ANNUAL MANAGEMENT REPORT FOR THE SUBSISTENCE AND COMMERCIAL FISHERIES OF THE KUSKOKWIM AREA

1999

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PREFACE

The Division of Commercial Fisheries (CF) of the Alaska Department of Fish & Game (ADF&G) is responsible for the management of commercial and subsistence fisheries in the Kuskokwim Area. This annual management report details the activities of the CF Division in the Kuskokwim Area in 1999.

This report is one of a series of Annual Management Reports detailing the management activities of the Division of Commercial Fisheries staff in the Kuskokwim Area. The 1960-1974 management reports for the "Kuskokwim District" appear in the Arctic-Yukon-Kuskokwim Area report series. The 1975-1986 management reports appear in the Kuskokwim Area Annual Report series. The Annual Management Report became a part of the Regional Information Report Series in 1987.

Data presented in this report supersede information found in previous management reports. This report includes summary data from many research projects. Complete documentation of these projects and results appear in separate reports. The bibliography includes both referenced and unreferenced reports concerning the Kuskokwim Area fisheries. Some of the data presented are preliminary and may be presented with minor differences in future reports.

To simplify use of this report, the tabular data are separated into current year tables and appendices of historic data. The appendices are separated by fishery and fishing district. The appendices show annual comparisons and information that seldom change.

The ages of fish in this report are presented as both total age, year spawned to year recorded and in the European notation. In the European system, the number of winters in fresh water after hatching is followed by the number of winters in salt water. The fresh and salt-water winters are separated by a decimal point. To derive total age from the European system you must add the fresh and salt water winters and add one for the year of spawning. For example an age-1.3 chinook salmon's total age is 5 years; 1+3+1=5.

Important subsistence and commercial fisheries in the Kuskokwim Area include herring and salmon. Other marine and freshwater finfish are harvested primarily for subsistence use. A list of indigenous fishes found in the Kuskokwim Area is provided in Appendix A.1.

PART I. SALMON FISHERY

Description of Area and District Boundaries

The Kuskokwim Area includes the Kuskokwim River drainage basin and all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula, plus Nunivak and St. Matthew Islands (Figure 1). Commercial salmon fishing occurs in four districts in the area:

District 1, the Lower Kuskokwim River, consists of the Kuskokwim River from a line between Apokak Slough and Popokamiut, upstream to a line between ADF&G regulatory markers located at Bogus Creek, about nine miles above the Tuluksak River (Figure 2). The downstream boundary has been in effect since 1986 and the upstream boundary was established in 1994 (Appendix A.2).

District 2, the Middle Kuskokwim River, consists of the Kuskokwim River from ADF&G regulatory markers located at the upstream entrance to the second slough on the west bank downstream from Kalskag to the regulatory markers at Chuathbaluk (Figure 3). The downstream boundary of District 2 was used for the first time in 1990 (Appendix A.2).

District 4, Quinhagak, consists of the waters of Kuskokwim Bay between the mouth of Weelung Creek (misspelled in the regulations as Wheeling) and the South Mouth of the Arolik River (Figure 4). The northern boundary was new in 1990 and the first boundary change since 1960 (Appendix A.2).

District 5 consists of the waters of Goodnews Bay (Figure 5). The District 5 boundaries are a line between the northernmost tip of South Spit and the southernmost tip of North Spit, and a line between the mouth of Ukfigag Creek and the mouth of the Tunulik River.

The letter code assigned to the Kuskokwim Area by the Commercial Fisheries Entry Commission is "W". It precedes the district number on the figures and in news releases (e.g. W-1). This helps the public differentiate between announcements for the Yukon River districts (Y) and the Kuskokwim River (W) districts.

Fishery Resources

Five species of Pacific salmon are harvested by commercial and subsistence fishers in the area; chinook or "king" salmon (*Oncorhynchus tshawytscha*), sockeye or "red" salmon (*O. nerka*), coho or "silver" salmon (*O. kisutch*), pink or "humpy" salmon (*O. gorbuscha*), and chum or "dog" salmon (*O. keta*). The Kuskokwim River drainage has the largest populations of chinook, sockeye, coho and chum salmon in the area. Pink salmon occur throughout the area with significantly larger returns in even years than in odd years. Little quantitative data on the population size of pink salmon is available because of the lack of commercial markets and interest by subsistence fishers. There are no commercial fisheries for rainbow trout (*O. mykiss*),

sheefish (*Stenodus leucichthys*) or Dolly Varden (*Salvelinus malma*) in the Kuskokwim Area. Their contribution to the subsistence fishery is not well quantified, except in the Kwethluk (Coffing 1991) and Kanektok Rivers (Wagner 1991). There is a growing sport fishery targeting salmon and resident freshwater fish (Minard et. al 1998).

Management

Management of the Kuskokwim Area salmon fishery is complex because of the difficulty in determining run size and timing, harvesting of mixed stocks, overlapping multispecies salmon runs, allocation issues, and the immense size of the Kuskokwim River drainage (Appendix B.1). The overall goal of the Kuskokwim Area research and management programs is to manage the salmon runs for sustained yield under policies set forth by the Alaska Board of Fisheries. Information is not adequate at this time to determine the escapement levels needed to produce maximum sustained yield. The Alaska State Legislature and the Alaska Board of Fisheries have designated subsistence fishing as the highest priority among beneficial uses of the resource (A.S. 16.05.258). Management of the Kuskokwim Area commercial salmon fisheries must take a conservative approach to maintain the subsistence priority, and to provide for spawning area escapements to sustain production of the resource (Appendix A.3).

Most fisheries within the Kuskokwim Area harvest salmon stocks that are several weeks and hundreds of miles from their spawning grounds. As with most mixed stock fisheries, some individual stocks may be under harvested or over harvested in relation to their abundance. It is not practical, except in a very generalized sense, to manage the stocks separately based on current knowledge.

The management objective for chinook, coho and chum salmon in Districts 1 and 2 is to achieve desired escapement objectives (Appendix A.3) and allow for the orderly harvest of fish surplus to spawning requirements. Due to its importance as a local food source, chinook salmon receives special consideration to insure that the commercial fishery does not significantly impact the subsistence fishery for this species. Sockeye and pink salmon are not actively managed in Districts 1 and 2. The management objective for chinook, coho and sockeye salmon in Districts 4 and 5 is to achieve desired escapement objectives (Appendix A.3) and allow for the orderly harvest of fish surplus to spawning requirements. Chum and pink salmon are not actively managed in Districts 4 and 5. Inseason management depends heavily on commercial catch data, test fisheries and run timing information. Run timing models are used inseason to predict the final escapement using the historical percentage of run passage for a particular date.

CF permanent full time staff assigned to the Kuskokwim Area includes one area management biologist, one area research biologist, two assistant area management biologists, two research project biologists and one field office assistant. In addition, approximately 25 seasonal employees are hired annually to assist in conducting various management and research projects. The staff aids in the enforcement of regulations in cooperation with the Department of Public Safety, Division of Fish and Wildlife Protection (FWP). Staff has also had increasing

involvement with various non-profit groups and the United States Fish and Wildlife Service to develop and operate salmon escapement monitoring projects (Table 1).

SUBSISTENCE SALMON FISHERY

Background

The harvest of fish and wildlife for subsistence use is an important component of the mixed subsistence-cash economy throughout the Kuskokwim Area. The subsistence salmon fishery in the region is one of the largest and most important in the state. During summer, early June through August, the day-to-day activities of many Kuskokwim Area households revolve around the harvesting, processing, and preserving of salmon for subsistence use. The seasonal movement of families from permanent winter communities to summer fishcamps situated along rivers and sloughs, continues to be a significant element of the annual subsistence harvest effort. 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 annually, and salmon as much as 53 percent of the total annual harvest (Coffing 1991).

Approximately 1,500 households in the region annually harvest salmon for subsistence use. Many other households, which are not directly involved in catching salmon, participate by assisting family and friends with cutting, drying, smoking, and associated preservation activities (salting, canning and freezing). Annual subsistence harvest surveys have been aimed at gathering data on chinook, chum, sockeye, and coho salmon. Subsistence catches of chinook salmon in the Kuskokwim Area often exceed the commercial catch of this species (Appendix A.4).

There are 37 communities consisting of approximately 4,200 households within the Kuskokwim Area (Figure 1). The majority of the area households (3,059) are situated within the drainage of the Kuskokwim River. Bethel is the largest community in the region, containing approximately 1,508 households. Approximately 342 households are located in the northern Kuskokwim Bay communities of Kwigillingok, Kongiganak and Kipnuk. Residents of these three communities harvest subsistence salmon from the Kuskokwim River as well as from areas closer to the communities. Residents of Quinhagak, Goodnews Bay, and Platinum, located along the south shore of Kuskokwim Bay, harvest salmon stocks primarily from the Kanektok, Arolik, and Goodnews River systems. Residents of Mekoryuk, Toksook Bay, Nightmute, Tununak, Newtok, and Chefornak, situated near the Bering Sea Coast, also harvest salmon from coastal waters as well as local tributaries.

Eligibility, Licenses, Permits, and Gear

Eligibility criteria require individuals be Alaskan residents for the proceeding 12 consecutive months before harvesting salmon for subsistence use. Prior to 1990 there were additional restrictions on participation in the fishery. These are described in earlier annual management reports. The majority of those individuals subsistence fishing for salmon in the Kuskokwim Area

are residents of the area. People living in other parts of the state who have family or friends in the region sometimes return to the Kuskokwim area to harvest or help process salmon.

Licenses and permits have never been required for subsistence salmon fishing in the Kuskokwim Area, nor were any required during 1999. There were also no restrictions on the number of salmon that could be harvested by individual fishers or households. Salmon harvested for subsistence use could be caught using set and drift gillnets, beach seines, and fish wheels. In the Holitna, Kanektok, Arolik, and Goodnews river drainages only, spears could also be used. The total length of set or drift gillnets in use by an individual fisher could not exceed 50 fathoms. Unless changed by emergency order, gillnets used for harvesting salmon in the Kuskokwim Area could be of any size mesh. Gillnets with six-inch or smaller mesh could not be more than 45 meshes in depth and nets with greater than six-inch mesh could not be more than 35 meshes in depth. Fishers were required to have their name and address attached to their gillnets and fish wheels.

In-Season Subsistence Closures

Areas within the commercial salmon fishing districts were periodically closed to subsistence salmon fishing 16 hours before, during, and 6 hours after commercial salmon fishing periods. The purpose of these closures was to discourage illegal commercial fishing and to help discourage the sale of subsistence caught salmon in the commercial fishery. Many of the commercial fishers are local residents who also participate in the subsistence fishery. The specific area closed to subsistence fishing varied from one district to the next.

In District 1, the waters of the Kuskokwim River were closed to subsistence salmon fishing around commercial salmon fishing periods. Tributaries flowing into the Kuskokwim River within the District did not close. That portion of the Kuskokwim River between Districts 1 and 2 was closed to subsistence fishing at the same time subsistence closures occurred in District 1. Kuskokuak Slough, located in District 1, did not close to subsistence fishing after July 31.

In District 2, waters of the Kuskokwim River and all tributaries flowing into the Kuskokwim River within District 2 were closed to subsistence salmon fishing around commercial salmon fishing periods in District 2. In addition to subsistence closures in District 4 waters, the entire Kanektok and Arolik Rivers near District 4 were closed to all subsistence fishing with nets around the commercial salmon fishing periods in that District. Likewise, the waters of District 5 were also restricted. The Goodnews River was also closed to all subsistence fishing by nets around the commercial periods in District 5.

SUBSISTENCE SALMON HARVEST SURVEYS

The management of Kuskokwim Area salmon fisheries requires that the Department know how many salmon are harvested in both the subsistence and commercial fisheries. Data on the subsistence harvest of salmon are collected annually. Commercial Fisheries Division began conducting subsistence salmon harvest surveys along the Kuskokwim River in 1960. Surveys

were initiated in Quinhagak (1967) and Goodnews Bay and Platinum (1979). The Division of Subsistence took over the annual subsistence salmon harvest surveys in 1988 under a reimbursable service agreement and have been responsible for collecting and analyzing the data since then.

Methods

Three methods were used to gather subsistence salmon harvest data. These methods were:

1) subsistence salmon catch calendars,

2) post-season community household surveys,

3) postcard surveys,

The Division maintains a community household database and updates this database annually during the community surveys. Each household in the database is designated as either "usually fish" or "does not usually fish" depending on past fishing history. Households listed in the database were the basis of sampling and estimation of subsistence salmon harvests for the Kuskokwim Area. Each household on the list was assigned a unique identifier through which subsequent information could be tracked.

The goals of the post-season survey were to:

1) collect harvest data that would result in a total harvest estimate for subsistence salmon by species for the Kuskokwim Fisheries Management Area by community;

2) compile information on fishing effort, gear types, participation rates, and timing of the subsistence harvest;

3) update community household lists and identify fishing households;

4) determine if subsistence fishing success during 1999 was poor, average, or better than average and, if poor, why.

Catch Calendars

In May 1999 subsistence salmon catch calendars were mailed to all Kuskokwim Area households that had been identified as "usually fish." Three similar, but unique, catch calendars (Appendix S.1) were designed for recording the daily catch of each salmon species harvested for subsistence use. One style of calendar was sent to households in communities along the Lower and Middle regions of the Kuskokwim River, to communities along the Bering Sea coast and along North Kuskokwim Bay, and to those communities in the Upper Kuskokwim River region

upstream as far as the community of Stony River. A second style of calendar was sent to the remaining households in the Upper Kuskokwim River region and a third style was sent to households in Quinhagak, Goodnews Bay, and Platinum. Differences in the style of calendar sent to households take into account the species available, salmon run-timing, and timing of subsistence fishing activities. Where mailing addresses were available, the calendars were mailed to post office boxes; otherwise calendars were sent general delivery for the post office clerk to distribute. Each calendar was postage paid and addressed for return to the Division of Subsistence office in Bethel. Subsistence salmon catch calendars were distributed to 1,528 households.

Household Surveys

The second method of collecting subsistence salmon harvest information was the post-season household surveys. With this method, staff traveled to communities in the Kuskokwim Area and went house-to-house interviewing residents about their 1999 salmon fishing efforts. Similar to the approach used in developing the catch calendars, three color-coded survey instruments were used to survey the majority of the communities (Appendix S.2). Except for local terms used for the salmon species, the survey questions asked in each region were identical. The survey form used when interviewing Bethel households also included a space for recording the households resident address and asked reasons why the household harvested salmon for subsistence using hook and line gear.

During 1999, the Division of Subsistence staff conducted house-to-house surveys in 28 communities. Budget constraints have precluded attempts to conduct house-to-house surveys in Mekoryuk, Newtok, Nightmute, Toksook Bay, Tununak, Chefornak, and Telida. House to house surveys were also not done in the communities of Kwigillingok, Kipnuk, and Kasigluk, since the communities asked us to stop doing surveys there several years ago. Through federal funding administered through the Alaska Department of Community and Regional Affairs, the Orutsararmuit Native Council (ONC) located in Bethel, hired two survey technicians to assist the department in gathering data by conducting house to house salmon harvest surveys in Bethel. This cooperative effort between the department and ONC resulted in a much better coverage of the Bethel community.

Survey efforts in these communities occurred over a two-month period, beginning in early October, after most residents had completed salmon fishing for the season and after most hunters had returned home from fall moose and caribou hunting. Communities in which residents usually harvest salmon through October were surveyed in November. Time spent in any one community ranged from one-half to two days depending on the size of the community. Surveys in Bethel were conducted over a 6 week period.

Survey work was conducted systematically. Prior to beginning the community surveys, efforts were made to inform and prepare residents for the arrival of staff doing the surveys. This was done weeks or days in advance of their arrival through letters to City, Tribal, or Traditional Council offices in each community, radio announcements, posters in public buildings and phone calls to

community officials. Prior to traveling to each community, staff identified households that had already mailed in or returned their salmon harvest calendars.

In Bethel, survey staff used a map of the community developed by the Bethel Fire Department. This map identified the street addresses of much of the community and was used to divide the community into areas that could be assigned to each of the two survey staff. Each survey staff working in Bethel also had access to a list of all Bethel households identified through previous surveys and a list of households which had been sent and returned their salmon fishing calendar.

Upon arrival in a community, staff checked in with the City or Council office to introduce themselves and outline their task. Staff used community household checklists, prepared in advance, to help them identify households they needed to contact while conducting household surveys. Each "checklist" contained a listing of all known households in the community, identified those households which were reported to have subsistence fished for salmon the previous year (1998), and households which were mailed 1999 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 1999.

Attempts were made to contact all households that were either identified as "usually fish" or were known to have fished during 1999. In Bethel, an effort was made to contact every household (a census) so that a more accurate list of the total number of households in Bethel could be established. Unlike the other communities, there was no one agency or organization that could provide a current Bethel household list. Structured interviews were conducted with these households through the use of the survey instrument. Subsistence salmon catch calendars that had not been mailed back to the department were also collected. If time permitted, other households on the community list were contacted about their salmon fishing activities. In 1999, 2,124 households were surveyed using this method.

Postcard Surveys

The third method of collecting information on subsistence harvest of salmon was through the use of postcard surveys (Appendix S.3). The postcard survey simply asked if the household harvested salmon from the Kuskokwim Area for subsistence use, the species and quantities harvested, the type of fishing gear used, and how fishing was for each of the four salmon species usually harvested. The postcard could be separated in half and returned postage paid to the department. This type of survey was the primary method of obtaining harvest data from households in Kipnuk, Kwigillingok, Kasigluk, Mekoryuk, Newtok, Nightmute, Toksook Bay, and Tununak and households in other communities which were not available at the time of the community surveys.

Postcard surveys were also left at the doors of several occupied households in Bethel where multiple attempts to contact household residents failed. As a final effort to contact households in Bethel, those individuals for which the department had a mailing list but were not contacted were also mailed a survey postcard. Overall 478 postcards were distributed to Bethel residents and 116

were returned completed. Many of the postcards were returned with an address correction indicating that the individual had moved away. If the address correction included a current address, a follow-up postcard was then sent to determine if the individual harvested salmon in the Kuskokwim Area during 1999. Overall, approximately 1,200 households were mailed postcard surveys.

Subsistence Salmon Harvest Estimation

Data from the three information sources (catch calendars, household surveys, and postcard surveys) were entered into a computer database. Data were verified against source documents, and several logic checks of the data were made. The master list of names and addresses of resident households was updated to reflect changes in household composition and number of households residing in each community. The unique household numbering system was maintained on the master list and on the database tables containing information from each of the three information sources.

In order to provide a single best estimate for a household's harvest of a salmon species during 1999, information was compiled from the various information sources. This process was conducted by a single researcher on the project to ensure data consistency. In most cases, there were few discrepancies between the information available from the different sources. In those cases where a household was known to have fished for salmon but their harvest could not be quantified through any information source, the household's harvest was estimated based on the mean harvest for the "usually fishes" strata. Likewise, if a household could not be contacted but was reported by a reliable source to not have fished, the household was assigned a harvest of zero.

Guidelines developed during the course of the process to composite harvest information included the assumptions that:

(1) the salmon catch calendar contained the best means of recording the household's harvest;

(2) information from the different sources needed to be evaluated concurrently in order to identify the harvest for each species;

(3) information from the different sources for a particular species may be different due to the timing of the collection of this information;

(4) information on the use of salmon to feed dogs be used as a minimum estimate of the household's harvest if no other information was available.

Salmon harvests identified as "removed from the commercial catch for subsistence use" were included in the household's subsistence harvest. The Bethel surveys did not include a question to specifically address the amount of commercially caught salmon retained for subsistence use.

However, the Bethel survey did include a question format aimed at determining the amount of the harvest obtained from each gear type used.

The average community catch (C_k) was estimated for salmon species from the composite catch per household data using the following formula:

$$C_k = \Sigma^1_{i=0} (N_{ki} * C_{ki}) / \Sigma^1_{i=0} N_{ki}$$

where
k = community
i = indicates whether the group "usually fishes" (1) or "usually does not fish"(0)
N_{ki} = number of households that "usually fish" or "usually do not fish"
C_{ki} = mean harvest for households that "usually fish" or "usually do not fish"

The total community catch (T_k) was estimated by $T_k = \Sigma^1_{i=0} (N_{ki} * C_{ki})$ and its variance (V_k) includes a finite population correction factor:

$$V_k = \Sigma^1_{i=0} ((N_{ki}^2)(1-(n_{ki}/ N_{ki}))(\Sigma_{ki}^2/ n_{ki}))$$

where n_{ki} = number of households for which information is available that "usually fish" or "usually do not fish" and Σ_{ki}^2 = variance for the amount harvested for the "usually fish" or "usually do not fish" households.

If fewer than 30 households or less than 50 percent of all households in a community were contacted, the reported harvest was used for the estimated harvest. Community catch estimates and their variances were summed across communities for region subtotals and across all regions for Kuskokwim Management Area totals.

1999 Sampling Summary

A summary of the sampling information by community and fishing area is presented in Table 12. Of the estimated 4,180 households located in the Kuskokwim Area, information was obtained for 2,804 (67%).

In total, 1,883 households have been classified as "usually fish." In 1999, subsistence salmon harvest information was collected from 1,486 (79%) of these households. Households classified as "usually do not fish" for salmon totaled 2,297. Information was collected from 1,037 (45%) of these households. Many (36%) of the households classified as "usually do not fish" resided in Bethel.

Fishing activity information was obtained for 2,571 households within the Kuskokwim River drainage, including the North Kuskokwim Bay communities. A total of 2,322 of these households were successfully contacted either through a household interview, a returned harvest calendar or returned postcard. 1,512 of these households harvested salmon for subsistence use during 1999.

In the South Kuskokwim Bay region, containing the communities of Quinhagak, Goodnews Bay, and Platinum, 166 (81%) of the 204 households living in the region were contacted. Of these contacted households, 136 (82%) harvested salmon in 1999 for subsistence use.

In total, 575 households have been estimated in the Bering Sea coast communities of Mekoryuk, Newtok, Nightmute, Toksook Bay, Tununak and Chefornak. A complete list of households was not available for these communities. The Alaska Permanent Fund application list was used to determine the number of postal boxes held in the community. Because households may share a postal address, the number of households in this region may be underestimated. Because house-to-house surveys were not conducted in these communities, data were obtained only by postcard surveys and calendar returns. Thirty-five households in this region provided information and twenty-nine reported harvesting salmon. Based on data gathered in other years, actual participation in salmon harvesting activities by households in this region is thought to be much greater than that reported by catch calendars or postcard surveys. For most communities, house-to-house surveys continue to be the primary vehicle for gathering data on harvest and use of subsistence salmon. During the 1999 survey efforts, house to house surveys accounted for 84 percent of all households contacted.

In total, 16 percent (252) of the 1,528 subsistence salmon calendars which were mailed pre-season were used and returned or picked up during the household surveys. There were 217 responses to the 1,254 postcard surveys that were mailed to Kuskokwim Area households who had not returned harvest calendars and were not interviewed by staff.

1999 Harvest Summary

A summary of the subsistence salmon harvest estimates by community and fishing area presented in Table 13. The 1999 total subsistence salmon harvest estimates for the Kuskokwim Area was 77,660 chinook, 47,612 chum, 49,388 sockeye, and 27,753 coho salmon. Seventy-six percent of the overall subsistence salmon harvests in the Kuskokwim Area were taken by residents of communities located from Tuluksak downstream to Eek.

Chinook salmon are particularly sought after for subsistence use in the Kuskokwim Area and account for a large percentage (38%) of the total subsistence salmon catch. The 1999 subsistence chinook harvest was about 11 % below the 1989 - 1999 average of 87,095 fish (Appendix A.10).

The estimated sockeye harvest during 1999 (49,388 fish) was the highest it has been since 1993 (Appendix A.11). The 1999 harvest was also 21% greater than the 1989 through 1999 harvest average of 40,896. Subsistence harvests of both coho and chum salmon have both experienced a general decline since 1989 (Appendix A.12 and A.13). The estimated harvest of 27,753 coho salmon in 1999 is 31% below the average harvest of 40,004 fish from 1989 through 1999. The harvest of 47,612 chum salmon during 1999 was the second lowest catch since 1989. The average harvest of chum salmon from 1989 through 1999 is 84,234 fish. Only in 1997 was the chum harvest lower (Appendix A.13).

Several hundred households provided information on the types of gear that they used for harvesting subsistence salmon. Households often used multiple types of gear: set gillnets, drift gillnets, large mesh gear and small mesh gear. Drift gillnets were the gear type most commonly reported, particularly in the lower and middle Kuskokwim River areas (Table 14). Set gillnets were used throughout the region. Fishers in the Kuskokwim River drainage from Stony River upstream to Nikolai and communities in the Bering Coast area depended largely on set gillnets for harvesting subsistence salmon. No fish wheels were reported during the 1999 surveys. Fish wheels are sometimes used by residents in Aniak and Stony River as well as in other middle and upper Kuskokwim River communities. One household in Mekoryuk reported using a seine to harvest salmon. Several households (175) throughout the region reported using rod and reel gear for harvest salmon for subsistence use. Residents in 21 communities reported using rod and reel gear to catch salmon.

On occasion, commercial fishers sometimes keep salmon caught during a commercial fishing period and take them home for subsistence use. During 1999, approximately 11 percent of the households which reported commercial fishing also reported that they kept salmon from their commercial catch for subsistence use (Table 15). A total of 105 chinook salmon, 37 chum, 106 sockeye, and 140 coho salmon were reportedly retained from the commercial catch for subsistence use. The number of salmon retained from commercial fishing activities for subsistence use is usually relatively low. The lack of commercial fishing opportunities in 1999 is partly responsible for the low numbers retained.

More than 1,000 households responded to a question about the quality of subsistence salmon fishing during 1999. The purpose of this question was to learn how households viewed their 1999 subsistence fishing success. Households were asked to rate their subsistence fishing success for each of the four species surveyed (chinook, sockeye, chum, coho) as "Very Good," "Average," or "Poor." Subsistence fishers from communities located within the Lower Kuskokwim River area, Tuntutuliak to Tuluksak, generally reported the quality of their subsistence fishing results higher than fishers in the middle and upper Kuskokwim region and South Kuskokwim Bay.

The majority (72%) of subsistence fishers responding felt that the quality of their subsistence chinook fishing was very good or average (Table 16). Comments which subsistence fishers shared about the 1999 chinook fishing success pointed that the run was slow, weak, and later than usual. Fishers also said that the chinook salmon were smaller than usual and that high water made fishing difficult.

Although the chum salmon harvest was relatively low during 1999, nearly two-thirds (62%) of Kuskokwim fishers felt that their chum salmon harvests were average or better. Fishers reporting poor chum harvest success indicated that the run was weak and that there were fewer fish than usual.

Overall satisfaction in subsistence fishing for sockeye salmon was higher than chinook, at 73 percent of households reporting it as very good or above average. Fishers reporting sockeye fishing as poor often weren't sure why it was poor for them, although some mentioned high water

and weak runs as the reason. Satisfaction in fishing for coho salmon was the lowest of all. Almost half (43%) reported that subsistence fishing for coho was poor. Reasons given for poor coho fishing included a weak run, smaller than usual fish and high water. Several fishers mentioned having to make more drifts than usual to harvest the few coho they caught.

COMMERCIAL FISHERY

The Kuskokwim Area commercial salmon fishery dates back to the late 1800s. In the early years of the fishery, most of the commercial catch was sold locally for dog food (Oswalt 1990, Brown 1983). Salmon have been harvested in the Kuskokwim Area for export since 1913 (Pennoyer 1965). The current system of fishing districts, formerly called subdistricts, began in 1960 for the Kuskokwim River and District 4 (Appendix A.2). District 5 was established in 1968. The Kuskokwim River chum salmon fishery began in 1971 with gillnet mesh size restricted to 6 inches or smaller after 25 June. In Districts 4 and 5, gillnet mesh size has been restricted to 6 inches or smaller since formal inception of the districts. In 1985, the 6-inch maximum gillnet mesh size was applied to all Kuskokwim Area commercial salmon fisheries. The directed chinook salmon fishery in the Kuskokwim River was discontinued in 1987 (Appendix A.2).

Prior to 1983, a management strategy of conservatively increasing the commercial harvest guidelines to establish definite trends between catch and escapement allowed development of the fishery. Since changing from a harvest-guideline-based management strategy to an escapement-objective-based strategy in 1983, average harvests have generally increased (Appendix A.4). The only stock in the Kuskokwim Area that is a management concern[2] is Goodnews Bay chinook salmon. The weak returns of chum and coho salmon in 1997, 1998 and 1999 may require special management measures in the 2001 through 2004 return years to prevent the creation of additional management concerns.

Coho salmon are the most important species in the commercial fishery both in terms of harvest numbers and value to the fishers. The commercial fisheries in all four districts target coho in late July and August. Chum salmon are usually second in importance being the target species in the Kuskokwim River fisheries in June and July. In most years, sockeye salmon are the third most commercially important species with directed fisheries in Districts 4 and 5. Chinook catch and value ranks fourth with the only directed commercial fishery on this species occurring in District 4. Pink salmon are the least numerous and least valuable species in the commercial fishery.

Public Communications

Communicating management plans and decisions to the public is often challenging because many people in the Kuskokwim Area speak only Yupik, or English as a second language. Special regulation notices are broadcast over local radio stations, VHF and CB radio in English

[2] A management concern is a stock that fails to reach its escapement objective despite repeated proactive management measures.

and Yupik. The department and the Kuskokwim River Salmon Management Working Group (Working Group) relationship has dramatically improved the acceptance and understanding of fisheries management by many users. The Department participates in school and workshop programs in the winter. News releases are now more widely distributed through a computerized FAX and e-mail system.

Commercial Fishery Data

Catch per unit of effort (CPUE) is used in this report to describe the relative success of fishing and as an index of abundance. Commercial CPUE is the catch during a fishing period divided by the product of the number of unique CFEC permits used in a fishing period and the total number of hours the district was open to commercial fishing. Commercial CPUE is the number of fish caught per permit-hour in this report.

Computer tabulations of fish tickets provide the commercial catch data presented in this report. The computer software program is a statewide system provided by the Commercial Fisheries Division Computer Services section.

The commercial fishery has expanded during the last 15 years (Appendix A.5). This expansion is due to increased participation by individual fishers and improvements in fishing gear, tendering, and processing capabilities, and a shift to escapement based management. In 1995, a record 829 of the 840 permit holders made at least one landing (Appendix A.6). Since 1989 and 1990, when 824 permit holders fished, the number of active permits had declined slightly until 1995 (Appendix A.6). Since 1995, the number of participating permit holders has decreased considerably due primarily to a significant drop in the prices paid for salmon. Kuskokwim Area permit holders can transfer freely between commercial fishing districts.

Appendix A.5 shows that permit-hours peaked in 1975; probably due to the impending limited entry permit moratorium. Since that time, maintaining adequate subsistence harvests and spawning escapements have required reductions in fishing time. Fishing efficiency has increased, as the increase in harvest (Appendix A.4) and the decrease in permit-hours (Appendix A.5) shows. Improved run strength, escapement based management, and increased participation resulted in permit-hours stabilizing to around 100,000 from 1987 to 1995 (Appendix A.5). In 1999, permit-hours were 89% below the most recent 10-year (1989-1998) average in Districts 1 and 2 because of limited fishing time due to very weak chum and coho salmon returns and lower participation caused by low prices. Permit-hours were 52% below average in District 5 and 46% below average in District 4 primarily due to low prices and a very poor coho return.

Commercial fishing regulations set maximum gillnet specifications of 6-inch or smaller mesh, 50 fathoms in length and 45 meshes in depth for all districts (ADF&G 1985). Fishing periods in Districts 1 and 2 are usually six hours in duration from 1:00 p.m. until 7:00 p.m., as required by the management plan. Longer fishing periods generally divide the extra time before 1:00 p.m. and after 7:00 p.m. In Districts 4 and 5 fishing periods are normally 12 hours in length. Fishers

in those two districts prefer daylight fishing hours so the periods are normally 9:00 a.m. until 9:00 p.m.

Adjustments of the number and duration of commercial fishing periods and time intervals between periods are the primary methods of distributing the harvest throughout the run. This helps to avoid over harvesting discrete stocks, achieve biological escapement goals (BEG's), and allows sufficient fishing time for the subsistence fishery. In 1999, commercial fishing periods varied between 6 and 12 hours in length depending on the district, species, effort, run magnitude and processing capacity. Run magnitude is assessed by commercial and subsistence catch data and by various department, non-profit organization, USFWS and industry sponsored projects.

Kuskokwim Area fishers owned 97% of the 825 commercial permits renewed in 1999 (excluding educational permits held by local schools) while non-local Alaskan residents owned 2% (17). Non-residents owned only 5 permits (Table 2).

SPORT FISHERY

The Sport Fish Division in Dillingham manages all sport fisheries from the Goodnews River to and including the Aniak River drainage on the mainstem Kuskokwim. The Sport Fish Division in Fairbanks manages the remaining Kuskokwim River drainages. Overall, sport fishing activity and harvest in the Kuskokwim Area is relatively low, but growing. The number of angler-days in Kuskokwim Bay and lower Kuskokwim River streams (downstream of and including the Aniak River drainage) has increased from 11,358 in 1985 to 21,247 in 1997 (Minard et. al. 1998). Preliminary estimates of angler-days for all Kuskokwim Area drainages in 1998 total 31,177[3]. Moderate sport fishing activity occurs in the Kanektok, Goodnews, Kisaralik, Kwethluk, Aniak and Holitna Rivers, which account for the majority of the angler-days in the Kuskokwim Area.

ESCAPEMENT MONITORING AND ASSESSING RUN ABUNDANCE

The vast size, remoteness and geomorphic diversity of the Kuskokwim Area presents tremendous challenges to monitoring salmon escapements and assessing run abundance. Aerial spawning ground surveys have been the most cost-effective means of monitoring salmon escapements in the area, but their usefulness and reliability are limited due to a high degree of variability. The more thorough and rigorous ground based projects such as weirs, counting towers and sonar have been operated in only a few locations because of costs and limited budgets. Over the past few years, however, ADF&G has been able to expand the number of weir and counting tower projects in the Kuskokwim Area through cooperative partnerships with other organizations (Table 1). These cooperative efforts have added substantially to our ability to monitor salmon escapements and to evaluate the effectiveness of inseason management actions.

3 Unpublished data from Dan Dunaway (Dillingham) and John Burr (Fairbanks) , ADF&G Sport Fish Division

Salmon managers require timely assessments of run abundance in order to effectively manage commercial and subsistence fisheries without jeopardizing escapement needs. Within the Kuskokwim River, escapement projects have limited usefulness for inseason management because of the great distances between the areas of harvest and the location of escapement projects. It may take weeks for salmon to travel between these locations. Consequently, managers in the Kuskokwim River rely on a variety of inseason indicators to assess run abundance including test fisheries, commercial catch statistics and informal reports from subsistence and sport fishers. In Kuskokwim Bay, the escapement monitoring projects are a short distance from the commercial fishing districts, so escapement data can have a more direct inseason application. Kuskokwim Bay managers also make extensive use of commercial catch statistics and information from subsistence fishers.

Aerial Surveys

Many of the escapement goals established for Kuskokwim Area streams in 1983 were based on aerial surveys. Biological escapement goals (BEGs) is a more recent term applied to escapement objectives (Buklis 1993). Kuskokwim Area BEGs based upon aerial surveys do not represent the entire spawning populations in the respective streams. The surveys are mostly conducted one time each season during a window of a few days when the maximum number of fish are expected to be on the spawning grounds. The BEGs developed from these surveys are based on the raw, unexpanded counts, therefore each count serves as an index of abundance rather than a census.

Aerial surveys are ordinarily restricted to clear water streams and lakes, the distribution of which is geographically skewed towards the lower Kuskokwim River basin and coastal streams. Tributaries in the middle and upper Kuskokwim River are oftentimes tannin stained or clouded by glacier runoff, both of which markedly reduce the visibility of fish. The list of streams with BEGs reflects the uneven geographic distribution of escapement monitoring (Appendix A.3).

In most cases, aerial surveys are best used to index spawning populations of sockeye and large chinook salmon because these fish are more visible. Some streams do have aerial survey-based BEGs for chum salmon (Buklis 1993), but these are of questionable usefulness because of protracted run timing and the low visibility of chum salmon on the spawning grounds. A few streams also have BEGs for coho salmon, but weather conditions seldom allow reliable aerial surveys to be flown for indexing coho salmon.

Ground Based Escapement Assessment

Weirs, counting towers and sonar projects operated in the Kuskokwim Area allow estimation of entire spawning populations, or major segments of those populations. Seven such projects were operated in the Kuskokwim Area in 1999 (Figure 1). Three of the projects have BEGs associated with them, but only one, the Kogrukluk River weir, has a BEG for coho salmon (Appendix A.3). Most of the BEGs are based on the average annual escapements at each site through about 1983 (Buklis 1993). BEGs are periodically reviewed and may be modified when appropriate. Other information collected at ground based projects may include salmon sex and length composition,

scales for age determination, statistics on the occurrence of gillnet marks on fish, genetic stock identification sampling, information on resident species, and habitat monitoring.

Kuskokwim River

Kogrukluk River Weir

The Kogrukluk River is a middle Kuskokwim River tributary located in the upper reaches of the Holitna River drainage (Figure 1). The Department has operated a weir on the Kogrukluk River since 1976 to monitor passage of chinook, sockeye, chum and coho salmon (Cappiello 1998a). The BEG for each of these species is 10,000, 2,000, 30,000 and 25,000 fish, respectively. Sockeye are considered incidental at the site, but since the project was first established, the annual trend has been towards increasing sockeye abundance (Appendix A.7). In fact, annual sockeye passage sometimes exceeds the abundance of other species. The Kogrukluk River weir is the only project in the Kuskokwim Area where coho escapement is regularly monitored. Operations in 1999 allowed for nearly full coverage of the salmon runs.

One of the earliest escapement monitoring projects in the Kuskokwim Area was a counting tower operated on the Kogrukluk River from 1969 through 1976 (Yanagawa 1972a, and 1973, Kuhlmann 1973, 1974, 1975; Baxter 1976 and 1977). The Department first tried to weir the river in 1971, but was unsuccessful (Yanagawa 1972b). Both the tower and the 1971 weir site were located several miles upstream of the current weir project. The early projects were also upstream of Shotgun Creek, a productive salmon spawning ground. The current weir site is downstream of Shotgun Creek.

Travel time for chum and coho salmon from the upper end of District 1 to the weir is estimated at about 25 days based on tagging studies conducted in the early 1960s (ADF&G 1961a and 1962a). Inseason escapement projection models have been developed to estimate the end-of-season escapements (Cappiello 1998a), but their usefulness is generally limited because of variability in salmon entry patterns.

Aniak River Sonar

The Aniak River is located in the lower Kuskokwim River basin and is believed to be one of the largest producers of chum salmon in the Kuskokwim Area (Figure 1). The Department began a sonar project on the river in 1980. Non-user configurable sonar equipment was used from 1980 through 1995. A transducer was deployed from one bank and passage in the unensonified section of the river was estimated using an expansion factor (Schneiderhan 1989). Results from the 1995 operations were considered unusable because of abnormalities in the operation that could not be resolved (Burkey et. al. 1996b). The problem was associated in part to limited crew experience, but also at fault was the lack of documentation inherent with non-user configurable sonar. In 1996 the project was redesigned to take advantage of user-configurable sonar technology (Vania and Huttunen, 1997). At the same time the project was relocated about a mile downstream where a transducer was deployed from each bank to allow full channel ensonification. The Association of Village Council Presidents has provided a technician to assist in field operations every year since the user configurable sonar was deployed. High water delayed installation several days in 1999,

but the late run timing of the salmon offset the late start. The project was also operated a few days later than usual to compensate for the late run timing.

The sonar passage estimates for the Aniak River include a mix of species, however the operating period typically focuses on a time span from late June through late July when the majority of fish passage is believed to be chum salmon. This assumption has generally been arguably confirmed through periodic netting activities (Schneiderhan 1989, Vania 1998). During the first few years of operation, fish passage was apportioned to chum and chinook salmon using the proportion of each species caught in gillnets (Schneiderhan 1981, 1982a, 1982b, 1984c). Species apportionment was discontinued after 1986 because of inadequate sample sizes, gillnet selectivity and the perceived dominance of chum salmon (Schneiderhan 1989). Since 1996, catches from periodic drift netting and beach seining at the site have been examined to obtain a qualitative indication of the relative abundance of salmon and resident species passing the sonar site.

The BEG for Aniak River sonar is 250,000 fish counts (Buklis 1993). Area biologists derived the goal subjectively in the early 1980s by relating the sonar passage estimates to trends in harvest and other escapement indices (Schneiderhan 1984c). In the years that followed, periodic consideration of the BEG provided no compelling reason to change the goal. The BEG of 250,000 fish has been carried forward to the redesigned sonar project, but it will be reassessed as more information is gathered.

The travel time for chum salmon from the upper end of District 1 to the Aniak River sonar site is estimated at about 7 or 8 days based on tagging studies (ADF&G 1961a and 1962a).

Other Kuskokwim River Escapement Projects

A number of other escapement projects have been operated periodically in the Kuskokwim drainage. The most intensive efforts occurred in the past few years through cooperative efforts with the U. S. Fish and Wildlife Service (USFWS), the Bering Sea Fishermen's Association (BSFA) and other organizations. Cooperative escapement projects were operated in 1999 on the Kwethluk, George, Tatlawiksuk and Takotna Rivers through partnerships with the Association of Village Council Presidents, the Kuskokwim Native Association, and Iditarod Area School District (Figure 1). These groups received federal funding through grants obtained by the BSFA, Bureau of Indian Affairs, the National Fish and Wildlife Foundation, and the National Marine Fisheries Service. The Department and USFWS worked jointly to provide varying levels of support to each project ranging from an on-site crew leader to equipment and technical guidance.

The George River weir (Molyneaux et. al. 1997b) and the Kwethluk River tower (Cappiello and Sundown 1998b) were each in their fourth year of operation, the Takotna River tower was in its fifth year and the Tatlawiksuk River weir was in its second year. The George and Tatlawiksuk River projects were both converted from fixed picket to resistance board weirs in 1999 and they were operational for nearly the entire chinook, chum and coho salmon runs. Operations at the Kwethluk River counting tower were truncated because counting conditions at the tower site were less than desired. The Takotna River counting tower never became operational due to poor installation and counting conditions throughout much of the season. None of the cooperative projects have BEGs associated with them as of yet. Annual funding for the cooperative projects is

always tenuous, however as of this writing all four projects are expected to operate in 2000. Plans are also underway to upgrade the Kwethluk and Takotna River projects from the current counting towers to a resistance board weir design that is better able to withstand periodic high water events.

Other escapement monitoring projects operated in the Kuskokwim River basin over the years include: South Fork Salmon River weir in 1981 and 1982 (Schneiderhan 1982b, 1982d), experimental sonar deployment in the Kwethluk and Kasigluk Rivers in 1978 and 1979 (Schneiderhan 1979,1980), and resistance board weirs on the Kwethluk in 1992 (Harper 1998) and Tuluksak Rivers from 1991 through 1994 (Harper 1995a, 1995b, 1995c, 1997), which were operated by the USFWS. All of these projects were discontinued due to funding shortages, technical limitations, or lack of local support.

District 4

Kanektok River Tower

The Kanektok River is the main spawning stream in District 4 (Figure 1). Historically, aerial surveys have been the primary means of assessing salmon escapements in the river. An experimental counting tower was initiated with little success in the lower Kanektok River in 1996 (Fox 1997). The project was operated through a cooperative effort between Quinhagak IRA and ADF&G, with support from BSFA, USFWS and the Bureau of Indian Affairs (BIA). Improvements were made to the tower operation in 1997 (Menard and Caole 1999). The changes, coupled with near record low water levels, allowed for moderate success in enumerating chinook, sockeye, chum and pink salmon, however, reliable species identification was difficult. Water levels in 1998 returned to a more average to above average range in the Kanektok River and the tower was essentially inoperable. The counting tower was not operated in 1999, instead resources were redirected to the development of a resistance board weir for the Kanektok River which may be installed in 2000.

Counting towers and non-configurable sonar equipment have been used in the past to estimate salmon escapement in the Kanektok River, but these projects were discontinued due to site limitations, technical obstacles and budget reductions (tower: ADF&G 1960, 1961b and 1962b; sonar: Schultz and Carey 1982, Schultz and Williams 1984, Huttunen 1984c, 1985c, 1986a, 1988).

District 5

Middle Fork Goodnews River

The Goodnews River is the primary salmon spawning stream in District 5. Salmon escapements are assessed in the drainage by means of aerial surveys and a weir on the Middle Fork Goodnews River (Figure 1). The weir is located about 15 miles from the eastern boundary of the commercial fishing district allowing for timely assessment of salmon escapement as needed for fishery management (Menard 1998). A fixed picket weir design was employed from 1991 to 1997. Use of a counting tower preceded the weir from 1981 through 1990 (Burkey 1990). The weir and tower projects monitored passage of chinook, sockeye and chum salmon. The BEGs are 3,500, 25,000 and 15,000 fish, respectively (Buklis 1993). The salmon spawning populations of the

entire Goodnews River drainage are estimated postseason based on the proportion of fish seen during aerial surveys relative to weir passage (Menard 1998).

Like most streams, assessment of coho salmon in the Goodnews River is problematic because of the high stream flows that often occur during the coho season. The problem was addressed in 1997 through the aid of the USFWS and BSFA who facilitated the purchase, fabrication and installation of a resistance board weir (Menard 1998). The resistance board weir replaced the fixed picket weir about mid-summer in 1997 and for the first time salmon enumeration continued through coho season. The resistance board weir allowed for nearly full coverage of the salmon runs in 1998 and again operated with little interruption in 1999. The late August and September operation was again funded through a grant from the USFWS.

Salmon Run Strength Assessment

Salmon managers require timely inseason assessment of salmon run abundance. In the Kuskokwim River, escapement projects provide limited usefulness in this regard because of the great distances between the areas of harvest and the project locations. Consequently, managers rely on test fisheries, commercial catch statistics, and informal reports from subsistence and sport fishers to augment escapement data.

In Kuskokwim Bay the escapement monitoring projects are much closer to the commercial fishing districts, so escapement data can be effectively used for inseason management. Kuskokwim Bay managers also make use of commercial catch statistics and information from subsistence and sport fishers. Catch statistics are especially important in District 4 where reliable escapement monitoring has been lacking.

Bethel Test Fishery

Daily inseason assessment of Kuskokwim River salmon run strength and timing is available from a drift gillnet test fishery operated near Bethel. The Bethel test fishery is located at river mile 80 of the Kuskokwim River which is about the midpoint of District 1 (Figure 2). The project began in 1984 and the methodology has remained largely unchanged (Molyneaux 1999). From early June through late August the test fish crew conducts three or four systematic gillnet drifts beginning one hour after high tide. The drifts are done at three stations distributed across the width of the channel. Each drift is 20 minutes in duration. Two 50 fathom gillnets are used, one net is hung with 5-3/8-inch mesh web and the other with 8-inch mesh. The two gillnets are rotated between the three stations following a systematic schedule. Both mesh sizes are operated from early June through about 10 July when chinook, sockeye and chum salmon all occur in relatively good abundance. The 8-inch mesh is discontinued after about 10 July when chinook abundance is low. Test fishing with the 5-3/8-inch mesh continues until late August.

The test fish catch from each tide is tallied by species then sold to a local fish buyer or distributed to charities. Catch statistics for chinook, sockeye, chum and coho salmon are presented as daily catch-per-unit-effort. Comparisons are made with test fish results from previous years to assess

abundance and run timing. The comparisons are subjective in that managers need to consider variables such as water level, fishing patterns and changing river morphology when comparing data from between years, and even within years.

Historically, other test fisheries have been attempted in the Kuskokwim River: Kwegooyuk test fishery, 1966 - 1983 (Baxter 1970, Huttunen 1984b); Eek test fishery, 1988 - 1994 (unpublished); Kuskokwim River subsistence test fishery, 1988 - 1990 (Kuskokwim Fishermen's Cooperative, 199[illegible]); Aniak test fishery, 1992 - 1995 (unpublished); Chuathbaluk test fishery, 1992 - 1993 (unpublished); and the Lower Kuskokwim River test fishery, 1995 (unpublished). Most of these projects were initiated at the prompting of groups other than ADF&G. They were all eventually discontinued for a variety of reasons including lack of funding, problems with consistency, difficulties with catch disposition, and ambiguous results.

Commercial Catch Statistics

Comparison of commercial catch statistics is another common method for assessing run strength. However, the usefulness of this approach can be confounded by inconsistencies in the number of participating fishers, the duration of commercial fishing periods and other variables that might influence catch or the effort applied by fishers. The practicality of this approach is limited, in years of low run abundance, because of the consequent fish mortality.

Subsistence and Sport Fish Information

Throughout each season, staff keep in close communication with subsistence and sport fishers to assess their fishing success and the degree to which their needs are being met. These catch reports sometimes play a pivotal role in management decisions. In 1999, Orutsararmuit Native Council began conducting inseason surveys of subsistence fishers as well and reporting the information to ADF&G and the Kuskokwim River Salmon Management Working Group.

Kuskokwim River Sonar

The department began developing a user-configurable sonar project in 1988 for deployment in the mainstem of the Kuskokwim River near Bethel (Mesiar et. al. 1994). That project became operable in 1993, but shortages in technical support and the restructuring of the Regional sonar program precluded its operation after 1995. Since 1995, the original sonar site has degraded and has been deemed unusable. Two sloughs that bypass the site have enlarged enough to possibly allow significant salmon migration. This could compromise salmon passage estimates at the old site. As part of the regional sonar rebuilding program, staff conducted limited site surveys in 1998. A redesigned sonar project began development in 1999 at a new site located 16 miles upriver of Bethel. The project is expected to require three or more years of development before it is able to provide information for inseason management, unfortunately, shortages in technical support will preclude development work in 2000.

SEASON SUMMARY

The 1999 Kuskokwim Area salmon season opened by emergency order with a period in District 4, on 21 June. The salmon season closed by regulation on 8 September following the final fishing period in District 5 on 25 August.

Extremely poor returns of chum and coho salmon, coupled with low prices resulted in the lowest harvest since 1983 and lowest exvessel value for Kuskokwim Area salmon fisheries since 1972 (Appendix A.6). Commercial salmon sales in 1999 were 83% below the most recent 10-year average (1989-1998). In 1999, 211,132 salmon were sold in the Kuskokwim Area. The catch was composed of 25,019 chinook, 81,201 sockeye, 32,251 coho, 2 pink and 72,659 chum salmon (Table 3). The 1999 estimated salmon harvests compared to the recent 10-year averages were as follows: chinook, 51% below, sockeye, 50% below, coho, 95% below, pink, 99% below[4] and chum 82% below average (Appendix A.4). The commercial harvest of chum was the second lowest since 1970 while the coho harvest was the lowest since 1972.

The department sold 98 chinook, 562 sockeye, 343 coho and 363 chum salmon from the Bethel test fishery. These fish were not included in the commercial sales. The receipts from these sales were used to help fund operating cost of the test fishery.

In 1999, 604 of the 832 Kuskokwim Area permit holders made at least one landing (Appendix A.6). This was the lowest number of permit holders fishing in the Kuskokwim Area since 1972. Commercial fishing effort, measured by permit-hours, was the lowest since 1966 and only 31% of the most recent 10-year average (Appendix A.5).

The average prices paid per pound were extremely low (Appendix A.8). Chinook salmon were worth an average of $0.32 per pound, $0.19 below the 10-year average. Likewise, sockeye salmon were worth $0.58 per pound, which was $0.13 below average. The price for coho salmon of $0.32 per pound was $0.13 below average and the second lowest since 1975. Pinks brought $0.05 a pound, $0.06 below average. The $0.10 per pound paid for chum salmon was $0.13 below average and the lowest since 1972.

Kuskokwim Area permit holders received $551,725 for their catch, excluding bonuses and other incentives not reported on fish tickets. Salmon buyers and processors operating in the Kuskokwim Area during 1999 are listed in Table 3. The value of the catch was the lowest since 1972 and 86% below the previous 10-year average of $3,830,193 (Appendix A.6). The average income per permit holder was $913, the lowest on record and 81% below the 10-year average of $4,797.

[4] Odd years only.

Kuskokwim River (Districts 1 and 2)

The Working Group, comprised of representatives from several Kuskokwim River salmon user groups, continued to work closely with the department in 1999. Through uncommon dedication by all the concerned parties, the Working Group provided inseason management recommendations that served as a cooperative approach to management of the Kuskokwim River salmon fisheries (Table 4). During the season, the Working Group met 10 times to evaluate the status of the salmon runs and make recommendations to the department.

The 1999 preseason outlook was for a near average chum salmon run. The return of five-year-old fish was expected to be above average based on the good return of four-year-old fish in 1998. The return of four-year-old chum salmon from the 1995 escapement was expected to be below average to average based on poor parent-year escapement. Overall, the 1999 commercial harvest of chum salmon was expected to be average to below average, ranging from 200,000 to 500,000 (Burkey et al 1999b).

In 1999, there were only 2 commercial fishing periods (two 6-hour) in District 1 for a total fishing time of 12 hours. This was a record low number of fishing periods in District 1. There were no commercial fishing periods in District 2. Total commercial harvest in District 1 was 4,705 chinook, 16,976 sockeye, 23,593 coho, 2 pink and 23,006 chum salmon (Table 6). Total exvessel value of the catch was $169,796, only 6% of the previous 10-year average exvessel value (Table 3).

A total of 509 permit holders fished in the District 1 commercial fishery in 1999 (Appendix B.2). The number of permit holders participating in the commercial fishery was a record low for both periods. These low effort levels slightly confounded comparisons of historical catch and CPUE.

Since the projects beginning in 1984, the Bethel test fishery CPUE provides a good estimate of the migration rate of salmon passing Bethel. The midpoints of the chinook, sockeye, chum and coho migrations in the Bethel test fishery were much later than normal. The sockeye, chum and coho salmon run timing past Bethel was the latest on record. The late run timing was probably due primarily to colder than normal ocean water temperatures and late ice breakup. The chinook migration midpoint of 28 June was 6 days later than the historical median of 22 June and the second latest on record (Molyneaux 1999). The sockeye migration midpoint was 6 July, 8 days after the 28 June median (Molyneaux 1999). The midpoint of the coho run was 15 August, 6 days later than the historical median of 9 August (Molyneaux 1999). The chum salmon migration midpoint was 14 July, 11 days later than the 3 July median (Molyneaux 1999).

For the entire season, Kuskokwim River water levels were above average for the 1984-1999 time period and at record high levels for 11 of the 92 total days. Water levels rose to record levels from 21-24 June and 30 June to 5 July. These high water levels may have significantly reduced the catchability of salmon in the Bethel test fishery. If true, comparability of CPUE data during these high water periods, to historical Bethel test fishery data would be greatly diminished.

There was only one commercial fishing period in District 1 during the chum salmon season on 30 June (Table 6). This is the latest opening date in the history of the Kuskokwim River chum salmon directed fishery. There were no commercial openings in District 2 (Table 6). A total of 23,006 chum salmon were harvested by 442 permit holders (Table 6). This was 7% of the most recent 10-year average chum salmon harvest. The average price per pound for chum salmon was $0.10 making the exvessel value of the chum catch worth only $16,428 (Table 3).

Run assessment through late-June showed below average chum and chinook salmon abundance. The Working Group met on 25 June and decided to meet again on 28 June due to the poor salmon run strength. By 26 June, subsistence catches of chinook had increased significantly. At the 28 June meeting, the Working Group recommended that the Kuskokwim River be opened to commercial fishing on 30 June. The department opened the commercial fishery on 30 June for 6 hours downstream of Bethel in compliance with 5 AAC 07.365 KUSKOKWIM RIVER SALMON MANAGEMENT PLAN. The catch of 22,700 chum salmon was the lowest on record for that date and, even with the record low effort level, the CPUE was also the lowest on record. The chinook and sockeye salmon catches and CPUEs were above average for that date.

For the remainder of the season, run strength indicators showed the chum salmon return to be well below average. The weak return of chum salmon resulted in a very conservative management strategy. Only one commercial period was allowed and the commercial chum fishery was closed on 15 July. Under what has come to be considered, by most commercial fishers, a 'normal' fishing schedule there are two openings per week (Monday and Thursday), with two or three days of no fishing between periods.

The preseason outlook for coho salmon was for an average to below average return. Although coho salmon escapement was considered good during the 1995 parent year, the poor survival of the 1993 and 1994 escapements tempered the outlook for 1999. The level of uncertainty in the 1999 coho outlook was especially high given the limited escapement assessment information and the unexpectedly poor return of coho salmon in 1997 and 1998. The preseason projected harvest of coho salmon in the Kuskokwim River commercial fishery ranged from 100,000 to 500,000 fish (Burkey et al 1999b)

The coho salmon season began on 7 August with a 6-hour period in District 1. The number of permit holders fishing in District 1 was a record low for that date. A total of 23,593 coho salmon were harvested by 389 permit holders (Table 6). Coho salmon catch and CPUE were record low for that time period. This was 5% of the most recent 10-year average coho salmon harvest. The average price per pound for coho salmon was $0.30 making the exvessel value of the coho salmon catch worth only $44,633.

There was only one commercial fishing period in District 1 and no periods in District 2 (Table 6) during the 1999 coho salmon season. Throughout the season, coho salmon run strength appeared to be very poor based on data from monitoring projects and the commercial catch. The conservative management strategy followed during the chum directed fishery was continued through the coho fishery. The run was not judged strong enough to support the 'normal' coho

salmon fishing schedule of two periods per week and three periods during the peak passage week. The Kuskokwim River closed to commercial fishing per regulation on 1 September.

Chinook Salmon

The combined commercial and subsistence chinook salmon harvest has increased from an average of 56,000 fish from 1960-1969 to 115,000 during 1988-1997 (Appendix B.3). A conservation concern for Kuskokwim River chinook salmon arose following a series of years with poor chinook salmon escapements in the mid-1980s (Figure 6). Besides the poor escapements, the low number of female chinook salmon in the escapement compounded the conservation concern (Cappiello and Burkey 1997).

Beginning in 1984, the Board of Fisheries began restricting the commercial fishery because the department was unable to correct the problem through inseason management measures. In 1985, a shift to 6-inch or smaller mesh commercial gillnets reduced the harvest of larger female chinook salmon. This gear change was successful in reducing the sex ratio of the commercial catch from 43% to 29% female (Molyneaux and DuBois 1996). However, the total escapement index continued to decline (Figure 6). To provide for the subsistence harvest and maintain average spawning escapements the directed commercial harvest of chinook salmon was prohibited in 1987. Chinook salmon escapements improved in subsequent years (Figure 6). An unexpected benefit of the improved status of chinook salmon in the Kuskokwim River was an increase in the commercial harvest of chinook salmon (Molyneaux and DuBois 1996). The subsistence fishery continues to target large chinook salmon with "king" gear. Improved survival, perhaps related to elimination of the directed high seas salmon fishery, played a role in the success of these management changes.

Since 1987 the chinook salmon catch has been incidental to the chum salmon fishery in Districts 1 and 2. In 1999 the commercial harvest of 4,705 was well below the recent 10-year average of 27,238 (Appendix B.3). This was primarily due to the limited fishing time during the chum salmon fishery. The exvessel value of the chinook harvest was $22,266, well below the recent average of $228,888 (Table 3).

Even with a record late start of the commercial fishery and only one opening during the chinook season, the total Kuskokwim River drainage escapement index for chinook salmon was not achieved in 1999 (Figure 6). Chinook escapement at the Kogrukluk River weir was 5,570, well below the goal of 10,000 fish (Appendix A.7). Chinook salmon escapement goals were achieved in only 1 of the 3 aerial survey index streams that were surveyed (Appendix B.4 and Table 7). The Bethel test fish index for chinook salmon was the second lowest on record (Molyneaux 1999).

Sockeye Salmon

The sockeye salmon catch is incidental to the directed chum salmon fishery in Districts 1 and 2. Before 1981, sockeye and chum salmon were not accurately differentiated in commercial or subsistence catches. This prevented an accurate record of the sockeye and chum salmon harvest

in the Kuskokwim River. Sockeye salmon have comprised 5% to 33% of the sockeye-chum salmon catch since 1981. Before 1981, the reported sockeye salmon catch was less than 2% of the sockeye-chum salmon catch (Appendix B.5). In 1999 the commercial harvest of 16,976 sockeye salmon was 72% below the recent 10-year average of 61,443 (Appendix B.5).

Sockeye salmon escapement is documented ancillary to the other species. Sockeye escapement at the Kogrukluk River weir was 5,864, which was 58% below the recent 10-year average escapement of 13,797 fish (Appendix A.7). The Bethel test fish index for sockeye salmon ranked eleventh of 16 years of data (Molyneaux 1999).

Chum Salmon

Before 1971, chum salmon were an incidental catch during the chinook and coho directed salmon fisheries. The expansion of the commercial chum salmon fishery began in 1971. Based on the 1924-1943 subsistence harvest estimates, a total chum salmon harvest of 400,000 appeared to be consistent with the reproductive potential of the run (Appendix A.4). A combined commercial and subsistence catch of 400,000 chum salmon was the management goal from 1971 to 1979. Subsistence catches for the entire river have declined since the inception of the commercial fishery in 1971 (Appendix B.6). From 1971 to 1980 the average subsistence chum harvest was 173,689. The average harvest declined to 136,206 for the period 1981 to 1990 and to 59,865 for the period 1991-1998 (Appendix B.6). This is thought to be primarily due to the decline in the use of dog teams for transportation, not the increased commercial harvest. The low harvests in the 1990s are also influenced by overall poor chum salmon returns in the 1990s.

The commercial chum salmon harvest for the Kuskokwim River (Districts 1 and 2) has averaged 334,029 salmon in the last 10 years (Appendix B.5).

The following guidelines are used to manage the commercial harvest:

1. Chum salmon run assessment projects indicate that escapements will be adequate.

2. Commercial catch per unit of effort compares to previous years when escapements were adequate.

3. Subsistence fishers report adequate subsistence catches.

Declining run strength normally resulted in a one to two week closure in the last half of July. Since 1988, this closure of the commercial fishery between the chum and coho seasons has occurred in most years. Before 1985, only that portion of District 1 downstream of Bethel was open to commercial fishing during the chum salmon fishery. The Board instructed the department to use the entire length of District 1 beginning in 1985. Low chum escapements occurred in 1986 and 1987. Runs in 1988 and 1989 were at record high levels, but in order to reach escapement objectives more time was required between fishing periods. The 1990 and 1991 runs were smaller but a 4 to 6 day spacing between periods resulted in approaching or reaching chum salmon escapement objectives. Since 1991, the commercial fishery has been

opened later in June and generally has relatively longer spacing between commercial periods. The 1993 and 1997 returns were two of the lowest on record with only one commercial opening and the lowest subsistence harvests on record. The returns in 1994 and 1996 were strong but limited processing capacity resulted in reduced fishing time (shorter periods) and below average commercial harvests (Appendix B.7). Although better than the disastrously low 1997 return, the 1998 chum salmon run strength was below average, which required 4-10 days spacing between commercial periods.

The cumulative CPUE for chum salmon in the Bethel test fishery in 1999 was the lowest since the project began in 1984 (Molyneaux 1999). The Aniak River sonar count of 177,771 was 29% below the goal of 250,000 counts (Table 8). The Kogrukluk River weir passage of 13,664 chum salmon was 54% below the goal of 30,000 fish. Daily chum salmon counts at the George River weir were generally better than corresponding counts in 1997 but below counts in 1996 (Appendix A.7).

At the Kogrukluk River weir, parent-year escapements exceeded the objective in the 1994 and 1995 brood years. Escapement past the Aniak River sonar was achieved in 1994 but no escapement estimate is available for 1995. The observed contribution of 5-year-old chum salmon was lower than expected based on the number of 4-year-olds in 1998. The contribution of 4-year-old fish in the 1999 return was poor, as expected based on the poor escapement in 1995.

Coho Salmon

Kuskokwim River managers have a limited number of inseason indicators of coho salmon abundance in the drainage: the Bethel test fishery, Kogrukluk River weir, commercial catch data and an informal collection of subsistence information. As they accumulate additional years of successful operation, the George and Tatlawiksuk River weirs will become more useful as coho salmon run strength indicators. The Kogrukluk River weir has a coho escapement objective of 25,000 fish. Commercial catch per unit of effort in District 2 during coho season which has been useful as an indicator of abundance of coho salmon above District 1 was not available in 1999.

Traditionally, coho salmon (locally called "rain fish") were not well utilized for subsistence because of poor drying conditions during rainy fall weather. Subsistence use of coho salmon has increased in areas where freezers are available to preserve fish. Since 1988, Subsistence Division staff has started their surveys after coho salmon have completed migration past the upper river villages. This has improved the quality of the coho salmon data over earlier years when subsistence surveys were conducted before subsistence fishing for coho was finished.

Commercial coho fishery management in the Kuskokwim River is based on coho salmon abundance when that species dominates the commercial catch. Fishing periods are usually simultaneous in Districts 1 and 2 throughout the season, which closes by regulation on 1 September. Record runs in 1984 and 1994 as well as a late run in 1989 resulted in extensions

of the season in those years (Appendix B.7). The management strategy during the coho season is similar to that for chum salmon.

In the most recent 20 years, coho catches have ranged from 130,803 fish in 1997 to the record high harvest in 1996 of 937,299 fish (Appendix B.5). The most recent 10-year average harvest is 514,277 fish. Since 1985, in years when both Districts 1 and 2 had buyers, the number of permit holders that fished during coho season has ranged from 597 to 775. In 1999 a total of 388 permit holders harvested 23,593 coho salmon in the Kuskokwim River districts (Table 6).

Under cooperative management of the commercial fishery with the Kuskokwim River Salmon Management Working Group, the coho salmon escapement goal at the Kogrukluk River weir has been achieved in three out of eight years with adequate data (Appendix A.7). Lack of public confidence in the Bethel test fishery, lag time of Kogrukluk River weir escapements, and lack of sufficient additional data contributed to the over fishing. The department's uncertainty during the early portions of the run often caused corrective actions to come too late to make a significant difference in escapement needs to the upper drainage as indexed by Kogrukluk River weir. The escapement objective at Kogrukluk River weir was achieved for three consecutive years from 1994-1996.

In 1999, the Kogrukluk River weir operated for most of the coho migration period. An estimated 12,609 coho salmon escaped, which was 50% below the minimum escapement goal of 25,000 fish (Appendix A.7). The Bethel test fishery cumulative CPUE in 1999 was the lowest on record (Molyneaux 1999).

Kuskokwim Bay

Quinhagak (District 4)

District 4 is located in the marine waters adjacent to the village of Quinhagak at the mouth of the Kanektok River, approximately 25 miles south of the Kuskokwim River (Figure 4). The commercial fishery was initiated in 1960, and occurs only in the marine waters of Kuskokwim Bay. The northern boundary of the fishing district is approximately seven miles from Quinhagak at Weelung Creek, and the southern boundary of the fishing district is approximately four miles from Quinhagak at the southernmost mouth of the Arolik River. The western boundary of the fishing district is three miles from the coast. Commercial fishing occurs primarily in the tidal channels that radiate out into the bay from freshwater streams in the district.

In the Kuskokwim Area, permit holders have unrestricted movement between commercial fishing districts, and the commercial fishing effort in District 4 increased considerably in the early 1990s. The number of permit holders, fishing in District 4, the last two decades has ranged from 177 in 1982 to a record high of 409 during the 1993 season. The recent 10-year average was 312 permit holders (Appendix C.1). The majority of the fishing effort occurs during the chinook and sockeye season with usually twice as many permits fished compared to coho season (Appendix C.2). The shift of effort in the early 1990s to District 4 may be due to the directed

chinook salmon fishery, and changes in the June Kuskokwim River commercial fishery. However, in the last several years, District 4 had below average effort and this trend continued in 1999 when 218 permit holders participated in the fishery. In 1999, the number of permits fished during chinook and sockeye salmon season were 30% below the 10-year average and the number of permits fished during coho season were 40% below the 10-year average (Appendix C.2). The lower number of permit holders participating in the fishery in the last several years may be attributable to lower fish prices and several construction projects in the area that offer more secure income. Also, the poor return of coho in 1999 likely had an effect on the number of permits fished during the fall season. There were 19 commercial fishing periods during the 1999 season, which was 40% below the 10-year average of 32 periods. The 1999 District 4 harvest of 104,016 salmon ranked twentieth out of forty years (1960-1999), and was 51% below the recent 10-year average of 213,825 salmon (Appendix C.3).

In previous years in the Quinhagak fishery there often was only one buyer during many fishing periods. This sometimes effected the fishing effort or the length of fishing periods because of limited processor capacity. In 1999 a new company purchased fish throughout the season in Quinhagak, which eliminated any restrictions on commercial fishing because of processing limitations. However, the low prices of the past few years have continued, and the exvessel value of $278,294 was 63% below the 10-year average of $762,875 (Table 3).

A joint weir project between the Department and the Native Village of Kwinhagak (NVK) was scheduled to begin counting in 1999, but because of high water levels, construction delays and a change in the weir location, the project is now scheduled to be operational in 2000. No escapement aerial surveys (Appendix C.4) were flown during peak spawning periods because of poor weather conditions and lack of airplane availability.

Historically, District 4 usually opens before 16 June in compliance with 5 AAC 07.367. DISTRICT 4 SALMON MANAGEMENT PLAN. However, a meeting with fishers in Quinhagak on 10 June resulted in a consensus to postpone the first opening because of weak subsistence catches. The fishers agreed to notify the department through the NVK Department of Natural Resources (DNR) when the first opening should occur. On 17 June the Native Village of Kwinhagak DNR notified the department that fishers were requesting the first opening to be on 21 June and the department concurred. An average harvest for chinook salmon occurred on the first opening (Table 9 and Appendix C.5), and fishing continued on the normal two periods per week schedule for chinook salmon season.

All commercial fishing periods in 1999 were 12 hours. Based on the CPUE during most commercial fishing periods during the chinook season, it appeared that run strength was below average to average. The 1999 chinook salmon commercial catch of 18,426 was the fourteenth highest catch on record (1960-1999), but was 13% below the recent 10-year average of 21,091 (Appendix C.3). Buyers paid an average price of $0.33 per pound, which was 8 cents higher than last year's price. The exvessel value of chinook salmon of $93,886 was below the 10-year average of $175,297 (Table 3).

The directed sockeye salmon fishery began after the 1 July opening when the sockeye catch exceeded the chinook catch. Fishing occurred only twice each week during the next two weeks of the sockeye fishery as the catch and CPUE (Table 9) were below the historical average (Appendix C.6). The following week (19 July) the sockeye CPUE improved to the historical average and fishing continued three times a week until coho salmon dominated the catch during the 4 August opening. The 1999 sockeye salmon catch of 41,315 was the tenth highest catch on record (1960-1999), but was the lowest catch in the 1990s, and was 32% below the recent 10-year average of 60,890 fish (Appendix C.3). The average price paid for sockeye salmon was $0.55 per pound, approximately the same price as 1998. The exvessel value for sockeye salmon in District 4 of $141,492 was below the 10-year average of $283,612 (Table 3).

Chum salmon are an incidental catch in the chinook and sockeye salmon commercial fisheries in District 4. The 1999 chum salmon catch of 38,091 was 33% below the recent 10-year average of 56,524 fish (Appendices C.3 and C.8). The average price per pound for chum salmon ($0.10) was approximately the same as last year, but the exvessel value of $28,116 was below the 10-year average of $83,315 (Table 3).

The directed coho salmon fishery began after the 4 August opening in which the coho catch surpassed the sockeye catch. The coho catches in late July and early August were at record lows and commercial fishing was suspended for one week when the department switched to coho management after the 4 August opener. The next opening on 11 August continued the trend of poor catches when compared to historical catches on that date (Appendix C.7). Two more commercial openings occurred the following week with catches declining from the previous openings. Historically the coho run is building or peaking by the third week of August and when declining catches occurred in 1999 the department suspended commercial fishing after the 18 August opening. Normally the district closes by regulation on 8 September, although sometimes buyers suspend operations in late August because of declining catches. The last opening on 18 August was the earliest the season has ended in over two decades. The coho catch of 6,184 was 97% below the recent 10-year average of 63,820 fish (Appendix C.3), and the lowest coho catch since 1972. Permit holders were paid an average of $0.34 per pound, which was $0.04 above last year's price. The exvessel value of $14,800 was well below the 10-year average of $217,601.

Goodnews Bay (District 5)

Commercial fishing began in Goodnews Bay, the southernmost salmon district in the Kuskokwim Area, in 1968 (Figure 5). Fishing primarily is with drift gillnets in tidal channels in Goodnews Bay and a few set gillnets near the mouth of the bay. The number of commercial fishers peaked in 1988 when 125 permit holders fished, and the recent 10-year average is 86 permit holders (Appendix D.1). However, in the last several years participation has been below average in District 5, with 53, 54, and 50 permit holders in 1996, 1997, and 1998, respectively (Appendix D.2). In 1999 there were 73 permits fished and this increase compared to recent years may have been the result of reduced fishing time in District 4. However, the overall decrease in permits fished when compared to the 10-year average is likely the result of lower fish prices.

District 5 had more commercial fishing openings in 1999 than any other Kuskokwim Area district. This was the first time since 1987 that there were more commercial openings in District 5 than District 4. In recent years, District 5 fishing time had been affected by processor availability. This was not the case in 1999 as a new company based a floating processor in Goodnews Bay. However, the 20 commercial fishing periods in 1999 was 26% below the recent 10-year average of 27 periods. The 1999 District 5 harvest of 38,834 salmon was 53% below the recent 10-year average of 83,203 salmon (Appendix D.3), and was the tenth lowest harvest in the history of the fishery (1968-1999). The exvessel value of $103,662 was 69% below the 10-year average of $332,759 (Table 3).

A counting tower on the Middle Fork Goodnews River provided estimates of salmon escapement from 1981 through 1990. In 1991 a weir replaced the tower. The weir provided more accurate counts at a lower cost, and the savings have allowed the project to enumerate a portion of the coho salmon escapement. The primary objective of this project is to provide daily escapement information to improve management of the commercial fishery. The Middle Fork Goodnews River weir project also provides a calibration of aerial survey accuracy (Appendices D.4 and D.5)

As in District 4, all fishing openings in District 5 in 1999 were 12 hours in length. Over the last five years the management strategy has been to delay the first opening until the last week of June as an attempt to increase escapement of chinook salmon into the Goodnews River drainage. The delayed first opener strategy has resulted in the escapement goal of 3,500 chinook salmon, past the Middle Fork Goodnews River weir, being met three times in the previous five years (Appendices D.6 and D.7). In 1999 chinook salmon showed delayed run timing which was attributed to the late spring and the department did not open the commercial fishery until early July. The chinook salmon escapement in 1999 was believed to have exceeded the goal of 3,500 fish. The actual count was 3,221 chinook. The 3,500 chinook escapement was believed to have been reached as high water resulted in a later than normal start date for the weir project and because of flooding in early August the weir was not operational for 10 days (Menard 2000). No aerial surveys were flown due to poor weather and lack of airplane availability. Using historical aerial survey ratios the North Fork Goodnews River escapement was estimated at 6,565 chinook salmon (Appendix D.4). The commercial catch of 1,888 chinook salmon was 26% below the recent 10-year harvest of 2,541 fish (Appendices D.3 and D.8). Permit holders were paid an average of $0.29 per pound, which was $0.04 above last year's price. The exvessel value of $9,020 was below the 10-year average of $21,549 for chinook salmon (Table 3).

The 2 July opening was the latest first opening for the Goodnews Bay fishery since 1971. The first opening resulted in a below average CPUE and the following week fishing was reduced from the normal three periods per week to two fishing periods (Table 10). Although below average catches continued in the second week of July, the weir passage of sockeye had increased, and projections showed that the escapement goal of 25,000 would be easily attained. Therefore, commercial fishing continued on the normal three periods a week schedule throughout the sockeye season. The commercial harvest in 1999 was 22,910 sockeye salmon, which was 41% below the recent 10-year average of 38,962 fish and ranked sixteenth historically

(Appendices D.3 and D.9). The average price paid for sockeye salmon, $0.53 per pound, was approximately the same price as last year. The exvessel value for sockeye salmon in District 5 of $78,800 was below the 10-year average of $193,529 (Table 3). The escapement at the Middle Fork Goodnews River weir was likely over 50,000 sockeye salmon. There were 48,205 sockeye actually counted and no interpolation made for passage during days the weir was inoperable (Menard 2000). Using historical aerial survey ratios, the North Fork Goodnews River escapement was estimated at 99,727 sockeye salmon (Appendix D.4).

The chum salmon catch is incidental to the sockeye salmon fishery in District 5. Chum catches were below historical catches (Appendix D.11) in 1999. The 1999 catch of 11,562 chum was 26% below the 10-year average of 15,717 fish and ranked seventeenth historically. The average price per pound for chum salmon was $0.10, which was 1 cent lower than last year, and the exvessel value of $8,327 was below the 10-year average of $24,252 (Table 3). The chum salmon escapement at Middle Fork Goodnews River weir was likely over 20,000 with 19,533 chums counted during the time the weir was operational (Menard 2000). Using historical aerial survey ratios the North Fork Goodnews River escapement was estimated at 51,361 chum salmon (Appendix D.4).

The directed coho salmon fishery began after the 11 August opening, when coho salmon catch surpassed sockeye salmon catch. Coho catches had been at record lows in early August and fishing time was reduced to two openings the following week. Poor catches continued and counts at the weir (which became operational again on 14 August) were low. Although coho catches improved during an opening on 25 August they were well below historical catches for that date. The weir also continued to have low passage of coho salmon and commercial fishing was suspended until the district closed by regulation on 8 September. The 1999 coho salmon catch of 2,474 was the third lowest on record and was 89% below the recent 10-year average of 22,629 fish (Appendices D.3 and D10). Permit holders were paid an average of $0.39 per pound, which was $0.09 more than last year. The exvessel value of $7,515 was below the 10-year average of $92,545 (Table 3).

This was the third year that escapement counting continued into September at the Middle Fork Goodnews weir. Escapement from 14 August until 26 September was 11,545 coho salmon (Menard 2000). Possibly a few hundred coho passed the weir before it became operational in mid-August and a few coho may have passed after the weir was pulled on the evening of 26 September. However, in the last three days of counting in September 1999, no coho passed the weir so the majority of the run was most likely counted. In 1997 and 1998, the weir was pulled on 17 September. Counts in 1997 and 1998 were 9,617 and 35,441 coho salmon respectively. Through 17 September in 1999 there was 11,129 coho salmon counted at the weir. The coho run in 1999 was believed to be similar to the 1997 run, as the commercial harvests in both years were comparable. Historically, 1997 and 1999 ranked as the third and fourth lowest commercial coho harvests (1968-1999), and the 1998 commercial harvest was the eleventh highest. Presently no BEG has been established for coho salmon at the Middle Fork Goodnews weir due to the limited coho escapement database.

Enforcement

The Fish and Wildlife Protection Division of the Department of Public Safety were present in the Kuskokwim Area from early June until early September. Personnel available for this program were four commissioned and one non-commissioned officer. They used one C-185, three Supercub aircraft and one skiff. Details on number and type of citations issued for commercial fishing violations are not available at this time.

OUTLOOK FOR 2000

The Kuskokwim Area has no formal forecast for salmon returns. Broad expectations are developed based on an evaluation of parent-year escapements and trends in harvest and perceived productivity. Harvest expectations are described using a loose interpretation of the statistical quartiles for the past ten years of harvest performance as a general guideline. Readers should be cautioned that these outlooks are subjective and have a high level of uncertainty associated with them.

Many of the major salmon runs of Western Alaska had extremely low returns in 1997, 1998 and 1999 for reasons that are not fully understood (ADF&G 1997, NOAA 1999). In the Kuskokwim River, the poor return of age 4 and 5 chum salmon in 1997, and age 5 chum in 1998, were in part an after effect of brood year run failures in 1992 and 1993 (Francisco et. al. 1993, 1994b). The run failures of 1992 and 1993 should not have effected the 1999 returns, none-the-less, returns were weak and the cause is unknown. For recent years, Western Alaska run failures of sockeye, chum, chinook and coho salmon likely have some linkage to the short term anomalous ocean conditions in 1997 and 1998; i.e., an exceptionally strong El Niño event in 1997 and La Niña event in 1998 that may have resulted in poor ocean survival of juvenile salmon (Kruse 1998, NOAA 1999). This event may continue to have a negative influence in 2000 for those cohorts of salmon, which were ocean resident during the anomalous conditions.

In addition to these shorter-term effects, many researchers (Beamish et. al. 1997, Mantua et. al. 1997. Hare et. al. 1999) describe evidence of a long-term shift in the climatic conditions of the North Pacific and Bering Sea that are not favorable to salmon production in Western Alaska. If true, the influence of this climatic 'regime shift' is expected to reduce the overall productivity of Western Alaskan salmon returns into the next decade. These factors make outlooks for the upcoming season even more uncertain.

Chinook Salmon

Most chinook salmon return to the Kuskokwim Area at ages six, five, or four (Molyneaux 1998), so the primary brood years for the 2000 return will be 1994, 1995 and 1996. Commercial fishers throughout the Kuskokwim Area are restricted to using gillnets with mesh sizes of 6 inches or smaller. All returning age classes are susceptible to harvest with this mesh size, although the older-age (larger) chinook are less vulnerable than younger-aged fish. For the Kuskokwim River

drainage, 1994-1996 brood year escapement information about chinook salmon is limited to aerial surveys (Burkey and Salomone 1999), and Kogrukluk River weir (Burkey 1995, Cappiello 1998a). Some brood year data is also available from a weirs and towers operated on the Tuluksak River from 1991 to 1994 (Harper 1997), George River which began in 1996 (Molyneaux et al 1997b), and the Takotna River which began in 1995 (Molyneaux and DuBois 2000). In Kuskokwim Bay, chinook brood year escapement data is available from aerial surveys (Burkey and Salomone 1999), and a weir operated on the Middle Fork Goodnews River (Menard 2000).

Districts 1 and 2

The timing of the chinook migration through Districts 1 and 2 of the Kuskokwim River overlaps broadly with the chum salmon migration. Since 1987, the commercial fishery has been directed at the more abundant chum stocks through gear, time and area restrictions. Managers also delay or restrict the commercial chum fishery when concerns about chinook abundance, or subsistence needs, warrant additional conservation measures (e.g., Francisco et. al. 1988, 1990 and 1991). The incidental chinook harvest in the commercial fishery is therefore linked to the abundance of both chinook and chum salmon. Market interest in chum salmon is another variable that sometimes drives the incidental chinook harvest (e.g., Burkey et. al. 1997a, 1998).

The return of chinook salmon to the Kuskokwim River in 2000 is expected to be near average. Brood year escapements were good in all three parent years (Appendix A.7 and B.4). Commercial fishing effort was low in those years either because of chum salmon conservation concerns (Anderson et. al. 1994), or limited market interest in chum salmon (Burkey et. al. 1996b and 1997a). Consequently, chinook escapements were augmented over what would have otherwise been available with more normal fishing effort.

Based on chinook passage at Kogrukluk River weir and aerial survey results, it appears that brood year escapements were good in those years. Weir escapement in 1994 was 52% above the BEG and aerial survey objectives were achieved in six of seven streams[5] (Burkey et. al. 1997b). In 1995 chinook escapement at Kogrukluk River weir was twice the BEG, and nine of nine aerial survey objectives were achieved. In 1996 weir escapement was 42% above the BEG, and two of three aerial survey objectives were achieved.

Limited chinook escapement passage estimates are available for few other streams. Tuluksak River weir was operated from 1991 to 1994, but the project had no BEGs associated with it (Harper 1995a, 1995b, 1995c, 1997, Burkey et. al. 1998). There has been a steady increase in chinook escapement over the four years at the Tuluksak and Kogrukluk River weirs in those years. George River weir began operation in 1996 and escapement appeared to be good relative to the subsequent years of operation (Molyneaux et. al. 1997b). Counts are available for Takotna

[5] Aerial survey objectives as used here include official BEG's and the median historic counts for streams surveyed, but which have no BEG.

River counting tower from 1996 and 1997; passage in 1996 was lower than in 1997 (Molyneaux and DuBois 2000).

Throughout the 1990s chinook abundance in the Kuskokwim River has been relatively good. The 1998 and 1999 returns appeared less abundant, but the available information is fragmentary due to high water levels that inhibited the operation of escapement projects and poor weather conditions that made conditions for conducting aerial surveys less than desirable.

The outlook for 2000 is for an incidental chinook harvest near or below the 10-year average. This outlook takes into consideration the anomalous ocean conditions that may have impacted the early marine residency for some of the returning chinook salmon in 2000. Also considered is the fact that a number of the past ten years had reduced commercial exploitation on chinook salmon due to conservation measures directed at chum salmon (Francisco et. al. 1993,1994b, 1995; Burkey et. al. 1997b, 1999a and 1999b). If markets and fishing effort allow, the 2000 incidental commercial harvest of chinook salmon is expected to be in the range of 5,000 to 20,000 fish (Table 11).

District 4

District 4 currently has the only directed commercial chinook fishery in the Kuskokwim Area. Chinook run timing overlaps with the migration of sockeye and chum salmon, but the commercial fishery remains targeted on earlier running chinook as long as that species dominates the catch.

The only means of assessing brood year escapement for District 4 chinook is from aerial surveys of the Kanektok River. The aerial survey indexes were 48 % above the BEG in 1994, no aerial surveys were completed in 1995, and 22% above the BEG in 1996 (Appendix C.4). For lack of any better information, based on the good commercial harvest in 1995, we concluded that chinook escapement was good that year.

The harvest trend for chinook salmon in District 4 has been variable in recent years. The 1996 harvest was in the lower end of the historical range, harvest was above average in 1997 and 1998 and near average in 1999 (Appendix C.3). The 1998 and 1999 returns did not appear to be influenced by the factors responsible for the chinook run failure in the Yukon River. Another factor that needs to be considered is that the number of permit holders participating in the District 4 fishery have generally been declining from the peak in 1993.

Based on brood year escapements and recent harvest trends, the 2000 return is expected to be average to below average. Market interest has not been an obstacle in District 4, although fishing opportunities are occasionally missed due to limited tender availability. Managers are conservative in their expectations because of chinook returns seen throughout much of Western Alaska in recent years. If markets and effort levels remain steady, commercial harvest is expected to be between 10,000 and 20,000 chinook in 2000 (Table 11).

District 5

Chinook stocks have been depressed in District 5 for much of the past two decades. The commercial fishery is directed at sockeye salmon, but the migratory timing of the two species overlap, with chinook running earlier. The first commercial fishing period of each season is generally delayed as a conservation measure to bolster chinook escapements. The chinook run does appear to be responding to the conservation measures. Escapements past the Middle Fork Goodnews River weir have improved throughout the 1990s, but conservation measures will likely continue in 2000 because escapements still tend to come in below the BEG in most years (Appendix A.7).

Brood year escapements for the 2000 return were 10 % above the minimum BEG in 1994, 38 % above in 1995, and 16 % below in 1996. Commercial fishing effort was relatively high in 1994 and 1995, but effort fell below average in 1996. Chinook harvest levels were near average in 1994 and 1995, but harvest in 1996 was among the lowest on record (Appendix D3).

In more recent years the escapement was 16 % below BEG in 1997, 7 % above BEG in 1998, and very near the BEG in 1999. Commercial fishing effort was down by half in all three of these years, but chinook harvest was down only 13 % in 1997, 57 % above average in 1998, and 29% below average in 1999. The 1998 return is of particular interest because both escapement and harvest were well above average. The Goodnews chinook run seemed unaffected by the factors that caused the run failures on the Yukon River.

The level of early season effort allowed in the sockeye fishery drives the incidental chinook harvest in District 5. Market interest and tender availability are also sometimes limiting. The chinook return in 2000 is expected to continue to be lower than desired and conservation measures will likely continue. Still, the incidental chinook commercial harvest is expected to be between 1,000 and 2,000 salmon, which is in the middle to lower range experienced over the past 10 years (Table 11).

Sockeye Salmon

Sockeye salmon return primarily at age five in the Kuskokwim Area (Molyneaux and DuBois 1999), so the 2000 returns will come mostly from the 1995 brood year. In the Kuskokwim River, commercial harvest of sockeye is incidental to the directed chum fishery. The only project providing sockeye escapement information in the Kuskokwim River drainage is Kogrukluk River weir (Burkey et. al. 1999b). In Kuskokwim Bay, both Districts 4 and 5 districts support sockeye directed commercial fisheries and escapement data is available from aerial surveys (Burkey and Salomone 1999) and a weir operated on the Middle Fork Goodnews River (Menard 2000).

Districts 1 and 2

Sockeye salmon migration in the Kuskokwim River commercial fishing districts overlaps with the chum migration. The commercial fishery is directed at the more abundant chum salmon. Sockeye salmon rarely factor into management decisions and monitoring of sockeye escapements is minimal. The incidental sockeye harvest is therefore linked to both the abundance of sockeye, and chum salmon, with management decisions based primarily on the abundance of chum salmon. Market interest in chum salmon is another important variable influencing the incidental sockeye harvest in the river.

Sockeye salmon stocks appear to be in good condition in the Kuskokwim River. Returns in 2000 are expected to be near average, although the harvest may be below average due to limitations that may be imposed by the chum fishery. Commercial salmon harvest in the parent year was tempered because of limited processing capacity. The length of commercial fishing periods in June and July of 1995 were mostly 4 hours instead of the more typical 6 or 8 hours periods (Appendix B.7). However, the incidental harvest of sockeye was above average that year and escapement at Kogrukluk River weir was among the best years on record (Appendices A.7 and B.5). It is difficult to determine abundance trends for more recent years because of the lack of escapement monitoring and limited commercial fishing, however escapement levels to Kogrukluk River remain good (Appendix A.7). The outlook for 2000 is that Kuskokwim River fishers can probably anticipate a near average return of sockeye salmon, but market interest and limited fishing effort for chum salmon may limit the sockeye harvest. The incidental sockeye harvest is expected to be in the range of 15,000 to 60,000 fish, which is in the lower half of the historic range since 1990 (Table 11).

District 4

The sockeye run to the Kanektok River is relatively protracted with the bulk of the run harvested between mid-June and late July. For most of June, the sockeye harvest is incidental to the directed chinook salmon fishery. Fishers are restricted to mesh sizes of 6-inch or smaller, so earlier running sockeye salmon are vulnerable to harvest efforts. The commercial fishery switches to sockeye salmon management by late June or early July when sockeye salmon become dominant in the catch. Still, the run timing of the two species overlap broadly and the overall commercial sockeye salmon harvest has some linkage with chinook abundance.

Sockeye salmon returns to District 4 are expected to be good in 2000. The 1995 brood year escapement is thought to have been good. Aerial survey data is not available for 1995, but commercial harvest was above average (Appendix C.3). Harvest levels throughout the 1990s have been markedly higher than years prior to 1990 and that trend is expected to continue (Appendix C.3). Fishing effort is liable to be below average in 2000. There has been a trend towards decreasing fishing effort in District 4 in recent years. The effort drop is due in part to the low prices paid to fishers for their catch and to other employment opportunities that have been available in the area. This trend is expected to continue in 2000. Harvest in 2000 is expected to be in the mid-range of the past ten years, which is about 40,000 to 70,000 sockeye salmon (Table 11).

District 5

As with District 4, the sockeye run in District 5 is protracted and overlaps with the earlier running chinook migration. The commercial fishery is directed at sockeye salmon, but the onset of that fishery is usually delayed as part of the chinook rebuilding plan. This management approach will continue to impact sockeye harvest in 2000.

District 5 is expected to have a good sockeye return in 2000. The brood year escapement past the Middle Fork Goodnews River weir was 56% above the BEG in 1995 (Appendix A.7), and the commercial harvest was near average (Appendix D.3). The trend throughout the 1990s has been towards average to above average escapements that have been consistently above the BEG. The actual number of sockeye harvested the past few years has been below average, but the lower catch is due to a sharp decrease in the number of participating fishers which began in 1996 (Appendix D.1). The catch per unit of commercial fishing effort has actually been good. Still, the lower number of participating fishers does compromise the reliability of using CPUE. As with District 4, part of the effort drop is attributed to the availability of other jobs in the area and the relatively low salmon prices paid to fishers which reduces the attraction of fishers from Kuskokwim River communities. These same factors are expected to limit effort in 2000. The 2000 sockeye harvest from District 5 is expected to be in the mid-range of the past ten years which is around 20,000 to 40,000 fish (Table 11).

Chum Salmon

Chum salmon return to the Kuskokwim Area primarily at five and four years of age (Molyneaux and DuBois, 1999) so 1995 and 1996 will be the main brood years for the 2000 returns. The Districts 1 and 2 commercial fisheries of the Kuskokwim River target chum salmon. Brood year escapement information is available mostly from Kogrukluk River weir (Burkey 1995, Cappiello 1998). Aniak River sonar was not operable in 1995, but it was operable in 1996 (Vania and Huttunen 1997; Burkey et. al. 1999b). Some brood year data is also available from the George River weir (Molyneaux et. al. 1997b) and Kwethluk River counting tower (Chris and Cappiello 1999) which began in 1996, and Takotna River counting tower which began in 1995 (Molyneaux and DuBois 2000).

Chum catches in Districts 4 and 5 of Kuskokwim Bay are incidental to fisheries directed at other salmon species. Brood year escapement information is available from aerial surveys (Burkey and Salomone 1999), and a weir operated on the Middle Fork Goodnews River (Menard 2000).

Districts 1 and 2

Average to below average numbers of chum salmon are expected to return to the Kuskokwim River in 2000. The parent year escapements at the Kogrukluk River weir were 4% and 62% above the BEG in 1995 and 1996 (Appendix A.7). Fish passage at Aniak River sonar was 21% above the BEG in 1996. The George and Kwethluk River projects were in their first year of operation in 1996 and for both projects the chum passage observed that year was better than in

subsequent years (Appendix A.7). Passage estimates for the Takotna River are incomplete for all but 1996 and 1997, with 1996 being the stronger of the two years. These escapements levels should provide the foundation for producing a good chum salmon return in 2000; however, overall chum salmon returns to the Kuskokwim River have been low in most of the past few years and this trend raises concern for the 2000 season.

Commercial harvest of chum salmon in the 1990s has generally been much lower than was experienced in the 1980s (Appendix B.5). Median annual harvest in the 1980s was 421,198 chum salmon (range 199,478 to 1,381,674), whereas in the 1990s the median was 239,496 (range 17,026 to 605,918). Dwindling market interest in chum salmon has contributed to the low harvest, but low returns were the over riding factor in at least 1993, 1997, 1998 and 1999 (Francisco et. al. 1994a, Burkey et. al. 1999a and 1999b). The low returns in 1997 and 1998 were attributed in part to low escapement in the parent year of 1993, however that does not explain the low returns seen in 1999. Based on he age composition of chum salmon escapements collected in 1999 it appears that low returns occurred in all age class, including age-4 chum whose cohorts will return as age-5 fish in 2000 (DuBois and Molyneaux, *unpublished*).

Considering all these factors, the 2000 return of chum salmon to the Kuskokwim River is expected to be average to below average. The harvest is expected to be between 50,000 and 300,000 chum salmon (Table 11). Concerns about market conditions and processor interest are expected to persist in 2000.

District 4

Chum harvest in District 4 is incidental to fisheries directed at chinook and sockeye salmon. The run timing overlaps between these species, and management focus is on chinook and sockeye salmon. Chum salmon are not generally integrated into management decisions; their incidental harvest is linked with the abundance of chinook and sockeye salmon.

The District 4 chum salmon escapement is traditionally monitored by aerial surveys of the Kanektok River. Survey counts have been chronically below the BEG index since 1984 (Appendix C.4), but this is probably misleading. The BEG for chum salmon of 30,500 is twice the sockeye BEG of 15,000, but the average aerial count has the reverse ratio of about two sockeye for every one chum salmon. The chum salmon BEG for the Kanektok River is currently under review and will likely be lowered to better reflect historical abundance levels.

The incidental commercial harvest of chum salmon in District 4 has generally been strong throughout the 1990s, although since 1997 the catches have been below average (Appendix C.3). Fishing effort was low in those years as well (Appendix C.1). Effort is expected to continue to be low in 2000. Chum harvest is expected to be in the range of 35,000 to 50,000 fish, which is average to below average (Table 11).

District 5

The chum salmon harvest in District 5 is incidental to the sockeye directed commercial fishery. The run timing of the two species overlap, but chum salmon are not generally integrated into the management decision process. The incidental harvest of chum salmon is therefore linked to the amount of fishing effort in the sockeye directed fishery.

Chum salmon escapement in District 5 is monitored at the Middle Fork Goodnews River weir. Escapements in the 1995 and 1996 brood years were more than double the BEG (Appendix A.7). The incidental commercial harvest of chum salmon was near average in 1995 and below average in 1996 (Appendix D.3), but fishing effort decreased by half in 1996 (Appendix D.2). The trend since 1996 has been for continued low effort and below average incidental harvest of chum salmon. Escapement levels are down from the mid 1990s, but still above BEG.

The return of chum salmon to District 5 in 2000 is expected to be near average, but the harvest may be below average due to the decreased effort. The incidental harvest of chum salmon is expected to be between 10,000 and 15,000 fish, which encompasses the middle to lower range of the past ten years (Table 11).

Coho Salmon

Coho salmon return to the Kuskokwim Area primarily at four years of age, so 1996 will be the main parent year for 2000 returns. There is very little information on which to base the coho run outlooks. For the entire Kuskokwim Area, the only escapement monitoring project operated during the coho season in 1996 was Kogrukluk River weir (Cappiello and Burkey 1997). Market interest in coho salmon has been relatively good in the Kuskokwim Area and that trend is expected to continue in 2000.

Districts 1 and 2

The escapement of coho salmon at Kogrukluk River weir in 1996 was twice the BEG and the commercial harvest of 937 thousand coho salmon was a record high. However, the return from that brood year is only expected to be average to below average in abundance due to low returns in 1997, 1998 and 1999. The trend seen in commercial catch statistics since the early 1980s had been towards increasing annual run sizes with a moderate even year dominance. Returns peaked in 1996 with a commercial harvest of 937,299 coho salmon, plus a record escapement at Kogrukluk River weir of 50,555 fish, twice the BEG (Appendix A.7). The trend ended unexpectedly in 1997 when the harvest fell to 130,803 coho and an escapement at Kogrukluk River of only 12,312, half the BEG. The return in 1998 was better, but far less than the levels seen in the ten years prior to 1997. Returns in 1999 were poor; Kogrukluk River escapement was 60% below goal and the commercial harvest of 23 thousand was 4% of average and the lowest harvest recorded since 1972. The coho return to the Kuskokwim River in 2000 is expected to be average to below average with a harvest in the range of 100,000 to 500,000 fish

(Table 11). It should be emphasized that the level of uncertainty in the coho outlook is especially high given recent volatility and limited escapement assessment.

Districts 4 and 5

Commercial harvest data are the primary guide to anticipating coho returns in Districts 4 and 5. As was described for the Kuskokwim River, the trend in District 4 over the past several years had been towards increasing harvest coupled with a modest cycle of even year dominance (Appendix C.3). The District 4 harvest also exhibited a pattern of volatility in 1996 and 1997 similar to what occurred in the Kuskokwim River. The 1998 harvest returned to a near average level, but in 1999 the harvest was again below average. The 2000 return is cautiously expected to be near average with a harvest in the range of 30,000 to 80,000 (Table 11). Like District 4, coho harvests in District 5 demonstrate modest even year dominance and harvest numbers have been volatile in recent years. Harvest in 1997 was below average, but returned to near average in 1998 (Appendix D.3). Harvest again fell to below average levels in 1999. The Middle Fork Goodnews River weir has been operated though most of the coho seasons for the past three years and escapements showed the same trend as was seen in the commercial fishery (Appendix A.7). Commercial fishing effort has been down by nearly half in recent years and it is expected to continue to be low in 2000. Assuming below average effort and tendency for larger returns in even years, the outlook for 2000 is for a near average harvest in the range of 10,000 to 25,000 coho (Table 11).

PART II: FRESHWATER FINFISH FISHERY

Several species other than salmon, herring and halibut are used for commercial, subsistence, and recreation purposes in the Kuskokwim Area. They are inconnu or sheefish (*Stenodus leucichthys*), whitefish (*Coregonus*) and (*Prosopium*) char (*Salvelinus*), burbot (*Lota lota*), Arctic grayling (*Thymallus arcticus*), northern pike (*Esox lucius*), Arctic lamprey (*Lampetra japonica*), rainbow smelt (*Osmerus mordax*) blackfish (*Dallia pectoralis*), rainbow trout (*Oncorhynchus mykiss*), lake trout (*Salvelinus namaycush*), threespine stickleback (*Gasterosteus aculeatus*), ninespine stickleback (*Pungitius pungitius*), and longnose sucker (*Catostomus catostomus*). The Division of Sport Fish documents the recreational fisheries.

Subsistence Fishery

Methods used for harvesting subsistence freshwater finfish include set and drift gillnets, seine, fish wheels, long lines, dip nets, jigging (hook and line through the ice), rod-and-reel and pots (locally called "traps"). Subsistence harvests occur year round. These fish may be eaten fresh, dried, smoked or frozen. Most are used for human consumption; however, some are also used for dog food. Regulations do not limit the number of freshwater fish that may be harvested for subsistence. Harvest data for these species are not collected on an annual basis. Data for some

Kuskokwim Area communities may be found in the Division of Subsistence Technical Paper series.

Commercial Fishery

The commercial fishery has been sporadic, primarily harvesting whitefish and burbot for local markets. Some of the whitefish harvest occurs under the ice in the winter.

A permit from the Commercial Fisheries Entry Commission is required. A permit from the department to conduct commercial fisheries on whitefish, pike, smelt, burbot and lamprey is also required. Those species may also be taken incidentally to commercial salmon fishing. Four freshwater permits were issued by the Bethel CF office in 1999 for the Kuskokwim Area. The guidelines for permits are:

1. All waters of the area except the Johnson River drainage and Whitefish Lake are open to commercial harvest of freshwater finfish. The heavy subsistence utilization of freshwater species in these areas is the reason for the closure.

2 Only whitefish, cisco, smelt, pike, burbot, and lamprey may be taken. Sheefish, char and trout may not be taken due to their small population, low reproductive rates and their heavy utilization in the subsistence and sport fisheries.

3. All legal commercial gear types are allowed.

4. Gillnets may not be less than 2 1/2 or greater than 5 inches stretch mesh. Long lines and set lines must use hooks with a gap between point and shank larger than 3/4 inch.

Appendix F.1 presents the freshwater finfish fishery catches and value since 1977. No commercial landings of whitefish were documented in 1999 (Appendix F.1).

Stock Status

The department does not monitor the status of the freshwater species in the Kuskokwim Area. Limited department observations, advisory committee recommendations and fishers interviews give no indication of declining populations in most drainages. Residents of Kasigluk, Atmautluak and Nunapitchuk have expressed concerns that subsistence fishers are overexploiting the whitefish stocks in Nunavakpak Lake (near Kasigluk).

PART III: MISCELLANEOUS SALTWATER FINFISH

A poorly documented commercial fishery on Saffron or "Tom Cod" (*Eleginus gracilus*) has occurred in the Kuskokwim Area for some time. These fish were surplus to subsistence needs and fishers and local stores were, and often still are, unaware of the regulatory requirements. The department has been trying to inform buyers and sellers of these requirements. Since 1988, we have had information on the sale of fish exported from the coastal villages to Bethel. Sales within the villages are still undocumented. No commercial landings were documented in 1999 (Appendix G.1).

PART IV. HERRING FISHERY

INTRODUCTION

Area and District Boundaries

There are five commercial gillnet sac roe districts and a subsistence herring fishery in the Kuskokwim Area. The Security Cove District includes all waters between the latitude of Cape Newenham and the latitude of the Salmon River (Figure 7). The Goodnews Bay District includes the waters of Goodnews Bay inside the north and south spits at the mouth and a line between the Ukfigag and Tunulik Rivers. The Cape Avinof District (Figure 8) consists of all waters landward of Kikegtek, Pingurbek and Kwigluk Islands from the longitude of Ishkowik River (162° 44' W. long) to the longitude of the Ursukfak River (164° 11' W. long). The Nelson Island District consists of all waters north of Chinigyak Cape and east of Atrnak Point, and all waters north of Talurarevuk Point and south of the southernmost tip of Chinit Point and east of 165° 30' W. long., and all waters north of the northernmost tip of Chinit Point and south of Kigigak Island and east of 165° 30' W. long. (Figure 9). The Nunivak Island District includes all waters extending three miles seaward of mean low water along the northern and east sides of Nunivak Islands from Kikoojit Rocks (60° 20' 00" N. lat., 166° 39' 05" W. long.) to Kaksajookalik Island (59° 45' 10" N. lat., 166° 14' 20" W. long.), the western most point of Cape Mendenhall (Figure 10).

Management Programs

The Security Cove, Goodnews Bay and Nunivak Island commercial herring fisheries are managed under the Bering Sea Herring Fishery Management Plan which sets the maximum exploitation rate at 20% of the estimated spawning biomass. The department attempts to harvest stocks in good condition (large volume, increasing abundance, good recruitment) at the upper end of the exploitation range (15-20%). Stocks in poor condition (small volume, decreasing abundance, poor recruitment) are exploited at lower than maximum rates (0-15%). The Alaska Board of Fisheries has directed the department to manage the commercial herring fisheries in the Cape Avinof District for an exploitation rate not to exceed 15% of the estimated available biomass. To provide additional protection for the subsistence herring harvest in the Nelson Island District, the following guidelines have been established by the Board of Fisheries:

1. The commercial fishery will be allowed to take up to 17% of the herring biomass in 1999, compared to up to 20% for most other fisheries having stocks of similar size and condition.

2. The commercial fishing season will be opened when a biomass of 3,000 tons or spawning activity is documented.

3. Periodic closures of the commercial fishery will be scheduled, during which time only subsistence fishing will be allowed.

4. Several important subsistence use areas occur throughout the district (e.g. waters around Cape Vancouver) and specific areas may be closed to commercial fishing to insure the adequacy of subsistence harvests.

5. The department will use all available means, including input from local residents, to insure the adequacy of subsistence herring harvests during the commercial fishing season.

All Kuskokwim Area commercial herring fisheries are opened and closed by emergency order to provide for an orderly fishery and allow periodic assessment of herring biomass. In 1990, the Nelson and Nunivak Island Districts were given limited entry status by the Commercial Fisheries Entry Commissions (CFEC). Entry permits were issued to qualified applicants who had fished in these fisheries before 1 January 1988. The Goodnews Bay District was closed to new entry beginning in 1997 and given limited entry status. CFEC held meetings in 1998 to determine a qualification system that will result in 182 limited entry permits being issued.

Season Summary

The total Kuskokwim Area Pacific herring harvest for 1999 was 4,337 short tons (st) with a total estimated value to the fishers of approximately $1,254,000 (Appendix H.1). The price paid in all districts ranged from $200 to $500 per st for 10% roe recovery, with an increase or decrease of $20 per st for each percentage point above or below 10%. This was equal to or above the 1998 price of $200 per ton. Processors paid approximately $50 per ton for bait herring. Commercial fisheries occurred in all districts except Nunivak Island, where a combination of late spring conditions, poor weather, lack of processor interest and low aerial survey numbers prevented a fishery from occurring. The sac roe harvest was 4,131 st The only food/bait sales in this area occur during the sac roe fishery when herring are delivered with roe content below the processor's acceptable minimums. Two hundred four st of herring did not meet processor roe criteria and were sold as bait while approximately 3 st of herring was lost to waste.

Fishing effort, measured in number of fishers who made deliveries, was up slightly in all districts except Nunivak Island. Three hundred ninety-two permit holders landed herring in the Kuskokwim Area, an increase of 8% from 1998. Effort increased by 12% in Security Cove and Goodnews Bay, 7% in Cape Avinof, and 9 % at Nelson Island (Appendix H.2). Average income per permit holder (excluding Nunivak Island) ranged from $1,581 in the Cape Avinof District to

$4,574 at Nelson Island (Appendix H.3). Ten companies bought herring in the Kuskokwim Area in 1999. Average roe recovery, from sac roe quality herring, ranged from 11.0% in the Security Cove and Cape Avinof Districts, to 11.3% in the Goodnews Bay District. The overall average sac roe content was 11.1%. Exploitation rates in individual districts (excluding Nunivak) ranged from 15% in the Cape Avinof District to 20.5% in the Nelson Island District (Appendix H.1).

The 1999 total estimated herring spawning biomass was 25,690 st for the surveyed portion of the Kuskokwim Area herring districts. This was 10% higher than the 1998 estimate (Appendix H.1). Ages 9 and older herring comprised 70.1% of the total biomass (Table 17). Recruit herring (ages 3, 4, and 5) accounted for 9.4% of the total run in number of fish (Table 18).

STOCK STATUS

Assessment Methods

Aerial surveys were flown throughout the Pacific herring spawning season in all Kuskokwim Area commercial fishing districts to determine relative abundance, distribution, and biomass of herring. Occurrence and extent of milt, numbers of fishing vessels and visibility features affecting survey quality were also recorded. Data collection methods were similar to those used since 1978.

Approximately 22 hours were spent conducting aerial surveys in the Kuskokwim Bay Area in 1999: 5.5 hours in Security Cove and Goodnews Bay, 1.3 hours in the Cape Avinof District, 3.5 hours in Nelson Island and 4.1 hours in Nunivak Island. Weather and sea conditions were variable throughout the Kuskokwim Bay Districts for most of the season, with most surveys being conducted under poor conditions.

Standard conversions of 1.52 tons/538 ft^2 (water depths less than 16 ft), 2.58 tons/538 ft^2 (water depths between 16 and 26 ft) and 2.83 tons/538 ft^2 (water depths greater than 26 ft) were used to convert estimated herring school surface areas to biomass within all districts.

Due to budget cuts, ADF&G test fishing with variable mesh gillnets occurred only in the Goodnews Bay, Cape Avinof and Nelson Island districts. The test fishing data are used to determine age, sex, size and sexual maturity of herring and to note occurrence of other schooling fishes. Data from Goodnews Bay was used to estimate these metrics for the Security Cove District and data from Nelson Island was used for the Nunivak Island metrics. The sampling goal for test fish crews was to sample a minimum of 60 herring per day or 420 per week from each district. Commercial landings were sampled in the same fishing districts. Age composition of herring collected from the department test fishery and the commercial catch is summarized, by district, in Table 18. Additionally, commercial gillnet vessels voluntarily collected herring samples within all districts that were evaluated by industry roe technicians for quality of roe content. This program allowed the openings to be timed to maximize roe production. This information also assists with interpretation and modification of aerial survey biomass data.

Ground surveys conducted in some districts provide information on the distribution and density of eelgrass beds and herring spawn deposition.

Spawning Populations

Security Cove District

Eleven aerial surveys were flown from 8 May to 31 May. Survey conditions ranged from fair to unsatisfactory. Herring spawn was observed on survey flights conducted from 20 to 31 May. On 22 May an aerial survey flown under fair conditions estimated a total of 5,262 st of herring in the district. This estimate was used as the total biomass estimate for 1999 and the guideline harvest level (GHL) was raised to 1,052 st as a result. A total of 14.5 miles of spawn was observed in the district with peak spawning activity (3.5 miles) on 25 May.

Due to budget cuts no samples were obtained from the Security Cove District in 1999. Age data was interpolated from samples collected at Goodnews Bay. Age 9 and older herring comprised 58% of the biomass (Table 17) while 3- to 5-year-old fish accounted for 5% of the return in numbers of fish (Table 18).

Goodnews Bay District

Thirteen aerial surveys were flown in the Goodnews Bay District between 8 May and 31 May in 1999. Surveys on 20 May and 22 May were rated as fair, the rest were flown under poor or unsatisfactory conditions. The largest concentration of herring was observed during a survey flown on 23 May, under poor conditions, and was estimated at 6,985 st This biomass estimate was used as the biomass estimate for 1999 and the GHL was raised to 1,379 st as a result. Approximately 3 miles of spawn was observed during aerial surveys on 22, 23 and 28 May with peak spawning observed on 23 May.

Test fishing crews sampled 808 herring for Age-Sex-Length (ASL) data from 20 May to 28 May. Age 9 and older herring made up 58% of the biomass (Table 17) while age 3 to 5 fish were 5% of the return in numbers of fish (Table 18).

Cape Avinof District

In 1999 two aerial surveys were flown under unacceptable conditions in the Cape Avinof District. The flights occurred on 6 June and 8 June. Only 11 st of herring were observed due to poor conditions. The preseason biomass estimate of 3,559 st was used as the total biomass. No spawning activity was observed during the survey flights, also due to the poor viewing conditions.

The Department's test fishery near Kipnuk captured 385 herring between 5 June and 14 June to sample for ASL data. Age 9 and older herring made up 48% of the biomass (Table 17) while age 3-5 year old herring represented 18% of the return in numbers of fish (Table 18).

Nelson Island District

Nine aerial surveys were flown between 30 May to 9 June during the 1999 season. Four surveys were flown under fair conditions. During an aerial survey flown on 3 June, 3,189 st of herring were observed in the district. This estimate exceeded the threshold necessary to initiate a fishery. On 9 June an estimated 3,466 st of herring were observed during an aerial survey. It is felt that these two biomass estimates were separated enough in space and time to represent distinct groups of fish and can be summed to represent an estimate of biomass present within the district. Based on these surveys the total biomass was estimated to be 6,655 st and the GHL was raised to 1,200 st Approximately 2 miles of spawn was observed during an aerial survey on 8 June.

Test fishing with variable mesh gillnets occurred from 24 May to 14 June. ASL and maturity information was collected from 1,261 herring. Age 9 herring made up 58% of the biomass (Table 17) while age 3 to 5 herring accounted for 10% of the numbers of fish (Table 18).

Nunivak Island District

Four aerial surveys were flown between 30 May and 9 June in the Nunivak Island District during the 1999 season. Three surveys were made under fair conditions. During an aerial survey on 8 June, 1,418 st of herring were observed. Due to the late timing of the aerial surveys a significant portion of the herring biomass was probably not surveyed. Total biomass was assumed to be 3,319 st based on the projected return from the 1998 escapement. Approximately 14 miles of spawning activity was observed during aerial surveys.

There was no commercial fishery in the Nunivak Island district in 1999. This was due primarily to a combination of late spring conditions, poor weather, persistent ice conditions, lack of processor interest and low aerial survey numbers. Age composition information was interpolated from data collected by the Nelson Island test fish crew.

Central Kuskokwim Bay

The Central Kuskokwim Bay area extends from Jacksmith Bay, south of Quinhagak, to the Ishkowik River (Figure 1). No commercial herring fishing districts are located in this area. Nine aerial surveys were flown in this area from 8 May to 31 May. None of these surveys were flown under satisfactory conditions. During a survey flown on 18 May an estimated 226 st of herring were observed. No spawn was observed during these overflights.

SUBSISTENCE FISHERY

Subsistence fishing for Pacific herring in the northeastern Bering Sea is very important in villages of the Yukon-Kuskokwim River delta. The subsistence fishery is conducted primarily by residents of the coastal villages of Kwigillingok, Kongiganak, Kipnuk, Chefornak, Toksook

Bay, Umkumiut, Nightmute, Tununak and Newtok. The herring stocks utilized by the subsistence fishery are the same ones targeted by the commercial fishery in the nearby commercial fishing districts.

Subsistence harvest surveys have occurred annually in Nelson Island villages from 1985 to 1996 and sporadically in Kuskokwim delta villages since 1975. Average annual herring subsistence harvests have been at least 110 tons since 1975 (Burkey et. al. 1998). No subsistence surveys were conducted in Kuskokwim Area communities in 1999. Subsistence survey results reflect harvest trends and reported catches represent minimum figures since not all fishers are contacted and other Kuskokwim River delta villages were not surveyed.

COMMERCIAL FISHERY

Security Cove District

The 1999 harvest in the Security Cove District was 1,016 st of sac roe herring with an average roe content of 11.0%, 56 st of bait herring and one ton of waste, for a total of 1,072 tons. There is no directed bait herring fishery within the Kuskokwim Bay Districts; resulting bait sales occur if herring delivered fail to meet processor's minimum standards for roe content.

Seven processors bought herring from 87 permit holders who made 255 deliveries in three fishing periods with nine hours total fishing time. The estimated exvessel value was $338,000. The exploitation rate was 20.4% based on the aerial survey biomass estimation of 5,261 st.

On 25 May, the first fishing period opened for 2 hours starting at 3:00 PM (Table 19). Seventy-six permit holders delivered 293 st of sac roe quality herring with an average roe content of 10.7%. The second opening occurred on 26 May for three hours starting at 4:00 am. Seventy-eight permit holders delivered 482 st of herring with an 11.0 % average roe content. The final period was for four hours on 26 May starting at 4:00 pm. Eighty-three permit holders delivered 240 st of herring with an average roe content of 11.5%.

Due to budget cuts no herring were sampled from the commercial catch in the Security Cove District in 1999.

Goodnews Bay District

The 1999 harvest was 1,333 st of sac roe herring with an average roe content of 11.3 % with 33 st of bait quality herring. No waste herring was reported. Four processors bought herring from 94 permit holders who made 679 deliveries in 8 fishing periods with 49 hours total fishing time. The estimated exvessel value was $301,000. The exploitation rate was 19.8% based on an aerial survey derived estimated biomass of 6,896 st.

On 29 May, the first fishing period opened for 6 hours at 5:00 am. Forty-six permit holders delivered 44 st of sac roe herring with a 10.0% average roe content. Peak harvest occurred on 31

May when 78 permit holders delivered 482 st during an 8-hour opener. The last period was on 1 June when 51 permit holders delivered 65 st Between 29 May and 1 June there were 8 fishing periods for a total of 49 hours fishing time. Catches ranged from 5 st on 30 May to 482 st on 31 May (Table 19).

Test fish crews sampled a total of 438 herring from the commercial catch. Age composition was 65% age 9 or older, 35% age 6-8, and 1% less than age 6 in numbers of fish (Table 18).

Cape Avinof District

The 1999 harvest was 516 st of sac roe herring with an average roe content of 11.0% and 17 st of bait herring for a total harvest of 533 st Three processors bought herring from 117 permit holders who made 656 deliveries in nine fishing periods with a total fishing time of 51 hours. The estimated exvessel value was $185,000. The exploitation rate was 15% based on a preseason biomass projection of 3,559 st.

On 11 June the first fishing period opened for three hours starting at 7:00 am. Fifty-one permit holders delivered 16 st of herring with a 10.3% average roe content. Between 11 June and 15 June there were 9 fishing periods for a total of 51 hours of fishing time. Catches ranged from 16 st on 11 June to 123 st on 12 June (Table 19).

A total of 416 herring were sampled from the commercial catch in the Cape Avinof District in 1999. Age composition was 68% age 9 or older and 32% age 6-8 in numbers of fish (Table 18).

Nelson Island District

The 1999 harvest was 1,267 st of sac roe herring with an average roe content of 11.2%, 97 st of bait herring and 2 st of waste. The wastage occurred during the first opener when an unknown number of nets (or portion of nets) were torn and lost due to excessive amounts of fish or abandoned for unknown reasons. Four processors bought herring from 94 permit holders who made 483 deliveries in three fishing periods with a total fishing time of 22 hours. The estimated exvessel value was $430,000. The exploitation rate was 20.5% based on a biomass estimate of 6,655 st obtained from aerial surveys.

On 4 June, the first fishing period opened for 9 hours starting at 12:00 PM (Table 19). Fifty-six permit holders delivered 357 st of sac roe quality herring with a 10.1% average roe content. The second period was for 6 hours beginning 4:00 PM on 7 June. Eighty-six permit holders harvested 411 st of sac roe herring with an average roe content of 11.6%. The last period was for seven hours starting at 5:00 PM on 8 June. Catch from this period was 499 st of herring with 11.7% average roe content. In the final period the allowable net length was shortened to 50 fathoms of gillnet per boat.

A total of 423 herring were sampled from the commercial catch. Age composition was 68% age 9 or older and 32 % age 6-8 in numbers of fish (Table 18).

Nunivak Island District

No commercial fishery occurred in the Nunivak Island District in 1999. This was due to a combination of late spring conditions, persistent marine ice, lack of processor interest and low aerial survey numbers.

Enforcement

The Division of Fish and Wildlife Protection (FWP) was present in the Goodnews Bay and Security Cove Districts this year. Two people from FWP were involved in Kuskokwim Bay herring fisheries. Enforcement officers utilized a single Supercub aircraft, and a Robinson R-22 helicopter. Details on the number and type of violations observed are not available from FWP at this time.

OUTLOOK AND MANAGEMENT STRATEGY FOR 2000

Projections from postseason escapement estimates, using historic mean rates of survival, current mean weights for each age class, and estimates of recruitment for each age class (Wespedstad 1982), suggest that the 2000 spawning biomass for the Kuskokwim Bay herring stocks (Security Cove to Nunivak Island) will be approximately 18,650 st with a projected harvest of 3,386 st (Table 20). If the return is as expected, a moderate increase over the projected 1999 biomass will be observed in Security Cove and Goodnews Bay, while a moderate decrease in biomass will be observed in the Cape Avinof, Nelson Island and Nunivak Island districts. However, variability in the quality of aerial survey assessments of biomass and deviations from the assumed survival or recruitment rates may result in the observed biomass being either above or below these projections. Therefore, harvest levels will be adjusted during the season according to observed herring spawning biomass. In addition, in accordance with the AYK Region harvest policy, the commercial fishery will not target newly recruited age classes (age 2 through 5 year-old-herring). If it is not possible to determine herring abundance using aerial survey methods, stock abundance will be assessed using information from the projected biomass, test and commercial catches and spawn deposition observations.

Security Cove District

The 2000 projected return to the Security Cove District is 3,622 st. A 20% exploitation rate would result in a harvest of 724 st (Table 20). A larger catch may occur if the 2000 biomass assessment is greater than the projection. Commercial fishing will not be allowed until the observed biomass reaches 1,200 st or significant spawning activity is observed. The occurrence and length of fishing periods will depend on stock strength, fishing effort, and spawning activity.

Age 7 herring are expected be the dominant age class in the 2000 return. Age 9 and older herring are expected to comprise approximately 45-50% of the biomass.

Goodnews Bay District

The management strategy for this district will be similar to that planned for Security Cove. The season will open and close by emergency order when a biomass of 1,200 st is observed or spawning activity occurs. The 2000 projected return of herring to the Goodnews Bay District is 4,665 st. A 20% exploitation rate would result in a harvest of 933 st (Table 20). A larger catch may occur if the 2000 biomass assessment is greater than the projection.

Like Security Cove, in Goodnews Bay, age 7 herring are expected to be the dominant age class in 2000. Age 9 and older herring are expected to comprise 45-50% of the biomass.

Cape Avinof District

Either significant spawning activity or a biomass of 500 st must be observed before the commercial herring season can be opened. The projected 2000 biomass for the Cape Avinof District is 2,868 st (Table 20). The exploitation rate will be no greater than 15% because of the limited database for this area and the priority of subsistence fishing. Assuming a 15% commercial exploitation rate, the projected harvest would be 430 st of herring.

Age 7 herring are expected to dominate the returning population in Cape Avinof in 2001. Age 9 and older herring are expected to comprise 30-35% of the biomass.

Nelson Island District

In the Bering Sea Herring Fishery Management Plan, the Alaska Board of Fisheries set a minimum biomass threshold of 3,000 st necessary for a commercial herring fishery in the Nelson Island District. The inseason estimate of herring biomass must exceed the threshold level before a commercial fishery can be allowed. The spawning biomass projected to return to the Nelson Island District in 2000 is 4,672 st (Table 20). The exploitation rate for 2000 is 16% based on 5 AAC 27.895 HARVEST STRATEGY FOR THE KUSKOKWIM AREA. This translates to a harvest of 734 st of herring. A larger catch may occur if the 2000 biomass assessment is greater than the projection.

Age 7 is expected to be the dominant age group in 2000. Age 9 and older herring are expected to comprise between 45-50% of the biomass in 2000.

Guidelines established by the Board of Fisheries (see page 43) that provide additional protection for the subsistence harvest of herring will be followed.

Nunivak Island District

The commercial season will open when the biomass reaches 1,500 st or when significant spawning is observed. The projected biomass of herring returning to the Nunivak Island District in 2000 is 2,832 st. A 20% exploitation rate would result in a 565 st harvest (Table 20). A larger catch may occur if the 2000 biomass assessment is greater than the projection.

Age 7 is expected to be the dominant age group. Age 9 and older herring are expected to comprise between 45-50% of the return.

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TABLES

Table 1. Salmon run assessment programs operated in the Kuskokwim Area during 1999.

Project Name	Location	Primary Objectives	Duration	Agency	Responsibility
Salmon Management Plan	Kuskokwim Area	- develop a comprehensive plan for managing salmon stocks of the Kuskokwim Area. - define goals and objectives. - identify potential opportunities and concerns. - recommend appropriate procedures. - evaluate priorities.	June - Sept.	ADFG/CF	all aspects
Subsistence Catch and Effort Assessment	Kuskokwim Area	- document and estimate the catch and associated effort of the subsistence salmon fisheries via interviews, catch calendars, mail-out questionnaires and telephone interviews.	Post-season	ADFG/S ONC	all aspects crew support
Escapement Sampling	Kuskokwim Area	- estimate age, sex and length of chinook, sockeye, chum and coho salmon from selected tributary spawning populations.	June - Sept	ADFG/CF	all aspects
Aerial Surveys	Kuskokwim Area	- index relative abundance of chinook salmon spawning escapement in selected streams througout the Kuskokwim Area. - index relative abundance of sockeye salmon spawning escapement in the Kanektok and Goodnews Rivers.	July - Aug	ADFG/CF	all aspects
Sport Catch, Harvest and Effort Assessment	Kuskokwim Area	- statewide mail-out survey to estimate sport catch, harvest and effort	post-season	ADFG/SF	all aspects
Commercial Catch and Effort Assessment	Districts 1, 2, 4 ad 5	- document and estimate the catch and associated effort of the commercial salmon fishery via receipts (fish tickets) of commercial sales and dock side sampling.	June - Sept	ADFG/CF	all aspects
Commercial Catch Sampling	Districts 1, 4 ad 5	- determine age, sex, and length of salmon harvested in the commercial fisheries.	June - Sept	ADFG/CF	all aspects
Bethel Test Fishery	Bethel Area RM. 80	- index relative run timing of chinook, sockeye, chum and coho salmon using drift gillnets - index relative run abundance of chinook, sockeye, chum and coho salmon using CPUE derived from drift gillnet catches.	June - Aug	ADFG/CF ONC	all aspects crew support
Kwethluk River Tower	mile 51 Kwethluk River RM. 99	- estimate daily escapement of chinook, sockeye, chum and pink salmon into the Kwethluk River. - estimate age, sex and length composition of chinook, chum and coho salmon escapement. - collect environmental / habitat information	June - July	AVCP ADFG/CF KIRA BSFA	all aspects planning & crew support funding
Aniak River Sonar	mile 12 Aniak River RM. 225	- estimate daily escapement of salmon into the Aniak River. - estimate age, sex and length composition of chum salmon escapement	June - July	ADFG/CF AVCP	all aspects crew support

- continued -

Table 1. (page 2 of 2)

Project Name	Location	Primary Objectives	Duration	Agency	Responsibility
George River Weir	mile 4 George River RM. 309	- estimate daily escapement of chinook, sockeye, chum, pink and coho salmon into the George River. - estimate age, sex and length composition of chinook, chum and coho salmon escapement. - collect environmental / habitat information	June - Sept	KNA ADFG/CF BSFA NOAA	all aspects all aspects funding
Kogrukluk River Weir	mile 85 Holitna River Drainage RM. 335	- estimate daily escapement of chinook, sockeye, chum and coho salmon into the Kogrukluk River. - estimate age, sex and length composition of chinook, chum and coho salmon escapement	June - Sept	ADFG/CF NOAA	all aspects funding
Tatlawiksuk River Weir	mile 2.5 Tatlawiksuk River RM. 383	- estimate daily escapement of chinook, sockeye, chum, pink and coho salmon into the Tatlawiksuk River. - estimate age, sex and length composition of chinook, chum and coho salmon escapement. - collect environmental / habitat information	June - Sept	KNA ADFG/CF BSFA NOAA	all aspects all aspects funding
Takotna River Weir	mile 35 Takotna River RM. 507	- estimate daily escapement of chinook, chum and coho salmon into the Takotna River. - estimate age, sex and length composition of chinook, chum and coho salmon escapement. - collect environmental / habitat information	June - July	TCS ADFG/CF BSFA	all aspects planning & supplies funding
Kanektok River Weir	mile 13 Kanektok River Kuskokwim Bay	- fabrication of resistance board weir	June - Sept	NVK ADFG/CF USFWS BSFA BIA	all aspects planning & supplies planning, supplies and funding funding
Middle Fork Goodnews River Weir	mile 5 Middle Fork Goodnews River Kuskokwim Bay	- estimate daily escapement of chinook, sockeye, chum, pink and coho salmon into the Middle Fork Goodnews River. - estimate age, sex and length composition of chinook, sockeye, chum and coho salmon escapement	June - Sept	ADFG/CF USFWS	all aspects funding for coho extension

ADFG/CF = Commercial Fisheries Division; Alaska Department of Fish and Game
ADFG/S = Subsistence Division; Alaska Department of Fish and Game
ADFG/SF = Sport Fish Division; Alaska Department of Fish and Game
AVCP = Association of Village Council Presidents
BIA = Bureau of Indian Affairs
BSFA = Bering Sea Fishermen's Association
KIRA = Kwethluk IRA
KNA = Kuskokwim River Native Association
NOAA = National Oceanic and Atmospheric Administration
NVK = Native Vilage of Kwinhagak
ONC = Orutsararmuit Native council
TCS = Takotna Charter School
USFWS = U.S. Fish and Wildlife Service

Table 2. Kuskokwim Area salmon entry permits issued by village, 1999.

Village	**Number of** ***Entry Permits***
Akiachak	67
Akiak	23
Aniak	10
Atmautluak	26
Bethel	167
Chefornak	3
Chuathbaluk	1
Eek	37
Goodnews Bay	27
Kalskags	7
Kasigluk	44
Kipnuk	15
Kongiganak	20
Kwethluk	56
Kwigillingok	19
Napakiak	39
Napaskiak	34
Nunapitchuk	46
Oscarville	1
Platinum	5
Quinhagak	84
Sleetmute	1
Tuluksak	27
Tuntutuliak	43
Tununak	1
KUSKOKWIM AREA SUBTOTAL	***803***
Anchorage	12
Dillingham	1
Twin Hills	1
Manokotak	1
Fairbanks	1
Wasilla	1
NON-LOCAL ALASKA RESIDENTS SUBTOTAL	***17***
Valencia, CA	1
Alpharetta, GA	1
Honey In The Hills, FL	1
Comstock, TX	1
Tacoma, WA	1
NON-RESIDENT SUBTOTAL	***5***
TOTAL NUMBER OF PERMITS	***825***

Table 3. Harvest and exvessel value of Kuskokwim Area salmon catch by district, 1999.

	Chinook	Sockeye	Coho	Pink	Chum	Total
Lower Kuskokwim River, District W-1						
			1999			
Fish	4,705	16,976	23,593	2	23,006	68,282
Pounds	71,827	123,488	148,777	6	164,275	508,373
Price	0.31	0.70	0.30	0.05	0.10	
Value	$22,266	$86,442	$44,633	$0	$16,428	$169,769
			Ave. 1989-98			
Fish	26,309	60,213	497,919	4,428	322,217	911,085
Value	$219,471	$319,454	$1,589,954	$1,327	$518,072	$2,648,278
Middle Kuskokwim River, District W-2						
			1999			
Fish	0	0	0	0	0	0
Pounds	0	0	0	0	0	0
Price						
Value	$0	$0	$0	$0	$0	$0
			Ave. 1989-98			
Fish	955	1,226	16,363	23	11,713	30,279
Value	$9,417	$6,775	$52,482	$12	$17,596	$86,282
Quinhagak, District W-4						
			1999			
Fish	18,426	41,315	6,184	0	38,091	104,016
Pounds	284,503	257,258	43,529	0	281,163	866,453
Price	0.33	0.55	0.34		0.10	
/alue	$93,886	$141,492	$14,800	$0	$28,116	$278,294
			Ave. 1989-98			
Fish	21,091	60,890	63,820	11,500	56,524	213,825
Value	$175,297	$283,612	$217,601	$3,051	$83,315	$762,875
Goodnews Bay, District W-5						
			1999			
Fish	1,888	22,910	2,474	0	11,562	38,834
Pounds	31,104	148,680	19,268	0	83,266	282,318
Price	0.29	0.53	0.39		0.10	
Value	$9,020	$78,800	$7,515	$0	$8,327	$103,662
			Ave. 1989-98			
Fish	2,541	38,961	22,628	3,354	15,717	83,201
Value	$21,549	$193,529	$92,545	$884	$24,252	$332,759
Kuskokwim Area Total						
			1999			
Fish	25,019	81,201	32,251	2	72,659	211,132
Pounds	387,434	529,426	211,574	6	528,704	1,657,144
Price	0.32	0.58	0.32	0.05	0.10	
Value	$125,173	$306,734	$66,947	$0	$52,870	$551,725
			Ave. 1989-98			
Fish	50,895	161,290	600,729	19,305	406,170	1,238,390
Value	$425,733	$803,370	$1,952,582	$5,274	$643,234	$3,830,195
Avg weight	15.5	6.5	6.6	3.0	7.3	

Table 4. Executive summary of working group and department actions, 1999.

Date	Comment
25 March	Greg Hoffman Sr. (Kuskokwim Fisherman's Coop) and Angela Morgan (Middle River Subsistence Fisher) were elected Co-Chairs of the Working Group for the 1999 season. Topics discussed were the outlook for the 1999 salmon returns, 1999 Kuskokwim River Salmon Management Plan, Working Group By-Laws revision, Federal Disaster Relief funds for western Alaska salmon research, and the AYK sonar program rebuilding plan.
25 June	The Working Group heard reports from subsistence fishers and the department concerning the status of Kuskokwim River salmon runs. Due to cold ocean water temperatures, salmon run timing appears to be late or weak based on the Bethel test fishery and subsistence reports. Subsistence fishers in the middle and upper Kuskokwim report that chinook salmon abundance and catches are poor for this date. Kwethluk Joint Group nominates and Working Group accepts Brian Epchook, Kwethluk IRA Natural Resources Director, to replace Raymond Nicholi as Lower Kuskokwim Subsistence representative Dept. recommendation: Working Group meet again on 28 June to reevaluate salmon run strength. Working Group recommendation: Accepted department's recommendation. Actual outcome: The Working Group met again on 28 June.
28 June	The Working Group heard reports from subsistence fishers and the department concerning the status of Kuskokwim River salmon runs. Bethel test fishery and subsistence catches indicate that the chinook, chum and sockeye runs are late or weak. Subsistence fishers report adequate chinook catches and good catches of sockeye in the lower river. Subsistence fishers in the middle Kuskokwim report that salmon catches and abundance are poor. Subsistence fishers in the upper Kuskokwim report that salmon abundance and catches are near average for this date. In order to accurately assess chum salmon run strength, the department felt that a test commercial opening downstream of Bethel was appropriate. Dept. recommendation: Six-hour period in District W-1, below Bethel, on 30 June. Working Group recommendation: Six-hour period in District W-1, below Bethel, on 30 June. Actual outcome: Six-hour period in District W-1, below Bethel, on 30 June.

- continued -

Table 4. (page 2 of 3)

Date	Comment
1 July	The commercial harvest and CPUE of chum salmon on 30 June were the lowest on record for that date. The Bethel test fishery and middle Kuskokwim subsistence catch information continue to indicate late or weak chinook and chum runs. The department can not justify further commercial fishing in the Kuskokwim River until chum salmon run strength shows significant improvement. Dept. recommendation: Meet again at call of chair when indicators of chum salmon run strength show significant improvement. Working Group recommendation: Accepted department's recommendation. Actual outcome: Working Group met again on 3 July.
3 July	The Working Group failed to achieve a quorum. Chum salmon appears to be late or weak based on commercial and subsistence catch reports, the Bethel test fishery and passage at escapement projects. The department can not justify further commercial fishing in the Kuskokwim River until chum salmon run strength shows significant improvement. Dept. recommendation: Meet again at call of chair when indicators of chum salmon run strength show significant improvement. Working Group recommendation: Accepted department's recommendation. Actual outcome: Working Group met again on 15 July.
15 July	The Working Group failed to achieve a quorum. All indicators of chum run strength show the run to be extremely weak. Even assuming record late run timing, and further commercial fishing would seriously jeopardize our ability to meet subsistence and escapement needs. Dept. recommendation: The Kuskokwim River commercial chum salmon fishery remain closed for the rest of the season and the Working Group meet again at call of Chair. Working Group recommendation: Accepted department's recommendation. Actual outcome: Working Group met again on 2 August.
2 August	The Working Group heard reports from subsistence fishers and the department concerning the status of Kuskokwim River coho salmon runs. It is too early to accurately assess coho salmon run strength and measures of coho run strength indicate that the run is weak for this date. The department can not justify commercial fishing in the Kuskokwim River at this time. Dept. recommendation: Meet again on 4 August to reassess salmon run strength. Working Group recommendation: Accepted department's recommendation. Actual outcome: Working Group met again on 4 August.

-continued-

Table 4. (page 3 of 3)

Date	Comment
4 August	Coho run strength appears to be too weak to allow commercial fishing at this time. The Elder seat was modified to include both Upriver and Downriver Elder seats. Peter Zaukar Sr. of Sleetmute was appointed to the Upriver Elder seat. Nick Lupie of Tuntutuliak was appointed to the Downriver Elder seat and Oscar Nick of Atmautluak was appointed as the Alternate member for this seat. Dept. recommendation: Working Group meet again on 6 August to reassess salmon run strength. Working Group recommendation: Meet again on 5 August. Actual outcome: Working Group met again on 5 August.
5 August	The department's run assessment information indicate that coho run strength is relatively weak for this date. Subsistence fishers report strong catches of coho in the lower river. Coho salmon subsistence catches in the middle and upper Kuskokwim River have been low. Dept. recommendation: Working Group meet again on 8 August to reassess salmon run strength. Working Group recommendation: Six-hour period in District W-1 on 7 August. Actual outcome: Six-hour period in District W-1 on 7 August.
9 August	The commercial harvest and CPUE of coho salmon on 7 August was the lowest on record for that date. All indicators of coho salmon run strength show that the coho run is weak or late. The department can not justify further commercial fishing in the Kuskokwim River until coho salmon run strength shows significant improvement. Dept. recommendation: Working Group meet again at call of chair when coho salmon run strength shows significant improvement. Working Group recommendation: Accepted department's recommendation. Actual outcome: Working Group met again on 25 August.
25 August	All indicators of coho salmon run strength show the coho run to be very weak. Commercial fishing at this time will seriously jeopardize our ability to meet coho salmon escapement and subsistence needs. Representatives Greg Hoffman Sr. (Kuskokwim Fisherman's Coop), Billy McCann (Lower River Commercial Fishers), Ron Egoak (KUFMA) and Oscar Nick (Downriver Elder Alternate) resigned from the Working Group. Dept. recommendation: Working Group meet again at the call of the chair when coho salmon run strength shows significant improvement. Working Group recommendation: Accepted department's recommendation Actual outcome: Working Group did not meet again during the 1999 season.

Table 5. Salmon processors and associated data, Kuskokwim Area, 1999.

Processor	Product	District
Arctic Salmon P.O. Box 578 Bethel, AK 99559	Frozen Salmon Fresh Salmon Salmon Roe	1, 2, 4 and 5
Coastal Village Seafoods, Inc 711 H Street, Suite 200 Anchorage, AK 99501	Frozen salmon Fresh salmon Salmon Roe	4 and 5
North Alaska Fisheries, Inc. P.O. Box 92737 Anchorage, AK 99509	Fresh Salmon Frozen Salmon Salmon Roe	1
Woodbine Alaska Fish Co. P.O. Box 218 Egegik, AK 99579	Frozen Salmon Canned Salmon Salmon Roe	1, 2, 4 and 5

Table 6. Commercial salmon harvest and fishing effort by period in Kuskokwim River Districts 1 and 2, and both districts combined, 1999.

				Chinook		Sockeye		Chum		Pink		Coho	
Period	Date	Hours	Permits	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE
District 1													
1	6/30	6	409	4,668	1.90	16,772	6.83	22,700	9.25				
2	8/7	6	389	37	0.02	204	0.09	306	0.13			23,593	10.11
Subtotal		12	509	4,705		16,976		23,006		0		23,593	
District 2													
	No Commercial Openings												
Subtotal		-	-	-		-		-		-		-	
Total													
Districts 1&2		12	509	4,705		16,976		23,006		0		23,593	

Table 7. Peak aerial survey salmon escapement estimates in Kuskokwim Area spawning tributaries by species, 1999[a].

Location	Date	Chinook	Sockeye	Coho	Chum
KUSKOKWIM RIVER:					
Holitna River	22 July	741	-	-	8,390
Kipchuk River	-	-	-	-	-
Salmon River (Aniak)	-	-	-	-	-
Aniak River	-	-	-	-	-
Holokuk River	22 July	18	-	-	700
Kasigluk River	-	-	-	-	-
Kisaralik River	-	-	-	-	-
Tuluksak River	-	-	-	-	-
Gagaryak River	-	-	-	-	-
Oskawalik River	22- July	98	-	-	2,210
Cheeneetnuk River	-	-	-	-	-
Salmon River (Pitka Fk)	-	-	-	-	-
Tatlawiksuk River	-	-	-	-	-
KUSKOKWIM BAY:					
Kinegnak River	-	-	-	-	-
Kanektok River	-	-	-	-	-
Goodnews River	-	-	-	-	-
Middle Fork Goodnews River	-	-	-	-	-
Arolik River	-	-	-	-	-
Unulak River	-	-	-	-	-
Salmon River	-	-	-	-	-

[a] Peak aerial salmon escapement index count. Aerial index counts do not represent total escapement, but reflect annual spawner abundance trends when made using standard survey methods under acceptable conditions.

Table 8. Daily and cumulative estimates of fish passage at the Aniak River sonar site, 1999.

Date	Left Bank	Right Bank	Daily Count	Cumulative Count	Percent Passage
1-Jul	571	733	1,303	1,303	1
2-Jul	737	1,196	1,933	3,236	2
3-Jul	582	1,069	1,651	4,887	3
4-Jul	691	1,009	1,700	6,588	4
5-Jul	866	1,738	2,604	9,192	5
6-Jul	894	2,673	3,567	12,758	7
7-Jul	880	3,645	4,525	17,283	10
8-Jul	1,300	3,528	4,828	22,111	12
9-Jul	1,446	3,295	4,741	26,852	15
10-Jul	1,810	4,058	5,868	32,720	18
11-Jul	1,878	3,423	5,301	38,021	21
12-Jul	2,120	4,215	6,334	44,355	25
13-Jul	1,615	3,710	5,325	49,680	28
14-Jul	977	2,949	3,926	53,606	30
15-Jul	1,634	3,620	5,254	58,860	33
16-Jul	1,961	3,299	5,260	64,120	36
17-Jul	2,730	3,959	6,689	70,809	40
18-Jul	2,973	2,931	5,904	76,713	43
19-Jul	2,971	3,384	6,355	83,068	47
20-Jul	3,488	4,382	7,870	90,938	51
21-Jul	2,545	3,380	5,925	96,863	54
22-Jul	2,137	2,510	4,647	101,510	57
23-Jul	3,712	4,377	8,089	109,599	62
24-Jul	4,838	5,203	10,041	119,640	67
25-Jul	4,990	5,623	10,613	130,253	73
26-Jul	2,988	3,325	6,313	136,566	77
27-Jul	1,922	1,653	3,575	140,141	79
28-Jul	2,777	3,149	5,926	146,066	82
29-Jul	2,998	3,191	6,189	152,255	86
30-Jul	2,873	3,125	5,998	158,253	89
31-Jul	3,089	2,970	6,059	164,312	92
1-Aug	2,498	2,676	5,173	169,485	95
2-Aug	1,788	2,222	4,009	173,495	98
3-Aug	1,472	2,804	4,276	177,771	100
TOTAL	72,749	105,022	177,771	177,771	

Table 9. Quinhagak, District 4 commercial salmon harvest and effort by period, 1999.

				Chinook		Sockeye		Chum		Pink*		Coho	
Period	Date	Hours	Permits	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE
1	6/21	12	93	4,075	3.65	396	0.35	766	0.69				
2	6/24	12	106	3,476	2.73	688	0.54	1,500	1.18				
3	6/28	12	125	5,468	3.65	2,497	1.66	4,559	3.04				
4	7/01	12	79	1,916	2.02	2,803	2.96	4,191	4.42				
5	7/05	12	116	1,246	0.90	4,367	3.14	5,038	3.62				
6	7/09	12	107	677	0.53	4,515	3.52	2,239	1.74				
7	7/14	12	107	548	0.43	5,787	4.51	6,668	5.19				
8	7/16	12	70	220	0.26	6,311	7.51	4,359	5.19			1	0.00
9	7/19	12	86	168	0.16	2,684	2.60	1,764	1.71			12	0.01
10	7/21	12	85	182	0.18	3,360	3.29	1,479	1.45			0	0.00
11	7/23	12	63	152	0.20	3,567	4.72	2,060	2.72			4	0.01
12	7/26	12	58	93	0.13	1,580	2.27	1,460	2.10			25	0.04
13	7/28	12	41	62	0.13	959	1.95	889	1.81			29	0.06
14	7/30	12	36	47	0.11	815	1.89	550	1.27			103	0.24
15	8/02	12	28	35	0.10	441	1.31	337	1.00			200	0.60
16	8/04	12	23	17	0.06	144	0.52	83	0.30			168	0.61
17	8/11	12	44	23	0.04	250	0.47	109	0.21			2,458	4.66
18	8/16	12	59	15	0.02	78	0.11	28	0.04			1,790	2.53
19	8/18	12	48	6	0.01	73	0.13	12	0.02			1,394	2.42
Total		228	218	18,426		41,315		38,091				6,184	

* No commercial landings of pink salmon in 1999.

Table 10. Goodnews Bay, District 5 commercial salmon harvest and effort by period, 1999.

				Chinook		Sockeye		Chum		Pink*		Coho	
Period	Date	Hours	Permits	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE	Number	CPUE
1	7/02	12	28	672	2.00	2,026	6.03	2,324	6.92				
2	7/07	12	47	352	0.62	4,588	8.13	1,917	3.40				
3	7/09	12	42	248	0.49	3,566	7.08	1,620	3.21				
4	7/12	12	58	107	0.15	2,762	3.97	1,801	2.59				
5	7/14	12	48	178	0.31	2,969	5.15	1,127	1.96				
6	7/16	12	35	93	0.22	1,809	4.31	1,102	2.62				
7	7/19	12	14	33	0.20	888	5.29	270	1.61				
8	7/21	12	25	48	0.16	974	3.25	377	1.26				
9	7/23	12	26	52	0.17	1,314	4.21	517	1.66			1	
10	7/26	12	19	26	0.11	533	2.34	184	0.81			0	
11	7/28	12	6	7	0.10	338	4.69	81	1.13			3	0.04
12	7/30	12	11	17	0.13	272	2.06	61	0.46			1	0.01
13	8/02	12	10	15	0.13	222	1.85	45	0.38			13	0.11
14	8/04	12	2	3	0.13	59	2.46	10	0.42			2	0.08
15	8/06	12	9	4	0.04	148	1.37	47	0.44			23	0.21
16	8/09	12	12	9	0.06	110	0.76	39	0.27			108	0.75
17	8/11	12	8	6	0.06	62	0.65	14	0.15			127	1.32
18	8/16	12	13	6	0.04	80	0.51	11	0.07			336	2.15
19	8/18	12	15	6	0.03	101	0.56	11	0.06			455	2.53
20	8/25	12	24	6	0.02	89	0.31	4	0.01			1,405	4.88
		240	73	1,888		22,910		11,562				2,472	

* No commercial landings of pink salmon in 1999.

Table 11. Preliminary outlook for the 2000 Kuskokwim Area commercial salmon harvest (X 1,000 of fish).

Species	Management District: Districts 1 and 2[a]	Management District: District 4	Management District: District 5	Kuskokwim Area Total
Chinook	5 to 20	10 to 20	1 to 2	16 to 42
Sockeye	15 to 60	40 to 70	20 to 40	75 to 170
Coho	100 to 500	30 to 80	10 to 25	140 to 605
Pink[b]	less than 1	less than 1	less than 1	2 to 3
Chum	50 to 300	35 to 50	10 to 15	95 to 365
TOTAL	170 to 881	115 to 221	41 to 83	328 to 1,185

a Kuskokwim River includes Districts 1 and 2.

b Outlook is based on historic catches in even years only.

Table 12. Kuskokwim Area subsistence salmon fishery sampling summary, 1999.

COMMUNITY	Total HH'S	CALENDAR Mailed	CALENDAR Returned	POSTCARD Mailed	POSTCARD Returned	NUMBER OF HOUSEHOLDS: Household Surveys	Phone Surveys	Subsistence Fished*	Harvest Data**	Any Info.*
Kipnuk	176	7	0	86	8	0	0	6	8	8
Kwigillingok	95	3	0	0	0	0	0	0	0	0
Kongiganak	71	48	1	19	1	44	0	45	54	69
NORTH KUSKOKWIM BAY	342	58	1	105	9	44	0	51	62	77
Tuntutuliak	74	53	12	18	2	55	0	60	55	72
Eek	67	42	15	6	1	47	0	44	62	65
Kasigluk	136	7	3	73	4	0	0	7	7	7
Nunapitchuk	100	63	19	16	2	72	0	77	87	99
Atmautluak	53	38	6	11	1	38	0	36	45	53
Napakiak	73	50	8	13	2	54	0	52	62	72
Napaskiak	74	55	6	15	0	49	0	59	62	73
Oscarville	15	11	4	5	2	10	0	13	10	15
Bethel	1,508	371	65	478	116	973	0	517	1,082	1,135
Kwethluk	142	101	19	38	2	92	0	107	109	135
Akiachak	119	77	4	39	5	68	0	90	93	115
Akiak	58	44	5	23	4	33	0	40	39	48
Tuluksak	72	58	5	10	1	56	0	55	60	72
LOWER KUSKOKWIM RIVER	2,491	970	171	745	142	1,547	0	1,157	1,773	1,961
Lower Kalskag	63	38	7	12	3	40	0	35	54	60
Upper Kalskag	53	28	7	9	2	41	0	29	49	53
Aniak	163	104	18	29	9	121	0	97	147	161
Chuathbaluk	28	21	4	5	1	19	0	19	25	28
MIDDLE KUSKOKWIM RIVER	307	191	36	55	15	221	0	180	275	302
Crooked Creek	30	23	5	6	0	18	0	18	26	29
Red Devil	18	14	5	1	0	13	0	14	16	18
Sleetmute	35	29	9	4	1	30	0	26	30	33
Stony River	16	14	1	6	0	11	0	8	12	16
Lime Village	17	7	0	8	3	2	0	7	12	15
McGrath	100	49	5	30	9	67	0	36	75	77
Takotna	14	1	0	0	0	14	0	0	14	14
Nikolai	29	17	3	6	2	20	0	15	27	29
Telida	2	0	0	2	0	0	0	0	0	0
UPPER KUSKOKWIM RIVER	261	154	28	63	15	175	0	124	212	231
Quinhagak	132	96	10	28	2	84	0	94	102	127
Goodnews Bay	53	29	3	6	1	38	0	30	47	53
Platinum	19	3	0	3	1	15	0	12	17	18
SOUTH KUSKOKWIM BAY	204	128	13	37	4	137	0	136	166	198
Mekoryuk	92	14	1	68	17	0	0	14	18	18
Newtok	80	1	0	42	0	0	0	0	0	0
Nightmute	67	1	0	22	1	0	0	1	1	1
Toksook Bay	133	9	2	61	13	0	0	14	15	15
Tununak	109	1	0	56	1	0	0	0	1	1
Chefornak	94	1	0	0	0	0	0	0	0	0
BERING SEA COAST	575	27	3	249	32	0	0	29	35	35
OTHER	0	0	0	0	0	0	0	0	0	0
KUSKOKWIM AREA TOTALS	4,180	1,528	252	1,254	217	2,124	0	1,677	2,523	2,804

* Includes information for an uncontacted household's fishing effort derived from another household's survey form.

** Households that did not fish and those households which did fish and provided harvest numbers.

Table 13. Subsistence salmon harvest summary, Kuskokwim Area, 1999.

COMMUNITY	HOUSEHOLDS Total	HOUSEHOLDS Contacted	CHINOOK Reported Harvest	CHINOOK Estimated Total	CHUM Reported Harvest	CHUM Estimated Total	SOCKEYE Reported Harvest	SOCKEYE Estimated Total	COHO Reported Harvest	COHO Estimated Total
Kipnuk	176	8	29	29	31	31	54	54	75	75
Kwigillingok	95	0	0	0	0	0	0	0	0	0
Kongiganak	71	54	883	1,320	771	1,152	667	991	148	222
N. KUSKOKWIM BAY	342	62	912	1,349	802	1,183	721	1,045	223	297
Tuntutuliak	74	55	2,620	3,645	1,336	1,862	1,479	2,048	234	331
Eek	67	62	1,655	1,816	463	508	570	625	236	258
Kasigluk	136	7	480	480	350	350	183	183	92	92
Nunapitchuk	100	87	3,810	4,521	3,996	4,742	2,951	3,493	333	391
Atmautluak	53	45	1,201	1,469	1,355	1,667	1,524	1,874	166	205
Napakiak	73	62	1,921	2,380	1,273	1,573	1,713	2,115	391	487
Napaskiak	74	62	3,066	3,827	2,130	2,687	1,637	2,058	279	355
Oscarville	15	10	1,335	2,289	1,112	1,906	1,263	2,165	569	970
Bethel	1,508	1,082	19,912	24,996	8,841	11,163	10,432	13,145	9,845	12,414
Kwethluk	142	109	4,666	6,081	2,646	3,449	2,387	3,112	2,296	2,993
Akiachak	119	93	4,065	5,373	2,068	2,741	2,356	3,130	502	663
Akiak	58	39	1,681	2,356	856	1,202	815	1,145	183	254
Tuluksak	72	60	1,906	2,348	1,266	1,566	1,214	1,490	249	307
LOWER KUSKOKWIM	2,491	1,773	48,318	61,581	27,692	35,417	28,524	36,584	15,375	19,721
Lower Kalskag	63	54	1,454	1,787	614	759	488	605	243	302
Upper Kalskag	53	49	1,566	1,688	617	665	569	614	142	153
Aniak	163	147	2,335	2,596	1,586	1,764	1,178	1,310	1,276	1,418
Chuathbaluk	28	25	941	1,110	636	729	402	460	123	137
MIDDLE KUSKOKWIM	307	275	6,296	7,181	3,453	3,916	2,637	2,989	1,784	2,010
Crooked Creek	30	26	585	681	692	806	592	690	441	515
Red Devil	18	16	141	161	169	193	497	568	398	455
Sleetmute	35	30	387	447	318	367	820	946	195	226
Stony River	16	12	35	55	228	358	783	1,230	325	511
Lime Village	17	12	95	155	764	1,012	2,023	2,550	459	600
McGrath	100	75	1,036	1,295	212	260	60	74	449	553
Takotna	14	14	0	0	0	0	0	0	0	0
Nikolai	29	27	266	288	82	89	0	0	109	117
Telida	2	0	0	0	0	0	0	0	0	0
UPPER KUSKOKWIM	261	212	2,545	3,082	2,465	3,085	4,775	6,059	2,376	2,976
KUSKOKWIM RIVER	3,401	2,322	58,071	73,194	34,412	43,601	36,657	46,677	19,758	25,004
Quinhagak	132	102	2,285	3,167	1,301	1,810	1,179	1,639	1,458	2,021
Goodnews Bay	53	47	656	805	203	250	627	770	361	439
Platinum	19	17	61	66	29	31	94	102	131	143
S. KUSKOKWIM BAY	204	166	3,002	4,038	1,533	2,092	1,900	2,511	1,950	2,603
Mekoryuk	92	18	15	15	1,583	1,583	2	2	64	64
Newtok	80	0	0	0	0	0	0	0	0	0
Nightmute	67	1	6	6	10	10	5	5	0	0
Toksook Bay	133	15	407	407	326	326	193	193	83	83
Tununak	109	1	0	0	0	0	0	0	0	0
Chefornak	94	0	0	0	0	0	0	0	0	0
BERING SEA COAST	575	35	428	428	1,919	1,919	200	200	147	147
KUSKOKWIM TOTALS	4,180	2,523	61,501	77,660	37,864	47,612	38,757	49,388	21,855	27,753

Note: If fewer than 30 households or less than 50% of the community households were contacted, then reported harvest is used for estimated harvest.

Table 14. Gear types reported used for subsistence salmon fishing, Kuskokwim Area, 1999.

COMMUNITY	Number of Households Reporting Type of Subsistence Fishing Gear Used					
	Set Gillnet	Drift Gillnet	Fish Wheel	Rod and Reel	Seine	Spear
Kipnuk	1	6	0	0	0	0
Kongiganak	3	26	0	0	0	0
NORTH KUSKOKWIM BAY	4	32	0	0	0	0
Tuntutuliak	1	36	0	2	0	0
Eek	15	24	0	1	0	0
Kasigluk	0	3	0	0	0	0
Nunapitchuk	3	52	0	0	0	0
Atmautluak	4	25	0	0	0	0
Napakiak	21	28	0	0	0	0
Napaskiak	13	34	0	1	0	0
Oscarville	5	6	0	0	0	0
Bethel	65	392	0	63	0	0
Kwethluk	26	48	0	13	0	0
Akiachak	18	48	0	4	0	0
Akiak	13	20	0	2	0	0
Tuluksak	11	33	0	3	0	0
LOWER KUSKOKWIM RIVER	195	749	0	89	0	0
Lower Kalskag	8	22	0	0	0	0
Upper Kalskag	3	15	0	2	0	0
Aniak	7	53	0	20	0	0
Chuathbaluk	2	10	0	4	0	0
MIDDLE KUSKOKWIM RIVER	20	100	0	26	0	0
Crooked Creek	4	11	0	4	0	0
Red Devil	3	3	0	6	0	0
Sleetmute	10	17	0	3	0	0
Stony River	3	1	0	0	0	0
Lime Village	4	0	0	1	0	0
McGrath	23	6	0	6	0	0
Nikolai	9	0	0	5	0	0
UPPER KUSKOKWIM RIVER	56	38	0	25	0	0
Quinhagak	13	43	0	19	0	0
Goodnews Bay	6	16	0	5	0	0
Platinum	3	4	0	7	0	0
SOUTH KUSKOKWIM BAY	22	63	0	31	0	0
Mekoryuk	7	1	0	4	1	0
Nightmute	0	1	0	0	0	0
Toksook Bay	3	7	0	0	0	0
BERING SEA COAST	10	9	0	4	1	0
KUSKOKWIM AREA TOTALS	307	991	0	175	1	0

Note: Data on households that subsistence fished is based upon house to house surveys, returned postcards, or returned calendars. Households using multiple gear types are listed for each gear type they reported. Communities where gear type information was not provided are not listed.

Table 15. Salmon Reported Retained From Commercial Catches for Subsistence use, Kuskokwim Area, 1999.

	HOUSEHOLDS REPORTING		NUMBER OF SALMON RETAINED FROM COMMERCIAL CATCH FOR SUBSISTENCE USE			
COMMUNITY	Commercial Fishing	Retained Commercial Caught Salmon for Subsistence	Chinook	Chum	Sockeye	Coho
Kongiganak	20	1	30	0	0	0
N. KUSKOKWIM BAY	20	1	30	0	0	0
Tuntutuliak	26	1	0	0	3	3
Eek	33	2	1	0	0	4
Nunapitchuk	33	2	6	0	9	0
Atmautluak	20	0	0	0	0	0
Napakiak	23	0	0	0	0	0
Napaskiak	24	5	0	0	9	56
Oscarville	7	0	0	0	0	0
Kwethluk	34	5	4	4	0	21
Akiachak	37	2	8	0	8	1
Akiak	13	0	0	0	0	0
Tuluksak	19	2	0	2	2	0
LOWER KUSKOKWIM	269	19	19	6	31	85
Lower Kalskag	2	0	0	0	0	0
Upper Kalskag	2	1	0	0	20	0
Aniak	3	0	0	0	0	0
Chuathbaluk	0	0	0	0	0	0
MIDDLE KUSKOKWIM	7	1	0	0	20	0
Crooked Creek	0	0	0	0	0	0
Red Devil	0	0	0	0	0	0
Sleetmute	0	0	0	0	0	0
Stony River	0	0	0	0	0	0
Lime Village	0	0	0	0	0	0
McGrath	0	0	0	0	0	0
Takotna	0	0	0	0	0	0
Nikolai	0	0	0	0	0	0
Telida	0	0	0	0	0	0
UPPER KUSKOKWIM	0	0	0	0	0	0
Quinhagak	50	19	46	31	32	54
Goodnews Bay	24	1	3	0	3	1
Platinum	7	2	7	0	20	0
S. KUSKOKWIM BAY	81	22	56	31	55	55
TOTAL	377	43	105	37	106	140

NOTE: Data are based upon surveyed households only without expansion to the community as a whole. Bethel households were surveyed but were not asked specific questions regarding salmon retained form commercial fishing activities. Except for Bethel, communities not listed were not surveyed house to house.

Table 16. Quality of Subsistence Salmon Fishing, Kuskokwim Area, 1999.

COMMUNITY	Number of Households Responding	Percent of Households Reporting Quality of Subsistence Fishing							
		CHINOOK		CHUM		SOCKEYE		COHO	
		Very Good or Average	Poor	Very Good or Average	Poor	Very Good or Average	Poor	Very Good or Average	Poor
Kipnuk	5	60	40	25	75	33	67	50	50
Kongiganak	26	62	38	50	50	62	38	67	33
N. KUSKOKWIM BAY	31	61	39	46	54	58	42	62	38
Tuntutuliak	36	75	25	67	33	78	22	83	17
Eek	33	76	24	56	44	80	20	44	56
Kasigluk	4	50	50	25	75	25	75	33	67
Nunapitchuk	53	83	17	75	25	79	21	67	33
Atmautluak	25	88	12	86	14	75	25	100	0
Napakiak	36	78	22	84	16	81	19	70	30
Napaskiak	34	94	6	90	10	93	7	67	33
Oscarville	6	83	17	40	60	67	33	0	100
Bethel	375	70	30	56	44	70	30	56	44
Kwethluk	54	85	15	63	37	91	9	77	23
Akiachak	51	82	18	68	32	80	20	67	33
Akiak	22	82	18	47	53	88	12	71	29
Tuluksak	33	73	27	73	27	79	21	100	0
LOWER KUSKOKWIM	762	76	24	65	35	76	24	60	40
Lower Kalskag	23	65	35	50	50	64	36	25	7[illegible]
Upper Kalskag	15	87	13	80	20	80	20	50	5[illegible]
Aniak	51	57	43	52	48	69	31	50	50
Chuathbaluk	9	67	33	50	50	63	37	25	75
MIDDLE KUSKOKWIM	98	64	36	56	44	69	31	46	54
Crooked Creek	13	69	31	83	17	88	12	85	15
Red Devil	6	67	33	0	0	100	0	100	0
Sleetmute	18	39	61	31	69	65	35	38	62
Stony River	2	100	0	50	50	100	0	50	50
Lime Village	3	33	67	100	0	100	0	100	0
McGrath	27	70	30	67	33	100	0	70	30
Nikolai	12	50	50	29	71	0	0	50	50
UPPER KUSKOKWIM	81	59	41	57	43	81	19	67	33
Quinhagak	44	59	41	57	43	57	43	33	67
Goodnews Bay	18	56	44	44	56	47	53	29	71
Platinum	6	0	100	33	67	50	50	56	44
S. KUSKOKWIM BAY	68	53	47	51	49	53	47	38	62
Mekoryuk	4	50	50	78	22	0	100	0	100
Nightmute	1	100	0	100	0	100	0	0	0
Toksook Bay	13	85	15	50	50	56	44	33	67
BERING SEA COAST	18	78	22	69	31	50	50	18	82
KUSKOKWIM AREA TOTALS	1,058	72	28	62	38	73	27	57	43

Note: There were no responses to this survey question from Kwigillingok, Takotna, Telida, Newtok, Tununak and Chefornak.
Data are from households that subsistence fished based upon household surveys and returned postcards surveys.

Table 17. Kuskokwim area Pacific herring proportion of biomass by age class, 1999.

District	Age (years) 2	3	4	5	6	7	8	9	10	11	12	13+	Total weight (st)
Commercial catch[a]													
Security Cove[c]				0.2	7.4	7.9	15.4	19.7	22.9	18.9	5.9	1.8	1,072
Goodnews Bay				0.2	7.4	7.9	15.4	19.7	22.9	18.9	5.9	1.8	1,366
Cape Avinof					5.1	7.3	16.0	23.8	18.1	21.3	5.7	2.8	533
Nelson Island				0.1	2.0	7.2	19.6	28.3	21.9	13.8	3.6	3.5	1,366
Nunivak Island	No Commercial Fishery in 1999												
All Districts			0.0	0.1	5.4	7.6	16.8	22.9	22.0	17.6	5.2	2.5	4,337
Test Fishery[b]													
Security Cove[c]		0.1	1.2	2.9	15.3	11.0	14.7	16.5	19.1	12.3	4.8	2.1	4,190
Goodnews Bay		0.1	1.1	2.6	16.0	11.1	14.5	16.2	19.0	13.1	4.3	1.9	5,529
Cape Avinof		0.4	7.8	2.8	25.1	7.8	12.6	16.7	14.6	8.3	3.6	0.4	3,026
Nelson Island		0.3	2.8	2.7	16.4	4.9	15.0	18.5	20.6	11.5	4.9	2.3	5,289
Nunivak Island		0.2	2.2	2.1	13.4	5.3	16.0	20.5	20.9	12.0	4.6	2.4	3,319
All Districts		0.2	2.7	2.6	16.8	8.2	14.6	17.6	19.1	11.7	4.5	1.9	21,353
Total Run													
Security Cove[c]			1.0	2.3	13.7	10.4	14.9	17.1	19.9	13.7	5.0	2.1	5,262
Goodnews Bay			0.9	2.1	14.3	10.5	14.7	16.9	19.8	14.3	4.6	1.9	6,895
Cape Avinof		0.4	6.6	2.4	22.1	7.7	13.1	17.8	15.1	10.3	3.9	0.8	3,559
Nelson Island		0.2	2.2	2.1	13.4	5.3	16.0	20.5	20.9	12.0	4.6	2.7	6,655
Nunivak Island		0.2	2.2	2.1	13.4	5.3	16.0	20.5	20.9	12.0	4.6	2.7	3,319
All Districts		0.3	2.5	4.5	14.2	9.0	15.5	19.0	18.3	10.9	4.0	2.1	25,690

a Commercial drift gill net

b ADF&G variable mesh gill net

c No sampling in Security Cove in 1999 due to budget cuts.

Table 18. Kuskokwim area Pacific herring age frequency by district, 1999.

District	Age (years) 2	3	4	5	6	7	8	9	10	11	12	13+	Sample Size
Commercial catch[a]													
Security Cove[c]													
Goodnews Bay				0.3	9.5	9.0	16.4	19.5	21.8	16.9	5.1	1.5	438
Cape Avinof					6.2	8.4	17.3	24.1	17.3	19.2	5.1	2.1	416
Nelson Island				0.3	2.6	8.5	21.2	28.0	20.9	12.4	3.2	3.0	423
Nunivak Island	no commercial fishery												
All Districts				0.2	6.1	8.6	18.3	23.8	20.0	16.2	4.5	2.2	1,277
Test Fishery[b]													
Security Cove[c]													
Goodnews Bay		0.1	2.1	3.9	20.2	12.5	14.7	15.1	16.1	10.7	3.3	1.4	808
Cape Avinof		1.1	15.0	4.0	29.3	7.7	10.8	12.9	10.8	5.8	2.4	0.3	385
Nelson Island		0.8	5.2	3.5	17.3	6.0	15.8	18.6	17.7	9.5	3.5	1.9	1,261
Nunivak Island	no commercial fishery												
All Districts		0.6	5.7	3.7	20.1	8.4	14.7	16.6	16.1	9.3	3.3	1.5	2,454
Total Run													
Security Cove[c]		0.1	1.7	3.2	18.3	11.8	15.0	15.9	17.1	11.8	3.7	1.5	-
Goodnews Bay		0.1	1.7	3.2	18.2	11.8	15.0	15.9	17.2	11.9	3.7	1.4	722
Cape Avinof		0.9	13.2	3.5	26.5	7.7	11.6	14.3	11.6	7.4	2.7	0.5	379
Nelson Island		0.8	5.2	3.5	17.3	6.0	15.8	18.6	17.7	9.5	3.5	1.9	1,184
Nunivak Island		0.8	5.2	3.5	17.3	6.0	15.8	18.6	17.7	9.5	3.5	1.9	-
All Districts		0.6	5.4	3.4	19.1	8.1	14.9	17.0	16.5	9.9	3.4	1.5	2,285

a Commercial drift gill net
b ADF&G variable mesh gill net
c No samples due to budget cuts

Table 19. Summary of Pacific herring commercial harvest by fishing period for Kuskokwim Area fishing districts, Alaska, 1999.

District	Period	Date	Time	Total hours	Harvest[1] (st)
Security Cove	1	5/25	1400-1700	3.0	333.6
	2	5/26	0400-0700	3.0	498.5
	3	5/26	1600-1900	3.0	240.2
			Total	9.0	1,072.3
Goodnews Bay	1	5/29	0500-1100	6.0	49.0
	2	5/29	0700-2300	6.0	61.0
	3	5/30	0600-1200	6.0	5.0
	4	5/30	1800-2400	6.0	97.6
	5	5/31	0700-1500	8.0	496.2
	6	5/31-6/1	1900-0200	7.0	260.0
	7	6/01	0700-1400	7.0	331.8
	8	6/01	2100-2400	3.0	65.4
			Total	49.0	1,365.8
Cape Avinof	1	6/11	0700-1000	3.0	16.8
	2	6/11	1800-2400	6.0	27.1
	3	6/12	0700-1300	6.0	67.9
	4	6/12	1900-0100	6.0	123.3
	5	6/13	0800-1400	6.0	43.3
	6	6/13-6/14	2000-0200	6.0	94.0
	7	6/14	0800-1400	6.0	40.1
	8	6/14-6/15	2100-0300	6.0	87.1
	9	6/15	0930-1530	6.0	33.5
			Total	51.0	533.1
Nelson Island	1	6/04	1200-2100	9.0	406.9
	2	6/07	1600-2200	6.0	421.7
	3	6/08	1700-2400	7.0	537.5
			Total	22.0	1,366.1
Nunivak Island	No commercial fishing in 1999				

[1] Report includes estimated hopper weights for actual de-watered weights as reported by processor on fish tickets and in final catch reports. Hopper weight was estimated by adding 10%.

Table 20. Projections of Pacific herring spawning biomass and harvest for commercial fishing districts in the Kuskokwim Area, Alaska, 2000.

	2000 Projection[a]			
District	Biomass (st)	Threshold (st)[b]	Harvest (st)	Exploitation Rate (%)
Security Cove	3,622	1,200	724	20
Goodnews Bay	4,665	1,200	933	20
Cape Avinof	2,868	500	430	15
Nelson Island	4,672	3,000	734	16[c]
Nunivak Island	2,823	1,500	423	15[d]
Total	18,650		3,244	

a Preseason projection. Projection may be adjusted based on inseason biomass estimates.
b Threshold biomass needed to allow a commercial fishery from 5 AAC 27.060 Bering Sea Herring Fishery Management Plan.
c Nelson Island exploitation rate is 20% of projected biomass minus 200 st for subsistence harvest.
d Nunivak Island exploitation rate is 15% of projected biomass when inseason aerial survey estimate isn't available.

FIGURES

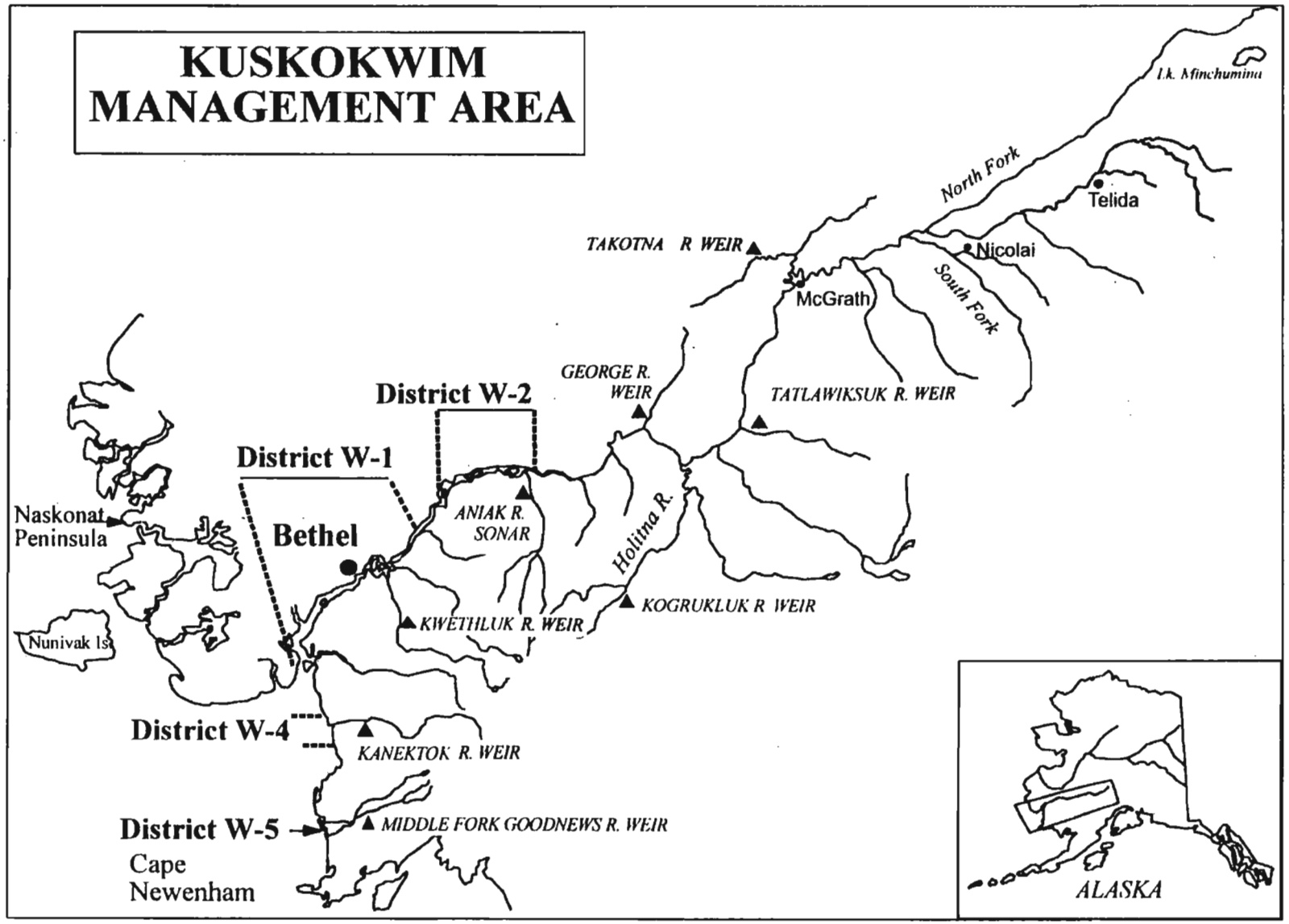

Figure 1. Kuskokwim Area map showing salmon management districts and escapement monitoring projects.

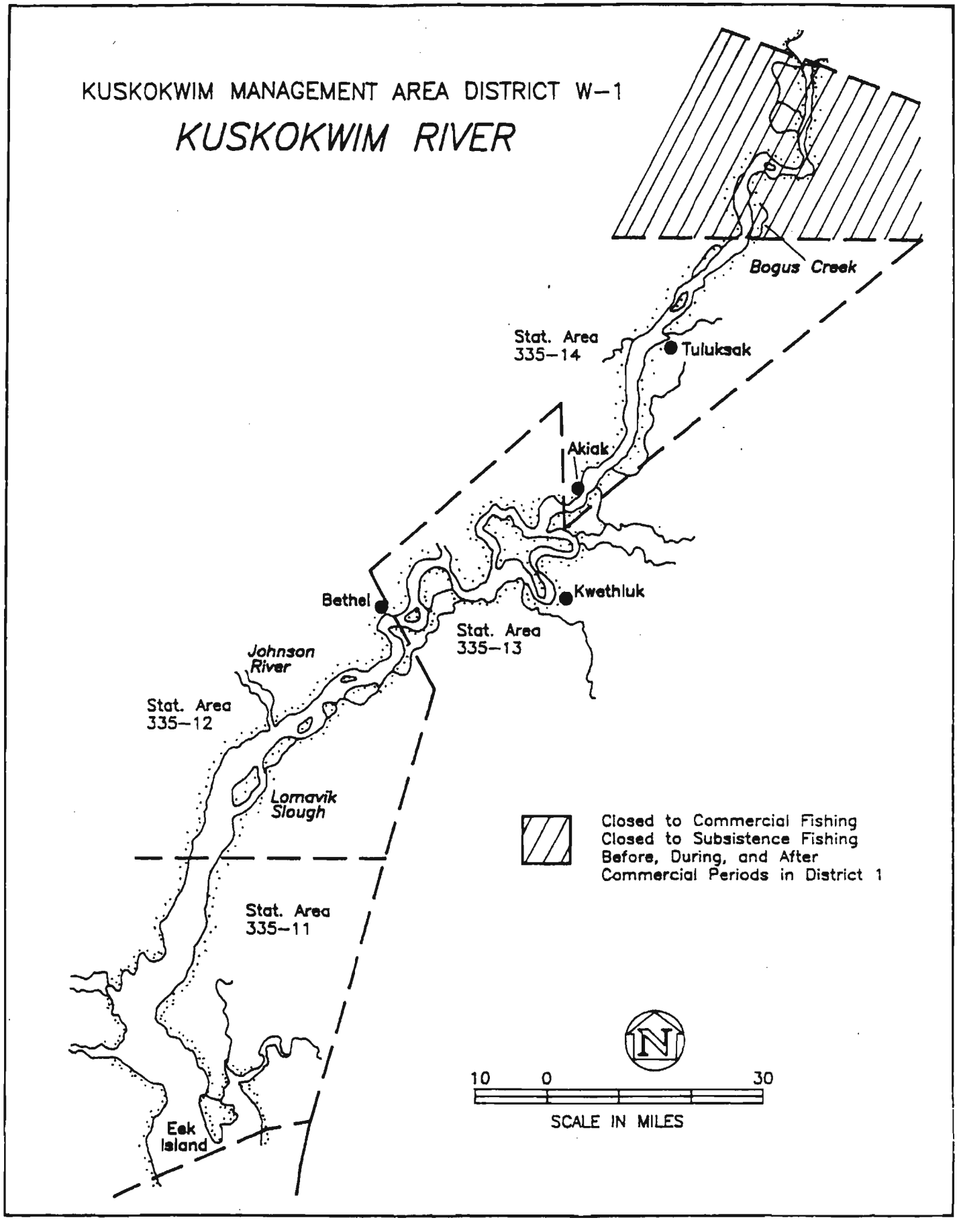

Figure 2. Kuskokwim Management Area, District W-1.

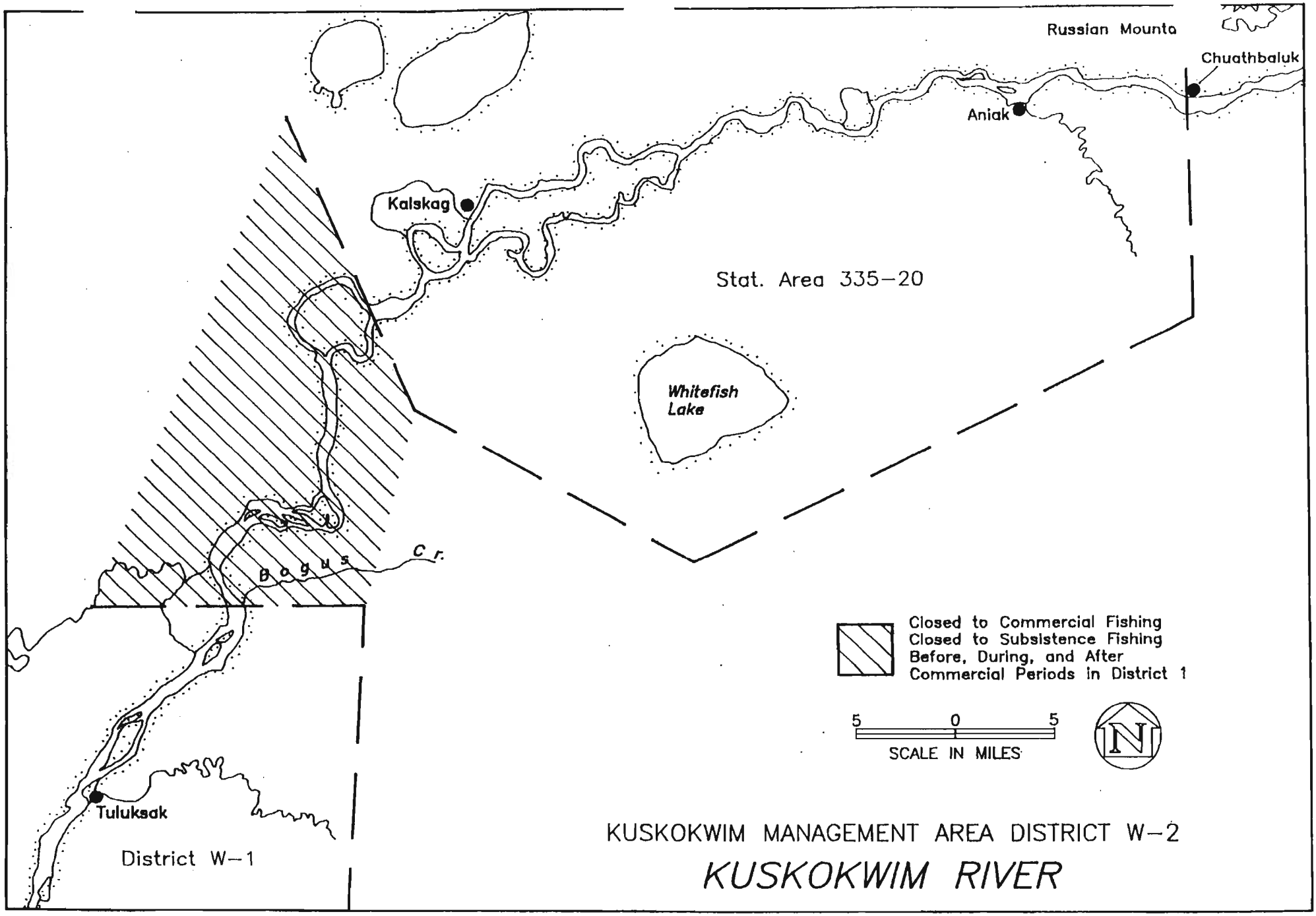

Figure 3. Kuskokwim Management Area, District W-2.

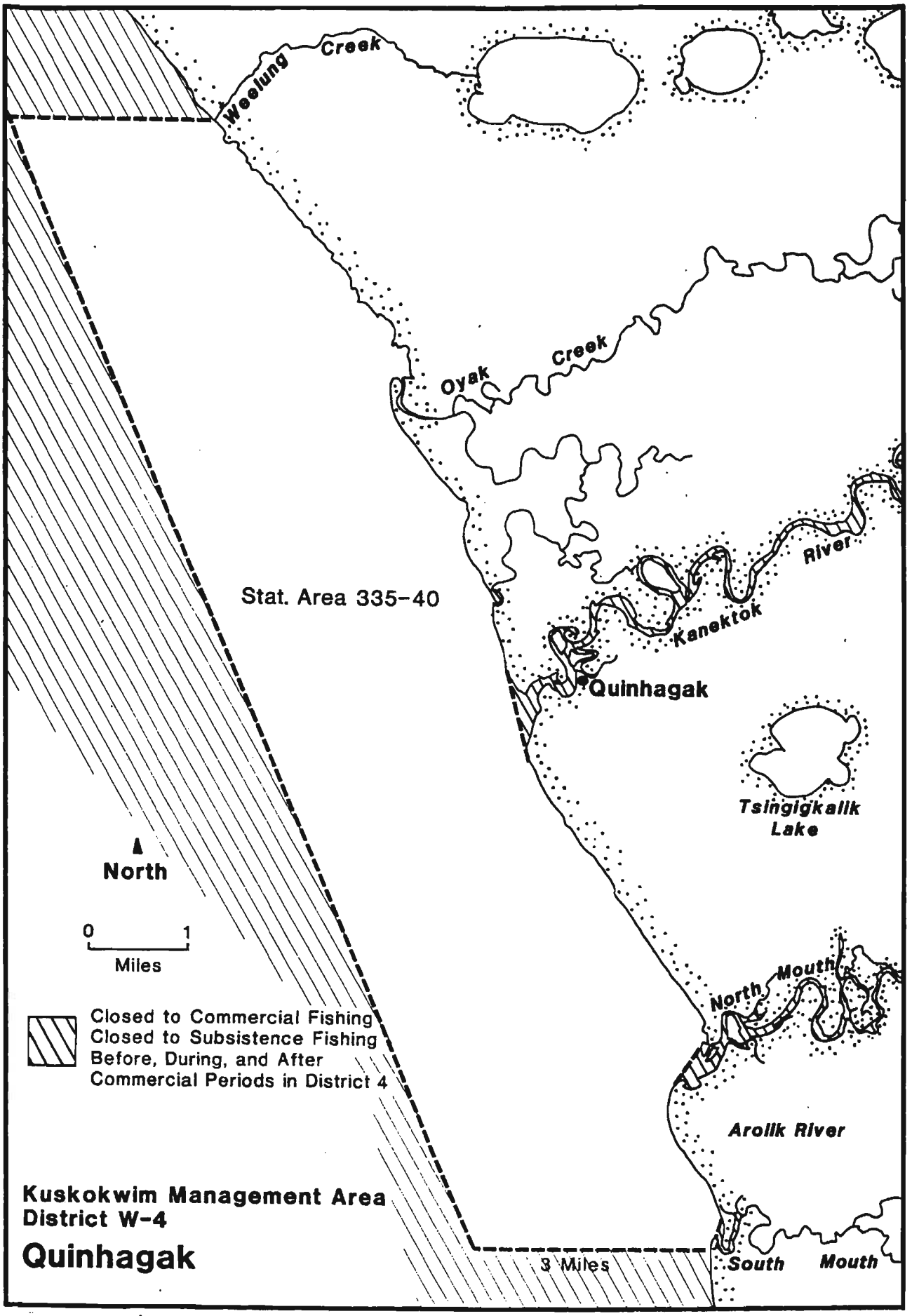

Figure 4. Kuskokwim Management Area, District W-4.

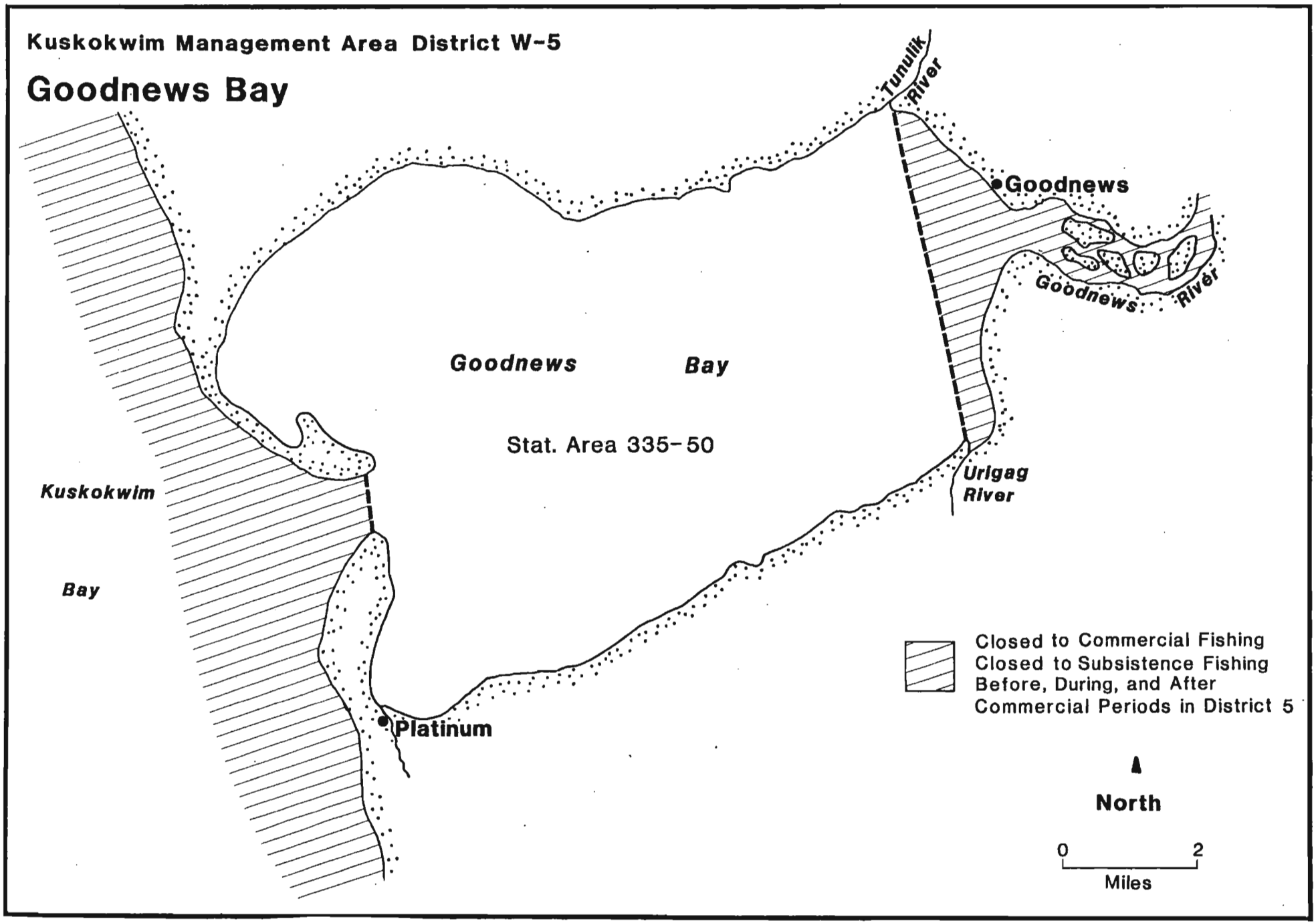

Figure 5. Kuskokwim Management Area, District W-5.

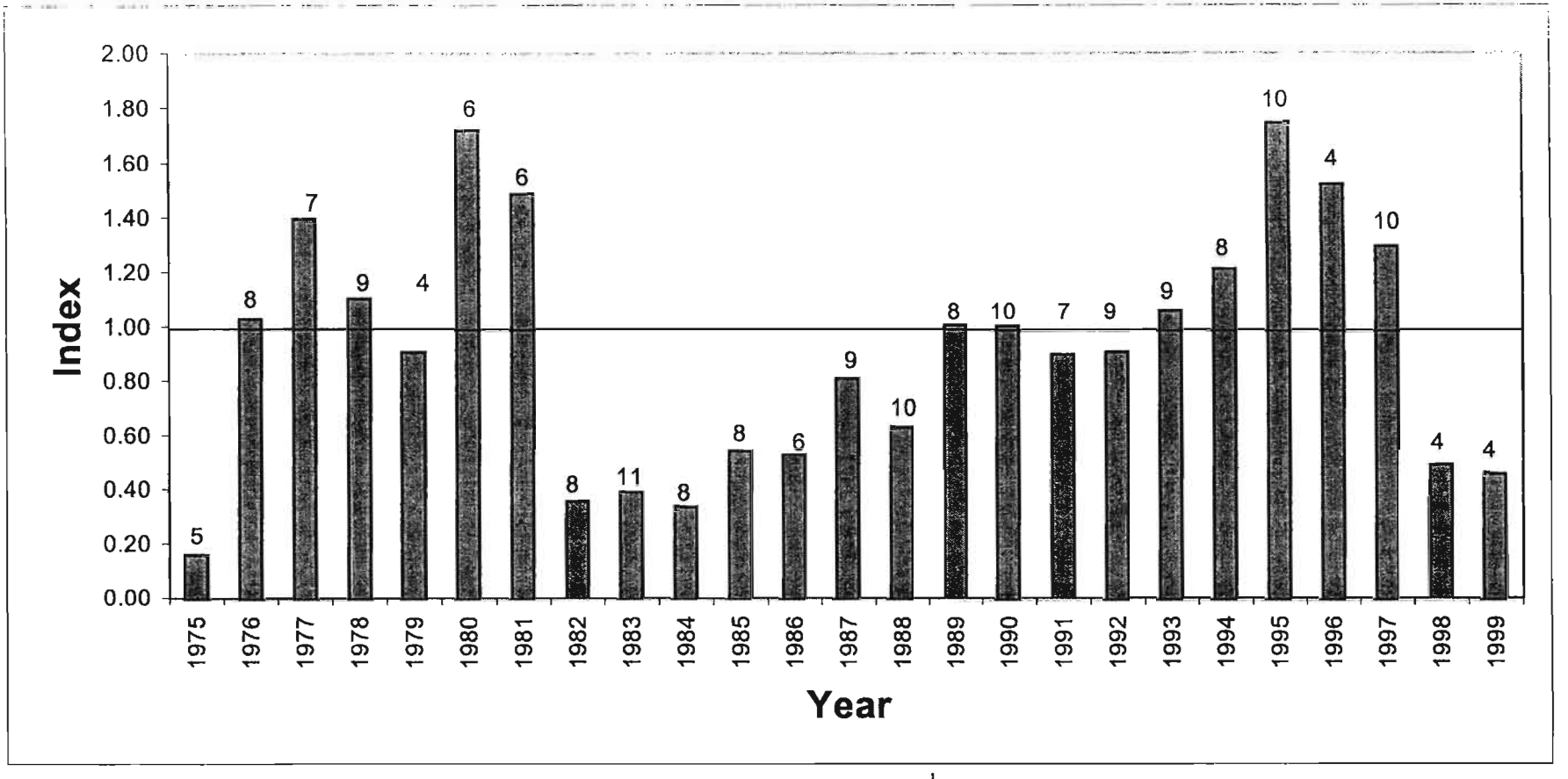

Figure 6. The Kuskokwim River chinook salmon escapement index,1975-1999.[1]

[1]The index represents relative escapement of 13 possible index streams for which adequate data is available. Numbers on top of bars indicate the number of index streams represented. The index scale represents the relative proportion of the BEG, if a BEG has been established, otherwise it represents the proportion of the median historical escapement. Index values greater than or equal to one mean that the BEG or historical median escapement was achieved in half or more of the streams. Index values of less than one mean that the BEG or historical median escapement was not achieved in over half the streams.

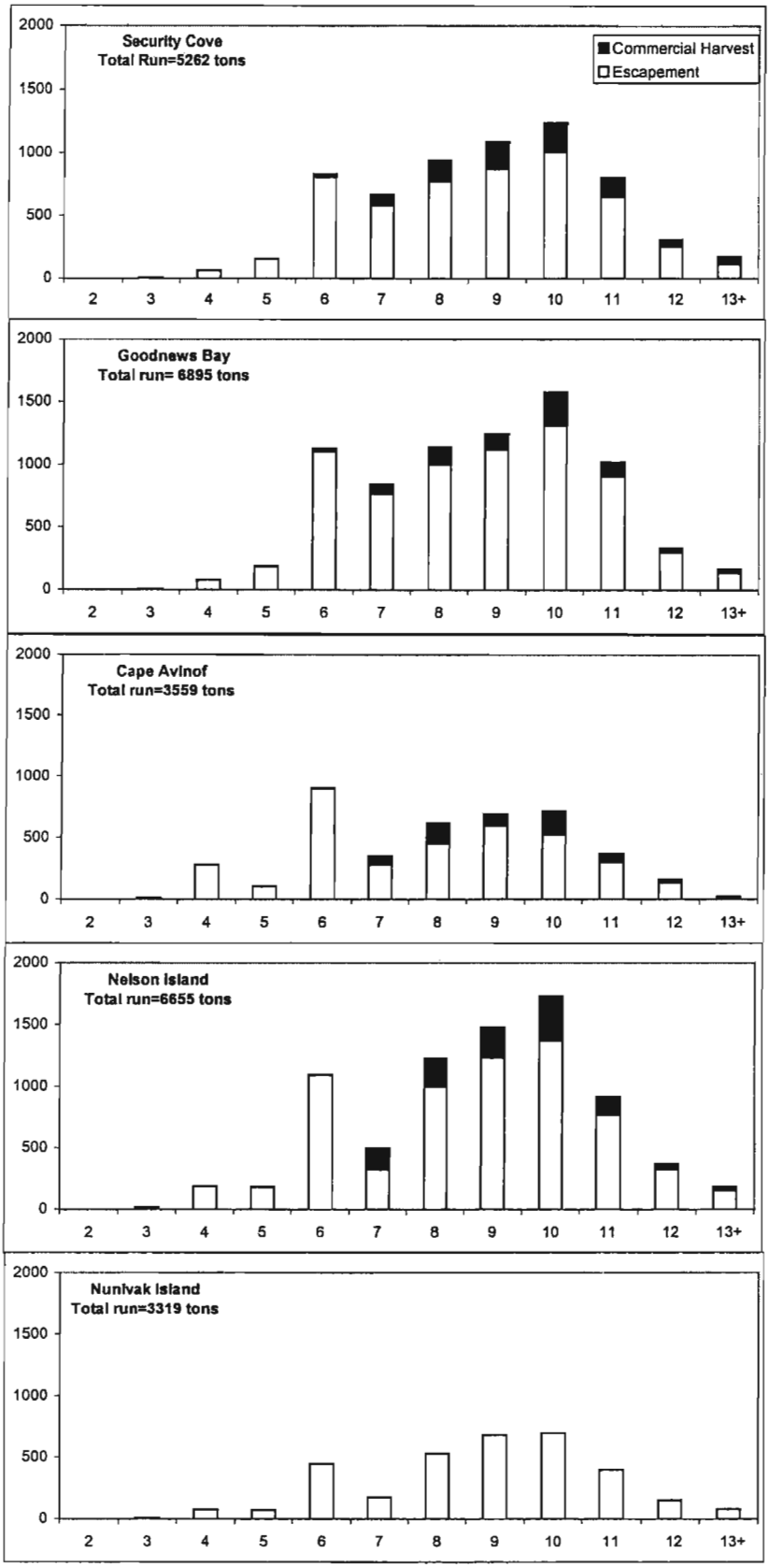

Figure 7. Age composition of Pacific herring in spawning populations and commercial harvest, Kuskokwim Area, Alaska, 1999.

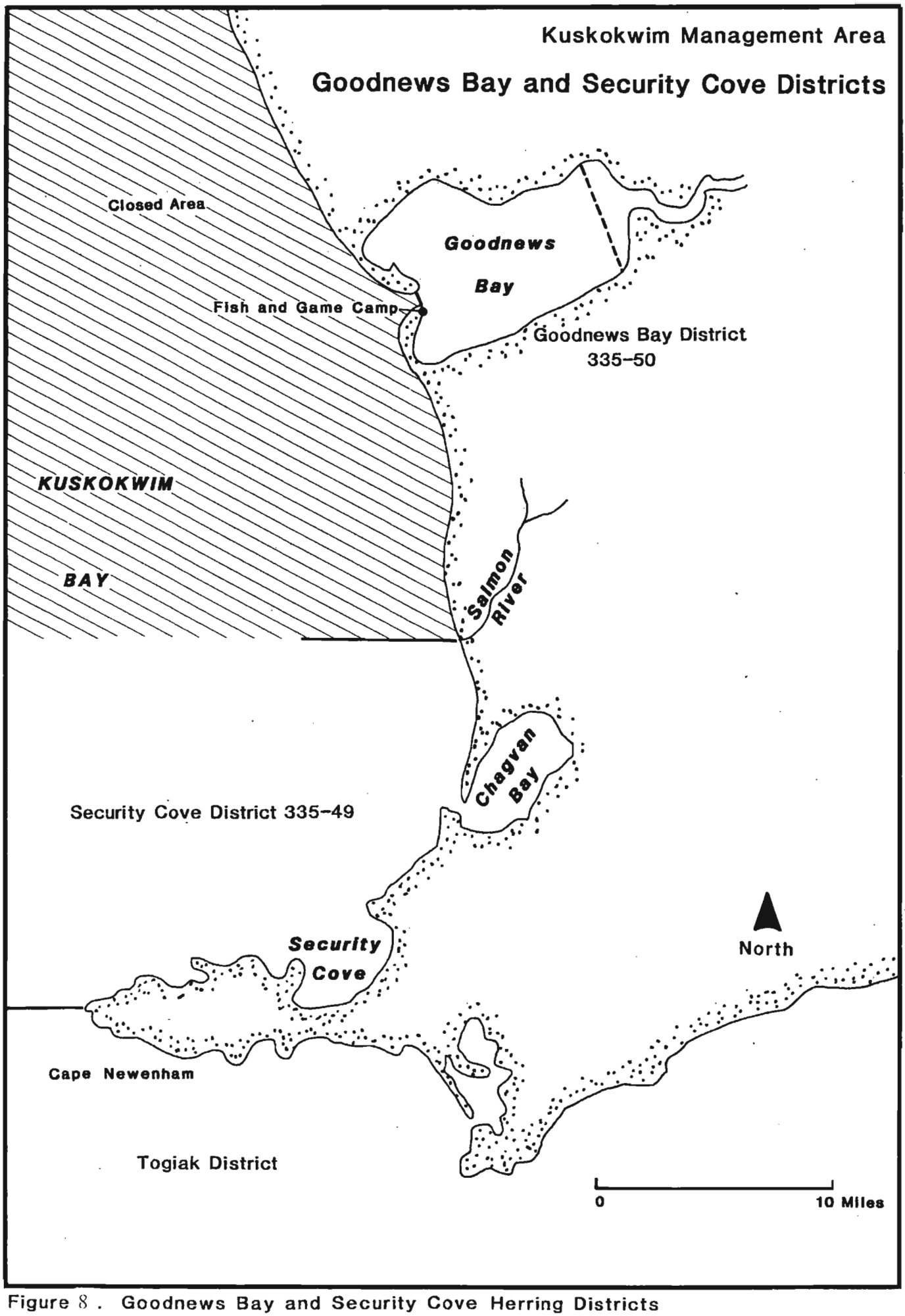

Figure 8. Goodnews Bay and Security Cove Herring Districts

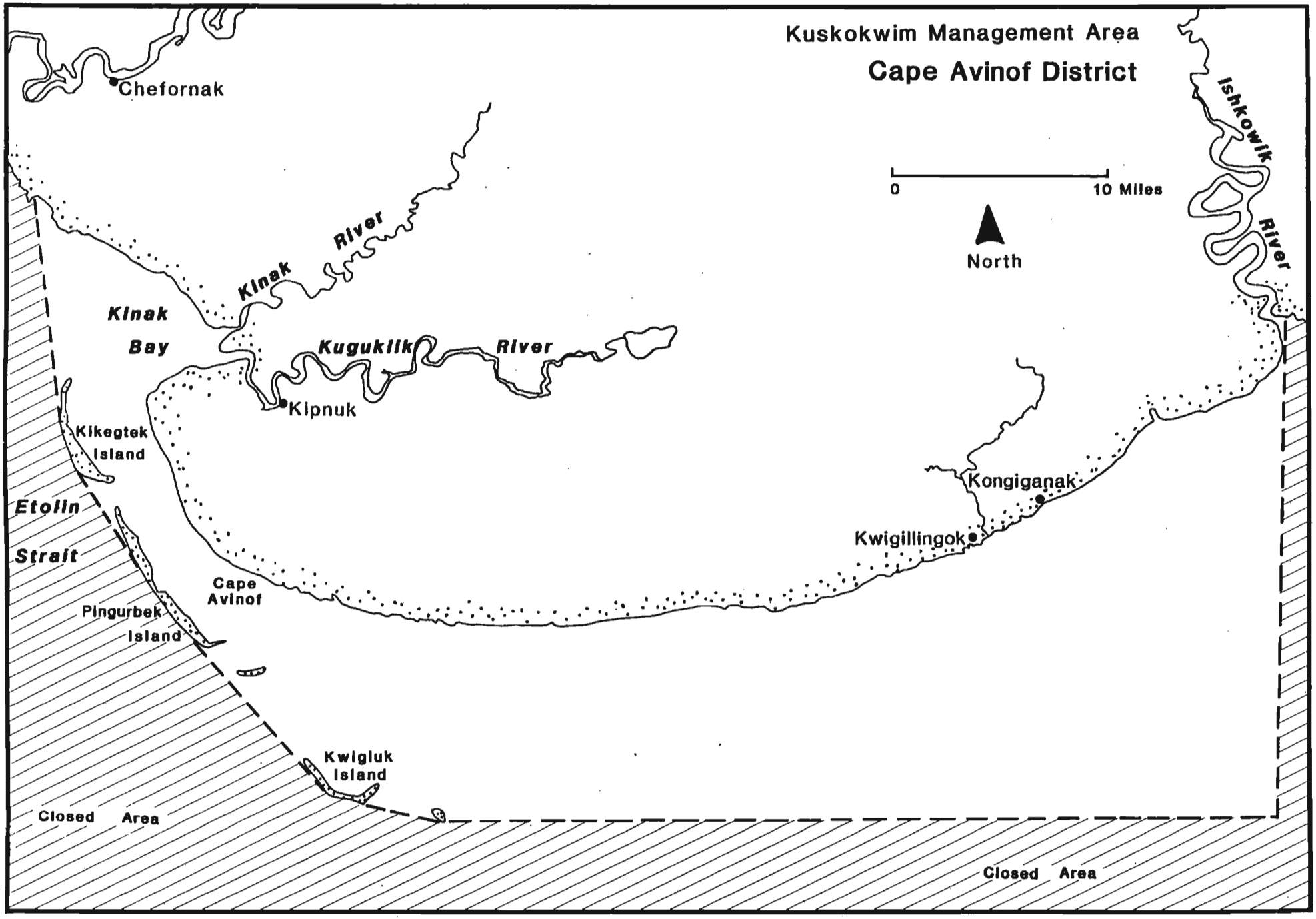

Figure 9. Cape Avinof Herring District

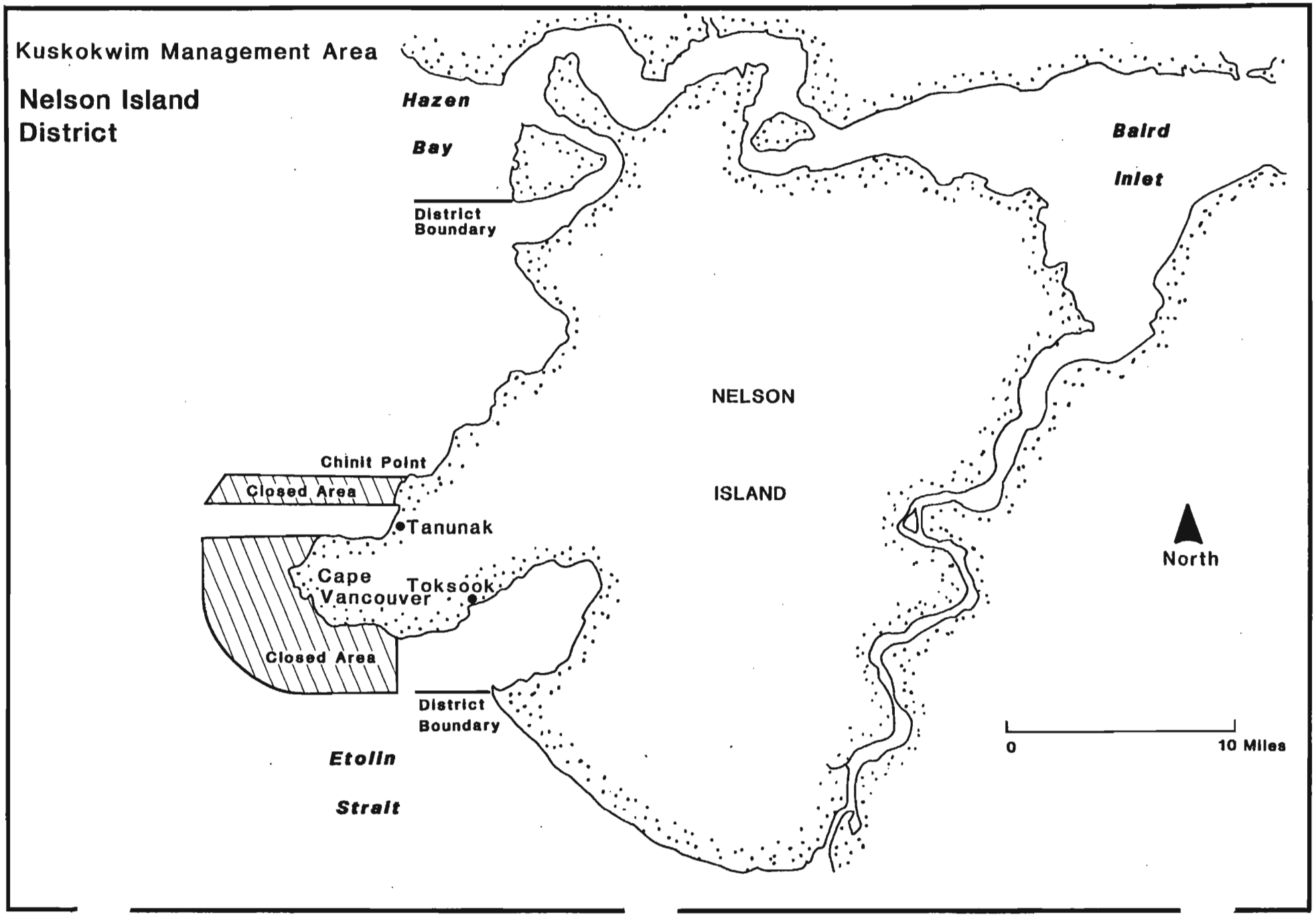

Figure ... Nelson Island Herring District

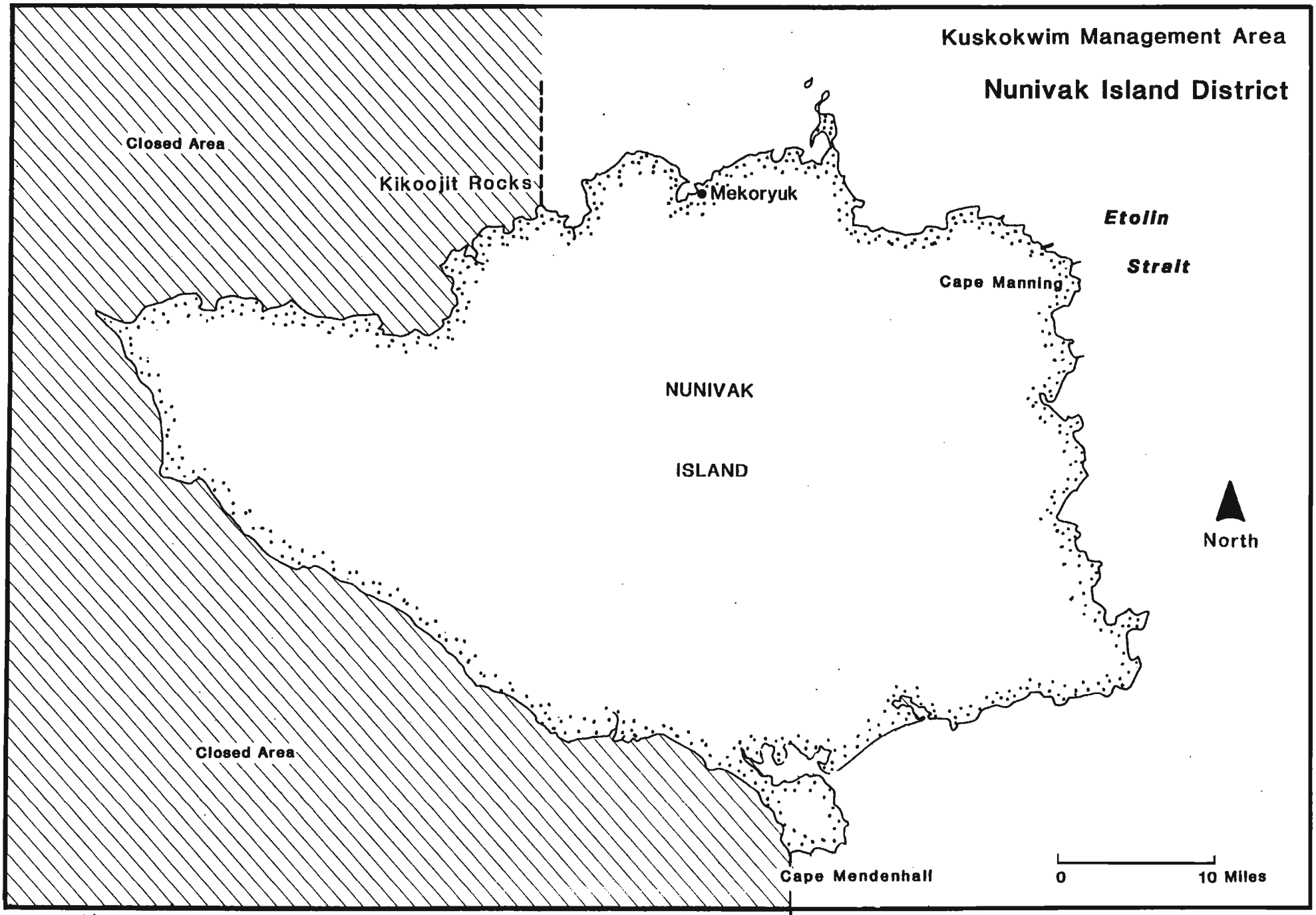

Figure 11. Nunivak Island Herring District

APPENDIX A

Appendix A.1. Fish species commonly found in the Kuskokwim Area.

Species Code	Genus and Species[a]	Common Name[a]
110	*Gadus macrocephalus*	Pacific Cod
113	*Eleginus gracilis*	Saffron Cod
129	*Platichthys stellatus*	Starry Flounder
122	*Pleuronectes glacialis*	Arctic Flounder
127	*Pleuronectes aspera*	Yellowfin Sole
128	*Pleuronectes vetulus*	English Sole
162	*Cottus cognatus*	Slimy Sculpin
166	*Oligocottus maculosus*	Tidepool Sculpin
192	*Hexagrammos stelleri*	Whitespotted Greenling
200	*Hippoglossus stenolepis*	Pacific Halibut
230	*Clupea pallasi*	Pacific Herring
410	*Oncorhynchus tshawytscha*	Chinook Salmon
420	*Oncorhynchus nerka*	Sockeye Salmon
430	*Oncorhynchus kisutch*	Coho Salmon
440	*Oncorhynchus gorbuscha*	Pink Salmon
450	*Oncorhynchus keta*	Chum Salmon
500	*Esox lucius*	Northern Pike
513	*Osmerus mordax*	Rainbow Smelt
514	*Hypomesus olidus*	Pond Smelt
516	*Mallotus villosus*	Capelin
520	*Salvelinus alpinus*	Arctic Char
532	*Salvelinus malma*	Dolly Varden
541	*Oncorhynchus mykiss*	Rainbow Trout
550	*Salvelinus namaycush*	Lake Trout
570	*Stenodus leucichthys*	Inconnu
588	*Coregonus nasus*	Broad Whitefish
589	*Coregonus pidschian*	Humpback Whitefish
583	*Coregonus sardinella*	Least Cisco
584	*Coregonus autumnalis*	Arctic Cisco
586	*Prosopium cylindraceum*	Round Whitefish
590	*Lota lota*	Burbot
600	*Lampetra tridentata*	Pacific Lamprey
601	*Lampetra japonica*	Arctic Lamprey
610	*Thymallus arcticus*	Arctic Grayling
630	*Dallia pectoralis*	Alaska Blackfish
640	*Catostomus catostomus*	Longnose Sucker
660	*Gasterosteus aculeatus*	Threespine Stickleback
661	*Pungitius pungitius*	Ninespine Stickleback
670	*Percopsis omiscomaycus*	Trout Perch
NA	*Megalocottus platycephalus*	Belligerent Sculpin
NA	*Myoxocephalus quadricornis*	Fourhorn Sculpin

[a] Based on American Fisheries Society Special Publication No. 20, Common and Scientific Names of Fishes from the United States and Canada (Fifth Edition). Committee and Names of Fishes, Bethesda, Maryland, 1991.

Appendix A.2. Historic events, which have potential or actual, influence on the commercial salmon fisheries of the Kuskokwim Area.

YEAR	EVENT [a]
1913	• Commercial sale of salmon export first documented in the Kuskokwim Area.
1954	• Commercial chinook salmon quota established.
1959	• First chinook landing since quota established.
1960	• Kanektok Counting Tower (1960-1962) • Quinhagak District (W-4) commercial salmon fishery established. • Kuskokwim Area divided into four subdistricts; Lower Kuskokwim River (Subdistrict 1), Middle Kuskokwim River (Subdistrict 2), Upper Kuskokwim River (Subdistrict 3), Quinhagak (Subdistrict 4). District boundaries are not well recorded; in the Aniak area some commonly used drift sites overlap between District 2 and 3 which confused catch reporting. • Kuskokwim River Drainage Surveys, 1960.
1961	• ADF&G Kuskokwim River tagging study.
1962	• ADF&G Kuskokwim River tagging study. • Boundary between Subdistricts 2 and 3 changed; the new location was not recorded but the most likely location was Kolmakof River. The reason for the change was to move the boundary to a point which was between commonly used gillnet locations and thereby avoid confusion in catch reporting. As a result, there were no landings in Subdistrict 3.
1963	• ADF&G Kuskokwim River tagging study. • Boundaries of subdistrict documented; Subdistrict 1 extended from Kuskokuak to Mishevik Slough, Subdistrict 2 was from Mishevik Slough to Kolmakof River, Subdistrict 3 was upstream of Kolmakof River.
1965	• Kwegooyuk test fishery (1965-1984; no records available for 1965).
1966	• ADF&G Kuskokwim River tagging study. • Subdistrict 3 was deleted from the regulations due to a lack of landings.
1968	• Goodnews Bay District (W-5) commercial salmon fishery established.
1969	• District 4 tagging study (1969-1970) on chinook and chum salmon. • Kogrukluk River (aka. Holitna River, Ignatti) tower/weir (1969-present).
1970	• Effect of explosive detonation in ice on northern pike.
1971	• Commercial fishing time in the Kuskokwim River reduced from two 24 hour periods per week to two 12 hour periods per week. • Chum fishery begins in the Kuskokwim River; season was from 25 June to 31 July, location limited to waters downstream of Napakiak, mesh size restricted to 6 in. or smaller. • Fishing periods established by Emergency Order in August. • Gillnet mesh size in Districts 4 and 5 restricted to 6 inch or smaller.
1974	• Commercial sale of salmon roe from subsistence caught fish (1974-1977)

-continued-

YEAR	EVENT[a]
1976	• Commercial fishing time in the Kuskokwim River was reduced from two 12 hour periods per week to two 6 hour periods per week. • Eek River reconnaissance survey. • Study on genetic variants in chum and chinook salmon.
1977	• Fishing periods to be established by Emergency Order before 26 June and after 31 July. • Limited entry permits issued. • Subsistence fishing closed 24 hours before during and 6 hours after each commercial fishing period. • Hoholitna River reconnaissance survey
1978	• Kasigluk River reconnaissance survey. • Kwethluk River sonar project.
1979	• The portion of District 1 used during the chum salmon season was extended from Napakiak upstream to Bethel. • Kasigluk River sonar project. • High seas salmon fleet moved for west of 160° W. longitude to west of 180° W. longitude.
1980	• Subsistence fishing closed 24 hours before, during and 6 hours after each commercial fishing period. • Aniak River sonar project.
1981	• Pilot test fish and FanScan projects at Bethel. • Inventory of Kisaralik River and Lake. • Goodnews River counting tower (1981-1990). • Salmon River (Pitka Fork drainage) weir project (1981-1984). • Species identification program results in better differentiation of sockeye and chum salmon.
1982	• Kanektok River sonar project (1982-1986).
1983	• Pilot test fish project at Bethel using drift gillnets. • Provisional escapement goals established for many of the major spawning tributaries in the area. • Management strategy shifts from guideline harvest based to obtaining escapement objective.
1984	• Kwegooyuk test fishery replaced by the Bethel drift test fishery.
1985	• Commercial fishing restricted to mesh sizes less than or equal to 6 inches. • Chum season utilizes entire length of District 1.
1986	• *Migratory timing of coho salmon in the Kuskokwim Area, 1979-1984.* • Kuskokwim River salmon abundance estimate based on calibrated test fish CPUE. • Downstream boundary of District 1 extended to a line from Apokak Slough to Popokamiut.
1987	• Discontinued the directed chinook salmon fishery in the Kuskokwim River. • First fishing period restricted to that portion of District 1, which is downstream of Bethel, due to chinook conservation concerns. • Subsistence fishing in all of District 2 and its tributary streams is closed before, during and after commercial periods. • South peninsula sockeye and chum salmon tagging study.

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YEAR	EVENT*
1988	• Review of the estimation of Kuskokwim River annual salmon passage through expansion of the Bethel test fish CPUE. • Kuskokwim River sonar project (1988-1995). • Kuskokwim River subsistence test fisheries (1988-1990). • District 1 upstream boundary extended to Bogus Creek. • District 2 reduced in size; downstream boundary moved upstream to High Bluffs, the upstream boundary moved downstream to Chuathbaluk. • Portion of Kuskokwim River between Districts 1 and 2 closed to subsistence fishing when District 1 subsistence fishing is closed. • Reorganization of District 1 Statistical Areas. • District 4 Salmon Management Plan adopted. • Establishment of the Kuskokwim River Salmon Management Working Group (1988-present). • Eek Test Fishery (1988-1990, 1992-1995).
1989	• USFWS conducted genetic sampling throughout the Kuskokwim Area. • USFWS conducted chinook tagging study in the lower Kuskokwim River. • Record low temperatures recorded in interior Alaska coupled with shallow snow pack threaten survival of salmon eggs/fry from 1988 spawning.
1990	• ADF&G genetic sampling (1990 - 1996). • Reorganization of District 1 statistical areas. • Upstream boundary of District 1 moved downstream from Bogus Creek to Big (Nelson) Island. • Downstream boundary of District 2 moved upstream to second slough below Kalskag. • District 4 northern boundary is extended north to Weelung Creek.
1991	• USFWS begins operation of weir on Tuluksak River (1991-1994). • Weir replaces counting tower on Goodnews River (1991-present).
1992	• Aniak and Chuathbaluk test fisheries (1992-1995). • Eek test fishery is re-established for the coho season. • USFWS operates Kwethluk River weir (1992) • Ban on high-seas drift gillnet fishing imposed. • Unusual proportion of returning 5 year old chum salmon had reduced growth between the second the third annuli. • Failure of age 4 chum salmon in the Kuskokwim River; Aniak drainage especially hard hit; attributed to cold winter of 1988-89.
1993	• Failure of age 4 and 5 chum salmon in the Kuskokwim River, Yukon River, and the Norton Sound/Kotzebue Area; cause unknown; especially hard hit were the Aniak drainage and the Yukon fall chum; commercial fishing severely restricted, chum sport fishery was closed, and the subsistence salmon fishery was restricted and closed for a period of time (first time ever).
1994	• Working Group commissioned and Dr. Mundy started "Recommendations for Strengthening the Cooperative Management Process of the Kuskokwim River Salmon Management Working Group". • Upstream boundary of District 1 moved upstream to Bogus Creek.

-continued-

YEAR	EVENT[a]
1995	• BSFA operates a chum salmon radio telemetry project on the Kuskokwim River. • Takotna Community School operates a salmon counting tower on the Takotna River (1995-present). • AVCP and BSFA operate the Lower Kuskokwim test fishery in cooperation with the department; the project is a modification of the Eek test fishery.
1996	• ADF&G genetic sampling for late spawning chum salmon and one mixed stock sample from District 1. • Near record low water levels on the Kuskokwim River during June and early August coupled with record high water temperatures. • Irregular fishing schedule in District 1 during June and July due to limited market interest for chum salmon. • Record early coho run coupled with record high harvest and escapement at Kogrukluk River. • AVCP operates a salmon counting tower on the Kwethluk River (1996–present). • KNA operates a salmon weir on the George River (1996-present). • Aniak River sonar is relocated to allow for full channel ensoniffication and configurable sonar technology is employed (1996-present). • Quinhagak IRA begins development of a salmon counting tower on the Kanektok River.
1997	• Kuskokwim River declared an economic disaster area due to very low chum and coho salmon returns, harvests and exvessel prices. Northern boundary of District 4 moved 3 miles south from July 14 to July 28. Record low chum salmon escapement at Kogrukluk River weir. • Aniak chum salmon return vastly exceeded expectations based on 1992-1993 spawning abundance estimates. • Due to an extremely low return of chum salmon, ADF&G, AVCP, KNA, KRSMWG, ONC, TCC and McGrath Native Council issue a joint appeal for subsistence users to conserve chum salmon. Record low subsistence harvest of chum salmon in the Kuskokwim Area. • Aniak processor does not operate due to depressed salmon market (1997-present) • Sale of salmon roe is prohibited in Districts 1 and 2 (effective beginning December 1997). • Middle Fork Goodnews River weir converted from fixed-panel to a resistance board "floating weir" and operated through majority of coho run for first time (1997-present). • Quinhagak IRA operates a salmon counting tower on the Kanektok River (1997-1998).
1998	• Kuskokwim River declared an economic disaster area for second straight year due to low chum and coho salmon returns, harvests and exvessel prices. • KNA operates a salmon weir on the Tatlawiksuk River (1998-present). • High water levels severely restrict operational period of many Kuskokwim Area escapement projects
1999	• Kuskokwim River experiences extremely low chum and coho salmon returns, harvests and exvessel prices for third consecutive year. Chinook salmon returns are also low and all species have very late run timing. Kuskokwim Bay coho returns and harvests extremely low. • Federal government assumes control of subsistence fishery management in federal waters on October 1. • KNA-operated salmon weirs on the Tatlawiksuk and George Rivers converted to resistance board (floating) weirs and operations extended through coho run. • Kuskokwim River sonar project begins redevelopment using split-beam sonar and is relocated to a new site one mile above upstream end of Church Slough.

[a] For additional information on specific topics refer to the Region III Report Catalog or historical Area Management Reports for the Kuskokwim Area.

Appendix A.3. Kuskokwim Area escapement index objectives for chinook, sockeye, coho and chum salmon.

		Escapement Objectives[a]			
		Chinook	Sockeye	Coho	Chum
	KUSKOKWIM RIVER:				
1.	Kwethluk River				
	a. 3-step Mt. to Canyon Cr.	1.0	-	-	7.0
	b. Canyon Creek	0.2	-	-	-
2.	Kisaralik River				
	a. Airstrip to Kisaralik L.	1.0	-	-	8.0
	b. Kasigluk R. (upper to lower)	0.1	-	-	4.0
3.	Tuluksak R. (Fog R. to Bear Cr.)	0.4	-	-	5.0
4.	Aniak River				
	a. Buckstock R. to Aniak L.	1.5	-	-	10.0
	b. Salmon River	0.6	-	-	3.0
	c. Aniak Sonar Project[b]	-	-	-	250.0
5.	Holitna River				
	a. Nogamut to Kashegelok	2.0	-	-	12.0
	b. Kogrukluk Weir[c]	10.0	-	25.0	30.0
6.	Salmon River (Pitka Fork)	1.3	-	-	-
	KUSKOKWIM BAY:				
1.	Kanektok River to Kagati Lake	5.0	15.0	25.0	30.5
2.	Goodnews River System				
	a. Main Fork and lakes	1.6	15.0	15.0	17.0
	b. Middle Fork and lakes	0.8	5.0	2.0	4.0
	c. Middle Fork Weir[c]	3.5	25.0	-	15.0

a Escapement objectives in thousands of fish are preliminary and are subject to change as additional data becomes available. Unless otherwise indicated, escapement objectives are based on aerial index counts which do not represent total escapement, but do reflect annual spawner abundance trends when made using standard survey methods under acceptable survey conditions.

b Sonar total escapement estimates.

c Weir total escapement estimates.

Appendix A.4. Kuskokwim Area commercial, subsistence and personal use salmon catches, 1913-1999.

	Commercial Harvest						Subsistence Harvest				Total
Year	Chinook	Sockeye	Chum	Pink	Coho	Subtotal	Chinook	Other[a]	Coho[b]	Subtotal	Harvest
1913	7,800					7,800					7,800
1914		2,667				2,667					2,667
1915											0
1916	949					949					949
1917	7,878					7,878					7,878
1918	3,055					3,055					3,055
1919	4,836					4,836					4,836
1920	34,853					34,853					34,853
1921	9,854					9,854					9,854
1922	8,944	6,120				15,064				180,000	195,064
1923	7,254					7,254					7,254
1924	19,253	900		7,167	7,167	34,487	17,700	203,148		220,848	255,335
1925	1,644	5,800				7,444	10,800	230,850		241,650	249,094
1926										738,576	738,576
1927										286,254	286,254
1928										481,090	481,090
1929										560,196	560,196
1930	7,626	2,448				10,074				538,650	548,724
1931	8,541					8,541				389,367	397,908
1932	9,339					9,339				746,415	755,754
1933							6,290	443,998		450,288	450,288
1934							20,800	597,132		617,932	617,932
1935	6,448				8,296	14,744	22,930	554,040		576,970	591,714
1936	624					624	33,500	549,423		582,923	583,547
1937	480					480		537,111		537,111	537,591
1938	624				828	1,452	10,153	400,242		410,395	411,847
1939	134					134	14,000	125,425		139,425	139,559
1940	247				500	747	8,000	415,523		423,523	424,270
1941	187				674	861	8,000	415,523		423,523	424,384
1942							6,400	325,339		331,739	331,739

- continued -

Year	Commercial Harvest						Subsistence Harvest				Total
	Chinook	Sockeye	Chum	Pink	Coho	Subtotal	Chinook	Other[a]	Coho[b]	Subtotal	Harvest
1943							6,400	325,339		331,739	331,739
1944											
1945											0
1946	2,288				674	2,962					2,962
1947	5,356					5,356					5,356
1948											0
1949											0
1950											0
1951	4,210					4,210					4,210
1952											0
1953											0
1954	57					57					57
1955											0
1956											0
1957											0
1958											0
1959	3,760					3,760					3,760
1960	5,969	5,649	0	0	5,498	17,116	18,887	301,753		320,640	337,756
1961	23,246	2,308	18,864	90	5,090	49,598	28,934	179,529		208,463	258,061
1962	20,867	10,313	45,707	4,340	12,432	93,659	13,582	175,304	161,849	350,735	444,394
1963	18,571	0	0	0	15,660	34,231	34,482	170,829	137,649	342,960	377,191
1964	21,230	13,422	707	939	28,992	65,290	29,017	219,208	190,191	438,416	503,706
1965	24,965	1,886	4,242	0	12,191	43,284	24,697	250,878		275,575	318,859
1966	25,823	1,030	2,610	268	22,985	52,716	49,325	175,735		225,060	277,776
1967	29,986	652	8,235	0	58,239	97,112	61,262	214,468		275,730	372,842
1968	43,157	5,884	19,684	75,818	154,275	298,818	35,698	278,008		313,706	612,524
1969	64,777	10,362	50,377	1,251	110,473	237,240	40,617	204,105		244,722	481,962
1970	64,722	12,654	60,566	27,422	62,245	227,609	69,612	246,810	11,868	328,290	555,899
1971	44,936	6,054	99,423	13	10,006	160,432	43,013	116,391	6,899	166,303	326,735
1972	55,598	4,312	97,197	1,952	23,880	182,939	38,176	120,316	1,325	159,817	342,756
1973	51,374	5,224	184,207	634	152,408	393,847	38,451	179,259	23,746	241,456	635,303
1974	30,670	29,003	196,127	60,099	179,579	495,478	26,665	277,170	32,780	336,615	832,093

- continued -

Year	Commercial Harvest						Subsistence Harvest						Total Harvest
	Chinook	Sockeye	Chum	Pink	Coho	Subtotal	Chinook	Other[a]		Coho[b]	Subtotal		
1975	28,219	17,686	225,308	910	112,751	384,874	47,569	176,389			223,958		608,832
1976	49,262	14,636	231,877	39,998	112,130	447,903	58,055	223,792		4,312	286,159		734,062
1977	58,256	18,621	298,959	434	263,727	639,997	58,158	203,397		12,193	273,748		913,745
1978	63,194	13,734	282,044	61,968	247,271	668,211	38,145	125,052		12,437	175,634		843,845
1979	53,314	39,463	297,167	574	308,683	699,201	57,053	163,451			220,504		919,705
1980	48,599	42,213	561,483	30,306	327,908	1,010,509	62,047	168,987		47,335	278,369		1,288,878
1981	79,377	105,940	485,653	463	278,541	949,974	64,274	163,554		28,301	256,129		1,206,103
1982	79,816	97,716	326,481	18,259	567,452	1,089,724	61,141	195,691		45,181	302,013		1,391,737
1983	93,676	90,834	306,554	379	248,389	739,832	51,020	149,172		2,834	203,026		942,858
1984	74,016	81,304	488,480	23,902	826,774	1,494,476	60,668	144,651		15,016	220,335		1,714,811
							Chinook	Sockeye	Chum	Pink	Coho		
1985	74,083	121,221	224,680	111	382,096	802,191	45,720	33,632	95,999	1,062	24,524	200,937	1,003,128
1986	44,972	142,029	349,268	16,569	736,910	1,289,748	54,256	20,239	142,930[c]		29,742	247,167	1,536,915
1987	65,558	170,849	603,274	163	478,594	1,318,438	71,804	25,180	70,709	291	18,085	186,069	1,504,507
1988[de]	74,563	149,949	1,443,953	37,592	623,733	2,329,790	75,107	33,102	153,980		43,866	306,055	2,635,845
1989[d]	66,914	82,365	801,355	819	554,411	1,505,864	85,322	37,088	145,106		57,847	325,363	1,831,227
1990	84,451	203,919	521,023	16,050	443,783	1,269,226	92,678	39,662	131,469		50,713	314,522	1,583,748
1991	48,170	202,441	502,187	522	556,818	1,310,138	90,224	56,404	96,308		55,581	298,517	1,608,655
1992	67,597	192,341	436,506	85,978	772,449	1,554,871	68,665	34,159	99,576		44,496	246,896	1,801,767
1993	26,636	167,235	94,937	71	686,570	975,449	91,721	51,363	61,726		35,295	240,105	1,215,554
1994	27,345	191,169	360,893	84,870	856,100	1,520,377	98,378	39,279	76,951		36,504	251,112	1,771,489
1995	72,352	198,045	707,212	318	555,539	1,533,466	100,159	28,622	68,942		39,165	236,888	1,770,354
1996	22,959	122,260	301,975	1,663	1,099,865	1,548,722	81,598	35,036	90,238		34,698	241,570	1,790,292
1997	47,990	123,002	67,200	7	166,648	404,847	85,506	41,270	40,976		30,714	198,466	603,313
1998	44,402	130,074	268,199	2,720	312,517	757,912	86,115	37,578	67,665		27,240	218,598	976,510
1999	25,019	81,201	72,659	2	32,251	211,132	77,659	49,388	47,612		27,754	202,413	413,545
10-Year Average 1989-98	50,882	161,285	406,149	347[f]	600,470	1,238,087	88,037	40,046	87,896		41,225	257,204	1,495,291

[a] Primarily chum and coho salmon.

[b] Reported subsistence coho salmon harvest only. Coho salmon subsistence harvest is poorly documented with no Kuskokwim River estimates attempted prior to 1988.

[c] Includes sockeye, pink and chum salmon.

[d] The personal use catch is included with the subsistence catch.

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

[f] Odd years only.

Appendix A.5. Commercial Fishing Effort in Permit-Hour[a] for the Kuskokwim Area, 1960-1999.

Year	District W-1	District W-2	District W-3	District W-4	District W-5	Total
1960	5,136	960	648	4,368	Closed	11,112
1961	16,200	1,512	1,512	4,992	Closed	24,216
1962	14,274		0	8,434	Closed	22,708
1963	5,712	1,722	0	5,520	Closed	12,954
1964	6,468	1,140	0		Closed	7,608
1965	13,500	546	0	3,696	Closed	17,742
1966	18,270		Closed		Closed	18,270
1967	88,248	1,932		3,954	Closed	94,134
1968	77,466	720		7,986	4,704	90,876
1969	67,140	1,488		29,952	14,055	112,635
1970	56,646	3,414		22,080	9,756	91,896
1971	18,060	1,842		24,987	7,476	52,365
1972	47,802	1,722		7,060	1,452	58,036
1973	77,478	3,072		18,372	2,928	101,850
1974	124,569	4,950		18,984	8,148	156,651
1975	181,786	3,648		12,312	5,400	203,146
1976	82,788	3,894		14,784	4,848	106,314
1977	73,944	3,426		17,592	3,780	98,742
1978	71,856	1,892		14,952	3,672	92,372
1979	49,608	984		27,096	8,220	85,908
1980	33,370	714		21,636	9,504	65,224
1981	45,096	1,248		25,656	11,256	83,256
1982	46,108	1,128		22,656	14,556	84,448
1983	47,040	708		20,748	9,456	77,952
1984	62,643	1,050		31,488	14,004	109,185
1985	37,452	462		22,254	8,544	68,712
1986	48,744	606		25,740	10,572	85,662
1987	60,525	576		21,222	10,332	92,655
1988	81,724	912		27,440	14,064	124,140
1989	66,470	816		26,134	12,552	105,972
1990	50,642	1,051		44,520	10,548	106,761
1991	62,672	1,320		29,160	11,532	104,684
1992	54,288	1,164		35,380	15,180	106,012
1993	39,210	774		35,988	13,118	89,090
1994	54,750	702		26,580	15,768	97,800
1995	42,784	602		34,020	14,844	92,250
1996	34,087	242		18,880	6,518	59,727
1997	13,662	30		28,836	5,820	48,348
1998	26,488	18		23,712	7,896	58,114
1999	4,770	0		16,488	5,424	26,682
Ten Year Average (1989-1998)	44,505	672		30,321	11,378	86,876

a Number of permits that made deliveries times the number of hours in the period.

Appendix A.6. Estimated exvessel value of the Kuskokwim Area commercial salmon fishery, 1964-1999.

Year	Gross Value ($) of Catch to Fishermen	Permits Fished[a]	Average Income
1964	83,030		
1965	90,950		
1966	87,466		
1967	138,647		
1968	290,370		
1969	297,233		
1970	362,470		
1971	371,220		
1972	360,727		
1973	827,735		
1974	1,056,042		
1975	899,178		
1976	1,380,229		
1977	3,891,950		
1978	2,337,470		
1979	3,678,000		
1980	2,725,134		
1981	3,766,525		
1982	4,213,954		
1983	2,670,400		
1984	5,809,000	774	7,505
1985	3,248,089	781	4,159
1986	4,746,089	789	6,015
1987	6,392,822	798	8,011
1988	12,514,489	811	15,431
1989	5,171,860	824	6,277
1990	4,894,580	824	5,940
1991	3,971,423	820	4,843
1992	5,295,912	814	6,506
1993	3,962,890	807	4,911
1994	5,201,611	797	6,526
1995	4,209,752	829	5,078
1996	2,900,603	713	4,068
1997	1,058,808	702	1,508
1998	1,634,495	707	2,312
1999	551,725	604	913
Ten year Average (1989-1998)	3,830,193	784	4,797

a Number of permits that made at least one delivery

Appendix A.7. Historical salmon escapement data from selected Kuskokwim Area projects, 1976-1999.

Year	Operating Period	Chinook	Sockeye	Chum	Pink [a]	Coho
Kogrukluk River Weir						
BEG		**10,000**		**30,000**		**25,000**
1976	06/29 to 07/31	5,579	2,326	8,117	0 [g]	[b]
1977	07/14 to 07/27	1,945 [b]	1,637b	19,444	2	[b]
1978	06/28 to 07/31	13,667	1,670	48,125	2	[b]
1979	07/01 to 07/24	11,338	2,628	18,599	1	[b]
1980	07/01 to 07/11	6,572 [b]	3,200 [b]	41,777	1	[b]
1981	06/27 to 10/05	16,655	18,066	57,365	6	11,455
1982	07/09 to 09/14	10,993	17,297	64,077	19	37,796
1983	06/23 to 09/27	2,992 [f]	1,176 [f]	9,407 [f]	0	8,538
1984	06/19 to 09/15	4,928	4,133	41,484	0	27,595
1985	07/06 to 09/24	4,619	4,359	15,005	0	16,441
1986	06/29 to 09/07	5,038	4,224	14,693	0	22,506
1987	07/15 to 09/24	4,063 [f]	[f]	17,422 [f]	0	22,821
1988	07/05 to 09/17	8,505	4,397	39,540	0	13,512
1989	07/07 to 08/24	11,940 [f]	5,811 [f]	39,548	0	[b]
1990	06/28 to 09/07	10,218	8,406	26,765	1	6,132 [b]
1991	07/04 to 09/15	7,850	16,455	24,188	4	9,933
1992	07/01 to 08/21	6,755	7,540	34,105	11	26,057 [b]
1993	07/02 to 09/06	12,332	29,358	31,899	0	20,517 [b]
1994	07/02 to 09/14	15,227	14,192 [f]	46,192 [f]	23	34,695
1995	07/02 to 09/06	20,630	10,996	31,265	2	27,856
1996	06/29 to 09/15	14,199	15,381	48,494	6	50,555
1997	06/28 to 09/21	13,285	13,062	7,937	0	12,312
1998	07/18 to 09/19	11,869 [f]	16,769 [f]	36,424 [f]	1	24,344
1999	07/05 to 09/18	5,570	5,864	13,820	0	12,609 [f]
Aniak River Sonar						
BEG				**250,000** [c]		
Non user-configurable, one-bank expanded estimates 1980 - 1995						
1980	06/22 to 07/30	56,469		1,169,470		
	08/16 to 09/12					81,556
1981	06/16 to 08/06	42,060		589,286		
1982	06/21 to 08/01	33,864		442,461		
1983	06/18 to 07/28	4,911		129,367		
1984	06/16 to 07/30			266,976		
1985	06/22 to 07/28			253,051		
1986	06/26 to 07/24			209,080		
1987	06/22 to 07/31			193,013		
1988	06/22 to 07/31			401,511		
1989	06/21 to 07/24			243,922		
1990	06/23 to 08/06			232,260		
1991	06/29 to 07/29			314,166		
1992	06/22 to 07/29			84,269		
1993	06/24 to 07/28			13,870		
1994	06/28 to 07/28			388,163		
1995	06/23 to 07/23			[d]		
User-configurable, two-bank estimates, 1996-1999						
BEG				**250,000** [c]		
1996	06/21 to 07/28			302,106		
1997	06/16 to 08/03			262,522		
1998	06/24 to 07/31			279,430		
1999	07/01 to 08/03			177,771		

-Continued-

Appendix A.7. (page 2 of 3)

Year	Operating Period	Chinook	Sockeye	Chum	Pink [a]	Coho
Kwethluk River						
Weir						
1992	06/18 to 09/12	9,675	1,316	30,596	45,952	45,605
Tower						
1996	06/22 to 07/27	7,859	2,075	27,462	2,899 [b]	180 [b]
1997	06/22 to 08/12	10,505	1,400	10,780	1,009 [b]	1,110 [b]
1998	07/24 to 08/18	[b]	[b]	[b]	[b]	[b]
1999	07/15 to 08/18	[b]	[b]	[b]	[b]	[b]
Tuluksak River Weir						
1991	06/12 to 09/18	697	34	7,675	391	4,651
1992	06/24 to 09/10	1,083	129	11,183	2,458	7,501
1993	06/17 to 09/10	2,218	88	13,804	210	8,328
1994	06/29 to 09/11	2,922	94	15,707	3,450	8,213
George River Weir						
1996	06/21 to 07/26	7,487	98	17,570	644 [b]	173 [b]
1997	06/09 to 09/15	7,820	445	5,940	0	8,937
1998	06/22 to 07/07	[b]	[b]	[b]	[b]	[b]
1999	07/14 to 09/25	3,548	39	11,682	96	8,930
Takotna River Tower						
1995	07/07 to 07/31	[b]	0	1,685 [b]	0	0 [b]
1996	06/15 to 07/26	402	0	2,806	0	0 [b]
1997	06/15 to 07/26	1,167	0	1,785		
1998	06/20 to 07/07	[b]	[b]	[b]	[b]	[b]
1999	Not Operational					
Tatlawiksuk River Weir						
1998	06/18 to 07/07	[b]	[b]	[b]	[b]	[b]
1999	06/15 to 09/20	1,494	6	9,656	1	3,464
Middle Fork Goodnews River Tower/Weir						
BEG:		**3,500**	**25,000**	**15,000**		
Counting Tower, 1981 - 1991						
1981	06/13 to 08/15	3,688	49,108	21,827	1,327 [b]	356 [b]
1982	06/23 to 08/03	1,395	56,255	6,767	13,855 [a]	91 [a]
1983	06/11 to 07/28	6,022	25,813	15,548	34 [b]	0 [b]
1984	06/15 to 07/31	3,260	32,053	19,003	13,744 [a]	249 [a]
1985	06/27 to 07/31	2,831	24,131	10,367	144 [b]	282 [b]
1986	06/16 to 07/24	2,092	51,069	14,764	8,133 [b]	163 [b]
1987	06/22 to 07/30	2,272	28,871	17,517	62 [b]	62 [b]
1988	06/23 to 07/30	2,712	15,799	20,799	6,781 [b]	6 [b]
1989	06/29 to 07/31	1,915	21,186	10,380	24b [b]	1,212 [b]
1990	06/19 to 07/24	3,636	31,679	6,410	3,378 [b]	0 [b]
Weir, 1991 - 1999						
1991	06/21 to 08/24	1,952	47,397	27,525	1,694 [b]	1,978 [b]
1992	06/21 to 08/25	1,903	27,268	22,023	23,030 [b]	150 [b]
1993	06/22 to 08/18	2,317	26,044	14,472	253 [b]	1,374 [b]
1994	06/23 to 08/16	3,856	55,751	34,849	38,705 [b]	309 [b]
1995	06/19 to 08/28	4,836	39,009	33,699	330 [b]	5,415 [b]
1996	06/19 to 08/23	2,930	58,264	40,450	14,509 [b]	9,699 [b]
1997	06/11 to 09/17	2,937	35,530	17,296	940	9,619
1998	07/04 to 09/17	4,584	47,951	28,905	10,367	35,441
1999	06/26 to 09/26	3,221	48,205	19,533	914	11,545

-Continued-

Year	Operating Period	Chinook	Sockeye	Chum	Pink [a]	Coho
Kanektok River Tower						
1996	7/2-7/13; 7/20-7/25	6,827 [b]	71,637 [b]	70,617 [b]		
1997	06/11 to 08/21	16,731 [b]	96,348 [b]	51,180 [b]	7,872 [b]	23,172 [b]
1998	07/04 to 09/17					
1999	Not Operational					

[a] Pink salmon can pass freely through the Kogrukluk River weir.

[b] No counts or incomplete count as project was not operated during a significant portion of the species' migration.

[c] Aniak River sonar counts after 1983 represent multiple species, however, chum salmon are assumed to be the dominant species during the operational period.

[d] Reliable escapement estimates are not available

[e] The original Aniak River sonar BEG of 250,000 fish counts has been carried forward to the user configurable project, but the BEG will be reassessed as more information is gathered.

[f] Partial season counts. Full season estimate derived from historic run timing data.

[g] Weir picket spacing allows pink salmon to pass uncounted.

Appendix A.8. Mean salmon weights and prices paid to commercial permit holders in the Kuskokwim Area, 1967-1999.

	Average Weight (lb)					Average Price ($)				
Year	Chinook	Sockeye	Chum	Pink	Coho	Chinook	Sockeye	Chum	Pink	Coho
1967	27.8	7.4	7.0	[a]	5.9	0.13	0.05	0.04	[a]	0.09
1968	23.8	6.2	7.9	4.0	7.2	0.16	0.10	0.04	0.05	0.09
1969	19.6	6.2	5.8	3.6	7.3	0.19	0.15	0.07	0.06	0.10
1970	18.9	5.4	6.1	3.3	7.3	0.20	0.21	0.08	0.08	0.14
1971 [b]	26.2	6.9	6.4	[a]	6.1	0.17	0.10	0.08	[a]	0.13
1972	24.7	[a]	6.5	[a]	6.4	0.20	[a]	0.08	[a]	0.16
1973	26.7	[a]	6.8	[a]	5.8	0.25	[a]	0.19	[a]	0.26
1974	17.1	6.3	6.8	4.1	7.5	0.46	0.34	0.25	0.23	0.27
1975	14.9	[a]	6.4	[a]	8.2	0.54	[a]	0.26	[a]	0.31
1976 [c]	17.0	6.7	7.0	3.5	7.8	0.64	0.43	0.27	0.25	0.40
1977	22.7	8.3	7.3	3.9	7.8	1.15	0.45	0.45	0.25	0.65
1978	24.2	6.5	8.9	3.9	7.1	0.50	0.49	0.32	0.12	0.40
1979	16.6	6.9	7.0	3.9	7.9	0.66	0.53	0.37	0.11	0.75
1980	14.1	6.7	6.4	3.6	6.9	0.47	0.31	0.24	0.12	0.64
1981	17.8	7.2	7.5	3.5	6.4	0.84	0.61	0.23	0.11	0.63
1982	19.3	7.2	7.3	3.6	7.3	0.82	0.41	0.22	0.05	0.53
1983	18.8	6.8	7.4	3.5	6.8	0.54	0.51	0.33	0.05	0.39
1984	16.4	6.6	6.7	3.2	7.7	0.89	0.52	0.28	0.07	0.55
1985	17.0	7.0	7.1	3.6	7.5	0.71	0.59	0.25	0.05	0.51
1986	17.0	7.2	6.8	3.4	6.4	0.80	0.70	0.25	0.05	0.60
1987	15.2	7.5	6.8	3.7	7.2	1.10	1.30	0.27	0.10	0.73
1988	14.1	7.3	6.9	3.4	7.2	1.30	1.42	0.40	0.15	1.25
1989	16.6	7.2	6.8	3.4	7.3	0.75	1.20	0.26	0.05	0.55
1990	15.1	6.7	6.9	3.2	6.5	0.56	1.05	0.26	0.12	0.62
1991	15.3	6.9	6.3	3.4	6.5	0.56	0.67	0.31	0.12	0.45
1992	13.4	7.0	6.8	3.9	7.3	0.66	0.90	0.32	0.06	0.45
1993	14.3	7.1	6.5	3.4	6.6	0.62	0.70	0.40	0.25	0.58
1994	15.6	6.9	6.6	3.6	7.6	0.51	0.53	0.21	0.08	0.57
1995	17.3	6.9	6.9	3.7	7.2	0.60	0.71	0.18	0.12	0.41
1996	15.7	7.2	7.2	3.8	8.0	0.26	0.40	0.11	0.12	0.25
1997	16.2	7.1	7.3	2.7	7.5	0.28	0.42	0.12	0.10	0.33
1998	14.2	6.8	6.9	3.8	7.8	0.27	0.53	0.13	0.10	0.32
1999	15.5	6.5	7.3	3.0	6.6	0.32	0.58	0.10	0.05	0.32
10-Year Average (1989-1998)	15.4	7.0	6.8	3.5	7.2	0.51	0.71	0.23	0.11	0.45

[a] Information unavailable.

[b] Information on price per pound was not available for District 5.

[c] Information was not available for District 4.

Appendix A.9. Maximum, mean, and minimum number of permits used in a single period by district, 1962-1999.

	District 1			District 2			District 4			District 5		
Year	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.
1962	190	121	25				32	19	7		Closed	
1963	103	17	1	17	10	2	30	13	1		Closed	
1964	113	30	1	30	4	1	29	15	1		Closed	
1965	164	43	1	5	3	1	31	13	1		Closed	
1966	172	122	61	1	1	1	12	8	1		Closed	
1967	208	144	10	4	2	1	19	8	1		Closed	
1968	262	164	2				78	38	8	17	13	5
1969	274	161	1	11	2	1	119	51	1	28	21	10
1970	320	198	22	11	6	3	75	48	21	25	16	5
1971	355	117	5	20	14	2	48	36	3	11	9	8
1972	341	149	28	12	10	8				12	9	5
1973	372	234	3	18	11	1	70	42	17	17	10	5
1974	444	272	25							40	23	7
1975	483	280	12				106	47	13	30	20	10
1976	495	357	174	55	33	11	99	44	5	35	13	4
1977	487	380	204	83	54	24	172	70	7	21	15	5
1178	509	390	72	24	12	3	123	38	3	24	15	5
1979	549	456	179	33	27	20	126	63	12	27	19	6
1980	482	421	319	37	23	12	101	56	3	35	22	9
1981	541	442	278	151	42	11	106	69	30	38	24	10
1982	499	414	302	47	7	10	107	67	5	30	25	7
1983	547	442	323	34	24	9	134	70	10	62	30	11
1984	542	411	39	33	17	8	165	82	34	47	38	29
1985	530	446	262	15	11	6	191	84	7	47	34	12
1986	600	489	234	27	9	3	216	86	2	52	31	19
1987	607	513	132	22	16	13	253	105	48	75	41	23
1988	640	583	408	21	17	13	202	73	9	68	39	22
1989	679	509	126	22	17	14	140	77	51	65	39	10
1990	653	614	534	18	16	14	218	106	1	58	27	1
1991	662	589	512	19	17	16	227	81	4	50	28	1
1992	653	577	374	21	15	9	187	86	19	91	34	17
1993	654	556	274	17	16	13	219	94	10	80	40	10
1994	606	501	157	17	13	6	171	69	13	88	34	2
1995	617	469	219	16	7	1	239	87	41	68	32	16
1996	541	351	194	6	3	1	120	65	41	40	28	13
1997	513	455	353	3	3	2	178	78	4	42	21	7
1998	496	392	154	3	2	0	116	64	25	37	23	14
1999	409	398	389	0	0	0	125	72	23	58	23	2

Appendix A.10. Kuskokwim Area subsistence chinook salmon harvest by community, 1960 - 1999.

Community	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Kipnuk	248	11	123	75	a						
Kwigillingok	250	35	43	106	339	a	250	957	70		220
Kongiganak	b	b	b	b						385	891
Tuntutuliak	226	2,226	842	2,853	1,826	1,575	3,097	3,462	2,214	2,195	3,558
Eek				c	c	2,921	4,572	2,566	2,038	2,065	1,882
Kasigluk & Eek					1,857	3,123					
Kasigluk	135	1,215	127	1,302	c	c	1,032	2,766	1,485	2,888	3,931
Nunapitchuk	683	2,042	848	1,874	636	490	2,213	1,926	1,750	2,279	4,680
Atmautluak	b	b	b	b	b	b	b	b	b	b	1,205
Napakiak	1,830	2,573	2,191	3,148	2,677	2,872	3,658	3,895	2,468	3,546	4,960
Napaskiak	536	1,258	759	1,569	2,201	1,071	2,710	2,998	1,663	2,227	3,446
Oscarville	1,968	282	75	309	339	688	322	1,127	393	457	542
Bethel	1,923	4,150	1,378	7,019	4,114	3,371	8,046	13,925	6,205	7,472	17,026
Kwethluk	2,692	3,763	2,329	5,050	3,262	2,887	6,551	6,993	2,848	3,187	7,932
Akiachak	1,626	3,052	1,800	2,533	3,488	3,685	4,904	5,543	3,755	2,602	7,022
Akiak	1,865	3,159	906	2,869	2,495	1,345	3,670	3,660	1,822	1,275	3,290
Tuluksak	737	1,486	493	1,295	572	1,021	1,576	1,709	1,048	1,131	1,995
Lower Kalskag	961	571	c	c	710	c	c	c	1,502	2,102	2,146
Upper Kalskag	667	1,049	c	c	1,143	c	c	c	1,619	1,623	734
Kalskags Comb.			805	2,661		1,395	3,379	3,567			
Aniak	1,057	688	185	602	1,104	c	2,072	1,280	517	1,406	2,136
Aniak[d]					642						
Chuathbaluk	64	54	10	30	74	c	139	217	34	180	219
Napaimute	20	16	44	52	134	a	78	60	94	19	22
Crooked Creek	747	518	561	859	1,358	374	1,446	585	77	541	684
Georgetown							12		0	9	2
Red Devil	c	40	c	c	c	c			111	142	232
Sleetmute	c	222	c	c	c	c	303	343	207	267	161
Sleetmute[e]	465	262	144	228	314	79					
Kashegelok[f]							10				
Stony River	435	25	31		299	79	636	303	176	2,187	105
Lime Village										50	15
Mcgrath							300	25			
Takotna											
Nikolai											
Telida											
Quinhagak								1,349	2,756		
Goodnews Bay											
Platinum											
Total	18,887	28,934	13,582	34,482	29,017	24,697	49,325	61,262	35,698	40,617	69,612

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Community	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Kipnuk[g]											
Kwigillingok[g]	200	10				75	382	75			
Kongiganak	41					122	361				
Tuntutuliak	1,841	3,214	2,859	1,577	3,492	4,807	2,470	1,656	2,268	2,545	4,446
Eek	1,969		1,981	2,356	2,110	3,232	2,675	1,807	2,003	1,557	1,731
Kasigluk	1,645	1,292	1,864	1,411	1,713	1,613	1,324	608	1,142	1,704	3,377
Nunapitchuk	1,978	2,496	2,663	1,165	2,092	2,578	2,622	2,178	2,109	2,612	2,918
Atmautluak	548	864	1,106	382	1,042	1,159	1,015	966	2,242	1,288	1,247
Napakiak	1,868	2,009	1,763	1,224	2,864	3,330	2,702	2,140	2,191	2,582	3,017
Napaskiak	1,916	1,578	2,048	900	2,303	3,566	1,989	2,122	2,085	3,160	2,911
Oscarville	570	196	586	180	891	623	672	349	629	477	495
Bethel	8,731	8,371	8,898	4,631	11,688	13,215	9,408	6,905	11,564	12,591	15,367
Kwethluk	5,564	5,137	3,444	2,694	3,179	4,193	5,563	3,172	6,919	7,627	6,167
Akiachak	4,818	3,872	2,592	1,726	3,534	4,915	5,407	2,951	4,818	5,405	3,094
Akiak	2,688	1,899	1,895	1,292	2,837	3,076	2,880	1,850	3,567	3,355	2,386
Tuluksak	1,280	1,318	1,322	883	1,338	1,411	2,906	1,906	1,489	2,807	2,446
Lower Kalskag	2,355	2,604	1,309	1,586	2,755	4,536	1,750	1,951	2,821	3,917	3,271
Upper Kalskag	601	401	938	463	1,752	1,413	2,813	1,253	1,590	1,889	1,171
Aniak	1,076	2,105	1,030	1,952	1,391	1,490	4,991	1,331	2,634	2,750	3,102
Chuathbaluk	179	261	942	674	594	657	1,507	1,238	2,189	1,507	841
Napaimute	17	20	13	6	16	420	176	144	149	90	45
Crooked Creek	291	183	269	650	238	264	619	488	728	654	512
Georgetown							66			93	
Red Devil	135	182	138	205	623	195	324	153	488	255	298
Sleetmute	181	69	504	269	256	356	684	300	755	220	728
Kashegelok[f]						156	233	92			
Stony River	402	95	287	439	761	620	33	182	171	332	233
Lime Village	2,119				100	33			38		
McGrath									581		
Takotna									65		
Nikolai									60		500
Telida											
Quinhagak							2,012	2,328	1,420	1,940	2,562
Goodnews Bay							574		228	498	1,309
Platinum									110	192	100
Total	43,013	38176	38,451	26,665	47,569	58,055	58,158	38,145	57,053	62,047	64,274

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Community	1982	1983	1984	1985	1986	1987	1988[i]	1989	1990	1991	1992
Kipnuk[g]	60							54	108	80	
Kwigillingok[g]											9
Kongiganak	52			235			585	1,412	1,442	778	904
Tuntutuliak	1,984	2,523	3,519	2,644	2,452	2,522	2,741	3,781	4,044	4,143	3,524
Eek	2,578	2,040		1,436			2,212	1,580	4,920	2,360	2,232
Kasigluk	3,115			2,054			1,367	2,173	3,167	2,955	94
Nunapitchuk	2,577	2,688		2,019	3,410	3,372	2,297	3,170	3,199	4,106	3,575
Atmautluak	1,752			1,559			1,131	1,227	2,569	1,784	1,422
Napakiak	3,500	2,047		1,805		2,760	3,091	3,710	4,158	2,543	3,328
Napaskiak	2,872			2,155		2,907	3,898	4,699	4,972	3,864	4,133
Oscarville	523			916		745	415	1,591	898	1,422	122
Bethel	13,516	8,492	11,066	6,940	11,984	8,107	15,038	24,655	19,641	28,817	17,196
Kwethluk	5,897		6,732	4,937	5,824	8,779	10,976	7,562	9,218	7,511	6,504
Akiachak	4,468		5,588	3,254		4,871	9,563	5,504	7,168	5,657	4,163
Akiak	2,745		3,413	2,975		3,683	3,706	4,811	5,178	3,247	3,207
Tuluksak	2,220	1,671	2,286	2,749		3,712	3,289	3,791	1,878	3,351	2,382
Lower Kalskag	2,594		3,242	1,707	1,666		3,024	3,337	2,494	3,947	2,269
Upper Kalskag	963		657	605	587		859	1,256	1,558	1,105	1,366
Aniak	2,071	3,174	1,847	1,828	4,624	2,131	4,071	3,406	3,189	3,261	3,955
Chuathbaluk	1,491			1,102			34	403	1,674	791	933
Napaimute	138			53							
Crooked Creek	515			218			618	451	929	947	472
Red Devil	273			176			263	189	273	168	328
Sleetmute	242		154	745			433	420	711	770	801
Stony River	419			167			315	692	498	586	233
Lime Village							341	105	240	60	
McGrath	160	830	730	59			440	418	1,231	880	1,038
Takotna							100	62	62	0	0
Nikolai	778	750	795	615			136	716	560	421	605
Telida								1			0
Quinhagak	2,402	2,542	3,109	2,341	2,682	3,663	3,690	3,542	6,013	3,693	3,447
Goodnews Bay	1,185	1,004	597	399	513	640	289	419	351	894	318
Platinum	51	62	32	27	42	176	21	48	188	23	56
Mekoryuk[g]								0	0	0	0
Newtok[g]							14	5	1	0	
Nightmute[g]							17	0	3	20	
Toksook Bay[g]							81	127	143	25	49
Tununak[g]							52	5	0	15	
Other											21
Total	61,141	51,020[h]	60,668[h]	45,720	54,256[h]	71,804[h]	75,107	85,322	92,678	90,224	68,665

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Community	1993	1994	1995	1996	1997	1998	1999
Kipnuk[g]	348	150				119	29
Kwigillingok[g]	80	7		15		100	
Kongiganak	781	1,271	843	830	1,609	1,250	1,320
Tuntutuliak	3,633	4,679	4,023	4,027	3,730	4,008	3,645
Eek	2,619	2,917	3,535	2,568	2,253	2,131	1,816
Kasigluk	548	694	392	579	880	541	480
Nunapitchuk	3,810	4,746	4,400	3,234	4,086	4,934	4,521
Atmautluak	1,818	1,819	1,918	1,801	1,768	1,452	1,469
Napakiak	3,972	3,545	3,902	3,784	2,873	3,504	2,380
Napaskiak	5,671	6,356	4,984	4,453	4,887	5,452	3,827
Oscarville	1,475	1,385	1,438	996	512	981	2,289
Bethel	22,083	24,515	29,568	20,783	21,253	23,963	24,996
Kwethluk	9,181	9,262	8,931	9,183	6,872	7,940	6,081
Akiachak	7,231	8,081	6,571	5,209	7,414	6,507	5,373
Akiak	4,280	4,759	4,118	4,569	3,378	3,311	2,356
Tuluksak	3,755	4,534	4,333	3,143	5,627	3,701	2,348
Lower Kalskag	3,930	3,976	5,321	2,870	3,549	2,041	1,787
Upper Kalskag	1,679	1,340	1,396	1,351	1,107	1,244	1,688
Aniak	4,618	3,413	3,422	3,204	3,794	3,508	2,596
Chuathbaluk	1,447	1,043	2,615	880	1,290	810	1,110
Crooked Creek	771	968	934	864	944	772	681
Red Devil	487	379	425	337	452	262	161
Sleetmute	1,767	1,327	885	1,230	1,171	947	447
Stony River	445	359	559	597	863	445	55
Lime Village	41	216	144	48	59	241	155
McGrath	567	1,052	800	1,203	974	769	1,295
Takotna	0	0		0		2	0
Nikolai	475	449	979	305	232	330	288
Telida							
Quinhagak	3,368	3,995	2,746	3,075	3,433	4,041	3,167
Goodnews Bay	628	712	858	403	437	713	805
Platinum	80	72	25	12	12	5	66
Mekoryuk[g]	0	6		0		1	15
Newtok[g]	0	2					
Nightmute[g]		8					6
Toksook Bay[g]	128	341	94	45	47	48	407
Tununak[g]	5	0				40	0
Chefornak[g]						2	
Other							
Total	91,721	98,378	100,159	81,598	85,506	86,115	77,660

Blanks indicate missing data.

a Data collected, combined with unspecified village or villages.
b Village not yet founded.
c Data collected, but reported with another village.
d Aniak, Chuathbaluk and Russian Mission.
e Sleetmute to Red Devil.
f Kashegelok and Holitna.
g Reported catch only.
h Estimate based on a sample of villages surveyed.
I Beginning in 1988, estimate based on new formula, data not comparable to previous years.

Appendix A.11. Kuskokwim Area subsistence sockeye salmon harvest by community, 1985 - 1999.

Community	1985	1986	1987	1988[c]	1989	1990	1991	1992	1993	1994	1995
Kipnuk[a]					402	175	136		90	132	
Kwigillingok[a]								0	140	5	
Kongiganak	130			830	658	423	533	905	705	702	530
Tuntutuliak	1,498	288	991	600	1,173	1,954	1,768	1,894	955	3,185	1,134
Eek	241			336	170	1,177	489	671	406	461	283
Kasigluk	1,138			376	235	810	1,421	81	122	275	165
Nunapitchuk	1,447	905	1,187	884	1,026	1,098	2,277	2,273	2,545	1,555	882
Atmautluak	1,308			320	1,143	1,501	881	1,304	1,387	796	1,099
Napakiak	1,242		1,439	1,087	1,752	1,375	1,176	1,315	1,150	1,627	959
Napaskiak	1,181		2,199	1,120	721	1,227	2,673	2,428	3,495	1,933	1,605
Oscarville	942		438	1,752	404	153	711	35	932	324	414
Bethel	3,409	7,730	3,810	5,614	7,316	6,392	17,669	7,173	10,503	8,563	8,190
Kwethluk	5,584	5,423	3,845	5,190	2,414	4,055	3,723	1,829	3,790	3,742	2,504
Akiachak	3,182		3,532	4,890	2,420	3,176	4,123	3,095	4,545	3,323	2,019
Akiak	1,368		1,883	1,378	2,492	1,739	1,708	1,458	3,558	1,786	643
Tuluksak	1,620		1,733	1,493	2,314	1,120	3,595	2,034	2,492	1,393	1,244
Lower Kalskag	948	783		1,581	767	851	1,092	467	2,339	950	681
Upper Kalskag	187	1,182		345	338	287	276	333	349	298	55
Aniak	2,116	2,652	2,101	1,078	959	1,356	2,031	1,180	1,578	571	975
Chuathbaluk	1,797			44	215	1,178	1,246	471	823	995	472
Napaimute	125										
Crooked Creek	1,218			327	436	1,556	998	489	831	512	192
Red Devil	205			437	356	445	426	315	717	311	620
Sleetmute	1,351			898	776	1,060	1,164	855	1,609	1,158	1,083
Stony River	585			195	1,084	835	1,912	1,462	1,488	802	1,342
Lime Village					5,653	2,333	956	0	2,800	1,760	700
McGrath			0	0	0	0	0	0	0	0	0
Takotna			0	0	0	0	0	0	0	0	
Nikolai			0	0	0	0	0	0	0	0	0
Telida				0	0			0			
Quinhagak	106	423	1,067	1,261	633	1,951	1,772	1,264	1,082	1,000	573
Goodnews Bay	562	860	834	898	710	970	1,132	669	784	669	219
Platinum	142	83	121	167	151	153	150	158	51	101	34
Mekoryuk[a]				1	0	50	1	0	1	87	
Newtok[a]					10	3	0		0	20	
Nightmute[a]					0	10	210			15	
Toksook Bay[a]					277	242	105	1	66	228	5
Tununak[a]					83	7	50		30	0	
Other[a]								1	1		
Total	33,632	20,239[b]	25,180[b]	33,102	37,088	39,662	56,404	34,159	51,363	39,279	28,622

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Appendix A.11. (page 2 of 2)

Community	1996	1997	1998	1999
Kipnuk[a]			107	54
Kwigillingok[a]	10		125	
Kongiganak	722	1,128	888	991
Tuntutuliak	1,526	2,048	1,275	2,048
Eek	478	584	382	625
Kasigluk[a]	588	499	53	183
Nunapitchuk	1,735	2,330	2,250	3,493
Atmautluak	1,456	724	1,050	1,874
Napakiak	1,083	1,455	1,705	2,115
Napaskiak	2,446	2,329	1,617	2,058
Oscarville	212	78	288	2,165
Bethel	7,112	10,868	8,134	13,145
Kwethluk	4,035	3,581	4,036	3,112
Akiachak	2,607	3,014	2,654	3,130
Akiak	1,449	1,398	1,478	1,145
Tuluksak	1,075	1,558	1,490	1,490
Lower Kalskag	1,144	1,455	574	605
Upper Kalskag	294	251	245	614
Aniak	1,277	1,124	1,151	1,310
Chuathbaluk	661	881	248	460
Crooked Creek	304	350	716	690
Red Devil	977	697	346	568
Sleetmute	1,304	1,458	1,398	946
Stony River	1,218	1,607	433	1,230
Lime Village	500	660	2,782	2,550
McGrath	0	20[d]		74
Takotna	0	0		0
Nikolai	0	0		0
Telida				
Quinhagak	400	556	1,490	1,639
Goodnews Bay	411	472	483	770
Platinum[a]	7	137	25	102
Mekoryuk[a]	0		21	2
Newtok[a]				
Nightmute[a]				5
Toksook Bay[a]	5	8	101	193
Tununak[a]			20	0
Chefornak[a]			13	
Other				
Total	35,036	41,270	37,578	49,388

Blanks indicate missing data.

a Reported harvest only.

b Estimated total based on sampled villages.

c Beginning in 1988, estimate based on new formula, data not comparable to previous years.

d McGrath residents sometimes travel to areas downriver to harvest sockeye.

Appendix A.12. Kuskokwim Area subsistence coho salmon harvest by community, 1985 - 1999.

Community	1985	1986	1987	1988[c]	1989	1990	1991	1992	1993	1994	1995
Kipnuk[a]					200	460	30		25	185	
Kwigillingok[a]								0	80	0	
Kongiganak	88			1,146	562	413	540	544	502	566	605
Tuntutuliak	371	1,692	760	754	508	1,135	729	761	820	441	365
Eek	406			291	349	1,620	343	531	206	426	347
Kasigluk	1,763			906	772	958	1,769	174	228	387	518
Nunapitchuk	513	1,084	696	898	469	573	1,167	2,226	321	781	641
Atmautluak	326			337	971	350	254	518	426	411	566
Napakiak	836		959	588	1,757	1,700	597	1,237	590	920	390
Napaskiak	415		629	1,503	1,130	922	754	866	783	2,012	580
Oscarville	155		40	50	430	43	136	0		49	
Bethel	6,094	19,351	8,077	8,291	22,390	19,342	28,136	15,902	13,764	12,258	19,906
Kwethluk	3,041	3,545	2,537	5,240	3,736	3,928	2,380	2,325	1,838	1,816	1,304
Akiachak	967		286	7,927	1,890	1,621	2,393	2,108	1,351	1,531	677
Akiak	1,270		1,294	1,577	4,959	1,591	2,231	1,137	1,315	1,110	501
Tuluksak	1,723		337	1,537	1,483	946	1,903	1,544	412	285	531
Lower Kalskag	596	2,211		158	981	375	510	469	778	845	718
Upper Kalskag	105	759		136	688	300	493	931	354	184	167
Aniak	1,552	1,051	2,302	1,903	2,640	1,484	1,143	1,844	1,091	1,682	1,265
Chuathbaluk	393			72	272	813	93	349	366	795	84
Napaimute	211										
Crooked Creek	290			89	530	886	277	413	409	581	381
Red Devil	846			672	1,591	866	1,132	1,160	1,812	994	1,557
Sleetmute	1,330			1,776	1,009	1,023	1,557	1,132	880	649	1,075
Stony River	395			161	611	423	502	744	512	505	1,083
Lime Village				1,055	2,025	538	336	300	618	960	246
McGrath				790	537	2,408	882	2,780	1,989	2,558	2,225
Takotna					40	0	0	0	0	0	
Nikolai	550			530	328	73	83	173	267	119	545
Telida					60			0			
Quinhagak	67	41	125	4,317	3,787	4,174	3,232	2,958	2,152	2,739	2,561
Goodnews Bay	210			1,072	830	1,556	1,789	1,163	1,197	435	296
Platinum	11	8	43	90	77	90	39	190	29	77	9
Mekoryuk[a]					106	52	130	2	53	87	
Newtok[a]					15	4	0		0	0	
Nightmute[a]					70	0	20			0	
Toksook Bay[a]					35	46	1	15	57	116	22
Tununak[a]					9	0	0		70	0	
Other[a]							39				
Total	24,524	29,742[b]	18,085[b]	43,866	57,847	50,713	55,581	44,496	35,295	36,504	39,165

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Community	1996	1997	1998	1999
Kipnuk[a]			85	75
Kwigillingok[a]	5		40	
Kongiganak	421	618	275	222
Tuntutuliak	1,339	669	935	331
Eek	389	80	306	258
Kasigluk[a]	368	518	140	92
Nunapitchuk	1,310	872	427	391
Atmautluak	537	531	425	205
Napakiak	600	168	749	487
Napaskiak	398	658	540	355
Oscarville	19	60	2	970
Bethel	12,929	15,108	11,294	12,414
Kwethluk	3,195	1,193	1,731	2,993
Akiachak	850	441	477	663
Akiak	972	846	674	254
Tuluksak	1,116	434	879	307
Lower Kalskag	1,022	652	347	302
Upper Kalskag	360	781	812	153
Aniak	2,671	1,494	1,308	1,418
Chuathbaluk	395	217	55	137
Crooked Creek	171	261	392	515
Red Devil	1,274	1,391	425	455
Sleetmute	846	419	301	226
Stony River	571	450	429	511
Lime Village	0	277	776	600
McGrath	919	753	924	553
Takotna	0		3	0
Nikolai	64	141	113	117
Telida				
Quinhagak	1,467	1,264	1,702	2,021
Goodnews Bay	293	343	312	439
Platinum[a]	59	54	19	143
Mekoryuk[a]	3		178	64
Newtok[a]				
Nightmute[a]				0
Toksook Bay[a]	135	21	97	83
Tununak[a]			60	0
Chefornak[a]			7	
Others				
Total	34,698	30,714	27,239	27,753

Blanks indicate missing data.

a Reported harvest only.

b Estimated total based on sampled villages.

c Beginning in 1988, estimate based on new formula, data not comparable to previous years.

Appendix A.13. Kuskokwim Area subsistence chum salmon harvest by community, 1985 - 1999.

Community	1985	1986	1987	1988[c]	1989	1990	1991	1992	1993	1994	1995
Kipnuk[a]					0	540	205		601	214	
Kwigillingok[a]								0	200	5	
Kongiganak	671			1,473	1,967	980	1,036	1,524	811	1,340	1,275
Tuntutuliak	4,346	2,734	5,385	4,700	5,068	6,250	4,755	6,052	2,899	5,232	3,488
Eek	401			1,323	972	3,090	814	1,397	244	624	815
Kasigluk	4,199			3,541	3,007	3,406	3,137	26	374	537	457
Nunapitchuk	4,346	4,676	4,621	7,331	6,923	5,240	6,055	8,229	4,854	4,587	4,297
Atmautluak	4,440			4,695	3,014	4,006	2,394	3,183	1,345	1,455	3,466
Napakiak	3,686		2,784	4,535	7,068	8,389	2,340	4,401	2,281	4,096	3,084
Napaskiak	5,810		6,832	11,623	13,079	8,166	6,582	6,061	3,622	5,605	4,271
Oscarville	1,294		1,135	2,461	1,341	925	1,141	29	566	676	1,018
Bethel	9,260	14,778	7,974	17,442	25,581	18,436	22,770	14,908	9,172	12,341	15,821
Kwethluk	6,866	9,736	7,636	21,352	10,128	11,102	5,497	7,647	3,491	6,102	6,050
Akiachak	5,931		4,355	17,749	7,747	9,133	5,994	5,771	3,492	6,286	4,074
Akiak	6,724		3,837	6,699	13,000	8,235	6,668	5,907	7,549	4,599	1,878
Tuluksak	6,064		3,466	7,046	9,796	5,845	5,695	4,798	3,834	2,476	2,609
Lower Kalskag	4,637	2,538		8,232	4,932	4,212	2,886	2,758	3,062	2,758	1,455
Upper Kalskag	1,855	3,684		3,317	3,427	1,321	2,357	2,843	578	864	1,351
Aniak	8,804	5,905	5,751	11,628	10,404	9,089	3,492	7,870	2,900	2,612	3,566
Chuathbaluk	3,782			450	2,051	4,510	1,912	2,502	2,895	1,615	1,807
Napaimute	414										
Crooked Creek	2,888			768	779	2,884	1,367	904	715	649	358
Red Devil	1,021			3,168	1,376	1,466	1,236	1,523	1,004	1,220	882
Sleetmute	3,689			4,873	1,813	1,874	1,862	3,151	681	1,533	1,758
Stony River	722			3,405	1,352	1,132	602	1,335	775	932	1,375
Lime Village				913	2,100	2,500	715	0	508	2,080	920
McGrath				639	1,276	2,839	1,068	2,854	590	1,294	1,486
Takotna				200	250	56	0	0	0	0	
Nikolai	2,900			2,404	1,221	882	495	818	353	293	301
Telida					15			0			
Quinhagak	901	808	1,084	1,065	1,568	3,234	1,593	1,833	1,008	1,452	686
Goodnews Bay	339	188	371	405	620	193	144	921	188	425	152
Platinum	9	3	207	43	164	139	5	85	0	45	3
Mekoryuk[a]				500	2,915	1,067	1,178	0	808	2,337	
Newtok[a]					20	4	0		0	0	
Nightmute[a]					30	35	60			7	
Toksook Bay[a]					86	224	103	246	296	660	239
Tununak[a]					16	65	150		30	0	
Other[a]							3	1			
Total	95,999	142,930[b]	70,709[b]	153,980	145,106	131,469	96,308	99,576	61,726	76,951	68,942

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Community	1996	1997	1998	1999
Kipnuk[a]			114	31
Kwigillingok[a]	30		250	
Kongiganak	1,331	902	1,643	1,152
Tuntutuliak	5,852	2,877	3,774	1,862
Eek	923	649	787	508
Kasigluk[a]	1,196	1,278	218	350
Nunapitchuk	5,833	2,794	5,389	4,742
Atmautluak	2,672	1,484	1,916	1,667
Napakiak	4,249	1,458	4,556	1,573
Napaskiak	4,983	2,589	4,227	2,687
Oscarville	1,552	35	420	1,906
Bethel	16,403	8,790	12,057	11,163
Kwethluk	11,870	3,554	4,786	3,449
Akiachak	4,993	1,768	2,467	2,741
Akiak	4,640	1,725	2,231	1,202
Tuluksak	3,167	2,887	3,224	1,566
Lower Kalskag	3,357	1,487	977	759
Upper Kalskag	1,621	405	487	665
Aniak	8,447	1,747	5,023	1,764
Chuathbaluk	2,089	1,244	1,027	729
Crooked Creek	347	311	2,561	806
Red Devil	787	551	565	193
Sleetmute	1,215	417	981	367
Stony River	443	591	897	358
Lime Village	500	251	964	1,012
McGrath	206	111	1,462	260
Takotna	10		15	0
Nikolai	249	65	519	89
Telida				
Quinhagak	930	600	1,448	1,810
Goodnews Bay	214	133	285	250
Platinum[a]	5	0	31	31
Mekoryuk[a]	0		2,176	1,583
Newtok[a]				
Nightmute[a]				10
Toksook Bay[a]	124	273	171	326
Tununak[a]				0
Chefornak[a]			17	
Other				
Total	90,238	40,976	67,665	47,612

Blanks indicate missing data.
a Reported harvest only.
b Estimated total based on sampled villages.
c Beginning in 1988, estimate based on new formula, data not comparable to previous years.

APPENDIX B

Appendix B.1. Kuskokwim River distances.[a]

Location	Distance from the Mouth		Distance from Bethel	
	Kilometer	Miles	Kilometer	Miles
Popokamiut (Lower boundary District 1)	-3	-2	-129	-80
Kuskokwim River Mouth 60.80 N, 162.42 W	0	0	-125	-78
Eek Island, Southernmost tip, (Lower boundary District 1)	19	12	-106	-66
Apokak Slough (Lower boundary District 1)	35	22	-90	-56
Eek River	39	24	-87	-54
Kwegooyuk	42	26	-84	-52
Kinak River	48	30	-78	-48
Tuntutuliak Village	56	35	-87	-54
Kialik River	59	37	-66	-41
Fowler Island	83	52	-42	-26
Johnson River	93	58	-32	-20
Napakiak Village	104	65	-21	-13
Napaskiak Village	115	71	-12	-7
Oscarville Village	115	71	-11	-7
Bethel City	125	78	0	0
Gweek River	145	90	20	12
Kwethluk Village	159	99	34	21
Akiachak Village	169	105	43	27
Kasigluk River	173	108	48	30
Kisaralik River	175	109	50	31
Akiak Village	190	118	64	40
Mishevik Slough,	212	132	87	54
Tuluksak Village	218	136	93	58
Nelson Island	220	137	95	59
(District 1 Boundary), Bogus Creek	234	146	109	68
High Bluffs	264	164	139	86
Boundary of District 2	295	183	170	105
Mud Creek Slough	297	185	172	107
Kalskag Village	309	192	184	114
Aniak Village, Aniak River	362	225	237	147
Chuathbaluk Village (Upper boundary District 2)	375	233	250	155
Kolmakof River	395	246	270	168
Napaimiut Village	410	255	285	177

(continued)

Location	Distance from the Mouth		Distance from Bethel	
	Kilometer	Miles	Kilometer	Miles
Holokuk River	415	258	290	180
Oskawalik River	449	279	324	201
Crooked Creek Village	466	290	341	212
Georgetown Village, George River	497	309	372	231
Red Devil Village	526	327	401	249
Sleetmute village	539	335	414	257
Holitna River	540	336	415	258
Stony River Village	585	364	460	286
Stony River	587	365	462	287
Swift River	611	380	486	302
Tatlawiksuk River	616	383	491	305
Devil's Elbow	645	401	520	323
Vinasale	740	460	615	382
McGrath Village	815	507	690	429
Middle Fork	889	553	764	475
Big River	801	560	776	482
Pitka Fork	920	572	795	494
Medra Village	928	577	803	499
South Fork	931	579	806	501
East Fork	943	586	818	508
North Fork	943	586	818	508
Nikolai Village	999	621	874	543
Swift Fork	1,136	706	1,011	628
Telida Village	1,184	736	1,059	658
Highpower Creek	1,200	746	1,075	668
Fish Creek	1,284	798	1,159	720
North Fork Lake	1,334	829	1,209	751
Top of Kuskokwim Drainage	1,498	931	1,373	853

a These distances were taken from the USGS 1:36,300 series of topographic maps. The "mouth" was defined as the point where the "grassland" banks are 24 miles apart. Some locations are not on the mainstem of the Kuskokwim River, as a result their mileages appear to be out of sequence since they are listed in the order of the turn off.

Appendix B.2. Lower Kuskokwim River, District 1 commercial effort, 1970-1999.

Year	Unrestricted Mesh Season	Restricted Mesh Season	Coho Salmon Season	Total
1970	361	a	266	387
1971	418	216	83	422
1972	405	176	245	425
1973	456	341	411	530
1974	606	467	516	666
1975	472	540	533	737
1976	561	517	516	674
1977	563	522	572	653
1978	615	617	597	723
1979	591	617	613	685
1980	553	579	586	663
1981	589	613	586	679
1982	610	576	596	686
1983	544	619	577	679
1984	520	587	619	654
1985	b	598	627	654
1986	b	631	663	688
1987	b	680	694	703
1988	b	c	c	746

	Number of Permits Landing Each Species						
	Chinook	Sockeye	Coho	Pink	Chum	Roe	Total
1989	695	688	732	261	719	22	745
1990	724	722	714	526	736	1	744
1991	687	705	731	159	733	1	749
1992	711	706	706	520	722	0	741
1993	669	654	717	54	715	0	740
1994	651	666	682	664	700	0	706
1995	684	692	680	80	699	0	712
1996	482	514	615	196	593	17	620
1997	445	446	593	2	551	0	604
1998	555	568	580	48	589	0	618
1999	412	425	388	2	442	0	509
Ten Year Average (1989-1998)	630	636	675	251	676	4	698

a No commercial salmon season.
b No unrestricted mesh season.
c Fishery continued without interruption.

Appendix B.3. Utilization of chinook salmon in the Kuskokwim River, 1960-1999.

Year	Commercial Harvest[a]	Subsistence Harvest[b]	Test Fishery Harvest	Total Utilization	10-Year Average
1960	5,969	18,887		24,856	
1961	18,918	28,934		47,852	
1962	15,341	13,582		28,923	
1963	12,016	34,482		46,498	
1964	17,149	29,017		46,166	
1965	21,989	24,697		46,686	
1966	25,545	49,325	285	75,155	
1967	29,986	59,913	766	90,665	
1968	34,278	32,942	608	67,828	
1969	43,997	40,617	833	85,447	56,008
1970	39,290	69,612	857	109,759	64,498
1971	40,274	43,242	756	84,272	68,140
1972	39,454	40,396	756	80,606	73,308
1973	32,838	39,093	577	72,508	75,909
1974	18,664	27,139	1,236	47,039	75,997
1975	22,135	48,448	704	71,287	78,457
1976	30,735	58,606	1,206	90,547	79,996
1977	35,830	56,580	1,264	93,674	80,297
1978	45,641	36,270	1,445	83,356	81,850
1979	38,966	56,283	979	96,228	82,928
1980	35,881	59,892	1,033	96,806	81,632
1981	47,663	61,329	1,218	110,210	84,226
1982	48,234	58,018	542	106,794	86,845
1983	33,174	47,412	1,139	81,725	87,767
1984	31,742	56,930	231	88,903	91,953
1985	37,889	43,874	79	81,842	93,009
1986	19,414	51,019	130	70,563	91,010
1987	36,179	67,325	384	103,888	92,032
1988	55,716	70,943 [c]	576	127,235	96,419
1989	43,217	82,098	543	125,858	99,382
1990	53,504	85,499	512	139,515	103,653
1991	37,778	85,627	117	123,522	104,985
1992	46,872	64,702	1,380	112,954	105,601
1993	8,735	89,290	2,483	100,508	107,479
1994	16,211	95,411	1,937	113,559	109,944
1995	30,846	97,193	1,421	129,460	114,706
1996	7,419	78,729	247	86,395	116,289
1997	10,441	81,557	332	92,330	115,134
1998	17,359	81,265	210	98,834	112,294
1999	4,705	77,695	98	82,498	107,958
10-Yr. Ave. (1989-1998)	27,238	84,137	918	112,294	

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

[b] Estimated subsistence harvest expanded from villages surveyed.

[c] Beginning in 1988, estimates are based on a new formula so data since 1988 is not comparable with previous years.

Appendix B.4. Peak aerial survey counts of chinook salmon in indexed Kuskokwim River spawning tributaries, 1975 - 1999a.

	Lower Kuskokwim				Middle Kuskokwim							Upper Kuskokwim	
Year	Eek	Kwethluk Canyon C.	Kisaralik	Tuluksak	Aniak	Kipchuk (Aniak)	Salmon (Aniak)	Holokuk	Oskawalik	Holitna	Kogrukluk Weir	Cheeneetnuk	Salmon (Pitka)
1975			118			94		17	71	1,114			
1976				139		177		126	204	2,571	5,579	1,197	1,146
1977		2,290		291			562	60	276			1,399	1,978
1978	1,613	1,732	2,417	403			289			2,766	13,667	267	1,127
1979		911						113			11,338		699
1980	2,378			725			1,186	250	123				1,177
1981		1,783	672		9,074		894				16,655		1,474
1982	230				2,645		185	42	120	521	10,993		419
1983	188	471	731	129	1,909		231	33	52	1,069		243	586
1984		273	157	93	1,409					299	4,926	1,177	577
1985	1,118	629		135				135	61		4,619	1,002	625
1986					909		336	100		850	5,038	381	
1987	1,739	975		60		193	516	208	193	813		317	
1988	2,255	766	840	188	945		244	57	80		8,506		501
1989	1,042	1,157	152		1,880	994	631				11,940		446
1990	1,983	1,295	631	166	1,255	537	596	143	113		10,218		
1991	1,312	1,002		342	1,564	885	583				7,850		
1992					2,284	670	335	64	91	1,822	6,755	1,050	2,555
1993					2,687	1,248	1,082	114	103	1,573	12,332	678	1,012
1994		848	1,021		1,848	1,520	1,218				15,227	1,206	1,010
1995			1,243		3,174	1,215	1,442	181	289	2,787	20,630	1,565	1,911
1996					3,496		983	85			14,199		
1997			439	173	2,187	855	980	322	1,470	2,093	13,280	345	
1998		27	457		2,239	353							
1999								18	98	741	5,570		
BEG	1,460[b]	**1,200[c]**	**1,000[c]**	**400[c]**	**1,500[c]**	670[b]	**600[c]**	107[b]	108[b]	**2,000[c]**	**10,000[c]**	1,002[b]	**1,300[c]**

a Estimates are from "peak" aerial surveys conducted between 20 and 31 July under fair, good, or excellent viewing conditions.
b Median of years 1975 through 1994.
c Formally established BEG (Buklis 1993).

Appendix B.5. Historical commercial salmon harvest in the Kuskokwim River, Districts 1 and 2 combined. 1960-1999. [a]

Year	Chinook	Sockeye	Chum	Pink	Coho	Total
1960	5,969	0	0	0	2,498	8,467
1961	18,918	0	0	0	5,044	23,962
1962	15,341	0	0	0	12,432	27,773
1963	12,016	0	0	0	15,660	27,676
1964	17,149	0	0	0	28,613	45,762
1965	21,989	0	0	0	12,191	34,180
1966	25,545	0	0	0	22,985	48,530
1967	29,986	0	148	0	56,313	86,447
1968	34,278	0	187	0	127,306	161,771
1969	43,997	322	7,165	0	83,765	135,249
1970	39,290	117	1,664	44	38,601	79,716
1971	40,274	2,606	68,914	0	5,253	117,047
1972	39,454	102	78,619	8	22,579	140,762
1973	32,838	369	148,746	33	130,876	312,862
1974	18,664	136	171,887	84	147,269	338,040
1975	22,135	23	184,171	10	81,945	288,284
1976	30,735	2,971	177,864	133	88,501	300,204
1977	35,830	9,379	248,721	203	241,364	535,497
1978	45,641	733	248,656	5,832	213,393	514,255
1979	38,966	1,054	261,874	78	219,060	521,032
1980	35,881	360	483,211	803	222,012	742,267
1981	47,663	48,375	418,677	292	211,251	726,258
1982	48,234	33,154	278,306	1,748	447,117	808,559
1983	33,174	68,855	276,698	211	196,287	575,225
1984	31,742	48,575	423,718	2,942	623,447	1,130,424
1985	37,889	106,647	199,478	75	335,606	679,695
1986	19,414	95,433	309,213	3,422	659,988	1,087,470
1987	36,179	136,602	574,336	43	399,467	1,146,627
1988	55,716	92,025	1,381,674	10,825	524,296	2,064,536
1989	43,217	42,747	749,182	464	479,856	1,315,466
1990	53,504	84,870	461,624	3,397	410,332	1,013,727
1991	37,778	108,946	431,802	378	500,935	1,079,839
1992	46,872	92,218	344,603	7,451	666,170	1,157,314
1993	8,735	27,008	43,337	64	610,739	689,883
1994	16,211	49,365	271,115	30,949	724,689	1,092,329
1995	30,846	92,500	605,918	93	471,461	1,200,818
1996	7,419	33,878	207,877	1,621	937,299	1,188,094
1997	10,441	21,989	17,026	2	130,803	180,261
1998	17,359	60,906	207,809	92	210,481	496,647
1999	4,705	16,976	23,006	2	23,593	68,282
10-Year Average (1989-1998)	27,238	61,443	334,029	200[b]	514,277	941,438

a Includes harvests in District 3 from 1960 to 1965.

b Odd years only

Appendix B.6. Utilization of chum salmon in the Kuskokwim River, 1960-1999.

Year	Commercial Harvest[a]	Subsistence Harvest[b]	Test Fishery Harvest	Total Utilization	Running 10-Year Average
1960	0	301,753 [c]		301,753	
1961	0	179,529 [c]		179,529	
1962	0	161,849 [c]		161,849	
1963	0	137,649 [c]		137,649	
1964	0	190,191 [c]		190,191	
1965	0	250,878 [c]		250,878	
1966	0	175,735 [c]	502 [d]	176,237	
1967	148	208,445 [c]	338	208,931	
1968	187	275,008 [c]	562	275,757	
1969	7,165	204,105 [c]	384	211,654	209,443
1970	1,664	246,810 [c]	1,139 [d]	249,613	204,229
1971	68,914	116,391 [c]	254	185,559	204,832
1972	78,619	120,316 [c]	486	199,421	208,589
1973	148,746	179,259 [c]	675	328,680	227,692
1974	171,887	277,170 [c]	2,021	451,078	253,781
1975	184,171	176,389 [c]	1,062	361,622	264,855
1976	177,864	223,792 [c]	2,101	403,757	287,607
1977	248,721	198,355 [c]	576	447,652	311,479
1978	248,656	118,809 [c]	2,153	369,618	320,865
1979	261,874	161,239 [c]	412	423,525	342,053
1980	483,751	165,172 [c]	2,058	650,981	382,189
1981	418,677	157,306 [c]	1,793	577,776	421,411
1982	278,306	190,011 [c]	504	468,821	448,351
1983	276,698	146,876 [c]	1,069	424,643	457,947
1984	423,718	142,542 [c]	1,186	567,446	469,584
1985	199,478	94,750	616	294,844	462,906
1986	309,213	141,931 [c]	1,693	452,837	467,814
1987	574,336	70,709	2,302	647,347	487,784
1988	1,381,674	151,967 [e]	4,379	1,538,020	604,624
1989	749,182	140,345	2,082	891,609	651,432
1990	461,624	125,626	2,107	589,357	645,270
1991	431,802	92,961	931	525,694	640,062
1992	344,603	96,081	15,330	456,014	638,781
1993	43,337	59,259	8,451	111,047	607,422
1994	271,115	72,268	11,998	355,381	586,215
1995	605,918	68,263	17,473	691,654	625,896
1996	207,877	89,430	2,864	300,171	610,629
1997	17,026	29,076	790	46,892	550,584
1998	207,809	63,537	1,140	272,486	424,031
1999	23,006	47,612	562	71,180	341,988
10-Yr. Ave. (1989-1998)	334,029	83,685	6,317	424,031	

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

[b] Estimated subsistence harvest expanded from villages surveyed.

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

[d] Includes small numbers of sockeye.

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

Appendix B.7. Historical commercial salmon catches by fishing period in Kuskowim Area District 1, 1974-1999.

Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1974	Jun 10 - 11 [a]	422	12	5,064	4,384	0.9	1	0.0	153	0.0	0	0.0
	Jun 13 - 14 [a]	488	12	5,856	5,790	1.0	2	0.0	607	0.1	0	0.0
	Jun 17 - 18 [a]	506	12	6,072	5,857	1.0	62	0.0	1,394	0.2	0	0.0
	Jun 27 [b]	267	6	1,602	558	0.3	0	0.0	27,017	16.9	0	0.0
	Jul 01 - 02 [b]	380	12	4,560	561	0.1	26	0.0	55,356	12.1	0	0.0
	Jul 04 - 05 [b]	282	12	3,384	196	0.1	0	0.0	27,211	8.0	0	0.0
	Jul 08 - 09 [b]	376	12	4,512	286	0.1	1	0.0	50,672	11.2	0	0.0
	Jul 18 [b]	190	6	1,140	31	0.0	0	0.0	6,661	5.8	19	0.0
	Aug 01 - 02 [b]	267	12	3,204	17	0.0	9	0.0	813	0.3	9,576	3.0
	Aug 05 - 08 [b]	444	72	31,968	18	0.0	35	0.0	1,170	0.0	59,090	1.8
	Aug 12 - 15 [b]	396	72	28,512	12	0.0	0	0.0	103	0.0	58,066	2.0
	Aug 19 - 22 [b]	263	72	18,936	0	0.0	0	0.0	32	0.0	12,301	0.6
	Aug 26 - 29 [b]	107	72	7,704	1	0.0	0	0.0	10	0.0	5,360	0.7
	Sept. 02 - 05 [b]	25	72	1,800	0	0.0	0	0.0	0	0.0	430	0.2
Total		666	456	124,314	17,711		136		171,199		144,842	
1975	Jun 16 [a]	12	6	72	359	4.99	0	0.0	3	0.0	0	0.0
	Jun 19 - 20 [a]	46	12	552	1,031	1.87	0	0.0	34	0.1	0	0.0
	Jun 23 - 24 [a]	483	12	5,796	17,235	2.97	0	0.0	3,792	0.7	0	0.0
	Jun 30 [b]	276	6	1,656	691	0.42	0	0.0	31,216	18.9	0	0.0
	Jul 03 [b]	360	6	2,160	636	0.29	0	0.0	35,525	16.4	0	0.0
	Jul 07 [b]	369	6	2,214	421	0.19	0	0.0	39,396	17.8	0	0.0
	Jul 10 [b]	304	6	1,824	195	0.11	0	0.0	39,910	21.9	0	0.0
	Jul 14 [b]	326	6	1,956	179	0.09	0	0.0	21,092	10.8	0	0.0
	Aug 01 [b]	142	6	852	5	0.01	0	0.0	2,113	2.5	2,357	2.8
	Aug 04 - 06 [b]	292	48	14,016	40	0.00	1	0.0	5,639	0.4	12,500	0.9
	Aug 11 - 13 [b]	373	48	17,904	8	0.00	0	0.0	2,247	0.1	18,551	1.0
	Aug 18 - 20 [b]	388	48	18,624	16	0.00	3	0.0	746	0.0	34,435	1.8
	Aug 25 - 27 [b]	270	48	12,960	0	0.00	0	0.0	73	0.0	16,277	1.3
Total		737	258	80,586	20,816		4		181,786		84,120	
1976	Jun 17 [a]	459	6	2,754	6,962	2.5	1	0.0	532	0.2	0	0.00
	Jun 21 [a]	495	6	2,970	13,048	4.4	0	0.0	2,543	0.9	0	0.00
	Jun 28 [b]	348	6	2,088	4,143	2.0	508	0.2	42,464	20.3	0	0.00
	Jul 01 [b]	415	6	2,490	1,550	0.6	338	0.1	44,024	17.7	0	0.00
	Jul 08 [b]	381	6	2,286	894	0.4	1,268	0.6	48,669	21.3	0	0.00
	Jul 12 [b]	344	6	2,262	344	0.2	701	0.3	21,153	9.4	0	0.00
	Jul 15 [b]	265	6	1,590	236	0.1	151	0.1	14,176	8.9	44	0.03
	Aug 02 - 03 [b]	286	24	6,864	83	0.0	0	0.0	2,067	0.3	10,534	1.53
	Aug 09 - 11 [b]	400	48	19,200	96	0.0	3	0.0	866	0.0	29,728	1.55
	Aug 16 - 18 [b]	387	48	18,576	50	0.0	1	0.0	154	0.0	28,664	1.54
	Aug 23 - 25 [b]	300	48	14,400	10	0.0	0	0.0	69	0.0	14,543	1.01
	Aug 30 - 31 [b]	174	42	7,308	2	0.0	0	0.00	10	0.0	4,420	0.60
Total		674	252	82,788	27,418		2,971		176,727		87,933	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1977	Aug 01 - 02 [b]	360	24	8,640	91	0.01	392	0.0	7,157	0.83	23,987	2.78
	Aug 08 [b]	487	48	23,376	117	0.01	59	0.0	3,306	0.14	91,474	3.91
	Aug 15 - 16 [b]	438	24	10,512	57	0.01	4	0.0	1,161	0.11	60,935	5.80
	Aug 18 [b]	378	12	4,536	13	0.00	1	0.0	224	0.05	25,589	5.64
	Aug 22 [b]	361	12	4,332	12	0.00	6	0.0	202	0.05	16,980	3.92
	Aug 25 [b]	264	12	3,168	12	0.00	0	0.0	127	0.04	11,874	3.75
	Aug 29 [b]	204	12	2,448	5	0.00	0	0.0	42	0.02	6,819	2.79
Total		653	186	73,944	31,659		9,369		232,681		237,659	
1978	Jun 09 [a]	509	6	3,054	7,590	2.49	10	0.0	734	0.24	0	0.00
	Jun 14 [a]	266	6	1,596	6,142	3.85	0	0.0	1,291	0.81	0	0.00
	Jun 16 [a]	396	6	2,376	12,341	5.19	22	0.0	5,950	2.50	0	0.00
	Jun 22 [a]	72	4	288	1,724	5.99	0	0.0	1,629	5.66	0	0.00
	Jun 23 [a]	429	4	1,716	8,342	4.86	0	0.0	12,587	7.34	0	0.00
	Jun 26 [b]	499	5	2,694	1,964	0.73	1	0.0	44,296	16.44	0	0.00
	Jun 29 [b]	422	6	2,652	1,759	0.66	52	0.0	36,793	13.87	0	0.00
	Jul 03 [b]	476	6	2,856	894	0.31	93	0.0	26,629	9.32	0	0.00
	Jul 06 [b]	485	12	5,820	1,460	0.25	302	0.1	48,031	8.25	0	0.00
	Jul 10 [b]	428	12	5,136	694	0.14	216	0.0	48,931	9.53	0	0.00
	Jul 13 [b]	422	6	2,532	293	0.12	0	0.0	14,935	5.90	0	0.00
	Aug 01 [b]	297	12	3,564	97	0.03	23	0.0	3,298	0.93	6,311	1.77
	Aug 04 [b]	364	12	4,368	79	0.02	6	0.0	906	0.21	9,445	2.16
	Aug 08 [b]	433	12	5,196	65	0.01	4	0.0	629	0.12	28,501	5.49
	Aug 11 [b]	485	12	5,820	39	0.01	2	0.0	280	0.05	42,428	7.29
	Aug 15 [b]	476	12	5,712	33	0.01	0	0.0	87	0.02	48,950	8.57
	Aug 18 [b]	434	12	5,208	16	0.00	2	0.0	67	0.01	29,485	5.66
	Aug 22 [b]	396	12	4,752	8	0.00	0	0.0	53	0.01	22,287	4.69
	Aug 25 [b]	293	12	3,516	12	0.00	0	0.0	13	0.00	11,168	3.18
	Aug 29 [b]	250	12	3,000	1	0.00	0	0.0	80	0.03	12,215	4.07
Total		723	182	71,856	43,553		733		247,219		210,790	
1979	Jul 10 [b]	520	6	3,120	470	0.15	23	0.01	32,434	10.40	0	0.00
	Aug 02 [b]	478	12	5,736	67	0.01	186	0.03	3,643	0.64	52,276	9.11
	Aug 06 [b]	480	6	2,880	38	0.01	54	0.02	1,148	0.40	53,797	18.68
	Aug 09 [b]	497	6	2,982	34	0.01	19	0.01	502	0.17	26,422	8.86
	Aug 13 [b]	463	6	2,778	20	0.01	11	0.00	179	0.06	27,915	10.05
	Aug 16 [b]	467	6	2,802	16	0.01	4	0.00	129	0.05	21,675	7.74
	Aug 20 [b]	390	6	2,340	23	0.01	7	0.00	104	0.04	19,445	8.31
	Aug 23 [b]	328	6	1,968	0	0.00	0	0.00	54	0.03	5,376	2.73
	Aug 27 [b]	310	12	3,720	6	0.00	2	0.00	40	0.01	6,342	1.70
	Aug 30 [b]	179	12	2,148	2	0.00	1	0.00	16	0.01	2,182	1.02
Total		685	114	49,608	36,053		460		258,516		215,430	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1980	Aug 07 [b]	455	6	2,730	45	0.02	67	0.02	2,098	0.77	36,126	13.23
	Aug 11 [b]	482	6	2,892	33	0.01	64	0.02	4,350	1.50	35,178	12.16
	Aug 14 [b]	439	6	2,634	23	0.01	38	0.01	366	0.14	28,211	10.71
	Aug 18 [b]	441	6	2,646	12	0.00	25	0.01	179	0.07	43,748	16.53
	Aug 21 [b]	419	6	2,514	10	0.00	26	0.01	94	0.04	33,274	13.24
	Aug 25 [b]	370	6	2,220	12	0.01	9	0.00	64	0.03	19,264	8.68
	Aug 28 [b]	319	6	1,914	3	0.00	5	0.00	19	0.01	13,484	7.04
Total		663	84	35,370	34,184		360		467,134		219,174	
1981	Jun 10 [a]	489	6	2,934	11,897	4.05	48	0.0	2,623	0.89	0	0.00
	Jun 16 [a]	541	6	3,246	17,985	5.54	316	0.1	11,501	3.54	0	0.00
	Jun 22 [b]	511	6	3,066	3,830	1.25	3,852	1.3	78,168	25.50	0	0.00
	Jun 25 [b]	508	6	3,048	2,000	0.66	6,037	2.0	81,431	26.72	0	0.00
	Jun 30 [b]	484	6	2,904	2,563	0.88	12,262	4.2	51,942	17.89	0	0.00
	Jul 02 [b]	459	6	2,754	1,707	0.62	9,769	3.5	58,594	21.28	0	0.00
	Jul 06 [b]	461	6	2,766	1,088	0.39	5,510	2.0	55,799	20.17	0	0.00
	Jul 09 [b]	440	6	2,640	941	0.36	7,760	2.9	66,138	25.05	0	0.00
	Aug 03 [b]	430	6	2,580	101	0.04	1,057	0.4	1,866	0.72	16,184	6.27
	Aug 06 [b]	441	6	2,646	77	0.03	674	0.3	1,046	0.40	13,885	5.25
	Aug 10 [b]	445	6	2,670	54	0.02	454	0.2	629	0.24	26,972	10.10
	Aug 13 [b]	473	6	2,838	54	0.02	233	0.1	448	0.16	46,252	16.30
	Aug 17 [b]	458	6	2,748	38	0.01	146	0.1	164	0.06	34,739	12.64
	Aug 20 [b]	380	6	2,280	17	0.01	55	0.0	73	0.03	24,184	10.61
	Aug 24 [b]	372	6	2,232	16	0.01	28	0.0	40	0.02	23,771	10.65
	Aug 27 [b]	346	6	2,076	16	0.01	25	0.0	59	0.03	13,785	6.64
	Aug 31 [b]	278	6	1,668	8	0.00	20	0.0	21	0.01	8,086	4.85
Total		679	102	45,096	42,011		45,554		410,542		207,858	
1982	Jul 05 [b]	372	6	2,232	875	0.39	2,769	1.24	29,315	13.13	0	0.00
	Jul 08 [b]	435	6	2,610	748	0.29	1,786	0.68	28,942	11.09	2	0.00
	Jul 12 [b]	354	6	2,124	307	0.14	638	0.30	20,709	9.75	23	0.01
	Jul 29 [b]	416	6	2,496	114	0.05	48	0.02	2,599	1.04	19,561	7.84
	Aug 02 [b]	388	6	2,328	67	0.03	69	0.03	949	0.41	31,944	13.72
	Aug 05 [b]	445	6	2,670	47	0.02	26	0.01	624	0.23	35,766	13.40
	Aug 09 [b]	442	6	2,652	29	0.01	25	0.01	342	0.13	61,231	23.09
	Aug 12 [b]	449	6	2,694	26	0.01	6	0.00	189	0.07	80,685	29.95
	Aug 16 [b]	420	6	2,520	15	0.01	5	0.00	96	0.04	77,785	30.87
	Aug 19 [b]	403	6	2,418	12	0.00	12	0.00	69	0.03	49,566	20.50
	Aug 23 [b]	349	6	2,094	3	0.00	5	0.00	28	0.01	25,218	12.04
	Aug 26 [b]	314	6	1,884	9	0.00	0	0.00	18	0.01	26,761	14.20
	Aug 30 [b]	302	6	1,812	7	0.00	1	0.00	18	0.01	26,815	14.80
Total		686	112	46,116	45,120		31,233		259,254		435,357	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1983	Jul 07 [b]	496	6	2,976	1,202	0.40	7,286	2.45	36,965	12.42	0	0.00
	Jul 11 [b]	466	6	2,796	633	0.23	3,001	1.07	20,560	7.35	0	0.00
	Aug 01 [b]	377	6	2,262	238	0.11	478	0.21	4,041	1.79	9,767	4.32
	Aug 04 [b]	430	6	2,580	237	0.09	272	0.11	2,580	1.00	15,389	5.96
	Aug 08 [b]	383	6	2,298	130	0.06	444	0.19	1,322	0.58	34,541	15.03
	Aug 11 [b]	485	6	2,910	96	0.03	146	0.05	534	0.18	35,268	12.12
	Aug 15 [b]	462	6	2,772	64	0.02	71	0.03	148	0.05	24,072	8.68
	Aug 18 [b]	408	6	2,448	56	0.02	52	0.02	111	0.05	22,822	9.32
	Aug 22 [b]	388	6	2,328	53	0.02	39	0.02	88	0.04	34,918	15.00
	Aug 26 [b]	323	6	1,938	27	0.01	31	0.02	55	0.03	19,039	9.82
Total		679	102	45,102	29,442		67,681		267,936		195,816	
1984	Jul 02 [b]	483	6	2,898	1,988	0.69	8,145	2.81	69,897	24.12	0	0.0
	Jul 05 [b]	426	6	2,556	1,218	0.48	6,798	2.66	54,981	21.51	1	0.0
	Jul 09 [b]	496	6	2,976	1,211	0.41	2,821	0.95	36,440	12.24	52	0.0
	Jul 12 [b]	436	6	2,616	858	0.33	12/27	0.84	24,269	9.28	196	0.1
	Jul 16 [b]	373	6	2,238	744	0.33	1,121	0.50	18,613	8.32	619	0.3
	Jul 30 [b]	459	6	2,754	351	0.13	281	0.10	2,329	0.85	56,609	20.6
	Aug 02 [b]	401	6	2,406	291	0.12	157	0.07	1,184	0.49	79,240	32.9
	Aug 06 [b]	542	9	4,878	106	0.02	113	0.02	639	0.13	84,406	17.3
	Aug 09 [b]	523	9	4,707	106	0.02	111	0.02	373	0.08	80,990	17.2
	Aug 13 [b]	504	9	4,536	81	0.02	67	0.01	235	0.05	80,268	17.7
	Aug 16 [b]	502	9	4,518	50	0.01	29	0.01	131	0.03	78,342	17.3
	Aug 20 [b]	491	9	4,419	33	0.01	14	0.00	59	0.01	63,829	14.4
	Aug 23 [b]	481	9	4,329	21	0.00	11	0.00	63	0.01	49,372	11.4
	Aug 27 [b]	350	9	3,150	53	0.02	2	0.00	18	0.01	16,472	5.2
	Aug 30 [b]	210	9	1,890	9	0.00	1	0.00	5	0.00	11,222	5.9
	Sept 03 [b]	69	5	360	2	0.01	0	0.00	5	0.01	1,603	4.5
	Sept 06 [b]	39	6	234	0	0.00	0	0.00	0	0.00	1,877	8.0
Total		654	149	62,643	29,946		46,571		396,031		605,098	
1985	Jun 20	423	6	2,538	6,519	2.57	5,246	2.07	19,762	7.79	0	0.00
	Jun 24	488	6	2,928	10,413	3.56	25,536	8.72	42,778	14.61	0	0.00
	Jun 27	492	6	2,952	8,791	2.98	26,155	8.86	47,443	16.07	0	0.00
	Jul 1	514	6	3,084	6,168	2.00	31,082	10.08	47,471	15.39	0	0.00
	Jul 4	460	6	2,760	3,774	1.37	16,114	5.84	28,581	10.36	0	0.00
	Aug 01	487	6	2,922	204	0.07	174	0.06	2,470	0.85	34,052	11.65
	Aug 05	527	6	3,162	121	0.04	33	0.01	1,558	0.49	54,819	17.34
	Aug 08	525	6	3,150	58	0.02	3	0.00	472	0.15	78,149	24.81
	Aug 12	530	6	3,180	44	0.01	7	0.00	342	0.11	77,809	24.47
	Aug 15	441	6	2,646	28	0.01	0	0.00	193	0.07	28,013	10.59
	Aug 19	406	6	2,436	13	0.01	2	0.00	32	0.01	19,316	7.93
	Aug 22	390	6	2,340	10	0.00	0	0.00	56	0.02	17,534	7.49
	Aug 26	297	6	1,782	8	0.00	0	0.00	22	0.01	10,688	6.00
	Aug 29	262	6	1,572	8	0.01	1	0.00	28	0.02	9,568	6.09
Total		654	84	37,452	36,159		104,353		191,208		329,948	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1986	Jul 07	586	6	3,516	1,805	0.51	8,347	2.37	55,983	15.92	0	0.00
	Jul 10	532	6	3,192	1,156	0.36	5,488	1.72	48,990	15.35	0	0.00
	Jul 31	352	6	2,112	60	0.03	219	0.10	2,239	1.06	27,553	13.05
	Aug 04	530	6	3,180	49	0.02	201	0.06	1,345	0.42	96,127	30.23
	Aug 07	600	9	5,400	66	0.01	38	0.01	50	0.01	127,024	23.52
	Aug 11	553	6	3,318	32	0.01	3	0.00	9	0.00	82,215	24.78
	Aug 13	526	6	3,156	32	0.01	2	0.00	3	0.00	92,918	29.44
	Aug 15	519	6	3,114	67	0.02	4	0.00	11	0.00	55,633	17.87
	Aug 18	477	6	2,862	15	0.01	4	0.00	0	0.00	51,328	17.93
	Aug 21	465	6	2,790	8	0.00	2	0.00	2	0.00	50,640	18.15
	Aug 25	458	6	2,748	4	0.00	0	0.00	0	0.00	37,365	13.60
	Aug 28	346	6	2,076	0	0.00	0	0.00	3	0.00	16,436	7.92
	Sept 01	234	6	1,404	6	0.00	0	0.00	0	0.00	5,949	4.24
Total		688	99	48,744	18,510		93,175		304,201		643,189	
1987	Jun 18	526	9	4,734	19,126	4.04	9,508	2.01	14,137	2.99	0	0.00
	Jun 24	607	9	5,463	0 [c]	0.00	24,355	4.46	54,454	9.97	0	0.00
	Jun 30	564	9	5,076	0 [c]	0.00	39,112	7.71	112,963	22.25	0	0.00
	Jul 03	580	6	3,480	5,970	1.72	44,030	12.65	66,783	19.19	0	0.00
	Jul 07	578	6	3,468	3,636	1.05	9,196	2.65	103,059	29.72	0	0.00
	Jul 11	597	6	3,582	1,910	0.53	4,611	1.29	72,118	20.13	1	0.00
	Jul 15	569	6	3,414	1,415	0.41	2,301	0.67	71,923	21.07	10	0.00
	Jul 20	551	6	3,306	1,343	0.41	826	0.25	65,135	19.70	500	0.15
	Aug 06	590	6	3,540	207	0.06	271	0.08	4,074	1.15	49,182	13.89
	Aug 13	604	6	3,624	103	0.03	222	0.06	894	0.25	104,968	28.96
	Aug 17	595	6	3,570	76	0.02	133	0.04	378	0.11	73,867	20.69
	Aug 19	585	6	3,510	36	0.01	25	0.01	156	0.04	45,277	12.90
	Aug 21	540	6	3,240	26	0.01	16	0.00	140	0.04	33,601	10.37
	Aug 24	500	6	3,000	27	0.01	4	0.00	108	0.04	27,607	9.20
	Aug 27	479	6	2,874	13	0.00	9	0.00	70	0.02	21,772	7.58
	Aug 31	364	6	2,184	7	0.00	5	0.00	57	0.03	12,873	5.89
	Sept 03	278	6	1,668	8	0.00	3	0.00	31	0.02	11,352	6.81
	Sept 07	132	6	792	4	0.01	4	0.01	19	0.02	4,311	5.44
Total		703	117	60,525	33,907		134,631		566,499		385,321	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1988	Jul 14	597	6	3,582	1,751	0.49	822	0.23	116,930	32.64	141	0.04
	Jul 18	567	6	3,402	1,107	0.33	396	0.12	57,749	16.98	502	0.15
	Jul 21	539	6	3,234	621	0.19	164	0.05	39,643	12.26	1,278	0.40
	Jul 25	494	6	2,964	329	0.11	109	0.04	24,893	8.40	6,323	2.13
	Jul 28	552	6	3,312	333	0.10	70	0.02	16,028	4.84	20,970	6.33
	Aug 01	594	6	3,564	201	0.06	32	0.01	6,967	1.95	33,954	9.53
	Aug 04	639	6	3,834	206	0.05	105	0.03	5,152	1.34	76,576	19.97
	Aug 08	640	6	3,840	114	0.03	92	0.02	2,890	0.75	76,345	19.88
	Aug 10	596	6	3,576	73	0.02	9	0.00	1,376	0.38	53,874	15.07
	Aug 12	624	6	3,744	115	0.03	11	0.00	1,422	0.38	84,700	22.62
	Aug 15	613	6	3,678	76	0.02	14	0.00	663	0.18	59,724	16.24
	Aug 18	620	6	3,720	37	0.01	8	0.00	230	0.06	37,415	10.06
	Aug 20	577	6	3,462	29	0.01	5	0.00	121	0.03	24,046	6.95
	Aug 27	532	6	3,192	14	0.00	8	0.00	93	0.03	22,683	7.11
	Aug 31	408	6	2,448	6	0.00	11	0.00	34	0.01	9,852	4.02
Total		746	140	81,724	53,810		89,764		1,361,982		508,417	
1989	Jun 19	374	8	2,992	9,204	3.08	5,495	1.84	41,789	13.97	0	0.0
	Jun 23	277	8	2,216	6,011	2.71	7,011	3.16	65,650	29.63	0	0.0
	Jun 26	126	8	1,008	1,862	1.85	3,746	3.72	32,373	32.12	0	0.0
	Jun 30	642	8	5,136	9,232	1.80	10,214	1.99	131,629	25.63	0	0.0
	Jul 03	629	6	3,774	4,600	1.22	5,808	1.54	91,345	24.20	0	0.0
	Jul 05	553	6	3,318	3,311	1.00	2,917	0.88	85,727	25.84	3	0.0
	Jul 08	621	6	3,726	3,136	0.84	3,177	0.85	119,066	31.96	9	0.0
	Jul 11	616	6	3,696	1,691	0.46	1,565	0.42	78,053	21.12	126	0.0
	Jul 14	590	6	3,540	1,216	0.34	796	0.22	44,401	12.54	230	0.0
	Jul 18	437	6	2,622	868	0.33	451	0.17	26,407	10.07	2,216	0.1
	Jul 27	562	6	3,372	210	0.06	95	0.03	5,716	1.70	5,651	0.7
	Aug 03	679	6	4,074	174	0.04	30	0.01	3,615	0.89	99,022	24.3
	Aug 07	642	6	3,852	78	0.02	22	0.01	868	0.23	73,514	19.1
	Aug 09	644	6	3,864	40	0.01	7	0.00	432	0.11	103,158	26.7
	Aug 12	650	6	3,900	34	0.01	8	0.00	122	0.03	81,970	21.0
	Aug 15	616	6	3,696	25	0.01	4	0.00	119	0.03	23,071	6.2
	Aug 18	381	6	2,286	7	0.00	5	0.00	16	0.01	5,938	2.6
	Aug 23	528	6	3,168	19	0.01	14	0.00	21	0.01	30,940	9.8
	Aug 26	508	6	3,048	17	0.01	13	0.00	15	0.00	20,881	6.9
	Aug 29	423	6	2,538	7	0.00	9	0.00	21	0.01	11,080	4.4
	Sept 01	194	6	1,164	3	0.00	1	0.00	7	0.01	3,225	2.8
Total		745	134	66,990	41,745		41,388		727,392		461,034	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1990	Aug 10	653	6	3,918	94	0.02	66	0.10	1,269	0.32	58,251	14.87
	Aug 13	642	6	3,852	38	0.01	48	0.07	509	0.13	115,444	29.97
	Aug 16	650	9	5,850	28	0.00	29	0.04	239	0.04	68,605	11.73
	Aug 20	594	6	3,564	11	0.00	34	0.06	113	0.03	51,838	14.54
	Aug 27	534	6	3,204	3	0.00	16	0.03	25	0.01	16,030	5.00
Total		743	83	51,236	51,883		81,958		438,027		395,237	
1991	Jun 20	601	6	3,606	13,813	3.83	19,732	5.47	13,266	3.68	0	0.00
	Jun 24	616	6	3,696	12,612	3.41	19,262	5.21	30,632	8.29	0	0.00
	Jul 01	629	6	3,774	5,966	1.58	24,428	6.47	50,121	13.28	0	0.00
	Jul 06	589	6	3,534	2,102	0.59	24,219	6.85	40,060	11.34	0	0.00
	Jul 13	571	6	3,426	904	0.26	6,458	1.88	52,552	15.34	16	0.00
	Jul 18	568	6	3,408	452	0.13	5,128	1.50	78,797	23.12	977	0.29
	Jul 22	543	6	3,258	233	0.07	3,085	0.95	49,788	15.28	2,655	0.81
	Jul 25	533	8	4,264	186	0.04	1,526	0.36	30,083	7.06	4,871	1.14
	Jul 29	534	8	4,272	134	0.03	732	0.17	24,026	5.62	37,141	8.69
	Aug 01	602	6	3,612	125	0.03	624	0.17	13,098	3.63	38,284	10.60
	Aug 05	643	8	5,144	56	0.01	96	0.02	6,091	1.18	56,262	10.94
	Aug 08	634	8	5,072	33	0.01	40	0.01	3,194	0.63	72,037	14.20
	Aug 12	662	8	5,296	42	0.01	31	0.01	1,586	0.30	114,581	21.64
	Aug 14	601	8	4,808	18	0.00	23	0.00	634	0.13	58,393	12.14
	Aug 19	590	6	3,540	24	0.01	24	0.01	313	0.09	57,364	16.20
	Aug 26	512	8	4,096	6	0.00	12	0.00	93	0.02	43,664	10.66
Total		749	110	64,806	36,706		105,420		394,334		486,245	
1992	Jun 18	567	8	4,536	9,756	2.15	8,508	1.88	32,695	7.21	0	0.00
	Jun 22	619	8	4,952	14,578	2.94	25,017	5.05	74,429	15.03	0	0.00
	Jun 25	627	8	5,016	8,984	1.79	21,922	4.37	55,114	10.99	0	0.00
	Jun 29	602	6	3,612	7,323	2.03	26,082	7.22	80,213	22.21	0	0.00
	Jul 06	587	8	4,696	3,250	0.69	7,962	1.70	84,196	17.93	2	0.00
	Aug 03	619	8	4,952	306	0.06	137	0.03	4,069	0.82	78,233	15.80
	Aug 06	590	6	3,540	116	0.03	98	0.03	1,319	0.37	57,506	16.24
	Aug 11	653	6	3,918	157	0.04	76	0.02	664	0.17	181,905	46.43
	Aug 14	632	6	3,792	63	0.02	55	0.01	196	0.05	87,959	23.20
	Aug 17	596	6	3,576	47	0.01	49	0.01	122	0.03	79,357	22.19
	Aug 20	578	6	3,468	36	0.01	17	0.00	53	0.02	73,363	21.15
	Aug 24	550	6	3,300	27	0.01	19	0.01	23	0.01	28,069	8.51
	Aug 27	481	6	2,886	26	0.01	6	0.00	26	0.01	28,238	9.78
	Aug 31	374	6	2,244	8	0.00	8	0.00	17	0.01	16,962	7.56
Total		741	94	54,488	44,677		89,956		333,136		631,594	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook		Sockeye		Chum		Coho	
					Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
1993	Aug 06	632	8	5,056	88	0.02	84	0.02	1,396	0.28	91,400	18.08
	Aug 09	628	6	3,768	65	0.02	75	0.02	446	0.12	54,817	14.55
	Aug 14	640	6	3,840	46	0.01	39	0.01	287	0.07	80,226	20.89
	Aug 17	620	6	3,720	30	0.01	31	0.01	119	0.03	82,696	22.23
	Aug 21	592	6	3,552	9	0.00	25	0.01	58	0.02	47,097	13.26
	Aug 25	441	6	2,646	6	0.00	13	0.00	28	0.01	10,556	3.99
	Aug 28	387	6	2,322	12	0.01	19	0.01	30	0.01	13,592	5.85
	Sept 01	274	6	1,644	4	0.00	3	0.00	18	0.01	12,190	7.41
Total		739	70	39,210	8,714		27,003		42,718		586,330	
1994	Jun 24	576	8	4,608	14,221	3.09	38,958	8.45	87,214	18.93	0	0.00
	Jul 14	496	4	1,984	578	0.29	3,891	1.96	43,585	21.97	820	0.41
	Jul 19	500	6	3,000	441	0.15	4,475	1.49	60,104	20.03	7,027	2.34
	Jul 23	506	6	3,036	313	0.10	1,125	0.37	38,149	12.57	24,213	7.98
	Jul 26	552	6	3,312	225	0.09	471	0.14	22,460	6.78	39,901	12.05
	Jul 29	577	6	3,462	204	0.06	159	0.05	11,252	3.25	52,090	15.05
	Aug 04	606	6	3,636	88	0.06	87	0.02	3,983	1.10	75,514	20.77
	Aug 09	530	6	3,180	29	0.03	70	0.02	1,153	0.36	129,570	40.75
	Aug 12	606	8	4,848	34	0.01	47	0.01	777	0.16	117,753	24.29
	Aug 15	595	8	4,760	22	0.01	33	0.01	321	0.07	47,902	10.06
	Aug 18	598	8	4,784	20	0.00	16	0.00	212	0.04	82,750	17.30
	Aug 22	554	8	4,432	12	0.00	15	0.00	104	0.02	44,054	9.94
	Aug 25	447	8	3,576	9	0.00	7	0.00	63	0.02	37,595	10.51
	Aug 27	445	6	2,670	3	0.00	4	0.00	30	0.01	20,526	7.69
	Aug 30	263	6	1,578	2	0.00	2	0.00	16	0.01	8,192	5.19
	Sept 02	157	6	942			2	0.00	3	0.00	2,489	2.64
Total		706	106	53,808	16,201		49,362		269,426		690,396	
1995	Jul 06	481	4	1,924	1,521	0.79	14,765	7.67	81,246	42.23	0	0.00
	Jul 10	494	4	1,976	906	0.46	7,100	3.59	86,368	43.71	21	0.01
	Jul 14	435	4	1,740	546	0.31	4,219	2.42	43,137	24.79	221	0.13
	Jul 18	336	6	2,016	366	0.18	2,482	1.23	37,294	18.50	671	0.33
	Jul 21	368	4	1,472	202	0.14	940	0.64	21,039	14.29	1,272	0.86
	Aug 04	234	6	1,404	64	0.05	123	0.09	1,072	0.76	48,665	34.66
	Aug 08	611	6	3,666	95	0.03	363	0.10	1,229	0.34	98,548	26.88
	Aug 12	617	6	3,702	50	0.01	359	0.10	899	0.24	102,421	27.67
	Aug 16	593	6	3,558	52	0.01	147	0.04	208	0.06	65,713	18.47
	Aug 19	555	6	3,330	28	0.01	87	0.03	133	0.04	41,057	12.33
	Aug 22	497	6	2,982	16	0.01	113	0.04	157	0.05	43,978	14.75
	Aug 26	477	6	2,862	25	0.01	117	0.04	101	0.04	29,129	10.18
	Aug 29	355	6	2,130	15	0.01	45	0.02	39	0.02	17,790	8.35
	Sept 01	219	6	1,314	2	0.00	31	0.02	12	0.01	5,783	4.40
Total		712	92	42,784	28,054		90,026		588,250		455,269	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1996	Jul 05	194	2	388	316	0.81	3,481	8.97	17,651	45.49	2	0.01
	Jul 08	211	2	422	178	0.42	6,795	16.10	18,801	44.55	24	0.06
	Jul 12	237	2	474	230	0.49	3,781	7.98	26,468	55.84	1,608	3.39
	Jul 16	197	2	394	87	0.22	602	1.53	15,192	38.56	4,675	11.87
	Jul 19	267	3	801	164	0.20	298	0.37	13,390	16.72	14,746	18.41
	Jul 22	417	6	2,502	183	0.07	639	0.26	14,504	5.80	50,443	20.16
	Jul 25	487	8	3,896	124	0.03	256	0.07	9,024	2.32	113,637	29.17
	Jul 29	526	6	3,156	97	0.03	186	0.06	3,828	1.21	144,773	45.87
	Jul 31	464	6	2,784	52	0.02	92	0.03	1,541	0.55	122,946	44.16
	Aug 03	541	6	3,246	59	0.02	129	0.04	1,097	0.34	132,540	40.83
	Aug 07	514	6	3,084	43	0.01	73	0.02	581	0.19	94,332	30.59
	Aug 10	502	6	3,012	45	0.01	60	0.02	797	0.26	83,653	27.77
	Aug 13	471	6	2,826	25	0.01	82	0.03	296	0.10	70,053	24.79
	Aug 16	459	6	2,754	28	0.01	147	0.05	215	0.08	49,012	17.80
	Aug 20	400	6	2,400	19	0.01	83	0.03	51	0.02	25,870	10.78
	Aug 23	293	6	1,758	9	0.01	22	0.01	23	0.01	13,133	7.47
	Aug 26	209	6	1,254	11	0.01	23	0.02	13	0.01	8,684	6.93
Total		620	92.5	37,015	6,972		33,404		202,827		930,131	
1997	Jun 23 [c]	353	6	2,118	10,023	4.73	21,218	10.02	13,090	6.18	0	0.00
	Jul 31 [c]	429	6	2,574	141	0.05	352	0.14	2,060	0.80	14,963	5.81
	Aug 6	513	6	3,078	145	0.05	229	0.07	1,387	0.45	37,216	12.09
	Aug 12	507	6	3,042	61	0.02	122	0.04	408	0.13	56,149	18.46
	Aug 18	475	6	2,850	66	0.02	67	0.02	58	0.02	21,273	7.46
Total		604	30	13,662	10,436		21,988		17,003		129,601	
1998	Jun 24	338	6	2,028	6,413	3.16	9,043	4.46	32,467	16.01		
	Jun 29	426	6	2,556	6,358	2.49	22,506	8.81	66,789	26.13		
	Jul 03	445	4	1,780	2,277	1.28	15,985	8.98	51,471	28.92	1	0.00
	Jul 11	417	4	1,668	1,127	0.68	10,172	6.10	29,407	17.63	23	0.01
	Jul 22	346	6	2,076	460	0.22	1,538	0.74	15,663	7.54	3,633	1.75
	Jul 27	370	6	2,220	356	0.16	932	0.42	7,500	3.38	18,497	8.33
	Aug 01	425	6	2,550	156	0.06	235	0.09	2,787	1.09	26,791	10.51
	Aug 06	496	6	2,976	88	0.03	295	0.10	1,020	0.34	45,128	15.16
	Aug 11	464	6	2,784	67	0.02	95	0.03	388	0.14	58,426	20.99
	Aug 17	439	6	2,634	34	0.01	45	0.02	122	0.05	34,640	13.15
	Aug 22	382	6	2,292	19	0.01	53	0.02	67	0.03	18,936	8.26
	Aug 29	154	6	924	1	0.00	7	0.01	17	0.02	4,093	4.43
Total		615	68	26,488	17,356		60,906		207,698		210,168	
1999	Jun 30	409	6	2,454	4,668	1.90	16,772	6.83	22,700	9.25		
	Aug 7	389	6	2,334	37	0.02	204	0.09	306	0.13	23,593	10.1
Total		509	12	4,788	4,705		16,976		23,006		23,593	

[a] Gillnet mesh size unrestricted.

[b] Gillnets were restricted to 6 inches or less; after 1985 this restriction was in effect for all periods.

[c] Sales of chinook salmon were prohibited. Estimated chinook harvest was between 12,119 and 13,615 on 6/24 and between 5,831 and 6,555 on 6/25.

Appendix B.8. Historical commercial salmon catches by fishing period in Kuskowim Area District 2, 1974-1999.

Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1974	Jun 10 - 14 [a]	26	96	2,496	549	0.2	0	0.0	16	0.0	0	0.0
	Jun 17 - 19 [a]	29	48	1,392	402	0.3	0	0.0	451	0.3	0	0.0
	Aug 5 - 9 [a]	14	96	1,344	2	0.0	0	0.0	210	0.2	990	0.7
	Aug 12 - 13 [a]	13	24	312	0	0.0	0	0.0	11	0.0	1,428	4.6
Total		37	264	5,544	953		0		688		2,418	
1975	Jun 23 - 27 [a]	38	96	3,648	1,319	0.36	0	0.0	2,385	0.7	0	0.0
Total		38	96	3,648	1,319		0		2,385		0	
1976	Jun 21 - 24 [a]	55	66	3,630	3,316	0.9	0	0.0	1,136	0.3	0	0.00
	Aug 23 - 25 [a]	11	24	264	1	0.0	0	0.0	1	0.0	568	2.15
Total		57	90	3,894	3,317		0		1,137		568	
1977	Jun 20 - 21 [a]	83	30	2,490	3,975	1.60	0	0.0	756	0.30	0	0.00
	Jul 4 [a]	54	12	648	195	0.30	10	0.0	15,160	23.40	0	0.00
	Aug 8 [a]	24	12	288	1	0.00	0	0.0	124	0.43	3,705	12.86
Total		105	54	3,426	4,171		10		16,040		3,705	
1978	Jun 14 [a]	8	6	48	359	7.48	0	0.0	59	1.23	0	0.00
	Jun 16 [a]	13	6	78	424	5.44	0	0.0	189	2.42	0	0.00
	Jun 22 [a]	9	4	36	411	11.42	0	0.0	377	10.47	0	0.00
	Jun 23 [a]	24	4	96	893	9.30	0	0.0	804	8.38	0	0.00
	Aug 18 [b]	3	12	36	0	0.00	0	0.0	0	0.00	257	7.14
	Aug 22 [b]	17	12	204	1	0.00	0	0.0	8	0.04	2,346	11.50
Total		43	44	498	2,088		0		1,437		2,603	
1979	Jun 21 [a]	29	12	348	1,030	2.96	142	0.41	982	2.82	0	0.00
	Jun 25 [a]	33	12	396	1,883	4.76	452	1.14	1,946	4.91	0	0.00
	Aug 13 [b]	20	12	240	0	0.00	0	0.00	430	1.79	3,630	15.13
Total		43	36	984	2,913		594		3,358		3,630	
1980	Jun 23 [a]	37	12	444	1,482	3.34	0	0.00	4,004	9.02	0	0.00
	Jul 09 [b]	21	6	126	215	1.71	0	0.00	11,911	94.53	0	0.00
	Aug 14 [b]	12	12	144	0	0.00	0	0.00	702	4.88	2,868	19.92
Total		43	30	714	1,697		0		16,617		2,868	
1981	Jun 16 [a]	18	6	108	933	8.64	4	0.0	810	7.50	0	0.00
	Jun 19 [a]	151	6	906	3,838	4.24	125	0.1	3,902	4.31	0	0.00
	Jun 25 [b]	11	6	66	499	7.56	0	0.0	3,329	50.44	0	0.00
	Aug 17 [b]	15	6	90	0	0.00	0	0.0	62	0.69	1,487	16.52
	Aug 20 [b]	13	6	78	1	0.01	0	0.0	32	0.41	1,896	24.31
Total		153	30	1,248	5,271		129		8,135		3,383	
1982	Jun 17 [a]	10	6	60	222	3.70	19	0.32	274	4.57	0	0.00
	Jun 21 [a]	23	6	138	769	5.57	53	0.38	817	5.92	0	0.00
	Jun 24 [a]	35	6	210	1,122	5.34	434	2.07	1,912	9.10	0	0.00
	Jul 2 [b]	24	6	144	271	1.88	607	4.22	7,060	49.03	0	0.00
	Jul 5 [b]	47	6	282	398	1.41	808	2.87	8,811	31.24	0	0.00
	Aug 9 [b]	15	6	90	2	0.02	0	0.00	144	1.60	1,841	20.46
	Aug 16 [b]	13	6	78	0	0.00	0	0.00	29	0.37	4,567	58.55
	Aug 19 [b]	21	6	126	1	0.01	0	0.00	5	0.04	5,352	42.48
Total		60	48	1,128	2,785		1,921		19,052		11,760	
1983	Jun 16 [a]	14	6	84	510	6.07	13	0.15	165	1.96	0	0.00
	Jun 20 [b]	28	6	168	746	4.44	86	0.51	2,069	12.32	0	0.00
	Jun 23 [b]	34	6	204	820	4.02	338	1.66	2,154	10.56	0	0.00
	Jun 27 [b]	33	6	198	755	3.81	736	3.72	4,276	21.60	0	0.00
	Aug 11 [b]	9	6	54	0	0.00	1	0.02	98	1.81	471	8.72
	Aug 15 [b]	0	6	0	0	0.00	0	0.00	0	0.00	0	0.00
	Aug 18 [b]	0	6	0	0	0.00	0	0.00	0	0.00	0	0.00
Total		43	42	708	2,831		1,174		8,762		471	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1984	Jul 2 [b]	25	6	150	204	1.36	982	6.55	7,420	49.47	0	0.00
	Aug 06 [b]	16	6	96	9	0.09	0	0.00	110	1.15	4,339	45.20
	Aug 09 [b]	11	6	66	1	0.02	0	0.00	69	1.05	4,340	65.76
	Aug 13 [b]	12	6	72	1	0.01	0	0.00	24	0.33	2,792	38.78
	Aug 16 [b]	17	6	102	1	0.01	0	0.00	16	0.16	3,652	35.80
	Aug 20 [b]	13	6	78	1	0.01	0	0.00	0	0.00	2,179	27.94
	Aug 23 [b]	8	6	48	0	0.00	0	0.00	0	0.00	1,047	21.81
	Aug 27 [b]	0	6	0	0	0.00	0	0.00	0	0.00	0	0.00
	Aug 30 [b]	0	6	0	0	0.00	0	0.00	0	0.00	0	0.00
Total		58	72	1,050	1,795		2,004		27,687		18,349	
1985	Jun 20	8	6	48	136	2.83	115	2.40	647	13.48	0	0.00
	Jun 24	11	6	66	263	3.98	340	5.15	2,411	36.53	0	0.00
	Jun 27	12	6	72	548	7.61	739	10.26	2,263	31.43	0	0.00
	Jul 1	15	6	90	779	8.66	1,100	12.22	2,854	31.71	0	0.00
	Jul 4	0	6	0	0	0.00	0	0.00	0	0.00	0	0.00
	Aug 08	6	6	36	0	0.00	0	0.00	41	1.14	739	20.53
	Aug 12	14	6	84	3	0.04	0	0.00	45	0.54	2,914	34.69
	Aug 15	11	6	66	1	0.02	0	0.00	9	0.14	2,005	30.38
Total		23	48	462	1,730		2,294		8,270		5,658	
1986	Jun 26	3	6	18	186	10.33	616	34.22	439	24.39	0	0.00
	Jun 30	13	6	78	386	4.95	1,171	15.01	1,619	20.76	0	0.00
	Jul 3	8	6	48	168	3.50	265	5.52	1,249	26.02	0	0.00
	Jul 7	2	6	12	117	9.75	26	2.17	387	32.25	0	0.00
	Jul 10	6	6	36	45	1.25	179	4.97	1,282	35.61	0	0.00
	Aug 07	8	6	48	0	0.00	0	0.00	0	0.00	2,445	50.94
	Aug 11	10	6	60	0	0.00	0	0.00	23	0.38	2,677	44.62
	Aug 13	10	6	60	0	0.00	1	0.02	13	0.22	2,787	46.45
	Aug 15	27	6	162	1	0.01	0	0.00	0	0.00	5,761	35.56
	Aug 18	8	6	48	1	0.02	0	0.00	0	0.00	1,804	37.58
	Aug 21	6	6	36	0	0.00	0	0.00	0	0.00	1,325	36.81
Total		43	66	606	904		2,258		5,012		16,799	
1987	Jul 03	15	6	90	1,325	14.72	511	5.68	3,200	35.56	0	0.00
	Jul 07	22	6	132	935	7.08	1,459	11.05	4,152	31.45	0	0.00
	Aug 13	14	6	84	4	0.05	1	0.01	304	3.62	2,273	27.06
	Aug 17	14	6	84	6	0.07	0	0.00	102	1.21	3,374	40.17
	Aug 19	13	6	78	1	0.01	0	0.00	39	0.50	3,928	50.36
	Aug 21	18	6	108	1	0.01	0	0.00	40	0.37	4,571	42.32
Total		29	36	576	2,272		1,971		7,837		14,146	
1988	Jun 24	13	6	78	669	8.58	1,041	13.35	4,232	54.26	0	0.00
	Jun 28	17	6	102	746	7.31	639	6.26	6,087	59.68	0	0.00
	Jul 2	19	6	114	468	4.11	579	5.08	8,155	71.54	0	0.00
	Aug 08	14	6	84	6	0.07	0	0.00	308	3.67	1,465	17.44
	Aug 10	16	6	96	10	0.10	0	0.00	312	3.25	3,823	39.82
	Aug 12	20	6	120	3	0.03	2	0.02	244	2.03	5,216	43.47
	Aug 15	21	6	126	1	0.01	0	0.00	144	1.14	2,317	18.39
	Aug 18	15	6	90	2	0.02	0	0.00	116	1.29	1,485	16.50
	Aug 20	17	6	102	1	0.01	0	0.00	94	0.92	1,573	15.42
Total		29	54	912	1,906		2,261		19,692		15,879	

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Year	Date		Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1989	Aug	07	22	6	132	3	0.02	0	0.00	238	1.80	6,607	50.1
	Aug	09	18	6	108	3	0.03	0	0.00	114	1.06	5,714	52.9
	Aug	15	15	6	90	1	0.01	0	0.00	7	0.08	1,867	20.7
	Aug	18	20	6	120	3	0.03	0	0.00	11	0.09	2,733	22.8
Total			30	50	846	1,383		1,096		20,946		16,921	
1990	Jun	29	14	6	84	641	7.63	735	8.75	3,838	45.69	0	0.00
	Jul	05	15	6	90	467	5.19	561	6.23	4,397	48.86	0	0.00
	Jul	09	17	6	102	255	2.50	580	5.69	5,163	50.62	0	0.00
	Jul	14	17	8	136	209	1.54	567	4.17	6,999	51.46	0	0.00
	Aug	06	15	6	90	21	0.23	5	0.06	742	8.24	1,111	12.34
	Aug	10	15	6	90	17	0.19	5	0.06	550	6.11	1,946	21.62
	Aug	13	16	6	96	4	0.04	1	0.01	276	2.88	4,192	43.67
	Aug	16	17	9	153	6	0.04	0	0.00	105	0.69	2,239	14.63
	Aug	20	18	6	108	0	0.00	0	0.00	12	0.11	2,548	23.59
	Aug	27	17	6	102	1	0.01	3	0.03	3	0.03	1,780	17.45
Total			22	65	1,051	1,621		2,457		22,085		13,816	
1991	Jul	01	17	6	102	483	4.74	1,200	11.76	3,043	29.83	0	0.00
	Jul	06	16	6	96	341	3.55	613	6.39	2,381	24.80	0	0.00
	Jul	13	18	6	108	112	1.04	981	9.08	4,384	40.59	0	0.00
	Jul	18	17	6	102	49	0.48	365	3.58	6,534	64.06	0	0.00
	Jul	22	19	6	114	28	0.25	117	1.03	7,154	62.75	17	0.15
	Jul	25	17	8	136	20	0.15	177	1.30	7,686	56.51	115	0.85
	Jul	29	16	8	128	21	0.16	70	0.55	3,452	26.97	177	1.38
	Aug	05	17	8	136	6	0.04	0	0.00	1,245	9.15	1,596	11.74
	Aug	08	17	8	136	4	0.03	3	0.02	835	6.14	2,381	17.51
	Aug	12	16	8	128	2	0.02	0	0.00	340	2.66	1,829	14.29
	Aug	14	15	8	120	4	0.03	0	0.00	227	1.89	2,461	20.51
	Aug	19	19	6	114	2	0.02	0	0.00	138	1.21	1,689	14.82
	Aug	26	16	8	128	0	0.00	0	0.00	49	0.38	4,425	34.57
Total			23	92	1,548	1,072		3,526		37,468		14,690	
1992	Jun	25	16	8	128	1,021	7.98	930	7.27	3,916	30.59	0	0.00
	Jun	29	15	6	90	815	9.06	525	5.83	2,439	27.10	0	0.00
	Jul	6	9	8	72	310	4.31	486	6.75	2,840	39.44	0	0.00
	Aug	03	17	8	136	27	0.20	317	2.33	1,440	10.59	5,106	37.54
	Aug	06	17	6	102	11	0.11	1	0.01	536	5.25	3,832	37.57
	Aug	11	19	6	114	7	0.06	1	0.01	136	1.19	3,837	33.66
	Aug	14	21	6	126	0	0.00	1	0.01	70	0.56	8,216	65.21
	Aug	17	16	6	96	0	0.00	0	0.00	24	0.25	5,685	59.22
	Aug	20	14	6	84	1	0.01	0	0.00	43	0.51	2,682	31.93
	Aug	24	14	6	84	3	0.04	1	0.01	17	0.20	2,827	33.65
	Aug	27	11	6	66	0	0.00	0	0.00	5	0.08	1,238	18.76
	Aug	31	11	6	66	0	0.00	0	0.00	1	0.02	1,153	17.47
Total			22	78	1,164	2,195		2,262		11,467		34,576	
1993	Aug	06	15	8	120	9	0.08	2	0.02	303	2.53	6,828	56.90
	Aug	09	17	6	102	4	0.04	1	0.01	153	1.50	3,839	37.64
	Aug	14	17	6	102	3	0.03	1	0.01	70	0.69	2,681	26.28
	Aug	17	16	6	96	3	0.03	0	0.00	23	0.24	2,349	24.47
	Aug	21	17	6	102	0	0.00	0	0.00	26	0.25	3,115	30.54
	Aug	25	15	6	90	0	0.00	1	0.01	24	0.27	3,008	33.42
	Aug	28	14	6	84	1	0.01	0	0.00	11	0.13	1,798	21.40
	Sept	01	13	6	78	1	0.01	0	0.00	9	0.12	791	10.14
Total			20	50	774	21		5		619		24,409	

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Year	Date	Number of Permits	Hours Fished	Permit Hours	Chinook Catch	Chinook CPUE	Sockeye Catch	Sockeye CPUE	Chum Catch	Chum CPUE	Coho Catch	Coho CPUE
1994	Aug 18	15	8	120	1	0.01	0	0.00	106	0.88	2,710	22.58
	Aug 22	12	8	96	0	0.00	1	0.01	34	0.35	1,855	19.32
	Aug 25	7	8	56	0	0.00	0	0.00	12	0.21	1,492	26.64
	Aug 27	6	6	36	0	0.00	1	0.03	2	0.06	677	18.81
Total		20	58	758	10		3		1,689		34,293	
1995	Jun 26	16	4	64	1,656	25.88	535	8.36	3,628	56.69	0	0.00
	Jun 29	13	4	52	707	13.60	620	11.92	3,577	68.79	0	0.00
	Jul 03	9	4	36	284	7.89	456	12.67	2,200	61.11	0	0.00
	Jul 06	8	4	32	74	2.31	331	10.34	2,372	74.13	0	0.00
	Jul 10	6	4	24	32	1.33	293	12.21	1,874	78.08	0	0.00
	Jul 14	2	4	8	7	0.88	51	6.38	480	60.00	0	0.00
	Jul 18	6	6	36	9	0.25	44	1.22	1,638	45.50	6	0.17
	Jul 21	5	4	20	4	0.20	132	6.60	899	44.95	13	0.65
	Aug 04	6	6	36	10	0.28	4	0.11	484	13.44	1,321	36.69
	Aug 08	9	6	54	2	0.04	6	0.11	379	7.02	2,816	52.15
	Aug 12	8	6	48	5	0.10	1	0.02	79	1.65	2,643	55.06
	Aug 16	12	6	72	1	0.01	0	0.00	41	0.57	4,398	61.08
	Aug 19	5	6	30	1	0.03	0	0.00	4	0.13	1,679	55.97
	Aug 22	8	6	48	0	0.00	1	0.02	9	0.19	1,750	36.46
	Aug 26	3	6	18	0	0.00	0	0.00	0	0.00	712	39.56
	Aug 29	3	6	18	0	0.00	0	0.00	4	0.22	660	36.67
	Sept 01	1	6	6	0	0.00	0	0.00	0	0.00	194	32.33
Total		21	88	602	2,792		2,474		17,668		16,192	
1996	Jun 24	6	2	12	145	12.08	69	5.75	613	51.08	0	0.00
	Jul 2	4	2	8	175	21.88	109	13.63	376	47.00	0	0.00
	Jul 5	3	2	6	8	1.33	38	6.33	606	101.00	0	0.00
	Jul 8	4	4	16	42	2.63	92	5.75	877	54.81	0	0.00
	Jul 12	4	4	16	60	3.75	56	3.50	758	47.38	0	0.00
	Jul 16	1	4	4	5	1.25	33	8.25	336	84.00	3	0.75
	Jul 19	3	4	12	9	0.75	9	0.75	444	37.00	51	4.25
	Jul 22	2	6	12	0	0.00	6	0.50	414	34.50	234	19.50
	Jul 25	3	8	24	2	0.08	5	0.21	367	15.29	700	29.17
	Jul 29	2	6	12	1	0.08	2	0.17	98	8.17	668	55.67
	Jul 31	1	6	6	0	0.00	2	0.33	148	24.67	162	27.00
	Aug 10	2	6	12	0	0.00	0	0.00	0	0.00	787	65.58
	Aug 13	5	6	30	0	0.00	1	0.03	5	0.17	1,761	58.70
	Aug 16	2	6	12	0	0.00	0	0.00	8	0.67	590	49.17
	Aug 20	3	6	18	0	0.00	52	2.89	0	0.00	1,063	59.06
	Aug 23	2	6	12	0	0.00	0	0.00	0	0.00	620	51.67
	Aug 26	5	6	30	0	0.00	0	0.00	0	0.00	541	18.03
Total		8	84	242	447		474		5,050		7,180	
1997	Aug 12	2	6	12	1	0.08	0	0.00	23	1.92	494	41.17
	Aug 18	3	6	18	4	0.22	1	0.06	0	0.00	708	39.33
Total		4	12	30	5		1		23		1,202	
1998	Aug 06	3	6	18	3	0.17	0	0	111	6.17	313	17.39
	Aug 11	No harvest/ No deliveries										
Total		3	6	18	3		0		111		313	
1999	No commercial fishery In W-2											

[a] Gillnet mesh size unrestricted.

[b] Gillnets were restricted to 6 inches or less; after 1985 this restriction was in effect for all periods.

Appendix B.9. Historical commercial salmon harvest by statistical area in District 1, 1974-1999.

	Stat Area 335-11				Stat Area 335-12				Stat Area 335-13				Stat Area 335-14			
Year	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho
1984 [ab]	20,229	45,276	385,178	332,679	9,717	1,295	10,853	272,419								
1985 [c]	18,210	53,548	117,152	168,465	17,949	50,805	74,056	161,483								
1986	9,329	46,505	169,958	301,093	9,181	46,670	134,243	342,096								
1987	20,492	82,403	332,002	226,252	13,415	52,228	234,497	159,069								
1988 [d]	40,355	60,168	861,433	290,872	12,540	27,127	453,012	199,036	915	2,469	47,537	18,509				
1989	29,702	28,319	498,490	233,182	10,856	11,499	203,120	192,796	1,187	1,570	25,782	35,056				
1990 [e]	6,195	8,988	54,431	63,804	29,195	38,113	224,148	196,827	11,762	20,508	101,711	93,928	4,731	14,349	57,737	40,678
1991	4,218	16,961	63,636	98,565	23,104	50,760	165,651	217,820	5,840	19,884	92,063	117,335	3,544	17,815	72,984	52,525
1992	7,754	18,253	76,215	124,583	23,177	36,938	178,693	271,900	9,064	22,829	43,979	159,189	4,682	11,936	34,249	75,922
1993	2,198	10,054	12,272	113,956	6,302	16,821	26,712	226,119	148	116	1,912	171,208	66	12	1,822	75,047
1994	1,589	8,071	27,823	87,428	13,678	34,512	163,087	283,129	634	4,863	55,284	226,100	300	1,916	23,232	93,739
1995	4,917	19,129	111,404	63,421	12,966	27,055	257,166	175,531	8,336	29,131	153,619	164,763	1,835	14,711	66,061	51,554
1996	237	1,851	9,651	100,608	4,161	15,969	117,496	393,330	2,064	12,619	57,533	323,751	510	2,965	18,147	112,442
1997	2,257	8,072	5,279	18,232	8,063	13,845	11,010	61,671	95	59	255	26,795	21	12	459	22,903
1998	2,457	13,536	34,648	32,025	9,346	24,882	105,751	69,654	4,713	18,773	48,908	60,664	840	3,715	18,391	47,825
1999	735	6,162	3,632	1,464	3,950	10,697	7,998	19,188	15	106	96	8,944	5	11	90	5,187

[a] Prior to June 25, gillnet mesh size was unrestricted in both statistical areas; after June 25, gillnet mesh size was restricted to 6 inches or less. Commerical fishing chum season was allowed only in 335-11, both stat. areas were open during coho season.

[b] Through 1987, stat. area 335-11 was located downstream of Bethel, and 335-12 was located upstream from Bethel to Mishevak Slough.

[c] Since 1985, gillnets have been restricted to 6 inches or less during all commecial periods.

[d] The upstream boundary of District 1 was moved upstream to Bogus Cr.; the area from the old boundary to Bogus Cr. was designated as stat. area 335-13.

[e] Beginning in 1990, the upstream boundary of District 1 was moved downstream to Nelson Is. and the district was split into four stat. areas. Stat. areas 335-11 & -12 are below Bethel, and 335-13 & -14 are above Bethel.

Appendix B 10. Historical commercial salmon harvest and effort by fishing period in Kuskokwim Statistical Area 335-11.

Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1990	Jun 20	134	6	2,580	2,021	5,353		
	Jun 25	102	6	1,453	2,719	6,986		
	Jun 29	92	6	694	975	5,116		
	Jul 05	66	6	518	1,509	11,354		
	Jul 09	91	6	455	721	12,405	5	
	Jul 14	93	8	254	868	11,053	17	43
	Aug 01	98	6	36	50	1,166	330	3,653
	Aug 06	106	6	170	34	599	193	20,588
	Aug 10	123	6	22	27	244	73	11,089
	Aug 13	95	6	6	27	67	26	16,094
	Aug 16	100	9	6	14	60	28	7,243
	Aug 20	70	6	0	15	27	18	3,259
	Aug 27	35	6	1	8	1	12	1,835
Total		743	83	6,195	8,988	54,431	702	63,804
1991	Jun 20	88	6	1,392	2,619	3,340		
	Jun 24	86	6	1,633	4,867	9,865		
	Jul 01	94	6	576	5,572	10,195		
	Jul 06	102	6	264	2,387	6,031		
	Jul 13	84	6	150	894	11,289	12	4
	Jul 18	89	6	66	396	7,990	0	218
	Jul 22	65	6	30	46	3,973	0	310
	Jul 25	69	8	40	51	4,012	66	1,543
	Jul 29	91	8	12	40	4,050	19	7,661
	Aug 01	126	6	12	24	957	16	11,091
	Aug 05	149	8	11	19	927	19	12,868
	Aug 08	147	8	10	13	562	14	24,661
	Aug 12	150	8	7	13	278	34	16,355
	Aug 14	107	8	6	10	139	13	14,426
	Aug 19	82	6	7	4	21	1	6,422
	Aug 26	68	8	2	6	7	0	3,006
Total		252	110	4,218	16,961	63,636	194	98,565
1992	Jun 18	130	8	2,449	3,388	9,256		
	Jun 22	146	8	2,389	5,669	17,363		
	Jun 25	135	8	1,109	3,430	11,135	5	
	Jun 29	109	6	981	4,040	16,734	0	
	Jul 06	96	8	640	1,559	20,850	540	
	Aug 03	146	8	81	32	492	2,098	26,666
	Aug 06	124	6	21	30	243	219	20,674
	Aug 11	151	6	26	35	57	15	25,099
	Aug 14	130	6	23	28	48	26	17,348
	Aug 17	116	6	15	19	19	6	10,943
	Aug 20	104	6	6	5	2	0	10,691
	Aug 24	93	6	5	12	6	0	5,147
	Aug 27	66	6	6	3	6	0	6,072
	Aug 31	57	6	3	3	4	0	1,943
Total		271	94	7,754	18,253	76,215	2,909	124,583

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1993	Jun 25	183	8	2,073	9,803	10,844		
	Jul 31	150	6	44	78	867		11,538
	Aug 04	163	6	10	32	264		16,044
	Aug 06	119	8	21	43	120		16,922
	Aug 09	112	6	13	32	41		10,192
	Aug 14	163	6	18	22	67	5	27,176
	Aug 17	130	6	9	17	38	0	19,712
	Aug 21	125	6	2	5	6	0	5,531
	Aug 25	83	6	3	9	12	0	2,932
	Aug 28	71	6	5	13	12	2	3,265
	Sept 01	24	6	0	0	1	0	644
Total		278	70	2,198	10,054	12,272	7	113,956
1994	Jun 24	116	8	1,306	6,720	13,224		
	Jul 14	67	4	82	493	4,691	581	382
	Jul 19	85	6	64	270	4,428	1,193	1,279
	Jul 23	80	6	38	274	1,927	1,211	3,109
	Jul 26	109	6	31	183	1,994	2,276	5,314
	Jul 29	105	6	24	47	941	1,294	7,498
	Aug 04	120	6	15	27	378	972	10,214
	Aug 09	67	6	6	4	44	166	9,080
	Aug 12	113	8	11	16	74	101	13,019
	Aug 15	109	8	5	18	74	187	12,159
	Aug 18	96	8	1	8	24	55	7,944
	Aug 22	88	8	4	8	13	56	9,971
	Aug 25	54	8	0	2	3	20	2,850
	Aug 27	62	6	1	0	2	6	2,709
	Aug 30	45	6	1	0	6	13	1,422
	Sept 02	20	6	0	1	0	0	478
Total		231	106	1,589	8,071	27,823	8,131	87,428
1995	Jun 22	120	4	1,794	1,225	8,912		
	Jun 26	117	4	1,242	4,950	16,819		
	Jun 29	124	4	752	4,383	18,410		
	Jul 03	117	4	453	3,199	17,751		
	Jul 06	103	4	238	1,530	15,670		
	Jul 10	96	4	111	927	14,650	1	
	Jul 14	95	4	153	1,574	7,637	0	62
	Jul 18	83	6	68	455	8,539	0	170
	Jul 21	55	4	33	130	2,642	0	443
	Aug 04	88	6	21	77	82	3	10,613
	Aug 08	120	6	10	87	94	3	10,166
	Aug 12	115	6	7	269	106	2	14,836
	Aug 16	91	6	7	67	16	6	6,867
	Aug 19	100	6	7	55	22	1	6,886
	Aug 22	89	6	7	76	22	1	7,332
	Aug 26	85	6	11	77	19	6	3,905
	Aug 29	43	6	3	26	10	1	1,269
	Sept 01	23	6	0	22	3	0	872
Total		260	92	4,917	19,129	111,404	24	63,421

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1996	Jun 17	No Tenders / No Deliveries						
	Jun 20	1	2	4	90	120		0
	Jun 24	No Tenders / No Deliveries						
	Jul 02	10	2	39	160	958		0
	Jul 05	20	2	37	481	1,432		0
	Jul 08	17	2	24	353	932		1
	Jul 12	15	2	12	133	1,937		200
	Jul 16	6	2	4	35	115		142
	Jul 19	27	3	11	39	843		1,959
	Jul 22	71	6	20	185	1,771		12,764
	Jul 25	90	8	22	74	406	118	7,838
	Jul 29	78	6	19	75	900	125	14,135
	Jul 31	35	6	4	9	63	0	5,886
	Aug 03	124	6	10	67	89	1	18,114
	Aug 07	116	6	9	27	38	0	15,346
	Aug 10	64	6	6	7	7	0	6,166
	Aug 13	65	6	2	27	20	0	5,003
	Aug 16	95	6	6	42	8	0	6,261
	Aug 20	77	6	4	41	8	0	3,589
	Aug 23	63	6	3	6	4	0	2,664
	Aug 26	15	6	1	0	0	0	540
Total		241	89.0	237	1,851	9,651	244	100,608
1997	Jun 23	81	6	2,171	7,745	4,540		
	Jul 31	108	6	44	118	559		4,460
	Aug 06	92	6	29	126	120		4,350
	Aug 12	73	6	5	40	36		4,095
	Aug 18	65	6	8	43	24		5,327
Total		158	30.0	2,257	8,072	5,279	0	18,232
1998	Jun 24	85	6	1,168	3,286	6,721		
	Jun 29	88	6	548	6,389	15,518		
	Jul 3	72	4	270	2,194	6,113		
	Jul 11	55	4	211	685	3,542		10
	Jul 22	51	6	117	395	801		561
	Jul 27	97	6	71	425	1,331		4,647
	Aug 1	104	6	37	67	490	6	6,221
	Aug 6	84	6	15	42	56	3	6,970
	Aug 11	86	6	14	32	57	8	8,562
	Aug 17	60	6	0	12	6	8	2,063
	Aug 22	51	6	5	5	7	9	2,256
	Aug 29	22	6	1	4	6	7	735
Total		215	68	2,457	13,536	34,648	41	32,025
1999	Jun 30	83	6	733	6,122			
	Aug 7	58	6	2	40	3,623		1,464
Total		100	12	735	6162	3623	0	1464

Appendix B.11. Historical commercial salmon harvest and effort by fishing period in Kuskokwim Statistical Area 335-12.

Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1990	Jun 20	496	6	14,110	8,297	24,953		
	Jun 25	341	6	7,342	13,289	32,077		
	Jun 29	337	6	3,815	7,660	35,828		
	Jul 05	316	6	1,589	3,954	40,720	2	
	Jul 09	294	6	1,201	3,172	43,347	4	
	Jul 14	313	8	864	1,471	40,580	10	15
	Aug 01	337	6	129	130	3,663	1,058	14,536
	Aug 06	350	6	71	68	1,979	611	28,431
	Aug 10	301	6	40	32	612	184	17,860
	Aug 13	322	6	16	15	260	68	83,038
	Aug 16	293	9	8	12	77	51	21,734
	Aug 20	284	6	8	11	44	17	25,003
	Aug 27	253	6	2	2	8	5	6,210
Total		649	83	29,195	38,113	224,148	2,010	196,827
1991	Jun 20	513	6	12,421	17,113	9,926		
	Jun 24	340	6	6,117	9,162	13,431		
	Jul 01	351	6	2,926	11,040	27,070		
	Jul 06	274	6	745	8,972	17,671	1	
	Jul 13	291	6	412	2,198	20,744	9	12
	Jul 18	250	6	135	1,612	32,764	9	531
	Jul 22	231	6	57	302	13,985	17	1,065
	Jul 25	241	8	68	166	10,015	18	1,988
	Jul 29	277	8	68	78	10,749	14	22,819
	Aug 01	294	6	93	35	4,874	11	14,836
	Aug 05	277	8	16	32	2,075	6	21,918
	Aug 08	268	8	9	15	1,284	8	25,824
	Aug 12	294	8	16	13	654	4	61,098
	Aug 14	275	8	7	7	260	2	22,589
	Aug 19	272	6	10	10	98	2	25,540
	Aug 26	233	8	4	5	51	2	19,600
Total		596	110	23,104	50,760	165,651	103	217,820
1992	Jun 18	437	8	7,307	5,120	23,439		
	Jun 22	313	8	7,160	9,668	42,391	14	
	Jun 25	288	8	3,537	8,323	26,332	1	
	Jun 29	291	6	3,645	10,957	45,137	38	
	Jul 06	294	8	1,192	2,677	38,783	151	1
	Aug 03	292	8	125	75	1,578	2,670	29,341
	Aug 06	271	6	54	23	522	249	24,520
	Aug 11	296	6	64	25	299	0	81,586
	Aug 14	274	6	27	24	98	0	31,051
	Aug 17	280	6	25	29	62	0	42,555
	Aug 20	267	6	14	9	30	0	35,619
	Aug 24	248	6	12	4	6	0	9,522
	Aug 27	223	6	14	2	11	1	13,262
	Aug 31	154	6	1	2	5	0	4,443
Total		566	94	23,177	36,936	178,693	3,124	271,900

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Appendix B.11. (page 2 of 3)

Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1993	Jun 25	441	8	6,111	16,560	23,279		
	Jul 31	286	6	59	60	1,558	11	25,420
	Aug 04	258	6	41	93	929	6	53,888
	Aug 06	279	8	31	28	535	9	37,491
	Aug 09	308	6	30	38	203	2	23,634
	Aug 14	287	6	16	12	115	6	34,600
	Aug 17	242	6	6	7	39	5	25,986
	Aug 21	244	6	3	14	30	1	13,822
	Aug 25	148	6	1	3	4	0	2,420
	Aug 28	128	6	3	5	11	0	3,406
	Sept 01	96	6	1	1	9	3	5,452
Total		566	70	6,302	16,821	26,712	43	226,119
1994	Jun 24	449	8	12,915	32,238	73,990		
	Jul 14	270	4	253	1,186	21,138	608	280
	Jul 19	246	6	107	566	30,904	1,398	2,553
	Jul 23	244	6	114	184	21,471	2,828	11,974
	Jul 26	265	6	86	119	8,168	3,449	17,595
	Jul 29	279	6	114	72	4,358	3,681	27,548
	Aug 04	299	6	40	39	1,716	2,148	26,966
	Aug 09	263	6	8	58	627	751	58,112
	Aug 12	264	8	12	20	287	224	44,381
	Aug 15	270	8	9	8	168	183	15,883
	Aug 18	262	8	11	5	122	129	31,199
	Aug 22	256	8	4	6	61	112	15,696
	Aug 25	214	8	4	4	47	65	16,031
	Aug 27	182	6	0	4	17	21	6,130
	Aug 30	218	6	1	2	10	8	6,770
	Sept 02	137	6	0	1	3	7	2,011
Total		583	106	13,678	34,512	163,087	15,612	283,129
1995	Jun 22	449	4	5,101	3,195	40,245		
	Jun 26	270	4	4,196	5,882	38,893		
	Jun 29	257	4	1,865	6,668	45,700		
	Jul 03	152	4	637	3,324	30,563	2	
	Jul 06	196	4	439	4,866	33,073	0	
	Jul 10	188	4	267	1,447	30,094	1	15
	Jul 14	203	4	195	786	18,045	3	112
	Jul 18	109	6	105	457	11,341	7	236
	Jul 21	171	4	56	173	7,988	5	436
	Aug 04	59	6	14	18	259	0	14,545
	Aug 08	265	6	35	66	473	5	41,623
	Aug 12	280	6	14	58	202	5	48,136
	Aug 16	251	6	14	23	76	5	18,086
	Aug 19	242	6	11	20	61	5	16,437
	Aug 22	213	6	2	21	83	5	17,312
	Aug 26	191	6	9	30	48	4	9,299
	Aug 29	152	6	5	14	15	6	8,186
	Sept 01	79	6	1	7	7	3	1,108
Total		561	92	12,966	27,055	257,166	56	175,531

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1996	Jun 17	245	2	2,045	1,850	11,560		
	Jun 20	185	2	1,014	4,205	18,678		
	Jun 24	129	1.5	248	1,762	10,233		
	Jul 02	122	2	259	2,058	9,868		
	Jul 05	86	2	85	882	8,460		1
	Jul 08	102	2	63	2,800	11,366		14
	Jul 12	127	2	103	1,555	15,561		1,018
	Jul 16	122	2	46	248	9,278		3,214
	Jul 19	141	3	61	132	6,491		7,046
	Jul 22	207	6	56	97	7,807	165	23,722
	Jul 25	254	8	44	76	4,720	140	61,435
	Jul 29	247	6	35	66	1,474	329	68,635
	Jul 31	250	6	24	49	834	212	52,739
	Aug 03	212	6	18	37	336	23	44,710
	Aug 07	195	6	19	27	319	34	36,850
	Aug 10	240	6	16	34	198	32	28,714
	Aug 13	224	6	13	33	144	21	30,841
	Aug 16	196	6	3	24	131	3	20,779
	Aug 20	150	6	7	19	22	2	7,242
	Aug 23	104	6	1	9	9	5	3,960
	Aug 26	72	6	1	6	7	0	2,410
Total		486	92.5	4,161	15,969	117,496	966	393,330
1997	Jun 23	274	6	7,852	13,473	8,550		
	Jul 31	322	6	97	234	1,501		10,503
	Aug 06	280	6	62	80	662	2	15,689
	Aug 12	261	6	33	40	269	0	28,857
	Aug 18	234	6	19	18	28		6,622
Total		449	30	8,063	13,845	11,010	2	61,671
1998	Jun 24	253	6	5,245	5,757	25,746		
	Jun 29	151	6	2,118	6,060	24,617		
	Jul 3	230	4	971	6,958	28,029		1
	Jul 11	235	4	549	5,356	16,917		8
	Jul 22	165	6	184	355	5,510		1,822
	Jul 27	176	6	133	229	3,239		9,459
	Aug 1	208	6	80	76	1,172	9	14,304
	Aug 6	212	6	24	31	324	3	11,901
	Aug 11	196	6	28	32	151	6	19,207
	Aug 17	150	6	10	11	26	1	7,056
	Aug 22	123	6	4	16	19	3	5,131
	Aug 29	48	6	0	1	1	0	765
Total		423	68	9,346	24,882	105,751	22	69,654
1999	Jun 30	326	6	3,935	10,650	19,088		
	Aug 7	177	6	15	47	100		7,998
Total		366	12	3,950	10,697	19,188	0	7,998

Appendix B.12. Historical commercial salmon harvest and effort by fishing period in Kuskowim Statistical Area 335-13.

Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1990	Jun 20	No commercial opening						
	Jun 25	126	6	5,152	7,408	10,387		
	Jun 29	153	6	3,477	6,016	20,099		
	Jul 05	153	6	1,305	2,580	23,669	1	
	Jul 09	167	6	903	2,845	24,575	2	
	Jul 14	171	8	769	1,547	19,037	5	12
	Aug 01	119	6	53	77	1,984	182	3,736
	Aug 06	125	6	52	10	1,293	166	8,923
	Aug 10	171	6	26	5	348	74	18,171
	Aug 13	170	6	14	5	173	16	12,956
	Aug 16	201	9	9	2	96	34	27,544
	Aug 20	181	6	2	7	37	2	17,669
	Aug 27	185	6		6	13	4	4,917
Total		328	77	11,762	20,508	101,711	486	93,928
1991	Jun 20	No commercial opening						
	Jun 24	123	6	3,101	2,724	3,522		
	Jul 01	124	6	1,535	4,535	6,816		
	Jul 06	141	6	597	7,017	8,479		
	Jul 13	126	6	221	1,604	10,841		
	Jul 18	151	6	177	2,143	24,301		198
	Jul 22	174	6	75	1,391	17,267	2	984
	Jul 25	146	8	43	282	9,149		903
	Jul 29	109	8	37	129	5,042		4,849
	Aug 01	128	6	14	33	3,903	2	8,114
	Aug 05	142	8	15	6	1,369		12,005
	Aug 08	154	8	9	7	780	2	16,259
	Aug 12	158	8	9	1	335	1	26,481
	Aug 14	157	8	4	5	117		14,882
	Aug 19	172	6	3	6	112	1	17,678
	Aug 26	153	8		1	30		14,982
Total		320	104	5,840	19,884	92,063	8	117,335
1992	Jun 18	No commercial opening						
	Jun 22	106	8	3,297	5,761	6,634		
	Jun 25	143	8	2,858	6,679	9,439		
	Jun 29	149	6	1,948	8,065	12,160	1	
	Jul 06	141	8	777	2,240	14,408	28	1
	Aug 03	128	8	56	18	676	859	13,315
	Aug 06	138	6	27	38	315	36	8,729
	Aug 11	174	6	58	14	224	3	56,448
	Aug 14	168	6	11	3	46		25,578
	Aug 17	143	6	6	1	31		18,169
	Aug 20	149	6	12	3	20		17,900
	Aug 24	144	6	7	3	9		7,102
	Aug 27	138	6	4	1	9		6,284
	Aug 31	117	6	3	3	8		5,663
Total		276	86	9,064	22,829	43,979	927	159,189

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1993	Jun 25	No commercial opening						
	Jul 31	146	6	50	66	950	6	13,815
	Aug 04	186	6	27	13	445	3	51,261
	Aug 06	185	8	27	12	296		27,064
	Aug 09	158	6	18	4	73	1	12,821
	Aug 14	141	6	6	5	69		10,512
	Aug 17	192	6	11	7	38	1	26,249
	Aug 21	150	6	3	5	20		16,709
	Aug 25	146	6	0	1	8		3,237
	Aug 28	148	6	4	1	5		5,061
	Sept 01	116	6	2	2	8		4,479
Total		306	62	148	116	1,912	11	171,208
1994	Jun 24	No commercial opening						
	Jul 14	128	4	163	1,454	11,546	88	79
	Jul 19	138	6	153	2,764	18,368	894	2,625
	Jul 23	148	6	127	507	11,053	1,465	7,978
	Jul 26	142	6	91	62	8,268	1,346	13,847
	Jul 29	148	6	41	32	4,337	789	12,660
	Aug 04	147	6	28	20	1,185	543	26,272
	Aug 09	159	6	6	6	208	249	40,824
	Aug 12	187	8	7	6	202	113	40,117
	Aug 15	169	8	5	7	45	32	14,199
	Aug 18	186	8	6	3	37	50	31,410
	Aug 22	163	8	2	1	18	19	10,675
	Aug 25	156	8	3	1	9	24	15,199
	Aug 27	167	6	2	0	8	12	10,215
Total		327	86	634	4,863	55,284	5,624	226,100
1995	Jun 22	No commercial opening						
	Jun 26	193	4	3,970	8,526	36,766		
	Jun 29	151	4	1,848	5,351	14,574		
	Jul 03	153	4	1,103	6,341	26,526		
	Jul 06	140	4	596	5,499	21,883		
	Jul 10	163	4	371	1,975	27,758		6
	Jul 14	87	4	126	552	9,049	2	42
	Jul 18	96	6	114	358	8,770	2	206
	Jul 21	100	4	88	217	6,679	1	307
	Aug 04	82	6	26	28	605	2	22,165
	Aug 08	194	6	40	181	393		36,567
	Aug 12	184	6	19	22	451	1	29,290
	Aug 16	199	6	17	50	74	1	29,628
	Aug 19	160	6	5	8	34	2	12,069
	Aug 22	148	6	4	9	35	1	15,120
	Aug 26	149	6	3	9	14		10,316
	Aug 29	120	6	5	3	6	1	6,154
	Sept 01	102	6	1	2	2		2,893
Total		331	88	8,336	29,131	153,619	13	164,763

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1996	Jun 17	No commercial opening						
	Jun 20	81	2	856	1,817	7,292		
	Jun 24	97	1.5	330	2,284	7,581		
	Jul 02	75	2	189	1,358	8,239		
	Jul 05	74	2	141	1,642	5,648		1
	Jul 08	75	2	76	3,181	4,362		6
	Jul 12	75	2	83	1,391	6,748		311
	Jul 16	58	2	27	231	3,860		1,031
	Jul 19	78	3	64	64	3,796		4,093
	Jul 22	125	6	94	311	4,246	71	12,283
	Jul 25	135	8	40	73	2,742	99	34,446
	Jul 29	185	6	40	43	925	126	52,950
	Jul 31	139	6	18	30	543	51	43,749
	Aug 03	163	6	28	25	600	19	49,738
	Aug 07	177	6	13	17	185	13	31,440
	Aug 10	168	6	22	14	571	7	37,493
	Aug 13	123	6	8	19	97	6	20,904
	Aug 16	178	6	17	76	65	1	18,405
	Aug 20	112	6	5	19	17	10	8,615
	Aug 23	84	6	4	7	10	5	3,770
	Aug 26	101	6	9	17	6	3	4,516
Total		309	90.5	2,064	12,619	57,533	411	323,751
1997	Jun 23	No commercial opening						
	Aug 06	105	6	37	17	201		8,856
	Aug 12	132	6	17	38	49		13,518
	Aug 18	116	6	39	4	5		4,421
Total		180	18	93	59	255	0	26,795
1998	Jun 23	No commercial opening						
	Jun 29	181	6	3,288	9,084	23,601		
	Jul 3	117	4	842	5,376	13,388		
	Jul 11	104	4	318	3,443	6,059		4
	Jul 22	72	6	75	521	3,756	4	567
	Jul 27	52	6	84	43	1,186	11	2,805
	Aug 1	69	6	18	35	417	4	2,379
	Aug 6	143	6	43	214	308	4	16,759
	Aug 11	119	6	20	19	93	2	15,426
	Aug 17	160	6	19	14	67	2	15,155
	Aug 22	143	6	6	22	30	2	6,063
	Aug 29	60	6	0	2	3	0	1,506
Total		316	62	4,713	18,773	48,908	29	60,664
1999	Jun 30	No commercial opening						
	Aug 7	105	6	15	106	96	2	8,944
Total		105	6	15	106	96	2	8944

Appendix B.13. Historical commercial salmon harvest and effort by fishing period in Kuskowim Statistical Area 335-14.

Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1990	Jun 20	No commercial opening						
	Jun 25	54	6	2,084	3,608	9,494		
	Jun 29	69	6	1,442	4,123	13,868		
	Jul 05	59	6	659	2,716	11,092		
	Jul 09	45	6	245	2,019	11,084		
	Jul 14	52	8	240	1,581	9,133		
	Aug 01	29	6	34	276	2,252	16	1,624
	Aug 06	50	6	13	21	726	6	3,508
	Aug 10	61	6	6	2	65	4	11,131
	Aug 13	56	6	2	1	9	1	3,356
	Aug 16	61	9	5	1	6	0	12,084
	Aug 20	61	6	1	1	5	1	5,907
	Aug 27	63	6	0	0	3	0	3,068
Total		143	77	4,731	14,349	57,737	28	40,678
1991	Jun 20	No commercial opening						
	Jun 24	71	6	1,761	2,509	3,814		
	Jul 01	63	6	929	3,281	6,040		
	Jul 06	72	6	496	5,843	7,879		
	Jul 13	72	6	121	1,762	9,678		
	Jul 18	78	6	74	977	13,742		30
	Jul 22	74	6	71	1,346	14,563		296
	Jul 25	77	8	35	1,027	6,907	2	437
	Jul 29	59	8	17	485	4,185	16	1,812
	Aug 01	56	6	6	532	3,364	1	4,243
	Aug 05	75	8	14	39	1,720	7	9,471
	Aug 08	65	8	5	5	568	0	5,293
	Aug 12	64	8	10	4	319	1	10,647
	Aug 14	63	8	1	1	118	0	6,496
	Aug 19	64	6	4	4	82	0	7,724
	Aug 26	60	8	0	0	5	0	6,076
Total		170	104	3,544	17,815	72,984	27	52,525
1992	Jun 18	No commercial opening						
	Jun 22	58	8	1,732	3,919	8,041		
	Jun 25	72	8	1,480	3,490	8,208		
	Jun 29	59	6	749	3,020	6,182		
	Jul 06	60	8	641	1,486	10,155		
	Aug 03	54	8	44	12	1,323	486	8,911
	Aug 06	57	6	14	7	239	0	3,583
	Aug 11	59	6	9	2	84	0	18,772
	Aug 14	63	6	2	0	4	0	13,982
	Aug 17	57	6	1	0	10	0	7,690
	Aug 20	59	6	4	0	1	0	9,153
	Aug 24	65	6	3	0	2	0	6,298
	Aug 27	54	6	2	0	0	0	2,620
	Aug 31	46	6	1	0	0	0	4,913
Total		116	86	4,682	11,936	34,249	486	75,922

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1993	Jun 25	No commercial opening						
	Jul 31	46	6	19	6	758		5,334
	Aug 04	60	6	20	3	442		16,456
	Aug 06	57	8	9	1	445	1	9,923
	Aug 09	50	6	4	1	129	1	8,170
	Aug 14	55	6	6	0	36	0	7,938
	Aug 17	58	6	4	0	4	1	10,749
	Aug 21	74	6	1	1	2	0	11,035
	Aug 25	65	6	2	0	4	0	1,967
	Aug 28	40	6	0	0	2	0	1,860
	Sept 01	38	6	1	0	0	0	1,615
Total		100	62	66	12	1,822	3	75,047
1994	Jun 24	No commercial opening						
	Jul 14	53	4	80	758	6,210	154	79
	Jul 19	35	6	117	875	6,404	230	570
	Jul 23	35	6	34	160	3,698	341	1,152
	Jul 26	37	6	17	107	4,030	343	3,145
	Jul 29	45	6	25	8	1,616	146	4,384
	Aug 04	42	6	5	1	704	172	12,062
	Aug 09	68	6	9	2	274	56	21,554
	Aug 12	61	8	4	5	214	59	20,236
	Aug 15	50	8	3	0	34	10	5,661
	Aug 18	59	8	2	0	29	31	12,197
	Aug 22	50	8	2	0	12	14	7,712
	Aug 25	33	8	2	0	4	3	3,515
	Aug 27	35	6	0	0	3	4	1,472
Total		120	86	300	1,916	23,232	1,563	93,739
1995	Jun 22	No commercial opening						
	Jun 26	4	4	63	91	674		
	Jun 29	33	4	488	1,786	4,896		
	Jul 03	55	4	654	4,214	14,587		
	Jul 06	45	4	248	2,870	10,620		
	Jul 10	48	4	157	2,751	13,866		
	Jul 14	50	4	72	1,307	8,406		5
	Jul 18	50	6	79	1,212	8,644		59
	Jul 21	42	4	25	420	3,730		86
	Aug 04	6	6	3	0	126		1,342
	Aug 08	36	6	10	29	269		10,192
	Aug 12	43	6	10	10	140		10,159
	Aug 16	52	6	14	7	42		11,132
	Aug 19	55	6	5	4	16		5,665
	Aug 22	47	6	3	7	17		4,214
	Aug 26	52	6	2	1	20		5,609
	Aug 29	40	6	2	2	8		2,181
	Sept 01	15	6	0	0	0		910
Total		97	88	1,835	14,711	66,061	0	51,554

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Year	Date	Number of Permits	Hours Fished	King Salmon	Sockeye Salmon	Chum Salmon	Pink Salmon	Coho Salmon
1996	Jun 17	No commercial opening						
	Jun 20	16	2	172	311	1,352		
	Jun 24	14	1.5	88	374	1,624		
	Jul 02	17	2	58	386	1,850		
	Jul 05	14	2	53	476	2,111		
	Jul 08	17	2	15	461	2,141		3
	Jul 12	20	2	32	702	2,222		79
	Jul 16	12	2	10	88	1,939		288
	Jul 19	21	3	28	63	2,260		1,648
	Jul 22	14	6	13	46	680		1,674
	Jul 25	18	8	18	33	1,156		9,918
	Jul 29	23	6	3	2	529		9,053
	Jul 31	51	6	6	4	101		20,572
	Aug 03	52	6	3	0	72		19,978
	Aug 07	31	6	2	2	39		10,696
	Aug 10	31	6	1	5	21		11,280
	Aug 13	59	6	2	3	35		13,305
	Aug 16	23	6	2	5	11		3,567
	Aug 20	62	6	3	4	4		6,424
	Aug 23	42	6	1	0	0		2,739
	Aug 26	21	6	0	0	0		1,218
Total		117	90.5	510	2,965	18,147	0	112,442
1997	Jun 23	No commercial opening						
	Jun 31	No commercial opening						
	Aug 06	37	6	17	6	404		8,321
	Aug 12	46	6	4	4	54		9,679
	Aug 18	60	6	0	2	1		4,903
Total		79	18	21	12	459	0	22,903
1998	Jun 24	No commercial opening						
	Jun 29	18	6	404	973	3,053		
	Jul 3	27	4	194	1,457	3,941		
	Jul 11	24	4	49	688	2,889		1
	Jul 22	60	6	84	267	5,596		683
	Jul 27	47	6	68	235	1,744		1,586
	Aug 1	44	6	21	57	708		3,887
	Aug 6	57	6	6	8	332		9,498
	Aug 11	64	6	5	12	87		15,231
	Aug 17	70	6	5	8	23		10,366
	Aug 22	65	6	4	10	11		5,486
	Aug 29	24	6	0	0	7		1,087
Total		136	62	840	3,715	18,391	0	47,825
1999	Jun 30	No commercial opening						
	Aug 7	49	6	5	11	571		5,187
Total		49	6	5	11	571	0	5187

Appendix B.14. Estimated historical daily fish passage at George River weir.

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
6/09		2		0 *		0		0 *		0		0 *		0		0 *		0		0 *		401		
6/10		0		0 *		0		0 *		0		0 *		0		0 *		0		0 *		260		
6/11		2		0 *		0		0 *		0		0 *		0		0 *		0		0 *		221		
6/12		1		0 *		0		0 *		0		0 *		0		0 *		0		0 *		145		
6/13		0		0 *		0		0 *		0		0 *		0		0 *		0		0 *		366		
6/14		6		0 *		0		0 *		0		0 *		0		0 *		0		0 *		326		
6/15		26		0 *		0		0 *		0		0 *		0		0 *		0		0 *		430		
6/16		0		0 *		0		0 *		1		0 *		0		0 *		0		0 *		262		
6/17		11		9 *		0		0 *		2		0 *		0		0 *		0		0 *		68		
6/18		8		5 *		0		0 *		0		0 *		0		0 *		0		0 *		223		
6/19		42		5 *		0		0 *		2		0 *		0		0 *		0		0 *		100		
6/20		0		14 *		0		0 *		0		0 *		0		0 *		0		0 *		0		
6/21	27	17		9 *	0	0		0 *	65	0		0 *	0	0		0 *	0	0		0 *	519	276		
6/22	17	18	1	33 *	0	0	0	0 *	613	3	1	0 *	0	0	0	0 *	0	0	0	0 *	832	70	2	
6/23	269	362	3	12 *	0	38	0	0 *	1,314	35	0	0 *	0	0	0	0 *	0	0	0	0 *	703	204	46	
6/24	762	488	4	5 *	0	53	0	0 *	692	52	6	22 *	0	0	0	0 *	0	0	0	0 *	238	72	218	
6/25	214	907	14	38 *	0	0	0	0 *	49	41	23	8 *	0	0	0	0 *	0	0	0	0 *	285	120	106	
6/26	41	288	44	12 *	5	0	0	0 *	376	49	162	22 *	0	0	0	0 *	0	0	0	0 *	62	162	688	
6/27	183	514	35	31 *	2	21	0	0 *	508	79	116	30 *	0	0	0	0 *	0	0	0	0 *	296	285	921	
6/28	98	397	170	62 *	1	18	0	0 *	167	34	289	81 *	0	0	0	0 *	0	0	0	0 *	2	366	987	
6/29	91	566	126	33 *	3	39	0	0 *	191	178	288	81 *	0	0	0	0 *	0	0	0	0 *	1	336	877	
6/30	84	767	164	36 *	4	86	0	0 *	215	204	399	70 *	0	0	0	0 *	0	0	0	0 *	0	245	1,102	
7/01	1,034	456	288	33 *	1	35	0	0 *	498	64	634	109 *	0	0	0	0 *	0	0	0	0 *	1	491	472	
7/02	712	277	397	31 *	10	15	0	0 *	730	85	388	103 *	1	0	0	0 *	0	0	0	0 *	15	215	115	
7/03	389	584	428	50 *	18	10	1	0 *	961	267	557	121 *	1	0	0	0 *	0	0	0	0 *	29	405	330	
7/04	320	347	287	95 *	8	11	2	0 *	1,074	83	605	132 *	0	0	0	0 *	0	0	0	0 *	0	305	119	
7/05	280	221	245	188 *	6	8	2	0 *	326	174	960	113 *	2	0	0	0 *	0	0	0	0 *	25	205	195	
7/06	579	294	203	280 *	9	9	0	0 *	606	111	439	169 *	1	0	0	0 *	0	0	0	0 *	43	176	101	
7/07	180	93	33	128 *	3	0	0	0 *	575	52	123	206 *	0	0	0	0 *	0	0	0	0 *	19	73	16	
7/08	122	34		68 *	0	3		0 *	629	49		190 *	0	0		0 *	0	0		0 *	2	301		
7/09	436	37		206 *	15	1		0 *	852	40		389 *	12	0		0 *	0	0		0 *	149	4		
7/10	127	29		185 *	0	5		0 *	241	62		470 *	0	0		0 *	0	0		0 *	2	79		
7/11	376	33		21 *	0	1		0 *	446	45		485 *	0	0		0 *	0	0		0 *	6	6		
7/12	53	245		58 *	4	25		0 *	343	237		500 *	4	1		0 *	0	0		0 *	1	109		
7/13	60	31		260 *	2	0		0 *	394	7		337 *	9	0		0 *	0	0		0 *	3	24		
7/14	127	11		456	0	1		0	489	12		182	11	0		0	0	0		0	0	31		54
7/15	324	65		43	0	0		0	556	158		194	34	1		0	0	0		0	21	2		42
7/16	78	6		196	1	0		0	232	51		333	18	0		0	1	0		0	15	0		25
7/17	67	22		61	0	6		0	462	236		327	34	0		0	0	0		0	15	39		20

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Appendix B.14. (page 2 of 3)

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
7/18	107	42		161	0	3		0	514	207		394	44	2		0	0	0		0	15	1		9
7/19	63	87		203	3	2		0	667	575		768	90	1		0	1	0		0	0	10		14
7/20	49	111		159	0	4		0	322	300		709	68	0		0	3	2		0	8	420		18
7/21	58	83		37	0	2		0	387	342		316	61	0		0	0	1		0	146	76		4
7/22	26	49		58	0	1		0	273	144		379	45	1		0	0	2		0	102	25		4
7/23	29	32		61	2	0		1	321	292		465	39	2		3	6	0		0	0	72		3
7/24	54	7		161	0	2		1	525	207		533	68	0		3	22	2		0	0	5		0
7/25	34	41		203	2	1		0	449	238		443	74	1		0	47	2		0	0	21		2
7/26	17	18		159	0	0		0	508	110		353	28	0		1	93	1		0	0	0		3
7/27		9		37		0		0		42		195		0		2		2		0		0		2
7/28		25		58		1		0		176		292		1		0		3		1		6		0
7/29		7		47		7		0		96		148		0		1		2		0		4		0
7/30		13	18	19		0	0	0		71	546	65		0	1	1		3	7	0		6	8	0
7/31		13	14	24		1	3	0		133	367	286		1	1	7		8	8	0		17	4	0
8/01		4	6	7		0	0	0		41	295	221		1	295	2		9	14	0		2	270	0
8/02		5	25	37		0	1	1		28	193	214		0	193	0		22	23	1		0	55	0
8/03		7		20		0		0		35		216		0		1		25		0		0		0
8/04		4		21		1		1		70		166		0		5		52		1		1		0
8/05		4		12		2		0		50		137		0		4		41		12		0		4
8/06		2		6		3		1		38		61		0		1		59		0		0		0
8/07		3		4		1		0		32		63		0		3		75		3		0		0
8/08		3		2		1		0		33		82		1		4		69		4		0		0
8/09		5		10		4		4		13		73		1		2		70		6		0		2
8/10		1		0		0		1		17		24		1		1		35		8		0		0
8/11		3		3		0		0		25		22		0		7		71		13		0		1
8/12		8		1		3		2		34		28		0		1		198		4		0		0
8/13		5		7		6		2		39		56		0		9		170		23		0		0
8/14		2		2		4		0		32		34		0		9		213		32		0		0
8/15		4		16		0		1		9		58		0		3		92		33		0		0
8/16		8		5		0		1		12		24		0		3		44		70		0		0
8/17		1		5		0		0		8		11		0		4		59		94		0		0
8/18		1		0		0		4		5		23		0		6		103		116		0		3
8/19		0		1		1		2		6		25		0		2		70		68		0		2
8/20		3		4		1		1		7		20		0		0		346		186		0		0
8/21		2		4		0		0		6		6		0		0		334		193		0		0
8/22		1		0		0		3		0		7		0		6		1,152		85		0		0
8/23		0		0		0		2		0		6		0		2		131		186		0		1
8/24		0		0		1		2		0		1		0		1		162		139		0		4

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Appendix B.14. (page 3 of 3)

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
8/25		0		1		1		2		2		5		0		0		66		96		0		2
8/26		0		1		2		0		5		3		0		0		275		141		1		2
8/27		0		2		0		0		5		1		0		0		64		206		13		1
8/28		0		0		0		1		1		4		0		0		60		230		6		2
8/29		0		0		2		0		4		1		0		0		17		198		1		1
8/30		0		1		3		0		6		3		2		1		1,474		70		21		2
8/31		0		0		0		2		9		7		0		0		275		107		2		1
9/01		0		2		0		2		1		5		0		1		481		1,296		0		2
9/02		0		0		0		0		0		4		0		0		202		718		0		2
9/03		0		0		0		0		4		2		0		0		161		72		7		2
9/04		0		0		0		0		0		9		0		0		151		185		0		2
9/05		0		1		0		0		4		7		0		0		261		113		0		3
9/06		0		0		0		2		1		8		0		0		58		108		0		0
9/07		0		0		0		0		7		4		0		0		234		114		0		0
9/08		0		1		0		0		0		3		0		0		34		425		0		0
9/09		0		0		0		0		0		4		0		1		375		331		0		0
9/10		0		0		0		0		5		0		0		0		478		86		0		0
9/11		0		0		0		0		0		4		0		0		174		35		0		0
9/12		0		1		0		0		0		0		0		0		47		566		0		0
9/13		0		0		0		0		0		1		0		0		141		676		1		2
9/14		0		0		0		0		0		0		0		0		105		917		0		0
9/15		0		0		0		0		0		1		0		0		174		653		0		0
9/16				0				0				1				0				60				1
9/17				0				0				0				0				36				1
9/18				0				0				0				0				145				1
9/19				0				0				0				0				49				2
9/20				0				0				1				0				3				0
9/21				0				0				3				0				12				2
9/22				0				0				0				0				1				6
9/23				0				0				2				0				2				18
9/24				0				0				0				0				1				4
9/25				0				0				1				0				0				2
Total	7,487	7,820	2,505	4,227	98	445	9	39	17,570	5,940	6,391	11,682	644	17	490	97	173	8,937	52	8,930	3,555	8,121	6,632	278

* estimated fish passage

Appendix B.15. Estimated historical daily cumulative fish passage at George River weir.

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
6/09		2		0 *		0		0 *		0		0 *		0		0		0		0 *		401		
6/10		2		0 *		0		0 *		0		0 *		0		0		0		0 *		661		
6/11		4		0 *		0		0 *		0		0 *		0		0		0		0 *		882		
6/12		5		0 *		0		0 *		0		0 *		0		0		0		0 *		1,027		
6/13		5		0 *		0		0 *		0		0 *		0		0		0		0 *		1,393		
6/14		11		0 *		0		0 *		0		0 *		0		0		0		0 *		1,719		
6/15		37		0 *		0		0 *		0		0 *		0		0		0		0 *		2,149		
6/16		37		0 *		0		0 *		1		0 *		0		0		0		0 *		2,411		
6/17		48		9 *		0		0 *		3		0 *		0		0		0		0 *		2,479		
6/18		56		14 *		0		0 *		3		0 *		0		0		0		0 *		2,702		
6/19		98		19 *		0		0 *		5		0 *		0		0		0		0 *		2,802		
6/20		98		33 *		0		0 *		5		0 *		0		0		0		0 *		2,802		
6/21	27	115		43 *	0	0		0 *	65	5		0 *	0	0		0	0	0		0 *	519	3,078		
6/22	44	133	1	76 *	0	0	0	0 *	678	8	1	0 *	0	0	0	0	0	0	0	0 *	1,351	3,148	2	
6/23	313	495	4	88 *	0	38	0	0 *	1,992	43	1	0 *	0	0	0	0	0	0	0	0 *	2,054	3,352	48	
6/24	1,075	983	8	93 *	0	91	0	0 *	2,684	95	7	22 *	0	0	0	0	0	0	0	0 *	2,292	3,424	266	
6/25	1,289	1,890	22	131 *	0	91	0	0 *	2,733	136	30	30 *	0	0	0	0	0	0	0	0 *	2,577	3,544	372	
6/26	1,330	2,178	66	142 *	5	91	0	0 *	3,109	185	192	52 *	0	0	0	0	0	0	0	0 *	2,639	3,706	1,060	
6/27	1,513	2,692	101	173 *	7	112	0	0 *	3,617	264	308	82 *	0	0	0	0	0	0	0	0 *	2,935	3,991	1,981	
6/28	1,611	3,089	271	235 *	8	130	0	0 *	3,784	298	597	162 *	0	0	0	0	0	0	0	0 *	2,937	4,357	2,968	
6/29	1,702	3,655	397	268 *	11	169	0	0 *	3,975	476	885	243 *	0	0	0	0	0	0	0	0 *	2,938	4,693	3,847	
6/30	1,786	4,422	561	304 *	15	255	0	0 *	4,190	680	1,284	313 *	0	0	0	0	0	0	0	0 *	2,938	4,938	4,949	
7/01	2,820	4,878	849	337 *	16	290	0	0 *	4,688	744	1,918	422 *	0	0	0	0	0	0	0	0 *	2,939	5,429	5,421	
7/02	3,532	5,155	1,246	368 *	25	305	0	0 *	5,418	829	2,306	525 *	1	0	0	0	0	0	0	0 *	2,954	5,644	5,536	
7/03	3,921	5,739	1,674	418 *	43	315	1	0 *	6,379	1,096	2,863	647 *	2	0	0	0	0	0	0	0 *	2,983	6,049	5,866	
7/04	4,241	6,086	1,961	513 *	51	326	3	0 *	7,453	1,179	3,468	779 *	2	0	0	0	0	0	0	0 *	2,983	6,354	5,985	
7/05	4,521	6,307	2,206	701 *	57	334	5	0 *	7,779	1,353	4,428	892 *	4	0	0	0	0	0	0	0 *	3,008	6,559	6,180	
7/06	5,100	6,601	2,409	981 *	66	343	5	0 *	8,385	1,464	4,867	1,061 *	5	0	0	0	0	0	0	0 *	3,051	6,735	6,281	
7/07	5,280	6,694	2,442	1,109 *	69	343	5	0 *	8,960	1,516	4,990	1,267 *	5	0	0	0	0	0	0	0 *	3,070	6,808	6,297	
7/08	5,402	6,728		1,177 *	69	346		0 *	9,589	1,565		1,457 *	5	0		0	0	0		0 *	3,072	7,109		
7/09	5,838	6,765		1,383 *	84	347		0 *	10,441	1,605		1,846 *	17	0		0	0	0		0 *	3,221	7,113		
7/10	5,965	6,794		1,568 *	84	352		0 *	10,682	1,667		2,316 *	17	0		0	0	0		0 *	3,223	7,192		
7/11	6,341	6,827		1,589 *	84	353		0 *	11,128	1,712		2,801 *	17	0		0	0	0		0 *	3,229	7,198		
7/12	6,394	7,072		1,647 *	88	378		0 *	11,471	1,949		3,301 *	21	1		0	0	0		0 *	3,230	7,307		
7/13	6,454	7,103		1,907 *	90	378		0 *	11,865	1,956		3,638 *	30	1		0	0	0		0 *	3,233	7,331		
7/14	6,581	7,114		2,363	90	379		0	12,354	1,968		3,820	41	1		0	0	0		0	3,233	7,362		54
7/15	6,905	7,179		2,406	90	379		0	12,910	2,126		4,014	75	2		0	0	0		0	3,254	7,364		96
7/16	6,983	7,185		2,602	91	379		0	13,142	2,177		4,347	93	2		0	1	0		0	3,269	7,364		121
7/17	7,050	7,207		2,663	91	385		0	13,604	2,413		4,674	127	2		0	1	0		0	3,284	7,403		141

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Appendix B.15. (page 2 of 3)

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
7/18	7,157	7,249		2,824	91	388		0	14,118	2,620		5,068	171	4		0	1	0		0	3,299	7,404		150
7/19	7,220	7,336		3,027	94	390		0	14,785	3,195		5,836	261	5		0	2	0		0	3,299	7,414		164
7/20	7,269	7,447		3,186	94	394		0	15,107	3,495		6,545	329	5		0	5	2		0	3,307	7,834		182
7/21	7,327	7,530		3,223	94	396		0	15,494	3,837		6,861	390	5		0	5	3		0	3,453	7,910		186
7/22	7,353	7,579		3,281	94	397		0	15,767	3,981		7,240	435	6		0	5	5		0	3,555	7,935		190
7/23	7,382	7,611		3,342	96	397		1	16,088	4,273		7,705	474	8		3	11	5		0	3,555	8,007		193
7/24	7,436	7,618		3,503	96	399		2	16,613	4,480		8,238	542	8		6	33	7		0	3,555	8,012		193
7/25	7,470	7,659		3,706	98	400		2	17,062	4,718		8,681	616	9		6	80	9		0	3,555	8,033		195
7/26	7,487	7,677		3,865	98	400		2	17,570	4,828		9,034	644	9		7	173	10		0	3,555	8,033		198
7/27		7,686		3,902		400		2		4,870		9,229		9		9		12		0		8,033		200
7/28		7,711		3,960		401		2		5,046		9,521		10		9		15		1		8,039		200
7/29		7,718		4,007		408		2		5,142		9,669		10		10		17		1		8,043		200
7/30		7,731	2,460	4,026		408	5	2		5,213	5,536	9,734		10	1	11		20	7	1		8,049	6,305	200
7/31		7,744	2,474	4,050		409	8	2		5,346	5,903	10,020		11	2	18		28	15	1		8,066	6,309	200
8/01		7,748	2,480	4,057		409	8	2		5,387	6,198	10,241		12	297	20		37	29	1		8,068	6,579	200
8/02		7,753	2,505	4,094		409	9	3		5,415	6,391	10,455		12	300	20		59	52	2		8,068	6,634	200
8/03		7,760		4,114		409		3		5,450		10,671		12		21		84		2		8,068		200
8/04		7,764		4,135		410		4		5,520		10,837		12		26		136		3		8,069		200
8/05		7,768		4,147		412		4		5,570		10,974		12		30		177		15		8,069		204
8/06		7,770		4,153		415		5		5,608		11,035		12		31		236		15		8,069		204
8/07		7,773		4,157		416		5		5,640		11,098		12		34		311		18		8,069		204
8/08		7,776		4,159		417		5		5,673		11,180		13		38		380		22		8,069		204
8/09		7,781		4,169		421		9		5,686		11,253		14		40		450		28		8,069		206
8/10		7,782		4,169		421		10		5,703		11,277		15		41		485		36		8,069		206
8/11		7,785		4,172		421		10		5,728		11,299		15		48		556		49		8,069		207
8/12		7,793		4,173		424		12		5,762		11,327		15		49		754		53		8,069		207
8/13		7,798		4,180		430		14		5,801		11,383		15		58		924		76		8,069		207
8/14		7,800		4,182		434		14		5,833		11,417		15		67		1,137		108		8,069		207
8/15		7,804		4,198		434		15		5,842		11,475		15		70		1,229		141		8,069		207
8/16		7,812		4,203		434		16		5,854		11,499		15		73		1,273		211		8,069		207
8/17		7,813		4,208		434		16		5,862		11,510		15		77		1,332		305		8,069		207
8/18		7,814		4,208		434		20		5,867		11,533		15		83		1,435		421		8,069		210
8/19		7,814		4,209		435		22		5,873		11,558		15		85		1,505		489		8,069		212
8/20		7,817		4,213		436		23		5,880		11,578		15		85		1,851		675		8,069		212
8/21		7,819		4,217		436		23		5,886		11,584		15		85		2,185		868		8,069		212
8/22		7,820		4,217		436		26		5,886		11,591		15		91		3,337		953		8,069		212
8/23		7,820		4,217		436		28		5,886		11,597		15		93		3,468		1,139		8,069		213
8/24		7,820		4,217		437		30		5,886		11,598		15		94		3,630		1,278		8,069		217
8/25		7,820		4,218		438		32		5,888		11,603		15		94		3,696		1,374		8,069		219

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Appendix B.15. (page 3 of 3)

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
8/26		7,820		4,219		440		32		5,893		11,606		15		94		3,971		1,515		8,070		221
8/27		7,820		4,221		440		32		5,898		11,607		15		94		4,035		1,721		8,083		222
8/28		7,820		4,221		440		33		5,899		11,611		15		94		4,095		1,951		8,089		224
8/29		7,820		4,221		442		33		5,903		11,612		15		94		4,112		2,149		8,090		225
8/30		7,820		4,222		445		33		5,909		11,615		17		95		5,586		2,219		8,111		227
8/31		7,820		4,222		445		35		5,918		11,622		17		95		5,861		2,326		8,113		228
9/01		7,820		4,224		445		37		5,919		11,627		17		96		6,342		3,622		8,113		230
9/02		7,820		4,224		445		37		5,919		11,631		17		96		6,544		4,340		8,113		232
9/03		7,820		4,224		445		37		5,923		11,633		17		96		6,705		4,412		8,120		234
9/04		7,820		4,224		445		37		5,923		11,642		17		96		6,856		4,597		8,120		236
9/05		7,820		4,225		445		37		5,927		11,649		17		96		7,117		4,710		8,120		239
9/06		7,820		4,225		445		39		5,928		11,657		17		96		7,175		4,818		8,120		239
9/07		7,820		4,225		445		39		5,935		11,661		17		96		7,409		4,932		8,120		239
9/08		7,820		4,226		445		39		5,935		11,664		17		96		7,443		5,357		8,120		239
9/09		7,820		4,226		445		39		5,935		11,668		17		97		7,818		5,688		8,120		239
9/10		7,820		4,226		445		39		5,940		11,668		17		97		8,296		5,774		8,120		239
9/11		7,820		4,226		445		39		5,940		11,672		17		97		8,470		5,809		8,120		239
9/12		7,820		4,227		445		39		5,940		11,672		17		97		8,517		6,375		8,120		239
9/13		7,820		4,227		445		39		5,940		11,673		17		97		8,658		7,051		8,121		241
9/14		7,820		4,227		445		39		5,940		11,673		17		97		8,763		7,968		8,121		241
9/15		7,820		4,227		445		39		5,940		11,674		17		97		8,937		8,621		8,121		241
9/16				4,227				39				11,675				97				8,681				242
9/17				4,227				39				11,675				97				8,717				243
9/18				4,227				39				11,675				97				8,862				244
9/19				4,227				39				11,675				97				8,911				246
9/20				4,227				39				11,676				97				8,914				246
9/21				4,227				39				11,679				97				8,926				248
9/22				4,227				39				11,679				97				8,927				254
9/23				4,227				39				11,681				97				8,929				272
9/24				4,227				39				11,681				97				8,930				276
9/25				4,227				39				11,682				97				8,930				278

* estimated fish passage

Appendix B.16. Estimated historical daily cumulative percent fish passage at George River weir.[a]

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
6/09		0				0				0				0	0			0	0			5		
6/10		0				0				0				0	0			0	0			8		
6/11		0				0				0				0	0			0	0			11		
6/12		0				0				0				0	0			0	0			13		
6/13		0				0				0				0	0			0	0			17		
6/14		0				0				0				0	0			0	0			21		
6/15		0	0			0				0	0			0	0			0	0			26		
6/16		0	0			0				0	0			0	0			0	0			30		
6/17		1	0			0				0	0			0	0			0	0			31		
6/18		1	0			0				0	0			0	0			0	0			33		
6/19		1	0			0				0	0			0	0			0	0			34		
6/20		1	0			0				0	0			0	0			0	0			34		
6/21	0	1	0	0	0				0	0	0		0	0	0		0	0	0		15	38		
6/22	1	2	0	0	0				4	0	0		0	0	0		0	0	0		38	39		
6/23	4	6	0	0	9				11	1	0		0	0	0		0	0	0		58	41		
6/24	14	13	0	0	20				15	2	0		0	0	0		0	0	0		64	42		
6/25	17	24	1	0	20				16	2	0		0	0	0		0	0	0		72	44		
6/26	18	28	1	5	20				18	3	0		0	0	0		0	0	0		74	46		
6/27	20	34	1	7	25				21	4	1		0	0	0		0	0	0		83	49		
6/28	22	40	2	8	29				22	5	1		0	0	0		0	0	0		83	54		
6/29	23	47	2	11	38				23	8	2		0	0	0		0	0	0		83	58		
6/30	24	57	3	15	57				24	11	3		0	0	0		0	0	0		83	61		
7/01	38	62	4	16	65				27	13	4		0	0	0		0	0	0		83	67		
7/02	47	66	4	26	69				31	14	4		0	0	0		0	0	0		83	69		
7/03	52	73	5	44	71				36	18	6		0	0	0		0	0	0		84	74		
7/04	57	78	7	52	73				42	20	7		0	0	0		0	0	0		84	78		
7/05	60	81	8	58	75				44	23	8		1	0	0		0	0	0		85	81		
7/06	68	84	9	67	77				48	25	9		1	0	0		0	0	0		86	83		
7/07	71	86	10	70	77				51	26	11		1	0	0		0	0	0		86	84		
7/08	72	86	10	70	78				55	26	12		1	0	0		0	0	0		86	88		
7/09	78	87	12	86	78				59	27	16		3	0	0		0	0	0		91	88		
7/10	80	87	14	86	79				61	28	20		3	0	0		0	0	0		91	89		
7/11	85	87	20	86	79				63	29	24		3	0	0		0	0	0		91	89		
7/12	85	90	28	90	85				65	33	28		3	6	0		0	0	0		91	90		
7/13	86	91	31	92	85				68	33	31		5	6	0		0	0	0		91	90		
7/14	88	91	33	92	85				70	33	33		6	6	0		0	0	0		91	91		
7/15	92	92	39	92	85				73	36	34		12	12	0		0	0	0		92	91		

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Appendix B.16. (page 2 of 3)

Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
7/16	93	92		44	93	85			75	37		37	14	12		0	1	0		0	92	91		
7/17	94	92		45	93	87			77	41		40	20	12		0	1	0		0	92	91		
7/18	96	93		46	93	87			80	44		43	27	24		0	1	0		0	93	91		
7/19	96	94		54	96	88			84	54		50	41	29		0	1	0		0	93	91		
7/20	97	95		67	96	89			86	59		56	51	29		0	3	0		0	93	96		
7/21	98	96		68	96	89			88	65		59	61	29		0	3	0		0	97	97		
7/22	98	97		73	96	89			90	67		62	68	35		0	3	0		0	100	98		
7/23	99	97		75	98	89			92	72		66	74	47		3	6	0		0	100	99		
7/24	99	97		80	98	90			95	75		71	84	47		6	19	0		0	100	99		
7/25	100	98		85	100	90			97	79		74	96	53		6	46	0		0	100	99		
7/26	100	98		90	100	90			100	81		77	100	53		7	100	0		0	100	99		
7/27		98		91		90				82		79		53		9		0		0		99		
7/28		99		92		90				85		82		59		9		0		0		99		
7/29		99		94		92				87		83		59		10		0		0		99		
7/30		99		94		92				88		83		59		11		0		0		99		
7/31		99		95		92				90		86		65		19		0		0		99		
8/01		99		95		92				91		88		71		10		0		0		99		
8/02		99		96		92				91		89		71		11		1		0		99		
8/03		99		97		92				92		91		71		19		1		0		99		
8/04		99		97		92				93		93		71		21		2		0		99		
8/05		99		98		93				94		94		71		21		2		0		99		
8/06		99		98		93				94		94		71		22		3		0		99		
8/07		99		98		93				95		95		71		27		3		0		99		
8/08		99		98		94				96		96		76		31		4		0		99		
8/09		100		98		95				96		96		82		32		5		0		99		
8/10		100		98		95				96		97		88		35		5		0		99		
8/11		100		98		95				96		97		88		39		6		1		99		
8/12		100		98		95				97		97		88		41		8		1		99		
8/13		100		99		97				98		97		88		42		10		1		99		
8/14		100		99		98				98		98		88		49		13		1		99		
8/15		100		99		98				98		98		88		51		14		2		99		
8/16		100		99		98				99		98		88		60		14		2		99		
8/17		100		99		98				99		99		88		69		15		3		99		
8/18		100		99		98				99		99		88		72		16		5		99		
8/19		100		99		98				99		99		88		75		17		5		99		
8/20		100		100		98				99		99		88		79		21		8		99		
8/21		100		100		98				99		99		88		86		24		10		99		

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Date	Chinook				Sockeye				Chum				Pink				Coho				Suckers			
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
8/22		100	100			98				99	99			88	88			37	11			99		
8/23		100	100			98				99	99			88	88			39	13			99		
8/24		100	100			98				99	99			88	88			41	14			99		
8/25		100	100			98				99	99			88	94			41	15			99		
8/26		100	100			99				99	99			88	96			44	17			99		
8/27		100	100			99				99	99			88	97			45	19			100		
8/28		100	100			99				99	99			88	97			46	22			100		
8/29		100	100			99				99	99			88	97			46	24			100		
8/30		100	100			100				99	99			100	97			63	25			100		
8/31		100	100			100				100	99			100	97			66	26			100		
9/01		100	100			100				100	100			100	97			71	41			100		
9/02		100	100			100				100	100			100	98			73	49			100		
9/03		100	100			100				100	100			100	98			75	49			100		
9/04		100	100			100				100	100			100	99			77	51			100		
9/05		100	100			100				100	100			100	99			80	53			100		
9/06		100	100			100				100	100			100	99			80	54			100		
9/07		100	100			100				100	100			100	99			83	55			100		
9/08		100	100			100				100	100			100	99			83	60			100		
9/09		100	100			100				100	100			100	99			87	64			100		
9/10		100	100			100				100	100			100	99			93	65			100		
9/11		100	100			100				100	100			100	99			95	65			100		
9/12		100	100			100				100	100			100	100			95	71			100		
9/13		100	100			100				100	100			100	100			97	79			100		
9/14		100	100			100				100	100			100	100			98	89			100		
9/15		100	100			100				100	100			100	100			100	97			100		
9/16			100								100				100				97					
9/17			100								100				100				98					
9/18			100								100				100				99					
9/19			100								100				100				100					
9/20			100								100				100				100					
9/21			100								100				100				100					
9/22			100								100				100				100					
9/23			100								100				100				100					
9/24			100								100				100				100					
9/25			100								100				100				100					

[a] The boxed areas within each column represent the central 50 percent test-fish catches and the median; years without boxed areas or numbers had truncated operational periods which disallowed estimating run timing.

Appendix B.17. Estimated historical daily fish passage at Tatlawiksuk River weir.

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
6/15		0		0		0		0		0		1,380
6/16		0		0		0		0		0		757
6/17		0		0		0		0		0		277
6/18	0	0	0	0	0	0	0	0	0	0	67	291
6/19	0	0	0	0	0	0	0	0	0	0	151	263
6/20	1	0	0	0	0	0	0	0	0	0	43	101
6/21	0	0	0	0	5	0	0	0	0	0	24	71
6/22	0	0	0	0	4	0	0	0	0	0	23	5
6/23	8	4	0	0	12	0	0	0	0	0	327	325
6/24	12	2	0	0	25	18	0	0	0	0	108	500
6/25	7	2	0	0	26	7	0	0	0	0	215	115
6/26	12	6	0	0	65	18	0	0	0	0	290	183
6/27	37	4	0	0	197	25	0	0	0	0	517	124
6/28	31	14	0	0	275	67	0	0	0	0	359	93
6/29	23	5	0	0	195	67	0	0	0	0	245	82
6/30	5	2	0	0	146	58	0	0	0	0	133	86
7/01	99	16	0	0	464	91	0	0	0	0	61	159
7/02	182	5	0	0	529	86	0	0	0	0	130	25
7/03	171	13	0	0	556	101	0	0	0	0	215	28
7/04	224	26	0	0	1,005	110	0	0	0	0	155	12
7/05	74	14	0	0	1,011	94	0	0	0	0	127	53
7/06	62	15	0	0	757	141	0	0	0	0	55	56
7/07	22	14	0	0	454	171	0	0	0	0	1	14
7/08		13		0		158		0		0		19
7/09		21		0		324		0		0		11
7/10		40		0		391		0		0		6
7/11		79 *		0 *		404 *		0 *		0 *		17 *
7/12		118		0		416		0		0		1
7/13		54		0		280		0		0		2
7/14		64		0		361		0		0		1
7/15		24		0		268		0		0		8
7/16		65		0		377		0		0		16
7/17		6		0		339		0		0		0
7/18		146		0		404		0		0		1
7/19		20		0		160		0		0		3
7/20		381		0		663		0		0		4
7/21		18		0		306		0		0		1
7/22		9		0		275		0		0		0
7/23		86		0		628		0		0		0
7/24		46		0		322		0		0		0
7/25		33		0		338		0		1		0
7/26		18		0		205		0		0		0
7/27		14 *		1 *		214 *		0 *		1 *		0 *
7/28		10		2		222		0		2		0

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Appendix B.17. (page 2 of 3)

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
7/29		22		0		130		0		9		0
7/30		15		0		285		0		1		0
7/31		6		0		141		0		1		0
8/01		6		0		171		0		0		0
8/02		1		0		125		0		0		0
8/03		4		2		141		0		0		0
8/04		3		0		60		0		0		0
8/05		5		0		57		0		2		0
8/06		3		0		35		0		0		0
8/07		2		0		43		0		5		0
8/08		4		0		24		0		1		0
8/09		0		0		42		1		1		0
8/10		1 *		0 *		35 *		0 *		3 *		0 *
8/11		1 *		0 *		32 *		0 *		5 *		0 *
8/12		1 *		0 *		30 *		0 *		2 *		0 *
8/13		1 *		0 *		28 *		0 *		9 *		0 *
8/14		1 *		0 *		26 *		0 *		12 *		0 *
8/15		1 *		0 *		24 *		0 *		13 *		0 *
8/16		1 *		0 *		21 *		0 *		27 *		0 *
8/17		1 *		0 *		19 *		0 *		37 *		0 *
8/18		1 *		0 *		17 *		0 *		45 *		0 *
8/19		1 *		0 *		15 *		0 *		26 *		0 *
8/20		1 *		0 *		13 *		0 *		72 *		0 *
8/21		1 *		0 *		10 *		0 *		75 *		0 *
8/22		1 *		0 *		8 *		0 *		33 *		0 *
8/23		1 *		0 *		6 *		0 *		72 *		0 *
8/24		0		0		1		0		103		0
8/25		1		0		0		0		88		0
8/26		0 *		0 *		2 *		0 *		93 *		0 *
8/27		0		0		2		0		97		0
8/28		0		0		0		0		181		0
8/29		0		0		0		0		171		0
8/30		0		0		0		0		93		0
8/31		0		0		1		0		184		0
9/01		0		0		0		0		239		0
9/02		1		1		1		0		170		0
9/03		0		0		0		0		140		0
9/04		0		0		0		0		190		1
9/05		0		0		1		0		193		1
9/06		0		0		2		0		103		1
9/07		0		0		0		0		30		0
9/08		0		0		0		0		35		0
9/09		0		0		0		0		53		0
9/10		0		0		0		0		303		0

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Appendix B.17. (page 3 of 3)

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
9/11		0		0		0		0		81		0
9/12		0		0		0		0		81		0
9/13		0		0		0		0		99		0
9/14		0		0		0		0		82		0
9/15		0		0		0		0		51		0
9/16		0		0		0		0		26		0
9/17		0		0		0		0		32		0
9/18		0		0		0		0		18		0
9/19		0		0		0		0		56		0
9/20		0		0		0		0		17		0
Total		1,494		6		9,656		1		3,464		5,093

* estimated fish passage

Appendix B.18. Estimated historical daily cumulative fish passage at Tatlawiksuk River weir.

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
6/15		0		0		0		0		0		1,380
6/16		0		0		0		0		0		2,137
6/17		0		0		0		0		0		2,414
6/18	0	0	0	0	0	0	0	0	0	0	67	2,705
6/19	0	0	0	0	0	0	0	0	0	0	218	2,968
6/20	1	0	0	0	0	0	0	0	0	0	261	3,069
6/21	1	0	0	0	5	0	0	0	0	0	285	3,140
6/22	1	0	0	0	9	0	0	0	0	0	308	3,145
6/23	9	4	0	0	21	0	0	0	0	0	635	3,470
6/24	21	6	0	0	46	18	0	0	0	0	743	3,970
6/25	28	8	0	0	72	25	0	0	0	0	958	4,085
6/26	40	14	0	0	137	43	0	0	0	0	1,248	4,268
6/27	77	18	0	0	334	68	0	0	0	0	1,765	4,392
6/28	108	32	0	0	609	135	0	0	0	0	2,124	4,485
6/29	131	37	0	0	804	202	0	0	0	0	2,369	4,567
6/30	136	39	0	0	950	260	0	0	0	0	2,502	4,653
7/01	235	55	0	0	1,414	351	0	0	0	0	2,563	4,812
7/02	417	60	0	0	1,943	437	0	0	0	0	2,693	4,837
7/03	588	73	0	0	2,499	538	0	0	0	0	2,908	4,865
7/04	812	99	0	0	3,504	648	0	0	0	0	3,063	4,877
7/05	886	113	0	0	4,515	742	0	0	0	0	3,190	4,930
7/06	948	128	0	0	5,272	883	0	0	0	0	3,245	4,986
7/07	970	142	0	0	5,726	1,054	0	0	0	0	3,246	5,000
7/08		155		0		1,212		0		0		5,019
7/09		176		0		1,536		0		0		5,030
7/10		216		0		1,927		0		0		5,036
7/11		295 *		0 *		2,331 *		0 *		0 *		5,053 *
7/12		413		0		2,747		0		0		5,054
7/13		467		0		3,027		0		0		5,056
7/14		531		0		3,388		0		0		5,057
7/15		555		0		3,656		0		0		5,065
7/16		620		0		4,033		0		0		5,081
7/17		626		0		4,372		0		0		5,081
7/18		772		0		4,776		0		0		5,082
7/19		792		0		4,936		0		0		5,085
7/20		1,173		0		5,599		0		0		5,089
7/21		1,191		0		5,905		0		0		5,090
7/22		1,200		0		6,180		0		0		5,090
7/23		1,286		0		6,808		0		0		5,090
7/24		1,332		0		7,130		0		0		5,090
7/25		1,365		0		7,468		0		1		5,090
7/26		1,383		0		7,673		0		1		5,090
7/27		1,397 *		1 *		7,886 *		0 *		2 *		5,090 *
7/28		1,407		3		8,108		0		4		5,090

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Appendix B.18. (page 2 of 3)

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
7/29		1,429		3		8,238		0		13		5,090
7/30		1,444		3		8,523		0		14		5,090
7/31		1,450		3		8,664		0		15		5,090
8/01		1,456		3		8,835		0		15		5,090
8/02		1,457		3		8,960		0		15		5,090
8/03		1,461		5		9,101		0		15		5,090
8/04		1,464		5		9,161		0		15		5,090
8/05		1,469		5		9,218		0		17		5,090
8/06		1,472		5		9,253		0		17		5,090
8/07		1,474		5		9,296		0		22		5,090
8/08		1,478		5		9,320		0		23		5,090
8/09		1,478		5		9,362		1		24		5,090
8/10		1,479 *		5 *		9,397 *		1 *		27 *		5,090 *
8/11		1,480 *		5 *		9,429 *		1 *		32 *		5,090 *
8/12		1,481 *		5 *		9,459 *		1 *		34 *		5,090 *
8/13		1,482 *		5 *		9,487 *		1 *		43 *		5,090 *
8/14		1,483 *		5 *		9,513 *		1 *		55 *		5,090 *
8/15		1,484 *		5 *		9,537 *		1 *		68 *		5,090 *
8/16		1,485 *		5 *		9,558 *		1 *		95 *		5,090 *
8/17		1,486 *		5 *		9,577 *		1 *		132 *		5,090 *
8/18		1,487 *		5 *		9,594 *		1 *		177 *		5,090 *
8/19		1,488 *		5 *		9,609 *		1 *		203 *		5,090 *
8/20		1,489 *		5 *		9,621 *		1 *		275 *		5,090 *
8/21		1,490 *		5 *		9,632 *		1 *		351 *		5,090 *
8/22		1,491 *		5 *		9,640 *		1 *		384 *		5,090 *
8/23		1,492 *		5 *		9,646 *		1 *		456 *		5,090 *
8/24		1,492		5		9,647		1		559		5,090
8/25		1,493		5		9,647		1		647		5,090
8/26		1,493 *		5 *		9,649 *		1 *		739 *		5,090 *
8/27		1,493		5		9,651		1		836		5,090
8/28		1,493		5		9,651		1		1,017		5,090
8/29		1,493		5		9,651		1		1,188		5,090
8/30		1,493		5		9,651		1		1,281		5,090
8/31		1,493		5		9,652		1		1,465		5,090
9/01		1,493		5		9,652		1		1,704		5,090
9/02		1,494		6		9,653		1		1,874		5,090
9/03		1,494		6		9,653		1		2,014		5,090
9/04		1,494		6		9,653		1		2,204		5,091
9/05		1,494		6		9,654		1		2,397		5,092
9/06		1,494		6		9,656		1		2,500		5,093
9/07		1,494		6		9,656		1		2,530		5,093
9/08		1,494		6		9,656		1		2,565		5,093
9/09		1,494		6		9,656		1		2,618		5,093
9/10		1,494		6		9,656		1		2,921		5,093

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Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
9/11		1,494		6		9,656		1		3,002		5,093
9/12		1,494		6		9,656		1		3,083		5,093
9/13		1,494		6		9,656		1		3,182		5,093
9/14		1,494		6		9,656		1		3,264		5,093
9/15		1,494		6		9,656		1		3,315		5,093
9/16		1,494		6		9,656		1		3,341		5,093
9/17		1,494		6		9,656		1		3,373		5,093
9/18		1,494		6		9,656		1		3,391		5,093
9/19		1,494		6		9,656		1		3,447		5,093
9/20		1,494		6		9,656		1		3,464		5,093

estimated fish passage

Appendix B.19. Estimated historical daily cumulative percent fish passage at Tatlawiksuk River weir.

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
6/15		0		0		0		0		0		27
6/16		0		0		0		0		0		42
6/17		0		0		0		0		0		47
6/18		0		0		0		0		0		53
6/19		0		0		0		0		0		58
6/20		0		0		0		0		0		60
6/21		0		0		0		0		0		62
6/22		0		0		0		0		0		62
6/23		0		0		0		0		0		68
6/24		0		0		0		0		0		78
6/25		1		0		0		0		0		80
6/26		1		0		0		0		0		84
6/27		1		0		1		0		0		86
6/28		2		0		1		0		0		88
6/29		2		0		2		0		0		90
6/30		3		0		3		0		0		91
7/01		4		0		4		0		0		94
7/02		4		0		5		0		0		95
7/03		5		0		6		0		0		96
7/04		7		0		7		0		0		96
7/05		8		0		8		0		0		97
7/06		9		0		9		0		0		98
7/07		10		0		11		0		0		98
7/08		10		0		13		0		0		99
7/09		12		0		16		0		0		99
7/10		14		0		20		0		0		99
7/11		20		0		24		0		0		99
7/12		28		0		28		0		0		99
7/13		31		0		31		0		0		99
7/14		36		0		35		0		0		99
7/15		37		0		38		0		0		99
7/16		41		0		42		0		0		100
7/17		42		0		45		0		0		100
7/18		52		0		49		0		0		100
7/19		53		0		51		0		0		100
7/20		79		0		58		0		0		100
7/21		80		0		61		0		0		100
7/22		80		0		64		0		0		100
7/23		86		0		71		0		0		100
7/24		89		0		74		0		0		100
7/25		91		0		77		0		0		100
7/26		93		0		79		0		0		100
7/27		94		17		82		0		0		100
7/28		94		50		84		0		0		100

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Appendix B.19. (page 2 of 3)

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
7/29		96		50		85		0		0		100
7/30		97		50		88		0		0		100
7/31		97		50		90		0		0		100
8/01		97		50		91		0		0		100
8/02		98		50		93		0		0		100
8/03		98		83		94		0		0		100
8/04		98		83		95		0		0		100
8/05		98		83		95		0		0		100
8/06		99		83		96		0		0		100
8/07		99		83		96		0		1		100
8/08		99		83		97		0		1		100
8/09		99		83		97		100		1		100
8/10		99		83		97		100		1		100
8/11		99		83		98		100		1		100
8/12		99		83		98		100		1		100
8/13		99		83		98		100		1		100
8/14		99		83		99		100		2		100
8/15		99		83		99		100		2		100
8/16		99		83		99		100		3		100
8/17		99		83		99		100		4		100
8/18		100		83		99		100		5		100
8/19		100		83		100		100		6		100
8/20		100		83		100		100		8		100
8/21		100		83		100		100		10		100
8/22		100		83		100		100		11		100
8/23		100		83		100		100		13		100
8/24		100		83		100		100		16		100
8/25		100		83		100		100		19		100
8/26		100		83		100		100		21		100
8/27		100		83		100		100		24		100
8/28		100		83		100		100		29		100
8/29		100		83		100		100		34		100
8/30		100		83		100		100		37		100
8/31		100		83		100		100		42		100
9/01		100		83		100		100		49		100
9/02		100		100		100		100		54		100
9/03		100		100		100		100		58		100
9/04		100		100		100		100		64		100
9/05		100		100		100		100		69		100
9/06		100		100		100		100		72		100
9/07		100		100		100		100		73		100
9/08		100		100		100		100		74		100
9/09		100		100		100		100		76		100
9/10		100		100		100		100		84		100

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Appendix B.19. (page 3 of 3)

Date	Chinook		Sockeye		Chum		Pink		Coho		Suckers	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
9/11		100		100		100		100		87		100
9/12		100		100		100		100		89		100
9/13		100		100		100		100		92		100
9/14		100		100		100		100		94		100
9/15		100		100		100		100		96		100
9/16		100		100		100		100		96		100
9/17		100		100		100		100		97		100
9/18		100		100		100		100		98		100
9/19		100		100		100		100		100		100
9/20		100		100		100		100		100		100

[a] The boxed areas within each column represent the central 50 percent test-fish catches and the median; years without boxed areas or numbers had truncated operational periods which disallowed estimating run timing.

Appendix B.20. Middle Kuskokwim River, District 2 commercial effort 1970-1999.

Year	Unrestricted Mesh Season	Restricted Mesh Season	Coho Salmon Season	Total
1970	10	a	11	18
1971	22	a	a	22
1972	12	a	a	12
1973	28	a	a	28
1974	36	a	16	37
1975	38	a	a	38
1976	55	a	11	57
1977	83	54	24	105
1978	28	a	16	43
1979	41	a	20	43
1980	37	21	12	43
1981	153	11	16	153
1982	38	50	25	60
1983	14	42	9	43
1984	15	49	32	58
1985	b	17	16	23
1986	b	21	35	43
1987	b	24	20	29
1988	b	19	21	29

	Number of Permits Landing Each Species						
	Chinook	Sockeye	Coho	Pink	Chum	Roe	Total
1989	20	19	29	8	26	2	30
1990	19	19	21	13	20	0	22
1991	20	20	22	9	22	0	23
1992	18	18	22	3	21	0	22
1993	10	4	20	0	19	0	20
1994	5	3	20	7	20	0	20
1995	18	19	15	0	20	0	21
1996	6	3	8	0	6	6	8
1997	3	1	4	0	2	0	4
1998	2	0	3	0	3	0	3
1999	a	a	a	a	a	a	a
Ten Year Average (1989-1998)	12	11	16	4	16	1	17

a No commercial salmon season.
b No unrestricted mesh season.

APPENDIX C

Appendix C.1. Quinhagak District commercial effort, 1970-1999.

YEAR	NUMBER OF PERIODS	FISHING HOURS[a]	EFFORT[b]
1970	14	1494	88
1971	6	630	61
1972	16	192	107
1973	28	504	109
1974	30	360	196
1975	24	288	127
1976	27	324	181
1977	27	324	258
1978	37	444	200
1979	36	432	206
1980	36	432	169
1981	33	396	186
1982	34	408	177
1983	28	318	226
1984	33	396	263
1985	23	276	300
1986	29	348	324
1987	19	216	310
1988	32	384	288
1989	29	348	227
1990	30	444	390
1991	31	372	346
1992	34	420	349
1993	32	384	409
1994	32	384	308
1995	35	414	382
1996	27	298	218
1997	31	372	289
1998	34	408	203
1999	19	228	218
Ten Year Average (1989-98)	32	384	312

a Number of hours that fishing was open in the Quinhagak District.
b Permits that made at least one delivery during the year.

Appendix C.2. Historical commercial effort by salmon species caught in Quinhagak District, 1975-1999.

YEAR	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1975	120	124	81	99	124	127
1976	169	145	90	167	176	181
1977	245	205	76	76	260	258
1978	195	101	77	140	197	200
1979[b]						206
1980	152	126	120	143	156	169
1981	187	176	142	56	190	186
1982[b]						177
1983	216	204	111	81	213	226
1984	238	229	227	209	238	263
1985	284	276	167	26	286	300
1986	320	307	148	201	315	324
1987	289	268	184	34	290	310
1988	253	186	182	167	236	288
1989	208	191	160	75	211	227
1990	377	371	138	259	386	390
1991	319	332	164	0	330	346
1992	329	340	189	280	341	349
1993	403	406	158	4	402	409
1994	288	278	136	238	289	308
1995	364	345	173	72	367	382
1996	202	212	137	1	210	218
1997	286	284	113	3	275	289
1998	199	199	117	76	196	203
1999	212	214	86	0	212	218
Ten Year Average (89-98)	298	296	149	31[a]	301	312

a Average of odd years only.
b Catch by permit unavailable.

Appendix C.3. Quinhagak District commercial salmon harvest, 1960-1999.

YEAR	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1960	0	5,649	3,000	0	0	8,649
1961	4,328	2,308	46	90	18,864	25,636
1962	5,526	10,313	0	4,340	45,707	65,886
1963	6,555	0	0	0	0	6,555
1964	4,081	13,422	379	939	707	19,528
1965	2,976	1,886	0	0	4,242	9,104
1966	278	1,030	0	268	2,610	4,186
1967	0	652	1926	0	8,087	10,665
1968	8,879	5,884	21,511	75,818	19,497	131,589
1969	16,802	3,784	15,077	953	38,206	74,822
1970	18,269	5,393	16,850	15,195	46,556	102,263
1971	4,185	3,118	2,982	13	30,208	40,506
1972	15,880	3,286	376	1,878	17,247	38,667
1973	14,993	2,783	16,515	277	19,680	54,248
1974	8,704	19,510	10,979	43,642	15,298	98,133
1975	3,928	8,584	10,742	486	35,233	58,973
1976	14,110	6,090	13,777	31,412	43,659	109,048
1977	19,090	5,519	9,028	202	43,707	77,546
1978	12,335	7,589	20,114	47,033	24,798	111,869
1979	11,144	18,828	47,525	295	25,995	103,787
1980	10,387	13,221	62,610	21,671	65,984	173,873
1981	24,524	17,292	47,551	160	53,334	142,861
1982	22,106	25,685	73,652	11,838	34,346	167,627
1983	46,385	10,263	32,442	168	23,090	112,348
1984	33,663	17,255	132,151	16,249	50,422	249,740
1985	30,401	7,876	29,992	28	20,418	88,715
1986	22,835	21,484	57,544	8,700	29,700	140,263
1987	26,022	6,489	50,070	66	8,557	91,204
1988	13,883	21,556	68,605	21,310	29,220	154,574
1989	20,820	20,582	44,607	273	39,395	125,677
1990	27,644	83,681	26,926	12,056	47,717	198,024
1991	9,480	53,657	42,571	115	54,493	160,316
1992	17,197	60,929	86,404	64,217	73,383	302,130
1993	15,784	80,934	55,817	7	40,943	193,485
1994	8,564	72,314	83,912	35,904	61,301	261,995
1995	38,584	68,194	66,203	186	81,462	254,629
1996	14,165	57,665	118,718	20	83,005[b]	273,573
1997	35,510	69,562	32,862	5	38,445	176,384
1998	23,158	41,382	80,183	2,217	45,095	192,035
1999	18,426	41,315	6,184	0	38,091	104,016
Ten Year Average (89 – 98)	21,091	60,890	63,820	117[a]	56,524	213,825

a Average of odd years only
b Estimate of chum roe included

Appendix C.4. Kanektok River aerial surveys by species, 1962-1999[a].

Year	SPECIES			
	Chinook	Sockeye	Coho	Chum
1962	935	43,108		
1963				
1964				
1965				
1966	3,718			28,800
1967				
1968	4,170	8,000		14,000
1969				
1970	3,112	11,375		
1971				
1972				
1973	814			
1974				
1975		6,018		
1976		22,936		8,697
1977	5,787	7,244		32,157
1978[b]	19,180	44,215		229,290
1979				
1980				
1981[c]	6,172	113,931	69,325	25,950
1982[d]	15,900	49,175		71,840
1983	8,142	55,940		
1984[e]	8,890	2,340		9,360
1985	12,182	30,840	46,830	53,060
1986	13,465	16,270		14,385
1987	3,643	14,940		16,790
1988	4,223	51,753	20,056	9,420
1989	11,180	30,440		20,583
1990	7,914	14,735		6,270
1991[d]	2,563	32,082		2,475
1992[f]	2,100	44,436	4,330	19,052
1993	3,856	14,955		25,675
1994[g]	4,670	23,128		1,285
1995	7,386	30,090		10,000
1996[g]				
1997[h]	6,107	22,020	23,656	7,040
1998	8,080	27,100	5,192	3,270
1999[i]				
	1,118	11,670	10,120	10,000
OBJECTIVE:	5,000	15,000		30,500

a Aerial surveys are those rated fair or good surveys obtained between 20 July and 5 August for chinook and sockeye salmon, 20-31 July for chum salmon, and 20 August and 5 September for coho salmon. Some surveys which do not meet these criteria may be referenced in this table; text are footnoted.

b Chum salmon count excluded from escapement objective calculation due to exceptional magnitude.

c Poor survey for chinook, sockeye, chum salmon.

d Late survey for chinook, sockeye salmon (after 5 August).

e Poor coho survey.

f Some chum may have been sockeye.

g Chum count not at peak, estimate made during chinook survey.

h Chinook, chum and sockeye numbers from 2 August. Chum not at peak. Coho survey on October 1, not at peak.

i Survey occurred before peak for chinook, sockeye and chum salmon (July 14).

Appendix C.5. Summary of historical commercial harvest by period, Quinhagak District, chinook salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	1	0	0	0	0
6/13	5	33	7720	6669	0.0559
6/14	2	0	5080	2540	0.0642
6/15	5	1165	3914	2948	0.0948
6/16	5	0	7835	1179	0.1291
6/17	2	3527	8190	5859	0.1551
6/18	6	1942	11997	5710	0.2350
6/19	3	3525	6405	5801	0.2701
6/20	5	746	7341	3031	0.3113
6/21	5	4075	6194	4493	0.3659
6/22	4	3642	10586	4377	0.4170
6/23	4	2039	11652	4807	0.4689
6/24	7	1403	6698	3476	0.5319
6/25	6	2125	4539	3435	0.5773
6/26	4	1506	3578	1722	0.5962
6/27	3	1849	9711	3795	0.6304
6/28	5	1438	5468	3283	0.6662
6/29	5	0	2378	1919	0.6841
6/30	5	690	4496	1272	0.7067
7/01	5	657	3752	1916	0.7307
7/02	8	1105	3602	1872	0.7646
7/03	6	1096	2771	1903	0.7902
7/04	5	508	4068	1381	0.8114
7/05	8	611	2710	1020	0.8326
7/06	6	273	1670	844	0.8443
7/07	8	620	1566	1135	0.8646
7/08	6	465	2407	837	0.8801
7/09	8	441	1259	731	0.8936
7/10	5	334	956	736	0.9013
7/11	9	331	1545	621	0.9173
7/12	4	306	687	483	0.9217
7/13	8	205	1011	494	0.9313
7/14	9	26	1351	438	0.9415
7/15	7	230	1306	352	0.9509
7/16	6	196	533	311	0.9554
7/17	7	130	443	222	0.9594
7/18	6	187	845	231	0.9641
7/19	6	97	792	154	0.9679
7/20	6	89	490	265	0.9716
7/21	8	90	248	172	0.9746
7/22	6	35	629	171	0.9775
7/23	7	0	324	106	0.9797
7/24	7	33	254	105	0.9816
7/25	6	0	379	110	0.9834
7/26	5	0	93	42	0.9839

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	10	0	194	91	0.9861
7/28	5	31	63	56	0.9866
7/29	8	21	116	81	0.9879
7/30	6	47	111	76	0.9890
7/31	8	0	63	38	0.9896
8/01	7	28	153	67	0.9908
8/02	7	14	53	35	0.9913
8/03	9	16	160	53	0.9925
8/04	5	0	59	30	0.9928
8/05	10	6	141	36	0.9939
8/06	7	19	78	38	0.9945
8/07	6	15	49	27	0.9949
8/08	8	0	71	19	0.9954
8/09	6	6	36	12	0.9956
8/10	8	0	125	38	0.9964
8/11	6	6	31	16	0.9966
8/12	8	12	74	21	0.9972
8/13	6	0	36	17	0.9974
8/14	8	6	29	14	0.9977
8/15	6	2	43	28	0.9980
8/16	9	1	16	10	0.9982
8/17	8	1	66	13	0.9985
8/18	8	6	13	10	0.9986
8/19	10	0	51	10	0.9989
8/20	6	6	16	9	0.9991
8/21	9	4	13	5	0.9992
8/22	6	3	33	9	0.9994
8/23	8	1	11	5	0.9995
8/24	7	1	14	4	0.9995
8/25	8	0	16	5	0.9996
8/26	9	1	17	5	0.9997
8/27	4	3	4	3	0.9998
8/28	8	2	8	4	0.9998
8/29	7	0	7	2	0.9999
8/30	3	0	9	1	0.9999
8/31	8	0	3	1	0.9999
9/01	6	0	10	1	0.9999
9/02	8	0	4	1	1.0000
9/03	5	0	2	0	1.0000
9/04	6	0	4	2	1.0000
9/05	7	0	2	1	1.0000
9/06	5	0	1	0	1.0000
9/07	8	0	0	0	1.0000
9/08	3	0	0	0	1.0000
9/09	1	0	0	0	1.0000

Appendix C.6. Summary of historical commercial harvest by period, Quinhagak District, sockeye salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	1	0	0	0	0
6/13	5	4	216	55	0.0006
6/14	2	0	384	192	0.0011
6/15	5	62	440	99	0.0021
6/16	5	0	411	150	0.0032
6/17	2	356	1119	738	0.0051
6/18	6	117	574	449	0.0082
6/19	3	171	1678	741	0.0115
6/20	5	111	485	367	0.0135
6/21	5	396	2322	1336	0.0228
6/22	4	379	1146	754	0.0267
6/23	4	343	1741	1497	0.0332
6/24	7	638	3271	1643	0.0501
6/25	6	732	3043	1654	0.0631
6/26	4	805	2777	2009	0.0728
6/27	3	461	4923	543	0.0804
6/28	5	1908	10941	2413	0.1058
6/29	5	0	6304	3940	0.1285
6/30	5	1360	9771	2601	0.1586
7/01	5	975	8625	3498	0.1874
7/02	8	1242	10007	2748	0.2277
7/03	6	2244	7045	3580	0.2588
7/04	5	627	8757	5555	0.2869
7/05	8	1157	15375	3650	0.3368
7/06	6	1126	8381	4998	0.3749
7/07	8	1211	8326	3978	0.4190
7/08	6	1289	9304	5005	0.4593
7/09	8	1532	9824	5661	0.5146
7/10	5	2229	9894	4622	0.5494
7/11	9	1901	7672	5800	0.6051
7/12	4	1468	6827	4149	0.6264
7/13	8	1842	13450	4974	0.6892
7/14	9	279	7490	3134	0.7275
7/15	7	1240	6687	4505	0.7658
7/16	6	564	8537	3262	0.7957
7/17	7	937	5203	3609	0.8258
7/18	6	657	5842	1388	0.8425
7/19	6	866	12850	2538	0.8730
7/20	6	477	4611	2120	0.8902
7/21	8	477	3360	1160	0.9065
7/22	6	799	3537	1305	0.9189
7/23	7	0	4361	715	0.9326
7/24	7	215	2610	944	0.9425
7/25	6	0	2681	684	0.9501
7/26	5	0	1580	529	0.9551

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	10	0	2096	476	0.9631
7/28	5	102	959	645	0.9669
7/29	8	126	997	438	0.9719
7/30	6	19	1516	431	0.9761
7/31	8	1	730	218	0.9789
8/01	7	42	757	157	0.9813
8/02	7	38	583	138	0.9834
8/03	9	30	408	137	0.9854
8/04	5	3	442	144	0.9868
8/05	10	6	333	153	0.9887
8/06	7	16	321	143	0.9899
8/07	6	30	481	125	0.9913
8/08	8	0	198	68	0.9922
8/09	6	6	307	75	0.9929
8/10	8	10	112	29	0.9934
8/11	6	6	250	61	0.9942
8/12	8	1	125	57	0.9948
8/13	6	0	205	24	0.9953
8/14	8	1	194	31	0.9959
8/15	6	12	166	32	0.9963
8/16	9	0	133	38	0.9968
8/17	8	1	71	17	0.9971
8/18	8	6	146	32	0.9975
8/19	10	0	48	12	0.9977
8/20	6	3	97	31	0.9980
8/21	9	0	139	23	0.9984
8/22	6	1	75	12	0.9986
8/23	8	1	102	15	0.9989
8/24	7	0	18	2	0.9990
8/25	8	0	114	9	0.9992
8/26	9	0	33	5	0.9994
8/27	4	0	30	5	0.9994
8/28	8	0	68	6	0.9996
8/29	7	0	11	6	0.9997
8/30	3	0	58	0	0.9997
8/31	8	0	20	4	0.9998
9/01	6	0	32	3	0.9999
9/02	8	0	14	5	0.9999
9/03	4	0	8	1	0.9999
9/04	6	0	18	3	1.0000
9/05	7	0	16	0	1.0000
9/06	5	0	1	0	1.0000
9/07	8	0	5	0	1.0000
9/08	3	0	3	0	1.0000
9/09	1	0	0	0	1.0000

Appendix C.7. Summary of historical commercial harvest by period, Quinhagak District, coho salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	1	0	0	0	0.0000
6/13	5	0	0	0	0.0000
6/14	2	0	0	0	0.0000
6/15	5	0	0	0	0.0000
6/16	5	0	0	0	0.0000
6/17	2	0	0	0	0.0000
6/18	6	0	0	0	0.0000
6/19	3	0	0	0	0.0000
6/20	5	0	0	0	0.0000
6/21	5	0	0	0	0.0000
6/22	4	0	0	0	0.0000
6/23	4	0	0	0	0.0000
6/24	7	0	0	0	0.0000
6/25	6	0	0	0	0.0000
6/26	4	0	0	0	0.0000
6/27	3	0	0	0	0.0000
6/28	5	0	0	0	0.0000
6/29	5	0	0	0	0.0000
6/30	5	0	2	0	0.0000
7/01	5	0	0	0	0.0000
7/02	8	0	1	0	0.0000
7/03	6	0	0	0	0.0000
7/04	5	0	0	0	0.0000
7/05	8	0	0	0	0.0000
7/06	6	0	0	0	0.0000
7/07	8	0	0	0	0.0000
7/08	6	0	0	0	0.0000
7/09	8	0	39	0	0.0000
7/10	5	0	5	0	0.0000
7/11	9	0	9	0	0.0001
7/12	4	0	2	0	0.0001
7/13	8	0	38	3	0.0001
7/14	9	0	2	0	0.0001
7/15	7	0	24	4	0.0002
7/16	6	0	39	3	0.0002
7/17	7	0	251	10	0.0005
7/18	6	1	234	11	0.0007
7/19	6	2	88	12	0.0009
7/20	6	3	787	59	0.0021
7/21	8	0	366	17	0.0026
7/22	6	1	250	27	0.0030
7/23	7	0	1386	36	0.0047
7/24	7	21	2295	93	0.0074
7/25	6	0	3482	309	0.0115
7/26	5	0	122	82	0.0118

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	10	0	5512	389	0.0227
7/28	5	29	1214	294	0.0244
7/29	8	152	7989	639	0.0352
7/30	6	103	3079	637	0.0417
7/31	8	146	5597	764	0.0506
8/01	7	389	5680	910	0.0610
8/02	7	200	12478	1789	0.0807
8/03	9	592	5390	1294	0.0954
8/04	5	168	4293	1755	0.1027
8/05	10	387	19091	3045	0.1398
8/06	7	1589	8436	4206	0.1661
8/07	6	693	8188	4929	0.1928
8/08	8	0	19215	2536	0.2325
8/09	6	1831	11553	5486	0.2651
8/10	8	1237	9428	5771	0.3062
8/11	6	2458	10076	6136	0.3386
8/12	8	2710	10458	3628	0.3757
8/13	6	1561	10961	5725	0.4065
8/14	8	1671	10424	3898	0.4415
8/15	6	1603	15733	7852	0.4875
8/16	9	1403	8299	3203	0.5192
8/17	8	2008	9897	5584	0.5599
8/18	8	1008	9776	6564	0.6035
8/19	10	0	12931	4526	0.6493
8/20	6	3958	8728	5540	0.6797
8/21	9	2110	9161	3662	0.7156
8/22	6	2493	8437	4582	0.7400
8/23	8	2400	11957	4528	0.7787
8/24	7	2790	8673	5394	0.8107
8/25	8	115	5308	2807	0.8292
8/26	9	1419	6505	4552	0.8611
8/27	4	1431	5975	3687	0.8741
8/28	8	1335	4684	3245	0.8958
8/29	7	0	3623	2701	0.9109
8/30	3	1054	9431	2193	0.9221
8/31	8	1427	7145	2668	0.9437
9/01	6	0	2565	1739	0.9522
9/02	8	535	5148	1454	0.9679
9/03	5	0	2777	600	0.9732
9/04	6	0	4442	1484	0.9826
9/05	7	0	3799	901	0.9896
9/06	5	0	1769	0	0.9921
9/07	8	0	3956	305	0.9989
9/08	3	0	1262	0	1.0000
9/09	1	0	0	0	1.0000

Appendix C.8. Summary of historical commercial harvest by period, Quinhagak District, chum salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	1	0	0	0	0.0000
6/13	5	14	1092	84	0.0017
6/14	2	0	2125	1063	0.0042
6/15	5	189	2821	1008	0.0105
6/16	5	0	847	279	0.0128
6/17	2	1556	1916	1736	0.0168
6/18	6	290	2611	1623	0.0275
6/19	3	788	1913	1198	0.0321
6/20	5	287	2760	746	0.0383
6/21	5	766	4471	2150	0.0507
6/22	4	1051	6984	1854	0.0645
6/23	4	1103	3226	1452	0.0730
6/24	7	732	5990	1500	0.0957
6/25	6	1711	6662	2956	0.1215
6/26	4	1199	4329	2190	0.1332
6/27	3	1855	2722	1874	0.1407
6/28	5	2458	5449	4559	0.1646
6/29	5	0	8441	5269	0.1958
6/30	5	2066	4903	2501	0.2144
7/01	5	1836	13544	4191	0.2524
7/02	8	1972	6034	3424	0.2874
7/03	6	1788	10073	4734	0.3242
7/04	5	2333	3155	2839	0.3407
7/05	8	1820	7481	4322	0.3828
7/06	6	2192	8484	4584	0.4155
7/07	8	2939	7138	3630	0.4538
7/08	6	3050	8296	4472	0.4889
7/09	8	2239	8768	4242	0.5356
7/10	5	4022	5667	5221	0.5652
7/11	9	2313	9329	3997	0.6136
7/12	4	3211	9074	3803	0.6370
7/13	8	3182	9794	4841	0.6889
7/14	9	134	6668	2084	0.7204
7/15	7	2796	10756	5791	0.7700
7/16	6	1784	4359	2370	0.7892
7/17	7	2326	8308	3842	0.8257
7/18	6	1310	4343	2806	0.8453
7/19	6	1577	4960	2762	0.8663
7/20	6	1590	4684	2806	0.8874
7/21	8	1143	2503	1804	0.9039
7/22	6	990	2696	1740	0.9163
7/23	7	0	2210	1690	0.9284
7/24	7	499	2713	1406	0.9411
7/25	6	0	1397	1078	0.9477
7/26	5	0	1460	1279	0.9534

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Appendix C.8. (page 2 of 2)

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	10	0	1885	710	0.9619
7/28	5	333	975	714	0.9658
7/29	8	190	1412	669	0.9724
7/30	6	173	802	551	0.9760
7/31	8	5	715	364	0.9796
8/01	7	246	479	334	0.9824
8/02	7	153	459	288	0.9848
8/03	9	110	580	247	0.9876
8/04	5	4	652	116	0.9889
8/05	10	98	357	196	0.9913
8/06	7	52	381	181	0.9929
8/07	6	43	260	108	0.9939
8/08	8	0	234	119	0.9948
8/09	6	11	265	105	0.9956
8/10	8	9	108	57	0.9961
8/11	6	4	110	44	0.9965
8/12	8	15	109	49	0.9970
8/13	6	2	100	36	0.9974
8/14	8	13	166	31	0.9979
8/15	6	6	106	36	0.9982
8/16	9	2	96	28	0.9986
8/17	8	0	50	15	0.9988
8/18	8	7	49	11	0.9989
8/19	10	0	54	12	0.9992
8/20	6	3	27	13	0.9993
8/21	9	2	26	11	0.9994
8/22	6	1	18	13	0.9995
8/23	8	3	27	12	0.9996
8/24	7	0	8	1	0.9996
8/25	8	0	25	5	0.9997
8/26	9	0	15	5	0.9998
8/27	4	0	6	2	0.9998
8/28	8	2	17	4	0.9998
8/29	7	0	3	0	0.9998
8/30	3	0	18	1	0.9999
8/31	8	0	10	1	0.9999
9/01	6	0	8	1	0.9999
9/02	8	0	7	1	0.9999
9/03	5	0	43	0	1.0000
9/04	6	0	13	0	1.0000
9/05	7	0	5	0	1.0000
9/06	5	0	0	0	1.0000
9/07	8	0	2	0	1.0000
9/08	3	0	0	0	1.0000
9/09	1	0	0	0	1.0000

APPENDIX D

Appendix D.1. Goodnews Bay District commercial effort 1970-1999.

YEAR	NUMBER OF PERIODS	FISHING HOURS[a]	EFFORT[b]
1970	28	624	35
1971	3	156	16
1972	8	186	14
1973	24	288	21
1974	30	360	49
1975	24	288	50
1976	32	384	40
1977	24	288	34
1978	36	432	35
1979	36	432	30
1980	38	456	48
1981	34	492	48
1982	34	540	48
1983	28	336	79
1984	31	372	77
1985	22	264	69
1986	30	360	86
1987	21	252	69
1988	30	360	125
1989	28	336	88
1990	28	396	82
1991	27	432	72
1992	26	396	111
1993	28	336	114
1994	32	432	116
1995	25	396	118
1996	21	247	53
1997	23	276	54
1998	29	348	50
1999	20	240	73
Ten Year Average (1989-98)	27	360	86

a Number of hours that fishing was open in the Goodnews Bay District.
b Permits that made at least one delivery during the year.

Appendix D.2. Historical commercial effort by salmon species caught in Goodnews District, 1975-1999.

YEAR	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1975	37	41	35	31	41	41
1976	39	41	31	39	41	42
1977	29	34	30	13	31	35
1978	29	30	30	30	29	34
1979[b]						30
1980	37	39	40	37	35	41
1981	43	44	44	1	41	44
1982	45	44	45	44	43	47
1983	71	68	40	0	70	72
1984	67	63	71	66	66	77
1985	63	63	52	6	63	69
1986	70	85	64	79	81	86
1987[b]						69
1988	106	123	76	87	100	125
1989	63	82	83	41	66	88
1990	71	82	42	41	81	82
1991	57	67	52	0	62	72
1992	85	111	53	104	106	111
1993	102	113	56	0	110	114
1994	106	116	44	105	115	116
1995	100	118	49	24	108	118
1996	46	53	32	1	53	53
1997	52	54	27	0	52	54
1998	49	50	33	26	50	50
1999	63	73	29	0	71	73
Ten Year Average (89-98)	73	85	47	13[a]	80	86

a Average of odd years only.
b Catch by permit unavailable.

Appendix D.3. Goodnews Bay District commercial salmon harvest, 1968-1999.

YEAR	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1968			5,458			5,458
1969	3,978	6,256	11,631	298	5,006	27,169
1970	7,163	7,144	6,794	12,183	12,346	45,630
1971	477	330	1,771	0	301	2,879
1972	264	924	925	66	1,331	3,510
1973	3,543	2,072	5,017	324	15,781	26,737
1974	3,302	9,357	21,340	16,373	8,942	59,314
1975	2,156	9,098	17,889	419	5,904	35,466
1976	4,417	5,575	9,852	8,453	10,354	38,651
1977	3,336	3,723	13,335	29	6,531	26,954
1978	5,218	5,412	13,764	9,103	8,590	42,087
1979	3,204	19,581	42,098	201	9,298	74,382
1980	2,331	28,632	43,256	7,832	11,748	93,799
1981	7,190	40,273	19,749	11	13,642	80,865
1982	9,476	38,877	46,683	4,673	13,829	113,538
1983	14,117	11,716	19,660	0	6,766	52,259
1984	8,612	15,474	71,176	4,711	14,340	114,313
1985	5,793	6,698	16,498	8	4,784	33,781
1986	2,723	25,112	19,378	4,447	10,355	62,015
1987	3,357	27,758	29,057	54	20,381	80,607
1988	4,964	36,368	30,832	5,509	33,059	110,732
1989	2,966	19,299	31,849	82	13,622	67,818
1990	3,303	35,823	7,804	629	13,194	60,753
1991	912	39,838	13,312	29	15,892	69,983
1992	3,528	39,194	19,875	14,310	18,520	95,427
1993	2,117	59,293	20,014	0	10,657	92,081
1994	2,570	69,490	47,499	18,017	28,477	166,053
1995	2,922	37,351	17,875	39	19,832	78,019
1996	1,375	30,717	43,836	22	11,093	87,043
1997	2,039	31,451	2,983	0	11,729	48,202
1998	3,675	27,161	21,246	411	14,155	66,648
1999	1,888	22,910	2,474	0	11,562	38,834
Ten Year Average (89 – 98)	2,541	38,962	22,629	30[a]	15,717	83,203

a Average of odd years only

Appendix D.4. Historical estimated salmon run size and commercial exploitation rate, Goodnews River, 1981-1999.

Year	Species	Middle Fork Tower/Weir Estimate	Middle Fork Aerial Survey Count as a Percentage of Weir Est.	North Fork Goodnews River Escapement Estimate	Goodnews Bay Subsistence Harvest Estimate	Goodnews Bay Commercial Harvest	Total Run Size Estimate	Exploitation[a] Rate (% of Run)
1981	Chinook	3,688	-b	7,766[c]	1,409	7,190	20,053	43
	Sockeye	49,108	-b	100,029[c]	3,511[d]	40,273	192,921	23
	Chum	21,827	-b	53,799[c]	-	13,642	89,268	15
1982	Chinook	1,395	-b	2,937[c]	1,236	9,476	15,044	71
	Sockeye	56,255	-b	114,587[c]	2,754[d]	38,877	212,473	20
	Chum	6,767	-b	16,679[c]	-	13,829	37,275	37
1983	Chinook	6,022	36	14,398	1,066	14,117	35,603	43
	Sockeye	25,813	22	69,955	1,518[d]	11,716	109,002	12
	Chum	15,548	-b	38,323[c]	-	6,766	60,637	11
1984	Chinook	3,260	35	8,743	629	8,612	21,244	43
	Sockeye	32,053	27	67,213	964	15,474	115,704	14
	Chum	19,003	35	117,739	189	14,340	151,271	10
1985	Chinook	2,831	70	7,979	426	5,793	17,029	37
	Sockeye	24,131	11	50,481	704	6,698	82,014	9
	Chum	10,367	32	25,025	348	4,784	40,524	13
1986	Chinook	2,092	57	4,094	555	2,723	9,464	35
	Sockeye	51,069	28	93,228	942	25,112	170,351	15
	Chum	14,764	38	51,910	191	10,355	77,220	14
1987	Chinook	2,272	100	4,490	816	3,357	10,935	38
	Sockeye	28,871	85	51,989	955	27,758	109,573	26
	Chum	17,517	58	37,802	578	20,381	76,278	27
1988	Chinook	2,712	39	5,419	310	4,964	13,405	39
	Sockeye	15,799	30	38,319	1065	36,368	91,551	41
	Chum	20,799	21	39,501	448	33,059	93,807	36
1989	Chinook	1,915	67	2,891	467	2,966	8,239	42
	Sockeye	21,186	60	35,476	869	19,299	76,830	26
	Chum	10,380	28	15,495	760	13,622	40,257	36
1990	Chinook	3,636	-b	7,656[c]	682	3,303	15,277	26
	Sockeye	31,679	-b	64,528[c]	905	35,823	132,935	28
	Chum	6,410	-b	15,799[c]	342	13,194	35,745	38
1991[e]	Chinook	1,952	-b	4,521[c]	682	912	8,067	20
	Sockeye	47,397	-b	96,544[c]	900	39,838	184,679	22
	Chum	27,525	-b	67,844[c]	106	15,892	111,367	14
1992	Chinook	1,903	61	1,854	252	3,528	7,537	50
	Sockeye	27,268	21	52,501	905	39,194	119,868	33
	Chum	22,023	19	16,084	662	18,520	57,289	33
1993	Chinook	2,349	-b	4,727[c]	488	2,117	9,681	27
	Sockeye	26,452	-b	54,325[c]	572	59,293	140,642	43
	Chum	14,952	-b	38,061[c]	133	10,657	63,803	17

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1994	Chinook	3,856	-b	7,866[c]	657	2,570	14,949	22
	Sockeye	55,751	-b	115,405[c]	652	69,490	241,298	29
	Chum	34,849	-b	91,653[c]	402	28,477	155,381	19
1995	Chinook	4,836	-b	9,865 [c]	552	2,922	18,175	19
	Sockeye	39,009	-b	80,749 [c]	787	37,351	157,896	24
	Chum	33,699	-b	88,628 [c]	329	19,832	142,488	14
1996	Chinook	2,930	-b	5,977 [c]	526	1,375	10,808	18
	Sockeye	58,264	-b	120,606 [c]	763	30,717	210, 350	15
	Chum	40,450	-b	106,384 [c]	326	11,093	158,253	7
1997	Chinook	2,937	51	7,216	449	2,039	12,641	20
	Sockeye	35,530	57	23,462	609	31,451	91,052	35
	Chum	17,296	-b	45,488 [c]	133	11,729	74,646	16
1998	Chinook	4,584	18	3,797	718	3,675	12,774	34
	Sockeye	47,951	25	14,693	508	27,161	90,313	31
	Chum	28,905	15	24,940	316	14,155	68,316	21
1999	Chinook	3,221	-b	6,565 [c]	871	1,888	12,545	22
	Sockeye	48,205	-b	99,727 [c]	872	22,910	171,714	14
	Chum	19,533	-b	51,361 [c]	281	11,562	82,737	14

a Commercial and subsistence exploitation
b Incomplete aerial survey results
c Average Middle Fork/Goodnews River escapement estimate ratio for 1983-1989 used to estimate Goodnews River escapement in years with no aerial survey data. After 1992, that year is included in the estimate ratio also.
d Subsistence caught chum salmon is included in subsistence sockeye salmon harvest
e Goodnews Tower Project changed to weir project in 1991.

Appendix D.5. Aerial survey results, Goodnews River 1980-1999.

	Goodnews River and Lake				Middle Fork Goodnews River and Lakes			
Year	Chinook	Sockeye	Chum	Coho	Chinook	Sockeye	Chum	Coho
1980	1,228	75,639	1,975		1,164	18,926	3,782	
1981	a	a	a		a	a	a	
1982	1,990	19,160	9,700		1,546	2,327	6,300	
1983	2,600	9,650	a		2,500	5,900	a	
1984	3,245	9,240	17,250	43,925	1,930	12,897	9,172	
1985	3,535	2,843	4,415		2,050	5,470	3,593	
1986	1,068	8,960	11,850		1,249	16,990	7,645	
1987	2,234	19,786	12,103	11,122	2,222	34,585	9,696	
1988	637	5,820	3,846		1,024	5,831	5,814	
1989	651	3,605	a		1,277	8,044	2,922	
1990	626	27,689	a		a	a	a	
1991[b]	a	a	a		a	a	a	
1992	875	10,397	1,950		1,012	7,200	3,270	
1993	a	a	a		a	a	a	
1994	a	a	a		a	a	a	
1995	3,314	a	a		a	a	a	
1996	a	a	a		a	a	a	
1997	3,611	12,610	a		1,447	19,843	a	
1998	578	3,497	2,743		731	11,632	3,619	
1999	a	a	a		a	a	a	
Escapement Objective[c]	1,600	15,000	17,000	800	800	5,000	4,000	20,000

a Information not available

b Survey past peak

c Escapement objectives are preliminary and are subject to change as additional data becomes available. Escapement objectives are based on aerial index counts, which do not represent total escapement, but do reflect annual spawner abundance trends when made using standard survey methods under acceptable survey conditions.

Appendix D.6. Historical salmon escapement at the Middle Fork Goodnews River project, 1981-1999.

Year	Operating period [a]	Chinook	Sockeye	Coho [b]	Pink	Chum
1981	June 13 – Aug 15	3,688	49,108	357	1,327	21,827
1982	June 23 – Aug 03	1,395	56,255	62	13,855	6,767
1983	June 11 – July 28	6,027	25,813	0	34	15,548
1984	June 15 – July 31	3,260	32,053	249	13,744	19,003
1985	June 27 – July 31	2,831	24,131	282	144	10,367
1986	June 16 – July 24	2,080	51,069	163	8,133	14,764
1987	June 22 – July 30	2,272	28,871	62	62	17,517
1988	June 23 – July 30	2,712	15,799	6	6,781	20,799
1989	June 29 – July 31	1,915	21,186	145	246	10,380
1990	June 20 – July 24	3,636	31,679	0	3,378	6,410
1991	June 29 – Aug 25	1,952	47,397	1,978	1,694	27,525
1992	June 21 – Aug 16	1,903	27,267		23,030	22,023
1993	June 22 – Aug 18	2,349	26,452	1,451	318	14,952
1994	June 22 – Aug 16	3,856	55,751		38,705	34,849
1995	June 19 – Aug 28	4,836	39,009	5,415	330	33,669
1996	June 18 – Aug 23	2,882	57,504	10,869	20,105	40,125
1997	June 12 – Sept 17	2,937	35,530	9,619	940	17,296
1998	July 04 – Sept 17	4,584	47,951	35,441	10,376	28,905
1999	June 25 – Sept 26	3,221	48,205	11,545	914	19,533

[a] In years where the project was initiated later than normal or during times the weir was not operational, interpolation was used to estimate escapement for the time period missed (see Appendix D.7.).

[b] The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, and 1999). No interpolation was attempted in 1992 or 1994 because of flooding.

›pendix D.7. Percentage of salmon escapement estimated at the Middle Fork Goodnews River project, 1991-1999.

Year	Operating period [a]	Chinook	Sockeye	Coho	Pink	Chum
1991	June 29 – Aug 25	0	15	0	0	2
1992	June 21 – Aug 16	29	43	0	3	15
1993	June 22 – Aug 18	14	22	0	0	8
1994	June 22 – Aug 16	20	16	0	0	20
1995	June 19 – Aug 28	0	0	0	0	0
1996	June 18 – Aug 23	26	24	11	28	27
1997	June 12 – Sept 17	2	1	0	0	8
1998	July 04 – Sept 17	32	32	3	0	11
1999	June 25 – Sept 26[b]	0	0	0	0	0

[a] Estimates were made for some species when the weir was not operational from June 15 through August 16. Previous to 1991 the project was a counting tower and the majority of the escapement was estimated based on a systematic counting schedule.

[b] The coho escapement continues into October and the majority of the run was not counted (except in 1997, 1998, and 1999). In 1999 the weir was out for 10 days in early August because of flooding.

Appendix D.8. Summary of historical commercial harvest by period, Goodnews Bay District, chinook salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	0	-	-	-	0.0000
6/13	1	1252	1252	1252	0.0150
6/14	0	-	-	-	0.0150
6/15	1	197	197	197	0.0173
6/16	2	251	1096	674	0.0335
6/17	1	362	362	362	0.0378
6/18	3	387	1706	1158	0.0767
6/19	2	296	390	343	0.0849
6/20	5	139	2642	404	0.1351
6/21	2	1298	1535	1417	0.1690
6/22	2	792	1591	1192	0.1976
6/23	3	583	1639	788	0.2336
6/24	3	476	988	620	0.2586
6/25	4	340	1896	1154	0.3130
6/26	3	0	416	352	0.3221
6/27	5	173	3944	388	0.3999
6/28	5	307	1307	807	0.4471
6/29	4	330	921	686	0.4785
6/30	7	242	1551	460	0.5354
7/01	2	77	1156	617	0.5502
7/02	9	166	710	318	0.5923
7/03	4	156	1065	328	0.6148
7/04	3	177	2301	637	0.6521
7/05	8	95	1809	290	0.6975
7/06	5	100	496	243	0.7136
7/07	10	132	1119	334	0.7704
7/08	8	93	495	169	0.7907
7/09	7	99	351	143	0.8080
7/10	5	156	326	203	0.8214
7/11	8	53	408	175	0.8395
7/12	5	107	737	313	0.8590
7/13	6	66	182	131	0.8677
7/14	8	54	514	154	0.8867
7/15	7	0	354	90	0.8975
7/16	8	54	294	85	0.9084
7/17	4	65	210	116	0.9145
7/18	7	0	217	71	0.9211
7/19	5	33	71	61	0.9242
7/20	7	38	192	84	0.9329
7/21	7	35	68	53	0.9374
7/22	4	19	228	66	0.9420
7/23	9	17	97	38	0.9465
7/24	5	20	77	44	0.9492
7/25	8	0	82	27	0.9524
7/26	5	0	41	26	0.9537

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	9	19	122	32	0.9594
7/28	6	5	22	15	0.9604
7/29	6	15	157	29	0.9637
7/30	8	16	73	19	0.9664
7/31	5	7	34	20	0.9676
8/01	8	0	78	18	0.9704
8/02	7	6	27	19	0.9719
8/03	9	9	102	24	0.9761
8/04	6	3	23	10	0.9769
8/05	8	6	54	18	0.9790
8/06	7	4	79	9	0.9805
8/07	4	8	43	16	0.9815
8/08	9	0	60	13	0.9832
8/09	5	7	21	11	0.9840
8/10	10	5	78	14	0.9867
8/11	6	5	20	8	0.9874
8/12	7	7	47	20	0.9891
8/13	6	0	36	5	0.9899
8/14	8	4	41	9	0.9911
8/15	6	5	26	11	0.9921
8/16	9	0	17	6	0.9929
8/17	7	2	22	7	0.9938
8/18	8	0	10	7	0.9943
8/19	7	3	14	8	0.9949
8/20	6	1	12	7	0.9954
8/21	9	0	11	3	0.9959
8/22	6	3	17	8	0.9965
8/23	5	0	9	6	0.9968
8/24	7	0	17	2	0.9973
8/25	7	0	13	4	0.9977
8/26	9	0	8	4	0.9981
8/27	5	0	13	3	0.9984
8/28	9	0	11	3	0.9988
8/29	6	2	9	4	0.9991
8/30	4	1	4	2	0.9992
8/31	8	0	6	1	0.9993
9/01	6	0	7	1	0.9995
9/02	7	0	5	2	0.9996
9/03	5	0	3	2	0.9997
9/04	5	0	6	1	0.9998
9/05	6	0	5	1	1.0000
9/06	3	0	0	0	1.0000
9/07	8	0	1	0	1.0000
9/08	4	0	2	0	1.0000
9/09	1	0	0	0	1.0000

Appendix D.9. Summary of historical commercial harvest by period, Goodnews Bay District, sockeye salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	0	-	-	-	0.0000
6/13	1	27	27	27	0.0000
6/14	0	-	-	-	0.0000
6/15	1	70	70	70	0.0002
6/16	2	125	696	411	0.0015
6/17	1	744	744	744	0.0027
6/18	3	281	596	348	0.0047
6/19	2	478	551	515	0.0064
6/20	5	102	1989	523	0.0121
6/21	2	967	1280	1124	0.0158
6/22	2	569	1074	822	0.0185
6/23	3	1029	2701	1466	0.0269
6/24	3	596	2120	1892	0.0344
6/25	4	852	2087	1348	0.0436
6/26	3	0	1909	1719	0.0495
6/27	5	685	3040	1664	0.0644
6/28	5	2008	4163	2932	0.0881
6/29	4	1412	3323	1763	0.1015
6/30	7	2037	8143	4651	0.1544
7/01	2	1143	3376	2260	0.1617
7/02	9	1818	8198	3021	0.2165
7/03	4	1427	5510	2565	0.2361
7/04	3	1598	7674	2154	0.2547
7/05	8	1254	5195	2854	0.2960
7/06	5	2346	7886	3352	0.3329
7/07	10	2057	6283	3654	0.3930
7/08	8	1231	6261	3981	0.4426
7/09	7	2167	4518	3566	0.4824
7/10	5	1759	8140	3217	0.5162
7/11	8	1397	3898	3068	0.5543
7/12	5	1444	16753	2762	0.6003
7/13	6	2046	5275	3538	0.6364
7/14	8	1039	4876	2891	0.6723
7/15	7	0	8860	2801	0.7107
7/16	8	902	4969	1940	0.7413
7/17	4	1598	3936	3310	0.7611
7/18	7	0	3049	1673	0.7779
7/19	5	888	2830	2151	0.7946
7/20	7	395	3852	1679	0.8169
7/21	7	507	2559	1300	0.8331
7/22	4	614	2207	1830	0.8436
7/23	9	162	3966	874	0.8623
7/24	5	588	2458	1106	0.8728
7/25	8	0	1678	472	0.8824
7/26	5	0	1804	852	0.8892

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	9	166	2903	534	0.9029
7/28	6	254	893	447	0.9077
7/29	6	342	1312	720	0.9156
7/30	8	84	1982	384	0.9246
7/31	5	300	803	380	0.9286
8/01	8	0	811	258	0.9325
8/02	7	204	969	335	0.9382
8/03	9	36	975	578	0.9462
8/04	6	59	739	189	0.9487
8/05	8	94	932	305	0.9542
8/06	7	34	498	251	0.9571
8/07	4	138	692	432	0.9599
8/08	9	0	926	260	0.9644
8/09	5	46	485	135	0.9660
8/10	10	18	659	273	0.9710
8/11	6	0	174	90	0.9719
8/12	7	17	564	238	0.9748
8/13	6	0	347	158	0.9762
8/14	8	4	382	199	0.9789
8/15	6	5	422	160	0.9808
8/16	9	0	322	109	0.9828
8/17	7	4	498	151	0.9848
8/18	8	0	318	84	0.9860
8/19	7	5	360	117	0.9876
8/20	6	0	214	118	0.9886
8/21	9	1	373	89	0.9904
8/22	6	7	353	118	0.9916
8/23	5	0	193	88	0.9923
8/24	7	1	244	48	0.9933
8/25	7	0	353	89	0.9945
8/26	9	0	204	66	0.9954
8/27	5	0	148	28	0.9958
8/28	9	1	186	51	0.9967
8/29	6	1	155	54	0.9973
8/30	4	0	171	36	0.9977
8/31	8	0	88	51	0.9983
9/01	6	0	158	47	0.9988
9/02	7	2	69	36	0.9992
9/03	5	0	72	21	0.9994
9/04	5	0	61	19	0.9997
9/05	6	0	61	0	0.9998
9/06	3	0	0	0	0.9998
9/07	8	0	63	3	1.0000
9/08	4	0	0	0	1.0000
9/09	1	0	0	0	1.0000

Appendix D.10. Summary of historical commercial harvest by period, Goodnews Bay District, coho salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	0	-	-	-	0.0000
6/13	1	0	0	0	0.0000
6/14	0	-	-	-	0.0000
6/15	1	0	0	0	0.0000
6/16	2	0	0	0	0.0000
6/17	1	0	0	0	0.0000
6/18	3	0	0	0	0.0000
6/19	2	0	0	0	0.0000
6/20	5	0	0	0	0.0000
6/21	2	0	0	0	0.0000
6/22	2	0	0	0	0.0000
6/23	3	0	0	0	0.0000
6/24	3	0	0	0	0.0000
6/25	4	0	0	0	0.0000
6/26	3	0	0	0	0.0000
6/27	5	0	0	0	0.0000
6/28	5	0	0	0	0.0000
6/29	4	0	0	0	0.0000
6/30	7	0	0	0	0.0000
7/01	2	0	0	0	0.0000
7/02	9	0	0	0	0.0000
7/03	4	0	0	0	0.0000
7/04	3	0	0	0	0.0000
7/05	8	0	0	0	0.0000
7/06	5	0	0	0	0.0000
7/07	10	0	0	0	0.0000
7/08	8	0	0	0	0.0000
7/09	7	0	0	0	0.0000
7/10	5	0	0	0	0.0000
7/11	8	0	0	0	0.0000
7/12	5	0	1	0	0.0000
7/13	6	0	0	0	0.0000
7/14	8	0	1	0	0.0000
7/15	7	0	13	0	0.0000
7/16	8	0	18	1	0.0001
7/17	4	0	0	0	0.0001
7/18	7	0	18	0	0.0001
7/19	5	0	11	0	0.0002
7/20	7	0	111	1	0.0004
7/21	7	0	18	2	0.0005
7/22	4	0	4	1	0.0005
7/23	9	1	195	13	0.0011
7/24	5	0	33	5	0.0012
7/25	8	0	632	52	0.0039
7/26	5	0	9	4	0.0040

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	9	0	1059	68	0.0083
7/28	6	3	153	5	0.0088
7/29	6	5	343	47	0.0099
7/30	8	1	1461	178	0.0170
7/31	5	24	364	38	0.0183
8/01	8	0	2811	119	0.0258
8/02	7	13	1491	109	0.0338
8/03	9	66	3943	165	0.0467
8/04	6	2	949	419	0.0523
8/05	8	126	2069	625	0.0647
8/06	7	23	4275	458	0.0816
8/07	4	231	812	638	0.0864
8/08	9	97	3090	1133	0.1115
8/09	5	108	2240	891	0.1238
8/10	10	463	4198	1218	0.1585
8/11	6	127	6065	1241	0.1821
8/12	7	1225	6488	1766	0.2176
8/13	6	673	4852	1593	0.2436
8/14	8	1325	4644	2198	0.2832
8/15	6	735	5999	2117	0.3165
8/16	9	336	7321	2226	0.3668
8/17	7	1390	6880	3002	0.4171
8/18	8	0	3864	1742	0.4457
8/19	7	1394	5628	3397	0.4954
8/20	6	68	9590	1675	0.5292
8/21	9	968	4967	1921	0.5736
8/22	6	629	6731	3556	0.6203
8/23	5	1308	5306	3417	0.6546
8/24	7	1597	5520	3467	0.7052
8/25	7	468	3590	1739	0.7337
8/26	9	15	3249	1918	0.7680
8/27	5	1101	6625	2519	0.7991
8/28	9	1016	3529	1896	0.8353
8/29	6	725	3402	1747	0.8587
8/30	4	1483	3730	1986	0.8778
8/31	8	1084	3143	1713	0.9111
9/01	6	604	2778	1415	0.9304
9/02	7	576	3233	1484	0.9522
9/03	5	377	2309	1167	0.9649
9/04	5	374	2685	1044	0.9780
9/05	6	0	2202	684	0.9875
9/06	3	0	1715	0	0.9911
9/07	8	0	2310	221	1.0000
9/08	4	0	0	0	1.0000
9/09	1	0	0	0	1.0000

Appendix D.11. Summary of historical commercial harvest by period, Goodnews Bay District, chum salmon, 1981-1999.

Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
6/12	0	-	-	-	0.0000
6/13	1	10	10	10	0.0000
6/14	0	-	-	-	0.0000
6/15	1	102	102	102	0.0004
6/16	2	89	1091	590	0.0045
6/17	1	167	167	167	0.0051
6/18	3	194	501	254	0.0084
6/19	2	249	557	403	0.0112
6/20	5	137	3501	341	0.0273
6/21	2	591	698	645	0.0318
6/22	2	708	2124	1416	0.0417
6/23	3	886	7833	886	0.0753
6/24	3	594	1188	821	0.0844
6/25	4	724	2351	1580	0.1062
6/26	3	0	1241	866	0.1135
6/27	5	540	2364	728	0.1313
6/28	5	526	8369	1605	0.1772
6/29	4	425	2983	1239	0.1978
6/30	7	997	2907	1627	0.2386
7/01	2	710	850	780	0.2441
7/02	9	565	3434	2208	0.3033
7/03	4	1309	3074	2513	0.3362
7/04	3	798	4075	1626	0.3589
7/05	8	927	3193	1521	0.4039
7/06	5	963	4076	1500	0.4392
7/07	10	1036	4478	1850	0.5085
7/08	8	949	2669	1866	0.5591
7/09	7	1024	2503	1356	0.5949
7/10	5	1346	4835	2063	0.6367
7/11	8	562	5830	1023	0.6836
7/12	5	1057	5498	1501	0.7230
7/13	6	896	2288	1392	0.7543
7/14	8	601	2123	1154	0.7906
7/15	7	0	3296	1279	0.8286
7/16	8	476	1360	1099	0.8550
7/17	4	680	2115	1776	0.8772
7/18	7	0	1191	649	0.8927
7/19	5	270	1470	506	0.9073
7/20	7	479	1265	657	0.9269
7/21	7	233	820	440	0.9383
7/22	4	307	1177	335	0.9458
7/23	9	35	591	301	0.9566
7/24	5	164	874	315	0.9634
7/25	8	0	281	217	0.9687
7/26	5	0	608	184	0.9727

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Date	No. Years w/ fishing period on this date	Minimum harvest	Maximum harvest	Median harvest	Cumulative proportion harvest
7/27	9	58	177	138	0.9770
7/28	6	81	94	89	0.9789
7/29	6	32	223	119	0.9814
7/30	8	42	124	96	0.9839
7/31	5	8	121	77	0.9851
8/01	8	0	108	56	0.9865
8/02	7	45	153	85	0.9886
8/03	9	22	105	52	0.9904
8/04	6	10	60	33	0.9911
8/05	8	21	165	45	0.9927
8/06	7	18	47	29	0.9934
8/07	4	16	62	19	0.9938
8/08	9	0	60	20	0.9946
8/09	5	13	63	39	0.9952
8/10	10	2	44	17	0.9959
8/11	6	10	25	14	0.9962
8/12	7	0	50	14	0.9966
8/13	6	2	22	7	0.9968
8/14	8	3	62	13	0.9974
8/15	6	0	23	9	0.9976
8/16	9	0	16	10	0.9979
8/17	7	0	22	7	0.9981
8/18	8	0	11	5	0.9982
8/19	7	2	16	5	0.9984
8/20	6	0	11	4	0.9985
8/21	9	0	127	1	0.9990
8/22	6	2	6	4	0.9991
8/23	5	0	8	4	0.9992
8/24	7	0	8	1	0.9992
8/25	7	0	8	4	0.9993
8/26	9	0	42	0	0.9995
8/27	5	0	5	2	0.9996
8/28	9	0	11	1	0.9996
8/29	6	0	6	4	0.9997
8/30	4	0	2	1	0.9997
8/31	8	0	9	3	0.9998
9/01	6	0	2	1	0.9998
9/02	7	0	10	2	0.9999
9/03	5	0	4	0	0.9999
9/04	5	0	9	2	1.0000
9/05	6	0	4	1	1.0000
9/06	3	0	0	0	1.0000
9/07	8	0	2	0	1.0000
9/08	4	0	0	0	1.0000
9/09	1	0	0	0	1.0000

APPENDIX F

Appendix F.1. Commercial freshwater finfish fishery catch data, Kuskokwim Area, 1977-1999.

Year	Number of Fishermen[b]	Number Caught[a]		Total Weight (lbs)		Total Value ($)		
		Whitefish[c]	Burbot	Whitefish	Burbot	Whitefish	Burbot	Total
1977	3	718	0	d	0	952	0	952
1978	b	1,735	0	6,017	0	d	0	d
1979	b	3,219	0	11,211	0	d	0	d
1980	4	603	0	2,173	0	830	0	830
1981	4	1,197	0	4,620	0	2,310	0	2,310
1982	5	1,512	0	6,219	0	2,856	0	2,856
1983	0	0	0	0	0	0	0	0
1984	2	0	651	0	d	0	d	d
1985	5	555	1,829	2,275	2,016	1,137	455	1,593
1986	3	0	0	0	3,428	0	857	857
1987	4	417	0	1,260	0	1,008	0	1,008
1988	3	d	d	2,588	7	1,991	3	1,994
1989	7	178	282	583	270	501	597	1,098
1990	11	1,664	d	5,502	10	5,166	5	5,171
1991	5	1,413	41	2,442	256	2,412	197	2,609
1992	6	2,124	18	6,309	86	6,285	43	6,328
1993	5	2,509	0	5,208	0	4,898	0	4,898
1994	3	2,393	0	4,905	0	4,345	0	4,345
1995	1	d	0	2,363	0	2,507	0	2,507
1996	2	3,139	0	4,915	0	4,776	0	4,776
1997	14	4,447	0	5,770	0	4,832	0	4,832
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0

a Does not include catches incidental to the commercial salmon fishery.
b Does not include fishers who delivered catches incidental to the commercial salmon fishery.
c Includes cisco, pike and blackfish (weight only).
d Data not available.

APPENDIX G

Appendix G.1. Commercial miscellaneous saltwater finfish fishery catch data, Kuskokwim Area, 1988-1999.

Year	Number of Fishermen	Species	Number Caught	Total weight (lbs)	Total value ($)
1988	4	Tom Cod[a]	b	439	878
1989	2	Tom Cod	b	591	1,180
1990	1	Tom Cod	300	221	442
1991	2	Tom Cod	b	1,356	2,690
1992	1	Tom Cod	b	303	303
1993	0	-- --	0	0	0
1994	1	Tom Cod	b	100	160
1995	0	-- --	0	0	0
1996	1	Tom Cod	b	713	1,426
1997	1	Tom Cod	b	250	500
1998	0	-- --	0	0	0
1999	0	-- --	0	0	0

a Tom Cod is the local name for Saffron Cod (Eleginus gracilis).
b Data not available

APPENDIX H

Appendix H.1. Estimated biomass and commercial harvest of Pacific herring in Kuskokwim Area fishing districts, Alaska, 1981-1999.

District	Estimated Biomass (st)	Harvest				Roe%a	Estimated Value ($1000's)	Exploitation Rate (%)
		Sac-roe	Bait	Waste	Total			
1999								
Security Cove	5261	1016	56	1	1072	10.8	338	20.4
Goodnews Bay	6896	1332	33	0	1366	11.2	301	19.8
Cape Avinof	3559	516	18	0	533	10.8	185	15.0
Nelson Is.	6655	1267	97	2	1366	10.9	430	20.5
Nunivak Is.	3319	-	-	-	-	-	-	-
Total	25690	4131	204	3	4337	10.9	1,254	16.9
1998								
Security Cove	4017	1012	0	0	1012	11.5	202	25.2
Goodnews Bay	4064	831	0	0	831	11.3	166	20.4
Cape Avinof	4287	656	0	0	656	11.6	131	15.3
Nelson Is.	7136	1250	0	0	1250	11.8	236	17.5
Nunivak Is.	3778	202	0	0	202	9.8	0	5.3
Total	23282	3951	0	0	202	11.2	735	17.0
1997								
Security Cove	4640	884	3	5	892	12.5	221	19.2
Goodnews Bay	4752	805	0	0	805	14.2	228	16.9
Cape Avinof	4616	687	0	0	687	11.5	157	14.9
Nelson Is.	7909	778	0	0	778	12.7	198	9.8
Nunivak Is.	3801	-	-	-	-	-	-	-
Total	25718	3154	3	5	3163	12.7	804	12.3
1996								
Security Cove	6867	1795	59	5	1859	11.6	1,251	27.1
Goodnews Bay	6315	1191	13	0	1204	12.5	895	19.1
Cape Avinof	4500	820	0	0	820	13.4	659	18.2
Nelson Is.	6638	986	44	0	1031	11.4	679	15.5
Nunivak Is.	4197	61	40	0	101	9.9	39	2.4
Total	28517	4854	156	5	5014	12.1	3,523	17.6
1995								
Security Cove	6702	1292	0	0	1292	12.3	956	19.3
Goodnews Bay	4224	1051	0	3	1054	13.5	848	25.0
Cape Avinof	3627	485	0	0	485	12.5	363	13.4
Nelson Is.	7754	1112	0	0	1112	10.6	710	14.3
Nunivak Is.	4579	33	7	0	41	11.0	22	0.9
Total	26886	3974	7	3	3985	12.2	2,900	14.8
1994								
Security Cove	7638	-	-	-	-	-	-	-
Goodnews Bay	5679	1061	0	0	1061	12.3	391	18.7
Cape Avinof	2827	427	0	0	427	12.2	156	15.1
Nelson Is.	5564	713	4	0	717	11.0	235	12.9
Nunivak Is.	4921	14	0	0	14	8.6	4	0.3
Total	26629	2215	4	0	2219	11.8	787	8.3
1993								
Security Cove	6995	5	0	0	5	12.8	2	0.1
Goodnews Bay	6211	945	9	0	954	10.3	293	15.4
Cape Avinof	2837	206	9	0	215	12.0	75	7.6
Nelson Is.	4944	613	52	74	739	10.6	198	14.9
Nunivak Is.	5176	-	-	-	-	-	-	-
Total	26163	1769	70	74	1913	10.6	568	7.3
1992								
Security Cove	7773	697	127	10	834	9.2	285	10.7
Goodnews Bay	5572	711	29	0	740	9.5	286	13.3
Cape Avinof	3446	443	9	0	452	9.9	178	13.1
Nelson Is.	5275	188	52	6	246	8.3	78	4.7
Nunivak Is.	5703	7	20	0	27	8.5	4	0.5
Total	27769	2046	237	16	2299	9.4	830	8.3

- continued -

District	Estimated Biomass (st)	Harvest				Roe%a	Estimated Value ($1000's)	Exploitation Rate (%)
		Sac-roe	Bait	Waste	Total			
1991								
Security Cove	4434	561	9	-	570	9.3	208	12.9
Goodnews Bay	4387	259	4	-	263	8.9	93	6.0
Cape Avinof	2083	240	27	-	267	9.5	94	12.8
Nelson Is.	2385	-	-	-	-	-	-	-
Nunivak Is.	3903	17	42	-	59	7.5	9	-
Total	17192	1077	82	-	1159	9.2	404	6.7
1990								
Security Cove	2650	174	60	0	234	8.7	94	8.8
Goodnews Bay	2577	427	28	0	455	12.2	314	17.7
Cape Avinof	2020	49	1	0	50	12.0	35	2.5
Nelson Is.	2705	-	-	-	-	-	-	-
Nunivak Is.	422	-	-	-	-	-	-	-
Total	10374	650	89	0	739	11.2	443	7.1
1989								
Security Cove	2830	544	10	0	554	9.4	256	19.6
Goodnews Bay	4044	453	162	0	616	8.4	335	15.2
Cape Avinof	2780	90	39	0	129	8.0	54	4.6
Nelson Is.	3316	122	100	11	233	8.5	57	7.0
Nunivak Is.	617	79	37	0	116	9.4	42	18.8
Total	13587	1289	347	11	1647	8.9	744	12.1
1988								
Security Cove	4906	324	0	0	324	9.3	362	6.6
Goodnews Bay	4479	473	10	0	483	8.0	463	10.8
Cape Avinof	4108	348	0	0	348	8.6	264	8.5
Nelson Is.	7152	760	15	0	775	9.2	713	10.8
Nunivak Is.	2800	-		0	-	-	-	-
Total	23445	1905	25	0	1930	8.8	1,802	8.2
1987								
Security Cove	2300	312	1	0	313	9.7	242	13.6
Goodnews Bay	2000	179	142	0	321	7.3	133	16.1
Nelson Is.	8100	915	8	0	923	9.2	661	11.4
Nunivak Is.	4400	254	160	0	414	7.8	231	9.4
Total	16800	1660	311	0	1971	8.9	1,267	11.7
1986								
Security Cove	3700	747	4	0	751	11.2	535	20.3
Goodnews Bay	3000	554	3	0	557	10.4	325	18.6
Nelson Is.	7300	852	34	0	886	10.3	428	12.1
Nunivak Is.	6000	469	42	0	511	10.1	213	8.5
Total	20000	2622	83	0	2705	10.5	1,501	13.5
1985								
Security Cove	4900	703	0	30	733	10.1	355	15.0
Goodnews Bay	4300	711	0	13	724	8.7	309	16.8
Nelson Is.	9500	967	10	0	977	10.6	527	10.3
Nunivak Is.	5700	349	9	0	358	8.9	146	6.3
Total	24400	2730	19	43	2792	9.8	1,337	11.4
1984								
Security Cove	5100	325	0	10	335	11.8	110	6.6
Goodnews Bay	4100	667	0	50	717	10.1	168	17.5
Total	9200	992	0	60	1052	10.7	278	11.4
1983								
Security Cove	6400	966	107	0	1073	9.4	443	16.8
Goodnews Bay	3200	426	9	0	435	9.4	185	13.6
Total	9600	1392	116	0	1508	9.4	628	15.7
1982								
Security Cove	5100	707	106	0	813	9.3	271	15.9
Goodnews Bay	2600	437	49	0	486	9.5	188	18.7
Total	7700	1144	155	0	1299	9.4	459	16.9
1981								
Security Cove	8300	1150	23	0	1173	8.1	347	14.1
Goodnews Bay	4300	558	99	0	657	7.7	196	15.3
Total	12600	1708	122	0	1830	8.0	543	14.5

Appendix H.2. Number of buyers and fishers participating in Kuskokwim Area Pacific herring fisheries, Alaska, 1981-1999.

Year	District	Number of Buyers	Number of Fishers	Number of Deliveries
1999	Security Cove	7	87	242
	Goodnews Bay	5	94	679
	Cape Avinof	3	117	656
	Nelson Island	4	94	483
	Nunivak Island	No commercial opening		
1998	Security Cove	9	78	255
	Goodnews Bay	2	84	580
	Cape Avinof	2	109	561
	Nelson Island	3	86	829
	Nunivak Island	1	7	7
1997	Security Cove	14	222	528
	Goodnews Bay	3	139	933
	Cape Avinof	2	145	560
	Nelson Island	3	105	348
	Nunivak Island	1	12[a]	0
1996	Security Cove	14	326	601
	Goodnews Bay	5	182	1,186
	Cape Avinof	2	161	833
	Nelson Island	3	109	515
	Nunivak Island	2	24	85
1995	Security Cove	12	106	257
	Goodnews Bay	4	127	878
	Cape Avinof	2	93	537
	Nelson Island	4	100	575
	Nunivak Island	2	13	46
1994	Security Cove	No commercial opening		
	Goodnews Bay	2	103	683
	Cape Avinof	1	85	502
	Nelson Island	3	104	409
	Nunivak Island	1	12	14
1993	Security Cove	1	9	9
	Goodnews Bay	3	63	705
	Cape Avinof	1	97	478
	Nelson Island	1	73	487
	Nunivak Island	No commercial opening		
1992	Security Cove	6	58	178
	Goodnews Bay	3	78	375
	Cape Avinof	2	121	335
	Nelson Island	3	85	222
	Nunivak Island	1	14	23

-continued-

Appendix H.2. (page 2 of 2)

Year	District	Number of Buyers	Number of Fishers	Number of Deliveries
1991	Security Cove	6	52	100
	Goodnews Bay	2	103	137
	Cape Avinof	1	137	463
	Nelson Island	No commercial opening		
	Nunivak Island	2	17	31
1990	Security Cove	9	52	77
	Goodnews Bay	3	126	530
	Cape Avinof	1	101	109
	Nelson Island	No commercial opening		
	Nunivak Island	No commercial opening		
1989	Security Cove	8	104	108
	Goodnews Bay	6	138	533
	Cape Avinof	3	147	335
	Nelson Island	4	162	438
	Nunivak Island	3	45	210
1988	Security Cove	4	31	51
	Goodnews Bay	6	60	309
	Cape Avinof	1	98	485
	Nelson Island	7	174	547
	Nunivak Island	No commercial opening		
1987	Security Cove	8	65	67
	Goodnews Bay	4	117	191
	Nelson Island	9	235	633
	Nunivak Island	4	61	341
1986	Security Cove	11	88	199
	Goodnews Bay	5	104	319
	Nelson Island	4	163	1,099
	Nunivak Island	5	36	284
1985	Security Cove	6	107	268
	Goodnews Bay	5	83	420
	Nelson Island	6	143	776
	Nunivak Island	5	37	273
1984	Security Cove	4	38	86
	Goodnews Bay	4	130	390
1983	Security Cove	6	94	312
	Goodnews Bay	4	84	225
1982	Security Cove	3	107	250
	Goodnews Bay	3	84	297
1981	Security Cove	7	113	311
	Goodnews Bay	5	175	479

a Estimated number of permit holders

Appendix H.3. Commercial harvest, effort and value of Pacific herring in Kuskokwim Area fishing districts, Alaska, 1981-1999.

Year	District	Estimated Harvest (st)	Number of permits	Hours fished	CPUE[a] (st)	Estimated Value	Income per permit
1999	Security Cove	1072	97	9	1.23	$338,000	$3,485
	Goodnews Bay	1366	94	49	0.30	$301,000	$3,202
	Cape Avinof	533	117	51	0.09	$185,000	$1,581
	Nelson Is.	1366	94	22	0.66	$430,000	$4,574
	Nunivak Is.	--	--	--	--	--	--
1998	Security Cove	1012	78	28.5	0.46	$202,340	$2,594
	Goodnews Bay	831	84	79	0.13	$166,220	$1,979
	Cape Avinof	656	109	44	0.14	$131,120	$1,203
	Nelson Is.	1250	86	76	0.18	$235,900	$2,743
	Nunivak Is.	202	7	6	0.05	$440	$63
1997	Security Cove	892	222	10.5	0.38	$221,000	$995
	Goodnews Bay	805	139	65.0	0.09	$228,000	$1,640
	Cape Avinof	687	145	26.0	0.18	$157,000	$1,083
	Nelson Is.	778	105	10.0	0.74	$198,000	$1,886
	Nunivak Is.	0	12	70.0	0.00	$0	$0
1996	Security Cove	1859	326	5.5	1.04	$1,252,270	$3,841
	Goodnews Bay	1204	182	45.0	0.15	$893,900	$4,912
	Cape Avinof	820	161	57.0	0.09	$659,280	$4,095
	Nelson Is.	1031	109	25.0	0.38	$676,624	$6,208
	Nunivak Is.	101	24	256.0	0.02	$38,234	$1,593
1995	Security Cove	1292	106	12.0	1.02	$956,000	$9,019
	Goodnews Bay	1054	127	56.0	0.15	$848,000	$6,677
	Cape Avinof	485	93	48.0	0.11	$363,000	$3,903
	Nelson Is.	1113	100	28.0	0.40	$710,000	$7,100
	Nunivak Is.	41	13	387.0	0.01	$22,000	$1,692
1994	Security Cove	--	--	--	--	--	--
	Goodnews Bay	1062	103	38.0	0.27	$391,000	$3,796
	Cape Avinof	427	85	62.0	0.08	$156,000	$1,835
	Nelson Is.	717	104	26.0	0.27	$235,000	$2,260
	Nunivak Is.	14	12	6.0	0.19	$4,000	$333
1993	Security Cove	5	9	24.5	0.02	$2,000	$222
	Goodnews Bay	954	63	123.0	0.12	$293,000	$4,651
	Cape Avinof	215	97	106.0	0.02	$75,000	$773
	Nelson Is.	739	73	63.5	0.16	$198,000	$2,712
	Nunivak Is.	--	--	--	--	--	--
1992	Security Cove	834	58	34.0	0.42	$285,000	$4,914
	Goodnews Bay	740	78	29.0	0.33	$286,000	$3,667
	Cape Avinof	452	121	12.0	0.31	$178,000	$1,471
	Nelson Is.	246	85	10.0	0.29	$78,000	$918
	Nunivak Is.	27	14	6.0	0.32	$4,000	$286
1991	Security Cove	570	52	12.0	0.91	$208,000	$4,000
	Goodnews Bay	263	103	4.0	0.64	$93,000	$903
	Cape Avinof	267	137	28.0	0.07	$94,000	$686
	Nelson Is.	--	--	--	--	--	--
	Nunivak Is.	59	17	12.0	0.29	$9,000	$529
1990	Security Cove	234	52	7.0	0.64	$94,000	$1,808
	Goodnews Bay	455	126	32.0	0.11	$314,000	$2,492
	Cape Avinof	50	101	3.0	0.17	$35,000	$347
	Nelson Is.	--	--	--	--	--	--
	Nunivak Is.	--	--	--	--	--	--

- continued -

Appendix H.3. (page 2 of 2)

Year	District	Estimated Harvest (st)	Number of permits	Hours fished	CPUE[a] (st)	Estimated Value	Income per permit
1989	Security Cove	554	104	4.0	1.33	$256,000	$2,462
	Goodnews Bay	616	138	50.0	0.09	$335,000	$2,428
	Cape Avinof	129	147	194.0	0.00	$54,000	$367
	Nelson Is.	233	162	15.0	0.10	$57,000	$352
	Nunivak Is.	116	45	186.0	0.01	$42,000	$933
1988	Security Cove	324	31	23.5	0.44	$362,000	$11,677
	Goodnews Bay	483	60	40.0	0.20	$463,000	$7,717
	Cape Avinof	348	98	88.5	0.04	$264,000	$2,694
	Nelson Is.	775	174	7.5	0.59	$713,000	$4,098
	Nunivak Is.	--	--	--	--	--	--
1987	Security Cove	313	65	13.0	0.37	$242,000	$3,723
	Goodnews Bay	321	117	11.0	0.25	$133,000	$1,137
	Nelson Is.	923	235	6.0	0.65	$661,000	$2,813
	Nunivak Is.	414	61	39.0	0.17	$231,000	$3,787
1986	Security Cove	751	88	73.0	0.12	$535,000	$6,080
	Goodnews Bay	557	104	53.0	0.10	$325,000	$3,125
	Nelson Is.	886	163	40.0	0.14	$428,000	$2,626
	Nunivak Is.	511	36	156.0	0.09	$213,000	$5,917
1985	Security Cove	733	107	125.0	0.05	$335,000	$3,131
	Goodnews Bay	724	83	130.0	0.07	$309,000	$3,723
	Nelson Is.	977	143	44.0	0.16	$527,000	$3,685
	Nunivak Is.	358	37	228.0	0.04	$146,000	$3,946
1984	Security Cove	335	38	345.0	0.03	$110,000	$2,895
	Goodnews Bay	717	130	139.0	0.04	$168,000	$1,292
1983	Security Cove	1073	94	87.0	0.13	$443,000	$4,713
	Goodnews Bay	435	84	278.0	0.02	$185,000	$2,202
1982	Security Cove	813	107	302.0	0.03	$271,000	$2,533
	Goodnews Bay	486	84	314.0	0.02	$188,000	$2,238
1981	Security Cove	1173	113	90.0	0.12	$347,000	$3,071
	Goodnews Bay	657	175	133.0	0.03	$196,000	$1,120

a CPUE = catch per permit per hour fished

APPENDIX S

Appendix S. 1. 1999 Kuskokwim Area Subsistence Salmon Harvest Calendar.

Dear Subsistence Fishers:

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

Our address is on the back of this calendar. When i finished fishing, you can fold the calendar so that our return address is visible. DO NOT PUT POSTAGE ON THE CALENDAR WHEN YOU RETURN IT TO US.. We have paid the postage.

This calendar is sent to you by the Subsistence Division of the Alaska Department of Fish and Game in Bethel..

NAME

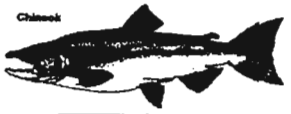
Thank you for helping to document subsistence haarvests. If you have any questions, please call (907) 543-31100.

Bulk Rate
U. S. Postage
Paid
Fairbanks, AK
Permit No. 99

MAY 1999 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	16	17	18	19	20	21	22
TARYAQVAK =	King _____	King _____	King _____	King _____	King _____	King _____	King _____
IQALLUK =	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SAYAK =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	23	24	25	26	27	28	29
CHINOOK =	King _____	King _____	King _____	King _____	King _____	King _____	King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SOCKEYE =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	30	31	* There are a number of small operators drying fish whose output is consumed locally or sold to persons travelling in the region. On the river above Bethel at Steamboat Slough, Neal Corrigan dried 1,500 fish for his own dogs. At Napamute, George Hoffman dried 2,000 small fish and 30 kings for his dogs and barter. At Crooked Creek, a man named Dennis Perrin dried 6,000 small fish and 200 kings." L.G. Wingard. Alaska Fisheries and Fur Seal Industries. U.S. Bureau of Fisheries. 1922				
	King _____	King _____					
	Chum _____	Chum _____					
	Red _____	Red _____					

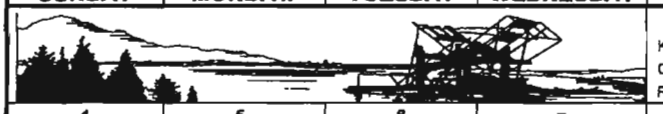
JUNE 1999 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4	5
			King _____	King _____	King _____	King _____	King _____
			Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
			Red _____	Red _____	Red _____	Red _____	Red _____
	6	7	8	9	10	11	12
TARYAQVAK =	King _____	King _____	King _____	King _____	King _____	King _____	King _____
IQALLUK =	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SAYAK =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	13	14	15	16	17	18	19
CHINOOK =	King _____	King _____	King _____	King _____	King _____	King _____	King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SOCKEYE =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	20	21	22	23	24	25	26
	King _____	King _____	King _____	King _____	King _____	King _____	King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	27	28	29	30	* Fishing on the Kuskokwim River is carried on by fishwheels and set nets. Set net operators can utilize nets from 25 to 30 fathoms on all the downriver where the tide ebbs and flows. Further upriver, fishwheels are placed on exposed points where the salmon crowd the meandering line of the stream. U.S. Bureau of Fisheries, 1922			
	King _____	King _____	King _____	King _____			
	Chum _____	Chum _____	Chum _____	Chum _____			
	Red _____	Red _____	Red _____	Red _____			

Thank you for helping to document subsistences harvests. If you have any questions, please call (907)) 543-3100. Please return the calendar when you ares finished subsistence salmon fishing for 1999.

NAME LABLE

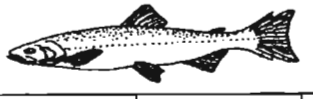
JULY 1999 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 King _____ Chum _____ Red _____	2 King _____ Chum _____ Red _____	3 King _____ Chum _____ Red _____
TARYAQVAK =	4 King _____	5 King _____	6 King _____	7 King _____	8 King _____	9 King _____	10 King _____
IQALLUK =	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SAYAK =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
CHINOOK =	11 King _____	12 King _____	13 King _____	14 King _____	15 King _____	16 King _____	17 King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SOCKEYE =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	18 King _____	19 King _____	20 King _____	21 King _____	22 King _____	23 King _____	24 King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
QAKIIYAK =	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	25 King _____	26 King _____	27 King _____	28 King _____	29 King _____	30 King _____	31 King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
COHO =	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____

AUGUST 1999 SUBSISTENCE SSALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDDAY	FRIDAY	SATURDAY
	1	2	3	4	5	6	7
TARYAQVAK =	King _____	King _____	King _____	King _____	King _____	King _____	King _____
IQALLUK	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SAYAK =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
QAKIIYAK =	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	8	9	10	11	12	13	14
CHINOOK =	King _____	King _____	King _____	King _____	King _____	King _____	King _____
	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____	Chum _____
SOCKEYE =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
COHO =	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	15 Chum _____	16 Chum _____	17 Chum _____	18 Chum _____	19 Chum _____	20 Chum _____	21 Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	22 Chum _____	23 Chum _____	24 Chum _____	25 Chum _____	26 Chum _____	27 Chum _____	28 Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	29 Chum _____	30 Chum _____	31 Chum _____	In 1832 ....."Three hundred arand seventy-two natives fished the river for local requirements (subsistence) ususing 498 set gill nets of 7,470 fathoms, 51 fishwheels, and a number of smallall boats. They prepared 485 tons of dried chums." U.S. Bureau of Fisheries,s 1932			
	Red _____	Red _____	Red _____				
	Silver _____	Silver _____	Silver _____				

SEPTEMBER 1999 SUBSISTENCE SALMON CALENDAR

	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDDAY	FRIDAY	SATURDAY
				1 Chum _____ Red _____ Silver _____	2 Chum _____ Red _____ Silver _____	3 Chum _____ Red _____ Silver _____	4 Chum _____ Red _____ Silver _____
IQALLUK =	5 Chum _____	6 Chum _____	7 Chum _____	8 Chum _____	9 Chum _____	10 Chum _____	11 Chum _____
SOCKEYE =	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
QAKIIYAK =	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	12 Chum _____	13 Chum _____	14 Chum _____	15 Chum _____	16 Chum _____	17 Chum _____	18 Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	19 Chum _____	20 Chum _____	21 Chum _____	22 Chum _____	23 Chum _____	24 Chum _____	25 Chum _____
	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____	Red _____
	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____
	26 Chum _____	27 Chum _____	28 Chum _____	29 Chum _____	30 Chum _____		
	Red _____	Red _____	Red _____	Red _____	Red _____		
	Silver _____	Silver _____	Silver _____	Silver _____	Silver _____		

Appendix S. 2. 1999 Kuskokwim Area Subsistence Salmon Harvest Survey Form.

Division of Subsistence, Bethel

COMM. ID# #_____

Chinook= *"taryaqvak,"* Chum= *"Iqalluk,"* Sockeye= *"sayak,"* Coho= *"qakiiyaq"*

HHID##_____

KUSKOKWIM AREA 1999

POST-SEASON SUBSISTENCEE SALMON HOUSEHOLD HARVEST SURVEY

* (Questions marked with an asteterisk are asked of all households interviewed) salmon

Community: _____ Household Head Name:_____

Survey Date: 10 11 _____, 1999 Name of Person Interviewed: HH, _____

Interviewer: SM RK _____. Household P.O. Box: _____

Was this household in community last year?: No ___ Yes___

*1. **Did this household catch salmon for subsistence usse this year?** No___ (go to # 3) Yes___

2. **May I have your salmon calendar?** (If household fishehed and we don't already have or don't collect the calendar, go to # 7)

Picked up by interviewer ____ (go to # 10) Mailed it to ADFG____ Didn't get one_____

Didn't use____ Lost or unavailable_____

*3. **Does this household usually subsistence fish for salalmon?** No___ Yes___

HOUSEHOLD DIDN'T FISH (Household did not help harvesest/catch salmon)

4. **Did this household help another household processs ("put up") salmon?**

No ____ (go to # 17) Yes ____: (Names, HHHIDs)_____

_____

5. **Please estimate how many salmon all of you processsed ("put up").**

CHINOOK_____ ("kings") CHUM_____ ("dogs") SOCKEYE/E_____ ("rereds") COHO_____ ("silvers") Could not estimate_____

6. **Please estimate how many salmon were for your hhousehold only.**

CHINOOK_____ ("kings") CHUM_____ ("dogs") SOCKEYE/E_____ ("rereds") COHO_____ ("silvers") Could not estimate_____

(Go to Question 17)

HOUSEHOLD FISHED, ADF&G *DOES NOT HAVEE* CALENDAR

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

_____

8. **Please estimate how many salmon your household d (or all households together) caught.** (Ask about salmon already eaten, frozen, given to other households, and dog food)

CHINOOK_____ ("kings") CHUM_____ ("dogs") SOCKEYE_____ ("reds")") COHO_____ ("silvers") Could not estimate_____ Salmon are included with Household

_____ (1 (HHID)

9. **Please estimate how many salmon were for your hhousehold only.**

CHINOOK_____ ("kings") CHUM_____ ("dogs") SOCKEYE/E_____ ("rereds") COHO_____ ("silvers") All____ Could not estimatate_____

(Go to Question 15)

HOUSEHOLD FISHED, ADF&G *DOES HAVE* CALEENDAR

10. **Are all of the salmon this household caught writtenn on the calendar?** (Ask about and include salmon already eaten, frorozen, given to other households, and dog food)

No ____ Yes ____ (go to # 12)

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

CHINOOK_____ ("kings") CHUM_____ ("dogs") SOCKEYE/E_____ ("rereds") COHO_____ ("silvers") Could not estimate_____

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

_____

(This Block is continued on back side)

COFFING, dSFORMKB98.DOC, 8:35 AM, October 4, 1999.

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

14. Please estimate how many salmon were for your household only. All_____
CHINOOK_____ CHUM_____ SOCKEYE_____ COHO_____ Could not estimate_____
(Go to Question 15) .....

FISHING GEAR (For subsistence fishing households only)

15A. What type(s) of fishing gear was used for catching subsistence salmon this year?
Drift net ____, Set Net ____, Rod and Reel _____, Fishwheel ____, Spear ____, Sein ____,

15B. What mesh size (gill net) did you use when catching King Salmon this year? _____(inches)

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

COMMERCIAL FISHING

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

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

19. How many commercially caught salmon were used for subsistence?
CHINOOK_____ CHUM_____ SOCKEYE_____ COHO_____

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

HOUSEHOLD SIZE

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

DOG FOOD (For subsistence fishing households only)

22. Did this household catch salmon for dog food?
No ____ (go to # 26) Only backbones/heads/guts/scraps _____ (go to # 26)
Yes ____

23. How many salmon? CHUM_____ ("dogs") SOCKEYE_____ ("reds") COHO_____ ("silvers")

24. Are the salmon caught for the dogs included on your calendar or in the estimates you gave me ?
Yes____, No ____

25. How many dogs does this household have? _____

26. (For subsistence fishing households only)
How was subsistence salmon fishing for your household this year?
Kings: __ Very Good __ Average __ Poor If Poor, why?_____
Chums: __ Very Good __ Average __ Poor If Poor, why?_____
Sockeye: __ Very Good __ Average __ Poor If Poor, why?_____
Coho: __ Very Good __ Average __ Poor If Poor, why?_____

*27. What could Fish and Game do to make subsistence fishing better for you? (regulations, etc)

_____
_____
_____

A summary of the subsistence fishing survey will be sent out next spring (April).

Appendix S. 3. 1999 Kuskokwim Area Subsistence Salmon Harvest Survey Postcard.

Dear Kuskokwim Area Resident,

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

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

Thank you,

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

(correct your address if necessary)
NAME:_____
P.O. BOX:_____
CITY, STATE:_____
ZIPCODE:_____

Did your household harvest salmon for subsistence use this year?
(include any salmon kept for subsistence when commercial fishing) Yes___ No___

How many subsistence salmon did your household harvest?
(include salmon eaten, given away, frozen, dried, smoked, canned, or for dogfood)

Chinook_____ (King salmon) Chum_____ (Dog salmon) Sockeye_____ (Red salmon) Coho_____ (Silver salmon)

What type(s) of gear did your household use to catch subsistence salmon ?
Set net_____ Drift net_____ Fishwheel____ Rod and reel_____

How was subsistence salmon fishing for your household this year?

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