3A94-05

SALMON FISHERIES IN THE YUKON AREA, ALASKA 1993

A Report to the Alaska Board of Fisheries

Regional Information Report[1] No. 3A94-05

Alaska Department of Fish and Game
Division of Commercial Fisheries Management and Development
333 Raspberry Road
Anchorage, Alaska 99518

February 1994

[1]The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

OFFICE OF EQUAL OPPORTUNITY (OEO) STATEMENT

The Alaska Department of Fish and Game conducts all programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood or disability. For information on alternative formats available for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 1-800-478-3648, or (fax) 907-586-6596. Any person who believes s/he has been discriminated against should write to: ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; or O.E.O., U.S. Department of the Interior, Washington, D.C. 20240.

Table of Contents

INTRODUCTION

The Yukon Area includes all waters of the Yukon River drainage in Alaska and coastal waters from Canal Point Light, near Cape Stephens, to the Naskonat Peninsula. Subsistence fishing occurs throughout most of the Yukon River drainage. Commercial salmon fishing occurs along the entire 1,200 mile length of the mainstem Yukon River in Alaska, and in the lower 220 miles of the Tanana River. For management purposes, the area is divided into six districts and 10 subdistricts (Figure 1). The Lower Yukon Area (Districts 1, 2, and 3) includes the coastal waters of the delta and that portion of the drainage from the mouth to Old Paradise Village (river mile 301). The Upper Yukon Area (Districts 4, 5, and 6) is that portion of the drainage upstream of Old Paradise Village to the US/Canada border, including the Tanana River. Salmon fisheries also occur in Canada, with fishery management activities conducted by the Canadian Department of Fisheries and Oceans (DFO).

Five species of Pacific salmon occur in the Yukon River, with chum salmon being the most abundant. The chum salmon return is made up of an early (summer chum salmon) run and a later (fall chum salmon) run. Chinook and summer chum salmon generally begin entering the river during late May or early June. The chinook salmon migration has usually passed through the lower river by the first week of July, while the summer chum salmon migration usually continues until mid-July. Fall chum salmon generally begin entry into the Yukon River by the middle of July and are present into September. Coho salmon generally begin entering the river during the first week of August with entry continuing into September.

Pink salmon are abundant only in even-numbered years (i.e., 1988, 1990, 1992...). Exploitation of pink salmon in both commercial and subsistence fisheries is very low due to their advanced stage of maturity, and the presence of other, more desirable species. Sockeye salmon are rare in the drainage.

DESCRIPTION OF FISHERIES, MANAGEMENT, AND REGULATIONS

Management of the Yukon River commercial salmon fishery is complex because of the difficulty in determining run size, harvesting of mixed stocks, increasing efficiency of the commercial fleet, and allocation issues. The overall goal of the department's research and management program is to manage the various salmon runs for sustained yield under the policies set forth by the Alaska Board of Fisheries. However, escapement levels required to produce maximum sustained yields are difficult to determine at this time due to the lack of an adequate database. Current escapement goals in the Yukon River drainage are based on historic escapement trends in key spawning index areas which are surveyed or counted annually. While escapement levels that produce maximum sustained yield may not be known, the escapement goals are intended to sustain the average historical catch in the fisheries.

Due to the mixed stock nature of the fishery, some tributary populations may be under- or over harvested in relation to their actual abundance. Based on current knowledge, it is impossible to manage individual stocks independently, and there is concern that some spawning populations may be reduced to very low levels.

Research and management projects are underway, and additional studies are planned, should additional funding become available, to obtain the biological information necessary for more precise management of the salmon runs. Current projects include: chinook salmon stock identification studies using scale pattern analysis (SPA), chinook and chum salmon stock identification studies using genetic stock identification (GSI) techniques, main river sonar operation (near Pilot Station) to obtain estimates of total Yukon River salmon abundance, monitoring spawning escapements in various locations, and test fishing projects in the Yukon River delta and Tanana River to provide inseason run timing and relative abundance information.

Commercial Fishery

Commercial chinook salmon fishing in the Alaskan portion of the Yukon River dates back to 1918, but the present multi-species salmon fishery did not become fully developed until the mid-1970s. During the 1970s, fishing time was liberal with relatively low effort levels. In more recent years, commercial fishing time has been greatly reduced due to the increased efficiency of the fleet.

There are two fishing seasons in the Yukon Area: the early or summer season which targets chinook and summer chum salmon, and the late or fall season which targets fall chum salmon, with an incidental harvest of coho salmon.

Legal commercial fishing gear consists of set and drift gillnets in the Lower Yukon Area, and fish wheels and set gillnets in the Upper Yukon Area. Open skiffs powered by outboard motors are typically used to operate fishing gear. Separate limited entry permits have been issued for the Upper and Lower Yukon Areas. There are 718 limited entry permits issued for the Lower Yukon Area, and 241 limited entry permits issued for the Upper Yukon Area.

Important components of management in the Alaskan portion of the drainage include guideline harvest ranges established by the Alaska Board of Fisheries (Table 1), and emergency orders, which are used to open and close the commercial fishing seasons, establish fishing period frequency and duration, and establish mesh size restrictions. Harvests near the midpoint of the guideline harvest ranges should be expected if the run is of average magnitude. In general, based upon evaluation of run abundance, the department attempts to manage the commercial fisheries such that each district's harvest is proportionately similar within their respective guideline harvest ranges.

Chinook and Summer Chum Salmon

Current guideline harvest ranges for chinook salmon were established in 1981 (Table 1). In February 1990, a river-wide guideline harvest range of 400,000-1,200,000 summer chum salmon was established by the Board of Fisheries (Table 1). This overall guideline was further distributed by district and subdistrict based on the average harvest shares from 1975 to 1989.

In District 4, summer chum salmon roe is the primary product sold by fishermen. The largest summer chum salmon harvest in District 4 occurs in Subdistrict 4-A. The guideline harvest range for Subdistrict 4-A is 113,000-338,000 summer chum salmon, or the equivalent roe poundage of 61,000-183,000 pounds of roe, or some combination of fish and pounds of roe. By regulation, no more than 183,000 pounds of summer chum roe may be sold annually. However, if the roe cap is reached in Subdistrict 4-A, only the sale of fish in-the-round is allowed. In an effort to improve harvest estimates, all salmon caught by CFEC permit holders during commercial periods in Subdistrict 4-A must be reported on fish tickets.

Management of the chinook and summer chum salmon runs is difficult because of the overlapping run timing of these species. In the Lower Yukon Area, mesh size restrictions (six-inch maximum mesh size) may be implemented to direct the harvest toward summer chum salmon prior to, between, or after chinook salmon directed fishing periods (unrestricted mesh size).

Fall Chum and Coho Salmon

Guideline harvest ranges for fall chum salmon were adjusted most recently in March 1993 (Table 1). No guideline harvest ranges have been established for coho salmon. Coho salmon harvests are dependent on management actions taken for fall chum salmon.

The Board of Fisheries adopted a salmon management plan for District 6, the Tanana River, in May 1988. Commercial and subsistence fishing time was reduced from two 48-hour periods per week to two 42-hour periods per week. However, it was specified that there be no more than one 42-hour commercial fishing period per week during the fall season. Management of the District 6 commercial fishery is based on existing guideline harvest ranges (Table 1). However, the harvest ranges may be exceeded if it can be determined inseason that doing so will not jeopardize escapement requirements or subsistence needs. Because the department has only limited tools and databases to assess the Tanana River salmon run strength inseason, management must be conservative in this fishery. Prior to the 1990 season, the Subdistrict 6-A commercial fishing schedule was reduced to no more than one 24-hour period per week during the fall season. This change by the Board of Fisheries was designed to increase fall chum spawning escapement to the Toklat River.

In March 1993, the Yukon River Drainage Fisheries Association's (YRDFA) petitioned the Board of Fisheries and provided recommendations on management actions that could be taken in an effort to rebuild the depressed Toklat River fall chum salmon stock. The board adopted The Toklat River Fall Chum Salmon Rebuilding Management Plan for the 1993 season using the YRDFA recommendations. The objective of the plan was to achieve the minimum escapement objective of 33,000 fall chum salmon on the Toklat River spawning grounds. Elements of the plan, based upon the preseason run projection, included allowing limited subsistence fishing for fall chum salmon in the Kantishna River and reducing commercial harvest levels.

Subsistence Fishery

Subsistence salmon fishing in the Yukon River drainage has a long history. Excluding the greater Fairbanks area (population 74,031 in 1990), some 40 communities, with a total population of approximately 11,000 people of primarily Yupik Eskimo and Athabaskan Indian descent, are located within the area. Approximately 1,500 households harvest salmon for subsistence use in the drainage.

Subsistence salmon fishing occurs from late May through October, although this varies throughout the drainage. Subsistence salmon fishing is often undertaken by extended family groups representing two or more households in a community. These groups, as well as members of individual households, cooperate to harvest, cut, dry, smoke, and store salmon for subsistence use. Many people who fish for subsistence salmon also operate as commercial fishermen.

Subsistence has been designated by the legislature as the highest priority among beneficial uses of fish resources. In major commercial fishing areas, it is necessary to place some restrictions on the subsistence fishery in order to enforce commercial fishing regulations. During the fishing season, however, substantially more fishing time is allowed for subsistence than for commercial purposes. Prior to and following the commercial fishing season, subsistence fishing is allowed seven days per week in Districts 1 through 5, and for two 42-hour periods per week in District 6. In general, since the early 1960s subsistence fishing has been managed and regulated to coincide with commercial salmon fishing periods when the commercial fishing season is open. During the commercial salmon season, additional subsistence only fishing time is allowed.

A new regulation adopted in March 1993 separates the subsistence and commercial fishing periods in Districts 1, 2, and 3. During the commercial season, subsistence fishing is only allowed between commercial periods. Subsistence fishing opens 12 hours after the close of a commercial period and ends 18 hours before the start of the next commercial opening.

Subsistence or personal use fishing permits are required in three areas within the upper Yukon River drainage: (1) the entire Tanana River drainage; (2) the Yukon River between Hess Creek

and Dall River; and (3) the Yukon River between the upstream mouth of Twenty-two Mile Slough and the U.S./Canada border. Additionally, in portions of District 6, there are harvest limits and reporting requirements.

In February 1990, the Alaska Board of Fisheries closed the lower Kantishna River and Toklat River to subsistence fishing for fall chum salmon in order to rebuild the Toklat River spawning stock. However, as a result of a request from fishermen for injunctive relief, the Alaska Superior Court provided for subsistence fishing to resume on those river systems in 1991. In February 1992, the Board allowed subsistence fishing in these rivers, but only with fish wheels equipped with liveboxes, and with the stipulation that all chum salmon must be returned alive to the water.

Gillnets, beach seines, and fish wheels are legal gear for subsistence fishing in the Yukon Area. The use of driftnets for subsistence fishing has been limited, by regulation, to the Lower Yukon Area and to the upper section of Subdistrict 4-A. In the Lower Yukon Area, set and drift gillnets are the dominant gear types. In the Upper Yukon Area, fish wheels and setnets are primarily used for subsistence fishing.

Subsistence salmon harvest data has been collected through the use of personal interviews, permit reports, and catch calendars since 1961. Through this period, survey methods and harvest reporting have varied.

In the Subdistrict 4-A summer chum salmon commercial fishery, fishermen extract and sell roe from their catch and retain the carcasses for subsistence use. During the 1980 to 1985 period, it is likely that many fishermen reported a portion of their commercial harvest as subsistence fish. It is probable that the unmarketable carcasses may have simply replaced a large portion of the subsistence harvest in this area. Since 1988, subsistence surveys for the Yukon River drainage were conducted in such a manner as to estimate the number of summer chum salmon taken by commercially-related activities and those taken by traditional subsistence fishing activities can be identified.

Chinook salmon are utilized mainly for human consumption. However, while chum and coho salmon are also used for human consumption, large numbers are also taken to feed sled dogs. The practice of keeping sled dogs is much more prevalent in the Upper Yukon Area and it is considered a major factor affecting subsistence use.

Personal Use Fisheries

Regulations were in effect from 1988 until July 1, 1990 that prohibited non-rural residents from participating in subsistence fishing. In those years, non-rural residents harvested salmon under personal use fishing regulations. The Alaska Supreme Court ruled, effective July 1990, that

every resident of the State of Alaska was an eligible subsistence user, making the personal use category obsolete. From July 1, 1990 through 1992, all Alaskan residents qualified as subsistence users.

Regulations adopted by the Board of Fisheries in February 1993 require salmon fishermen in that portion of the Tanana River drainage included in the Fairbanks Non-Subsistence Area (Figure 2) to obtain a personal use permit. Personal use permit holders are required to report to the department the number of salmon taken each week. Additionally, in the subdistrict adjacent to the Fairbanks area, Subdistrict 6-C, there is a fishery harvest limit. The personal use fishery harvest limit in Subdistrict 6-C is 750 chinook salmon, 5,000 summer chum salmon, and 5,200 fall chum and coho salmon combined. If this harvest limit is reached, the personal use fishery in Subdistrict 6-C will be closed.

Sport Fisheries

In general, sport fish salmon harvests in the Yukon Area are relatively minor compared to commercial and subsistence harvests. The Tanana River drainage is the exception, as it supports a popular sport fishery. In 1988, the Board of Fisheries established a guideline harvest range of 300-700 chinook salmon for the Salcha River recreational fishery. In 1990, the Board established a guideline harvest range of 300-600 chinook salmon for the Chena River recreational fishery.

Canadian Fisheries

U.S./Canada Treaty Negotiations

Negotiations were initiated in 1985 between the U.S. and Canada regarding a Yukon River salmon treaty. Substantial progress has been made to date on several issues, but some important issues remain to be settled.

A six-year stabilization program, ending after the 1995 season, has been agreed to for chinook salmon which spawn in the mainstem Yukon River in Canada. The objective of the program is to stabilize the stock by achieving a spawning escapement of 18,000 or more chinook salmon for each year through 1995. This stabilization spawning objective was established to prevent any further decrease in chinook salmon escapements. During the stabilization period, Canada will manage all of its chinook salmon fisheries on the mainstem Yukon River within a guideline harvest range of 16,800 in years of weak returns to 19,800 in years of strong returns.

The management agencies are to develop a chinook salmon rebuilding program to begin in 1996 for the purpose of achieving a more optimal spawning escapement level in the future. The Joint Technical Committee (JTC), made up of Canadian and Alaskan fishery biologists, has recommended a spawning escapement objective of 33,000 to 43,000 chinook salmon as the long term goal of a rebuilding program.

Both countries have agreed to a twelve-year rebuilding program, ending after the 2001 season, for fall chum salmon which spawn in the mainstem Yukon River in Canada. The objective of the program is to rebuild the stock by achieving a spawning escapement of 80,000 or more fall chum salmon for all brood years by the year 2001. The program will endeavor to rebuild the stronger brood years in one cycle and the weaker brood years in three cycles in equal increments.

During the rebuilding program, Canada will manage all fall chum salmon fisheries on the mainstem Yukon River in Canada within a guideline harvest range of 23,600 in years of weak returns to 32,600 in years of strong returns. The U.S. will endeavor to deliver to the Canadian border on the mainstem Yukon River, the number of chum salmon necessary to meet the spawning escapement objective for that year in the rebuilding program, and provide for a harvest in Canada within the guideline harvest range. Specific border passage ranges agreed to for 1992 through 1995 are:

1992	74,600-112,600
1993	74,600-112,600
1994	84,600-112,600
1995	103,600-112,600

The two countries agreed not to initiate new fisheries on the Porcupine River for an eight-year period and to consider rebuilding and improving management of Canadian Porcupine River fall chum stocks.

The latest round of negotiations was held in Whitehorse, Yukon Territory, Canada during November 9-13, 1992. Current U.S. and Canada negotiating positions on harvest shares after rebuilding are far apart. The two countries have also been discussing the establishment of a restoration and enhancement fund. Such a fund would be used to help restore and enhance Yukon River salmon stocks through cooperative programs.

SUBSISTENCE AND PERSONAL USE HARVEST, 1993

Subsistence and personal use salmon harvest information was obtained from a personal interview survey program, susbsistence and personal use permits, and department records of test fish given

to the public. The estimated total subsistence and personal use harvest within the Alaskan portion of the Yukon River drainage of 62,912 chinook, 105,416 summer chum, 76,860 fall chum, and 15,772 coho salmon was taken by an estimated 1,246 fishing households and permit holders (Table 2). Additionally, 130 fishing households in the coastal villages of Hooper Bay and Scammon Bay harvested an estimated 1,429 chinook, 20,798 summer chum, 120 fall chum, and 40 coho salmon (Table 2). These estimates do not include commercially caught salmon retained for subsistence purposes. Based on the survey program and fishticket reports from commercial fishermen, an estimated 2,728 chinook and 32,732 summer chum (primarily District 4) were retained from commercial catches for subsistence use.

A total of 416 fishing permits (279 subsistence and 137 personal use) were issued to fishermen fishing in permit required areas. The reported harvest by the 401 returned permits was 7,775 chinook, 8,044 summer chum, 15,285 fall chum, and 4,415 coho salmon (Table 2 and 3). The department chose not to issue any Delta River fall chum salmon carcass permits this year to minimize spawning habitat disturbances.

COMMERCIAL SEASON SUMMARY, 1993

Commercial sales totaled 190,072 salmon and 24,976 pounds of unprocessed salmon roe for the Alaskan portion of the Yukon River drainage in 1993. Total sales were composed of 93,550 chinook and 96,522 summer chum salmon sold in-the-round (Table 4). Additionally, roe sales by species totaled 2,014 pounds for chinook and 22,962 pounds for summer chum salmon. The total estimated commercial salmon harvest including the estimated harvest to produce roe sold was 94,110 chinook and 140,116 summer chum salmon. The 1993 estimated salmon catches compared to the 1988 through 1992 five-year average were as follows: chinook, 11% below (Table 5) and summer chum salmon, 85% below (Table 6). There was no commercial fishing allowed for fall chum and coho salmon in 1993. Historical fall chum and coho commercial harvests are presented in Tables 7 and 8.

Yukon River fishermen in Alaska received an estimated $5.4 million for their catch, approximately one-half the recent 5-year average of $10.2 million. Five buyer-processors and two catcher-sellers operated in the Lower Yukon Area, and 11 buyer-processors and 13 catcher-sellers operated in the Upper Yukon Area.

Lower Yukon fishermen received an estimated average price per pound of $2.70 for chinook and $0.38 for summer chum salmon. Ex-vessel value of the Lower Yukon Area fishery was $5.1 million. The average income for the 682 Lower Yukon Area fishermen (95 percent of the total permit holders issued for the area) that participated in the 1993 fishery was $7,503.

Upper Yukon commercial fishermen received an estimated average price per pound of $1.06 for chinook salmon, $5.52 for chinook salmon roe, $0.35 for summer chum salmon, and $8.53 for summer chum salmon roe. The ex-vessel value of the Upper Yukon Area fishery was $0.3 million. The average income for the 143 upper Yukon fishermen (51% of the total permit holders issued for the area) who participated in the 1993 fishery was $2,576.

A regulation adopted by the Board of Fisheries in February 1992, requires fishermen to report the number of salmon caught but not sold during commercial fishing periods on fish tickets. Fishermen reported 25 chinook, 211 summer chum and 7 pink salmon were caught but not sold during commercial fishing periods in the Lower Yukon Area in 1993. Fishermen reported a total of 1,877 chinook and 14 summer chum salmon were caught but not sold during commercial fishing periods in Districts 5 and 6, and Subdistricts 4-B and 4-C in the Upper Yukon Area. A total of 24,300 summer chum salmon were reported to have been harvested by commercial fishermen during the commercial fishery in Subdistrict 4-A.

Chinook Salmon

The 1993 preseason outlook was for a slightly below average chinook salmon run based on parent year escapements. The commercial harvest for the Alaskan portion of the drainage was anticipated to be between 86,000 and 98,000 chinook salmon.

The Lower Yukon Area was generally free of ice by May 19. Chinook salmon entry into the lower river appeared to be slightly earlier than average and similar to run timing in 1988. The first chinook salmon catches were reported on May 26 near Sheldon's Point by a subsistence fisherman. The department's test fishing projects recorded the first chinook salmon catches on May 28.

Comparative lower river test fishing cumulative CPUE from 8.5" mesh size set gillnet sites indicated an average abundance of chinook salmon in 1993, similar to the returns from 1988 through 1991. Therefore, the midpoint of the guideline harvest ranges were targeted in Alaska. Approximately 50% of the 1993 chinook salmon run had entered the lower river by June 18. Chinook salmon test fish catches in 5.5 inch mesh size set gillnets were the second highest ever recorded. Overall, combined 8.5 inch and 5.5 inch test net catches of chinook salmon indicated abundance was slightly greater than average.

The Yukon River sonar project at Pilot Station has estimated the daily upstream passage of migrating salmon for six seasons (1986-1991). The sonar project did not operate in 1992. During 1993, the sonar project utilized new transducers which allowed the sonar range to be greatly increased compared to previous years. A total season passage estimate of 137,239 chinook salmon was obtained (Table 11). Passage estimates for 1993 may not be comparable to other years because of the utilization of the new transducers.

The Yukon Area Management Plan requires approximately 7-10 days of chinook salmon passage through the lower river as documented by increasing subsistence and/or test net catches prior to initiation of the commercial fishery. This provides for: 1) fish to become distributed throughout the Lower Yukon Area, and 2) passage of a segment of the run out of the lower river prior to the commercial fishery. Because test fishing catches of chinook salmon increased fairly slowly until June 11, the 1993 commercial salmon fishing season was opened by emergency order after approximately eleven days of increasing subsistence and test net catches. The chinook salmon directed fishery with unrestricted mesh size gillnets was opened on a staggered basis: June 14 in District 1, June 16 in District 2, and June 20 in District 3.

The first two periods in Districts 1 and 2 were 12 hours in duration. The harvest of 23,020 chinook salmon taken during the second period in District 1 on June 17 and 18 was the largest on record for a 12-hour opening. Because the combined commercial harvest in District 1 and 2 was projected to exceed 55,000 chinook salmon after the second commercial fishing period in District 2 on June 21, unrestricted mesh size fishing periods were reduced to six hours duration beginning with the third commercial period in District 1. In addition, the third fishing period in District 2 was delayed from June 23 until June 25. These management actions were designed to spread out the harvest to achieve adequate spawning escapements throughout the drainage.

If chinook salmon run strength and commercial harvests developed as anticipated, another management strategy was to discontinue the use of unrestricted mesh size gillnets when the combined District 1 and 2 harvest approached 60,000 to 70,000 chinook salmon. It was anticipated that additional chinook salmon would then be taken during periods restricted to six inch maximum mesh size gillnets.

A single 6-hour period with gillnets restricted to six inch maximum mesh size was established in the lower river on June 24 in District 1. Because of the poor summer chum salmon return, the remainder of commercial fishing season consisted of 6-hour unrestricted mesh size fishing periods. This strategy was utilized to allow additional harvest of chinook salmon while protecting chum salmon. The last commercial fishing period occurred July 1. On July 7, the Lower Yukon Area commercial fishing season was closed.

The total harvest of 86,579 chinook salmon for Districts 1 and 2 was 4% below the midpoint of the guideline harvest range of 90,000 fish and 9% below the 1988-1992 average harvest of 95,398 fish. A total of 84,377 chinook salmon were harvested during unrestricted mesh size fishing periods in Districts 1 and 2, and 2,202 chinook salmon were harvested during the single restricted mesh size fishing period. The average weight of chinook salmon harvested during unrestricted mesh size fishing periods and restricted mesh size periods was 20.7 pounds and 15.8 pounds, respectively.

In District 3, five unrestricted mesh size fishing periods (two 12-hour and three 6-hour) were allowed. The initial delay in opening District 3 allowed the first segment of the chinook salmon run to pass through the district and allowed a majority of the subsistence harvest to be taken

prior to the commercial fishery. A total of 1,501 chinook salmon were harvested in District 3, which was 17% below the lower end of the guideline harvest range and 24% below the recent five-year average. Fishing effort was approximately 66% less than average in District 3.

All chinook salmon sales in District 4 occurred in Subdistricts 4-B and 4-C. The commercial fishing season opened on June 27. The first three fishing periods in Subdistricts 4-B and 4-C were primarily directed toward chinook salmon. District 4 fishermen sold 1,349 chinook salmon and 701 pounds of chinook salmon roe, for an estimated 1,577 fish commercial harvest. This harvest was 38% below the midpoint of the District 4 guideline harvest range.

In District 5, chinook salmon is the primary species of commercial value during the early season. The commercial fishing season was opened in Subdistricts 5-A, 5-B, and 5-C on July 2 when it was estimated that the chinook salmon run was well distributed throughout the subdistricts. There was one 36-hour and one 24-hour period in Subdistricts 5-A, B, and C. The total estimated harvest was 2,608 chinook salmon for Subdistricts 5-A, 5-B, and 5-C. This harvest was at the midpoint of the guideline harvest range of 2,600 fish. There were two fishing periods allowed in Subdistrict 5-D also. The midpoint of the guideline harvest range was taken (400 chinook salmon).

District 6 had two 42-hour periods which were directed toward the harvest of chinook salmon due to the poor summer chum run. The first 42-hour fishing period occurred on July 12. The next commercial fishing period was delayed until July 19 when preliminary escapement information indicated that chinook salmon spawning escapement objectives in the Chena and Salcha River would be achieved. Because of an above average chinook salmon return to the Tanana River, as documented by tower counts on the Chena and Salcha Rivers, the guideline harvest range was exceeded in District 6. Commercial sales totalled 1,113 chinook salmon and 1,313 pounds of chinook salmon roe, for an estimated harvest of 1,445 fish.

Summer Chum Salmon

The summer chum salmon outlook was for below average to average abundance and the commercial harvest was projected to be between 400,000 and 800,000 fish for the entire Yukon Area. Summer chum migratory timing appeared to be late overall, due to the early portion of the run being weak and protracted. This was not entirely unexpected as the return of 5-year old fish was anticipated to be below average. However, the contribution of age-4 fish to the run was very low, and very unexpected. At the end of the season it was estimated that the run was only half as large as projected.

The department's test fishing projects recorded the first summer chum salmon catches on May 28. Comparative lower river test net indices suggested the 1993 summer chum salmon run was below average in abundance and similar to the poor 1982 return. Approximately 50% of the

summer chum salmon return had entered the lower river by June 27 according to test fishing CPUE data.

The Pilot Station sonar project estimated the passage of 949,776 summer chum salmon in 1993 Table 11). This passage estimate is similar to the below average runs observed in 1987 and 1990. However, passage estimates for 1993 may not be comparable to other years due to the deployment of new transducers, which increased the sonar range.

Typically, the peak of the summer chum salmon run occurs by the end of June. Lower river test fishing CPUE data indicated an increase in summer chum salmon abundance from June 17 through June 21. A single summer chum directed commercial fishing period with gillnets restricted to six inch maximum mesh size was allowed on June 24 in District 1. This period was based upon decreased abundance of chinook salmon, cumulative harvest of chinook salmon to date, and anticipated increase in summer chum salmon abundance historically observed during late June. However, the abundance of summer chum salmon did not increase substantially and the run was judged to be poor through the remainder of the season. Additional commercial harvest of summer chum salmon with restricted mesh gear was not allowed.

The total commercial summer chum salmon harvest in District 1 and 2 was 92,991 fish, which was 84% below the recent 5-year average harvest of 577,292 fish. The harvest was 37% of the lower end of the guideline harvest range of 251,000 summer chums for Districts 1 and 2. A total of 47,488 summer chum were harvested during unrestricted mesh size fishing periods in Districts 1 and 2, combined, and 45,503 summer chum were harvested during the one restricted mesh size fishing period. The average weight of summer chum salmon in the lower river commercial catch was 6.6 pounds.

No summer chum salmon directed fishing periods were allowed in Districts 2, 3, 5, and 6.

A total of 463 summer chum salmon were sold in five unrestricted mesh size fishing periods in District 3 which was well below the recent five-year average of 6,233 fish. No restricted mesh size fishing periods were allowed in District 3.

Only two summer chum salmon directed fishing periods were allowed in Subdistrict 4-A; one 12-hour and one 9-hour. These fishing periods were delayed until mid-July when it appeared enough summer chum salmon were available for a limited harvest. Subdistrict 4-A fishermen sold 20,485 pounds of summer chum roe. No fish were purchased in the round in Subdistrict 4-A. The department estimated postseason that 38,196 male and female summer chum salmon were harvested to produce the roe sold in Subdistrict 4-A. The total estimated harvest was 34% of the lower end of the guideline harvest range.

Subdistricts 4-B and 4-C fished a total of four periods. The last fishing period in Subdistricts 4-B and 4-C was directed at summer chum salmon. A total of 27 summer chum salmon and 1,962 pounds of roe were sold. The estimated harvest of 4,761 summer chum salmon was 30% of the low end of the guideline harvest range of 16,000-47,000 fish.

In District 5, summer chum salmon do not contribute substantially to the commercial harvest because of the timing of the fishery, lower availability, poor flesh quality, and the high transportation costs to the market. No summer chum salmon were sold in District 5 in 1993.

In District 6, commercial fishing time was limited to two 42-hour periods primarily directed at the harvest of chinook salmon due to concerns for achieving adequate summer chum salmon escapements. A total of 3,041 summer chum salmon and 515 pounds of roe were sold, for an estimated total commercial harvest of 3,705 summer chum salmon, which was 29% of the lower end of the guideline harvest range of 13,000 to 38,000 summer chum salmon.

Fall Chum Salmon

The overall fall chum salmon return was projected to be 734,000 fish. A management plan was developed preseason by the Yukon River Drainage Fisheries Association and the department which identified the need for 400,000 fall chum for spawning escapement and approximately 220,000 fall chum to provide for Alaskan subsistence harvests and Canadian harvests. The 1993 commercial harvest in the Alaskan portion of the Yukon River drainage was expected to range from 77,900 to 113,000 fall chum salmon.

Near the estimated midpoint of the run on August 8, the cumulative test fishing CPUE for fall chum salmon was 13.24 which was below the mean cumulative CPUE for the years 1980-1992 of 14.03. The Pilot Station sonar passage estimate was only 148,198 fall chum salmon through August 8. The average sonar passage is 257,858 fall chum salmon by this date. Additionally, test fish age composition data indicated that the proportion of age-4 fall chum salmon was below the preseason projection, which suggested a poor return from the 1989 parent year. Therefore, the run was judged to be below average and the department announced the decision not to reopen the fall season commercial fishery on August 9.

Due to the poor return of fall chum salmon, subsistence salmon fishing time was reduced to 48 hours per week throughout the Yukon River drainage beginning on August 16. Districts 1-4 and Subdistricts 5-C, 5-D, 6-A and 6-B were put on a schedule of two 24-hour periods per week. Subdistricts 5-A and 5-B were placed on a schedule of four 12-hour periods per week. Sport fishing for fall chum salmon was closed on August 16. The personal use salmon fishery was closed on August 22 and a total closure of the subsistence salmon fishery occurred on September 3.

Based on the decreased presence of fall chum salmon and to allow the harvest of coho salmon, subsistence salmon fishing was reopened in the Lower Yukon Area beginning on September 17, with a schedule of two 24-hour periods per week. Subsistence fishermen in Subdistrict 4-A, including the Koyukuk River, were placed on two 24-hour subsistence salmon fishing periods beginning September 17. Subdistricts 4-B and 4-C commenced fishing on September 19, with two 24-hour subsistence openings per week. Subdistricts 5-B, 5-C and 5-D were allowed to fish

7 days per week beginning September 27. Subdistricts 5-A and District 6 had a single 24-hour subsistence opening on September 22. This single test opening was allowed in order to help evaluate the strength of the Tanana River run and allow fishermen to harvest coho salmon.

All subsistence salmon fishing restrictions were removed on October 1 in the Lower Yukon Area and on October 16 in the Upper Yukon Area.

The combined cumulative season CPUE of 26.74 through August 25 for the four standard lower river test net sites was the fourth largest on record. The mean cumulative CPUE through August 25 is 22.21 for all years from 1980 to 1992 and 27.14 for odd-numbered years from 1980 to 1992. Comparative test fishing indices suggested the 1993 run was average in magnitude and similar in magnitude to the 1983 and 1989 runs. However, the earlier portion of the 1993 fall chum run did not appear to be as strong as in 1983 and 1989.

The Yukon River sonar project at Pilot Station estimated a total passage of 295,303 fall chum Table 11). This was the lowest sonar passage estimate on record. The total fall chum salmon passage estimate was 40% of the preseason projected run size of 734,000 fish.

A three day travel time for fall chum salmon between the lower river test fishery and Pilot Station sonar site remained fairly consistent throughout the season. However, there was a large difference in relative magnitude between daily lower river test fishing CPUE and corresponding sonar counts. It appears that the Pilot Station sonar fall chum passage estimate was much more accurate than the lower river test fishery in portraying run abundance of fall chum salmon. Fall chum salmon escapement information from the Sheenjek River, Fishing Branch River, and Canadian Yukon River mainstem tagging project indicated a very poor fall chum salmon run.

Lower river test fishing CPUE data appeared to greatly overestimate run size. Wind direction, bank orientation of migrating salmon, low water level, and fish size may have had some effect on test net catches. The cumulative lower river test fishery CPUE in 1986 was also very large compared to postseason run assessment and water levels were very low during that year. Historical lower river test fishery indices are also affected by commercial removal below the test net sites which makes comparisons between years more difficult.

Preliminary age composition data from fall chum salmon test fish catch samples indicated that approximately 60% of the run was composed of age-4 fish, which was lower than expected. A poor return of age-5 fall chum salmon was projected for 1993. Therefore, it was anticipated that age-4 fish would represent approximately 85% of the run. Additionally, the percentage of age-6 fish in test fishery samples was higher than normal. Age composition information suggested that the return from the 1989 parent year was much lower than expected.

Coho Salmon

The coho salmon run outlook was for an average return. Coho and fall chum salmon run timing overlaps to a considerable extent. Because of this overlap and the overriding importance of fall chum salmon conservation, the harvest of coho salmon is a function of management strategies directed towards fall chum salmon.

A commercial fishery for coho salmon was not possible in 1993 because of the overlap in run timing with fall chum salmon. Any incidental commercial harvest of fall chum salmon would have had a serious impact on fall chum stocks that appeared to be of low abundance.

Coho salmon test fishing data indicated the run was near average in magnitude. Run timing of coho salmon appeared to be about average, although there were very low test fishing catches until the first major pulse was observed on August 14-16. The combined cumulative CPUE of 14.80 for the four standard test net sites was the fourth highest on record through August 25. The average season cumulative CPUE from 1980 through 1992 is 14.07. After August 16, coho salmon consistently made up a majority of the daily test fish catches. It should be noted that the entire coho salmon return is not indexed, because the migration continues into September after the test fishery is terminated.

The Yukon River sonar project at Pilot Station estimated a total passage of 40,474 coho salmon (Table 11). This was the lowest sonar passage estimate on record. There did not appear to be any correlation between daily CPUE in the lower river test fishery and subsequent sonar passage estimates and sonar test fishery CPUE for coho salmon at Pilot Station three days later.

A single test subsistence salmon opening occurred in Subdistrict 5-A and District 6 on September 22. This test opening was used to evaluate the strength of the Tanana River coho salmon return. Approximately 37 percent of the subsistence harvest consisted of coho salmon. Combined with test fish catch information the Tanana River coho salmon return was judged to be poor and no additional subsistence salmon fishing was allowed until October 16.

Enforcement

Two new regulations were adopted by the Board of Fisheries prior to the fishing season. One regulation required identification of a vessel used by a commercial salmon permit holder to take salmon during the open commercial fishing season in Districts 1, 2, and 3. Compliance with this regulation was excellent. The other regulation required subsistence fishermen to remove the dorsal fin of chinook salmon immediately upon landing. This requirement was not well received by the public and appeared to be ignored by a majority of fishermen.

Fish and Wildlife Protection officers conducted intensive patrols in the Lower Yukon Area during June 1993 utilizing three float planes, three full time Fish and Wildlife officers and one part time officer. Approximately 1,600 contacts were made in 1993, 54 warnings were issued and 97 citations were issued. Over half of the citations were issued for fishing during closed periods which entailed fishing just prior to openings and shortly after period closures. The remaining citations were for gear violations and fishing without license in possession, over the limit of gear onboard vessel, improperly marked buoys, subsistence fishing during a closed period, and fishing without photo I.D.

There are nine Fish and Wildlife Protection Officers based out of the Fairbanks and Galena offices. During the 1993 season, FWP concentrated enforcement efforts on permit holders who were fishing early, fishing over limits of gear, or not physically participating in the operation of their commercial gear. Overall, FWP officers noticed good compliance with season openings and closures during routine patrols. The exception was this fall during the closure of subsistence salmon fishing. During the subsistence salmon fishing closure both FWP and department staff observed gear operating in civil disobedience while conducting aerial gear surveys.

Fish and Wildlife Protection officers continue to be concerned and active in the investigation of roe from subsistence caught fish illegally entering the commercial market. However, the amount of roe entering the commercial market this way is believed to have been significantly reduced from prior years.

Regulatory Proposals

There is a petition before the board to consider a Yukon River fall chum salmon subsistence fishery management plan. In addition, there are a number of regulatory options for rebuilding AYK-Region chum salmon stocks for consideration by the board.

Canadian Fisheries, 1993

Management plans for the Canadian chinook and chum salmon fisheries on the Yukon River in 1993 were formulated to reflect the understandings reached during U.S./Canada negotiations. Most of the commercial harvest on the mainstem Yukon River near Dawson is taken in set gillnets. However, beginning in 1991, more fish wheels have been used to harvest chum salmon. Harvests within the Canadian portion of the Porcupine River drainage is currently limited to an Aboriginal Fishery.

Chinook Salmon

Prior to the 1993 commercial fishing season, the commercial guideline harvest for chinook salmon was set at 9,100 to 12,100 fish with a preseason target of 9,900 fish. The preliminary commercial harvest was 10,335 chinook salmon (Table 9). Aboriginal Fishery, Domestic, and Sport fisheries harvests in 1993 totaled 6,233 chinook salmon. The preliminary mainstem Yukon River border passage estimate for chinook salmon was 41,000 fish.

Fall Chum Salmon

The 1993 commercial guideline harvest for fall chum salmon was set at 21,300 to 30,300 chum salmon with a preseason target of 21,800 fish in view of a below average expected run. The preliminary commercial harvest was 7,762 chum salmon (Table 10). Aboriginal Fishery, Domestic, and Sport fisheries harvests in 1993 totaled 5,655 fall chum salmon. The preliminary border passage estimate for fall chum salmon was 40,000 fish.

STATUS OF STOCKS AND FISHERY

The Yukon River sonar project at Pilot Station has estimated daily passage of migrating salmon for six years (1986-1991). In 1992 the sonar project did not operate. During 1993, the sonar project was operated with new equipment which allowed the sonar range to be greatly increased compared to previous years. Annual estimates of salmon passage for prior years are presented in Table 11. Passage estimates for 1993 may not be comparable to other years due to the utilization of the new transducers.

Chinook Salmon

Commercial chinook salmon catches in the Alaskan portion of the Yukon River drainage have shown a decreasing trend. The recent 5-year (1988-1992) average commercial harvest was 106,187 fish compared to the previous 5-year (1983-1987) average of 129,746 chinook salmon (Table 5). The majority of the commercial harvest occurs in Districts 1 and 2. The recent 5-year average chinook salmon subsistence harvest in Alaska was 48,533 fish, which was a 5% increase over the previous 5-year average of 47,502 chinook salmon (Table 12). Total Canadian harvests have averaged 19,422 chinook salmon annually (1988-1992) (Table 9).

Chinook salmon spawning stocks are widely distributed throughout the Yukon River drainage. Analysis of chinook salmon scale patterns, age compositions, and stock composition of catches and escapements are used by the department to estimate geographic region of origin of the fishery harvests. Stock identification studies indicate that approximately 57% of the chinook salmon harvest in Alaska is spawned in Canada. Chinook salmon escapements in Canada were well below desired levels from 1985 through 1987. Efforts to increase escapements to the Canadian mainstem Yukon River resulted in larger spawning escapements during the past six years (Table 14).

Interim, minimum chinook salmon escapement goals have been established by ADF&G for eight Alaskan streams or index areas (Table 15). These escapement goals are based upon aerial survey index counts which do not represent total escapement. Aerial survey escapement data indicate that spawning escapement objectives for middle river stocks (primarily Tanana River drainage) have not been met during some recent years, however, escapement objectives for lower river stocks (Yukon River drainage below the Koyukuk River) have generally been achieved in recent years. It should be understood that caution must be used when comparing aerial survey results between years due to the variability inherent to this methodology.

Chinook salmon spawning escapements in the lower Yukon River were above minimum escapement goals in 1993 (Table 15). An aerial survey conducted on July 11 under excellent conditions documented 5,855 chinook in the East Fork and 2,765 chinook in the West Fork of the Andreafsky River. Escapement goals are 1,500 and 1,400 for the East and West Forks, respectively. An aerial survey conducted on the Anvik River on July 23 under poor conditions documented 1,526 chinook salmon within the index area. The escapement goal is 500 chinook salmon for the Anvik River index area. Aerial index counts of 1,844 and 1,181 chinook salmon in the North and South Fork Nulato Rivers, respectively, were well above minimum goals in these streams. The Gisasa River aerial index count of 1,573 chinook salmon indicated the minimum escapement goal was achieved.

Inseason assessment of chinook salmon escapement to the Tanana River drainage in 1993 was improved compared to prior years through the operation of counting towers on the Chena and Salcha Rivers by Sport fish Division. The 1993 escapement estimates were 12,241 chinook for the Chena River and 10,007 chinook for the Salcha River. These estimates greatly exceeded the average total population estimates obtained by mark and recapture projects in recent years. Aerial surveys of these two streams also indicated that escapement goals were met.

The Canadian Department of Fisheries and Oceans (DFO) has conducted a tagging program on salmon stocks in the Canadian section of the drainage since 1982 (excluding 1984). The preliminary 1993 tagging estimate of total spawning escapement for the Canadian portion of the Yukon River drainage (excluding the Porcupine drainage) was 28,578 chinook salmon. This estimate meets the stabilization objective of 18,000 or more fish, but falls short of the interim spawning escapement objective range of 33,000-43,000 chinook salmon.

Summer Chum Salmon

Summer chum salmon commercial harvests greatly increased during the late 1980s. The recent 5-year average (1988-1992) estimated commercial harvest was 955,818 fish (Table 6). The majority of the commercial harvest takes place in Districts 1 and 2 and Subdistrict 4-A. Approximately 147,237 summer chum salmon are taken annually (1988-1992 average) for subsistence use throughout the drainage (Table 12).

The Andreafsky and Anvik Rivers are the major summer chum salmon-producing rivers (Table 16). Escapements of over one million summer chum salmon have been documented by sonar in the Anvik River. The Koyukuk, Nulato, and Tanana Rivers are also important summer chum salmon-producing systems. Summer chum salmon escapements in the Anvik River were above escapement goals from 1988, 1989, and 1991-1993, however, spawning escapements to other Yukon River tributaries, based on limited aerial survey information, generally appeared to have been below desired levels from 1988 to 1992.

Interim minimum escapement goals for six major summer chum spawning streams in the lower and middle Yukon River drainage have been established (Table 16). The Anvik River escapement objective is based on a sonar-enumeration estimate of the total escapement population. All other summer chum salmon escapement objectives are based upon historical averages of aerial survey index counts.

Escapement objectives were met in only one summer chum salmon stream throughout the entire drainage in 1993. The Anvik River escapement of 517,409 fish was 4% above the minimum escapement objective of 500,000 fish (Table 16). Overall, the 1993 Anvik River sonar estimate accounted for 55% of the total passage estimate for summer chum salmon at Pilot Station.

An aerial survey of the Andreafsky River system was conducted on July 11. Survey conditions were rated as excellent overall, although this survey did occur before peak spawning. A total of 10,935 summer chums were observed on the East Fork and 9,111 on the West Fork of the Andreafsky River. These escapements were well below the minimum goals (109,000 East Fork and 116,000 for the West Fork).

Similarly, very poor index counts of summer chum salmon in the North Fork Nulato River, 7,698, Hogatza River, 525, were very poor, and accounted for less than 15% of the minimum escapement goal for each stream (Table 15). The summer chum salmon aerial survey index count of 212 fish for the Salcha River was well below the minimum goal of 3,500 fish.

Fall Chum Salmon

Commercial fall chum salmon catches in the Alaskan portion of the Yukon River drainage have shown a decreasing trend. The recent 5-year (1988-1992) average estimated commercial harvest of 166,345 fish is a reduction of approximately 10% compared to the previous 5-year (1983-1987) average of 185,702 fall chum salmon (Table 7, Figure 3). The majority of the commercial harvest occurs in Districts 1 and 2. The recent 5-year average fall chum salmon subsistence harvest in Alaska was 160,700 fish, which was a 19% decrease compared to the previous 5-year average of 217,887 fall chum salmon (including 115,829 fish involved in illegal sales in 1987) (Table 12, Figure 3). During the period 1988-1992, approximately 90% of the annual reported subsistence harvest has occurred in the Upper Yukon Area (Table 2). Total Canadian fall chum salmon harvests have decreased approximately 8% from an average of 29,741 fish annually (1983-1987) to 27,281 fish annually (1988-1992)(Table 10).

Major fall chum salmon spawning areas are located in the Tanana and Porcupine River drainages, and within the Canadian portion of the Yukon River drainage. Interim minimum escapement goals for the Toklat, Delta, Sheenjek, and Fishing Branch Rivers are 11,000, 33,000, 64,000, and 50,000 fall chum salmon, respectively (Table 17). Unlike the chinook and summer chum salmon index objectives, the fall chum salmon interim minimum escapement objectives are based on estimates of total abundance. In addition, annual estimates of border passage and spawning escapement are available for the fall chum stock in the Canadian portion of the upper mainstem Yukon River. The long term goal of rebuilding the Canadian Yukon River mainstem stock is for greater than 80,000 fall chum salmon spawners.

Historical tagging studies conducted near Galena and Ruby indicated that the early segment of fall chum salmon may be bound primarily for the Porcupine River and Canadian portion of the Yukon River. The later segment of the fall chum salmon run, although likely mixed with other stocks, is believed to be destined primarily for the Tanana River drainage. Stock identification studies, using protein genetics, are presently underway to improve our understanding of fall chum salmon timing by spawning stock, through the fisheries.

During the 1980s, there was concern for the health of fall chum salmon stocks because spawning escapements were below objective levels from 1982 through 1984 (Table 17, Figures 4 and 5). Additional regulatory restrictions adopted by the Board of Fisheries in 1983 and 1986 resulted in generally improved spawning escapements during the late 1980s. However, spawning populations in the Toklat River, Fishing Branch River, and the Yukon River mainstem in Canada have shown less improvement than other spawning areas. Therefore, over the next four year cycle, a continued reduction in fall chum harvests is believed to be necessary.

Overall, fall chum salmon escapements were below average in 1993, with escapement objectives being achieved in only one area. Escapements to the Porcupine River drainage was evaluated by observations made in the Sheenjek and Fishing Branch Rivers. The 1993 preliminary sonar

estimate of approximately 43,000 fall chum salmon for the Sheenjek River was 33 percent below the minimum escapement objective of 64,000 fish (Table 17).

The Tanana River fall chum salmon escapement in 1993 was evaluated by foot surveys made in the Toklat and Delta River index areas. Total estimated escapement to the Toklat River was approximately 26,500 fall chum salmon. This is approximately 20 percent below the escapement goal of 33,000 fish. The Delta River fall chum salmon escapement goal was reached as evident by an estimated escapement of 17,400 fish. Although no escapement objectives exist for other fall chum salmon spawning areas in the upper Tanana River, escapement counts during peak spawning were 5,550 and 2,490 fish, to Bluff Cabin and Clearwater Lake Outlet Sloughs (Big Delta region), respectively.

The preliminary fall chum salmon spawning population estimate made by DFO for the Canadian portion of the mainstem Yukon River in 1993 was approximately 30,000 fish. This escapement estimate was below the targeted minimum level of 51,000 fall chum salmon for 1993.

Although no fall commercial fishery was allowed in the Alaskan portion of the drainage in 1993, spawning escapements were still below desired levels. It appeared that the production from the 1988 and 1989 brood years was very poor.

Coho Salmon

Commercial coho salmon catches in the Alaskan portion of the Yukon River drainage have shown an increasing trend. The recent 5-year (1988-1992) average commercial harvest of 66,028 fish was a 65% increase over the previous 5-year (1983-1987) average of 40,037 coho salmon (Table 8). Similarly, the recent 5-year average coho salmon subsistence harvest in Alaska of 50,161 fish was a 32% increase over the previous 5-year average of 44,908 coho salmon (including 36,291 fish involved in illegal sales in 1987) (Table 12).

The sonar project at Pilot Station estimated a total passage of 40,474 coho salmon through the end of August in 1993, the lowest sonar passage estimate on record through that date (Table 11). However, coho salmon passage estimates at Pilot Station are not complete run assessments due to termination of the project each year prior to conclusion of the coho migration.

Coho salmon spawning escapement assessment is very limited in the Yukon River drainage due to funding limitations and survey conditions at that time of year. Most of the information that has been collected is from the Tanana River drainage (Table 18). The only escapement goal established for coho salmon thus far is for the Delta Clearwater River, which is a minimum of 9,000 fish. That goal was reached in 1993 based upon a boat survey count of 10,875 coho salmon on October 21. Additionally, an estimated 3,525 coho salmon were observed in the

outlet to Clearwater Lake by boat survey on October 29. That is the second highest estimate on record for that area and is more than double the most recent five year average of 1,590.

However, it appears that coho spawning escapements in other portions of the Tanana River drainage were below average. Only 138 coho salmon were counted by ground survey in Geiger Creek in the Toklat River drainage, 33% below the recent 5-year average. The Division of Sport Fish boat survey count of coho salmon escapement in the Delta Clearwater River for 1993 was 10,875 fish.

OUTLOOK FOR 1994

Chinook Salmon

The majority of chinook salmon returning to the Yukon River are 6-year-old fish; however, 5- and 7-year-old fish make a significant contribution to the run. In general, spawning ground escapements in 1988, the primary brood year (age-6 in 1994), were judged to be average in magnitude in Canada, the Tanana River in Alaska, and in the lower river area. Survival and production of the 1988 brood year appears to be average based on observations of a normal contribution of 5-year-old fish to the 1993 commercial catch. It is expected that the return of 5-year-old fish in 1994 will be average in magnitude based on parent year escapements in 1989 and average proportion of 4-year-old fish observed in the 1993 run. The return of 7-year-old fish in 1994 (1987 year class) is expected to be average, as the return of the 1987 year class in 1993 as 6-year-old fish was average. Overall, the 1994 chinook salmon run is anticipated to be near average in strength. The commercial harvest in Alaska is expected to total 88,000-99,000 chinook salmon (82,000-92,000 fish in the Lower Yukon Area and 6,000-7,000 fish in the Upper Yukon Area). If a very poor summer chum salmon run occurs, the chinook salmon harvest may be lower due to conservation measures taken to protect summer chum salmon.

Summer Chum Salmon

Summer chum salmon return primarily as 4-year-old fish. The return of 4-year-old fish in 1994 will be dependent on production from the 1990 brood year and survival of the resulting cohort. Summer chum salmon spawning escapement to the Anvik River in 1990 was 403,600 as compared to a minimum escapement goal of 500,000. Aerial survey conditions were poor for assessing escapements to other spawning areas in 1990, but the available information indicates that escapements were likely below the goals. The return of 5-year-old fish in 1994 is expected to be very poor based upon the poor return of 4-year-old fish in 1993. In summary, based on

evaluation of parent year escapements in 1990 and assuming a poor return of age-5 fish, the run outlook for Yukon River summer chum would normally be for a below average run for 1994. The commercial harvest would be expected to be 100,000-400,000 fish given this run outlook. However, if the production failure apparent for Yukon River summer chum salmon from the 1989 brood year occurs for the 1990 brood year, the outlook for 1994 would change from below average to critically low. In such a case, conservative management actions may be necessary to assure adequate escapements, including additional restrictions to commercial, sport, personal use, and subsistence fisheries.

Fall Chum Salmon

The estimated average annual age composition of returning Yukon River fall chum salmon is approximately 70% age 4 fish, followed by 20% age 5 fish. Escapements in 1990, the brood year for returning age 4 fish in 1994, varied throughout the drainage. In that year only escapement goals in the Toklat and Sheenjek Rivers were achieved. Elsewhere, estimated escapements were below objective levels, i.e, the Delta River, Fishing Branch River, and upper mainstem Yukon River Canadian stocks. The contribution of age 3 fall chum salmon in the 1993 return was estimated to be the lowest on record which, when combined with escapement data for 1990, suggests a below average return of age 4 fish in 1994. Further, the return of age 5 fall chum salmon (1989 brood year) is expected to be well below average in 1994 based upon the widespread failure of that year class as age 4 fish in 1993. Based upon estimated spawner-return relationships and age composition data, the 1994 projected return of Yukon River fall chum salmon is 605,000. This projection includes an estimated 112,000 age-5 shortfall from the 1989 brood year. Taking into account spawning escapement requirements, Alaskan subsistence and Canadian harvests, together with the need to rebuild Toklat and Canadian fall chum salmon stocks, no commercial fishing opportunities are anticipated in 1994. Additionally, if the production failure apparent for the 1989 brood year occurs for the 1990 brood year, the outlook for 1994 would change to critically low. In such a case, conservative management actions may be necessary to assure adequate escapements, including additional restrictions to sport, personal use, and subsistence fisheries.

Coho Salmon

Although comprehensive escapement information on Yukon River coho salmon is lacking, it is known that fish primarily return at age 4. Limited coho salmon escapement surveys in the Tanana River drainage for the brood year 1990 suggested below average escapements were realized. Assuming average survival, a below average return is anticipated for 1994. Harvest of coho salmon in 1994 will be largely dependent upon the abundance of fall chum salmon and

accompanying management strategies to harvest that species. Commercial harvest of coho salmon in 1994 is not anticipated.

TABLES AND FIGURES

Table 1. Guideline harvest ranges and mid-points for commercial harvest of Yukon River chinook, and summer chum salmon in Alaska.

Chinook Salmon

District or Subdistrict	Guideline Harvest Range					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1 and 2	60,000	89.1	90,000	91.6	120,000	92.9
3	1,800	2.7	2,000	2.0	2,200	1.7
4	2,250	3.3	2,550	2.6	2,850	2.2
5A,B,C	2,400	3.6	2,600	2.6	2,800	2.2
5D	300	0.4	400	0.4	500	0.4
6	600	0.9	700	0.7	800	0.6
Total	67,350	100.0	98,250	100.0	129,150	100.0

Summer Chum Salmon

District or Subdistrict	Guideline Harvest Range					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1 and 2	251,000	62.8	503,000	62.9	755,000	62.9
3	6,000	1.5	12,500	1.6	19,000	1.6
4A *	113,000	28.3	225,500	28.2	338,000	28.2
4B,C	16,000	4.0	31,500	3.9	47,000	3.9
5	1,000	0.3	2,000	0.3	3,000	0.3
6	13,000	3.3	25,500	3.2	38,000	3.2
Total	400,000	100.0	800,000	100.0	1,200,000	100.0

Fall Chum Salmon

District or Subdistrict	Guideline Harvest Range					
	Lower		Mid-Point		Upper	
	Numbers	Percent	Numbers	Percent	Numbers	Percent
1, 2, and 3	60,000	82.5	140,000	71.2	220,000	68.6
4B,C	5,000	6.9	22,500	11.4	40,000	12.5
5A,B,C	4,000	5.5	20,000	10.2	36,000	11.2
5D	1,000	1.4	2,500	1.3	4,000	1.2
6	2,750	3.8	11,625	5.9	20,500	6.4
Total	72,750	100.0	196,625	100.0	320,500	100.0

* Or the equivalent roe poundage of 61,000 to 183,000 pounds or some combination of fish and pounds of roe.

Table 2. Preliminary subsistence salmon harvest estimates and related information for the Yukon Managment Area. 1993. [a]

Village	Survey Date	Fishing Households [b]	Dogs	Chinook	Summer Chum	Fall Chum	Coho	Set Nets	Drift Nets	Fish Wheels
Hooper Bay	9/13-9/15 [c]	75	253	230	16,106	113	0	75	0	0
Scammon Bay	9/13-9/14	55	138	1,199	4,692	7	40	55	0	0
Bering Sea Coast Subtotal		130	391	1,429	20,798	120	40	130	0	0
Sheldon Pt.	9/10	23	38	561	2,362	158	78	21	2	0
Alakanuk	9/8-9/9, 9/11	74	148	2,562	8,935	182	138	41	33	0
Emmonak	9/7-9/10 [d]	73	248	4,372	15,568	1,507	196	35	38	0
Kotlik	9/24-9/25 [e]	76	256	2,913	7,121	5,923	1,931	53	23	0
District 1 Subtotal		246	690	10,408	33,986	7,770	2,343	150	96	0
Mt. Village	9/17- 9/18	124	262	3,217	10,505	1,113	447	4	120	0
Pitkas Pt.	9/18	14	79	1,001	1,481	268	349	1	13	0
St. Marys	9/16, 9/18, 9/24	47	128	2,042	5,925	440	102	8	39	0
Pilot Station	9/21-9/22 [f]	46	106	2,661	5,640	1,017	477	5	41	0
Marshall	9/23	55	305	2,592	1,745	256	320	10	45	0
District 2 Subtotal		286	880	11,513	25,296	3,094	1,695	28	258	0
Russian Mission	9/24	27	152	3,273	1,838	172	152	11	16	0
Holy Cross	9/21	37	190	3,191	1,517	1,066	88	11	26	0
District 3 Subtotal		64	342	6,464	3,355	1,238	240	22	42	0
Lower Yukon River Drainage Total		596	1,912	28,385	62,637	12,102	4,278	200	396	0
Anvik	9/22	17	221	663	1,735	420	115	11	4	2
Grayling	9/22-9/23	26	145	1,045	1,137	2,083	164	20	4	2
Kaltag	10/5-10/6	31	137	1,260	1,116	704	334	7	14	10
Nulato	10/5-10/6	28	172	1,660	15	571	37	6	17	5
Koyukuk	10/7	19	80	853	230	2,052	70	8	4	7
Galena	10/7-10/8, 10/22	62	289	1,732	2,477	3,255	124	28	13	21
Ruby	11/1	19	193	3,263	1,459	1,085	308	7	0	12
District 4 Yukon R. Subtotal [g]		202	1,237	10,476	8,169	10,170	1,152	87	56	59
Shageluk										
Innoko R. Subtotal	9/20 [h]	12	105	128	4,183	211	39	11	0	1
Huslia	10/21-9/22	15	191	232	8,343	258	9	15	0	0
Hughes	10/20	8	46	88	827	169	3	8	0	0
Allakaket	10/27	12	106	135	2,651	233	3	12	0	0
Alatna	10/28	3	15	4	52	2	0	3	0	0
Bettles	10/28	3	50	1	34	0	0	3	0	0
Koyukuk R. Subtotal		41	408	460	11,907	662	15	41	0	0
District 4 Subtotal		255	1,750	11,064	24,259	11,043	1,206	139	56	60
Tanana	10/14-10/15	34	664	3,362	4,245	23,103	5,576	16	0	18
Rampart	10/20-10/21	16	128	1,956	1,489	3,272	38	11	0	5
Fairbanks NSB	permits [i]	30	733	1,514	465	930	0	27	0	3
Stevens Village	10/27 [j]	16	61	1,754	653	862	0	16	0	0
Birch Creek	10/29	0	6	0	0	0	0	0	0	0
Beaver	10/27	12	66	1,557	134	692	135	12	0	0
Ft. Yukon	10/19-10/25	60	476	6,361	3,830	2,380	5	25	0	35
Circle	permits [k]	8	80	745	83	349	10	5	0	3
Central	permits [l]	8	27	210	2	0	0	7	0	1
Eagle	permits [m]	25	176	753	32	2,070	85	24	0	1
Other	permits [n]	5	15	437	24	1,750	0	3	0	2
District 5 Yukon R. Subtotal		214	2,432	18,649	10,957	35,408	5,849	146	0	68

-Continued-

Table 2. (p. 2 of 2).

Village	Survey Date	Fishing Households [b]	Dogs	Chinook	Summer Chum	Fall Chum	Coho	Set Nets	Drift Nets	Fish Wheels
Venetie	10/27-10/28, 12/13-14	28	346	2,716	129	7,881	135	28	0	0
Chalkyitsik	10/30-10/31, 12/10-11	4	93	0	0	475	0	4	0	0
Chandalar/Black Rivers Subtotal		32	439	2,716	129	8,356	135	32	0	0
District 5 Subtotal		246	2,871	21,365	11,086	43,764	5,984	178	0	68
Manley	permits [o]	16	507	238	1,277	3,150	1,535	12	0	4
Minto	permits [p]	11	247	468	367	301	300	7	0	4
Nenana	permits [q]	23	698	693	5,019	5,929	1,314	11	0	12
Healy	permits [r]	2	65	0	0	351	1,155	2	0	0
Fairbanks NSB	permits [s,t]	87	340	699	771	219	0	77	0	10
Delta Junction	permits [u]	3	0	0	0	1	0	3	0	0
Other	permits [v]	7	0	0	0	0	0	6	0	1
District 6 Tanana R. Subtotal		149	1,857	2,098	7,434	9,951	4,304	118	0	31
Upper Yukon River Drainage Total		650	6,478	34,527	42,779	64,758	11,494	435	56	159
Alaska, Yukon River Drainage Total		1,246	8,390	62,912	105,416	76,860	15,772	635	452	159
Yukon Management Area Total *including Bering Sea coast*		1,376	8,781	64,341	126,214	76,980	15,812	765	452	159

[a] Data collected by Commercial Fisheries Division. Survey data is expanded for number of fishing households, number of dogs, and catch data. Permit data is unexpanded, the number of dogs is based on permits issued while the number of fishing households and their catch is based on returned permits. Gear data represents the principal gear types used by fishing households with exceptions of other gear types not listed.

[b] Estimated number of households that fished in non-permit communities or number of permittees who reported fishing in permit required areas.

[c] A tagging study conducted at Hooper Bay in 1986 by the Bering Sea Fishermen's Association concluded that harvests in the Nouk Spit area of Hooper Bay intercepted Yukon River and Norton Sound chum salmon stocks.

[d] Includes 1,284 chinook, 2,846 summer chum, 1364 fall chum, and 180 coho salmon from ADF&G test fish catches.

[e] Includes 300 chinook, 1,265 summer chum, 2,328 fall chum, and 1,030 coho salmon from ADF&G test fish catches.

[f] Includes 471 chinook, 2,098 summer chum, 652 fall chum, and 222 coho salmon from ADF&G test fish catches.

[g] Does not include summer chum salmon taken during commercial roe fishery used for subsistence.

[h] Shageluk harvest data from households fishing mainstem Yukon River and Innoko River.

[i] Data from Fairbanks North Star Borough fishermen who fished the Yukon River in a permit required area. Of the 39 permits issued, 39 returned their permits and 30 fished.

[j] Permit harvest information from Stevens Village residents was included in the survey data.

[k] Circle. Of the 19 permits issued, 19 returned their permits and 8 fished.

[l] Central. Of the 14 permits issued, 14 returned their permits and 8 fished.

[m] Eagle. Of the 35 permits issued, 35 returned their permits and 25 fished.

[n] Other. Includes residents of Manley, Minto, Nenana, Rampart and Tok who fished the Yukon River in a permit area. Of the 9 permits issued, 8 returned their permits and 5 fished.

[o] Manley . Of the 26 permits issued, 25 returned their permits and 16 fished. Includes 33 summer chum and 65 fall chum salmon from ADF&G's test fish wheel (died in the live box).

[p] Minto. Of the 40 permits issued, 33 returned their permits and 11 fished.

[q] Nenana. Of the 51 permits issued, 48 returned their permits and 23 fished.

[r] Healy. Of the 5 permits issued, 5 returned their permits and 2 fished.

[s] Data from Fairbanks North Star Borough fishermen who fished the Tanana River. Of the 153 permits issued, 151 returned their permits and 87 fished.

[t] Personal use fishermen were not asked for dog information since personal use fish could only be used for human consumption or bait.

[u] Delta. Of the 4 permits issued, 4 returned their permits and 3 fished.

[v] Other. Includes residents of Anchorage, Dot Lake, Northway, Paxson, and Tok who fished the Tanana River. Of the 9 permits issued, 9 returned their permits and 7 fished.

Table 3. Preliminary reported Yukon Area subsistence and personal use salmon catches taken under authority of a permit, listed by fishing location, [a]

Permit Fishing Area	Permit Type	Issued	Returned	Percent Returned	Fished [b]	Chinook	Summer Chum	Fall Chum	Coho	Whitefish	Sheefish	Burbot	Pike
Subsistence Use													
Yukon River near Haul Road Bridge	SY-#-93	49	47	96%	36	3,767	492	2,915	16	1,009	13	23	26
Yukon River near Circle and Eagle	SE-#-93	79	79	100%	49	1,910	118	2,419	95	680	3	1	39
Tanana River Fishing Subdistrict 6A [c]	SA-#-93	38	37	97%	21	331	784	2,613	1,315	216	8	21	54
Tanana River Fishing Subdistrict 6B	SB-#-93	99	89	90%	38	1,341	5,976	7,166	2,987	407	8	13	211
Tanana River Upstream of Subdistrict 6C	SU-#-93	10	10	100%	8	0	0	5	0	483	0	1	51
Kantishna River Fishing Subdistrict 6B	SK-#-93	4	4	100%	1	0	0	4	2	0	0	0	0
Subsistence Permit Subtotals		279	266	95%	153	7,349	7,370	15,122	4,415	2,795	32	59	381
Personal Use													
Tanana River Fishing Subdistrict 6C	PC-#-93	133	131	98%	79	426	674	163	0	33	3	2	1
Tanana River Whitefish	PU-#-93	4	4	100%	2	0	0	0	0	191	0	0	1
Personal Use Permit Subtotals		137	135	99%	81	426	674	163	0	224	3	2	2
Delta River Carcasses [d]	PD-#-93	0	0	100%	0	0	0	0	0	0	0	0	0
Total		416 [e]	401	96%	234	7,775	8,044	15,285	4,415	3,019	35	61	383

[a] Does not include permit information returned after February 14, 1994.

[b] The number of fishermen who fished based on returned permits.

[c] Includes 33 summer chum and 65 fall chum (that died in the live box) given away as part of the Departments Manley test fish wheel program.

[d] The department chose not to issue any carcass permits to reduce spawning habitat disturbances.

[e] Includes 6 households that fished in two different permit areas.

Table 4. Preliminary estimates of commercial salmon sales and estimated harvests in the Alaska portion of the Yukon River drainage, 1993. [a,b]

District Subdist.	No. of Fishermen [c]	Chinook			Summer Chum			Fall Chum			Coho		
		Numbers	Roe	Estimated	Numbers	Roe	Estimated	Numbers	Roe	Estimated	Numbers	Roe	Estimated
1	448	49,286	-	49,286	73,659	-	73,659	0	-	0	0	-	0
2	238	37,293	-	37,293	19,332	-	19,332	0	-	0	0	-	0
Subtotal	680	86,579	-	86,579	92,991	-	92,991	0	-	0	0	-	0
3	6	1,501	-	1,501	463	-	463	0	-	0	0	-	0
Total Lower Yukon	682	88,080	-	88,080	93,454	-	93,454	0	-	0	0	-	0
4-A	53	0	0	0	0	20,485	38,196 [d]	0	0	0	0	0	0
4-B,C	23	1,349	701	1,577	27	1,962	4,761	0	0	0	0	0	0
Subtotal District 4	75	1,349	701	1,577	27	22,447	42,957	0	0	0	0	0	0
5-A,B,C	27	2,608	0	2,608	0	0	0	0	0	0	0	0	0
5-D	3	400	0	400	0	0	0	0	0	0	0	0	0
Subtotal District 5	30	3,008	0	3,008	0	0	0	0	0	0	0	0	0
District 6	18	1,113	1,313	1,445	3,041	515	3,705	0	0	0	0	0	0
Total Upper Yukon	123	5,470	2,014	6,030	3,068	22,962	46,662	0	0	0	0	0	0
Total Yukon Area	805	93,550	2,014	94,110	96,522	22,962	140,116	0	0	0	0	0	0

a Commercial sales reported in numbers of fish sold in the round and pounds of unprocessed roe sold by fishermen. Unless otherwise noted, estimated harvest is the number of fish sold in the round plus the estimated number of females harvested to produce the roe sold.

b Does not include Department test fish sales.

c Number of unique permits fished by district, subdistrict, or area. Area totals may not add up due to transfers between districts or subdistricts.

d Estimated number of male and female salmon harvested to produce roe sold.

Table 5. Commercial chinook salmon sales and harvest by district, Yukon River drainage in Alaska, 1961-1993. a

	Lower Yukon Area b				Upper Yukon Area										
					Dist. 4			Dist. 5			Dist. 6				
Year	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe	Estimated Harvest c	Numbers	Roe	Estimated Harvest c	Numbers	Roe	Estimated Harvest c	Subtotal Estimated Harvest	Alaska Total
1961	84,466	29,026	4,368	117,860	-	-	-	-	-	-	-	-	-	1,804	119,664
1962	67,099	22,224	4,687	94,010	-	-	-	-	-	-	-	-	-	724	94,734
1963	85,004	24,221	7,020	116,245	-	-	-	-	-	-	-	-	-	803	117,048
1964	67,555	20,246	4,705	92,506	-	-	-	-	-	-	-	-	-	1,081	93,587
1965	89,268	23,763	3,204	116,235	-	-	-	-	-	-	-	-	-	1,863	118,098
1966	70,788	16,927	3,612	91,327	-	-	-	-	-	-	-	-	-	1,988	93,315
1967	104,350	20,239	3,618	128,207	-	-	-	-	-	-	-	-	-	1,449	129,656
1968	79,465	21,392	4,543	105,400	-	-	-	-	-	-	-	-	-	1,126	106,526
1969	71,688	14,756	3,595	90,039	-	-	-	-	-	-	-	-	-	988	91,027
1970	56,648	17,141	3,705	77,494	-	-	-	-	-	-	-	-	-	1,651	79,145
1971	86,042	19,226	3,490	108,758	-	-	-	-	-	-	-	-	-	1,749	110,507
1972	70,052	17,855	3,841	91,748	-	-	-	-	-	-	-	-	-	1,092	92,840
1973	56,981	13,859	3,204	74,044	-	-	-	-	-	-	-	-	-	1,309	75,353
1974	71,840	17,948	3,480	93,268	685	-	685	2,663	-	2,663	1,473	-	1,473	4,821	98,089
1975	44,585	11,315	4,177	60,077	389	-	389	2,872	-	2,872	500	-	500	3,761	63,838
1976	62,410	16,556	4,148	83,114	409	-	409	3,151	-	3,151	1,102	-	1,102	4,662	87,776
1977	69,915	16,722	3,965	90,602	985	-	985	4,162	-	4,162	1,008	-	1,008	6,155	96,757
1978	59,006	32,924	2,916	94,846	608	-	608	3,079	-	3,079	635	-	635	4,322	99,168
1979	75,007	41,498	5,018	121,523	1,989	-	1,989	3,389	-	3,389	772	-	772	6,150	127,673
1980	90,382	50,004	5,240	145,626	1,521	-	1,521	4,891	-	4,891	1,947	-	1,947	8,359	153,985
1981	99,506	45,781	4,023	149,310	1,347	-	1,347	6,374	-	6,374	987	-	987	8,708	158,018
1982	74,450	39,132	2,609	116,191	1,087	-	1,087	5,385	-	5,385	981	-	981	7,453	123,644
1983	95,457	43,229	4,106	142,792	601	-	601	3,606	-	3,606	911	-	911	5,118	147,910
1984	74,671	36,697	3,039	114,407	961	-	961	3,669	-	3,669	867	-	867	5,497	119,904
1985	90,011	48,365	2,588	140,964	664	-	664	3,418	-	3,418	1,142	-	1,142	5,224	146,188
1986	53,035	41,849	901	95,785	502	-	502	2,733	-	2,733	950	-	950	4,185	99,970
1987	76,643	47,458	2,039	126,140	1,524	-	1,524	3,758 d	-	3,758	3,338 e	-	3,338	8,620	134,760
1988	57,109	35,188	1,767	94,064	3,159	-	3,159	3,436	-	3,436	762	-	762	7,357	101,421
1989	62,364 f	33,225	1,645	97,234	2,790	-	2,790	3,286	-	3,286	1,741	-	1,741	7,817	105,051
1990	52,262 g	33,213	2,341	87,816	3,536	8	3,538	3,353	47	3,365	1,757	1,676	2,156	9,059	96,875
1991	56,332 h	39,260 h	2,344	97,936	2,446	2,222	3,582	3,810	62	3,826	686	1,545	1,072	8,480	106,416
1992	74,212 i	38,139 i	1,819	114,170	1,651	2,273	2,394	3,852	7	3,855	572	884	752	7,001	121,171
1993	49,286	37,293	1,501	88,080	1,349	701	1,577	3,008	0	3,008	1,113	1,313	1,445	6,030	94,110
5 Yr Avg 1983-87	77,963	43,520	2,535	124,018	850	-	850	3,437	-	3,437	1,442	-	1,442	5,729	129,746
5 Yr Avg 1988-92	60,456	35,805	1,983	98,244	2,716	-	3,093	3,547	-	3,554	1,104	-	1,297	7,943	106,187

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe.
b Includes department test fish sales in the Lower Yukon Area prior to 1991.
c The estimated harvest is the number of fish sold in the round plus the estimated number of females to produce the roe sold.
d Includes illegal sales of 653 chinook salmon.
e Includes illegal sales of 2,136 chinook salmon.
f Includes unlawful purchases of 3,211 chinook salmon.
g Includes unlawful purchases of 1,101 chinook salmon.
h Includes unlawful purchases of 2,711 chinook salmon in District 1 and 284 chinook salmon in District 2.
i Includes unlawful purchases of 1,218 chinook salmon in District 1 and 207 chinook salmon in Dsitrict 2.

Table 6. Commercial summer chum salmon sales and havest by district, Yukon River drainage in Alaska, 1967-1993. a

	Lower Yukon Area b				Upper Yukon Area										
					District 4			District 5			District 6				
Year	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe	Estimated Harvest c	Numbers	Roe	Estimated Harvest d	Numbers	Roe	Estimated Harvest d	Subtotal Estimated Harvest	Alaska Total Harvest
1967	9,453	1,425	57	10,935	-	-	-	-	-	-	-	-	-	0	10,935
1968	12,995	1,407	68	14,470	-	-	-	-	-	-	-	-	-	0	14,470
1969	56,886	5,080	0	61,966	-	-	-	-	-	-	-	-	-	0	61,966
1970	117,357	19,649	0	137,006	-	-	-	-	-	-	-	-	-	0	137,006
1971	93,928	6,112	50	100,090	-	-	-	-	-	-	-	-	-	0	100,090
1972	114,234	20,907	527	135,668	-	-	-	-	-	-	-	-	-	0	135,668
1973	221,644	63,402	463	285,509	-	-	-	-	-	-	-	-	-	0	285,509
1974	466,004	74,152	1,721	541,877	27,866	-	27,866	6,831	-	6,831	13,318	-	13,318	48,015	589,892
1975	418,323	99,139	0	517,462	165,054	-	165,054	12,997	-	12,997	14,782	-	14,782	192,833	710,295
1976	273,204	99,190	9,802	382,196	211,307	-	211,307	774	-	774	6,617	-	6,617	218,698	600,894
1977	250,652	105,679	3,412	359,743	169,541	-	169,541	1,274	-	1,274	4,317	-	4,317	175,132	534,875
1978	393,785	227,548	27,003	648,336	364,184	16,920	381,104	4,892	605	5,497	34,814	8,236	43,050	429,651	1,077,987
1979	369,934	172,838	40,015	582,787	169,430	35,317	204,747	8,608	1,009	9,617	18,491	3,891	22,382	236,746	819,533
1980	391,252	308,704	44,782	744,738	147,560	135,824	283,384	456	0	456	35,855	3,282	39,137	322,977	1,067,715
1981	507,158	351,878	54,471	913,507	59,718	187,032	330,445	1,236	49	1,285	32,477	1,987	34,464	366,194	1,279,701
1982	249,516	182,344	4,086	435,946	3,647	151,281	257,719	213	21	234	21,597	1,517	23,114	281,067	717,013
1983	451,164	248,092	14,600	713,856	6,672	148,125	255,388	42	1,856	1,898	24,309	18	24,327	281,613	995,469
1984	292,676	236,931	1,087	530,694	1,009	166,842	278,070	645	47	692	56,249	335	56,584	335,346	866,040
1985	247,486	188,099	1,792	437,377	12,007	247,085	427,483	700	0	700	66,913	1,540	68,453	496,636	934,013
1986	381,127	288,427	442	669,996	300	269,545	465,535	690	0	690	50,483	2,146	52,629	518,854	1,188,850
1987	222,898	174,876	3,501	401,275	29,991	121,474	209,800	362	44	406	10,610	450	11,060	221,266	622,541
1988	648,198	425,172	13,965	1,087,335	24,051	254,526	490,074	722	363	1,085	40,129	1,646	41,775	532,934	1,620,269
1989	547,781 e	343,962	7,578	899,321	18,554	283,305	510,244	154	373	527	42,115	4,871	46,986	557,757	1,457,078
1990	148,911	132,507	643	282,061	12,364	105,723	211,061	11	594	671	12,360 g	3,059	14,788	226,520	508,581
1991	140,470 f	175,149	8,912	324,531	6,381	137,232	301,124	4	28	35	18,197	4,716	23,893	325,052	649,583
1992	177,329 h	147,129 h	65	324,523	2,659	110,809	211,396	102	295	430	5,029	1,892	7,228	219,054	543,577
1993	73,659	19,332	463	93,454	27	22,447	42,957	0	0	0	3,041	515	3,705	46,662	140,116
5 Yr Avg 1983-87	319,070	227,285	4,284	550,640	9,996	190,614	327,255	488	389	877	41,713	898	42,611	370,743	921,383
5 Yr Avg 1988-92	332,538	244,784	6,233	583,554	12,802	178,319	344,780	199	331	550	23,566	3,237	26,934	372,263	955,818

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe (may include small amounts of chinook salmon roe).
b Includes department test fish sales in the Lower Yukon Area prior to 1991.
c Estimated harvest is the estimated number of males and females harvested to produce the roe sold. It is assumed that summer chum salmon sold in the round were primarely male salmon that are estimated in roe expansion.
d Estimated harvest is the number of fish sold in the round plus the estimated number of females to produce roe sold.
e Includes unlawful purchases of 150 summerchum salmon in District 1.
f Includes unlawful purchases of 1,023 summer chum salmon in District 1.
g Includes 1,278 female summer chum salmon sold with roe extracted and sold separately. The estimated harvest of females to produce roe sold is decreased by a similar amount.
h Includes unlawful purchases of 31 chum salmon in District 1 and 91 chum salmon in District 2.

Table 7. Commercial fall chum salmon sales by district, Yukon River drainage in Alaska, 1961–1993. a

Year	Lower Yukon Area b				Upper Yukon Area											Alaska Total Harvest
					District 4			District 5			District 6			Subtotal		
	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe c	Estimated Harvest d	Numbers	Roe c	Estimated Harvest d	Numbers	Roe c	Estimated Harvest d	Roe c	Estimated Harvest d	
1961	42,461	–	–	42,461	–	–	–	–	–	–	–	–	–	0	0	42,461
1962	53,116	–	–	53,116	–	–	–	–	–	–	–	–	–	0	0	53,116
1963	–	–	–	0	–	–	–	–	–	–	–	–	–	0	0	0
1964	8,347	–	–	8,347	–	–	–	–	–	–	–	–	–	0	0	8,347
1965	22,936	–	–	22,936	–	–	–	–	–	–	–	–	–	0	381	23,317
1966	69,836	–	1,209	71,045	–	–	–	–	–	–	–	–	–	0	0	71,045
1967	36,451	–	1,823	38,274	–	–	–	–	–	–	–	–	–	0	0	38,274
1968	49,857	–	3,068	52,925	–	–	–	–	–	–	–	–	–	0	0	52,925
1969	128,866	–	1,722	130,588	–	–	–	–	–	–	–	–	–	0	722	131,310
1970	200,306	4,858	3,285	208,449	–	–	–	–	–	–	–	–	–	0	1,146	209,595
1971	188,533	–	–	188,533	–	–	–	–	–	–	–	–	–	0	1,061	189,594
1972	136,711	12,898	1,313	150,922	–	–	–	–	–	–	–	–	–	0	1,254	152,176
1973	173,783	45,304	–	219,087	–	–	–	–	–	–	–	–	–	0	13,003	232,090
1974	176,036	53,540	552	230,128	9,213	–	9,213	23,551	–	23,551	26,884	–	26,884	0	59,648	289,776
1975	158,183	51,666	5,590	215,439	13,666	–	13,666	27,212	–	27,212	18,692	–	18,692	0	59,570	275,009
1976	105,851	21,212	4,250	131,313	1,742	–	1,742	5,387	–	5,387	17,948	–	17,948	0	25,077	156,390
1977	131,758	51,994	15,851	199,603	13,980	–	13,980	25,730	–	25,730	18,673	–	18,673	0	58,383	257,986
1978	127,947	51,646	11,527	191,120	10,988	1,721	12,709	21,016	5,220	26,236	13,259	3,687	16,946	10,628	55,891	247,011
1979	109,406	94,042	25,955	229,403	48,899	3,199	52,098	47,459	8,097	55,556	34,185	7,170	41,355	18,466	149,009	378,412
1980	106,829	83,881	13,519	204,229	27,978	4,347	32,325	41,771	605	42,376	19,452	68	19,520	5,020	94,221	298,450
1981	167,834	154,883	19,043	341,760	12,082	1,311	13,393	86,620	6,955	93,575	25,989	3,019	29,008	11,285	135,976	477,736
1982	97,484	96,581	5,815	199,880	3,894	167	4,061	13,593	42	13,635	6,820	596	7,416	805	25,112	224,992
1983	124,371	85,645	10,018	220,034	4,482	1,963	6,445	43,993	0	43,993	34,089	3,101	37,190	5,064	87,628	307,662
1984	78,751	70,803	6,429	155,983	7,625	2,215	9,840	24,060	57	24,117	20,564	56	20,620	2,328	54,577	210,560
1985	129,948	40,490	5,164	175,602	24,452	2,525	26,977	25,338	0	25,338	42,352	0	42,352	2,525	94,667	270,269
1986	59,352	51,307	2,793	113,452	2,045	0	2,045	22,053	395	22,448	1,892	182	2,074	577	26,567	140,019
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	45,529	31,861	2,090	79,480	15,662	1,421	17,083	16,989	0	16,989	21,844	1,806	23,650	3,227	57,722	137,202
1989	77,876	97,906	15,332	191,114	11,776	3,407	15,183	18,215	3,989	22,204	49,090	7,353	56,443	14,749	93,830	284,944
1990	27,337	37,173	3,715	68,225	4,989	2,351	8,166	7,778	1,058	8,976	44,066 e	7,535	50,974	10,944	68,116	136,341
1991	59,724	102,628	9,213	171,565	3,737	1,616	6,091	27,355	3,625	32,114	28,195	14,154	44,448	19,395	82,653	254,218
1992	0	0	0	0	0	0	0	0	0	0	15,721	2,806	19,022	2,806	19,022	19,022
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Yr Ave 1983–87	78,484	49,649	4,881	133,014	7,721	1,341	9,061	23,089	90	23,179	19,779	668	20,447	2,099	52,688	185,702
5 Yr Ave 1988–92	42,093	53,914	6,070	102,077	7,233	1,759	9,305	14,067	1,734	16,057	31,783	6,731	38,907	10,224	64,269	166,345

a Sales reported in numbers of fish sold in the round and pounds of unprocessed roe.
b Includes department test fish sales in the Lower Yukon Area prior to 1991.
c May include small amounts of coho salmon roe.
d Estimated harvest is the number of fish sold in the round plus the estimated number of females to produce roe sold.
e Includes 884 female fall chum salmon sold with roe extracted and sold separately.

Table 8. Commercial coho salmon sales and harvest by district, Yukon River drainage in Alaska, 1961-1993. a

	Lower Yukon Area b				Upper Yukon Area						
							Dist. 6				
Year	Dist. 1	Dist. 2	Dist. 3	Subtotal	Dist. 4	Dist. 5	Number	Roe	Estimated Harvest c	Subtotal	Total Harvest
1961	2,855	-	-	2,855	-	-	-	-	-	0	2,855
1962	22,926	-	-	22,926	-	-	-	-	-	0	22,926
1963	5,572	-	-	5,572	-	-	-	-	-	0	5,572
1964	2,446	-	-	2,446	-	-	-	-	-	0	2,446
1965	350	-	-	350	-	-	-	-	-	0	350
1966	19,254	-	-	19,254	-	-	-	-	-	0	19,254
1967	9,925	0	1,122	11,047	-	-	-	-	-	0	11,047
1968	13,153	0	150	13,303	-	-	-	-	-	0	13,303
1969	13,989	0	1,009	14,998	-	-	-	-	-	0	14,998
1970	12,632	0	0	12,632	-	-	-	-	-	0	12,632
1971	12,165	0	0	12,165	-	-	-	-	-	0	12,165
1972	21,705	506	0	22,211	-	-	-	-	-	0	22,211
1973	34,860	1,781	0	36,641	-	-	-	-	-	0	36,641
1974	13,713	176	0	13,889	0	1,409	1,479	-	1,479	2,888	16,777
1975	2,288	200	0	2,488	0	5	53	-	53	58	2,546
1976	4,064	17	0	4,081	0	0	1,103	-	1,103	1,103	5,184
1977	31,720	5,319	538	37,577	0	2	1,284	-	1,284	1,286	38,863
1978	16,460	5,835	758	23,053	32	1	3,066	-	3,066	3,099	26,152
1979	11,369	2,850	0	14,219	155	0	2,791	-	2,791	2,946	17,165
1980	4,829	2,660	0	7,489	30	0	1,226	-	1,226	1,256	8,745
1981	13,129	7,848	419	21,396	0	0	2,284	-	2,284	2,284	23,680
1982	15,115	14,179	87	29,381	15	0	7,780	-	7,780	7,795	37,176
1983	4,595	2,557	0	7,152	0	0	6,168	-	6,168	6,168	13,320
1984	29,472	43,064	621	73,157	1,095	0	7,688	-	7,688	8,783	81,940
1985	27,676	17,125	171	44,972	938	0	11,762	-	11,762	12,700	57,672
1986	24,824	21,197	793	46,814	0	0	441	-	441	441	47,255
1987	0	0	0	0	0	0	0	-	0	0	0
1988	36,435	34,776	1,419	72,630	2	8	13,972	-	13,972	13,982	86,612
1989	24,672	38,522	3,988	67,182	3	84	16,084	-	16,084	16,171	83,353
1990	13,354	16,435	918	30,707	0	0	11,549 d	4,042	14,804	14,804	45,511
1991	54,095	40,898	1,905	96,898	14	0	6,268	4,299	9,774	9,788	106,686
1992	0	0	0	0	0	0	6,556	1,680	7,979	7,979	7,979
1993	0	0	0	0	0	0	0	0	0	0	0
5 Yr Ave 1983-87	17,313	16,789	317	34,419	407	0	5,212	-	5,212	5,618	40,037
5 Yr Ave 1988-92	25,711	26,126	1,646	53,483	4	18	10,886	-	12,523	12,545	66,028

a Sales reported in numbers of fish sold in the round and pounds of roe. Coho salmon roe sales not separated from fall chum salmon until 1990.

b Includes department test fish sales prior to 1991.

c Estimated harvest is the number of fish sold in the round plus the estimated number of females to produce the roe sold.

d Does not include 438 female coho salmon sold with roe extracted and sold separetly.

Table 9. Canadian catch of Yukon River chinook salmon, 1961-1993. [a]

Year	Mainstem Yukon River Harvest						Porcupine River Aboriginal Fishery Harvest	Total Canadian Harvest
	Commercial	Domestic	Aboriginal Fishery	Sport [b]	Combined Non-Commercial	Total		
1961	3,446		9,300		0	12,746	500	13,246
1962	4,037		9,300		0	13,337	600	13,937
1963	2,283		7,750		0	10,033	44	10,077
1964	3,208		4,124		0	7,332	76	7,408
1965	2,265		3,021		0	5,286	94	5,380
1966	1,942		2,445		0	4,387	65	4,452
1967	2,187		2,920		0	5,107	43	5,150
1968	2,212		2,800		0	5,012	30	5,042
1969	1,640		957		0	2,597	27	2,624
1970	2,611		2,044		0	4,655	8	4,663
1971	3,178		3,260		0	6,438	9	6,447
1972	1,769		3,960		0	5,729		5,729
1973	2,199		2,319		0	4,518	4	4,522
1974	1,808	406	3,342		0	5,556	75	5,631
1975	3,000	400	2,500		0	5,900	100	6,000
1976	3,500	500	1,000		0	5,000	25	5,025
1977	4,720	531	2,247		0	7,498	29	7,527
1978	2,975	421	2,485		0	5,881		5,881
1979	6,175	1,200	3,000		0	10,375		10,375
1980	9,500	3,500	7,546	300	0	20,846	2,000	22,846
1981	8,593	237	8,879	300	0	18,009	100	18,109
1982	8,640	435	7,433	300	0	16,808	400	17,208
1983	13,027	400	5,025	300	0	18,752	200	18,952
1984	9,885	260	5,850	300	0	16,295	500	16,795
1985	12,573	478	5,800	300	0	19,151	150	19,301
1986	10,797	342	8,625	300	0	20,064	300	20,364
1987	10,864	330	6,069	300	0	17,563	51	17,614
1988	13,217	282	7,178	650	0	21,327	100	21,427
1989	9,789	400	6,930	300	0	17,419	525	17,944
1990	11,324	247	7,109	300	0	18,980	258	19,238
1991	10,906	227	9,011	300	0	20,444	163	20,607
1992	10,877	277	6,339	300	0	17,793	100	17,893
1993 [c]	10,350	243	5,556	300	0	16,449	134	16,583
Average								
1961-82	3,722	848	4,211	300	0	8,320	223	8,513
1983-87	11,429	362	6,274	300	0	18,365	240	18,605
1988-92	11,223	287	7,313	370	0	19,193	229	19,422

[a] Catch in number of fish.

[b] Sport fish harvest unknown prior to 1980.

[c] Preliminary.

Table 10. Canadian catch of Yukon River fall chum salmon 1961-1993. [a]

Year	Mainstem Yukon River Harvest					Porcupine River Aboriginal Fishery Harvest
	Commercial	Domestic	Aboriginal Fishery	Combined Non-Commercial	Total	
1961	3,276		3,800	3,800	7,076	2,000
1962	936		6,500	6,500	7,436	2,000
1963	2,196		5,500	5,500	7,696	20,000
1964	1,929		4,200	4,200	6,129	6,058
1965	2,071		2,183	2,183	4,254	7,535
1966	3,157		1,430	1,430	4,587	8,605
1967	3,343		1,850	1,850	5,193	11,768
1968	453		1,180	1,180	1,633	10,000
1969	2,279		2,120	2,120	4,399	3,377
1970	2,479		612	612	3,091	620
1971	1,761		150	150	1,911	15,000
1972	2,532		0	0	2,532	5,000
1973	2,806		1,129	1,129	3,935	6,200
1974	2,544	466	1,636	2,102	4,646	7,000
1975	2,500	4,600	2,500	7,100	9,600	11,000
1976	1,000	1,000	100	1,100	2,100	3,100
1977	3,990	1,499	1,430	2,929	6,919	5,560
1978	3,356	728	482	1,210	4,566	5,000
1979	9,084	2,000	11,000	13,000	22,084	
1980	9,000	4,000	3,218	7,218	16,218	6,000
1981	15,260	1,611	2,410	4,021	19,281	3,000
1982	11,312	683	3,096	3,779	15,091	1,000
1983	25,990	300	1,200	1,500	27,490	2,000
1984	22,932	535	1,800	2,335	25,267	4,000
1985	35,746	279	1,740	2,019	37,765	3,500
1986	11,464	222	2,150	2,372	13,836	657
1987	40,591	132	3,622	3,754	44,345	135
1988	30,263	349	1,882	2,231	32,494	1,071
1989	17,549	100	2,462	2,562	20,111	2,909
1990	27,537	0	3,675	3,675	31,212	2,410
1991	31,404	0	2,438	2,438	33,842	1,576
1992	18,576	0	169	169	18,745	1,935
1993 [b]	7,762	0	4,590	4,590	12,352	1,065
Average						
1961-82	3,967	1,843	2,569	3,323	7,290	6,658
1983-87	27,345	294	2,102	2,396	29,741	2,058
1988-92	25,066	90	2,125	2,215	27,281	1,980

[a] Catch in number of fish.

[b] Preliminary.

Table 11. Sonar estimates of salmon passage on the mainstem Yukon River at Pilot Station, 1986-1993.

Year	Dates of Operation	Chinook	Summer Chum	Fall Chum	Coho	Pink
1986 [a,b]	6/09-9/12	169,068	1,932,868	583,439	210,066	1,082,000
1987 [b]	6/09-9/06	116,126	826,384	596,410	227,982	13,000
1988 [b]	6/02-9/14	120,652	1,772,839	424,356	263,053	612,000
1989 [b]	6/04-9/11	91,548	1,603,647	605,843	169,358	3,000
1990 [c]	6/05-9/04	156,028	931,498	545,963	241,023	206,000
1991 [c]	6/05-9/01	75,681	1,232,874	596,922	70,725	N/A
1992 [d]	-	-	-	-	-	-
1993 [b]	6/04-8/31	137,239	949,776	295,303	40,474	N/A

[a] Passage estimates for all species in 1986 were expanded based on river bank profile and water depth. This expansion was not necessary for subsequent years.

[b] Passage estimates for all species in 1986 through 1989 and 1993 include only fish passage within the insonified zone.

[c] Passage estimates for fall chum and coho salmon in 1990 and 1991 include an estimate of passage beyond the insonified zone. Passage estimates for other species in 1990 and 1991 include only fish passage within the isonified zone.

[d] Sonar did not operate in 1992.

Table 12. Subsistence and personal use salmon catch in the Yukon River drainage in Alaska, 1961-1993. [a,b]

Year	Chinook	Summer chum		Fall Chum [c]		Coho [c]	Total
		Reported	Estimated Use [e]	Reported	Estimated Use [e]		
1961	21,488	305,317	305,317	101,772	101,772	9,192	437,769
1962	11,110	261,856	261,856	87,285	87,285	9,480	369,731
1963	24,862	297,094	297,094	99,031	99,031	27,699	448,686
1964	16,231	361,080	361,080	120,360	120,360	12,187	509,858
1965	16,608	336,848	336,848	112,283	112,283	11,789	477,528
1966	11,572	154,508	154,508	51,503	51,503	13,192	230,775
1967	16,448	206,233	206,233	68,744	68,744	17,164	308,589
1968	12,106	133,880	133,880	44,627	44,627	11,613	202,226
1969	14,000	156,191	156,191	52,063	52,063	7,776	230,030
1970	13,874	166,504	166,504	55,501	55,501	3,966	239,845
1971	25,684	171,487	171,487	57,162	57,162	16,912	271,245
1972	20,258	108,006	108,006	36,002	36,002	7,532	171,798
1973	24,317	161,012	161,012	53,670	53,670	10,236	249,235
1974	19,964	227,811	227,811	93,776	93,776	11,646	353,197
1975	13,045	211,888	211,888	86,591	86,591	20,708	332,232
1976	17,806	186,872	186,872	72,327	72,327	5,241	282,246
1977	17,581	159,502	159,502	82,771	82,771	16,333	276,187
1978	30,297	188,303	197,144	84,239	94,867	7,787	330,095
1979	31,005	191,287	196,187	214,881	233,347	9,794	470,333
1980	42,724	167,705	272,398	167,637	172,657	20,158	507,937
1981	29,690	117,629	208,284	177,240	188,525	21,228	447,727
1982	28,158	117,413	260,969	132,092	132,987	35,894	458,008
1983	49,478	149,180	240,386	187,864	192,928	23,895	506,687
1984	42,428	166,630	230,747	172,495	174,823	49,020	497,018
1985	39,771	157,744	264,828	203,947	206,472	32,264	543,335
1986	45,238	182,337	290,825	163,466	164,043	34,468	534,574
1987	53,124	179,202	275,914	361,663 [d]	361,663	84,894 [d]	775,595
1988	46,590	203,802	311,724	160,352	159,703	70,285	588,302
1989	47,213	169,547	249,582	214,361	224,046	42,241	563,082
1990	52,550	118,831	201,839	182,774	188,941	48,971	492,301
1991	45,621	118,509	275,673	138,411	168,990	37,388	527,672
1992	45,626	125,497	231,853	107,602	111,109	51,921	440,509
1993	62,912	105,416	111,965	76,860	76,860	15,772	449,785
5 Yr. Ave 1983-1987	46,008	167,019	260,540	217,887	219,986	44,908	571,442
5 Yr. Ave 1988-1992	47,520	147,237	254,134	160,700	170,558	50,161	522,373

[a] Includes personal use catches beginning in 1987 and ending in June 1990. Does not include usage of salmon from commercial related harvest to produce roe sales.

[b] Catches estimated for 1961-1976. Catches of salmon other than chinook salmon were not differentiated by species until 1977.

[c] Minimum estimates for 1961-1978 because surveys were typically conducted before the end of the season.

[d] Includes illegal sales involving an additional estimated 115,829 fall chum and 36,291 coho salmon in Districts 5 and 6.

[e] Includes salmon harvested solely for subsistence, plus an estimated of the number of salmon carcasses harvested for the commercial production of salmon roe and used for subsistence.

Table 13. Reported Yukon River fall chum salmon subsistence and personal use catches (may include commercial related harvest to produce roe sold) in numbers of fish by village, 1980-1993.

Village	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Mouth to Anuk River														
Sheldon Pt.	1,249	490	886	233	555	713	259	882	289	586	102	84	490	158
Alakanuk	1,227	4,913	1,336	903	1,219	2,603	2,030	3,748	1,194	430	267	193	401	182
Emmonak	2,016	4,375	4,458	2,715	3,329	4,539	2,746	8,160	1,792	840	2,353	2,027	1,628	1,507
Kotlik	2,941	5,762	3,336	4,387	3,782	5,420	3,965	5,677	2,200	3,058	2,613	1,631	2,697	5,923
Personal Use								-	7	20	60			
Subtotal	7,433	15,540	10,016	8,238	8,885	13,275	9,000	18,467	5,482	4,934	5,395	3,935	5,216	7,770
Anuk River to Owl Slough														
Mt. Village	5,719	3,794	2,810	4,065	3,497	3,591	2,947	4,897	1,880	4,641	1,566	1,473	1,052	1,113
Pitkas Pt.-St. Marys	3,268	3,322	2,386	3,138	3,927	3,315	5,401	3,966	2,533	1,970	956	2,202	77	708
Pilot Station	1,187	1,764	1,568	1,302	832	1,957	1,663	583	1,372	1,872	1,941	1,062	3,526	1,017
Marshall	2,261	2,890	2,747	1,836	3,138	2,681	3,472	4,008	2,815	1,532	1,724	891	2,727	256
Subtotal	12,435	11,770	9,511	10,341	11,394	11,544	13,483	13,454	8,600	10,015	6,187	5,628	7,382	3,094
Owl Slough to Bonasila R.														
Russian Mission	226	497	630	773	860	1,266	637	1,255	1,151	308	878	425	648	172
Holy Cross	2,094	2,396	1,029	2,090	1,373	1,024	1,148	1,598	596	711	1,178	190	845	1,066
Subtotal	2,320	2,893	1,659	2,863	2,233	2,290	1,785	2,853	1,747	1,019	2,056	615	1,493	1,238
Lower Yukon Total	22,188	30,203	21,186	21,442	22,512	27,109	24,268	34,774	15,829	15,968	13,638	10,178	14,091	12,102
Bonasila R. to Illinois Cr.														
Anvik	2,750	2,167	4,088	902	720	2,125	913	394	136	168	583	452	894	420
Grayling	1,904	890	2,972	3,847	1,950	3,106	4,204	4,750	1,760	830	1,405	3,616	2,993	2,083
Kaltag	2,111	2,329	812	2,833	1,330	1,570	2,024	7,474	2,293	1,654	2,327	2,834	2,522	704
Nulato	1,134	621	217	3,159	1,675	4,240	1,762	2,200	1,673	2,436	3,546	1,637	1,910	571
Koyukuk	2,319	700	1,355	1,120	1,560	798	2,195	2,492	587	2,460	860	2,761	2,817	2,052
Galena	2,652	3,142	2,164	4,259	7,270	4,476	4,819	10,509	4,308	6,436	3,202	5,525	2,393	3,255
Ruby-Kokrines	4,557	7,984	6,662	12,319	8,505	6,717	7,101	11,000	5,171	6,599	3,352	2,856	4,499	1,085
Subtotal	17,427	17,833	18,270	28,439	23,010	23,032	23,018	38,819	15,928	20,583	15,275	19,681	18,028	10,170
Illinois Cr. to U.S. Can. Border														
Tanana	32,834	30,820	31,470	41,630	42,690	28,113	32,049	41,825	55,998	40,845	41,145	40,868	19,365	23,103
Rampart	5,977	5,370	5,495	5,627	4,395	19,619	3,950	5,092	3,600	2,472	10,818	5,801	5,701	3,272
Fbks. Sub/Pers	6,488	7,527	9,272	12,865	12,920	13,874	11,708	21,014	2,653	3,536	4,167	2,022	2,491	2,680
Stevens Village	3,233	8,356	7,392	3,502	4,932	11,679	4,150	7,538	1,451	6,633	3,857	2,481	150	862
Beaver	190	735	1,878	6,004	0	1,761	3,321	5,750	96	7,242	757	7	361	692
Ft. Yukon	6,537	16,143	1,926	3,967	7,525	12,719	8,543	15,200	2,766	27,790	11,627	7,467	2,284	2,380
Circle	1,737	5,219	290	3,687	3,107	4,096	3,650	7,691	4,396	4,478	7,814	6,340	6,379	349
Eagle	16,740	30,997	13,255	20,021	18,519	25,264	16,027	19,678	14,800	11,557	8,389	8,158	5,630	2,070
Subtotals	73,736	105,167	70,978	97,303	94,088	117,125	83,398	123,788	85,760	104,553	88,574	73,144	42,361	35,408

-Continued-

Table 13. (p. 2 of 2).

Village	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 [a]
Shageluk														
Innoko River Subtotal		150		-	-	0	370	434	0	4	0	0	865	211
Koyukuk River														
Huslia	1,104	119	102	3,528	6,306	276	808	585	1,697	1,728	846	411	1,286	258
Hughes	2,265	611	1,231	327	1,280	1,260	1,422	586	311	260	70	270	325	169
Allakaket [c]	2879	1410	716	1915	556	707	878	1477	443	1969	3050	513	1593 [g]	235
Subtotal	6,248	2,140	2,049	5,770	8,142	2,243	3,108	2,648	2,451	3,957	3,966	1,194	3,204	662
Tanana River														
Minto-Manley	17,153	12,601	8,012	17,889	6,221	11,202	6,450	9,686	9,514	23,092	35,685	18,519	10,027	3,451
Nenana [f]	29,742	10,176	9,034	11,685	13,520	22,901	15,902	26,909	26,889	25,340	13,956	17,932	13,253	5,929
Fairbanks [e]	3,433	3,855	2,518	2,600	2,985	2,860	2,803	3,316	2,230	12,219	4,072	4,018	2,433	571
Subtotal	50,328	26,632	19,564	32,174	22,726	36,963	25,155	39,911	38,633	60,651	53,713	40,469	25,713	9,951
Chandalar R. Subtotal	2,730	6,400	850	7,800	4,345	-	4,726	5,460	1,102	10,977	6,867	858	3,340	8,356
Upper Yukon Total	150,469	158,322	111,711	171,486	152,311	179,363	139,775	211,060	143,874	200,725	168,395	135,346	93,511	64,758
Alaska Total	172,657	188,525	132,897	192,928	174,823	206,472	164,043	245,834	159,703	216,693	182,033	145,524	107,602	76,860
Old Crow Porcupine R.	6,000	3,000	3,459	3,100	6,230	3,500	700	4,024	3,302	5,471	6,085	4,014	2,104	5,655
Canada Total [d]	13,000	6,829	3,459	3,100	6,230	5,519	3,072	3,889	3,302	5,471	6,085	4,014	2,104	5,655
Total	185,657	195,354	136,356	196,028	181,053	211,991	167,115	249,723	163,005	222,164	188,118	149,538	109,706	82,515

[a] Catches reported in numbers of fish.

[b] Includes catches by Fairbanks subsistence and personal use permit holders that fished in Yukon River near the Haul Road bridge crossing.

[c] Alatna combined with Allakaket.

[d] Combined Indian Food Fish, Domestic and sport fish catch data by village obtained from annual management reports.

[e] Personal use catches included.

[f] Nenana includes Healy area subsistence catches.

[g] 1993 data is preliminary.

[h] Bettles included with Allaket/Alatna.

Table 14. Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961-1993. [a]

Year	Tincup Creek	Tatchun River[b]	Little Salmon River	Big Salmon River[c]	Nisutlin River[d]	Ross River[f]	Wolf River[g]	Whitehorse Fishway[h]	Canada Mainstem Tagging Estimate[j]
1961								1,068	
1962								1,500	
1963								483	
1964								595	
1965								903	
1966		7 [k]						563	
1967								533	
1968			173 [k]	857 [k]	407 [k]	104 [k]		414	
1969			120	286	105			334	
1970		100		670	615		71 [k]	625	
1971		130	275	275	650		750	856	
1972		80	126	415	237		13	391	
1973		99	27 [k]	75 [k]	36 [k]			224	
1974		192		70 [k]	48 [k]			273	
1975		175		153 [k]	249		40 [k]	313	
1976		52		86 [k]	102			121	
1977		150	408	316 [k]	77			277	
1978		200	330	524	375			725	
1979		150	489 [k]	632	713		183 [k]	1,184	
1980		222	286 [k]	1,436	975		377	1,383	
1981		133	670	2,411	1,626	949	395	1,555	
1982		73	403	758	578	155	104	473	19,790
1983	100	264	101 [k]	540	701	43 [k,n]	95	905	28,989
1984	150	153	434	1,044	832	151 [k]	124	1,042	27,616 [m]
1985	210	190	255	801	409	23 [k]	110	508	10,730
1986	228	155	54 [k]	745	459 [k]	72 [n]	109	557	16,415
1987	100	159	468	891	183	180 [k]	35	327	13,260
1988	204	152	368	765	267	242	66	405	23,118
1989	88	100	862	1,662	695	433 [p]	146	549	25,201
1990	83	643	665	1,806	652	457 [k]	188	1,407	37,699
1991			326	1,040		250	201 [r]	1,266	20,743
1992	73	106	494	617	241	423	110 [r]	758	25,497
1993 [s]		183	184	572	339	400	168 [r]	668	28,578
E.O.									33,000-43,000[t]

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Survey rating is fair to good, unless otherwise noted. Latest table revision: December 3, 1993.

[b] All foot surveys except 1978 (boat survey) and 1986 (aerial survey).

[c] For 1968, 1970, and 1971 counts are from mainstem Big Salmon River. For all other years counts are from the mainstem Big Salmon River between Big Salmon Lake and the vicinity of Souch Creek.

[d] One Hundred Mile Creek to Sidney Creek.

[f] Big Timber Creek to Lewis Lake.

[g] Wolf Lake to Red River.

[h] Includes 50, 90, 292, 506, 243, 288 fin-clipped hatchery-origin salmon in 1988, 1989, 1990, 1991, 1992, and 1993, respectively.

[j] Estimated total spawning escapement excluding Porcupine River (estimated border escapement minus the Canadian catch).

[k] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

[m] Estimate derived by dividing the annual 5-area (Whitehorse Fishway, Big Salmon, Nisutlin, Wolf, Tatchun) count by the average proportion of the annual 5-area index count to the estimated spawning escapements from the DFO tagging study for years 1982, 1983, and 1985-1989.

[n] Information on area surveyed is unavailable.

[p] Counts are for Big Timber Creek to Sheldon Lake.

[r] Counts are for Wolf Lake to Fish Lake outlet.

[s] Preliminary.

[t] Interim escapement objective. Stabilization escapement objective for years 1990 - 1995 is 18,000 salmon.

Table 15. Chinook salmon escapement counts for selected Alaskan spawning stocks in the Yukon River drainage, 1961-1993.[a]

	Andreafsky River		Anvik River[b]		Nulato River			Chena River			Salcha River		
Year	East Fork	West Fork	River	Index Area	North Fork[c]	South Fork	Gisasa River	Population Estimate	River	Index Area[d]	Population Estimate	River	Index Area[f]
1961	1,003		1,226		376 [g]	167	266 [g]					2,878	
1962	675 [g]	762 [g]							61 [g,h]			937	
1963									137 [g]				
1964	867	705										450	
1965		344 [g]	650 [g]									408	
1966	361	303	638									800	
1967		276 [g]	336 [g]										
1968	380	383	310 [g]									739	
1969	274 [g]	231 [g]	296 [g]									461 [g]	
1970	665	574 [g]	368						6 [g]			1,882	
1971	1,904	1,682							193 [g,h]			158 [g]	
1972	798	582 [g]	1,198						138 [g,h]			1,193	1,034
1973	825	788	613						21 [g]			391	352 [j]
1974		285	471 [g]		55 [g]	23 [g]	161		1,016 [h]	959 [h]		1,857	1,620
1975	993	301	730		123	81	385		316 [h]	262 [h]		1,055	950 [j]
1976	818	643	1,053		471	177	332		531	496		1,641	1,473
1977	2,008	1,499	1,371		286	201	255		563			1,202	1,052
1978	2,487	1,062	1,324		498	422	45 [g]		1,726			3,499	3,258
1979	1,180	1,134	1,484		1,093	414	484		1,159 [g]			4,789	4,310 [j]
1980	958 [g]	1,500	1,330	1,192	954 [g]	369 [g]	951		2,541			6,757	6,126
1981	2,146 [g]	231 [g]	807 [g]	577 [g]		791			600 [g]			1,237	1,121
1982	1,274	851					421		2,073			2,534	2,346
1983			653 [g]	376 [g]	526	480	572		2,553	2,336		1,961	1,803
1984	1,573 [g]	1,993	641 [g]	574 [g]					501	494		1,031	906
1985	1,617	2,248	1,051	720	1,600	1,180	735		2,553	2,262		2,035	1,860
1986	1,954	3,158	1,118	918	1,452	1,522	1,346	9,065	2,031	1,935		3,368	3,031 [j]
1987	1,608	3,281	1,174	879	1,145	493	731	6,404	1,312	1,209	4,771	1,898	1,671
1988	1,020	1,448	1,805	1,449	1,061	714	797	3,346	1,966	1,760	4,562	2,761	2,553
1989	1,399	1,089	442 [g]	212 [g]				2,666	1,280	1,185	3,294	2,333	2,136
1990	2,503	1,545	2,347	1,595	568 [g]	430 [g,k]	884 [g]	5,603	1,436	1,402	10,728	3,744	3,429
1991	1,938	2,544	875 [g]	625 [g]	767	1,253	1,690	3,025	1,277 [g]	1,277 [g]	5,608	2,212 [g]	1,925 [g]
1992	1,030 [g]	2,002 [g]	1,536	931	348	231	910	5,230	825 [g]	799 [g]	7,862	1,484 [g]	1,436 [g]
1993 [m]	5,855	2,765	1,720	1,526	1,844	1,181	1,573	12,241	2,943	2,660	10,007	3,636	3,562
E.O.[n]	>1,500	>1,400	>1,300[p]	>500[p]	>800	>500	>600			>1,700			>2,500

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Survey rating is fair to good, unless otherwise noted. Latest table revision: January 25, 1994.

[b] From 1961-1970, river count data are from aerial surveys of various segments of the mainstem Anvik River. From 1972-1979, counting tower operated; mainstem aerial survey counts below the tower were added to tower counts. From 1980-present, aerial survey counts for the river are best available minimal estimates for the entire Anvik River drainage. Index area counts are from the mainstem Anvik River between the Yellow River and McDonald Creek.

[c] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted.

[d] Chena River index area for assessing the escapement objective is from Moose Creek Dam to Middle Fork River.

[f] Salcha River index area for assessing the escapement objective is from the TAPS crossing to Caribou Creek.

[g] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

[h] Boat survey.

[j] Data unavailable for index area. Calculated from historic (1972-91) average ratio of index area counts to total river counts (0.90:1.0).

[k] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.

[m] Preliminary.

[n] Interim escapement objectives. Established March, 1992.

[p] Interim escapement objective for the entire Anvik River drainage is 1,300 salmon. Interim escapement objective for mainstem Anvik River between the Yellow River and McDonald Creek is 500 salmon.

Table 16. Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973-1993.

Year	Andreafsky River[a] East Fork Aerial	Andreafsky River[a] East Fork Sonar or Tower	Andreafsky River[a] West Fork	Anvik River[a] Tower & Aerial[b]	Anvik River[a] Sonar	Rodo River[a]	Nulato River[a] South Fork	Nulato River[a] North Fork[c]	Gisasa River[a]	Hogatza River[a] (Clear and Caribou Crs)	Tozitna River[a]	Chena River[a]	Salcha River[a]
1973	10,149 [d]		51,835	86,665 [d]								79 [d]	
1974	3,215 [d]		33,578	201,277		16,137	29,016	29,334	22,022		1,823	4,349	3,510
1975	223,485		235,954	845,485		25,335	51,215	87,280	56,904	22,355	3,512	1,670	7,573
1976	105,347		118,420	406,166		38,258	9,230 [d]	30,771	21,342	20,744	725 [d]	685	6,474
1977	112,722		63,120	262,854		16,118	11,385	58,275	2,204 [d]	10,734	761 [d]	610	677 [d]
1978	127,050		57,321	251,339		17,845	12,821	41,659	9,280 [d]	5,102	2,262	1,609	5,405
1979	66,471		43,391	81,830 [d]	280,537		1,506	35,598	10,962	14,221		1,025 [d]	3,060
1980	36,823 [d]		114,759		492,676		3,702 [d]	11,244 [d]	10,388	19,786	580	338	4,140
1981	81,555	147,312 [f]	[i]		1,486,182		14,348					3,500	8,500
1982	7,501 [d]	181,352 [f]	7,267 [d]		444,581				334 [d]	4,984 [d]	874	1,509	3,756
1983		110,608 [f]			362,912		1,263 [d]	19,749	2,356 [d]	28,141	1,604	1,097	716 [d]
1984	95,200 [d]	70,125 [f]	238,565		891,028							1,861	9,810
1985	66,146		52,750		1,080,243	24,576	10,494	19,344	13,232	22,566	1,030	1,005	3,178
1986	83,931	167,614 [g]	99,373		1,189,602		16,848	47,417	12,114		1,778	1,509	8,028
1987	6,687 [d]	45,221 [g]	35,535		455,876		4,094	7,163	2,123	5,669 [d]		333	3,657
1988	43,056	68,937 [g]	45,432		1,125,449	13,872	15,132	26,951	9,284	6,890	2,983	432	2,889 [d]
1989	21,460 [d]				636,906					[i]		714 [d]	1,574 [d]
1990	11,519 [d]		20,426 [d]		403,627	1,941 [d]	3,196 [d,h]	1,419 [d]	450 [d]	2,177 [d]	36	100 [d]	450 [d]
1991	31,886		46,657		847,772	3,977	13,150	12,491	7,003	9,947	93	10 [d]	154 [d]
1992	11,308 [d]		37,808 [d]		775,626	4,465	5,322	12,358	9,300	2,986	794	848 [d]	3,222
1993 [p]	10,935 [d]		9,111 [d]		517,409	7,867	5,486	7,698	1,581		970	168	212
E.O.[j]	>109,000		>116,000		>500,000[k]			>53,000[m]		>17,000[n]			>3,500

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Latest table revision January 11, 1994.

[b] From 1972-1979, counting tower operated; mainstem aerial survey counts below the tower were added to tower counts.

[c] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted.

[d] Incomplete survey and/or poor survey timing or conditions resulted in minimal or inaccurate count.

[f] Sonar count.

[g] Tower count.

[h] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.

[j] Interim escapement objective.

[k] The Anvik River Escapement Objective was rounded upward to 500,000 from 487,000 in March, 1992.

[m] Interim escapement objective for North Fork Nulato River only.

[n] Consists of Clear and Caribou Creeks interim escapement objectives of 9,000 and 8,000, respectively.

[p] Preliminary.

Table 17. Fall chum salmon escapement counts for selected spawning areas in the Alaskan and Canadian portions of the Yukon River drainage, 1971-1993.[a]

	Alaska				Canada					
Year	Toklat River[b]	Delta River[c]	Chandalar River[d]	Sheenjek River[d,r]	Fishing Branch River[g]	Mainstem Yukon River Index[q,j]	Koidern River[n]	Kluane River[u,k]	Teslin River[u,m]	Mainstem Tagging Estimate[o]
1971					312,800					
1972	[a]				35,125 [p]			198 [z,s]		
1973					15,989 [t]	383		2,500		
1974	43,484	- 5,915		89,966 [w]	32,525 [t]			400		
1975	90,984	3,734 [w]		173,371 [w]	353,282 [t]	7,671		362 [e]		
1976	53,882	6,312 [w]		26,354 [w]	36,584			20		
1977	36,462	16,876 [w]		45,544 [w]	88,400			3,555		
1978	37,057	11,136		32,449 [w]	40,800			0 [e]		
1979	179,627	8,355		91,372 [w]	119,898			4,640 [e]		
1980	26,373	5,137		28,933 [w]	55,268			3,150		
1981	15,775	23,508		74,560	57,386 [x]			25,806		
1982	3,601	4,235		31,421	15,901	1,020 [y]		5,378		31,958
1983	20,807	7,705		49,392	27,200	7,560		8,578 [e]		90,875
1984	16,511	12,411		27,130	15,150	2,800 [z]	1,300	7,200	200	56,633 [aa]
1985	22,805	17,276 [w]		152,768	56,016 [t]	10,760	1,195	7,538	356	62,010
1986	18,903	6,703 [w]	59,313	83,197	31,723 [t]	825	14	16,686	213	87,990
1987	22,141	21,180	52,416	140,086	48,956 [t]	6,115	50	12,000		80,776
1988	13,324	18,024	33,619	40,866	23,597 [t]	1,550	0	6,950	140	36,786
1989	30,447	21,342 [w]	69,161	79,116 [ab]	43,834 [t]	5,320	40	3,050	210 [f]	35,750
1990	33,672	8,992 [w]	78,631	62,200 [ac]	35,000 [ad]	3,651	1	4,683	739	51,755
1991	13,197	32,905 [w]		86,496	37,733 [t]	2,426	53	11,675	468	78,461
1992	13,194	8,893 [w]		78,808	22,517 [t]	4,438	4	3,339	450	49,217
1993 [af]	26,500	17,400		43,000	28,798 [t]	2,620	0	4,610	555 [f]	29,938
E.O.[ag]	> 33,000	> 11,000		> 64,000[ah]	50,000 - 120,000					> 80,000

[a] Latest table revision December 6, 1993.
[b] Total escapement estimates using Delta River migratory time density curve and percentage of live salmon present by survey date in upper Toklat River area.
[c] Total escapement estimates made from migratory time density curve (see Barton 1986), unless otherwise indicated.
[d] Side-scan sonar estimate.
[f] From 1981-1985 sonar operations were initiated between August 29 and September 2. From 1986-1990 sonar operations were initiated between August 17 and August 25 For 1991 and 1992 sonar operations were initiated on August 9.
[g] Within the Canadian Porcupine River drainage. Total escapement estimated using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.
[j] Aerial survey count unless otherwise indicated.
[j] Tatchun Creek to Fort Selkirk.
[k] Duke River to end of spawning sloughs below Swede Johnston Creek.
[m] Boswell Creek area (5km below to 5km above confluence).
[n] Excludes Fishing Branch River escapement (estimated border passage minus Canadian removal).
[o] Weir installed on September 22. Estimate consists of a wier count of 17,190 after September 22, and a tagging passage estimate of 17,935 prior to weir installation.
[r] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[s] Foot survey
[t] Weir count.
[u] Total escapement estimates using sonar to aerial survey expansion factor of 2.221.
[w] Population estimate from replicate foot surveys and stream life data.
[x] Initial aerial survey count was doubled before applying the weir/aerial expansion factor of 2.72 since only half of the spawning area was surveyed.
[y] Boat survey.
[z] Total index area not surveyed. Survey included the mainstem Yukon River between Yukon Crossing to 30 km below Fort Selkirk.
[aa] Escapement estimate based on mark-recapture program unavailable. Estimate based on assumed average exploitation rate.
[ad] Does not include a passage estimate of 20,000 salmon prior to initiation of sonar-monitoring operations.
[ac] Does not include a passage estimate of 15,550 salmon prior to initiation of sonar-monitoring operations.
[ab] Weir was not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approximately 27,000 fish was made through date of survey, based upon historic average aerial-to-weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000 - 40,000 fish in view of aerial survey timing.
[af] Preliminary.
[ag] Interim escapement objective.
[ah] Based on escapement estimates for years 1974-1990.

Table 18. Coho salmon escapement counts for selected spawning areas in the Yukon River drainage, 1972-1993.[a]

Year	Andreafsky River		Anvik River	Kantishna River		Nenana River Drainage				Delta Clearwater River[d,f]	Clearwater Lake and Outlet	Richardson Clearwater River
	East Fork	West Fork		Geiger Creek	Barton Creek	Lost Slough	Nenana Mainstem[b]	Wood Creek[c]	17-Mile Slough			
1972										630	417	454 [h]
1973										3,322	551 [d]	375 [d]
1974						1,388			27	3,954 [g]	560	652 [d]
1975						943			956	5,100	1,575 [d,f]	4 [h]
1976			467 [h]	25 [j]		118			281	1,920	1,500 [d,f]	80 [h]
1977			81 [h]	60		524		310 [j]	1,167	4,793	730 [d,f]	327
1978						350		300 [j]	466	4,798	570 [d,f]	
1979						227			1,987	8,970	1,015 [d,f]	372
1980				3 [j]		499		1,603 [j]	592	3,946	1,545 [d,f]	611
1981	1,657 [h]					274		849 [k,n]	1,005	8,563 [m]	459 [h]	550
1982				81 [j]				1,436 [k,n]		8,365 [m]		
1983				42 [j]		766		1,042 [k]	103	8,019 [m]	253	88
1984				20		2,677		8,826 [k]		11,061	1,368	428
1985				42		1,584		4,470 [k]	2,081	5,358	750	
1986				5 [j]	496	794		1,664 [k]	218 [e,f]	10,857	3,577	146 [h]
1987				1,175 [j]		2,511		2,387 [k]	3,802	22,300	4,225 [d,f]	
1988	1,913	830	1,203	159 [j]	437	348		2,046 [k]		21,600	825 [d,f]	
1989				155 [j]	12 [h]			412 [k]	824 [h]	11,000	1,600 [d,f]	483
1990				211 [j]		688	1,308		15 [h]	8,325	2,375 [d,f]	
1991				427 [j]	467 [h]	564	447		52	23,900	3,150 [d,f]	
1992				77 [j]	55 [h]	372			490	3,983	229 [d,f]	500 [d]
1993 [r]				138 [j]	141			666 [k,p]		10,875	3,525 [d,f]	
E.O.[s]										>9,000		

[a] Only peak counts presented. Survey rating is fair to good, unless otherwise noted. Latest table revision: November 10, 1993.
[b] Mainstem Nenana River between confluences of Lost Slough and Teklanika River.
[c] Surveyed by F.R.E.D.
[d] Surveyed by Sport Fish Division.
[f] Boat survey.
[g] Aerial survey.
[h] Poor survey.
[j] Foot survey.
[k] Weir count.
[m] Expanded estimate based on partial survey counts and historic distribution of spawners from 1977-1980.
[n] Coho weir was operated at the mouth of Clear Creek (Shores Landing).
[p] Weir project terminated on October 4. Weir normally operated until mid to late October.
[r] Preliminary.
[s] Interim escapement objective established March, 1993.

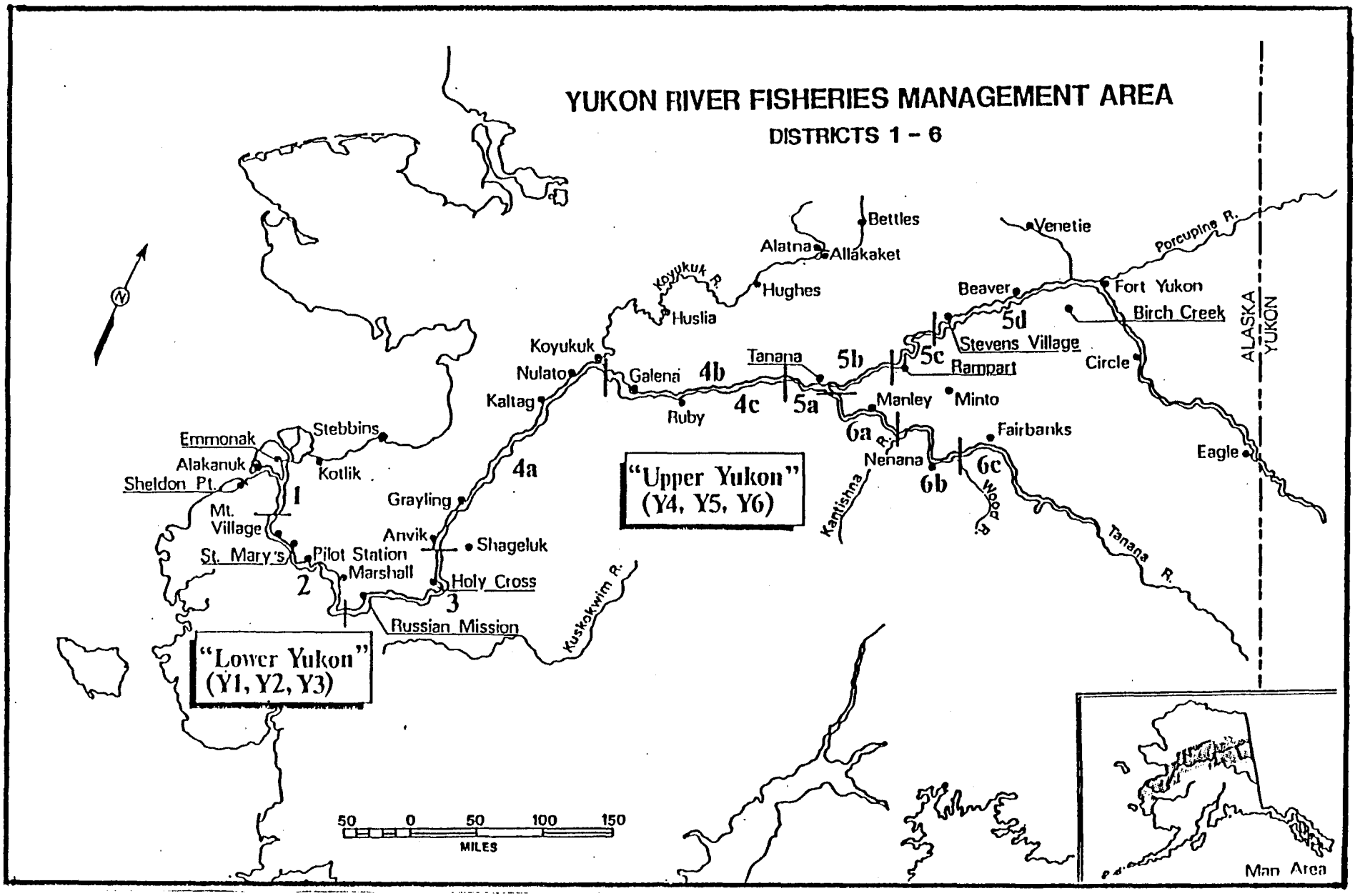

Figure 1. Map of Alaskan portion of the Yukon River drainage, showing communitites and fishing districts.

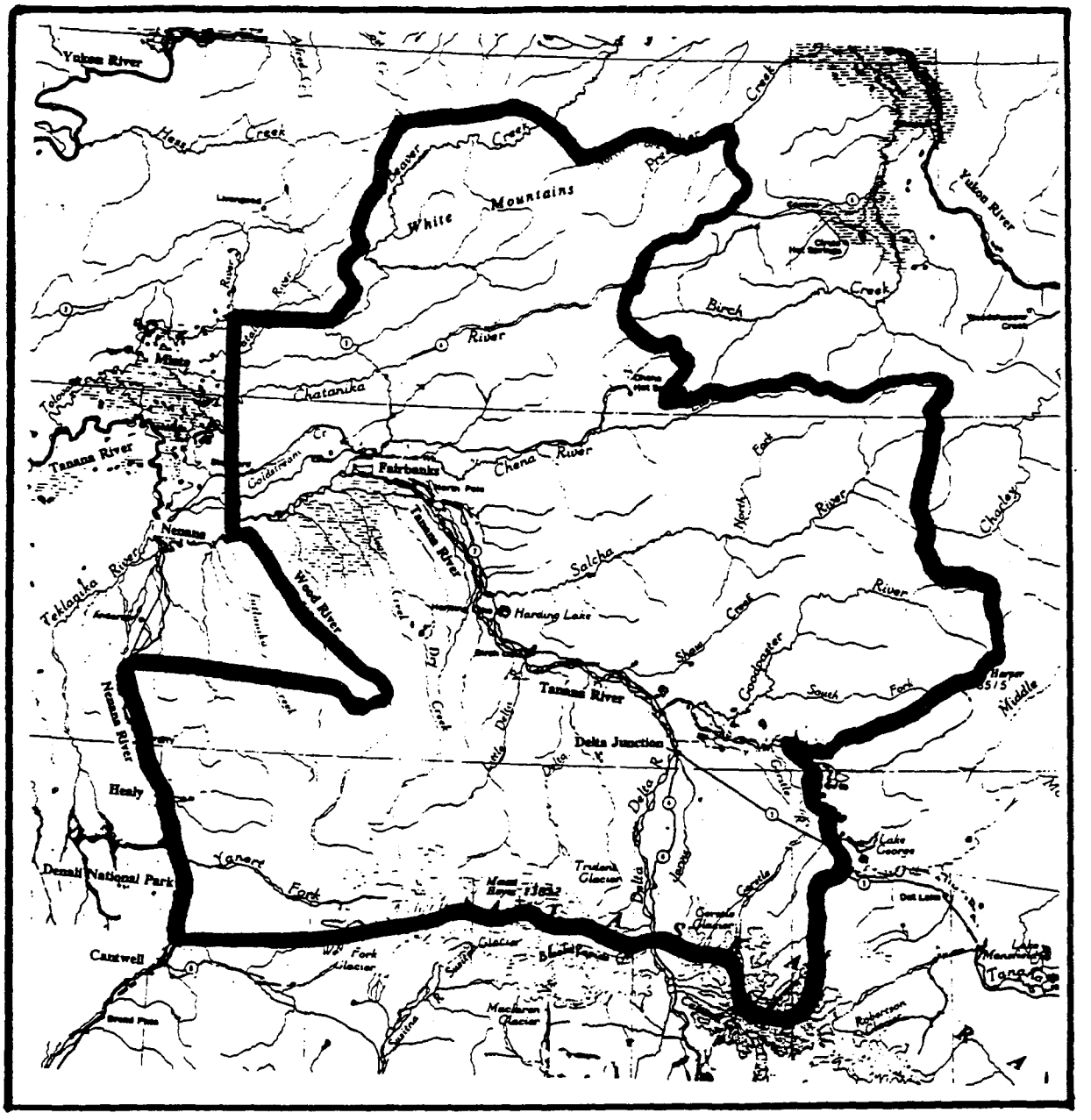

Figure 2. Fairbanks Nonsubsistence Area, 1993.

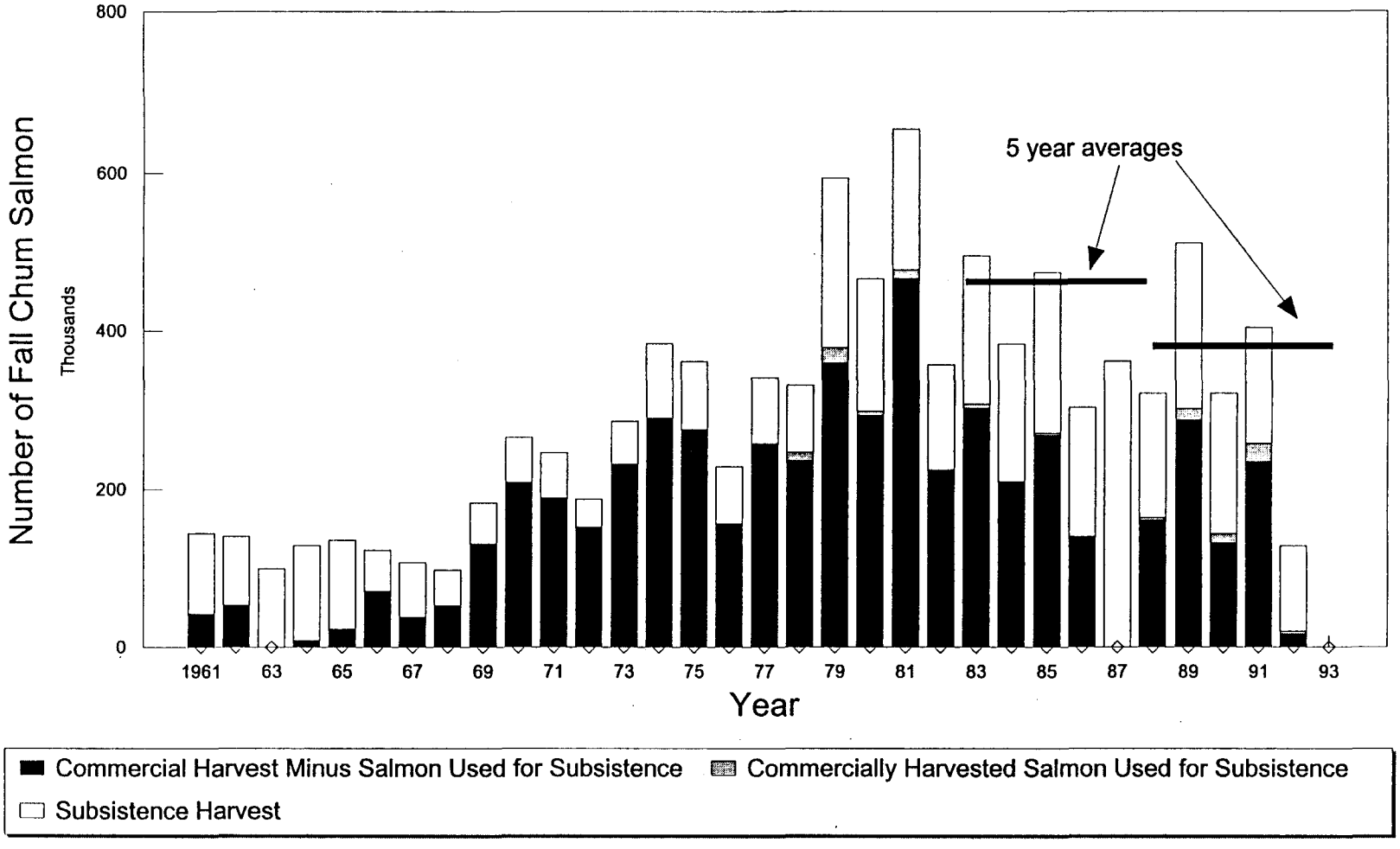

Figure 3. Alaskan harvest of fall chum salmon, Yukon River, 1961-1993. The 1993 harvest only includes commercial catch data. Horizontal lines indicate 5-year average harvests.

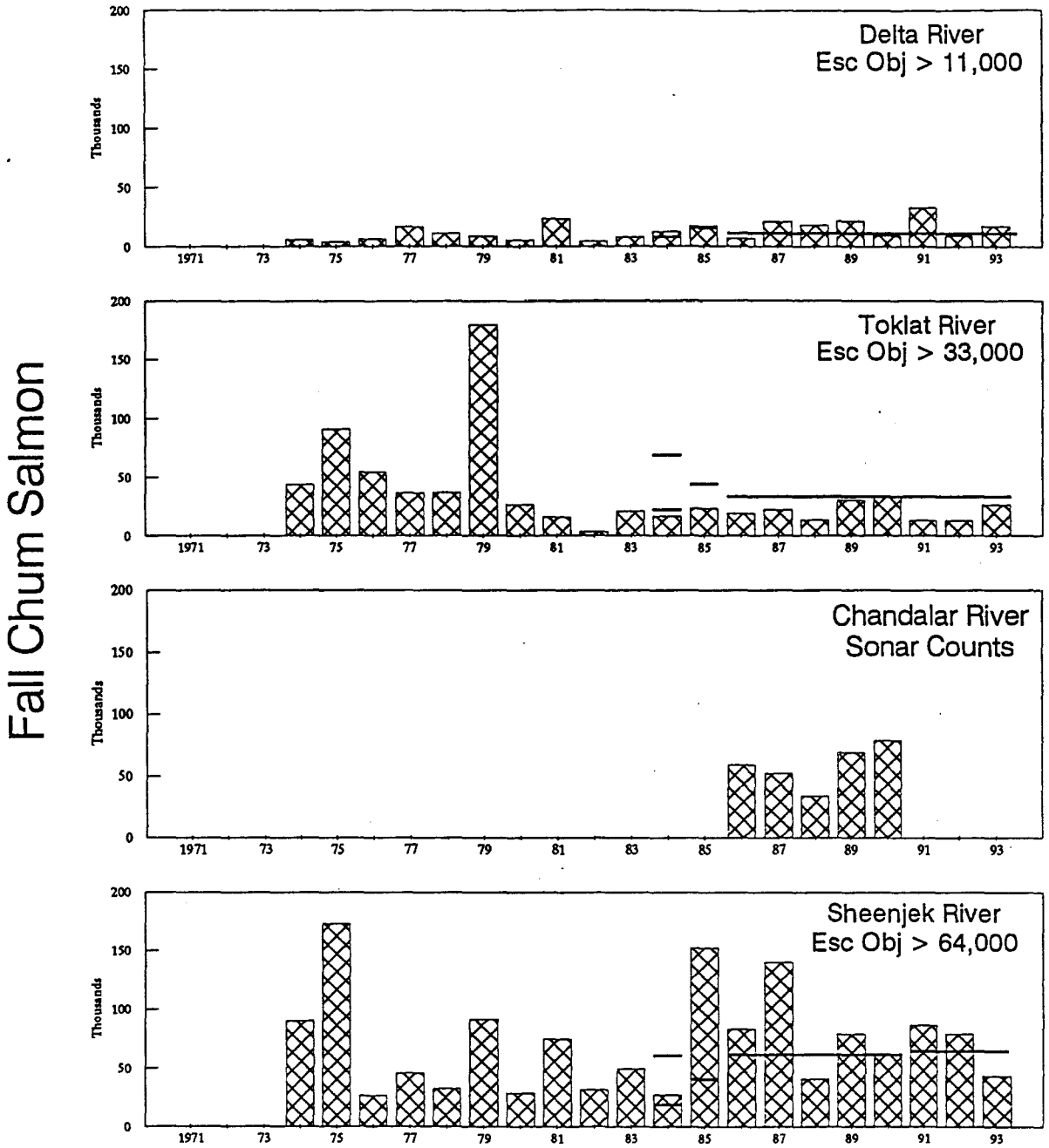

Figure 4. Fall chum salmon escapement estimates for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1971–1993. Horizontal lines represent interim escapement objectives.

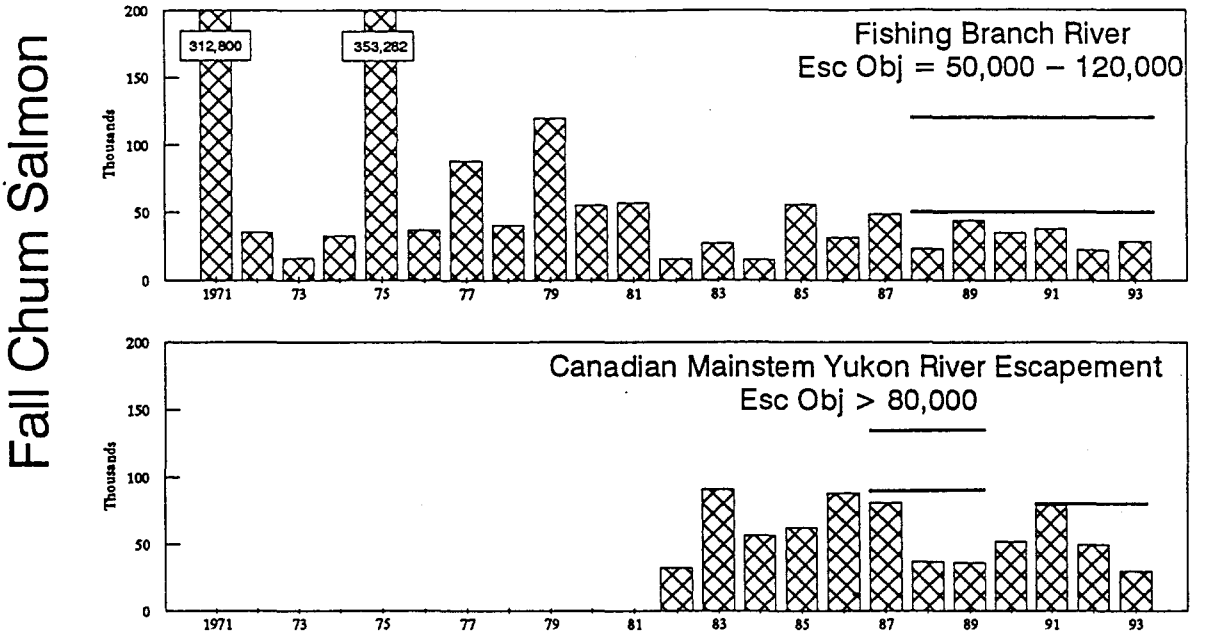

Figure 5. Fall chum salmon escapement estimates for spawning areas in the Canadian portion of the Yukon River drainage, 1971–1993. Horizontal lines represent interim escapement objectives.