YUKON RIVER SALMON SEASON REVIEW FOR 1995 AND TECHNICAL COMMITTEE REPORT

Prepared by

THE UNITED STATES/CANADA
YUKON RIVER JOINT TECHNICAL COMMITTEE

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1.0 INTRODUCTION

The previous U.S./Canada Yukon River Joint Technical Committee (JTC) report, dated March 1995, was intended for presentation to the Yukon River Panel at their first meeting. Additionally, it was anticipated that the Panel would then task the JTC to meet in the fall of 1995 to prepare a review of the 1995 season and complete other assignments. However, the Yukon River Panel had not formed as of the fall of 1995 because of unanticipated delays in enabling U.S. legislation. Therefore, the JTC was not specifically tasked by the Panel for the fall 1995 JTC meeting. However, previous fall meetings of the U.S./Canada Yukon River JTC were primarily held to exchange and review information on the current year fishing season and the status of salmon stocks and briefly summarize project activities. Therefore, in the absence of specific assignments from the Panel, the JTC set as its primary purpose for this 8-9 November meeting in Whitehorse the preparation of a standard season summary report. Additionally, the JTC continued discussions on two items which were initiated at the March meeting: 1) the salmon restoration and enhancement (R&E) proposal process; and 2) an update on the potential for a salmon radio-tagging project in the upper Yukon River drainage.

This report is organized into nine sections and three attachments. The various sections summarize the 1995 fishing season in the Yukon River drainage, the status of the spawning stocks, selected project activities, discussions on the R&E process, and planning for the upper Yukon River salmon radio-tagging project. A list of the people who attended this meeting is provided in Attachment I. Attachment II provides the updated historical Yukon River salmon catch and escapement data in graphic and tabular form. Note that the Alaska commercial catch information in Attachment II is in numbers of salmon. Salmon roe sales have been converted to the number of salmon estimated to have been caught to produce the reported weight of roe sold. Attachment III provides the second draft of the proposal application format for R&E funding support. Compilation of this report from the November 1995 JTC meeting was completed in February 1996.

2.0 1995 COMMERCIAL FISHERY - ALASKA

Preliminary estimates of commercial sales totaled 679,174 salmon and 330,824 pounds of unprocessed salmon roe (Table 1) for the Alaskan portion of the Yukon River drainage (Figure 1) in 1995. Note that the 1995 Alaskan commercial harvest is expressed as the number of salmon sold in the round and pounds of salmon roe sold. Total sales were composed of 122,728 chinook, 259,774 summer chum, 250,733 fall chum, and 45,939 coho salmon sold in the round (Table 1). Roe sales by species totalled 5,357 pounds for chinook, 290,737 pounds for summer chum, 32,501 pounds for fall chum, and 2,229 pounds for coho salmon (Table 1).

All commercial salmon sales, in terms of number of salmon or pounds of roe, with the exception of coho salmon roe sales, were above the most recent 5-year (1990-1994) average. However,

declining salmon markets, particularly for chum salmon flesh, had a major impact on the commercial fishery in Alaska, resulting in limited harvests in some districts and lower exvessel value. With regards to fish sold in the round, the chinook salmon catch was 16% above the 1990-94 average; the summer chum salmon catch was 12% above the average; the fall chum salmon catch was 237% above the average; and the coho salmon catch was 52% above the average (Table 2). Chinook salmon roe sales were 104% above the 1990-94 average; summer chum salmon roe sales were 200% above the average; and fall chum roe sales were 346% above the average. Coho salmon roe sales were 29% below the 1990-94 average. Higher across-the-board salmon sales reflect the exceptionally strong chinook, summer chum, and fall chum salmon runs during the 1995 season in the Yukon River, and also the relatively low harvests for some salmon species in some recent years. Note that salmon roe sales data were not available for chinook and coho salmon prior to 1990 (Table 2).

Yukon River fishermen in Alaska received an estimated $7.2 million for their catch in 1995, approximately 5% below the recent 5-year average of $7.5 million. Six buyer-processors and one catcher-seller operated in the Lower Yukon Area, and eight 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 $2.09 for chinook salmon, $0.16 for summer chum salmon, $0.15 for fall chum salmon, and $0.29 for coho salmon. Upper Yukon commercial fishermen received an estimated per-pound average price of $0.77 for chinook salmon, $2.64 for chinook salmon roe, $0.13 for summer chum salmon, $3.58 for summer chum salmon roe, $0.13 for fall chum salmon, $2.96 for fall chum salmon roe, $0.14 for coho salmon, and $2.51 for coho salmon roe.

2.1 Chinook and Summer Chum Salmon

The 1995 preseason outlook was for an average to above average chinook salmon run based on parent year escapements. The summer chum salmon outlook was for a below average to average run. The commercial harvest in the Alaskan portion of the drainage was anticipated to be between 88,000 and 108,000 chinook and 300,000 to 600,000 summer chum salmon.

Chinook salmon migratory timing was slightly early and similar to run timing in 1980 based on lower river test fishery data. Summer chum salmon migratory timing appeared to be average. The first chinook salmon catches were reported on 24 May near Sheldon's Point by a subsistence fisherman. The department's test fishing projects recorded the first chinook and summer chum salmon catches on 29 May. Chinook and summer chum salmon entered the river primarily through the south and middle mouths.

A record test fishing cumulative catch per unit effort (CPUE) of 34.39 for chinook salmon from Big Eddy and Middle Mouth 8.5 inch mesh size set gillnet sites indicated above average abundance in 1995 and similar to the large runs in 1980, 1981, 1987 and 1994. Initially, the indication of a strong run was viewed cautiously, as water levels were well below normal, which

may have resulted in increased efficiency of the test fishery. Approximately 50% of the chinook salmon run had entered the lower river by 16 June. Chinook salmon test fish catches in 5.5 inch mesh size set gillnets were about average.

A record test net cumulative CPUE of 154.05 for summer chum salmon indicated the 1995 run was above average in abundance and similar to the very large runs in 1980 and 1981. Approximately 50% of the summer chum salmon return had entered the lower river by 22 June according to test fishing CPUE data.

The Pilot Station sonar project estimated a passage of 263,000 chinook and 3,667,000 summer chum salmon. These passage estimates were the largest since the project was initiated in 1986. However, passage estimates since 1993 are not strictly comparable to other years' estimates because of changes in equipment and operations since initiation of the project.

Based on the assessment of above average chinook and summer chum salmon abundance, the targeted commercial harvests were increased beyond the preseason projections. The harvest of chinook salmon was near the upper end of the guideline harvest ranges in Districts 1, 2 and 5, and a record harvest was taken in District 6. However, declining salmon market conditions resulted in no commercial openings in District 3 during the summer season and a limited chinook salmon harvest in District 4. Because of a weak summer chum salmon flesh market, the Lower Yukon Area summer chum harvest was below the lower end of the guideline harvest range. Salmon roe markets remained relatively stable, which resulted in summer chum salmon harvests at or above the upper end of guideline harvest ranges in the Upper Yukon Area.

The 1995 Lower Yukon Area commercial salmon fishing season was opened by emergency order after approximately nine days of increasing subsistence and test net catches. District 2 was opened first with a 9-hour commercial period on 11 June. District 1 followed on schedule with a 12-hour period on 12 June. Both districts continued fishing on schedule (Monday, Thursday for District 1 and Sunday, Wednesday for District 2) through 22 June with unrestricted mesh size gillnets. In order to spread out the chinook salmon harvest and to ensure adequate escapements throughout the drainage, fishing periods with unrestricted mesh size gillnets were 12 hours or less in duration. In addition, District 2 had a six-hour period restricted to six inch or less mesh size on 20 June in order to allow for the harvest of summer chums while there was still a market for the fish. No commercial fishing was allowed in District 3 (Table 1) because of the lack of a market.

The harvest of 21,225 chinook salmon taken during the fourth period in District 1 on 22-23 June was the third largest harvest for a 12-hour period on record. Prior to the opening of this period, it was anticipated that 10,000 to 11,000 chinook salmon would be taken. Because of this unanticipated large chinook harvest, buyer and processor capacity was temporarily limited, resulting in the cancellation of a six inch or less mesh size period scheduled for the evening of 23 June in District 1. Although this fishing period was cancelled with very short notice, there was very little confusion among the fleet.

Because of the limited chinook salmon market, after the chinook salmon harvest reached 100,000 fish for Districts 1 and 2, and the poor summer chum salmon market, no buyers were available to purchase fish in District 2 after 23 June. However, one additional unrestricted fishing period and six periods restricted to six inch or less mesh size were allowed in District 1 after 23 June. The limited market for chum salmon resulted in all summer chum salmon directed commercial periods being of short duration. Fishing time was based on processor capacity and chum salmon abundance, as indicated by the lower river test fishery. The last commercial fishing period in the Lower Yukon Area was on 7 July.

The total combined harvest of 117,564 chinook salmon for Districts 1 and 2 (Table 1) was 31% above the midpoint of the guideline harvest range of 90,000 fish and 21% above the 1990-1994 average harvest of 96,786 fish, but below the upper end of the guideline harvest range of 120,000 fish. A total of 114,434 chinook salmon were harvested during the nine unrestricted mesh size fishing periods in Districts 1 and 2. A total of 3,098 chinook salmon were harvested during the seven periods in District 1 and 2 restricted to six inch maximum mesh size gillnets. Additionally, 32 chinook salmon were harvested during the fall fishing season. The average weight of chinook salmon harvested during unrestricted mesh size periods was 21.8 pounds, while the average weight of chinook salmon harvested during six-inch maximum mesh size fishing periods was 15.1 pounds.

Preliminary age composition data from the Lower Yukon Area indicated age-6 fish accounted for 77% to 88% of the chinook salmon catch during fishing periods with unrestricted mesh size gillnets. This larger than normal percentage, and corresponding number, of age-6 chinook salmon in 1995 is consistent with the above average return of age-5 fish in 1994. These consistent, relatively large sibling returns indicate good production from the 1989 parent-year escapement. Sex composition in District 1 and 2 harvests was nearly 1 male:1 female. Twenty-three adipose fin-clipped chinook salmon were collected from 8-23 June. A total of 14 fin-clipped chinook salmon were recovered during commercial catch sampling activities and nine were recovered from the test fishery. A total of 19 coded wire tags were verified. All originated from the Whitehorse hatchery.

The total combined commercial summer chum salmon harvest in District 1 and 2 of 226,083 fish (Table 1) was 5% above the recent 5-year average harvest of 215,961 fish. However, this harvest was 10% below the lower end of the guideline harvest range of 251,000 summer chums for Districts 1 and 2. A total of 112,223 summer chum were harvested during the seven fishing periods restricted to six inch or less mesh size and 113,860 summer chum were harvested during the nine unrestricted mesh size fishing periods in Districts 1 and 2 combined. The average weight of summer chum salmon was 6.7 pounds.

Summer chum salmon commercial harvests in the Lower Yukon Area were dominated by age-5 fish. Age-5 summer chum salmon comprised from 50% to 72% of the catch in fishing periods with unrestricted mesh size gillnets. Age-5 summer chum salmon accounted for 39% to 67% of the catch during restricted mesh size periods.

District 4 was opened to commercial salmon fishing on 28 June. The first fishing period in Subdistrict 4-A was 18 hours in duration. For the remainder of the season, fishing periods were limited to 12 hours in duration to prevent the harvest from overwhelming processing capacity. This was the first season during which a three 12-hour period per week fishing schedule was established. This schedule worked very well for fishers and buyers. Harvested summer chum salmon were processed efficiently under this fishing schedule. Because of a large summer chum salmon run and a reduced harvest of summer chum salmon in the lower river area, because of the poor flesh market, a large harvestable surplus of summer chum salmon was available in Subdistrict 4-A and in the Anvik River Management Area. Because of this extraordinary large surplus of summer chum salmon, the sale of roe in Subdistrict 4-A and the Anvik River Management Area were allowed to reach the roe caps. A total of 48,477 pounds of summer chum salmon roe were sold in the Anvik River Management Area and 189,252 pounds of summer chum salmon roe were sold in Subdistrict 4-A. The Board of Fisheries was contacted regarding the possibility of exceeding the roe caps because a large harvestable surplus was still available. Because of the controversial nature of the roe fishery and the need for allowing full public hearings, the Board did not approve exceeding the roe caps. Only the sale of summer chum salmon in the round was allowed during the last fishing period in Subdistrict 4-A. Although two buyers expressed interest in buying a limited number of fish in the round, the fishery did not materialize and no sales were made.

This was the second consecutive year that commercial fishing was allowed within the Anvik River. In the Anvik River Management Area, fishing periods were scheduled concurrently with Subdistrict 4-A openings, with the exception of the second period. During the first and second periods in the Anvik River, permit holders were limited to selling 600 chum salmon in the round or 400 pounds of roe per period. Permit holders were not limited to the amount of chum salmon or chum roe sold for the remainder of the periods. The management strategy to divert fishing effort from the mainstem Yukon River in Subdistrict 4-A to the Anvik River seemed to work well. The number of permit holders that fished in the Anvik River during concurrent periods with Subdistrict 4-A ranged from 3 to 15 and averaged 10.

A record harvest of 43,345 pounds of summer chum salmon roe was sold in Subdistricts 4-B and 4-C (Table 1). The harvest was allowed to exceed the guideline harvest range based on the large summer chum salmon escapement documented in the Anvik, Kaltag, Nulato, and Gisasa Rivers. Poor fishing conditions and declining markets led to a below average total estimated harvest of 481 chinook salmon in Subdistricts 4-B and 4-C. A total of six 48-hour fishing periods were allowed.

The commercial fishing season was opened in Subdistricts 5-A, 5-B, and 5-C on 1 July, after the chinook salmon run was believed to be well distributed throughout these subdistricts. Three 24-hour fishing periods were allowed in these subdistricts. Commercial fishing in Subdistrict 5-D commenced on 11 July. Four 36-hour fishing periods were allowed in Subdistrict 5-D. The upper end of the chinook salmon guideline harvest ranges were nearly met in District 5. The total estimated harvest was 2,753 chinook in Subdistricts 5-A, 5-B and 5-C and 489 chinook salmon in Subdistrict 5-D. Additionally, 107 summer chum salmon and 188 pounds of summer chum

salmon roe were sold in Subdistricts 5-A, 5-B, and 5-C. Summer chum salmon were not sold in Subdistrict 5-D. Declining market conditions limited the harvest during some fishing periods in District 5.

A record total estimated harvest of 2,748 chinook salmon was taken in District 6. The total estimated harvest of 37,428 summer chum salmon was near the upper end of the guideline harvest range. Management of the fishery was primarily based on Chena and Salcha River tower counts. Four 42-hour fishing periods were allowed. The first period was directed at chinook salmon and the remaining periods were directed at summer chum salmon. The second fishing period was delayed to ensure adequate chinook salmon escapement.

2.2 Fall Chum and Coho Salmon

Fall chum salmon return as primarily age-4 and age-5 fish. Based on parent year escapement information and estimated spawner-return relationships, approximately 800,000 fall chum salmon were projected to return to the Yukon River drainage in 1995. As adopted in the Yukon River drainage fall chum salmon management plan, the Board of Fisheries identified the need for a minimum of 400,000 fall chum salmon for drainage-wide escapement and 200,000 fall chum salmon for Alaskan subsistence and anticipated Canadian harvests. The 1995 preseason projection suggested that an Alaskan commercial harvest of up to 200,000 fall chum salmon could occur in 1995 and still provide for escapement and subsistence needs. However, rebuilding efforts for both the Canadian and Toklat River fall chum salmon stocks lowered the maximum Alaskan commercial harvest level that could be supported by the 1995 Yukon River fall chum salmon run. A reduction in the allowable commercial harvest would permit additional salmon to reach the spawning grounds to aid in the rebuilding efforts. If the fall chum salmon run materialized as projected, Alaskan fishermen could have expected a commercial harvest on the order of 150,000 fall chum salmon. However, based on inseason information, the department was prepared to adjust the run size projection and the corresponding allowable Alaskan commercial harvest upwards or downwards.

The preseason projection was primarily used for management during the early portion of the fall chum salmon run (16-31 July). However, by 1 August, inseason assessment indicated that the 1995 fall chum salmon run was larger than projected. The Lower Yukon test fish cumulative CPUE for fall chum salmon through August 1 was 18.19, the second highest on record (1980-1994) and 81% above the average (1980-1994) cumulative CPUE. Additionally, the estimated passage of fall chum salmon by the Pilot Station sonar site was approximately 450,000 salmon through 1 August. Based on this estimate and historical average run timing data (1986-1991 & 1993-1994), the total season passage of fall chum salmon was projected to be 1.67 million salmon. As the season progressed, these and other inseason indicators continued to suggest an above average fall chum salmon run. Based on these inseason run strength indications, targeted commercial harvest levels were ultimately increased to the upper end of each district's or subdistrict's individual guideline harvest range.

Marketing difficulties, lack of buyers, limited processing or tendering capacities, limitations on when or where processors could handle fish, lack of a flesh market, low prices, and low effort hampered efforts to reach the upper end of the respective guideline harvest ranges in Districts 1 through 4 and Subdistricts 5-A, 5-B, and 5-C. Most areas had a record or near record number of fall season commercial fishing periods. However, initial District 1 commercial fishing periods were very short in duration. The 1995 Alaskan commercial harvest was approximately 283,000 fall chum salmon. The combined guideline harvest range for the Yukon Area in Alaska is 72,750 to 320,500 fall chum salmon.

Only one district was allowed to exceed its individual guideline harvest range. A record harvest of approximately 74,100 fall chum and 6,900 coho salmon were sold during the four District 6 commercial periods. The District 6 guideline harvest range is 2,750 to 20,500 fall chum salmon. The Board of Fisheries has approved exceeding the guideline harvest range in District 6 when the additional commercial harvest would not jeopardize escapement or subsistence needs. However, with the limited inseason tools available to assess the run into the upper Tanana River, it is difficult to determine the maximum level of the commercial harvest which would still provide for escapement goal minimums and subsistence needs. Because of this, the department has been conservative in the management of the Tanana River commercial fishery. Despite the record harvest levels, the department was confident, inseason, that the escapement objectives in the upper Tanana River would be achieved. However, escapement results would not be known until mid- to late-October, following postseason spawning ground surveys, too late for inseason management.

The department recognizes the need for better Tanana River inseason management tools, and this is the first year of a joint Bering Sea Fisheries Association (BSFA) and Alaska Department of Fish and Game (ADF&G) tagging project in the upper Tanana River. The experimental project's long-term objective includes providing managers with an inseason upper Tanana River fall chum salmon run size estimate. The results from this first year project will be evaluated postseason. Although it may take several years to develop, if the project proves to be successful it will greatly improve the information available to managers of the Tanana River fisheries.

Coho salmon have a later, but overlapping, run timing with that of fall chum salmon. Comprehensive coho salmon escapement information is lacking within the Yukon River drainage. Coho salmon return primarily as age-4 fish. Based on limited coho salmon escapement surveys in 1991, and assuming average survival rates, an above average return of coho salmon was projected in 1995. No guideline harvest ranges have been established for coho salmon. Currently, coho salmon are incidentally harvested in the directed commercial fall chum salmon fishery. Approximately 47,000 coho salmon were sold commercially in 1995, of which the majority (approximately 86%) were harvested in Districts 1 and 2.

3.0 1995 COMMERCIAL FISHERY - CANADA

The management plans for the Canadian chinook and chum salmon fisheries on the Yukon River in 1995 were formulated to reflect the understandings reached in the Interim Yukon River Salmon Agreement (IYRSA). Accordingly, the guideline harvest ranges, and the border and spawning escapement goals for upper Yukon chinook and chum salmon, that were established in the IYRSA, provided the foundation for the 1995 management plans.

A preliminary total of 50,356 salmon including 11,344 chinook salmon and 39,012 chum salmon was harvested in the 1995 Canadian Yukon River commercial fishery (Table 3). The chinook catch was 4% above the recent chinook cycle average (1989-1994) catch of 10,879 chinook and the chum catch was 78% above the recent cycle average (1991-1994) of 21,944 chum.

A total of 30 commercial licenses was issued in 1995, the same number as in 1994. The maximum number of commercial fishers active during any one week of the chinook salmon season was 17 fishers. During the chum season, the highest number of fishers present in any one opening was 18 fishers. Most of the commercial chinook harvest was taken by gill nets set in eddies; only two fishwheels were in use during the chinook season. However, during the chum season, five fishwheels were in operation.

3.1 Chinook Salmon

With the preseason expectation of a total run size of about 112,000[1] Canadian-origin mainstem Yukon River chinook salmon in 1995, which was approximately 14% below average, the elements of the chinook management plan adopted for 1995 included:

i) a minimum escapement goal of 18,000 chinook, as per the stabilization plan agreed to in the IYRSA;

ii) a total upper Yukon guideline harvest range for all users of 16,800 to 19,800 chinook salmon, which was the range agreed to in the IYRSA;

iii) a commercial guideline harvest range of 9,000 to 12,000 chinook, with a preseason target of 9,800 chinook. Based on the preseason forecast for a below average return, the catch was expected to fall within the lower half of the range; and

iv) a one day per week fishery for the initial two weeks of the season, followed by a three day opening subject to run assessments. It was indicated in the plan that the initial

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[1] The preseason expectation was later re-calculated and upgraded to 131,800 chinook, a slightly above average outlook.

opening would occur the Monday following the date the first chinook salmon was captured in the DFO fishwheels or the Aboriginal fishery. If there was insufficient time to post this opening, for example if the first fish was caught on the weekend, the first one day opening would be postponed and the time would be added to the subsequent opening. The duration of fishing periods after the first two weeks of the season was to be determined inseason based on run strength and harvest guidelines.

This fishing plan was similar to the plan developed for 1994.

The commercial fishery opened on Monday, 3 July, 1995 (statistical week 27) for 48 hours, one week later than scheduled. According to the fishing plan, the fishery was to have opened the Monday following the capture of the first fish in the DFO fishwheels or the Aboriginal fishery. With the first capture occurring 25 June, there was insufficient time to arrange for an opening the following day. As a result, the opening was postponed and a second day was added to the 3 July opening. The date of chinook arrival at the fishwheels was two days later than in 1993 when the first fish appeared on 23 June, the earliest date on record.

The catch in the 3 July opening of the commercial fishery, consisting of 326 chinook for 9 fishers, was far above the previous cycle average catch for this week of 14 chinook. Throughout the season, the comparison of weekly fishing performance with similar statistical weeks of previous years was viewed with some caution because of the relative lateness of the calendar dates within statistical weeks in 1995. For example, statistical week 27 in 1995 was the week of 2-8 July, whereas in 1994, statistical week 27 occurred 27 June to 2 July. This meant interpreting whether inter-annual comparisons of a given statistical week in 1995 might more appropriately have been made with the previous cycle averages for the subsequent statistical week.

Consistent with the management plan, fishing time was extended to three days, two weeks after the run had begun. The official beginning date of the run was determined to be 26 June through the examination of the trend in the three-day moving average of the catch of chinook salmon in the DFO fishwheels early in the season. The commercial catch during the 10-13 July opening, statistical week 28, was a record catch for this week and the catch-per-unit-effort (CPUE) was approximately three times the recent cycle average. Based on the above average run strength reported from the Pilot Station sonar project by this time and the strong early showing of chinook salmon in the Canadian commercial fishery and the DFO fishwheels (approximately 100% above average), the season target commercial catch was increased to the upper end of the commercial guideline harvest range, 12,000 chinook. The cumulative catch through week 28 was 2,562 chinook, 1,551 fish above the guideline to that point in the season. Cumulative weekly commercial guideline harvests were established during the fishing season based on historical run timing and the current inseason commercial harvest objective for the season.

The chinook catch and CPUE were about average for statistical week 29 (17-20 July) and the fishery closed after three days to prevent the cumulative catch, 4,886 chinook, from getting too far above the cumulative guideline through that week, 3,595 chinook. The first inseason border

escapement forecast, approximately 59,000 chinook, was made at the end of week 29 based on preliminary mark-recapture data from the Bio Island tagging program. This forecast provided further support for the decision in the previous week to adjust the target seasonal commercial catch to the upper end of the guideline harvest range.

The peak weekly catch of the chinook season, 2,908 fish, occurred during the three-day fishery 24-27 July and although the weekly catch was only 2% above average, the CPUE was the highest on record (69 chinook/fisher/day) and was 50% above average. The principle reason for this discrepancy can be attributed to the shorter fishing time fished during this week in 1995 compared to the normal fishing time of four or five days. Although the run strength justified an extension to the fishing time, the fishery was restricted to three days in respect for the cumulative weekly guideline harvest which had already been exceeded by 27%. Further evidence that the run was peaking was provided from the DFO fishwheels which peaked 27 July with a combined daily catch of 170 chinook. The cumulative combined fishwheel catch through 27 July was 1,359 chinook, the second highest on record through that date and 63% above the 1985-1994 average for the same period. Based on updated mark-recapture data through week 30, the forecast border escapement increased to approximately 71,000 chinook.

The weekly fishing time remained at three days for statistical week 31 (31 July-3 August) through week 33 (14-17 August). The chinook CPUE was 14% above average in week 31, average in week 32, then fell to 45% below average in week 33. With decreasing abundance, border escapement forecasts dropped from approximately 74,000 chinook in week 31, to 62,000 chinook in week 33. By 17 August, the cumulative catch of 11,039 chinook was within 3% of the cumulative weekly management guideline of 11,314 fish.

Declining chinook abundance in the previous week and reduced fishing opportunity, i.e. two days, spelled an end to the 1995 chinook season; there was no commercial fishing effort in week 34. The final inseason border escapement forecast was approximately 62,000 chinook.

The preliminary total commercial chinook catch of 11,344 fish was 4% above average and was 5% below the revised inseason target of 12,000 chinook, i.e. the upper end of the guideline harvest range of 9,000 to 12,000 chinook. For comparison, the recent six-year average commercial catch was 10,879 chinook (1989 to 1994); during this period the catch ranged from 9,789 chinook in 1989 to 12,028 chinook in 1994. The preliminary postseason estimate of the border escapement indicated a Canadian commercial harvest rate of 22% on chinook salmon in 1995 compared to the recent cycle average harvest rate of 24% (1989-1994).

Comparisons of the commercial chinook CPUE with previous years indicated the run was above average in magnitude and slightly late in timing. The cumulative CPUE through week 34 was a record 270 chinook/fisher/day, 29% above the recent cycle average of 205 chinook/fisher/day. Fishing effort during the chinook season, i.e. through week 34, was 12% below average (249 boat-days versus an average of 282 boat-days) and was 25% below the effort level in 1994.

3.2 Fall Chum Salmon

The chum salmon run to the upper Yukon was expected to be above average in 1995 primarily because of the above average spawning escapement of 78,461 chum in 1991; the return of five-year-olds was expected to be below average because of the below average escapement of 51,735 chum in 1990. The 1995 chum salmon management plan was developed to address this outlook and the objectives of the three-cycle rebuilding plan that has been agreed to in the IYRSA. Accordingly, the plan included the following components:

i) an escapement goal of 80,000 upper Yukon chum salmon. This goal was developed by the Canada/U.S. JTC to reflect a three-cycle rebuild of the principal brood year escapement of 78,461 chum in 1991 to a long term goal of >80,000 chum;

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

iii) a commercial guideline harvest range of 20,300 to 29,300 chum salmon with a preseason target of 29,300 chum; the upper end of the range was recommended in view of the above average expected return. It was expected that the U.S. would manage for a border escapement of at least 112,600 chum salmon which was the upper end of the U.S. border escapement management range of 103,600 to 112,600 chum that had been established in the IYRSA for 1995. A border escapement of this magnitude would achieve the 1995 escapement goal and the upper end of the Canadian guideline harvest range; and

iv) reduced fishing time (1-2 days) for the initial weeks of the chum season, followed by potentially longer openings commencing early in September depending on assessments of run strength and the guideline harvest ranges.

In early August, ADF&G was forecasting an excellent drainage-wide fall chum salmon run that appeared to be in excess of one million fish. The projections from the Pilot Station sonar project provided the first inseason justification for setting the seasonal Canadian commercial harvest target at the upper end of the commercial guideline harvest range.

The Canadian commercial fishery opened for two days to target chum salmon, on 28 August (week 35). During this opening, the chum salmon CPUE (98 chum/fisher/day) was approximately three times the average value for this week. DFO fishwheel catches were at record levels and by the end of August were approximately 160% above average.

As a result of the exceptional early run strength observed in all indicators, the fishery was increased to three days the following week. The catch of 7,051 chum and CPUE of 191 chum/fisher/day, more than three times the average, established new records for statistical week 36. No extension to fishing time was permitted since the cumulative catch of 8,643 chum was well above the cumulative weekly management guideline of 2,900 pieces. A very preliminary

forecast based on mark-recapture data was generated at the end of week 36 (7 September), indicating the total border escapement might exceed 200,000 chum.

Record, or near record, chum CPUE persisted through week 38 (week ending 21 September) and the fishery was opened for three days in each of weeks 37 and 38. The peak chum catch of the season, totalling 11,203 fish, occurred during the 18-21 September opening. This was a record catch for statistical week 38 and overall was the second highest weekly chum catch on record. DFO fishwheel catches appeared to level off and decline somewhat prior to 9 September causing the forecast to decline to approximately 150,000 in week 37. However, a marked increase in the fishwheel catches occurred over the following week, causing the forecast to rebound to approximately 174,000 by the end of week 38.

Preliminary catch reports from the first two days of week 38 suggested the fishery had peaked the previous week and that the daily catches of chum in the commercial fishery were declining to average levels. Daily catches from the DFO fishwheels also appeared to indicate that the run strength was dropping, falling from a peak catch of 304 chum on 15 September to 208 chum on 18 September. Based on this information, i.e. the preliminary hails and decreasing fishwheel catches, it appeared that the seasonal target of 29,300 chum would be achieved in week 39 in a final three day fishery.

The announcement for the final opening, scheduled 25-28 September, was made mid-week of week 38 in order to give sufficient time for fishers to be notified that the season would close the end of the next opening. However, by the beginning of week 39, the outlook had changed: the catch projection of approximately 7,500 for week 38 was significantly below the actual catch of 11,203 chum and the DFO fishwheel catches had reversed their downward trend and were heading to a new and even greater peak than previously observed. The peak fishwheel catch of the season, 464 chum occurred 25 September, i.e. the start of the *final* fishing period. This indicated that the fishery performance would likely be as good as, if not better than, the previous week. The three day fishery in week 39 produced a chum catch of 10,727 pieces, another weekly record and 100% above the average catch for this week.

The preliminary total commercial chum harvest of 39,012 fish was second highest on record and was 33% above the upper end of the commercial guideline harvest range of 20,300 to 29,300 chum. For comparison, the recent four-year cycle average commercial catch was 21,944 (1991-1994) ranging from 7,762 chum in 1993, to 31,404 chum salmon in 1991. Based on preliminary tag recovery data, the harvest rate in the commercial fishery was approximately 20%, compared to the 1991-1994 cycle average of 24%.

Total fishing effort during the chum season (from week 35 on) was 184 boat-days in 1995, 28% above the 1991-1994 average of approximately 144 boat-days. The total number of days fished during this period, i.e. after week 35, was 14 days compared to the 1991-1994 average of 13 days.

The run strength based on cumulative commercial fishery CPUE was a record and was 55% above the previous cycle average. The cumulative DFO fishwheel catch of 9,482 chum salmon was also a record, and was 264% above the previous cycle average. The preliminary mark-recapture estimate, as discussed in Section 6.2.2 of this report, was a record and was approximately 123% above average. Run timing in the commercial fishery was unimodal with a protracted peak spanning weeks 37 and 38. When adjusted for calendar date, the timing appeared about average. Run timing based on DFO fishwheel catches appeared to be bimodal with the first peak occurring on 12 September (week 37); a second and larger peak occurred 25 September (week 39). The DFO fishwheels catches indicated that a significant group of fish passed through the commercial fishing area after the fishery closed for the season. Overall, the run timing based on fishwheel data appeared about five days later than average. Usually 50% of the combined total fishwheel catch occurs by 14 September; in 1995, half of the total catch had not occurred until 19 September.

4.0 1995 SUBSISTENCE, PERSONAL USE, ABORIGINAL, DOMESTIC, AND SPORT FISHERIES

4.1 Alaska

4.1.1 Subsistence Fishery

Subsistence "catch calendars" were mailed to non-permitted households in Yukon River drainage rural communities in Alaska in May for use during the fishing season. Personal interviews were conducted with fishermen immediately following the season. Subsistence fishermen in portions of District 5 and District 6 were required to obtain subsistence fishing permits and record harvest data. Additionally, personal-use permits were required for fishers who fished in the Fairbanks non-subsistence area of the Tanana River. Fishermen not contacted by other means were contacted by telephone or mail. Preliminary analysis of 1995 subsistence harvest data has just been completed. The preliminary estimated 1995 subsistence salmon harvest in the Alaska portion of the Yukon River drainage totalled approximately 48,800 chinook, 119,100 summer chum, 129,600 fall chum, and 28,800 coho salmon. These estimates include personal-use catches in the Fairbanks non-subsistence use area, but do not include commercially-caught salmon carcasses retained for subsistence purposes.

Data for 1994 were not available for inclusion in the March 1995 JTC report, and are therefore summarized here. The estimated 1994 subsistence salmon harvest in the Alaska portion of the Yukon River drainage totalled approximately 54,600 chinook, 132,500 summer chum, 123,200 fall chum, and 44,600 coho salmon. These estimates do not include commercially-caught salmon carcasses retained for subsistence purposes.

4.1.2 Personal Use Fishery

Regulations were in effect from 1988 until July 1990 that prohibited non-rural residents from participating in subsistence fishing. In those years, non-rural residents harvested salmon under personal use fishing regulations. The Alaska Supreme Court ruled, effective July 1990, that every resident of the State of Alaska was an eligible subsistence user, making the personal use category essentially obsolete. From July 1990 through 1992 all Alaskan residents qualified as subsistence users.

In 1992, during a special session of the legislature, a subsistence law was passed which allowed the Alaska Boards of Fisheries and Game to designate subsistence and non-subsistence zones. This law classified fishers as personal use or subsistence fisher based on the location of their domicile. The location where they fished did not affect their classification. The Fairbanks Non-Subsistence Use Zone was the only non-subsistence zone created in the Yukon Area by the Boards of Fisheries and Game. This zone basically included the Fairbanks North Star Borough. In October 1993, a Superior Court ruled that this 1992 subsistence law was unconstitutional. The State was immediately granted a stay, which allowed for status quo fishing regulations to remain in effect until April 1994. At that time the Alaska Supreme Court vacated the State's motion for a stay. This action resulted in all Alaskan residents being classified as subsistence users during the 1994 fishing season.

In 1995 the Joint Board of Fish and Game adopted the Fairbanks Non-subsistence Area. Within non-subsistence areas, no subsistence fishing was allowed. This new regulation primarily affected salmon fishermen within Subdistrict 6-C, which falls entirely within the Fairbanks Non-subsistence Area. The 1995 Subdistrict 6-C salmon fishery was managed under personal use regulations. Personal-use salmon harvests in this subdistrict is limited to 750 chinook salmon, 5,000 summer chum salmon, and 5,200 fall chum and coho salmon combined. In 1995, 130 fishers were issued personal-use salmon fishing permits. Fishers fishing under personal-use regulations harvested a preliminary catch of 398 chinook, 780 summer chum, 863 fall chum, and 417 coho salmon.

4.1.3 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 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. Overall Yukon River drainage sport harvest estimates for recent years (1990-94) have averaged about 1,100 chinook salmon, 900 chum salmon, and 1,900 coho salmon. Note that the chum salmon sport harvest information is not apportioned to the summer and fall runs, but reported as chum salmon. Therefore, the harvests of each run of chum salmon are unknown. Although some fall chum salmon are taken by sport fishers, the majority

of the chum salmon harvest is believed to be taken from the summer run because the summer run is usually much larger than the fall run. Therefore, for purposes of this report the total chum salmon sport harvest is reported as summer chum salmon. Harvest information for 1995 is not yet available. Sport harvest of salmon in the Alaskan portion of the Yukon River drainage in 1994 was estimated to total 2,281 chinook salmon, 952 chum salmon, and 2,174 coho salmon (Howe et al. 1995).

4.2 Canada

4.2.1 Aboriginal Fishery

In 1995, a comprehensive survey of the Aboriginal fishery was conducted, involving both inseason and postseason interviews. The preliminary estimate of the total chinook salmon catch was 8,036 fish, comprised of 7,576 chinook taken in the upper Yukon area and 460 chinook salmon harvested in the Porcupine River. The 1989-1994 average catches for these areas were 7,202 and 268 chinook salmon, respectively. For 1994, the preliminary estimate of chinook harvest in the upper Yukon area has been updated to 8,089 fish.

The preliminary estimate of the 1995 Aboriginal fishery harvest of chum salmon is 1,389 fish. This includes 951 fish caught in the upper Yukon area and 438 chum salmon caught in the Porcupine River. The upper Yukon area harvest is significantly below the previous cycle average of 3,180 chum and the updated estimate for 1994 of 5,319 chum salmon. The lower catch in 1995 may be attributed to abundance of chinook salmon earlier in the season, combined with the ready availability of chum salmon in the commercial fishery. The Porcupine River chum salmon harvest estimate is incomplete; however, it is close to the preliminary figure reported in 1994, i.e. 658 chum, which has since been updated to 2,654 chum. The 1991-1994 average harvest of chum salmon for the Porcupine River is 1,958 chum salmon.

Coho catches in Canada are generally limited to the Porcupine River where they are taken in the Old Crow fishery in late October and November. The estimated harvest of 332 in 1994 is slightly lower than the previous cycle average of 368 coho. No estimate is available as yet for 1995.

4.2.2 Domestic Fishery

It is estimated that approximately 300 chinook salmon were taken in the domestic fishery in 1995, similar to the previous cycle average of 295 chinook. It is expected that no chum salmon were caught in the domestic fishery in 1995.

4.2.3 Sport Fishery

As in previous years, there was no specific sport fishery data collection programme. In the past, it was assumed that approximately 300 chinook were harvested annually by sport fishermen in Canadian sections of the Yukon River basin. The estimate for 1995 was increased to 700

chinook based on an number of observations by Fishery Officers that fishing pressure was much higher than in previous years. This was primarily due to the excellent return of chinook salmon in 1995.

5.0 STATUS OF SPAWNING STOCKS

5.1 Chinook Salmon

5.1.1 Alaska

Yukon River chinook salmon run strength in 1995 was assessed as above average. Based on the Yukon River sonar counts at Pilot Station and harvest and escapement estimates below the sonar site, the total run size was approximately 385,000 salmon. Although commercial sales of chinook salmon in the round and pounds of roe within the Alaska portion of the Yukon River drainage were both above the 1990-1994 average, chinook salmon escapement goals were achieved throughout most of the Yukon River drainage. Additionally, the quality, or percent female composition, of the escapement appeared to be good where sampled. Minimum escapement goals have been established in the East and West Fork Andreafsky, Anvik, North and South Fork Nulato, Gisasa, Chena and Salcha Rivers within the Alaska portion of the Yukon River drainage. These minimum escapement goals are based on aerial survey index counts which do not represent the total escapement.

Chinook salmon escapement to the Andreafsky River was at or near the escapement goal level, as assessed by an aerial survey conducted on 26 July. Although aerial survey counts of chinook salmon in the East Fork Andreafsky, 1,635 salmon, exceeded the minimum escapement goal of 1,500 salmon by 9%, the chinook salmon count in the West Fork Andreafsky, 1,108 salmon, was 21% below the minimum escapement goal of 1,400 chinook salmon for that fork. The USFWS provided an independent estimate of chinook salmon escapement for the East Fork from counts of chinook salmon passing through a weir. Although the weir count of 5,841 chinook salmon supports the aerial survey assessment that the escapement goal minimum was met, the 1995 weir count was only 75% of the 1994 weir count. Estimated age composition of the samples of chinook salmon collected at the East Fork Andreafsky River weir site was 38% age-4, 29% age-5, and 31% age-6 salmon. Males were more numerous than females, accounting for 57% of the sample.

An aerial survey of the Anvik River on 21 July, conducted under good conditions, resulted in a count of 1,147 chinook salmon within the escapement index area. This count exceeded the minimum aerial survey escapement goal for this area, 500 salmon, by 129%. Over 400 chinook salmon carcasses were sampled for age, sex, and size information, and for scale pattern analysis baseline information. Age-6 salmon dominated these samples, accounting for 63% of the total sample. Females were more numerous than males, accounting for 64% of the sample.

An aerial survey was conducted on the Nulato River on 21 July under fair conditions. On this survey, 968 chinook salmon were counted in the mainstem below the confluence of the North and South Forks and in the North Fork Nulato River. A total of 681 chinook salmon were counted in the South Fork. These counts were 21% and 36% above the minimum aerial survey escapement goals for the North Fork and the mainstem river section below the forks and South Fork, respectively. Minimum escapement goals are 800 chinook salmon for the North Fork and 500 for the South Fork Nulato River. Additionally, an independent estimate of chinook salmon escapement was provided from a salmon counting-tower project, operated by Tanana Chiefs Conference (TCC). Interestingly, the chinook salmon escapement estimate generated from this tower project was 237 salmon less than the aerial survey count. Usually, aerial survey counts of salmon are only an index of total abundance because all fish are not present in the stream at the time of the survey, and all salmon present are usually not seen. The lower tower estimate may be partially explained by the migrational habits of the chinook salmon as they pass the tower site, in conjunction with the width of the river. The width of the Nulato River at the tower site, 49 meters, precludes a one-bank salmon counting tower operation. Therefore, two towers are employed to observe and count salmon passage. Because nearly all chum salmon migrate close to each bank, observation and counting of chum salmon is usually completed without difficultly. Conversely, chinook salmon tend to migrate past the tower site in the deeper, mid-portion of the river where viewing is difficult. Additionally, because nearly all chum salmon pass close to shore, and outnumber chinook salmon possibly by two orders of magnitude, observer attention to the mid-section of the river is diminished. Therefore, it is plausible that a portion of the chinook salmon escapement was not counted because the salmon tended to migrate within this mid-section and were not observed during counting periods. As expected, too few chinook salmon were captured during beach-seining activities to describe the age and sex composition of the escapement.

An aerial survey was conducted on 21 July under fair conditions on the Gisasa River, a tributary to the Koyukuk River. A total of 410 chinook salmon were observed in this river. This count is approximately 32% below the minimum escapement goal of 600 chinook. Although the aerial survey escapement goal was not achieved, the USFWS counted 4,023 chinook salmon migrating through the Gisasa River weir. Additionally, the chinook salmon escapement was sampled at the weir for age and sex composition throughout the migration. Age-6 salmon dominated the sample, accounting for 52% of the total salmon sampled. Males were more slightly numerous than females, accounting for 54% of the total sample.

Aerial surveys of the Chena River, on 27 July, and of the Salcha River, on 28 July, in the Tanana River drainage, under fair conditions, indicated that the escapement goals were met in 1995. Chinook salmon counts in the index areas of the Chena and Salcha Rivers were 79% and 49%, respectively, above the minimum escapement goals for these index areas. The minimum escapement goals for the Chena River index area is 1,700 salmon; the minimum escapement goal for the Salcha River index area is 2,500 salmon. Since 1993, inseason assessment of chinook salmon escapement to the Tanana River drainage has been based on tower counts of chinook salmon passing the Chena and Salcha River tower sites. These tower projects are operated by Sport Fish Division of ADF&G. Although high, turbid water hampered the operations on the

Chena River during the 1995 season, salmon counts from the Salcha River tower indicated that an adequate number of salmon escaped to spawn. Based on tower counts, ADF&G estimated that 13,537 chinook salmon escaped to spawn in the Salcha River. Based on a post-season population estimate of escapement using mark-recapture methodology, ADF&G estimated that 11,616 chinook salmon escaped to spawn in the Chena River. The 1995 total escapement estimates for the Chena and Salcha Rivers are 53% and 29%, respectively, above the 1990-1994 average total escapements. Age and sex composition samples were collected in 1995 from carcass surveys on both rivers. A total of 791 and 545 chinook salmon were collected and sampled for sex and age from the Chena and Salcha Rivers, respectively. Age-6 salmon dominated samples, accounting for 71% of the Chena River sample and 63% of the Salcha River sample. Females were more numerous than males in both samples, accounting for 66% of the Chena River sample and 56% of the Salcha River sample.

5.1.2 Canada

The chinook salmon spawning index areas surveyed by helicopter in 1995 included the Little Salmon River, Big Salmon River, Ross River, Wolf River, Nisutlin River, and Tincup Creek. These indices were flown once. The Tatchun Creek index was surveyed twice on foot; the higher count is documented in this report. Results relative to previous cycle averages and fish countability ratings are as follows:

Index	1995 Relative to 1989-1994 Average	Survey Rating
Little Salmon River	44% above	excellent
Big Salmon River	6% above	good
Ross River	39% below	poor
Wolf River	14% above	good
Nisutlin River	41% below	excellent
Tatchun Creek	32% above	excellent
Tincup Creek	40% above	fair

Fish countability ratings are generally a reflection of visibility; surveys with ratings other than "poor" are considered useful for inter-annual and inter-index comparisons. The timing of these surveys appeared to approximate peak spawning. Actual counts, along with results obtained in previous years, are presented in Attachment Table 10. Note that single survey counts do not sample the entire escapement, since runs are usually protracted with early spawners disappearing before the late ones arrive. Weather and water conditions, spawning density, and observer experience and bias can also affect accuracy.

The preliminary tagging estimate of the total spawning escapement for the Canadian portion of the upper Yukon drainage was approximately 32,168 chinook salmon, 18% above the 1989-1994 average of 27,265 chinook. Results of the DFO tagging programme are discussed in greater detail in Section 6.2.2 of this report.

5.2 Summer Chum Salmon

Although a below average to average summer chum salmon run was anticipated for the Yukon River in 1995, the run was well above average in magnitude. Based on passage estimates from the Yukon River sonar project at Pilot Station and harvest and escapement estimates below the sonar site, the total run size probably exceeded 4.0 million salmon. Although summer chum salmon harvests were above the recent 5-year average, escapement goals appear to have been met throughout the Yukon River drainage for the second consecutive year.

Minimum aerial-survey based escapement goals for chum salmon have been established in the East and West Fork Andreafsky River, Anvik River, North Fork Nulato River, Clear and Caribou Creeks of the Hogatza-Koyukuk River drainage, and the Salcha River. Because these minimum escapement goals are based on aerial survey index counts, they do not represent the total escapement to the spawning tributary. A sonar-estimate based goal for chum salmon has also been established for the Anvik River, and has effectively replaced the aerial survey-based goal for that tributary.

The preliminary Anvik River sonar-based escapement estimate of 1,339,418 summer chum salmon was approximately 167% above the minimum escapement goal of 500,000. Summer chum salmon were sampled by beach seine in the vicinity of the sonar site for age, sex, and size information. Age-4 salmon dominated the sample (n=589), accounting for 58% of the pooled sample. Male salmon were more numerous than female salmon, accounting for 60% of the sample.

Fish weir projects were operated by USFWS on the East Fork Andreafsky and Gisasa Rivers. A total of 172,148 summer chum salmon were counted passing through the weir on the East Fork Andreafsky River. The summer chum salmon minimum escapement goal for the East Fork Andreafsky River is 109,000 aerial survey counts. The minimum escapement goal for the West Fork Andreafsky River is 116,000 aerial survey counts. However, aerial surveys were not conducted on the Andreafsky River for summer chum salmon during the 1995 season. Because there are very few data which describe the relationship between aerial survey counts of summer chum salmon and weir counts, it is difficult to determine if the minimum escapement goal was achieved. Summer chum salmon were sampled for age, sex, and size information at the weir site. Total sample size was 833 salmon. Age-5 salmon accounted for 52% of the estimated escapement passage. The sex ratio was essentially 1:1.

A total of 136,886 summer chum salmon were counted passing through the Gisasa River weir. Additionally, summer chum salmon were sampled for age, sex and length information. Age-4

salmon dominated the pooled sample (n=632), accounting for 73% of the sample. Male salmon were slightly more numerous than females, accounting for 54% of the sample. A summer chum salmon escapement goal has not been established for this river.

Counting-tower projects were operated on the Kaltag and Nulato Rivers, Clear Creek, and the Chena and Salcha Rivers. The Kaltag River tower project was operated by the City of Kaltag and funded by the Alaska Cooperative 4-H Extension Service and BSFA. During 1995, TCC conducted salmon-counting tower operations on the Nulato River and on Clear Creek, a tributary of the Hogatza River within the Koyukuk River drainage. Sport Fish Division of ADF&G operated salmon-counting projects on the Chena and Salcha Rivers.

The estimated summer chum salmon escapement into the Kaltag River in 1995, 73,940 salmon, exceeded the 1994 escapement by more than 50%. Additionally, summer chum salmon were collected by beach seine gear and sampled for age, sex and length information. Age-5 salmon dominated the pooled sample (n=152), accounting for 66% of the total. Male salmon were more numerous than female salmon, accounting for 67% of the sample. No escapement goal has been established for the Kaltag River.

The estimated summer chum salmon escapement into the Nulato River (both forks combined) was 236,892 salmon, based on expanded tower counts. However, an aerial survey of the North Fork Nulato River and mainstem below the forks on 21 July under fair conditions, resulted in a count of only 29,949 summer chum salmon. This count is 43% below the minimum escapement goal of 53,000 aerial survey salmon counts for this section of river. The apparent discrepancy between these escapement assessments cannot be resolved at this time. Summer chum salmon were also sampled for age, sex, and length information. Age-4 salmon dominated the sample (n=574), accounting for 54% of the pooled sample. The sex ratio of the sample was essentially 1:1.

The estimated escapement into Clear Creek, 116,735 summer chum salmon, strongly suggested that the minimum escapement goal of 9,000 aerial survey counts was achieved. Additionally, summer chum salmon were sampled for age, sex, and length information. Age-4 salmon dominated the sample (n=501), accounting for 65% of the pooled sample. Female salmon were more numerous than male salmon, accounting for 62% of the sample.

Tower-counting operations were conducted on the Chena River during the period 10-30 July. However, frequent interruptions, because of high, turbid waters, precluded an accurate estimate of the total escapement to this tributary. An aerial survey was conducted on the Chena River on 27 July. However, the survey was rated "poor" for observing summer chum salmon because it was conducted prior to peak spawning. Unlike Chena River chinook salmon, a post-season estimate of the total spawning population was not made. Summer chum salmon were not sampled for age, sex, and length information.

Based on tower counts, Sport Fish Division of ADF&G provided an escapement estimate of 31,329 summer chum salmon for the Salcha River. Although this estimate for Salcha River

summer chum salmon escapement is 20% below the 1994 estimate, it indicates that the minimum escapement goal was probably met in 1995. An aerial survey was conducted on the Salcha River on 28 July. However, the survey was rated "poor" for observing summer chum salmon because it was conducted prior to peak spawning. A total of 934 summer chum salmon were observed on this survey. The aerial survey-based minimum escapement goal for the Salcha River is 3,500 salmon. Summer chum salmon were not sampled for age, sex, and length information.

5.3 Fall Chum Salmon

5.3.1 Alaska

Although an overall run of 800,000 fall chum salmon was anticipated for the Yukon River drainage in 1995, the run was approximately 1,400,000 fall chum salmon, based on passage estimates from the Yukon River sonar project at Pilot Station and harvest estimates below the sonar site. For the second consecutive year, all fall chum salmon spawning escapement objectives were achieved in 1995. Within the Alaska portion of the Yukon River drainage, minimum escapement goals for fall chum salmon have been established in the Sheenjek, Toklat, and Delta Rivers. These goals are based on estimated total spawning abundance as determined from estimated sonar counts for the Sheenjek River, and from estimated, expanded spawning ground counts for the Toklat and Delta Rivers.

The preliminary sonar-based estimate of fall chum salmon escapement to the Sheenjek River, in the Porcupine River drainage, approximately 235,000 salmon, was more than 3.5 times than the minimum escapement goal of 64,000 fall chum salmon. Fall chum salmon were sampled for age, sex, and size information, however, these samples have not yet been analyzed.

The preliminary sonar-based estimate of salmon escapement to the Toklat River, in the Kantishna-Tanana River drainage, was 128,129 salmon. Although this estimate is thought to include an unknown number of coho salmon, the number of coho salmon passing the sonar site is assumed to be small based on the very small proportion of coho salmon observed on the upper Toklat River during spawning grounds surveys. In 1995, the annual upper Toklat River spawning ground survey was conducted very late because persistent turbid water conditions, caused by protracted mild air temperatures, precluded the observation of salmon and salmon carcasses. Because of this, it is believed that a large number of carcasses washed out of the system prior to the survey and were not counted. Total estimated escapement to the Toklat River was approximately 54,513 fall chum salmon. This is approximately 65% above the minimum escapement goal of 33,000 fish.

The estimated fall chum salmon escapement to the Delta River was 20,587 salmon. This estimate is 87% above the minimum escapement goal of 11,000 salmon.

5.3.2 Canada

In 1995, as in previous years, chum salmon aerial surveys were conducted on the Kluane River, the mainstem Yukon River and the Teslin River. Due to the record high tagging estimate, the Koidern River was also flown by DFO staff. Counts are given in Attachment Table 12. Note that survey results differ from actual escapement due to reasons outlined in section 5.1.2.

The Kluane River count was 116% above the 1991-1994 average and approximates the record count of 16,700 chum obtained in 1986. The mainstem Yukon River count was 49% above average and the Teslin River count was 29% above average. Mainstem Yukon River and Teslin River counts obtained in 1994 are excluded from the cycle averages because of poor fish countability. Water levels on these rivers in 1995 were very low relative to average. Fish countability on the Kluane River and Teslin River surveys was good; on the mainstem Yukon River it was fair because of the presence of marginal ice cover. The Koidern River was very turbid and the potential for observing chum salmon was very low except near the mouth of the river. Surveys in the past have suggested that this section of the river supports a significant portion of the annual spawning activity in this tributary. During the aerial survey in 1995, no chum salmon or chum salmon predator sign was observed on the Koidern River.

The Fishing Branch River index area was flown on 4 October in order to continue to examine the relationship between aerial counts and known weir counts. Approximately 7,000 fish were counted during the aerial survey which constitutes 16% of the weir count through 3 October. The weir count was not adjusted to account for the period when the weir was inoperable because of flooding. Results of the Fishing Branch weir programme are presented in Section 6.2.6 of this report.

The preliminary mark-recapture estimate of the total chum salmon spawning escapement for the Canadian portion of the upper Yukon drainage is 158,240 chum. This exceeds the previous record of 98,358 chum established in 1994, and is 148% above the 1991-1994 average of 63,911 chum salmon. Results of the DFO tagging programme are discussed in greater detail in Section 6.2.2 of this report.

5.4 Coho Salmon

Coho salmon run and escapement assessment is very limited in the Yukon River drainage due to funding limitations and escapement survey conditions at that time of year. Most of the escapement information that has been collected is from the Tanana River drainage. The only escapement goal established for coho salmon is for an index area of the Delta Clearwater River. The minimum escapement goal for the index area is 9,000 coho salmon. This goal is based on the number of coho salmon observed during a boat survey of the area, which is conducted during peak spawning activity. Sport Fish Division of ADF&G conducted a boat survey of the Delta Clearwater River index area and counted 20,100 coho salmon in 1995, more than double the minimum goal. A total of 335 coho salmon were also sampled for age, sex, and size information.

Age-4 salmon dominated the escapement sample, accounting for 71% of the total. Male salmon were more numerous than female salmon, accounting for 60% of the sample.

In 1995, a partnership with BSFA and USFWS enabled the extension of the East Fork Andreafsky weir operations into September to gather coho salmon escapement data. Normally, the timing of the weir operation is planned to count chinook and summer chum salmon, terminating in late July or early August. BSFA distributed funds to Yupiit of Andreafski, a local village council, for hiring personnel to work with a USFWS crewleader during August and part of September. Through 12 September, 10,901 coho salmon were passed through the weir. Coho salmon were also sampled for age, sex, and size information. Age-4 salmon dominated the sample (n=356), accounting for 64% of the sample. Males were more numerous than females, accounting for 56% of the sample.

6.0 PROJECT SUMMARIES

6.1 Alaska

In addition to projects operated and funded by state and federal agencies, several fishery-related projects within the Yukon River drainage were funded from a U.S. congressional appropriation, managed and distributed to local organizations by the Bureau of Indian Affairs (BIA). Organizations which received funds directly from the BIA included: Association of Village Council Presidents, Inc. (AVCP), Bering Sea Fisherman's Association (BSFA), Council of Athabascan Tribal Governments (CATG), and the Tanana Chiefs Conference (TCC). BSFA further distributed a portion of their allocated funds to local village organizations. These funds were used to hire personnel to work on projects wholly or partially funded by BSFA. Local organizations which received funds from BSFA included: Asacarsarmiut Traditional Council (Mountain Village test fishery); Yupiit of Andreafski (Andreafsky River weir), City of Kaltag (Kaltag River tower), Louden Village Council (Galena test fish wheel), and the Tanana Native Council (Tanana tagging).

Results from most projects are incorporated in the fishery and stock status portions of this report. Historic project results can be found in the attached database tables and figures. A list of all projects conducted within the Alaskan portion of the Yukon River drainage, including project location, objectives, and responsible agencies or organizations, is provided in Table 4. Because of the relatively large number of projects conducted within the Alaskan portion of the drainage in 1995, only new projects, or projects of particular interest, are presented in detail here. These specific projects are: (1) Yukon River (Alaskan portion) comprehensive salmon planning, conducted by ADF&G and the Yukon River Drainage Fisheries Association (YRDFA); (2) Yukon River salmon stock identification research, conducted by ADF&G, USFWS, and the National Biological Service-Alaska Science Center (NBS-ASC); (3) the Mountain Village drift gillnet test fishing project, cooperatively funded by BSFA and AVCP, and operated by BSFA; (4) the Yukon River sonar project at Pilot Station, conducted by ADF&G; (5) the Clear Creek tower

project, conducted by TCC; (6) the South Fork Koyukuk River weir project conducted by USFWS; (7) the Galena fish wheel test fishing project, conducted by BSFA; (8) the Chandalar River sonar project, conducted by USFWS; (9) Fort Yukon fish wheel test fishing project conducted by CATG; (10) the Black River weir project, conducted by CATG; (11) Tanana River tagging project, conducted by ADF&G and BSFA; and (12) the Toklat River fall chum salmon restoration feasibility study, conducted by ADF&G.

6.1.1 Yukon River (Alaskan Portion) Comprehensive Salmon Plan

ADF&G is in the process of developing a Yukon River comprehensive salmon plan for the U.S. portion of the Yukon River drainage. This is 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. The intent of the plan is to define goals and objectives, provide reference information on the stocks and fisheries, identify potential restoration and enhancement opportunities and concerns, recommend appropriate procedures, and evaluate priorities. ADF&G has entered into a cooperative agreement with YRDFA on the planning process. The plan is scheduled to be completed in the summer of 1996.

6.1.2 Yukon River Salmon Stock Identification

Scale Pattern Analysis. A combined analysis using scale patterns, age composition estimates, and geographic distribution of catches is used by ADF&G on an annual basis to estimate the stock composition of chinook salmon in Yukon River fishery harvests. Three region-of-origin run groupings of chinook salmon, or runs, have been identified within the Yukon River drainage. The lower and middle run stocks spawn in the Alaska portion of the drainage, and the upper run stock spawns in the Canadian portion of the drainage.

Scale pattern analysis (SPA) is used to apportion the major age group(s) of the District 1, 2, 3, and 4 chinook salmon harvest to region of origin, or stock. The minor age groups in these harvests are apportioned to run based on presences of those age classes in the run-specific escapement relative to the other run-specific escapements. The District 5 harvest, as well as the Canadian harvest, are apportioned entirely to the upper run stock based on geographical location of the harvest. Likewise, the District 6 harvest is apportioned to the middle run stock also based on geography.

During 1995, stock standards for the lower river run were obtained from chinook salmon escapements to the Andreafsky, Anvik and Gisasa Rivers. Middle river stock standards were obtained from chinook salmon escapements to the Chena and Salcha Rivers of the Tanana River drainage. DFO contributed scale samples from tagging project fish wheels and from the commercial fishery in Canada for use as the standard for the upper run stock. Data have not yet been analyzed for 1995. Prior year analyses have provided the following estimates of stock composition for the total Yukon River drainage chinook salmon harvest (commercial and non-commercial harvests in Alaska and Canada combined):

Year	Lower Run Stock	Middle Run Stock	Upper Run Stock
1982	15%	23%	62%
1983	12%	39%	49%
1984	29%	36%	35%
1985	31%	20%	49%
1986	26%	6%	68%
1987	17%	19%	64%
1988	27%	12%	61%
1989	26%	16%	58%
1990	19%	22%	59%
1991	26%	28%	46%
1992	18%	23%	59%
1993	22%	13%	65%
1994	16%	24%	60%

Genetic Stock Identification–Allozmye. Genetic stock identification (GSI) research on Yukon River salmon was initiated with a small scale feasibility study on chum salmon in the mid-1980's by DFO. In 1987, this research was taken up by the USFWS and expanded to include chinook salmon, with ADF&G providing support for field sampling. In recent years this research has been conducted by both the USFWS and ADF&G.

A progress report by the USFWS for the 1987-1990 spawning stock baseline and District 1 commercial and test fishery sampling was completed and presented to the JTC in 1992. A completion report, incorporating results from 1991 sampling efforts, will be provided to the JTC by the fall 1996 meeting.

Sampling of the District 1 commercial and test fisheries was suspended beginning in 1992. Efforts were focused on the collection of additional spawning stock samples in an attempt to improve the baseline and provide for improved accuracy of fishery sample analyses in the future. Sampling of chum salmon spawning stocks was conducted at various locations throughout the Yukon River drainage in 1995 to continue to improve the GSI baseline. Genetic sampling goals for the 1995 season included Clear Creek (middle Koyukuk), Jim River or Henshaw Creek (upper Koyukuk), Black River, and the Canadian Yukon River mainstem. Chum salmon were collected for genetic analysis at Clear Creek (n=100) in July by TCC, and in Henshaw Creek (n=62) and

the South Fork Koyukuk (n=100) in September by ADF&G. Chum salmon samples for GSI analysis were also collected in September by USFWS from the Black River (n=96), within the Porcupine River drainage, in the vicinity of Chalkyitsik. Canadian Yukon River mainstem samples were collected the week of 30 October by DFO. Samples will be analyzed prior to the spring 1996 JTC meeting.

The allozyme baseline for chum salmon has been updated with data from populations collected from 1991 to 1994, and with six new allozyme markers (*sAAT-3**, *mAH-3**, *GPI-B1,2**, *LDH-B2**, *PEPA**, and *PGMr**). The new baseline has been tested for its ability to identify the following groups in mixtures using simulation studies (mixtures are randomly generated from the baseline) and proof tests (populations are deleted from the baseline and used as the mixture): Lower Summer Run, MidRiver Summer Run, Toklat River, Upper Tanana fall Run, Chandalar/Sheenjek Rivers, Fishing Branch/Canadian Yukon River mainstem, Teslin River, and Kluane/Donjek Rivers. A report on the genetic analysis of the updated baseline is currently being prepared.

In addition to baseline sampling, the USFWS sampled 2,352 fall chum salmon from the subsistence fishery near the village of Tanana in 1992. Although all laboratory work has been completed on these samples, the data are currently being statistically analyzed. Results will be presented at the spring 1996 JTC meeting.

Genetic Stock Identification–Molecular Genetic Markers. Genetic discrimination among some U.S. and Canada fall chum salmon stocks has not been satisfactory using protein-based genetic information. The National Biological Service (NBS), USFWS, and ADF&G are testing the utility of various molecular genetic markers to discriminate among those stocks. Three types of genetic markers will be assessed: microsatellite regions of the nuclear DNA (NBS-ASC); nuclear DNA introns (ADF&G); and mitochondrial (mt) DNA (USFWS). The genetic resolution obtained with the molecular markers will be compared with the resolution from proteins. Three Alaskan and five Canadian fall chum salmon stocks are being used for the test. Alaskan stocks include: Delta, Chandalar, and Sheenjek. Canadian stocks include Fishing Branch, Kluane, and three Canadian mainstem Yukon River stocks, Minto, Tatchun, and Big Creek.

The participants agreed to initially analyze Delta, Sheenjek, Fishing Branch, and Minto samples in order to perform preliminary analyses. The remaining four stocks will be analyzed subsequently. All three participants are working with a sample size of 50 samples from each stock. All of the samples were previously processed for protein genetic markers in the Yukon River GSI studies. During the spring and early summer of 1995, DNA was extracted by NBS-ASC from 532 fall chum salmon tissue samples that had been archived in USFWS freezers. Samples were aliquoted into working concentrations and distributed to collaborators in ADF&G and USFWS for analyses.

Fifty individuals from each stock will be characterized with a minimum of six microsatellite loci which were developed by the NBS-ASC. To date, the NBS-ASC has characterized 50 individuals at four microsatellite loci from the initial four populations. Three of the four loci have been

scored. Preliminary findings indicate that significant differences exist among the fish from the four spawning aggregations, suggesting that these loci may provide additional resolution for fall chum salmon stock separation issue.

The USFWS Genetics Lab is analyzing mtDNA variation of the eight chum salmon stocks using polymerase chain reaction (PCR) methods and restriction fragment length polymorphism (RFLP) analyses. A pilot study to test these methods showed seven different mtDNA variants among several of the fall chum salmon stocks. Laboratory processing for the first four stock samples was scheduled for completion in October 1995.

To date, ADF&G genetics has amplified a Growth Hormone II intron for Delta, Chandalar, Sheenjek, Fishing Branch, Minto, Big Creek, Tatchun, and Kluane stocks. Three populations, Delta River, Sheenjek River, and Minto, have been assayed for genetic variation using a restriction enzyme digest. Three alleles were detected. Up to five additional nuclear introns will be assayed for genetic variation.

Laboratory processing will be completed by January 1996. The collaborators will perform joint data analyses following laboratory processing and the results will be presented at the spring 1996 JTC meeting.

6.1.3 Mountain Village Drift Gillnet Test Fishing

The Mt. Village test fishing project was funded by BSFA and AVCP and cooperatively operated by BSFA and the Asacarsarmiut Traditional Council. This test fish project used drift gillnets to capture salmon from 28 July until 2 October near the village of Mountain Village (Figure 1; River Mile (RM) 87) in the mainstem Yukon River. Project personnel also collected water temperature, water turbidity and water level data daily. The main objectives of the project were as follows:

1. to evaluate the feasibility of the project to provide inseason information on patterns of fall chum and coho salmon run abundance and timing, via daily test fish catch per unit effort (CPUE), in the Yukon River near Mountain Village.

2. to evaluate the feasibility of the project to estimate relative abundance of fall chum and coho salmon in the Yukon River near Mountain Village for a historic perspective (after a number of years) on run abundance and timing (via comparison of daily and cumulative historic test fish CPUEs).

Three drift sites were established approximately 4 river miles upstream of Mountain Village on the mainstem Yukon River. Two of the fishing sites were associated with a sandbar located near the middle of the river; one on each side of the bar. The remaining site was located along the south bank.

Test fishing was conducted at the three fishing sites on a daily basis. Some interruptions to the daily fishing routine were caused by exploration of alternative test fishing sites during the initial days of project operation; confusion generated from test-fishing schedules which conflicted with commercial fishing periods; and equipment failure. However, once a routine was established the project operated smoothly.

Test fishing times and number of salmon caught were recorded by site and reported to the department daily. The department calculated a combined daily test fish CPUE based on total number of salmon caught and the total fishing time at the three sites. Overall, 560 chum and 291 coho salmon were caught in this test fishery. Most of these fish were distributed to the public for subsistence use, a few salmon were released alive, and some salmon were sold during commercial periods that coincided with test fishing operations.

Preliminary analysis indicates that the daily test fish CPUE for fall chum salmon from the Mountain Village test fish project compared well to the preliminary Yukon Sonar daily passage estimate.

6.1.4 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 annually since 1986, except for 1992, when the project was operated for experimental purposes only. Sonar equipment is used to estimate fish passage, and test fishing with a range of different mesh size drift gill nets is used to estimate species composition of passage estimates. From 1986-1991 sonar equipment which operated at a frequency of 420 kHz was used to estimate salmon passage. However, these estimates are now known to have been perturbed beyond usefulness by the confounding effects of attenuation on the theoretical acoustic beam shape and effective range. Beginning in 1993, sonar equipment which operates at a frequency of 120 kHz was used to provide greater ensonification range and minimize the attenuation problems encountered with the former 420 kHz frequency equipment. The use of the lower frequency equipment substantially reduced the bias which affected estimates in prior years.

The newly configured 120 kHz equipment was field tested in 1993 using standard acoustic targets and was verified to perform very well. Data collected beginning in 1993 have, with some exception, proven to be valuable in assessing salmon run strength and timing for fisheries management purposes. Problems associated with project operations at the Yukon River sonar site during the 1994 fall season resulted in unreliable fall chum salmon passage estimates. Although ADF&G announced that it would conduct a review of the 1994 project, that review never materialized. Still, estimation procedures continue to be improved. Significant enhancements in 1995 included further refinements to the species apportionment process and elimination of attempts to classify detected fish as to direction of travel using information on angle of passage through the beam.

The sonar project was operated from 7 June through 3 September in 1995. The pattern of daily salmon abundance at the sonar project trended closely with the pattern of ADF&G test fishing CPUE data at the mouth of the river. Salmon passage estimates, during both the summer and fall seasons, were comparable to preliminary post-season reconstructions of run size. Passage data from the sonar project, in conjunction with test fishing projects, harvest data and spawning escapement counting projects, was used to accurately inform fishery managers as to the strength and timing of chinook, summer chum and fall chum salmon for fishery management in 1995.

The salmon passage estimates at Pilot Station in 1995 were based upon a sampling design in which sonar equipment was typically operated for 9.0 hours each day. On four occasions in 1995 the sonar equipment was operated 24 hours per day. The resulting 24-hour and expanded 9.0-hour passage estimates for those days were not significantly different. The two sampling designs provided daily passage estimates that were within 2% to 12% of each other, and the sum of the passage estimates for the four days was within 6% between the two designs. In contrast with 24-hour estimates in prior years, the 24-hour estimates generated in 1995 were slightly but consistently larger than the expanded 9.0-hour estimates.

Estimates of annual fish passage, rounded to the nearest one thousand fish for each species category, for the period 1993-1995 using 120 kHz sonar equipment, were as follows:

Yr	Chinook	S. Chum	F. Chum	Coho[a]	Other Fish[b]
93[c]	135,000	947,000	292,000	42,000	351,000[d]
94[c]	141,000	1,997,000	407,000	191,000	271,000[d]
95[f]	263,000	3,667,000	1,247,000	155,000	618,000

a Passage estimates for coho salmon are incomplete. The sonar project is terminated prior to the end of the coho salmon run.

b "Other Fish" may include pink salmon (which are substantially more abundant in even-numbered years), whitefish, sheefish, northern pike, and other species. These estimates are not total passage estimates but are merely expanded estimates of the number of fish in the acoustical beam.

c Chart recording traces of fish or debris judged to be travelling downstream, and an associated portion of traces with no discernable direction of travel, were not included in passage estimate calculations.

d Does not include fish passing near shore on the left (south) bank.

f All chart recording traces of fish were assumed to be travelling upstream, and, therefore, included in passage estimate calculations.

6.1.5 Clear Creek Tower

A salmon-counting tower was operated on Clear Creek, a tributary of the Hogatza River within the Koyukuk River drainage. The mouth of Clear Creek is located approximately 779 river miles from the mouth of the Yukon River. This was the first year of operation for this project, which was funded and operated by the Tanana Chiefs Conference, Inc.

The tower site was located on Clear Creek at the confluence with the Hogatza River. Twenty-four hour per day counting was conducted between 22 June and 21 July. However, chum salmon were observed in Clear Creek upon arrival at the project site on 21 June. This project provided the first ground enumeration of this stock of summer chum salmon throughout the duration of the run.

The preliminary expanded estimates of salmon passage at the tower site for the operational period are 116,735 summer chum and 2 chinook salmon. The interim minimum escapement goal for summer chum salmon is 9,000 aerial survey counts of summer chum salmon. The Bureau of Land Management (BLM) conducted an aerial survey on 16 July, using a Bell 206 B model helicopter, and counted 24,240 chum and 1 chinook salmon. Quartile days of passage for chum salmon occurred on 5 July, 9 July, and 13 July, with the middle 50% of the run passing in 9 days.

Summer chum were captured for age-sex-length (ASL) information using 2 1/4 inch beach seine gear. Age class composition for all strata combined, based on 501 ageable scales, was age-3, 1.0%; age-4, 65.3%; and age-5, 33.7%. Female chum salmon were more numerous than male salmon, accounting for 63% of the pooled sample.

Tissue samples were collected from 100 chum, preserved in liquid nitrogen and shipped to ADF&G in Anchorage for GSI analysis. Additionally, water quality information was collected that may serve as baseline data for future surface disturbance (placer mining) activities in Clear Creek. Water quality was good to excellent which allowed for uninterrupted viewing for the duration of the project. Turbidity (Hach model 2008) and settleable solids (Imhoff cone) observations were made daily. Turbidity ranged from 0.70 NTU to 4.83, with a mean of 2.14 NTU. Settleable solids were either non-detectable or trace.

6.1.6 South Fork Koyukuk River Weir

During the summer of 1995, the USFWS purchased and shipped primary materials for construction of a resistance-panel weir on the South Fork Koyukuk River, located approximately 1,117 river miles from the mouth of the Yukon River. Materials were placed on site using a helicopter at a location approximately one river mile above the mouth of Fish Creek. At this site the river is approximately 250 feet wide and 4-5 feet deep. Assuming water levels allow for weir installation by mid-June 1996, the USFWS will operate the weir to monitor both the summer run of chum and chinook and the fall run of chum salmon. Local hire will be a high priority for this project to gain local acceptance and understanding of weir operations and its relation to fishery management.

6.1.7 Galena Fish Wheel Test Fishing

The Galena test fish wheel project (RM 530) was funded by BSFA and operated in conjunction with the Louden Traditional Village Council. Project objectives were to determine the feasibility of providing indices of relative abundance and migration timing of fall chum and coho salmon

for the middle Yukon River area for inseason management purposes. The Galena test fish wheel project operated from 31 July through 28 August. However, problems associated with shifting river bottom from spring ice flows hampered test fishing operations throughout the duration of the project. During the operational period, 755 fall chum and 0 coho salmon were caught. The project terminated on 28 August when the fish wheel was destroyed by high winds. Preliminary analysis of project data indicates that this project did not provide good indices of relative abundance or migration timing of the fall chum and coho salmon run during 1995.

6.1.8 Chandalar River Sonar

The Chandalar River (RM 996) is located in Interior Alaska on the Yukon Flats National Wildlife Refuge. The Chandalar River supports one of the major fall chum salmon spawning stocks in the Alaska portion of the Yukon River drainage. Past aerial survey indices of abundance did not provide an estimate of the total size of the spawning population, in contrast to single-beam sonar estimates obtained by USFWS from 1986 to 1990. Because of the importance of the Chandalar River fall chum salmon stock as a refuge and subsistence resource, USFWS initiated a developmental split-beam sonar project in 1994 at the site formerly used for the single-beam sonar project. Developmental split-beam sonar work continued during the 1995 season.

During this second year of the study, one elliptical-beam transducer was deployed nearshore from each bank of the river; a 2.9° x 11.5° transducer on the right bank and a 4.6° x 10.9° transducer on the left bank. Weirs were installed on each bank to direct fish off-shore into the detectable range of each transducer. Approximately 80 percent of the river width was ensonified. Both split-beam sonar units were operated 24 hours per day from 8 August - 22 September, except for one period of extremely high water (17-22 August on the right bank and 17-19 August on the left bank). Water levels were higher than normal throughout the season, requiring frequent relocation of the transducers. Systems were calibrated using *in situ* techniques developed in the field, which involved suspending a 38.1 mm tungsten carbide sphere approximately 6 meters from the transducer. Both on- and off-axis target strengths were recorded and were generally within 3 dB of the predicted value. Additionally, an attempt was made to obtain *in situ* target strength measurements of free-swimming chum salmon. Throughout the season, chum salmon were captured, measured for length, tagged with a helium balloon attached to the dorsal fin, and tracked through the sonar beam.

Detailed acoustic analyses will take place by USFWS this winter and a progress report will be available in June 1996. USFWS reports that preliminary results suggest that the total escapement of fall chum salmon in 1995 was approximately four times greater than the five-year average (1986-1990) of 59,000 fish. Most fish were oriented close to the bottom, near to shore, and traveling upstream. Gill netting during sonar operation verified that the target species, chum salmon, was the only fish species migrating past the sonar site in significant numbers.

There were a few changes to the 1994 system that greatly enhanced daily sonar operation and analysis in 1995. A computer network system was installed that allowed communication between the sounder, processor, and analysis computer. This, coupled with optical disk drives

installed on the analysis computers, allowed transfer of files for back-up and analysis without stopping acoustic data acquisition. This saved up to two hours of down-time per day, resulting in almost continuous sonar operation, except for generator re-fueling, calibration, and transducer moves. Another improvement to the system was the development of re-tracking software that allowed for in-season counts of up-stream targets. Unwanted acoustic data, i.e., caused by rocks, boat wake, acoustic noise, and debris, could be manually excluded from the data base. Hourly and daily estimates of upstream fish passage could then be easily extracted. With the large numbers of fish passing the site this season, on-site personnel were not able to keep up with daily counts which reached over 9,000 upstream fish per day. Two-thirds of all acoustic data has been re-tracked as of 12 October, 1995. With future improvements in software development and data sampling techniques, the USFWS believes that the generation of in-season counts should be possible.

6.1.9 Fort Yukon Fish Wheel Test Fishing

In 1995, two Yukon River test fish wheels were operated by the Council of Athabascan Tribal Governments (CATG) near the village of Fort Yukon. Specific objectives of the first year project included determining the feasibility of estimating timing and relative magnitude of the fall chum salmon passage into the Upper Yukon Area using adjustable axle fish wheels equipped with a livebox. One fish wheel was located downstream of Fort Yukon (RM 1,002), below the most upstream mouth of the Porcupine River, while the other test fish wheel was located upstream of Fort Yukon.

The downstream test fish wheel operated from 11 August through 27 September and caught 13,752 fall chum and 6 coho salmon. The midpoint of the catch occurred on 15 September. The upstream test fish wheel operated from 18 August through 27 September and caught 12,095 fall chum salmon. The midpoint of the upstream fish wheel fall chum salmon catch occurred on 18 September. Postseason analysis of the data collected needs to occur prior to determining the project-monitoring feasibility.

6.1.10 Black River Weir

In 1995, CATG attempted to estimate the passage of salmon into the Black River drainage with a weir. The project was located near the village of Chalkyitsik (RM 1,084). Several possible weir sites were identified, and the project's operational plan directed that the weir was to be operational from early August until late September. Unfortunately, high water levels prevented the deployment of the weir in 1995. It is planned to use the funding secured in 1995 to operate the weir in 1996.

6.1.11 Tanana River Tagging

A cooperative fall chum salmon stock assessment project by ADF&G and BSFA was implemented on the Tanana River in 1995. The primary objective of the study was to determine the feasibility of estimating the abundance of fall chum salmon in the Tanana River upstream of

the Kantishna River using mark and recapture techniques. Secondary objectives were to estimate the migration rates of fall chum salmon within the Tanana River and determine the timing of selected spawning stocks (e.g., the Delta River) as they pass the tagging site. The feasibility of implementing the project on an annual basis for use as a reliable inseason management indicator of Tanana River fall chum salmon run strength and timing will also be evaluated.

Two fish wheels were operated within 3 km of each other and on opposite sides of the Tanana River approximately 5-6 km above the mouth of the Kantishna River to capture chum salmon for tagging. Both tagging wheels were equipped with a live box and a four person crew tagged chum salmon during a 6-hour daily deployment schedule. Chum salmon were tagged with individually numbered spaghetti tags (color coded to each wheel) and each tagged fish had its adipose fin removed as a secondary mark. A total of 4,348 chum salmon were tagged and released (218 from the left bank wheel and 4,130 from the right bank wheel) from 7 August through 30 September.

Two additional fish wheels, which operated approximately 60-70 kilometers upstream of the tagging wheels, were used to recapture tagged chum salmon. The two recovery wheels, each equipped with a live box, were fished 24 hours per day on opposite sides of the river and within 2 km of each other. A total of 12,680 chum salmon were captured in the recovery wheels from 7 August through 1 October, of which 173 were marked. Additional recoveries of tagged chum salmon were voluntarily made by commercial and subsistence fishermen, as encouraged by a $200 lottery. Tag recoveries are also being made at this time from spawning ground surveys to provide stock specific run timing information where possible.

Exploratory and diagnostic data analyses are currently underway. Subsequent analyses will explore the feasibility of developing inseason and postseason estimators of abundance.

6.1.12 Toklat River Fall Chum Restoration Feasibility Study

Spawning escapements to the Toklat River were not meeting the minimum escapement goal in recent years prior to 1994, despite conservative fishery management actions. As a result, there was growing public interest in investigating restoration options for this stock. ADF&G is conducting a feasibility analysis to provide information useful for future planning.

A small experimental egg-take was conducted in 1992 to test field logistics under the challenging winter conditions that occur at the location and time when these fish spawn. In October 1992, 130,500 fall chum salmon eggs were collected from the Toklat River. Mortalities were kept to a minimum by making use of fish for both the egg-take and other sampling objectives to the extent possible. Fish were sampled for genetic analysis and disease screening. Incubation was carried out at the Clear Hatchery facility. All of the resulting 92,000 surviving fry were coded wire tagged, fin-clipped, and released back into the Toklat River in May 1993. The second Toklat River fall chum salmon egg-take was conducted in October 1993. A total of 208,200 fall chum salmon eggs were collected. All of the resulting 194,900 surviving fry were released back into the Toklat River in May 1994, with 150,000 of the fry coded wire tagged and fin-clipped.

The third Toklat River fall chum salmon egg-take was conducted in October 1994. At that time, a total of 388,000 fall chum salmon eggs were collected. During the spring of 1995, all surviving fry, 324,000, were coded-wire tagged, fin-clipped, and released back into the Toklat River. A total of 220,000 fall chum salmon eggs were collected during the fourth and final fall chum salmon egg-take of this feasibility study in October 1995.

Recovery of the marked fish at adult return is expected to provide statistically significant information on their contribution to proximal fisheries. The first substantial adult return, age-4 salmon from the spring 1993 fry release, is expected in 1996, and a sampling design to recover tagged fish will be developed. Results from the various components of this study should significantly improve our information base for this stock.

In conjunction with the Toklat River fall chum salmon restoration feasibility study, a habitat study was initiated on the Toklat River fall chum salmon spawning grounds in October 1994. The objectives of the habitat study are to: 1. determine the quantity and quality of fall chum salmon spawning habitat on the Toklat River and evaluate the biological basis for the current escapement goal, and 2. evaluate opportunities to stabilize and improve the spawning habitat. Results from the first year of field work are not yet available.

6.2 Canada

6.2.1 Upper Yukon River Salmon Test Fishing (Yukon Territory)

DFO has collected run timing and relative abundance data for chinook and chum salmon using fishwheels situated near the Canada/U.S. border since 1982 (excluding 1984). Consistency in the fishwheel sites and fishing methods permits some inter-annual and in-season comparisons, although the primary purpose of the fishwheels is to live-capture salmon for the mark-recapture programme. Fishwheel catches tend to correlate poorly with mark-recapture estimates of border escapement; therefore, catch data is used cautiously when assessing abundance.

The first chinook salmon was captured on 25 June, within two days of the date of first capture in the previous two years, 23 June in 1993 and 24 June in 1994. The date of first capture of chinook salmon in the fishwheels has ranged from 23 June to 18 July in the years 1985 through 1994; the average date is 1 July. The combined total fishwheel catch of chinook salmon in 1995 was a record 2,215 fish, 56% above the recent cycle average. Two very distinct peaks were observed, the first on 17 July and a second, much larger peak, ten days later. On average, the run peaks at the fishwheels on approximately 21 July. The mid-point of the run was 26 July, slightly later than the 1989-1994 average mid-point, 22 July. The chinook salmon sex ratio as observed in the fishwheel catches was 31% female. This is consistent with sex ratios observed from 1989 through 1994, which have averaged 32%. It is possible that chinook salmon sex ratio estimates based on fishwheel harvests may be biased in favor of males because of differential capture probabilities between sexes.

The total fishwheel catch of 9,482 chum salmon was also a record; it was more than double the previous record catch and exceeded the 1991-1994 average by 264%. The chum salmon run timing also appeared to be bimodal with an initial peak on 12 September, and a second, larger peak on 25 September. Overall, the run timing was somewhat later than average, with the mid-point occurring on 19 September. The recent cycle average mid-point is 13 September. Although significant catches were observed in August, the run was not particularly protracted; catches decreased rapidly after the late September peak.

Since 1982 (excluding 1984), salmon caught in the fishwheels have been sampled for age (using scales), fork length and sex. In 1995, all salmon captured were sampled for length and sex; a sub-sample (50% for chinook and 17% for chum) will be aged.

6.2.2 Upper Yukon River Tagging Program

DFO has conducted a tagging programme on salmon stocks in the Canadian section of the upper Yukon River drainage since 1982 (excluding 1984). The objectives of the programme are to provide inseason estimates of the upper Yukon border escapement of chinook and chum salmon for management purposes and to provide postseason estimates of the total spawning escapements, harvest rates, migration rates and run timing. Spaghetti tags are applied to salmon live-captured in the fishwheels and subsequent recoveries are made in the different fisheries located upstream, and infrequently in those located downstream. Population estimates are developed using spaghetti tag recoveries from the Canadian commercial fishery downstream from the Stewart River where intensive weekly/daily catch monitoring is conducted.

The preliminary 1995 chinook salmon border escapement estimate is 52,088 fish (95% confidence interval = 47,306 to 57,353). Of this number, approximately 32,168 chinook salmon are estimated to have reached the various spawning grounds. Comparative border and spawning escapement estimates from the tagging programme for 1989 through 1995 are as follows:

Year	Border Escap't M/R Estimate	Total Upper Yukon Cdn Chinook Salmon Catch	Estimated Spawning Escapement
1989	42,620	17,419	25,201
1990	56,679	18,980	37,699
1991	41,187	20,444	20,743
1992	43,300	17,953	25,497
1993	45,027	16,469	28,558
1994	46,680	20,790	25,890
Average	45,916	18,676	27,265
1995*	52,088	19,920	32,168
*:	Preliminary		

The preliminary chum salmon population estimate is 198,203 fish (95% confidence interval = 188,870 to 207,997). Approximately 158,240 of these fish are estimated to have reached the various spawning grounds, a number that meets the rebuilding goal of more than 80,000 chum salmon as recommended by the JTC. Both the spawning escapement and border escapement estimates exceed all previous annual estimates made since the programme was initiated in 1982. Comparative border and spawning escapement estimates from the tagging programme for 1991 through 1995 are as follows:

Year	Border Escap't M/R Estimate	Total Upper Yukon Cdn. Chum Salmon Catch	Estimated Spawning Escapement
1991	112,303	33,842	78,461
1992	67,962	18,880	49,082
1993	42,165	12,422	29,743
1994	133,712	35,354	98,358
Average	89,036	25,125	63,911
1995*	198,203	39,963	158,240
*:	Preliminary		

6.2.3 Commercial Fishery Harvest Sampling

Sampling of both the chinook and chum salmon commercial harvests was conducted in 1995. Age, length, and sex data were obtained from approximately 1,400 chinook salmon and a similar number of chum salmon over the course of their respective runs. The chinook salmon were also sampled for coded-wire tags (CWTs). The data obtained may serve to increase the accuracy of the mark-recapture estimate by permitting stratification of both capture and recapture events. Analysis of the sampling results has not yet been completed.

6.2.4 Whitehorse Rapids Fishway Chinook Enumeration

A record 2,103 chinook salmon was observed at the Whitehorse Fishway in 1995, including 711 females (34% of the total count). A total of 757 adipose-clipped fish was observed (409 males and 348 females) comprising 36% of the run. Proportionately, more females were adipose-clipped than males; 49% of all females compared to 29% of all males.

As was observed in 1994, a number of chinook ascended the fishway more than once. CWT results from 1994 showed that the fish that exhibited this behaviour had been released into the fishway as fry, after rearing in the hatchery. The fishway was first used as a release site for adipose-clipped hatchery fry in 1989; hence, it is possible that the number of adipose-clipped fish may be exaggerated somewhat in annual counts beginning in 1991, when the first three-year-olds would have returned. The 1994 count of adipose-clipped fish is being reviewed and will be adjusted downwards. In 1995, all adipose-clipped chinook salmon ascending the fishway were marked with a caudal punch. Preliminary results indicated that approximately 11% of the marked fish re-ascended the fishway; however they were included in the cumulative count only once. Of the fish which ascended the fishway more than once, 29 males and 9 females were sacrificed for CWT's. In addition to these fish and the fish taken for broodstock (see section 6.2.6), a random CWT sample was removed from the fishway to determine year and location of release as fry; this comprised 30 adipose-clipped males and 15 adipose-clipped females.

During the most recent six-year cycle, the first fish has arrived at the fishway on, or about, 27 July. In 1995, the first fish arrived one week early, on 20 July. However, the peak count dates (11 and 14 August) and run mid-point (13 August) in 1995 were fairly consistent with the recent average (for both peak count and run mid-point) of 14 August.

6.2.5 Wolf Creek Chinook Salmon Weir

An enumeration weir was operated by the Yukon Fish and Game Association on Wolf Creek in 1995. Chinook salmon fry from the Whitehorse Hatchery have been released into Wolf Creek since 1985; over the past cycle the average annual release has been approximately 50,000 fry. As a consequence, the number of fish observed in the creek has been increasing (prior to 1995, fish presence was observed from foot surveys). In 1995, 242 adult chinook salmon were counted through the weir, 60% of which were counted in one day. The sex ratio of the run was 40%

female. All but 11 of the fish counted were adipose clipped; the unclipped fish may have been returns from untagged releases, or possibly, progeny of Wolf Creek spawners.

6.2.6 Whitehorse Hatchery Operations

Approximately 74,800 chinook salmon fry were produced from the Whitehorse Hatchery in 1995. Production was below hatchery capacity due to difficulties obtaining broodstock, poor fertilization and below average egg-to-fry survival in 1994. Approximately 70,000 fry were coded-wire tagged; 20,000 of these were released into Wolf Creek and 50,000 were released into Michie Creek. The remaining unmarked fry were also released into Michie Creek.

A total of 93 females and 175 males was taken for broodstock in 1995. Ten females were known to be of hatchery origin; none of the males used exhibited clipped adipose fins. The number of males used in the broodstock program was increased in 1995 to increase the genetic diversity of the hatchery-reared stock. An estimated total of 502,000 eggs was taken from the 91 females that were successfully spawned. After shocking, approximately 450,000 eggs remained in incubation at the hatchery.

6.2.7 Fishing Branch River Chum Salmon Weir

A weir to enumerate chum salmon escapement to the Fishing Branch River has operated annually since 1985, except for 1990. Prior to 1985, the weir operated during the 1972-1975 period. Since 1991 the weir program has been managed cooperatively between the Vuntut Gwitchin First Nation, of Old Crow, and DFO. Escapement estimates, including aerial count expansions, have ranged from approximately 16,000 in 1973 to 353,000 in 1975 (Attachment Table 12).

A total of 51,971 chum salmon was counted through the weir in 1995. Approximately 51% of these fish were female. However, enumeration during the start of the run in 1995 was hampered by extreme high water conditions; from 31 August until 9 September inclusive no counts were obtained as the weir was submerged. For approximately four days after counting resumed, the weir was not fish-tight. An estimate of the number of chum that might have migrated during this period has not yet been made.

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

Year	Period of Weir Operation	Total Count	Female Count (% of total)
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	weir did not operate	35,000*	
1991	Sep 01 - Oct 15	37,733	59%
1992	Aug 30 - Oct 18	22,517	54%
1993	Aug 31 - Oct 25	28,707	53%
1994	Aug 26 - Oct 25	65,247	56%
1991-94 average		38,551	56%
1995**	Aug 27 - Oct 16	51,971	51%

*: Estimated by aerial survey expansion.
**: Preliminary.

6.2.8 Community Development and Education Program

As part of a community education and public participation program, incubation boxes were in operation in 1995 at McIntyre Creek, in Whitehorse, and at the North Klondike River, near Dawson City. The community based project on the Mayo River, which has included two small scale incubation boxes and a chinook salmon enumeration weir, was not conducted in 1995 due to funding problems. 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. Previous year's activities are summarized in the following table. The Kluane River chum fry from the 1989 brood were released into the Kluane River. The primary release site for Takhini River chinook stock has been Flat Creek, a small, north bank tributary of the Takhini River. Takhini River fry have also been released into the mainstem Takhini River, close to the outlet of Kusawa Lake. In 1995 the chinook fry release was split equally between the two sites.

McIntyre Creek Incubation Box			
Brood Year	Stock	# Fry released without CWT's	# Fry released with CWT's.
1989	Kluane River	35,000 chum	
1990	Takhini River		20,000 chinook
1991	Takhini River	7,000 chinook	30,000 chinook
1992	Takhini River		58,500 chinook
1993	Takhini River	1,500 chinook	72,000 chinook
1994	Takhini River	1,500 chinook	52,500 chinook

Approximately 103,000 chinook salmon eggs were collected from the Takhini River in 1995 for the McIntyre Creek incubation box. In September, the box was vandalized and an estimated 80% of the eggs were destroyed. The security system is now being upgraded at the facility.

A small enumeration weir was constructed on Flat Creek in 1995 to enumerate returns. No chinook salmon were counted through the weir; however this was not unexpected considering the size of the release groups involved and the fact that 1990 was the first year of release in this location.

Approximately 32,000 chinook salmon eggs were taken from Tatchun Creek, but instead of being placed in the North Klondike River incubation box as in the past, they were taken to McIntyre Creek and placed in a fish-tote modified for egg incubation purposes. There are currently about 25,000 Tatchun Creek chinook eggs incubating at MacIntyre Creek. Fortunately this stock was not affected by vandalism. As has been the case when Tatchun Creek stock has been incubated in the North Klondike incubation box, the resulting fry will be released into Tatchun Creek.

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 has been conducted jointly by the Dawson First Nation and the Yukon River Commercial Fishers Association 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

public school in Dawson City. The number of fry released since inception of the project are given below. The Minto chum fry (1989 brood) were released at Minto; the mainstem Yukon chinook fry (1991 brood) were released into a small pot-hole lake near Whitehorse; and the fry resulting from broodstock collection on the Klondike River and the North Klondike River have been released into the North Klondike River.

Klondike River Incubation Box			
Brood Year	Stock	# Fry released without CWT's	# Fry released with CWT's.
1989	Minto	11,000 chum	
1990	Tatchun Creek		30,000 chinook
1991	Tatchun Creek mainstem Yukon	7,000 chinook 1,500 chinook	31,000 chinook
1992	North Klondike River Tatchun Creek	500 chinook	20,000 chinook 5,000 chinook
1993	North Klondike River Tatchun Creek		4,000 chinook 34,000 chinook
1994	Klondike River Tatchun Creek	 1,000 chinook	4,000 chinook 29,000 chinook

A total of 35,000 Klondike River chinook salmon eggs was taken for the North Klondike River incubation box in 1995.

The educational programme "Salmon in the Classroom" was continued successfully in 1995. In this program, eggs (approximately 100/incubator) are donated from the various incubation boxes for use in classroom incubators.

6.2.9 Blind Creek Chinook Salmon Weir

As part of another community project, an enumeration weir was operated on Blind Creek from mid-July to late August 1995 by the Ross River Dena Council. This watercourse empties into the Pelly River close to the town of Faro. A total of 826 chinook salmon was counted through the weir.

7.0 RESTORATION AND ENHANCEMENT (R&E) PROPOSAL PROCESS

Initial discussion concerning the R&E proposal process involved the application format for proposals requesting R&E funds. This discussion centered on clarifying and improving the instructions and associated funding request form, presented as a first draft in the March, 1995 JTC report (JTC 1995). A second draft of the instructions and funding request form was prepared at the November, 1995 JTC meeting which is presented in Attachment III.

Further discussion addressed the process for the call for, and review of, R&E proposals. JTC meeting participants agreed that one of the functions of the JTC was to review the proposals based on technical merit. Proposals will be identified based on the following categories: (1) restoring habitat and wild stocks; (2) enhancing habitat; and (3) enhancing wild stocks. Based on language in the Interim Yukon River Salmon Agreement, the technical merit evaluation will include, when appropriate, evaluation of the ecological and genetic risks and socioeconomic impacts, and identify alternative actions including, but not restricted to, fishery management actions. JTC members agreed that opening and closing deadlines for annual proposal submission would likely be required. However, the JTC still needs to establish a process by which project proposals will be called for and reviewed, and determine how the technical merit review will be summarized for the Panel.

After discussing the many different scenarios for proposal submission and evaluation, it was suggested that the Panel should consider a Secretariat, or administrator, position, whose role would include functioning as a technical monitor and facilitator for the R&E proposal process. Under this scenario, this position would also provide support for Panel functions. It was envisioned that this position would also distribute the call for proposals, distribute proposal forms, review the submitted proposals for completeness, solicit additional information from applicants if necessary, monitor the JTC review process, and facilitate the public comment and review process.

Should the Panel decline to establish such a position, the proposal submission and review process would need to be considered accordingly. Issues which Panel members will need to address include: (1) monitoring funded projects; (2) monitoring the expenditure of funds; (3) determining what action may be required if the funded work does not get done; and (4) auditing and establishing progress-reporting requirements. It was noted that under paragraph 32(d) of the Interim Yukon River Salmon Agreement, the Parties may be required to fulfill these functions.

There was lengthy discussion over concern that the JTC may be in conflict of interest, or appear to be in conflict of interest, when reviewing proposals from agencies and organizations linked to the JTC by membership. Suggestions to address this concern included initially separating proposals based on origin, i.e., agency versus public proposals, and also by subject category. However, the JTC agreed that proposals should be ranked based on technical merit alone, without separating them by origin or category. It was felt that the technical monitoring function of the Secretariat would provide an independent perspective to the review process, and thereby alleviate

some of the conflict of interest concerns. Additionally, the JTC felt that these concerns should not be debilitating because the Interim Yukon River Salmon Agreement, paragraph 42, requires an open public review process, with the proposals and the associated JTC evaluation being available for public review and comment. Finally, the JTC members felt that the conflict of interest concern would be minimized because the Yukon River Panel, not the JTC, will ultimately decide which proposals to fund.

Finally, questions regarding the legal status of the R&E funds were raised. If the funds were considered federal government funds, the distribution of the funds may trigger environmental assessment requirements under the Canadian Environmental Assessment Act or additional U.S. reporting requirements. The legal status of the R&E Fund needs to be researched and clarified.

8.0 SALMON RADIO-TAGGING PROJECT PLANNING

The JTC continued its discussion on the potential use of radio telemetry to investigate run characteristics and spawning distribution of salmon stocks in the upper Yukon River drainage. The potential use of radio telemetry within the Yukon River drainage was initially discussed at the March 1995 JTC meeting following an announcement at that meeting by the National Marine Fisheries Service (NMFS) participant that radio tags and tracking equipment, as well as project leader expertise, might be available from NMFS for work on the Yukon River. During that meeting, the Porcupine River drainage was chosen as the study site because of the paucity of information for this section of the drainage, the availability of approximately 500 radio tags and 10-12 data receivers, and the assumed low cost to fund the project. The JTC agreed that a study on the Porcupine River system, designed to better define fall chum salmon spawning distribution and run timing in that subdrainage, would be a meaningful and achievable objective (JTC 1995). At that time, the JTC viewed the project as an opportunistic endeavor which would provide meaningful and needed information by exploiting the potential availability of radio telemetry equipment, while having a relatively low operational cost. A planning team was formed at the March 1995 meeting to develop a draft project plan for a fall chum salmon radio-tagging project within the Porcupine River drainage, for review by the JTC during the fall 1995 JTC meeting. The planning team consisted of staff from ADF&G, DFO, USFWS, NBS, NMFS, and TCC.

Several meetings were held by the members of the planning team and a draft proposal was developed to serve as a framework for further discussions. It is important to note that the Canadian member of the planning team was unable to attend any of these meetings. The planning team expanded the scope of the project plan to fall chum salmon upriver of the Yukon-Tanana River confluence, which would include both the Porcupine and upper Yukon River drainages. The planning team proposed a multi-year, interagency program that would combine telemetry and mark-recapture (mass tagging) studies. A draft proposal for discussion purposes was developed and distributed at the fall 1995 JTC meeting. Members of the planning team from NMFS and USFWS provided an overview of the draft proposal for the JTC. A NMFS staff member gave a brief overview of the telemetry system and reiterated that radio telemetry

equipment (i.e., transmitters, receivers, tracking stations) could potentially be made available for the program.

A wide-ranging discussion followed on various aspects of the draft proposal, including the scope of the program, study objectives and feasibility, and funding. Much of the discussion centered on whether to focus efforts on fall chum salmon stocks in the Porcupine River drainage, or to expand the study area to include salmon stocks in the entire Yukon River drainage above the Yukon-Tanana River confluence. Although the physical characteristics of the Porcupine River are conducive to use of an automated detection system, fish capture within this section of the drainage might be problematic, especially if coincident mass-tagging abundance estimates were desired. However, it was noted that if adequate capture methods were developed, this project could provide substantial new information regarding Porcupine River drainage fall chum salmon stocks. The feasibility of linking a radio-tagging project to the existing DFO mark-recapture project on the mainstem Yukon River was also discussed. It was also noted that although radio telemetry could be useful in increasing knowledge regarding the biology and distribution of salmon species, it may also be also useful in providing background data for potential restoration and enhancement projects.

A concern was expressed that sample sizes in the expanded radio-telemetry, mass-tagging option might be insufficient to obtain meaningful, quantitative information. Questions related to program costs were difficult to address because of the conceptual nature of the proposal. However, it was assumed that costs would likely vary depending on study objectives. It became apparent that even the original project conceptualized by the JTC in March 1995 namely, radio-tagging project within the Porcupine River drainage, would likely require dedicated interagency funding and support. The Canadian co-chair stated that joint telemetry studies, such as those being discussed, should have Panel sanction and direction, and might require support from the R&E Fund for Canadian participation. A request for funding from the R&E Fund would be contingent on the project study objectives meeting the terms and conditions of the R&E Fund.

The JTC decided to seek guidance from the Yukon River Panel regarding the use of this technology in the Yukon River drainage before working further on any one concept. Therefore, the JTC suspended further work on project planning, and instead tasked the team to prepare a draft discussion document for JTC review. This document would provide an overview of radio telemetry capabilities, the types of information that telemetry and mass-tagging studies could provide, either individually or in concert, and a review of the different study options discussed, including the potential information that could be obtained from each option. Once finalized, the discussion document would be presented to the Yukon River Panel by the JTC.

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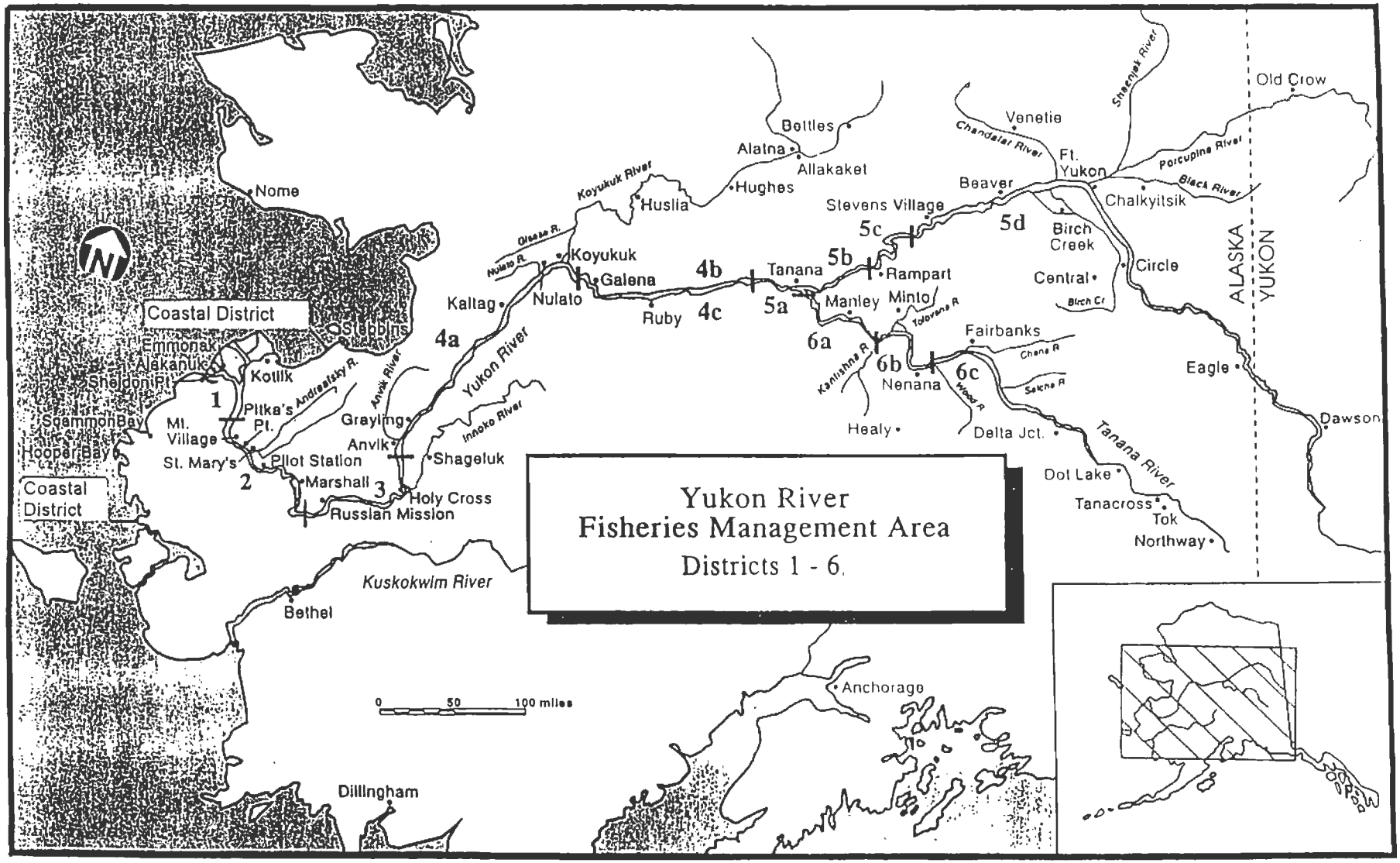

Figure 1. Map of Alaskan portion of the Yukon River drainage, showing communities and fishing districts

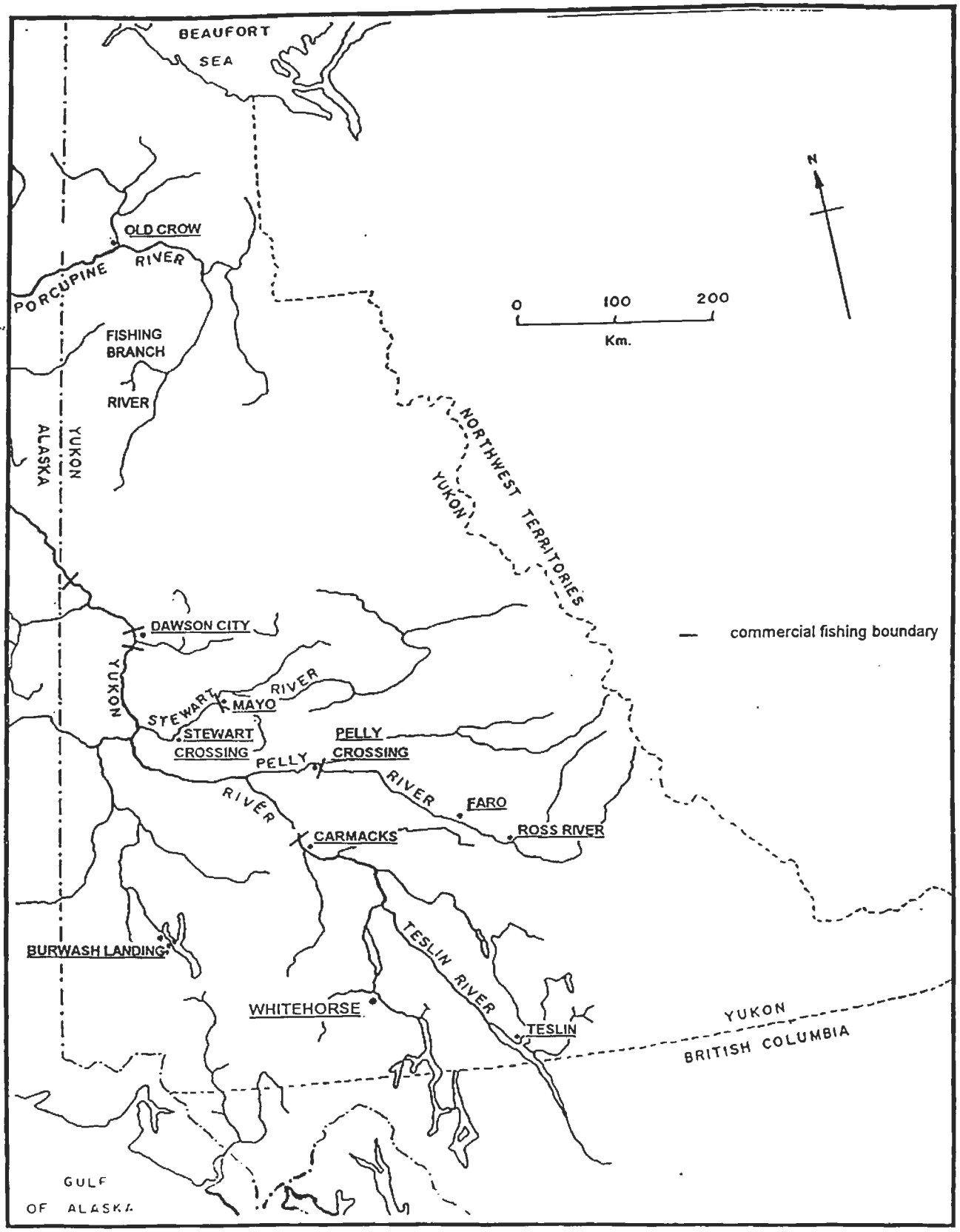

Figure 2. Map of the Canadian portion of the Yukon River, showing commercial fishing boundaries.

Table 1. Preliminary estimates of commercial sales of salmon and salmon roe in the Alaska portion of the Yukon River drainage, 1995.

District Subdist.	No. of Fishermen [a]	Chinook		Summer Chum		Fall Chum		Coho		Total Salmon	
		Numbers	Roe (lbs) [b]	Numbers	Roe (lbs) [b]	Numbers	Roe (lbs) [b]	Numbers	Roe (lbs)	Numbers	Roe (lbs)
1	446	76,106	0	142,266	0	79,345	0	21,625	0	319,342	0
2	255	41,458	0	83,817	0	90,831	0	18,488	0	234,594	0
Subtotal	664	117,564	0	226,083	0	170,176	0	40,113	0	553,936	0
3	0	0	0	0	0	0	0	0	0	0	0
Total Lower Yukon	664	117,564	0	226,083	0	170,176	0	40,113	0	553,936	0
Anvik River	22	0	0	0	48,477	0	0	0	0	0	48,477
4-A	65	0	0	0	189,252	0	0	0	0	0	189,252
4-B,C	22	262	626	8,873	43,345	2,924	4,126	0	0	12,059	48,097
Subtotal District 4	87	262	626	8,873	281,074	2,924	4,126	0	0	12,059	285,826
5-A,B,C	28	2,753	0	107	188	5,799	15,992	0	0	8,659	16,180
5-D	3	489	0	0	0	3,979	2,823	0	0	4,468	2,823
Subtotal District 5	31	3,242	0	107	188	9,778	18,815	0	0	13,127	19,003
District 6	24	1,660	4,731	24,711	9,475	67,855	9,560	5,826	2,229	100,052	25,995
Total Upper Yukon	142	5,164	5,357	33,691	290,737	80,557	32,501	5,826	2,229	125,238	330,824
Total Yukon Area	806	122,728	5,357	259,774	290,737	250,733	32,501	45,939	2,229	679,174	330,824

[a] Number of unique permits fished by district, subdistrict, or area. Some fishers fished in more than one district or subdistrict.
[b] Unprocessed roe sold by fishermen.

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Table 2. Commercial sales of salmon and salmon roe in the Alaska portion of the Yukon River drainage, 1961-1995 [a]

Year	Chinook		Summer Chum		Fall Chum		Coho	
	Numbers	Roe (lbs.)	Numbers	Roe (lbs.)	Numbers	Roe (lbs.)	Numbers	Roe (lbs.)
1961	119,664	-	0	-	42,461	-	2,855	-
1962	94,734	-	0	-	53,116	-	22,926	-
1963	117,048	-	0	-	0	-	5,572	-
1964	93,587	-	0	-	8,347	-	2,446	-
1965	118,098	-	0	-	23,317	-	731	-
1966	93,315	-	0	-	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	-	15,720	-
1970	79,145	-	137,006	-	209,595	-	13,778	-
1971	110,507	-	100,090	-	189,594	-	13,226	-
1972	92,840	-	135,668	-	152,176	-	23,465	-
1973	75,353	-	285,509	-	232,090	-	49,644	-
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	156,706	-	1,003,556	189,068	466,451	11,285	23,651	-
1982	123,174	-	460,167	152,819	224,187	805	36,895	-
1983	146,904	-	742,463	149,999	302,598	5,064	13,157	-
1984	118,815	-	586,375	167,224	207,938	2,328	81,826	-
1985	145,476	-	514,900	248,625	267,302	2,525	57,521	-
1986	99,268	-	719,234	271,691	138,688	577	47,162	-
1987	133,558	-	439,854	121,968	0	0	0	-
1988	100,364	-	1,148,650	256,535	133,320	3,227	86,187	-
1989	104,198	-	955,806	288,549	266,206	14,749	81,548	-
1990	95,247	1,731	303,858	109,376	122,010	10,944	41,032	4,042
1991	104,878	3,829	349,113	141,976	230,852	19,395	103,180	4,299
1992	120,245	3,164	332,313	112,996	15,721	2,806	6,556	1,680
1993	93,550	2,014	96,522	22,962	0	0	0	0
1994	113,137	2,394	80,284	97,757	3,631	3,276	120	5,588
1995 [b]	122,728	5,357	259,774	290,737	250,733	32,501	45,939	2,229
1990-94 Avg.	105,411	2,626	232,418	97,013	74,443	7,284	30,178	3,122

[a] Commercial sales reported in numbers of fish sold in the round and pounds of unprocessed roe sold by fishermen.
[b] Data for 1995 are preliminary.

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Table 3. Canadian weekly commercial catches of chinook and chum salmon in the Yukon River in 1995.

Statistical Week	Week Ending	Start Date	Finish Date	Days Fished	Number Fishing	Boat Days	Chinook Salmon	Chum Salmon	Coho Salmon
27	08-Jul	03-Jul	05-Jul	2	9	18.0	326	0	0
28	15-Jul	10-Jul	13-Jul	3	16	49.0	2,236	0	0
29	22-Jul	17-Jul	20-Jul	3	17	51.0	2,324	0	0
30	29-Jul	24-Jul	27-Jul	3	14	42.0	2,908	0	0
31	05-Aug	31-Jul	03-Aug	3	14	43.0	2,085	8	0
32	12-Aug	07-Aug	10-Aug	3	11	32.0	987	55	0
33	19-Aug	14-Aug	17-Aug	3	5	14.0	173	55	0
34	26-Aug	21-Aug	23-Aug	2	0	0.0	0	0	0
35	02-Sep	28-Aug	30-Aug	2	8	15.0	3	1,474	0
36	09-Sep	04-Sep	07-Sep	3	12	37.0	2	7,051	0
37	16-Sep	11-Sep	14-Sep	3	11	34.0	0	8,439	0
38	23-Sep	18-Sep	21-Sep	3	15	45.0	0	11,203	0
39	30-Sep	25-Sep	28-Sep	3	18	53.0	0	10,727	0
40	07-Oct				closed for season				
Dawson area subtotal				36		433	11,044	39,012	0
Upriver commercial subtotal							300		
Total Commercial Harvest							11,344	39,012	0
Domestic Harvest (season estimate)							300		
Estimated Recreational Harvest (season estimate)							700		
Aboriginal Harvest (updated Nov. 07 - incomplete)							7,576	951	
TOTAL UPPER YUKON HARVEST (preliminary)							19,920	39,963	0
Old Crow AF (updated Nov. 07 - incomplete)							460	438	

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Table 4. Salmon fishery projects conducted in the Alaskan portion of the Yukon River drainage in 1995.

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Commercial Catch and Effort Assessment	Alaskan portion of the Yukon River drainage	- document and estimate the catch and associated effort of the Alaskan Yukon River commercial salmon fishery via receipts (fish tickets) of commercial sales of salmon or salmon roe.	June - Sept	ADF&G	all aspects
Commercial Catch Sampling and Monitoring	Alaskan portion of the Yukon River drainage	- determine age, sex, and size of salmon harvested in Alaskan Yukon River commercial fisheries; - monitor Alaskan commercial fishery openings and closures	June - Sept	ADF&G ADPS	all aspects enforcement
Subsistence Catch and Effort Assessment	Alaskan portion of the Yukon River drainage	- document and estimate the catch and associated effort of the Alaskan Yukon River subsistence salmon fishery via interviews, catch calendars, mail-out questionnaires, telephone interviews, and subsistence fishing permits.	post-season	ADF&G	all aspects
Sport Catch, Harvest and Effort Assessment	Alaskan portion of the Yukon River drainage	- document and estimate the catch, harvest, and associated effort of the Alaskan Yukon River sport fishery via post-season mail-out questionnaires.	post-season	ADF&G	all aspects
Yukon River (Alaskan Portion) Comprehensive Salmon Plan	Alaskan portion of the Yukon River drainage	- develop a comprehensive plan for restoration and enhancement of salmon stocks of the Alaskan portion of the Yukon River drainage; - define goals and objectives; - identify potential opportunities and concerns; - recommend appropriate procedures; - evaluate priorities.	ongoing	ADF&G , YRDFA, & USFWS	all aspects
Yukon River Salmon Stock Identification	Yukon River drainage	- estimate chinook salmon stock composition of the various Yukon River drainage harvests through analyses of scale patterns, age compositions, and geographical distribution of catches and escapements;	ongoing	ADF&G DFO & USFWS	all aspects provides scale samples
		- develop and improve genetic stock identification (GSI) techniques for identification of chum salmon harvests to region of origin;		ADF&G DFO & USFWS	all aspects provides samples
		- estimate stock compositions of mixed-stock salmon harvests collected in previous years;		USFWS ADF&G	all aspects assisted in Distr. 1 sampling
		- investigate the utility of mtDNA, microsatellite, and intron markers in identifying U S./Canada fall chum salmon stocks. (new)		NBS USFWS & ADF&G	lead agency in pilot study participating in pilot study
Yukon River Salmon Escapement Surveys and Sampling	Alaskan portion of the Yukon River drainage	- estimate population size, or index the relative abundance, of chinook, chum, and coho salmon spawning escapements by aerial, foot, and boat surveys; - estimate age, sex, and size of selected tributary chinook, chum, and coho salmon spawning populations.	July - Nov.	ADF&G	all aspects
Lower Yukon Set Gillnet Test Fishing	South, Middle, and North mouths of the Yukon River delta, RM 20	- index chinook, summer and fall chum, and coho salmon run timing patterns using set gillnets; - index relative run strength of chinook and summer chum salmon using test fish CPUE; - sample captured salmon for age, sex, size composition information.	June - Sept.	ADF&G	all aspects
Mountain Village Drift Gillnet Test Fishing (new)	mainstem Yukon River, RM 87	- determine feasibility of using drift gillnets to index timing and relative abundance of fall chum and coho salmon runs.	Aug.	BSFA AVCP	all aspects provided partial funding
East Fork Andreafsky River Weir	mile 20 East Fork Andreafsky River, RM 124	- estimate daily escapement of chinook, summer chum, and coho (1995) salmon into the East Fork Andreafsky River; - estimate age, sex, and size composition of the chinook, summer chum, and coho (1995) salmon escapements	June - Sept.	USFWS BSFA	all aspects provided funding for Aug. & Sept , 1995 operations

continued

Table 4. (page 2 of 3).

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Yukon River Sonar	Pilot Station, RM 123	- estimate chinook, summer chum, and fall chum salmon passage in the mainstem Yukon River.	June - Sept	ADF&G	all aspects
Anvik River Sonar	mile 40 Anvik River, RM 358	- estimate daily escapement of summer chum salmon into the Anvik River; - estimate age, sex, and size composition of the summer chum salmon escapement	June - July	ADF&G	all aspects
Kaltag River Tower	mile 1 Kaltag Creek, RM 451	- estimate daily escapement of chinook and summer chum salmon into Kaltag Creek; - estimate age, sex, and size composition of the summer chum salmon escapement	June - July	AK Cooperative Extension 4-H Prog BSFA	all aspects provided partial funding
Nulato River Tower	mile 3 Nulato River, RM 486	- estimate daily escapement of summer chum and chinook salmon into the Nulato River; - estimate age, sex, and size composition of the summer chum salmon escapement	June - July	TCC	all aspects
Gisasa River Weir	mile 3 Gisasa River, Koyukuk River drainage, RM 567	- estimate daily escapement of chinook and summer chum salmon into the Gisasa River; - estimate age, sex, and size composition of the chinook and summer chum salmon escapements.	June - Aug.	USFWS	all aspects
Clear Creek Tower (new)	mile 0 Clear Creek, Hogotza River drainage, Koyukuk River drainage, RM ~ 780	- estimate daily escapement of chinook and summer chum salmon into Clear Creek; - estimate age, sex, and size composition of the summer chum salmon escapement.	June - Aug	TCC	all aspects
South Fork Koyukuk River Weir (new: site prep during 1995)	South Fork Koyukuk River near mouth of Fish Creek RM > 1,117	- estimate daily escapement of chinook, summer chum and fall chum salmon to the South Fork Koyukuk River - estimate age, sex, and size composition of the salmon escapement.	did not operate in 1995	USFWS	all aspects
Galena Fish Wheel Test Fishing (new)	mainstem Yukon River, RM 530	- index the timing of the fall chum salmon run in the mainstem Yukon River.	June - Aug	BSFA	all aspects
Chandalar River Sonar	mile 14 Chandalar River, RM 996	- investigate feasibility of using split-beam sonar equipment to estimate fall chum salmon escapement	Aug - Sept.	USFWS	all aspects
Fort Yukon Fish Wheel Test Fishing (new)	mainstem Yukon River, RM 1,002	- index the timing of the fall chum salmon run in the mainstem Yukon River, - investigate the feasibility of detecting differences in run timing of Porcupine and mainstem Yukon River fall chum salmon stocks based on fish wheel placement; - provide educational opportunities for area students in the operation of a salmon run-timing project	Aug - Sept.	CATG	all aspects
Black River Weir (new)	mile 60 Black River, Porcupine River drainage, RM 1,086	- estimate daily escapement of fall chum salmon, and other fish species, which pass through the weir on the Black River; - estimate age, sex, and size composition of the fall chum salmon escapement, and of other fish species which pass through the weir; - provide educational opportunities for area students in the operation of a salmon escapement-monitoring project	Aug - Sept	CATG USFWS	all aspects technical support and training
Sheenjek River Sonar	mile 6 Sheenjek River, Porcupine River drainage, RM 1,060	- estimate daily escapement of fall chum salmon into the Sheenjek River; - estimate age, sex, and size composition of the fall chum salmon escapement	Aug - Sept	ADF&G	all aspects

continued

Table 4. (page 3 of 3).

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Fall Chum Salmon Radio Telemetry Planning (new)	Porcupine and/or Upper Yukon River drainages	- develop a plan for a potential fall chum salmon radio-tagging and tracking project.	ongoing	NBS NMFS USFWS ADF&G TCC DFO	all aspects equipment & technical support all aspects all aspects all aspects all aspects
Yukon Border Sonar	mainstem Yukon River, near Eagle, RM 1,213	- develop methods for use of split-beam sonar equipment to estimate chinook and fall chum passage into Canada.	did not operate in 1995	ADF&G DFO USFWS	all aspects all aspects providing equipment
Tanana River and Tanana village Fish Wheel Test Fishing	mainstem Tanana River, Manley, RM 765 Nenana, RM 860 mainstem Yukon River, Tanana, RM 695	- index timing of the summer chum, and/or, fall chum, and coho salmon runs using test fish wheels.	Aug - Sept. June - Sept. Aug - Sept.	ADF&G ADF&G BSFA	all aspects all aspects all aspects
Tanana River Tagging (new)	mainstem Tanana River between RM 793 and 860.	- estimate the population size of the Tanana River fall chum salmon run above the confluence of the Kantishna River using mark-recapture methodology; - investigate feasibility of employing project results as a future, reliable in-season management tool for assessing fall chum salmon run strength and timing on an annual basis.	Aug - Sept.	ADF&G BSFA	all aspects provided partial funding
Toklat River Sonar & Barton Creek Weir	mile 15 Toklat River, Kantishna River drainage, Tanana River drainage, RM 853	- estimate daily escapement of salmon into the Toklat River; - estimate age, sex, and size composition of the fall chum and coho salmon escapements.	Aug - Sept.	ADF&G	all aspects
Toklat River Fall Chum Salmon Restoration Feasibility Study Feasibility Study	Toklat River, Kantishna River drainage, Tanana River drainage, RM 838	- investigate restoration options for the Toklat River fall chum salmon stock; - investigate feasibility of conducting cold-weather, remote egg-takes from the Toklat River fall chum salmon spawning grounds; - estimate contribution of the Toklat River fall chum salmon spawning stock to proximal fisheries; - estimate the quantity and quality of the fall chum salmon spawning area of the Toklat River.	ongoing	ADF&G BSFA TCC	all aspects provided partial funding provided partial funding and partial staffing
Chena River Tower	mile 1 Chena River, Tanana River drainage, RM 921	- estimate daily escapement of chinook and summer chum salmon into the Chena River.	July - Aug	ADF&G	all aspects
Salcha River Tower	mile 2 Salcha River, Tanana River drainage, RM 967	- estimate daily escapement of chinook and summer chum salmon into the Salcha River.	July - Aug.	ADF&G	all aspects

Agency Acronyms:

ADF&G = Alaska Department of Fish and Game
ADPS = Alaska Department of Public Safety
AVCP = Association of Village Council Presidents, Inc.
BSFA = Bering Sea Fishermen's Association
CATG = Council of Athabascan Tribal Governments
DFO = Department of Fisheries and Oceans (Canada)
NBS = National Biological Service
NMFS = National Marine Fisheries Service
TCC = Tanana Chiefs Conference, Inc
USFWS = United States Fish and Wildlife Service
YRDFA = Yukon River Drainage Fisheries Association

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Table 5. List of harvest and escapement monitoring projects conducted in the Canadian portion of the Yukon River drainage in 1995.

Project Name	Location	Primary Objective(s)	Duration	Agency	Responsibility
Yukon Mark-Recapture	approx. 5 miles above Canada/U S border	- determine population, escapement and harvest rate estimates of chinook and chum salmon entering the Canadian section of the upper Yukon River; - inseason run forecasting.	June 15 - Oct 15	DFO	All aspects
Commercial Catch Monitoring	Dawson City	- determine weekly catches in the Canadian commercial fishery; - recovery of tags.	July 1 - Oct 15	DFO	All aspects
Aboriginal Catch Monitoring	Yukon communities	- determine weekly catches in the Aboriginal fishery; - recovery of tags; - implementation of Land Claims Agreement;	July 1 - Oct 15	DFO, CYI, Yukon First Nations	joint project
Electrophoretic Sampling	Minto area	- obtain chum tissue samples for GSI baseline	Oct. 15 - Nov 1	DFO ADF&G	- sample collection - tissue analysis
Commercial Fishery Sampling	Dawson City	- to obtain age, size, sex composition of commercial catch; - to sample for coded wire tags.	July 1 - Oct 15	DFO	All aspects
Aerial surveys	chinook & chum index streams	- to obtain escapement counts in index spawning areas	Aug. 15 - Nov 1	DFO	All aspects
Fishing Branch Chum Weir	Fishing Br. River	- to enumerate chum salmon returning to the Fishing Branch River and obtain age, size, and sex composition data	Sept 1 - Nov 1	Vuntut Gwitchin DFO	- field work, report prep. - equipment, tech support
Whitehorse Hatchery Chinook Salmon CWT	Whitehorse	- to coded-wire tag the fry produced at the Whitehorse Hatchery	May 15 - June 1	DFO Hatchery staff	- most aspects - assistance
MacIntyre Incubation Box	Whitehorse	- incubate 100K chinook salmon eggs and apply coded wire tags to resulting fry.	year round	DFO	All aspects
North Klondike Incubation Box	N Klondike River	- incubate 100K chinook salmon eggs and apply coded wire tags to resulting fry	year round	Dawson First Nation Yukon R. Com. Fish Assoc. DFO	Field work, project monitoring Field work, project monitoring Technical support
Blind Creek Weir	Faro	- enumerate adult chinook salmon returns	July 15 - Sept. 1	Ross River Dena Council DFO	All aspects Technical support
Flat Creek Weir	Whitehorse	- enumerate adult chinook salmon CWT returns to the Takhini River.	Aug. 1 - Sept 1	DFO	All aspects
Wolf Creek Weir	Whitehorse	- enumerate adult chinook salmon returns	Aug 1 - Sept 1	Yukon Fish & Game Assoc DFO	All aspects Technical support

ATTACHMENT I:

LIST OF
JTC MEETING PARTICIPANTS:
8-9 NOVEMBER 1995

The following people attended at least a portion of the 8-9 November 1995 JTC meeting:

Canadian Department of Fisheries and Oceans (DFO)
- Sandy Johnston (co-chair)
- Ian Boyce
- Gail Faulkner
- Burt Hunt

Alaska Department of Fish and Game (ADF&G)
- Larry Buklis (co-chair)
- Dan Bergstrom
- Jeff Bromaghin
- Russ Holder
- Dan Huttunen
- Gene Sandone

United States Fish and Wildlife Service (USFWS)
- Steve Klosiewski
- Mike Millard
- Monty Millard

National Marine Fisheries Service (NMFS)
- John Eiler
- Michael W. Greenough

Bering Sea Fishermen's Association (BSFA)
- Jude Henzler

Tanana Chiefs Conference, Inc. (TCC)
- Paul Headlee

Council of Athabascan Tribal Governments (CATG)
- Michael S. Peter

ATTACHMENT II:

HISTORICAL YUKON RIVER SALMON CATCH AND ESCAPEMENT DATABASE

LIST OF ATTACHMENT TABLES

LIST OF ATTACHMENT FIGURES

LIST OF ATTACHMENT FIGURES (continued)

Attachment Table 1. Alaskan and Canadian total utilization of Yukon River chinook, churn, and coho salmon, 1903-1995.

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

Attachment Table 1. (page 2 of 2).

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	114,494	1,090,758	1,205,252	7,527	12,479	20,006	122,021	1,103,237	1,225,258
1978	129,988	1,615,312	1,745,300	5,881	9,566	15,447	135,869	1,624,878	1,760,747
1979	159,232	1,596,133	1,755,365	10,375	22,084	32,459	169,607	1,618,217	1,787,824
1980	197,665	1,730,960	1,928,625	22,846	23,718 [d]	46,564	220,511	1,754,678	1,975,189
1981	188,477	2,097,871	2,286,348	18,109	22,781 [d]	40,890	206,586	2,120,652	2,327,238
1982	152,808	1,265,457	1,418,265	17,208	16,091 [d]	33,299	170,016	1,281,548	1,451,564
1983	198,436	1,678,597	1,877,033	18,952	29,490 [d]	48,442	217,388	1,708,087	1,925,475
1984	162,683	1,548,101	1,710,784	16,795	29,767 [d]	46,562	179,478	1,577,868	1,757,346
1985	187,327	1,657,984	1,845,311	19,301	41,515 [d]	60,816	206,628	1,699,499	1,906,127
1986	146,004	1,758,825	1,904,829	20,364	14,843 [d]	35,207	166,368	1,773,668	1,940,036
1987	188,386	1,246,176	1,434,562	17,614	44,786 [d]	62,400	206,000	1,290,962	1,496,962
1988	148,421	2,311,196	2,459,617	21,427	33,915 [d]	55,342	169,848	2,345,111	2,514,959
1989	157,606	2,281,566	2,439,172	17,944	23,490 [d]	41,434	175,550	2,305,056	2,480,606
1990	149,433	1,053,351	1,202,784	19,238	34,302 [d]	53,540	168,671	1,087,653	1,256,324
1991	154,651	1,335,111	1,489,762	20,607	35,653 [d]	56,260	175,258	1,370,764	1,546,022
1992	168,191	863,575	1,031,766	17,903	21,310 [d]	39,213	186,094	884,885	1,070,979
1993	163,078	342,871	505,949	16,611	14,150 [d]	30,761	179,689	357,021	536,710
1994 [f]	172,315	579,651	751,966	21,218	38,340	59,558	193,533	617,991	811,524
1995 [f,g]	174,991	1,433,334	1,608,325	20,380	40,401	60,781	195,371	1,473,735	1,669,106

[a] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe.
[b] Commercial, subsistence, personal-use, and sport catches combined.
[c] Catch in number of salmon. Commercial, Aboriginal, domestic, and sport catches combined.
[d] Includes the Old Crow Aboriginal fishery harvest of coho salmon.
[f] Preliminary.
[g] Does not include Alaskan sport fish harvests. These harvest numbers are unavailable at this time.

Attachment Table 2. Alaskan and Canadian total utilization of Yukon River chinook and fall chum salmon, 1961-1995.

	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	114,494	122,021	12,479	340,757	353,236
1978	5,881	129,988	135,869	9,566	331,250	340,816
1979	10,375	159,232	169,607	22,084	593,293	615,377
1980	22,846	197,665	220,511	22,218	466,087	488,305
1981	18,109	188,477	206,586	22,281	654,976	677,257
1982	17,208	152,808	170,016	16,091	357,084	373,175
1983	18,952	198,436	217,388	29,490	495,526	525,016
1984	16,795	162,683	179,478	29,267	383,055	412,322
1985	19,301	187,327	206,628	41,265	474,216	515,481
1986	20,364	146,004	166,368	14,543	303,485	318,028
1987	17,614	188,386	206,000	44,480	361,663 [d]	406,143
1988	21,427	148,421	169,848	33,565	319,677	353,242
1989	17,944	157,606	175,550	23,020	518,157	541,177
1990	19,238	149,433	168,671	33,622	316,478	350,100
1991	20,607	154,651	175,258	35,418	403,678	439,096
1992	17,903	168,191	186,094	20,815	128,031 [g]	148,846
1993	16,611	163,078	179,689	14,090	76,925 [d]	91,015
1994 [f]	21,218	172,315	193,533	38,008	131,217	169,225
1995 [f]	20,380	174,991 [h]	195,371	40,401	413,767	454,168
Average						
1961-84	9,293	131,432	140,724	14,957	280,840	295,796
1985-89	19,330	165,549	184,879	31,375	395,440	426,814
1990-94	19,115	161,534	180,649	28,391	211,266	239,656

[a] Catch in number of salmon. Includes commercial, Aboriginal, domestic, and sport catches combined.

[b] Catch in number of salmon. Includes estimated number of salmon harvested for the commercial production of salmon roe (See Bergstrom et al. 1992: 1990 Yukon Area AMR.).

[c] Commercial, subsistence, personal-use, and sport catches combined.

[d] Commercial fishery did not operate within the Alaskan portion of the drainage.

[f] Preliminary.

[g] Commercial fishery operated only in District 6, the Tanana River.

[h] Does not include sport fish harvest..

Attachment Table 3. Alaskan catch of Yukon River chinook salmon, 1961-1995.

Year	Estimated Subsistence Use [a]	Harvest			
		Subsistence [b]	Commercial [c]	Sport [d]	Total
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	156	114,494
1978	30,297	30,297	99,168	523	129,988
1979	31,005	31,005	127,673	554	159,232
1980	42,724	42,724	153,985	956	197,665
1981	29,690	29,690	158,018	769	188,477
1982	28,158	28,158	123,644	1,006	152,808
1983	49,478	49,478	147,910	1,048	198,436
1984	42,428	42,428	119,904	351	162,683
1985	39,771	39,771	146,188	1,368	187,327
1986	45,238	45,238	99,970	796	146,004
1987	53,124	53,124	134,760 [f]	502	188,386
1988	46,032	46,032	101,445	944	148,421
1989	51,062	51,062	105,491	1,053	157,606
1990	51,594	51,181	97,708	544	149,433
1991	48,311	46,773	107,105	773	154,651
1992	46,553	45,626	122,134	431	168,191
1993	66,261	65,701	95,682	1,695	163,078
1994 [g]	55,266	54,563	115,471	2,281	172,315
1995 [g]	50,111	48,804	126,187	[h]	174,991
Average					
1961-84	22,947	22,947	108,261	670	131,432
1985-89	47,045	47,045	117,571	933	165,549
1990-94	53,597	52,769	107,620	1,145	161,534

[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.
[c] Includes ADF&G test fish sales, fish sold in the round, and estimated numbers of female salmon commercially harvested for the commercial production of salmon roe. (See Bergstrom et al. 1992: 1990 Yukon Area AMR).
[d] Sport fish harvest for the Alaskan portion of the Yukon River drainage. The majority of this harvest is believed to have been taken within the Tanana River drainage. (See Schultz et al. 1993: 1992 Yukon Area AMR).
[f] Includes 653 and 2,136 chinook salmon illegally sold in District 5 and 6 (Tanana River), respectively.
[g] Preliminary.
[h] Data are unavailable at this time.

Attachment Table 4 Canadian catch of Yukon River chinook salmon, 1961-1995.

Year	Mainstem Yukon River Harvest						Porcupine River Aboriginal Fishery Harvest	Total Canadian Harvest
	Commercial	Domestic	Aboriginal Fishery	Sport[a]	Combined Non-Commercial	Total		
1961	3,446		9,300		9,300	12,746	500	13,246
1962	4,037		9,300		9,300	13,337	600	13,937
1963	2,283		7,750		7,750	10,033	44	10,077
1964	3,208		4,124		4,124	7,332	76	7 408
1965	2,265		3,021		3,021	5,286	94	5,380
1966	1,942		2,445		2,445	4,387	65	4,452
1967	2,187		2,920		2,920	5,107	43	5 150
1968	2,212		2,800		2,800	5,012	30	5,042
1969	1,640		957		957	2,597	27	2,624
1970	2,611		2,044		2,044	4,655	8	4,663
1971	3,178		3,260		3,260	6,438	9	6 447
1972	1,769		3,960		3,960	5,729		5,729
1973	2,199		2,319		2,319	4,518	4	4,522
1974	1,808	406	3,342		3,748	5,556	75	5,631
1975	3,000	400	2,500		2,900	5,900	100	6,000
1976	3,500	500	1,000		1,500	5,000	25	5,025
1977	4,720	531	2,247		2,778	7,498	29	7,527
1978	2,975	421	2,485		2,906	5,881		5,881
1979	6,175	1,200	3,000		4,200	10,375		10,375
1980	9,500	3,500	7,546	300	11,346	20,846	2,000	22,846
1981	8,593	237	8,879	300	9,416	18,009	100	18,109
1982	8,640	435	7,433	300	8,168	16,808	400	17,208
1983	13,027	400	5,025	300	5,725	18,752	200	18,952
1984	9,885	260	5,850	300	6,410	16,295	500	16,795
1985	12,573	478	5,800	300	6,578	19,151	150	19,301
1986	10,797	342	8,625	300	9,267	20,064	300	20,364
1987	10,864	330	6,069	300	6,699	17,563	51	17,614
1988	13,217	282	7,178	650	8,110	21,327	100	21,427
1989	9,789	400	6,930	300	7,630	17,419	525	17,944
1990	11,324	247	7,109	300	7,656	18,980	258	19,238
1991	10,906	227	9,011	300	9,538	20,444	163	20,607
1992	10,877	277	6,349	300	6,926	17,803	100	17,903
1993	10,350	243	5,576	300	6,119	16,469	142	16,611
1994	12,028	373	8,089	300	8,762	20,790	428	21,218
1995 [b]	11,344	300	7,576	700	8,576	19,920	460	20,380
Average								
1961-84	4,367	754	4,313	300	4,721	9,087	235	9,293
1985-89	11,448	366	6,920	370	7,657	19,105	225	19,330
1990-94	11,097	273	7,227	300	7,800	18,897	218	19,115

[a] Sport fish harvest unknown prior to 1980.
[b] Preliminary

Attachment Table 5. Alaskan catch of Yukon River summer chum salmon, 1961-1995.

Year	Estimated Subsistence Use [a]	Harvest			
		Subsistence [b]	Commercial [c]	Sport [d]	Total
1961	305,317 [f]	305,317 [f]	0		305,317
1962	261,856 [f]	261,856 [f]	0		261,856
1963	297,094 [f]	297,094 [f]	0		297,094
1964	361,080 [f]	361,080 [f]	0		361,080
1965	336,848 [f]	336,848 [f]	0		336,848
1966	154,508 [f]	154,508 [f]	0		154,508
1967	206,233 [f]	206,233 [f]	10,935		217,168
1968	133,880 [f]	133,880 [f]	14,470		148,350
1969	156,191 [f]	156,191 [f]	61,966		218,157
1970	166,504 [f]	166,504 [f]	137,006		303,510
1971	171,487 [f]	171,487 [f]	100,090		271,577
1972	108,006 [f]	108,006 [f]	135,668		243,674
1973	161,012 [f]	161,012 [f]	285,509		446,521
1974	227,811 [f]	227,811 [f]	589,892		817,703
1975	211,888 [f]	211,888 [f]	710,295		922,183
1976	186,872 [f]	186,872 [f]	600,894		787,766
1977	159,502	159,502	534,875	316	694,693
1978	197,144	171,383	1,077,987	451	1,249,821
1979	196,187	155,970	819,533	328	975,831
1980	272,398	167,705	1,067,715	483	1,235,903
1981	208,284	117,629	1,279,701	612	1,397,942
1982	260,969	117,413	717,013	780	835,206
1983	240,386	149,180	995,469	998	1,145,647
1984	230,747	166,630	866,040	585	1,033,255
1985	264,828	157,744	934,013	1,267	1,093,024
1986	290,825	182,337	1,188,850	895	1,372,082
1987	275,914	174,940	622,541	846	798,327
1988	311,724	198,806	1,620,269	1,037	1,820,112
1989	249,582	169,046	1,463,345	2,131	1,634,522
1990	201,839 [g]	117,436	525,440	472	643,348
1991	275,673 [g]	118,540	662,036	1,037	781,613
1992	261,448 [g]	125,497	545,544	1,308	672,349
1993	139,541 [g]	106,728	141,985	564	249,277
1994 [h]	245,973 [g]	132,510	263,752	952	397,214
1995 [h]	232,146 [g]	119,103	824,487	[i]	943,590
Average					
1961-84	217,175	193,833	416,877	569	610,900
1985-89	278,575	176,575	1,165,804	1,235	1,343,613
1990-94	224,895	120,142	427,751	867	548,760

[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 salmon commercially harvested for the commercial production of salmon roe. (See Bergstrom et al. 1992: 1990 Yukon Area AMR.)
[d] Includes both summer and fall chum salmon sport fish harvest within the Alaskan portion of the Yukon River drainage. The majority of this harvest is believed to have been taken within the Tanana River drainage.
[f] Catches of summer chum salmon estimated for 1961-1976 since catches other than chinook salmon were not differentiated by species.
[g] Subsistence harvest plus commercially-harvested summer chum salmon for roe production in District 5 and 6, plus the estimated subsistence use of commercially-harvested summer chum salmon in District 4.
[h] Preliminary.
[i] Data are unavailable at this time.

Attachment Table 6. Alaskan catch of Yukon River fall chum salmon, 1961-1995.

Year	Estimated Subsistence Use [a]	Harvest		
		Subsistence [b]	Commercial [c]	Total [d]
1961	101,772 [f, g]	101,772 [f]	42,461	144,233
1962	87,285 [f, g]	87,285 [f]	53,116	140,401
1963	99,031 [f, g]	99,031 [f]	0	99,031
1964	120,360 [f, g]	120,360 [f]	8,347	128,707
1965	112,283 [f, g]	112,283 [f]	23,317	135,600
1966	51,503 [f, g]	51,503 [f]	71,045	122,548
1967	68,744 [f, g]	68,744 [f]	38,274	107,018
1968	44,627 [f, g]	44,627 [f]	52,925	97,552
1969	52,063 [f, g]	52,063 [f]	131,310	183,373
1970	55,501 [f, g]	55,501 [f]	209,595	265,096
1971	57,162 [f, g]	57,162 [f]	189,594	246,756
1972	36,002 [f, g]	36,002 [f]	152,176	188,178
1973	53,670 [f, g]	53,670 [f]	232,090	285,760
1974	93,776 [f, g]	93,776 [f]	289,776	383,552
1975	86,591 [f, g]	86,591 [f]	275,009	361,600
1976	72,327 [f, g]	72,327 [f]	156,390	228,717
1977	82,771 [g]	82,771 [g]	257,986	340,757
1978	94,867 [g]	84,239 [g]	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 [h]	0	361,663
1988	158,694	155,467	164,210	319,677
1989	230,978	216,229	301,928	518,157
1990	185,244	173,076	143,402	316,478
1991	168,890	145,524	258,154	403,678
1992	110,903	107,602	20,429 [k]	128,031
1993	76,925	76,925	0	76,925
1994 [j]	127,586	123,218	7,999	131,217
1995 [j]	161,913	129,589	284,178	413,767
Average				
1961-84	102,730	100,497	180,343	280,840
1985-89	224,370	220,154	175,285	395,440
1990-94	133,910	125,269	85,997	211,266

[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 Bergstrom et al. 1992: 1990 Yukon Area AMR).

[d] Does not include sport-fish harvest. The majority of the sport-fish harvest is believed to be taken in the Tanana River drainage. Sport fish division does not differentiate between the two races of chum salmon. However, the majority of this harvest is believed to be summer chum salmon.

[f] Catches of fall chum salmon estimated for 1961-1976 since catches other than chinook salmon were not differentiated by species.

[g] Minimum estimates of fall chum salmon for 1961-1978 because surveys were conducted prior to the end of the fishing season.

[h] Includes an estimated 95,768 and 119,168 fall chum salmon illegally sold in Districts 5 and 6 (Tanana River), respectively.

[j] Preliminary.

[k] Commercial fishery operated only in District 6, the Tanana River.

[m] Data are unavailable at this time.

Attachment Table 7. Canadian catch of Yukon River fall chum salmon 1961-1995.

Year	Mainstem Yukon River Harvest					Porcupine River Aboriginal Fishery Harvest	Total Canadian Harvest
	Commercial	Domestic	Aboriginal Fishery	Combined Non-Commercial	Total		
1961	3,276		3,800	3,800	7,076	2,000	9,076
1962	936		6,500	6,500	7,436	2,000	9,436
1963	2,196		5,500	5,500	7,696	20,000	27,696
1964	1,929		4,200	4,200	6,129	6,058	12,187
1965	2,071		2,183	2,183	4,254	7,535	11,789
1966	3,157		1,430	1,430	4,587	8,605	13,192
1967	3,343		1,850	1,850	5,193	11,768	16,961
1968	453		1,180	1,180	1,633	10,000	11,633
1969	2,279		2,120	2,120	4,399	3,377	7,776
1970	2,479		612	612	3,091	620	3,711
1971	1,761		150	150	1,911	15,000	16,911
1972	2,532			0	2,532	5,000	7,532
1973	2,806		1,129	1,129	3,935	6,200	10,135
1974	2,544	466	1,636	2,102	4,646	7,000	11,646
1975	2,500	4,600	2,500	7,100	9,600	11,000	20,600
1976	1,000	1,000	100	1,100	2,100	3,100	5,200
1977	3,990	1,499	1,430	2,929	6,919	5,560	12,479
1978	3,356	728	482	1,210	4,566	5,000	9,566
1979	9,084	2,000	11,000	13,000	22,084		22,084
1980	9,000	4,000	3,218	7,218	16,218	6,000	22,218
1981	15,260	1,611	2,410	4,021	19,281	3,000	22,281
1982	11,312	683	3,096	3,779	15,091	1,000	16,091
1983	25,990	300	1,200	1,500	27,490	2,000	29,490
1984	22,932	535	1,800	2,335	25,267	4,000	29,267
1985	35,746	279	1,740	2,019	37,765	3,500	41,265
1986	11,464	222	2,200	2,422	13,886	657	14,543
1987	40,591	132	3,622	3,754	44,345	135	44,480
1988	30,263	349	1,882	2,231	32,494	1,071	33,565
1989	17,549	100	2,462	2,562	20,111	2,909	23,020
1990	27,537	0	3,675	3,675	31,212	2,410	33,622
1991	31,404	0	2,438	2,438	33,842	1,576	35,418
1992	18,576	0	304	304	18,880	1,935	20,815
1993	7,762	0	4,660	4,660	12,422	1,668	14,090
1994	30,035	0	5,319	5,319	35,354	2,654	38,008
1995 [a]	39,012	0	951	951	39,963	438	40,401
Average							
1961-84	5,674	1,584	2,588	3,206	8,881	6,340	14,957
1985-89	27,123	216	2,381	2,598	29,720	1,654	31,375
1990-94	23,063	0	3,279	3,279	26,342	2,049	28,391

[a] Preliminary.

Attachment Table 8. Alaskan catch of Yukon River coho salmon, 1961-1995.

Year	Estimated Subsistence Use[a]	Harvest			
		Subsistence[b]	Commercial[c]	Sport[d]	Total
1961	9,192[f,g]	9,192[f,g]	2,855		12,047
1962	9,480[f,g]	9,480[f,g]	22,926		32,406
1963	27,699[f,g]	27,699[f,g]	5,572		33,271
1964	12,187[f,g]	12,187[f,g]	2,446		14,633
1965	11,789[f,g]	11,789[f,g]	350		12,139
1966	13,192[f,g]	13,192[f,g]	19,254		32,446
1967	17,164[f,g]	17,164[f,g]	11,047		28,211
1968	11,613[f,g]	11,613[f,g]	13,303		24,916
1969	7,776[f,g]	7,776[f,g]	15,093		22,869
1970	3,966[f,g]	3,966[f,g]	13,188		17,154
1971	16,912[f,g]	16,912[f,g]	12,203		29,115
1972	7,532[f,g]	7,532[f,g]	22,233		29,765
1973	10,236[f,g]	10,236[f,g]	36,641		46,877
1974	11,646[f,g]	11,646[f,g]	16,777		28,423
1975	20,708[f,g]	20,708[f,g]	2,546		23,254
1976	5,241[f,g]	5,241[f,g]	5,184		10,425
1977	16,333[g]	16,333[g]	38,863	112	55,308
1978	7,787[g]	7,787[g]	26,152	302	34,241
1979	9,794	9,794	17,165	50	27,009
1980	20,158	20,158	8,745	67	28,970
1981	21,228	21,228	23,680	45	44,953
1982	35,894	35,894	37,176	97	73,167
1983	23,905	23,905	13,320	199	37,424
1984	49,020	49,020	81,940	831	131,791
1985	32,264	32,264	57,672	808	90,744
1986	34,468	34,468	47,255	1,535	83,258
1987	84,894	84,894[h]	0	1,292	86,186
1988	69,080	69,080	99,907	2,420	171,407
1989	41,583	41,583	85,493	1,811	128,887
1990	47,896	44,641	46,937	1,947	93,525
1991	40,894	37,388	109,657	2,775	149,820
1992	53,344	51,921	9,608[k]	1,666	63,195
1993	15,772	15,772	0	897	16,669
1994[j]	48,926	44,594	4,452	2,174	51,220
1995[j]	29,845	28,771	47,206	[m]	75,977
Average					
1961-84	15,852	15,852	18,694	213	34,617
1985-89	52,458	52,458	58,065	1,573	112,096
1990-94	41,366	38,863	34,131	1,892	74,886

[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 Bergstrom et al. 1992: 1990 Yukon Area AMR).
[d] Sport fish harvest for the Alaskan portion of the Yukon River drainage. The majority of this harvest is believed to have been taken within the Tanana River drainage.
[f] Catches of coho salmon estimated for 1961-1976 since catches other than chinook salmon were not differentiated by species.
[g] Minimum estimates of coho salmon for 1961-1978 because surveys were conducted prior to the end of the fishing season.
[h] Includes an estimated 5,015 and 31,276 coho salmon illegally sold in Districts 5 and 6 (Tanana River), respectively.
[j] Preliminary.
[k] Commercial fishery operated only in District 6, the Tanana River.
[m] Data are unavailable at this time.

Attachment Table 9. Chinook salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1961-1995.[a]

	Andreafsky River			Anvik River		Nulato River			Gisasa River		Chena River			Salcha River		
	East Fork		West	Aerial		Aerial					Pop Est	Aerial		Pop Est	Aerial	
Year	Aerial	Tower or Weir Cnt	Fork Aerial	River[b]	Index Area[b]	North Fork[c]	South Fork	Mainstem Tower Counts	Aerial	Weir	or Tower Counts	River	Index Area[d]	or Tower Counts	River	Index Area[f]
1961	1,003			1,226		376 [g]	167		266 [g]						2,878	
1962	675 [g]		762 [g]									61 [g,h]			937	
1963												137 [g]				
1964	867		705												450	
1965			344 [g]	650 [g]											408	
1966	361		303	638											800	
1967			276 [g]	336 [g]												
1968	380		383	310 [g]											739	
1969	274 [g]		231 [g]	296 [g]											461 [g]	
1970	665		574 [g]	368								6 [g]			1,882	
1971	1,904		1,682									193 [g,h]			158 [g]	
1972	798		582 [g]	1,198								138 [g,h]			1,193	1,034
1973	825		788	613								21 [g]			391	352 [j]
1974			285	471 [g]		55 [g]	23 [g]		161			1,016 [h]	959 [h]		1,857	1,620
1975	993		301	730		123	81		385			316 [h]	262 [h]		1,055	950 [j]
1976	818		643	1,053		471	177		332			531	496		1,641	1,473
1977	2,008		1,499	1,371		286	201		255			563			1,202	1,052
1978	2,487		1,062	1,324		498	422		45 [g]			1,726			3,499	3,258
1979	1,180		1,134	1,484		1,093	414		484			1,159 [g]			4,789	4,310 [j]
1980	958 [g]		1,500	1,330	1,192	954 [g]	369 [g]		951			2,541			6,757	6,126
1981	2,146 [g]		231 [g]	807 [g]	577 [g]		791					600 [g]			1,237	1,121
1982	1,274		851						421			2,073			2,534	2,346
1983				653 [g]	376 [g]	526	480		572			2,553	2,336		1,961	1,803
1984	1,573 [g]		1,993	641 [g]	574 [g]							501	494		1,031	906
1985	1,617		2,248	1,051	720	1,600	1,180		735			2,553	2,262		2,035	1,860
1986	1,954	1,530 [k]	3,158	1,118	918	1,452	1,522		1,346		9,065 [m]	2,031	1,935		3,368	3,031 [j]
1987	1,608	2,011 [k]	3,281	1,174	879	1,145	493		731		6,404 [m]	1,312	1,209	4,771 [m]	1,898	1,671
1988	1,020	1,339 [k]	1,448	1,805	1,449	1,061	714		797		3,346 [m]	1,966	1,760	4,562 [m]	2,761	2,553
1989	1,399		1,089	442 [g]	212 [g]						2,666 [m]	1,280	1,185	3,294 [m]	2,333	2,136
1990	2,503		1,545	2,347	1,595	568 [g]	430 [g,n]		884 [g]		5,603 [m]	1,436	1,402	10,728 [m]	3,744	3,429
1991	1,938		2,544	875 [g]	625 [g]	767	1,253		1,690		3,025 [m]	1,277 [g]	1,277 [g]	5,608 [m]	2,212 [g]	1,925 [g]
1992	1,030 [g]		2,002 [g]	1,536	931	348	231		910		5,230 [m]	825 [g]	799 [g]	7,862 [m]	1,484 [g]	1,436 [g]
1993	5,855		2,765	1,720	1,526	1,844	1,181		1,573		12,241 [k]	2,943	2,660	10,007 [k]	3,636	3,562
1994 [v]	300 [g]	7,801 [p,r]	213 [g]		913 [g]			1,795 [s]	2,775	2,888 [p,t]	11,877 [k]	1,570	1,570	18,399 [k]	11,823	11,189
1995	1,635	5,841	1,108	1,996	1,147	968	681	1,412	410	4,023	11,616 [m]	3,575	3,039	13,537 [k]	3,978	3,734
E.O.[w]	>1,500		>1,400	>1,300[x]	>500[x]	>800	>500		>600				>1,700			>2,500

continued

Attachment Table 9. (page 2 of 2).

[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 23-Jan-96
[b] From 1961-1970, river count data are from aerial surveys of various segments of the mainstem Anvik River From 1972-1979, counting tower operated; mainstem aerial survey counts below the tower were added to tower counts From 1980-present, aerial survey counts for the river are best available minimal estimates for the entire Anvik River drainage Index area counts are from the mainstem Anvik River between the Yellow River and McDonald Creek.
[c] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted
[d] Chena River index area for assessing the escapement objective is from Moose Creek Dam to Middle Fork River
[f] Salcha River index area for assessing the escapement objective is from the TAPS crossing to Caribou Creek
[g] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[h] Boat survey.
[j] Data unavailable for index area. Calculated from historic (1972-91) average ratio of index area counts to total river counts (0.90:1.0).
[k] Tower Counts
[m] Population estimate
[n] Manistem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts.
[p] Weir Counts
[r] Weir installed on June 29; first full day of counts June 30.
[s] Tower counts delayed until June 29 because of high, turbid water. First full day of counts occurred on June 30.
[t] Weir installed on July 11; first full day of counts July 12.
[v] Preliminary.
[w] Interim escapement goals. Established March, 1992.
[x] Interim escapement goal 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.

Attachment Table 10. Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961-1995.

Year	Tincup Creek[a]	Tatchun River[a, b]	Little Salmon River[a]	Big Salmon River[a, c]	Nisutlin River[a, d]	Ross River[a, f]	Wolf River[a, g]	Whitehorse Fishway[h]	Canada Mainstem Tagging Estimate[j]
1961								1,068	
1962								1,500	
1963								483	
1964								595	
1965								903	
1966		7[k]						563	
1967								533	
1968			173[k]	857[k]	407[k]	104[k]		414	
1969			120	286	105			334	
1970		100		670	615		71[k]	625	
1971		130	275	275	650		750	856	
1972		80	126	415	237		13	391	
1973		99	27[k]	75[k]	36[k]			224	
1974		192		70[k]	48[k]			273	
1975		175		153[k]	249		40[k]	313	
1976		52		86[k]	102			121	
1977		150	408	316[k]	77			277	
1978		200	330	524	375			725	
1979		150	489[k]	632	713		183[k]	1,184	
1980		222	286[k]	1,436	975		377	1,383	
1981		133	670	2,411	1,626	949	395	1,555	
1982		73	403	758	578	155	104	473	19,790
1983	100	264	101[k]	540	701	43[k, n]	95	905	28,989
1984	150	153	434	1,044	832	151[k]	124	1,042	27,616[m]
1985	210	190	255	801	409	23[k]	110	508	10,730
1986	228	155	54[k]	745	459[k]	72[n]	109	557	16,415
1987	100	159	468	891	183	180[k]	35	327	13,260
1988	204	152	368	765	267	242	66	405	23,118
1989	88	100	862	1,662	695	433[p]	146	549	25,201
1990	83	643	665	1,806	652	457[k]	188	1,407	37,699
1991			326	1,040		250	201[r]	1,266	20,743
1992	73	106	494	617	241	423	110[r]	758	25,497
1993		183	184	572	339	400	168[r]	668	28,558
1994[s]	101[k]	477	726	1,764	389	506	393[r]	1,577[t]	25,890
1995[s]	121	397	781	1,314	274	229[k]	253[r]	2,103	32,168
E.O.									33,000 - 43,000[q]

continued

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Survey rating is fair to good, unless otherwise noted. Latest table revision: December 19, 1995.
[b] All foot surveys except 1978 (boat survey) and 1986 (aerial survey).
[c] For 1968, 1970, and 1971 counts are from mainstem Big Salmon River. For all other years counts are from the mainstem Big Salmon River between Big Salmon Lake and the vicinity of Souch Creek.
[d] One Hundred Mile Creek to Sidney Creek.
[f] Big Timber Creek to Lewis Lake.
[g] Wolf Lake to Red River.
[h] Includes 50, 90, 292, 506, 243, 288, 879, and 757 fin-clipped hatchery-origin salmon in 1988, 1989, 1990, 1991, 1992, 1993, 1994, and 1995 respectively. Note that the 1994 count is presently under review because a number of fin-clipped fish were double-counted.
[j] Estimated total spawning escapement excluding Porcupine River (estimated border escapement minus the Canadian catch).
[k] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[m] Estimate derived by dividing the annual 5-area (Whitehorse Fishway, Big Salmon, Nisutlin, Wolf, Tatchun) count by the average proportion of the annual 5-area index count to the estimated spawning escapement from the DFO tagging study for years 1983, 1983, and 1985-1989.
[n] Information on area surveyed is unavailable.
[p] Counts are for Big Timber Creek to Sheldon Lake.
[r] Counts are for Wolf Lake to Fish Lake outlet.
[s] Preliminary. Area surveyed unknown.
[t] Under review; a number of fin-clipped fish were double-counted.

Attachment Table 11 Summer chum salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1973-1995

Year	Andreafsky River East Fork Aerial[a]	Andreafsky River East Fork Sonar, Tower, or Weir Cnts	Andreafsky River West Fork[a]	Anvik River Tower & Aerial[b]	Anvik River Sonar	Rodo River[a]	Kaltag Cr. Tower Counts	Nulato River Aerial South Fork	Nulato River Aerial North Fork[c]	Nulato River Mainstem Tower Counts	Gisasa River Aerial	Gisasa River Weir	Hogatza River Clear & Caribou Cr. Aerial	Hogatza River Clear Creek Tower Counts	Tozitna River[a]	Chena River Aerial	Chena River Tower	Salcha River Aerial	Salcha River Tower
1973	10,149 [d]		51,835	249,015												79 [d]		290	
1974	3,215 [d]		33,578	411,133		16,137		29,016	29,334		22,022				1,823	4,349		3,510	
1975	223,485		235,954	900,967		25,335		51,215	87,280		56,904		22,355		3,512	1,670		7,573	
1976	105,347		118,420	511,475		38,258		9,230 [d]	30,771		21,342		20,744		725 [d]	685		6,484	
1977	112,722		63,120	358,771		16,118		11,385	58,275		2,204 [d]		10,734		761 [d]	610		677 [d]	
1978	127,050		57,321	307,270		17,845		12,821	41,659		9,280 [d]		5,102		2,262	1,609		5,405	
1979	66,471		43,391		280,537			1,506	35,598		10,962		14,221			1,025 [d]		3,060	
1980	36,823 [d]		114,759		492,676			3,702 [d]	11,244 [d]		10,388		19,786		580	338		4,140	
1981	81,555	147,312 [f]			1,486,182			14,348								3,500		8,500	
1982	7,501 [d]	181,352 [f]	7,267 [d]		444,581						334 [d]		4,984 [d]		874	1,509		3,756	
1983		110,608 [f]			362,912			1,263 [d]	19,749		2,356 [d]		28,141		1,604	1,097		716 [d]	
1984	95,200 [d]	70,125 [f]	238,565		891,028								184 [d]			1,861		9,810	
1985	66,146		52,750		1,080,243	24,576		10,494	19,344		13,232		22,566		1,030	1,005		3,178	
1986	83,931	167,614 [g]	99,373		1,189,602			16,848	47,417		12,114				1,778	1,509		8,028	
1987	6,687 [d]	45,221 [g]	35,535		455,876			4,094	7,163		2,123		5,669 [d]			333		3,657	
1988	43,056	68,937 [g]	45,432		1,125,449	13,872		15,132	26,951		9,284		6,890		2,983	432		2,889 [d]	
1989	21,460 [d]				636,906											714 [d]		1,574 [d]	
1990	11,519 [d]		20,426 [d]		403,627	1,941 [d]		3,196 [d]	1,419 [d]		450 [d]		2,177 [d]		36	245 [q]		450 [d]	
1991	31,886		46,657		847,772	3,977		13,150	12,491		7,003		9,947		93	115 [d]		154 [d]	
1992	11,308 [d]		37,808 [d]		775,626	4,465		5,322	12,358		9,300		2,986		794	848 [d]		3,222	
1993	10,935 [d]		9,111 [d]		517,409	7,867		5,486	7,698		1,581				970	168	5,487	212	5,563
1994		200,981 [j, k]			1,124,689		47,295			148,762 [m]	6,827	51,116 [n]	8,247 [o]			1,137	10,108	4,916	39,343
1995 [w]		172,148 [j, p]			1,339,418	12,849	73,940	10,875	29,949	236,890	6,458	136,886		116,735	4,985	185 [d]	3,475 [q]	934 [d]	31,329
E.O.[r]	>109,000		>116,000		>500,000[s]				>53,000[t]				>17,000[v]					>3,500	

[a] Data obtained by aerial survey unless otherwise noted. Only peak counts are listed. Latest table revision :December 12, 1995
[b] From 1972-1979 counting tower operated; escapement estimate listed is the tower counts plus expanded aerial survey counts below the tower (see Buklis 1982).
[c] Includes mainstem counts below the confluence of the North and South Forks, unless otherwise noted
[d] Incomplete survey and/or poor survey timing or conditions resulted in minimal or inaccurate count.
[f] Sonar count.
[g] Tower count.
[h] Mainstem counts below the confluence of the North and South Forks Nulato River included in the South Fork counts
[j] Weir Count
[k] Weir installed on June 29. First full day of counts occurred on June 30.
[m] Tower counts delayed until June 29 because of high, turbid water. First full day of counts occurred on June30
[n] Weir installed on July 11. First full day of counts occurred on July 12.
[o] BLM helicopter survey.
[p] Weir operated from June 16 - September 12. Passage of chum salmon from August 1 - September 12 was 2,584 fish
[q] Tower operations were severly hampered because of high, turbid water which prohibited observations from the tower. Tower operated during the periods July 10 - 15 and from July 19 - 30, 1995.
[r] Interim escapement objective.
[s] The Anvik River Escapement Objective was rounded upward to 500,000 from 487,000 in March, 1992.
[t] Interim escapement objective for North Fork Nulato River only
[v] Consists of Clear and Caribou Creeks interim escapement objectives of 9,000 and 8,000, respectively.
[w] Preliminary.

Attachment Table 12. Fall chum salmon escapement counts for selected spawning areas in Alaskan and Canadian portions of the Yukon River drainage, 1971-1995. [a]

Year	Alaska				Canada					
	Toklat River[b]	Delta River[c]	Chandalar River [d]	Sheenjek River [d]	Fishing Branch River[f, g]	Mainstem Yukon River Index[g, h]	Koidern River[g]	Kluane River[g, j]	Teslin River[g, k]	Mainstem Tagging Estimate[m]
1971					312,800					
1972		5,384			35,125 [n]			198 [p, r]		
1973		10,469			15,989 [s]	383		2,500		
1974	41,798	5,915		89,966 [t]	32,525 [s]			400		
1975	92,265	3,734 [v]		173,371 [t]	353,282 [s]	7,671		362 [r]		
1976	52,891	6,312 [v]		26,354 [t]	36,584			20		
1977	34,887	16,876 [v]		45,544 [t]	88,400			3,555		
1978	37,001	11,136		32,449 [t]	40,800			0 [r]		
1979	158,336	8,355		91,372 [t]	119,898			4,640 [r]		
1980	26,346	5,137		28,933 [t]	55,268			3,150		
1981	15,623	23,508		74,560	57,386 [w]			25,806		
1982	3,624	4,235		31,421	15,901	1,020 [x]		5,378		31,958
1983	21,869	7,705		49,392	27,200	7,560		8,578 [r]		90,875
1984	16,758	12,411		27,130	15,150	2,800 [y]	1,300	7,200	200	56,633 [z]
1985	22,750	17,276 [v]		152,768	56,016 [s]	10,760	1,195	7,538	356	62,010
1986	17,976	6,703 [v]	59,313	84,207 [aa]	31,723 [s]	825	14	16,686	213	87,940
1987	22,117	21,180	52,416	153,267 [aa]	48,956 [s]	6,115	50	12,000		80,776
1988	13,436	18,024	33,619	45,206 [aa]	23,597 [s]	1,550	0	6,950	140	36,786
1989	30,421	21,342 [v]	69,161	99,116 [aa]	43,834 [s]	5,320	40	3,050	210 [p]	35,750
1990	34,739	8,992 [v]	78,631	77,750 [aa]	35,000 [ab]	3,651	1	4,683	739	51,755
1991	13,487	32,905 [v]		86,496 [ac]	37,733 [s]	2,426	53	11,675	468	78,461
1992	14,070	8,893 [v]		78,808 [ac]	22,517 [s]	4,438	4	3,339	450	49,082
1993	27,838	19,857		42,922 [ac]	28,707 [s]	2,620	0	4,610	555	29,743
1994	76,057	23,777 [v]		153,000 [ac, ad]	65,247 [s]	1,429 [p]	20 [p]	10,734	209 [p]	98,358
1995 [ad]	54,513 [ah]	20,587		235,000 [ac]	51,971 [s, ai]	4,701	0	16,456	633	158,240
E.O.[af]	> 33,000	> 11,000		> 64,000 [ag]	50,000 - 120,000					> 80,000

continued

[a] Latest table revision November 2,1995.
[b] Expanded total abundance estimates for upper Toklat River index area using stream life curve (SLC) developed with 1987-1993 data. Index area includes Geiger Creek, Sushana River, and mainstem floodplain sloughs from approximately 0.25 mile upstream of roadhouse to approximately 1.25 mile downstream of roadhouse.
[c] Estimates are a total spawner abundance, generally from using spawner abundance curves and streamlife data.
[d] Side-scan sonar estimate, unless otherwise indicated.
[f] Located within the Canadian portion of the Porcupine River drainage. Total escapement estimated using weir to aerial survey expansion factor of 2.72, unless otherwise indicated
[g] Aerial survey count unless otherwise indicated.
[h] Tatchun Creek to Fort Selkirk.
[j] Duke River to end of spawning sloughs below Swede Johnston Creek.
[k] Boswell Creek area (5 km below to 5 km above confluence).
[m] Excludes Fishing Branch River escapement (estimated border passage minus Canadian removal).
[n] Weir installed on September 22. Estimate consists of a weir count of 17,190 after September 22, and a tagging passage estimate of 17,935 prior to weir installation.
[p] Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
[r] Foot survey
[s] Weir count.
[t] Total escapement estimate using sonar to aerial survey expansion factor of 2.22.
[v] Population estimate from replicate foot surveys and stream life data.
[w] Initial aerial survey count was doubled before applying the weir/aerial expansion factor of 2.72 since only half of the spawning area was surveyed.
[x] Boat survey.
[y] Total index area not surveyed. Survey included the mainstem Yukon River between Yukon Crossing to 30 km below Fort Selkirk.
[z] Escapement estimate based on mark-recapture program unavailable. Estimate based on assumed average exploitation rate.
[aa] Expanded estimates for period approximating second week August through middle fourth week September, using Chandalar River run timing data.
[ab] Weir was not operated. Although only 7,541 chum salmon were counted on a single survey flown October 26, a population estimate of approximately 27,000 fish was made through date of survey, based upon historic average aerial-to-weir expansion of 28%. Actual population of spawners was reported by DFO as between 30,000 - 40,000 fish considering aerial survey timing.
[ac] Total abundance estimates are for the period approximating second week August through middle fourth week of September . Comparatively escapement estimates prior to 1986 are considered more conservative; approximating the period of end of August through middle week of September.
[ad] Preliminary.
[af] Interim escapement objective.
[ag] Based on escapement estimates for years 1974-1990.
[ah] Minimal estimate because of late timing of ground surveys with respect to peak of spawning.
[aj] Minimal count because weir was submerged, but closed, during the period 31 August- 8 September because of high water.

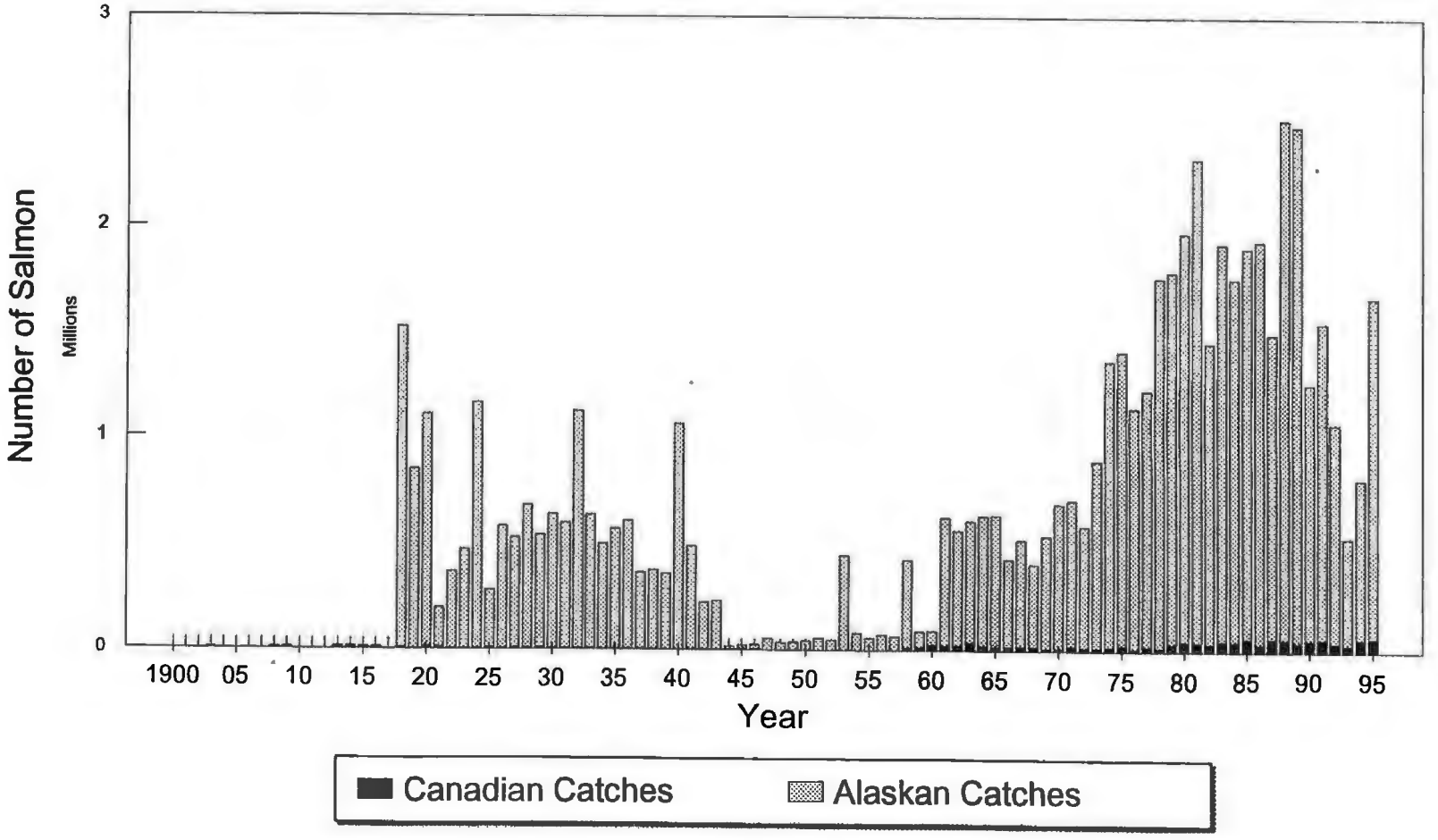
Attachment Table 13. Coho salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1972-1995. [a]

Year	Andreafsky River		Anvik River	Kantishna River		Nenana River Drainage				Delta Clearwater River[f,g]	Clearwater Lake and Outlet	Richardson Clearwater River
	East Fork	West Fork		Geiger Creek[b]	Barton Creek	Lost Slough	Nenana Mainstem[c]	Wood Creek[d]	Seventeen Slough			
1972										630	417	454 [k]
1973										3,322	551 [f]	375 [f]
1974						1,388			27	3,954 [l]	560	652 [f]
1975						943			956	5,100	1,575 [f,h]	4 [k]
1976			467 [k]	25 [j]		118			281	1,920	1,500 [f,h]	80 [k]
1977			81 [k]	60		524 [k]		310 [b]	1,167	4,793	730 [f,h]	327
1978						350		300 [b]	466	4,798	570 [f,h]	
1979						227			1,987	8,970	1,015 [f,h]	372
1980				3 [j]		499 [k]		1,603 [b]	592	3,946	1,545 [f,h]	611
1981	1,657 [k]					274		849 [n,r]	1,005	8,563 [p]	459 [k]	550
1982				81				1,436 [n,r]		8,365 [p]		
1983				42		766		1,042 [n]	103	8,019 [p]	253	88
1984				20 [j]		2,677		8,826 [n]		11,061	1,368	428
1985				42 [j]		1,584		4,470 [n]	2,081	5,358	750	
1986				5	496	794		1,664 [n]	218 [d,h]	10,857	3,577	146 [k]
1987				1,175		2,511		2,387 [n]	3,802	22,300	4,225 [f,h]	
1988	1,913	830	1,203	159	437	348		2,046 [n]		21,600	825 [f,h]	
1989				155	12 [k]			412 [n]	824 [k]	11,000	1,600 [f,h]	483
1990				211		688	1,308		15 [k]	8,325	2,375 [f,h]	
1991				427	467 [k]	564	447		52	23,900	3,150 [f,h]	
1992				77	55 [k]	372			490	3,963	229 [f,h]	500 [f]
1993				138	141	484	419	666 [n,s]	581	10,875	3,525 [f,h]	
1994 [t]				410	2,000 [n,w]	944	1,647	1,317 [n,x]	2,909	62,675 [y]	3,425 [f,h]	5,800 [f]
1995	10,901 [z]				192 [n]					20,100		
E.O.										>9,000[u]		

continued

Attachment Table 13. (page 2 of 2).

[a] Only peak counts presented. Survey rating is fair to good, unless otherwise noted. Latest table revision: November 3,1995.
[b] Foot survey.
[c] Mainstem Nenana River between confluences of Lost Slough and Teklanika River.
[d] Surveyed by F.R.E.D.
[f] Surveyed by Sport Fish Division.
[g] Boat survey counts in the lower 17.5 river miles, unless otherwise indicated.
[h] Boat Survey.
[j] Aerial survey.
[k] Poor survey.
[n] Weir count.
[p] Expanded estimate based on partial survey counts and historic distribution of spawners from 1977-1980.
[r] Coho weir was operated at the mouth of Clear Creek (Shores Landing).
[s] Weir project terminated on October 4. Weir normally operated until mid to late October.
[t] Preliminary.
[u] Interim escapement objective established March, 1993, based on boat survey counts of coho salmon in the lower 17.5 river miles during the period October 21-27.
[w] A total of 298 coho salmon were passed between September 11 and October 4. However, it was estimated that 1,500 to 2,000 coho salmon passed the weir site within a 24-hour period beginning at approximately noon on October 4. Weir operated from August 18 through morning of October 5, 1994.
[x] Weir project terminated September 27. Weir normally operated until mid-October.
[y] An additional 17,565 coho salmon were counted by helicopter in the Delta Clearwater outside of the normal mainstem index area.
[z] Weir count



Attachment Figure 1. Total utilization of chinook, chum, and coho salmon, Yukon River, 1900-1995. The 1995 Alaskan harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time.

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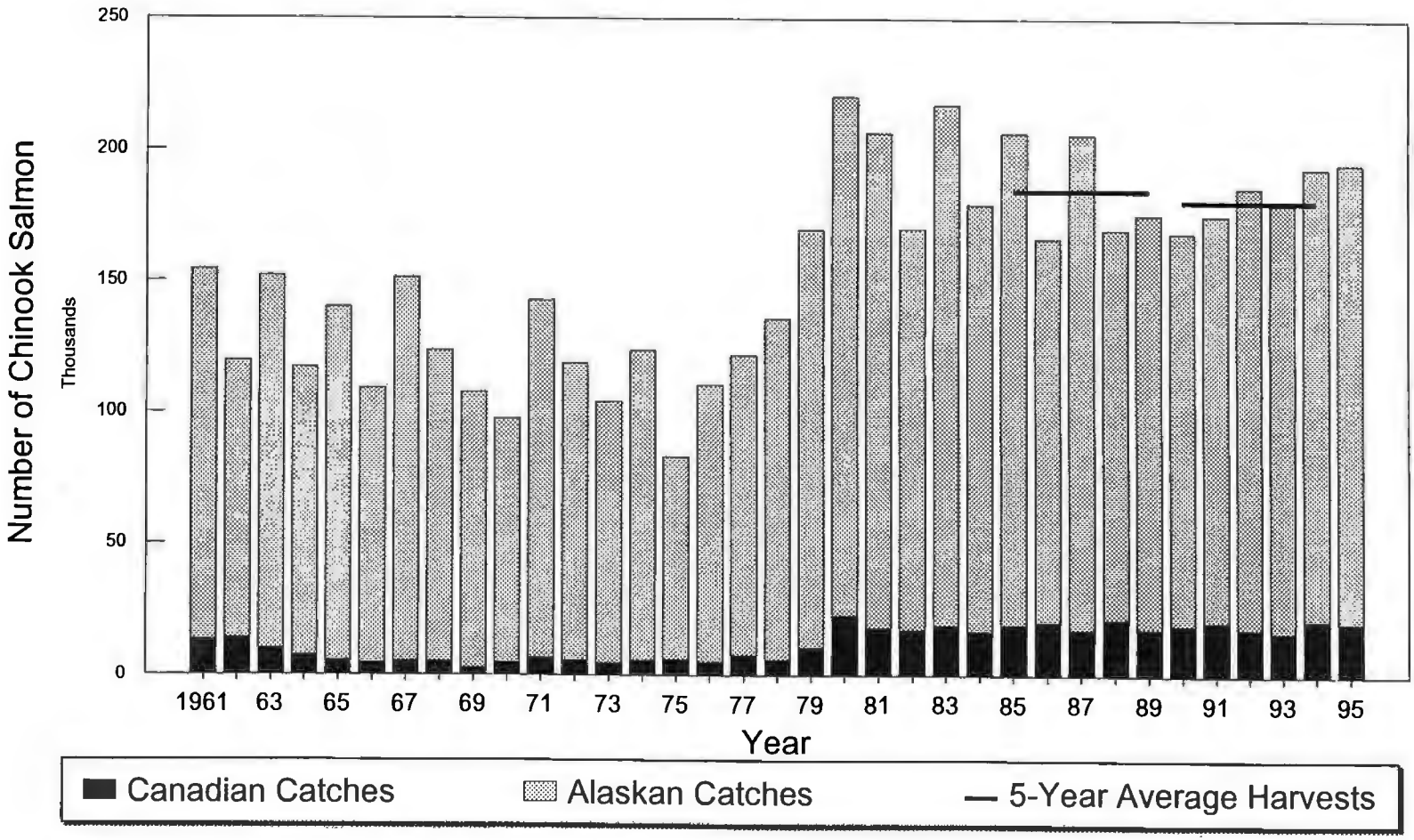

Attachment Figure 2. **Total utilization of chinook salmon, Yukon River, 1961-1995. The 1995 Alaskan harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time. Horizontal lines indicate 5-year average harvests.**

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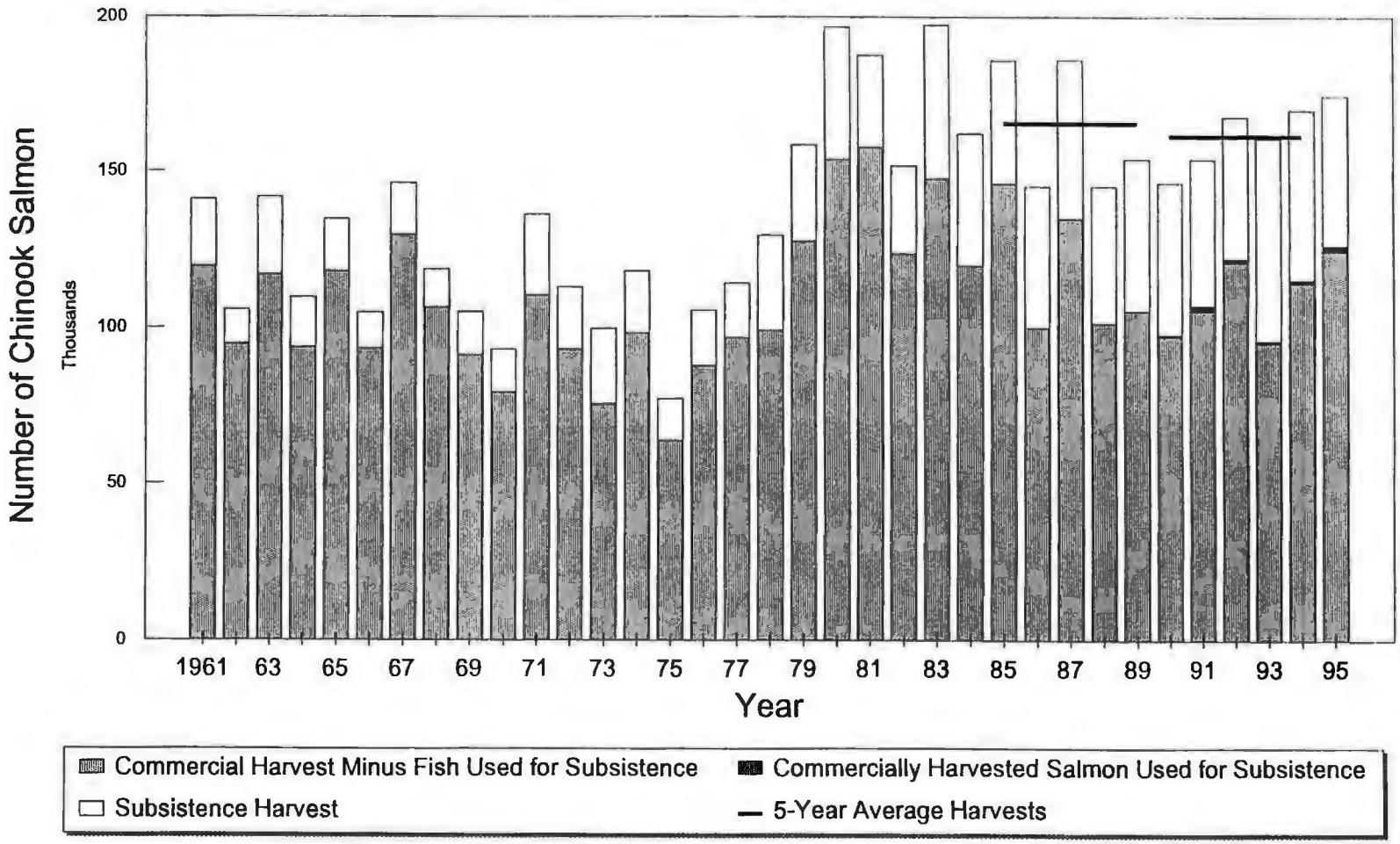

Attachment Figure 3. **Alaskan harvest of chinook salmon, Yukon River, 1961-1995. The 1995 harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time. Horizontal lines indicate 5-year average harvests.**

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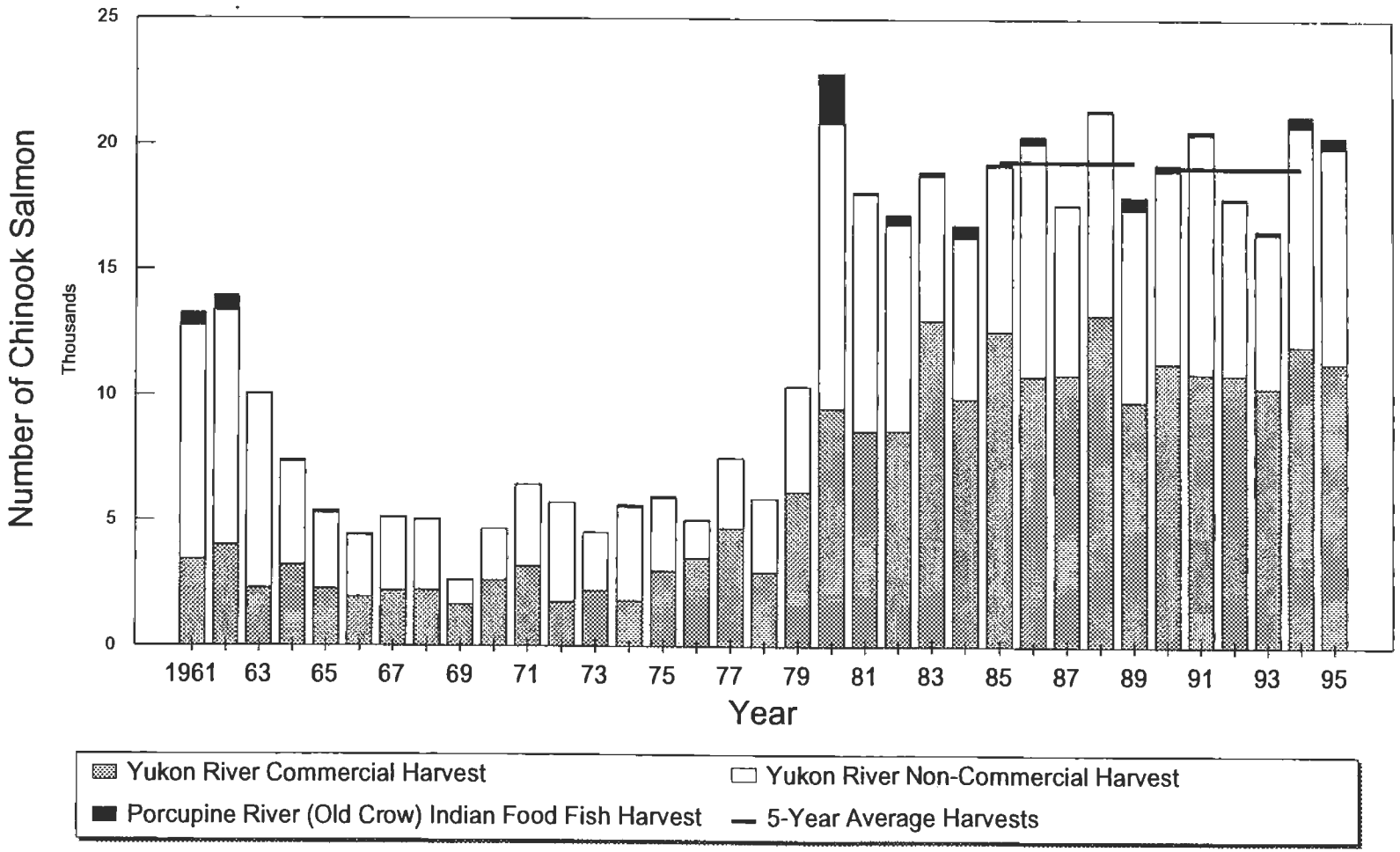
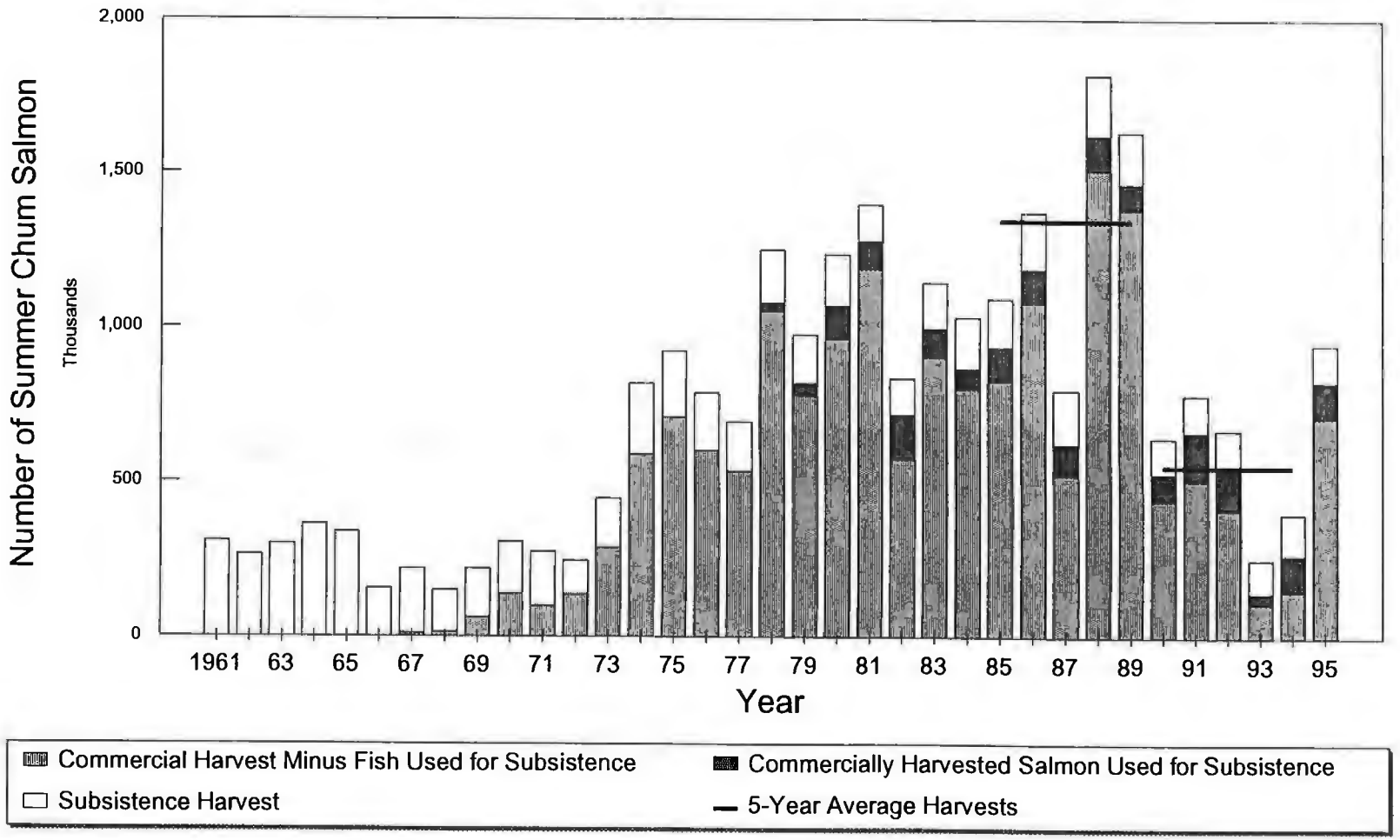
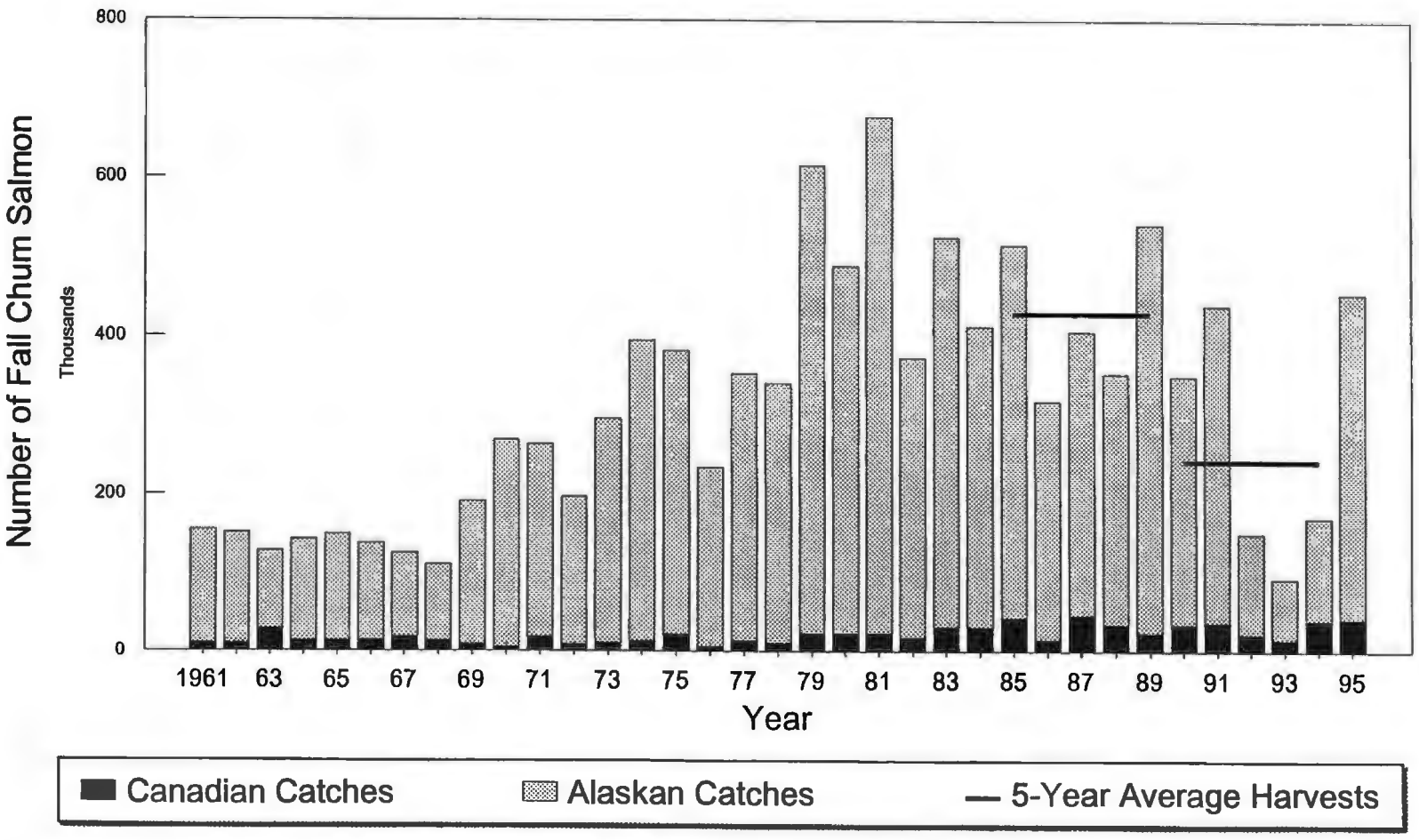


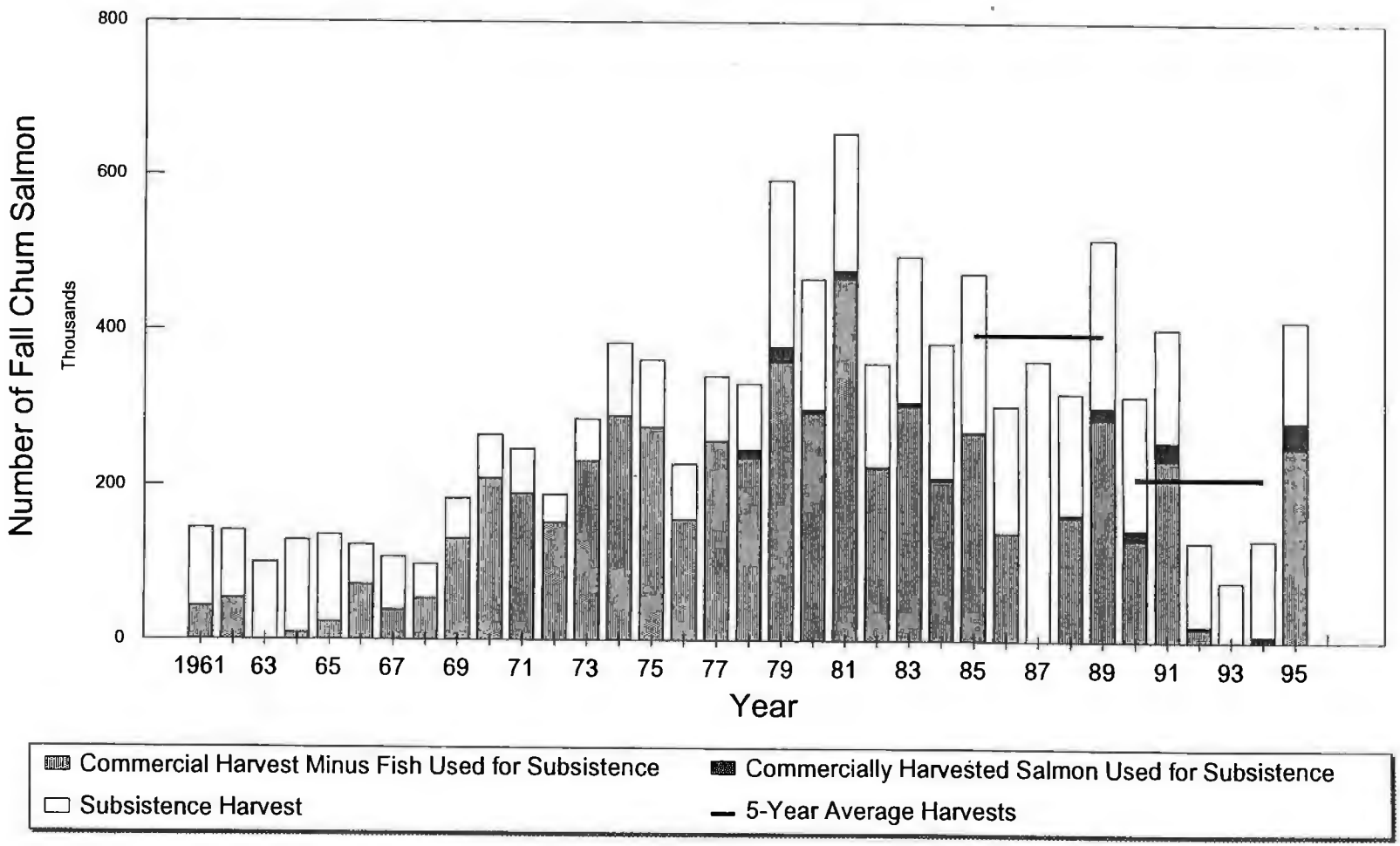
Attachment Figure 4. Canadian harvest of chinook salmon, Yukon River, 1961-1995. Horizontal lines indicate 5-year average harvests.



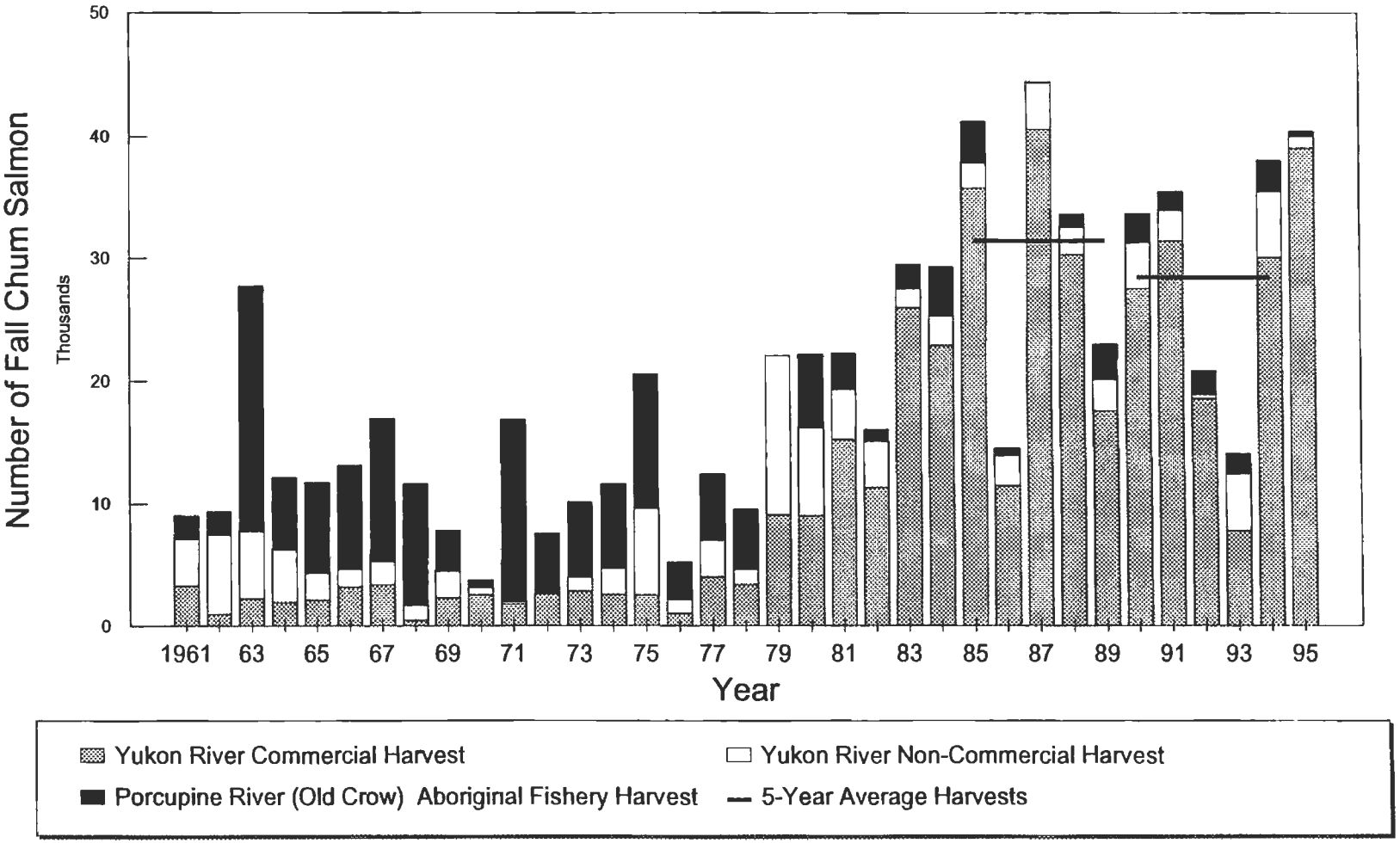
Attachment Figure 5. **Alaskan harvest of summer chum salmon, Yukon River, 1961-1995. The 1995 harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time. Horizontal lines indicate 5-year average harvests.**



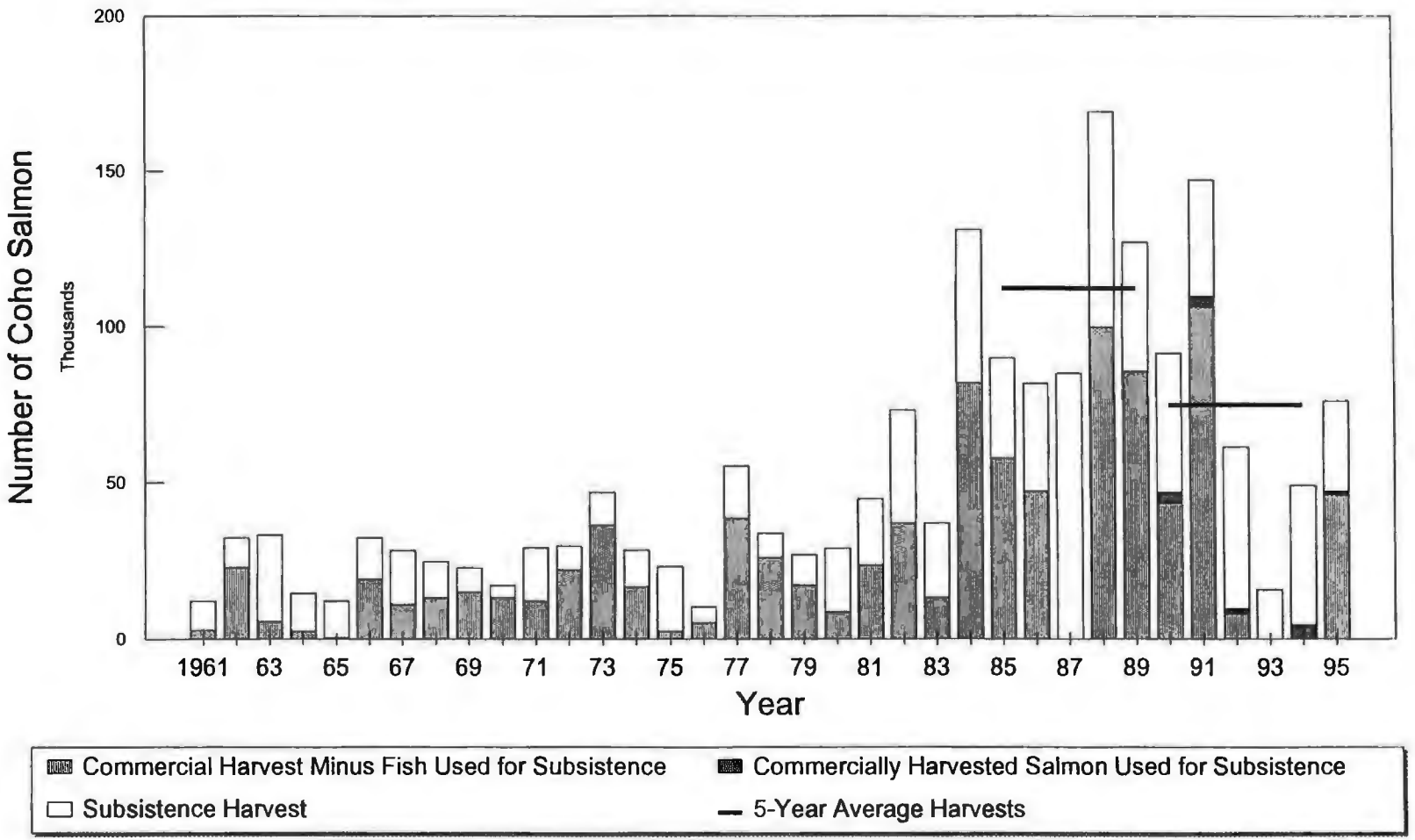
Attachment Figure 6. Total utilization of fall chum salmon, Yukon River, 1961-1995. The 1995 Alaskan harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time. Horizontal lines indicate 5-year average harvests.



Attachment Figure 7. **Alaskan harvest of fall chum salmon, Yukon River, 1961-1995. The 1995 harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time. Horizontal lines indicate 5-year average harvests.**



Attachment Figure 8. Canadian harvest of fall chum salmon, Yukon River, 1961-1995. Horizontal lines indicate 5-year average harvests.



Attachment Figure 9. **Alaskan harvest of coho salmon, Yukon River, 1961-1995. The 1995 harvest includes only commercial catch data. Other Alaskan harvest estimates are unavailable at this time. Horizontal lines indicate 5-year average harvests.**

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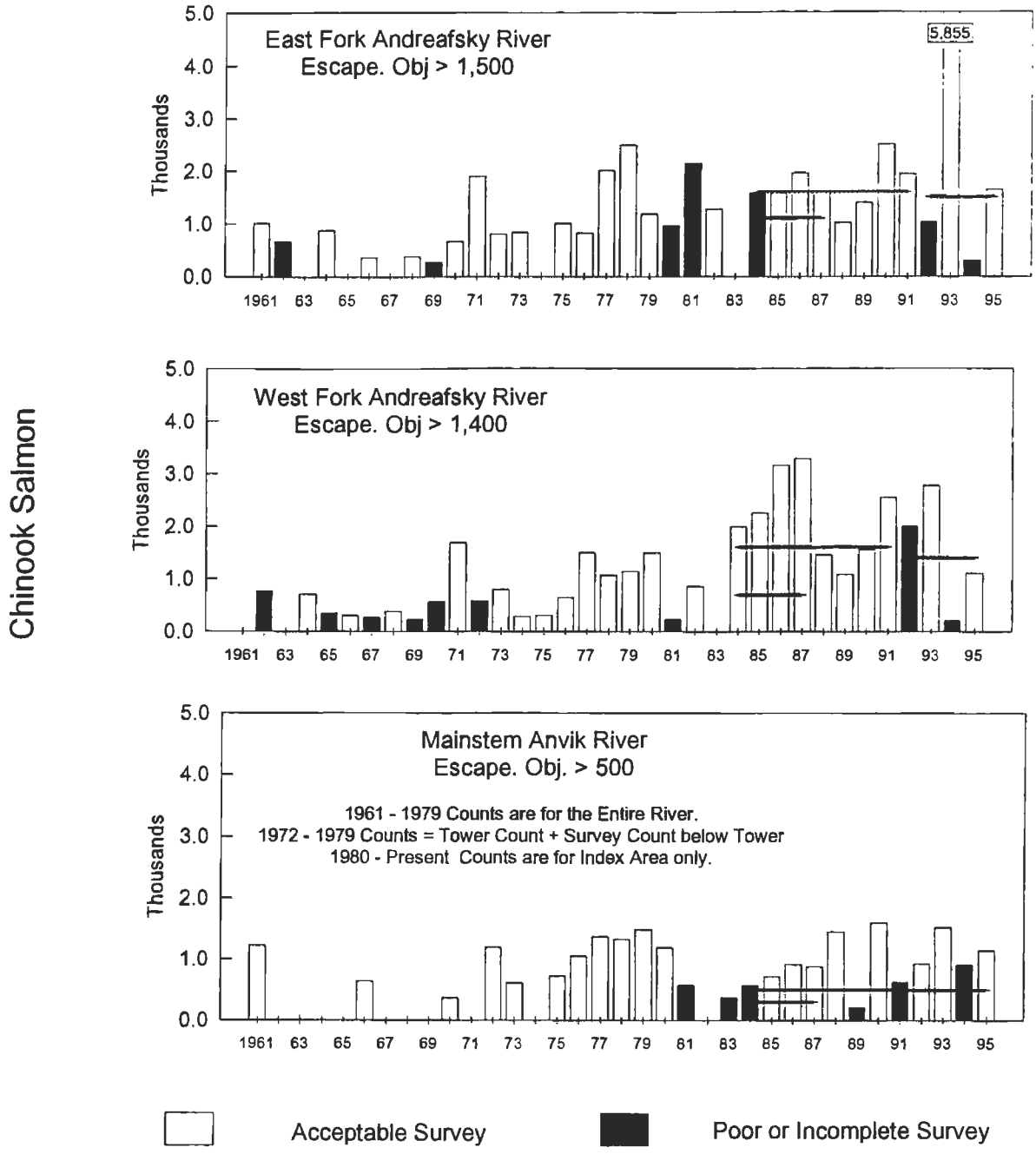

Attachment Figure 10. Chinook salmon escapement counts for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1961-1995. Horizontal lines represent interim escapement goals.

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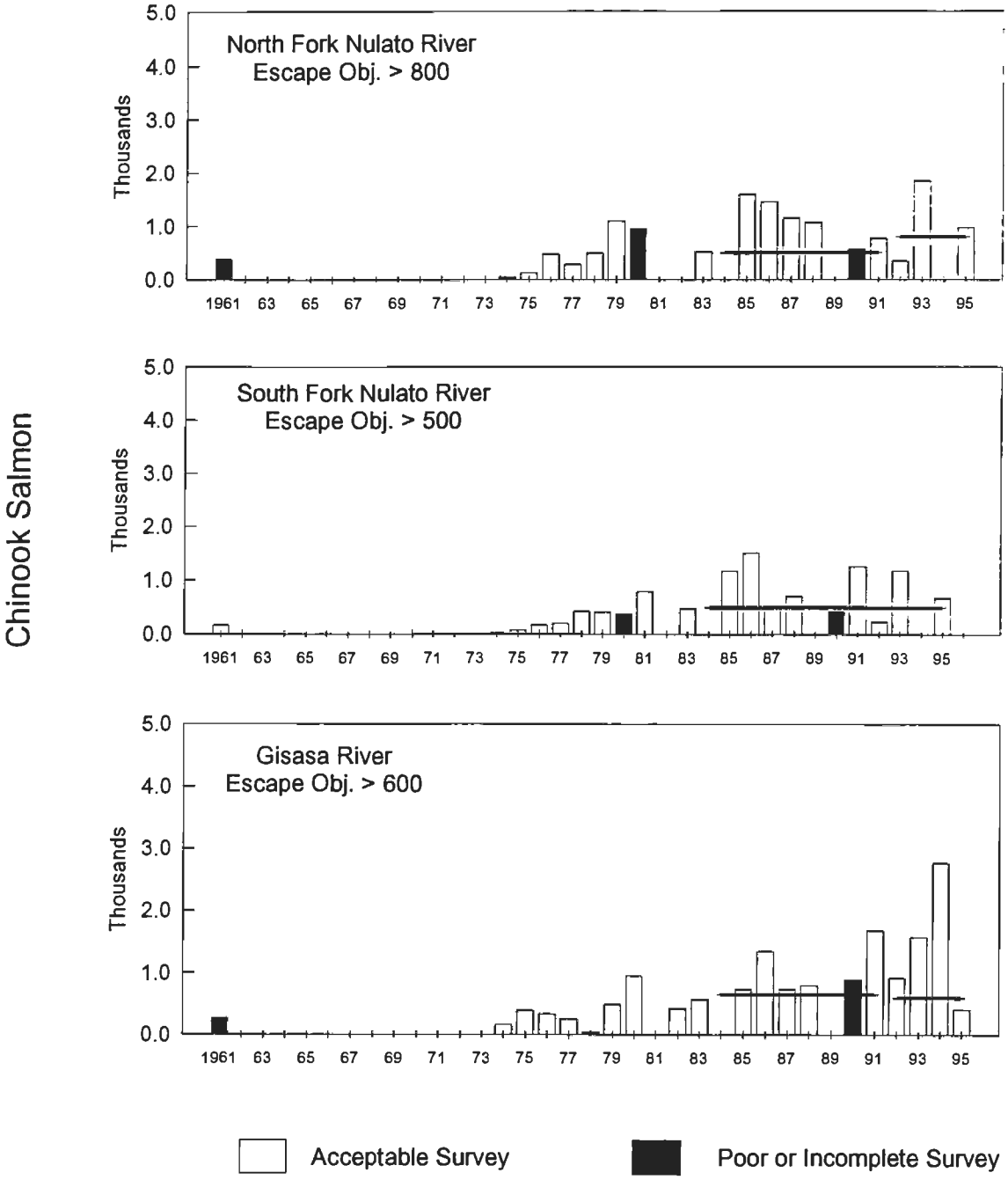

Attachment Figure 10. **(Page 2 of 4).**

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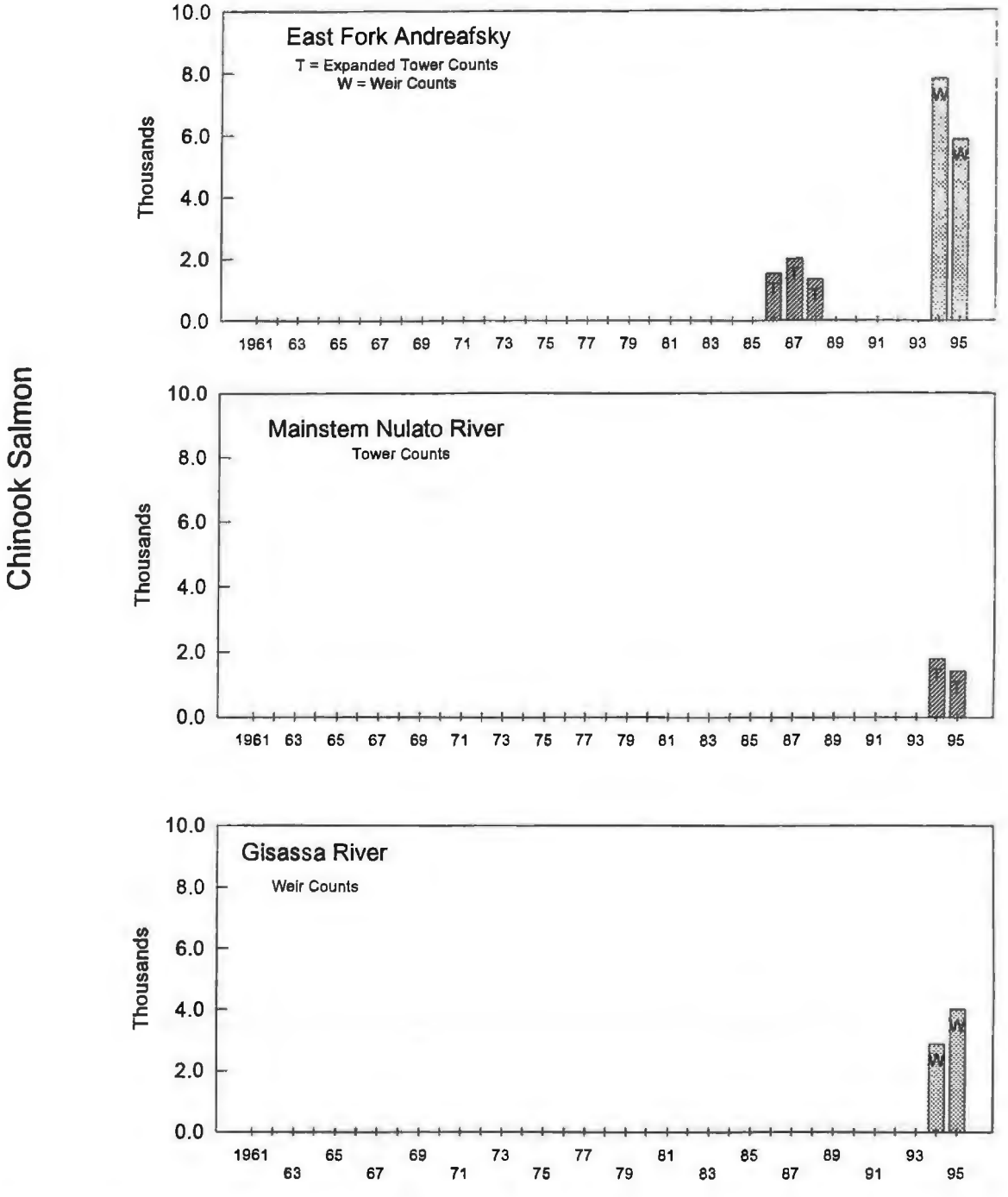

Attachment Figure 10. (Page 3 of 4).

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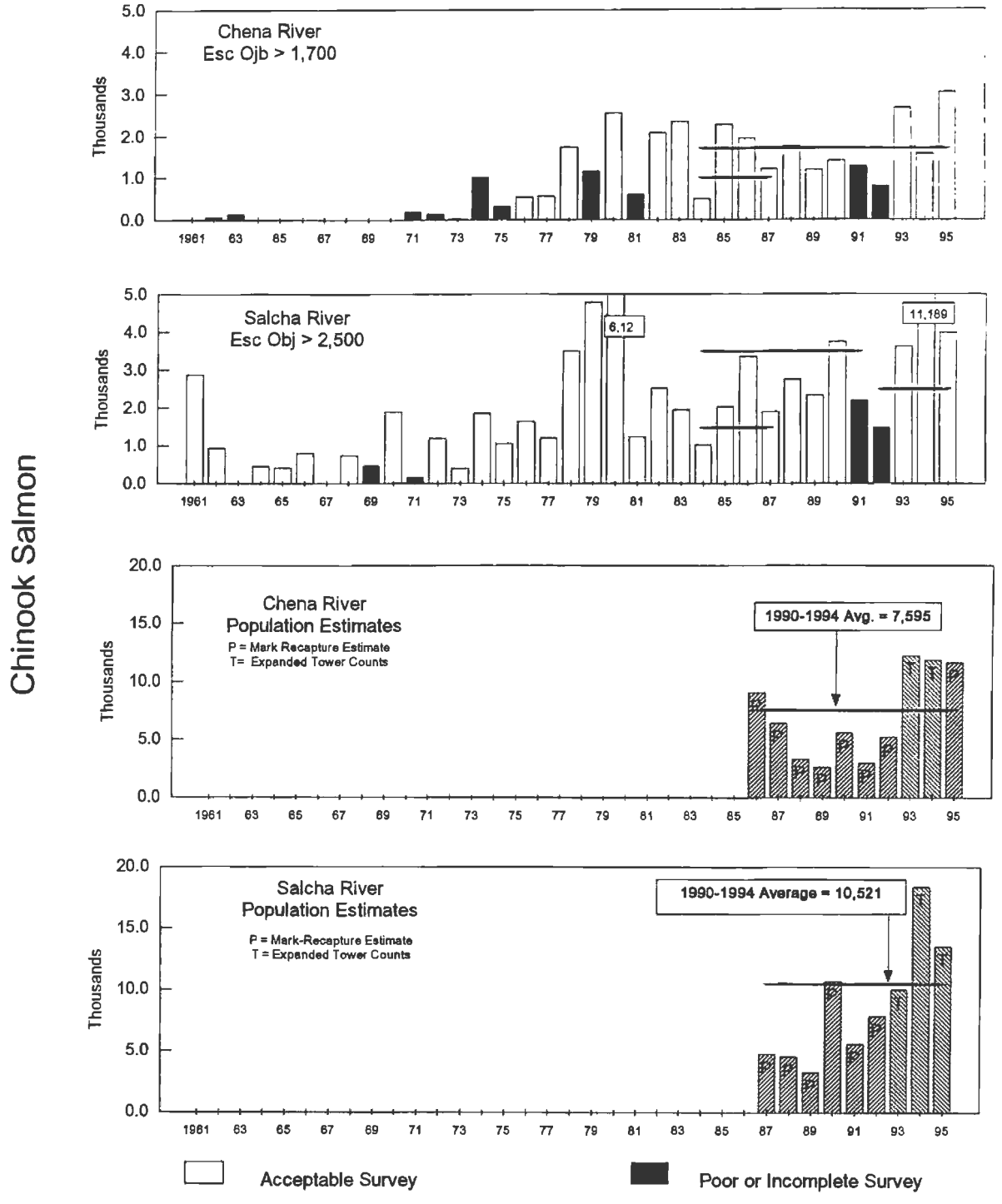

Attachment Figure 10. (p 4 of 4).

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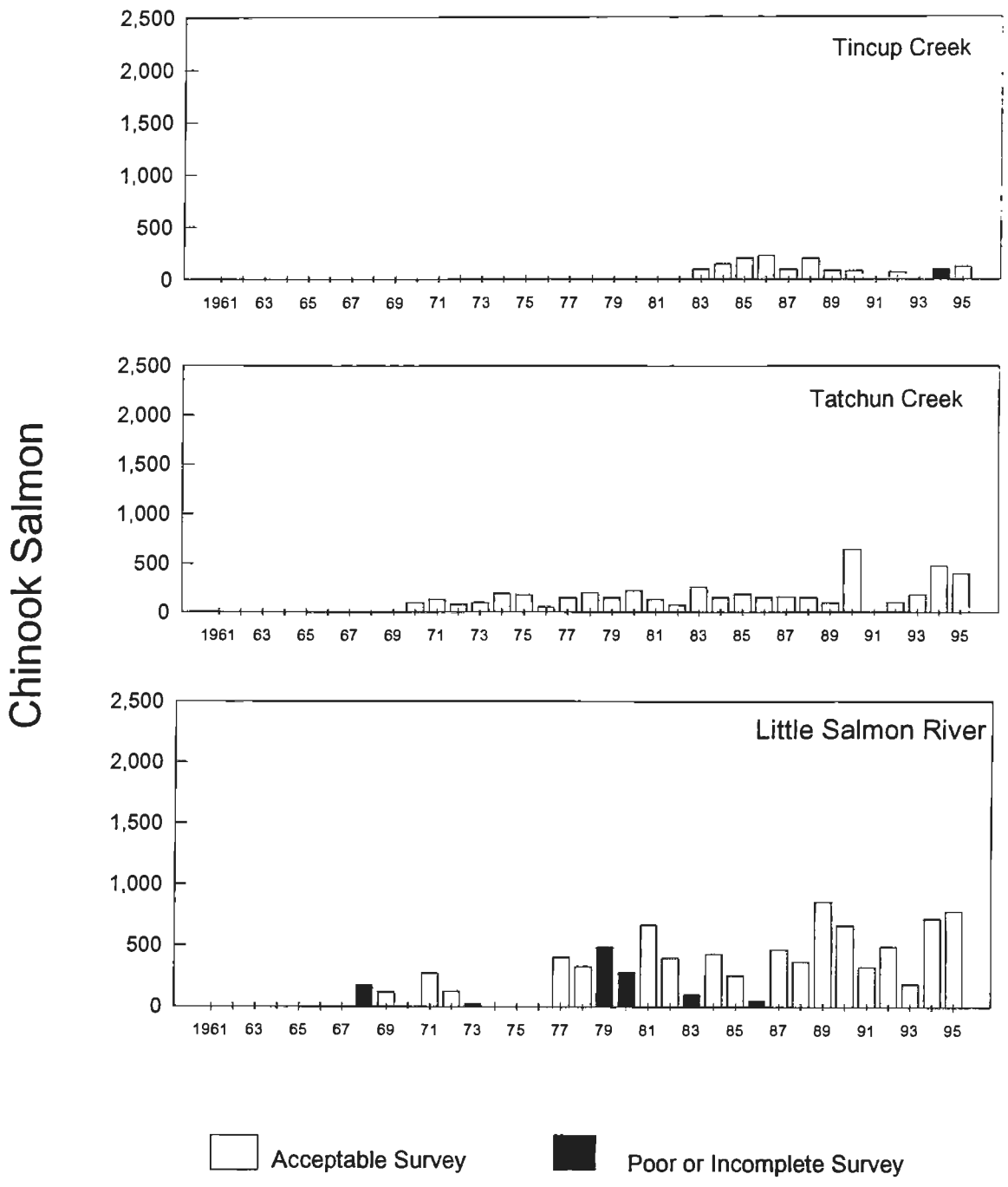

Attachment Figure 11. **Chinook salmon escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1961-1995.**

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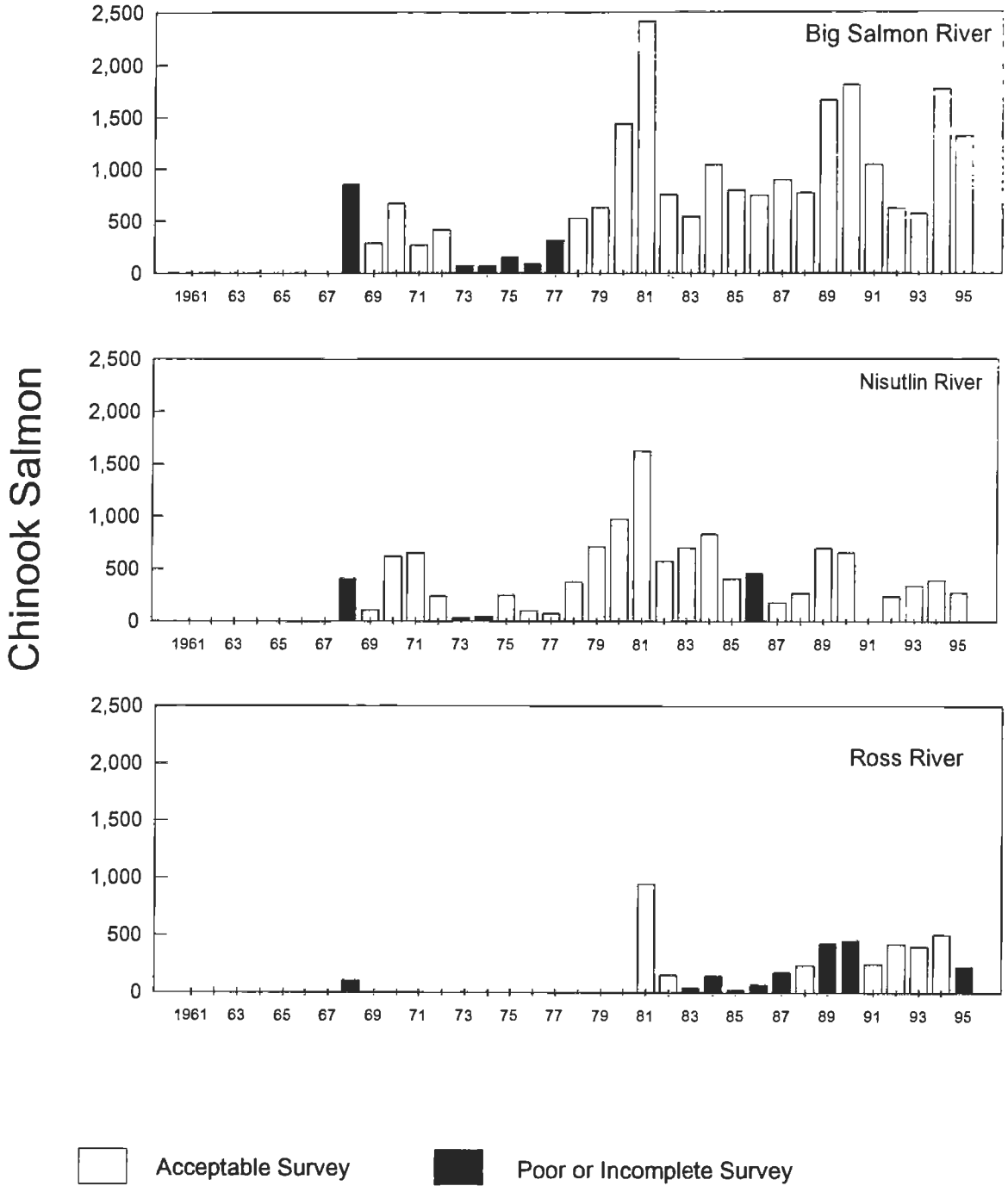

Attachment Figure 11. (page 2 of 3).

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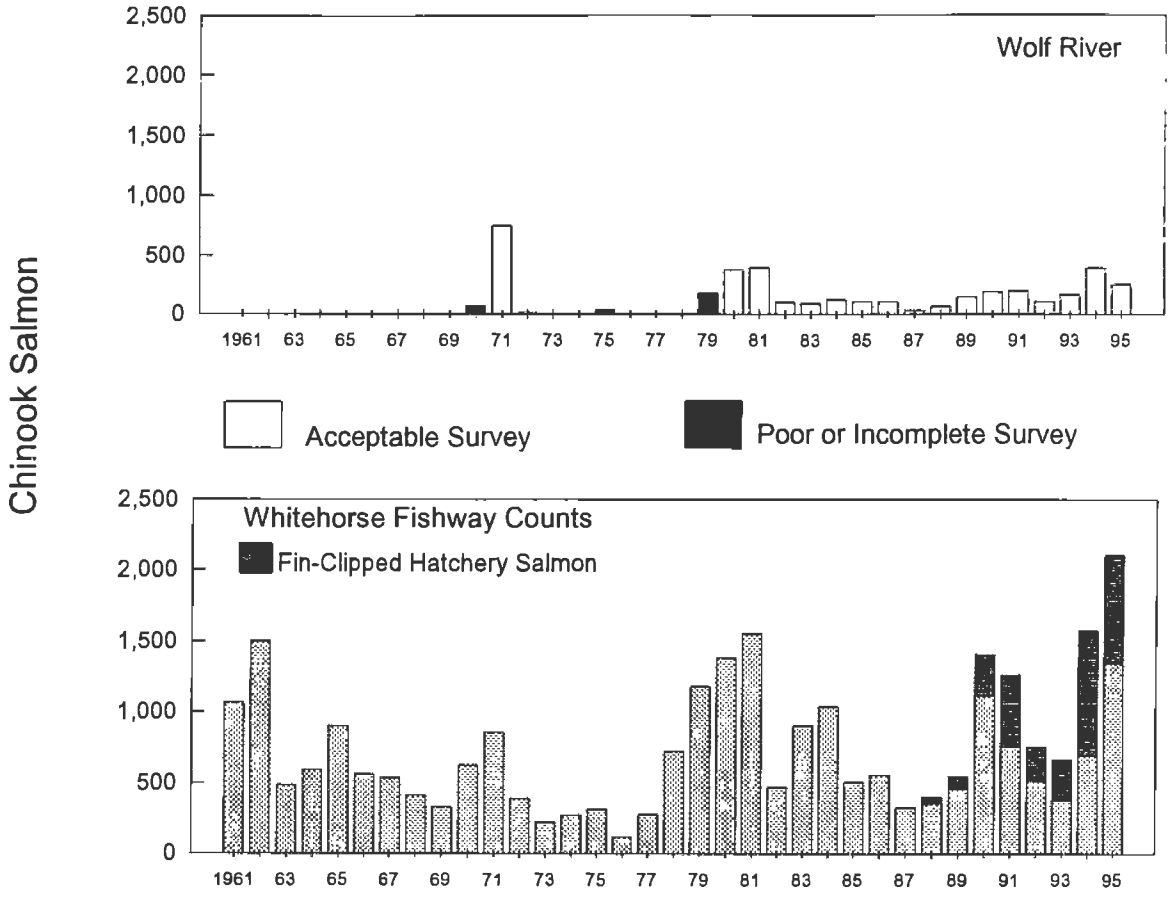

Attachment Figure 11. **(page 3 of 3).**

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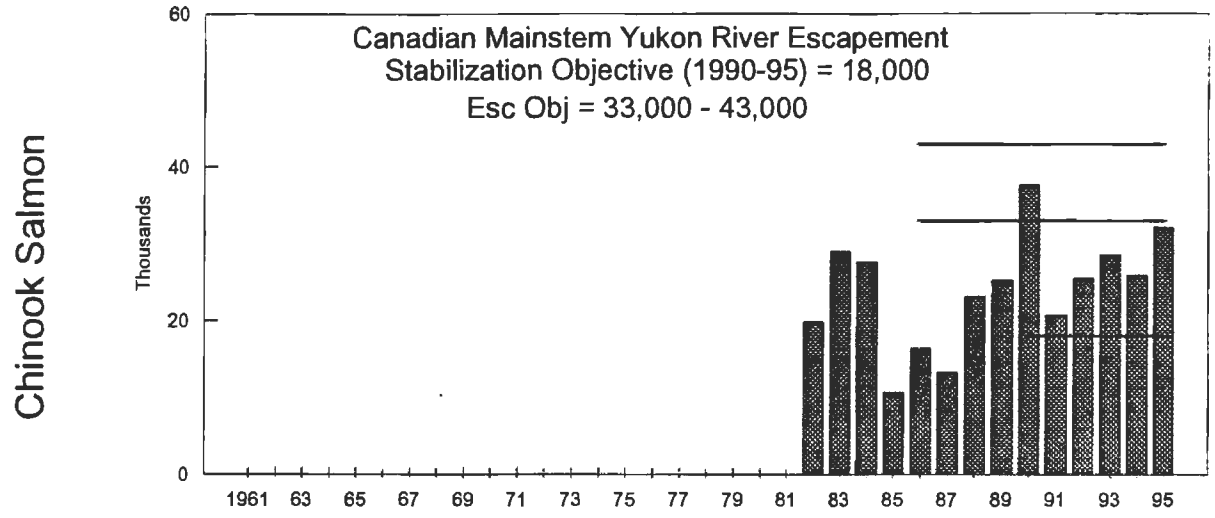

Attachment Figure 12. **Estimated total chinook salmon escapement to the Canadian portion of the mainstem Yukon River, 1982-1995. Horizontal lines represent the interim escapement goal range, 33,000-43,000 salmon, and the stabilization objective, 18,000 salmon.**

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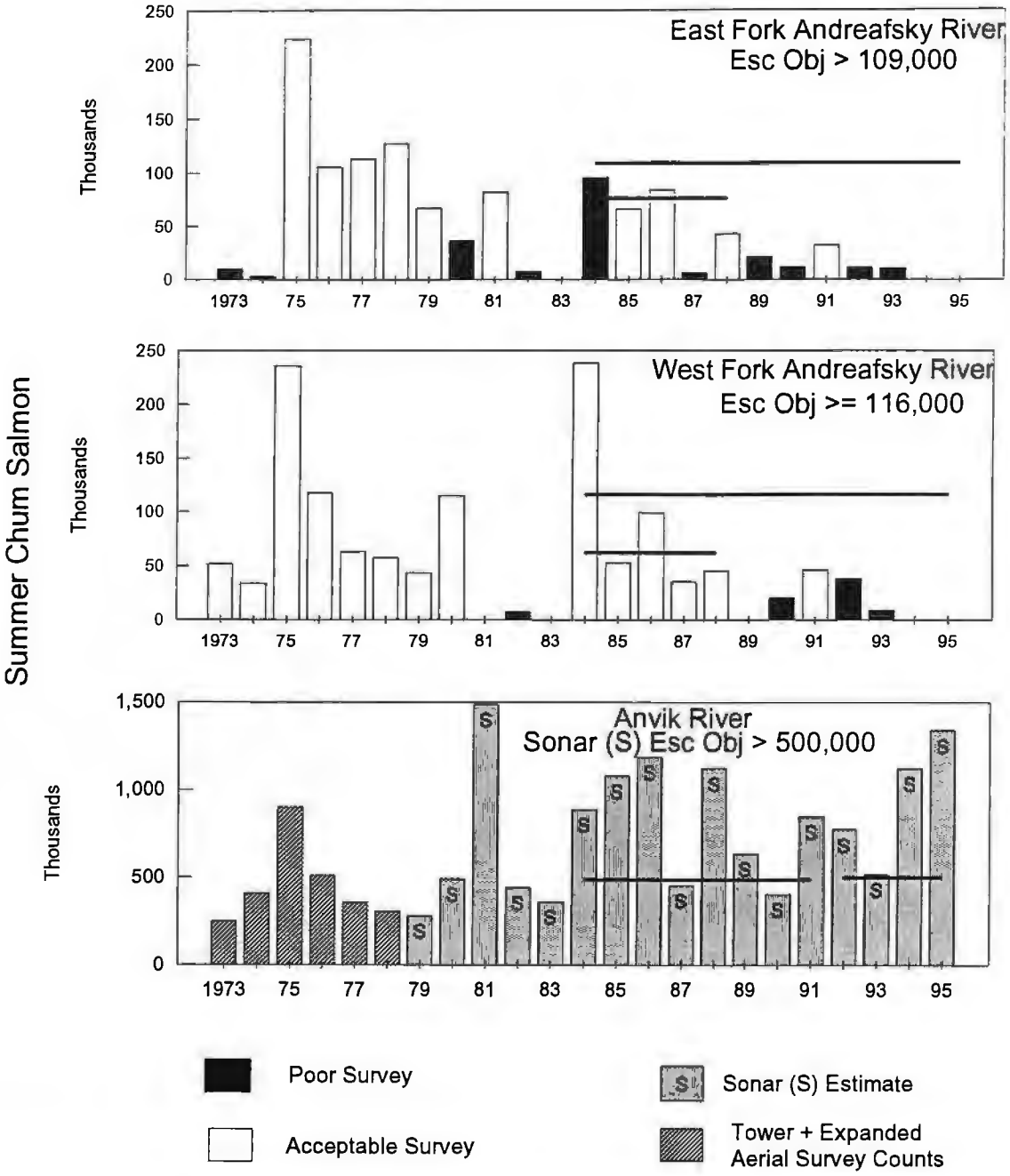

Attachment Figure 13. **Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973-1995. Horizontal lines represent interim escapement objectives. Counts are aerial survey counts of summer chum salmon, unless otherwise noted.**

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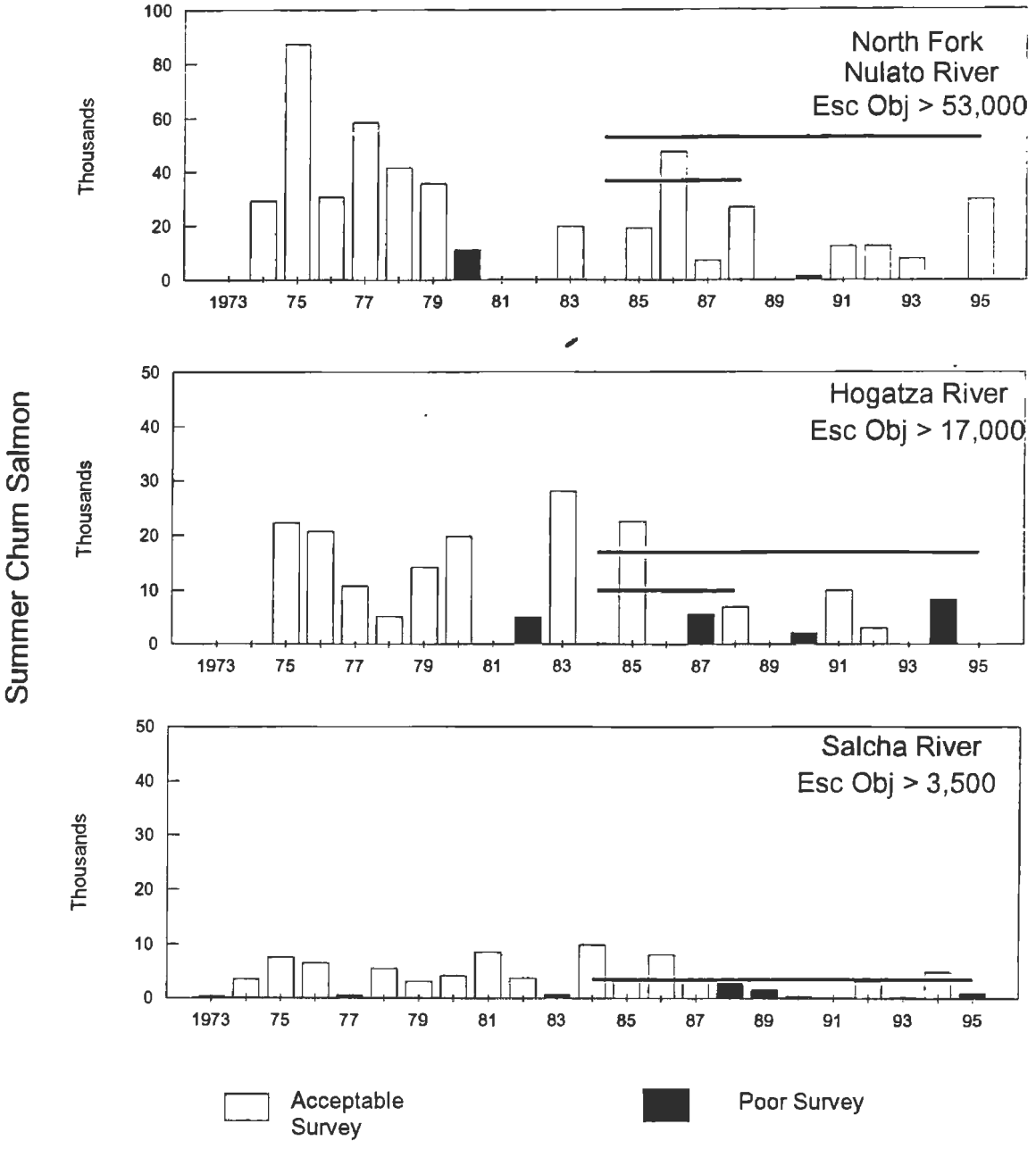

Attachment Figure 13. (page 2 of 2).

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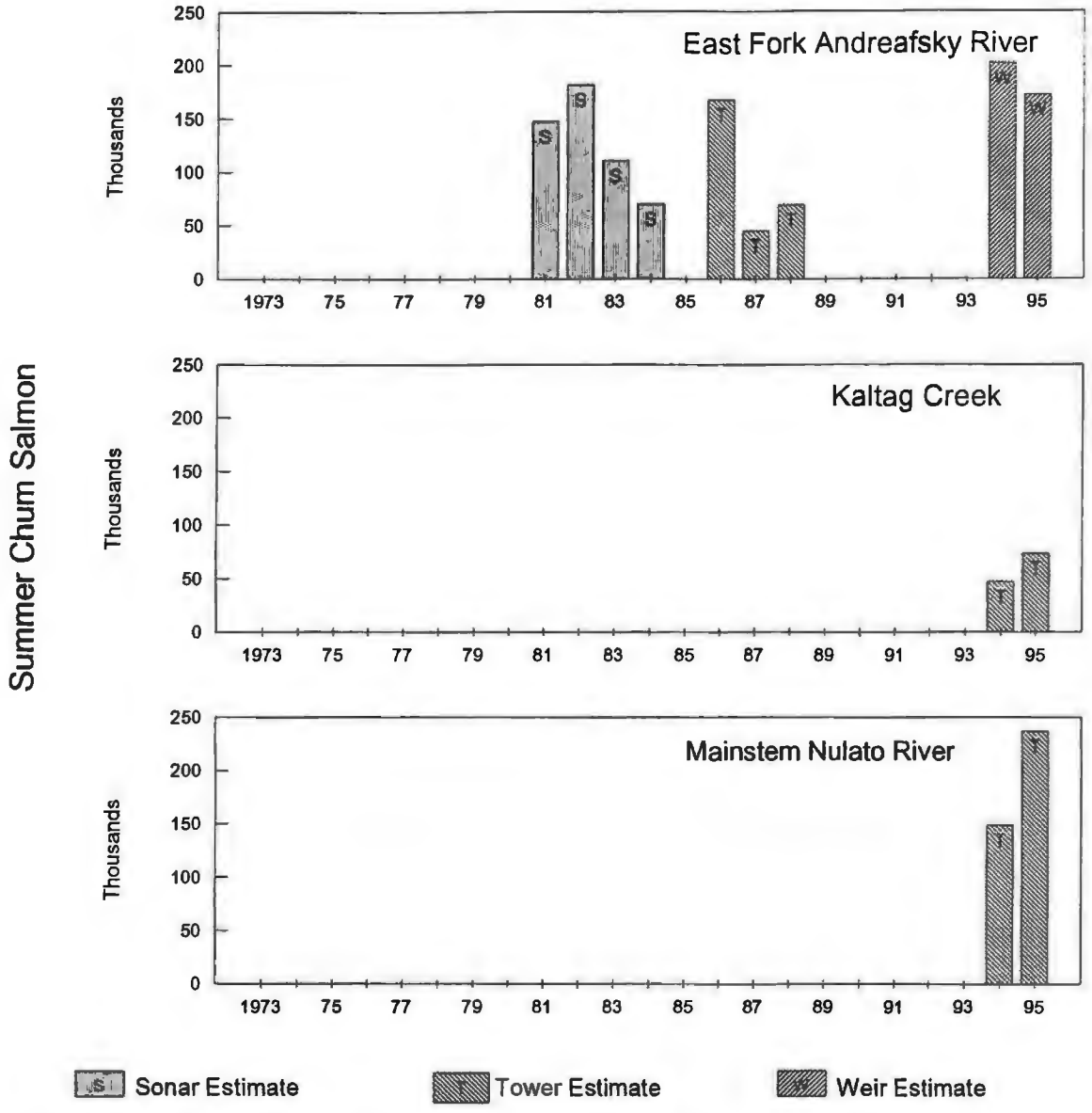

Attachment Figure 14. **Sonar, tower, and weir-based escapement estimates for selected summer chum salmon spawning tributaries within the Alaskan portion of the Yukon River drainage.**

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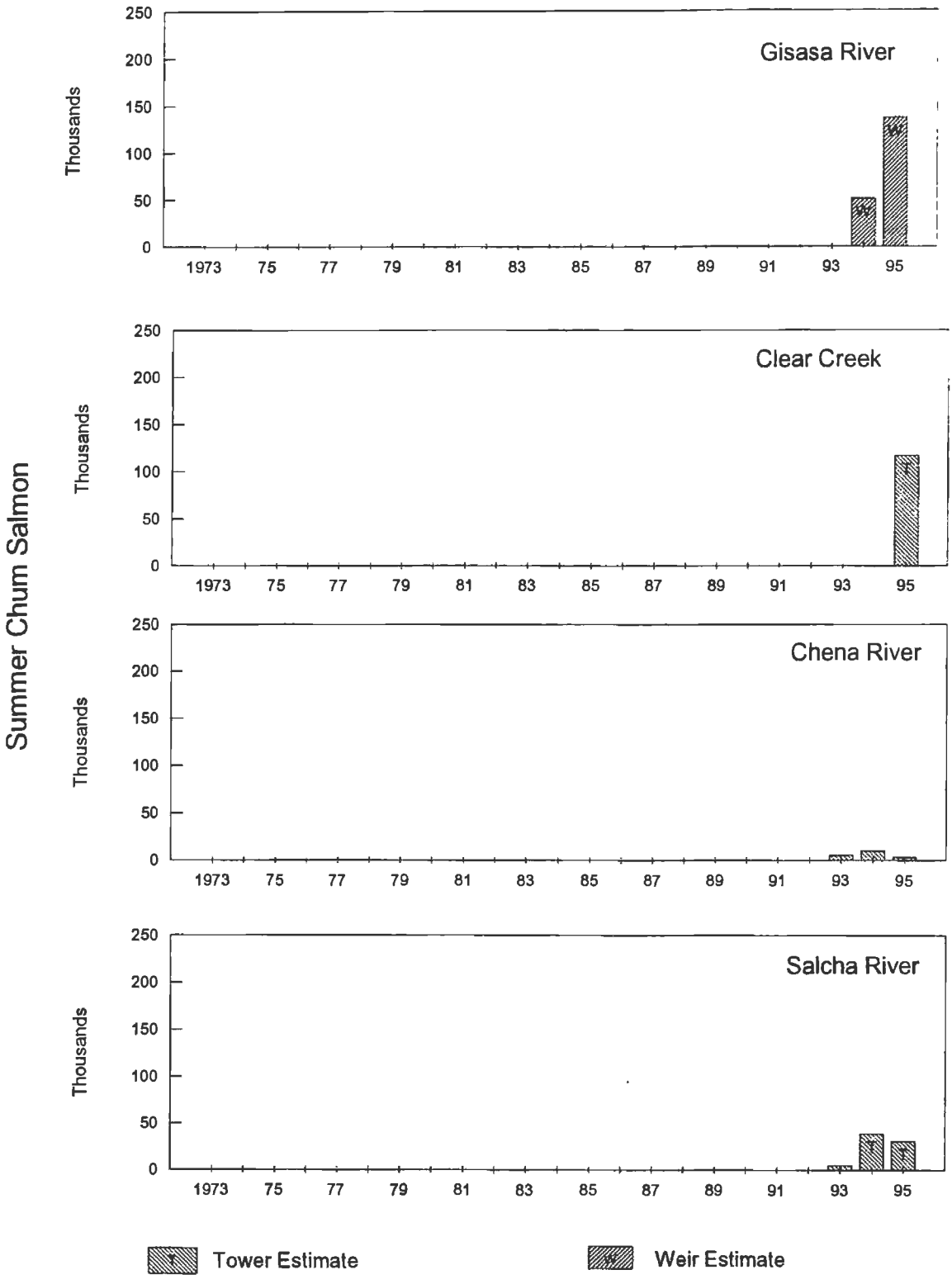

Attachment Figure 14. (p 2 of 2).

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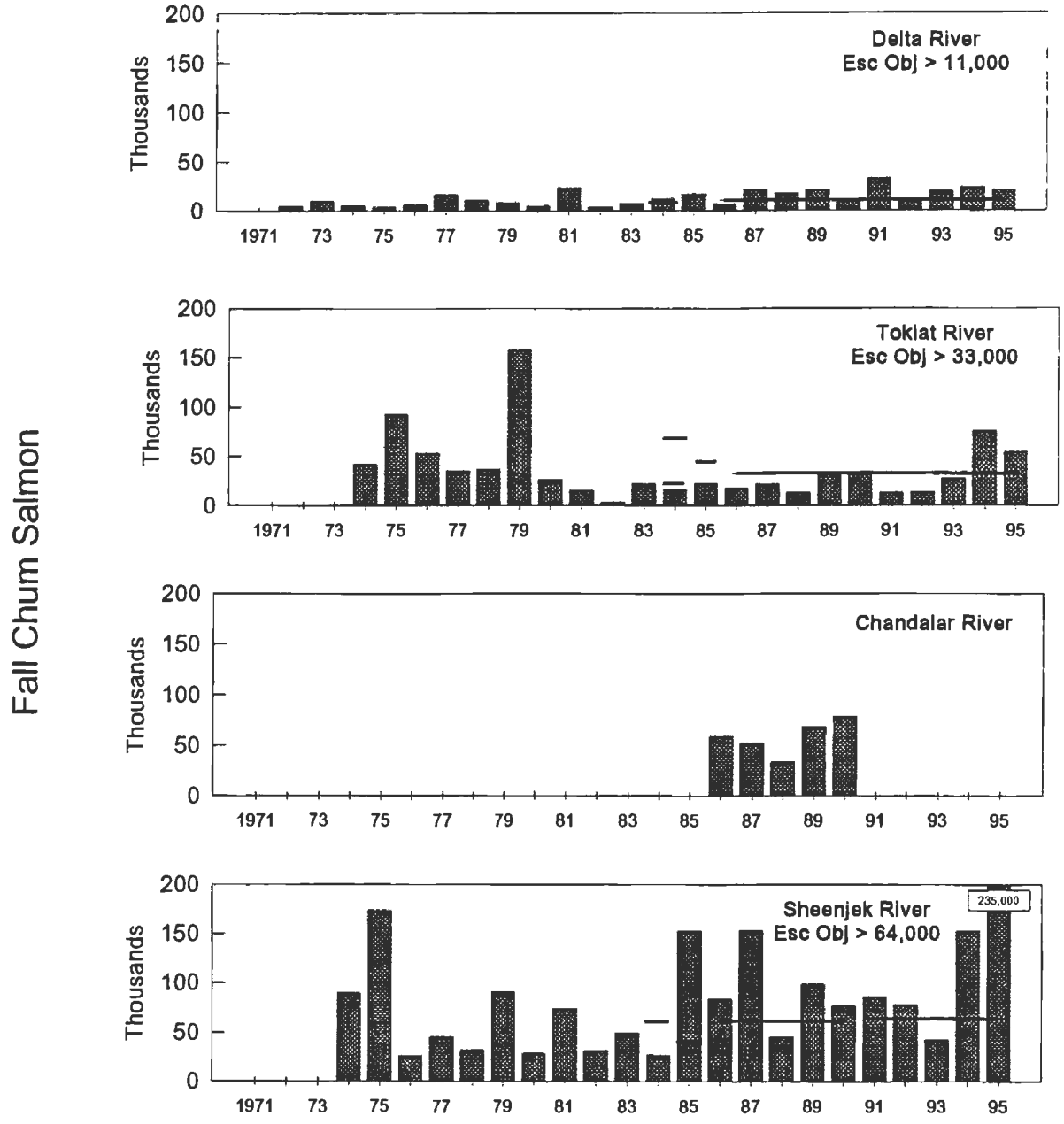
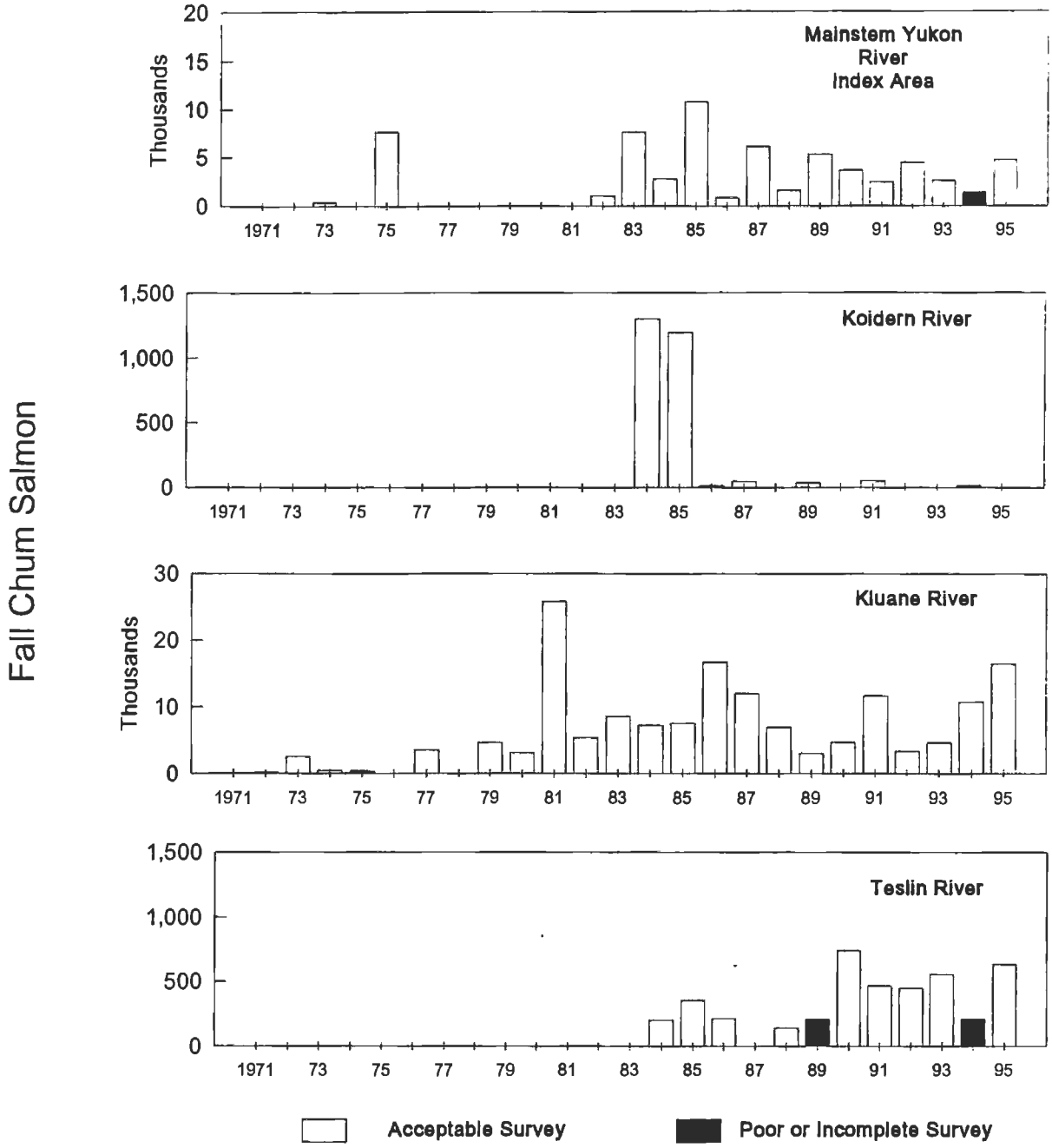
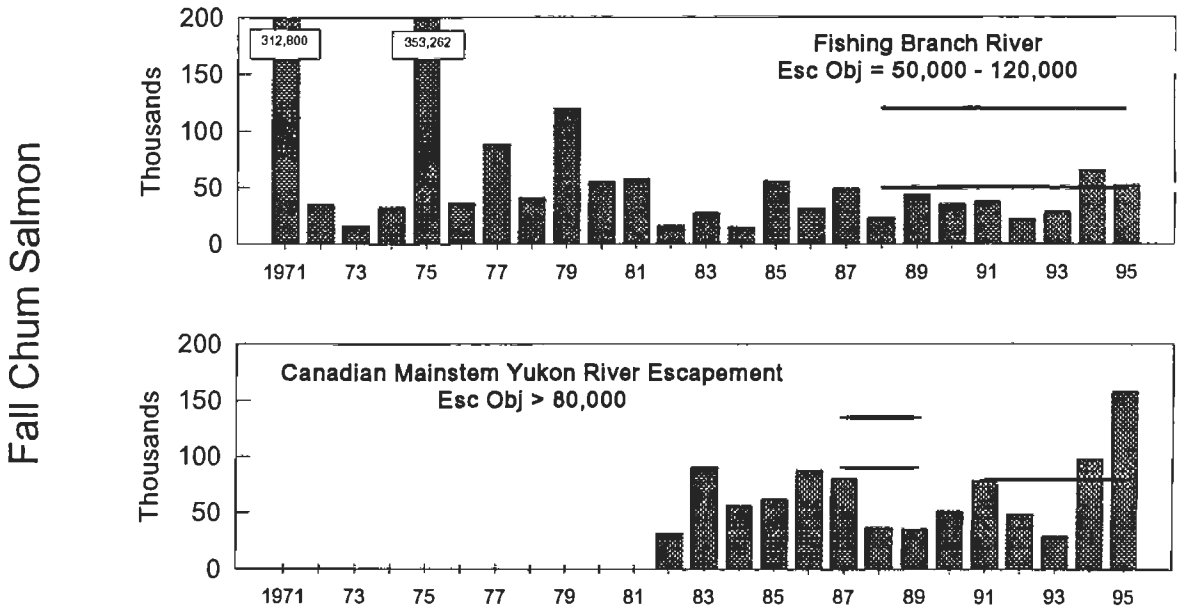


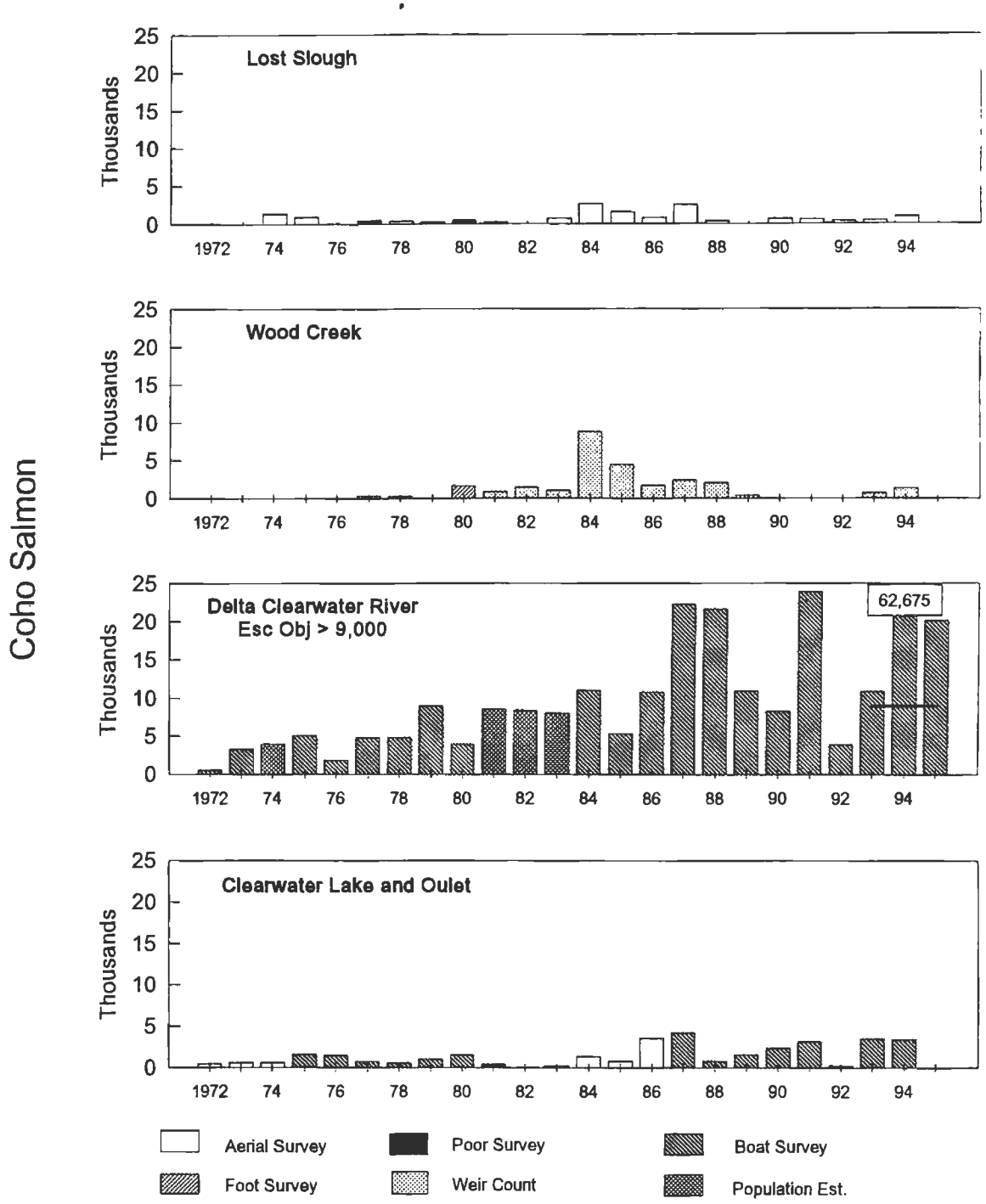
Attachment Figure 15. Fall chum salmon escapement estimates for selected spawning areas in the Alaskan portion of the Yukon River drainage, 1971-1995. Horizontal lines represent interim escapement goals.



Attachment Figure 16. Fall chum salmon aerial survey escapement counts for selected spawning areas in the Canadian portion of the Yukon River drainage, 1971-1995. Note that the y-axis scale is variable.



Attachment Figure 17. Fall chum salmon escapement estimates for spawning areas in the Canadian portion of the Yukon River drainage, 1971-1995. Horizontal lines represent interim escapement goals.



Attachment Figure 18. Coho salmon escapement counts for selected spawning areas in the Yukon River drainage, 1972-1995. Horizontal line indicates the interim escapement goal.

ATTACHMENT III:

DRAFT

YUKON RIVER SALMON RESTORATION AND ENHANCEMENT FUND
INSTRUCTIONS FOR SUBMITTING FUNDING REQUESTS

DRAFT

Yukon River Salmon Restoration and Enhancement Fund
Instructions For Submitting Funding Requests

Requests for funding from the Yukon River Salmon Restoration and Enhancement Fund administered by the Yukon River Panel consist of two components, a Funding Summary Request Form and a detailed work plan. A Funding Summary Request Form and an example of the information required in, and the format of, the work plan are attached to these instructions. Both components must be fully completed and sent to ***(name and address to be determined by the Panel)***.

The priorities for implementing projects with the Fund will be in this order: (a) restoring habitat and wild stocks; (b) enhancing habitat; and (c) enhancing wild stocks. The Yukon River Joint Technical Committee (JTC) will initially evaluate proposals based upon their technical merit. The technical merit evaluation is to include when appropriate, evaluation of the ecological and genetic risks, socioeconomic impacts, and to identify alternative actions. The proposal and the JTC evaluation will then be released for public review and comment. The proposal, along with the JTC evaluation and public comments will then be forwarded to the Panel for review and funding consideration.

The Funding Summary Request Form is a single page describing the proposed activity and is designed to provide an overview of the information fundamental to the request. The following instructions are intended as an aid for completing each section of the short form.

Name and Address. Complete this section in detail so that you can be contacted concerning your funding request. If an agency or organization is making the request, please provide the name of an appropriate individual to contact regarding the request, as well as the name of the agency or organization.

Project Name and Location. Provide an accurate and descriptive name for the proposed project, and indicate the river or area where the project is to occur.

Objectives Summary. Provide a brief summary of the objectives and expected benefits of the proposal.

Proposal Summary. Provide a brief summary of the activity to be funded. Include an indication of the stock(s) of salmon of interest, and the methods by which the objectives are to be accomplished.

Schedule and Costs. Indicate the year work is to begin and if applicable, how many years the work will be conducted. Include critical time frames for project activities. Examples would be needing open water to begin, perhaps frozen ground for access, or calendar concerns for funding by other sources. Similarly, indicate the cost of the proposed project in the first year, as well as the total cost of the project over its intended duration. Please clearly identify total cost of the project (including all sources) and the R&E amount being applied for.

DRAFT

Yukon River Salmon Restoration and Enhancement Fund
Funding Summary Request Form

Name:_____

Organization:_____

Phone Number:_____ Fax Number:_____

Address:_____

_____

_____

_____

Project Name:_____

Project Location:_____

_____

Objectives Summary:_____

_____

_____

_____

Proposal Summary:_____

_____

_____

_____

_____

_____

_____

Other Funding:_____

Project Duration:_____ Total Requested R&E Funds:_____

Start Date:_____ First Year Funding:_____

A project work plan must accompany this form to receive consideration.

DO NOT WRITE IN THIS SPACE

Request Number: _____ Date Received: _____

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Yukon River Salmon Restoration and Enhancement Fund
Project Work Plan
Format and Instructions

Request Number: *Leave Blank*

Title: Provide a brief descriptive title for the project. The title should be identical to the title given on the summary form.

Introduction: The Introduction should clearly present the rationale for funding the proposed project and highlight the expected benefits. Explain how the proposal satisfies the eligibility requirements of the Yukon River Salmon Restoration and Enhancement Fund as outlined in the Interim Yukon River Salmon Agreement. Projects will be funded by the priorities of first restoring habitat and wild stocks, second for enhancing habitat, and third for enhancing wild stocks.

Summarize existing information pertinent to the study, including findings from previous work and local or traditional knowledge. Provide references for this information where possible. For ongoing projects, progress reports from earlier stages of the project must be cited.

Study Area: Describe the area in which the project is to be conducted and the salmon stocks of interest. Attach a 1:250,000 scale map with the location(s) of the proposed work area clearly marked. Identify on the map any information relating to; human development, resident or migratory wildlife, access concerns, easement corridors, and land status.

Licenses and Permits: Describe license and permit applications which will be required, the probable time frame for receipt, and a realistic assessment of being approved or denied.

Objectives: State the specific objectives of the project beginning with the highest priority. The objectives should specifically relate to the objectives of the Yukon River Salmon Restoration and Enhancement Fund. The priorities for implementing projects with the Fund will be in this order: (a) restoring habitat and wild stocks; (b) enhancing habitat; and (c) enhancing wild stocks.

Methods: Describe the methods to be used in the project. All methods should support the stated objectives. Include, if appropriate, descriptions of equipment to be used, statistical designs of data collection procedures, data collection procedures or other field activities, statistical methods by which data will be analyzed, and expected products. The Methods section may be divided into subheadings that represent different phases of the project.

Personnel: This section should describe who will be involved in the project. If applicable, the number and size of field crews, and the number of project leaders and other supervisory personnel are to be listed. The names and credentials of project leaders and other supervisory staff should be included. The role of government, public interest groups, agencies, private sector consultants, or technical staff of organizations should be described.

Schedules: A schedule for all activities should be provided in summary form, including projected dates of field activities, analyses, delivery dates for reports, and any other primary component of the project. Whenever appropriate, the individual responsible for each component should be listed.

Proposed Budget: Funds Requested should be provided for the following categories:

I. Personnel costs, including benefits

II. Operating Costs:
   1. Administration (communications, photo-copying, office supplies, computing supplies, etc.)
   2. Travel (commercial, charter, per diem, mileage, etc.)
   3. Materials, Supplies, and Maintenance (fuel, groceries, sampling and camp equipment, etc.)

III. Capital Equipment (equipment to be purchased which costs in excess of $ *to be determined by Panel*)

IV. Other

The proposed distribution of capital equipment upon project completion should be indicated.

Other Sources of Funding, Assistance, and/or Information: If appropriate, use this section to detail resources necessary to the success of the project, but that are not paid for by the Fund. This includes but is not limited to vessel time, use of volunteers or personnel not funded by the project, data collection activities by other projects, personal equity to be invested in the project. Indicate by similar budget categories as those previously listed, the project costs being funded outside of the R&E Fund.

Literature Cited: If appropriate, include a complete list of all publications cited in the work plan using a standard format.

Consultation and Public Support: Applicants are encouraged to coordinate with any government, public, or other parties to solicit support for the proposed project. All such information should be held by the applicant until the proposal becomes available for public comment.