

SUBSISTENCE HARVEST OF PACIFIC SALMON
IN THE YUKON RIVER DRAINAGE ALASKA, 1986.

by

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ABSTRACT

Comprehensive surveys to census subsistence catches within the Yukon River drainage, Alaska have been conducted annually by the Department since 1961. In 1986, full funding was available to survey the subsistence catch in 38 villages, measure the precision of the estimated harvest and investigate the estimate's accuracy. The estimated harvest and approximate 95% confidence intervals of the drainage were 45,238 \pm 1,023 chinook salmon, 290,815 \pm 14,006 summer chum, 164,043 \pm 6,880 fall chum and 34,468 \pm 3,436 coho salmon. No significant difference was found in the mean catch of chinook salmon between inseason and postseason surveys though more families were contacted during the postseason. Monitoring of catch and effort by staff resident during the fishing season compared well with postseason survey results in two villages.

INTRODUCTION

The primary goal of fishery management is to control the exploitation of a population or assemblage of populations in order to obtain maximum benefit as defined by the regulatory authority. In order to achieve this, removal by all fisherman whether for commercial or personal use must be documented.

Fish resources of the Yukon River drainage are harvested and utilized for personal consumption by people in more than 40 communities. Because of documented traditional use of the resource it is the intent of the Alaska legislature that subsistence use of fishery resources be given the highest priority so long as maintenance of fish stocks on a sustained-yield basis is not jeopardized by doing so (ADF&G 1986). Pacific salmon (Oncorhynchus spp.) are utilized by both commercial and subsistence fisherman throughout the drainage. The implementation of the State of Alaska's subsistence use priority and control of total exploitation for stock conservation requires data on species composition, harvest level, geographic use areas, and methods of harvest for the subsistence fishery in addition to commercial harvest control data.

The major salmon resources of the Yukon River drainage are fully utilized. Any decline in stock abundance or proposals for increased harvests by one group requires a reallocation by the regulatory authority. Again, subsistence fishery data provides the background on this harvest component and forms the information base for decisions on allocation and conservation. It is important to estimate the subsistence harvest on an annual basis, estimate precision and evaluate its accuracy.

The Alaska Board of Fisheries in 1985 and 1986 has considered intensive conservation measures to reverse the decline of the fall chum salmon (Oncorhynchus keta) stocks in the Yukon River and proposed changes in the management of the directed commercial and subsistence fisheries. Subsistence harvest information is being used in treaty negotiations with the Canadian government over allocation of Yukon River salmon. Similarly, the new subsistence law made effective 1 June 1986, requires determinations by the Alaska Board of Fisheries concerning salmon stocks used for subsistence purposes by rural residents and will require the most precise harvest information which can be provided, Andrews (1986).

This report presents the estimate of the subsistence salmon harvest in the Yukon River drainage for 1986. The precision of this estimate is also presented and the accuracy investigated. The report summarizes the current year's findings and consolidates historic subsistence catch and effort data with particular emphasis on the summer harvest of salmon. Historically, winter subsistence catches of fish have not been well documented and surveys have not been designed to monitor these catches on a drainage wide basis.

Description of The Study Area

The Yukon River is the largest river in Alaska, draining approximately 35% of the state's land mass, and is the fifth largest drainage in North America. The river originates in British Columbia, Canada within 48 km of the Gulf of Alaska and flows over 3,700 km to its mouth on the Bering Sea draining an area of approximately 855,000 km² (Figure 1). The study area addressed in this report is limited to that portion of the Yukon River which flows within US territorial boundaries.

The Alaska portion of the Yukon drainage has been divided into six commercial fishing districts, five along the main stem Yukon from the mouth to the US-Canada border and the sixth in the main stem Tanana River (Figure 1). Districts 1-3 are often referred to as the "lower Yukon" and Districts 4-6 as the "upper Yukon". Subsistence catches have been summarized by district in order for these data to be available for run reconstruction and estimation of total utilization by district and exploitation rates if possible.

The study area includes more than 30 communities along the main stem Yukon River and more than 15 communities on the significant tributaries of the Yukon River such as the Innoko, Koyukuk, Tanana, Chandalar, and Black rivers. There are approximately 10 to 15 thousand Eskimo and Athabaskan Indian people in the area, the majority of whom reside in the 45 communities scattered along the coast and major river systems (ADF&G 1985). Only villages within the Yukon drainage and the coastal villages of the mouth will be discussed in this report. The population in the region experiences a slight increase during the fishing season as a result of visiting commercial fishermen, relatives, and friends. It is recognized that some unknown number of Yukon River salmon are intercepted in subsistence fisheries of coastal villages north and south of the Yukon River.

Description of the Subsistence Fishery

Four species of salmon, chinook (*Oncorhynchus tshawytscha*), chum (a summer and fall run), coho (*O. kisutch*), and to a lesser extent, pink salmon (*O. gorbuscha*) are harvested from June through October for subsistence purposes. In addition, whitefish (*Coregonus* spp.), inconnu (*Stenodus leucichthys*), northern pike (*Esox lucius*), Arctic grayling (*Thymallus arcticus*), burbot (*Lota lota*), char (*Salvelinus* spp.), Alaska blackfish (*Dallia pectoralis*), saffron cod (*Eleginus gracilis*), Arctic lamprey (*Lampetra japonica*), and other fishes are also harvested for subsistence purposes and contribute significantly to the diets of the fishing communities (Wolfe 1982). Discussion of these non-salmon species will be limited because harvest data obtained in 1986 cannot be easily compared with those of earlier years.

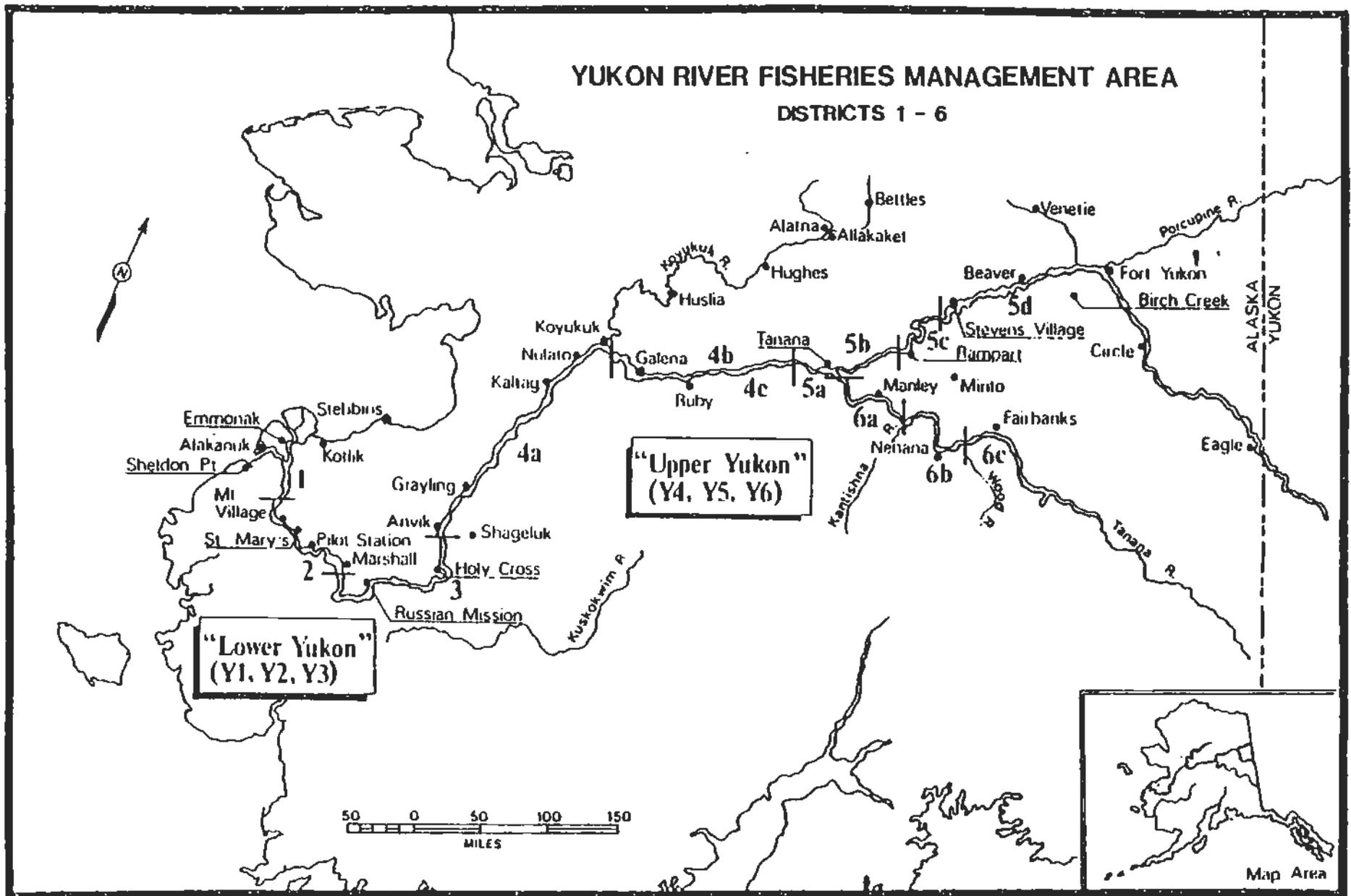


Figure 1. Villages and fishing district boundaries for the Alaska portion of the Yukon River drainage.

The salmon fishery remains the central component of most village communities and is the largest single resource harvested by local households (Wolfe 1982). At the outset of the fishing season, many of the local fishermen leave their winter communities and reorganize into a number of summer camps stretched along the banks of the region's major rivers, sloughs, and tributaries. These camps serve as bases of operation for the summer's fishing activities. The balance of the subsistence fishing fleet conduct their operations from their winter communities.

Subsistence fishing is often not an individual effort, but the activity of extended family groups. The group, or "fishing family" is commonly related by ties of kinship and cooperates during the summer in the harvesting, cutting, drying, smoking, and storing of salmon. The fishing family often contains a limited entry permit holder for that commercial fishery. Although, many active subsistence fishermen are non-commercial fishermen who prefer to utilize fish as a diet main-stay or supplement for themselves or their dog teams, a great many commercial fishermen also fish for subsistence purposes. There is no clear distinction between commercial and subsistence user groups.

Yukon River subsistence salmon fisheries are greatly influenced by commercial salmon regulations because of common fishing time restrictions. Prior to 1961, fishing time restrictions were not imposed and subsistence fishing could occur seven days a week. In the lower Yukon, commercial fishing for chinook salmon was allowed 4.5 days a week until quotas were met. Fixed quotas were replaced in 1961 by a system of scheduled weekly fishing periods and for the first time subsistence fishing for chinook salmon was permitted only during open commercial periods. Beginning in 1965, subsistence fishing for fall chum salmon was also tied to the schedule of commercial openings and closures (Wolfe 1982).

Since 1960, the time allowed for subsistence fishing has progressively shortened because of reduced commercial fishing time. In the lower Yukon, subsistence fishing for chinook salmon decreased from seven days per week in 1956 to four days per week in 1961, three days in 1974 to the current approximate two days per week scheduled by emergency order. Reductions in fishing time have been intended to restrict the commercial harvest to achieve adequate escapement and not to restrict subsistence harvest (ADF&G 1985). Beginning in 1984, additional time for subsistence fishing was allowed during specially scheduled fishing periods every other weekend during the chinook salmon season and every weekend during chum salmon season in order to offset the reduction in commercial fishing time. Subsistence fishing time is also unrestricted up to 24 hours before the season's first scheduled commercial fishing period and 24 hours following the last scheduled period.

Commercial fishing in the upper Yukon after 1960 was allowed seven days per week until a fixed quota was met. Subsistence fishing time was unrestricted until 1975 when commercial fishing

time was reduced to five days per week and subsistence fishing was allowed only during open commercial fishing periods. Further reduction to four days per week was made in some districts and subdistricts in 1979. Currently, subsistence fishing time is unregulated up to 24 hours before the first scheduled commercial fishing period and 24 hours after the season's closure. During the commercial fishing season subsistence fishing is allowed only during commercial fishing periods. If the commercial fishery closes for longer than five days within the season, subsistence fishing is allowed daily except for a 48 hour weekly closure which is scheduled for varying time periods for Districts 4-6.

Fishing gear types used on the river include fishwheels, weirs, fish traps, dip nets, beach seines, set gill nets, and drift gill nets. Currently, fishwheels, set and drift gill nets are the most commonly used methods to capture salmon (Wolfe 1981, Marcotte 1982). The choice of fishing gear differs regionally with fisherman using gill nets in the lower river below Anvik and the rest of the drainage using a mixture of fishwheels and gill nets. In Districts 1-3 only set and drift gill nets and beach seines may be operated except in District 1 after July 19, a special set net only coastal area has been established which is closed to the use of drift gill nets. Currently set gill nets are heavily utilized by fishermen from the coastal villages of Kotlik and Sheldon's Point, while drift gill nets are the dominant gear types used by fishermen from villages in District 2. In District 4-6 only set gill nets and fishwheels may be operated. However, in District 4 fishing with drift gill nets is allowed in a 183 km stretch of river from Stink Creek, 48 km south from Kaltag, upriver to Cone Point, midway between Koyukuk and Galena (Huntington 1981, Marcotte 1982).

Fishwheels are generally more efficient than nets for some species and areas, yielding higher catch per unit effort (CPUE) in the upper Yukon. In District 5 fishwheels account for a higher chinook CPUE than set gill nets. In District 6 fishwheels are a more efficient gear type for harvesting chum and coho salmon.

History of Subsistence Effort and Harvest Documentation

Comprehensive surveys to census subsistence salmon catches within the Yukon River drainage were initiated by the Department's Division of Commercial Fisheries in 1961. In that year, a survey to estimate the subsistence catch of all salmon species was made by two Department aides traveling by boat from the mouth of the Yukon River upstream to and including Dawson City, Yukon Territory, Canada. In addition, the survey covered the Tanana River from its mouth upstream to and including the village of Nenana. The surveyors obtained subsistence catch data by counting fish present on drying racks, in smokehouses, in bundles stored within caches, and estimating numbers stored in barrels and kegs. In addition to actual counts, catch data were obtained through personal interviews with fishing families living along the river.

Harvest estimates were then expanded by the estimated percent of the village's fishing families not surveyed in order to derive an estimate of total annual subsistence harvest for each village surveyed. In addition, catches made by villages not surveyed were reported by responsible individuals to whom survey forms were mailed (ADF&G 1963).

According to Regnart (pers. com), subsistence catch calendars were issued to fishing families living along the Yukon River in 1963 and possibly as early as 1962. Fishermen were encouraged to use these calendars to record their daily subsistence catches. Some of these were returned to the Department postseason or shown to Department personnel during surveys, contributing to the accuracy of subsistence catch data collected. The catch calendar in conjunction with actual counts of harvested salmon and postseason interviews were employed through the 1970s. By the early 1980s emphasis shifted to the catch calendar and postseason interviews. The catch calendar method of data collection was discontinued in 1984 because the number of calendars returned in recent years did not justify the cost. As an alternative, postal questionnaires were mailed to persons not contacted during village postseason interview visits (ADF&G 1984).

The primary objective of the annual survey during the early years was to document the chinook salmon subsistence harvest. Subsistence catches were categorized and recorded as number of chinook salmon and "other" or "small" salmon. Survey methods were modified in 1977 to include a better accounting of all harvested salmon species. The 1977 Yukon-Area Annual Management Report (ADF&G 1977) states, "For the first time, an effort was made in 1977 to determine the percent composition of salmon species (other than kings) taken for subsistence purposes. This was accomplished by revising the subsistence survey forms so that more specific information could be gathered."

The timing of surveys conducted from 1961-1978 was in late July and early August and normally completed for the lower Yukon villages by mid-August (Appendix A.1). From 1979-1986, surveys were conducted from late August to early September in order to obtain more complete fall chum and coho salmon catch data. In general, upper Yukon surveys from 1961-1977 were conducted in late August or September and were too early to obtain complete harvest data of coho and chum salmon. Since 1977, surveys in the upper Yukon have been conducted later (late September and October), and even into mid-November (1980). Koyukuk village surveys were also conducted in late August (Appendix A.1). Survey dates were too early for complete fall chum and coho salmon catch data prior to 1978.

Subsistence survey coverage of Alaska villages using personal interviews, catch calendars, and/or postseason postal questionnaires from 1979-1986 has been largely complete. The only villages not consistently surveyed over the period include the upper Yukon villages of Minto, no survey in 1979, Chalkyitsik, no surveys from 1979-1985 and Shageluk, no surveys

from 1977-1978 and 1982-1985. Total catch per village surveyed was expanded to include estimated catch of fishing families not contacted that year. Villages not surveyed in a given year were not expanded for in the total drainage catch. Effort data of number of large and small mesh gill nets, and fishwheels per fishing family have been collected annually since surveys began. Auxiliary information on number of dogs (since 1967), number of snow machines (1967-1982) and number of people per fishing family (1963-1966) has been collected during indicated time periods.

Subsistence permits are used in some areas to assess the harvest. Permits are currently required in three areas within the upper Yukon drainage: (1) the Tanana River drainage upstream of the Wood River confluence (river km 1,430) since 1970; (2) the Yukon River between Hess Creek (river km 1,266) and Dall River (river km 1,346) since 1974 (ADF&G 1974) and (3) the Yukon River between the upstream mouth of Twenty-two Mile Slough (river km 1,650) and the US Canada international border since 1979 (ADF&G 1979). A catch limit of five chinook and 75 chum and coho salmon combined was in place prior to 1982, for the Tanana River permit area. Limits were changed in 1982 to 10 chinook salmon and 75 summer chum salmon and 75 fall chum and coho salmon combined.

The Division of Subsistence was created within the Department of Fish and Game by the Alaska legislature with enactment of Chapter 151 of the 1978 Alaska Sessions Laws (AS 16.65.251). The collection of information on all aspects of subsistence and its role in the lives of the residents of Alaska has been a primary mission of the Division. Generally, Subsistence Division research has consisted of intensive case studies over a year or a several year time span in selected villages in which detailed information throughout the harvest period is collected. The detailed, season long approach to the collection of effort and harvest data has generally supported the results achieved by postseason interviews, postal surveys and permits. Commercial Fisheries Division's estimate of the number of households in Kaltag, Nulato, Koyukuk, Galena and Ruby was in close agreement with that documented by Subsistence Division (Huntington 1981). The Subsistence Division monitored catches in Russian Mission in 1984 and Holy Cross in 1985, during which time the Division of Commercial Fisheries sent postseason postal questionnaires. The Division of Commercial Fisheries then expanded the average catch from returned questionnaires by the previous five year average number of fishing families obtained from village surveys. There was close agreement in estimates of total catch between the season long monitoring (in-season) and the postseason surveys, (D.J. Bergstrom, personal communication). The greatest discrepancy between the postseason and inseason surveys was a 41% difference between the 1985 fall chum catch in Holy Cross (Table 1). The number of fishing families as determined by Subsistence Division staff also agreed closely (within 4 families) with the computer list of fishing families maintained from the previous year.

Table 1. Subsistence harvest and effort data as collected throughout the season by a Division of Subsistence resident monitor and the Division of Commercial Fisheries' postseason mail survey.

Village	Inclusive Survey Date	Number of Fishing Families	Catch in Number of Salmon									
			Chinook		Summer Chum		Fall Chum		Coho		Pink	
			Mean	Total	Mean	Total	Mean	Total	Mean	Total	Mean	Total
Russian Mission	July-August 1984	22	88	1,938	101	2,227	39	860	34	740	23	502
	Postseason 1984	21	64	1,338	118	2,482	29	617	31	653	0	
	Percent Error b			-31		11		-28		-12		
Holy Cross	July-August 1983	20	89	1,775	90	1,797	79	1,578	0	0		
	"	22		1,953		1,977		1,736		0		
	Postseason 1983	22	108	2,348	85	1,870	47	1,024	5	100		
	Percent Error b			21		-5		-41				

a Harvest estimate expanded for the number of fishing families determined by Subsistence Division but not contacted.

b Percent Error = (Postseason - In-season)/In-season

c For postseason survey represents the previous five year average number of fishing families.

Annual surveys to estimate subsistence catch and effort have also been conducted by the Department of Fisheries and Oceans in the Canadian portion of the Yukon drainage since 1962. Subsistence data have been collected using a combination of multiple inseason and postseason personal interviews and returned catch cards (Seigel and McKenzie 1985).

Historical Catch and Effort Data

The Department has estimated the subsistence harvest of chinook salmon since 1961 and has made separate estimates for summer and fall run chum salmon, coho and pink salmon since 1977. Subsistence catches have been reported since 1961 in the Department's annual management report series. Total Alaskan Yukon catches of chinook salmon have ranged from 11,110 in 1962 to 49,478 in 1983 (Table 2). The summer chum salmon harvest has increased steadily from 159,502 in 1977 to 264,828 in 1985. Similarly, estimates of the fall chum subsistence harvest have increased, from 82,771 in 1977 to more than 233,347 in 1979. The harvest range since 1979 has been from 130-200 thousand salmon. Coho salmon catches have ranged from 7,787 in 1978 to 49,020 in 1984. Appendix A.2 and A.3 presents the chinook salmon harvest by village and district since 1961 and Appendix A.4, the pooled catches of chum, coho and pink salmon for 1961 through 1976. Appendix A.5 through A.7 presents summer chum, fall chum and coho salmon subsistence catches since 1977.

The number of fishing families has varied greatly between the period 1963-1976 (Appendix A.8) and 1978-1986 (Appendix A.9). The mean drainage wide number of fishing families doubled from 563 (1963-1977) to 1,076 (1978-1986). This may have begun in 1978 when catch and effort data were expanded to represent those not contacted but estimated to have fished. Historical catch data were also expanded. Number of fishing families may not have been expanded and may reflect only those contacted, for the years 1963-1977 (F.M. Andersen and E.F. Andrews, personal communication).

Objectives

The primary objective of the 1986 Yukon River subsistence survey was to provide an estimate of effort and harvest for the subsistence fishery by species, village and district for the Alaska portion of the Yukon River drainage. Secondary objectives included the evaluation of methods of estimating Yukon drainage subsistence effort and harvests by area and the precision and accuracy of the estimated catch.

Table 2. Alaska Yukon River subsistence catch, 1961-1985.

Year	Catch in Number of Salmon				Small Salmon ^a
	Chinook	Summer Chum	Fall Chum	Coho	
1961	21,463				405,357
1962	10,994				347,244
1963	24,607				392,780
1964	15,668				479,124
1965	16,325				446,297
1966	11,361				206,011
1967	16,383				274,977
1968	11,987				178,507
1969	13,972				208,254
1970	13,874				222,005
1971	25,511				228,649
1972	20,458				144,008
1973	24,403				212,337
1974	19,912				315,198
1975	12,896				287,299
1976	17,806				259,197
1977	17,567	159,502	82,771	16,333	258,606
1978	30,297	197,144	94,867	7,787	299,798
1979	31,005	196,187	233,347	9,794	439,328
1980	42,724	272,398	172,657	20,158	465,213
1981	29,690	205,783	188,375	21,208	415,366
1982	28,158	260,969	132,897	35,894	429,760
1983	49,478	240,386	192,928	23,895	457,209
1984	42,428	230,747	174,823	49,020	454,590
1985	39,771	264,828	206,472	32,264	503,564
Average (1961-1985)	37,905	240,543	179,099	32,456	452,098
Average (1977-1985)	34,569	225,327	164,349	24,039	413,715

^a Subsistence catch was not separated by run of chum or coho before 1977 and was reported as "small" salmon

METHODS

Estimation of the 1986 subsistence harvest in the Alaska portion of the Yukon drainage involved a combined program of permit monitoring, postal surveys and fisherman interviews in all communities involved in subsistence fishing. Surveys were conducted both during (in-season) and after (postseason) the period of active fishing. The postseason survey was designed to personally interview all households that participate in subsistence fishing in those communities chosen for sampling. Postal surveys were then mailed to all known fishermen not contacted in sampled villages and previously unsampled communities. The inseason interview survey was designed to assess the chinook harvest soon after active fishing for this species ended, but before fishermen harvested fall chum or coho salmon. Fourteen upper Yukon villages which account for the greatest number of chinook salmon were selected for door to door personal interviews. Subsequent comparisons of the harvest estimates were made with the postseason surveys of these villages. Harvest estimates were also made by Department staff residing in two villages throughout the fishing season who were able to verify daily catches for comparison to postseason surveys that rely on recall by participants. Comparison between the inseason survey or season long monitoring and the postseason survey of a village was used to assess the accuracy of the postseason survey method.

Thirty eight villages with historically documented subsistence catch were surveyed. Communities which no longer exist or have as fishermen permanent residents of other communities were dropped or merged with a nearby village. Those obtaining permits were reported by community of residency and grouped by the district in which fishing occurred though the village may not physically reside in that district. In example, harvest data from permittees of the Yukon River between Hess Creek and the Dall River were reported using the local name Fairbanks Fish Camp (F.C.) referring to the general borough of residency for those fishermen. The harvest taken by Tok residents holding permits for the Yukon River upstream of Twenty-Two Mile Slough was reported in District 5. Permit data from residents of Fairbanks, North Pole and Salcha for the Tanana River upstream of Wood River were pooled and reported as Fairbanks in District 6.

A list was compiled of all known heads of families who subsistence fish, prior to the survey. This was accomplished by updating the list of fishing families contacted in previous years by Subsistence and Commercial Fisheries Divisions. Such lists have been maintained in computer files since 1980 and were updated annually based on the contacts made during the latest survey or as information concerning deaths or family transfers became known. The list was then verified by community officials or knowledgeable individuals for each area, where possible, in order to make any final additions or deletions. The list then consisted of a contact person and address for each household known to subsistence fish for salmon though it may not be known

whether or not they actually fished in 1986. The list of fishing families for areas where permits are issued was simply a list of those people who received permits in 1986. Lists for the lower (Districts 1-3) and upper Yukon (Districts 4-5) were maintained in separate Lotus 1-2-3 worksheets in the respective area offices of Emmonak and Fairbanks.

Inseason surveys for the villages of the upper Yukon were timed to coincide with the end of the chinook salmon harvest. The survey was conducted in early August and lasted one month. In contrast the postseason survey was timed to document the total salmon harvest soon after the fishing season in order to maximize participant recall. Surveys in the lower Yukon were conducted between 23 August and 5 September. Anyone not contacted at that time received a postal questionnaire by 10 September. Upper Yukon surveys were conducted from 15 October through 14 November. Postal surveys were mailed by 30 November to those not contacted. Permits were issued to allow fishing for the current season and were required to be returned within 10 days of the expiration date. In general fishing data from permits were received by 30 November.

Personal interviews were conducted systematically throughout the drainage on a village by village basis. Upon arrival in a village the city office or village police were contacted and the purpose and the methods of the survey were explained. An attempt was then made to contact and categorize each person on the computer listing as to the following:

1. fished as determined from an interview
2. fished as determined from others though not interviewed
3. did not fish as determined from an interview
4. did not fish as determined from others though not interviewed
5. can not determine whether they fished or not.
6. name should be removed from the list (e.g. if the family has moved).

Names were also added to the list at this time if the contact for the household changed or if additional families were found to have fished in 1986.

During the personal interview catch was recorded for each salmon species, including separate records for summer and fall run chum salmon, and for whitefish and inconnu. Fishing method and effort was recorded as numbers of large or small mesh gill nets or number of fishwheels. Number of dogs per household was also recorded because a significant proportion of the chum salmon harvest is used for dog food. Similar information was requested on the postal surveys (Appendix B.1) and permits (Appendix B.2). Personal interviews were conducted in a similar manner for both the inseason and postseason surveys.

It was necessary to estimate the number of families fishing in 1986 for villages in which fishing status could not be determined for all names on the master list. The number of fishing families

(F_k) for village k was estimated as follows:

$$F_k = \sum_{i=1}^2 f_{ik} + f_{5k}P_k$$

where:

f_{1k} = number of families that fished and were surveyed for catch and effort data

f_{2k} = number of families that fished but were not directly surveyed

f_{3k} = number of families that indicated they did not fish during the survey

f_{4k} = number of families that did not fish but were not directly surveyed

f_{5k} = number of families for which it is not known whether they fished or not

P_k = the proportion that fished of the total for which fishing status is known

and $p_k = (f_{1k} + f_{2k}) / \sum_{i=1}^4 f_{ik}$

Only data collected during personal interviews or from returned permits were used to estimate the proportion p_k because it was hypothesized that very few people who did not fish would return postal surveys. The number of fishing families in each village was the sum of the number of known fishermen whether or not catch and effort data were collected (f_{1k}, f_{2k}) and some proportion of those (f_{5k}) for which the fishing status was unknown. The best available estimate of the proportion of unknowns to have fished was, p_k , the proportion of those that fished of all families for which fishing status was determined during the postseason village survey and returned permit data.

The variance for the number of fishing families was estimated by:

$$\text{Var}(F_k) = f_{5k}^2 \text{Var}(P_k)$$

where the variance of p_k (Snedecor and Cochran, 1980) was estimated by:

$$\text{Var}(P_k) = (f_{5k} / \sum_{i=1}^5 f_{ik}) P_k (1-P_k) / \left(\sum_{i=1}^4 f_{ik}^{-1} \right)$$

The average village catch (C_k) was estimated by fish species, run of chum salmon and whitefish genus from the catch per household (C_{ik}) data collected through personal interviews, returned postal surveys and permits. Mean village catch (C_k) was estimated by:

$$C_k = \sum_{i=1}^{f_{1k}} C_{ik} / f_{1k}$$

and its variance includes a finite population correction factor (fpc_k) of all known families that were determined to have fished in 1986:

$$\text{Var}(C_k) = (fpc_k) \sum_{i=1}^{f_{1k}} (C_{ik} - C_k)^2 / (f_{1k} - 1) f_{1k}$$

where:

$$fpc_k = (f_{2k} + f_{5k}) / (f_{1k} + f_{2k} + f_{5k})$$

The estimated harvest for each village became the product of the mean catch per family and the number of fishing families:

$$C_k = F_k C_k$$

and its variance was estimated as:

$$\text{Var}(C_k) = F_k^2 \text{Var}(C_k) + C_k^2 \text{Var}(F_k) - \text{Var}(C_k) \text{Var}(F_k)$$

Village catch and effort estimates and their variances were summed across villages for district subtotals and across districts for drainage wide totals. Village catches were considered strata and the drainage wide variance was then the sum of the variance of village catches.

Comparisons of catches among villages or between survey response type (personal interview and postal survey) were made using the Kruskal-Wallis test (Conover 1980). Approximate p-values of the Kruskal-Wallis test were based on the chi-square distribution and the decision to reject the null hypothesis was at the $\alpha = 0.05$ level.

RESULTS

A total of 718 fishing families was interviewed (Table 3) 202 postal surveys and 373 permits were returned. Overall 78% of those known to subsistence fish were surveyed for catch and effort data. Of those interviewed 21% responded that they did not fish in 1986 compared to only 7% of those returning postal questionnaires. This was a significant difference between response types (personal interview or postal questionnaire) in percent not fishing. As a result, only personal interview data were used to estimate the percent who fished, of fishing families of unknown fishing status.

The mean catch per fishing family varied by village and run of salmon (Table 4). The mean catch of chinook salmon per fishing family along the main stem increased from 15 chinook salmon in Alakanuk to 283 in Rampart. The mean summer chum catch per fishing family was largest in District 4 with an average catch of

Table 3. Number of households interviewed, received postal surveys or permits for the collection of subsistence harvest data postseason throughout the Yukon River drainage, Alaska 1986.

District/ Area	Village	Inclusive Survey Date	Families on Computer List	a Percent Contacted	Number Contacted by				Number of Unknown Fishing Status	
					Personal Interview	Postal Survey		Permits		
					Sent	Returned	Issued	Returned		
1	Sheldon's Pt.	8/28	20	73	14	6	1	0	0	3
	Alakanuk	8/23-8/27	85	78	59	26	7	0	0	18
	Emmonak	8/30	80	43	27	53	7	0	0	18
	Kotlik	8/24-8/26	54	89	48	6	0	0	0	1
2	Mt. Village	9/4	87	72	51	36	12	0	0	21
	Pitka's Pt.	9/6	13	85	10	3	1	0	0	2
	St. Mary's	8/31-9/3	43	87	40	23	15	0	0	7
	Pilot Station	9/1	54	74	30	24	10	0	0	10
	Marshall	9/2	58	69	31	27	9	0	0	16
3	Rusofin Mission	9/3	26	88	16	10	7	0	0	1
	Holy Cross	9/3	29	72	15	14	6	0	0	7
4	Anvik	Mail	20	65	6	14	7	0	0	3
	Shegelek	10/15	13	100	12	1	1	0	0	0
	Grayling	10/15	28	89	18	10	7	0	0	2
	Kaitag	10/20	24	96	19	5	4	0	0	1
	Mulato	10/21	38	87	22	16	11	0	0	3
	Koyukuk	10/23	19	100	17	2	2	0	0	0
	Galena	10/20-10/24	33	97	22	11	10	0	0	0
	Ruby	10/24	26	85	15	11	7	0	0	0
	Koyukuk R.	Nuslie	10/22	20	100	15	5	5	0	0
Hughes		10/22	15	93	14	1	0	0	0	0
Allakaket		10/22	25	100	18	7	7	0	0	0
5	Tarana	10/28	37	81	18	19	12	0	0	7
	Rampart	11/3	13	100	13	0	0	0	0	0
	Fairbanks F.C.	Mail	63	73	0	0	0	63	46	14
	Stevens Village	11/3	30	90	16	14	6	18	18	2
	Beaver	11/3	10	90	8	2	1	0	0	1
	Fort Yukon	11/3-11/7	50	82	30	20	11	0	0	5
	Circle	11/3	15	93	7	8	7	12	9	1
	Central	11/3	4	100	0	4	3	3	2	1
	Eagle	11/12-11/14	64	89	44	20	11	24	22	6
	Tok	Mail	3	100	0	0	0	3	3	0
Chandler R.	Venetie	11/5	14	100	14	0	0	0	0	0
Black R.	Chalkyitsik	11/5	12	75	9	3	0	0	0	3
6	Manley	10/30-10/31	16	75	8	8	4	0	0	1
	Ninto	10/30	23	74	14	7	1	0	0	2
	Nenana	Mail	35	74	18	19	10	0	0	9
	Fairbanks c	Mail	257	91	0	0	0	257	235	22
	North Pole	Mail	53	92	0	0	0	53	49	4
	Selche	Mail	13	85	0	0	0	13	11	2
Totals			1,542	78	718	435	202	446	373	193

a Some fishing families were interviewed and subsequently returned permits.

b Does not include those who were not contacted but for which fishing status was determined from contact with relatives or neighbors.

c Data from Fairbanks, North Pole and Selche are pooled and reported as Fairbanks.

Table 4. Number of families fishing (N), their mean subsistence catch and standard deviation (SD) by village in the Yukon River drainage, Alaska 1988.

District	Village	a Number Sampled for Harvest Data (N)	b Catch in Number of Salmon							
			Chinook		Summer Chum		Fall Chum		Coho	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Sheldon's Pt.	12	38	29	309	195	17	31	15	29
	Alakanuk	33	15	19	168	102	30	49	23	37
	Emmonak	30	24	40	187	199	21	62	13	32
	Kotlik	44	26	34	208	179	25	53	3	10
2	Ht. Village	57	17	28	146	130	38	72	11	19
	Pitka's Pt.	9	26	28	186	101	15	24	7	17
	St. Mary's	53	24	28	216	221	88	345	80	342
	Pilot Station	33	32	47	175	278	37	76	34	60
	Marshall	39	36	23	132	159	64	86	36	46
3	Russian Mission	22	76	83	157	122	28	33	50	54
	Holy Cross	20	94	84	90	150	43	61	4	11
4	Anvik	9	65	85	2,810	3,630	62	57	20	49
	Shageluk	11	5	5	610	215	34	50	16	37
	Grayling	20	82	109	1,570	2,305	187	275	38	90
	Kaitag	20	52	53	1,184	2,324	97	125	11	26
	Mulato	25	65	89	348	690	63	76	2	10
	Koyukuk	15	38	78	417	1,273	146	260	10	26
	Galena	24	42	53	265	635	193	420	19	68
	Ruby	19	66	102	415	734	374	440	18	27
	Koyukuk R.	Huslia	16	5	8	657	970	51	79	2
Hughes		13	21	34	520	871	102	177	0	0
Allakaket		21	27	48	425	679	42	91	1	3
5	Tarana	27	50	67	346	439	94	1,340	140	294
	Rampart	6	283	163	242	273	658	1,588	18	40
	Fairbanks F.C.	34	37	46	29	64	266	685	15	56
	Stevens Village	15	168	109	184	359	243	322	4	13
	Beaver	7	91	181	0	0	429	787	16	37
	Fort Yukon	24	101	119	107	191	279	506	4	13
	Circle	12	161	268	22	38	287	274	3	10
	Central	3	62	78	61	53	0	0	0	0
	Eagle	33	50	60	12	56	434	559	0	1
	Tok	3	27	27	24	41	0	0	0	0
	Chandler R.	Venetie	8	4	12	0	0	399	333	0
Black R.	Chalkyitsik	5	0	0	0	0	230	342	1	2
6	Manley	10	59	105	57	123	560	729	51	127
	Ninto	10	32	34	146	315	50	97	97	175
	Narano	15	90	134	446	1,245	685	954	435	850
	Fairbanks	193	3	5	19	26	13	23	8	17

a Represents only those who reported catches. Data from personal interviews, postal surveys and returned permits pooled.
b Mean catch is reported to the nearest whole fish.

2,810 in Anvik. The mean fall chum catch per fishing family was largest in District 5 with 954 in Tanana. The mean coho catch per fishing family was largest in District 6 with 435 in Nenana. In general the mean catch of summer chum was smaller than the mean fall chum catch in Districts 5 and 6 and larger in Districts 1 through 4. The mean catch per fishing family was similar for fall chum and coho salmon in villages of Districts 1 through 3. In general, the standard deviation increased with increasing mean catch and was quite large. The standard error for the mean catch was adjusted for a finite population and was quite small (Appendix C.1). The resulting 95% confidence interval was also small.

The sample mean is the most common summary statistic, though if the underlying distribution is not symmetric it may not be the preferred statistic to describe central tendency. The mean can be sensitive to a few extremely large or small values and in that case the median may be the better statistic to describe a "typical" fishing family or at least to state the level of catch for which half the village caught greater and half caught fewer than. The distribution of each district's catch per fishing family is presented for chinook, summer chum, fall chum and coho salmon in Appendix C.2 through C.9. They were found to be very skewed with numerous zero catches and a few extremely large values. Village median catch (Table 5) was consistently smaller than its mean catch and the magnitude of the difference depended on the degree to which the catch distribution was skewed. Note that the number of small and zero catches resulted in a median coho catch of zero for most Yukon villages.

The subsistence fishery is regulated by district though data are collected and initially reported by village. Ultimately, regulation through the control of exploitation and analysis of harvest data are conducted on a district level to compliment commercial fisheries data. It was therefore of interest to investigate whether the catches differed among villages within a district. Fishing family chinook catches differed significantly among villages for District 1, 2, 4 and 5. In District 6 permit data were omitted because of the harvest limits and the other village's catches were not significantly different for any salmon category. The fall chum salmon catch per fishing family was not significantly different within Districts 2, 3, 4 and the p-values for Districts 1 and 5 were 0.49 and 0.342 respectively. Summer chum and coho salmon catches were significantly different within all other districts except coho salmon in District 4. Significantly different catches within a district could be attributed to stock availability, personal preferences or gear type differences. In example, District 5 summer chum salmon are not readily available to villages upriver of Fort Yukon.

Village, District and Drainage Harvest And Effort Totals

Drainage wide, the largest subsistence harvests were 3,083

Table 5. Number of families fishing (N) and their median subsistence catch by village in the Yukon River drainage, Alaska 1986.

District	Village	Number Sampled for Harvest Data (N)	Median Catch in Number of Salmon ^b			
			Chinook	Summer Chum	Fall Chum	Coho
1	Sheldon's Pt.	12	26	288	0	0
	Alakanuk	53	8	150	3	0
	Emonak	30	11	140	0	0
	Kotlik	44	17	161	0	0
2	Mt. Village	57	12	120	6	0
	Pitka's Pt.	9	18	160	0	0
	St. Mary's	53	15	180	3	15
	Pilot Station	33	20	85	0	9
	Marshall	39	33	65	35	20
3	Ruseion Mission	22	65	88	12	2
	Holy Cross	20	73	14	20	0
4	Arvik	9	50	1,500	30	0
	Shageluk	11	4	300	0	0
	Grayling	20	39	675	55	0
	Kaltag	20	35	200	55	0
	Nulato	25	30	75	40	0
	Koyukuk	15	10	50	60	0
	Galena	24	19	40	23	0
	Ruby	19	28	45	150	6
Koyukuk R.	Huelia	16	1	125	25	0
	Hughes	13	10	200	25	0
	Allakaket	21	6	200	0	0
5	Tanana	27	20	250	350	0
	Rampart	6	300	200	0	0
	Fairbanks F.C.	34	24	10	0	0
	Stevens Village	15	200	0	100	0
	Beaver	7	30	0	0	0
	Fort Yukon	24	48	0	55	0
	Circle	12	68	2	243	0
	Central	3	34	83	0	0
	Eagle	33	31	0	160	0
	Tok	3	12	0	0	0
Chandalar R.	Venetie	8	0	0	388	0
Black R.	Chelkyitsik	5	0	0	50	0
6	Manley	10	5	13	0	0
	Minto	10	23	0	0	0
	Menana	15	50	75	25	0
	Fairbanks	193	0	6	0	0

a Represents only those who reported catches. Data from personal interviews, postal surveys and returned permits pooled.

b Median catch is reported to the nearest whole fish.

chinook salmon in Fort Yukon, 41,581 summer chum salmon in Anvik, 32,049 fall chum salmon in Tanana and 10,090 coho salmon in Nenana (Table 6). The standard deviations were quite small resulting from the high level of coverage of the 1986 survey and the resulting small finite population correction factor. If all fishing families in a village were surveyed the standard deviation would be zero.

The drainage total salmon harvest in Alaska and its approximate 95% confidence interval was 45,238 (+/- 1,023) chinook salmon, 290,815 (+/- 14,006) summer chum salmon, 164,043 (+/- 6,880) fall chum salmon and 34,468 (+/- 3,436) coho salmon. The largest subsistence catch for chinook salmon occurred in District 5, summer chum salmon harvest was largest in District 4, and the harvest of coho salmon was largest in District 6 (Table 7). Small catches of pink salmon, whitefish and inconnu were also reported (Appendix C.10).

Throughout the drainage both large and small mesh gill nets were used to target either chinook or chum salmon (Table 8) though more fishermen used small mesh gill nets (1,001) than large mesh (638). A total of 201 fishwheels were used in the upper Yukon Districts 4-6. Two-thirds of the fishermen with fishwheels also used gill nets. There was a total of 1.6 units of gear per estimated fishing family.

Inseason Harvest Surveys And Village Monitoring

The inseason survey was conducted from 6 to 21 August in 14 villages to estimate the chinook salmon subsistence harvest. In all villages fewer families were contacted in-season (Table 9) than during the postseason survey which included the follow up postal survey. No significant paired difference between surveys was found in the mean village catch per fishing family from villages where greater than three families were contacted in-season (Table 9). The difference between the inseason and postseason estimate of the mean chinook catch per fishing family ranged from 1.1% in Nenana to 300% in Venetie. As a result of conducting two Commercial Fisheries Division surveys in the same village a number of fishermen were interviewed twice. Little difference was found in the participant responses between surveys (Table 10). The greatest discrepancy was found in Nulato where mean catch reported from 7 fishermen interviewed twice was 35% higher in the postseason survey than the in-season. This could have resulted from continued fishing after the 7 August inseason survey or differential recall. In general the greatest differences occurred between the surveys of downriver villages.

In 1986, season long monitoring of salmon subsistence catches occurred in Hughes on the Koyukuk River and Fort Yukon in District 5. In Hughes, the number of fishing families varied by only one between the estimate made by a local resident who had been contracted to monitor catches from July through August and

Table 6. Estimated total subsistence catch, its standard deviation (SD) and number of subsistence fishing families, in the Yukon River drainage, Alaska 1986.

District/ Area	Village	Catch in Number of Salmon									
		Fishing Families		Chinook		Summer Chum		Fall Chum		Coho	
		Number	SD	Total	SD	Total	SD	Total	SD	Total	SD
1	Sheldon's Pt.	15	0.3	592	45	4,755	437	259	48	237	60
	Alakanuk	67	1	1,027	87	11,280	480	2,030	230	1,518	171
	Emmonak	73	0.8	1,754	223	12,618	895	2,746	349	732	179
	Kotlik	49	0	1,902	49	10,201	237	3,965	76	238	15
2	Ht. Village	78	0.8	1,367	158	11,468	728	2,947	399	828	106
	Pitka's Pt.	11	0.3	274	42	1,973	133	156	37	71	23
	St. Mary's	60	0.2	1,443	79	13,013	618	5,245	965	4,761	957
	Pilot Station	45	0.7	1,452	202	7,870	1,189	1,643	323	1,314	237
3	Marshall	55	0.5	1,947	109	7,172	748	3,472	606	1,966	215
	Russian Mission	23	0	1,747	85	3,136	124	637	34	679	56
4	Holy Cross	27	0.5	2,505	254	2,392	455	1,148	186	102	34
	Arvik	15	0.5	939	277	41,581	11,874	913	187	296	161
Koyukuk R.	Shogeluk	11	0	53	0	6,710	0	370	0	173	0
	Grayling	23	0.2	1,837	197	35,284	4,181	4,204	500	860	164
	Kelting	21	0.1	1,080	34	26,867	2,363	2,024	128	229	27
	Kuleto	28	0.3	1,833	186	10,349	1,441	1,762	159	69	21
	Koyukuk	15	0	589	0	6,250	0	2,195	0	154	0
	Galena	25	0	1,046	34	6,618	648	4,819	429	465	49
	Ruby	19	0	1,263	0	7,883	0	7,101	0	339	0
	Hualla	14	0	82	0	10,506	0	808	0	31	0
	Hughes	14	0	296	33	7,280	904	1,422	184	0	0
Allakaket	21	0	543	0	8,934	0	878	0	15	0	
5	Tanana	34	0.4	1,672	198	11,648	1,289	32,049	3,935	4,691	862
	Rampart	6	0	1,700	0	1,450	0	3,950	0	110	0
	Fairbanks F.C.	48	0.8	1,762	217	1,382	303	11,708	3,227	709	264
	Stevens Village	17	0.2	2,839	193	3,116	640	4,150	574	67	23
	Beaver	8	0.2	708	188	0	0	3,321	815	124	39
	Fort Yukon	31	0.4	3,083	388	3,244	625	8,543	1,654	118	42
	Circle	13	0.2	2,047	273	273	39	3,650	279	37	10
	Central	3	0	186	0	186	0	0	0	0	0
	Eagle	37	0.4	1,833	162	445	150	16,027	1,506	6	2
	Tok	3	0	82	0	71	0	0	0	0	0
Chandler R.	Venetie	8	0	32	0	0	0	3,193	0	0	0
Black R.	Chaikyitsik	7	0.5	0	0	0	0	1,533	627	8	3
6	Nanley	11	0.1	621	105	604	124	5,905	734	538	127
	Ninto	11	0.2	350	47	1,587	443	545	137	1,058	246
	Nanana	23	0.2	2,093	493	10,827	4,644	15,902	3,502	10,090	3,121
	Fairbanks	211	0.6	637	25	4,024	139	2,803	127	1,635	90

Table 7. Estimated district-area subsistence catch, its standard deviation (SD) and number of subsistence fishing families in the Yukon River drainage, Alaska 1986.

District/Area	Numbers of Fishing Families	Numbers of Salmon							
		Chinook		Summer Chum		Fall Chum		Coho	
		Total	SD	Total	SD	Total	SD	Total	SD
1	206	5,275	253	38,854	1,135	9,000	430	2,725	255
2	249	6,483	293	41,496	1,705	13,483	1,167	9,140	1,020
3	50	4,252	268	5,528	472	1,785	189	781	66
Lower Yukon Total	505	16,010	470	85,878	2,102	24,268	1,258	12,646	1,053
4	157	8,642	395	139,342	12,906	23,388	715	2,585	237
Koyukuk River	51	941	35	26,720	904	3,108	184	46	0
5	200	15,912	641	21,833	1,605	83,398	5,654	5,862	904
Chandalar/Black R.	15	32	0	0	0	4,726	627	8	3
6 (Tanana R.)	256	3,701	507	17,042	4,669	25,155	3,583	13,321	3,135
Upper Yukon Total	679	29,228	908	204,937	13,847	139,775	6,764	21,822	3,271
Lower 95% C.I. a		43,233		263,363		150,559		27,733	
Total	1,184	45,238	1,023	290,815	14,006	164,043	6,880	34,468	3,436
Upper 95% C.I.		47,243		318,267		177,527		41,203	

a C.I. = Confidence interval based on a normal statistic of 1.96

Table 8. Estimated number of subsistence fishing families, gear used and number of dogs per village for the Yukon River drainage, Alaska 1986.

District/ Area	Village	Fishing Families	Gill Nets ^a		Fishwheels	Dogs
			Large Mesh	Small Mesh		
1	Sheldon's Pt.	15	10	17	0	59
	Alakanuk	67	27	96	0	188
	Emonak	75	30	50	0	103
	Kotlik	49	19	49	0	170
2	Mt. Village	78	40	78	0	219
	Pitka's Pt.	11	7	11	0	77
	St. Mary's	60	36	64	0	379
	Pilot Station	45	23	47	0	97
	Marshall	53	40	56	0	379
3	Russian Mission	23	21	23	0	108
	Holy Cross	27	27	13	0	66
4	Arwik	15	16	10	7	92
	Shageluk	11	1	11	0	104
	Grayling	23	19	20	10	183
	Kaltag	21	17	9	13	163
	Mulato	28	19	16	15	128
	Koyukuk	15	8	13	1	49
	Galena	25	20	10	6	139
	Ruby	19	2	8	11	220
Koyukuk R.	Huslia	16	4	17	1	158
	Hughes	14	1	14	0	78
	Allakaket	21	10	27	0	191
5	Tanana	34	20	15	31	686
	Rampart	6	7	2	2	68
	Fairbanks F.C.	48	50	27	10	90
	Stevens Village	17	20	9	6	106
	Beaver	8	7	1	1	54
	Fort Yukon	31	24	15	18	216
	Circle	13	7	10	10	95
	Central	3	3	2	0	3
	Eagle	37	30	34	7	230
	Tok	3	2	1	0	0
Chandalar R.	Venetie	8	0	8	0	87
Black R.	Chalkyitsik	7	0	7	0	11
6	Manley	11	8	5	7	127
	Minto	11	7	4	2	72
	Nanana	23	12	14	17	324
	Fairbanks	211	44	188	26	0
Total		1,184	638	1,001	201	5,519

^a Large mesh gill nets are generally larger than 6 in mesh and small mesh less than 6 in.

Table 9. Mean reported chinook salmon subsistence catch and number reporting by village for inseason (August) and postseason (October-November) surveys, 1986.

Village	Date	Fishing Families Responding	Number of Chinook Salmon		Percent Difference From In-season Reported Mean Catch	Statistic	
			Mean Catch	SD		t	F
Kaltag	8/6	17	54	50.8	-3.8	0.12	1.10
	10/20	20	52	53.2			
Hulato	8/7	12	83	90.7	-27.7	0.57	1.03
	10/21	25	65	89.2			
Galena	8/5-8/8	15	38	46.5	9.5	-0.24	1.28
	10/20-10/24	24	42	52.6			
Ruby	8/8	11	50	66.8	24.2	-0.46	2.33
	10/24	19	66	101.9			
Tanana	8/11	14	54	63	-8.0	0.18	1.14
	10/28	27	50	67.3			
Rampart	8/15	5	340	96.2	-20.1	0.68	2.88
	11/3	6	283	163.3			
Stevens Village	8/15	9	187	112.1	-11.3	0.41	1.06
	11/3	15	168	109			
Beaver	8/15	3	35	13.6	61.5	a	177.32
	11/3	7	91	181.1			
Circle	8/20	3	64	37.8	60.2	a	50.38
	11/3	12	161	268.3			
Venetie	8/20	2	16	22.6	-300.0	1.15	4.00
	11/5	8	4	11.3			
Eagle	8/19	16	52	60.3	-4.0	0.11	1.00
	11/12-11/14	33	50	60.2			
Manley	8/13	5	106	136.7	-79.7	0.74	1.70
	10/30-10/31	10	59	104.8			
Hinto	8/29	7	46	30.9	-43.8	0.87	1.18
	10/30	10	32	33.6			
Kenana	8/21	9	89	79.3	1.1	-0.02	2.86
	Mail	15	90	134.2			
Total In-season		128	78.0		-6.0		
Total Postseason		231	73.6				

a A significant difference was found ($\alpha=0.05$) between the variances and a t statistic was not calculated.

Table 10. Inseason (August) chinook salmon subsistence catch reports compared to postseason (October-November) survey reports by the same fishermen, 1986

Village	Inclusive Survey Date	Number of Fishermen Interviewed Twice	Mean Reported Catch	SD	Percent Difference From In-season Mean Catch
Katag	8/6 10/20	14	55 46	53 42	-20.7
Mulato	8/7 10/21	7	79 121	103 127	35.3
Galena	8/5-8/8 10/23	10	34 42	37 59	19.5
Ruby	8/8 10/24	8	58 64	77 74	8.8
Tanana	8/11 10/28	11	53 58	68 68	7.6
Rampart	8/15 11/3	5	340 340	96 96	0.0
Steven's Village	8/15 11/3	6	147 136	114 99	-8.1
Beaver	8/15 11/3	3	35 35	14 14	0.0
Circle	8/20 11/3	1	20 20		0.0
Eagle	8/19 11/10-11/11	5	52 55	61 59	5.1
Venetie	8/20 11/3	1	32 32		0.0
Hanley	8/13 10/30	2	15 15	21 21	0.0
Minto	8/29 10/30	6	51 51	30 30	0.0
Total in-season		58	76		4.5
Total Postseason			79		

the postseason survey conducted by a different department employee. Reported catches were likewise very similar between surveys (Table 11). A Subsistence Division employee monitored catches in Fort Yukon. Twenty one families with established fish camps or who could be consistently contacted were chosen for monitoring, Andrews (pers. com). In contrast during the postseason survey, an attempt was made to contact everyone on the computer list. A total of 50 people had previously been listed for Fort Yukon and only 5 remained with unknown fishing status. A total of 14 families who had fished were directly interviewed in the postseason survey, 10 returned postal surveys indicating that they had fished, and 4 families were known to have fished through contact with friends, relatives, or neighbors. In summary 28 families were determined to have fished and 3 of the 5 unknowns were estimated to have fished. The estimate of mean catch varied from 53 chinook salmon per family based on the 20 non-randomly chosen fishing families monitored by Subsistence Division to 101 chinook salmon for the Commercial Fisheries postseason survey. For the Subsistence Division survey, local residents did not differentiate between fall and summer chum salmon and did not report any coho catch. The mean chum catch per family was greater for the 21 families monitored all season (507) than that of the post season survey (386).

DISCUSSION

Historic Harvest Levels and Distribution

It is necessary to predict future levels of subsistence fishing in order to insure adequate escapement and the priority use of the Yukon fisheries resources for subsistence purposes. Unlike the commercial fishery there is very little inseason reporting of subsistence catches. The results of a season's harvest are often not available until mid-winter. Therefore, it becomes necessary to anticipate future utilization levels, distribution and timing of the subsistence harvest based on historical catch trends throughout the drainage.

Subsistence catches have been estimated since 1961 for chinook salmon and all other salmon pooled and reported as "small" salmon. Beginning in 1977, there has been separate accounting by summer and fall run chum salmon and coho salmon. Figure 2 presents subsistence catches in Alaska of chinook salmon and all other pooled since 1961. Subsistence catches of all species appear to have been depressed from the mid 1960s through 1977 (Figure 2). Thereafter catches have increased steadily through the 1980s returning to levels of the early 1960s for "other" salmon and creating record harvests of chinook salmon. This change in harvest level from the mid-1960s has been accompanied by a change in distribution of the catch within the drainage.

Table 11. Inseason subsistence harvest and effort survey compared to the Division of Commercial Fisheries' postseason surveys, 1986.

Village	Inclusive Survey Date	Number of Fishing Families	Catch in Number of Salmon									
			Chinook		Summer Chum		Fall Chum		Chum Total		Coho	
			Mean	Total	Mean	Total	Mean	Total	Mean	Total	Mean	Total
Hughes	7/10-9/23	15	21	309	520	7,956	93	1,399				
	10/22	14	21	296	520	7,280	102	1,422				
Fort Yukon	7/1-10/30	21	53	1,122					507	10,654		
		31 ^a		1,656					507	15,727		
	11/3-11/7	31	101	3,083	107	3,264	279	8,543	386	11,807	4	117
		31 ^b	72	2,232								

^a Harvest estimate expanded for the number of fishing families determined for postseason survey (5-7 November)

^b Harvest estimate and mean catch based on only personal interview without postal surveys.

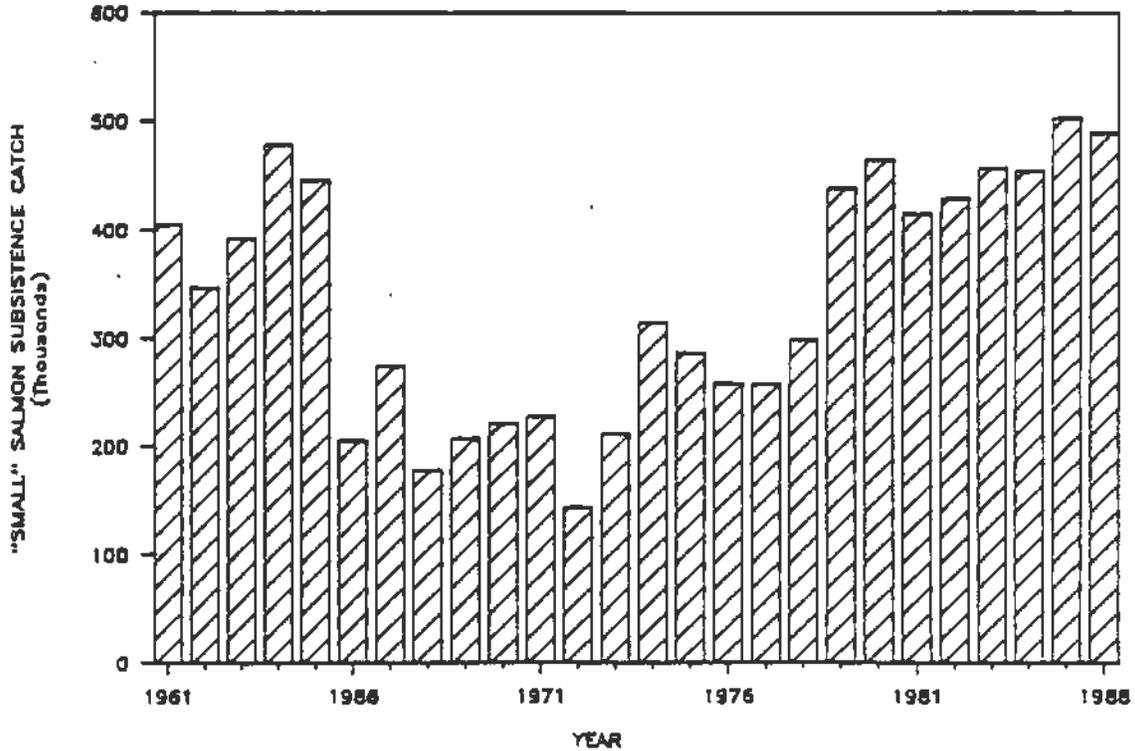
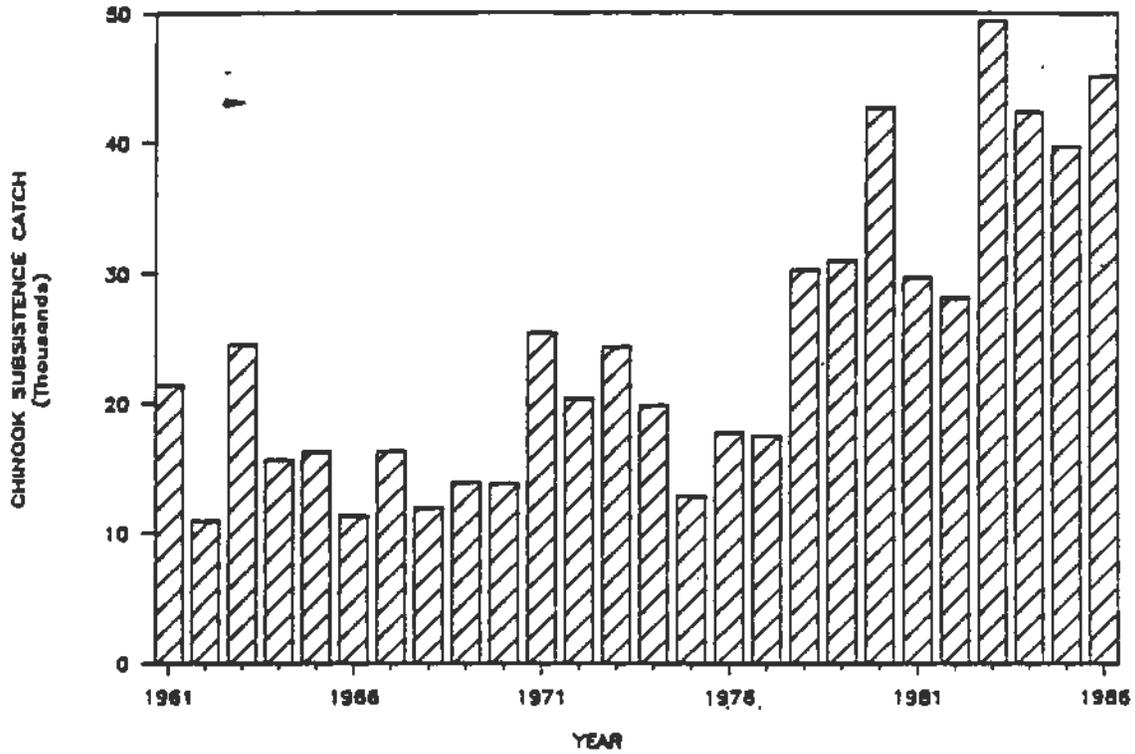


Figure 2. Subsistence catch in the Yukon River, Alaska, of chinook salmon (top) and all other salmon pooled (bottom) in number of fish for 1961 through 1986.

Chinook Salmon

Perhaps the most dramatic and steady long term increase in subsistence catches has been for chinook salmon (Figure 3). Increased catches have been observed in all districts (Appendix A.2 and A.3) and the average catch has doubled from that of the period 1961 - 1972 of 16,883 chinook salmon to 33,182 for 1973 - 1986. There has also been some change in the distribution of catch (Figure 3). The proportion taken in District 6 has increased over time converging with that taken in District 1 through 4. The proportion of total harvest taken in District 5 has increased from a low of 11% in 1975 to 46% in 1981 (Figure 3, Appendix A.10).

Summer Chum Salmon

The subsistence catch of summer chum salmon in the Yukon River has increased from 159,502 fish in 1977 to 290,825 in 1986 (Appendix A.5). The increased catch is most evident in District 4 (Figure 4) which consistently comprises more than 40% of Alaska's Yukon River subsistence harvest.

The yearly fluctuation in drainage wide catch is in most part due to variation in the level of harvest in District 4. In comparison other district's catch or proportion of total has changed little. The next highest proportion of drainage-wide catch is taken in District 5 and varies inversely to District 4 (Appendix A.10).

Fall Chum Salmon

In 1979, the subsistence catch of fall chum salmon in the Yukon River, Alaska doubled over previous levels (Figure 5). Catches have averaged 183 thousand since, ranging from 133 to 233 thousand (Appendix A.6).

There has been some change in the distribution of catches throughout the drainage. The proportion taken in District 6 declined from 1977 through 1981 and the proportion taken in District 5 and 4 have increased (Figure 5). The greatest proportion of the catch is taken in District 5, averaging 52 percent for the period 1977-1986 (Appendix A.10). District 3 takes the smallest percent averaging 2 percent (1977-1986).

Coho Salmon

Reported subsistence catches have increased greatly over the last 10 years (Figure 6, Appendix A.7). The 1982 - 1986 average of 35,109 was over double the previous five year average of 15,056 (1977 - 1981). Much of the increase is due to increased catches in Districts 5 and 6. There is a question of whether increased coho catches are a result of better reporting as fisherman begin

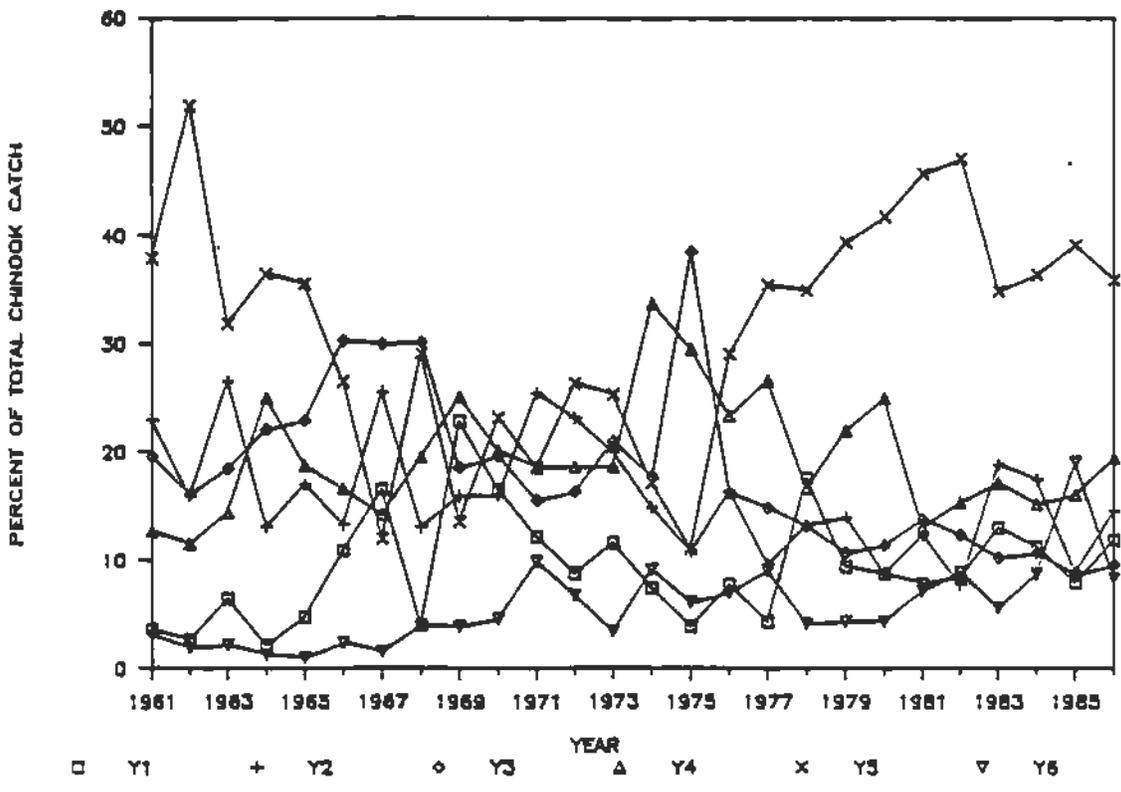
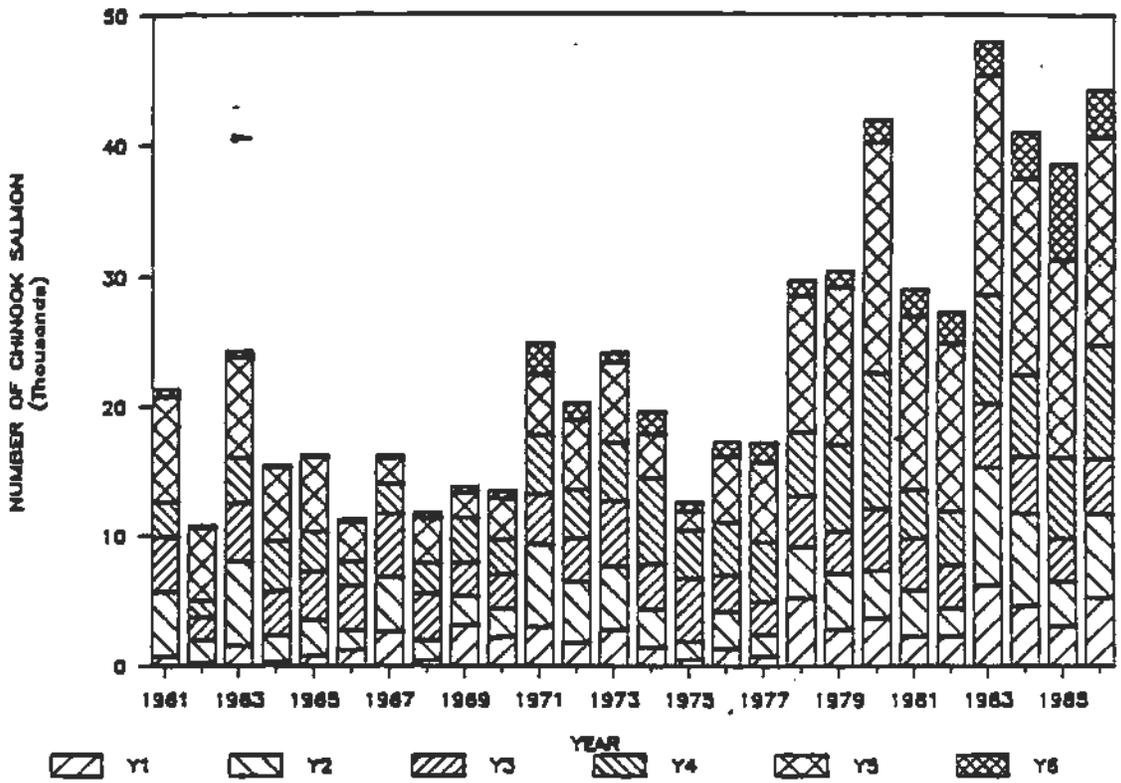


Figure 3. Chinook salmon subsistence catch by district in the Yukon River, Alaska, in number of fish (top) and percent of total (bottom) for 1961 through 1986.

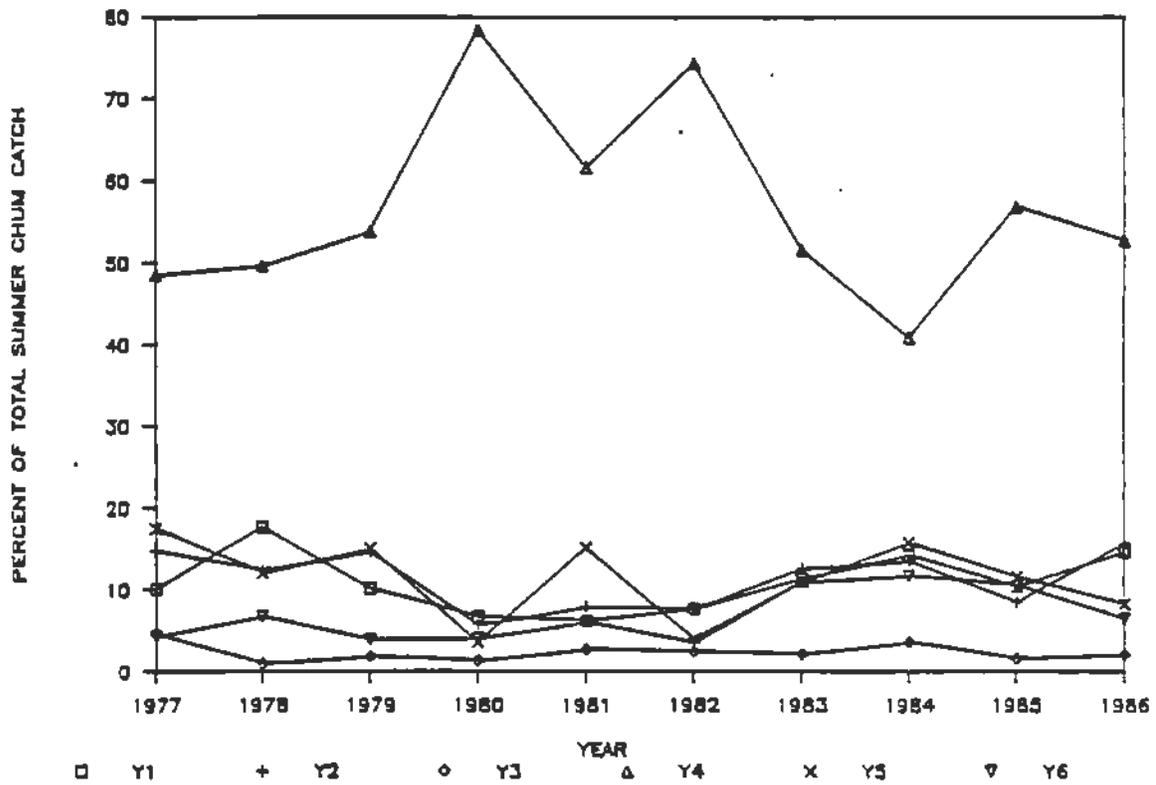
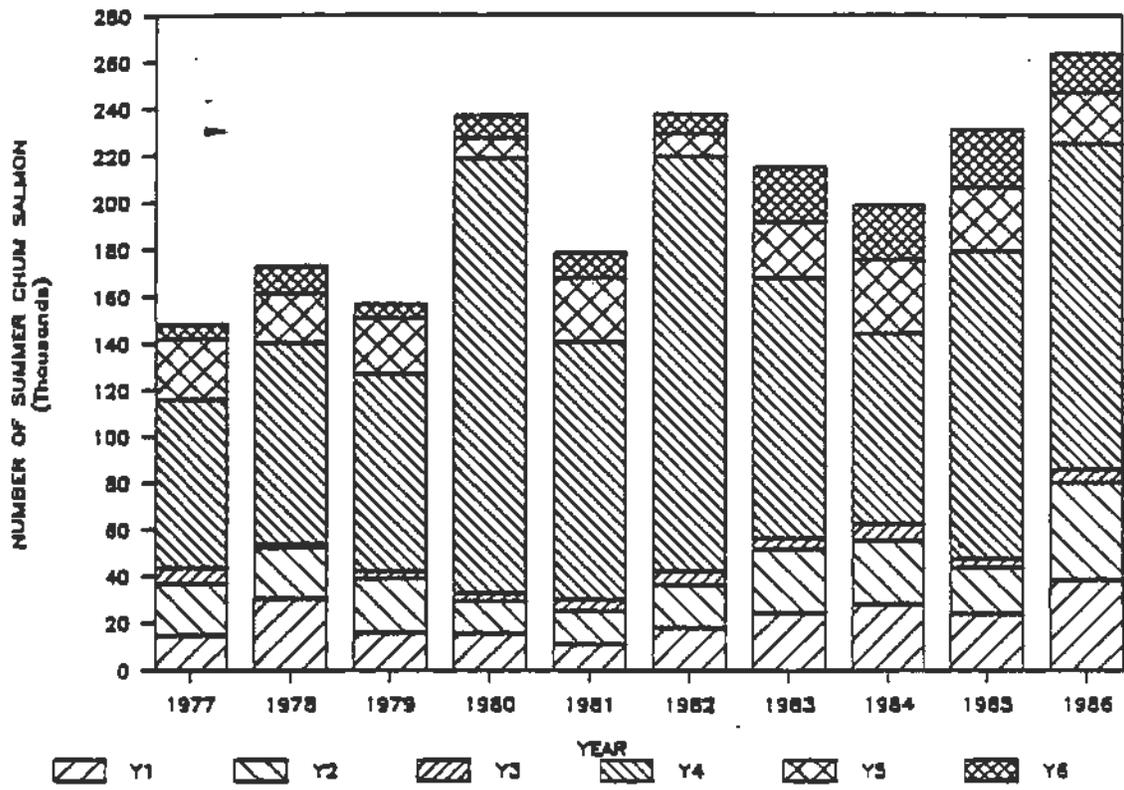


Figure 4. Summer chum salmon subsistence catch by district in the Yukon River, Alaska, in number of fish (top) and percent of total (bottom) for 1977 through 1986.

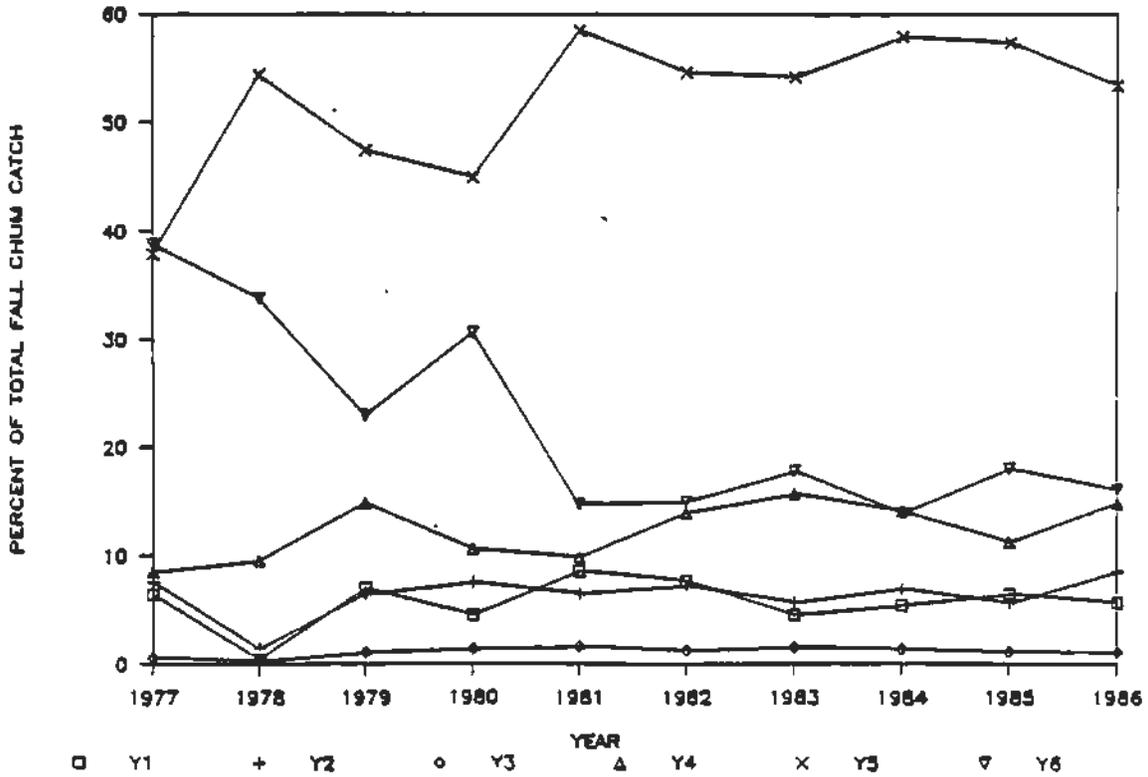
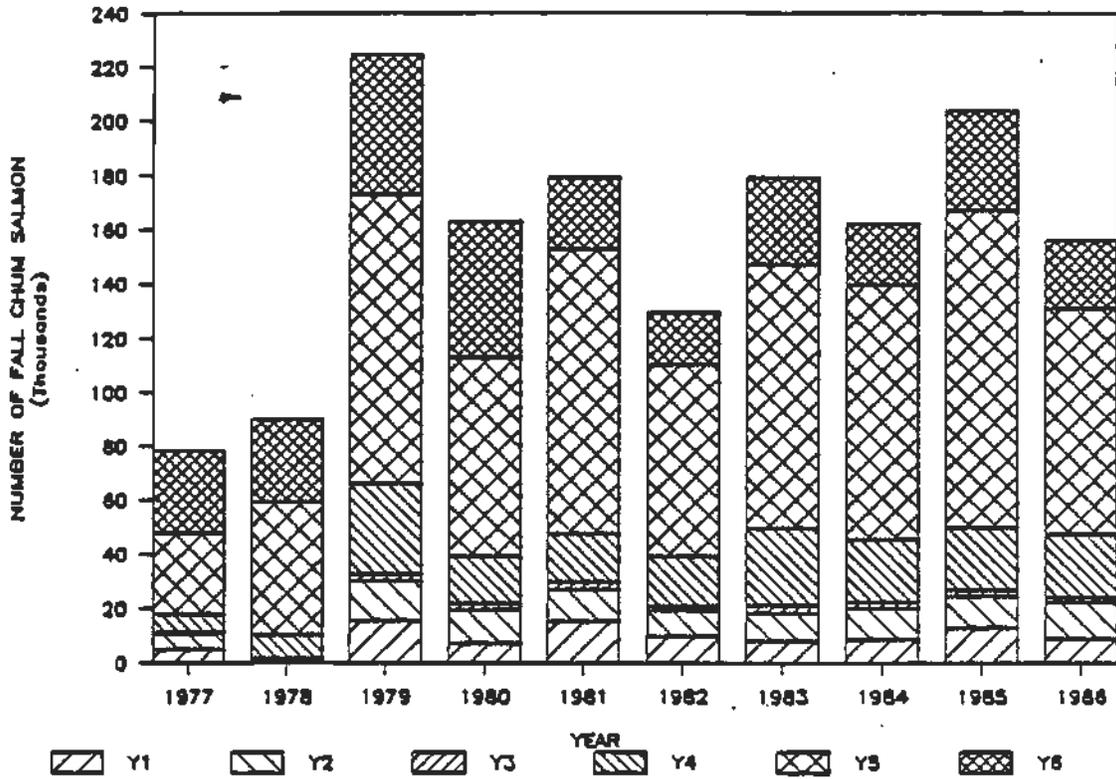


Figure 5. Fall chum salmon subsistence catch by district in the Yukon River, Alaska, in number of fish (top) and percent of total (bottom) for 1977 through 1986.

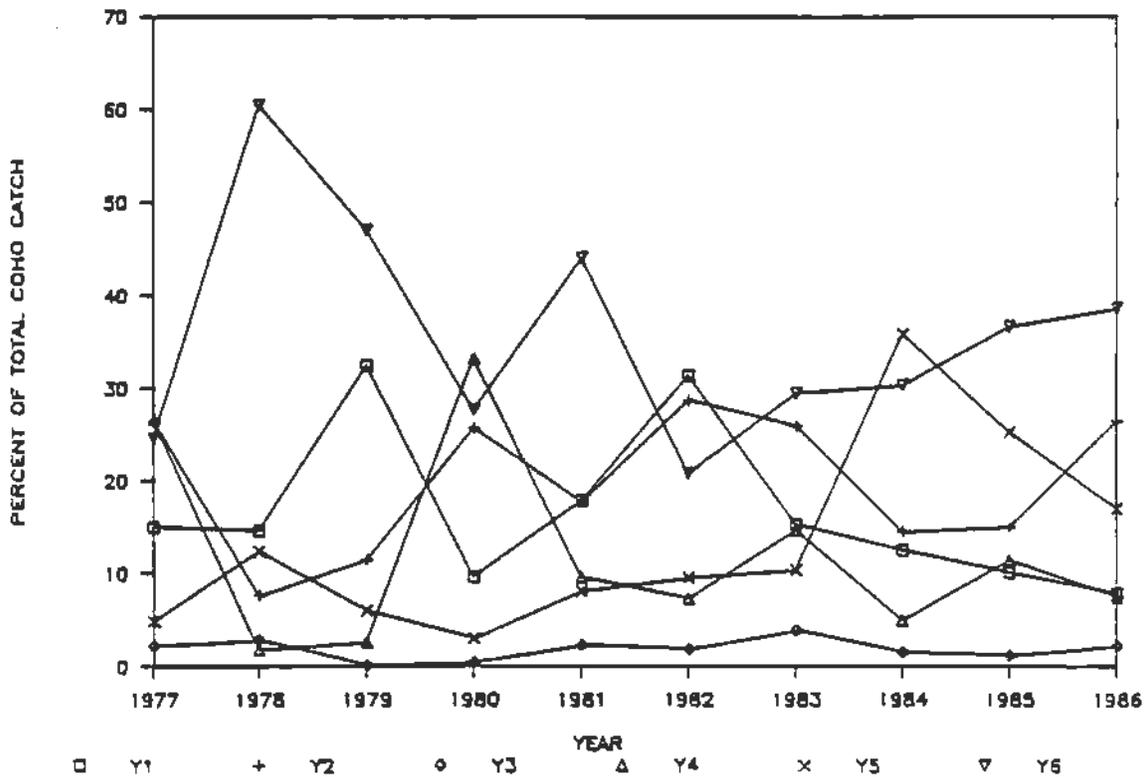
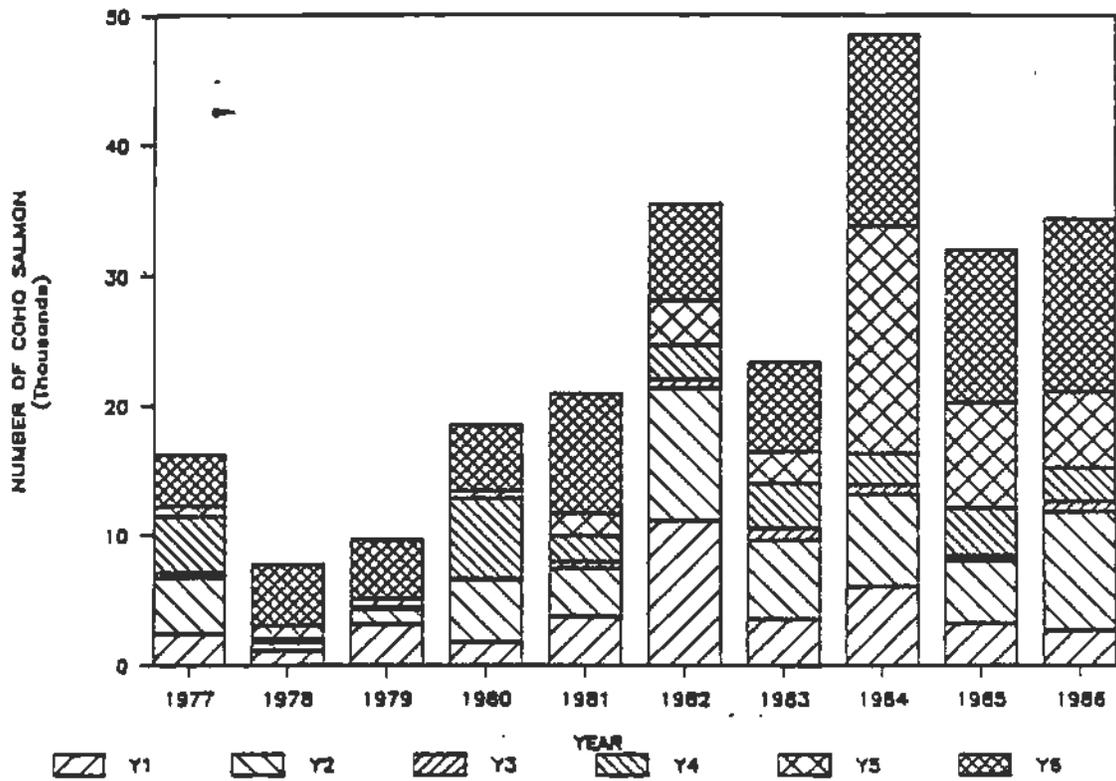


Figure 6. Coho salmon subsistence catch by district in the Yukon River, Alaska, in number of fish (top) and percent of total (bottom) for 1977 through 1986.

to differentiate them from fall chum in their subsistence catches or represent an increase in stock abundance, as the commercial catch of coho has also increased. Yet the department's programs which index abundance have also indicated an increase (D. Bergstrom, personal communication) in stock strength to explain increased catches.

The distribution of the coho catch across districts has varied yearly. The proportion caught in District 1 has declined over the last 5 years while District 6 has increased (Figure 6). On average (1977-1986) District 6 takes the largest proportion with 36% and District 3 the smallest with less than 2% (Appendix A.10).

Future Harvest Levels and Distribution

Fishery managers, in their role to control exploitation, have used the most recent five year average to predict the next year's subsistence catch. Of course, ultimate future harvests will depend on the abundance of the target stocks and availability of alternative species. For example, the increased utilization of coho salmon in District 6 has complimented the decline in fall chum salmon. Following this approach one would expect the harvest in 1987 to approach 41,000 chinook, 258,000 summer chum, 175,000 fall chum and 35,000 coho salmon. One would also expect to see the largest proportion of the chinook catch taken in District 5 (39%), the summer chum catch in District 4 (55%), the fall chum catch in District 5 (56%), and the coho catch in District 6 (31%).

CONCLUSION

The 1986 subsistence survey contacted 78% of the individuals known to subsistence fish and all villages with historically documented subsistence harvest were sampled. Due to the completeness of the survey the resulting harvest estimates were very precise. The approximate 95% confidence interval was plus or minus 4% for chinook, 9% for summer chum, 8% for fall chum and 20% for coho salmon. The estimated harvest and approximate 95% confidence intervals of the drainage were 43,238 \pm 1,023 chinook salmon, 290,815 \pm 14,006 summer chum, 164,043 \pm 6,880 fall chum and 34,468 \pm 3,436 coho salmon.

It is difficult to conclude on the accuracy of the survey. It was hypothesized that the postseason estimate of the chinook salmon harvest might not be accurate due to the time elapsed between actual fishing and the survey. An inseason survey was conducted in order to better document the chinook harvest directly after the season. No significant difference in mean catches of chinook salmon between inseason and postseason

surveys was detected. Therefore we can not conclude that the time elapsing between the two surveys effected the accuracy of the postseason estimates of mean catch per fishing family. A difference may exist which was not detected due to the large variances in part associated with the small sample size. There was close agreement in the harvest estimates given by fishermen interviewed during both surveys. The inseason survey will not be continued because fewer fishermen are contacted which reduces precision of the total harvest estimate, and since the postseason estimate of mean chinook catch appears adequate.

A further attempt to evaluate the accuracy of the postseason survey was made by comparing it with season long monitoring of catches in Hughes and Fort Yukon. The postseason harvest estimate was very accurate in Hughes. A comparison could not be made due to the sample design for Fort Yukon. It was thought that the difference between the monitoring in Fort Yukon and the postseason survey was in part due to the time span for which staff were active in Fort Yukon and the non-random choice of monitored fishermen. It may be more appropriate to evaluate the accuracy of the postseason survey based on the 1986 results in Hughes (Table 10) and historical comparisons in Russian Mission and Holy Cross (Table 1). Anytime staff monitor catches in a village, fishermen may become more aware of the magnitude of their catch and similar accuracy can not be assumed for other villages. Yet even if fishermen are aware of their catches because of inseason monitoring they will accurately report it postseason in a personal interview, postal survey or permit. In summary, if people know what they catch it will be accurately reported.

ACKNOWLEDGMENTS

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APPENDIX A: HISTORICAL SUBSISTENCE DATA

Appendix A.1 Date of assistance surveys conducted in villages of the Yukon River, 1961-1986.

District	Village	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
1	Alekanuk	d	d	8/8	8/1-2	8/1-2	7/29-30	8/5-7	8/1	8/2-4	8/1-3	8/3	8/7	8/6	8/5	8/4	8/2
	Sheldon's Point	d	d	8/6	8/3	8/3	8/1	8/14	8/5	8/1	7/31	8/1	8/4	8/3	8/3	8/3	8/1
	Zemonaik	d	d	8/3	8/4-5	8/4-5	8/2	8/17	8/7	8/3-6	8/4-5	8/4	8/3	8/4	8/6	8/6	8/3
	Kotlik	d	d	7/30	8/5-6	8/9	8/6-7	8/19	8/10	8/9	8/6	8/8	8/11	8/9	8/9	8/8	8/7
2	Mountain Village	d	d	8/14-17	8/7, 8/9	8/16	8/9	8/21-22	8/11-12	8/11	8/8-9	8/9	8/13-14	8/10	8/14	8/9	8/8
	Pitka's Point	d	d	8/18-19	8/11, 8/13	8/18	8/10-11	8/22-23	8/13-16	8/12-13	8/10	8/11	8/15	8/11	8/15	8/9	8/9
	Saint Mary's	d	d	8/18-19	8/11, 8/13	8/18	8/10-11	8/22-23	8/13-16	8/12-13	8/11	8/12-13	8/16-17	8/11	8/13	8/10	8/10
	Pilot Station	d	d	8/20-21	8/17	8/17	8/12	8/23-24	8/17	8/16	8/13	8/11	8/18	8/13	8/15	8/11	8/11
	Marshall	d	d	8/23-23	8/19	8/19	8/12	8/24	8/20	8/18	8/14	8/17	8/23	8/13	8/16	8/12	8/12
3	Russian Mission	d	d	8/24	8/19	8/20	8/13	8/25	8/21	8/23	8/18	8/18	8/24	8/14	8/17	8/14	8/13
	Soly Cross	d	d	8/25-26	8/20	8/23-24	8/14	8/24-25	8/22	8/24	8/21	8/20	8/26	8/13	8/18	8/13	8/14
4	Anvik	d	d	8/27	8/25	8/28	8/23	8/29	8/26	8/26	8/22	8/22	8/26	8/16	8/18	8/15	8/13
	Shageluk	d	d	8/28	8/26	8/27	8/24	8/29	8/26	8/26	8/23	8/22	8/26	8/16	8/19	8/16	8/16
	Grayling				8/26	8/27	8/24	8/29	8/26	8/26	8/23	8/22	8/26	8/16	8/19	8/16	8/17
	Kaitag	d	d	8/29-30	8/27	8/29-30	8/25	9/1	8/28	8/28	8/24	8/24	8/28	8/17	8/20	8/17	8/19
	Mulato	d	d	8/30-9/1	8/28	8/31	8/27	9/2	8/29	8/29	8/25	8/25	8/29	8/18	8/20	8/18	8/25
	Koyukuk	d	d	9/1	8/29	9/1	8/27	9/3	8/30	8/30	8/26	8/28	8/29	8/19	8/20	8/18	8/20
	Galena	d	d	9/2-3	8/30	9/2	8/29	9/5	8/30	8/30	8/27	8/27	8/30	8/19	8/21	9/21	9/18
	Ruby	d	d	9/3-4	9/1	9/3	8/31	9/6	9/2	8/31	8/26	8/28	8/31	8/20	8/21	d	9/18
5	Tenana	d	d	9/3-6	9/4	9/4-5	9/2-3	9/14	9/4	9/4-5	8/30	8/31	9/6	9/4	8/24	9/13	9/25
	Rampart	d	d	10/1	9/11	9/11	9/12	9/12	9/7	9/6	9/4	9/5	9/2	8/24	8/25	9/13	9/25
	Fairbanks b														Permit	Permit	Permit
	Stevan's Village	d	d	10/4	9/14	9/13	9/13	9/12	9/7	9/6	9/4	9/5	9/2	8/24	8/23	9/14	10/2
	Beaver	d	d	10/6	9/15	9/14	9/12	9/12	9/7	9/7	9/4	9/5	9/2	8/24	8/23	9/14	10/2
	Fort Yukon	d	d	10/8-9	9/16-17	9/15-18	9/13	9/13	9/7	9/6	9/4	9/5	9/3	8/24	8/26	9/27	10/2
	Circle	d	d	10/13									9/2	8/24	8/26	9/27	10/3
Eagle	d	d										d	9/2	8/24	8/26	9/27	10/3
6	Manley	d	d	9/26	9/6	9/5, 7	9/15	9/18	9/6	9/4	9/6	9/1	9/3		8/27	d	10/3
	Minto	d	d	9/26	9/6	9/5, 7	9/15	9/18	9/6	9/4	9/6	9/1		8/25			
	Nenana	d	d	9/28	9/10	9/9	9/14-15	9/10	9/6	9/4	9/6	9/1	9/3	8/27	d		10/3
	Fairbanks c										Permit	Permit	Permit	Permit	Permit	Permit	Permit
Koyukuk R.	Buslie		d	e	e	e		9/9	9/5	8/23	9/1	d	9/5	8/23	8/24	8/19	8/23
	Bugha			e	e	e		9/9	9/5	8/22	9/1	d	9/8	8/23	8/24	8/19	8/23
	Allakaket		d	e				9/9	9/5	8/22	9/1	d	9/5	8/23	8/24	8/19	8/23
	Alatna		d					9/9	9/5	8/22	9/1	d	9/5	8/23	8/24	8/19	8/23
Chandalar R.	Venatic		d	e		9/20	9/14	9/13	9/7	9/7	d	d	9/3	d		9/14	d
	Black R.		d	e	d	9/17											

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Appendix A.1 (continued: p 2 of 2)

District	Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	
1	Alakamuk	d	8/2	8/24	8/29	8/26	8/28	8/25-27	8/23	8/22, 29	8/23, 27	
	Sheldon's Point	8/2	7/31	8/22	8/28	8/30	8/27	8/23	8/20	8/26	8/28	
	Emmonak	d	8/23	8/25	8/28-30	9/1	9/4	8/26-27	8/27	8/25-26	8/30	
	Kotlik	8/8	8/4	8/23	8/25-26	8/23	8/31	8/24, 28	8/22	8/23, 27	8/24	
2	Mountain Village	8/9	8/9	8/29	9/3-4	9/3	9/7	9/4	Mail	9/5-6	9/4	
	Pitka's Point	8/11	8/10	8/29	9/3	9/6	9/7	9/2	Mail	9/6	9/8	
	Saint Mary's	8/11	8/10	8/29	9/5	9/14	9/7	9/3	Mail	9/7-8	8/31, 9/5	
	Pilot Station	8/12	8/12	8/24	9/6	9/7	9/9	9/5	Mail	8/16-25	9/1	
	Marshall	d	8/11	8/23	9/7	9/8	9/10	9/6	Mail	9/3	9/2	
3	Russian Mission	d	8/13	8/26	9/8	9/9	9/11	9/7	Mail	9/4	9/3	
	Holy Cross	8/15	8/13	8/29	9/9	9/10	9/12	Mail	Mail	Mail	9/5	
4	Anvik	8/17	8/14	8/28	9/28	9/11-12	9/13	Mail	Mail	a	Mail	
	Shageluk			9/8	Mail	Mail					10/15	
	Grayling	8/19	8/14	8/28	9/13	9/12	9/13	Mail	Mail	Oct., Nov.	10/15	
	Kalkeg	8/21	8/16	Mail	Oct.	9/21	10/1	July, Oct.	July, Nov.	July, Oct.	8/8, 10/20	
	Nulato	8/25	8/17	9/13	Oct.	9/21	10/1	July, Oct.	July, Nov.	10/10	8/7, 10/21	
	Koyukuk	8/24	8/19	9/7	Oct.	9/19	10/1	Mail	Aug., Nov.	10/9	10/23	
	Galena	10/2	9/1	9/8	Oct.	9/18	10/2	11/30	Aug., Nov.	10/8	8/3-8, 10/20-24	
	Ruby	10/1	9/2	9/10	Oct.	9/16	10/2	11/29	Aug., Nov.	10/11	8/8, 10/24	
5	Tanana	10/7	9/29	9/17	10/8	10/8	10/23	10/27-28	Mail	10/29	8/11, 10/28	
	Rampart	10/7	9/28	Mail	10/9	10/9	10/23	a	Mail	10/31	8/15, 11/3	
	Fairbanks b	Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit	
	Steven's Village	10/11	10/3	11/3	10/23	10/9	10/30	Mail	Oct.	10/31	8/15, 11/3	
	Beaver	10/11	10/3	10/10	10/17	10/9	10/30	Mail	Mail	a	8/15, 11/3	
	Fort Yukon	10/11	10/7	10/10	10/13	10/9-10	10/30	Oct.	Oct.	11/5	11/5-7	
	Circle	10/12	10/10	10/10	10/13	10/10	11/7	Mail	Mail	Mail	8/20, 11/3	
	Eagle	10/12	10/9	10/11	10/16	10/10-11	11/7	10/17-18	Nov.	Oct., Dec.	10/11, 11/12-14	
	6	Hanley	9/29	10/11	9/20	10/7	10/3	11/13	Mail	Mail	Mail	8/13, 10/30
		Minto				10/6	10/6	d	Mail	July, Nov.	Mail	8/29, 10/30
Nenana		10/5	10/9	10/16	10/3	10/14	11/14	Mail	Mail	Mail	8/21, Mail	
Fairbanks c		Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit	Permit	
Koyukuk R.	Buelia	8/23	8/18	Mail	Nov.	9/23	9/30	Mail	Mail	10/9	10/22	
	Hughes	8/23	8/18	Mail	Oct.	9/23	9/30	Mail	Mail	10/12	10/22	
	Allakaket	8/23	8/18	Mail	Oct.	9/24	9/30	Mail	Mail	10/12	10/22	
	Alatna	8/23	8/18	Mail	Oct.	9/24	9/30	Mail	Mail	10/12	10/22	
Chandalar R.	Venetie	10/11	10/5	10/10	10/17	10/10	10/30	Mail	Mail		8/20, 11/5	
Black R.	Chalkyitsik										11/5	

- a Five year average used
- b Yukon River from Bova Creek to Dall River
- c Tanana River between Wood River and Salehs River
- d Survey data collected but specific dates unknown
- e Survey data from catch calendars only

Appendix A.2. Subsistence catch of chinook salmon by village in the Yukon River in numbers of fish, 1961-1976.

Village	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Sheldons Pt.	180		893	52	41	127	755	30	728	1,093	802	442	165	203	108	122
Alakanuk	143	53	81	87	177	263	287	203	852	589	1,116	647	461	349	130	363
Emmonak a	137	21	120	63	145	160	541	42	810	131	667	300	1,163	211	55	398
Estlik b	290	216	488	124	412	692	1,121	200	789	417	370	379	1,020	396	204	472
District 1	772	290	1,982	328	776	1,242	2,704	477	3,179	2,250	3,033	1,748	2,811	1,459	497	1,353
Mt. Village	1,110	619	2,427	985	510	217	1,345	230	337	340	2,036	932	912	460	394	397
Pickaa Pt.-										188	471	204	477	234	230	123
St. Marys o	1,810	391	1,254	521	826	499	993	168	737	387	1,475	1,313	793	644	208	1,150
Pilot Station	753	219	801	237	302	440	1,334	784	367	647	1,400	1,358	1,308	517	107	502
Marshall	1,265	503	2,012	290	842	350	306	343	544	598	885	713	1,163	1,048	436	694
District 2	4,938	1,732	6,494	2,033	2,780	1,506	4,178	1,555	2,225	2,168	6,347	4,720	4,833	2,923	1,375	2,866
Russian Mission	1,563	641	1,392	1,185	1,393	800	2,019	2,178	707	993	838	875	1,387	1,243	2,098	1,328
Boly Cross	2,648	1,111	3,123	2,243	2,351	2,645	2,876	1,418	1,877	1,678	3,032	2,359	3,708	2,243	2,792	1,493
District 3	4,213	1,752	4,315	3,428	3,744	3,445	4,893	3,988	2,584	2,671	3,871	3,334	3,093	3,486	4,890	2,820
Lower Yukon Total	9,921	3,774	12,391	5,789	7,300	6,193	11,777	5,620	7,988	7,009	13,273	9,842	12,759	7,868	6,762	7,041

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Village	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Anvik	22	51	163	153	118	144	54	114	71	67	152	72	67	111	83	84
Shogeluk																13
Grayling		37		124	246	85	199	200	187	155	416	185	516	547	100	119
Kaltag	33	224	102	350	57	47	199	60	232	124	154	83	148	616	192	57
Nulato	513	171	835	355	305	218	578	269	771	734	478	364	507	1,161	1,119	968
Koyukuk	403	429	629	209	228	93	262	390	357	30	410	417	564	604	50	437
Galena	628	123	282	150	260	407	210	434	263	313	574	608	510	786	1,294	435
Ruby	1,060	226	1,514	2,555	1,843	887	820	881	1,819	1,313	2,465	2,876	2,418	2,899	912	1,959
District 4	2,757	1,255	3,523	3,884	3,857	1,801	2,322	2,326	3,580	2,736	6,641	3,805	4,538	6,644	3,730	4,868
Tanana	2,379	332	1,414	329	324	421	151	427	683	361	428	1,461	965	709	80	1,338
Rampart	805	1,438	1,231	990	1,041	869	368	922	321	138	1,190	1,457	2,614	452	517	501
Fairbanks F.C.																20
Stevens Village	658	831	1,075	325	910	620	334	787	950	851	750	1,002	1,027	590	391	615
Beaver	185	442	491	718	488	51	210	495	458	773	777	241	358	34	188	188
Ft. Yukon	2,958	1,822	2,831	2,898	2,747	1,074	692	832	75	1,019	786	520	536	1,838	215	1,158
Circle/Control	496	393	250	1,200							666	345	225	406	16	528
Eagle	875	400	500	17	100						111	353	421	68	20	633
District 5	8,148	5,658	7,790	5,689	5,802	2,015	1,955	3,463	1,887	3,154	4,428	3,378	6,146	3,367	1,407	5,069
Hanley	330	6	0						75	138		99	50	176	213	326
Minto	17	86	325				0	12	1	0	7	208	60	154		
Menana	318	115	210	194	157	272	252	442	463	357	2,357	887	683	1,431	333	864
Fairbanks										132	98	198	26	38	32	31
District 6	657	207	535	194	157	272	252	474	561	627	2,462	1,376	827	1,788	778	1,221
Musita		100	32	112	9		7	35	18	12	2	1	35	69	23	21
Hughes			47	18				45	10	116	315	27	32	10	25	155
Allakaket/Alatna			85				70	4	23	150	190	28	74	155	151	231
Koyukuk R.	0	100	164	138	9	0	77	104	49	258	507	56	141	234	199	407
Ventle					0	0	0	0	7	10	0	0	8		0	0
Chalkyitsik	0	0	2	2	0											
Upper Yukon Total	11,542	7,220	12,016	9,879	9,825	5,188	4,806	6,367	5,884	6,785	12,238	10,616	11,844	12,044	8,134	10,765
Yukon Total	21,463	10,994	24,607	15,668	16,325	11,361	16,383	11,987	13,972	13,874	25,511	20,458	24,403	19,912	12,896	17,888

a Includes Lemont Slough.

b Includes Aproz Pass and vicinity.

c Pitkas Pt. and St. Marys combined in 1961-1969.

d Includes New Minto Fish Camp 1972-1974.

Appendix A.3. Subsistence catch of chinook salmon by village in the Yukon River in numbers of fish 1977-1986.

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Sheldons Pt.	302	546	91	427	163	79	1,021	802	143	592	442
Alakanuk	213	1,123	893	1,395	423	336	1,582	1,028	517	1,027	777
Emonak a	62	2,738	1,362	1,175	1,021	1,328	2,436	2,099	1,382	1,754	1,653
Kotlik b	173	837	533	472	675	568	1,224	695	1,029	1,902	838
District 1	750	5,246	2,879	3,669	2,282	2,311	6,263	4,624	3,071	5,275	3,710
Mt. Village	172	817	1,025	843	811	218	1,875	1,217	672	1,367	959
Pitkas Pt.	87		390	241	312	373	254	996	83	274	404
St. Marys c	489	1,314	1,328	1,056	1,068	612	2,178	1,667	695	1,443	1,244
Pilot Station	556	1,027	804	433	399	428	2,703	1,116	896	1,452	1,108
Marshall	364	806	721	1,101	990	478	2,055	2,176	1,122	1,947	1,364
District 2	1,668	3,964	4,268	3,674	3,580	2,109	9,065	7,172	3,468	6,483	5,079
Russian Mission	639	1,498	1,476	1,660	1,689	1,628	2,634	1,938	974	1,747	1,773
Holy Cross	1,920	2,466	1,792	3,123	2,312	1,731	2,276	2,456	2,368	2,505	2,229
District 3	2,559	3,902	3,263	4,783	4,001	3,359	4,910	4,394	3,342	4,252	4,001
Lower Yukon Total	4,977	13,112	10,410	12,126	9,863	7,779	20,238	16,190	9,881	16,010	12,790

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Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Arvik	67	180	261	161	191	354	744	576	405	959	454
Shageluk			62	35	10					53	3
Grayling	149	292	391	3,664	222	294	951	879	903	1,837	650
Kaitag	216	127	435	694	179	344	652	487	669	1,080	466
Mulato	1,531	1,354	1,245	2,297	1,117	811	1,133	966	1,063	1,835	1,018
Koyukuk	752	518	495	699	541	493	966	1,009	194	569	641
Galena	1,155	945	1,591	1,205	570	733	1,477	1,226	1,329	1,046	1,067
Ruby	735	1,539	2,221	1,736	964	1,168	2,346	1,107	1,657	1,263	1,448
District 4	4,605	4,935	6,701	10,491	3,794	4,199	8,271	6,250	6,220	8,642	5,747
Tanana	858	1,851	1,604	5,711	2,517	2,250	5,547	2,682	1,248	1,672	2,845
Rampart	1,194	987	1,820	1,169	488	887	1,070	876	1,302	1,700	925
Fairbanks F.C.	467	1,333	899	1,350	1,095	1,935	2,672	2,499	1,845	1,762	2,013
Stevens Village	775	1,845	1,295	2,612	1,292	1,810	2,531	2,177	2,763	2,839	2,115
Beaver	299	358	394	506	552	250	220	553	506	708	416
Ft. Yukon	1,061	2,642	1,922	2,527	2,794	1,894	1,887	3,608	2,900	3,083	2,617
Circle/Centrol	304	212	1,175	769	728	969	648	545	2,259	2,233	1,030
Eagle ^d	1,171	963	2,888	2,880	3,782	2,844	2,183	1,998	2,247	1,915	2,615
District 5	6,129	10,391	11,997	17,524	13,248	12,839	16,758	16,938	15,090	15,912	14,575
Menley	752	298	269	410	567	386	990	282	744	621	554
Minto				334	344	411	275	440	1,386	350	571
Nenana	742	807	800	771	974	1,195	966	2,556	4,919	2,095	2,122
Fairbanks	67	126	244	291	400	451	475	321	326	657	395
District 6	1,561	1,231	1,333	1,826	2,085	2,443	2,706	3,599	7,375	3,701	3,642
Huslia	50	132	146	154	61	125	459	169	144	82	192
Hughes	72	216	180	226	402	479	318	856	778	296	567
Allakaket/Alatna	173	246	258	217	185	274	706	375	283	563	365
Koyukuk R.	295	594	544	597	648	878	1,483	1,400	1,205	941	1,123
Venetie	0	14	0	160	52	20	22	51		32	36
Chalkyitaik	0									0	0
Upper Yukon Total	12,590	17,185	20,595	30,598	19,827	20,379	29,240	26,238	29,890	29,228	25,115
Yukon Total	17,567	30,297	31,005	42,724	29,690	28,158	49,478	42,428	39,771	45,238	37,905

a Includes Lamour Slough in 1977.

b Includes Aproke Pass and vicinity in 1978 only.

c Pitkas Pt. and St. Marys combined in 1978.

d Tok added to Eagle in 1986.

Appendix A.4. Subsistence catch consisting of coho, pink and chum salmon pooled by village in the Yukon River in numbers of fish, 1961-1976.

Village	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Shaldona Pt.	12,683	10,899	30,798	8,701	9,851	3,007	2,737	8,693	5,573	4,238	4,355	3,534	2,720	6,247	1,459	2,033
Alakanak	8,932	5,747	17,953	11,333	21,473	9,830	9,964	14,184	13,806	10,994	7,893	5,696	6,551	12,743	3,656	10,866
Emmonak a	15,670	9,074	27,749	16,954	47,386	11,824	13,314	16,569	12,836	7,265	5,103	4,840	10,197	-8,288	3,430	8,628
Kotlik b	12,940	11,433	18,837	11,788	24,857	13,744	15,161	6,962	10,439	3,443	3,223	4,308	8,157	6,638	6,378	10,289
District 1	49,625	37,153	95,357	48,776	103,367	38,403	43,186	46,008	44,654	27,948	22,578	18,388	27,625	33,936	17,123	31,816
Nr. Village	7,373	8,331	18,106	13,593	11,473	7,548	8,305	7,312	10,676	4,865	8,214	3,909	7,524	11,661	8,720	8,278
Pickas Pt.-										6,764	4,819	2,329	1,793	2,433	3,783	1,964
St. Marys c	8,771	10,310	7,001	12,308	14,130	8,460	9,790	9,166	11,386	7,840	8,714	8,743	7,498	12,045	4,861	10,096
Pilot Station	5,603	13,926	3,553	18,776	7,843	3,587	6,520	4,770	7,313	5,882	4,171	7,026	8,474	8,367	7,849	3,498
Marshall	5,992	8,595	8,023	10,125	6,611	3,640	3,070	3,330	6,606	4,910	6,134	3,174	4,934	6,763	5,710	3,938
District 2	27,741	39,362	38,683	47,802	40,101	25,235	27,685	24,778	36,383	30,261	32,672	29,181	30,133	41,469	28,923	29,774
Russian Mission	4,098	9,994	3,354	10,049	4,888	2,787	4,897	3,836	3,668	3,114	2,378	2,919	2,459	4,748	4,113	2,407
Holy Cross	21,144	20,424	12,532	31,447	15,709	4,228	22,341	18,309	6,037	4,188	2,387	3,421	3,532	4,811	4,691	1,546
District 3	25,242	30,418	17,886	41,316	30,597	6,935	27,238	14,143	9,703	7,302	4,763	6,340	3,991	9,331	8,804	3,933
Lower Yukon Total	102,608	104,933	143,926	137,294	174,265	70,375	98,119	84,931	90,742	65,503	59,413	53,919	63,749	84,736	54,850	63,543

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Appendix A.4. (continued: p 2 of 2)

Village	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Anvik	61,406	43,404	28,064	34,341	37,179	14,239	20,793	10,020	8,925	9,924	8,121	3,689	20,850	29,261	30,924	26,660
Shageluk d	56,284	3,600	18,358													2,100
Grayling		32,737		23,784	36,436	11,437	22,852	8,225	18,037	12,548	6,900	6,428	12,778	27,421	26,476	26,977
Kaltag	23,395	25,824	23,193	35,961	29,382	21,729	27,028	12,090	9,942	12,465	10,662	4,285	23,135	14,920	11,699	13,106
Nulato	63,613	27,948	31,742	62,446	43,988	22,017	22,521	13,242	23,853	26,456	18,369	7,648	13,568	37,312	22,552	13,253
Koyukuk	13,544	6,282	7,966	36,167	11,232	7,443	4,613	3,541	3,359	3,789	3,125	1,772	1,964	14,978	5,667	2,440
Galena	10,585	1,673	6,731	3,100	2,741	8,296	2,650	1,079	2,422	3,179	2,015	1,353	4,612	8,307	11,500	13,435
Ruby	15,654	18,243	15,585	30,122	17,603	5,530	10,690	2,382	5,201	8,068	13,356	6,725	12,932	19,235	8,820	10,777
District 4	244,481	159,711	131,639	225,921	178,561	90,691	111,147	50,579	71,739	76,429	62,548	31,900	89,839	151,434	117,638	108,748
Tanana	12,775	7,245	16,646	15,348	14,885	10,421	11,938	13,406	12,455	23,017	25,273	13,108	10,795	12,447	26,342	21,592
Rampart	11,722	6,962	11,209	14,963	13,462	4,056	15,763	2,636	8,935	5,252	11,435	3,674	8,986	1,527	8,117	14,175
Fairbanks F.C.																90
Stevens Village e	3,490	4,355	8,247	6,979	7,346	1,900	3,145	2,022	2,725	8,292	7,957	1,118	3,618	4,428	2,297	1,080
Beaver	2,975	2,334	12,119	11,359	3,274	4,135	4,292	3,619	1,965	2,378	1,870	3,157	1,372	1,583	1,825	517
Ft. Yukon	13,252	10,255	31,219	19,407	19,402	3,960	8,983	6,564	3,338	6,354	3,498	1,597	3,074	142	19,458	1,143
Circle/Central	992	800	100	2,300							2,940	752	592	1,266	1,283	153
Eagle	150	100	125	1,502	256						490	587	2,109	66	1,825	1,141
District 5	45,356	32,051	79,665	71,938	58,625	24,472	44,121	28,247	29,418	45,293	53,463	23,993	30,546	21,459	61,147	39,891
Manley	1,950	4,773	2,965						200	40		6	7	20	6,000	9,400
Minto f	4,536	12,455	12,528	17,628	11,358	7,152	22	740	130	500	8		2,460	2,300		
Nenana	6,426	13,821	13,599	11,129	7,363	12,023	3,517	6,055	3,247	11,398	19,007	20,864	14,154	26,340	26,634	14,345
Fairbanks										1,072	5,655	8,608	1,657	2,958	1,615	2,826
District 6	12,912	31,049	29,092	28,757	18,721	19,175	3,539	6,795	3,577	13,010	24,670	29,478	18,278	31,618	34,249	26,571
Huslia		16,000	5,455	13,913	5,101		5,489	3,677	2,466	4,018	1,468	534	4,482	6,601	5,026	8,791
Hughes			767	559			5,837	2,237	3,112	6,367	16,902	2,777	2,541	8,786	5,429	4,280
Allakaket/Alatna			1,972				4,099	1,490	4,084	8,985	9,382	1,357	2,492	10,544	6,559	4,865
Koyukuk R.	0	16,000	8,194	14,472	5,101	0	15,425	7,404	9,662	19,370	27,752	4,668	9,515	25,931	17,014	17,936
Venetie		1,000	200		9,586	1,098	2,626	551	3,116	2,400	801	50	410		2,401	508
Chalkyitsik		500	64	742	1,438											
Upper Yukon	302,749	240,311	248,854	341,830	272,032	135,436	176,858	93,576	117,512	156,502	169,214	90,089	148,588	230,442	232,449	193,654
Yukon Total	405,357	347,244	392,780	479,124	446,297	206,011	274,977	178,507	208,254	222,005	228,649	144,008	212,337	315,198	287,299	259,197

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a Includes Lapount Slough.
 b Includes Aproka Pass and vicinity.
 c Pitkas Pt. and St. Marys combined in 1961-1969.
 d Includes Holikachuk.
 e Includes New Minto Fish Camp 1972-1974.
 f Includes Manley for 1964-1966.

Appendix A.5. Subsistence catch of summer chum salmon by village in the Yukon River in numbers of fish, 1977-1986.

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Sheldons Pt.	842	3,385	610	907	2,495	885	1,690	2,701	1,717	4,755	1,898
Alakanuk	5,569	9,408	4,615	3,343	2,263	5,225	9,347	10,095	7,702	11,260	6,926
Emmonak a	4,370	9,601	6,084	4,915	4,907	8,426	8,401	10,053	8,742	12,618	8,106
Kotlik b	4,278	8,503	4,835	6,807	1,645	3,916	5,241	5,610	6,188	10,201	4,520
District 1	15,059	30,897	16,144	15,972	11,310	18,452	24,679	28,459	24,349	38,854	21,450
Ht. Village	5,959	6,362	8,043	3,090	3,383	3,854	10,183	8,665	6,745	11,468	6,566
Pitkas Pt. -	2,904		2,131	289	566	1,418	982	2,129	945	1,973	1,212
St. Marys c	7,055	9,494	6,167	3,327	4,113	7,987	7,587	8,890	6,611	13,013	7,038
Pilot Station	4,226	3,810	3,193	2,545	2,859	2,135	4,683	3,236	3,133	7,870	3,209
Marshall	1,850	2,018	3,742	4,430	3,277	3,048	3,961	4,076	2,361	7,172	3,345
District 2	21,994	21,684	23,276	13,681	14,218	18,442	27,396	26,996	19,795	41,496	21,369
Russian Mission	1,801	856	913	628	2,628	1,419	1,576	2,227	1,817	3,136	1,933
Holy Cross	5,041	850	2,033	2,614	2,301	4,421	3,033	5,124	1,870	2,392	3,350
District 3	6,842	1,706	2,946	3,242	4,929	5,840	4,609	7,351	3,687	5,528	5,283
Lower Yukon Total	43,895	54,287	42,366	32,895	30,457	42,734	56,684	62,806	47,831	85,878	48,102

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Appendix A.5. (continued: p 2 of 2)

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Anvik	23,394	19,883	12,714	28,051	26,588	27,087	20,592	22,433	24,950	41,581	24,330
Shageluk			6,585	2,485	2,501					6,710	834
Grayling	16,275	18,365	18,418	29,894	15,836	47,006	22,958	28,060	23,937	35,284	27,559
Kaitag	15,043	18,127	22,928	53,470	28,121	37,125	27,674	1,800	26,969	24,667	24,337
Mulato	9,444	8,589	6,054	29,657	7,534	19,740	11,130	232	16,315	10,349	10,990
Koyukuk	2,752	4,857	5,570	14,416	11,788	18,149	14,440	5,215	9,666	6,250	11,852
Galena	3,226	8,930	4,218	13,102	15,089	20,434	5,789	19,480	16,212	6,618	15,401
Ruby	2,204	11,568	8,305	15,084	5,542	7,539	8,804	4,282	13,556	7,883	7,945
District 4	72,338	86,319	84,792	186,159	110,498	177,080	111,387	81,502	131,601	139,342	122,414
Tanana	8,915	9,297	5,964	5,109	7,873	3,214	5,552	10,620	11,148	11,646	7,681
Rampart	6,327	1,135	15,300	109	1,946	0	3,698	7,650	5,133	1,450	3,685
Fairbanks F.C.	1,568	6,055	1,202	1,227	4,501	2,056	2,194	4,065	2,027	1,382	2,969
Stevens Village	1,257	1,766	16	520	2,576	666	5,051	5,952	3,046	3,116	3,458
Beaver	694	102	34	263	146	534	100	167	263	0	242
Ft. Yukon	6,390	2,471	749	1,291	8,149	1,434	7,142	3,032	4,410	3,264	4,833
Circle/Central	1	39	433	48	2,009	0	73	0	930	459	602
Eagle ^d	888	163	180	27	108	1,887	133	49	39	516	443
District 5	26,060	21,028	23,878	8,594	27,308	9,791	23,943	31,535	26,996	21,833	23,915
Manley	3,615	3,601	1,939	564	2,972	971	7,245	1,260	856	604	2,661
Minto				450	367	808	7,414	5,042	5,291	1,587	3,784
Kenena	2,716	5,440	1,880	4,945	4,369	3,972	6,779	13,962	15,825	10,827	8,981
Fairbanks	118	2,729	2,384	3,749	3,239	2,708	2,276	3,177	2,646	4,024	2,809
District 6	6,449	11,770	6,203	9,708	10,947	8,459	23,714	23,441	24,618	17,042	18,236
Muslie	2,949	8,556	19,805	15,063	12,550	6,809	18,588	12,550	13,430	10,516	12,785
Hughes	4,081	6,387	11,664	10,545	6,196	8,409	1,905	14,744	12,788	7,280	8,808
Allakaket/Alatna	3,750	8,797	7,479	9,434	7,827	7,687	4,165	4,169	7,564	8,934	6,282
Koyukuk R.	10,780	23,740	38,948	35,042	26,573	22,905	24,658	31,463	33,782	26,730	27,876
Venetie	0	0	0	0	0	0	0	0	0	0	0
Chalkyitsik	0									0	0
Upper Yukon	115,607	142,857	153,821	239,503	175,326	218,235	183,702	167,941	216,997	204,947	192,440
Yukon Total	159,502	197,144	196,187	272,398	205,783	260,969	240,386	230,747	264,828	290,825	240,543

- a Includes Lamont Slough in 1977.
- b Includes Aproka Pass and vicinity in 1978 only.
- c Pitkas Pt. and St. Marys combined in 1978.
- d Tok added to Eagle in 1986.

Appendix A.6. Subsistence catch of fall chum salmon by village in the Yukon River in numbers of fish, 1977-1986.

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Sheldone Pt.	285	0	1,072	1,249	490	866	233	555	713	259	575
Alakanuk	634	148	5,841	1,227	4,913	1,336	903	1,219	2,603	2,030	2,195
Emmonak a	2,099	83	5,182	2,016	4,375	4,458	2,715	3,329	4,539	2,746	3,883
Kotlik b	2,067	159	3,693	2,941	5,762	3,336	4,367	3,782	5,420	3,965	4,537
District 1	5,085	390	15,788	7,433	15,540	10,016	8,238	8,885	13,275	9,000	11,191
Mt. Village	3,332	556	5,144	5,719	3,794	2,810	4,065	3,497	3,591	2,947	3,551
Pitkas Pt.-	8		1,197	608	319	901	342	1,186	621	156	674
St. Marys c	1,309	311	2,332	2,660	3,003	1,485	2,796	2,741	2,694	5,245	2,544
Pilot Station	552	189	2,949	1,187	1,764	1,568	1,302	832	1,957	1,663	1,485
Marshall	588	241	3,040	2,261	2,890	2,747	1,836	3,138	2,681	3,472	2,658
District 2	5,989	1,297	14,662	12,435	11,770	9,511	10,341	11,394	11,544	13,483	10,912
Russian Mission	300	177	1,002	226	497	630	773	860	1,266	637	805
Holy Cross	161	89	1,441	2,094	2,396	1,029	2,090	1,373	1,024	1,148	1,582
District 3	461	266	2,443	2,320	2,893	1,459	2,863	2,233	2,290	1,785	2,388
Lower Yukon Total	11,533	1,953	32,893	22,188	30,203	21,186	21,442	22,512	27,109	24,268	24,490

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Appendix A.6. (continued—p 2 of 2)

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Arvik	309	118	2,203	2,750	2,167	4,088	902	720	2,125	913	2,000
Shageluk			0	0	150					370	50
Grayling	299	459	2,199	1,904	890	2,972	3,847	1,990	3,106	4,204	2,553
Kaltag	329	1,149	8,454	2,111	2,329	812	2,833	1,330	1,570	2,024	1,775
Mulato	807	477	5,280	1,134	621	217	3,159	1,675	4,240	1,762	1,982
Koyukuk	556	411	4,515	2,319	700	1,359	1,120	1,560	798	2,195	1,107
Galena	2,287	3,013	2,597	2,652	3,142	2,164	4,259	7,270	4,476	4,819	4,262
Ruby	2,145	3,033	8,367	4,557	7,984	6,662	12,319	8,905	6,717	7,101	8,437
District 4	6,732	8,660	33,615	17,427	17,833	18,270	28,439	23,010	23,032	23,388	22,117
Tanana	10,282	12,682	32,842	32,834	30,820	31,470	41,630	42,690	28,113	32,049	34,945
Rampart	3,654	1,584	9,710	5,977	5,370	5,495	5,627	4,395	19,619	3,950	8,101
Fairbanks F.C.	979	3,680	7,031	6,488	7,527	9,272	12,865	12,920	13,874	11,708	11,292
Stevens Village	1,080	4,947	4,125	3,233	8,356	7,392	3,502	4,932	11,679	4,150	7,172
Beaver	22	1,591	1,792	190	733	1,878	6,004	0	1,761	3,321	2,076
Ft. Yukon	7,224	18,932	21,487	6,537	16,143	1,926	3,967	7,525	12,719	8,943	8,456
Circle/Central	132	820	3,108	1,757	5,219	290	3,687	3,107	4,096	3,650	3,280
Eagle ^d	6,542	4,863	26,754	16,740	30,997	13,255	20,021	18,519	25,264	16,061	21,611
District 5	29,915	49,099	106,849	73,736	105,167	70,978	97,303	94,088	117,125	83,432	96,932
Hanley	9,966	10,620	18,835	7,653	9,419	4,444	11,400	2,196	6,560	5,906	6,804
Minto				9,500	3,182	3,568	6,489	4,025	4,642	545	4,381
Merena	20,102	19,255	29,430	29,742	10,176	9,034	11,685	13,520	22,901	15,902	13,463
Fairbanks	536	682	3,481	3,433	3,855	2,518	2,600	2,985	2,860	2,799	2,964
District 6	30,604	30,557	51,766	50,328	26,632	19,564	32,174	22,726	36,963	25,152	27,612
Huslia	804	100	1,950	1,104	119	102	3,528	6,306	276	808	2,066
Hughes	775	173	1,201	2,265	611	1,231	327	1,280	1,260	1,422	942
Allakaket/Alatna	146	1,717	1,130	2,879	1,410	716	1,915	556	707	878	1,061
Koyukuk R.	1,725	1,992	4,281	6,248	2,140	2,049	5,770	8,142	2,243	3,108	4,069
Venetie	1,660	2,606	3,943	2,730	6,400	850	7,800	4,345		3,193	4,849
Chalkyitsik	600									1,533	
Upper Yukon Total	71,236	92,914	200,454	150,469	158,172	111,711	171,486	152,311	179,363	139,806	155,578
Yukon Total	82,771	94,867	253,347	172,657	188,375	132,897	192,928	174,823	206,472	166,074	180,069

a Includes Lamount Slough in 1977.

b Includes Aproka Pass and vicinity in 1978 only.

c Pitkas Pt. and St. Marys combined in 1978.

d Tok added to Eagle in 1986.

Appendix A.7. Subsistence catch of coho salmon by village in the Yukon River in numbers of fish, 1977-1986.

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Sheldons Pt.	200	35	495	389	215	1,770	170	245	49	237	490
Alakanuk	388	27	796	521	508	1,313	438	776	894	1,518	786
Emmonak a	1,057	142	1,368	789	1,295	4,795	1,290	3,659	1,552	732	2,518
Kotlik b	807	938	525	109	1,751	3,314	1,692	1,415	751	238	1,785
District 1	2,452	1,142	3,184	1,808	3,769	11,192	3,590	6,095	3,246	2,725	5,578
Ht. Village	1,877	2	117	1,739	1,055	3,025	2,500	982	1,527	828	1,818
Pitkas Pt.-	576		150	32	306	826	481	600	175	71	478
St. Marys c	495	292	298	982	877	1,957	1,048	1,424	938	4,761	1,269
Pilot Station	930	1	347	1,510	431	2,644	638	1,114	710	1,514	1,107
Marshall	458	303	220	538	1,067	1,777	1,405	2,946	1,484	1,966	1,736
District 2	4,336	598	1,132	4,801	3,736	10,229	6,072	7,066	4,834	9,140	6,387
Russian Mission	161	223	12	26	434	156	540	740	276	679	429
Holy Cross	202	0	0	65	56	519	377	0	100	102	210
District 3	363	223	12	91	490	675	917	740	376	781	640
Lower Yukon Total	7,151	1,963	4,328	6,700	7,995	22,096	10,579	13,901	8,456	12,646	12,605

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Appendix A.7. (continued: p 2 of 2)

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Average (1981-1985)
Arvik	144	20	33	625	385	58	250	40	272	296	201
Shageluk			62	0	20					173	7
Grayling	528	0	13	510	172	1,014	1,275	97	0	860	512
Kaitag	1,216	15	42	1,758	102	62	0	0	0	229	33
Nulato	1,814	0	2	271	140	76	0	0	510	69	145
Koyukuk	638	0	48	710	142	187	40	200	120	154	138
Galena	14	2	0	945	333	347	759	452	1,072	465	593
Ruby	0	108	59	1,376	746	867	1,122	1,631	1,719	339	1,217
District 4	4,354	145	259	6,195	2,020	2,611	3,446	2,420	3,693	2,585	2,838
Tanana	593	704	412	318	1,373	3,260	2,312	16,898	7,384	4,691	6,245
Rampart	75	52	0	15	169	0	47	120	513	110	170
Fairbanks F.C.	20	0	39	36	6	20	78	254	13	709	74
Stevens Village	22	12	0	181	95	23	0	145	182	67	89
Beaver	0	24	0	5	0	0	0	0	1	124	0
Ft. Yukon	16	177	30	0	70	125	11	33	3	118	48
Circle/Central	70	0	0	0	0	0	0	0	0	37	0
Eagle ^d	2	1	114	6	0	0	0	17	2	6	4
District 5	798	970	595	561	1,713	3,428	2,448	17,467	8,098	5,862	6,631
Manley	2,610	1,273	1,419	1,454	3,723	837	1,350	1,566	1,926	538	1,880
Minto				180	267	1,500	0	800	1,144	1,058	742
Nenana	1,349	2,930	2,215	2,862	3,356	3,078	4,352	10,270	7,614	10,090	5,734
Fairbanks	71	506	978	667	1,915	2,003	1,230	2,149	1,077	1,637	1,675
District 6	4,030	4,709	4,612	5,163	9,261	7,418	6,922	14,785	11,761	13,323	10,029
Nuslie	0	0	0	633	146	17	475	12	0	31	130
Hughes	0	0	0	645	42	0	0	400	138	0	116
Allakaket/Alatna	0	0	0	261	31	324	25	35	118	15	107
Koyukuk R.	0	0	0	1,539	219	341	500	447	256	46	353
Venetie	0	0	0	0	0	0	0	0	0	0	0
Chalkyitaik										8	
Upper Yukon	9,182	5,824	5,466	13,458	13,213	13,798	13,316	35,119	23,808	21,824	19,851
Yukon Total	16,333	7,787	9,794	20,158	21,208	35,894	23,895	49,020	32,264	34,470	32,456

- a Includes Lamont Slough in 1977.
- b Includes Apruka Pass and vicinity in 1978 only.
- c Pitkas Pt. and St. Marys combined in 1978.
- d Tok added to Eagle in 1986.

Appendix A.8. Number of subsistence fishing families for villages of the Yukon River, Alaska 1963-1976.

Village	d														1963 - 1976	
	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	Average	SD
Sheldons Pt.	44	25	22	21	18	17	14	14	16	17	18	16	20	13	20	8
Alakanuk	48	54	54	54	48	55	57	49	59	42	55	59	26	58	51	9
Emmonak a	39	57	48	35	38	38	45	37	45	33	54	33	57	43	43	8
Kotlik b	43	49	42	46	31	36	38	21	29	22	36	24	43		35	9
District 1	174	185	166	156	135	146	154	150	149	114	163	134	146	114	150	20
Mt. Village	36	54	43	32	36	43	37	33	42	37	49	46	43	42	41	6
Pitkas Pt. -								11	14	8	11	9	13	10	11	2
St. Marys c	36	35	42	38	34	37	39	26	36	32	28	31	28	27	34	5
Pilot Station	36	35	28	26	29	32	33	29	25	35	37	31	35	27	31	4
Marshall	24	23	23	18	19	21	20	24	28	24	28	26	26	24	23	3
District 2	132	147	136	114	118	133	129	123	145	136	153	143	145	130	135	11
Russian Mission	16	20	17	14	19	17	16	18	16	16	16	17	16	15	17	2
Boly Cross	37	32	27	26	26	25	18	10	13	15	20	15	16	15	21	8
District 3	53	52	44	40	45	42	34	28	29	31	36	32	32	30	38	8
Lower Yukon Total	359	384	346	310	298	321	317	309	323	281	352	309	323	274	322	30

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Appendix A.B. (continued: p 2 of 2)

Village	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1963 - 1976		
															Average	SD	
Anvik	17	19	14	14	15	12	12	9	10	13	13	13	13	13	13	13	3
Shageluk															11	11	0
Grayling		18	18	15	17	17	16	18	19	15	19	19	20	17	18	21	1
Kaitog	25	24	22	21	22	21	20	13	20	13	16	20	20	22	20	3	1
Mulato	37	32	23	33	32	28	26	22	27	18	23	28	26	22	27	5	1
Koyukuk	17	18	13	14	12	14	9	9	13	9	11	10	10	12	12	3	1
Gelena	11	10	11	13	10	8	5	6	8	8	13	11	29	24	12	7	1
Ruby	16	15	13	10	13	9	11	8	15	11	12	15	8	14	12	3	1
District 4	123	136	114	120	121	109	99	87	112	87	107	116	126	135	114	15	1
Tanana	17	13	13	9	13	12	10	7	14	14	20	16	26	22	15	3	1
Beaufort	7	9	9	4	6	5	5	5	10	5	14	11	15	8	8	3	1
Fairbanks F.G.															8	0	1
Stevens Village	10	8	8	8	12	7	7	7	5	5	9	8	9	10	8	2	1
Beaver	13	10	8	4	5	4	6	6	8	5	7	3	4	5	6	3	1
Fort Yukon	23	19	19	18	12	11	10	10	12	7	9	7	22	18	14	6	1
Circle/Central	2	4						4	6	2	4	2	5	3	4	1	1
Egla	2	2	1						1	3	6	6	7	12	4	4	1
District 5	74	65	58	43	48	39	38	39	56	41	69	53	88	86	57	17	1
Nanley	1						1	1		1	1	1	6	8	3	3	1
Minto	18				2	3	2	1	5		3	8			5	6	1
Nanana	9	7	8	8	2	4	2	4	10	11	15	12	6	13	8	4	1
Fairbanks								18	24	18	23	53	54		32	17	1
District 6	28	7	8	8	4	7	5	24	39	30	42	74	66	21	26	23	1
Busila	7	11	4		11	10	11	9	9	14	12	6	7	16	10	3	1
Hughes	2	1			8	7	8	14	13	9	7	8	3	9	8	4	1
Allakaket/Alatna	9				16	16	16	15	16	11	71	18	13	15	20	17	1
Koyukuk R. Subtotal	18	12	4	0	35	33	35	38	38	34	90	32	25	40	31	21	1
Venetie	1			13	11	7	7	3	3						6	4	1
Chukkyitsak	1	3	15												6	8	1
Subtotal Chandalar/ Black R.	2	3	15	13	11	7	7	3	3	0	0	0	0	0	5	5	1
Upper Yukon Total	245	223	199	184	219	195	184	191	248	192	308	275	103	282	232	45	1
Totals	604	607	545	494	517	516	501	500	571	473	660	584	628	556	554	57	1

a Includes Lamount Slough.
 b Includes Aprozka Pass and vicinity.
 c Pitkas Pt. and St. Marys combined in 1963-1969.
 d Data not available for 1961-1962

Appendix A.9. Number of subsistence fishing families for villages of the Yukon River, Alaska 1977-1986.

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1978 - 1986	
											Average	SD
Sheldons Pt.	14	18	12	18	15	16	17	18	20	15	17	2
Alakanuk	50	72	76	59	60	70	69	71	69	67	68	5
Emmonak a	38	63	71	58	58	77	87	76	72	75	71	9
Korlik b	23	40	37	40	42	42	53	46	51	49	44	6
District 1	127	193	196	176	175	205	226	211	212	206	200	17
Kr. Village	40	52	34	37	35	63	73	60	62	78	62	9
Pitkas Pt.	11	14	14	11	10	13	14	12	9	11	12	2
St. Marys c	24	51	41	38	34	30	56	44	47	60	47	8
Pilot Station	23	38	49	38	32	39	30	42	36	49	41	6
Marshall	24	27	33	39	32	40	46	38	37	55	39	8
District 2	124	168	191	183	163	205	239	196	191	249	198	29
Russian Mission	14	18	18	19	21	21	26	22	20	23	21	3
Holy Cross	20	18	19	26	22	21	22	22	22	27	22	3
District 3	34	36	37	45	43	42	48	44	42	50	43	5
Lower Yukon Total	285	397	424	404	381	452	513	451	445	505	441	46

-continued-

Appendix A.9. (continued: p 2 of 2)

Village	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1978 - 1986	
											Average	SD
Arvik	25	13	17	15	13	20	16	16		15	16	2
Shageluk			16	4	8					11	10	5
Grayling	33	27	21	22	18	26	23	23	19	23	22	3
Kalrag	22	28	24	19	17	23	15	11	21	21	20	5
Nulato	27	28	30	24	21	18	17	13	23	28	23	6
Koyukuk	11	12	11	13	11	11	12	9	12	15	12	2
Galena	17	24	28	34	25	21	21	21	20	25	24	4
Ruby	8	14	14	20	19	17	18	18	20	19	18	2
District 4	143	146	161	133	132	136	123	111	117	157	137	18
Tanana	39	53	36	38	37	25	33	30	33	34	35	8
Rampart	16	15	14	10	15	7	12	12	11	6	11	3
Fairbanks F.C.	15	42	34	42	24	44	41	30	35	48	38	8
Stevens Village	12	19	12	18	12	17	22	24	25	17	18	5
Beaver	7	8	7	6	6	3	6	5		8	6	1
Fort Yukon	24	31	33	37	31	23	24	23	25	31	29	5
Circle/Central	7	8	17	6	16	9	11	11	10	16	12	4
Eagle ^d	27	33	38	54	60	52	48	43	49	40	48	9
District 5	147	209	211	211	201	184	195	178	188	200	197	12
Hanley	17	30	18	11	17	10	15	6	8	11	13	5
Minto				12	10	4	9	20	11	11	11	5
Nenana	19	22	23	30	28	26	26	26	27	23	26	3
Fairbanks	31	126	199	234	228	209	147	212	155	211	193	42
District 6	67	168	240	307	283	249	197	264	201	256	241	44
Ruslia	13	23	25	16	17	14	19	19	16	16	18	4
Hughes	12	12	12	11	13	13	12	12	15	14	13	1
Allakaket/Alatna	18	21	24	23	19	19	21	21	15	21	20	3
Koyukuk R. Subtotal	43	56	61	50	49	46	52	52	46	51	51	5
Venetie	5	9	8	6	13	4	8	8		8	8	1
Chalkyitsik										7	7	0
Subtotal Chandalar/ Black R.	5	9	8	6	13	4	8	8		15	9	4
Upper Yukon Total	403	588	681	727	678	619	574	613	552	679	635	59
Totals	690	985	1,105	1,131	1,059	1,071	1,087	1,064	987	1,184	1,076	62

- a Includes Lamont Slough in 1977.
b Includes Aproka Pass and vicinity in 1978 only.
c Pitkas Pt. and St. Marys combined in 1978.
d Tok added to Eagle in 1986.

Appendix A.10. Subsistence catch in number of salmon expressed as percent of total yearly Alaska harvest by district for each major salmon group harvested in the Yukon River drainage, 1977-1986.

 Percent of Total Chinook Catch

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Mean(77-86)
1	4.3	17.7	9.5	8.7	7.9	8.5	13.1	11.3	8.0	11.9	10.1
2	9.7	13.4	14.0	8.8	12.3	7.7	18.9	17.5	9.0	14.6	12.6
3	14.8	13.1	10.7	11.4	13.8	12.3	10.2	10.7	8.7	9.6	11.5
4	26.7	16.7	22.0	25.0	13.1	15.4	17.2	15.3	16.1	19.5	18.7
5	35.5	35.0	39.4	41.8	45.7	47.1	34.9	36.5	39.1	35.9	39.1
6	9.0	4.1	4.4	4.4	7.2	9.0	5.6	8.8	19.1	8.4	8.0

 Percent of Total Summer Chum Catch

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Mean(77-86)
1	10.13	17.82	10.27	6.73	6.31	7.75	11.44	14.28	10.54	14.71	11.0
2	14.79	12.50	14.80	5.76	7.93	7.75	12.70	13.55	8.57	15.71	11.4
3	4.60	0.98	1.87	1.37	2.75	2.45	2.14	3.69	1.60	2.09	2.4
4	48.64	49.78	53.93	78.43	61.66	74.38	51.63	40.90	56.96	52.76	56.9
5	17.51	12.13	15.19	3.62	15.24	4.11	11.10	15.82	11.68	8.27	11.5
6	4.34	6.79	3.94	4.09	6.11	3.55	10.99	11.76	10.66	6.45	6.9

 Percent of Total Fall Chum Catch

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Mean(77-86)
1	6.5	0.4	7.0	4.5	8.6	7.7	4.6	5.5	6.5	5.8	5.7
2	7.6	1.4	6.5	7.6	6.5	7.3	5.8	7.0	5.7	8.6	6.4
3	0.6	0.3	1.1	1.4	1.6	1.3	1.6	1.4	1.1	1.1	1.2
4	8.5	9.6	14.9	10.6	9.9	14.1	15.9	14.2	11.3	15.0	12.4
5	38.0	54.4	47.5	45.0	58.5	54.6	54.3	58.0	57.3	53.4	52.1
6	38.8	33.9	23.0	30.7	14.8	15.0	17.9	14.0	18.1	16.1	22.2

 Percent of Total Coho Chum Catch

District	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Mean(77-86)
1	15.0	14.7	32.5	9.7	18.0	31.5	15.3	12.5	10.1	7.9	16.7
2	26.5	7.7	11.6	25.8	17.8	28.8	26.0	14.5	15.1	26.6	20.0
3	2.2	2.9	0.1	0.5	2.3	1.9	3.9	1.5	1.2	2.3	1.9
4	26.7	1.9	2.6	33.3	9.6	7.3	14.7	5.0	11.5	7.5	12.0
5	4.9	12.5	6.1	3.0	8.2	9.6	10.5	36.0	25.3	17.0	13.3
6	24.7	60.5	47.1	27.7	44.1	20.9	29.6	30.4	36.7	38.7	36.0

APPENDIX B: 1986 DATA COLLECTION FORMS

Name _____

Village _____

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

Salmon Fishing Questionnaire

The Alaska Department of Fish and Game needs to know the salmon catch data for the Arctic-Yukon-Kuskokwim area. This information is required to insure adequate numbers of salmon are available for the subsistence needs of the people. Also this information may be used in treaty meetings between the U.S.A., Canada, and Japan to show that Alaskans are fully utilizing their salmon runs.

During this past fishing season, our survey crew visited your area collecting information on the local fishing effort. Since you were away or not available at the time, the survey crew was unable to visit with you. In order that we may complete our survey, will you please supply us with the needed information by answering the following questions. Just write the correct number in the space after each question.

How many people in your family? _____ How many dogs do you have? _____

How many king nets did you fish? _____

How many dog nets did you fish? _____

How many fishwheels did you fish? _____

Would you please write in the number of each kind of salmon that you or your family took this year as near as you can. Your reported catch should include fish taken for subsistence purposes only.

KING SALMON _____ DOG (Chum) SALMON _____ FALL CHUM (Silver) _____

COHO SALMON _____ SHEEFISH _____ OTHER KINDS OF FISH _____

This letter should be returned to our office by placing it in the enclosed return, stamped, addressed envelope.

We appreciate any assistance you can give to this study.

Thank you.

Fred M. Andersen

Appendix B.1. An example of the postal survey mailed to subsistence fishermen not contacted during the postseason survey.

STATE OF ALASKA
Department of Fish and Game, Division of Commercial Fisheries
1300 College Road, Fairbanks, AK 99701 (Phone: 456-4286)

SUBSISTENCE SALMON FISHING PERMIT - YUKON AREA

Name: _____ Phone: _____

Mailing Address: _____

Residence Address: _____

Area to be Fished: _____ District _____ Location _____

Period of Time to be Covered by Fishery: _____ to _____

Number of Fish Desired: Kings _____ Chums (Dogs) _____

Cohos (silvers) _____ Other _____

Fishing Gear: _____ Gillnet(s) _____ length _____ stretch mesh size

_____ Fishwheel _____ Other (specify) _____

Conditions of Permit:

All regulations pertaining to subsistence fishing for salmon in this area are to be observed. These regulations are published annually in the Alaska Subsistence Fishing Regulation booklet. A summary of these regulations is available from the Fairbanks office.

Fish caught for subsistence use may not be sold or allowed to enter into commercial use.

An accurate record of fish taken under authority of this permit must be kept and recorded in the appropriate spaces on the form provided on the reverse of this permit. Return the permit and form to the Alaska Department of Fish and Game, Commercial Fish Division, 1300 College Road, Fairbanks, AK 99701 within 10 days after the permit expiration date. FAILURE TO RETURN YOUR PERMIT AND CATCH FORM WILL RESULT IN YOUR NOT BEING ISSUED A PERMIT NEXT YEAR.

X

Signature of Permittee - I hereby claim the information contained on this permit is a true statement as witnessed by my signature above, and I further state that I am a resident of Alaska.

TO BE COMPLETED BY ISSUING OFFICER:

The above-named person(s) is authorized to subsistence fish in the Yukon Area

District _____, Location _____

from _____ to _____, using (gear) _____

_____ may be taken under authority of this permit.

Signature of Authorizing Officer

Date Issued

Permit No.: _____

Appendix B.2. An example of the permit issued to subsistence fishermen in areas requiring permits on the Yukon River.

APPENDIX C: 1986 SUBSISTENCE DATA

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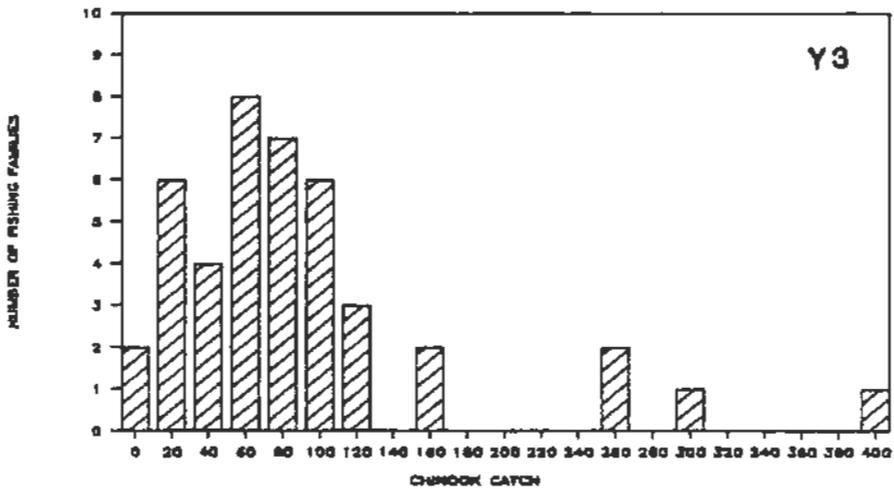
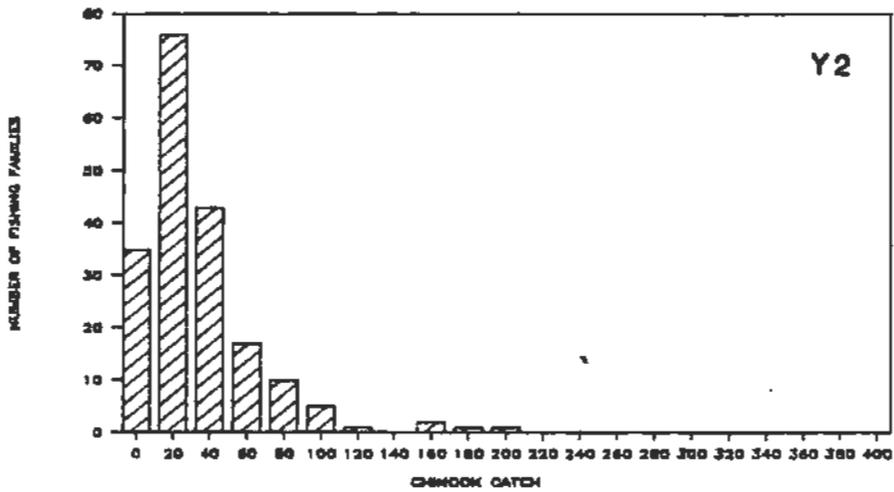
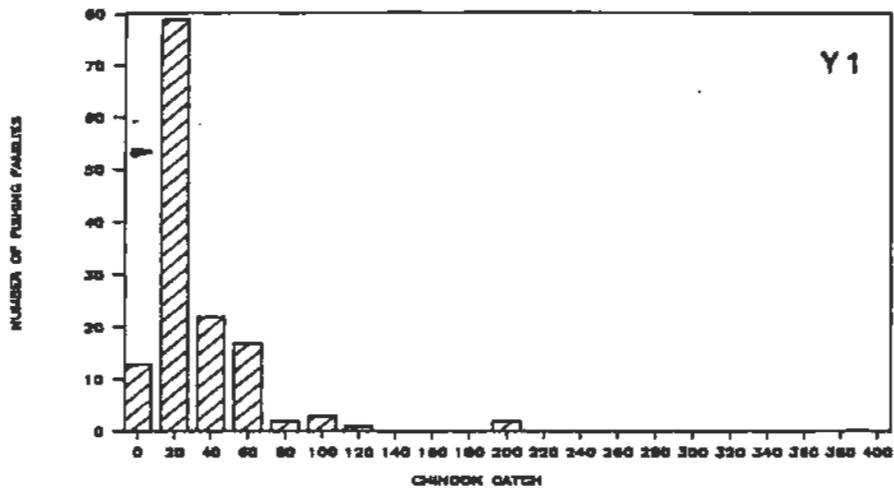
Appendix C.1. Number of families fishing (N), their mean subsistence catch, its standard error (SE), and the upper and lower bounds of a 95% confidence interval by village and salmon category in the Yukon River drainage, Alaska 1986.

		Catch in Number of Salmon ^b																	
District	Village	a (N)	Chinook				Summer Chum				Fall Chum				Coho				
			Mean	SE	UCB	LCB ^c	Mean	SE	UCB	LCB	Mean	SE	UCB	LCB	Mean	SE	UCB	LCB	
	Sheldon's Pt.	12	38	4.2	47	29	309	28.2	371	247	17	4.4	27	7	15	4.2	24	6	
	Alakanuk	53	15	1.3	18	12	168	7.0	182	154	30	3.4	37	23	23	2.5	28	18	
	Emmonak	30	24	4.8	34	14	187	19.2	226	148	21	7.5	36	6	13	3.8	21	5	
	Kotlik	44	26	1.0	28	24	208	5.4	219	197	25	1.6	28	22	3	0.3	4	2	
	Mt. Village	57	17	2.0	21	13	146	9.2	165	127	38	5.1	48	28	11	1.4	14	8	
	Pitka's Pt.	9	26	3.9	35	17	186	14.3	219	153	15	3.4	23	7	7	2.4	13	1	
	St. Mary's	53	24	1.3	27	21	218	10.4	239	197	88	16.2	121	55	80	16.0	112	48	
	Pilot Station	33	32	4.5	41	23	175	26.4	229	121	37	7.2	52	22	34	5.7	46	22	
	Marshall	39	36	2.0	40	32	132	13.7	160	104	64	7.3	79	49	36	3.9	44	28	
	Russian Mission	22	76	3.7	84	68	137	5.4	148	126	28	1.5	31	25	30	2.4	35	25	
	Holy Cross	20	94	9.5	114	74	90	17.1	126	54	43	7.0	58	28	4	1.3	7	1	
61	Anvik	9	65	18.7	108	22	2810	800.4	4656	964	62	12.6	91	33	20	10.9	45	-5	
	Shageluk	11	5	0.0	5	5	610	0.0	610	610	34	0.0	34	34	16	0.0	16	16	
	Grayling	20	82	8.8	100	64	1570	186.0	1959	1181	187	22.2	233	141	38	7.3	53	23	
	Kaltag	20	52	2.6	57	47	1184	113.4	1421	947	97	6.1	110	84	11	1.3	14	8	
	Nulato	25	65	6.6	79	51	368	51.2	474	262	63	5.6	75	51	2	0.7	3	1	
	Koyukuk	15	38	0.0	38	38	417	0.0	417	417	146	0.0	146	146	10	0.0	10	10	
	Galena	24	42	2.1	46	38	265	25.9	319	211	193	17.2	229	157	19	2.0	23	15	
	Ruby	19	66	0.0	66	66	415	0.0	415	415	374	0.0	374	374	18	0.0	18	18	
Koyukuk R.	Huslia	16	5	0.0	5	5	657	0.0	657	657	51	0.0	51	51	2	0.0	2	2	
	Hughes	13	21	2.5	26	16	520	64.5	661	379	102	13.1	131	73	0	0.0	0	0	
	Allakaket	21	27	0.0	27	27	425	0.0	425	425	42	0.0	42	42	1	0.0	1	1	
	Tanana	27	50	5.9	62	38	346	38.3	425	267	954	117.0	1195	713	140	25.6	193	87	
	Rampart	6	283	0.0	283	283	242	0.0	242	242	658	0.0	658	658	18	0.0	18	18	
	Fairbanks F.G.	34	37	4.6	46	28	29	6.4	42	16	246	67.8	384	108	15	5.5	26	4	
	Stevens Village	15	168	11.5	193	143	184	37.9	265	103	245	33.9	318	172	4	1.4	7	1	
	Beaver	7	91	24.2	150	32	0	0.0	0	0	429	105.1	686	172	16	5.0	28	4	
	Fort Yukon	24	101	12.6	127	75	107	20.4	149	65	279	53.9	391	167	4	1.4	7	1	
	Circle	12	161	21.5	208	114	22	3.1	29	15	287	21.9	335	239	3	0.8	5	1	
	Central	3	62	22.5	159	-35	61	15.3	127	-5	0	0.0	0	0	0	0.0	0	0	
	Eagle	33	50	4.4	59	41	12	4.1	20	4	434	40.7	517	351	0	0.1	0	-0	
	Tok	3	27	13.2	84	-30	24	19.8	109	-61	0	0.0	0	0	0	0.0	0	0	
	Chandalax R.	Venetie	8	4	0.0	4	4	0	0.0	0	0	399	0.0	399	399	0	0.0	0	0
Black R.	Chelkyitsik	5	0	0.0	0	0	0	0.0	0	0	230	93.7	490	-30	1	0.5	2	-0	
	Manley	10	59	10.0	82	36	57	11.7	83	31	560	69.5	717	403	51	12.1	78	24	
	Minto	10	32	4.3	42	22	146	40.6	238	54	50	12.5	78	22	97	22.6	148	46	
	Nenana	15	90	21.2	135	45	466	200.0	895	37	685	150.8	1008	362	435	134.4	723	147	
	Fairbanks	193	3	0.1	3	3	19	0.7	20	18	13	0.6	14	12	8	0.4	9	7	

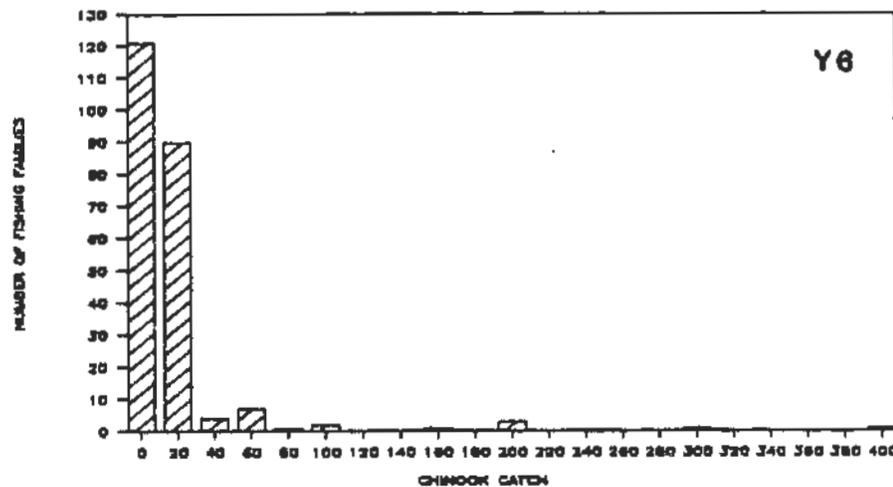
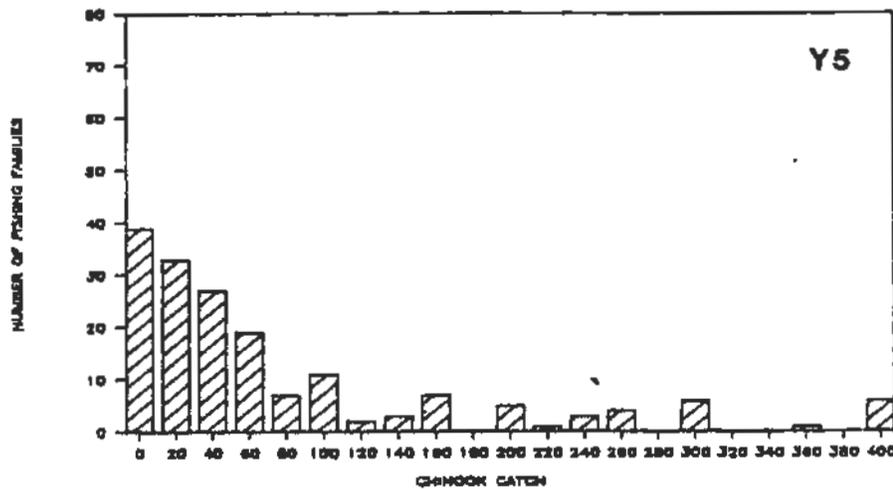
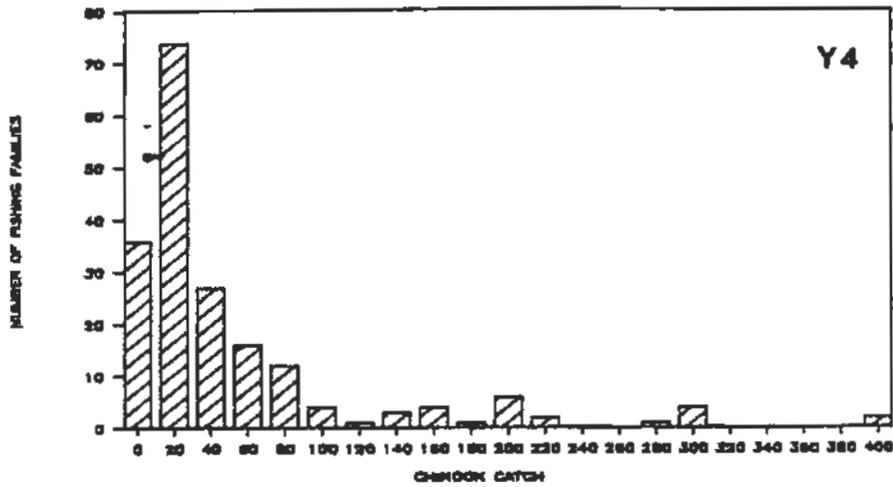
a Represents only those who reported catches. Data from personal interviews, postal surveys and returned permits pooled.

b Mean catch is reported to the nearest whole fish.

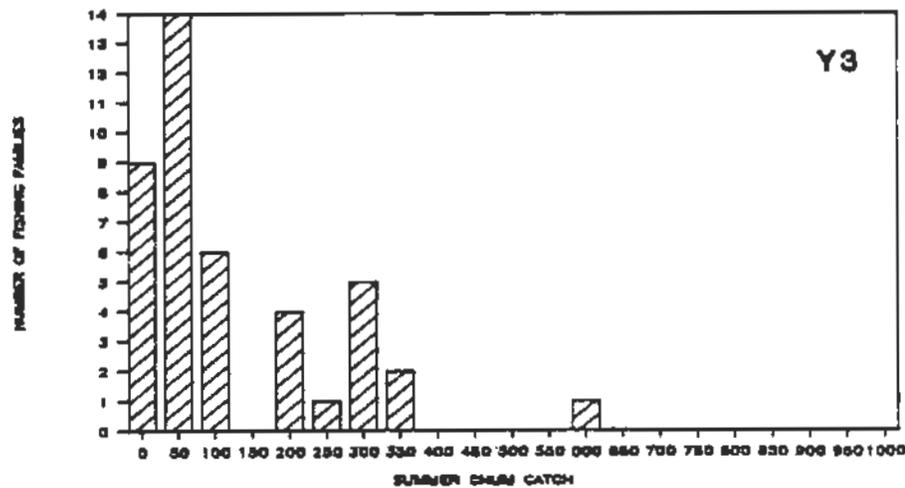
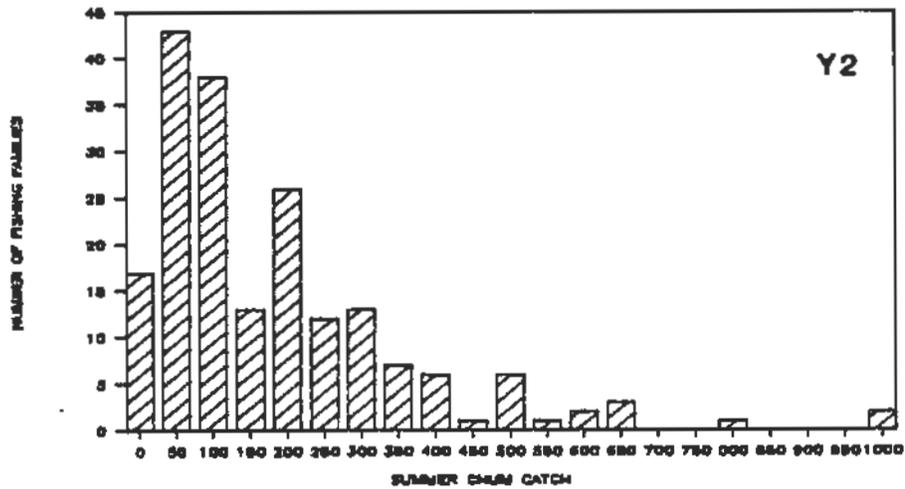
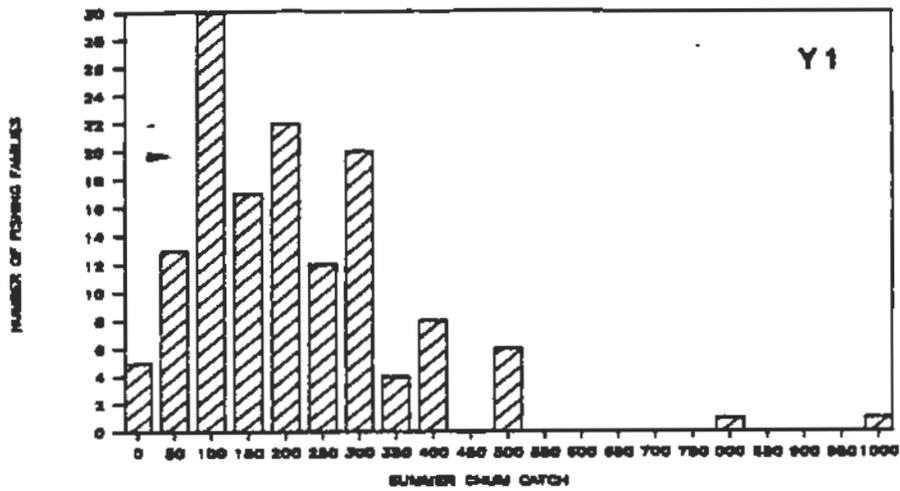
c UCB, LCB are the upper (UCB) and lower (LCB) bounds of a 95% confidence interval.



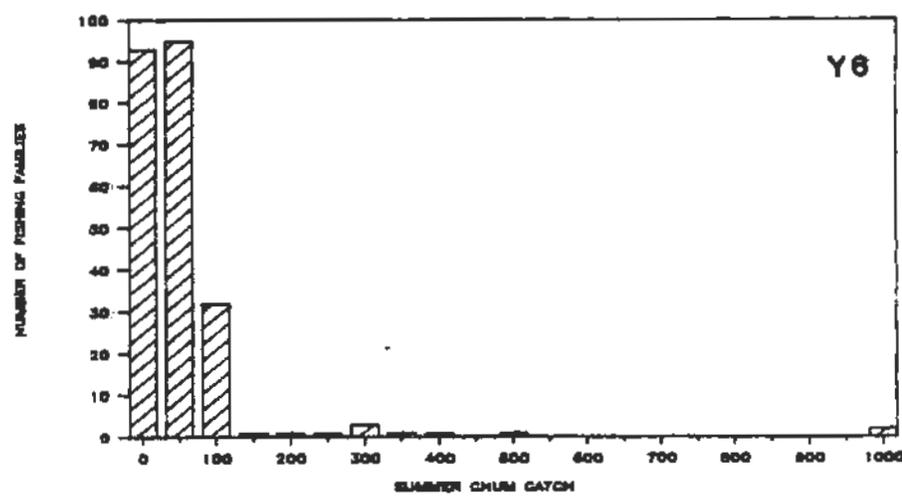
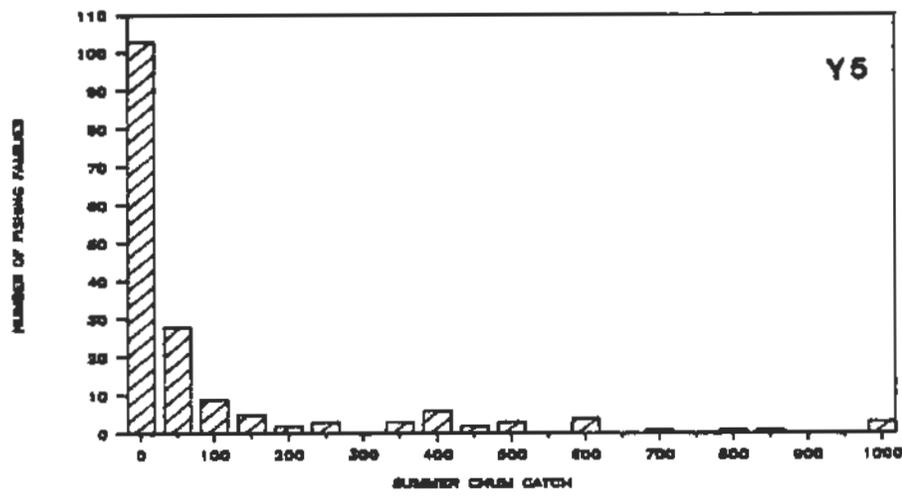
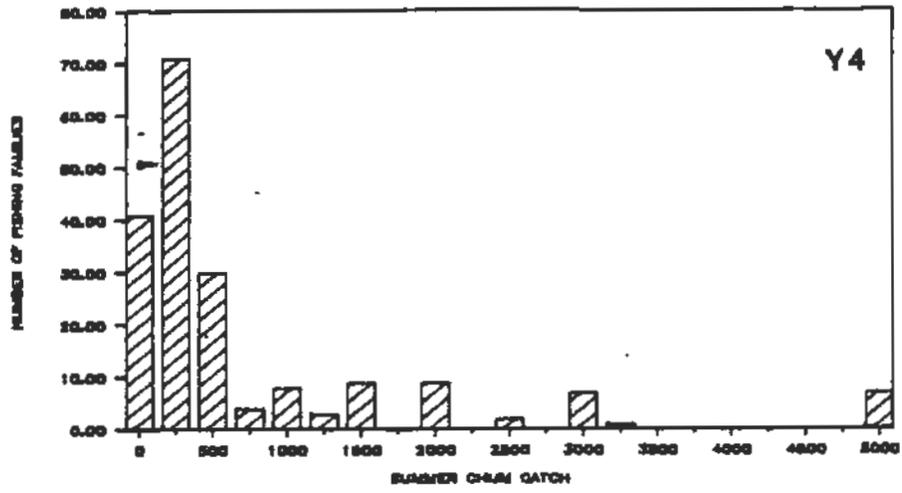
Appendix C.2. Histogram of 1986 chinook salmon catches in number of fish per fishing family for Districts 1 through 3 of the Yukon River, Alaska. The last bar on each graph also includes all catches greater than 400.



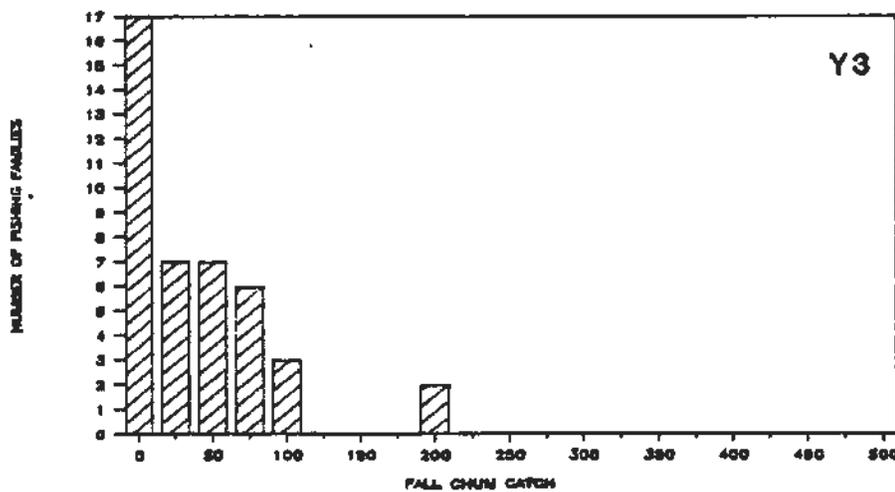
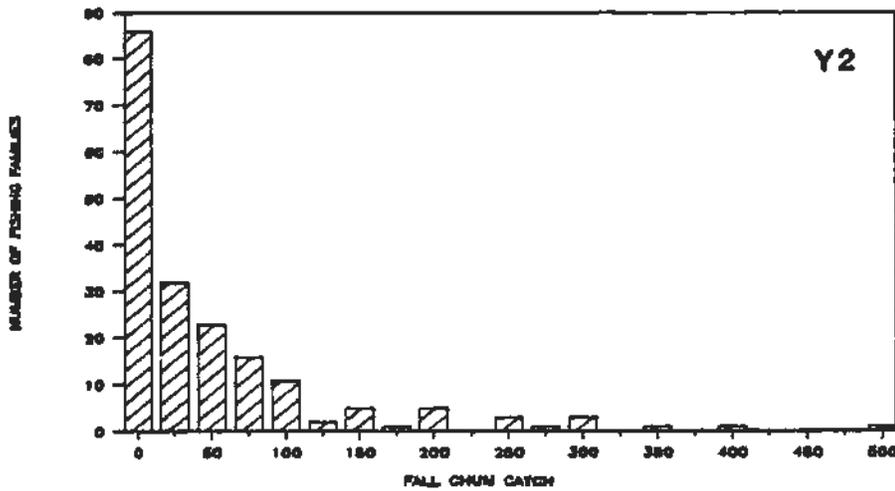
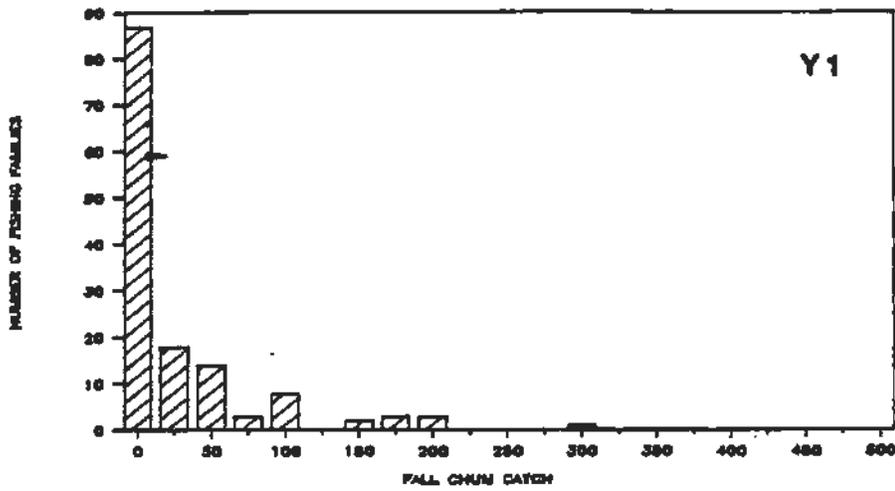
Appendix C.3. Histogram of 1986 chinook salmon catches in number of fish per fishing family for Districts 4 through 6 of the Yukon River, Alaska. The last bar on each graph also includes all catches greater than 400.



Appendix C.4. Histogram of 1986 summer chum salmon catches in number of fish per fishing family for Districts 1 through 3 of the Yukon River, Alaska. The last bar on each graph also includes all catches greater than 1,000.



Appendix C.5. Histogram of 1986 summer chum salmon catches in number of fish per fishing family for Districts 4 through 6 of the Yukon River, Alaska. The last bar on each graph also includes all catches greater than 5,000 (top) or 1,000 (middle, bottom).



Appendix C.6. Histogram of 1986 fall chum salmon catches in number of fish per fishing family for Districts 1 through 3 of the Yukon River, Alaska. The last bar on each graph also includes all catches greater than 500.

Appendix C.10 Estimated subsistence harvest by village for the
the Yukon River drainage, Alaska in 1986.

District	Village	Catch in Numbers of Fish		
		Pink Salmon	Whitefish	Inconnu
1	Sheldon's Pt.	0	662	916
	Alakanuk	0	1,539	1,158
	Emmonak	0	1,161	838
	Kotlik	246	160	407
2	Mt. Village	0	1,452	697
	Pitka's Pt.	0	239	160
	St. Mary's	0	962	243
	Pilot Station	0	3,857	2,171
	Marshall	0	3,633	721
3	Russian Mission	0	268	180
	Holy Cross	0	279	127
4	Anvik	0	181	352
	Shageluk	788	308	88
	Grayling	0	1,039	425
	Katteg	0	610	49
	Nulato	0	419	93
	Koyukuk	0	349	87
	Huslia	0	1,565	149
	Hughes	0	309	162
	Allakaket	0	1,641	398
	Galena	0	3,275	325
	Ruby	0	900	190
5	Tanana	0	9,960	3,230
	Rampart	0	100	60
	Fairbanks F.C.	0	361	146
	Stevens Village	0	408	71
	Beaver	0	100	55
	Fort Yukon	0	2,899	566
	Circle	0	79	11
	Central	0	1	3
	Venetia	0	0	0
	Chalkyitsik	0	1,475	440
	Eagle	0	843	156
	Tok	0	3	2
	6	Nanley	0	593
Ninto		0	0	1
Nonana		0	433	226
Fairbanks		0	60	12
North Pole		0	1	0
Salcha		0	0	0
Totals		1,034	42,122	15,000