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**SALMON FISHERIES IN
THE YUKON RIVER, ALASKA 1991**

A Report to the Alaska Board of Fisheries

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Alaska Department of Fish and Game
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1.0 INTRODUCTION

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

Five species of Pacific salmon occur in the Yukon River, with chum salmon being the most abundant. The chum salmon return is made up of an early (summer chum salmon) run and a later (fall chum salmon) run. Pink salmon are abundant only in even-numbered years (i.e., 1988, 1990, 1992...). Exploitation of pink salmon in both commercial and subsistence fisheries is very low due to their advanced stage of maturity, availability only in the lower Yukon River, and the presence of other, more desirable species. Sockeye salmon are rare in the drainage. Salmon run timing into the Yukon River is quite variable. Chinook and summer chum salmon generally begin entering the river during late May or early June. The chinook salmon migration has usually passed through the lower river by the first week of July, while summer chum salmon are usually present in the lower river in significant numbers until mid-July. Fall chum salmon generally begin entry into the Yukon River by the middle of July and are present into September. Coho salmon generally begin entering the river during the first week of August with entry continuing into September.

The objective of the department's research and management program is to manage the various salmon runs for sustained yield. However, current management of the Yukon River commercial salmon fishery must be conservative because of: 1) the difficulty in determining run size and timing; 2) the mixed-stock nature of the harvest; 3) increased effort and efficiency of the commercial fleet; 4) allocation concerns; and 5) the need to provide for escapements and subsistence requirements. Since most of the commercial fisheries have expanded in recent years, there is a lack of adequate escapement and return data on which to fully evaluate the effects of increased commercial harvests. Because the Yukon River commercial fisheries harvest mixed stocks, some tributary populations may be under- or over-harvested in relation to their actual abundance.

Numerous research projects are underway, and additional studies are planned should additional funding become available, to obtain the biological information necessary for more precise management of the salmon runs. Current projects operated by the Alaska Department of Fish and Game (ADF&G), United States Fish and Wildlife Service (USFWS), or the Canadian Department of Fisheries and Oceans (DFO) include: 1) chinook and chum salmon stock identification studies using scale pattern analysis (SPA) and electrophoretic techniques (GSI); 2) side-scanning sonar (Sheenjek and Anvik Rivers), fishway (Whitehorse, Canada), or weir

enumeration (Fishing Branch River) to obtain accurate daily and seasonal escapement estimates in important tributaries; 3) main river sonar operation (near Pilot Station) to obtain estimates of total Yukon River salmon abundance; 4) chinook and fall chum salmon mark and recapture programs (Yukon Territory, Salcha, and Chena Rivers) and aerial surveys to estimate and index spawning escapements for all species; and 5) test fisheries in the Yukon River delta area, near Ruby, and within the Tanana River provide in-season run timing and relative abundance information.

2.0 COMMERCIAL FISHERY - ALASKA

Commercial chinook salmon fishing in the Alaskan portion of the Yukon River dates back to 1918, but the multi-species salmon fishery did not become fully developed until mid-1970. During the 1970s, fishing time was liberal with relatively low effort levels. In more recent years, commercial fishing time has been greatly reduced. There are two fishing seasons along the Yukon River: the early or summer season which targets chinook and summer chum salmon, and the late or fall season which targets fall chum salmon with an incidental harvest of coho salmon.

Important regulations for management include guideline harvest ranges (Table 1) and emergency order authority to establish weekly fishing periods and gill net mesh size specifications. The commercial fishing season is opened by emergency order in each district. The lower Yukon commercial fishery is opened (generally 5-15 June) after it has been determined, by monitoring test fishing and subsistence catches, that a sustained migration of chinook salmon is in progress, and that the early portion of the chinook salmon run has passed through the lower river.

A guideline harvest range of 60,000-120,000 chinook salmon has been established for Districts 1 and 2 combined, and a guideline harvest range of 1,800-2,200 chinook salmon has been established for District 3. Individual chinook salmon guideline harvest ranges are in effect for each Upper Yukon Area district or subdistricts with a combined harvest range of 5,550-6,950 fish. Harvests near the midpoint of the guideline harvest ranges should be expected if the run is of average magnitude.

A river-wide guideline harvest range of 400,000-1,200,000 summer chum salmon was established by the Board of Fisheries in February 1990 (Table 1). This overall guideline was further distributed by district and subdistrict based on the previous 15-year-average harvests. Management of the summer chum salmon fishery in the Lower Yukon Area is greatly dependent on actions taken for chinook salmon because of the overlapping run timing of both species. Prior to the 1985 season, mesh size restrictions (six-inch maximum mesh size) were implemented to direct the harvest toward summer chum salmon only after most of the chinook salmon harvest goal had been achieved. Since 1985, during years of high summer chum salmon abundance and early run timing, restricted mesh size periods have been implemented prior to or between chinook salmon directed fishing periods (unrestricted mesh size) to harvest summer chum salmon.

The largest summer chum salmon harvest in District 4 occurs in Subdistrict 4-A.

Subdistrict 4-A, summer chum salmon roe is the primary product. Relatively poor flesh quality and high costs of transportation have combined to minimize the export of summer chum salmon from this district. However, Subdistrict 4-A summer chum salmon produce a very high quality caviar. The guideline harvest range for Subdistrict 4-A is 113,000-338,000 summer chum salmon, or the equivalent roe poundage of 61,000-183,000 pounds of roe, or some combination of fish and pounds of roe. By regulation, no more than 183,000 pounds of summer chum roe may be sold annually. However, if the roe cap is reached in Subdistrict 4-A, regulation allows the sale of fish in-the-round only. In an effort to improve harvest estimates, all salmon caught by CFEC permit holders during commercial periods in Subdistrict 4-A must be reported on fish tickets. In the remainder of District 4, the Subdistrict 4-B and 4-C guideline harvest range is 16,000 to 47,000 summer chum salmon.

Fall chum salmon harvest levels are governed by guideline harvest ranges (Table 1) in the Lower Yukon Area of 60,000-220,000 fish and in the Upper Yukon Area of 12,750-100,500 fish. No guideline harvest range for coho salmon has been established for the Lower Yukon Area. In the Upper Yukon Area, guideline harvest ranges include coho and fall chum salmon combined. In February 1990, these guideline harvest ranges were increased by the Board of Fisheries from the previous levels in effect since 1986. Coho salmon harvests are dependent on management actions taken for fall chum salmon. In all districts, fishing frequency and duration is dependent on the department's perception of the strength of the fall chum salmon return.

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

Legal commercial fishing gear consists of set and drift gillnets in the Lower Yukon Area, and fish wheels and set gillnets in the Upper Yukon Area. Separate limited entry permits have been issued for the upper and lower Yukon areas, and are not transferable between areas. Open skiffs powered by outboard motors are typically used to operate fishing gear and to deliver fish to tenders or buying stations. There are 716 limited entry permit holders in the Lower Yukon Area, and 235 limited entry permit holders in the Upper Yukon Area.

2.1 Season Summary, 1991

Preliminary commercial sales totaled 782,100 salmon and 169,499 pounds of unprocessed salmon roe for the Alaskan portion of the Yukon River drainage in 1991. This harvest was composed of 101,240 chinook, 346,828 summer chum, 230,852 fall chum, and 103,180 coho salmon sold in the round (Table 2). Additionally,

roe sales by species totaled 3,829 pounds for chinook, 141,976 pounds for summer chum, 19,395 pounds for fall chum, and 4,299 pounds for coho salmon (Table 2). The department estimates the number of fish harvested to produce salmon roe sold in determining the total commercial salmon harvest. The total estimated salmon harvest includes the salmon estimated to produce roe sold and salmon sold in the round. The 1991 chinook salmon catch was 4 percent below the 1986 through 1990 five year average (Table 3), summer chum salmon, 38 percent below average (Table 4), fall chum salmon, 82 percent above average (Table 5), and coho salmon, 92 percent above average (Table 6): Roe sales were 32 percent below the 1986-90 average for summer chum salmon. Note that the five year average for fall chum salmon includes 1987 when the commercial fishery was closed. Roe sales data were not available by species for chinook and coho salmon prior to 1990; therefore, historical comparisons are not yet meaningful.

Yukon River fishermen in Alaska received an estimated \$9.6 million for their catch, approximately 9 percent above the recent 5-year average. Ten buyer-processors operated in the Lower Yukon Area, and 11 buyer-processors and 15 catcher-sellers operated in the Upper Yukon Area of Alaska. Limited entry permits are not transferable between the upper and lower Yukon areas.

Lower Yukon fishermen received an average price per pound of \$3.70 for chinook salmon, \$0.36 for summer chum salmon, \$0.34 for fall chum salmon, and \$0.44 for coho salmon. Exvessel value of the Lower Yukon Area fishery was \$8.7 million. The average income for the 680 Lower Yukon Area fishermen (95 percent of the total permit holders issued for the area) that participated in the 1991 fishery was \$12,700.

Upper Yukon commercial fishermen received an estimated average price per pound of \$0.70 for chinook salmon, \$2.92 for chinook salmon roe, \$0.18 for summer chum salmon, \$4.21 for summer chum salmon roe, \$0.22 for fall chum salmon, \$3.56 for fall chum salmon roe, \$0.30 for coho salmon, and \$2.50 for coho salmon roe. The Upper Yukon Area's value of the fishery for the fishermen was \$.9 million. The average income for the 146 upper Yukon fishermen (62 percent of the total permit holders issued for the area) who participated in the 1991 fishery was \$6,130.

2.2 Chinook Salmon

According to historical test fishing and sonar data, chinook salmon migratory timing into the lower river appeared to be about average as compared with other years. Upper river test fishery and escapement projects indicated that run timing was earlier than had been determined by the lower river indicators. The first chinook salmon catches were reported on 29 May, near Emmonak, by a subsistence fisherman and the department's test fish project. Test fishing data indicated 50 percent of the chinook salmon return had entered the lower river by 19 June. The estimated sonar passage of 77,000 chinook salmon at Pilot Station was the lowest since the project was initiated in 1986. However, offshore fish movement and sonar beam attenuation are two factors which may have affected accuracy of the passage estimate.

The Lower Yukon Area commercial salmon fishing season was opened by emergency order after approximately eight to ten days of increasing subsistence and test-net catches in the lower Yukon River. The chinook salmon directed fishery was

opened on a staggered basis: 13 June in District 1, 16 June in District 2, and 19 June in District 3. All subsequent fishing periods were established by emergency order. The first commercial fishing periods in Districts 1 and 2 were 12 hours in duration. Because of continued strong catches in the test and commercial fisheries, subsequent fishing periods remained at 12 hours in duration.

The total District 1 and 2 chinook salmon harvest was 91,960 fish, 2 percent above the midpoint of the guideline harvest range and 6 percent below the 1986-1990 average harvest. Due to the average abundance of chinook salmon and the below average abundance of summer chum salmon, unrestricted mesh size gillnets were allowed in five of the six summer season fishing periods in District 1, and five of the seven summer season fishing periods in District 2.

The average weight of chinook salmon in the lower river commercial catch was 20.4 pounds. The chinook salmon return was unusual in regard to the large age-5 contribution. This followed one year after a large age-4 component in 1990.

In District 3, two unrestricted mesh size fishing periods (one 18-hour and one 6-hour) were allowed. The initial delay in opening District 3 allowed the first segment of the chinook salmon return to pass through the district prior to the commercial fishery. A total of 2,344 chinook salmon were harvested in District 3, which was 144 fish above the upper end of the guideline harvest range of 2,200 fish, and 35 percent above the recent five-year-average.

In Subdistrict 4-A, the chinook salmon harvest is largely incidental to the directed summer chum salmon fishery. Virtually all of the District 4 chinook salmon commercial harvest is taken in Subdistricts 4-B and 4-C (Figure 1). The District 4 chinook salmon harvest was approximately 2,000 fish after the second fishing period which ended on 2 July. Since the guideline harvest range for District 4 is 2,250-2,850 chinook salmon, the next commercial opening was delayed until 7 July, when summer chum salmon would be more numerous and chinook salmon less abundant. This strategy slowed down the chinook salmon harvest and allowed fishermen the opportunity to harvest the targeted commercial harvest of the low end of the summer chum salmon guideline harvest range. The 1991 District 4 sale was 2,440 chinook salmon and 2,222 pounds of chinook salmon roe, for an estimated 2,996 chinook salmon commercial harvest. This harvest is 5 percent above the upper end of the District 4 guideline harvest range, and 30 percent above the recent five year average.

In District 5, chinook salmon is the primary species of commercial value during the early season. Summer chum salmon do not contribute substantially to the commercial harvest because of their lower availability and relatively poor flesh quality, and the high transportation costs to the market. Commercial fishing periods were scheduled when the bulk of the chinook salmon run was in the district in order to reduce the impact on individual stocks. Two fishing periods (one 48-hour and one 18-hour) occurred in Subdistricts 5-A, 5-B, and 5-C for a total harvest of 3,256 chinook salmon and 62 pounds of roe, for an estimated commercial harvest of 3,272 chinook salmon. This harvest was 15 percent above the upper end of the guideline harvest range of 2,850 fish. One 48-hour fishing period was allowed in Subdistrict 5-D for a harvest of 554 chinook salmon which exceeded the upper end of the Subdistrict 5-D guideline of 500 fish by 54 fish.

In District 6, the chinook salmon harvest is largely incidental to the directed summer chum salmon fishery due to the low harvest guideline for chinook salmon (600-800 fish). The Alaska Board of Fisheries verbally directed the department in May 1988, that the Tanana River commercial salmon fishery could be managed as a terminal fishery. The first 42-hour fishing period occurred on 15 July, and fishermen fished a total of six 42-hour periods. Commercial sales totaled 686 chinook salmon and 1,545 pounds of chinook salmon roe, for an estimated harvest of 1,072 fish. This harvest exceeded the upper end of the guideline harvest range of 800 fish by 272 fish.

2.3 Summer Chum Salmon

Similar to the chinook salmon migration, the majority of the summer chum salmon run entered the river through the south and middle mouths of the Yukon River. Although slightly larger in magnitude than the 1987 and 1990 returns, comparative test-net indices indicated the 1991 summer chum salmon return was below average in abundance. Approximately 50 percent of the summer chum salmon return had entered the lower river by 24 June according to test fishing catch per unit effort (CPUE) data. The sonar project at Pilot Station estimated the summer chum salmon passage to be 1,283,000 fish. However, offshore fish movement and sonar beam attenuation are two factors which may have affected accuracy of the passage estimate. Preliminary age composition information from Districts 1 and 2 indicated that the commercial catch was composed primarily of age-5 fish. This information suggests that the age-4 component of the return from the poor 1987 parent year escapement was weak, as had been expected. The average weight of summer chum salmon in the lower river commercial catch was 6.7 pounds.

Due to the below average return of summer chum salmon, a restricted mesh size fishing period was not implemented in District 1 until 4 July, and in District 2 until 30 June. Based upon an aerial survey conducted on 7 July, poor spawning escapement to the Andreafsky River contributed to the decision to close the summer commercial fishing season after only one restricted mesh size fishing period in District 1, and after only two in District 2. The total District 1 and 2 summer chum salmon commercial harvest of 313,308 fish was 52 percent below the recent 5-year average, and below the mid-point of the guideline harvest range of 503,000 fish.

There was one restricted mesh size fishing period in District 3. A total of 2,383 summer chum salmon were harvested in two unrestricted mesh size fishing periods, and 6,529 in the one restricted mesh size fishing period. The summer commercial fishing season closed 30 June. The District 3 summer chum salmon harvest was 8,912 fish, which was 71 percent above the recent 5-year average, but below the mid-point of the guideline harvest range of 12,500 fish.

In District 4, the season opened on 26 June. Due to the high catch rate anticipated in Subdistrict 4-A and the low, targeted commercial summer chum salmon harvest, four of the five fishing periods were limited by emergency order from 48 hours to 24 hours in duration. With lower catch rates, Subdistricts 4-B and 4-C remained on the regulatory 48-hour fishing periods. By regulation, only in Subdistrict 4-A are the department's estimate of the number of males and females harvested to produce the roe sold included in the commercial catch. In Subdistrict 4-A, fish sold in the round are assumed to be males and are accounted

for in the roe expansion. In Subdistricts 4-B and 4-C, and Districts 5 and 6, only the number of females estimated to produce the roe sold are estimated and added to the fish sold in the round in determining the commercial catch. Subdistrict 4-A fishermen sold 5,289 summer chum salmon and 128,231 pounds of roe. The department estimated that 237,465 male and female summer chum salmon were harvested to produce this roe sold. This harvest was slightly above the midpoint of the guideline harvest range of 113,000-338,000 summer chum salmon. Subdistricts 4-B and 4-C also fished five periods and sold 1,092 summer chum salmon and 9,001 pounds of roe, and is estimated that 16,669 male and female summer chum salmon were harvested to produce this roe sold. This harvest was just above the lower end of the guideline harvest range of 16,000 -47,000 summer chum salmon. The Subdistrict 4-B and 4-C commercial fishing summer season was closed due to exceeding the upper end of the chinook salmon guideline harvest range.

In District 5, summer chum salmon are caught incidentally to the chinook salmon fishery. A total of 4 summer chum salmon and 28 pounds of summer chum salmon roe were sold. The District 5 summer chum salmon harvest in 1991 was estimated to be 35 fish. This harvest is well below the District 5 guideline harvest range of 1,000 to 3,000 summer chum salmon. District 5 commercial fishing summer season in 1991 was closed due to exceeding the upper end of the chinook salmon guideline harvest range.

In District 6 there were six 42-hour commercial fishing periods during the summer season. The first commercial fishing period started on 15 July, and the last period ended on 7 August. A total of 18,197 summer chum salmon and 4,716 pounds of roe were sold, for an estimated total commercial harvest of 23,893 summer chum salmon. This harvest fell within the District 6 guideline harvest range of 13,000 to 38,000 summer chum salmon.

2.4 Fall Chum and Coho Salmon

Fall chum salmon migratory timing into the lower river initially appeared to be average with a significant passage of chum salmon occurring from 16 July through 22 July. Historical test fishing and sonar data indicate that, usually by 10 August, 50 percent of the run has passed. However, according to upper river test fishery and escapement projects, the timing was somewhat later than had been estimated from the lower river test fishery. Four pulses of fall chum salmon entered the river on 29 July, 7 August, 18-19 August, and 22 August. Comparative lower Yukon River test fishing data indicated an above average fall chum salmon return. Coho salmon test fishing data indicated an above average return and average run timing.

The fall season commercial salmon fishery was opened by emergency order on 29 July in District 1, and 31 July in Districts 2 and 3. Twice weekly fishing periods of 16 hours in duration in the coastal "Set Net Only Area" where tides affect fishing opportunity, and of 9 hours in duration in the remainder of District 1 and in Districts 2 and 3 were established. Typically, fall chum salmon enter the river in relatively short pulses during windy weather. A total harvest of 117,584 fall chum salmon were taken as of 16 August after six fishing periods in District 1, and five periods each in Districts 2 and 3. At this time, Commercial fishing periods were reduced to 12 hours in the "Set Net Only

Area" of District 1, and to 6 hours in the remainder of District 1 and Districts 2 and 3 for the remainder of the season. The fall chum run remained strong after 17 August. Therefore, continued harvests occurred until the close of the fall season on 27 August. A total of 171,565 fall chum salmon and a record 96,898 coho salmon were harvested in Districts 1, 2, and 3 combined. The fall chum salmon harvest was 23 percent above the midpoint of the 60,000-220,000 fall chum salmon guideline harvest range for Districts 1, 2, and 3 combined, and 90 percent above the recent 5-year average. (Note: the recent five year average includes 1987 during which no commercial fishery was allowed.)

Prior to the 1991 fishing season, the Alaska Board of Fisheries closed the Kantishna and Toklat Rivers to subsistence fishing for fall chum salmon in order to rebuild Toklat River spawning escapement. However, subsequent decisions issued by the Alaska Superior Court provided for subsistence fishing to resume on those river systems due to injunctive relief. The injunctive relief for the 1991 season does not alter the regulations beyond the 1991 season. On 17 August, in response to the court decisions, the department reduced the commercial fishing time allowed during each period downstream from the Kantishna River in an effort to benefit Toklat River stock escapement.

Preliminary passage estimates at the Pilot Station sonar site through termination of operations on 1 September totaled 547,000 fall chum salmon and 79,000 coho salmon. However, similar to 1990, offshore fish passage was considered significant in 1991 and was accounted for to the extent possible in the fall season passage estimates. Sonar beam attenuation continues to be a factor which requires further attention.

Subdistrict 4-A, by regulation, does not have a fall chum salmon commercial season. In Subdistricts 4-B and 4-C, the fall season opened on 11 August. However, few fish were sold due to depressed market conditions. The season remained open until the regulatory closing date of 30 September. The commercial harvest by two catcher-processors and a few fishermen who were able to secure a buyer totaled 3,737 fall chum salmon and 14 coho salmon sold in the round, and 1,616 pounds of fall chum salmon roe. The District 4 estimated total commercial harvest was 6,091 fall chum salmon. The guideline harvest range is 5,000-40,000 fall chum and coho salmon combined for Subdistricts 4-B and 4-C combined. The targeted commercial harvest was for near 30,000 fall chum and coho salmon combined. The estimated 1991 harvest of 6,091 fish was slightly above the lower end of the guideline harvest range, and 30 percent below the recent five year average.

The Subdistrict 5-A, 5-B, and 5-C fall season fishing schedule was two 12-hour periods per week in 5-A, and two 24-hour periods per week in Subdistrict 5-B and 5-C beginning on 20 August. Four fishing periods were allowed in each subdistrict. Harvest totaled 24,141 fall chum salmon and 3,625 pounds of fall chum salmon roe, for an estimated total commercial harvest of 28,900 fall chum salmon. No coho salmon were reported sold. The guideline harvest range for Subdistricts 5-A, 5-B, and 5-C combined is 4,000-36,000 fall chum and coho salmon combined. Subdistrict 5-D was open for three fishing periods. Sales totaled 3,214 fall chum salmon in the round. No coho salmon were reported sold. The guideline harvest range for Subdistrict 5-D is 1,000-4,000 fall chum and coho salmon combined.

District 6, Tanana River, was managed under a terminal fishery management plan as directed by the Alaska Board of Fisheries for the fourth consecutive year. Based on sustained high catches in test fish wheels and in the commercial and subsistence fishery, the overall fall chum salmon run in the Tanana River was assessed to be above average in strength. Three fishing periods were allowed in each subdistrict in District 6. Due to Board of Fisheries concerns for the Toklat River fall chum salmon stock, fishing periods in Subdistrict 6-A were reduced to 24 hours in duration by regulation. Regulations still allowed 42 hour periods in Subdistricts 6-B and 6-C. Following court rulings that allowed subsistence fishing to resume on the Kantishna River, the department further reduced the Subdistrict 6-A commercial fishing duration to 12 hours. Sales for District 6 totaled 28,195 fall chum salmon, 14,154 pounds of fall chum salmon roe, 6,268 coho salmon, and 4,299 pounds of coho salmon roe, for an estimated total commercial harvest of 44,448 fall chum and 9,773 coho salmon. The combined estimated commercial harvest of 54,221 fall chum and coho salmon, exceeded the upper end of the District 6 guideline harvest range of 20,500 fall chum and coho salmon combined by 165 percent.

3.0 SUBSISTENCE AND PERSONAL USE FISHERIES - ALASKA

3.1 Subsistence Fisheries

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

Subsistence salmon fishing occurs from late May through October, although this varies throughout the drainage. Fishing activities are based either from a fish camp or the home village. However, the degree to which one or the other is more prevalent varies from community to community. Some people from communities not situated along the Yukon River, such as Birch Creek, Venetie, and some residents of Chalkyitsik, operate fish camps along the Yukon River. Subsistence salmon fishing is often undertaken by extended family groups representing two or more households in a community. These groups, as well as members of individual households, cooperate to harvest, cut, dry, smoke, and store salmon for subsistence use. Many people who fish for subsistence salmon also operate as commercial fishermen.

Subsistence has been designated by the legislature as the highest priority among beneficial uses of fish resources. In major commercial fishing areas, it is necessary to place some restrictions on the subsistence fishery in order to enforce commercial fishing regulations. During the fishing season, however, substantially more fishing time is allowed for subsistence than for commercial purposes. In general, since the early 1960s subsistence fishing has been managed and regulated to coincide with commercial salmon fishing periods when the commercial fishing is open. In all districts, during the commercial salmon season, additional subsistence only fishing time is allowed. Prior to and

following the commercial fishing season, subsistence fishing is allowed seven days per week in Districts 1 through 5, and for two 42-hour periods per week in District 6. Subsistence fishing permits are required in three areas within the upper Yukon drainage: (1) the entire Tanana River drainage; (2) the Yukon River between Hess Creek and Dall River; and (3) the Yukon River between the upstream mouth of Twenty-two Mile Slough and the U.S./Canada border.

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

Subsistence salmon harvest data has been collected by the Division of Commercial Fisheries through the use of personal interviews, permit reports, and catch calendars since 1961, excluding 1988. Through this period, survey methods and harvest reporting have varied. Due to funding limitations, the Department was unable to send survey crews to all villages in 1983 and 1984 to interview fishermen. In 1985, personal interviews were conducted in most villages. During 1986 and 1987, increased funding provided by U.S./Canada negotiation support allowed more comprehensive subsistence fishery harvest surveys. In 1988, the Subsistence Division modified the subsistence harvest survey design and collected subsistence harvest data. The modified method consisted of a comprehensive list of all households in the Yukon River drainage stratified by community. Households were classified into two strata: 1) usually fishing for subsistence, or 2) not usually fishing for subsistence. This modified method was also used for the 1989 surveys. In 1990, the household classification system was further refined. Five categories of "use" were defined: 1) unknown, 2) non-user, 3) light user, 4) medium user, and 5) heavy user. The five category system was used for the 1990 and 1991 surveys. Canadian non-commercial harvest information is collected by the Canadian Department of Fisheries and Oceans (DFO).

In the Subdistrict 4-A commercial fishery, there is a very limited commercial market for summer chum salmon flesh, while salmon roe has a significant commercial market. As a result, commercial fishermen extract and sell roe from their catch and retain the carcasses for subsistence use. During the 1980 to 1985 period, it is likely that many fishermen reported a portion of their commercial harvest as subsistence fish. It is probable that the unmarketable commercial product may have simply replaced a large portion of the subsistence harvest in this area. Since 1986, subsistence surveys for the Yukon River drainage were conducted in such a manner as to estimate the number of summer chum salmon taken by commercially related activities and those taken by traditional subsistence fishing activities.

In May, subsistence "catch calendars" were mailed to most fishing households identified in Yukon River drainage communities in Alaska for use during the fishing season. Personal interviews were conducted with fishermen by department personnel following the fishing season. Subsistence fishermen in portions of District 5 and all of District 6 were required to obtain subsistence fishing permits and record and report harvest information. Fishermen not contacted by other means were being contacted by mail at the time this report was prepared.

Preliminary estimates for the 1991 subsistence harvest in the Alaskan portion of the Yukon River drainage should be available by the February 4, 1992, Board of Fisheries meeting.

Estimates of the 1990 subsistence harvest in the Alaska portion of the Yukon River drainage totaled 52,113 chinook, 118,471 summer chum, 182,033 fall chum, and 47,816 coho salmon (Tables 7 and 8). These estimates do not include commercially caught summer chum salmon retained for subsistence purposes in District 4.

3.2 Personal Use Fisheries

Regulations were in effect from 1988 until July 1, 1990 that prohibited non-rural residents from participating in subsistence fishing. In those years, non-rural residents harvested salmon under personal use fishing regulations. The Alaska Supreme Court ruled, effective July 1990, that every resident of the State of Alaska was an eligible subsistence user, making the personal use category obsolete. Since July 1, 1990, all Alaskan residents are considered subsistence users. In 1990, a total of 222 personal-use permits were issued in the Yukon Area (Table 9). In 1991, no personal use permits were issued.

4.0 FISHERIES - CANADA

Management plans for the Canadian chinook and chum salmon fisheries on the Yukon River in 1991 were formulated to reflect the understandings reached during U.S./Canada negotiations. The tentatively agreed to guideline harvest ranges during the period of rebuilding for all Canadian mainstem Yukon River fisheries are 16,800-19,800 chinook, and 23,600-32,600 fall chum salmon. The parties have also reached a tentative agreement on a stabilization spawning objective of 18,000 chinook salmon and a minimum escapement objective of 80,000 fall chum salmon for the Canadian portion of the mainstem Yukon River drainage. This stabilization spawning objective for chinook was established to prevent any further decrease in chinook salmon escapements. The U.S./Canada Joint Technical Committee (JTC) has set interim spawning escapement ranges for the mainstem Yukon River drainage of 33,000-43,000 chinook salmon. A separate escapement objective of 50,000-120,000 fall chum salmon has also been set by the JTC for salmon spawning in the Canadian portion of the Porcupine River drainage.

The latest round of the US/Canada Yukon River negotiations was held in Whitehorse, Yukon Territory on December 2-6, 1991. During this meeting, significant progress was made on a chum salmon rebuilding plan, the equity and restoration fund issue, and language for a termination clause. The rebuilding plan for chum salmon in the Canadian Yukon mainstem is scheduled for 12 years ending in 2001, has a goal of 80,000 or more spawners, and a guideline harvest range for the Canadian fishery of 23,600 to 32,600 chum salmon annually during rebuilding. The US will endeavor to deliver to the Canadian border the number of chum salmon necessary to meet the spawning escapement objective appropriate for that year in the rebuilding program and provide for a Canadian harvest within the agreed guideline harvest range. Specific border escapement ranges are laid out for the next four years:

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

For the remaining years in the plan thereafter, the US will endeavor to deliver annually between 88,600 and 112,600 chum to the Canadian border. Differing US and Canadian language regarding the definition of a rebuilt stock, which is linked to harvest sharing after rebuilding, was left unresolved for future negotiation.

The proposal on the equity issue still has some elements to be negotiated, but otherwise goes a long way towards resolving the equity issue within the Yukon River. The US would contribute to a Yukon River salmon restoration and enhancement fund administered by the Yukon River Panel for Canadian origin stocks, with potential benefits to fishermen of both countries. The amount of the US contribution would be annually determined based on the number of Canadian origin chinook and chum salmon harvested by US fishermen, the proportion not deemed to the US, and the value of those fish in the Canadian commercial fishery.

The proposal on a termination clause would allow the Yukon River treaty to stand alone from the Pacific Salmon Treaty should either of the agreements terminate. There is also a lock-in period proposed by Canada that the US would like to consider before making any counter proposals.

The next round of negotiations are scheduled for March 23 to 27, 1992 in Anchorage. Major items on the agenda include harvest shares after rebuilding, the Porcupine River, and the deeming factor.

Most of the commercial harvest on the mainstem Yukon River near Dawson is taken in set gillnets. However, during the 1991 commercial fishing season, more fish wheels were used to harvest salmon. Harvests within the Canadian portion of the Porcupine River drainage is currently limited to an Indian Food fish fishery. Canadian commercial fishermen received, in Canadian dollars, approximately \$1.50 per pound for chinook salmon, \$.15 per pound for fall chum salmon, \$2.75 per pound for chum salmon roe, and \$2.00 per pound for chinook salmon roe. Historical harvest information is presented in Table 10 for chinook salmon and Table 11 for fall chum salmon.

4.1 Chinook Salmon

Prior to the 1991 commercial fishing season, the Canadian Department of Fisheries and Oceans (DFO) set the commercial guideline harvest for chinook salmon at 9,100-12,100 salmon. The preliminary 1991 mainstem Yukon River border passage estimate for chinook salmon, and associated Canadian fishery harvests and spawning escapement estimates are as follows:

| | | |
|----------------------------|--------|---------|
| 1991 Border Passage | | 40,993 |
| (1982 to 1991 average) | | 41,000) |
| Total Mainstem Harvests | | 18,411 |
| Commercial | 10,906 | |
| Indian Food Fish | 6,978 | |
| Domestic | 227 | |
| Sport | 300 | |
| Porcupine Drainage Harvest | | |
| Indian Food Fish | 200 | |

4.2 Fall Chum Salmon

Prior to the 1991 commercial fishing season, the Canadian Department of Fisheries and Oceans (DFO) set the commercial guideline harvest for fall chum salmon at 20,900-29,900 salmon. The preliminary 1991 mainstem Yukon River border passage estimate for fall chum salmon, and associated Canadian fishery harvests and spawning escapement estimates are as follows:

| | | |
|----------------------------|--------|---------|
| 1991 Border Passage | | 112,850 |
| (1982 to 1991 average) | | 89,497) |
| Total Mainstem Harvests | | 36,403 |
| Commercial | 30,784 | |
| Indian Food Fish | 5,619 | |
| Domestic | 0 | |
| Sport | 0 | |
| Porcupine Drainage Harvest | | |
| Indian Food Fish | 1,642 | |

5.0 STATUS OF SPAWNING STOCKS

5.1 Chinook Salmon

5.1.1 Alaska

Chinook salmon escapement objectives were generally met in the Alaska portion of the Yukon River drainage (Table 10). In the lower river tributaries, aerial survey index counts were obtained of 1,938 chinook salmon in the East Fork and 2,544 in the West Fork of the Andreafsky River, and 625 within an index area of the Anvik River. Escapement objectives are 1,600 and 1,000 for the East and West Forks of the Andreafsky River, respectively, and 500 for the Anvik River index area. Aerial survey escapement objectives for chinook salmon were also achieved in the Nulato and Gisasa Rivers in the middle portion of the drainage. Aerial surveys of the Chena and Salcha Rivers in the Tanana River drainage, provided index area counts of 1,276 and 1,922 chinook salmon, respectively. The surveys for these two streams were conducted seven to ten days prior to the peak of

spawning. The Division of Sport Fish has conducted tagging studies on the Chena River since 1986, and on the Salcha River since 1987 to estimate chinook salmon escapement population sizes. Preliminary estimates for 1991 are 3,025 chinook salmon for the Chena River and 5,608 chinook salmon for the Salcha River. Chinook salmon escapements have ranged from 2,666 in 1989 to 9,065 in 1986 for the Chena River, and 3,294 in 1989 to 10,728 in 1990 for the Salcha River.

5.1.2 Canada

The preliminary tagging estimate of total spawning escapement for the Canadian portion of the Yukon River drainage (excluding the Porcupine drainage) was 22,582 chinook salmon. This estimate falls short of the interim spawning escapement objective range of 33,000-43,000 chinook salmon, but is above the stabilization objective of 18,000 fish. Aerial survey results are listed in Table 11.

5.2 Summer Chum Salmon

A preliminary sonar estimate of 860,525 summer chum salmon for the Anvik River was 78 percent above the escapement objective of 487,000 fish. Two aerial surveys of the Andreafsky River system conducted on 7 and 22 July both indicated poor escapements. The peak aerial survey count on 22 July of 58,180 summer chum salmon for the East and West Forks combined was well below the escapement objective of 225,000 for the East and West Forks. Surveys of the Nulato (25,641 fish), Gisasa (7,003 fish), and Hogatza (9,947 fish) Rivers, conducted under generally good survey conditions, indicated that summer chum salmon escapements to these systems were poor (Table 12). Because of poor aerial survey conditions in 1991, it is difficult to assess the Tanana River summer chum salmon escapement. The magnitude of the Anvik River stock size compared to the other summer chum salmon stocks, the mixed stock characteristics of the fisheries, and the variable status of the stocks makes it difficult to optimize the overall harvest and escapement for all of the stocks.

5.3 Fall Chum Salmon

5.3.1 Alaska

The preliminary sonar estimate of approximately 88,890 fall chum salmon for the Sheenjek River is well above the minimum escapement objective of 64,000 fish (Table 13). The Chandalar River sonar project, operated by the USFWS from 1986 through 1990, was not operational in 1991. Escapement to the Toklat River of approximately 13,197 fall chum salmon in the lower portion of the Tanana River drainage was less than 50 percent of the minimum objective of 33,000 fish. However, escapement surveys in the upper Tanana River drainage indicated that escapements were in excess of two times the escapement objective for the Delta River index area. Escapement to other spawning areas in the upper Tanana River such as Bluff Cabin Slough and Clear Water Lake Outlet also appeared to be very good.

5.3.2 Canada

The preliminary population estimate made by DFO of fall chum salmon entering the Canadian portion of the upper Yukon River was approximately 112,800 fish. Subtracting the preliminary estimated Canadian commercial and non-commercial harvest from this population estimate results in a total escapement estimate to Yukon Territory (excluding the Porcupine River drainage) of approximately 76,447 spawners, slightly below the interim, minimum escapement objective of greater than 80,000 fish.

Escapement to the Fishing Branch River in the Porcupine River drainage of 37,733 fall chum salmon based on a weir project count was 24 percent below objectives. The spawning escapement objective, set by the U.S./Canada Joint Technical Committee, is 50,000-120,000 fall chum salmon for this system.

5.4 Coho Salmon

Coho salmon escapement assessment is very limited in the Yukon River drainage due to funding limitations and survey conditions at that time of year. Most of the information that has been collected is from the Tanana River drainage (Table 14). The Division of Sport Fish boat survey count of coho salmon escapement in the Delta Clearwater River for 1991 was a record of 23,900 fish. Since 1971, documented abundance of coho salmon spawners in this system had ranged from 632 fish in 1972 to 22,300 in 1987.

6.0 SELECTED MAJOR PROJECT SUMMARIES

6.1 Alaska

6.1.1 Salmon Stock Identification

Analysis of chinook salmon scale patterns, age compositions, and geographic distribution of catches and escapements are used by the department on an annual basis to estimate geographic region of origin of the fishery harvests. Data have not yet been analyzed for 1991. Prior year scale pattern analysis (SPA) studies provided the following estimates of region of origin for the total Yukon River drainage chinook salmon harvest (commercial and non-commercial harvests in Alaska and Canada combined):

| Year | Alaska | | Canada |
|------|--------------------------------------|-------------------|------------------|
| | Lower Run Origin | Middle Run Origin | Upper Run Origin |
| 1982 | 15% | 23% | 62% |
| 1983 | 12% | 36% | 51% |
| 1984 | 29% | 36% | 35% |
| 1985 | 31% | 19% | 50% |
| 1986 | 27% | 6% | 68% |
| 1987 | 17% | 18% | 65% |
| 1988 | 27% | 12% | 61% |
| 1989 | 25% | 18% | 57% |
| 1990 | 20% | 23% | 57% |
| 1991 | Not available at time of publication | | |

The lower and middle regions of origin are within Alaska, and the upper region of origin is defined as being within the Canadian portion of the drainage.

The USFWS continued research into the feasibility of using protein electrophoresis methodology (GSI) to identify chinook and chum salmon stocks in the mixed stock District I fishery in 1991. This work was initiated in 1987.

6.1.2 Yukon River Sonar

Hydroacoustic counters and test gillnets were operated by the department on the mainstem Yukon River near Pilot Station from 5 June through 1 September 1991, to estimate salmon passage by species. Preliminary estimates of salmon passage for 1991 were approximately 77,000 chinook, 1,283,000 summer chum, 547,000 fall chum, and 79,000 coho salmon. Accuracy of the estimates are under review due to species apportionment sampling difficulties, sonar beam attenuation and the offshore movement of fish during some years, especially during the fall season. The Department is attempting to improve the accuracy of sonar data through equipment modifications and in-season sampling. Annual estimates of salmon passage for prior years are presented here for reference as follows:

| Year | Dates of Operation | Chinook | Summer Chum | Fall Chum | Coho | Pink |
|---------------------|--------------------|---------|-------------|-----------|---------|-----------|
| 1986 ^{a,b} | 6/09-9/12 | 155,000 | 1,831,000 | 557,000 | 180,000 | 1,062,000 |
| 1987 ^b | 6/09-9/06 | 116,000 | 826,000 | 596,000 | 228,000 | 13,000 |
| 1988 ^b | 6/02-9/14 | 121,000 | 1,773,000 | 424,000 | 243,000 | 612,000 |
| 1989 ^b | 6/04-9/11 | 92,000 | 1,604,000 | 606,000 | 169,000 | 3,000 |
| 1990 ^c | 6/05-9/04 | 155,000 | 926,000 | 484,000 | 232,000 | 206,000 |
| 1991 ^c | 6/05-9/04 | 77,000 | 1,283,000 | 547,000 | 79,000 | N/A |

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

^b Passage estimates for all species in 1986 through 1989 include only fish passage within the inscribed zone.

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

6.2 Canada

6.2.1 Yukon River Tagging Program

The Canadian Department of Fisheries and Oceans (DFO) has conducted a tagging program on salmon stocks in the Canadian section of the drainage since 1982 (excluding 1984). The objectives of the study have been to estimate the total return of chinook and fall chum salmon to Canada (excluding the Porcupine drainage which is partially enumerated by the Fishing Branch weir or estimated by aerial surveys), and to obtain estimates of total escapement, harvest rates, migration rates, and run timing. Spaghetti tags are applied to live-captured salmon in the last fish wheels, and subsequent recoveries are made by the different user groups fishing upstream. Population estimates are derived from those tags recovered in the commercial fishery below the Stewart River. Analysis of the 1991 data is incomplete; however, the preliminary chinook salmon border population estimate is 40,993 fish. Of this number, 22,582 chinook salmon are estimated to have reached the various spawning grounds.

7.0 OUTLOOK FOR 1992

7.1 Chinook Salmon

The majority of chinook salmon returning to the Yukon River are 6-year-old fish; however, 5- and 7-year-old fish make a significant contribution to the run. In general, spawning ground escapements in 1986, the primary brood year (age-6 in 1992), were judged to be average to below average in magnitude in Canada, and average to above average in Alaska. Survival and production of the 1986 brood year is apparently above average based on observations of a higher than normal contribution of 5-year-old fish to the 1991 commercial catch. It is expected that the 1992 return of 5-year-old fish (1987 brood year) will be below average to average. Based on escapements which ranged from below average in Canada to average in Alaska during 1987, and average proportion of 4-year-old fish in the 1991 return. The return of 7-year-old fish in 1992 (1985 year class) is expected to be average, as the return of the 1985 year class in 1990 as 5-year-old fish and in 1991 as 6-year-old fish was average. Overall, the 1992 chinook salmon return is anticipated to be average in strength. The commercial harvest in Alaska is expected to total 86,000-107,000 chinook salmon (80,000-100,000 fish in the Lower Yukon Area, 6,000-7,000 fish in the Upper Yukon Area). Because the Alaska Board of Fisheries has directed that the Tanana River commercial fishery could be managed as a terminal fishery, the actual District 6 commercial harvest could vary from the District 6 guideline harvest range depending on inseason indicators.

7.2 Summer Chum Salmon

Summer chum salmon return primarily as 4-year-old fish, although substantial 5-year-old returns often result from brood years with high survival rates. The return of 4-year-old fish in 1992 will be dependent on production from the 1988 brood year and survival of the resulting cohort. In 1988, summer chum salmon escapements ranged from below average in non-Anvik River stocks to above average in the Anvik River. The Anvik River summer chum salmon stock is expected to be the primary contributor to the 1992 return. In addition, the return of 5-year-

old fish in 1992 is expected to be below average in strength based upon the below average return of 4-year-old fish in 1991. In summary, based on evaluation of brood year run size data and assuming average survival, it is expected that the Yukon River summer chum salmon return in 1992 will be below average to average in magnitude. The commercial harvest is expected to be 600,000-800,000 fish. Because of the mixed stock nature of the fishery and the Anvik River expected to be the primary contributor to the run, it will be difficult to optimize the harvest of individual stocks and the anticipated commercial harvest may not be achieved.

7.3 Fall Chum Salmon

Similar to summer chum salmon, fall chum salmon return primarily as 4-year-old fish. Escapements in 1988 (the brood year which will produce 4-year-old fish in 1992) were below average. The contribution of age-3 fall chum salmon in the 1991 return was below average which, when combined with available escapement data, suggests a below average return of 4-year-old fish in 1992. The return of 5-year-old fish (1987 brood year) is expected to be above average, overall, based on the contribution of age 4 fall chum salmon in the 1991 harvest, and the above average escapements in the majority of systems in 1987. In summary, based on evaluation of brood year escapements and assuming average survival rates, the overall fall chum salmon return is expected to be below average in 1992. The 1992 commercial harvest may range from 0 harvest to approaching the low end of the guideline harvest range of 75,000 fall chum salmon (approximately 60,000 in the Lower Yukon Area, and 15,000 fall chum and coho salmon combined in the Upper Yukon Area). However, with the rebuilding effort underway with the Canadians for the Yukon River mainstem stock, and the continued slow recovery of the Toklat River stocks combine to result in the increased possibility of a severely restricted commercial fishery or not allowing a commercial fall season fishery in 1992. With the exception of the upper Tanana River, commercial fisheries may only occur on the Yukon River if run size exceeds the low expectations.

7.4 Coho Salmon

Coho salmon return primarily as 4-year-old fish. Comprehensive escapement information for coho salmon is lacking, but surveys in the Tanana River system indicated above average escapement in 1988. The commercial coho salmon harvest will be dependent on the timing and frequency of fishing periods allowed for fall chum salmon.

FIGURES AND TABLES

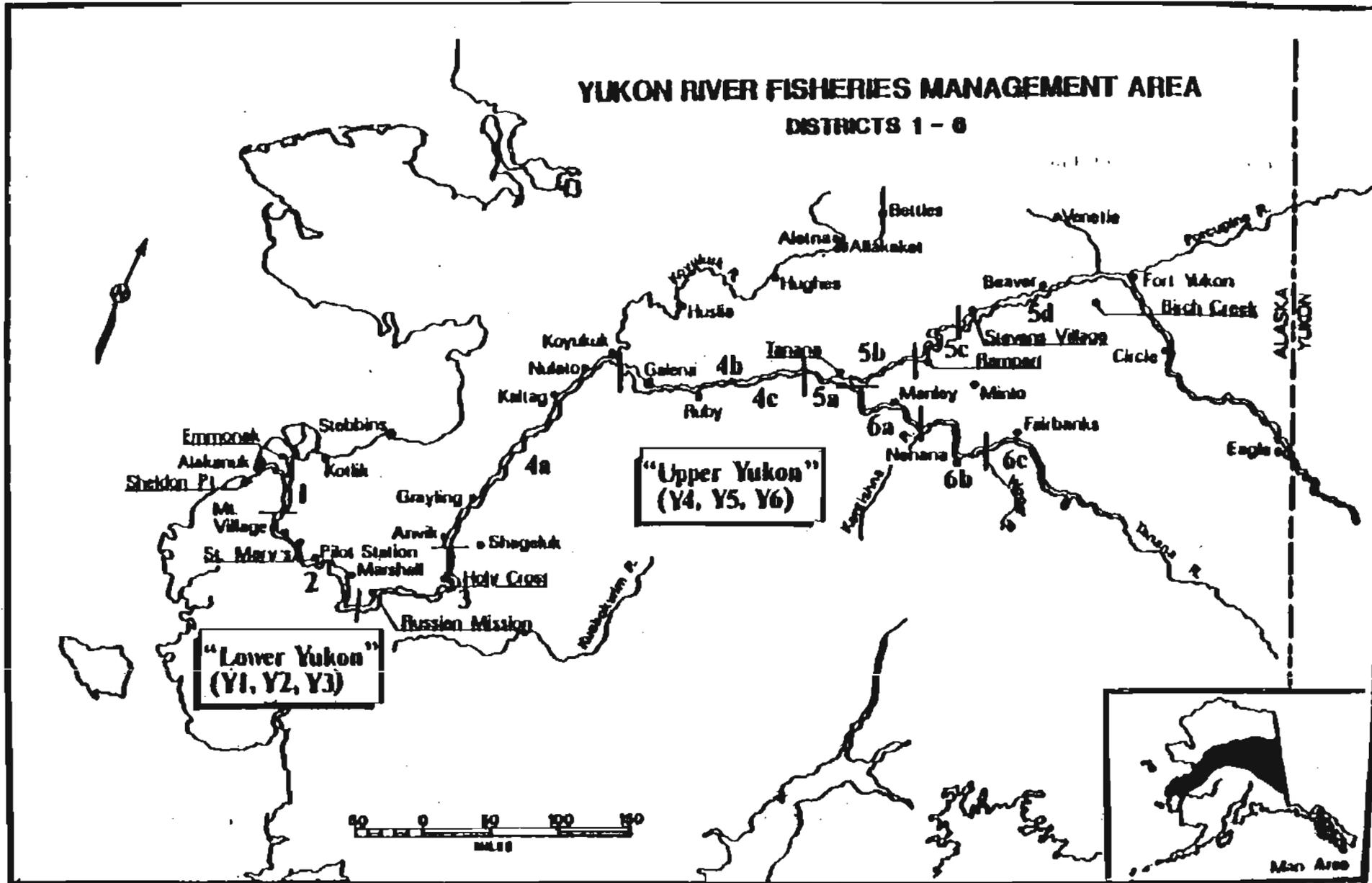


Figure 1. Map of the Alaskan portion of the Yukon River drainage, showing communities and fishing districts.

Table 1. Guideline harvest ranges and mid-points for Alaskan and Canadian commercial harvests of Yukon River chinook, summer chum and fall chum salmon.

| Chinook Salmon | | | | | | |
|--|-------------------------|--------------|----------------|--------------|----------------|--------------|
| Alaskan Management District or Country | Guideline Harvest Range | | | | | |
| | Lower | | Mid-Point | | Upper | |
| | Numbers | Percent | Numbers | Percent | Numbers | Percent |
| 1 and 2 | 60,000 | 78.5 | 90,000 | 82.7 | 120,000 | 85.0 |
| 3 | 1,800 | 2.4 | 2,000 | 1.8 | 2,200 | 1.6 |
| 4 | 2,250 | 2.9 | 2,550 | 2.3 | 2,850 | 2.0 |
| 5A, B, C | 2,400 | 3.1 | 2,600 | 2.4 | 2,800 | 2.0 |
| 5D | 300 | 0.4 | 400 | 0.4 | 500 | 0.4 |
| 6 | 600 | 0.8 | 700 | 0.6 | 800 | 0.6 |
| YT, Canada a | 9,100 | 11.9 | 10,600 | 9.7 | 12,100 | 8.6 |
| Total | 76,450 | 100.0 | 108,850 | 100.0 | 141,250 | 100.0 |

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

| Fall Chum Salmon | | | | | | |
|--|-------------------------|--------------|----------------|--------------|----------------|--------------|
| Alaskan Management District or Country | Guideline Harvest Range | | | | | |
| | Lower | | Mid-Point | | Upper | |
| | Numbers | Percent | Numbers | Percent | Numbers | Percent |
| 1, 2, and 3 | 60,000 | 66.1 | 140,000 | 63.1 | 220,000 | 62.8 |
| 4B, C c | 5,000 | 5.3 | 22,500 | 10.1 | 40,000 | 11.4 |
| 5A, B, C c | 4,000 | 4.3 | 20,000 | 9.0 | 36,000 | 10.3 |
| 5D c | 1,000 | 1.1 | 2,500 | 1.1 | 4,000 | 1.1 |
| 6 c | 2,750 | 2.9 | 11,625 | 5.2 | 20,500 | 5.9 |
| YT, Canada a | 20,900 | 22.3 | 25,400 | 11.4 | 29,900 | 8.5 |
| Total | 93,650 | 100.0 | 222,025 | 100.0 | 350,400 | 100.0 |

a Includes only the mainstem Yukon River fisheries in Canada. Varies annually dependent on Indian Food fishery demand. Overall guideline harvest range for all Canadian fisheries are 16,800 to 19,800 for chinook salmon and 23,600 to 32,600 for fall chum salmon.

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

c Guideline harvest set in numbers of fall chum and coho salmon combined.

Table 2. Preliminary Alaskan commercial sales of Yukon River salmon in 1991. a

| District Subdist. | No. of Fishermen d | Chinook | | Summer Chum | | Fall Chum | | Coho | | Total Salmon | |
|----------------------|--------------------------|---------|-------|-------------|---------|-----------|--------|---------|-------|--------------|---------|
| | | Numbers | Roe | Numbers | Roe | Numbers | Roe | Numbers | Roe | Numbers | Roe |
| District 1 | 497 | 53,014 | 0 | 138,159 | 0 | 59,724 | 0 | 54,095 | 0 | 304,992 | 0 |
| District 2 | 272 | 38,946 | 0 | 175,149 | 0 | 102,628 | 0 | 40,898 | 0 | 357,621 | 0 |
| Subtotal | 674 | 91,960 | 0 | 313,308 | 0 | 162,352 | 0 | 94,993 | 0 | 662,613 | 0 |
| District 3 | 29 | 2,344 | 0 | 8,912 | 0 | 9,213 | 0 | 1,905 | 0 | 22,374 | 0 |
| Lower Yukon b | 680 | 94,304 | 0 | 322,220 | 0 | 171,565 | 0 | 96,898 | 0 | 684,987 | 0 |
| 4-A | 63 | 69 | 162 | 5,289 | 128,231 | 0 | 0 | 0 | 0 | 5,358 | 128,393 |
| 4-B,C | 23 | 2,371 | 2,060 | 1,092 | 9,001 | 3,737 | 1,616 | 14 | 0 | 7,214 | 12,677 |
| District 4 | 85 | 2,440 | 2,222 | 6,381 | 137,232 | 3,737 | 1,616 | 14 | 0 | 12,572 | 141,070 |
| 5-A,B,C | 28 | 3,256 | 62 | 4 | 28 | 24,141 | 3,625 | 0 | 0 | 27,401 | 3,715 |
| 5-D | 7 | 554 | 0 | 26 | 0 | 3,214 | 0 | 0 | 0 | 3,794 | 0 |
| District 5 | 33 | 3,810 | 62 | 30 | 28 | 27,355 | 3,625 | 0 | 0 | 31,195 | 3,715 |
| District 6 | 28 | 686 | 1,545 | 18,197 | 4,716 | 28,195 | 14,154 | 6,268 | 4,299 | 53,346 | 24,714 |
| Upper Yukon c | 146 | 6,936 | 3,829 | 24,608 | 141,976 | 59,287 | 19,395 | 6,282 | 4,299 | 97,113 | 169,499 |
| Yukon Area | 826 | 101,240 | 3,829 | 346,828 | 141,976 | 230,852 | 19,395 | 103,180 | 4,299 | 782,100 | 169,499 |

a Harvest reported in numbers of fish sold in the round and pounds of salmon roe.

b Does not include Department lower Yukon test fish sales of 598 chinook, 2,076 summer chum, 2,551 fall chum, and 2,180 coho salmon.

c Does not include Department upper Yukon test fish sales of 91 chinook, 1,858 summer chum, 1,385 fall chum, and 791 coho salmon.

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

Table 3. Commercial chinook salmon sales by district, Yukon River drainage, 1974-1991. a

| Year | Lower Yukon Area | | | | Upper Yukon Area b | | | | | | | | | Alaska Total Harvest | |
|--------------|------------------|---------|---------|----------|--------------------|-------|------------------------|------------|-----|------------------------|------------|-------|------------------------|----------------------------|---------------------|
| | Dist. 1 | Dist. 2 | Dist. 3 | Subtotal | District 4 | | | District 5 | | | District 6 | | | | Subtotal Harvest |
| | | | | | Numbers | Roe | Estimated Harvest c | Numbers | Roe | Estimated Harvest c | Numbers | Roe | Estimated Harvest c | | |
| 1974 | 71,840 | 17,948 | 3,480 | 93,268 | 685 | - | 685 | 2,663 | - | 2,663 | 1,473 | - | 1,473 | 4,821 | 98,089 |
| 1975 | 44,585 | 11,315 | 4,177 | 60,077 | 389 | - | 389 | 2,872 | - | 2,872 | 500 | - | 500 | 3,761 | 63,838 |
| 1976 | 62,410 | 16,556 | 4,148 | 83,114 | 409 | - | 409 | 3,151 | - | 3,151 | 1,102 | - | 1,102 | 4,662 | 87,776 |
| 1977 | 69,915 | 16,722 | 3,965 | 90,602 | 985 | - | 985 | 4,162 | - | 4,162 | 1,008 | - | 1,008 | 6,155 | 96,757 |
| 1978 | 59,006 | 32,924 | 2,916 | 94,846 | 608 | - | 608 | 3,079 | - | 3,079 | 635 | - | 635 | 4,322 | 99,168 |
| 1979 | 75,007 | 41,498 | 5,018 | 121,523 | 1,989 | - | 1,989 | 3,389 | - | 3,389 | 772 | - | 772 | 6,150 | 127,673 |
| 1980 | 90,382 | 50,004 | 5,240 | 145,626 | 1,521 | - | 1,521 | 4,891 | - | 4,891 | 1,947 | - | 1,947 | 8,359 | 153,985 |
| 1981 | 99,506 | 45,781 | 4,023 | 149,310 | 1,347 | - | 1,347 | 6,374 | - | 6,374 | 987 | - | 987 | 8,708 | 158,018 |
| 1982 | 74,450 | 39,132 | 2,609 | 116,191 | 1,087 | - | 1,087 | 5,385 | - | 5,385 | 981 | - | 981 | 7,453 | 123,644 |
| 1983 | 95,457 | 43,229 | 4,106 | 142,792 | 601 | - | 601 | 3,606 | - | 3,606 | 911 | - | 911 | 5,118 | 147,910 |
| 1984 | 74,671 | 36,697 | 3,039 | 114,407 | 961 | - | 961 | 3,669 | - | 3,669 | 867 | - | 867 | 5,497 | 119,904 |
| 1985 | 90,011 | 48,365 | 2,588 | 140,964 | 664 | - | 664 | 3,418 | - | 3,418 | 1,142 | - | 1,142 | 5,224 | 146,188 |
| 1986 | 53,035 | 41,849 | 901 | 95,785 | 502 | - | 502 | 2,733 | - | 2,733 | 950 | - | 950 | 4,185 | 99,970 |
| 1987 | 76,643 | 47,458 | 2,039 | 126,140 | 1,524 | - | 1,524 | 3,758 | - | 3,758 | 3,338 | - | 3,338 | 8,620 | 134,760 |
| 1988 | 57,109 | 35,188 | 1,767 | 94,064 | 3,159 | - | 3,159 | 3,436 | - | 3,436 | 762 | - | 762 | 7,357 | 101,421 |
| 1989 | 59,153 | 33,225 | 1,645 | 94,023 | 2,790 | - | 2,790 | 3,286 | - | 3,286 | 1,741 | - | 1,741 | 7,817 | 101,840 |
| 1990 | 51,161 | 33,213 | 2,341 | 86,715 | 3,536 | 8 | 3,538 | 3,353 | 47 | 3,365 | 1,757 | 1,676 | 2,156 | 9,059 | 95,774 |
| 1991 | 53,014 | 38,946 | 2,344 | 94,304 | 2,440 | 2,222 | 2,996 | 3,810 | 62 | 3,826 | 686 | 1,545 | 1,072 | 8,708 | 103,012 |
| 1986 TO 1990 | | | | | | | | | | | | | | | |
| AVERAGE | 59,420 | 38,187 | 1,739 | 99,345 | 2,302 | 2 | 2,303 | 3,313 | 9 | 3,316 | 1,710 | 335 | 1,789 | 7,408 | 106,753 |

a Preliminary 1991 harvest. Does not include department test fish sales.

b In chinook salmon sold in the round and pounds of roe sold. Roe sales information for chinook salmon was not available prior to 1990.

c Estimated harvest = fish sold in the round + estimated females to produce roe sold.

Table 4. Commercial summer chum salmon sales or estimate of total commercial-related removal by district, Yukon River drainage, 1974-1991. a

| Year | Lower Yukon Area | | | | Upper Yukon Area b | | | | | | | | | Alaska Total Harvest | |
|--------------|------------------|---------|---------|-----------|--------------------|---------|--|------------|-------|---------------------|------------|-------|---------------------|----------------------|------------------|
| | Dist. 1 | Dist. 2 | Dist. 3 | Subtotal | District 4 | | | District 5 | | | District 6 | | | | |
| | | | | | Number | Roe | Estimated Total Commercial-Related Removal c | Number | Roe | Estimated Harvest d | Number | Roe | Estimated Harvest d | | Subtotal Harvest |
| 1974 | 466,004 | 74,152 | 1,721 | 541,877 | 27,868 | - | 27,868 | 8,831 | - | 8,831 | 13,318 | - | 13,318 | 48,015 | 589,892 |
| 1975 | 418,323 | 89,139 | 0 | 517,462 | 185,054 | - | 185,054 | 12,997 | - | 12,997 | 14,782 | - | 14,782 | 192,833 | 710,295 |
| 1976 | 273,204 | 89,190 | 9,802 | 382,196 | 211,307 | - | 211,307 | 774 | - | 774 | 6,817 | - | 6,817 | 218,898 | 600,894 |
| 1977 | 250,652 | 105,879 | 3,412 | 359,743 | 189,541 | - | 189,541 | 1,274 | - | 1,274 | 4,317 | - | 4,317 | 175,132 | 534,875 |
| 1978 | 393,785 | 227,548 | 27,003 | 648,388 | 384,184 | 18,920 | 382,984 | 4,892 | 605 | 5,584 | 34,814 | 8,238 | 45,109 | 433,657 | 1,081,993 |
| 1979 | 389,934 | 172,898 | 40,015 | 602,787 | 189,430 | 35,317 | 208,871 | 8,808 | 1,009 | 9,729 | 18,491 | 3,891 | 23,355 | 241,755 | 824,542 |
| 1980 | 391,252 | 308,704 | 44,782 | 744,738 | 147,560 | 185,824 | 298,478 | 458 | 0 | 458 | 35,855 | 3,282 | 39,958 | 338,889 | 1,083,627 |
| 1981 | 507,158 | 351,878 | 54,471 | 913,507 | 59,718 | 187,032 | 346,356 | 1,238 | 49 | 1,290 | 32,477 | 1,987 | 34,981 | 382,607 | 1,296,114 |
| 1982 | 249,516 | 182,344 | 4,088 | 435,948 | 3,847 | 151,281 | 280,160 | 213 | 21 | 238 | 21,597 | 1,517 | 23,493 | 303,880 | 739,826 |
| 1983 | 451,184 | 248,092 | 14,600 | 713,856 | 6,672 | 148,125 | 274,308 | 42 | 1,858 | 2,104 | 24,309 | 18 | 24,332 | 300,741 | 1,014,597 |
| 1984 | 292,676 | 236,931 | 1,087 | 530,694 | 1,009 | 166,842 | 308,967 | 845 | 47 | 897 | 56,249 | 335 | 56,688 | 368,332 | 897,028 |
| 1985 | 247,486 | 188,099 | 1,792 | 437,377 | 12,007 | 247,085 | 457,565 | 700 | 0 | 700 | 56,913 | 1,540 | 68,838 | 527,103 | 964,480 |
| 1986 | 381,127 | 288,427 | 442 | 669,996 | 300 | 289,545 | 499,157 | 690 | 0 | 690 | 50,483 | 2,148 | 53,166 | 553,013 | 1,223,009 |
| 1987 | 222,898 | 174,876 | 3,501 | 401,275 | 29,991 | 121,474 | 224,952 | 362 | 44 | 411 | 10,810 | 450 | 11,173 | 236,535 | 637,810 |
| 1988 | 648,198 | 425,172 | 13,965 | 1,087,335 | 24,051 | 254,628 | 472,921 | 722 | 383 | 1,125 | 49,129 | 1,848 | 42,187 | 518,233 | 1,603,568 |
| 1989 | 547,631 | 343,862 | 7,578 | 899,171 | 18,554 | 283,305 | 510,244 | 154 | 373 | 568 | 42,115 | 4,671 | 48,204 | 559,016 | 1,458,187 |
| 1990 | 148,911 | 132,597 | 643 | 282,081 | 12,384 | 105,723 | 185,783 | 11 | 594 | 671 | 11,082 | 3,059 | 14,788 | 211,242 | 493,303 |
| 1991 | 138,159 | 175,149 | 8,912 | 322,220 | 6,381 | 137,232 | 254,133 | 30 | 28 | 61 | 18,197 | 4,718 | 23,893 | 278,087 | 600,307 |
| 1985 to 1990 | | | | | | | | | | | | | | | |
| AVG | 389,753 | 272,989 | 6,228 | 667,968 | 17,052 | 208,915 | 380,811 | 388 | 275 | 693 | 30,984 | 2,434 | 33,903 | 415,208 | 1,083,175 |

a Preliminary 1991 harvest. Does not include department test fish sales.

b Prior to 1990, may include small amounts of chinook salmon roe.

c For years 1974-1980, Estimated Total Related Removal = fish sold in the round + estimated numbers of females to produce the roe sold. For years 1981-1991, Estimated Total Commercial Related Removal = estimated number of males and females harvested to produce the roe sold. Includes an unknown amount of males that were returned back to the water alive as part of a fisherman's effort to reduce number of carcasses. It assumes that the summer chum salmon sold in the round were primarily male salmon that are estimated in the roe expansion.

d Estimated harvest = fish sold in the round + estimated females to produce roe sold. Male salmon caught during commercial operations were either sold in the round or reported as subsistence.

Table 5. Commercial fall chum salmon sales by district, Yukon River drainage, 1974-1991. a

| Year | Lower Yukon Area | | | | Upper Yukon Area b | | | | | | | | | Alaska Total Harvest | |
|--------------|------------------|---------|---------|----------|--------------------|-------|------------------------|------------|-------|------------------------|------------|--------|------------------------|----------------------------|---------------------|
| | Dist. 1 | Dist. 2 | Dist. 3 | Subtotal | District 4 | | | District 5 | | | District 6 | | | | Subtotal Harvest |
| | | | | | Numbers | Roe | Estimated Harvest c | Numbers | Roe | Estimated Harvest c | Numbers | Roe | Estimated Harvest c | | |
| 1974 | 176,036 | 53,540 | 552 | 230,128 | 9,213 | - | 9,213 | 23,551 | - | 23,551 | 26,884 | - | 26,884 | 59,648 | 289,776 |
| 1975 | 158,183 | 51,666 | 5,590 | 215,439 | 13,666 | - | 13,666 | 27,212 | - | 27,212 | 18,692 | - | 18,692 | 59,570 | 275,009 |
| 1976 | 105,851 | 21,212 | 4,250 | 131,313 | 1,742 | - | 1,742 | 5,387 | - | 5,387 | 17,948 | - | 17,948 | 25,077 | 156,390 |
| 1977 | 131,758 | 51,994 | 15,851 | 199,603 | 13,980 | - | 13,980 | 25,730 | - | 25,730 | 18,673 | - | 18,673 | 58,383 | 257,986 |
| 1978 | 127,947 | 51,646 | 11,527 | 191,120 | 10,988 | 1,721 | 13,139 | 21,016 | 5,220 | 26,816 | 13,259 | 3,687 | 16,946 | 56,901 | 268,021 |
| 1979 | 109,406 | 94,042 | 25,955 | 229,403 | 48,899 | 3,199 | 52,898 | 47,459 | 8,097 | 56,456 | 34,185 | 7,170 | 41,355 | 150,708 | 380,111 |
| 1980 | 106,829 | 83,881 | 13,519 | 204,229 | 27,978 | 4,347 | 33,412 | 41,771 | 605 | 42,443 | 19,452 | 68 | 19,520 | 95,375 | 299,604 |
| 1981 | 167,834 | 154,883 | 19,043 | 341,760 | 12,082 | 1,311 | 13,721 | 86,620 | 6,955 | 94,348 | 25,989 | 3,019 | 29,008 | 137,077 | 478,837 |
| 1982 | 97,484 | 96,581 | 5,815 | 199,880 | 3,894 | 167 | 4,103 | 13,593 | 42 | 13,640 | 6,820 | 596 | 7,416 | 25,158 | 225,038 |
| 1983 | 124,371 | 85,645 | 10,018 | 220,034 | 4,482 | 1,963 | 6,936 | 43,993 | 0 | 43,993 | 34,089 | 3,101 | 37,190 | 88,119 | 308,153 |
| 1984 | 78,751 | 70,803 | 6,429 | 155,983 | 7,625 | 2,215 | 10,394 | 24,060 | 57 | 24,123 | 20,564 | 56 | 20,620 | 55,137 | 211,120 |
| 1985 | 129,948 | 40,490 | 5,164 | 175,602 | 24,452 | 2,525 | 27,608 | 25,338 | 0 | 25,338 | 42,352 | 0 | 42,352 | 95,298 | 270,900 |
| 1986 | 59,352 | 51,307 | 2,793 | 113,452 | 2,045 | 0 | 2,045 | 22,053 | 395 | 22,492 | 1,892 | 182 | 2,074 | 26,611 | 140,063 |
| 1987 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1988 | 45,529 | 31,861 | 2,090 | 79,480 | 15,662 | 1,421 | 17,438 | 16,989 | 0 | 16,989 | 21,844 | 1,806 | 23,650 | 58,077 | 137,557 |
| 1989 | 77,876 | 97,906 | 15,332 | 191,114 | 11,776 | 3,407 | 16,035 | 18,215 | 3,989 | 22,647 | 49,090 | 7,353 | 56,443 | 95,125 | 286,239 |
| 1990 | 27,337 | 37,173 | 3,715 | 68,225 | 4,989 | 2,351 | 8,166 | 7,778 | 1,058 | 8,976 | 42,929 | 7,392 | 50,568 | 67,710 | 135,935 |
| 1991 | 59,724 | 102,628 | 9,213 | 171,565 | 3,737 | 1,616 | 6,091 | 27,355 | 3,625 | 32,114 | 28,195 | 14,154 | 44,448 | 82,653 | 254,210 |
| 1986 to 1990 | | | | | | | | | | | | | | | |
| AVERAGE | 42,019 | 43,649 | 4,786 | 90,454 | 6,894 | 1,436 | 8,737 | 13,007 | 1,088 | 14,221 | 23,151 | 3,347 | 26,547 | 49,505 | 139,959 |

a Preliminary 1991 harvest. Does not include department test fish sales.

b In fall chum salmon sold in the round and pounds of roe sold. Prior to 1990, may include coho salmon roe.

c Estimated harvest = fish sold in the round + estimated females to produce roe sold.

Table 6. Commercial coho salmon sales by district, Yukon River drainage, 1974-1991. a

| Year | Lower Yukon Area | | | | Upper Yukon Area b | | | | | | | | | Alaska Total Harvest | |
|--------------|------------------|---------|---------|----------|--------------------|-----|------------------------|------------|-----|------------------------|------------|-------|------------------------|----------------------------|---------------------|
| | Dist. 1 | Dist. 2 | Dist. 3 | Subtotal | District 4 | | | District 5 | | | District 6 | | | | Subtotal Harvest |
| | | | | | Numbers | Roe | Estimated Harvest c | Numbers | Roe | Estimated Harvest c | Numbers | Roe | Estimated Harvest c | | |
| 1974 | 13,713 | 176 | - | 13,889 | 0 | - | 0 | 1,409 | - | 1,409 | 1,479 | - | 1,479 | 2,888 | 16,777 |
| 1975 | 2,288 | 200 | - | 2,488 | 0 | - | 0 | 5 | - | 5 | 53 | - | 53 | 58 | 2,546 |
| 1976 | 4,064 | 17 | - | 4,081 | 0 | - | 0 | 0 | - | 0 | 1,103 | - | 1,103 | 1,103 | 5,184 |
| 1977 | 31,720 | 5,319 | 538 | 37,577 | 0 | - | 0 | 2 | - | 2 | 1,284 | - | 1,284 | 1,286 | 38,863 |
| 1978 | 16,460 | 5,835 | 758 | 23,053 | 32 | - | 32 | 1 | - | 1 | 3,066 | - | 3,066 | 3,099 | 26,152 |
| 1979 | 11,369 | 2,850 | - | 14,219 | 155 | - | 155 | 0 | - | 0 | 2,791 | - | 2,791 | 2,946 | 17,165 |
| 1980 | 4,829 | 2,660 | - | 7,489 | 30 | - | 30 | 0 | - | 0 | 1,226 | - | 1,226 | 1,256 | 8,745 |
| 1981 | 13,129 | 7,848 | 419 | 21,396 | 0 | - | 0 | 0 | - | 0 | 2,284 | - | 2,284 | 2,284 | 23,680 |
| 1982 | 15,115 | 14,179 | 87 | 29,381 | 15 | - | 15 | 0 | - | 0 | 7,780 | - | 7,780 | 7,795 | 37,176 |
| 1983 | 4,595 | 2,557 | - | 7,152 | 0 | - | 0 | 0 | - | 0 | 6,168 | - | 6,168 | 6,168 | 13,320 |
| 1984 | 29,472 | 43,064 | 621 | 73,157 | 1,095 | - | 1,095 | 0 | - | 0 | 7,688 | - | 7,688 | 8,783 | 81,940 |
| 1985 | 27,676 | 17,125 | 171 | 44,972 | 938 | - | 938 | 0 | - | 0 | 11,762 | - | 11,762 | 12,700 | 57,672 |
| 1986 | 24,824 | 21,197 | 793 | 46,814 | 0 | - | 0 | 0 | - | 0 | 441 | - | 441 | 441 | 47,255 |
| 1987 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | - | 0 | 0 | 0 |
| 1988 | 36,435 | 34,776 | 1,419 | 72,630 | 2 | - | 2 | 8 | - | 8 | 27,267 | - | 27,267 | 27,277 | 99,907 |
| 1989 | 24,672 | 38,522 | 3,988 | 67,182 | 3 | - | 3 | 84 | - | 84 | 18,224 | - | 18,224 | 18,311 | 85,493 |
| 1990 | 13,354 | 16,435 | 918 | 30,707 | 0 | 0 | 0 | 0 | 0 | 0 | 11,529 | 4,042 | 14,782 | 14,782 | 45,489 |
| 1991 | 54,095 | 40,898 | 1,905 | 96,898 | 14 | 0 | 14 | 0 | 0 | 0 | 6,268 | 4,299 | 9,773 | 9,787 | 106,685 |
| 1986 to 1990 | | | | | | | | | | | | | | | |
| AVERAGE | 19,857 | 22,186 | 1,424 | 43,467 | 1 | 0 | 1 | 18 | 0 | 18 | 11,492 | 808 | 12,143 | 12,162 | 55,629 |

a Preliminary 1991 harvest. Does not include department test fish sales.

b In coho salmon sold in the round and pounds of roe sold. Roe sales information for coho salmon was not available prior to 1990.

c Estimated harvest = fish sold in the round + estimated females to produce roe sold.

Table 7. Yukon River drainage subsistence and personal use salmon harvest, 1990. a

| Village | Survey Date | Fishing Households | b Chinook | Summer Chum | Fall Chum | Coho | Sat Nets | Drift Nets | Fish Wheels |
|-------------------|-------------|--------------------|-----------|-------------|-----------|--------|----------|------------|-------------|
| Sheldon Pt. | 9/6 | 12 | 756 | 1,458 | 102 | 78 | 12 | 0 | 0 |
| Alakanuk | 9/1 | 53 | 871 | 7,265 | 267 | 156 | 42 | 11 | 0 |
| Emmonak | 8/30-31 | c 83 | 1,873 | 15,215 | 2,353 | 1,283 | 27 | 56 | 0 |
| Kotlik | 9/7 | d 55 | 3,119 | 13,061 | 2,613 | 1,784 | 35 | 19 | 0 |
| Personal Use | permits | 18 | 534 | 295 | 60 | 8 | 0 | 18 | 0 |
| Y-1 Subtotal | | 221 | 7,153 | 37,294 | 5,395 | 3,309 | 116 | 104 | 0 |
| Mt. Village | 9/13 | 85 | 1,792 | 9,950 | 1,566 | 1,754 | 16 | 69 | 0 |
| Pitkas Pt. | 9/11-12 | 13 | 391 | 1,438 | 150 | 52 | 3 | 10 | 0 |
| St. Marys | 9/12 | 48 | 2,085 | 8,077 | 806 | 463 | 3 | 45 | 0 |
| Pilot Station | 9/14 | e 56 | 3,786 | 6,698 | 1,941 | 1,968 | 10 | 46 | 0 |
| Marshall | 9/19 | 40 | 1,492 | 2,290 | 1,724 | 2,107 | 7 | 33 | 0 |
| Y-2 Subtotal | | 262 | 9,546 | 28,453 | 6,187 | 6,344 | 39 | 203 | 0 |
| Russian Mission | 9/19 | 27 | 1,694 | 2,146 | 878 | 688 | 19 | 8 | 0 |
| Holy Cross | 9/15 | 33 | 2,337 | 857 | 1,178 | 338 | 15 | 18 | 0 |
| Y-3 Subtotal | | 60 | 4,031 | 3,003 | 2,056 | 1,026 | 34 | 26 | 0 |
| Lower Yukon Total | | 523 | 20,730 | 68,750 | 13,638 | 10,679 | 189 | 333 | 0 |
| Anvik | 9/18 | 14 | 481 | 2,032 | 583 | 236 | 7 | 2 | 5 |
| Shageluk | 9/17 | f 12 | 62 | 6,518 | 0 | 0 | 12 | 0 | 0 |
| Grayling | 9/18 | 9 | 144 | 1,430 | 1,405 | 10 | 5 | 2 | 2 |
| Kaltag | 10/9 | 39 | 2,244 | 6,956 | 2,327 | 501 | 6 | 21 | 12 |
| Nulato | 10/11 | 55 | 2,788 | 502 | 3,546 | 845 | 7 | 23 | 25 |
| Koyukuk | 10/10 | 12 | 876 | 283 | 860 | 162 | 5 | 4 | 3 |
| Galena | 10/8-12 | 100 | 3,134 | 1,760 | 3,202 | 572 | 48 | 19 | 33 |
| Ruby | 10/16 | 45 | 811 | 351 | 3,352 | 974 | 24 | 0 | 21 |
| Y-4 Subtotal | | 286 | 10,540 | 19,832 | g 15,275 | 3,300 | 114 | 71 | 101 |
| Tanana | 10/25-26 | 42 | 2,284 | 5,905 | 41,145 | 8,580 | 17 | 0 | 25 |
| Rampart | 11/12-13 | 15 | 1,481 | 58 | 10,818 | 591 | 9 | 0 | 6 |
| Fbks Sub/Pers-Use | permits | h 48 | 2,533 | 860 | 4,167 | 41 | 43 | 0 | 5 |
| Stevens Village | 11/1 | 16 | 1,295 | 1,671 | 3,857 | 479 | 10 | 0 | 6 |
| Beaver | 10/18 | 11 | 721 | 108 | 757 | 172 | 11 | 0 | 0 |
| Ft. Yukon | 10/30-31 | 41 | 4,051 | 145 | 11,627 | 727 | 11 | 0 | 30 |
| Circle/Central | permits | i 21 | 2,201 | 1,377 | 7,814 | 221 | 13 | 0 | 8 |
| Eagle | permits | j 35 | 1,845 | 384 | 8,389 | 3 | 32 | 0 | 3 |
| Y-5 Subtotal | | 229 | 16,411 | 10,508 | 88,574 | 10,814 | 146 | 0 | 83 |
| Main River Totals | | 1,038 | 47,681 | 99,090 | 117,487 | 24,793 | 449 | 404 | 184 |

-Continued-

Table 7. (page 2 of 2)

| Village | Survey Date | Fishing Household | Chinook | Summer Chum | Fall Chum | Coho | Set Nets | Drift Nets | Fish Wheels |
|-------------------------------------|------------------|-------------------|---------|-------------|-----------|--------|----------|------------|-------------|
| Manley | permits k | 28 | 1,509 | 2,637 | 28,885 | 8,808 | 20 | - | 8 |
| Minto | permits l | 17 | 249 | 785 | 6,800 | 2,436 | 10 | - | 7 |
| Menana | permits m | 34 | 1,441 | 1,515 | 13,956 | 8,051 | 17 | - | 17 |
| Healy | permits n | 3 | 0 | 0 | 2,283 | 1,774 | 2 | - | 1 |
| Fbks Sub/Pers-use | permits o | 120 | 560 | 1,134 | 1,789 | 1,288 | 97 | - | 23 |
| Y-6 Subtotal | | 202 | 3,739 | 6,071 | 53,713 | 22,357 | 146 | 0 | 56 |
| Hualia | 10/16 | 15 | 198 | 7,368 | 846 | 235 | 15 | 0 | 0 |
| Hughes | 10/15-16 | 10 | 90 | 509 | 70 | 43 | 10 | 0 | 0 |
| Allakaket/Alatna | 10/22-23, 11/7 p | 14/5 | 356 | 5,343 | 3,050 | 36 | 19 | 0 | 0 |
| Koyukuk R. Subtotal | | 44 | 644 | 13,220 | 3,966 | 314 | 44 | 0 | 0 |
| Venetie | 11/1 | 13 | 29 | 0 | 5,377 | 348 | 13 | 0 | 0 |
| Chalkyitsik | 11/1-2 | 6 | 0 | 90 | 1,490 | 4 | 6 | 0 | 0 |
| Subtotal Chandalar/Black Rivers | | 19 | 29 | 90 | 6,867 | 352 | 19 | 0 | 0 |
| Subtotal Upper Yukon (Alaska) | | 780 | 31,383 | 49,721 | 168,393 | 37,137 | 461 | 71 | 240 |
| Yukon River Drainage (Alaska) Total | | 1,303 | 52,113 | 118,471 | 182,033 | 47,816 | 651 | 404 | 240 |
| Old Crow | q | - | 247 | - | 2,410 | - | - | - | - |
| Yukon River Mainstem Canada | q | - | 7,356 | - | 3,675 | - | - | - | - |
| Yukon Territory Totals | q | - | 7,603 | - | 6,085 | - | - | - | - |
| Grand Total Yukon River Drainage | | 1,303 | 59,716 | 118,471 | 188,118 | 47,816 | 653 | 404 | 240 |

- a Subsistence data collected by Commercial Fisheries Division. Gear data represents estimated household use.
- b Estimated numbers of households that fished.
- c Includes 944 chinook, 1,838 summer chum, 1,163 fall chum, and 870 coho salmon from ADF&G test fish catches.
- d Includes 1,323 chinook, 2,189 summer chum, 944 fall chum, and 713 coho salmon from ADF&G test fish catches.
- e Includes 542 chinook, 1,882 summer chum, 1,077 fall chum, and 869 coho salmon from ADF&G test fish catches.
- f Shageluk harvest data from households fishing mainstem Yukon River and Innoko River.
- g Does not include fish taken during commercial roe fishery used for subsistence.
- h Data from fishermen who fished between Heas Creek and Dall River (Yukon River bridge area).
Of the 63 permits issued, 57 returned their permits and 42 fished. Estimate 48 fishing households.
Does not include residents of Stevens Village who were issued permits.
- i Includes Circle and vicinity, and Central.
Of the 29 permits issued, 24 returned their permits and 18 fished. Estimate 21 fishing households.
- j Includes Eagle and vicinity, Eagle Village, Chicken, and Tok.
Of the 49 permits issued, 48 returned their permits and 34 fished. Estimate 35 fishing households.
- k Manley. Of the 36 permits issued, 32 returned their permits and 24 fished. Estimate 28 fishing households.
Includes 548 chinook, 416 summer chum, 4,042 fall chum, and 1,357 coho salmon from ADF&G test fishwheel.
- l Minto. Of the 25 permits issued, 15 returned their permits and 7 fished. Estimate 17 fishing households.
- m Menana. Of the 46 permits issued, 42 returned their permits and 30 fished. Estimate 34 fishing households.
Includes 418 chinook, 443 summer chum, and 329 fall chum salmon from ADF&G test fishwheel.
- n Healy. Of the 5 permits issued, 5 returned their permits and 3 fished. Three fishing households.
- o Data from permitted fishermen who fished the Tanana River.
Of the 175 permits issued, 166 returned their permits and 111 fished. Estimate 120 fishing households.
- p Includes 24 summer chum salmon from Bettles.
- q Indian Food Fish and Domestic catch data from Department of Fisheries & Oceans, Whitehorse, Yukon Territory (preliminary data).

Table 8. Alaskan subsistence and personal use catch of Yukon River Salmon, 1961-1991. a, b

| Year | Chinook | Summer Chum | Fall Chum | Coho c | Total |
|--------|---------|-------------|-----------|--------|---------|
| 1961 | 21,488 | 305,317 | 101,772 | 9,192 | 437,769 |
| 1962 | 11,110 | 261,856 | 87,285 | 9,480 | 369,731 |
| 1963 | 24,862 | 297,094 | 99,031 | 27,699 | 448,686 |
| 1964 | 16,231 | 361,080 | 120,360 | 12,187 | 509,858 |
| 1965 | 16,608 | 336,848 | 112,283 | 11,789 | 477,528 |
| 1966 | 11,572 | 154,508 | 51,503 | 13,192 | 230,775 |
| 1967 | 16,448 | 206,233 | 68,744 | 17,164 | 308,589 |
| 1968 | 12,106 | 133,880 | 44,627 | 11,613 | 202,226 |
| 1969 | 14,000 | 156,191 | 52,063 | 7,776 | 230,030 |
| 1970 | 13,874 | 166,504 | 55,501 | 3,966 | 239,845 |
| 1971 | 25,684 | 171,487 | 57,162 | 16,912 | 271,245 |
| 1972 | 20,258 | 108,006 | 36,002 | 7,532 | 171,798 |
| 1973 | 24,317 | 161,012 | 53,670 | 10,236 | 249,235 |
| 1974 | 19,964 | 227,811 | 93,776 | 11,646 | 353,197 |
| 1975 | 13,045 | 211,888 | 86,591 | 20,708 | 332,232 |
| 1976 | 17,806 | 186,872 | 72,327 | 5,241 | 282,246 |
| 1977 | 17,581 | 159,502 | 82,771 | 16,333 | 276,187 |
| 1978 | 30,297 | 197,144 | 94,867 | 7,787 | 330,095 |
| 1979 | 31,005 | 196,187 | 233,347 | 9,794 | 470,333 |
| 1980 | 42,724 | 272,398 | 172,657 | 20,158 | 507,937 |
| 1981 | 29,690 | 208,284 | 188,525 | 21,228 | 447,727 |
| 1982 | 28,158 | 260,969 | 132,897 | 35,894 | 457,918 |
| 1983 | 49,478 | 240,386 | 192,928 | 23,895 | 506,687 |
| 1984 | 42,428 | 230,747 | 174,823 | 49,020 | 497,018 |
| 1985 | 39,771 | 264,828 | 206,472 | 32,264 | 543,335 |
| 1986 | 45,238 | 290,825 | 164,043 | 34,468 | 534,574 |
| 1987 d | 53,124 | 275,914 | 361,663 | 84,894 | 775,595 |
| 1988 | 46,590 | 202,137 | 159,703 | 69,138 | 477,568 |
| 1989 | 49,574 | 164,495 | 217,405 | 39,972 | 471,446 |
| 1990 e | 52,113 | 118,471 | 182,033 | 47,816 | 400,433 |
| 1991 f | | | | | |

Five Year Average

| | | | | | |
|-----------|--------|---------|---------|--------|---------|
| 1986-1990 | 49,328 | 210,368 | 216,969 | 55,258 | 531,923 |
|-----------|--------|---------|---------|--------|---------|

- a Includes personal use catches beginning in 1987 and ending in June 1990.
- b Catches estimated for 1961-1976. Catches of salmon other than chinook salmon were not differentiated by species until 1977.
- c Minimum estimates for 1961-1978 because surveys were typically conducted before the end of the fishing season.
- d Includes estimates of catches from illegal fall fish and roe sales in Districts 5 and 6.
- e Preliminary data.
- f Subsistence catch information in preparation.

Table 9. Subsistence and personal use salmon catches taken under authority of a permit in the Yukon Area, 1990.

| Permit Area | Permit Type | Permits | | Percent Returned | Did not Fish ^a | Reported Harvest | | | | Estimated Harvest ^b | | | |
|---|-------------|---------|----------|------------------|---------------------------|------------------|-------------|-----------|--------|--------------------------------|-------------|-----------|--------|
| | | Issued | Returned | | | Chinook | Summer Chum | Fall Chum | Coho | Chinook | Summer Chum | Fall Chum | Coho |
| Lower Yukon | LY-#-90 | 19 | 16 | 84% | 1 | 450 | 256 | 60 | 8 | 534 | 295 | 60 | 8 |
| Upper Yukon, Haul Road | PY-#-90 | 38 | 35 | 92% | 10 | 1,527 | 641 | 3,723 | 18 | 1,659 | 695 | 4,041 | 18 |
| Upper Yukon, Circle/Eagle | PE-#-90 | 5 | 5 | 100% | 1 | 240 | 0 | 13 | 5 | 240 | 0 | 13 | 5 |
| Upper Yukon, Other | PR-#-90 | 3 | 1 | 33% | 0 | 2 | 0 | 0 | 0 | 6 | 0 | 0 | 0 |
| Tanana River Fishing Subdistrict 6A | PA-#-90 | 1 | 1 | 100% | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tanana River Fishing Subdistrict 6B | PB-#-90 | 4 | 4 | 100% | 1 | 9 | 12 | 40 | 35 | 9 | 12 | 40 | 35 |
| Tanana River Fishing Subdistrict 6C | PC-#-90 | 152 | 144 | 95% | 42 | 442 | 918 | 1353 | 1120 | 466 | 966 | 1,425 | 1,184 |
| Personal Use Total | | 222 | 206 | 93% | 56 | 2,670 | 1,827 | 5,189 | 1,186 | 2,914 | 1,968 | 5,579 | 1,250 |
| Yukon River near Haul Road Bridge | SY-#-90 | 26 | 25 | 96% | 9 | 2032 | 3493 | 1109 | 455 | 2,114 | 3,633 | 1,153 | 473 |
| Yukon River near Circle and Eagle | SE-#-90 | 80 | 74 | 93% | 21 | 3,670 | 1,629 | 14,979 | 201 | 3,970 | 1,761 | 16,191 | 219 |
| Tanana River c Fishing Subdistrict 6A | SA-#-90 | 42 | 36 | 86% | 10 | 821 | 1,834 | 23,915 | 7,051 | 1,507 | 2,556 | 31,941 | 9,584 |
| Tanana River d Fishing Subdistrict 6B | SB-#-90 | 70 | 58 | 83% | 20 | 816 | 1,523 | 16,003 | 9,155 | 1,402 | 2,279 | 19,644 | 11,051 |
| Tanana River Fishing Subdistrict 6C | SC-#-90 | 19 | 18 | 95% | 12 | 15 | 69 | 279 | 50 | 16 | 73 | 294 | 53 |
| Tanana River Upstream of Subdistrict 6C | SU-#-90 | 1 | 1 | 100% | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delta River Carcasses | SD-#-90 | 7 | 7 | 100% | 4 | 0 | 0 | 750 | 0 | 0 | 0 | 750 | 0 |
| Subsistence Total | | 245 | 219 | 89% | 77 | 7,355 | 8,548 | 57,035 | 16,912 | 9,009 | 10,301 | 69,973 | 21,380 |
| Personal Use and Subsistence Total | | 467 | 425 | 91% | 133 | 10,025 | 10,375 | 62,224 | 18,098 | 11,923 | 12,269 | 75,552 | 22,630 |

a The number of permit holder who returned a permit and reported that they did not fish.

b Estimated harvest = (reported harvest by species/permits returned) x permits issued.

c Estimated harvest includes 548 chinook, 416 summer chum, 4042 fall chum, and 1357 coho salmon given away as part of the Departments test fish wheel program.

d Estimated harvest includes 418 chinook, 443 summer chum, and 329 fall chum salmon given away as part of the Departments test fish wheel program.

Table 10. Canadian catch of Yukon River chinook salmon, 1961-1991.^a

| Year | Mainstem Yukon River Harvest | | | | Total | Porcupine River Indian Food Fish | Total Utilization |
|-------------------|------------------------------|----------|---------------------|--------------------|--------|---|----------------------|
| | Commercial | Domestic | Indian Food Fish | Sport ^b | | | |
| 1961 | 3,446 | | 9,300 | | 12,746 | 500 | 13,246 |
| 1962 | 4,037 | | 9,300 | | 13,337 | 600 | 13,937 |
| 1963 | 2,263 | | 7,750 | | 10,013 | 44 | 10,077 |
| 1964 | 3,208 | | 4,124 | | 7,332 | 78 | 7,408 |
| 1965 | 2,265 | | 3,021 | | 5,286 | 94 | 5,380 |
| 1966 | 1,942 | | 2,445 | | 4,387 | 65 | 4,452 |
| 1967 | 2,167 | | 2,920 | | 5,107 | 43 | 5,150 |
| 1968 | 2,212 | | 2,800 | | 5,012 | 30 | 5,042 |
| 1969 | 1,640 | | 957 | | 2,597 | 27 | 2,624 |
| 1970 | 2,611 | | 2,044 | | 4,655 | 8 | 4,663 |
| 1971 | 3,178 | | 3,260 | | 6,438 | 9 | 6,447 |
| 1972 | 1,789 | | 3,960 | | 5,729 | - | 5,729 |
| 1973 | 2,199 | | 2,319 | | 4,518 | 4 | 4,522 |
| 1974 | 1,806 | 408 | 3,342 | | 5,556 | 75 | 5,631 |
| 1975 | 3,000 | 400 | 2,500 | | 5,900 | 100 | 6,000 |
| 1976 | 3,500 | 500 | 1,000 | | 5,000 | 25 | 5,025 |
| 1977 | 4,720 | 531 | 2,247 | | 7,498 | 29 | 7,527 |
| 1978 | 2,975 | 421 | 2,485 | | 5,881 | - | 5,881 |
| 1979 | 6,175 | 1,200 | 3,000 | | 10,375 | - | 10,375 |
| 1980 | 9,500 | 3,500 | 7,548 | 300 | 20,848 | 2,000 | 22,848 |
| 1981 | 8,583 | 237 | 8,679 | 300 | 18,009 | 100 | 18,109 |
| 1982 | 8,640 | 435 | 7,433 | 300 | 16,808 | 400 | 17,208 |
| 1983 | 13,027 | 400 | 5,025 | 300 | 18,752 | 200 | 18,952 |
| 1984 | 9,885 | 260 | 5,650 | 300 | 16,295 | 500 | 16,795 |
| 1985 | 12,573 | 478 | 5,600 | 300 | 19,151 | 150 | 19,301 |
| 1986 | 10,797 | 342 | 8,625 | 300 | 20,064 | 300 | 20,364 |
| 1987 | 10,864 | 330 | 8,119 | 300 | 17,613 | 51 | 17,664 |
| 1988 | 13,217 | 282 | 7,178 | 650 | 21,327 | 100 | 21,427 |
| 1989 | 9,769 | 400 | 6,930 | 300 | 17,419 | 525 | 17,944 |
| 1990 | 11,324 | 247 | 7,109 | 300 | 18,980 | 247 | 19,227 |
| 1991 ^c | 10,906 | 227 | 6,978 | 300 | 18,411 | 200 | 18,611 |
| Average | | | | | | | |
| 1961-80 | 3,233 | 994 | 3,816 | | 7,412 | 186 | 7,598 |
| 1961-85 | 10,544 | 382 | 6,597 | 300 | 17,803 | 270 | 18,073 |
| 1966-90 | 11,198 | 320 | 7,192 | 370 | 19,081 | 245 | 19,325 |

^a Catch in numbers of fish.

^b Sport fish harvest unknown prior to 1980.

^c Preliminary.

Table 11. Canadian catch of Yukon River fall chum salmon 1961-1991.^a

| Year | Mainstem Yukon River Harvest | | | | Porcupine River Indian Food Fish | Total Utilization |
|-------------------|------------------------------|----------|------------------|--------|----------------------------------|-------------------|
| | Commercial | Domestic | Indian Food Fish | Total | | |
| 1961 | 3,276 | | 3,800 | 7,076 | 2,000 | 9,076 |
| 1962 | 936 | | 6,500 | 7,436 | 2,000 | 9,436 |
| 1963 | 2,196 | | 5,500 | 7,696 | 20,000 | 27,696 |
| 1964 | 1,929 | | 4,200 | 6,129 | 6,058 | 12,187 |
| 1965 | 2,071 | | 2,183 | 4,254 | 7,535 | 11,789 |
| 1966 | 3,157 | | 1,430 | 4,587 | 8,805 | 13,392 |
| 1967 | 3,343 | | 1,850 | 5,193 | 11,768 | 16,951 |
| 1968 | 483 | | 1,180 | 1,663 | 10,000 | 11,663 |
| 1969 | 2,279 | | 2,120 | 4,399 | 3,377 | 7,776 |
| 1970 | 2,479 | | 612 | 3,091 | 620 | 3,711 |
| 1971 | 1,781 | | 150 | 1,931 | 15,000 | 16,931 |
| 1972 | 2,532 | | 0 | 2,532 | 5,000 | 7,532 |
| 1973 | 2,808 | | 1,129 | 3,937 | 6,200 | 10,137 |
| 1974 | 2,544 | 468 | 1,638 | 4,648 | 7,000 | 11,648 |
| 1975 | 2,500 | 4,600 | 2,500 | 9,600 | 11,000 | 20,600 |
| 1976 | 1,000 | 1,000 | 100 | 2,100 | 3,100 | 5,200 |
| 1977 | 3,990 | 1,499 | 1,430 | 6,919 | 5,560 | 12,479 |
| 1978 | 3,358 | 728 | 482 | 4,568 | 5,000 | 9,568 |
| 1979 | 9,084 | 2,000 | 11,000 | 22,084 | - | 22,084 |
| 1980 | 9,000 | 4,000 | 3,218 | 16,218 | 6,000 | 22,218 |
| 1981 | 15,280 | 1,811 | 2,410 | 19,501 | 3,000 | 22,501 |
| 1982 | 11,312 | 683 | 3,096 | 15,091 | 1,000 | 16,091 |
| 1983 | 25,960 | 300 | 1,200 | 27,460 | 2,000 | 29,460 |
| 1984 | 22,982 | 535 | 1,800 | 25,317 | 4,000 | 29,317 |
| 1985 | 35,748 | 279 | 1,740 | 37,767 | 3,500 | 41,267 |
| 1986 | 11,464 | 222 | 2,150 | 13,836 | 657 | 14,493 |
| 1987 | 40,551 | 132 | 3,622 | 44,305 | 135 | 44,440 |
| 1988 | 30,283 | 349 | 1,882 | 32,414 | 1,071 | 33,485 |
| 1989 | 17,548 | 100 | 2,482 | 20,130 | 2,909 | 23,039 |
| 1990 | 27,537 | 0 | 3,675 | 31,212 | 2,410 | 33,622 |
| 1991 ^b | 30,784 | 0 | 5,819 | 36,603 | 1,642 | 38,245 |
| Average | | | | | | |
| 1961-80 | 3,085 | 2,042 | 2,551 | 6,300 | 6,791 | 13,091 |
| 1981-85 | 22,248 | 682 | 2,049 | 24,979 | 2,700 | 27,679 |
| 1986-90 | 25,481 | 161 | 2,758 | 28,400 | 1,436 | 29,836 |

^a Catch in numbers of fish.

^b Preliminary.

Table 1. Chinook salmon escapement counts for selected U.S. spawning stocks in the Anvik River drainage, 1961-1991. a

| Year | Andreadsky River | | Anvik River b | Nuleto River | Gisasa River | Goodpaster River | Chena River f | | Salcha River g | |
|--------------------------------------|------------------|-----------|---------------|--------------|--------------|------------------|---------------|-----------------------|----------------|-----------------------|
| | East Fork | West Fork | | | | | Index | Population Estimate d | Index | Population Estimate d |
| 1961 | 1,003 | - | 1,228 | 543 c | 288 c | 402 | - | - | - | - |
| 1962 | 875 c | 762 c | - | - | - | - | - | - | - | - |
| 1963 | - | - | - | - | - | - | - | - | - | - |
| 1964 | 867 | 705 | - | - | - | - | - | - | - | - |
| 1965 | - | 344 c | 850 | - | - | 80 c | - | - | - | - |
| 1966 | 361 | 303 | 838 | - | - | - | - | - | - | - |
| 1967 | - | 278 c | 338 | - | - | - | - | - | - | - |
| 1968 | 380 | 363 | 310 | - | - | - | - | - | - | - |
| 1969 | 274 c | 231 c | 298 | - | - | - | - | - | - | - |
| 1970 | 685 | 574 c | 368 | - | - | 239 | - | - | - | - |
| 1971 | 1,904 | 1,682 | - | - | - | - | - | - | - | - |
| 1972 | 798 | 582 c | 1,198 | - | - | 21 c | - | - | 1,034 | - |
| 1973 | 825 | 788 | 813 | - | - | 14 | - | - | - | - |
| 1974 | - | 285 | 471 c | 78 c | 161 | 97 | 968 | - | 1,620 | - |
| 1975 | 993 | 301 | 730 | 204 | 385 | - | 282 | - | - | - |
| 1976 | 818 | 843 | 1,153 | 848 | 332 | 65 | 498 | - | 1,473 | - |
| 1977 | 2,008 | 1,499 | 1,371 | 487 c | 255 | 29 | - | - | 1,082 | - |
| 1978 | 2,487 | 1,062 | 1,324 | 920 | 45 c | - | - | - | 3,258 | - |
| 1979 | 1,180 | 1,134 | 1,484 | 1,507 | 484 | - | - | - | - | - |
| 1980 | 968 c | 1,500 | 1,182 | 1,323 c | 951 | - | - | - | 8,128 | - |
| 1981 | 2,148 c | 231 c | 577 | 791 c | - | - | - | - | 1,121 c | - |
| 1982 | 1,274 | 851 | - | - | 421 | - | - | - | 2,348 | - |
| 1983 | - | - | 378 | 1,008 | 572 | 150 | 2,338 | - | 1,803 | - |
| 1984 | 1,573 c | 1,983 | 574 | - | - | - | 494 | - | 908 | - |
| 1985 | 1,617 | 2,248 | 720 | 2,780 | 735 | - | 2,282 | - | 1,880 | - |
| 1986 | 1,954 | 3,158 | 918 | 2,974 | 1,348 | - | 1,935 | 9,065 | - | - |
| 1987 | 1,808 | 3,281 | 879 | 1,638 | 731 | - | 1,209 c | 8,404 | 1,871 | 4,771 |
| 1988 | 1,020 | 1,448 | 1,448 | 1,773 | 797 | - | 1,780 | 3,348 | 2,553 | 4,562 |
| 1989 | 1,389 | 1,089 | 212 | - | - | - | 1,185 | 2,688 | 2,138 | 3,294 |
| 1990 | 2,503 | 1,545 | 1,595 | 988 | 884 c | 510 | 1,402 c | 5,803 | 3,429 | 10,728 |
| 1991 h | 1,938 | 2,544 | 825 | 2,020 | 1,890 | 868 | 1,278 c | 3,025 | 1,922 c | 5,608 |
| Interim Minimum Escapement Objective | 1,800 | 1,000 | 500 | 1,000 | 650 | - | 1,700 | - | 2,500 | - |

a Data obtained by aerial survey unless otherwise noted. Only peak counts are listed.
b From 1961-1970, aerial survey count data are from various segments of the mainstem Anvik River. From 1972-1979, tower estimates, mainstem aerial survey counts below the tower were added to tower counts. From 1980-present, aerial survey counts are from the mainstem Anvik River between the Yellow River and McDonald Creek.
c Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.
d Population point estimate based on a Division of Sport Fisheries tag and recovery project.
e Interim escapement objective for the mainstem Anvik River between the Yellow River and McDonald Creek. Chena River index area for assessing escapement objectives is from Moose Creek Dam to Middle Fork River.
f Salcha River index area for assessing escapement objectives is from TAPS crossing to Caribou Creek.
g Preliminary information.

Table 13. Chinook salmon escapement counts for selected Canadian spawning stocks in the Yukon River drainage, 1961-1991. a

| Year | Tincup Creek | Tatchun River b | Little Salmon River | Big Salmon River d | Nisutlin River e | Wolf River f | Whitehorse Fishway g | Mainstem Tagging Estimate h |
|--------------------------------------|--------------|-----------------|---------------------|--------------------|------------------|--------------|----------------------|-----------------------------|
| 1961 | - | - | - | - | - | - | 1,068 | - |
| 1962 | - | - | - | - | - | - | 1,500 | - |
| 1963 | - | - | - | - | - | - | 483 | - |
| 1964 | - | - | - | - | - | - | 596 | - |
| 1965 | - | - | - | - | - | - | 903 | - |
| 1966 | - | 7 c | - | - | - | - | 563 | - |
| 1967 | - | - | - | - | - | - | 533 | - |
| 1968 | - | - | 173 c | 857 c | 407 c | - | 414 | - |
| 1969 | - | - | 120 | 286 | 105 | - | 334 | - |
| 1970 | - | 100 | - | 670 | 615 | 71 c | 625 | - |
| 1971 | - | 130 | 275 | 275 | 650 | 750 | 856 | - |
| 1972 | - | 80 | 126 | 415 | 237 | 13 | 391 | - |
| 1973 | 100 | 99 | 27 c | 75 c | 36 c | - | 224 | - |
| 1974 | - | 192 | - | 70 c | 48 c | - | 273 | - |
| 1975 | - | 175 | - | 153 c | 249 | 40 c | 313 | - |
| 1976 | - | 52 | - | 86 c | 102 | - | 121 | - |
| 1977 | - | 150 | 408 | 316 c | 77 | - | 277 | - |
| 1978 | - | 200 | 330 | 524 | 375 | - | 725 | - |
| 1979 | - | 150 | 489 c | 632 | 713 | 183 c | 1,184 | - |
| 1980 | - | 222 | 286 c | 1,436 | 975 | 377 | 1,383 | - |
| 1981 | - | 133 | 670 | 2,411 | 1,626 | 396 | 1,555 | - |
| 1982 | - | 73 | 403 | 758 | 578 | 104 | 473 | 19,790 |
| 1983 | 100 | 264 | 101 c | 540 | 701 | 95 | 905 | 28,989 |
| 1984 | 150 | 161 | 434 | 1,044 | 832 | 124 | 1,042 | 27,616 |
| 1985 | 210 | 190 | 255 | 801 | 409 | 110 | 508 | 10,730 |
| 1986 | 228 | 155 | 54 c | 745 | 456 c | 109 | 557 | 16,415 |
| 1987 | 100 | 159 | 468 | 891 | 183 | 35 | 327 | 13,210 |
| 1988 | 204 | 130 | 368 | 765 | 267 | 66 | 405 | 23,118 |
| 1989 | 88 | 100 | 862 | 1,662 | 685 | 146 | 549 | 25,201 |
| 1990 | 83 | 643 | 665 | 1,806 | 632 | 188 | 1,407 | 38,678 |
| 1991 j | - | - | 326 | 1,040 | - | 201 | 1,266 | 22,582 |
| Interim Minimum Escapement Objective | | | | | | | | 33,000 |

a Data obtained by aerial survey unless otherwise noted. Only peak counts are listed.

b All foot surveys except 1976 (boat survey) and 1966 (aerial survey).

c Incomplete and/or poor survey conditions resulting in minimal or inaccurate counts.

d 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 South Creek.

e One Hundred Mile Creek to Sidney Creek.

f Wolf Lake to Red River.

g Includes 50, 90, 292 and 506 fin-clipped hatchery-origin salmon in 1988, 1989, 1990 and 1991, respectively.

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

i Estimate derived by dividing the 1984 5-area (Whitehorse Fishway, Big Salmon, Nisutlin, Wolf, Tatchun) by the average proportion of the 5-area index count to the estimated spawning escapements from the DFO tagging study for years 1962, 1983, and 1985-1989.

j Preliminary information.

Table 14. Summer chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1973–1991. a

| Year | Andreafsky River | | | | | | | | | |
|---|------------------|----------------|----------------|----------------|----------------|---------------|--------------|-----------------|-------------|--------------|
| | East Fork | | West Fork | Anvik River | | Nulato River | Gisasa River | Hogatza River | Chena River | Salcha River |
| | Aerial | Sonar or Tower | | Tower & Aerial | Sonar | | | | | |
| 1973 | 10,149 b | – | 51,835 | 86,665 b | – | – | – | – | – | – |
| 1974 | 3,215 b | – | 33,578 | 201,277 | – | 51,160 | – | – | – | 3,510 |
| 1975 | 223,485 | – | 235,954 | 845,485 | – | 138,495 | – | 22,355 | – | 7,573 |
| 1976 | 105,347 | – | 118,420 | 406,166 | – | 40,001 b | – | 20,744 | – | 6,474 |
| 1977 | 112,722 | – | 63,120 | 262,854 | – | 69,660 | – | 10,734 | – | 677 b |
| 1978 | 127,050 | – | 57,321 | 251,339 | – | 54,480 | 9,280 b | 5,102 | 1,809 | 5,405 |
| 1979 | 66,471 | – | 43,391 | – | 280,537 | 37,104 | 10,962 | 14,221 | 1,025 b | 3,060 |
| 1980 | 36,823 b | – | 115,457 | – | 492,676 | 14,948 b | 10,388 | 19,788 | 338 | 4,140 |
| 1981 | 81,555 | 147,312 c | – | – | 1,479,582 | 14,348 b | – | – | 3,500 | 8,500 |
| 1982 | 7,501 b | 181,352 o | 7,267 b | – | 444,581 | – | 334 b | 4,984 b | 1,509 | 3,756 |
| 1983 | – | 110,808 o | – | – | 362,912 | 21,012 b | 2,356 b | 28,141 | 1,097 | 716 b |
| 1984 | 95,200 b | 70,125 o | 238,565 | – | 891,028 | – | – | – | 1,861 | 9,810 |
| 1985 | 66,146 | – | 52,750 | – | 1,080,243 | 29,838 | 13,232 | 22,566 | 1,005 | 3,178 |
| 1986 | 83,931 | 167,614 d | 99,373 | – | 1,189,602 | 64,265 | 12,114 | – | 1,509 | 8,028 |
| 1987 | 6,687 b | 45,221 d | 35,535 | – | 455,876 | 11,267 | 2,123 | 5,669 b | 333 | 3,657 |
| 1988 | 43,056 | 68,937 d | 45,432 | – | 1,125,449 | 42,083 | 9,284 | 6,890 | 432 | 2,889 b |
| 1989 | 21,480 b | – | – | – | 636,906 | – | – | – | 714 b | 1,574 b |
| 1990 | 11,519 b | – | 20,426 b | – | 395,303 | 4,615 b | 450 b | 2,177 b | – | 450 b |
| 1991 e | 23,819 | – | 34,561 | – | 860,525 | 25,641 | 7,003 | 9,947 | – | 154 b |
| Interim Minimum Escapement Objective | 109,000 | – | 116,000 | – | 487,000 | 53,000 | – | 17,000 f | – | 3,500 |

a Data obtained by aerial survey unless otherwise noted. Only peak counts are listed.

b Incomplete survey and/or poor survey timing or conditions resulted in minimal or inaccurate count.

c Sonar count.

d Tower count.

e Preliminary

f Interim escapement objective includes Clear Creek (8,000) and Caribou Creek (700).

Table 15. Fall chum salmon escapement counts for selected spawning areas in the Yukon River drainage, 1974-1991.

| Year | Tanana River Drainage | | | | | | | Canada Mainstem Tagging Estimate f |
|--------------------------------------|-----------------------|-------------------------|------------------------------|------------------|----------------------|---------------------|------------------------------|---|
| | Tokitk River b | Bluff Cabin Slough n | Clear Water Lake Outlet n | Delta River a | Chandalar River c | Sheenjek River e | Fishing Branch River e | |
| 1974 | 43,464 | - | - | 5,915 | - | 89,966 d | 32,825 g | - |
| 1975 | 90,984 | - | - | 3,734 h | - | 173,371 d | 363,282 g | - |
| 1976 | 53,882 | - | - | 8,312 h | - | 26,354 d | 36,584 | - |
| 1977 | 38,462 | - | - | 16,878 h | - | 45,544 d | 88,400 | - |
| 1978 | 37,057 | - | - | 11,138 | - | 32,449 d | 40,800 | - |
| 1979 | 179,627 | - | - | 8,365 | - | 91,172 d | 119,898 | - |
| 1980 | 28,373 | 3,190 | - | 5,137 | - | 28,033 d | 55,268 | - |
| 1981 | 15,775 | 8,120 | 1,780 | 23,508 | - | 74,960 d | 57,386 i | - |
| 1982 | 3,801 | 1,156 o | - | 4,235 | - | 31,421 | 15,901 | 31,958 |
| 1983 | 20,807 | 12,715 o | 2,380 | 7,705 | - | 49,392 | 27,200 | 90,879 |
| 1984 | 16,511 | 4,017 o | 851 | 12,411 | - | 27,130 | 15,150 | 58,633 j |
| 1985 | 22,805 | 2,655 | 1,372 | 17,278 h | - | 152,768 | 56,100 g | 62,010 |
| 1986 | 18,903 | 3,458 o | 475 | 8,703 h | 59,313 | 83,187 | 31,173 g | 87,990 |
| 1987 | 22,141 | 8,398 o | 1,500 | 21,180 | 52,416 | 140,086 | 48,958 g | 80,776 |
| 1988 | 13,324 | 4,481 | 2,312 | 18,024 | 39,619 | 41,073 | 28,597 g | 36,788 |
| 1989 | 30,447 | 5,388 | 1,273 | 21,342 h | 69,161 | 101,748 | 43,634 g | 35,750 |
| 1990 | 33,872 | 1,632 o | 178 o | 8,982 h | 78,631 | 63,135 | 27,000 m | 49,849 |
| 1991 k | 13,197 | 7,198 o | 4,291 o | 32,905 h | - | 88,890 | 37,733 g | 78,447 |
| Interim Minimum Escapement Objective | 33,000 | - | - | 11,000 | - | 64,000 | 50,000 | 60,000 |

- a Total escapement estimates made from migratory time density curve (see Barton 1986), unless otherwise indicated.
- b Total escapement estimates using Delta River migratory time density curve and percentage of live salmon present by survey date in the upper Tokitk River area.
- c Sonar estimate.
- d Total escapement estimates using sonar to aerial survey expansion factor of 2.221.
- e Total escapement estimates using weir to aerial survey expansion factor of 2.72, unless otherwise indicated.
- f Estimated total spawning estimates excluding Porcupine-Fishing Branch Rivers (estimated border escapement minus Canadian removal).
- g Weir estimate.
- h Population estimate from replicate foot surveys and stream life data.
- i 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.
- j Escapement estimate based on mark-recapture program unavailable. Estimate based on assumed average exploitation rate.
- k Preliminary information.
- m Weir was not operated. Total escapement estimate using weir to aerial survey expansion factor of 3.57. Survey was conducted approximately 2 weeks late. Therefore, a more reasonable escapement estimate would be between 30,000 and 40,000 salmon.
- n Peak aerial survey count, unless otherwise noted. Not a total population estimate.
- o Peak ground survey count. Not a total population estimate.

Table 1. Salmon escapement counts for selected spawning areas in the
 Clearwater River drainage, 1972-1991. a

| Year | Nenana River Drainage | | | | Delta Clearwater River d,e | Clearwater Lake and Outlet | Richardson Clearwater River |
|------|-----------------------|----------------|-----------------|-------------------|----------------------------------|----------------------------------|-----------------------------------|
| | Lost Slough | Clear Creek | Wood Creek b | 17 Mile Slough | | | |
| 1972 | - | - | - | - | 632 | 417 | 484 g |
| 1973 | - | - | - | - | 3,322 | 551 d | 375 d |
| 1974 | 1,388 | - | - | 27 | 3,954 | 580 | 652 d |
| 1975 | 943 | - | - | 956 | 5,100 | 1,575 d,e | 4 g |
| 1976 | 118 | 13 | - | 281 | 1,920 | 1,500 d,e | 80 g |
| 1977 | 524 | - | 310 c | 1,167 | 4,793 | 730 d,e | 327 |
| 1978 | 350 | - | 300 c | 468 | 4,798 | 570 d,e | - |
| 1979 | 227 | - | - | 1,987 | 8,970 | 1,015 d,e | 372 |
| 1980 | 489 | - | 1,603 c | 592 | 3,948 | 1,545 d,e | 611 |
| 1981 | 274 | - | 849 h | 1,005 | 8,563 f | 459 g | 550 |
| 1982 | - | - | 1,438 h | - | 8,365 f | - | - |
| 1983 | 768 | - | 1,044 h | 103 | 8,019 f | 253 | 88 |
| 1984 | 2,677 | 2,600 b,e | 8,805 h | - | 11,061 | 1,388 | 428 |
| 1985 | 1,584 | - | 3,775 h | 2,081 | 5,358 | 750 | - |
| 1986 | 794 | 605 b,e | 1,684 h | 218 b,e | 10,857 | 3,577 | 148 g |
| 1987 | 2,511 | - | 2,450 h | 3,802 | 22,300 | 4,225 d,e | - |
| 1988 | 348 | - | 2,048 h | - | 21,600 | 825 d,e | - |
| 1989 | - | - | 412 h | 824 g | 11,000 | 1,600 d,e | 483 |
| | 688 | - | - | 15 g | 8,325 | 2,375 d,e | - |
| | 584 | - | - | 52 | 23,900 | 3,150 d,e | - |

a Only peak counts presented. Survey rating is fair to good, unless otherwise noted.

b Surveyed by F.R.E.D.

c Foot survey.

d Surveyed by Sport Fish Division.

