# YUKON RIVER SALMON SEASON REVIEW FOR 1992 AND TECHNICAL COMMITTEE REPORT

Prepared by

THE JOINT UNITED STATES/CANADA
YUKON RIVER TECHNICAL COMMITTEE

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Whitehorse, Yukon Territory

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## 1.0 INTRODUCTION

The chief negotiators for the United States and Canadian delegations to the Yukon River salmon negotiations directed the Joint Technical Committee (JTC) to address the subject areas described in this report. The JTC met in Whitehorse on the 7th and 8th of October, 1992. The meeting was attended by the following persons:

Canadian Department of Fisheries and Oceans
Ken Wilson (co-chair)
Sandy Johnston
Ian Boyce

Yukon Territorial Government
Nick de Graff

Alaska Department of Fish and Game
Larry Buklis (co-chair)
Louis Barton

United States Fish and Wildlife Service
Monty Millard
Steve Klein

National Marine Fisheries Service
Aven Andersen

This report is organized into eight sections with one attachment. Sections 2 through 6 review the 1992 fishing season in the Yukon River drainage, the status of the spawning stocks, and results from selected projects. Section 7 addresses an assignment given to the JTC by the chief negotiators regarding options for Fishing Branch River fall chum salmon rebuilding. Section 8 addresses an assignment given to the JTC by the chief negotiators to resolve any minor discrepancies in the historical Yukon River salmon catch and escapement database. Attachment I provides an update of historical Yukon River salmon catch and escapement data in graphic and tabular form. This report was initiated in October 1992, but was not finalized until February 1993 due to delays in editorial compilation. The most current catch and escapement information available as of February 1993 was used in finalizing this report.

## 2.0 1992 COMMERCIAL FISHERY - ALASKA

Preliminary estimates of commercial sales total 474,835 salmon and 120,646 pounds of unprocessed salmon roe for the Alaskan portion of the Yukon River drainage (Figure 1) in 1992. Total sales were composed of 120,245 chinook, 332,313 summer chum, 15,721 fall chum and 6,556 coho salmon sold in the round (Table 1). Additionally,

roe sales by species totalled 3,164 pounds for chinook, 112,996 pounds for summer chum, 2,806 pounds for fall chum, and 1,680 pounds for coho salmon. With regards to fish sold in the round, the chinook salmon catch was 12% above the 1987-91 average, summer chum 48% below average, fall chum 90% below average, and coho salmon 90% below average (Table 2). Roe sales were 38% below the 1987-91 average for summer chum salmon, and 71% below average for fall chum salmon. Roe sales data were not available by species for chinook and coho salmon prior to 1990, therefore historical comparisons are not yet meaningful.

Yukon River fishermen in Alaska received an estimated $11.6 million for their catch in 1992, approximately 23% above the recent 5-year average. Five buyer-processors operated in the Lower Yukon Area, and 10 buyer-processors and 12 catcher-sellers operated in the Upper Yukon Area of Alaska.

Lower Yukon fishermen received an average landed price per pound of $4.12 for chinook salmon, and $0.27 for summer chum salmon. Upper Yukon commercial fishermen received an estimated per-pound average price of $0.91 for chinook salmon, $0.32 for summer chum salmon, $4.53 for summer chum roe, $0.39 for fall chum salmon, $4.50 for fall chum roe, and $0.39 for coho salmon.

## 2.1 Chinook Salmon

The chinook salmon run into the lower river appeared to be late, compressed, and above average in abundance as compared with prior years. The mainstem lower Yukon River was generally free of ice by the 3rd of June. However, coastal waters remained ice covered until the 10th of June. The first chinook salmon catches were reported on the 13th of June near Sheldons Point by a subsistence fisherman. The first chinook in the ADF&G test fishing nets near Emmonak was captured on the 14th of June. Chinook salmon entry was primarily through the south and middle mouths of the Yukon River based on commercial and test net catches.

Test fishing catches at Big Eddy and Middle Mouth indicated chinook salmon abundance and run timing were most similar to the 1984 and 1985 runs. Approximately 50% of the chinook salmon return had entered the lower river by the 28th of June based upon test fishing data. Due to problems with one of the set net sites, it now appears that chinook salmon test fishing catches may have been biased low early in the season through the 27th of June, and may have been biased high from the 28th of June through the 5th of July.

The average weight of chinook salmon in the lower river commercial catch was 21.5 pounds. The average weight of chinook salmon harvested during unrestricted mesh size fishing periods and restricted mesh size periods was 22.5 and 16.7 pounds,

respectively. Age composition samples from the District 1 commercial fishery indicated that age-6 fish accounted for the majority of the catch.

Due to ice conditions along the coast, the chinook salmon run was late and compressed, with test fishing catches increasing very rapidly compared to other years. Therefore, the commercial salmon fishing season was opened by emergency order after approximately six days of increasing subsistence and test net catches in the lower Yukon River. The chinook salmon directed fishery was opened on a staggered basis: the 20th of June in District 1, the 22nd of June in District 2, and the 1st of July in District 3. All subsequent fishing periods were established by emergency order. The first commercial fishing period in Districts 1 and 2 was 6 hours in duration, which is the shortest unrestricted mesh size period ever to open the season in the Yukon River. Because of the compressed nature of the run, no subsequent fishing periods were allowed to exceed 12 hours in duration. Fishing time per period was more restrictive in 1992 than in any prior year.

The total District 1 and 2 chinook salmon harvest was 112,351 fish, 6% below the upper end of the guideline harvest range for the two districts combined (60,000 to 120,000 chinook). Approximately 75% of the chinook salmon harvest in Districts 1 and 2 combined was taken during unrestricted mesh size fishing periods. Unrestricted mesh size gill nets were allowed in four of the eight fishing periods in District 1 and four of the seven fishing periods in District 2. Unrestricted mesh size fishing periods in District 1 occurred on the 20th of June (6 hours), the 22nd of June (12 hours), the 26th of June (6 hours), and the 2nd of July (12 hours). Unrestricted mesh size fishing periods in District 2 occurred on the 22nd of June (6 hours), the 24th of June (12 hours), the 28th of June (6 hours), and the 8th of July (6 hours).

In District 3, the season was opened on the 1st of July, and three unrestricted mesh size fishing periods were allowed. The initial delay in opening District 3 allowed the first segment of the chinook salmon return to pass through the district prior to the commercial fishery. A total of 1,819 chinook salmon were harvested in District 3, which was essentially equal to the lower end of the guideline harvest range for the district (1,800 to 2,200 chinook).

In District 4, the chinook salmon harvest is largely incidental to the directed summer chum salmon fishery. Virtually all of the District 4 chinook salmon commercial harvest is taken in Subdistricts 4-B and 4-C. The total District 4 sale of 1,651 chinook salmon and 2,273 pounds of chinook salmon roe was slightly below the lower end of the guideline harvest range for the district (2,250 to 2,850 chinook), considering the roe sales probably represent 568 female chinook based upon a conversion factor of 4 lbs roe per female chinook.

In District 5, chinook salmon is the primary species of commercial value during the early season due to the low availability and poor flesh quality of chum salmon. Commercial fishing periods were scheduled when the bulk of the run was in the district in order to reduce the impact on individual stocks. Two fishing periods (one 48-hour and one 24-hour) occurred in Subdistricts 5-A, 5-B, and 5-C for a total harvest of 3,395 chinook salmon and 7 pounds of roe, which was above the upper end of the guideline harvest range for this portion of the district (2,400 to 2,800 chinook). One 42-hour fishing period was allowed in Subdistrict 5-D for a harvest of 457 chinook salmon, which was within the guideline for this portion of the district (300 to 500 chinook).

In District 6, the chinook salmon harvest is largely incidental to the directed summer chum salmon fishery due to the low guideline harvest range for chinook (600 to 800 fish). The Alaska Board of Fisheries has directed that the Tanana River commercial fishery could be managed as a terminal fishery. The first 42-hour fishing period occurred on the 20th of July, and 549 chinook salmon and 824 pounds of chinook roe were sold. In-season aerial and ground surveys of the Chena and Salcha Rivers in the Tanana River drainage raised concerns regarding whether the chinook salmon escapement objectives would be achieved for those systems. As a result, three commercial fishing periods which would normally have occurred in the lower and middle portions of the Tanana River (Subdistricts 6-A and 6-B) were cancelled, as were four commercial fishing periods which would normally have occurred in the upper portion of the Tanana River (Subdistrict 6-C). Additionally, sport fishing for salmon was closed in the Tanana River drainage, and one subsistence fishing period which would normally have occurred in the lower and middle portions of the Tanana River (Subdistricts 6-A and 6-B) was cancelled, as were two subsistence fishing periods which would normally have occurred in the upper portion of the Tanana River (Subdistrict 6-C). On the 3rd of August a second 42-hour commercial fishing period was allowed in Subdistricts 6-A and 6-B only, since few chinook salmon were thought to still be in that portion of the district and additional summer chum salmon harvest was available. Twenty-two chinook salmon and 60 pounds of chinook roe were sold during that second period. Commercial sales totalled 572 chinook salmon and 884 pounds of chinook salmon roe in District 6 for the season.

## 2.2 Summer Chum Salmon

As for chinook salmon, the majority of the summer chum salmon run entered through the south and middle mouths of the Yukon River. Comparative test net catches indicated that the 1992 summer chum salmon return was below average in abundance, but similar to the 1990 and 1991 runs. Summer chum salmon catches were relatively strong in the test fishery from the 16th through the 26th of June, and decreased sharply after the 2nd of July. Approximately 50% of

the summer chum salmon return had entered the lower river by the 23rd of June according to test fishing data.

Preliminary age composition information from District 1 and 2 indicated that the commercial catch was composed primarily of age-5 fish, with age-6 fish comprising a larger proportion of the catch than normal, and age-4 fish accounting for a smaller proportion than normal. The low abundance of age-4 fish was unusual and largely responsible for the sharp decline in summer chum salmon abundance after the 2nd of July. The average weight of summer chum salmon in the lower river commercial catch was 6.9 pounds.

The total District 1 and 2 summer chum salmon harvest was 324,458 fish, 35% below the mid-point of the guideline harvest range for the two districts combined (251,000 to 755,000 summer chum). Approximately 75% of the summer chum salmon harvest in Districts 1 and 2 combined was taken during restricted mesh size fishing periods. Only restricted mesh size gill nets (not to exceed six-inch stretch mesh measure) were allowed in four of the eight fishing periods in District 1 and three of the seven fishing periods in District 2. Restricted mesh size fishing periods in District 1 occurred on the 27th of June (9 hours), the 29th of June (12 hours), the 6th of July (6 hours), and the 9th of July (6 hours). Restricted mesh size fishing periods in District 2 occurred on the 26th of June (6 hours), the 1st of July (12 hours), and the 6th of July (6 hours).

There were no restricted mesh size fishing periods in District 3. A total of 65 summer chum salmon was sold from the three unrestricted mesh size fishing periods in District 3. Poor quality of summer chum salmon and market conditions were factors in the low summer chum salmon harvest, which was well below the low end of the guideline harvest range for this district (6,000 to 19,000 summer chum).

In District 4, the season opened on the 5th of July. Due to the catch rate anticipated in Subdistrict 4-A, all four of the fishing periods were limited to 24 hours each in duration, while all six periods in Subdistricts 4-B and 4-C were the traditional 48-hour fishing periods. Subdistrict 4-A fishermen sold 99,701 pounds of summer chum roe, which was 19% below the midpoint of the guideline harvest range for this subdistrict (61,000 to 183,000 pounds of summer chum roe). Subdistricts 4-B and 4-C sold 2,659 summer chum salmon and 11,108 pounds of roe, which was below the lower end of the guideline harvest range for these subdistricts combined (16,000 to 47,000 summer chum). The Subdistrict 4-B and 4-C commercial fishery was closed prior to reaching the low end of the summer chum salmon guideline harvest range due to concern for middle Yukon River summer chum salmon spawning escapements.

In District 5, summer chum salmon are caught incidentally to the chinook salmon fishery. A total of 102 summer chum salmon and 295

pounds of summer chum roe were sold.

In District 6, there were only two 42-hour commercial fishing periods during the summer season, with the latter period only open for Subdistricts 6-A and 6-B as described previously in the chinook salmon section of this report. A total of 5,029 summer chum salmon and 1,892 pounds of summer chum roe were sold, which is about 45% below the low end of the guideline harvest range for District 6 (13,000 to 38,000 summer chum).

## 2.3 Fall Chum and Coho Salmon

A below average return of fall chum salmon was expected in 1992 based upon evaluation of parent year escapements. Expectations were for a very limited commercial harvest, if any commercial fishery was to occur at all. Given that parent year escapement was relatively good only in the upper Tanana River, but not in the lower Tanana River or elsewhere in the Yukon River drainage, the greatest likelihood for a commercial fishery to be allowed in 1992 was in the upper portion of the Tanana River.

Fall chum salmon migratory timing into the lower river appeared to be average, however the run appeared to be much more compressed than normal. There was one major pulse of fall chum salmon which entered the Yukon River between the 4th and 7th of August. Cumulative test fishing indices in the lower river indicated that the 1992 fall chum return was below average in abundance, and similar to the 1988 and 1990 runs. Coho salmon test fishing data indicated that the coho run was above average in magnitude and average in run timing.

The Yukon River (Districts 1 through 5) and lower Tanana River (Subdistrict 6-A) fishing districts were not opened to commercial salmon fishing during the fall season in 1992 due to the below average fall chum salmon return and the need to improve spawning escapements for most stocks from the parent year levels. However, the middle and upper portions of the Tanana River (Subdistricts 6-B and 6-C), which are upstream from the Toklat River, were allowed a commercial fall fishing season.

Two commercial fishing periods were allowed in Subdistricts 6-B and 6-C. There was one 42-hour period beginning on the 7th of September, and one 24-hour period beginning on the 18th of September. Sales for District 6 totalled 15,721 fall chum salmon, 2,806 pounds of fall chum roe, 6,556 coho salmon, and 1,680 pounds of coho roe. That compares to a guideline harvest range for District 6 of 2,750 to 20,500 fall chum and coho salmon combined.

## 3.0 1992 COMMERCIAL FISHERY - CANADA

The management plans for the Canadian chinook and chum salmon fisheries on the Yukon River in 1992 generally reflect the understandings reached as of the most recent round of the Yukon Salmon Negotiations which were held in Anchorage, during the week of March 23, 1992. Accordingly, the guideline harvest ranges, and the border and spawning escapement goals for upper Yukon chinook and chum salmon, tentatively agreed to in the Yukon Salmon Negotiations, provided the foundation for the 1992 management plans.

A preliminary total of 29,453 salmon including 10,877 chinook salmon and 18,576 chum salmon was harvested in the 1992 Canadian Yukon River commercial fishery. The chinook catch was 3.1% below the recent chinook cycle (1986 - 1991) average catch of 11,150 chinook and the chum catch was 30.4% below the recent cycle average of 26,688 chum (1988 to 1991 average). A total of 30 commercial licenses was issued in 1992, the same as in 1991. Most of the commercial chinook harvest was taken by gill nets set in eddies. However, during the chum season, more than 45% of the catch was estimated to have been taken in fish-wheels. Ten fish-wheels were used in 1992 compared to nine in 1991 and three in 1990.

### 3.1 Chinook Salmon

The elements of the chinook management plan adopted for 1992 included:

i) a minimum escapement goal of 18,000 chinook;

ii) a total upper Yukon guideline harvest range for all users of 16,800 to 19,800 chinook salmon;

iii) a commercial guideline harvest range of 8,600 to 11,600 chinook and a pre-season target of 9,400 chinook. Based on the pre-season forecast for a below average return, it was expected the catch would fall towards the lower end of the range; and

iv) a one day per week fishery for the initial two weeks of the season, followed by a three day per week opening. Subsequent fishing periods were to be determined in-season based on run strength and harvest guidelines.

The 1992 chinook salmon fishing plan differed from the plan in the previous year in the following ways:

i) The commercial guideline harvest range was reduced from 9,100 - 12,100 chinook to 8,600 - 11,600 chinook to account for increases in the recent average Indian food fishery harvest;

ii) unlike previous years, no additional fishing time was allowed for the fishing area upstream of the Sixty Mile River; and

iii) the scheduled number of days to be fished each week was established only for the first three openings. In past years, the number of days to be fished was set out in the plan for the entire season.

The commercial fishery opened on Monday, July 20, 1992 (statistical week 30) for two days after the presence of chinook salmon had been determined by the DFO test fish-wheels located just upstream of the international border. The first chinook was caught in the fish-wheels on July 14, 1992, sixteen days later than in 1991. Fish were first reported in Eagle, Alaska, on July 13.

The opening date of the fishery was the second latest on record and was about two weeks later than average. Rather than fishing one day, as scheduled in the pre-season plan, the initial fishing period was for 48 hours. Additional time was fished at the beginning of the season since the run was expected to be quite compressed due to its late arrival. Despite the late timing of the run, the catch per unit of effort (CPUE) was above average in the initial opening, and continued to be above average throughout the season (note: CPUE is the catch/boat/day). Fishing conditions were poor due to extraordinarily high water conditions which persisted throughout the chinook season.

The opening day in the second week, statistical week 31, was advanced to Sunday and fishing time was increased to three days (July 26 to July 29) in response to the trend in the DFO fishwheel catch and the expectation of a compressed run. DFO fishwheel catches had peaked July 22 just eight days after the first fish had been caught, but declined sharply by the end of statistical week 30 (July 26). The catch of 168 chinook in the DFO White Rock fishwheel on July 22 established a new record daily catch for this fishwheel, exceeding the previous record of 163 chinook set in 1983. Commercial catches after the first two days in statistical week 31 were above average and the CPUE was approximately 85% above average. As a result, an extension of 24 hours was given increasing the total days fished in the second week to four. At this time, due to the above average fishwheel and commercial catches, the season target commercial catch was increased from the pre-season target of 9,400, to 10,500 chinook, close to the mid-point of the commercial guideline harvest range. The first in-season forecast of border escapement was made on July 31 based on mark-

recapture data. The abnormally late run timing made it difficult to estimate the proportion of run through to date and therefore a wide range in the initial forecast of border escapement was obtained: 34,000 to 68,000 chinook.

In the third week of the chinook season, i.e. statistical week 32, the fishery was open for four days (August 02 to August 06). Average catches per day and the CPUE during this opening were record high and were more than twice the respective averages for this week. However, it was apparent that the run strength was beginning to weaken during the last day of fishing in this week. The week ended with a season cumulative catch of 9,488 chinook which was approximately 300 fish below the guideline for this opening. The border escapement forecast was updated and ranged from 41,000 to 47,000 based on current mark-recapture and catch data. Based on the current border escapement forecast and the above average run indicators (commercial fishery CPUE and DFO fishwheels), the season guideline was adjusted upwards to 11,000 chinook.

As a result of the declining run strength in the commercial fishery in the latter part of the previous week, and in the DFO fishwheels, the fishery was initially scheduled to open for two days (August 09 to August 11) in statistical week 33. However, above average daily catches and CPUE, and a reduction in overall fishing effort lead to a one day extension. The cumulative catch at the end of week 33 was 10,253 chinook compared to a guideline of 10,367 chinook. The final in-season forecast of chinook border escapement was made this week ranging from 40,400 to 41,700 chinook.

Although the fishery was open for one day during each of the next two weeks, effort was minimal as the chinook run ended and the chum run was just starting to increase.

The preliminary estimated total commercial chinook catch is 10,877 fish, which is within the guideline harvest range of 8,600 to 11,600 chinook. Approximately 95% of the catch was harvested in the lower fishing area, i.e. downstream from the Sixty Mile River. For comparison, the recent six-year average commercial catch is 11,150 chinook (1986 to 1991); the lowest catch in this period occurred in 1989 with a catch of 9,789 chinook, whereas, a record catch of 13,217 occurred in 1988. Preliminary tag recovery information suggested a Canadian commercial harvest rate of 23.8% on chinook salmon in 1992, compared to a cycle average harvest rate of 27.2% (1986 - 1991).

Comparisons of the average commercial chinook catch/day with previous years indicated the run was two weeks late in arriving, however the peak was only about one week late. The run appeared to be slightly compressed in the commercial fishery.

Operation of the DFO fishwheel at Sheep Rock was not possible for most of the chinook season due to high water and lack of anchoring points. As a result, only the White Rock fishwheel was in operation to give indications of run strength. The White Rock chinook catch was the highest on record and was more than three times the 1982-91 average.

The maximum number of commercial fisherman active during any one week of the chinook salmon run was 17 fishermen, one more than in 1991.

## 3.2 Fall Chum

The conservation initiatives undertaken in 1991 were expanded in 1992 for upper Yukon chum salmon. The chum management plan included the following components:

i) an escapement goal of 51,200 upper Yukon chum salmon. This goal represented the number of spawners required to rebuild the 1988 brood escapement of 36,800 chum to the long term goal of at least 80,000 spawners in three cycles;

ii) a guideline harvest range for all Canadian upper Yukon fisheries of 23,600 to 32,600 chum;

iii) a commercial guideline harvest range of 20,900 to 29,900 chum salmon with a pre-season target of 20,900 chum in view of a below average expected return; and

iv) reduced fishing time (two days/week) for the first two weeks of the chum season, followed by openings commencing the first week of September that would be based on assessments of run strength and the guideline harvest ranges.

Fishing time was reduced to one day per week during the last half of August as chinook abundance declined and the chum run began to build. Daily catches of chum salmon during the last week of August were below average and effort was relatively light with three fishermen fishing. For statistical week 36, fishing time was increased to three days commencing August 31. The average catch per day for this week, 1,049 chum/day, was the highest on record (for statistical week 36) and was 74% above the recent cycle average (1988-1991) for this week.

Near record daily catches were again recorded in the following week, statistical week 37, during the three day fishing period from September 7 - 10. A two day opening was initially scheduled for this week, however, an extension of one additional day was given

based on the strength of the commercial catches and consideration for the guideline cumulative catch for the week. A season target of 20,900 was in effect.

Beginning September 14, the fishery was reduced to two days per week for the remainder of the season. The CPUE and catch per day remained well above average through statistical week 38 (fishing period September 14-16): the CPUE was 86% above average and the catch/day was 36% above average. However, forecasts of border escapement calculated after statistical week 37 ranged from 68,000 to 77,400 chum salmon indicating the season target should continue to be the lower end of the guideline harvest range for the balance of the season.

Record cold temperatures (minus 15° C) and heavy snowfall occurred during the two day fishery from September 21-23 and chum catches fell to below average levels. By the next week, statistical week 40, only three fishermen remained active in the fishery. Poor fishing conditions continued and a tragic accident occurred which resulted in two assistants going missing and presumed drowned.

The total commercial chum harvest of 18,576 fish fell below the commercial guideline harvest range of 20,900 to 29,900 chum. For comparison, the 1988-1991 average catch was 26,688 chum ranging from 17,549 chum in 1989 to 31,404 chum salmon in 1991. Based on preliminary tag recovery data, the harvest rate in the commercial fishery was approximately 27%, compared to the 1988-1991 cycle average of 34%. The run strength based on commercial fishery performance indicators was similar to that indicated by DFO fishwheel catches, about average. However, the preliminary tagging results indicated a below average border escapement. Generally, the run timing appeared to be approximately one week earlier than average.

A maximum of 12 fishermen was active in any one week during the chum season.

## 4.0 1992 SUBSISTENCE, DOMESTIC, INDIAN FOOD AND SPORT FISHERIES

### 4.1 Alaska

#### 4.1.1 Subsistence Fishery

Subsistence "catch calendars" were mailed to each fishing household in all Yukon River drainage communities in Alaska in May for use during the fishing season. Direct interviews were conducted with fishermen immediately following the season. Subsistence fishermen in portions of District 5 and all of District 6 were required to obtain subsistence fishing permits and record harvest data. Fishermen not contacted by other means were contacted by mail.

Analysis of 1992 subsistence harvest data will not be completed for several months.

Data for 1991 were not available for inclusion in the November 1991 JTC report, and are therefore summarized here. Estimates of the 1991 subsistence harvest in the Alaska portion of the Yukon River drainage totalled approximately 47,000 chinook, 119,000 summer chum, 146,000 fall chum, and 37,000 coho salmon. These estimates do not include commercially caught summer chum salmon retained for subsistence purposes in District 4.

#### 4.1.2 Sport Fishery

Approximately ninety percent of the sport fishing effort in the Alaskan portion of the Yukon River drainage occurs in the Tanana River drainage, mostly along the road system. Only a small portion of the effort is directed toward anadromous salmon, although major sport fisheries targeting anadromous salmon take place annually in the Chena, Salcha, Chatanika, and other Interior Alaska river systems. Sport fishing effort and harvests are annually monitored through a state-wide sport fishery survey. Some on-site fishery monitoring also takes place at locations where more intense sport fishing occurs. Harvest estimates for recent years have averaged about 1,000 chinook salmon, 1,200 chum salmon, and 1,600 coho salmon. It is estimated that most of these harvests have occurred within the Tanana River drainage. Harvest information for 1992 is not yet available. However, it is expected that harvests for 1992 will be below those of recent years for chinook and chum salmon, due to restrictions imposed in the Tanana River for conservation purposes.

### 4.2 Canada

#### 4.2.1 Indian Food Fishery

Data has not yet been collected for the 1992 Indian food fishery catches. It is anticipated that the total upper Yukon IFF chinook catch will be similar to the recent cycle average catch of about 7,500 chinook; and the chum catch is expected to be below the recent cycle average of approximately 2,600 chum.

Coho catches in Canada are generally limited to the Porcupine drainage where they are taken in the Old Crow fishery. The recent average for this fishery is approximately 500 coho. Catch data for chinook, chum and coho from the Porcupine River are not yet available.

#### 4.2.2 Domestic Fishery

Catch data indicate that the domestic harvest of chinook salmon in 1992 was 277. No chum salmon are reported to have been harvested.

#### 4.2.3 Sport Fishery

As in previous years, no sport fishery harvest data was collected in 1992. In the past it was assumed that approximately 300 chinook were harvested annually by sport fishermen in Canadian sections of the Yukon River basin. However, there are concerns that actual catches have significantly exceeded this level.

## 5.0 STATUS OF SPAWNING STOCKS

### 5.1 Chinook Salmon

#### 5.1.1 Alaska

Chinook salmon spawning escapements were variable in 1992, with escapements at or near objective levels in the lower river, but below objective levels for some of the stocks further upriver. Aerial survey index counts were obtained of 1,030 chinook salmon (poor survey rating) in the East Fork and 2,002 (poor survey rating) in the West Fork of the Andreafsky River, and 931 (fair survey rating) within an index area of the Anvik River. Escapement objectives are >1,500 and >1,400 for the East and West Forks of the Andreafsky River, respectively, and >500 for the Anvik River index area. A count of 579 chinook for the Nulato River (fair survey rating) was well below the objective of >1,300, while the Gisasa River count of 910 chinook (fair survey rating) achieved the objective of >600.

It was difficult to accurately assess chinook salmon spawning escapements in the Chena and Salcha Rivers, in the Tanana River drainage, due to inclement weather and slightly turbid water conditions. A poor to fair survey flown on the Salcha River on the 3rd of August resulted in an estimate of 1,484 chinook. This was below the objective level of >2,500 chinook for this river. The highest count for the Chena River occurred on the 11th of August, after the peak of spawning, and only 825 chinook were observed under poor to fair survey conditions. This was well below the objective of >1,700 chinook for this river.

ADF&G has conducted tagging studies on the Chena River since 1986, and on the Salcha River since 1987, to estimate chinook salmon escapement total population sizes. Very preliminary estimates for 1992 are 4,000 chinook salmon for the Chena River and 7,400 chinook salmon for the Salcha River. These compare to an average population estimate of 5,000 for the Chena River, and 5,800 for the

Salcha River, for the years tagging has been conducted. Whereas less certainty can be placed upon whether or not the chinook salmon escapement objective was met in the Salcha River, it is apparent that the Chena River objective was not met.

### 5.1.2 Canada

The date of aerial surveys to determine chinook spawning escapement was delayed by about 1.5 weeks due to the later than average timing of the overall chinook run in the upper Yukon this year. For example, the chinook run at Dawson was roughly 2 weeks later than usual, and arrival of the first chinook at the Whitehorse Fishway was about 10 days late. Areas surveyed in 1992 included the Little Salmon River, Ross River, Wolf River, Nisutlin River, Big Salmon River, Tatchun Creek and Tincup Creek.

Index escapements in the Little Salmon and Wolf rivers were about average in 1992. Ross River showed a two-fold increase over the previous ten year average (excluding 1982 and 1983 when no surveys were conducted). Counts in the Big Salmon and Nisutlin rivers were 39% and 55% below their respective ten year averages. Tatchun Creek and Tincup Creek counts were both 50% below average. Unfortunately, as apparent from the high number of carcasses,lone females, and vacant redds observed, the surveys should have been flown one week earlier, i.e. August 20. It appears that although the arrival of chinook in the upper Yukon was delayed, spawning was not. Therefore, fish must have spawned immediately upon arrival on the grounds. In spite of the timing of the surveys, it is felt that the results are useful for inter-annual comparisons.

The preliminary tagging estimate of the total spawning escapement for the Canadian portion of the upper Yukon drainage was approximately 24,359. Results of the DFO tagging programme are discussed in greater detail in section 6 of this report.

## 5.2 Summer Chum Salmon

An aerial survey of the Andreafsky River system conducted on the 17th of July under poor survey conditions indicated that summer chum escapement was well below the objective level for this system. Counts of 11,308 summer chum salmon for the East Fork and 37,808 for the West Fork were well below the escapement objectives of >109,000 for the East Fork and >116,000 for the West Fork. A preliminary sonar estimate of 775,626 summer chum salmon for the Anvik River was approximately 55% above the escapement objective of >500,000 fish. With the exception of the Salcha River, summer chum salmon escapements to tributaries upstream from the Anvik River were well below objective levels based upon aerial surveys. The Salcha River survey on the 11th of August under fair survey conditions resulted in a count of 3,222 summer chum, which was

close to the objective of >3,500. The magnitude of the Anvik River stock size compared to the other summer chum salmon stocks, the mixed stock characteristics of the fisheries, and the variable status of the stocks makes it difficult to optimize the overall harvest and escapement for all of the stocks.

## 5.3 Fall Chum Salmon

### 5.3.1 Alaska

Overall, fall chum salmon escapements in Alaska were below average in 1992, with escapement objectives being achieved only in the Sheenjek River. The Sheenjek River sonar project has historically operated for the period of approximately August 25 through September 24, and it is from sonar estimated passage during that time period that the Sheenjek River fall chum escapement objective of greater than 64,000 fish was established. In 1992 sonar operations were initiated some two weeks earlier than usual. A preliminary sonar estimate of approximately 79,000 fall chum salmon was made for the period of August 9 through September 19. The fact that approximately 14,000 fall chums were estimated to have passed prior to August 25 indicates that the escapement objective was achieved in 1992. Further, although unseasonably cold weather necessitated termination of the program on the 19th of September due to river icing conditions, fish were still passing the site at a rate of approximately 2,200 fall chums per day.

The Tanana River fall chum salmon escapement in 1992 was evaluated by foot surveys made in the Toklat and Delta River index areas. Total estimated escapement to the Toklat River was approximately 10,800 fall chum salmon; the lowest escapement for this river since 1982, and the second lowest on record. The Delta River fall chum salmon escapement estimate was approximately 8,900 fish, approximately 19% below the minimum objective of 11,000 fish. Although no escapement objectives exist for other fall chum spawning areas in the upper Tanana River, escapement counts during peak spawning of approximately 3,600 and 1,200 fish to Bluff Cabin and Clearwater Lake Outlet Sloughs (Big Delta region), respectively, indicated below average escapements. These numbers are approximately 25% lower than the recent ten year average.

Although no fall fishery was allowed in Districts 1-5 in 1992, spawning escapements were still below desired levels. It appeared that the production from the 1988 brood year was very poor based on the much lower than normal proportion of age four fall chum salmon in the 1992 run. The unusually cold winter of 1988-89 may have contributed to the poor return of age four fish in 1992.

### 5.3.2 Canada

Aerial surveys of chum salmon escapement index areas were conducted on the Kluane, Koidern, Fishing Branch, Teslin and mainstem Yukon rivers in 1992. Also, in co-operation with the USFWS, the White, Donjek, and Big Salmon rivers were scouted in an effort to pin-point spawning locations for future electrophoretic sampling. A foot survey was conducted on the Kluane River in concert with electrophoretic sampling at that site.

The Kluane, Koidern and mainstem Yukon aerial surveys were rated fair, being hampered by significant icing of some back sloughs. Counts for the Kluane and Koidern rivers were well below average (only 2 fish were observed in the Koidern). The mainstem Yukon count was above both the 1987-1991 average and the Kluane count. The Teslin River yielded a count similar to that obtained in 1991, which also was above average. Due to the degree of braiding in these systems, complete surveys were not possible on the White and Donjek rivers. Only 2 chum salmon were observed on the White River, while there were approximately 125 chum salmon observed on the Donjek River. No chum salmon were observed on the Big Salmon River.

The Fishing Branch River weir was operated in 1992 again under a joint programme with the Vuntut Gwitch'in Band (Old Crow) and DFO with funding from the Economic Development Agreement of the Federal and Territorial governments. One aerial survey was performed on September 28 for comparative aerial counts with a known weir count. The survey count was 25.6% of the count through the weir at the time the survey was flown, and 15.9% of the final weir count of 22,517 chum. Details of the Fishing Branch River programme are presented section 6 of this report.

The preliminary tagging estimate of the total spawning escapement for the Canadian portion of the upper Yukon drainage was approximately 46,772 chum. Problems were experienced with the fishwheels and the commercial fishery as a result of extremely cold temperatures in September. Preliminary results of the DFO tagging programme are discussed in greater detail in section 6 of this report.

## 5.4 Coho Salmon

Coho salmon 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. Escapement aerial and ground surveys for coho salmon are under way, and results are not yet available. Questions regarding coho salmon spawning locations and

timing within lower river tributaries were asked during subsistence surveys to gain more information regarding those stocks.

## 6.0 PROJECT SUMMARIES

### 6.1 Alaska

Operational methods for most projects remained similar to what has been described in prior years. Results are incorporated in the fishery and stock status portions of this report, and are reported in the tables of catch and escapement data. For these reasons, the following projects conducted by ADF&G in 1992 will not be discussed in further detail here: Anvik River and Sheenjek River sonar projects, Chena River and Salcha River salmon tagging studies, lower Yukon River test fishing with set and drift gill nets, Tanana River test fishing with fish wheels, commercial fishery monitoring, subsistence harvest surveys, aerial and ground surveys of salmon escapements, and sampling of fishery catches and escapements for age-sex-length data. However, several projects warrant further discussion here since they are either new or retain a significant research and development character. These projects are: (1) Yukon River salmon stock identification research conducted by ADF&G and USFWS, (2) the Yukon River sonar project at Pilot Station conducted by ADF&G, (3) Yukon River salmon restoration and enhancement planning being initiated by ADF&G, and (4) a Toklat River fall chum salmon restoration feasibility study being initiated by ADF&G.

#### 6.1.1 Salmon Stock Identification

A combined analysis of chinook salmon scale patterns, age compositions, and geographic distribution of catches and escapements is used by ADF&G on an annual basis to estimate geographic region of origin of the fishery harvests. Data have not yet been analyzed for 1992. Prior year analyses have provided the following estimates of region of origin for the total Yukon River drainage chinook salmon harvest (commercial and non-commercial harvests in Alaska and Canada combined):

| Year | Lower Run Origin | Middle Run Origin | Upper Run Origin |
|---|---|---|---|
| 1982 | 14% | 24% | 62% |
| 1983 | 12% | 37% | 51% |
| 1984 | 29% | 36% | 35% |
| 1985 | 31% | 19% | 50% |
| 1986 | 26% | 6% | 68% |
| 1987 | 17% | 19% | 64% |
| 1988 | 27% | 11% | 62% |
| 1989 | 26% | 16% | 58% |
| 1990 | 19% | 22% | 59% |
| 1991 | 26% | 29% | 45% |

Note that the lower and middle regions of origins are within Alaska, and the upper region of origin is the Canadian portion of the drainage.

ADF&G and the USFWS continued research into the feasibility of using protein electrophoresis methodology to identify chinook and chum salmon stocks in the mixed stock Yukon River fishery in 1992. This work was initiated in 1987 by the USFWS, and status reports have been provided to the delegations periodically as warranted by new information. Sampling of the District 1 commercial and test fishery catches was suspended in 1992 in order to collect additional spawning escapement samples for improving the genetic baseline data. This should provide for improved accuracy of fishery sample analyses in the future. See section 6.3.2 for information on genetic stock identification escapement sampling conducted by the various agencies in 1992. In addition, the USFWS was able to mount a sampling effort in the Subdistrict 5-A and 5-B fall chum salmon subsistence fishery in 1992, which will provide information on an upriver fishery that has not been sampled for stock identification information in the past.

### 6.1.2 Yukon River Sonar

The Yukon River sonar project at Pilot Station has been estimating the daily upstream passage of chinook, summer chum, fall chum, and coho salmon for six consecutive years (1986-1991). In 1992 the project was operated for a reduced time period of approximately five weeks for experimental purposes only. Daily fish passage was not estimated. It is intended to return to full operation in 1993. New equipment was purchased this year which should provide more accurate counts of migrating fish. The new equipment did not arrive in time for the normal starting time of field operations in

1992, and when it did arrive it required several weeks for thorough field testing. At the present location, some fish travel far from shore and were difficult to count with the existing equipment. The new equipment should help to alleviate some of this difficulty by extending the counting range offshore, and also may allow thresholding of smaller non-salmon species.

### 6.1.3 Salmon Restoration and Enhancement Planning

The State of Alaska has provided funding to ADF&G to undertake a salmon restoration and enhancement planning process for the U.S. portion of the Yukon River drainage. This will be a process involving user groups, various government agencies, and other interested parties with the goal of developing a comprehensive plan for the U.S. portion of the Yukon River drainage. While not yet scoped out as to its content, such a plan could potentially define goals and objectives, provide reference information on the stocks and fisheries, identify potential opportunities and concerns, recommend appropriate procedures, and evaluate priorities. Work on this plan is expected to get under way early in 1993.

### 6.1.4 Toklat River Fall Chum Restoration Feasibility Study

There has been ongoing concern regarding the status of the Toklat River fall chum salmon stock. Spawning escapements have not met objectives for most recent years despite conservative fishery management actions. As a result, there is growing public interest in investigating restoration options for this stock. Funding has not been provided to initiate a large-scale restoration program for this stock, but ADF&G is undertaking a small-scale study in 1992 to provide information useful for assessing feasibility in future planning. Fall chum salmon will be sampled from the Toklat River for genetic risk assessment and disease screening. A small experimental egg-take will be conducted to test field logistics under the challenging Interior winter conditions that occur at the location and time when these fish spawn. It is anticipated that 130,000 eggs will be taken from approximately 50 females. Mortalities will be kept to a minimum by making use of fish for both the egg-take and sampling objectives to the extent possible. Incubation will be tested at the Clear Hatchery facility. Fry will be coded wire tagged, fin-clipped, and released back into the Toklat River in the spring of 1993. The release of 100,000 marked fry would be expected to provide statistically significant information on contribution of marked fish to proximal fisheries when those fish return as adults four years later. Results from the various components of this study should significantly improve our information base for this stock.

## 6.2 Canada

### 6.2.1 Upper Yukon River Salmon Test Fishing (Yukon Territory)

Run timing and relative abundance data were collected by DFO for both chinook and chum salmon from two fishwheels located near the Canada/U.S. border. Although the primary purpose of the fishwheels is to capture salmon for the tagging programme, consistency in the site selection and fishing time since 1982 does provide the opportunity for some inter-annual and in-season comparisons.

During the chinook season in 1992, operational problems were encountered throughout the run with abnormally high water levels. Initial set-up of the fishwheels was delayed when an ice jam and resulting flood annihilated the camp and both fishwheels. One fishwheel was operational by July 02, well before the run had commenced. However, the other fishwheel did not fish until August 08 when the water level had finally subsided enough to allow access to the anchor point.

The 1992 fishwheel catch data indicated a record high chinook run that was approximately two weeks late in arrival. On average, the first chinook salmon is caught in the White Rock fishwheel on July 04; in 1992 the first fish was not caught until July 14. Despite the late arrival time, the peak of the run appeared just slightly later than normal. The peak catch of 168 chinook on July 22 was a record for the White Rock fishwheel exceeding the previous record of 163 chinook on July 21, 1983. For this wheel, it is very unusual to capture more than 100 chinook in any particular day. The cumulative chinook catch in the White Rock wheel was a record 1,739 chinook salmon, exceeding the 1982-91 average catch of 523 chinook by 333%. Prior to 1992, the highest number of chinook caught in the White Rock fishwheel was 1,072 chinook in 1983.

It appears that the fishwheel catch data grossly misrepresented the chinook run magnitude in 1992; the collection of in-season tag return data was proven to be absolutely essential in 1992. This data consistently tempered the expectation of a record run one might have had based on the fishwheel catch data and the fishery performance data, i.e. CPUE. It is possible that the high water conditions that persisted throughout the chinook run forced the fish to migrate closer to shore making them more susceptible to capture in fishing gear (which is tethered to shore in most cases).

The run size during the first half of the 1992 chum season appeared to be about average in 1992 based on the DFO fishwheel catches; however, the run after mid-September appeared to be very weak. Both the White Rock and Sheep Rock catch curves were bimodal with a small initial peak towards the end of August, followed by a stronger peak September 9-12. The latter peak was roughly four days earlier than average. Sub-freezing temperatures and snow from

September 11 to the end of the season caused problems with icing which may have affected the efficiency of the fishwheels. A precipitous drop in both fishwheel catches occurred after September 18 and catches remained well below average through October 3 when the program terminated. On several occasions after September 22 the fishwheels ground to a halt after becoming encrusted in ice. As a result, catches after the third week of September are likely not representative of the actual run strength.

The chum CPUE in the commercial fishery generally reflected similar run characteristics as indicated by the DFO fishwheels, although the bimodality observed in the fishwheel catches was not apparent in the commercial CPUE. The run timing, according to fishery performance indicators, was roughly one week earlier than normal and the run appeared to be about average in magnitude. Commercial CPUE peaked September 14-16 dropping off sharply the following week. However, poor fishing conditions likely affected the relative fishing success after mid-September and may have depressed the CPUE compared to actual run strength.

### 6.2.2 Upper Yukon Tagging Program

DFO has conducted a salmon tagging programme on salmon stocks in the Canadian section of the drainage since 1982 (excluding 1984). The objectives of the study have been to estimate the total return of chinook and fall chum salmon to Canada (excluding the Porcupine drainage which is partially enumerated by the Fishing Branch weir or by aerial surveys) and to obtain estimates of total escapement, harvest rates, migration rates and run timing. Spaghetti tags are applied to salmon live-captured in the test fish wheels and subsequent recoveries are made by the different user groups fishing upstream. Population estimates are derived from those tags recovered in the commercial fishery below the Stewart River.

The preliminary chinook salmon border population estimate is 43,300 fish (95% C.I. = 39,238 to 47,771). Of this number, approximately 24,359 chinook are estimated to have reached the various spawning grounds. Population and spawning escapement estimates from DFO mark-recapture studies for 1982 through 1992 are summarized on the following page:

| Year | Border Escap't M/R estimate | Total Upper Yukon Cdn. CK catch | Estimated Spawning Escap't |
|---|---|---|---|
| 1982 | 36,598 | 16,808 | 19,790 |
| 1983 | 47,741 | 18,752 | 28,989 |
| 1984 | no tagging | 16,295 | 27,616* |
| 1985 | 29,881 | 19,151 | 10,730 |
| 1986 | 36,479 | 20,064 | 16,415 |
| 1987 | 30,823 | 17,563 | 13,260 |
| 1988 | 44,445 | 21,327 | 23,118 |
| 1989 | 42,620 | 17,419 | 25,201 |
| 1990 | 56,679 | 18,980 | 37,699 |
| 1991 | 41,187 | 20,444 | 20,743 |
| average | 40,717** | 18,680 | 21,772** |
| 1992*** | 43,300 | 18,941 | 24,359 |

notes: * estimate based on expansion of aerial surveys;
** excludes 1984.
*** preliminary only.

The preliminary population estimate of Yukon River chum salmon migrating into Canada (excluding the Porcupine River) in 1992 is 67,962 fish (95% C.I. = 61,889 to 74,776). The effect of inclement weather conditions towards the end of September on either the tagging effort and/or the recapture effort is currently under review. At this time, a minimum of approximately 46,772 chum are estimated to have reached the various spawning grounds. The escapement goal for 1992 was 51,200. For comparison, population and spawning escapement estimates from DFO mark-recapture studies on Yukon chum salmon from 1982 through 1992 are as follows:

| Year | Border Escap't M/R estimate | Total Upper Yukon Cdn. CM catch | Estimated Spawning Escap't |
|---|---|---|---|
| 1982 | 47,049 | 15,091 | 31,958 |
| 1983 | 118,365 | 27,490 | 90,875 |
| 1984 | no tagging | 25,267 | 56,633* |
| 1985 | 99,775 | 37,765 | 62,010 |
| 1986 | 101,826 | 13,836 | 87,990 |
| 1987 | 125,121 | 44,345 | 80,776 |
| 1988 | 69,280 | 32,494 | 36,786 |
| 1989 | 55,861 | 20,111 | 35,750 |
| 1990 | 82,967 | 31,192 | 51,735 |
| 1991 | 112,303 | 33,842 | 78,461 |
| average | 90,283** | 28,145 | 61,818** |
| 1992*** | 67,962 | 21,190 | 46,772 |

notes: * estimate based on assumed comm. harvest rate;
** excludes 1984.
*** preliminary only.

### 6.2.3 Whitehorse Rapids Fishway Chinook Enumeration

A total of 758 chinook salmon (303 females and 455 males) was enumerated at the Whitehorse Rapids Fishway in 1992, just under the 1987-1991 average of 791 chinook. The first chinook appeared on August 6, approximately ten days later than the average date of arrival over the previous five years. However, the run was compressed, with the mid-point of the run being only three days late (August 18) and the date of the peak daily count being average.

This year a total of 324 adipose-clipped fish was counted (79 females and 245 males, 81 of which were jacks). Hatchery returns accounted for at least 43% of the total run through the ladder. It is likely that the actual percentage is higher due to the fact that

not all hatchery raised fry were adipose-clipped. Following are the percentages of hatchery releases which were adipose-clipped since the inception of the hatchery:

| Year | Percentage clipped |
|---|---|
| 1984-85 | 76.6 |
| 1985-86 | 92.0 |
| 1986-87 | 86.0 |
| 1987-88 | 43.8 |
| 1988-89 | 56.5 |
| 1989-90 | 89.4 |
| 1990-91 | 64.0 |
| 1991-92* | 37.8 |
| Note: | * preliminary |

In 1992, the total naturally spawning population was 217 females and 425 males. This includes 43 males which were spawned once for the hatchery and then released. The remainder of the chinook returning to the fishway were sacrificed for brood-stock.

### 6.2.4 Whitehorse Hatchery Operations

From a total of 405,908 fertilized eggs on hand in September 1991, 371,721 fry were released in June 1992 for an egg-to-fry survival of 92%. Approximately 150,000 coded-wire tagged juveniles were released in equal proportions at three different sites including Michie Creek, Wolf Creek, and below the Whitehorse dam.

Unlike some previous years, high water temperatures or mortality were not a problem during the 1992 egg-take. The brood stock consisted of 86 females and 73 males, of which 30 females and 20 males were adipose clipped. After shocking and first pick, the number of eggs currently being incubated is 460,000.

### 6.2.5 Fishing Branch River Chum Salmon Weir

A weir to enumerate chum salmon escapements to the Fishing Branch River (Porcupine drainage) has operated in the following years: 1972-1975, 1985-1989, 1991 and 1992. Weir counts have ranged from 16,000 to 353,000 and are showing a general downward trend. As in

1991, the 1992 Fishing Branch River chum enumeration programme was managed co-operatively between DFO and the Vuntut Gwitch'in First Nation of Old Crow. Funding came from the Economic Development Agreement of the Federal and Territorial governments.

The total count in 1992 was 22,517 chum salmon which is the lowest weir count recorded since 1985 and is 5% below the principle brood year escapement of 23,597 in 1988. The low count in 1992 was unexpected considering the commercial closure of the fall chum fishery in the U.S. portions of the drainage.

The following table presents the weir counts since 1985 for comparative purposes:

| Year | Period of Weir Operation | Total Count | Approx. % Female |
|---|---|---|---|
| 1985 | Sep 06 - Oct 20 | 56,016 | 56% |
| 1986 | Sep 01 - Oct 19 | 31,723 | 54% |
| 1987 | Aug 29 - Oct 18 | 48,956 | 58% |
| 1988 | Sep 05 - Oct 16 | 23,597 | 58% |
| 1989 | Aug 30 - Oct 17 | 43,834 | 49% |
| 1990 | no weir | 35,000* | |
| 1991 | Sep 01 - Oct 15 | 37,733 | 59% |
| 1985-91 avg | | 39,551 | 55% |
| 1992 | Aug 30 - Oct 18 | 22,517 | 54% |
| * note: estimated by aerial survey expansion. | | | |

### 6.2.6 Community Development and Education Program

As part of a community education and public demonstration program, three incubation boxes are in operation in the following locations: McIntyre Creek, Whitehorse; Mayo River; and North Klondike River. The objectives of the incubation box program include: development, education and demonstration of remote/isolated small scale incubation systems; production of sufficient numbers of fry in specific locations for coded-wire tag releases; and provision of local schools with a supply of eyed eggs for small (50-100 egg capacity) classroom incubators.

The McIntyre box, with a capacity of 120,000 eggs, is located in Whitehorse on a groundwater supply which flows into McIntyre Creek.

The box was installed in October 1989, and operated the first year incubating chum salmon eggs taken from Kluane River stock. Approximately 35,000 unmarked chum fry were released back into a side slough of the Kluane River in the spring of 1990 by school children from Whitehorse and Haines Junction. In the fall of 1990, chinook eggs from the Takhini River were incubated in the McIntyre box and the resultant 20,000 fry were reared, coded-wire tagged and released into Flat Creek, a tributary of the Takhini River, in September of 1991. Takhini River chinook eggs were again incubated from September 1991 through the spring of 1992, and a total of 37,000 fry were reared over the summer and released into Flat Creek in mid June 1992. Approximately 30,000 of the these fry were coded-wire tagged with half tags. The egg-take program using Takhini River stocks was repeated in September of 1992 and currently there are about 85,000 eggs incubating. Fry that are produced from the 1992 egg-take will again be reared, coded-wire tagged and released into Flat Creek.

The first Mayo River incubation box, with a capacity of 60,000 eggs, was installed in the summer of 1991 on a groundwater supply adjacent to the Mayo hydro plant (approximately 10 km from the town of Mayo). This project is being conducted by the Mayo District Renewable Resource Council with technical support from DFO. A second, 60,000 egg capacity box was installed in the summer of 1992. In late summer of 1991, approximately 14,000 eggs were taken from Mayo River chinook salmon in the vicinity of the power house, and incubated over the winter. A total of 13,000 fry were produced and these were released unmarked back into the Mayo River in the spring of 1992. The 1992 egg-take totalled 78,000 eggs, again from Mayo River chinook salmon near the power house. Rearing tanks have been installed for use when the fry emerge, and the fry will be reared to taggable size, coded-wire tagged and released in 1993.

The North Klondike River incubation box is located on a small stream which flows into a side slough of the North Klondike River. This project is currently being conducted by the Dawson First Nation with technical assistance from DFO. The box, with a capacity of 60,000 eggs, was first installed in 1989. All eggs destined for this incubation box are first incubated in a moist air incubator for about 1.5 months in a school in Dawson City. Initial testing of the incubator was accomplished using chum salmon eggs taken from mainstem Yukon in the Minto Landing area. Approximately 11,000 unmarked fry were produced from the first year's operation and these were released unmarked back into the Yukon River at Minto. In 1990, attempts to obtain eggs from North Klondike chinook failed due to unavailability of broodstock. As a result, 43,000 chinook eggs were obtained from Tatchun Creek and incubated over the winter of 1990/91. A total of 30,400 marked fry were released back into Tatchun Creek in 1991. Problems were again encountered in obtaining eggs from North Klondike chinook in 1991. Alternate plans were implemented to incubate 69,300 Tatchun Creek

eggs and 30,000 eggs donated by the Yukon River Commercial Fishermen's Association from chinook caught in the mainstem Yukon downstream of the 40-Mile River. Approximately 31,000 marked fry were released back into Tatchun Creek in August of 1992, and only 1,500 fry survived from the Yukon mainstem egg-take; these were released into a pothole lake south of Whitehorse. Currently there are about 25,000 North Klondike chinook eggs and 14,000 Tatchun chinook eggs incubating in the North Klondike box. It is planned that the resultant fry from the 1992 egg-take will be tagged and released back into the systems from which they originated.

In conjunction with the Yukon Department of Education, DFO has developed a classroom educational unit entitled "Salmon in the Classroom". This project, undertaken initially in 1989, involved a Yukon adaptation of the "Salmonids in the Classroom" package which was developed previously in British Columbia. As part of the program, classroom incubators (100 egg capacity) have been distributed to most schools in the Yukon; in 1992 there were 23 incubators in use. The classroom incubators are supplied with eyed eggs from the incubation boxes (described above) or from local spawning areas. Fry resulting from the program will be transported back to the stream of origin and released by school children in the spring of 1993. Some schools are also participating in monitoring and maintaining the incubation boxes.

## 6.3 Cooperative Projects

### 6.3.1 Yukon River Border Sonar

Objectives of the 1992 Yukon River border sonar project were fully accomplished by ADF&G and USFWS personnel during the field season, with a DFO staff member participating in project activities for a one week period during the season. Activities at the project site near Eagle, Alaska, began on the 1st of July. Camp construction was completed by the 16th of July, after which the sonar equipment and support personnel arrived. After some delay due to "bugs" in system hardware and software, field season sonar objectives of detecting standard targets and developing in-season calibration procedures were accomplished. Test gill netting began in late July. The river bottom was fairly free of debris but drift net efficiency was limited due to very high water velocities. Sonar and test netting operations were suspended in August. Sonar and gill net data were once again collected between the 8th and 22nd of September. Set nets were used during the September period, and mortalities were minimized by frequently checking the nets. Most of the fish caught during the July operational period were chinook salmon, while most of the fish caught during the September operational period were chum salmon. Personnel from ADF&G and USFWS are currently processing data.

### 6.3.2 Salmon Genetic Stock Identification Sampling

Sampling of chum salmon spawning stocks was conducted at various locations throughout the Yukon River drainage in 1992 to improve the genetic stock identification (GSI) baseline. ADF&G sampled chum salmon from the Chena River, Salcha River, Sheenjek River, Toklat River, Bluff Cabin Slough, Tanana River mainstem, and from several locations within the Anvik River drainage. The USFWS sampled chum salmon from the Koyukuk River, Tozitna River, and Kaltag Creek. DFO sampled chum salmon from the Fishing Branch River. In a cooperative sampling effort in Canada, USFWS and DFO sampled chum salmon from the Kluane River, Teslin River, and Yukon River mainstem near Minto. They also conducted a reconnaissance survey of the Big Salmon River, Koidern River, White River, and Donjek River in Canada to determine whether sampling for chum salmon should be attempted next year. Results of the survey indicated that the potential for electrophoretic sampling on these rivers in the immediate future is limited.

As part of a program to improve chinook salmon GSI baselines over a broad geographic region, ADF&G conducted some juvenile chinook salmon sampling in the Canadian portion of the Yukon River drainage in 1992. Samples of juvenile chinook were collected by ADF&G staff from Stony Creek (Takhini drainage), Sidney Creek (Nisutlin drainage), Blind Creek (Pelly drainage), McQuesten River (Stewart drainage), and the Nordenskjold River. While the purpose of this sampling was not specific to a Yukon River project, it will help to upgrade the Yukon River chinook salmon GSI baseline.

## 7.0 FISHING BRANCH RIVER FALL CHUM REBUILDING OPTIONS

The JTC identified four categories within which options to rebuild the Fishing Branch River stock might be considered. These were to rebuild by: 1) benefit of the Yukon River mainstem fall chum rebuilding program; 2) developing a specific rebuilding program for the Fishing Branch River; 3) studying and improving spawning habitat in the Fishing Branch River; and 4) using supplemental production. The JTC attempted to examine the potential response of the Fishing Branch River chum salmon stock to the Yukon River mainstem rebuilding program in order to assess the need to move beyond the first category listed above. To do this, several assumptions were necessary due to our lack of knowledge on this stock. Fixed rates of productivity were used to project returns and estimate harvest rates and escapements. These outputs should not be taken in a predictive sense, but are intended to highlight the effect of various assumptions on our expectations for the Fishing Branch River stock and to point out areas for future research. The following procedures were conducted:

1. a model of the upper Yukon chum rebuilding program was constructed using the base level escapements from 1988 to

1991, an assumed productivity of 2.5 adult returns per spawner, and an assumed 100% age-four age composition;

2. from the upper Yukon chum rebuilding model, the required U.S. harvest rate for each year was calculated by subtracting the sum of the spawning escapement objective for that year and the projected Canadian catch (which varied within the agreed range of 23,600 to 32,600) from the total run forecast (based on the brood escapement, an assumed productivity of 2.5, and an age-four age composition);

3. a second model was constructed for the Fishing Branch stock which included the escapements from the same base period, i.e. 1988 to 1991, an assumed 100% age-four age composition, a U.S. harvest rate calculated for each year as per point 2 above, a constant Canadian harvest in the Porcupine River of 1,500 chum (similar to the 1991 catch), and a range of productivities from 1.5 to 2.5 returns per spawner. A range in productivities below 2.5 was used because there was some concern in the JTC that the Fishing Branch stock may not be as productive as upper Yukon stocks given the poor response in the Fishing Branch chum escapement in 1992. Approximately 22,500 chum escaped to the Fishing Branch in 1992 compared to 23,600 in 1988, the principal brood year for the 1992 return. It was expected that there would be a significant increase over the brood escapement this year given the minimal commercial fishing activity for fall chum in the U.S. portion of the drainage.

The primary objective of the Fishing Branch model was to compare the Fishing Branch chum escapement for each year during the upper Yukon chum rebuilding program from 1992 through 2001 given different levels of productivity. It was assumed that the Fishing Branch stock would be co-mingled with other fall chum stocks in U.S. fishing districts and therefore would be harvested at the same rate as upper Yukon chum stocks. Harvest rates in the U.S. fisheries were calculated from the upper Yukon chum rebuilding model. Given that the harvest rates are estimates driven by assumed productivities which are not known, these should not be used out of context from this analysis. The following points summarize the results with respect to coincidental Fishing Branch chum rebuilding[1]:

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[1] The stock would be considered to be rebuilt if the escapement in each of four consecutive years exceeds the minimum escapement objective. For example, if it is stated that Fishing Branch chum would be expected to be rebuilt by 2001, the escapements in 1998 through 2001 would all be expected to exceed 50,000 fish.

1. if the actual productivity of Fishing Branch chum is in the range of 1.5 to 2.0 returns/spawner, the stock will not likely rebuild by 2001 (Figure 2a); if the productivity is 2.1 or greater, rebuilding is expected by 2001;

2. if the actual productivity of this stock is between 1.4 and 1.8 returns/spawner, rebuilding of the escapement would likely occur in only one cycle year before 2001;

3. if the productivity is 1.8 or greater, at least two cycle years would be expected to be rebuilt by 2001;

4. if the productivity is 2.0 , all but one cycle would be expected to rebuild in three cycles (Figure 2b);

5. if the productivity is 2.5, three cycle years would be expected to be rebuilt within one cycle, and all cycle years would be rebuilt by 1996.

This assignment illustrates the sensitivity of rebuilding plans to variation in assumed productivity values. For example, by decreasing the assumed productivity rate from 2.5 fish/spawner to 1.5 fish/spawner, the expected outcome with respect to Fishing Branch chum salmon escapement in 2001 decreases from 281,000 (cycle rebuilding @ productivity of 2.5) to 58,000 (cycle rebuilding @ productivity of 1.5). Because of this sensitivity and our lack of knowledge with respect to productivity, and the likelihood that productivity will vary, i.e. not be fixed, it is difficult at this time to state whether Fishing Branch chum salmon stocks will rebuild by 2001 as a result of the upper Yukon chum rebuilding plan. It is therefore important to initiate studies which give a better understanding of the overall productivity of Yukon River stocks.

As stated above, the lack of response in 1992 to the conservation actions taken in the U.S. commercial fishery, may indicate low productivity from the 1988 brood escapement. However, there are several other factors which may have contributed to the poor escapement in 1992, including differential harvest in the fisheries which did operate in 1992. Unfortunately, an assessment of the role of these factors is precluded by the lack of stock composition data from the fisheries. The Fishing Branch is not the only chum stock in the Yukon drainage that appears to have a conservation problem. A similar declining trend in escapement is found with the Toklat chum stock (in the Tanana drainage). Studies, in addition to the developing GSI program, are being initiated by ADF&G in 1992 with the objective of releasing coded-wire tagged chum fry from Toklat River broodstock into the Toklat River in 1993. A similar program undertaken on the Fishing Branch could provide valuable comparative data and could take advantage of the CWT adult sampling program that is anticipated to collect adult return data from the Toklat study.

To better assess the potential for rebuilding the Fishing Branch chum salmon stock, the Yukon River Joint Technical Committee recommends that studies be implemented as soon as possible that will enable annual run reconstructions of this stock. Such studies should include: the continuation of the Fishing Branch weir program to enumerate adult escapement; a continuation of the development of the GSI program to determine the contributions of Fishing Branch chum to fisheries throughout the Yukon River; and a CWT program to provide alternate estimates of contribution rates. Consideration could also be given to conducting a spawning ground habitat study on the Fishing Branch River, or a study to examine the consumption rates of predators, of which there are many (bears and wolves), to determine their potential impact on the spawning population. The latter might be coordinated with the current study by the Yukon Territorial Government which is examining the potential for non-consumptive use of the Fishing Branch area, i.e wildlife viewing. Once a better understanding of the productivity and utilization of the Fishing Branch chum stock is realized, appropriate rebuilding plans can be developed.

## 8.0 REVIEW OF HISTORICAL CATCH AND ESCAPEMENT DATA

Minor discrepancies and revisions in historical salmon catch and escapement data were discussed and resolved. The catch and escapement data summary appended to this JTC report reflects the revised data. In addition, feasibility of generating estimates of chinook salmon spawning escapement for the Yukon River mainstem in Canada prior to the initiation of the tagging study in 1982 was investigated for the purpose of extending our analysis of spawner-return relationships. There is a relatively complete escapement index database in place for chinook salmon in the Canadian Yukon River drainage, and this allowed for generating approximate chinook salmon population estimates for the years 1977-81. It was further agreed that the JTC will not attempt to estimate fall chum salmon spawning escapement population sizes for the Yukon River mainstem in Canada prior to the initiation of the tagging study in 1982, since there is inadequate data with which to generate such estimates.

# FIGURES AND TABLES

**ATTACHMENT I.**
**HISTORICAL YUKON RIVER SALMON CATCH AND ESCAPEMENT DATA**

Appendix Table 1. Alaskan and Canadian total utilization of Yukon River salmon, 1903–1992.

| Year | Alaska[a,b] | | | Canada[c] | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Chinook | Other Salmon | Total | Chinook | Other Salmon | Total | Chinook Salmon | Other Salmon | Total |
| 1903 | – | – | – | 4,666 | – | 4,666 | 4,666 | – | 4,666 |
| 1904 | – | – | – | – | – | – | – | – | – |
| 1905 | – | – | – | – | – | – | – | – | – |
| 1906 | – | – | – | – | – | – | – | – | – |
| 1907 | – | – | – | – | – | – | – | – | – |
| 1908 | – | – | – | 7,000 | – | 7,000 | 7,000 | – | 7,000 |
| 1909 | – | – | – | 9,238 | – | 9,238 | 9,238 | – | 9,238 |
| 1910 | – | – | – | – | – | – | – | – | – |
| 1911 | – | – | – | – | – | – | – | – | – |
| 1912 | – | – | – | – | – | – | – | – | – |
| 1913 | – | – | – | 12,133 | – | 12,133 | 12,133 | – | 12,133 |
| 1914 | – | – | – | 12,573 | – | 12,573 | 12,573 | – | 12,573 |
| 1915 | – | – | – | 10,466 | – | 10,466 | 10,466 | – | 10,466 |
| 1916 | – | – | – | 9,566 | – | 9,566 | 9,566 | – | 9,566 |
| 1917 | – | – | – | – | – | – | – | – | – |
| 1918 | 12,239 | 1,500,065 | 1,512,304 | 7,066 | – | 7,066 | 19,305 | 1,500,065 | 1,519,370 |
| 1919 | 104,822 | 738,790 | 843,612 | 1,800 | – | 1,800 | 106,622 | 738,790 | 845,412 |
| 1920 | 78,467 | 1,015,655 | 1,094,122 | 12,000 | – | 12,000 | 90,467 | 1,015,655 | 1,106,122 |
| 1921 | 69,646 | 112,098 | 181,744 | 10,840 | – | 10,840 | 80,486 | 112,098 | 192,584 |
| 1922 | 31,825 | 330,000 | 361,825 | 2,420 | – | 2,420 | 34,245 | 330,000 | 364,245 |
| 1923 | 30,893 | 435,000 | 465,893 | 1,833 | – | 1,833 | 32,726 | 435,000 | 467,726 |
| 1924 | 27,375 | 1,130,000 | 1,157,375 | 4,560 | – | 4,560 | 31,935 | 1,130,000 | 1,161,935 |
| 1925 | 15,000 | 259,000 | 274,000 | 3,900 | – | 3,900 | 18,900 | 259,000 | 277,900 |
| 1926 | 20,500 | 555,000 | 575,500 | 4,373 | – | 4,373 | 24,873 | 555,000 | 579,873 |
| 1927 | – | 520,000 | 520,000 | 5,366 | – | 5,366 | 5,366 | 520,000 | 525,366 |
| 1928 | – | 670,000 | 670,000 | 5,733 | – | 5,733 | 5,733 | 670,000 | 675,733 |
| 1929 | – | 537,000 | 537,000 | 5,226 | – | 5,226 | 5,226 | 537,000 | 542,226 |
| 1930 | – | 633,000 | 633,000 | 3,660 | – | 3,660 | 3,660 | 633,000 | 636,660 |
| 1931 | 26,693 | 565,000 | 591,693 | 3,473 | – | 3,473 | 30,166 | 565,000 | 595,166 |
| 1932 | 27,899 | 1,092,000 | 1,119,899 | 4,200 | – | 4,200 | 32,099 | 1,092,000 | 1,124,099 |
| 1933 | 28,779 | 603,000 | 631,779 | 3,333 | – | 3,333 | 32,112 | 603,000 | 635,112 |
| 1934 | 23,365 | 474,000 | 497,365 | 2,000 | – | 2,000 | 25,365 | 474,000 | 499,365 |
| 1935 | 27,665 | 537,000 | 564,665 | 3,466 | – | 3,466 | 31,131 | 537,000 | 568,131 |
| 1936 | 43,713 | 560,000 | 603,713 | 3,400 | – | 3,400 | 47,113 | 560,000 | 607,113 |
| 1937 | 12,154 | 346,000 | 358,154 | 3,746 | – | 3,746 | 15,900 | 346,000 | 361,900 |
| 1938 | 32,971 | 340,450 | 373,421 | 860 | – | 860 | 33,831 | 340,450 | 374,281 |
| 1939 | 28,037 | 327,650 | 355,687 | 720 | – | 720 | 28,757 | 327,650 | 356,407 |
| 1940 | 32,453 | 1,029,000 | 1,061,453 | 1,153 | – | 1,153 | 33,606 | 1,029,000 | 1,062,606 |
| 1941 | 47,608 | 438,000 | 485,608 | 2,806 | – | 2,806 | 50,414 | 438,000 | 488,414 |
| 1942 | 22,487 | 197,000 | 219,487 | 713 | – | 713 | 23,200 | 197,000 | 220,200 |
| 1943 | 27,650 | 200,000 | 227,650 | 609 | – | 609 | 28,259 | 200,000 | 228,259 |
| 1944 | 14,232 | – | 14,232 | 986 | – | 986 | 15,218 | – | 15,218 |
| 1945 | 19,727 | – | 19,727 | 1,333 | – | 1,333 | 21,060 | – | 21,060 |
| 1946 | 22,782 | – | 22,782 | 353 | – | 353 | 23,135 | – | 23,135 |
| 1947 | 54,026 | – | 54,026 | 120 | – | 120 | 54,146 | – | 54,146 |
| 1948 | 33,842 | – | 33,842 | – | – | – | 33,842 | – | 33,842 |
| 1949 | 36,379 | – | 36,379 | – | – | – | 36,379 | – | 36,379 |
| 1950 | 41,808 | – | 41,808 | – | – | – | 41,808 | – | 41,808 |
| 1951 | 56,278 | – | 56,278 | – | – | – | 56,278 | – | 56,278 |
| 1952 | 38,637 | 10,868 | 49,505 | – | – | – | 38,637 | 10,868 | 49,505 |
| 1953 | 58,859 | 385,977 | 444,836 | – | – | – | 58,859 | 385,977 | 444,836 |
| 1954 | 64,545 | 14,375 | 78,920 | – | – | – | 64,545 | 14,375 | 78,920 |
| 1955 | 55,925 | – | 55,925 | – | – | – | 55,925 | – | 55,925 |
| 1956 | 62,208 | 10,743 | 72,951 | – | – | – | 62,208 | 10,743 | 72,951 |
| 1957 | 63,623 | – | 63,623 | – | – | – | 63,623 | – | 63,623 |
| 1958 | 75,625 | 337,500 | 413,125 | 11,000 | 1,500 | 12,500 | 86,625 | 339,000 | 425,625 |
| 1959 | 78,370 | – | 78,370 | 8,434 | 3,098 | 11,532 | 86,804 | 3,098 | 89,902 |
| 1960 | 67,597 | – | 67,597 | 9,653 | 15,608 | 25,261 | 77,250 | 15,608 | 92,858 |

–continued–

| Year | Alaska[a,b] | | | Canada[c] | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | Chinook | Other Salmon | Total | Chinook | Other Salmon | Total | Chinook Salmon | Other Salmon | Total |
| 1961 | 141,152 | 461,597 | 602,749 | 13,246 | 9,076 | 22,322 | 154,398 | 470,673 | 625,071 |
| 1962 | 105,844 | 434,663 | 540,507 | 13,937 | 9,436 | 23,373 | 119,781 | 444,099 | 563,880 |
| 1963 | 141,910 | 429,396 | 571,306 | 10,077 | 27,696 | 37,773 | 151,987 | 457,092 | 609,079 |
| 1964 | 109,818 | 504,420 | 614,238 | 7,408 | 12,187 | 19,595 | 117,226 | 516,607 | 633,833 |
| 1965 | 134,706 | 484,587 | 619,293 | 5,380 | 11,789 | 17,169 | 140,086 | 496,376 | 636,462 |
| 1966 | 104,887 | 309,502 | 414,389 | 4,452 | 13,192 | 17,644 | 109,339 | 322,694 | 432,033 |
| 1967 | 146,104 | 352,397 | 498,501 | 5,150 | 16,961 | 22,111 | 151,254 | 369,358 | 520,612 |
| 1968 | 118,632 | 270,818 | 389,450 | 5,042 | 11,633 | 16,675 | 123,674 | 282,451 | 406,125 |
| 1969 | 105,027 | 424,399 | 529,426 | 2,624 | 7,776 | 10,400 | 107,651 | 432,175 | 539,826 |
| 1970 | 93,019 | 585,760 | 678,779 | 4,663 | 3,711 | 8,374 | 97,682 | 589,471 | 687,153 |
| 1971 | 136,191 | 547,448 | 683,639 | 6,447 | 16,911 | 23,358 | 142,638 | 564,359 | 706,997 |
| 1972 | 113,098 | 461,617 | 574,715 | 5,729 | 7,532 | 13,261 | 118,827 | 469,149 | 587,976 |
| 1973 | 99,670 | 779,158 | 878,828 | 4,522 | 10,135 | 14,657 | 104,192 | 789,293 | 893,485 |
| 1974 | 118,053 | 1,229,678 | 1,347,731 | 5,631 | 11,646 | 17,277 | 123,684 | 1,241,324 | 1,365,008 |
| 1975 | 76,883 | 1,307,037 | 1,383,920 | 6,000 | 20,600 | 26,600 | 82,883 | 1,327,637 | 1,410,520 |
| 1976 | 105,582 | 1,026,908 | 1,132,490 | 5,025 | 5,200 | 10,225 | 110,607 | 1,032,108 | 1,142,715 |
| 1977 | 114,338 | 1,090,330 | 1,204,668 | 7,527 | 12,479 | 20,006 | 121,865 | 1,102,809 | 1,224,674 |
| 1978 | 129,465 | 1,631,479 | 1,760,944 | 5,881 | 9,566 | 15,447 | 135,346 | 1,641,045 | 1,776,391 |
| 1979 | 158,678 | 1,631,072 | 1,789,750 | 10,375 | 22,084 | 32,459 | 169,053 | 1,653,156 | 1,822,209 |
| 1980 | 196,709 | 1,730,410 | 1,927,119 | 22,846 | 22,218 | 45,064 | 219,555 | 1,752,628 | 1,972,183 |
| 1981 | 187,708 | 2,097,214 | 2,284,922 | 16,109 | 22,281 | 40,390 | 205,817 | 2,119,495 | 2,325,312 |
| 1982 | 151,802 | 1,264,580 | 1,416,382 | 17,208 | 16,091 | 33,299 | 169,010 | 1,280,671 | 1,449,681 |
| 1983 | 197,388 | 1,677,390 | 1,874,778 | 18,952 | 29,490 | 48,442 | 216,340 | 1,706,880 | 1,923,220 |
| 1984 | 162,332 | 1,546,685 | 1,709,017 | 16,795 | 29,267 | 46,062 | 179,127 | 1,575,952 | 1,755,079 |
| 1985 | 185,959 | 1,655,909 | 1,841,868 | 19,301 | 41,265 | 60,566 | 205,260 | 1,697,174 | 1,902,434 |
| 1986 | 145,208 | 1,756,395 | 1,901,603 | 20,364 | 14,493 | 34,857 | 165,572 | 1,770,888 | 1,936,460 |
| 1987 | 187,884 | 1,244,038 | 1,431,922 | 17,614 | 44,480 | 62,094 | 205,498 | 1,288,518 | 1,494,016 |
| 1988 | 148,011 | 2,312,894 | 2,460,905 | 21,427 | 33,565 | 54,992 | 169,438 | 2,346,459 | 2,515,897 |
| 1989 | 153,560 | 2,270,272 | 2,423,832 | 17,944 | 23,020 | 40,964 | 171,504 | 2,293,292 | 2,464,796 |
| 1990 | 148,706 | 1,047,507 | 1,196,213 | 19,238 | 33,622 | 52,860 | 167,944 | 1,081,129 | 1,249,073 |
| 1991[d] | 152,726 | 1,268,645 | 1,421,371 | 20,607 | 35,418 | 56,025 | 173,333 | 1,304,063 | 1,477,396 |
| 1992[d,e] | 171,992 | 984,988 | 1,156,980 | 19,174 | 23,182 | 42,356 | 191,166 | 1,008,170 | 1,199,335 |

[a] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe.
[b] Commercial, subsistence, and personal-use catches combined.
[c] Commercial, Indian Food, Domestic, and sport catches combined.
[d] Preliminary
[e] Subsistence and non-commercial harvest data unavailable. Average subsistence harvest substituted.

Appendix Table 2. Alaskan and Canadian total utilization of Yukon River chinook and fall chum salmon, 1961–1992.

| | Chinook | | | Fall Chum | | |
|---|---|---|---|---|---|---|
| Year | Canada[a] | Alaska[b,c] | Total | Canada[a] | Alaska[b,c] | Total |
| 1961 | 13,246 | 141,152 | 154,398 | 9,076 | 144,233 | 153,309 |
| 1962 | 13,937 | 105,844 | 119,781 | 9,436 | 140,401 | 149,837 |
| 1963 | 10,077 | 141,910 | 151,987 | 27,696 | 99,031 [d] | 126,727 |
| 1964 | 7,408 | 109,818 | 117,226 | 12,187 | 128,707 | 140,894 |
| 1965 | 5,380 | 134,706 | 140,086 | 11,789 | 135,600 | 147,389 |
| 1966 | 4,452 | 104,887 | 109,339 | 13,192 | 122,548 | 135,740 |
| 1967 | 5,150 | 146,104 | 151,254 | 16,961 | 107,018 | 123,979 |
| 1968 | 5,042 | 118,632 | 123,674 | 11,633 | 97,552 | 109,185 |
| 1969 | 2,624 | 105,027 | 107,651 | 7,776 | 183,373 | 191,149 |
| 1970 | 4,663 | 93,019 | 97,682 | 3,711 | 265,096 | 268,807 |
| 1971 | 6,447 | 136,191 | 142,638 | 16,911 | 246,756 | 263,667 |
| 1972 | 5,729 | 113,098 | 118,827 | 7,532 | 188,178 | 195,710 |
| 1973 | 4,522 | 99,670 | 104,192 | 10,135 | 285,760 | 295,895 |
| 1974 | 5,631 | 118,053 | 123,684 | 11,646 | 383,552 | 395,198 |
| 1975 | 6,000 | 76,883 | 82,883 | 20,600 | 361,600 | 382,200 |
| 1976 | 5,025 | 105,582 | 110,607 | 5,200 | 228,717 | 233,917 |
| 1977 | 7,527 | 114,338 | 121,865 | 12,479 | 340,757 | 353,236 |
| 1978 | 5,881 | 129,465 | 135,346 | 9,566 | 331,250 | 340,816 |
| 1979 | 10,375 | 158,678 | 169,053 | 22,084 | 593,293 | 615,377 |
| 1980 | 22,846 | 196,709 | 219,555 | 22,218 | 466,087 | 488,305 |
| 1981 | 18,109 | 187,708 | 205,817 | 22,281 | 654,976 | 677,257 |
| 1982 | 17,208 | 151,802 | 169,010 | 16,091 | 357,084 | 373,175 |
| 1983 | 18,952 | 197,388 | 216,340 | 29,490 | 495,526 | 525,016 |
| 1984 | 16,795 | 162,332 | 179,127 | 29,267 | 383,055 | 412,322 |
| 1985 | 19,301 | 185,959 | 205,260 | 41,265 | 474,216 | 515,481 |
| 1986 | 20,364 | 145,208 | 165,572 | 14,493 | 303,485 | 317,978 |
| 1987 | 17,614 | 187,884 | 205,498 | 44,480 | 361,663 [d] | 406,143 |
| 1988 | 21,427 | 148,011 | 169,438 | 33,565 | 320,666 | 354,231 |
| 1989 | 17,944 | 153,560 | 171,504 | 23,020 | 511,225 | 534,245 |
| 1990 | 19,238 | 148,706 | 167,944 | 33,622 | 321,059 | 354,681 |
| 1991 [e] | 20,607 | 152,726 | 173,333 | 35,418 | 396,565 | 431,983 |
| 1992 [e,f] | 19,174 | 171,992 | 191,166 | 23,182 | 229,130 | 252,312 |
| Average | | | | | | |
| 1961–81 | 8,099 | 125,594 | 133,693 | 13,529 | 262,118 | 275,647 |
| 1982–86 | 18,524 | 168,538 | 187,062 | 26,121 | 402,673 | 428,794 |
| 1987–91 | 19,366 | 158,177 | 177,543 | 34,021 | 382,236 | 416,257 |

[a] Commercial, Indian Food, and Domestic catches combined.
[b] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe.
[c] Commercial, subsistence, and personal–use catches combined.
[d] Subsistence catch only; commercial fishery did not operate.
[e] Preliminary.
[f] Subsistence and non–commercial harvest data unavailable. Average subsistence harvest substituted.

Appendix Table 3. Alaskan catch of Yukon River chinook salmon, 1961–1992.

| Year | Estimated Subsistence Use[a] | Harvest | | |
|---|---|---|---|---|
| | | Subsistence Harvest[b] | Commercial Harvest[c] | Total Harvest |
| 1961 | 21,488 | 21,488 | 119,664 | 141,152 |
| 1962 | 11,110 | 11,110 | 94,734 | 105,844 |
| 1963 | 24,862 | 24,862 | 117,048 | 141,910 |
| 1964 | 16,231 | 16,231 | 93,587 | 109,818 |
| 1965 | 16,608 | 16,608 | 118,098 | 134,706 |
| 1966 | 11,572 | 11,572 | 93,315 | 104,887 |
| 1967 | 16,448 | 16,448 | 129,656 | 146,104 |
| 1968 | 12,106 | 12,106 | 106,526 | 118,632 |
| 1969 | 14,000 | 14,000 | 91,027 | 105,027 |
| 1970 | 13,874 | 13,874 | 79,145 | 93,019 |
| 1971 | 25,684 | 25,684 | 110,507 | 136,191 |
| 1972 | 20,258 | 20,258 | 92,840 | 113,098 |
| 1973 | 24,317 | 24,317 | 75,353 | 99,670 |
| 1974 | 19,964 | 19,964 | 98,089 | 118,053 |
| 1975 | 13,045 | 13,045 | 63,838 | 76,883 |
| 1976 | 17,806 | 17,806 | 87,776 | 105,582 |
| 1977 | 17,581 | 17,581 | 96,757 | 114,338 |
| 1978 | 30,297 | 30,297 | 99,168 | 129,465 |
| 1979 | 31,005 | 31,005 | 127,673 | 158,678 |
| 1980 | 42,724 | 42,724 | 153,985 | 196,709 |
| 1981 | 29,690 | 29,690 | 158,018 | 187,708 |
| 1982 | 28,158 | 28,158 | 123,644 | 151,802 |
| 1983 | 49,478 | 49,478 | 147,910 | 197,388 |
| 1984 | 42,428 | 42,428 | 119,904 | 162,332 |
| 1985 | 39,771 | 39,771 | 146,188 | 185,959 |
| 1986 | 45,238 | 45,238 | 99,970 | 145,208 |
| 1987 | 53,124 | 53,124 | 134,760 [d] | 187,884 |
| 1988 | 46,590 | 46,590 | 101,421 | 148,011 |
| 1989 | 51,280 | 51,280 | 102,280 | 153,560 |
| 1990 | 52,512 | 52,099 | 96,607 | 148,706 |
| 1991 [e] | 47,159 | 46,201 | 106,525 | 152,726 |
| 1992 [e] | 50,611 [f] | 49,859 [f] | 122,133 | 171,992 |
| Average | | | | |
| 1961–81 | 20,508 | 20,508 | 105,086 | 125,594 |
| 1982–86 | 41,015 | 41,015 | 127,523 | 168,538 |
| 1987–91 | 50,133 | 49,859 | 108,319 | 158,177 |

[a] Includes salmon harvested solely for subsistence, plus an estimate of the number of salmon carcasses harvested for the commercial production of salmon roe and used for subsistence. These data are only available since 1990.

[b] Includes salmon harvested solely for subsistence and personal use. Taken from 1990 Yukon Area AMR.

[c] Includes ADF&G test fish sales, fish sold in the round, plus an estimate of the number of female salmon commercailly harvested for the commercial production of salmon roe. (See 1990 Yukon Area AMR).

[d] Includes 653 and 2,136 chinook salmon illegally sold in District 5 and 6 (Tanana River), respectively.

[e] Preliminary.

[f] Subsistence harvest data unavailable. Most recent 5–year average substituted.

Appendix Table 4. Canadian catch of Yukon River chinook salmon, 1961–1992.[a]

| Year | Mainstem Yukon River Harvest | | | | | Porcupine River Indian Food Fish | Total Utilization |
|---|---|---|---|---|---|---|---|
| | Commercial | Domestic | Indian Food Fish | Sport[b] | Total | | |
| 1961 | 3,446 | | 9,300 | | 12,746 | 500 | 13,246 |
| 1962 | 4,037 | | 9,300 | | 13,337 | 600 | 13,937 |
| 1963 | 2,283 | | 7,750 | | 10,033 | 44 | 10,077 |
| 1964 | 3,208 | | 4,124 | | 7,332 | 76 | 7,408 |
| 1965 | 2,265 | | 3,021 | | 5,286 | 94 | 5,380 |
| 1966 | 1,942 | | 2,445 | | 4,387 | 65 | 4,452 |
| 1967 | 2,187 | | 2,920 | | 5,107 | 43 | 5,150 |
| 1968 | 2,212 | | 2,800 | | 5,012 | 30 | 5,042 |
| 1969 | 1,640 | | 957 | | 2,597 | 27 | 2,624 |
| 1970 | 2,611 | | 2,044 | | 4,655 | 8 | 4,663 |
| 1971 | 3,178 | | 3,260 | | 6,438 | 9 | 6,447 |
| 1972 | 1,769 | | 3,960 | | 5,729 | – | 5,729 |
| 1973 | 2,199 | | 2,319 | | 4,518 | 4 | 4,522 |
| 1974 | 1,808 | 406 | 3,342 | | 5,556 | 75 | 5,631 |
| 1975 | 3,000 | 400 | 2,500 | | 5,900 | 100 | 6,000 |
| 1976 | 3,500 | 500 | 1,000 | | 5,000 | 25 | 5,025 |
| 1977 | 4,720 | 531 | 2,247 | | 7,498 | 29 | 7,527 |
| 1978 | 2,975 | 421 | 2,485 | | 5,881 | – | 5,881 |
| 1979 | 6,175 | 1,200 | 3,000 | | 10,375 | – | 10,375 |
| 1980 | 9,500 | 3,500 | 7,546 | 300 | 20,846 | 2,000 | 22,846 |
| 1981 | 8,593 | 237 | 8,879 | 300 | 18,009 | 100 | 18,109 |
| 1982 | 8,640 | 435 | 7,433 | 300 | 16,808 | 400 | 17,208 |
| 1983 | 13,027 | 400 | 5,025 | 300 | 18,752 | 200 | 18,952 |
| 1984 | 9,885 | 260 | 5,850 | 300 | 16,295 | 500 | 16,795 |
| 1985 | 12,573 | 478 | 5,800 | 300 | 19,151 | 150 | 19,301 |
| 1986 | 10,797 | 342 | 8,625 | 300 | 20,064 | 300 | 20,364 |
| 1987 | 10,864 | 330 | 6,069 | 300 | 17,563 | 51 | 17,614 |
| 1988 | 13,217 | 282 | 7,178 | 650 | 21,327 | 100 | 21,427 |
| 1989 | 9,789 | 400 | 6,930 | 300 | 17,419 | 525 | 17,944 |
| 1990 | 11,324 | 247 | 7,109 | 300 | 18,980 | 258 | 19,238 |
| 1991 | 10,906 | 227 | 9,011 | 300 | 20,444 | 163 | 20,607 |
| 1992[c] | 10,877 | 277 | 7,487[d] | 300 | 18,941 | 233[d] | 19,174 |
| Average | | | | | | | |
| 1961–81 | 3,488 | 899 | 4,057 | 300 | 7,916 | 182 | 8,099 |
| 1982–86 | 10,984 | 383 | 6,547 | 300 | 18,214 | 310 | 18,524 |
| 1987–91 | 11,220 | 297 | 7,259 | 370 | 19,147 | 219 | 19,366 |

[a] Catch in number of fish.
[b] Sport fish harvest unknown prior to 1980.
[c] Preliminary.
[d] Data are unavailable at this time. Average of the previous 6 years data (cycle average) is substituted.

Appendix Table 5. Alaska catch of Yukon River summer chum salmon, 1961–1992.

| Year | Estimated Subsistence Use[a] | Harvest | | |
|---|---|---|---|---|
| | | Subsistence Harvest[b] | Commercial Harvest[c] | Total Harvest |
| 1961 | 305,317 [d] | 305,317 [d] | 0 | 305,317 |
| 1962 | 261,856 [d] | 261,856 [d] | 0 | 261,856 |
| 1963 | 297,094 [d] | 297,094 [d] | 0 | 297,094 |
| 1964 | 361,080 [d] | 361,080 [d] | 0 | 361,080 |
| 1965 | 336,848 [d] | 336,848 [d] | 0 | 336,848 |
| 1966 | 154,508 [d] | 154,508 [d] | 0 | 154,508 |
| 1967 | 206,233 [d] | 206,233 [d] | 10,935 | 217,168 |
| 1968 | 133,880 [d] | 133,880 [d] | 14,470 | 148,350 |
| 1969 | 156,191 [d] | 156,191 [d] | 61,966 | 218,157 |
| 1970 | 166,504 [d] | 166,504 [d] | 137,006 | 303,510 |
| 1971 | 171,487 [d] | 171,487 [d] | 100,090 | 271,577 |
| 1972 | 108,006 [d] | 108,006 [d] | 135,668 | 243,674 |
| 1973 | 161,012 [d] | 161,012 [d] | 285,509 | 446,521 |
| 1974 | 227,811 [d] | 227,811 [d] | 589,892 | 817,703 |
| 1975 | 211,888 [d] | 211,888 [d] | 710,295 | 922,183 |
| 1976 | 186,872 [d] | 186,872 [d] | 600,894 | 787,766 |
| 1977 | 159,502 | 159,502 | 534,875 | 694,377 |
| 1978 | 197,144 | 188,303 | 1,077,987 | 1,266,290 |
| 1979 | 196,187 | 191,287 | 819,533 | 1,010,820 |
| 1980 | 272,398 | 167,705 | 1,067,715 | 1,235,420 |
| 1981 | 208,284 | 117,629 | 1,279,701 | 1,397,330 |
| 1982 | 260,969 | 117,413 | 717,013 | 834,426 |
| 1983 | 240,386 | 149,180 | 995,469 | 1,144,649 |
| 1984 | 230,747 | 166,630 | 866,040 | 1,032,670 |
| 1985 | 264,828 | 157,744 | 934,013 | 1,091,757 |
| 1986 | 290,825 | 182,337 | 1,188,850 | 1,371,187 |
| 1987 | 275,914 | 174,940 | 622,541 | 797,481 |
| 1988 | 311,724 | 202,914 | 1,620,269 | 1,823,183 |
| 1989 | 249,582 | 168,849 | 1,463,195 | 1,632,044 |
| 1990 | 201,839 [e] | 117,811 | 513,906 | 631,717 |
| 1991 [f] | 275,673 [e] | 118,509 | 606,527 | 725,036 |
| 1992 [f] | 262,946 [g] | 156,605 [g] | 533,496 | 690,101 |
| Average | | | | |
| 1961–81 | 213,338 | 203,382 | 353,645 | 557,026 |
| 1982–86 | 257,551 | 154,661 | 940,277 | 1,094,938 |
| 1987–91 | 262,946 | 156,605 | 965,288 | 1,121,892 |

[a] Includes salmon harvested solely for subsistence, plus an estimate of the number of salmon carcasses harvested for the commercial production of salmon roe and used for subsistence.
[b] Includes salmon harvested solely for subsistence. Taken from 1990 Yukon Area AMR.
[c] Includes ADF&G test fish sales, fish sold in the round, plus an estimate of the number of salmon commercially harvested for the commercial production of salmon roe. (See 1990 Yukon Area AMR).
[d] Catches of summer chum salmon estimated for 1961–1976 since catches other than chinook salmon were not differentiated by species.
[e] Subsistence harvest plus estimated number of summer chum salmon fed to dogs by District 4 subsistence fishing households.
[f] Preliminary.
[g] Subsistence harvest data unavailable. Most recent 5–year average substituted.

Appendix Table 6. Alaska catch of Yukon River fall chum salmon, 1961–1992.

| Year | Estimated Subsistence Use[a] | Harvest | | |
|---|---|---|---|---|
| | | Subsistence Harvest[b] | Commercial Harvest[c] | Total Harvest |
| 1961 | 101,772 [d,e] | 101,772 [d,e] | 42,461 | 144,233 |
| 1962 | 87,285 [d,e] | 87,285 [d,e] | 53,116 | 140,401 |
| 1963 | 99,031 [d,e] | 99,031 [d,e] | 0 | 99,031 |
| 1964 | 120,360 [d,e] | 120,360 [d,e] | 8,347 | 128,707 |
| 1965 | 112,283 [d,e] | 112,283 [d,e] | 23,317 | 135,600 |
| 1966 | 51,503 [d,e] | 51,503 [d,e] | 71,045 | 122,548 |
| 1967 | 68,744 [d,e] | 68,744 [d,e] | 38,274 | 107,018 |
| 1968 | 44,627 [d,e] | 44,627 [d,e] | 52,925 | 97,552 |
| 1969 | 52,063 [d,e] | 52,063 [d,e] | 131,310 | 183,373 |
| 1970 | 55,501 [d,e] | 55,501 [d,e] | 209,595 | 265,096 |
| 1971 | 57,162 [d,e] | 57,162 [d,e] | 189,594 | 246,756 |
| 1972 | 36,002 [d,e] | 36,002 [d,e] | 152,176 | 188,178 |
| 1973 | 53,670 [d,e] | 53,670 [d,e] | 232,090 | 285,760 |
| 1974 | 93,776 [d,e] | 93,776 [d,e] | 289,776 | 383,552 |
| 1975 | 86,591 [d,e] | 86,591 [d,e] | 275,009 | 361,600 |
| 1976 | 72,327 [d,e] | 72,327 [d,e] | 156,390 | 228,717 |
| 1977 | 82,771 [e] | 82,771 [e] | 257,986 | 340,757 |
| 1978 | 94,867 [e] | 84,239 [e] | 247,011 | 331,250 |
| 1979 | 233,347 | 214,881 | 378,412 | 593,293 |
| 1980 | 172,657 | 167,637 | 298,450 | 466,087 |
| 1981 | 188,525 | 177,240 | 477,736 | 654,976 |
| 1982 | 132,897 | 132,092 | 224,992 | 357,084 |
| 1983 | 192,928 | 187,864 | 307,662 | 495,526 |
| 1984 | 174,823 | 172,495 | 210,560 | 383,055 |
| 1985 | 206,472 | 203,947 | 270,269 | 474,216 |
| 1986 | 164,043 | 163,466 | 140,019 | 303,485 |
| 1987 | 361,663 | 361,663 [f] | 0 | 361,663 |
| 1988 | 159,703 | 156,476 | 164,190 | 320,666 |
| 1989 | 224,046 | 209,297 | 301,928 | 511,225 |
| 1990 | 188,941 | 177,658 | 143,401 | 321,059 |
| 1991 [g] | 161,777 | 138,411 | 258,154 | 396,565 |
| 1992 [g] | 212,002 [h] | 208,701 [h] | 20,429 | 229,130 |
| Average | | | | |
| 1961–81 | 93,565 | 91,403 | 170,715 | 262,118 |
| 1982–86 | 174,233 | 171,973 | 230,700 | 402,673 |
| 1987–91 | 219,226 | 208,701 | 173,535 | 382,236 |

[a] Includes salmon harvested solely for subsistence, plus an estimate of the number of salmon carcasses harvested for the commercial production of salmon roe and used for subsistence.
[b] Includes salmon harvested solely for subsistence.
[c] Includes ADF&G test fish sales, fish sold in the round, plus an estimate of the number of female salmon commercially harvested for the commercial production of salmon roe. (See 1990 Yukon Area AMR).
[d] Catches of fall chum salmon estimated for 1961–1976 since catches other than chinook salmon were not differentiated by species.
[e] Minimum estimates of fall chum salmon for 1961–1978 because surveys were conducted prior to the end of the fishing season.
[f] Includes an estimated 95,768 and 119,168 fall chum salmon illegally sold in Districts 5 and 6 (Tanana River), respectively.
[g] Preliminary.
[h] Subsistence harvest data unavailable. Most recent 5–year subsistence harvest average substituted.

Appendix Table 7. Canadian catch of Yukon River fall chum salmon 1961–1992.[a]

| Year | Mainstem Yukon River Harvest | | | | Porcupine River Indian Food Fish | Total Utilization |
|---|---|---|---|---|---|---|
| | Commercial | Domestic | Indian Food Fish | Total | | |
| 1961 | 3,276 | | 3,800 | 7,076 | 2,000 | 9,076 |
| 1962 | 936 | | 6,500 | 7,436 | 2,000 | 9,436 |
| 1963 | 2,196 | | 5,500 | 7,696 | 20,000 | 27,696 |
| 1964 | 1,929 | | 4,200 | 6,129 | 6,058 | 12,187 |
| 1965 | 2,071 | | 2,183 | 4,254 | 7,535 | 11,789 |
| 1966 | 3,157 | | 1,430 | 4,587 | 8,605 | 13,192 |
| 1967 | 3,343 | | 1,850 | 5,193 | 11,768 | 16,961 |
| 1968 | 453 | | 1,180 | 1,633 | 10,000 | 11,633 |
| 1969 | 2,279 | | 2,120 | 4,399 | 3,377 | 7,776 |
| 1970 | 2,479 | | 612 | 3,091 | 620 | 3,711 |
| 1971 | 1,761 | | 150 | 1,911 | 15,000 | 16,911 |
| 1972 | 2,532 | | 0 | 2,532 | 5,000 | 7,532 |
| 1973 | 2,806 | | 1,129 | 3,935 | 6,200 | 10,135 |
| 1974 | 2,544 | 466 | 1,636 | 4,646 | 7,000 | 11,646 |
| 1975 | 2,500 | 4,600 | 2,500 | 9,600 | 11,000 | 20,600 |
| 1976 | 1,000 | 1,000 | 100 | 2,100 | 3,100 | 5,200 |
| 1977 | 3,990 | 1,499 | 1,430 | 6,919 | 5,560 | 12,479 |
| 1978 | 3,356 | 728 | 482 | 4,566 | 5,000 | 9,566 |
| 1979 | 9,084 | 2,000 | 11,000 | 22,084 | – | 22,084 |
| 1980 | 9,000 | 4,000 | 3,218 | 16,218 | 6,000 | 22,218 |
| 1981 | 15,260 | 1,611 | 2,410 | 19,281 | 3,000 | 22,281 |
| 1982 | 11,312 | 683 | 3,096 | 15,091 | 1,000 | 16,091 |
| 1983 | 25,990 | 300 | 1,200 | 27,490 | 2,000 | 29,490 |
| 1984 | 22,932 | 535 | 1,800 | 25,267 | 4,000 | 29,267 |
| 1985 | 35,746 | 279 | 1,740 | 37,765 | 3,500 | 41,265 |
| 1986 | 11,464 | 222 | 2,150 | 13,836 | 657 | 14,493 |
| 1987 | 40,591 | 132 | 3,622 | 44,345 | 135 | 44,480 |
| 1988 | 30,263 | 349 | 1,882 | 32,494 | 1,071 | 33,565 |
| 1989 | 17,549 | 100 | 2,462 | 20,111 | 2,909 | 23,020 |
| 1990 | 27,537 | 0 | 3,675 | 31,212 | 2,410 | 33,622 |
| 1991 | 31,404 | 0 | 2,438 | 33,842 | 1,576 | 35,418 |
| 1992[b] | 18,576 | 0 | 2,614[c] | 21,190 | 1,992[c] | 23,182 |
| Average | | | | | | |
| 1961–81 | 3,617 | 1,988 | 2,544 | 6,918 | 6,611 | 13,529 |
| 1982–86 | 21,489 | 404 | 1,997 | 23,890 | 2,231 | 26,121 |
| 1987–91 | 29,469 | 116 | 2,816 | 32,401 | 1,620 | 34,021 |

[a] Catch in number of fish.
[b] Preliminary.
[c] Data are unavailable at this time. Average of the previous 4 years data (cycle average) is substituted.

Appendix Table 8. Alaska catch of Yukon River coho salmon, 1961–1992.

| Year | Estimated Subsistence Use[a] | Harvest | | |
|---|---|---|---|---|
| | | Subsistence Harvest[b] | Commercial Harvest[c] | Total Harvest |
| 1961 | 9,192 [d,e] | 9,192 [d,e] | 2,855 | 12,047 |
| 1962 | 9,480 [d,e] | 9,480 [d,e] | 22,926 | 32,406 |
| 1963 | 27,699 [d,e] | 27,699 [d,e] | 5,572 | 33,271 |
| 1964 | 12,187 [d,e] | 12,187 [d,e] | 2,446 | 14,633 |
| 1965 | 11,789 [d,e] | 11,789 [d,e] | 350 | 12,139 |
| 1966 | 13,192 [d,e] | 13,192 [d,e] | 19,254 | 32,446 |
| 1967 | 17,164 [d,e] | 17,164 [d,e] | 11,047 | 28,211 |
| 1968 | 11,613 [d,e] | 11,613 [d,e] | 13,303 | 24,916 |
| 1969 | 7,776 [d,e] | 7,776 [d,e] | 15,093 | 22,869 |
| 1970 | 3,966 [d,e] | 3,966 [d,e] | 13,188 | 17,154 |
| 1971 | 16,912 [d,e] | 16,912 [d,e] | 12,203 | 29,115 |
| 1972 | 7,532 [d,e] | 7,532 [d,e] | 22,233 | 29,765 |
| 1973 | 10,236 [d,e] | 10,236 [d,e] | 36,641 | 46,877 |
| 1974 | 11,646 [d,e] | 11,646 [d,e] | 16,777 | 28,423 |
| 1975 | 20,708 [d,e] | 20,708 [d,e] | 2,546 | 23,254 |
| 1976 | 5,241 [d,e] | 5,241 [d,e] | 5,184 | 10,425 |
| 1977 | 16,333 [e] | 16,333 [e] | 38,863 | 55,196 |
| 1978 | 7,787 [e] | 7,787 [e] | 26,152 | 33,939 |
| 1979 | 9,794 | 9,794 | 17,165 | 26,959 |
| 1980 | 20,158 | 20,158 | 8,745 | 28,903 |
| 1981 | 21,228 | 21,228 | 23,680 | 44,908 |
| 1982 | 35,894 | 35,894 | 37,176 | 73,070 |
| 1983 | 23,895 | 23,895 | 13,320 | 37,215 |
| 1984 | 49,020 | 49,020 | 81,940 | 130,960 |
| 1985 | 32,264 | 32,264 | 57,672 | 89,936 |
| 1986 | 34,468 | 34,468 | 47,255 | 81,723 |
| 1987 | 84,894 | 84,894 [f] | 0 | 84,894 |
| 1988 | 69,138 | 69,138 | 99,907 | 169,045 |
| 1989 | 41,510 | 41,510 | 85,493 | 127,003 |
| 1990 | 50,611 | 47,816 | 46,915 | 94,731 |
| 1991 [g] | 40,893 | 37,388 | 109,656 | 147,044 |
| 1992 [g] | 57,409 [h] | 56,149 [h] | 9,608 | 65,757 |
| Average | | | | |
| 1961–81 | 12,935 | 12,935 | 15,058 | 27,993 |
| 1982–86 | 35,108 | 35,108 | 47,473 | 82,581 |
| 1987–91 | 57,409 | 56,149 | 68,394 | 124,543 |

[a] Includes salmon harvested solely for subsistence, plus an estimate of the number of salmon carcasses harvested for the commercial production of salmon roe and used for subsistence. These data are available only since 1990.
[b] Includes salmon harvested solely for subsistence.
[c] Includes ADF&G test fish sales, fish sold in the round, plus an estimate of the numbers of female salmon commercially harvested for the commercial production of salmon roe. (See 1990 Yukon Area AMR).
[d] Catches of coho salmon estimated for 1961–1976 since catches other than chinook salmon were not differentiated by species.
[e] Minimum estimates of coho salmon for 1961–1978 because surveys were conducted prior to the end of the fishing season.
[f] Includes an estimated 5,015 and 31,276 coho salmon illegally sold in Districts 5 and 6 (Tanana River), respectively.
[g] Preliminary.
[h] Subsistence harvest data unavailable. Most recent 5–year subsistence harvest average substituted.

Appendix Table 9. Chinook salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1961–1992.[a]

| Year | Andreafsky River | | Anvik River[b] | | Nulato River | | | Chena River | | | Salcha River | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | East Fork | West Fork | River | Index Area | North Fork[c] | South Fork | Gisasa River | Population Estimate | River | Index Area[d] | Population Estimate | River | Index Area[e] |
| 1961 | 1,003 | – | 1,226 | – | 376 [f] | 167 | 266 [f] | – | – | – | – | 2,878 | – |
| 1962 | 675 [f] | 762 [f] | – | – | – | – | – | – | 61 [f,g] | – | – | 937 | – |
| 1963 | – | – | – | – | – | – | – | – | 137 [f] | – | – | – | – |
| 1964 | 867 | 705 | – | – | – | – | – | – | – | – | – | 450 | – |
| 1965 | – | 344 [f] | 650 [f] | – | – | – | – | – | – | – | – | 408 | – |
| 1966 | 361 | 303 | 638 | – | – | – | – | – | – | – | – | 800 | – |
| 1967 | – | 276 [f] | 336 [f] | – | – | – | – | – | – | – | – | – | – |
| 1968 | 380 | 383 | 310 [f] | – | – | – | – | – | – | – | – | 739 | – |
| 1969 | 274 [f] | 231 [f] | 296 [f] | – | – | – | – | – | – | – | – | 461 [f] | – |
| 1970 | 665 | 574 [f] | 368 | – | – | – | – | – | 6 [f] | – | – | 1,882 | – |
| 1971 | 1,904 | 1,682 | – | – | – | – | – | – | 193 [f,g] | – | – | 158 [f] | – |
| 1972 | 798 | 582 [f] | 1,198 | – | – | – | – | – | 138 [f,g] | – | – | 1,193 | 1,034 |
| 1973 | 825 | 788 | 613 | – | – | – | – | – | 21 [f] | – | – | 391 | 352 [h] |
| 1974 | – | 285 | 471 [f] | – | 55 [f] | 23 [f] | 161 | – | 1,016 [g] | 959 [g] | – | 1,857 | 1,620 |
| 1975 | 993 | 301 | 730 | – | 123 | 81 | 385 | – | 316 [g] | 262 [g] | – | 1,055 | 950 [h] |
| 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 [f] | – | 1,726 | – | – | 3,499 | 3,258 |
| 1979 | 1,180 | 1,134 | 1,484 | – | 1,093 | 414 | 484 | – | 1,159 [f] | – | – | 4,789 | 4,310 [h] |
| 1980 | 958 [f] | 1,500 | 1,330 | 1,192 | 954 [f] | 369 [f] | 951 | – | 2,541 | – | – | 6,757 | 6,126 |
| 1981 | 2,146 [f] | 231 [f] | 807 [f] | 577 [f] | – | 791 | – | – | 600 [f] | – | – | 1,237 | 1,121 |
| 1982 | 1,274 | 851 | – | – | – | – | 421 | – | 2,073 | – | – | 2,534 | 2,346 |
| 1983 | – | – | 653 [f] | 376 [f] | 526 | 480 | 572 | – | 2,553 | 2,336 | – | 1,961 | 1,803 |
| 1984 | 1,573 [f] | 1,993 | 641 [f] | 574 [f] | – | – | – | – | 501 | 494 | – | 1,031 | 906 |
| 1985 | 1,617 | 2,248 | 1,051 | 720 | 1,600 | 1,180 | 735 | – | 2,553 | 2,262 | – | 2,035 | 1,860 |
| 1986 | 1,954 | 3,158 | 1,118 | 918 | 1,452 | 1,522 | 1,346 | 9,065 | 2,031 | 1,935 | – | 3,368 | 3,031 [h] |
| 1987 | 1,608 | 3,281 | 1,174 | 879 | 1,145 | 493 | 731 | 6,404 | 1,312 | 1,209 | 4,771 | 1,898 | 1,671 |
| 1988 | 1,020 | 1,448 | 1,805 | 1,449 | 1,061 | 714 | 797 | 3,346 | 1,966 | 1,760 | 4,562 | 2,761 | 2,553 |
| 1989 | 1,399 | 1,089 | 442 [f] | 212 [f] | – | – | – | 2,666 | 1,280 | 1,185 | 3,294 | 2,333 | 2,136 |
| 1990 | 2,503 | 1,545 | 2,347 | 1,595 | 568 [f] | 430 [f,i] | 884 [f] | 5,603 | 1,436 | 1,402 | 10,728 | 3,744 | 3,429 |
| 1991 | 1,938 | 2,544 | 875 [f] | 625 [f] | 767 | 1,253 | 1,690 | 3,025 | 1,277 [f] | 1,277 [f] | 5,608 | 2,212 [f] | 1,925 [f] |
| 1992 [k] | 1,030 [f] | 2,002 [f] | 1,536 | 931 | 348 | 231 | 910 | 5,230 | 825 [f] | 799 [f] | 8,410 | 1,484 [f] | 1,436 [f] |
| E.O.[m] | >1500 | >1400 | >1,300[n] | >500[n] | >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: November 18, 1992.

[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.

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

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

[g] Boat survey.

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

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

[k] Preliminary

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

[n] 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.

02/26/93

Appendix Table 10. Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961–1992.[a]

| Year | Tincup Creek | Tatchun River[b] | Little Salmon River | Big Salmon River[c] | Nisutlin River[d] | Wolf River[f] | Whitehorse Fishway[g] | Canada Mainstem Tagging Estimate[h] |
|---|---|---|---|---|---|---|---|---|
| 1961 | – | – | – | – | – | – | 1,068 | – |
| 1962 | – | – | – | – | – | – | 1,500 | – |
| 1963 | – | – | – | – | – | – | 483 | – |
| 1964 | – | – | – | – | – | – | 595 | – |
| 1965 | – | – | – | – | – | – | 903 | – |
| 1966 | – | 7[j] | – | – | – | – | 563 | – |
| 1967 | – | – | – | – | – | – | 533 | – |
| 1968 | – | – | 173[j] | 857[j] | 407[j] | – | 414 | – |
| 1969 | – | – | 120 | 286 | 105 | – | 334 | – |
| 1970 | – | 100 | – | 670 | 615 | 71[j] | 625 | – |
| 1971 | – | 130 | 275 | 275 | 650 | 750 | 856 | – |
| 1972 | – | 80 | 126 | 415 | 237 | 13 | 391 | – |
| 1973 | 100 | 99 | 27[j] | 75[j] | 36[j] | – | 224 | – |
| 1974 | – | 192 | – | 70[j] | 48[j] | – | 273 | – |
| 1975 | – | 175 | – | 153[j] | 249 | 40[j] | 313 | – |
| 1976 | – | 52 | – | 86[j] | 102 | – | 121 | – |
| 1977 | – | 150 | 408 | 316[j] | 77 | – | 277 | – |
| 1978 | – | 200 | 330 | 524 | 375 | – | 725 | – |
| 1979 | – | 150 | 489[j] | 632 | 713 | 183[j] | 1,184 | – |
| 1980 | – | 222 | 286[j] | 1,436 | 975 | 377 | 1,383 | – |
| 1981 | – | 133 | 670 | 2,411 | 1,626 | 395 | 1,555 | – |
| 1982 | – | 73 | 403 | 758 | 578 | 104 | 473 | 19,790 |
| 1983 | 100 | 264 | 101[j] | 540 | 701 | 95 | 905 | 28,989 |
| 1984 | 150 | 153 | 434 | 1,044 | 832 | 124 | 1,042 | 27,616[k] |
| 1985 | 210 | 190 | 255 | 801 | 409 | 110 | 508 | 10,730 |
| 1986 | 228 | 155 | 54[j] | 745 | 459[j] | 109 | 557 | 16,415 |
| 1987 | 100 | 159 | 468 | 891 | 183 | 35 | 327 | 13,260 |
| 1988 | 204 | 152 | 368 | 765 | 267 | 66 | 405 | 23,118 |
| 1989 | 88 | 100 | 862 | 1,662 | 695 | 146 | 549 | 25,201 |
| 1990 | 83 | 643 | 665 | 1,806 | 652 | 188 | 1,407 | 37,699 |
| 1991 | – | – | 326 | 1,040 | – | 201[m] | 1,266 | 20,743 |
| 1992[n] | 73 | 106 | 494 | 617 | 241 | 110[m] | 758 | 24,359 |
| E.O.[p] | | | | | | | | 33,000–43,000[p] |

[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: November 18, 1992.
[b] All foot surveys except 1978 (boat survey) and 1986 (aerial survey).
[c] For 1968, 1970, and 1971 counts are from mainstem Big Salmon River. For all other years counts are from the mainstem Big Salmon River between Big Salmon Lake and the vicinity of Souch Creek.
[d] One Hundred Mile Creek to Sidney Creek.
[f] Wolf Lake to Red River.
[g] Includes 50, 90, 292, 506, 243 fin–clipped hatchery–origin salmon in 1988, 1989, 1990, 1991, and 1992 respectively.
[h] Estimated total spawning escapement excluding Porcupine River (estimated border escapement minus the Canadian catch).
[j] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[k] 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.
[m] Counts are for Wolf Lake to Fish Lake outlet.
[n] Preliminary
[p] Interim escapement objective. Stabilization escapement objective for years 1990 – 1995 is 18,000 salmon.

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Appendix Table 11. Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973–1992.[a]

| Year | Andreafsky River: East Fork Aerial | Andreafsky River: East Fork Sonar or Tower | Andreafsky River: West Fork | Anvik River: Tower & Aerial[b] | Anvik River: Sonar | Nulato River: South Fork | Nulato River: North Fork[c] | Gisasa River | Hogatza River (Clear and Caribou Crs) | Chena River | Salcha River |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 10,149 [d] | – | 51,835 | 86,665 [d] | – | – | – | – | – | 79 [d] | – |
| 1974 | 3,215 [d] | – | 33,578 | 201,277 | – | 29,016 | 29,334 | 22,022 | – | 4,349 | 3,510 |
| 1975 | 223,485 | – | 235,954 | 845,485 | – | 51,215 | 87,280 | 56,904 | 22,355 | 1,670 | 7,573 |
| 1976 | 105,347 | – | 118,420 | 406,166 | – | 9,230 [d] | 30,771 | 21,342 | 20,744 | 685 | 6,474 |
| 1977 | 112,722 | – | 63,120 | 262,854 | – | 11,385 | 58,275 | 2,204 [d] | 10,734 | 610 | 677 [d] |
| 1978 | 127,050 | – | 57,321 | 251,339 | – | 12,821 | 41,659 | 9,280 [d] | 5,102 | 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 | 338 | 4,140 |
| 1981 | 81,555 | 147,312 [e] | – | – | 1,488,182 | 14,348 | – | – | – | 3,500 | 8,500 |
| 1982 | 7,501 [d] | 181,352 [e] | 7,267 [d] | – | 444,581 | – | – | 334 [d] | 4,984 [d] | 1,509 | 3,756 |
| 1983 | – | 110,608 [e] | – | – | 362,912 | 1,263 [d] | 19,749 | 2,356 [d] | 28,141 | 1,097 | 716 [d] |
| 1984 | 95,200 [d] | 70,125 [e] | 238,565 | – | 891,028 | – | – | – | – | 1,861 | 9,810 |
| 1985 | 66,146 | – | 52,750 | – | 1,080,243 | 10,494 | 19,344 | 13,232 | 22,566 | 1,005 | 3,178 |
| 1986 | 83,931 | 167,614 [f] | 99,373 | – | 1,189,602 | 16,848 | 47,417 | 12,114 | – | 1,509 | 8,028 |
| 1987 | 6,687 [d] | 45,221 [f] | 35,535 | – | 455,876 | 4,094 | 7,163 | 2,123 | 5,669 [d] | 333 | 3,657 |
| 1988 | 43,056 | 68,937 [f] | 45,432 | – | 1,125,449 | 15,132 | 26,951 | 9,284 | 6,890 | 432 | 2,889 [d] |
| 1989 | 21,460 [d] | – | – | – | 636,906 | – | – | – | – | 714 [d] | 1,574 [d] |
| 1990 | 11,519 [d] | – | 20,426 [d] | – | 403,627 | 3,196 [d,g] | 1,419 [d] | 450 [d] | 2,177 [d] | 100 [d] | 450 [d] |
| 1991 | 31,886 | – | 46,657 | – | 847,772 | 13,150 | 12,491 | 7,003 | 9,947 | 10 [d] | 154 [d] |
| 1992 [n] | 11,308 [d] | – | 37,808 [d] | – | 775,626 | 5,322 | 12,358 | 9,300 | 2,986 | 848 [d] | 3,222 |
| E.O.[h] | >109,000 | – | >116,000 | – | >500,000 [j] | – | >53,000 [k] | – | >17,000 [m] | – | >3,500 |

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Latest table revision November 18, 1992.
[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.
[e] Sonar count.
[f] Tower count.
[g] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.
[h] Interim escapement objective.
[j] The Anvik River Escapement Objective was rounded upward to 500,000 from 487,000 in March, 1992.
[k] Interim escapement objective for North Fork Nulato River only.
[m] Consists of Clear and Caribou Creeks interim escapement objectives of 9,000 and 8,000, respectively.
[n] Preliminary.

02/26/93

Appendix Table 12. Fall chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1971–1992.[a]

| Year | Toklat River[b] | Delta River[c] | Chandalar River[d] | Sheenjek River[d] | Fishing Branch River[e] | Canada Mainstem Tagging Estimate[f] |
|---|---|---|---|---|---|---|
| 1971 | – | – | – | – | 312,800 | – |
| 1972 | – | – | – | – | 35,125 [g] | – |
| 1973 | – | – | – | – | 15,989 [h] | – |
| 1974 | 43,484 | 5,915 | – | 89,966 [j] | 32,525 [h] | – |
| 1975 | 90,984 | 3,734 [k] | – | 173,371 [j] | 353,282 [h] | – |
| 1976 | 53,882 | 6,312 [k] | – | 26,354 [j] | 36,584 | – |
| 1977 | 36,462 | 16,876 [k] | – | 45,544 [j] | 88,400 | – |
| 1978 | 37,057 | 11,136 | – | 32,449 [j] | 40,800 | – |
| 1979 | 179,627 | 8,355 | – | 91,372 [j] | 119,898 | – |
| 1980 | 26,373 | 5,137 | – | 28,933 [j] | 55,268 | – |
| 1981 | 15,775 | 23,508 | – | 74,560 | 57,386 [m] | – |
| 1982 | 3,601 | 4,235 | – | 31,421 | 15,901 | 31,958 |
| 1983 | 20,807 | 7,705 | – | 49,392 | 27,200 | 90,875 |
| 1984 | 16,511 | 12,411 | – | 27,130 | 15,150 | 56,633 [n] |
| 1985 | 22,805 | 17,276 [k] | – | 152,768 | 56,016 [h] | 62,010 |
| 1986 | 18,903 | 6,703 [k] | 59,313 | 83,197 | 31,723 [h] | 87,990 |
| 1987 | 22,141 | 21,180 | 52,416 | 140,086 | 48,956 [h] | 80,776 |
| 1988 | 13,324 | 18,024 | 33,619 | 41,073 | 23,597 [h] | 36,786 |
| 1989 | 30,447 | 21,342 [k] | 69,161 | 101,748 [p] | 43,834 [h] | 35,750 |
| 1990 | 33,672 | 8,992 [k] | 78,631 | 65,721 [s] | 35,000 [r] | 51,755 |
| 1991 | 13,197 | 32,905 [k] | – | 90,000 [s] | 37,733 [h] | 78,461 |
| 1992 [s] | 10,813 | 8,893 [k] | – | 79,315 | 22,517 [h] | 46,772 |
| E.O.[t] | > 33,000 | > 11,000 | – | > 64,000 [u] | 50,000 – 120,000 | > 80,000 |

[a] Latest table revision February 11, 1993.
[b] Total escapement estimates using Delta River migratory time density curve and percentage of live salmon present by survey date in upper Toklat River area.
[c] Total escapement estimates made from migratory time density curve (see Barton 1986), unless otherwise indicated.
[d] Sonar estimate. From 1981–1985 sonar operations were initiated between August 29 and September 2. From 1986–1990 sonar operations were initiated between August 17 and August 25. For 1991 and 1992 sonar operations were initiated on August 9.
[e] Total escapement estimates using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.
[f] Excludes Fishing Branch River escapment (estimated border passage minus Canadian removal).
[g] 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.
[h] Weir estimate.
[j] Total escapement estimates using sonar to aerial survey expansion factor of 2.221.
[k] Population estimate from replicate foot surveys and stream life data.
[m] 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.
[n] Escapement estimate based on mark–recapture program unavailable. Estimate based on assumed average exploitation rate.
[p] Includes a passage estimate of 20,000 salmon prior to initation of sonar–monitoring operations.
[r] Weir was not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approxiately 27,000 fish was made through date of survey, based upon historic average aerial–to–weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000 – 40,000 fish in view of aerial survey timing.
[s] Preliminary.
[t] Interim escapement objective.
[u] Based on escapement estimates for years 1974–1990.
[w] Data unavailable at this time.

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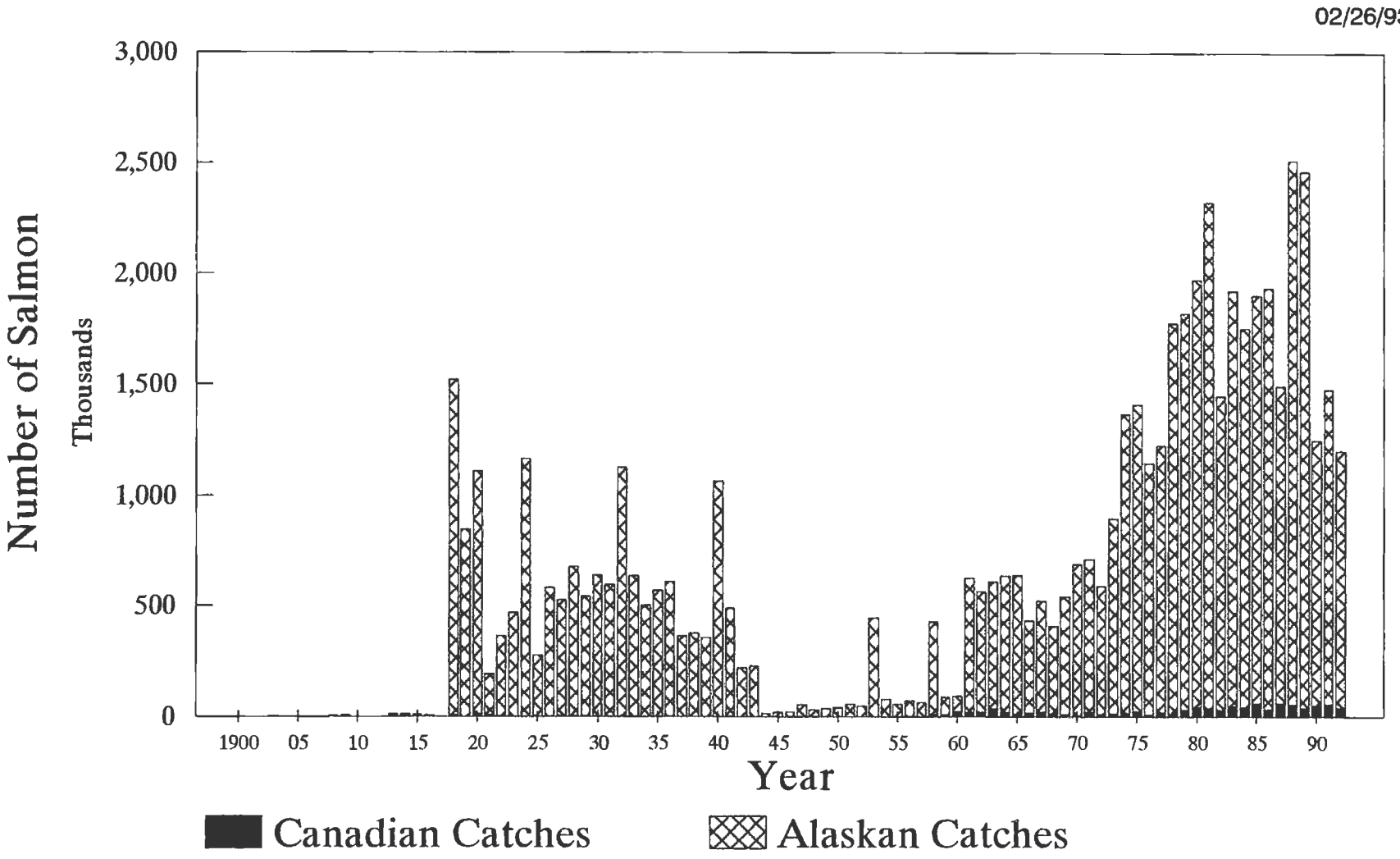
Apprendix Table 13. Coho salmon escapement counts for selected spawning areas in the Yukon River drainage, 1972–1992.[a]

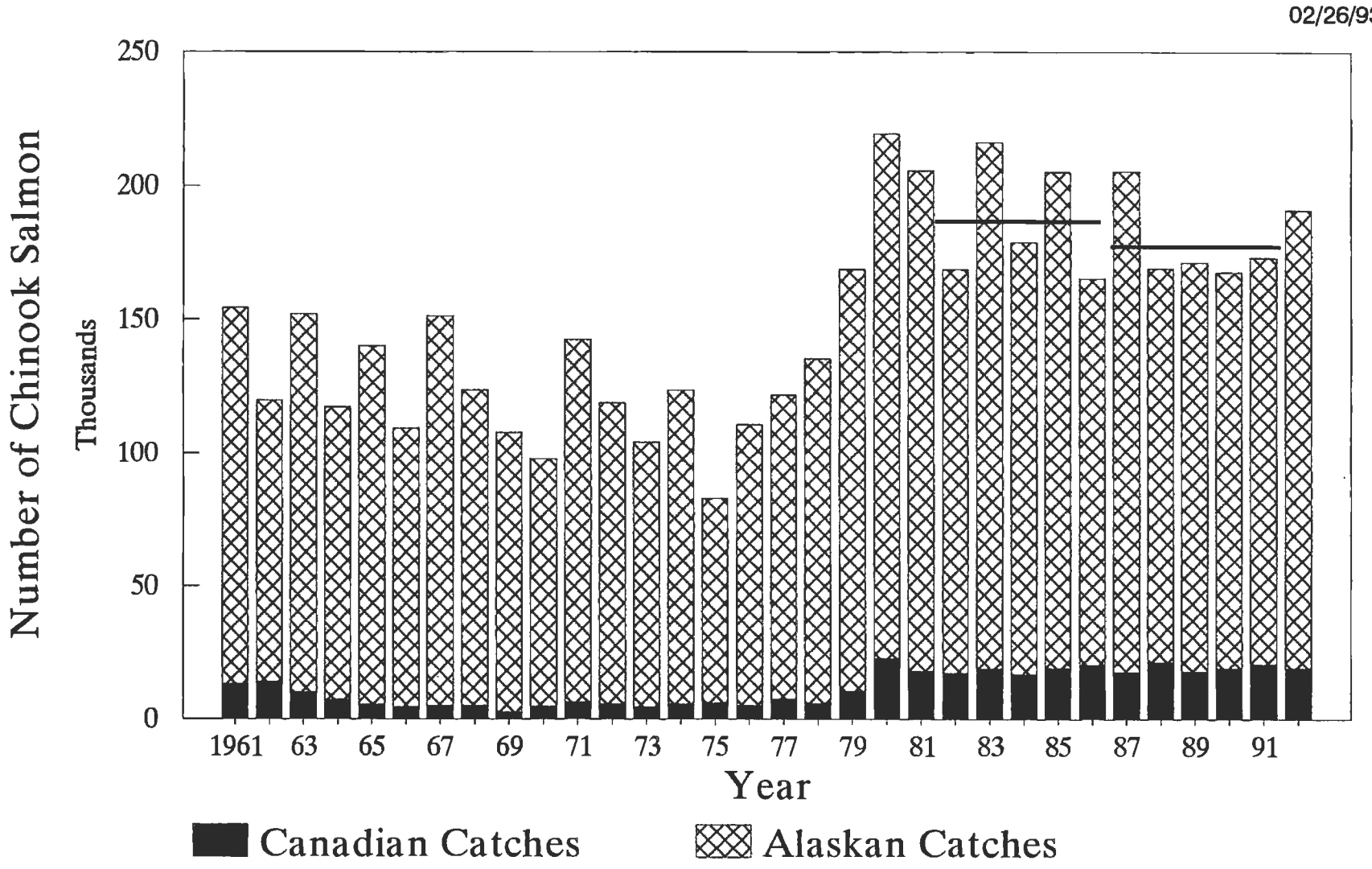
| Year | Andreafsky River | | Anvik River | Kantishna River | | Nenana River Drainage | | | | Delta Clearwater River[d,f] | Clearwater Lake and Outlet | Richardson Clearwater River |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | East Fork | West Fork | | Geiger Creek | Barton Creek | Lost Slough | Nenana Mainstem[b] | Wood Creek[c] | 17–Mile Slough | | | |
| 1972 | – | – | – | – | – | – | – | – | – | 630 | 417 | 454 [h] |
| 1973 | – | – | – | – | – | – | – | – | – | 3,322 | 551 [d] | 375 [d] |
| 1974 | – | – | – | – | – | 1,388 | – | – | 27 | 3,954 [g] | 560 | 652 [d] |
| 1975 | – | – | – | – | – | 943 | – | – | 956 | 5,100 | 1,575 [d,f] | 4 [h] |
| 1976 | – | – | 467 [h] | 25 [j] | – | 118 | – | – | 281 | 1,920 | 1,500 [d,f] | 80 [h] |
| 1977 | – | – | 81 [h] | 60 | – | 524 | – | 310 [j] | 1,167 | 4,793 | 730 [d,f] | 327 |
| 1978 | – | – | – | – | – | 350 | – | 300 [j] | 466 | 4,798 | 570 [d,f] | – |
| 1979 | – | – | – | – | – | 227 | – | – | 1,987 | 8,970 | 1,015 [d,f] | 372 |
| 1980 | – | – | – | 3 [j] | – | 499 | – | 1,603 [j] | 592 | 3,946 | 1,545 [d,f] | 611 |
| 1981 | 1,657 [h] | – | – | – | – | 274 | – | 849 [k] | 1,005 | 8,563 [m] | 459 [h] | 550 |
| 1982 | – | – | – | 81 [j] | – | – | – | 1,436 [k] | – | 8,365 [m] | – | – |
| 1983 | – | – | – | 42 [j] | – | 766 | – | 1,044 [k] | 103 | 8,019 [m] | 253 | 88 |
| 1984 | – | – | – | 20 | – | 2,677 | – | 8,805 [k] | – | 11,061 | 1,368 | 428 |
| 1985 | – | – | – | 42 | – | 1,584 | – | 3,775 [k] | 2,081 | 5,358 | 750 | – |
| 1986 | – | – | – | 5 [j] | 496 | 794 | – | 1,664 [k] | 218 [c,f] | 10,857 | 3,577 | 146 [h] |
| 1987 | – | – | – | 1,175 [j] | – | 2,511 | – | 2,450 [k] | 3,802 | 22,300 | 4,225 [d,f] | – |
| 1988 | 1,913 | 830 | 830 | 159 [j] | 437 | 348 | – | 2,046 [k] | – | 21,600 | 825 [d,f] | – |
| 1989 | – | – | – | 155 [j] | 12 [h] | – | – | 412 [k] | 824 [h] | 11,000 | 1,600 [d,f] | 483 |
| 1990 | – | – | – | 211 [j] | – | 688 | 1,308 | – | 15 [h] | 8,325 | 2,375 [d,f] | – |
| 1991 | – | – | – | 427 [j] | 467 [h] | 564 | 447 | – | 52 | 23,900 | 3,150 [d,f] | – |
| 1992 [n] | – | – | – | 77 [j] | 55 [h] | 372 | – | – | 490 | 3,983 | 229 [d,f] | 500 [d] |

[a] Only peak counts presented. Survey rating is fair to good, unless otherwise noted. Latest table revision: February 24, 1993.
[b] Mainstem Nenana River between confluences of Lost Slough and Teklanika River.
[c] Surveyed by F.R.E.D.
[d] Surveyed by Sport Fish Division.
[f] Boat survey.
[g] Aerial Survey.
[h] Poor survey.
[j] Foot survey.
[k] Weir count.
[m] Expanded estimated based on partial survey counts and historic distribution of spawners from 1977–1980.
[n] Preliminary



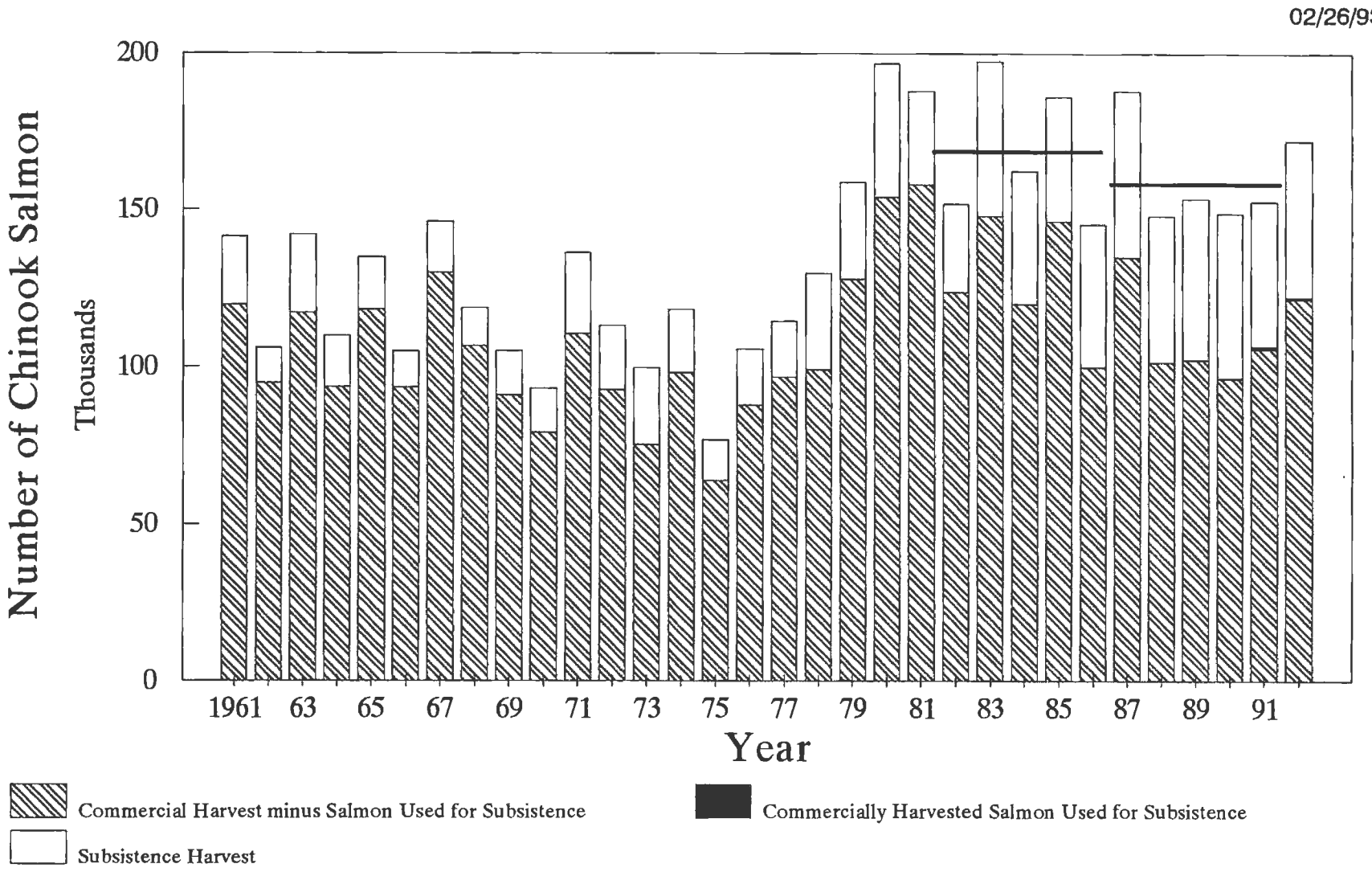



Appendix Figure 1. Total utilization of all salmon species, Yukon River, 1900–1992.






**Appendix Figure 2. Total utilization of chinook salmon, Yukon River, 1961–1992.**

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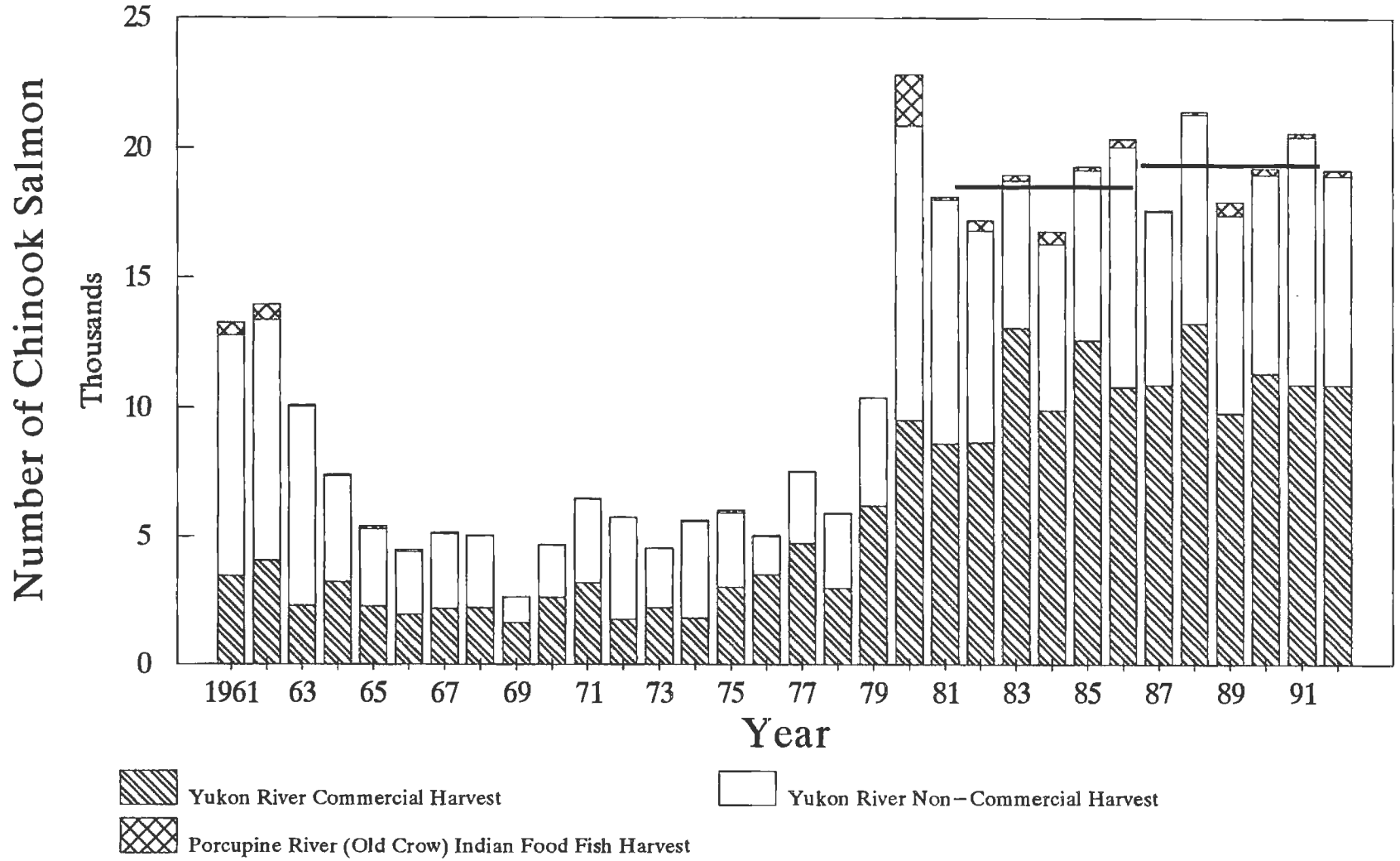
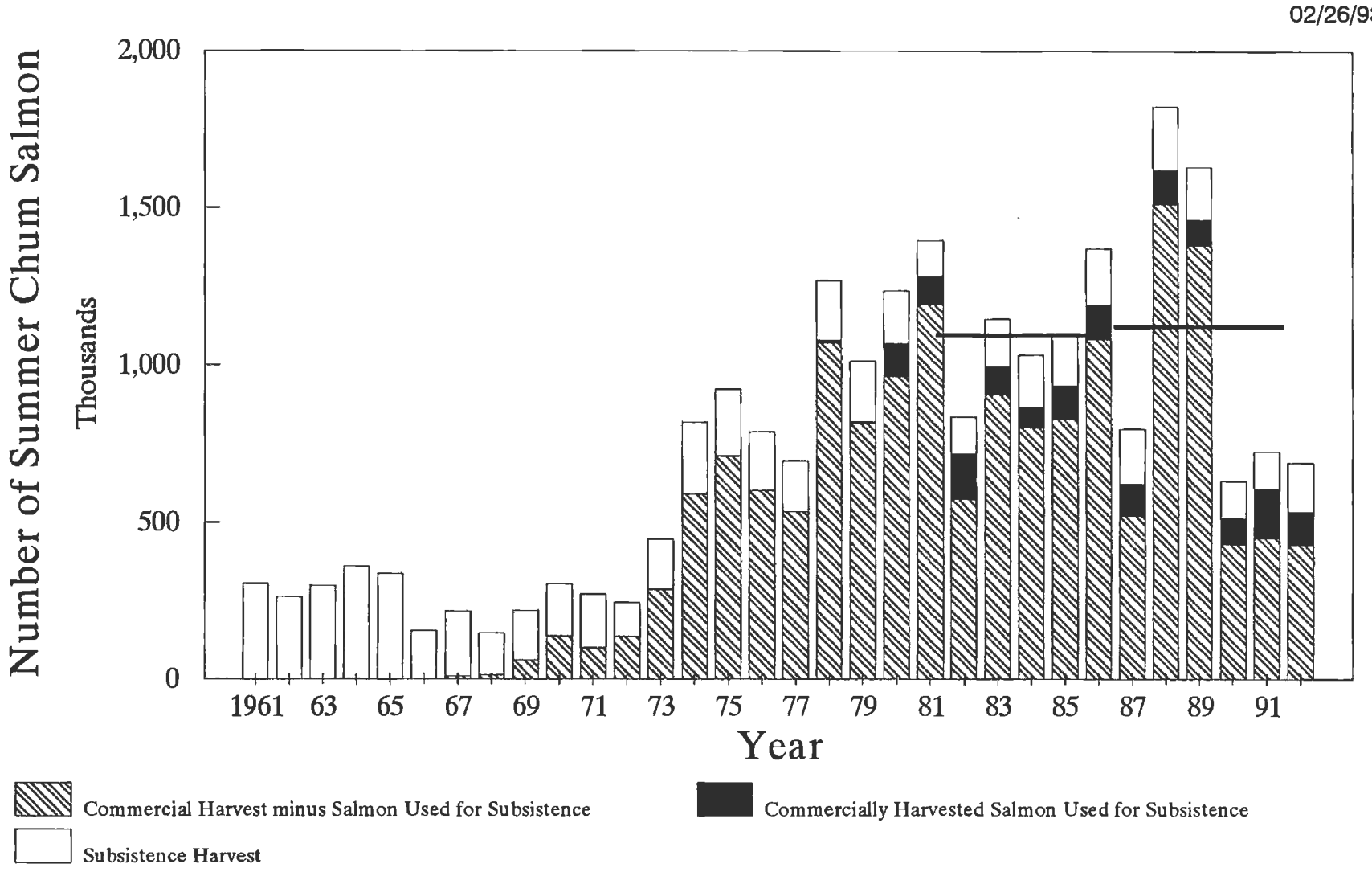
**Appendix Figure 3. Alaskan harvest of chinook salmon, Yukon River, 1961–1992.**



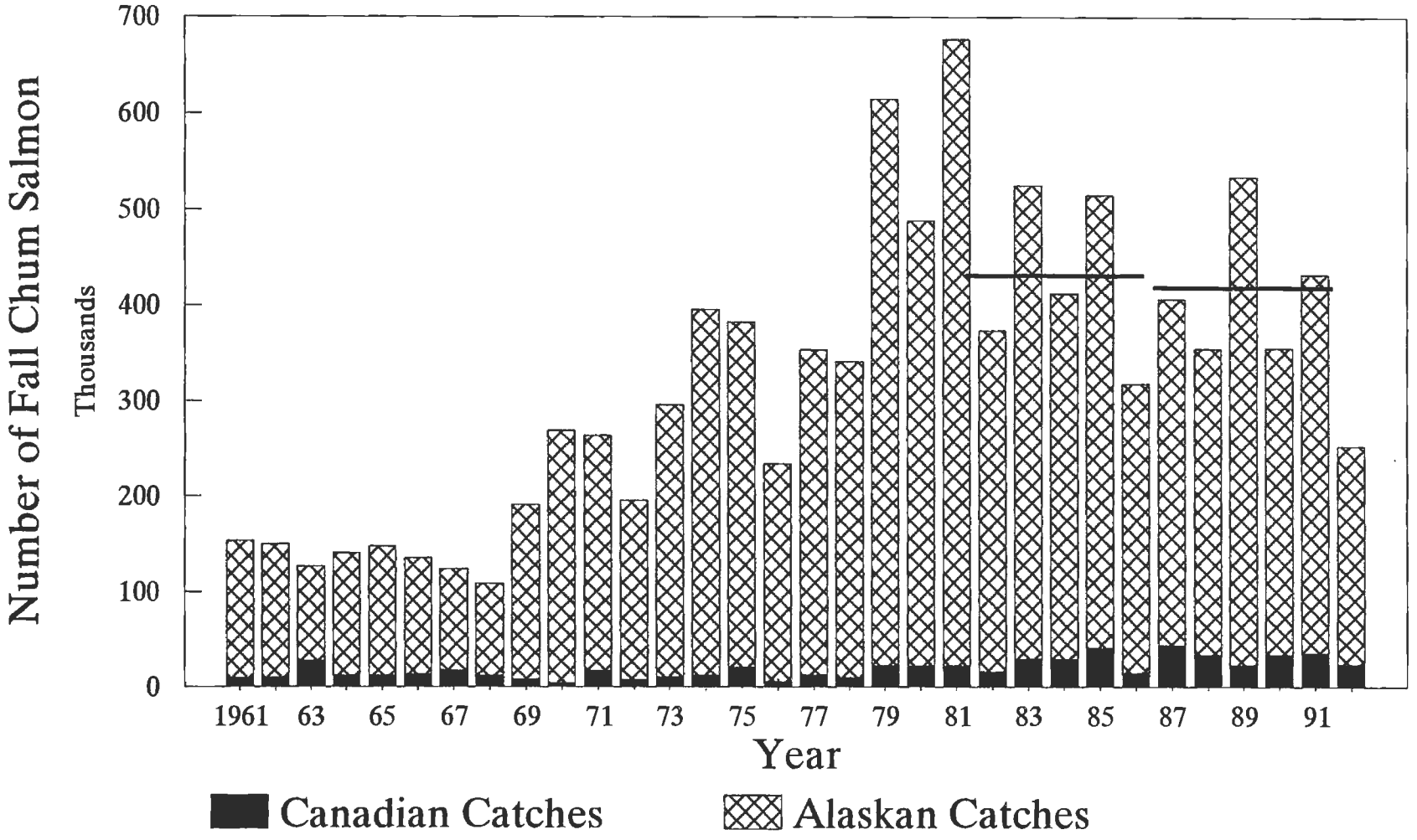



**Appendix Figure 4. Canadian harvest of chinook salmon, Yukon River, 1961–1992.**



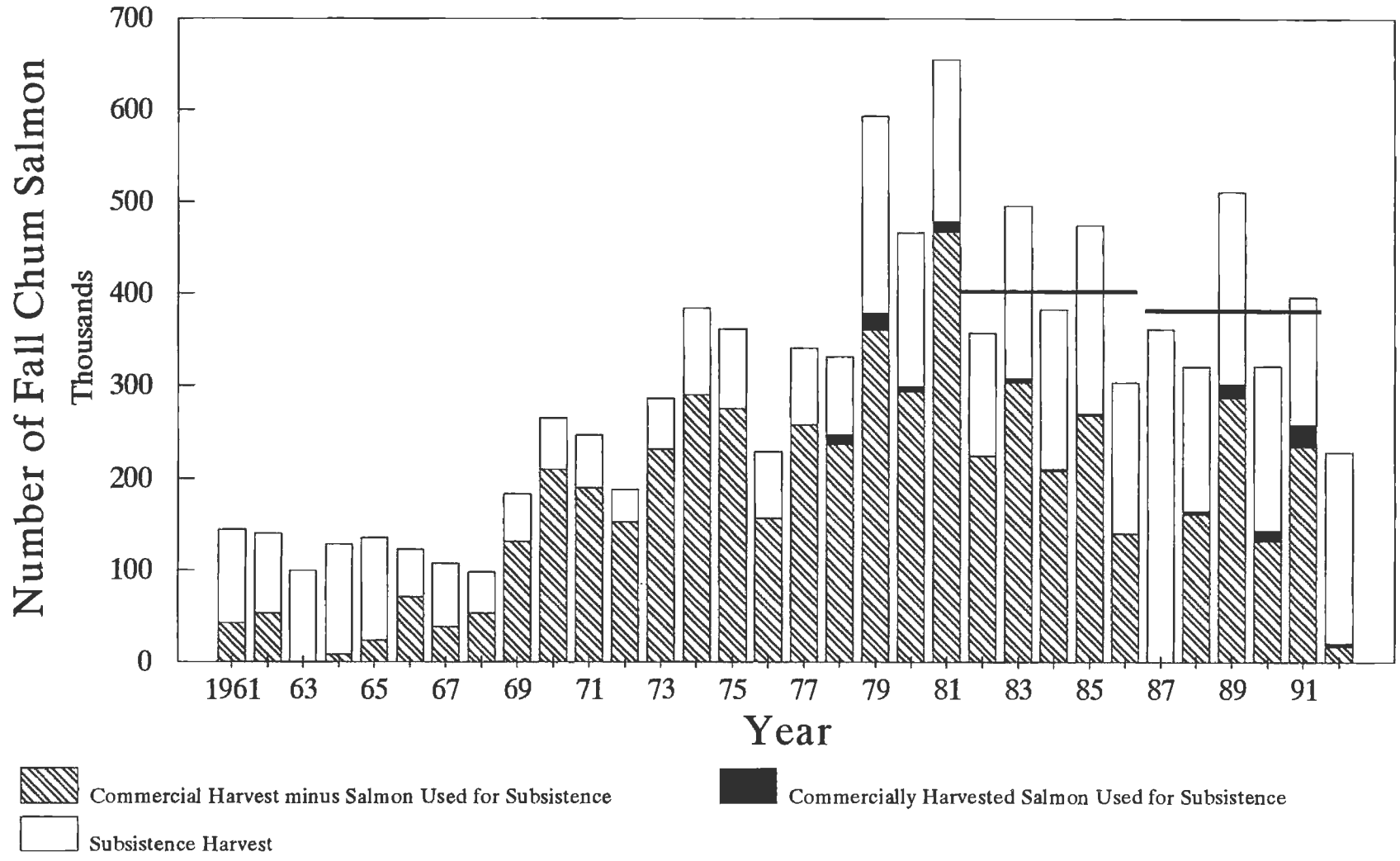



**Appendix Figure 5. Alaskan harvest of summer chum salmon, Yukon River, 1961–1992.**



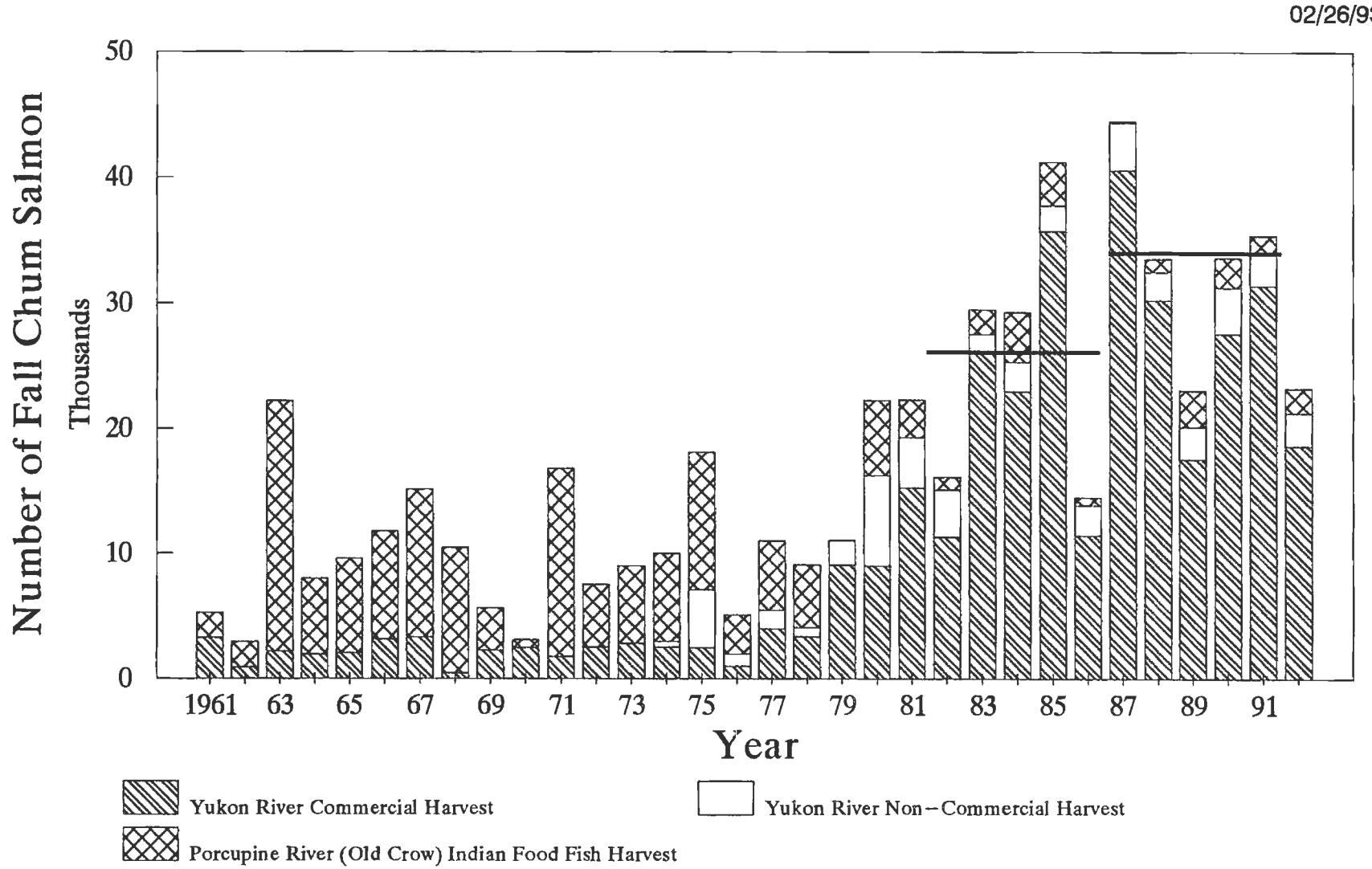



Appendix Figure 6. Total utilization of fall chum salmon, Yukon River, 1961–1992.

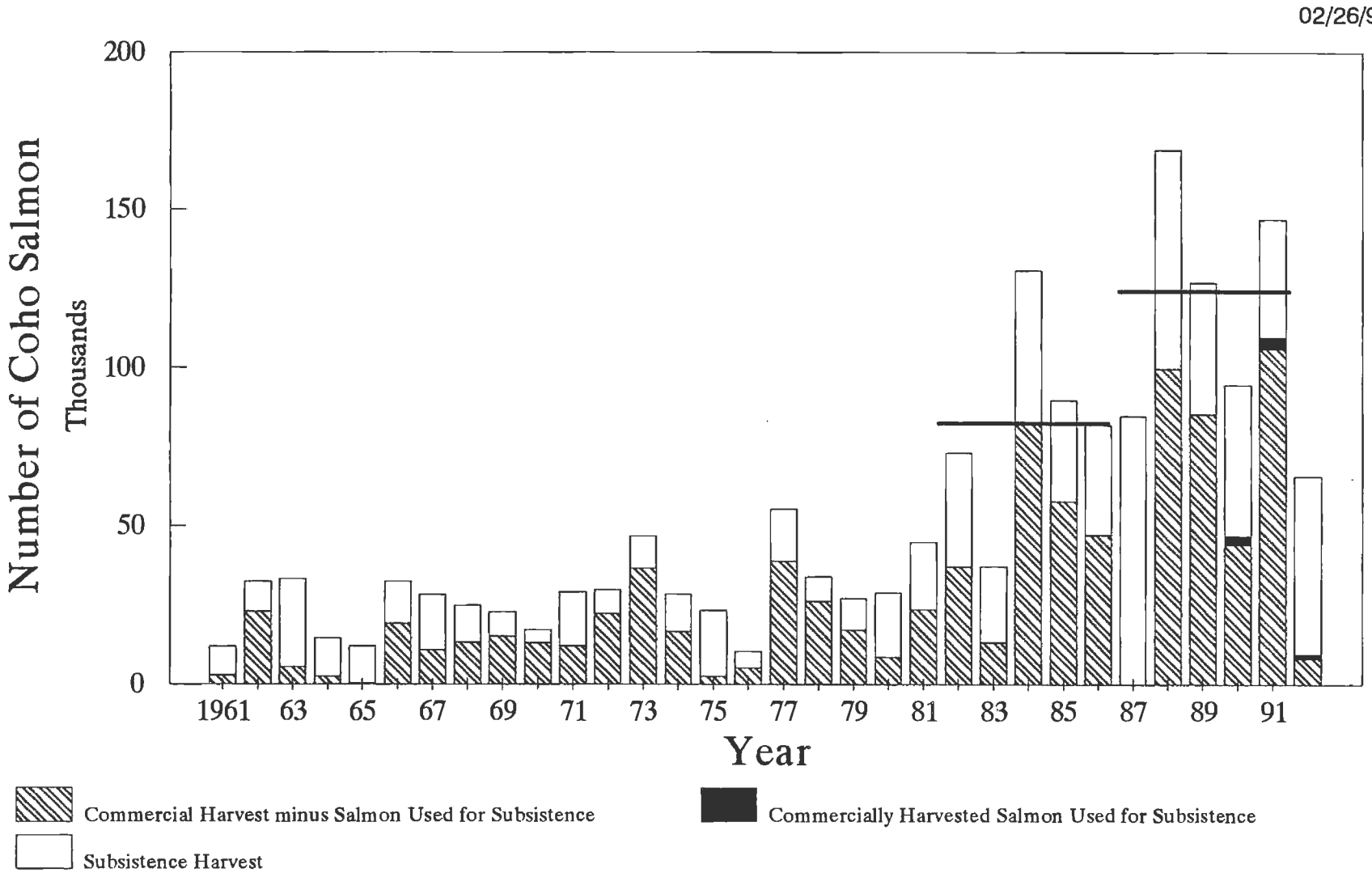





**Appendix Figure 7. Alaskan harvest of fall chum salmon, Yukon River, 1961–1992.**

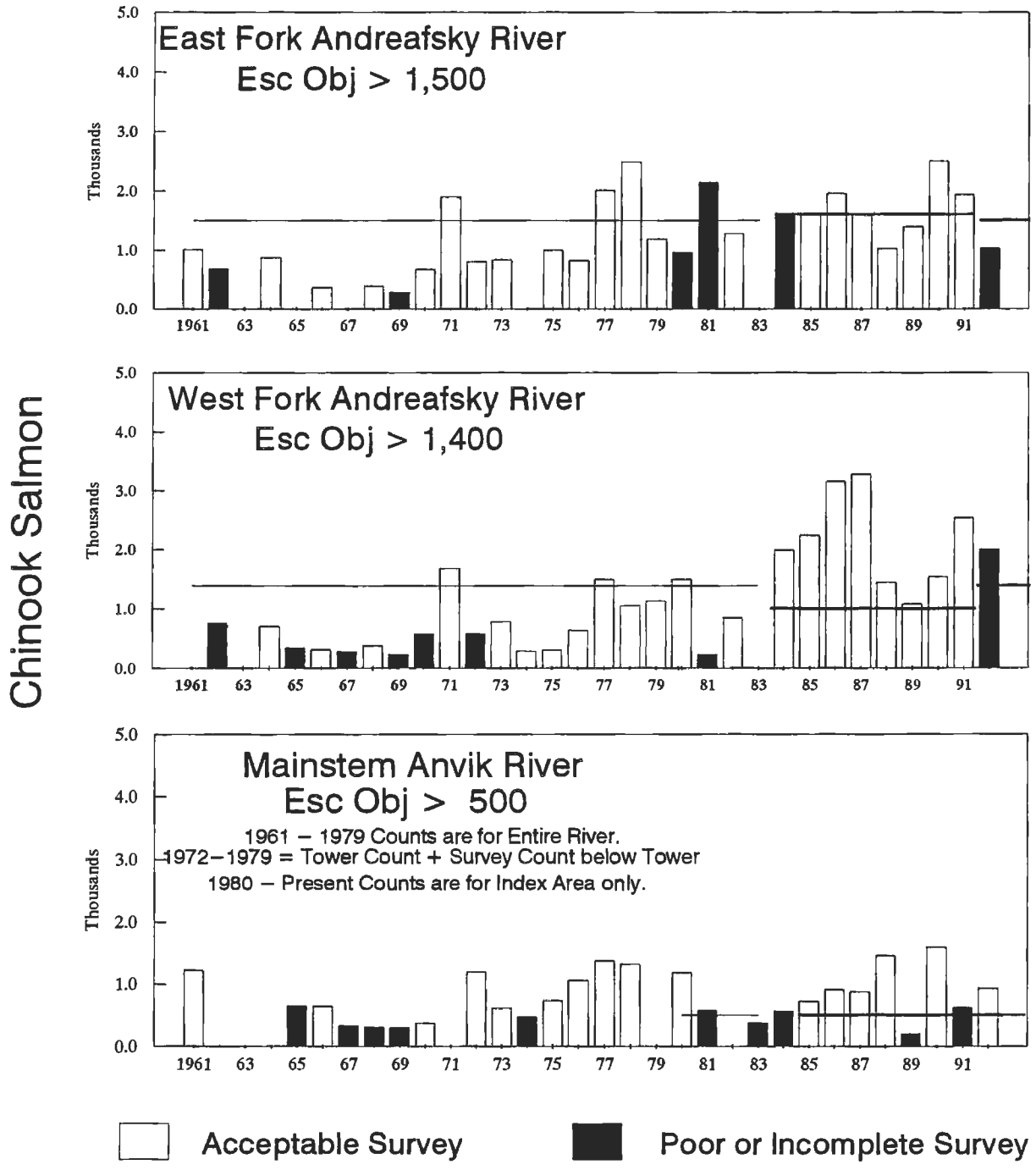



**Appendix Figure 8. Canadian harvest of fall chum salmon, Yukon River, 1961–1992.**

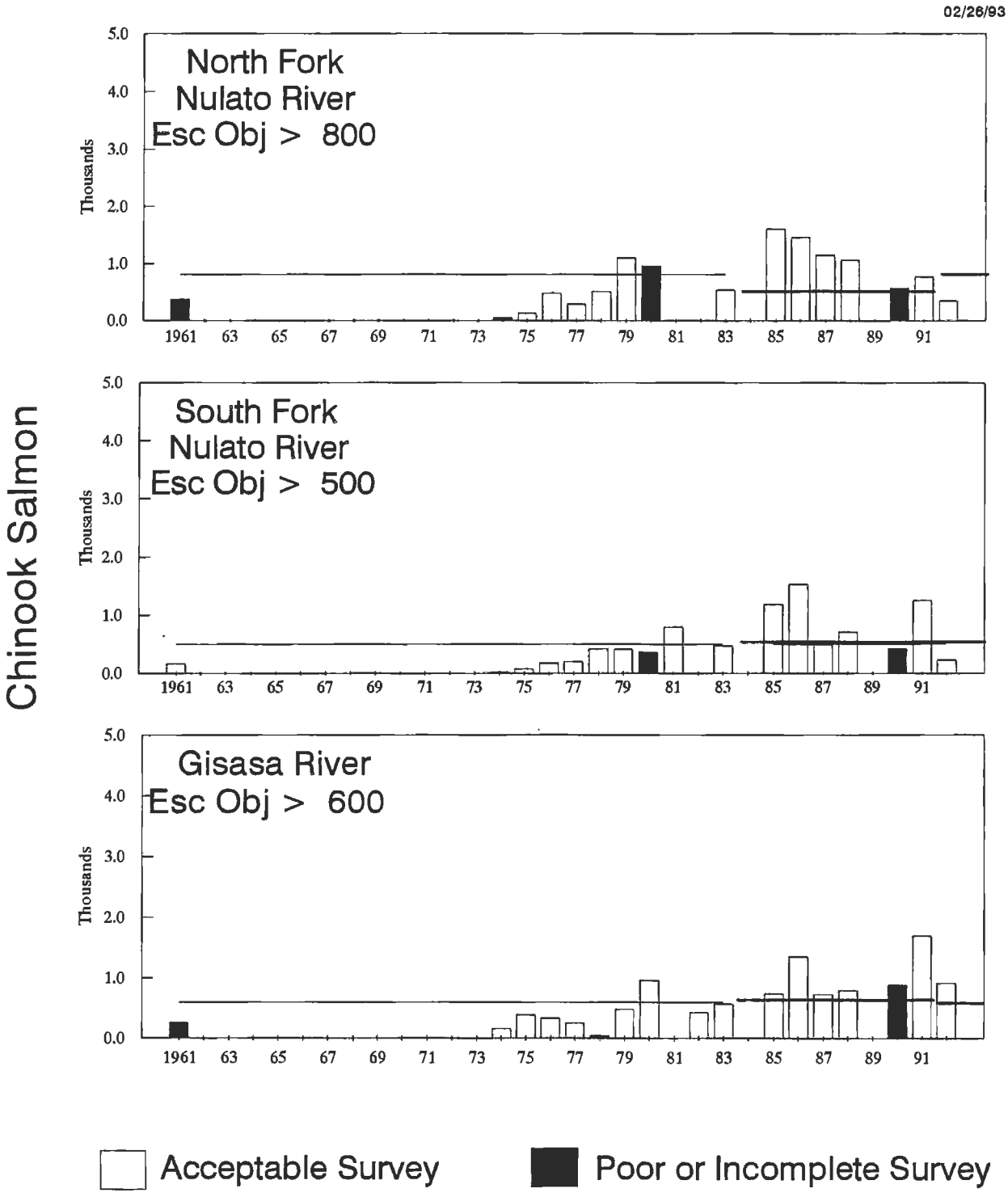




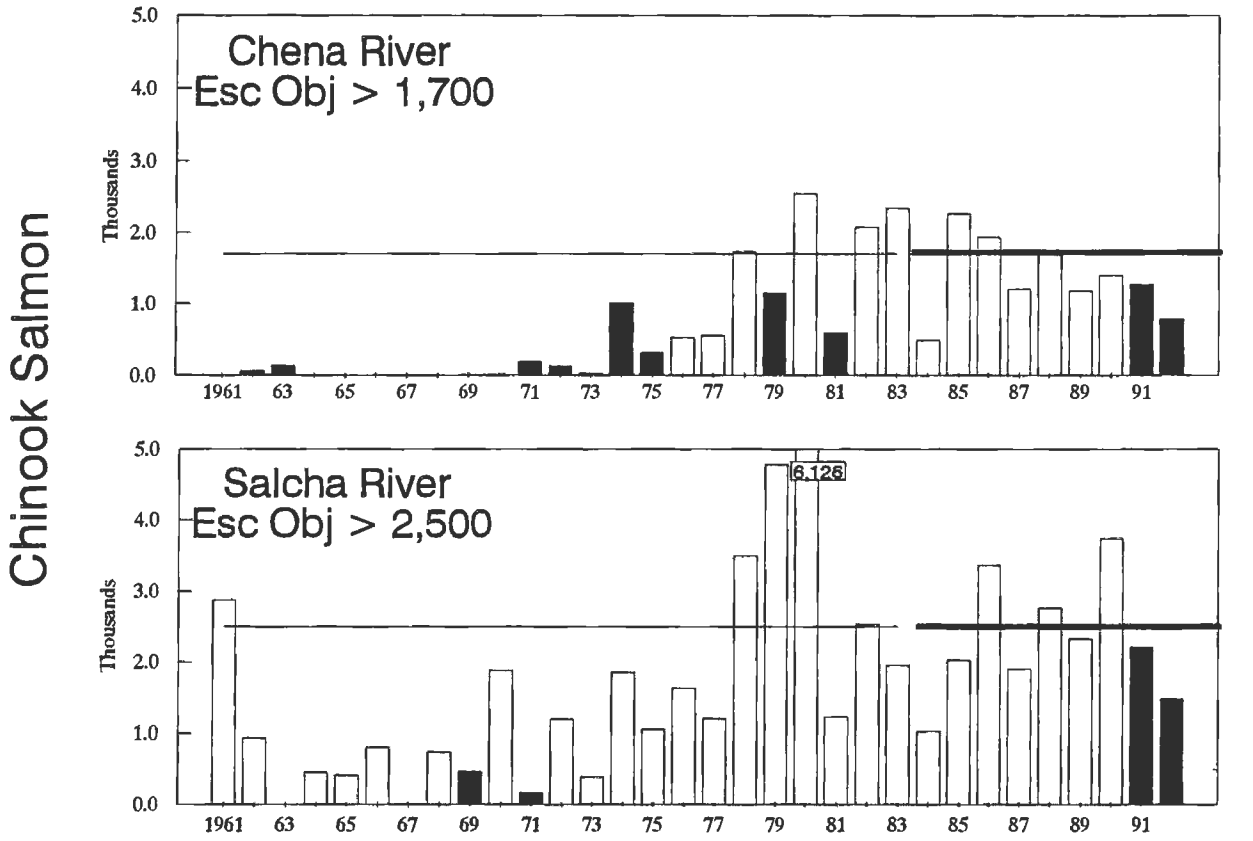

**Appendix Figure 9. Alaskan harvest of coho salmon, Yukon River, 1961–1992.**



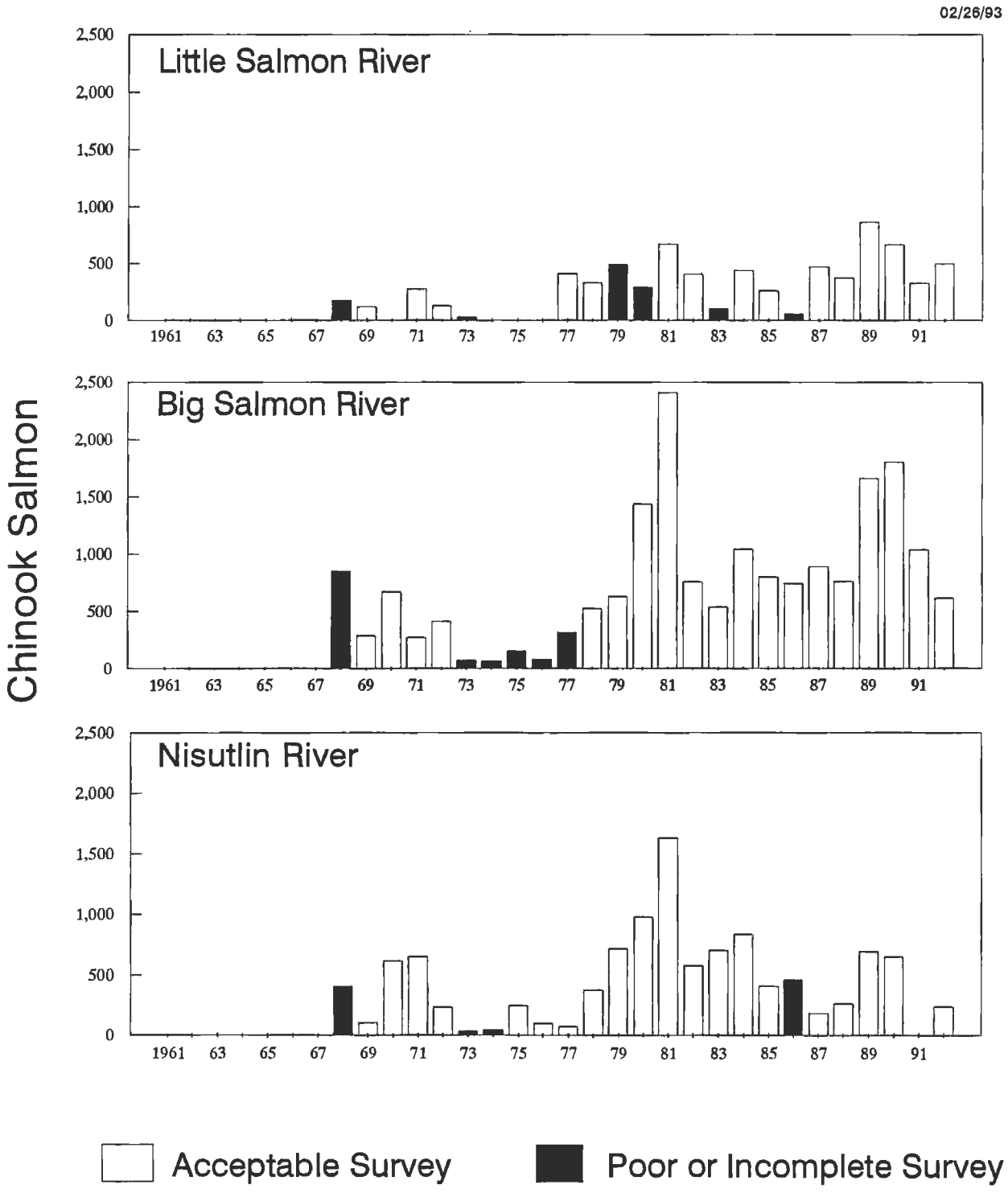

**Appendix Figure 10.** **Chinook salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1961–1992.**



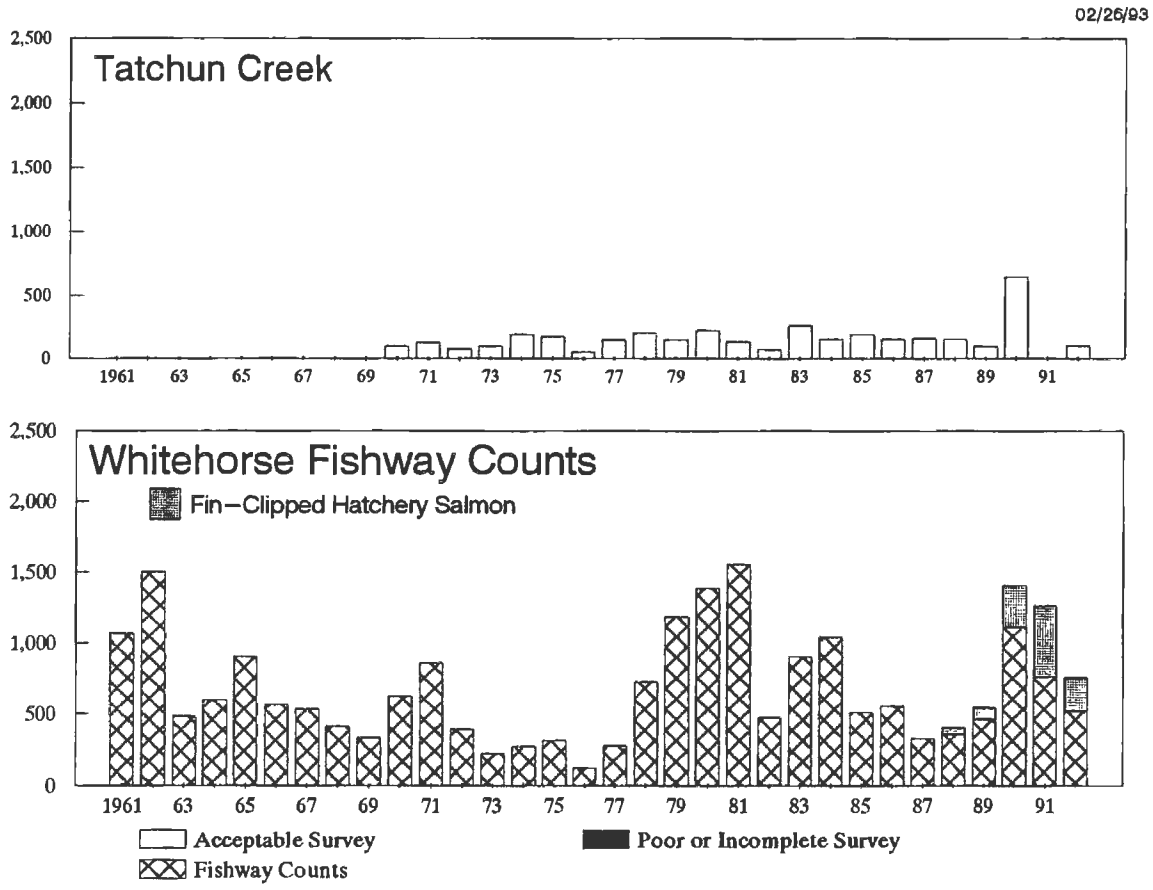

**Appendix Figure 10. (Page 2 of 3).**



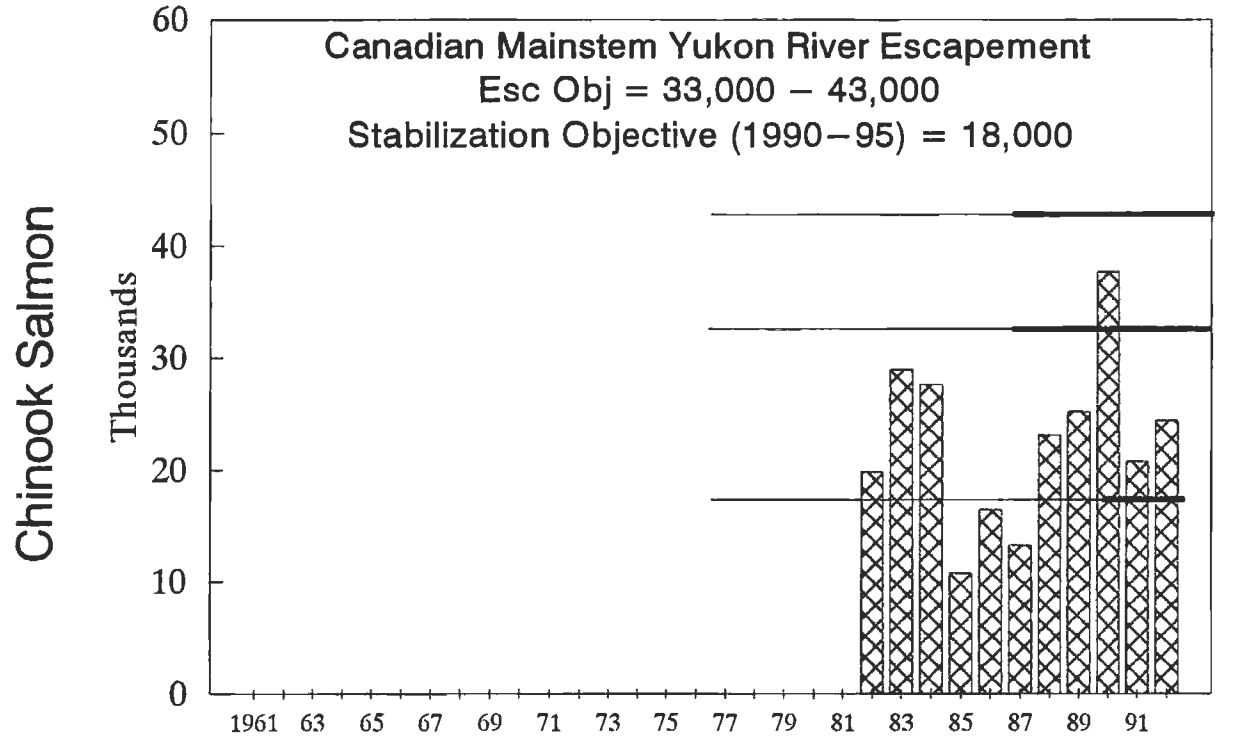

**Appendix Figure 10. (Page 3 of 3).**



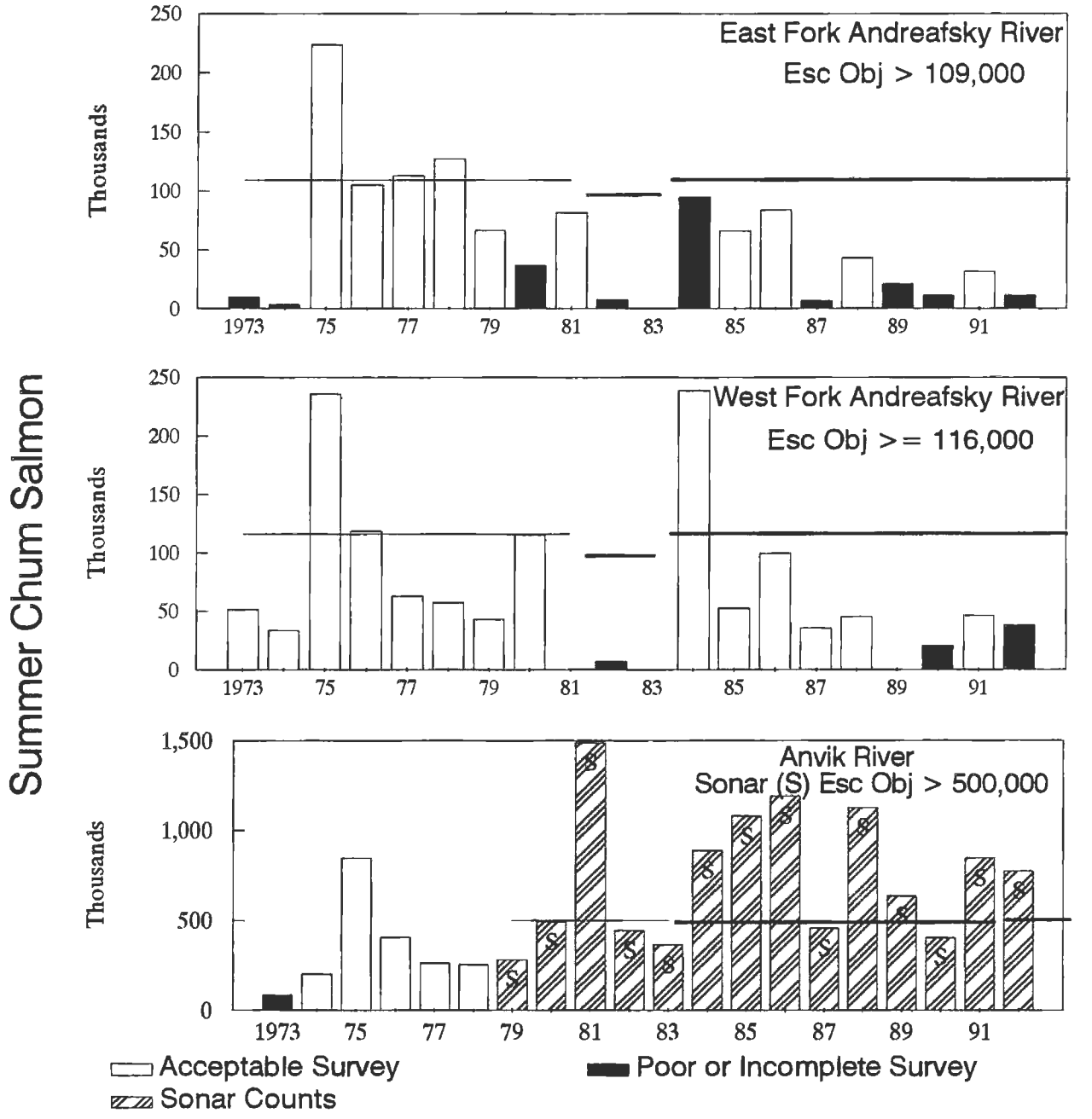

**Appendix Figure 11. Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961–1992.**



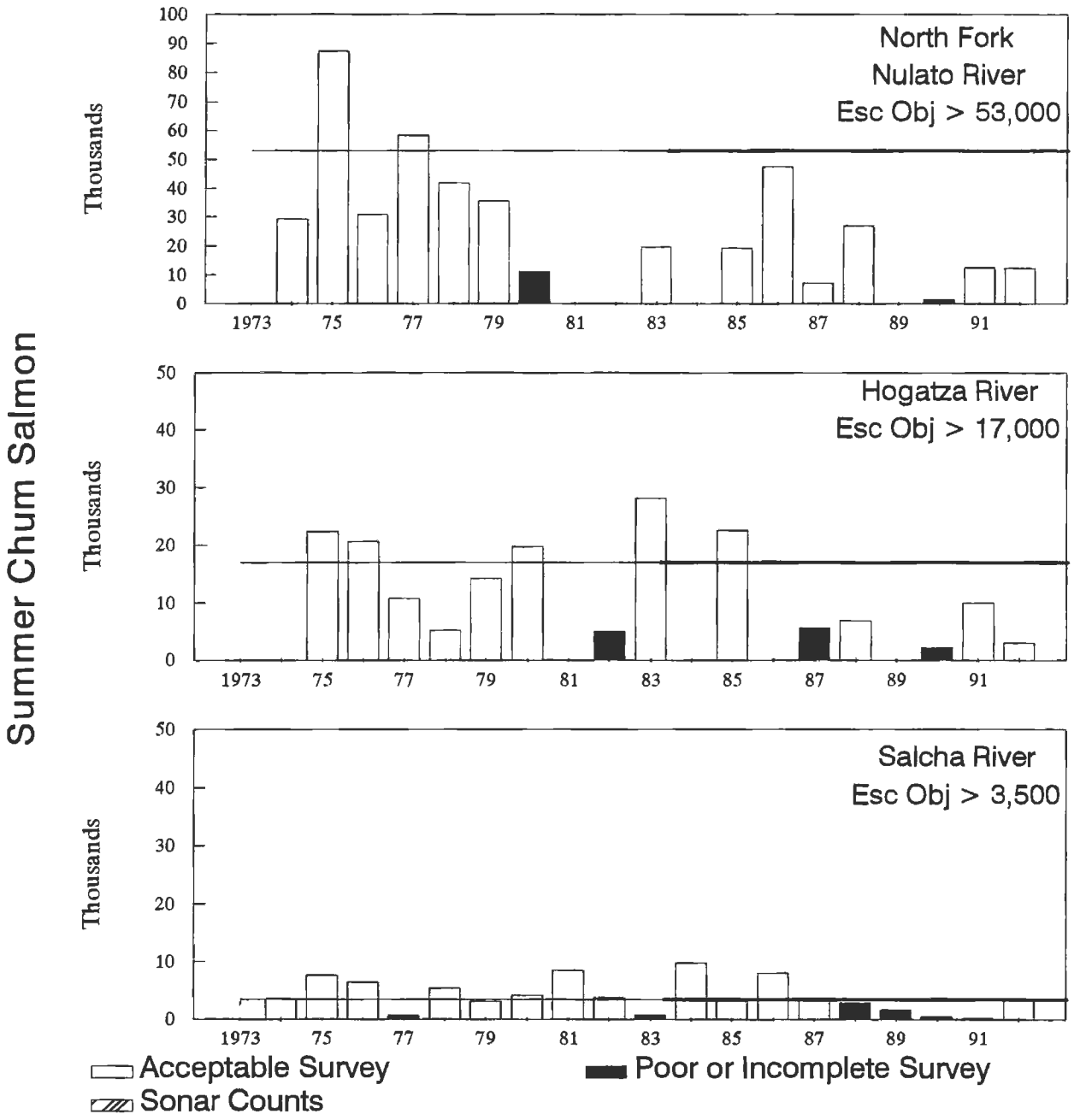

**Appendix Figure 11. (page 2 of 2).**



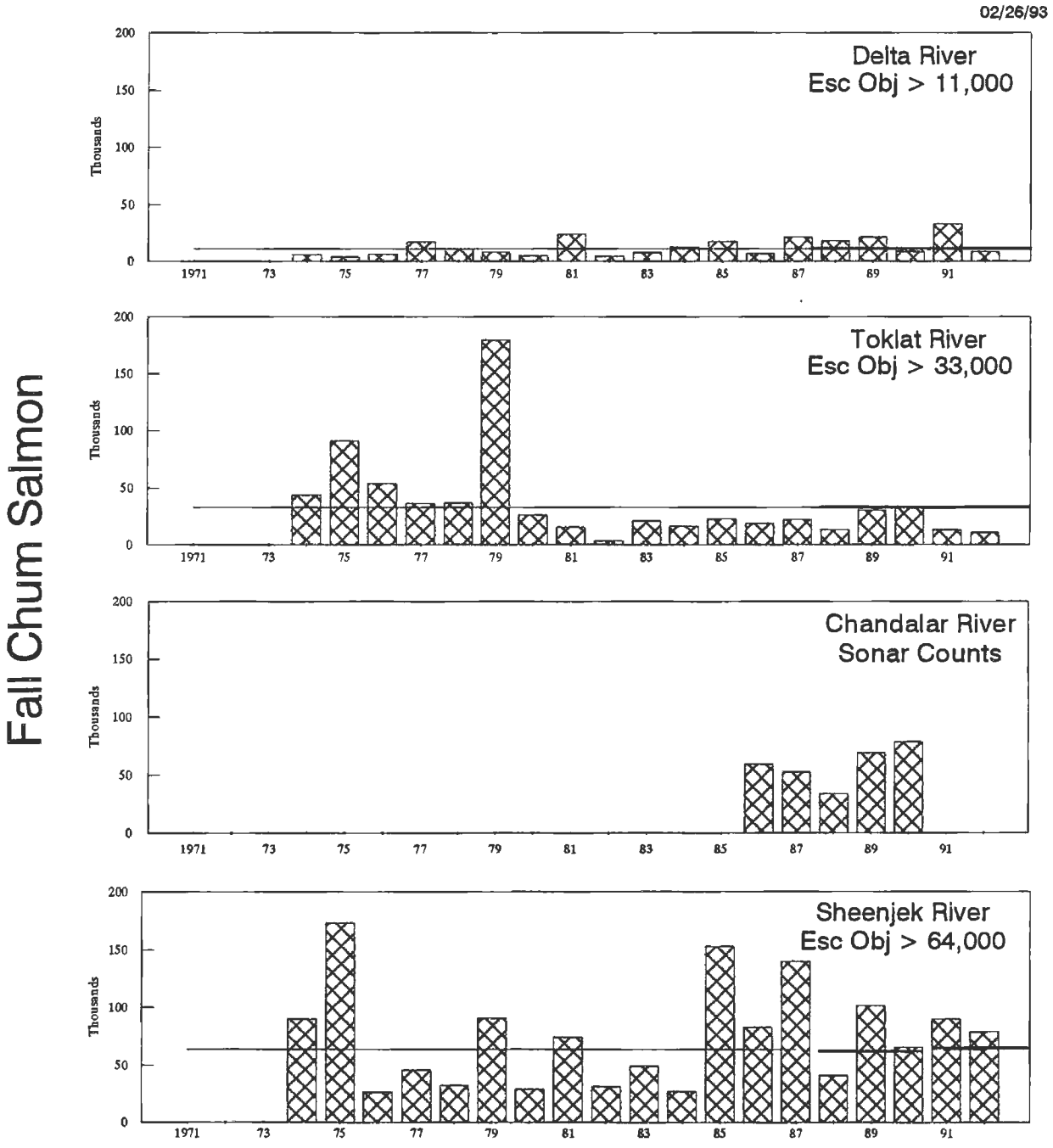

**Appendix Figure 12. Estimated total chinook salmon escapement to the Canadian portion of the mainstem Yukon River, 1982–1992.**



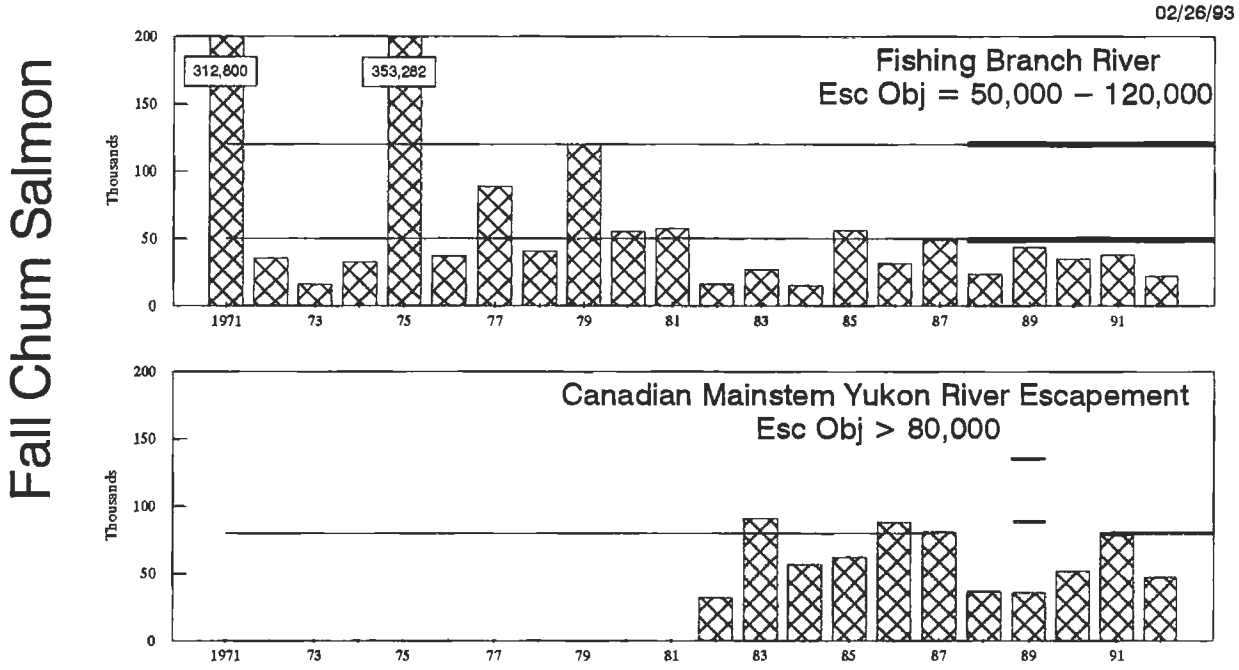

**Appendix Figure 13.** **Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973–1992.**



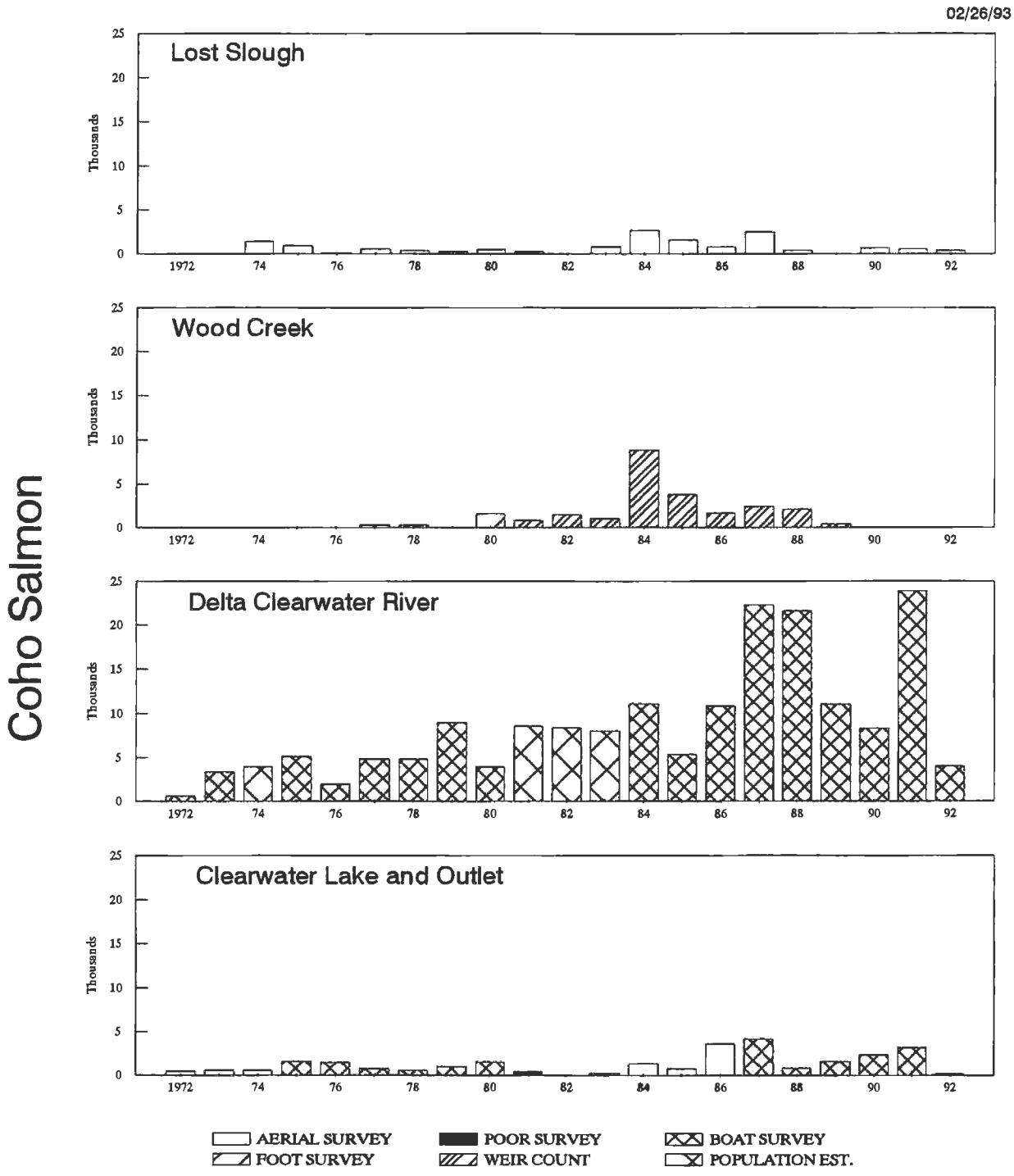

**Appendix Figure 13. (page 2 of 2).**




**Appendix Figure 14. Fall chum salmon escapement estimates for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1971–1992.**




**Appendix Figure 15. Fall chum salmon escapement estimates for spawning areas in the Canadian portion of the Yukon River drainage, 1971–1992.**




**Appendix Figure 16. Coho salmon escpaement counts for selected spawning areas in the Yukon River drainage, 1972–1992.**

Table 1. Preliminary estimates of commercial sales of salmon and salmon roe in the Alaska portion of the Yukon River drainage, 1992. a

| District Subdist. | No. of Fishermen | Chinook | | Summer Chum | | Fall Chum | | Coho | | Total Salmon | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Numbers | Roe (lbs) | Numbers | Roe (lbs) | Numbers | Roe (lbs) | Numbers | Roe (lbs) | Numbers | Roe (lbs) |
| 1 | 438 | 74,212 | – | 177,329 | – | 0 | – | 0 | – | 251,541 | – |
| 2 | 263 | 38,139 | – | 147,129 | – | 0 | – | 0 | – | 185,268 | – |
| Subtotal | 675 | 112,351 | – | 324,458 | – | 0 | – | 0 | – | 436,809 | – |
| 3 | 19 | 1,819 | – | 65 | – | 0 | – | 0 | – | 1,884 | – |
| Total Lower Yukon | 679 | 114,170 | – | 324,523 | – | 0 | – | 0 | – | 438,693 | – |
| 4–A | 71 | 0 | 86 | 0 | 99,701 | 0 | 0 | 0 | 0 | 0 | 99,787 |
| 4–B,C | 22 | 1,651 | 2,187 | 2,659 | 11,108 | 0 | 0 | 0 | 0 | 4,310 | 13,295 |
| Subtotal District 4 | 90 | 1,651 | 2,273 | 2,659 | 110,809 | 0 | 0 | 0 | 0 | 4,310 | 113,082 |
| 5–A,B,C | 25 | 3,395 | 7 | 102 | 295 | 0 | 0 | 0 | 0 | 3,497 | 302 |
| 5–D | 3 | 457 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 457 | 0 |
| Subtotal District 5 | 28 | 3,852 | 7 | 102 | 295 | 0 | 0 | 0 | 0 | 3,954 | 302 |
| District 6 | 25 | 572 | 884 | 5,029 | 1,892 | 15,721 | 2,806 | 6,556 | 1,680 | 27,878 | 7,262 |
| Total Upper Yukon | 143 | 6,075 | 3,164 | 7,790 | 112,996 | 15,721 | 2,806 | 6,556 | 1,680 | 36,142 | 120,646 |
| Total Yukon Area | 822 | 120,245 | 3,164 | 332,313 | 112,996 | 15,721 | 2,806 | 6,556 | 1,680 | 474,835 | 120,646 |

a Commercial sales reported in numbers of fish sold in the round and pounds of unprocessed roe sold by fishermen.

Table 2. Commercial sales of salmon and salmon roe in the Alaska portion of the Yukon River drainage, 1961–1992. a

| Year | Chinook | | Summer Chum | | Fall Chum | | Coho | |
|---|---|---|---|---|---|---|---|---|
| | Numbers | Roe | Numbers | Roe | Numbers | Roe | Numbers | Roe |
| 1961 | 119,664 | – | – | – | 42,461 | – | 2,855 | – |
| 1962 | 94,734 | – | – | – | 53,116 | – | 22,926 | – |
| 1963 | 117,048 | – | – | – | 0 | – | 5,572 | – |
| 1964 | 93,587 | – | – | – | 8,347 | – | 2,446 | – |
| 1965 | 118,098 | – | – | – | 23,317 | – | 350 | – |
| 1966 | 93,315 | – | – | – | 71,045 | – | 19,254 | – |
| 1967 | 129,656 | – | 10,935 | – | 38,274 | – | 11,047 | – |
| 1968 | 106,526 | – | 14,470 | – | 52,925 | – | 13,303 | – |
| 1969 | 91,027 | – | 61,966 | – | 131,310 | – | 15,093 | – |
| 1970 | 79,145 | – | 137,006 | – | 209,595 | – | 13,188 | – |
| 1971 | 110,507 | – | 100,090 | – | 189,594 | – | 12,203 | – |
| 1972 | 92,840 | – | 135,668 | – | 152,176 | – | 22,233 | – |
| 1973 | 75,353 | – | 285,509 | – | 232,090 | – | 36,641 | – |
| 1974 | 98,089 | – | 589,892 | – | 289,776 | – | 16,777 | – |
| 1975 | 63,838 | – | 710,295 | – | 275,009 | – | 2,546 | – |
| 1976 | 87,776 | – | 600,894 | – | 156,390 | – | 5,184 | – |
| 1977 | 96,757 | – | 534,875 | – | 257,986 | – | 38,863 | – |
| 1978 | 99,168 | – | 1,052,226 | 25,761 | 236,383 | 10,628 | 26,152 | – |
| 1979 | 127,673 | – | 779,316 | 40,217 | 359,946 | 18,466 | 17,165 | – |
| 1980 | 153,985 | – | 928,609 | 139,106 | 293,430 | 5,020 | 8,745 | – |
| 1981 | 158,018 | – | 1,006,938 | 189,068 | 466,451 | 11,285 | 23,680 | – |
| 1982 | 123,644 | – | 461,403 | 152,819 | 224,187 | 805 | 37,176 | – |
| 1983 | 147,910 | – | 744,879 | 149,999 | 302,598 | 5,064 | 13,320 | – |
| 1984 | 119,904 | – | 588,597 | 167,224 | 208,232 | 2,328 | 81,940 | – |
| 1985 | 146,188 | – | 516,997 | 248,625 | 267,744 | 2,525 | 57,672 | – |
| 1986 | 99,970 | – | 721,469 | 271,691 | 139,442 | 577 | 47,255 | – |
| 1987 | 134,760 | – | 442,238 | 121,968 | 0 | 0 | 0 | – |
| 1988 | 101,421 | – | 1,152,237 | 256,535 | 133,975 | 3,227 | 86,612 | – |
| 1989 | 101,840 | – | 959,994 | 288,549 | 270,195 | 14,749 | 83,353 | – |
| 1990 | 95,361 | 1,731 | 306,796 | 109,376 | 125,058 | 10,944 | 42,694 | 4,042 |
| 1991 | 104,878 | 3,829 | 349,113 | 141,976 | 230,852 | 19,395 | 103,180 | 4,299 |
| 1992 b | 120,245 | 3,164 | 332,313 | 112,996 | 15,721 | 2,806 | 6,556 | 1,680 |
| 1987–91 Avg | 107,652 | – | 642,076 | 183,681 | 152,016 | 9,663 | 63,168 | – |

a Commercial sales reported in numbers of fish sold in the round and pounds of unprocessed roe sold by fishermen.

b Data for 1992 are preliminary.

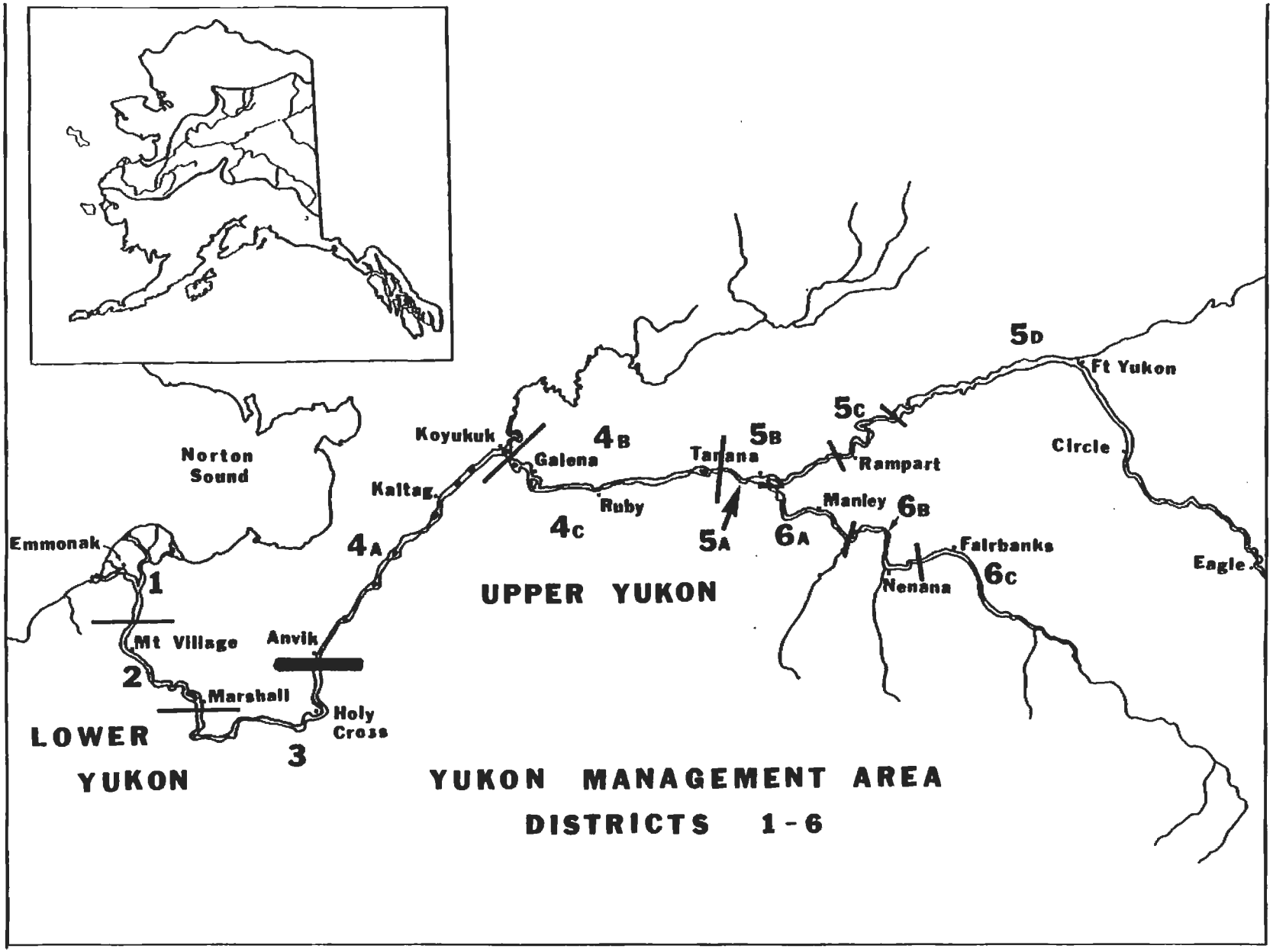



Figure 1. Map of the Alaskan portion of the Yukon River, showing fishing district boundaries.

Figure 2a. Expected Fishing Branch River chum salmon escapement assuming productivity = 1.5 adults/spawner.

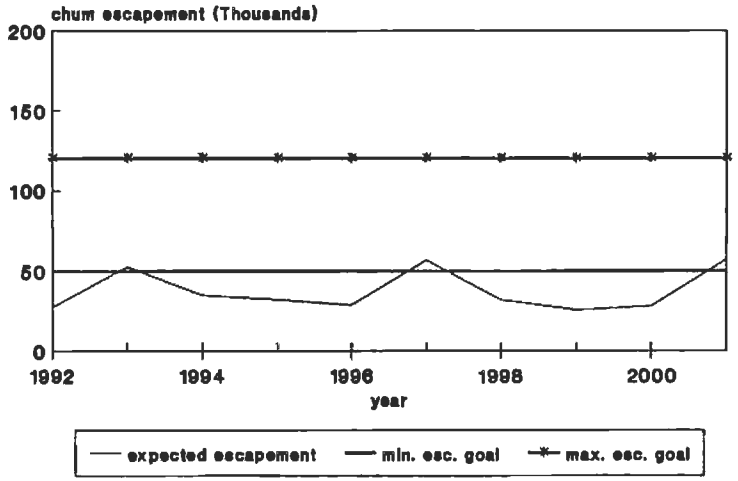



Figure 2b. Expected Fishing Branch R. chum salmon escapement assuming productivity = 2.0 adults/spawner.