2	30.0	42.4	10	9	95.3	45.9	14	11	76.6	918	1073	195	18.2%
Bethel	1051	624	2.5	12.0	600	453	31.4	51.0	1651	1077	13.0	15787	21475	1562	7.3%
Kwethluk	76	24	8.7	21.4	83	80	57.0	62.6	159	104	31.1	4767	4938	591	12.0%
Akiachak	37	16	14.6	26.2	97	63	52.7	40.2	134	79	39.9	3554	5346	686	12.8%
Akiak	27	13	52.4	56.7	46	38	69.9	53.2	73	51	53.4	3337	3896	695	17.8%
Tuluksak	20	3	25.0	43.3	60	42	60.0	68.9	80	45	46.0	2597	3678	1157	31.4%
LOWER KUSKOKWIM	1535	790	4.0	780.0	1214	941	43.1	967.5	2749	1731	21.3	45428	58497	2486	4.2%
Lower Kalskag	38	20	2.1	8.2	35	27	55.4	49.4	73	47	27.6	1536	2016	332	16.5%
Upper Kalskag	31	12	4.3	7.2	31	27	34.7	38.6	62	39	18.2	989	1128	193	17.1%
Aniak	65	33	8.8	40.9	85	85	17.7	34.1	150	118	13.8	1794	2077	650	31.3%
Chuathbaluk	11	7	2.4	4.0	21	18	17.7	31.5	32	25	12.5	336	399	119	29.9%
MIDDLE KUSKOKWIM	145	72	5.0	332.4	172	157	28.4	188.6	317	229	17.7	4655	5620	764	13.6%
Crooked Creek	12	3	6.7	11.5	26	23	31.2	27.2	38	26	21.9	737	831	171	20.6%
Red Devil	3	2	0.0	0.0	12	9	6.0	9.2	15	11	4.8	54	72	37	50.9%
Sleetmute	13	7	10.7	28.3	20	19	27.3	39.9	33	26	20.8	593	685	206	30.1%
Stony River	5	3	0.0	0.0	10	8	11.1	18.1	15	11	7.4	89	111	57	51.4%
Lime Village	4	3	0.0	0.0	10	10	6.5	9.7	14	13	4.6	65	65	NA	NA
McGrath	73	42	1.2	5.3	66	59	6.3	10.5	139	101	3.6	424	506	97	19.2%
Takotna	14	0	0.0	0.0	5	0	0.0	0.0	19	0	0.0	0	0	NA	NA
Nikolai	16	0	0.0	0.0	20	2	7.5	7.8	36	2	0.4	15	15	NA	NA
Telida	2	0	0.0	0.0	0	0	0.0	0.0	2	0	0.0	0	0	NA	NA
UPPER KUSKOKWIM	142	60	1.7	123.5	169	130	12.0	78.7	311	190	7.3	1977	2285	293	12.8%
KUSKOKWIM RIVER	2133	931	3.4	932.6	1599	1255	37.8	993.2	3732	2186	18.2	53216	67788	2725	4.0%
Quinhagak	62	30	22.8	64.6	81	74	30.6	39.9	143	104	27.3	2953	3898	1074	27.6%
Goodnews Bay	29	9	8.6	14.9	35	33	16.3	18.9	64	42	10.1	616	649	245	37.8%
Platinum	3	2	0.0	0.0	13	13	6.8	13.8	16	15	5.5	88	88	NA	NA
S. KUSKOKWIM BAY	94	41	15.9	539.0	129	120	24.4	113.9	223	161	20.8	3657	4635	1102	23.8%
Mekoryuk	94	17	0.6	1.3	0	0	0.0	0.0	94	17	0.1	10	10	NA	NA
Newtok	79	3	0.0	0.0	0	0	0.0	0.0	79	3	0.0	0	0	NA	NA
Nightmute	68	3	1.3	2.3	0	0	0.0	0.0	68	3	0.1	4	4	NA	NA
Toksook Bay	136	3	17.0	20.7	0	0	0.0	0.0	136	3	0.4	51	51	NA	NA
Tununak	110	1	5.0	0.0	0	0	0.0	0.0	110	1	0.0	5	5	NA	NA
BERING SEA COAST	487	27	0.1	0.0	0	0	0.0	0.0	487	27	0.1	70	70	NA	NA
Chefornak	92	1	5.0	0.0	1	0	0.0	0.0	93	1	0.1	5	5	NA	NA
TOTALS	2806	1000	3.2	1077.1	1729	1375	36.8	999.7	4535	2375	16.0	56948	72498	2939	4.1%

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

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

2003 Kuskokwim River Chum Salmon Subsistence Harvests

	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	0	0.0	0.0	8	0	0.0	0.0	176	0	0.0	0	0	NA	NA
Kwigillingok	92	0	0.0	0.0	3	0	0.0	0.0	95	0	0.0	0	0	NA	NA
Kongiganak	51	9	6.4	16.5	33	27	27.6	25.2	84	36	11.5	804	970	528	54.5%
N. KUSKOKWIM BAY	311	9	0.2	255.3	44	27	20.7	68.2	355	36	2.7	804	970	528	54.5%
Tuntutuliak	22	15	4.0	8.3	57	51	42.6	63.2	79	66	31.8	2231	2514	332	13.2%
Eek	27	19	0.4	1.1	51	39	12.0	22.0	78	58	8.0	474	621	175	28.1%
Kasigluk	128	3	27.0	31.1	7	1	216.0	0.0	135	4	2.2	297	297	NA	NA
Nunapitchuk	36	21	7.8	13.1	67	56	57.6	70.9	103	77	40.2	3389	4139	531	12.8%
Atmautluak	31	14	4.3	13.4	31	30	47.7	55.3	62	44	24.8	1491	1539	199	13.0%
Napakiak	49	17	8.8	13.7	44	39	28.1	39.1	93	56	14.9	1244	1384	322	23.3%
Napaskiak	27	19	6.7	14.1	61	40	44.5	68.6	88	59	32.9	1906	2893	783	27.1%
Oscarville	4	2	32.0	45.3	10	9	57.6	33.0	14	11	50.3	582	704	194	27.5%
Bethel	1051	624	1.3	7.3	600	453	14.1	35.2	1651	1077	6.0	7199	9829	1058	10.8%
Kwethluk	76	24	6.7	21.1	83	80	26.4	47.1	159	104	14.8	2269	2348	566	24.1%
Akiachak	37	16	12.0	28.9	97	63	38.7	44.7	134	79	29.4	2628	3943	761	19.3%
Akiak	27	13	4.8	13.7	46	38	57.7	178.2	73	51	37.2	2254	2715	1119	41.2%
Tuluksak	20	3	8.3	14.4	60	42	25.5	26.6	80	45	19.4	1096	1555	409	26.3%
LOWER KUSKOKWIM	1535	790	1.8	469.9	1214	941	26.1	971.1	2749	1731	12.5	27060	34481	2158	6.3%
Lower Kalskag	38	20	0.0	0.0	35	27	44.8	77.7	73	47	21.5	1210	1569	501	31.9%
Upper Kalskag	31	12	0.3	0.9	31	27	15.6	24.9	62	39	7.8	423	485	107	22.1%
Aniak	65	33	1.7	6.5	85	85	12.3	36.0	150	118	7.7	1106	1160	104	8.9%
Chuathbaluk	11	7	1.6	3.7	21	18	106.3	351.1	32	25	70.3	1924	2249	1314	58.4%
MIDDLE KUSKOKWIM	145	72	0.9	53.0	172	157	31.0	705.0	317	229	17.2	4663	5463	1414	25.9%
Crooked Creek	12	3	5.0	8.7	26	23	33.6	38.3	38	26	23.4	788	889	175	19.7%
Red Devil	3	2	0.0	0.0	12	9	4.1	10.3	15	11	3.3	37	49	41	83.9%
Sleetmute	13	7	0.0	0.0	20	19	20.4	34.1	33	26	12.4	388	408	70	17.2%
Stony River	5	3	0.0	0.0	10	8	27.5	69.8	15	11	18.3	220	275	221	80.3%
Lime Village	4	3	0.0	0.0	10	10	14.0	16.6	14	13	10.0	140	140	NA	NA
McGrath	73	42	0.0	0.3	66	59	9.2	29.1	139	101	4.4	544	610	163	26.7%
Takotna	14	0	0.0	0.0	5	0	0.0	0.0	19	0	0.0	0	0	NA	NA
Nikolai	16	0	0.0	0.0	20	2	17.5	12.0	36	2	1.0	35	35	NA	NA
Telida	2	0	0.0	0.0	0	0	0.0	0.0	2	0	0.0	0	0	NA	NA
UPPER KUSKOKWIM	142	60	0.1	52.0	169	130	14.1	159.6	311	190	7.7	2152	2406	336	14.0%
KUSKOKWIM RIVER	2133	931	1.4	539.9	1599	1255	25.2	1212.5	3732	2186	11.6	34679	43320	2655	6.1%
Quinhagak	62	30	3.6	8.1	81	74	11.2	19.3	143	104	7.9	935	1129	169	15.0%
Goodnews Bay	29	9	0.4	1.3	35	33	3.5	5.6	64	42	2.0	119	126	27	21.4%
Platinum	3	2	0.0	0.0	13	13	3.8	8.5	16	15	3.1	50	50	NA	NA
S. KUSKOKWIM BAY	94	41	2.4	66.4	129	120	8.3	54.1	223	161	5.9	1104	1305	171	13.1%
Mekoryuk	94	17	87.3	91.3	0	0	0.0	0.0	94	17	15.8	1484	1484	NA	NA
Newtok	79	3	3.0	5.2	0	0	0.0	0.0	79	3	0.1	9	9	NA	NA
Nightmute	68	3	5.0	8.7	0	0	0.0	0.0	68	3	0.2	15	15	NA	NA
Toksook Bay	136	3	44.3	51.0	0	0	0.0	0.0	136	3	1.0	133	133	NA	NA
Tununak	110	1	10.0	0.0	0	0	0.0	0.0	110	1	0.1	10	10	NA	NA
BERING SEA COAST	487	27	3.4	0.0	0	0	0.0	0.0	487	27	3.4	1651	1651	NA	NA
Chefornak	92	1	15.0	0.0	1	0	0.0	0.0	93	1	0.2	15	15	NA	NA
TOTALS	2806	1000	1.7	544.0	1729	1375	23.9	1213.7	4535	2375	10.2	37449	46291	2660	5.7%

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

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

2003 Kuskokwim River Sockeye Salmon Subsistence Harvests

	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	0	0.0	0.0	8	0	0.0	0.0	176	0	0.0	0	0	NA	NA
Kwigillingok	92	0	0.0	0.0	3	0	0.0	0.0	95	0	0.0	0	0	NA	NA
Kongiganak	51	9	8.9	18.2	33	27	16.9	16.5	84	36	7.6	536	637	568	89.1%
N. KUSKOKWIM BAY	311	9	0.3	280.2	44	27	12.7	44.8	355	36	1.8	536	637	568	89.1%
Tuntutuliak	22	15	11.2	32.2	57	51	23.0	39.8	79	66	19.7	1339	1555	292	18.8%
Eek	27	19	1.4	4.3	51	39	13.3	24.2	78	58	9.2	544	714	194	27.2%
Kasigluk	128	3	37.3	48.4	7	1	98.0	0.0	135	4	1.6	210	210	NA	NA
Nunapitchuk	36	21	5.8	9.1	67	56	34.5	48.0	103	77	24.5	2054	2521	360	14.3%
Atmautluak	31	14	1.9	3.8	31	30	27.2	25.6	62	44	14.0	841	868	70	8.0%
Napakiak	49	17	10.2	17.0	44	39	23.9	25.8	93	56	13.2	1104	1223	349	28.5%
Napaskiak	27	19	12.3	30.7	61	40	34.3	46.1	88	59	27.5	1603	2420	562	23.2%
Oscarville	4	2	46.5	65.8	10	9	51.4	56.6	14	11	50.0	556	700	289	41.3%
Bethel	1051	624	1.6	6.8	600	453	14.8	35.8	1651	1077	6.4	7694	10542	1063	10.1%
Kwethluk	76	24	4.5	9.6	83	80	20.1	32.6	159	104	11.2	1716	1776	272	15.3%
Akiachak	37	16	10.8	20.4	97	63	29.3	38.8	134	79	22.5	2019	3016	630	20.9%
Akiak	27	13	24.8	33.0	46	38	29.9	37.9	73	51	23.3	1459	1698	427	25.2%
Tuluksak	20	3	6.7	11.5	60	42	21.9	32.4	80	45	16.7	939	1333	410	30.8%
LOWER KUSKOKWIM	1535	790	2.3	428.5	1214	941	20.6	706.2	2749	1731	10.4	22078	28576	1652	5.8%
Lower Kalskag	38	20	0.0	0.0	35	27	20.4	28.1	73	47	9.8	551	714	181	25.4%
Upper Kalskag	31	12	0.3	0.9	31	27	15.5	16.3	62	39	7.8	421	483	71	14.7%
Aniak	65	33	1.2	4.2	85	85	7.0	13.1	150	118	4.5	631	670	66	9.9%
Chuathbaluk	11	7	0.3	0.8	21	18	13.5	24.0	32	25	9.0	245	287	90	31.3%
MIDDLE KUSKOKWIM	145	72	0.6	33.6	172	157	12.0	106.9	317	229	6.8	1848	2154	224	10.4%
Crooked Creek	12	3	6.3	11.0	26	23	28.0	24.5	38	26	19.7	663	747	160	21.4%
Red Devil	3	2	0.0	0.0	12	9	24.1	38.5	15	11	19.3	217	289	154	53.3%
Sleetmute	13	7	5.7	15.1	20	19	29.7	38.3	33	26	20.2	604	668	128	19.2%
Stony River	5	3	0.0	0.0	10	8	13.9	25.8	15	11	9.3	111	139	81	58.6%
Lime Village	4	3	0.0	0.0	10	10	100.0	97.2	14	13	71.4	1000	1000	NA	NA
McGrath	73	42	1.0	4.8	66	59	2.6	13.3	139	101	1.7	194	242	102	42.2%
Takotna	14	0	0.0	0.0	5	0	0.0	0.0	19	0	0.0	0	0	NA	NA
Nikolai	16	0	0.0	0.0	20	2	0.0	0.0	36	2	0.0	0	0	NA	NA
Telida	2	0	0.0	0.0	0	0	0.0	0.0	2	0	0.0	0	0	NA	NA
UPPER KUSKOKWIM	142	60	1.2	90.0	169	130	17.3	112.0	311	190	9.9	2789	3085	287	9.3%
KUSKOKWIM RIVER	2133	931	1.8	520.9	1599	1255	19.1	724.4	3732	2186	9.2	27251	34452	1784	5.2%
Quinhagak	62	30	3.5	7.2	81	74	17.3	38.7	143	104	11.3	1388	1622	244	15.1%
Goodnews Bay	29	9	3.2	5.6	35	33	18.4	20.9	64	42	10.5	635	672	108	16.1%
Platinum	3	2	0.0	0.0	13	13	8.5	10.7	16	15	6.9	111	111	NA	NA
S. KUSKOKWIM BAY	94	41	2.6	73.6	129	120	16.7	111.4	223	161	10.8	2134	2405	267	11.1%
Mekoryuk	94	17	0.1	0.5	0	0	0.0	0.0	94	17	0.0	2	2	NA	NA
Newtok	79	3	0.0	0.0	0	0	0.0	0.0	79	3	0.0	0	0	NA	NA
Nightmute	68	3	6.7	11.5	0	0	0.0	0.0	68	3	0.3	20	20	NA	NA
Toksook Bay	136	3	0.0	0.0	0	0	0.0	0.0	136	3	0.0	0	0	NA	NA
Tununak	110	1	5.0	0.0	0	0	0.0	0.0	110	1	0.0	5	5	NA	NA
BERING SEA COAST	487	27	0.1	0.0	0	0	0.0	0.0	487	27	0.1	27	27	NA	NA
Chefornak	92	1	10.0	0.0	1	0	0.0	0.0	93	1	0.1	10	10	NA	NA
TOTALS	2806	1000	1.5	526.1	1729	1375	18.9	732.9	4535	2375	8.1	29422	36894	1804	4.9%

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

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

2003 Kuskokwim River Coho Salmon Subsistence Harvests

	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	0	0.0	0.0	8	0	0.0	0.0	176	0	0.0	0	0	NA	NA
Kwigillingok	92	0	0.0	0.0	3	0	0.0	0.0	95	0	0.0	0	0	NA	NA
Kongiganak	51	9	4.0	9.9	33	27	22.2	58.6	84	36	9.1	635	768	441	57.5%
N. KUSKOKWIM BAY	311	9	0.1	153.5	44	27	16.6	158.6	355	36	2.2	635	768	441	57.5%
Tuntutuliak	22	15	1.9	5.2	57	51	40.1	119.8	79	66	29.5	2075	2329	622	26.7%
Eek	27	19	4.0	10.1	51	39	27.2	60.3	78	58	19.1	1135	1493	482	32.3%
Kasigluk	128	3	6.7	11.5	7	1	114.0	0.0	135	4	1.0	134	134	NA	NA
Nunapitchuk	36	21	1.6	4.0	67	56	9.3	21.6	103	77	6.6	551	676	162	23.9%
Atmautluak	31	14	1.2	2.9	31	30	12.6	17.0	62	44	6.6	394	407	49	12.2%
Napakiak	49	17	3.9	10.0	44	39	23.5	39.0	93	56	11.8	981	1098	267	24.3%
Napaskiak	27	19	4.5	17.2	61	40	23.0	35.4	88	59	17.3	1004	1522	417	27.4%
Oscarville	4	2	0.0	0.0	10	9	2.7	4.8	14	11	1.9	24	27	10	37.4%
Bethel	1051	624	2.2	10.4	600	453	18.1	49.2	1651	1077	8.0	9613	13237	1480	11.2%
Kwethluk	76	24	1.8	7.8	83	80	22.8	52.5	159	104	12.2	1865	1933	273	14.1%
Akiachak	37	16	4.1	12.6	97	63	26.2	59.3	134	79	19.5	1719	2611	876	33.6%
Akiak	27	13	2.1	3.9	46	38	24.1	72.7	73	51	15.5	942	1135	455	40.1%
Tuluksak	20	3	0.0	0.0	60	42	25.4	39.3	80	45	19.0	1066	1523	399	26.2%
LOWER KUSKOKWIM	1535	790	1.9	331.5	1214	941	20.8	981.2	2749	1731	10.2	21503	28125	2071	7.4%
Lower Kalskag	38	20	0.0	0.0	35	27	10.7	21.5	73	47	5.1	289	375	139	37.0%
Upper Kalskag	31	12	15.0	52.0	31	27	13.7	20.0	62	39	9.8	550	605	733	121.2%
Aniak	65	33	5.1	22.8	85	85	14.3	36.1	150	118	10.3	1388	1552	362	23.3%
Chuathbaluk	11	7	3.0	6.4	21	18	13.3	20.0	32	25	9.8	261	313	81	26.0%
MIDDLE KUSKOKWIM	145	72	3.8	406.8	172	157	13.4	89.7	317	229	9.0	2488	2845	833	29.3%
Crooked Creek	12	3	1.7	2.9	26	23	16.3	26.9	38	26	11.3	381	430	105	24.4%
Red Devil	3	2	0.0	0.0	12	9	17.4	35.6	15	11	13.9	157	209	142	68.1%
Sleetmute	13	7	5.9	13.0	20	19	30.1	77.1	33	26	20.5	613	678	181	26.6%
Stony River	5	3	0.0	0.0	10	8	87.9	170.2	15	11	58.6	703	879	538	61.2%
Lime Village	4	3	0.0	0.0	10	10	16.4	30.5	14	13	11.7	164	164	NA	NA
McGrath	73	42	0.8	3.9	66	59	15.8	62.2	139	101	7.9	964	1099	353	32.1%
Takotna	14	0	0.0	0.0	5	0	0.0	0.0	19	0	0.0	0	0	NA	NA
Nikolai	16	0	0.0	0.0	20	2	21.5	10.6	36	2	1.2	43	43	NA	NA
Telida	2	0	0.0	0.0	0	0	0.0	0.0	2	0	0.0	0	0	NA	NA
UPPER KUSKOKWIM	142	60	1.0	55.0	169	130	19.9	341.4	311	190	11.3	3025	3502	692	19.7%
KUSKOKWIM RIVER	2133	931	1.7	549.5	1599	1255	19.8	1054.8	3732	2186	9.4	27651	35240	2379	6.7%
Quinhagak	62	30	1.2	3.6	81	74	24.4	46.3	143	104	14.3	1838	2047	263	12.8%
Goodnews Bay	29	9	6.1	10.5	35	33	30.2	52.2	64	42	17.3	1050	1110	227	20.5%
Platinum	3	2	0.0	0.0	13	13	16.1	20.4	16	15	13.1	209	209	NA	NA
S. KUSKOKWIM BAY	94	41	1.4	89.2	129	120	25.1	148.9	223	161	15.1	3097	3366	347	10.3%
Mekoryuk	94	17	6.6	9.2	0	0	0.0	0.0	94	17	1.2	112	112	NA	NA
Newtok	79	3	0.0	0.0	0	0	0.0	0.0	79	3	0.0	0	0	NA	NA
Nightmute	68	3	0.0	0.0	0	0	0.0	0.0	68	3	0.0	0	0	NA	NA
Toksook Bay	136	3	19.3	26.9	0	0	0.0	0.0	136	3	0.4	58	58	NA	NA
Tununak	110	1	0.0	0.0	0	0	0.0	0.0	110	1	0.0	0	0	NA	NA
BERING SEA COAST	487	27	0.3	0.0	0	0	0.0	0.0	487	27	0.3	170	170	NA	NA
Chefornak	92	1	15.0	0.0	1	0	0.0	0.0	93	1	0.2	15	15	NA	NA
TOTALS	2806	1000	1.4	556.7	1729	1375	20.1	1065.2	4535	2375	8.6	30933	38791	2404	6.2%

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

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

APPENDIX C

Bethel Post-Season Survey
Sample Redesign Recommendations

For several years, the Bethel Post-Season Survey has relied on a sampling method that tracks the harvest reports of persons in households in Bethel. The Respondents have been tracked as they have moved or changed households, and have been assigned to strata of harvesters or non-harvesters according to past years' surveys, or through self-reporting of harvest levels. Harvest levels have been estimated each year through proportional expansion of the Respondent's reports to the total population in Bethel. A census has been attempted every year, with 800-1000 household harvester surveys returned out of a total of approximately 1750 households.

In addition, harvest calendars are mailed to all previously-reporting households in the pre-fishing season. The calendars are intended to assist Respondents in recording their catches in real-time, so that the post-season survey is not based entirely on recall. The harvest calendars are also used to estimate monthly return rates of fish species to the area's watershed. Further, survey postcards are sent to all Respondents where the field technician has not been able to contact a Household.

The harvest survey response rate is about 85%; and the harvest calendar return rate is about 10%. The postcard return rate is less than 5%.

800 completed harvester surveys represent a response rate sufficient to estimate Bethel's subsistence harvest in an order of magnitude for comparison from year to year. The Researcher's addition of qualitative ("judgment sampling") context information has added considerable confidence in these estimates from year to year, as well. However, the original sample design has introduced some inconsistencies that have increased the cost of implementing the survey. More importantly, it is evident that the level of *measurement and sampling error* has increased, which could compromise future annual estimates.

Measurement Error

Unlike sampling error, measurement error is difficult to quantify, and exists to some degree in every study. Researchers have identified the following possible sources of measurement error in the Bethel study:

Population
Evaluating other secondary sources of data, such as population, has been problematic. Household estimates used in the study have fluctuated over time, from 1750 in 2000, to 1500 in 2002. The US Census estimated 1751 households for 2000. Attempts to validate or update the count with Permanent Fund application returns and other government counts have helped, but a firm population and household number has been difficult to achieve.

Mailing

Bethel does have well-organized street addresses. It does not have home-delivery of mail; residents hold PO Boxes (Federal Express, which delivers to street addresses, does operate in Bethel). An attempt has been made to correlate Respondents' street addresses with their post office boxes, and track changes from year to year so that they may receive the mailed harvest calendars. Other considerations are that more than one household may collect their mail at one PO Box, or that household composition may not hold a one-to-one correspondence between all members and their PO Box from year-to-year.

Household Contact

Originally, households in Bethel were rostered, named by head-of-household, numbered, and sampled. The persons in these households have been tracked over time. It is possible to track households over time in an informal longitudinal model, as secondary data, and analyses (reliability and validity) of those patterns are the subject of other ongoing Subsistence Division Studies. However, this was not the intended research plan for estimating Bethel harvests.

This method has been used in the smaller villages with success, as all possible permutations of household composition are manageable, and a few community representatives can edit the list in a sit-down meeting. This method was extended to much-larger and more-transient Bethel. This household list has been updated each year ad hoc by the field technicians. Households were deleted as they moved out of the area, and new households were given a new Household ID as they moved into Bethel. New housing was built, other housing was torn down. Household members moved in and out of residency with extended family, married, divorced, died, or had children. Every year, the data management staff spends about one month matching households by street address, mailing address, household ID, path of travel (for the field technicians), and household composition, in order to preserve a continuous record for each household. This is so that previously identified and responding harvesters can be re-sampled, but not as an effort to track households over time.

The original numbering system is no longer consecutive. The existing system does have integrity in that the field technicians are very well-trained, and have longevity on the study, so there is confidence that the established sampling rules, and identification of harvesting-households are being applied consistently.

Non-Response Bias

While the refusal rate is measured at 15% among harvesters, it is not known what the covert refusal rate might be among non-harvesters. This includes harvesters who may have indicated that they did not harvest in order to terminate the interview, or those who may have other reasons for minimizing their harvest levels. They may perceive a consequence of future restrictions or regulations, for example. A refusal by a "super-harvester" would be noticeable and verifiable in a small village, but not in a large town like Bethel.

Households are currently and should be continuously over-sampled in order to mitigate the effects of refusals, and dilute the possibility of bias in the sample. Re-sampling selections should be undertaken every new study year. Bias is introduced when only responsive harvesting-Respondents are interviewed.

Recall
Surveys utilizing recalled data introduce another element of measurement data. Respondents may simply not recall some harvests, especially when a large number of units are involved. Providing Respondents with calendars to record their harvests as they occur should increase accuracy. With a 10% return rate on calendars, it is possible that all Respondents are not receiving their calendars by mail, because of the difficulties in tracking their post office boxes from year to year. Other tabulation methods could be considered, such as a wallet-sized notebook, which might be more convenient and accessible for Respondents to use.

SAMPLING ERROR

Sample Frame Error

Stratification
The sample frame is all Bethel households. Harvest estimates are made by expanding harvests in proportions of non-fishers to fishers, though the incidence rate of either group is not known with precision. This has been estimated by self-declaration of the Respondent, and is subject to some of the measurement errors discussed above. It is not known how accurate these designations are without secondary local and researcher judgment, as is possible in small villages. It should not be necessary to rely on a stratified sample in larger communities, which has a consequence of introducing bias, sampling, and measurement error.

RECOMMENDATIONS

Sampling Frame
All Bethel Households can be enumerated in a geographical, dwelling-unit (DU) model. Using Bethel City/Fire Department Street Address Maps, two field technicians will count/list all dwelling units by subdivision. This requires the selection of a starting point to the subdivision. The dwelling units are numbered consecutively, and non-dwelling units are designated. Listing rules are developed, and the path of travel noted with arrows on the maps. The path of travel is continuous, as follows:

> All counting takes place on the right side of the street. All boundaries are followed, making every possible right turn, and making a U-turn at dead ends. Each DU is numbered. Each unit within an apartment building is considered a separate DU, so inquiries must be made as to the number of units within, and apartment numbers are recorded. Institutional or transient residences such as jails, hospitals, cannery housing, nursing homes, etc., are not listed, and are not considered to be eligible households.
>
> This produces a numerical listing of DU's that is updated every year with added dwelling units, which are assigned an appended digit to the DU ID to the left. The DU's, if unoccupied, are still numbered.

This process takes two field technicians approximately 5 days to complete. It creates a firm number of households in Bethel, and creates a means to extract a random sample.

Sample selection
Systematic sampling is recommended as the most economical method to achieve results. A skip interval is calculated, taking the following into account:

a) number of surveys necessary for a 95% confidence level based on the number of DU's counted. This is typically about 400.

b) Oversampling to correct for the refusal rate, and incalculable measurement error. This is estimated to be about 20%, which means that 500 households would need to be contacted to achieve 400 surveys. Some of these 400 would be non-harvesters, and would be "screened out" at the door.

c) These factors would be calculated in final after enumeration of DU's, and professional expertise is applied to estimating oversampling requirements. This should generate new estimates of incidence rates of fishers/non-fishers. (It has been suggested that it might be useful to add hunt/non-hunt screening questions for later use for other species and studies, such as birds or large mammals, for reference).

d) A random pre-selection using a random number generator probably would not create an even distribution of surveys throughout Bethel subdivisions, and introduce an unintentionally biased result. An even distribution throughout town is desired, because it has been noted that Bethel subdivisions are not homogenous.

e) Therefore, if 2000 DU's are counted, the Field Technician would contact 500/2000, or every fourth DU for a harvest survey. This distributes surveys evenly throughout Bethel.

f) If contact cannot be made with a DU after three tries, a "drop-down" substitution is made, in which the nearest house to the right is substituted for the selected DU.

Contacting Selected Respondents
The disposition of every contact with every DU is recorded (refusal, unable to contact, come back later/too busy, vacant, completed survey, non-harvester, not a dwelling unit/listing error etc.), and is necessary for calculating statistics about the survey. Two screening questions are administered before asking for an interview:

1. Did anyone in your household subsistence fish this year, in 2004?
2. Did you receive a calendar?

If the Respondent household did not fish that season, they are not interviewed about harvest, but they will be coded so as to land in the database as a non-harvester. Harvesters would schedule an interview and hopefully produce a calendar.

Another screening question has been suggested, “Have you lived in an area with rural subsistence preference for one year? This is because residents who have not lived in a subsistence area for a year are actually ineligible for study, being ineligible for subsistence harvests, and are counted in a different category than those who did not harvest for some other reason.

If the oversampling fails to produce enough surveys for a reliable sample, then resampling occurs, and the process is repeated systematically throughout Bethel.

Calendars
It is recommended that calendars be mailed to all post office box holders in Bethel. These may be collected at the time of survey, or if a recipient is not selected for survey, they could mail them in as supplemental information for the study. The postcard surveys are no longer necessary.

A Federal Express (which delivers to street addresses) alternative may also be investigated. If the skip pattern is identified pre-season, selected households could be fed-exed calendars and study information in April. There is usually a government contract available for about $3/piece, but this may not be so in Bethel, which is a contract station. However, because this type of delivery is obviously expensive, Respondents may be impressed with the value of the information they are asked to provide.

Household Tracking
This would be abandoned as a survey objective. However, tracking would be maintained as it randomly occurs, either via a selected Respondent, or by calendar.

Cost
This design should result in an increase of about $1000 in mailing calendars, a reduction of one-month of Analyst Programmer/Coordinator/Clerk time ($4000), one-month of SRS time (?), and a reduction of two (person-) months of field technician time (even with the added counting/listing duties.)

CONCLUSION

This sampling strategy is designed as a straightforward approach to ensure that harvests reported by respondents can be used to estimate total harvest with reasonable accuracy. The analysis would also be straightforward, where estimated harvest is equal to the reported harvest multiplied with the inverse of the response rate. The response rate is calculated as the proportion of the sample frame (all of Bethel) that responded to the survey. This assumes that the sample accurately reflects the harvester/non-harvester population (i.e, the counting and listing is precise), that the sampling is random, and therefore unbiased, and that a high enough response rate is achieved to satisfy reliability requirements, and minimize the potential effect of non-response bias.