SALMON FISHERIES IN THE YUKON AREA, ALASKA 1994

A Report to the Alaska Board of Fisheries

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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. For management purposes, the area is divided into seven districts and 10 subdistricts (Figure 1). Commercial fishing occurs along the entire 1,200 mile length of the Yukon River in Alaska, and in the lower 225 miles of the Tanana River. The Coastal District of the Yukon Area is only open to subsistence fishing. 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 the Alaskan portion of the drainage upstream of Old Paradise Village. Commercial, Aboriginal, and Domestic 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., 1990, 1992, 1994...). 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 salmon 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 or only 8 inch or greater mesh size).

Fall Chum and Coho Salmon

Guideline harvest ranges for fall chum salmon are depicted in Table 1. Currently, there are no guideline harvest ranges established for coho salmon. Commercial coho salmon harvests are dependent on management actions taken for fall chum salmon.

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 1994 season (Appendix A.1) 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 in Districts downstream.

The Board of Fisheries adopted the Yukon River Drainage Fall Chum Salmon Management Plan in March of 1994 (Appendix A.1.). This plan identified the need for spawning escapement and rebuilding requirements throughout the drainage, subsistence needs for the Alaskan portion of the drainage, and the commitments for Canadian harvests. The plan is dependent on the departments ability to accurately assess the run size entering the river and taking appropriate management actions.

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. Additional subsistence only fishing time may be allowed.

However, regulations adopted in 1993 and 1994 separate subsistence and commercial fishing periods in Districts 1, 2, 3 and Subdistrict 4-A. During the commercial season, subsistence fishing is only allowed between commercial periods. Subsistence fishing opens 12 hours after the closure 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 household permit and fishery harvest limits and reporting requirements. The 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 subsistence fishery in Subdistrict 6-C will be closed.

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. In March 1993, the Board provided a fishery harvest limit of 2,000 chum salmon and individual permit limits of 450 chum salmon. Additionally, fishermen were allowed to continue fishing after the fishery harvest limit was reached using a fish wheel with a livebox. This same regulatory plan was in place for 1994.

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.

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.

In 1992, the legislature passed a subsistence law during a special session which allowed the Board of Fisheries to divide the state into subsistence or non-subsistence zones. The only non-subsistence zone in the Yukon Area which the Boards of Fisheries and Game created was the Fairbanks Non-Subsistence Use Zone, which basically included the Fairbanks North Star

Borough. In October 1993, a Superior Court ruled that this 1992 subsistence law was unconstitutional. The state was immediately granted a stay, which had allowed for status quo fishing regulations to remain in effect until April 11, 1994 when the Alaska Supreme Court vacated the State's motion for a stay. All Alaskan residents were again qualified as subsistence users during the 1994 fishing season.

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 to 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 goal for that year in the rebuilding program, and provide for a harvest in Canada within the guideline harvest range. The specific border passage range agreed to for 1994 was 84,600-112,600 fall chum salmon.

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.

SUBSISTENCE SALMON HARVEST, 1994

The 1994 subsistence salmon harvest information is unavailable for inclusion in this report. It is estimated that chinook and summer chum salmon harvests in 1994 will be similar or slightly greater than 1993 due to the average to above average run sizes experienced in 1994. It is estimated that the 1994 fall chum and coho salmon subsistence harvest will be greater than in 1993 when poor returns and closure of the subsistence fishery limited the subsistence harvest, but not as large as the previous five-year average due to the subsistence restrictions enacted during the 1994 fall season. The 1993 survey and permit subsistence salmon harvest in the Alaskan portion of the Yukon River drainage is summarized in Table 2. Table 12 contains the subsistence and personal use salmon harvest in the Yukon River drainage in Alaska from 1961 to 1993.

Subsistence and personal use salmon harvest information is obtained from a personal interview survey program, subsistence permits, and department records of test fish given to the public. Subsistence salmon permits generally expire October 15 of any given year. Actual interviews of nearly 1,000 households in 34 villages are normally completed by the first week of November. Preliminary subsistence salmon harvest estimates are usually available in March after survey editing, telephone interviews, computer data entry of both survey and permit information, and permit reminder letters have been compiled.

COMMERCIAL SEASON SUMMARY, 1994

Preliminary commercial sales were 196,707 salmon and 111,533 pounds of unprocessed salmon roe for the Alaskan portion of the Yukon River drainage in 1994. Total sales were composed of 113,125 chinook, 79,831 summer chum, 3,631 fall chum, and 120 coho salmon sold in-the-round (Table 3). Additionally, roe sales by species totaled 1,945 pounds for chinook, 100,724 pounds for summer chum, 3,276 pounds for fall chum and 5,588 pounds for coho salmon. The total estimated commercial salmon harvest including the estimated harvest to produce roe sold

was 113,643 chinook, 261,986 summer chum, 7,999 fall chum, and 4,452 coho salmon. The 1994 estimated salmon catches compared to the 1989 through 1993 five-year average were as follows: chinook, 8% above (Table 4), summer chum salmon, 60% below (Table 5), fall chum, 94% below (Table 6), and coho, 90% below (Table 7).

Yukon River fishermen in Alaska received an estimated $4.8 million for their catch, approximately one-half the recent 5-year average of $8.6 million (Table 8). Fishermen received lower than average (1989-1993) prices for all salmon species except coho. Five buyer-processors operated in the Lower Yukon Area, and 8 buyer-processors and 10 catcher-sellers operated in the Upper Yukon Area.

Lower Yukon fishermen received an estimated average price per pound of $2.07 for chinook and $0.21 for summer chum salmon. Ex-vessel value of the Lower Yukon Area fishery was $4.2 million. The average income for the 659 Lower Yukon Area fishermen (92 percent of the total permit holders issued for the area) that participated in the 1994 fishery was $6,447.

Upper Yukon commercial fishermen received an estimated average price per pound of $0.71 for chinook salmon, $3.04 for chinook salmon roe, $0.18 for summer chum salmon, $3.69 for summer chum salmon roe, $0.14 for fall chum salmon, $1.50 for fall chum salmon roe, $0.43 for coho salmon, and $1.50 for coho salmon roe. The ex-vessel value of the Upper Yukon Area fishery was $0.6 million.

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 96 chinook and 3,039 summer chum salmon were caught but not sold during commercial fishing periods in the Lower Yukon Area in 1994. Upper Yukon Area (Districts 4, 5 and 6) caught but not sold data are not available at this time. The total of summer chum salmon harvested by commercial fishermen as reported of fish tickets during the commercial fishery in Subdistrict 4-A is also not available at this time.

Chinook and Summer Chum Salmon Season

The 1994 preseason outlook was for an average chinook salmon run based on parent year escapements. The summer chum salmon outlook was for a below average to critically low run. The commercial harvest for the Alaskan portion of the drainage was anticipated to be between 88,000 and 99,000 chinook salmon with a minimal harvest of summer chum salmon.

The Lower Yukon Area was generally free of ice by May 22. The first chinook salmon catches were reported on May 24 near Sheldon's Point by a subsistence fisherman. The department's test fishing projects recorded the first chum and chinook salmon catches on May 28 and May 29, respectively. Chinook salmon migratory timing was average and similar to run timing in 1989. Summer chum salmon migratory timing appeared to be near average. Chinook and summer chum salmon entered the river primarily through the south and middle mouths.

Comparative lower river test fishing cumulative CPUE from 8.5 inch mesh size set gillnet sites indicated above average abundance of chinook salmon in 1994, similar to the large returns in 1980, 1981 and 1987. Approximately 50% of the 1994 chinook salmon run had entered the lower river by June 19. Chinook salmon test fish catches in 5.5 inch mesh size set gillnets were about average.

Comparative test net indices suggested the 1994 summer chum salmon run was above average in abundance. Approximately 50% of the summer chum salmon return had entered the lower river by June 26 according to test fishing CPUE data.

Because of the projection of a below average to critically low summer chum salmon run in 1994, the department managed the Yukon River summer chum salmon run very conservatively to reduce the mortality of summer chum salmon. The first management priority was to achieve spawning escapement goals. To the extent that escapement goals were achieved and there was a harvestable surplus identified, the subsistence fishery had priority. The management plan prescribed that no directed commercial fishing for summer chum salmon would be allowed until it could be determined that a harvestable surplus above escapement and subsistence needs existed. Directed chinook salmon commercial fishing periods were regulated to reduce summer chum salmon mortality by adjusting the timing, length and frequency of fishing periods and by requiring fishermen to use gillnet mesh size of 8 inch or larger. Preseason, fishermen were informed that the commercial harvest of chinook salmon might be lower than anticipated due to management actions that might be necessary to conserve summer chum salmon.

The management plan identified the need for a total run size estimate of 1.1 million summer chum salmon above Pilot Station to provide for escapement (900,000 fish) and subsistence catches (200,000 fish). A total run size estimate of 1,250,000 summer chum salmon above Pilot Station would be necessary to provide for escapement (500,000 fish for Anvik River and 500,000 fish for non-Anvik areas), subsistence catches (200,000 fish), and incidental harvests during the chinook salmon directed commercial fishery (50,000 fish) prior to allowing a directed commercial fishery for summer chum salmon.

The Pilot Station sonar was used as the primary indication of summer chum salmon run strength. Inseason, the total run projection at Pilot Station was based on the earliest run timing observed at the project (the 1986 season) and average run timing. It was anticipated that a good projection of total run passage by the sonar would be possible between June 21 and June 27 (the average 25% and 50% point of the run). Post-season analysis showed that this was indeed the case. In an effort to be very conservative, through the month of June, the run projection based on the earliest run timing was used to assess the run. However, it became apparent that the projection based on average run timing was much more accurate.

Since 1993, the Pilot Station sonar project has utilized new transducers which allowed the sonar range to be greatly increased compared to previous years. Total season passage estimates of 141,000 chinook and 1,997,000 summer chum salmon were obtained in 1994 (Table 11). The summer chum salmon passage estimate was the largest since the project became operational in

1986. However, passage estimates for 1994 may not be comparable to other years prior to 1993 because of the deployment of the new transducers.

The Anvik River sonar escapement estimate was compared to the Pilot Station sonar estimate inseason. This comparison was made to assess whether or not the distribution of spawners was appropriate such that the minimum escapement goal of 500,000 would be achieved in the Anvik River and that escapements to non-Anvik River tributaries would be adequate. On June 30, it was determined that escapements would likely be achieved river wide and that the surplus greater than escapement and subsistence needs would be assessed on a daily basis.

Districts 1 and 2

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 before the commercial fishery. The 1994 commercial salmon fishing season was opened by emergency order after approximately eight days of increasing subsistence and test net catches. The chinook salmon directed fishery was opened on a staggered basis: June 13 in District 1, June 15 in District 2, and June 22 in District 3.

Initially, only gillnets of 8 inch or greater mesh size were allowed in the directed chinook salmon commercial fishery in order to reduce the mortality of chum salmon. It was anticipated that the combined incidental harvest of summer chum salmon in Districts 1 and 2 would be no more than 35,000 fish, if the summer chum salmon run was very poor as in 1993.

In addition, fishermen were requested to attempt to use their commercially caught summer chum salmon for subsistence purposes during the first two periods in District 1 and 2. This management strategy was used to reduce the overall harvest of summer chum salmon by substituting chum salmon caught while commercial fishing for fish that would have been caught during subsistence fishing. It is estimated that about half of the commercial fishermen complied with this request, however, reporting of salmon caught but not sold during the commercial fishing on fish tickets was poor. During the first fishing period in District 1, there was some confusion with the request to retain chum salmon for subsistence use. Some fishermen thought that it was illegal to sell chum salmon, and there was concern that the chum salmon catch would affect the chinook salmon fishery. The department responded by distributing notices to villages in Districts 1 and 2 and to buyers, and broadcasting radio reports explaining the management strategy.

The total number of chum salmon caught but not sold was estimated by using the average catch for permit holders that either sold fish or reported their chum salmon as not sold to expand for those permit holders reporting no harvest of chum salmon. We estimated that 15,373 summer chum salmon were caught but not sold and were not reported on fish tickets. It is assumed that these fish will be reported as subsistence use during post-season subsistence surveys. On June

21, it was determined that the summer chum salmon run was greater than 1.1 million fish and fishermen were notified that all chum salmon caught during commercial fishing could be sold.

Because of the relatively slow increase in test fishing cumulative CPUE through June 10, the first periods in Districts 1 and 2 were 6 hours in duration. The next two periods in both districts were 9 hours in duration. The harvest of 18,222 chinook salmon taken during the second period in District 2 on June 21 was the second largest period harvest on record. Fishing periods were less than the expected 12 hours in order to lower the incidental harvest of summer chum salmon and to spread out the chinook salmon harvest. Additionally, to spread out the chinook salmon harvest, the second commercial period in District 2 and the third commercial period in District 1 were delayed from June 19 until June 21 and from June 20 to June 22, respectively. Unrestricted mesh size gillnets were allowed during the fourth opening in each district as summer chum salmon abundance reached an acceptable level.

The last commercial fishing period occurred on July 4 and 5 in District 1 and was the only opening restricted to gillnets of 6 inch or less mesh size. A total of 15,369 summer chum salmon were harvested during this period. Because of poor market conditions, no buyers were available for summer chum salmon and no additional commercial fishing periods were allowed after July 6.

The total harvest of 103,933 chinook salmon for Districts 1 and 2 was 13% above the midpoint of the guideline harvest range of 90,000 fish and 10% above the 1989-1993 average harvest of 94,255 fish (Tables 3 and 4). A total of 87,981 chinook salmon were harvested during 8 inch or greater mesh size fishing periods and 15,344 chinook salmon were harvested during the two unrestricted mesh size fishing periods in Districts 1 and 2. A total of 608 chinook salmon were harvested during the single period in District 1 restricted to 6 inch maximum mesh size gillnets. The average weight of chinook salmon harvested during 8 inch or greater mesh size fishing periods, unrestricted mesh size periods, and 6 inch maximum mesh size fishing periods was 20.1, 21.4 and 17.5 pounds, respectively.

The total commercial summer chum salmon harvest in District 1 and 2 was 55,201 fish, which was 86% below the recent 5-year average harvest of 384,748 fish (Tables 3 and 5). The harvest was 22% of the lower end of the guideline harvest range of 251,000 summer chum salmon for Districts 1 and 2. A total of 30,189 summer chum salmon were harvested during fishing periods restricted to 8 inch or greater mesh size and 9,643 summer chum salmon were harvested during the two unrestricted mesh size fishing periods in Districts 1 and 2 combined. The average weight of chum salmon harvested during 8 inch or greater mesh size fishing periods, unrestricted mesh size periods, and 6 inch maximum mesh size fishing periods was 6.7 pounds, 6.5 and 6.2 pounds, respectively.

District 3

In District 3, two 12-hour fishing periods with gillnets restricted to 8 inch or greater mesh size 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 1,114 chinook salmon were harvested, which was 38% below the lower end of the guideline harvest range and 42% below the recent five-year average (Table 4). A total of 35 summer chum salmon were sold, which was well below the recent five-year average of 3,532 fish (Table 5). Because of the relatively poor quality of chum salmon in this district, chum salmon caught during commercial fishing are generally used for subsistence purposes. Seven permit holders sold fish in District 3, which was similar to last years effort.

District 4

All chinook salmon sales in District 4 occurred in Subdistricts 4-B and 4-C. The commercial fishing season opened on June 22 in these subdistricts. The first four fishing periods in Subdistricts 4-B and 4-C were primarily directed toward chinook salmon. District 4 fishermen sold 2,204 chinook salmon and 124 pounds of chinook salmon roe, for an estimated 2,250 fish commercial harvest (Table 3). This harvest was 12% below the midpoint of the District 4 guideline harvest range.

The last two fishing periods in Subdistricts 4-B and 4-C were directed at summer chum salmon. A total of 3,471 summer chum salmon and 7,780 pounds of roe were sold. The estimated harvest of 16,523 summer chum salmon was just above the low end of the guideline harvest range of 16,000-47,000 fish.

Four summer chum salmon directed fishing periods were allowed in Subdistrict 4-A; three 24-hour and one 18-hour. These fishing periods were delayed until early-July when it was determined that enough summer chum salmon were available for commercial harvest. Subdistrict 4-A fishermen sold 65,496 pounds of summer chum salmon roe. No fish were purchased in the round in Subdistrict 4-A. The department estimated postseason that 136,345 male and female summer chum salmon were harvested to produce the roe sold in Subdistrict 4-A. The total estimated harvest was just above the lower end of the guideline harvest range.

Anvik River Management Area

In March 1994, the Alaska Board of Fisheries adopted the Anvik River Chum Salmon Fishery Management Plan, which established regulations allowing for a commercial summer chum salmon fishery within the Anvik River. During June, an experimental test fishing project was conducted in cooperation with Bering Sea Fishermen's Association to collect information on gear types, potential area to be opened for commercial fishing, and incidental harvest of other species. Because of the projected poor summer chum salmon run, the department did not anticipate allowing a commercial fishery in the Anvik River in 1994. Accordingly, buyers and commercial fishermen were not prepared for a commercial fishery.

However, it was projected in early July that the Anvik River summer chum salmon escapement would be close to one million fish, well above the escapement goal of 500,000 fish. To provide

for an orderly commercial fishery, emergency regulations were adopted on short notice, based upon input from local fishermen and fishery managers. The emergency regulations allowed the sale of summer chum salmon roe, included the option of permit holders using a single gillnet not to exceed 25 fathoms in length and not larger than 5 1/4 inch mesh, and a catch limit of no more than 400 chum salmon or 400 pounds of chum salmon roe for each CFEC permit holder during each commercial fishing period. Local fishermen suggested a catch limit as a method of controlling the harvest to prevent wastage. As processors did not have any equipment or facilities to process fish in-the-round, the department allowed the sale of summer chum salmon roe in 1994.

Test fishing conducted prior to the commercial fishery indicated that beach seines were an efficient gear type, which would allow male chum salmon and other species (grayling and chinook salmon) to be released. A majority of fishermen that participated in the fishery purchased beach seines on short notice. The lower 12 miles of the Anvik River were open to commercial fishing for a total of six fishing periods. A total of 19,532 pounds of roe were sold from an estimated harvest of 22,434 female summer chum salmon. Incidental catches of chinook salmon appeared to be minimal. Overall, this fishery proved to be successful through the cooperative effort of fishermen and the department.

District 5

In District 5, chinook salmon is the primary species of commercial value during the early season. 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 market.

The commercial fishing season was opened in Subdistricts 5-A, 5-B, and 5-C on July 6 when it was estimated that the chinook salmon run was well distributed throughout the subdistricts. There was one 24-hour and one 12-hour period. The total estimated harvest was 3,289 chinook salmon for Subdistricts 5-A, 5-B, and 5-C. This harvest was above the upper end of the guideline harvest range of 2,600 to 2,800 fish. A total of 96 summer chum salmon and 88 pounds of roe were sold.

There were two fishing periods allowed in Subdistrict 5-D on July 12 and July 18. A total of 450 chinook salmon were sold in Subdistrict 5-D.

District 6

District 6 had one 42-hour period directed toward the harvest of chinook salmon, which began on July 11. The next commercial fishing period was delayed until July 22 when preliminary escapement information indicated that chinook salmon spawning escapement objectives in the Chena and Salcha River would be achieved and summer chum salmon run abundance indicated there was a surplus available for commercial harvest. Commercial fishing was allowed during one 42-hour period per week from July 22 through August 10 in order to balance the harvest of

summer chum salmon with achieving adequate spawning escapements. 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 2,135 chinook salmon and 1,398 pounds of chinook salmon roe, for an estimated harvest of 2,498 fish. A total of 21,028 summer chum salmon and 7,828 pounds of roe were sold, for an estimated total commercial harvest of 31,254 summer chum salmon, which was within the guideline harvest range of 13,000 to 38,000 summer chum salmon.

Fall Chum Salmon

The 1994 preseason projection for the Yukon River drainage fall chum salmon run was 605,000 fish. The Yukon River Drainage Fall Chum Salmon Management Plan was adopted in March of 1994 by the Board of Fisheries. The plan identified the need for 400,000 fall chum salmon for spawning escapement and approximately 200,000 fall chum salmon to provide for Alaskan subsistence and Canadian harvests. A total of 600,000 fall chum salmon were needed to allow for normal subsistence activities. The preseason projection suggested that the run would be sufficient to allow for escapement and rebuilding needs throughout the drainage and still provide for a normal subsistence salmon harvest levels. A commercial harvest in the Alaskan portion of the Yukon River drainage was not anticipated in 1994.

The department primarily used the preseason projection during the early portion of the fall chum salmon return. On average 25 percent of the run passes by Pilot Station sonar by August 1. From August 1 until August 20, Pilot Station sonar inseason fall chum salmon projections were used in management decisions. Based on the guidelines laid out in the Yukon River Drainage Fall Chum Salmon Management Plan, when the sonar inseason projection fell below the 600,000 fall chum salmon, the department implemented sport and personal use fisheries closures and subsistence salmon fishing restrictions.

Based primarily on the Pilot Station sonar run assessment, the directed fall chum salmon subsistence fishing schedule in Districts 1, 2, 3, and Subdistrict 4-A, and the Coastal District was reduced to five days a week on August 6, not including the tributaries below the Koyukuk River. Sport fishing for Yukon River chum salmon below the Koyukuk River was also closed on August 6. Directed fall chum salmon subsistence fishing schedule was then reduced to 48-hours per week in Districts 1 through 4, and Subdistricts 5-B and 5-C, on August 13; except for the Yukon River tributaries below the Koyukuk River. Sport fishing for chum salmon was also closed for the remaining portion of the Yukon River drainage and included the Tanana River drainage on August 13 . Directed fall chum salmon subsistence fishery was further restricted on August 18, Districts 1 through 4 were closed and Districts 5 and 6 were reduced to 24-hours per week; Districts 4, 5, and 6 were allowed to fish with liveboxes or livechutes for an additional 24-hours per week. The District 6 personal use fishery was also closed on August 18.

The Pilot Station sonar assessment of the fall chum salmon run was significantly different from subsistence fishermen catch rate reports in 1994. A diagnostic trip was made to Pilot Station

sonar by regional and Sonar Technical Services personnel, on August 21 through August 25, to revaluate the sonar's operation before further management actions were to be taken. During this evaluation, a less than optimum aiming was discovered. It was determined that for that day, the new aim was counting 2.3 times more fish than the old aim.

Comparing the relationship between the sonar passage estimate and the test fish catch rates suggested that the sonar may have under-counted the run size since August 9 by as much as 70,000 fall chum salmon. From August 21 until September 4, the department used this adjusted sonar count in the management of the fisheries. The adjusted sonar count indicated that continued subsistence restriction was still needed in order to meet escapement objectives. However, with the adjusted sonar passage projection, the department relaxed the restrictions in District 4 by reopening it for one 24-hour period per week on August 29.

By early September, as preliminary spawning escapement information became available, it became obvious that the sonar under-counted the run by significantly more than 70,000 fish. On September 4, normal subsistence salmon fishing schedules were allowed, as well as reopening the personal use fishery. Sport fishing for salmon was reopened on September 6. Some subsistence fishermen expressed concerns over not being able to meet their subsistence salmon needs due to the earlier restrictions, most reports were from the Old Minto Area and the Fort Yukon Area. In response to these reports, the normal subsistence schedule of five days a week on the Old Minto Area was increased to seven days a week, on September 16. As additional information from the spawning grounds, and estimates of Canadian border passage became available, it became evident that there was a commercially harvestable surplus of fall chum salmon available from the 1994 run. Because of the concerns in the Old Minto Area and in the Fort Yukon Area, the limited commercial fisheries were only allowed upstream of those areas.

The department permitted commercial fishing above Fort Yukon in the upper portion of Subdistrict 5-D. Three 48-hour commercial fishing periods were allowed beginning on September 19, September 22, and September 26. A total of 3,630 fall chum salmon were sold, this approached the upper end of the Subdistrict 5-D Guideline Harvest Range of 1,000 to 4,000. In the Tanana River, escapement information is not available until post-season foot surveys on the spawning grounds are completed in late October to mid-November. A limited commercial fishery was allowed above the Old Minto Area in Subdistricts 6-B, and Subdistrict 6-C, based on the overall run strength of the Yukon River drainage. During the one 24-hour commercial fishing period beginning on September 19, a total of one fall chum salmon and 3,276 pounds of fall chum salmon roe were sold. It was estimated that a total of 4,369 female fall chum salmon were commercially harvested to produce the roe sold. The estimated harvest of fall chum salmon to produce the roe sold totaled 8,500 males and females. This level of harvest exceeded the low end of the District 6 Guideline Harvest Range of 2,750 to 20,500 fall chum salmon. Without specific escapement information from the spawning grounds in the upper Tanana River, the department was very conservative in the management of the District 6 commercial fishery and no more commercial periods were announced.

The department's test fishing project in the lower river was discontinued earlier than normal on August 18. This action was taken to further reduce fall chum harvests given the poor inseason projection from Pilot Station sonar and to maintain consistency with subsistence closures. On that date, the cumulative test fishing CPUE for fall chum salmon was 30.40 through August 18, which was above the mean cumulative CPUE for the years 1980 to 1993 of 19.80. Wind direction, bank orientation of migrating salmon, water levels, and fish size may effect test net catches. Historical lower river test fishery indices are also affected by commercial removal below the test net sites which makes comparisons between years more difficult.

It is difficult to compare the age composition data since the test nets were pulled prior to the normal termination dates, therefore the later component of the run was not sampled for age composition. Preliminary age composition data from fall chum salmon test fish catch samples through August 18 indicated that approximately 59% of the run was composed of age-4 fish, and 40% of the run was composed of age-5 fish.

Coho Salmon

Coho and fall chum salmon run timing overlaps considerably. Because of this overlap and the overriding importance of fall chum salmon, the harvest of coho salmon is a function of management strategies directed towards fall chum salmon. Given the department's concern for conserving fall chum salmon and lack of information necessary to manage coho salmon separately, no commercial harvest of coho salmon was anticipated for the 1994 season.

A limited commercial fishery for fall chum salmon did occur once the fisheries were re-opened to normal subsistence schedules and a commercially harvestable surplus was identified by preliminary data from various escapement projects. A limited commercial salmon fishery was opened in the upper portion of Subdistrict 6-B, above the Old Minto Area, and in Subdistrict 6-C. During one 24-hour commercial fishing period beginning on September 19, the incidental catch of coho salmon totaled 120 coho salmon and 5,588 pounds of coho salmon roe were sold. It was estimated that a total of 4,452 female coho salmon were commercially harvested to produce the roe sold. The estimated harvest of male and female coho salmon to produce the roe sold totaled 13,250 fish.

Coho salmon test fishing data indicated the run was above average in magnitude. Run timing of coho salmon appeared to be near average. The lower river test fishing project was discontinued on August 18, which was earlier than normal. The cumulative test fishing CPUE of 24.75 was the highest on record through August 18. The average season cumulative CPUE on August 18 from 1980 through 1993 is 7.46. 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 191,115 coho salmon through September 8 (Table 11). This number is considered a minimum passage estimate for coho salmon.

Regulatory Proposals

There are twenty-one proposals before the Board of Fisheries which include two for the Cape Romanzof commercial herring fishery, seven proposals concerning the Yukon River subsistence fishery, and twelve proposals concerning the Yukon River commercial salmon fishery. Some of the major issues to be considered by the Board of Fisheries include, the Anvik River chum salmon fishery management plan, the Yukon River fall chum salmon management plan, the Toklat River fall chum salmon rebuilding management plan, and establishing a Yukon River coho salmon management plan.

Canadian Fisheries, 1994

Management plans for the Canadian chinook and chum salmon fisheries on the Yukon River in 1994 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 1994 commercial fishing season, the commercial guideline harvest for chinook salmon was set at 9,100 to 12,100 fish with a preseason target of 10,600 fish. The preliminary commercial harvest was 11,966 chinook salmon (Table 9). Aboriginal Fishery, Domestic, and Sport fisheries harvests were estimated to total 7,724 chinook salmon. The preliminary mainstem Yukon River border passage estimate for chinook salmon was 50,674 fish.

Fall Chum Salmon

The 1994 commercial Canadian guideline harvest range for fall chum salmon was 21,300 to 30,300 chum salmon. Preliminary Canadian commercial harvest was 30,035 chum salmon (Table 10). Aboriginal Fishery, Domestic, and Sport fisheries harvests in 1994 were estimated to be 2,880 fall chum salmon for a estimated total harvest of 32,915 fall chum salmon. The preliminary border passage estimate for fall chum salmon was 135,372 fish with a border spawning escapement estimate of 114,270 fall chum salmon.

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 and 1994,

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 and 1994 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 (1989-1993) average commercial harvest was 104,700 fish compared to the previous 5-year (1984-1988) average of 120,400 chinook salmon (Table 5). The recent 5-year average chinook salmon subsistence harvest in Alaska was 50,800 chinook salmon (Table 12). Total Canadian harvests have averaged 18,700 chinook salmon annually (1989-1993) (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 51% 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 13).

Interim, minimum chinook salmon escapement goals have been established by ADF&G for eight Alaskan streams or index areas (Table 14). 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 escapement goals in lower river tributaries were believed to have been achieved throughout the drainage in 1994 (Table 14). Aerial surveys of the East Fork and West Fork of the Andreafsky River were not possible due to poor weather conditions. Escapement goals are 1,500 and 1,400 for the East and West Forks, respectively. However, a total of 7,801 chinook salmon were passed through a USFWS weir operated on the East Fork Andreafsky River, which suggested the escapement goal was met. An aerial survey conducted on the Anvik River on July 23 under poor conditions documented 913 chinook salmon within the index area. The escapement goal is 500 chinook salmon for the Anvik River index area.

Inseason assessment of chinook salmon escapement to the Tanana River drainage in 1993 and 1994 were improved compared to prior years through the operation of counting towers on the

Chena and Salcha Rivers by Sport Fish Division. The 1994 escapement estimates were 12,006 chinook salmon for the Chena River and 18,376 chinook salmon 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 1994 tagging estimate of total spawning escapement for the Canadian portion of the Yukon River drainage (excluding the Porcupine drainage) was 32,000 chinook salmon. This estimate is well above the stabilization objective of 18,000 or more fish, but falls just short of the interim spawning escapement objective range of 33,000-43,000 chinook salmon.

Summer Chum Salmon

The recent 5-year average (1989-1993) estimated commercial harvest was 659,800 summer chum salmon, which was a 37% decrease from the previous 5-year average of 1,046,300 salmon (Table 6). Approximately 214,200 summer chum salmon are taken annually (1989-1993 average) for subsistence use throughout the drainage (Table 12). Summer chum salmon used for subsistence includes the reported use of carcasses related to commercial roe fisheries.

Summer chum salmon primarily spawn in tributaries from the mouth of the Yukon River to the Tanana River drainage. Escapements in the Anvik River, the largest single producer of summer chum salmon, were above the escapement goal in 1991-1993 (Table 15). However, spawning escapements to other Yukon River tributaries, based on limited aerial survey information, generally appear to have been below desired levels from 1990 through 1993.

Escapement objectives appear to have been met throughout the entire drainage in 1994. The Anvik River escapement of 1,129,000 fish was more than double the minimum escapement goal of 500,000 fish (Table 15). Overall, the 1994 Anvik River sonar estimate accounted for 57% of the total passage estimate for summer chum salmon at Pilot Station.

USFWS weir projects were operated on the East Fork Andreafsky and Gisasa Rivers. Although high water delayed start up of these projects the results indicated that escapement goals were achieved. A total of 201,000 and 55,000 summer chum salmon were counted at East Fork Andreafsky and Gisasa Rivers, respectively.

Tower counting projects were operated on the Kaltag, Nulato, Chena and Salcha Rivers. The Kaltag River tower project was primarily organized and funded by Alaska Cooperative Extension 4-H Program and partially funded by Bering Sea Fishermen's Association (BSFA). The escapement of 48,000 summer chum salmon into the Kaltag River was the highest count on record for this tributary. The Nulato River tower project was cooperatively funded by ADF&G, BSFA, and Tanana Chiefs Conference (TCC). Although high water and turbid conditions

hampered operations at Nulato and Chena Rivers, counts of 144,000 and 10,000 fish, respectively, indicated adequate escapements were achieved. The Salcha River escapement estimate of 39,000 summer chum salmon was over double the 1993 estimated escapement. The Chena and Salcha projects were funded by the department with the seasonal operation supervised by Sport Fish Division.

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 (1989-1993) average estimated commercial harvest of 138,728 fish is a reduction of approximately 8% compared to the previous 5-year (1984-1988) average of 151,610 fall chum salmon (Table 6). The recent 5-year average fall chum salmon subsistence harvest in Alaska was 144,002 fish, which was a 24% decrease compared to the previous 5-year average of 189,219 fall chum salmon (excluding 115,829 fish involved in illegal sales in 1987)(Table 12). Approximately 90% of the annual reported subsistence fall chum salmon harvest has occurred in the Upper Yukon Area (Table 2). Total Canadian fall chum salmon harvests have slightly decreased by approximately 24% from an average of 30,741 fish annually (1984-1988) to 23,252 fish annually (1989-1993)(Table 10).

Major fall chum salmon spawning areas are located in the Chandalar, 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 16). 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 salmon 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 are primarily bound for the Porcupine River drainage and Canadian portion of the Yukon River drainage. 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 16). 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 salmon commercial harvests is believed to be necessary.

Overall, fall chum salmon escapements were well above average in 1994, with escapement objectives being achieved in all areas. Escapements to the Porcupine River drainage was evaluated by observations made in the Sheenjek and Fishing Branch Rivers. The 1994 preliminary sonar estimate of approximately 153,000 fall chum salmon for the Sheenjek River was 239 percent above the minimum escapement objective of 64,000 fish (Table 16). The preliminary weir passage estimate of 67,000 fall chum salmon to the Fishing Branch River was 134 percent above the minimum escapement objective of 50,000 fish.

The Tanana River fall chum salmon escapement in 1994 was evaluated by post season foot surveys made in the Toklat River (inseason using a research and development sonar project) and Delta River index areas. Total estimated escapement to the Toklat River in 1994 was approximately 73,867 fall chum salmon. This is approximately 224 percent above the minimum escapement goal of 33,000 fish. The Delta River fall chum salmon escapement was estimated to be 23,300, based upon a foot survey count of 16,131 fall chum salmon observed on October 25, 1994. This is approximately 212 percent above the minimum escapement objective of 11,000 fish. Although no escapement objectives exist for other fall chum salmon spawning areas in the upper Tanana River, escapement counts during peak spawning will be done in the following areas, Bluff Cabin and Clearwater Lake Outlet Sloughs (Big Delta region).

The preliminary fall chum salmon spawning population estimate made by the Department of Fisheries and Oceans (DFO) for the Canadian portion of the mainstem Yukon River in 1994 was approximately 114,270 fish. This escapement estimate was approximately 187 percent above the targeted rebuilding spawning escapement level of 61,000 fall chum salmon for 1994.

Although a limited fall commercial fishery was allowed in the Alaskan and Canadian portion of the drainage in 1994, spawning escapements reached the minimum escapement objectives due to reduced exploitation rates and the run returning above the preseason projection. It appears that the production from the 1989 brood year (age-4 fish in 1993 and age-5 fish in 1994) was below expectations while the production from the 1990 brood year (age-4 fish in 1994) returned near normal.

Coho Salmon

Commercial coho salmon catches in the Alaskan portion of the Yukon River drainage have shown a slight decreasing trend. The recent 5-year (1989-1993) average commercial harvest of 48,706 fish was a decrease of approximately 11% over the previous 5-year (1984-1988) average of 54,696 coho salmon (Table 7). Similarly, the recent 5-year average coho salmon subsistence harvest in Alaska of 39,259 fish was a 16% decrease over the previous 5-year average of 46,928 coho salmon (excluding 36,291 fish involved in illegal sales in 1987) (Table 12).

The sonar project at Pilot Station estimated a minimum total passage of 191,115 coho salmon through September 8, 1994, indicating an average run (Table 11). However, coho salmon passage estimates at Pilot Station are considered a minimum count and do not provide a complete

run assessments due to termination of the project each year prior to conclusion of the coho salmon 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 17). Currently, the only escapement goal established for coho salmon is for the Delta Clearwater River, which has a minimum escapement goal of 9,000 fish. The 1994 Division of Sport Fish boat survey count of coho salmon escapement in the Delta Clearwater River index area was 62,925 fish. That is the highest coho salmon escapement estimate on record for this index area and is approximately 542 percent above the most recent 5-year average of 11,613 fish. It also appears that coho salmon spawning escapements in other portions of the Tanana River drainage were above average.

OUTLOOK FOR 1995

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 and 1989, the primary brood years producing 6- and 7-year-old fish returning in 1995, were judged to be average in magnitude. Additionally, the 6-year-old return is expected to be strong based upon the large contribution of age-5 fish in the 1994 run. Although the return of 4-year-old fish in 1994 was no better than average, spawning escapements were above average in 1990. Overall, the 1995 chinook salmon run is anticipated to be average to above average in strength. The commercial harvest in Alaska is expected to total 88,000-108,000 chinook salmon (82,000-100,000 fish in the Lower Yukon Area and 6,000-8,000 fish in the Upper Yukon Area).

Summer Chum Salmon

The return of 5-year-old fish in 1995 is expected to be below average based on the relatively poor escapements observed in 1990 and the below average return of 4-year-old fish in 1994. A below average to average return of age-4 summer chum salmon is expected. Summer chum salmon spawning escapement to the Anvik River in 1991 was 848,000, 70% above the escapement goal of 500,000. However, escapements to other spawning areas in 1991 were below average based upon aerial surveys. Overall, the 1995 outlook is for a below average to average summer chum salmon run. The commercial harvest is expected to be 300,000-600,000 fish.

Fall Chum Salmon

The estimated annual age composition of returning Yukon River fall chum salmon is 70 percent age 4 fish, followed by 25 percent age-5 fish. Fall chum salmon escapement in 1991, the brood year for returning age-4 fish in 1995, varied throughout the drainage. In that year both the Sheenjek and Delta Rivers minimum escapement goals were exceeded. The Toklat and Fishing Branch Rivers were below desired levels in 1991. A formal projection of the 1995 fall chum salmon run is not available at this time, however, based on parent year escapement a limited fall chum salmon commercial fishery is anticipated in 1995. A commercial harvest towards the low end of the 72,750 to 320,000 fall chum salmon guideline harvest range is expected.

Coho Salmon

Comprehensive coho salmon escapement information is lacking on the Yukon River. It is known that coho salmon return primarily as age-4 fish. Assuming average survival rates, limited coho salmon escapement surveys in 1991 suggest an above average return of coho salmon in 1995. Coho salmon have a later but overlapping run timing with that of fall chum salmon. There are no guideline harvest ranges established for coho salmon. Currently, coho salmon are considered incidental harvest to the directed commercial fall chum salmon fishery. With a fall chum salmon commercial harvest towards the low end of the Guideline Harvest Range, an incidental harvest of less then 60,000 coho salmon would be anticipated.

TABLES, FIGURES

AND APPENDIX

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 [a]	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

[a] 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 estimates of commercial salmon sales and estimated harvests in the Alaska portion of the Yukon River drainage, 1994. [a,b]

District Subdist.	No. of Fishermen [c]	Chinook [e] Numbers	Roe	Estimated	Summer Chum [e] Numbers	Roe	Estimated	Fall Chum [e] Numbers	Roe	Estimated	Coho [e] Numbers	Roe	Estimated
1	414	62,241	-	62,241	42,332	-	42,332	0	-	0	0	-	0
2	250	41,692	-	41,692	12,869	-	12,869	0	-	0	0	-	0
Subtotal	657	103,933	-	103,933	55,201	-	55,201	0	-	0	0	-	0
3	7	1,114	-	1,114	35	-	35	0	-	0	0	-	0
Total Lower Yukon	659	105,047	-	105,047	55,236	-	55,236	0	-	0	0	-	0
Anvik River		0	0	0	0	19,532	22,434						
4-A		0	0	0	0	65,496	136,345 [d]	0	0	0	0	0	0
4-B,C		2,204	124	2,250	3,471	7,780	16,523 [d]	0	0	0	0	0	0
Subtotal District 4		*2,204*	*124*	*2,250*	*3,471*	*92,808*	*175,302*	*0*	*0*	*0*	*0*	*0*	*0*
5-A,B,C		3,289	0	3,289	96	88	194	0	0	0	0	0	0
5-D		450	0	450	0	0	0	3,630	0	3,630	0	0	0
Subtotal District 5		*3,739*	*0*	*3,739*	*96*	*88*	*194*	*3,630*	*0*	*3,630*	*0*	*0*	*0*
District 6		2,135	1,821	2,607	21,028	7,828	31,254	1	3,276	4,369	120	5,588	4,452
Total Upper Yukon		8,078	1,945	8,596	24,595	100,724	206,750	3,631	3,276	7,999	120	5,588	4,452
Total Yukon Area		113,125	1,945	113,643	79,831	100,724	261,986	3,631	3,276	7,999	120	5,588	4,452

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.

e Districts 4, 5 and 6 are based on verbal processor reports

Table 4. Commercial chinook salmon sales and harvest by district, Yukon River drainage in Alaska, 1961-1994. a

					Upper Yukon Area										
					Dist. 4			Dist. 5			Dist. 6				
	Lower Yukon Area b						Estimated			Estimated			Estimated	Subtotal Estimated	Alaska
Year	Dist. 1	Dist. 2	Dist. 3	Subtotal	Numbers	Roe	Harvest c	Numbers	Roe	Harvest c	Numbers	Roe	Harvest c	Harvest	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
1994	62,241	41,692	1,114	105,047	2,204	124	2,250	3,739	0	3,739	2,135	1,821	2,607	8,596	113,643
5 Yr Avg 1984-88	70,294	41,911	2,067	114,272	1,362	-	1,362	3,403	-	3,403	1,412	-	1,412	6,177	120,449
5 Yr Avg 1989-93	58,891	36,226	1,930	97,047	2,354	-	2,776	3,462	-	3,468	1,174	-	1,433	7,677	104,725

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 5. Commercial summer chum salmon sales and havest by district, Yukon River drainage in Alaska, 1967-1994. 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
1994	42,332	12,869	35	55,236	3,471	92,808	175,302	96	88	194	21,028	7,828	31,254	206,750	261,986
5 Yr Avg 1984-88	358,477	262,701	4,157	625,335	13,472	211,894	374,192	624	91	715	44,877	1,223	46,100	421,007	1,046,343
5 Yr Avg 1989-93	217,630	163,616	3,532	384,778	7,997	131,903	255,356	54	258	333	16,148	3,011	19,320	275,009	659,787

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 6. Commercial fall chum salmon sales by district, Yukon River drainage in Alaska, 1961-1994. a

	Lower Yukon Area b				Upper Yukon Area												
					District 4			District 5			District 6			Subtotal			
Year	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	Numbers	Roe c	Estimated Harvest d	Alaska Total Harvest
1961	42,461	-	-	42,461	-	-	-	-	-	-	-	-	-	0	0	0	42,461
1962	53,116	-	-	53,116	-	-	-	-	-	-	-	-	-	0	0	0	53,116
1963	-	-	-	0	-	-	-	-	-	-	-	-	-	0	0	0	0
1964	8,347	-	-	8,347	-	-	-	-	-	-	-	-	-	0	0	0	8,347
1965	22,936	-	-	22,936	-	-	-	-	-	-	-	-	-	0	0	381	23,317
1966	69,836	-	1,209	71,045	-	-	-	-	-	-	-	-	-	0	0	0	71,045
1967	36,451	-	1,823	38,274	-	-	-	-	-	-	-	-	-	0	0	0	38,274
1968	49,857	-	3,068	52,925	-	-	-	-	-	-	-	-	-	0	0	0	52,925
1969	128,866	-	1,722	130,588	-	-	-	-	-	-	-	-	-	0	0	722	131,310
1970	200,306	4,858	3,285	208,449	-	-	-	-	-	-	-	-	-	0	0	1,146	209,595
1971	188,533	-	-	188,533	-	-	-	-	-	-	-	-	-	0	0	1,061	189,594
1972	136,711	12,898	1,313	150,922	-	-	-	-	-	-	-	-	-	0	0	1,254	152,176
1973	173,783	45,304	-	219,087	-	-	-	-	-	-	-	-	-	0	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	59,648	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	59,570	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	25,077	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	58,383	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	45,263	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	130,543	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	89,201	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	124,691	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	24,307	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	82,564	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	52,249	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	92,142	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	25,990	577	26,567	140,019
1987	0	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	54,495	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	79,081	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	43,182 e	7,535	50,090	55,949	10,944	67,232	135,457
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	59,287	19,395	82,653	254,218
1992	0	0	0	0	0	0	0	0	0	0	15,721	2,806	19,022	15,721	2,806	19,022	19,022
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994 f	0	0	0	0	0	0	0	3,630	0	3,630	1	3,276	4,369	3,631	3,276	7,999	7,999
5 Yr Avg 1984-88	62,716	38,892	3,295	104,903	9,957	1,232	11,189	17,688	90	17,778	17,330	409	17,739	44,975	1,731	46,707	151,610
5 Yr Avg 1989-93	32,987	47,541	5,652	86,181	4,100	1,475	5,888	10,670	1,734	12,659	27,238	6,370	34,001	42,008	9,579	52,547	138,728

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 Does not includes 884 female fall chum salmon sold with roe extracted and sold separately.
f Preliminary.

Table 7. Commercial coho salmon sales and harvest by district, Yukon River drainage in Alaska, 1961-1994. 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	Estimated Harvest c	Numbers	Roe	Estimated Harvest c	Numbers	Roe	Estimated Harvest c	Numbers	Roe	Estimated Harvest c	
1961	2,855	-	-	2,855	-	-	-	-	-	-	-	-	-	0	-	0	2,855
1962	22,926	-	-	22,926	-	-	-	-	-	-	-	-	-	0	-	0	22,926
1963	5,572	-	-	5,572	-	-	-	-	-	-	-	-	-	0	-	0	5,572
1964	2,446	-	-	2,446	-	-	-	-	-	-	-	-	-	0	-	0	2,446
1965	350	-	-	350	-	-	-	-	-	-	-	-	-	0	-	0	350
1966	19,254	-	-	19,254	-	-	-	-	-	-	-	-	-	0	-	0	19,254
1967	9,925	0	1,122	11,047	-	-	-	-	-	-	-	-	-	0	-	0	11,047
1968	13,153	0	150	13,303	-	-	-	-	-	-	-	-	-	0	-	0	13,303
1969	13,989	0	1,009	14,998	-	-	-	-	-	-	-	-	-	0	-	0	14,998
1970	12,632	0	0	12,632	-	-	-	-	-	-	-	-	-	0	-	0	12,632
1971	12,165	0	0	12,165	-	-	-	-	-	-	-	-	-	0	-	0	12,165
1972	21,705	506	0	22,211	-	-	-	-	-	-	-	-	-	0	-	0	22,211
1973	34,860	1,781	0	36,641	-	-	-	-	-	-	-	-	-	0	-	0	36,641
1974	13,713	176	0	13,889	0	-	0	1,409	-	1,409	1,479	-	1,479	2,888	-	2,888	16,777
1975	2,288	200	0	2,488	0	-	0	5	-	5	53	-	53	58	-	58	2,546
1976	4,064	17	0	4,081	0	-	0	0	-	0	1,103	-	1,103	1,103	-	1,103	5,184
1977	31,720	5,319	538	37,577	0	-	0	2	-	2	1,284	-	1,284	1,286	-	1,286	38,863
1978	16,460	5,835	758	23,053	32	-	32	1	-	1	3,066	-	3,066	3,099	-	3,099	26,152
1979	11,369	2,850	0	14,219	155	-	155	0	-	0	2,791	-	2,791	2,946	-	2,946	17,165
1980	4,829	2,660	0	7,489	30	-	30	0	-	0	1,226	-	1,226	1,256	-	1,256	8,745
1981	13,129	7,848	419	21,396	0	-	0	0	-	0	2,284	-	2,284	2,284	-	2,284	23,680
1982	15,115	14,179	87	29,381	15	-	15	0	-	0	7,780	-	7,780	7,795	-	7,795	37,176
1983	4,595	2,557	0	7,152	0	-	0	0	-	0	6,168	-	6,168	6,168	-	6,168	13,320
1984	29,472	43,064	621	73,157	1,095	-	1,095	0	-	0	7,688	-	7,688	8,783	-	8,783	81,940
1985	27,676	17,125	171	44,972	938	-	938	0	-	0	11,762	-	11,762	12,700	-	12,700	57,672
1986	24,824	21,197	793	46,814	0	-	0	0	-	0	441	-	441	441	-	441	47,255
1987	0	0	0	0	0	-	0	0	-	0	0	-	0	0	-	0	0
1988	36,435	34,776	1,419	72,630	2	-	2	8	-	8	13,972	-	13,972	13,982	-	13,982	86,612
1989	24,672	38,522	3,988	67,182	3	-	3	84	-	84	16,084	-	16,084	16,171	-	16,171	83,353
1990	13,354	16,435	918	30,707	0	0	0	0	0	0	11,549 d	4,042	14,804	11,549	4,042	14,804	45,511
1991	54,095	40,898	1,905	96,898	14	0	14	0	0	0	6,268	4,299	9,774	6,282	4,299	9,788	106,686
1992	0	0	0	0	0	0	0	0	0	0	6,556	1,680	7,979	6,556	1,680	7,979	7,979
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994 e	0	0	0	0	0	0	0	0	0	0	120	5,588	4,452	120	5,588	4,452	4,452
5 Yr Avg 1984-88	23,681	23,232	601	47,515	407	-	407	2	-	2	6,773	-	6,773	7,181	-	7,181	54,696
5 Yr Avg 1989-93	18,424	19,171	1,362	38,957	3	-	3	17	-	17	8,091	-	9,728	8,112	-	9,748	48,706

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 separately.
e Preliminary.

Table 8. Value of commercial salmon fishery to Yukon Area fishermen, 1977-1994.

	Chinook				Summer Chum					Fall Chum				Coho				
	Lower Yukon		Upper Yukon		Lower Yukon		Upper Yukon			Lower Yukon		Upper Yukon		Lower Yukon		Upper Yukon		Total
Year	$/lb	Value	$/lb	Value	$/lb	Value	$/lb	$/Roe	Value	$/lb	Value	$/lb	Value	$/lb	Value	$/lb	Value	Value
1977	0.85	1,841,033	1.37	148,766	0.40	1,007,280	0.27	2.66	306,481	0.45	718,571	0.22	102,170	0.50	140,914	0.27	2,251	4,267,466
1978	0.90	2,048,674	0.87	66,472	0.45	2,071,434	0.24	N/A	655,738	0.47	691,854	0.25	103,091	0.60	96,823	0.24	6,105	5,740,191
1979	1.09	2,763,433	1.00	124,230	0.52	2,242,564	0.25	3.00	444,924	0.68	1,158,485	0.29	347,814	0.80	83,466	0.25	6,599	7,171,515
1980	1.04	3,409,105	0.85	113,662	0.20	1,027,738	0.23	2.50	627,249	0.28	394,162	0.27	198,088	0.36	17,374	0.29	2,374	5,789,752
1981	1.20	4,420,669	1.00	206,380	0.40	2,741,178	0.20	3.00	699,876	0.55	1,503,744	0.35	356,805	0.60	87,385	0.35	4,568	10,020,605
1982	1.41	3,768,107	1.02	162,699	0.40	1,237,735	0.18	2.75	452,837	0.55	846,492	0.28	53,258	0.69	135,828	0.37	18,786	6,675,742
1983	1.40	4,093,562	1.08	105,584	0.34	1,734,270	0.16	1.66	281,883	0.34	591,011	0.19	128,950	0.35	17,497	0.31	11,472	6,964,229
1984	1.50	3,510,923	0.95	102,354	0.26	926,922	0.23	1.78	382,776	0.32	374,359	0.26	103,417	0.50	256,050	0.24	12,823	5,669,624
1985	1.50	4,294,432	0.86	82,644	0.35	1,032,700	0.23	1.94	593,801	0.47	634,616	0.25	178,125	0.53	176,254	0.33	26,797	7,019,369
1986	1.63	3,165,078	0.89	73,363	0.38	1,746,455	0.22	2.08	634,091	0.49	399,321	0.14	30,309	0.71	211,942	0.21	556	6,261,115
1987	1.98	5,428,933	0.79	136,196	0.48	1,313,618	0.19	2.22	323,611	-	0	-	0	-	0	-	0	7,202,358
1988	2.97	5,463,800	1.04	142,284	0.66	5,001,100	0.23	4.33	1,213,991	1.01	638,700	0.32	151,300	1.38	734,400	0.37	34,116	13,379,691
1989	2.77	5,181,700	0.84	108,178	0.34	2,217,700	0.24	4.41	1,377,117	0.50	713,400	0.28	223,996	0.66	323,300	0.35	33,959	10,179,350
1990	2.84	4,820,859	0.72	105,295	0.24	497,571	0.11	4.41	506,611	0.45	238,165	0.34	174,965	0.66	137,302	0.34	37,026	6,517,794
1991	3.70	7,128,300	0.70	97,140	0.36	782,300	0.18	4.21	627,177	0.34	438,310	0.23	157,831	0.44	300,182	0.30	21,556	9,552,796
1992	4.12	9,957,002	0.91	168,999	0.27	606,976	0.30	4.53	525,204	-	0	0.39	54,161	-	0	0.39	19,529	11,331,871
1993	2.70	4,884,044	1.06	113,217	0.37	226,772	0.35	8.53	203,762	-	0	-	0	-	0	-	0	5,427,794
1994	2.07	4,169,270	0.71	102,625	0.21	79,206	0.18	3.69	402,766	-	0	0.14	8,548	-	0	0.43	8,742	4,771,157
5 Yr Ave 1989-1993	3.23	6,394,381	0.85	118,566	0.32	866,264	0.24	5.22	647,974	0.26	277,975	0.25	122,191	0.35	152,157	0.28	22,414	8,601,921

Table 9. Canadian catch of Yukon River chinook salmon, 1961–1994.[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		9,300	12,746	500	13,246
1962	4,037		9,300		9,300	13,337	600	13,937
1963	2,283		7,750		7,750	10,033	44	10,077
1964	3,208		4,124		4,124	7,332	76	7,408
1965	2,265		3,021		3,021	5,286	94	5,380
1966	1,942		2,445		2,445	4,387	65	4,452
1967	2,187		2,920		2,920	5,107	43	5,150
1968	2,212		2,800		2,800	5,012	30	5,042
1969	1,640		957		957	2,597	27	2,624
1970	2,611		2,044		2,044	4,655	8	4,663
1971	3,178		3,260		3,260	6,438	9	6,447
1972	1,769		3,960		3,960	5,729		5,729
1973	2,199		2,319		2,319	4,518	4	4,522
1974	1,808	406	3,342		3,748	5,556	75	5,631
1975	3,000	400	2,500		2,900	5,900	100	6,000
1976	3,500	500	1,000		1,500	5,000	25	5,025
1977	4,720	531	2,247		2,778	7,498	29	7,527
1978	2,975	421	2,485		2,906	5,881		5,881
1979	6,175	1,200	3,000		4,200	10,375		10,375
1980	9,500	3,500	7,546	300	11,346	20,846	2,000	22,846
1981	8,593	237	8,879	300	9,416	18,009	100	18,109
1982	8,640	435	7,433	300	8,168	16,808	400	17,208
1983	13,027	400	5,025	300	5,725	18,752	200	18,952
1984	9,885	260	5,850	300	6,410	16,295	500	16,795
1985	12,573	478	5,800	300	6,578	19,151	150	19,301
1986	10,797	342	8,625	300	9,267	20,064	300	20,364
1987	10,864	330	6,069	300	6,699	17,563	51	17,614
1988	13,217	282	7,178	650	8,110	21,327	100	21,427
1989	9,789	400	6,930	300	7,630	17,419	525	17,944
1990	11,324	247	7,109	300	7,656	18,980	258	19,238
1991	10,906	227	9,011	300	9,538	20,444	163	20,607
1992	10,877	277	6,499	300	7,076	17,953	100	18,053
1993 [c]	10,350	243	5,576	300	6,119	16,469	142	16,611
1994	11,966	300	7,124	300	7,724	19,690	[d]	19,690
Average								
1961–83	4,127	803	4,246	300	4,647	8,774	221	8,967
1984–88	11,467	338	6,704	370	7,413	18,880	220	19,100
1989–93	10,649	279	7,025	300	7,604	18,253	238	18,491

[a] Catch in number of fish.
[b] Sport fish harvest unknown prior to 1980.
[c] Preliminary.
[d] Data are unavailable at this time.

Table 10. Canadian catch of Yukon River fall chum salmon 1961-1994.

Year	Mainstem Yukon River Harvest					Porcupine River Aboriginal Fishery Harvest	Total Canadian Harvest
	Commercial	Domestic	Aboriginal Fishery	Combined Non-Commercial	Total		
1961	3,276		3,800	3,800	7,076	2,000	9,076
1962	936		6,500	6,500	7,436	2,000	9,436
1963	2,196		5,500	5,500	7,696	20,000	27,696
1964	1,929		4,200	4,200	6,129	6,058	12,187
1965	2,071		2,183	2,183	4,254	7,535	11,789
1966	3,157		1,430	1,430	4,587	8,605	13,192
1967	3,343		1,850	1,850	5,193	11,768	16,961
1968	453		1,180	1,180	1,633	10,000	11,633
1969	2,279		2,120	2,120	4,399	3,377	7,776
1970	2,479		612	612	3,091	620	3,711
1971	1,761		150	150	1,911	15,000	16,911
1972	2,532		0	0	2,532	5,000	7,532
1973	2,806		1,129	1,129	3,935	6,200	10,135
1974	2,544	466	1,636	2,102	4,646	7,000	11,646
1975	2,500	4,600	2,500	7,100	9,600	11,000	20,600
1976	1,000	1,000	100	1,100	2,100	3,100	5,200
1977	3,990	1,499	1,430	2,929	6,919	5,560	12,479
1978	3,356	728	482	1,210	4,566	5,000	9,566
1979	9,084	2,000	11,000	13,000	22,084		22,084
1980	9,000	4,000	3,218	7,218	16,218	6,000	22,218
1981	15,260	1,611	2,410	4,021	19,281	3,000	22,281
1982	11,312	683	3,096	3,779	15,091	1,000	16,091
1983	25,990	300	1,200	1,500	27,490	2,000	29,490
1984	22,932	535	1,800	2,335	25,267	4,000	29,267
1985	35,746	279	1,740	2,019	37,765	3,500	41,265
1986	11,464	222	2,200	2,422	13,886	657	14,543
1987	40,591	132	3,622	3,754	44,345	135	44,480
1988	30,263	349	1,882	2,231	32,494	1,071	33,565
1989	17,549	100	2,462	2,562	20,111	2,909	23,020
1990	27,537	0	3,675	3,675	31,212	2,410	33,622
1991	31,404	0	2,438	2,438	33,842	1,576	35,418
1992	18,576	0	304	304	18,880	1,935	20,815
1993 [a]	7,762	0	4,660	4,660	12,422	1,668	14,090
1994 [a]	30,035	0	2,880	2,880	32,915	[b]	32,915
Average							
1961-83	4,924	1,689	2,510	3,244	8,168	6,447	14,334
1984-88	28,199	303	2,249	2,552	30,751	1,873	32,624
1989-93	20,566	20	2,708	2,728	23,293	2,100	25,393

[a] Preliminary.
[b] Data are unavailable at this time.

Table 11. Sonar estimates of salmon passage on the mainstem Yukon River at Pilot Station, 1986-1994.

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
1994 [b]	6/04-9/08	141,029	1,997,186	407,389	191,115	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 e Use	Reported	Estimated e Use		
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. Avg 1984-88	45,430	177,943	274,808	212,385	213,341	54,186	587,765
5 Yr. Avg 1989-93	50,784	127,560	214,182	144,002	153,989	39,259	494,670

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. Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961-1994.

Year	Tincup Creek	Tatchun River[a,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	25,347
1993		183	184	572	339	400	168 [r]	668	28,558
1994 [s]	101 [k]	477 [n]	726	1,876	421	506	400 [r]	1,577	30,984
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: October 31, 1994.
[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 Salmo 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. Area surveyed unknown.
[t] Interim escapement objective. Stabilization escapement objective for years 1990 - 1995 is 18,000 salmon.

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Table 14. Chinook salmon escapement counts for selected Alaskan spawning stocks in the Yukon River drainage, 1961-1994. [a]

	Andreafsky River			Anvik River		Nulato River			Gisasa River		Chena River			Salcha River		
	East Fork		West	Aerial		Aerial						Aerial			Aerial	
Year	Aerial	Tower or Weir Cnt	Fork Aerial	River[b]	Index Area[b]	North Fork[c]	South Fork	Mainstem Tower Counts	Aerial	Weir	Pop. Est. or Tower Counts	River	Index Area[d]	Pop. Est. or Tower Counts	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 [i]
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 [i]
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 [i]
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	1,530 [k]	3,158	1,118	918	1,452	1,522		1,346		9,065 [m]	2,031	1,935		3,368	3,031 [i]
1987	1,608	2,011 [k]	3,281	1,174	879	1,145	493		731		6,404 [m]	1,312	1,209	4,771 [m]	1,898	1,671
1988	1,020	1,339 [k]	1,448	1,805	1,449	1,061	714		797		3,346 [m]	1,966	1,760	4,562 [m]	2,761	2,553
1989	1,399		1,089	442 [g]	212 [g]						2,666 [m]	1,280	1,185	3,294 [m]	2,333	2,136
1990	2,503		1,545	2,347	1,595	568 [g]	430 [g,n]		884 [g]		5,603 [m]	1,436	1,402	10,728 [m]	3,744	3,429
1991	1,938		2,544	875 [g]	625 [g]	767	1,253		1,690		3,025 [m]	1,277 [g]	1,277 [g]	5,608 [m]	2,212 [g]	1,925 [g]
1992	1,030 [g]		2,002 [g]	1,536	931	348	231		910		5,230 [m]	825 [g]	799 [g]	7,862 [m]	1,484 [g]	1,436 [g]
1993	5,855		2,765	1,720	1,526	1,844	1,181		1,573		12,241 [k]	2,943	2,660	10,007 [k]	3,636	3,562
1994 [v]	300 [g]	7,801 [p,r]	213 [g]		913 [g]			1,633 [s]	2,775	3,005 [p,t]	12,006 [k]	1,570	1,570	18,376 [k]	11,823	11,189
E.O.[w]	>1,500		>1,400	>1,300[x]	>500[x]	>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: October 27, 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.
[i] 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] Tower Counts
[m] Population estimate
[n] Manistem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.
[p] Weir Counts
[r] Weir installed on June 29; first full day of counts June 30.
[s] Tower counts delayed until June 29 because of high, turbid water. First full day of counts occurred on June 30.
[t] Weir installed on June 11; first full day of counts June 12.
[v] Preliminary.
[w] Interim escapement objectives. Established March, 1992.
[x] 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 15. Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973-1994.

Year	Andreafsky River East Fork Aerial	Andreafsky River East Fork Sonar, Tower, or Weir Cnts	Andreafsky River West Fork [a]	Anvik River Tower & Aerial [b]	Anvik River Sonar	Rodo River [a]	Kaltag Cr. Tower Counts	Nulato River Aerial South Fork	Nulato River Aerial North Fork [c]	Nulato River Mainstem Tower Counts	Gisasa River Aerial	Gisasa River Weir	Hogatza River [a] (Clear & Caribou Creeks)	Tozitna River [a]	Chena River Aerial	Chena River Tower	Salcha River Aerial	Salcha River Tower
1973	10,149 [d]		51,835	86,665 [d]											79 [d]		290	
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		6,484	
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 [g]			1,486,182			14,348							3,500		8,500	
1982	7,501 [d]	181,352 [g]	7,267 [d]		444,581						334 [d]		4,984 [d]	874	1,509		3,756	
1983		110,608 [g]			362,912			1,263 [d]	19,749		2,356 [d]		28,141	1,604	1,097		716 [d]	
1984	95,200 [d]	70,125 [g]	238,565		891,028								184 [d]		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 [h]	99,373		1,189,602			16,848	47,417		12,114			1,778	1,509		8,028	
1987	6,687 [d]	45,221 [h]	35,535		455,876			4,094	7,163		2,123		5,669 [d]		333		3,657	
1988	43,056	68,937 [h]	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										714 [d]		1,574 [d]	
1990	11,519 [d]		20,426 [d]		403,627	1,941 [d]		3,196 [d, j]	1,419 [d]		450 [d]		2,177 [d]	36	245 [d]		450 [d]	
1991	31,886		46,657		847,772	3,977		13,150	12,491		7,003		9,947	93	115 [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	10,935 [d]		9,111 [d]		517,409	7,867		5,486	7,698		1,581			970	168	5,487	212	5,563
1994 [y]		200,981 [n, p]			1,128,924		47,615			144,552 [r]	6,827	51,273 [s]			1,137	10,108	4,679	39,343
E.O. [t]	>109,000		>116,000		>500,000 [v]				>53,000 [x]				>17,000 [x]				>3,500	

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Latest table revision October 20, 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] Boat survey
[g] Sonar count.
[h] Tower count.
[j] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.
[k] Tower Count
[n] Weir Count
[p] Weir installed on June 29. First full day of counts occurred on June 30.
[r] Tower counts delayed until June 29 because of high, turbid water. First full day of counts occurred on June30.
[s] Weir installed on July 11. First full day of counts occurred on July 12.
[t] Interim escapement objective.
[v] The Anvik River Escapement Objective was rounded upward to 500,000 from 487,000 in March, 1992.
[w] Interim escapement objective for North Fork Nulato River only.
[x] Consists of Clear and Caribou Creeks interim escapement objectives of 9,000 and 8,000, respectively.
[y] Preliminary.

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Table 16. Fall chum salmon escapement counts for selected spawning areas in Alaskan and Canadian portions of the Yukon River drainage, 1971-1994.[a]

	Alaska				Canada					
Year	Toklat River[b]	Delta River[c]	Chandalar River[d]	Sheenjek River[d,f]	Fishing Branch River[g]	Mainstem Yukon River Index[g,h]	Koidern River[g]	Kluane River[g,j]	Teslin River[g,k]	Mainstem Tagging Estimate[m]
1971					312,800					
1972		5,384			35,125[n]			198[p,r]		
1973		10,469			15,989[s]	383		2,500		
1974	41,798	5,915		89,966[t]	32,525[s]			400		
1975	92,265	3,734[v]		173,371[t]	353,282[s]	7,671		362[r]		
1976	52,891	6,312[v]		26,354[t]	36,584			20		
1977	34,887	16,876[v]		45,544[t]	88,400			3,555		
1978	37,001	11,136		32,449[t]	40,800			0[r]		
1979	158,336	8,355		91,372[t]	119,898			4,640[r]		
1980	26,346	5,137		28,933[t]	55,268			3,150		
1981	15,623	23,508		74,560	57,386[w]			25,806		
1982	3,624	4,235		31,421	15,901	1,020[x]		5,378		31,958
1983	21,869	7,705		49,392	27,200	7,560		8,578[r]		90,875
1984	16,758	12,411		27,130	15,150	2,800[y]	1,300	7,200	200	56,633[z]
1985	22,750	17,276[v]		152,768	56,016[s]	10,760	1,195	7,538	356	62,010
1986	17,976	6,703[v]	59,313	84,207[aa]	31,723[s]	825	14	16,686	213	87,940
1987	22,117	21,180	52,416	153,267[aa]	48,956[s]	6,115	50	12,000		80,776
1988	13,436	18,024	33,619	45,206[aa]	23,597[s]	1,550	0	6,950	140	36,786
1989	30,421	21,342[v]	69,161	99,116[aa]	43,834[s]	5,320	40	3,050	210[p]	35,750
1990	34,739	8,992[v]	78,631	77,750[aa]	35,000[ab]	3,651	1	4,683	739	51,755
1991	13,487	32,905[v]		86,496[ac]	37,733[s]	2,426	53	11,675	468	78,461
1992	14,070	8,893[v]		78,808[ac]	22,517[s]	4,438	4	3,339	450	49,082
1993	27,838	19,857		42,922[ac]	28,798[s]	2,620	0	4,610	555	29,743
1994[ad]	73,867	23,300[af]		153,000[ac]	65,237[s]	1,429[p]		10,734		102,457
E.O.[ag]	> 33,000	> 11,000		> 64,000[ah]	50,000 - 120,000					> 80,000

-continued-

[a] Latest table revision November, 3 1994.
[b] Expanded total abundance estimates for upper Toklat River index area using stream life curve (SLC) developed with 1987-1993 data. Index area includes Geiger Creek, Sushana River,and mainstem floodplain sloughs from approximately 0.25 mile upstream of roadhouse to approximately 1.25 mile downstream of roadhouse.
[c] Estimates are a total spawner abundance, generally from using spawner abundance curves and streamlife data.
[d] Side-scan sonar estimate, unless otherwise indicated.
[f] Within the Canadian Porcupine River drainage. Total escapement estimated using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.
[g] Aerial survey count unless otherwise indicated.
[h] Tatchun Creek to Fort Selkirk.
[j] Duke River to end of spawning sloughs below Swede Johnston Creek.
[k] Boswell Creek area (5km below to 5km above confluence).
[m] Excludes Fishing Branch River escapement (estimated border passage minus Canadian removal).
[n] 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.
[p] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[r] Foot survey
[s] Weir count.
[t] Total escapement estimate using sonar to aerial survey expansion factor of 2.22.
[v] Population estimate from replicate foot surveys and stream life data.
[w] 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.
[x] Boat survey.
[y] Total index area not surveyed. Survey included the mainstem Yukon River between Yukon Crossing to 30 km below Fort Selkirk.
[z] Escapement estimate based on mark-recapture program unavailable. Estimate based on assumed average exploitation rate.
[aa] Expanded estimates for period approximating second week August through middle fourth week September, using Chandalar River run timing data.
[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 considering aerial survey timing.
[ac] Total abundance estimates are for the period approximating second week August through middle fourth week of September . Comparatively escapement estimates prior to 1986 are considered more conservative; approximating the period of end of August through middle week of September.
[ad] Preliminary.
[af] Preliminary final estimate using Delta River MTD curve; based upon a ground count of 16,131 chums observed on October 25, 1994.
[ag] Interim escapement objective.
[ah] Based on escapement estimates for years 1974-1990.

Table 17. Coho salmon escapement counts for selected spawning areas in the Yukon River drainage, 1972-1994 [a]

Year	Andreafsky River		Anvik River	Kantishna River		Nenana River Drainage				Delta Clearwater River [f, g]	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 [k]
1973										3,322	551 [f]	375 [f]
1974						1,388			27	3,954 [j]	560	652 [f]
1975						943			956	5,100	1,575 [f, h]	4 [k]
1976			467 [k]	25 [j]		118			281	1,920	1,500 [f, h]	80 [k]
1977			81 [k]	60		524		310 [b]	1,167	4,793	730 [f, h]	327
1978						350		300 [b]	466	4,798	570 [f, h]	
1979						227			1,987	8,970	1,015 [f, h]	372
1980				3 [j]		499		1,603 [b]	592	3,946	1,545 [f, h]	611
1981	1,657 [k]					274		849 [n, r]	1,005	8,563 [p]	459 [k]	550
1982				81				1,436 [n, r]		8,365 [p]		
1983				42		766		1,042 [n]	103	8,019 [p]	253	88
1984				20 [j]		2,677		8,826 [n]		11,061	1,368	428
1985				42 [j]		1,584		4,470 [n]	2,081	5,358	750	
1986				5	496	794		1,664 [n]	218 [d, h]	10,857	3,577	146 [k]
1987				1,175		2,511		2,387 [n]	3,802	22,300	4,225 [f, h]	
1988	1,913	830	1,203	159	437	348		2,046 [n]		21,600	825 [f, h]	
1989				155	12 [k]			412 [n]	824 [k]	11,000	1,600 [f, h]	483
1990				211		688	1,308		15 [k]	8,325	2,375 [f, h]	
1991				427	467 [k]	564	447		52	23,900	3,150 [f, h]	
1992				77	55 [k]	372			490	3,963	229 [f, h]	500 [f]
1993				138	141			666 [n, s]		10,875	3,525 [f, h]	
1994 [t]				410	2,000 [n, w]	944	1,647	1,317 [n, x]	2,909	62,675 [y]	3,425 [f, h]	5,800 [f]
E.O.										>9,000 [u]		

[a] Only peak counts presented. Survey rating is fair to good, unless otherwise noted. Latest table revision: November 3, 1994.
[b] Foot survey.
[c] Mainstem Nenana River between confluences of Lost Slough and Teklanika River.
[d] Surveyed by F.R.E.D.
[f] Surveyed by Sport Fish Division.
[g] Boat survey counts in the lower 17.5 river miles, unless otherwise indicated.
[h] Boat Survey.
[j] Aerial survey.
[k] Poor survey.
[n] Weir count.
[p] Expanded estimate based on partial survey counts and historic distribution of spawners from 1977-1980.
[r] Coho weir was operated at the mouth of Clear Creek (Shores Landing).
[s] Weir project terminated on October 4. Weir normally operated until mid to late October.
[t] Preliminary.
[u] Interim escapement objective established March, 1993, based on boat survey counts of coho salmon in the lower 17.5 river miles during the period October 21-27.
[w] A total of 298 coho salmon were passed between September 11 and October 4. However, it was estimated that 1,500 to 2,000 coho salmon passed the weir site within a 24-hour period beginning at approximately noon on Oc tober 4. Weir operated from August 18 through morning of October 5, 1994.
[x] Weir project terminated September 27. Weir normally operated until mid-October.
[y] An additional 17,565 coho salmon were counted by helicopter in the Delta Clearwater outside of the normal mainstem index area.

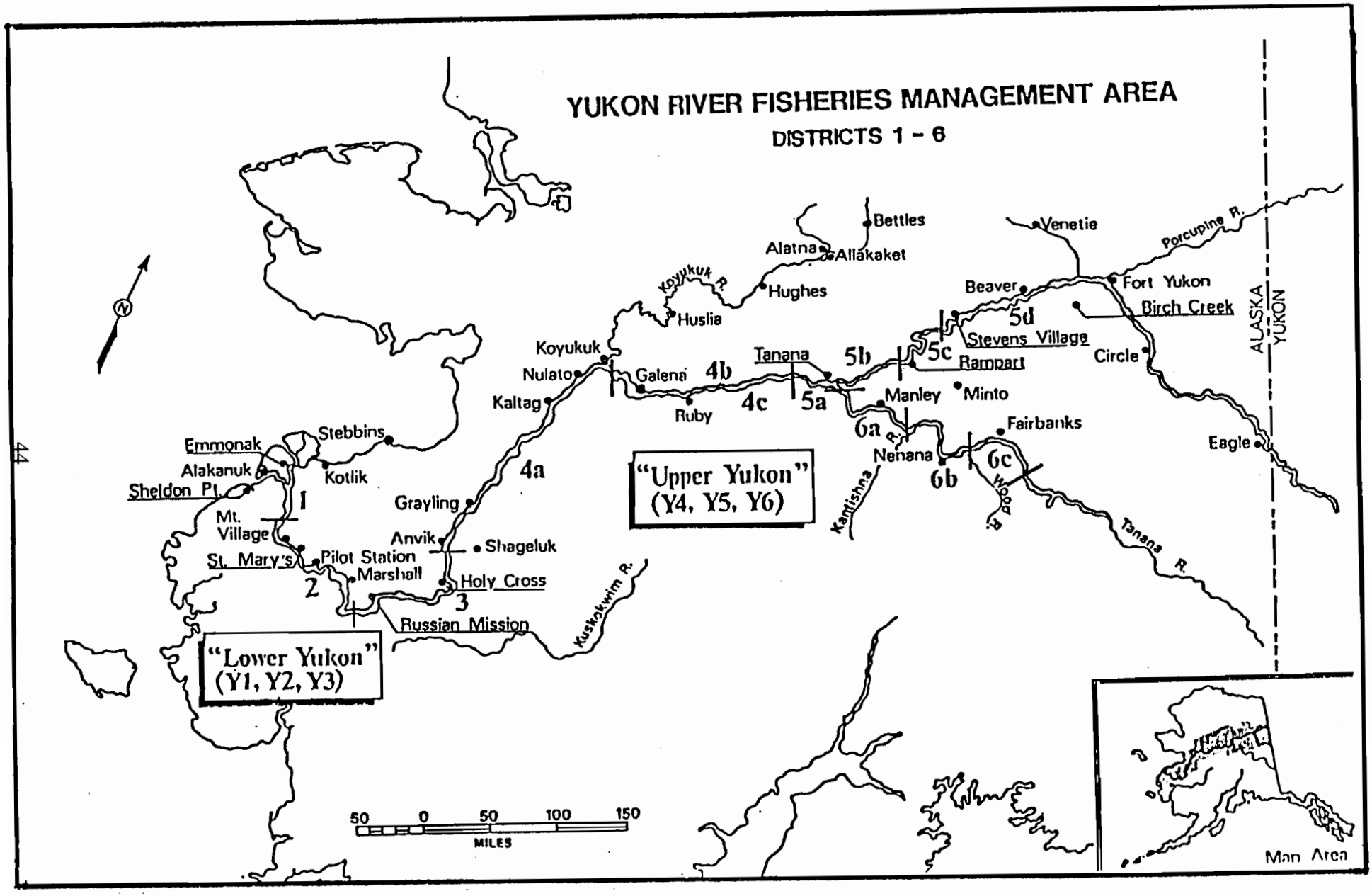

Figure 1. Map of Alaskan portion of the Yukon River drainage, showing communitites and fishing districts.

Appendix A.1. Selected Regulation Changes Adopted by the Alaska Board of Fisheries in March, 1994.

On March 22-28, 1994 the Alaska Board of Fisheries adopted new commercial and subsistence fishing regulations intended to conserve chum salmon. The some of the new regulations affecting the Yukon Area include the Yukon River Drainage Fall Chum Salmon Management Plan and the Toklat River Fall Chum Salmon Rebuilding Management Plan and are listed below.

5 AAC 01.249. The 1994 Yukon River Drainage Fall Chum Salmon Management Plan.

This management plan is to ensure adequate escapement of fall chum salmon into the Yukon River drainage and to provide management guidelines to the department. The plan will be in effect from July 16 through December 31 each year as follows:

(1) when the projected run size is less than 400,000 chum salmon, the department shall close the commercial, sport, personal-use, and subsistence directed chum salmon fisheries;

(2) when the projected run size is from 400,000 to 475,000, the department may open a subsistence fishery of up to 24 hours of fishing per week;

(3) when the projected run size is from 475,001 to 550,000 chum salmon, the department may open a subsistence fishery of up to 48 hours of fishing per week;

(4) when the projected run size is from 550,001 to 600,000 chum salmon, the department may open a subsistence fishery of up to 120 hours of fishing per week;

(5) when the projected run size is greater than 600,000 chum salmon, the department may open the subsistence fishery to the fishing seasons and periods specified in 5 AAC 01.210 and 5 AAC 05.367, open a personal-use fishery of up to 84 hours of fishing per week, and a sport fishery to allow for the retention of chum salmon; and

(6) when the projected run size is greater than 650,000 chum salmon, the department may allow for a commercial fishery with the harvest distributed by district or subdistrict proportional to the established guideline harvest range; harvest levels below the low end of the guideline harvest range will be distributed by district or subdistrict proportional to the mid-point of the guideline harvest range.

5 AAC 01.248. The 1994 Toklat River Fall Chum Salmon Rebuilding Management Plan.

(a) The Board of Fisheries finds that a comprehensive long-term management plan is necessary to promote sustained yield of Toklat River fall chum salmon stocks. The lack of complete resource information concerning the Toklat River fall chum salmon stock limits the ability of the board to develop a long-term management approach at this time. The Yukon River Drainage Fisheries

Association presented to the board a Toklat River Fall Chum Salmon Rebuilding Management Plan which contained recommended management actions that will aid in the rebuilding effort of the Toklat River fall chum salmon stock. The objective of the plan is to achieve the minimum escapement objective of 33,000 fall chum salmon on the Toklat River spawning grounds. To accomplish this objective, the department shall implement the following provisions:

(1) from August 15 through May 15, the Toklat River drainage is closed to sport, personal use, and subsistence fishing;

(2) in the Kantishna River, the following subsistence permit requirements apply:

(A) from August 15 through December 31, the subsistence salmon harvest limit in the Kantishna River is 2,000 chum salmon;

(B) from August 15 through December 31, the annual possession limit for the holder of a Kantishna River subsistence salmon fishing permit is 450 chum salmon; until the fishery harvest limit is reached, permits for additional salmon may be issued by the department;

(C) salmon may be taken only by set gillnet or fish wheel; after August 15, once the allowable fishery harvest limit of 2,000 chum salmon is reached, only fish wheel equipped with liveboxes may be operated as follows:

(i) a livebox must be constructed so that it contains no less than 45 cubic feet of water volume while in operation;

(ii) while in operation, a livebox must be checked at least once every 12 hours, and all chum salmon caught must be returned alive to the water;

(iii) for the purpose of this subsection, a "livebox" is a submerged container, attached to the fish wheel, that will keep fish caught by the fish wheel alive;

(3) the fishery management strategy is to allow a commercial harvest that is lower than the maximum harvest level that could be supported by the Yukon River fall chum salmon return;

(4) in Subdistricts 5-A and 6-A, during the commercial fall chum salmon season there may not be more than one 24-hour commercial period per week;

(5) in Subdistrict 5-A, following the commercial salmon season closure, salmon may be taken by subsistence fishing from 6:00 p.m. Tuesday until 6:00 p.m. Sunday.

(b) The provisions of this section supersede corresponding commercial, sport, personal use, and subsistence regulations in 5 AAC.