

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

1983
YUKON AREA
SALMON REPORT

to the
Alaska Board of Fisheries
February 1984

Anchorage Area Office: 333 Raspberry Road, Anchorage, Alaska 99502

Area Management Biologist - Michael Geiger

Project Biologist - Larry Buklis

Project Biologist - Richard Nickerson

Project Biologist - Doug McBride

Fairbanks Area Office: 1300 College Road, Fairbanks, Alaska 99701

Area Management Biologist - Fred Andersen

Project Biologist - Louis Barton

St. Marys Field Office: P.O. Box 195, St. Marys, Alaska 99658

Assistant Area Management Biologist - James Brady

TABLE OF CONTENTS

	Page No.
I. BACKGROUND	1
A. Area Boundaries and Legal Gear.	1
B. General Management Objectives	1
C. Status of Fishery, Stocks, and Management Strategies.	3
II. SEASON SUMMARY	11
A. Area Summary.	11
B. King Salmon	12
C. Summer Chum Salmon.	13
D. Fall Chum Salmon.	15
E. Coho Salmon	17
III. OUTLOOK FOR 1984	17
IV. FIGURES AND TABLES	19
Figure 1. Map of Yukon management area, districts, and subdistricts.	19
Figure 2. King salmon escapements in selected Yukon River tributaries, 1960-1983.	20
Figure 3. Commercial and subsistence king catches in Alaska, Yukon River, 1971-1983.	22
Figure 4. Summer chum escapements in selected Yukon River tributaries, 1971-1983.	23
Figure 5. Fall chum salmon escapements in selected Yukon River tributaries, 1974-1983.	25
Figure 6. Yukon area commercial and subsistence chum salmon catches, 1971-1983	26
Table 1. Commercial salmon catches, Yukon area, 1961-1983.	27
Table 2. Commercial salmon catches by species and subdistrict, 1983	28
Table 3. Upper Yukon area salmon and salmon roe production, 1983.	29

BACKGROUND

Area Boundaries and Legal Gear

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 and subsistence fishing occurs along the 1200 mile length of the Yukon River (in Alaska) and in the lower 220 miles of the Tanana River.

Legal commercial fishing gear consists of set and drift gillnets in the lower Yukon area (lower 3 districts) and fishwheels and set gillnets in the upper Yukon area. Open skiffs powered by outboard motors are used to operate the fishing gear and deliver the fish to buyers.

General Management Objectives

The overall objective of the Department's research and management programs is to manage the various salmon runs for optimum sustained yield. The commercial fishery is regulated on the assumption that a harvestable surplus, after providing for spawning and subsistence utilization requirements, is available.

Subsistence has been designated by the Legislature (State Law 151) as the highest priority among beneficial uses of fish and game resources. Except in areas where intensive commercial fisheries occur, the subsistence fishery is subject to few restrictions in order to give preference to subsistence users. The majority of Yukon River fishermen usually take salmon for both commercial and subsistence purposes in major commercial fishing areas. Therefore, in order to enforce commercial fishing regulations, it is necessary to place some restrictions on the subsistence fishery. For example, during the commercial salmon fishing season in most areas, subsistence fishing is allowed only during the open commercial

fishing periods. During the course of the year, however, substantially more subsistence fishing time is allowed than commercial fishing time.

Management is made difficult by the character of salmon runs, the nature of the various fisheries (for example, the rapid evolution of the lower Yukon setnet fishery into a drift net fishery), and the river itself. Since most of the commercial fisheries have only developed or 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. The various fisheries, which are scattered over 1400 river miles, harvest mixed stocks usually several weeks and hundreds of miles from their spawning grounds. Because the Yukon River commercial fishery is essentially a "cape fishery" (harvesting mixed stocks), some tributary populations may be under- or overharvested in relation to their actual abundance. For example, in a mixed-stock fishery, where it is impossible to manage each stock separately, some spawning populations may be reduced to very low levels or even eliminated.

New research projects are underway and other programs are planned, once additional funding becomes available, to obtain the biological information necessary for better management of the salmon runs. These include: (1) king salmon stock separation studies using scale analysis techniques (2) side-scanning sonar to obtain accurate daily and seasonal escapements in important tributaries (Anvik, Andreafsky, and Sheenjok rivers), (3) expanded upper Yukon test fishing program, and (4) main river sonar feasibility study (near Pilot Station) to obtain index estimates of salmon abundance.

Management of the Yukon River commercial salmon fishery should be conservative because of the difficulty in determining run size, harvesting of mixed stocks, increased effort by and efficiency of the commercial fleet, allocation problems, and the need to provide for upriver escapements and subsistence requirements. This is achieved by establishing guideline harvest ranges, gillnet mesh-size restrictions, weekly fishing periods,

and season closures. If it becomes apparent during the fishing season (based on analysis of commercial catch and test fishery data) that the run is substantially smaller or larger than needed for escapement and subsistence requirements, commercial fishing time is adjusted through the use of the emergency order or, less frequently, emergency regulation authority.

Status of Fishery, Stocks, and Management Strategies

All five species of Pacific salmon occur in the Yukon River, with chums being the most abundant, followed by kings, cohos, pinks, and reds. Commercial salmon fishing (for kings) on the Yukon dates back to 1918, but the multi-species salmon fishery did not become fully developed until the mid-1970's. In the Alaskan portion of the Yukon, the average commercial salmon harvest for the period 1978-1982 is 1.4 million fish (Table 1). An average of 441,000 salmon is taken additionally each year for subsistence use.

Approximately 900 commercial fishermen (700 in the 3 lower subdistricts) and 20 processors participate in the fishery. The ex-vessel value of the salmon catch has averaged \$7.6 million for the most recent 5-year period.

King salmon spawning populations are widely distributed throughout the Alaskan and Canadian portions of the Yukon River drainage. Major spawning streams in Alaska include the Andreafsky, Anvik, Nulato, Salcha and Chena rivers; in the Canadian portion of the drainage (Yukon Territory), important king salmon systems include the Big Salmon and Nisutlin rivers. King salmon escapement trends are shown in Figure 2.

Annual subsistence catches of king salmon in Alaska during 1962-1982 ranged from 11,000-43,000 (20,700 average) (Figure 3). During the past 5 years, subsistence king catches have increased due to above-average

size runs (31,800 average). In the Yukon Territory (Canada), the recent 5-year average is 7,900 kings.

During the period 1960-1971, the commercial catch of king salmon ranged from 67,600 to 129,700 and averaged 101,800. Yukon king salmon runs generally declined in magnitude during the early to mid-1970's, and average commercial harvests dropped to 83,700 during the period 1972-76. This decline of Yukon River king salmon is partially attributed to interceptions by the Japanese high seas mothership fishery.

Since 1976, reductions in high seas interceptions (except 1980), a series of mild winters, and more restrictive management of the inshore fishery have combined to produce a series of above-average king salmon returns. For the period 1978 through 1982, average commercial harvests (in Alaska) increased to 132,600 (Table 1). During the same period, commercial catches in the Yukon Territory averaged 6,400 kings.

Timing of king salmon runs is highly variable, in response to spring weather conditions. Opening of the commercial fishery in the lower river is likewise variable and occurs between June 5 and June 15 by emergency order. The season is opened only after it is determined that a sustained in-migration of fish is occurring and that the early portion of the run is well distributed throughout the lower river. This strategy allows fishery managers an opportunity to assess run strength prior to intensive commercial fishing effort, spreads fishing effort over a larger portion of the run, and affords subsistence fishermen an opportunity to harvest fish for their domestic needs prior to implementation of restrictive commercial fishing periods.

During the king salmon season, commercial and subsistence fishing in districts 1 and 2 is regulated by emergency order and is normally allowed for two 24-hour periods per week. Regulations adopted by the Board of Fisheries prior to the 1983 season allow an additional 24-hour subsistence fishing period every other weekend in districts 1 and 2 during the

commercial king salmon season. In district 3, fishing is allowed for two 36-hour periods per week, and in districts 4, 5, and 6 fishing occurs during two 48-hour periods per week. Duration and frequency of fishing periods may be changed by emergency order, depending on run strength as indicated by comparative commercial and test catches.

A guideline harvest range of 60,000-120,000 king salmon for districts 1 and 2 has been established by the Board of Fisheries. The midpoint (90,000) of this guideline harvest range should be the expected catch if the run is of average magnitude. The expected catch if the run is above average would be 90-120,000 kings. If an exceptionally large run occurs, as in 1981, then the upper end (120,000) of the guideline harvest range may be exceeded. Consequently, fishing time may be reduced in districts 1 and 2 to more evenly distribute harvest throughout the run, even in years of large runs. Commercial king salmon harvests in districts 3-6 are likewise regulated by guideline harvest ranges which allow an additional (combined) harvest of 7,350 to 9,150 kings.

Summer chums are the more abundant of the two chum salmon runs that occur in the Yukon River. Summer chums can be distinguished from fall chums by the following characteristics: (1) earlier run timing (early June to mid-July in the lower river); (2) rapid maturation in fresh water; (3) smaller body size (6-7 lbs.); and (4) greater population size.

Summer-run chums spawn primarily in the lower 600 miles of the drainage. The Anvik River supports the largest spawning population; other important spawning areas include the Andrafsky, Nulato, Rodo, Salcha and Hogatza River drainages. With possible exceptions, Yukon summer chum stocks have not experienced declining escapements, although runs fluctuate greatly in abundance from year to year. Documented harvests and escapements during recent years show minimum run sizes ranging from 1.2 to 5.6 million fish. Summer chum salmon escapement trends are shown in Figure 4.

Regulations regarding harvest and sale of summer-run chum salmon were liberalized beginning with the 1967 season. By 1973 all gillnet mesh-size restrictions were lifted in order to afford fishermen an opportunity to use small-mesh gillnets, which select for the more abundant chum salmon. Prior to this time, commercialization of this species had been limited because of its importance to upriver subsistence fisheries. Presently the summer chum salmon subsistence fishery takes about 200,000 fish annually (227,200 - 1978-1982 average).

The summer chum commercial fishery has developed rapidly in recent years. From 1967 through 1982, harvests ranged from 11,200 to 1.2 million fish, and the most recent 5-year average is 942,500 (Table 1). A regulation was promulgated prior to the 1976 season which established a range of dates (from June 27 to July 5 in districts 1 and 2, and July 5 to July 15 in district 3) after which only gillnets of 6-inch or smaller mesh can be used. This regulation serves not only to minimize capture of large female king salmon during the late portion of the king run but also to optimize the harvest of the abundant summer chums migrating through the lower river fishery during late June-early July.

Management of summer chums is complicated by the fact that both king and summer chum salmon exhibit similar run timing. Because of the overriding importance of king salmon, the harvest of chums in the lower river is greatly dependent on the regulations and management strategies employed toward the more intensively managed king salmon fishery. Even if an exceptionally large run of summer chums develops, the harvest of that species may be no more than average because of restrictions imposed on the fleet for the conservation of kings.

Guideline harvest ranges are used to regulate the harvest of kings and fall chums but have not been established for summer chums.

The majority of summer chums harvested in the upper Yukon districts are taken in subdistrict 4-A. A statewide abundance of ocean-caught salmon

in recent years has adversely affected the marketability of upriver summer chum salmon because of their relatively poor flesh quality; however, large amounts of high-quality roe continue to be produced in this area.

Fall chums have the following differentiating characteristics from summer chum salmon: (1) later run timing (mid-July to early September in the lower river); (2) larger size (7-9 lbs.) and robust body shape and bright silvery appearance in the lower river; (3) smaller population size; and (4) spawning that occurs in the upper portions of the drainage in spring-fed streams.

Major spawning areas are located in the Porcupine River drainage (Sheenjek River in Alaska and Fishing Branch River in Canada) and the Tanana River drainage in Alaska (Toklat River, Delta River, and mainstem Tanana upstream of Fairbanks). Spawning occurs during September through mid-November.

Porcupine River and upper Yukon fall chums are distinguished from Tanana River fall chums by their earlier run timing and their orientation along the north bank of the Yukon River (mile 530-700), as opposed to the south-bank orientation of Tanana drainage fall chums.

Substantially different escapement trends have been observed for some of the major spawning populations. Escapements in the upper Tanana River were strong in 1979-1981 and 1983 but have been depressed in recent years in the Toklat, Sheenjek, and Fishing Branch rivers (Figure 4). Fishing Branch River escapement information has been quite limited in recent years due to poor survey conditions, but a decline in escapements is apparent (Figure 5).

Use of tag and recovery data resulted in population estimates of 460,000 and 514,000 fish during 1977 and 1978, respectively. Minimum annual population estimates based on documented harvests and escapements range from 349,000 to 922,000 since 1974.

Fall chum subsistence catches in Alaska average 163,200 annually (1978-1982) (Figure 2). An additional 8,500 fall chums are taken annually (recent 5-year average) in the Yukon Territory (mostly at Old Crow).

Commercial fall chum catches in Alaska since 1961 have ranged from 8,300 to 486,100, and the recent 5-year average (1978-1982) harvest is 323,300. In the Yukon Territory, the recent 5-year average catch is 9,600 fish.

The fisheries for these species are regulated by guideline harvest ranges which are established by regulation. In the lower Yukon, the flexible guideline harvest range is 120,000-220,000 chums. In years of average abundance, the harvest should approximate 170,000 fish, the midpoint of the guideline range. Harvests should approach the upper or lower ends of the range if the run is substantially above or below average in magnitude. Guideline harvest ranges for the upper river districts are established to include incidental harvests of coho salmon. Combined guideline harvest levels for the upriver districts are 25,500-100,500.

In response to the poor run experienced during 1982, difficulties in assessing in-season run strength, and the increasing efficiency of the fleet, the Alaska Board of Fisheries adopted several important regulatory restrictions. These restrictions were required to help prevent over-harvesting of specific run segments and to distribute the harvest throughout the run. The following is a summary of changes implemented by the Board:

1. Commercial Fishing Season

Provides for an approximate 7-day closure of the commercial fishing season for the lower Yukon area during the early portion of the fall chum run (Porcupine River-upper Yukon stocks). The season closure is implemented by emergency order on a staggered basis for each district. The following example depicts the probable sequence of closures for each district based on a fall chum run of normal timing:

District 1: July 19 through July 25

District 2: July 22 through July 28

District 3: July 25 through July 31

2. Set-Net-Only Area

During the fall chum commercial fishing season in coastal areas of district 1, commercial fishermen are restricted to the operation of set gillnets in a special "Set Net Only" area. Commercial fishermen must register to fish the set-net-only area and may not fish for commercial purposes in other areas of district 1 or in districts 2 or 3 during the remainder of the commercial fishing season. Commercial fishermen registered to fish in the set-net-only area may not fish for subsistence with drift gillnets in districts 1, 2, and 3, and subsistence fishing with drift gillnets in the set-net-only area is prohibited during the remainder of the commercial fishing season.

3. Weekly Fishing Periods

Based on emergency order authority, a fishing schedule of two 24-hour periods per week is allowed in the set-net-only area. In other areas of district 1 and in district 2, both set and drift gillnets may be operated for two 12-hour fishing periods per week during the commercial fishing season. A daylight fishing schedule for the 12-hour periods (e.g., 6 a.m. to 6 p.m.) provides for fishermen's safety. In district 3, the fishing schedule consists of two 24-hour periods per week.

4. Guideline Harvest Range

The fall chum salmon fishery is governed by a flexible guideline harvest range of 120,000 to 220,000 fish for districts 1, 2, and 3 combined. The Board of Fisheries directed the Department to target toward the lower end of the present guideline harvest range unless the run is of very large magnitude. If the fall chum run is of

below-average to average magnitude, then the harvest should approximate 120,000-170,000 fish. If the fall chum run is exceptionally large, then a greater harvest may be taken, but the upper end of the guideline harvest range (220,000) should not be exceeded.

5. Subsistence Fishing

The aforementioned reduced commercial fishing periods affect the subsistence fishery since fishing time for both fisheries is coincidental. An additional fishing period (24 hours) each weekend for subsistence is allowed in district 1 (excluding the set net area) and in district 2 after the reopening of the fishing season in late July by emergency order. Continuation of these special subsistence fishing periods during the season will be contingent on the occurrence of minimal violations. Once the commercial fishing season is closed, subsistence fishing will be allowed 7 days per week by regulation.

The overall commercial guideline harvest range of 145,500-320,500 fall chum salmon was established on the assumption that the commercial harvest will not impinge on spawning ground requirements or subsistence needs. Recent data indicate that present utilization levels may be higher than can be sustained, and, in light of an apparent trend of increasing subsistence catches, a reduction in guideline harvest ranges may be required in order to maintain the health and productivity of those stocks.

Commercial and subsistence chum salmon catches are depicted in Figure 6.

Coho salmon enter the river during August and early September. Escapement information is very limited. Comparative escapement information for this species is available only from the Tanana River drainage, where escapements appear to have been relatively stable during the last 10 years. Available data indicate the majority of coho spawn in clearwater streams tributary to the Tanana River. The Delta Clearwater River near

Delta Junction supports the largest known population within the Yukon drainage.

The commercial harvest of coho salmon in the lower Yukon area is dependent upon the timing and duration of the fall chum season. Coho migration in the lower river peaks during mid- to late August. Cohos are taken incidentally to the fall chum fishery in most districts but in some years contribute substantially to the commercial and subsistence harvests in the Tanana River. Commercial catches in the Yukon area during the period 1978-1982 have averaged approximately 22,500 coho (Table 1).

1983 SEASON SUMMARY

Area Summary

In 1983, a total of 1,363,770 salmon was harvested commercially in the Yukon area. The catch was composed of 147,910 kings; 894,878 summer chums; 307,662 fall chums; and 13,320 cohos (Table 2). The king salmon harvest exceeded the previous 5-year average of 136,202 by 10%; however, the combined summer- and fall-run chum catch was approximately 8% below the average for the years 1978-1982. The 1982 coho salmon harvest of 13,320 fell 41% below the recent 5-year average.

Yukon River fishermen received an estimated \$6,988,000 for their catch, which is comparable to the recent 5-year average. Ten processors operated in the lower three districts, and 13 processors and 18 catcher-sellers operated in the upper Yukon area.

Even though markets for upper Yukon king salmon were depressed, prices were comparable (\$1.08 per lb.) to previous years. Prices paid for king salmon in the lower Yukon area were likewise strong (\$1.41 per lb. average); however, chum and coho prices were depressed in both areas, averaging approximately \$.35 per lb. in the lower river and \$.16-.19 for chums and \$.31 for coho in upriver districts.

Subsistence harvest surveys are still underway, but it is projected that totals will approximate 30,000 kings; 200,000 summer chums; 175,000 fall chums; and 15,000 cohos.

King Salmon

The Yukon River experienced an early breakup during 1983, as the river was free of ice by May 21. The first king salmon was reported to have been caught at Sheldon's Point on May 25, but no significant catches were made at the ADF&G test fishing site at Big Eddy until June 3.

In accordance with the management strategy previously described in this report and in the 1983 Yukon Area Management Plan, the early portion of the run was allowed to pass through the fishery prior to the opening of the commercial fishery.

The commercial fishing season was opened on June 9; in-season catch data indicated above-average run strength, and four 24-hour fishing periods were allowed in districts 1 and 2. By June 21, the catch was approximately 107,000 kings, and on June 23 the 6-inch maximum mesh-size restriction was imposed. This action was followed by a record incidental harvest of nearly 32,000 king salmon. This, combined with the district 3 king salmon harvest of 4,100, brought the lower Yukon total commercial harvest to 142,792 king salmon.

Following the pattern established in past years, the commercial king salmon catch in district 4 was low (601). The catch is not considered reflective of run strength as most fishermen in this area prefer to retain king salmon for personal use. One fisherman, a catcher-seller located in the upper portion of the district, accounted for nearly 80% of the total district commercial harvest.

As in district 4, the district 5 commercial harvest of 3,606 kings is not considered an accurate indicator of run strength. Because of the

large pre-season surplus of king salmon, the 1983 market for upper Yukon kings was extremely weak. There was, however, a limited local (Fairbanks) demand for king salmon, and some fishermen, particularly those situated near the Haul Road bridge, were able to market a portion of their catch by transporting it to Fairbanks and selling it to restaurants and door to door.

Subdistricts 5-A, 5-B, and 5-C were closed by emergency order on July 31. Subdistrict 5-D (which is managed independently of the lower portions of the district) had only two active fishermen during the king salmon season, and the harvest for this area totaled 236 kings.

The first reported Tanana River king salmon was taken at Fairbanks on June 26. Commercial landings were first recorded during the subsequent period (June 27-29), and the peak of the run (as judged by commercial deliveries) occurred during the period July 18-20. Total commercial catch for the district was 911 kings. As often happens, high water and accompanying driftwood adversely affected catches during late July and early August.

Observed escapements of king salmon to Yukon River streams were judged to have been fair. Comparisons made for 12 index streams indicate that 1983 escapements were approximately 15% below the 1978-1982 average but were nearly 21% above the most recent 10-year average for those same streams (Figure 2).

Summer Chum Salmon

Commercial catches of summer chums in the lower Yukon districts were relatively low (123,411) prior to the June 23 changeover to small-mesh gear. After this date, chum catches increased dramatically, and a record single-period catch of 106,000 was made during June 30-July 1 in district 1. Summer chum catches in district 1, 2, and 3 were 451,164; 248,092; and 14,600 fish, respectively. The total lower Yukon summer

chum harvest of 713,856 was approximately 6% above the recent 5-year harvest of 669,507.

The total harvest of 181,022 "equivalent" summer chums taken in the upriver districts was nearly 34% below the recent 5-year average. Continuing a trend established in recent years, very limited markets existed for summer-run chum salmon, particularly in subdistrict 4-A. Lacking a market for chums in the round from this area, a fishery for roe has developed. For purposes of maintaining comparable catch statistics, roe production data are converted to equivalent numbers of salmon based on average roe weight per female. These data are presented in Table 3.

Two processors purchased 6,672 chums in district 4 during 1983. Approximately 56% of these were transported to markets in Anchorage, and the balance was experimentally processed in Galena into a fish-paste product for export.

Unlike the district 4 fishery, Tanana River summer chums are sold and marketed in the round. The 1983 commercial harvest of 24,309 summer chums is nearly 20% below the 1978-1982 average. Unusually high water during late July and early August is thought to have hampered fishing success.

Escapement of summer chums to Yukon River tributaries was variable. The Anvik River chum escapement was approximately 38% below the recent 5-year average. However, escapements to the upper Koyukuk drainage were excellent, and a record number of summer chums (28,141) was observed in streams tributary to the Hogatza River (Figure 4). Inclement weather precluded peak surveys of summer chums in the Tanana River drainage.

Fall Chum Salmon

Fall-run chum salmon were first captured in the Department's test nets located in the lower portion of district 1 on July 14. Due to the overlapping run timing of summer and fall chums, the commercial catches in districts 1 and 2 between July 18 and 21 were a composite of both populations. By July 23, virtually 100% of the chums present in the lower river were fall chums based on timing and body appearance. The early portion of the fall chum run appeared only average in magnitude; however, catch-per-unit-effort data from both commercial and test fishing nets improved dramatically after August 1.

As a result of the regulatory changes described previously in this report, the lower Yukon fall chum fishery was managed more conservatively than in past years. The mid-season closure was from July 20 until July 27 in district 1 and from July 22 until July 30 in district 2. After this closure, both districts were reopened on the newly restricted fishing schedule. Of the 171 fishermen who registered to fish in the set-net-only area, only 137 actually fished. Overall, registrants in the set-net-only area caught an average of 340 chums per fisherman, while fishermen in the remainder of district 1 caught an average of 352 chums per fisherman.

The total fall chum harvests in districts 1, 2, and 3 were 124,371; 85,645; and 10,018, respectively, for a total of 220,034 (Table 1).

The early portions of the fall chum run to the upper Yukon districts appeared weak. Catches at the north-bank test wheel began to show a dramatic improvement on August 23 and remained high for approximately 2-1/2 weeks.

As mentioned above, catches of fall chums in district 4 were weak through mid-August. The Galena-based buyer reopened the plant for processing on August 14 but was forced to terminate his operation by

August 19 as fishermen were unable to produce enough volume to warrant his staying open. Catches began to build by August 23; however, only sporadic purchases of chums were made (by a Fairbanks-area processor) until the season was closed on September 16. Total catch for the district was 6,445 "equivalent" fall chums (Table 3).

By August 28, substantial numbers of fall chums had escaped through the lower portion of district 5, and a decision was made to open the commercial fishery on August 30. Approximately 15,000 fall chums were taken during the first 48-hour period and roughly 26,000 during the second period. Even though the second period produced a near record catch, a decision was made to close subdistricts 5-A, 5-B, and 5-C on September 5; total harvest for the fall season was 40,943 chums. The commercial fishing season in subdistrict 5-D remained open until September 30. The chum harvest for that area was 3,092 and was taken by two fishermen.

In accordance with the Yukon area management plan, the Tanana River fall chum fishery opening was delayed until the run was well distributed throughout the lower and middle portions of the drainage. Distribution and abundance are determined by analysis of subsistence catch data from the Manley, Nenana, and Fairbanks areas. The season was opened for a 24-hour period on September 13. Because of the unusually large catch (17,311 chum and coho combined), two additional 24-hour periods were allowed. Total catch for the 72-hour fall season was 37,190 "equivalent" fall chums and 6,168 cohos. Timing of the run appeared normal.

Escapement levels for streams surveyed were highly variable. Escapements to upper Yukon and upper Tanana River streams were judged to be good; however, the Toklat River and streams tributary to the Porcupine River were judged to be average or below average in magnitude (Figure 5).

Coho Salmon

As detailed in the background section of this report, the magnitude of the commercial coho catch is dependent more on run timing relative to the fall chum run than on actual abundance. The 1983 coho run was late and was judged average in magnitude. The commercial harvest of 13,320 cohos is 41% below the recent 5-year average; however, escapement, where monitored, was strong.

OUTLOOK FOR 1984

King Salmon

In most years, the dominant age class returning is 6-year-old fish; however, 5- and 7-year-old fish also contribute to the run. The 1978 brood year run (6-year-olds in 1984) was judged average to above average in abundance as indicated by comparative catch and escapement data. The return of 5-year-olds (1979 brood year) is expected to be substantial, based on average to above-average run strength in 1979. Seven-year-olds are expected to contribute significantly to the run in 1984, based on the above-average return of 6-year-olds in 1983. In summary, based on evaluation of brood year run size data, it is expected that the 1984 Yukon River king salmon run will be average to above average in magnitude. The expected commercial harvest is expected to total 90,000-120,000 fish.

Summer Chum Salmon

Normally, Yukon River summer chum salmon runs are primarily composed of 4-year-old fish, although in some years 5-year-old fish are present in large numbers. The return of 4-year-olds in 1984 will be greatly dependent on the strength of the 1980 brood year and the survival of the resulting offspring. Based on the available catch and escapement data, the 1980 summer chum salmon run was considered average in magnitude. The return of 4-year-olds in 1984 is expected to be of similar

magnitude. The return of 5-year-olds is not expected to be significant based on the average return of 4-year-olds in 1983. In summary, the magnitude of the Yukon River summer chum salmon run in 1984 is expected to be average. The commercial harvest is expected to total 600,000-1,200,000 fish.

Fall Chum Salmon

Similar to the summer run, the majority of the fall chum returning each year are 4-year-old fish. Based on comparative catch and escapement information, the 1980 brood year (4-year-olds) was considered below average to average in magnitude. The return of 5-year-olds (1979 brood year) is expected to be significant because of the strong return of 4-year-olds in 1983. In summary, the 1984 Yukon River fall chum salmon run is expected to be average in magnitude. The expected commercial harvest should approximate 233,000 fish, the midpoint of the guideline harvest range for the entire river.

Coho Salmon

The coho salmon run is much smaller than the fall chum run, and the harvest is dependent on the duration of the fishery for fall chums. The commercial coho catch is expected to total 20,000-30,000 fish.

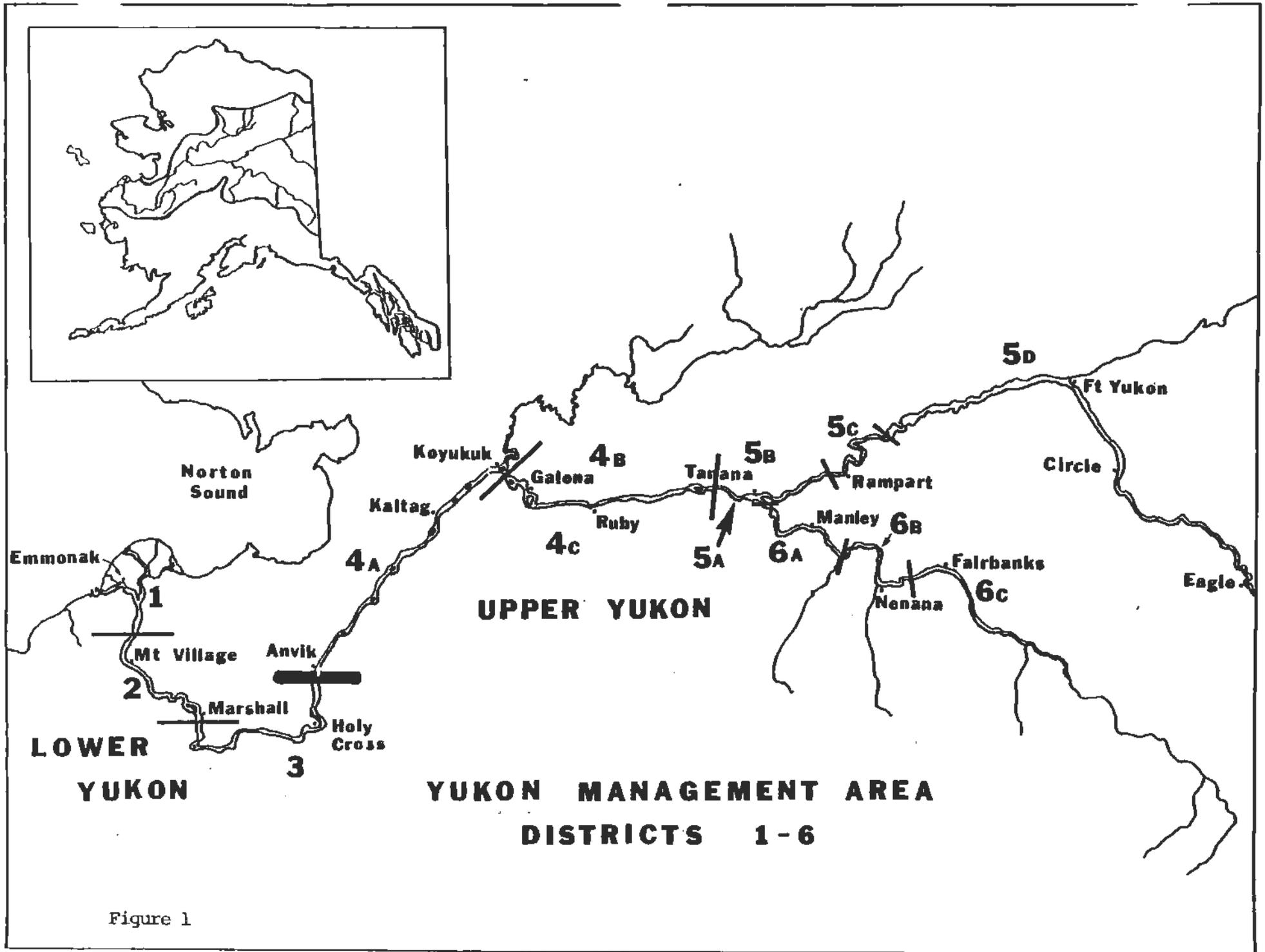


Figure 1

FIGURE 2: KING SALMON ESCAPEMENTS IN SELECTED YUKON RIVER TRIBUTARIES, 1960-1983. A/

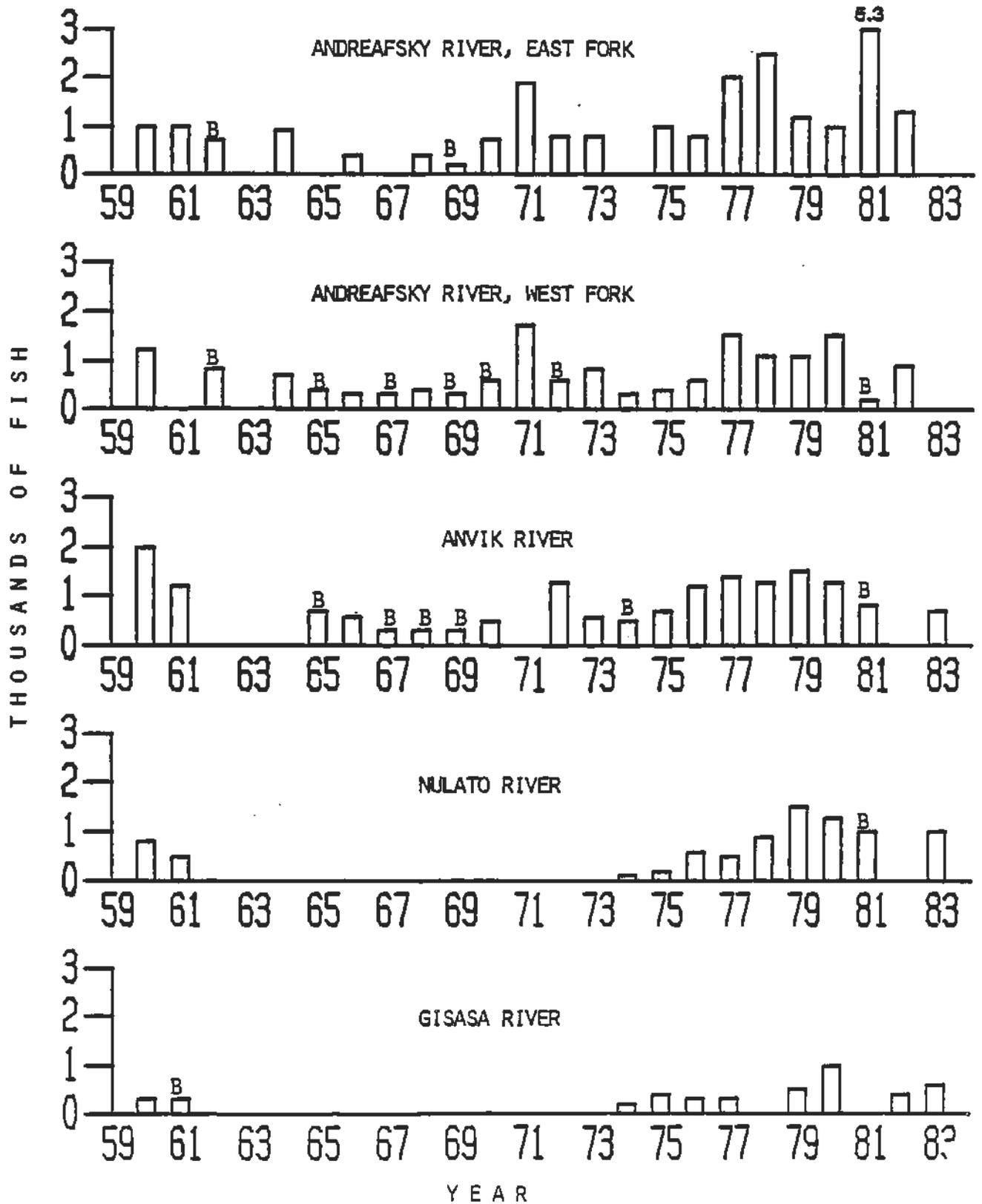
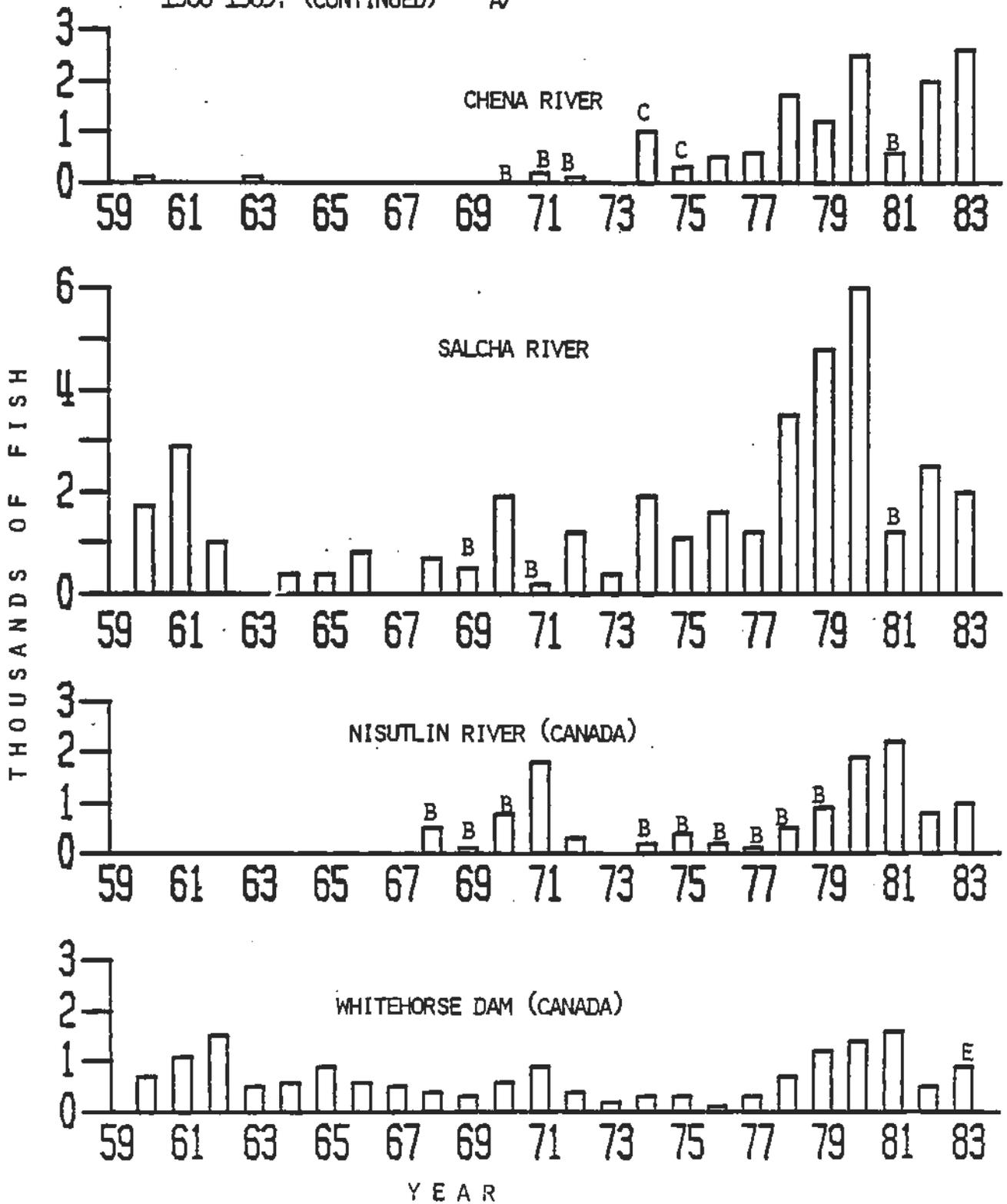
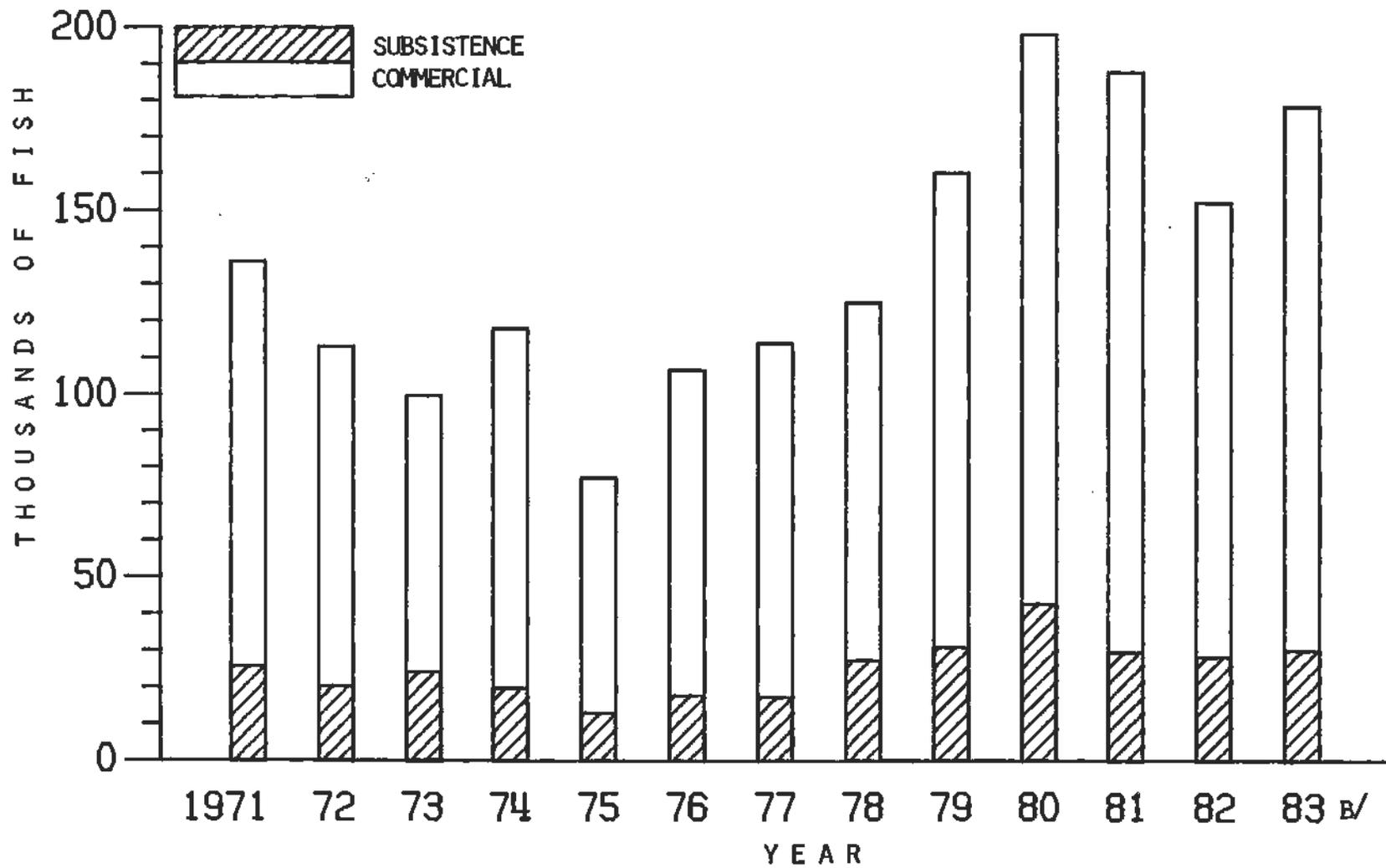


FIGURE 2: KING SALMON ESCAPEMENTS IN SELECTED YUKON RIVER TRIBUTARIES, 1960-1983. (CONTINUED) A/



- A/ Aerial survey counts except Whitehorse Dam, which is total count from fishway.
- B/ Incomplete or poor survey conditions resulting in very low escapement estimates.
- C/ Boat survey
- D/ Sonar estimate
- E/ Preliminary data

FIGURE 3: YUKON AREA COMMERCIAL AND SUBSISTENCE KING SALMON CATCHES, 1971-1983 A/



A/ Does not include Canadian catches

B/ Preliminary estimate

FIGURE 4: SUMMER CHUM SALMON ESCAPEMENTS IN SELECTED YUKON RIVER TRIBUTARIES, 1975-1983. A/

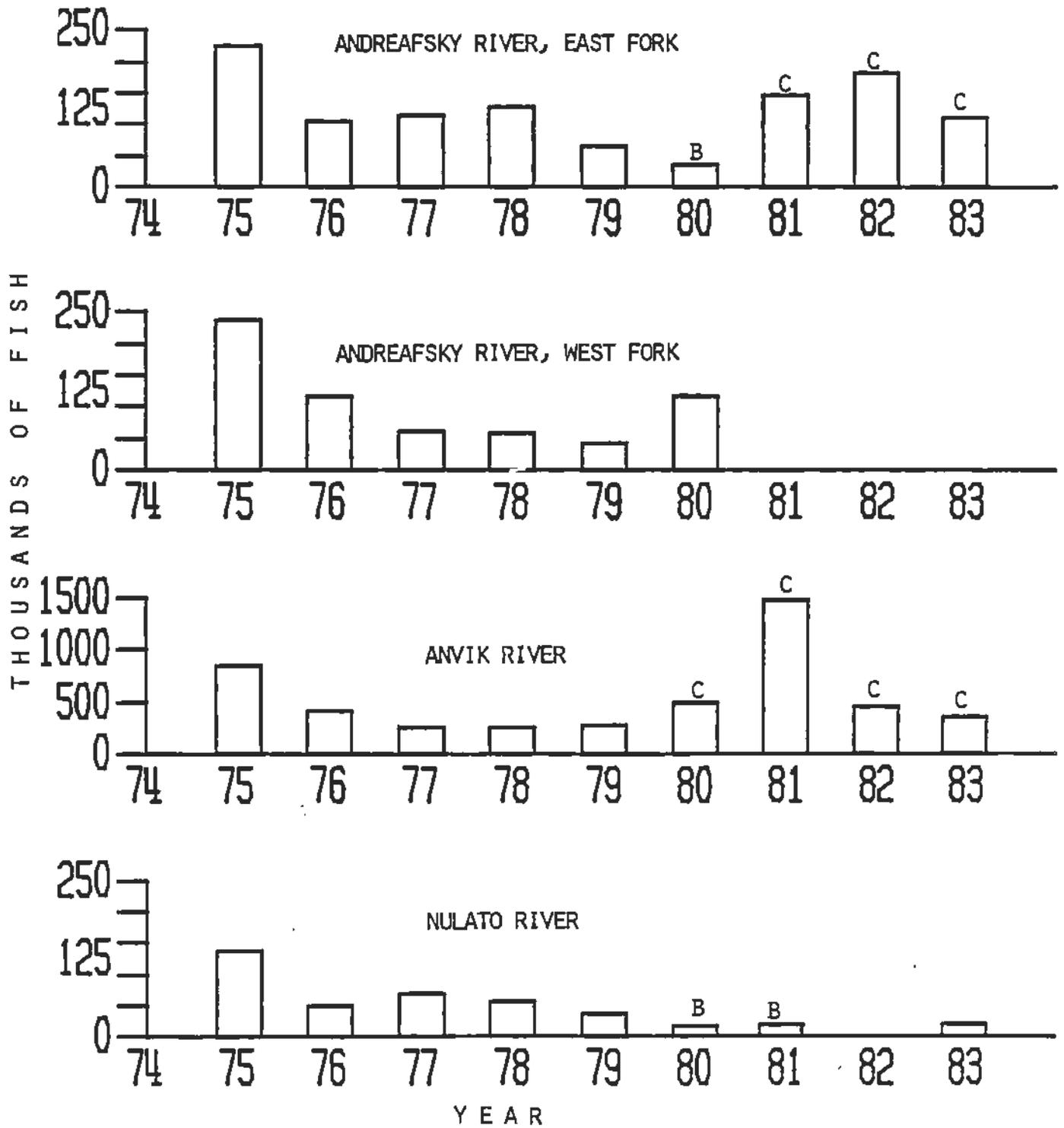
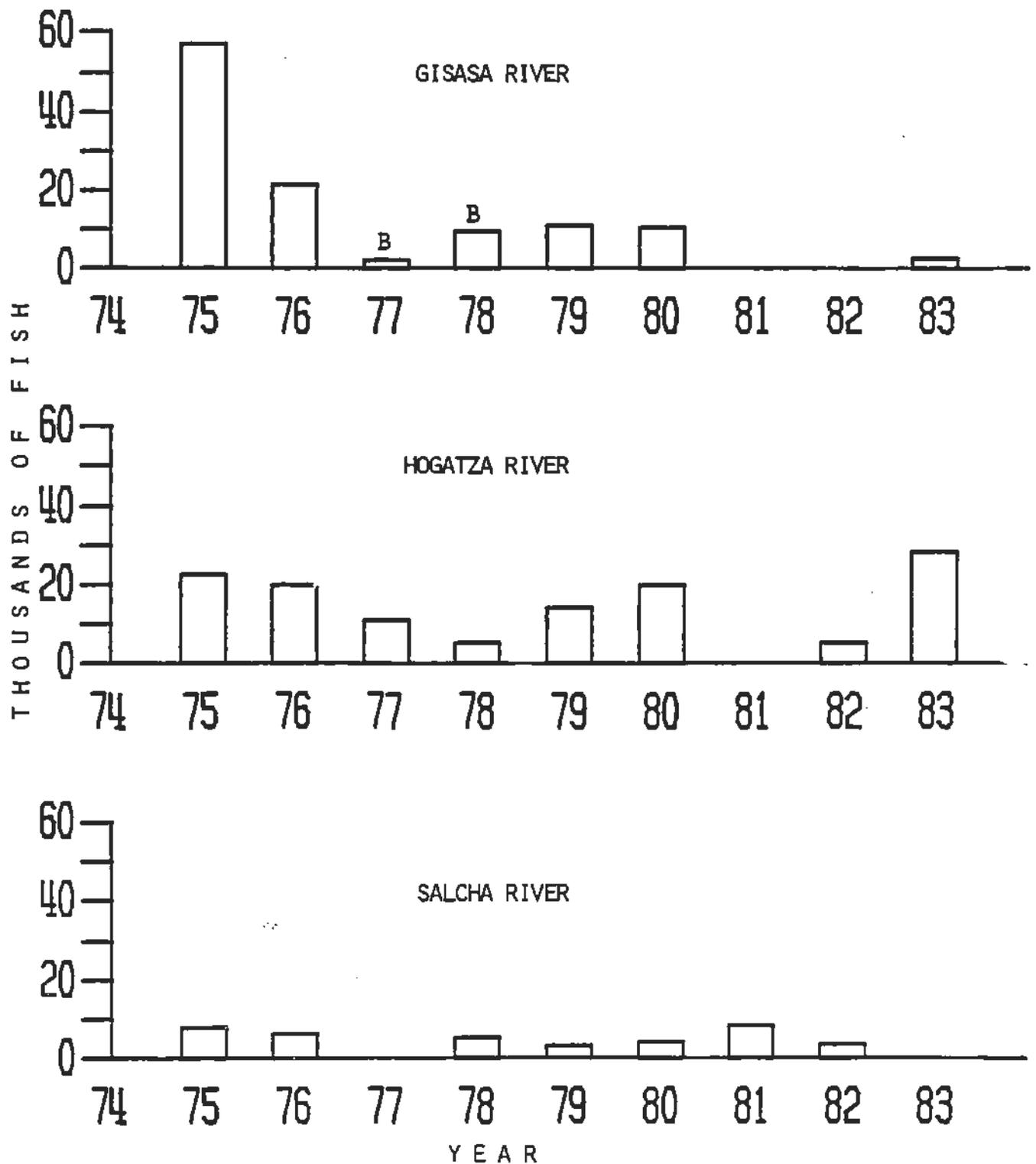


FIGURE 4: SUMMER CHUM SALMON ESCAPEMENTS IN SELECTED YUKON RIVER TRIBUTARIES, 1975-1983. (CONTINUED) A/

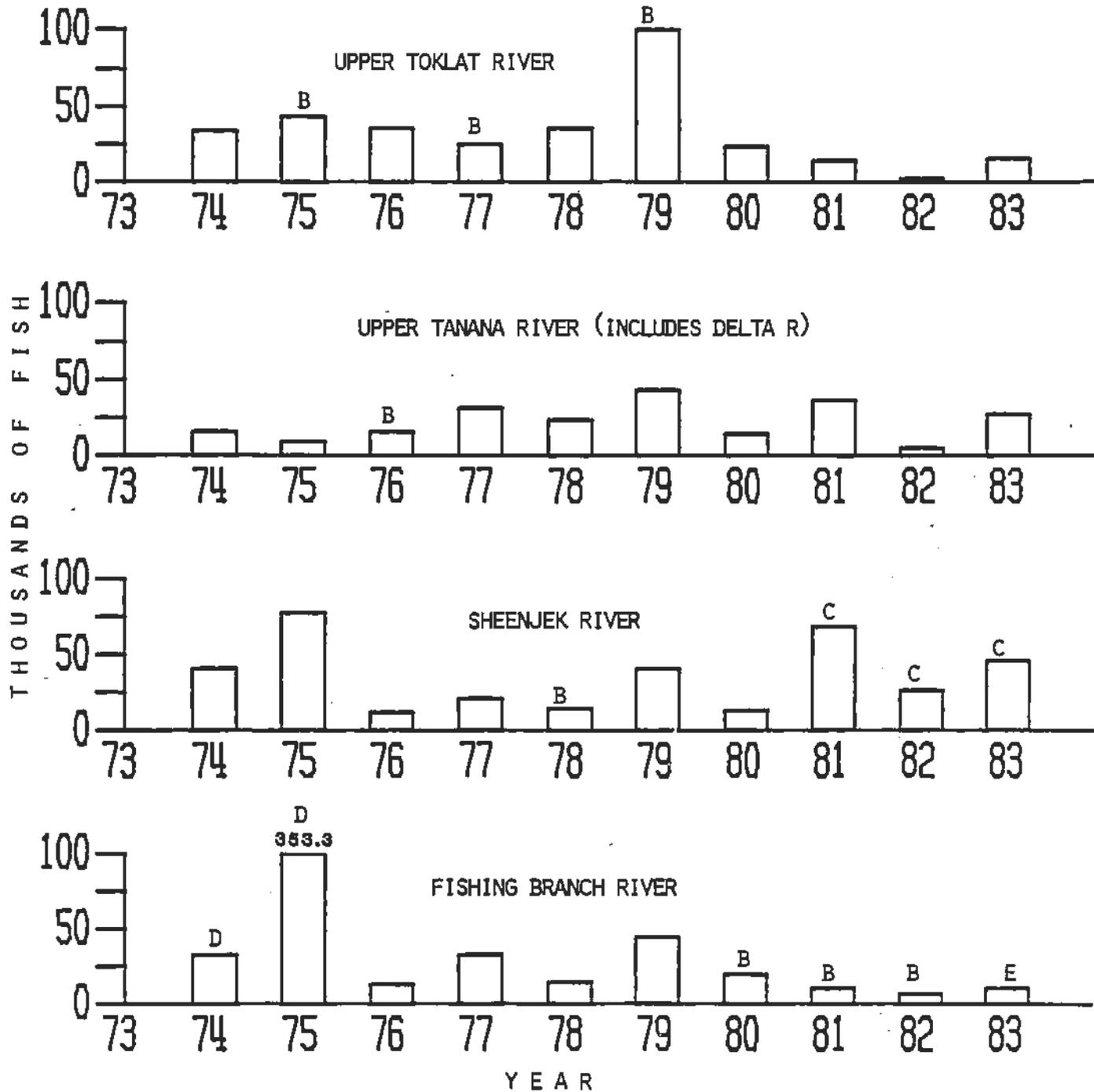


A/ Aerial survey counts except Anvik River, which represents total escape-ments from aerial survey, counting tower and sonar methods.

B/ Poor survey conditions resulting in very low escapement estimates.

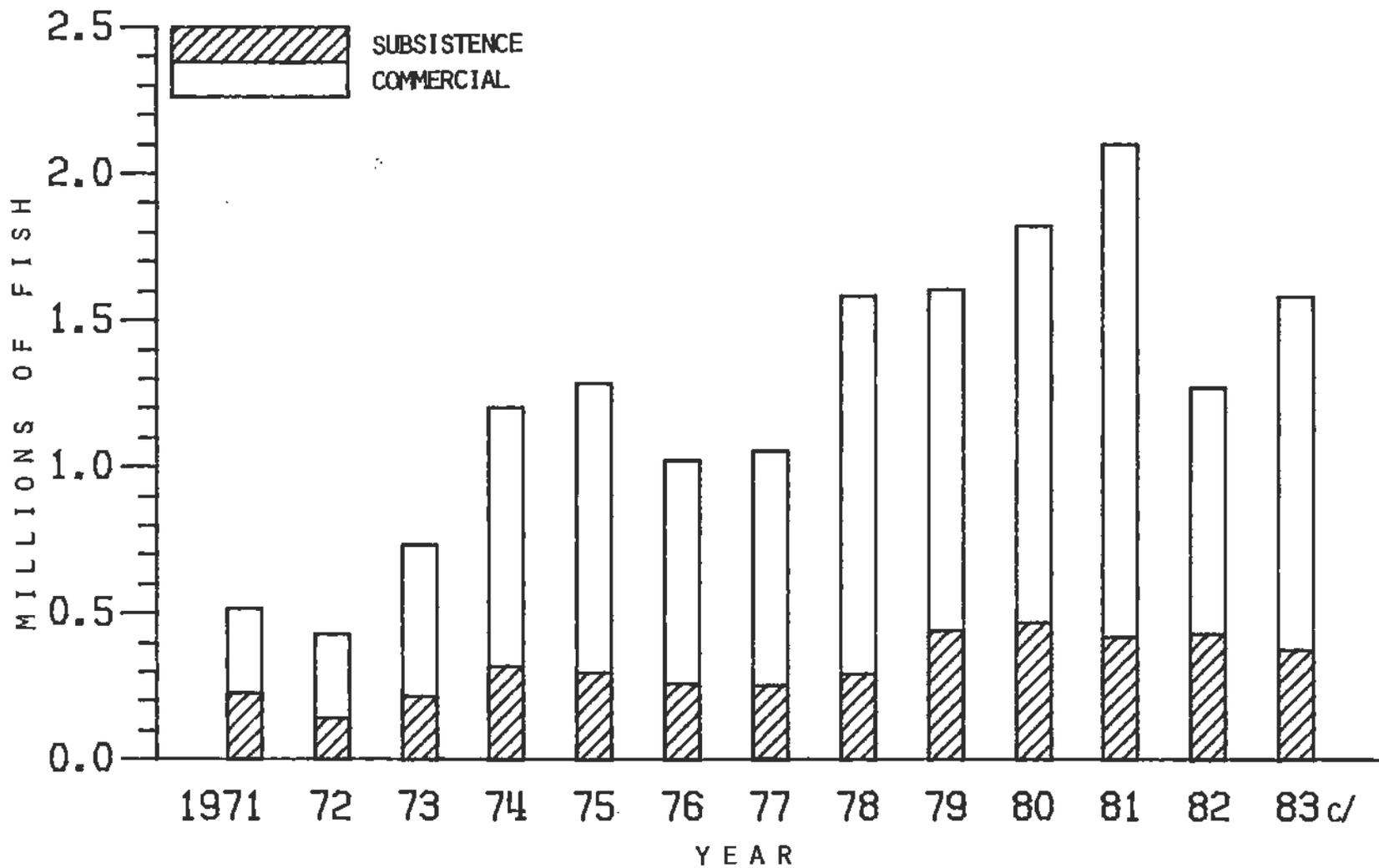
C/ Escapement estimate from sonar count.

FIGURE 5: FALL CHUM SALMON ESCAPEMENTS IN SELECTED YUKON RIVER TRIBUTARIES, 1974-1983, A/



- A/ All surveys rated fair to good unless rated otherwise
- B/ Poor or incomplete survey resulting in minimal estimate
- C/ Sonar count
- D/ Weir count
- E/ Preliminary data

FIGURE 6: YUKON AREA COMMERCIAL AND SUBSISTENCE CHUM SALMON CATCHES, 1971-1983 A/ B/



A/ Does not include Canadian catches

B/ Includes small numbers of pink and coho salmon

C/ Preliminary estimate

Table 1. Commercial salmon catches, Yukon area, 1961-1983.^a

Year	King	Summer chum ^b	Fall chum ^b	Total chum ^b	Coho ^b	Total ^b
1961	120,260	-	42,577	42,577	2,855	165,692
1962	94,374	-	53,160	53,160	22,926	170,820
1963	116,994	-	-	-	5,572	122,566
1964	93,587	-	8,347	8,347	2,446	104,380
1965	118,098	-	23,317	23,317	350	141,765
1966	93,315	-	71,045	71,045	19,254	183,614
1967	129,706	11,179	38,274	49,453	11,047	190,206
1968	106,526	14,470	52,925	67,395	13,303	187,224
1969	90,223	60,569	131,291	191,860	14,981	297,064
1970	80,269	137,368	209,356	346,724	12,245	439,238
1971	110,507	100,090	189,594	289,684	12,203	412,394
1972	92,840	135,668	152,176	287,844	22,233	402,917
1973	75,353	285,844	232,090	517,934	36,641	630,029
1974	97,919	604,210	273,158	877,368	16,240	993,402
1975	63,740	728,156	265,156	993,312	2,346	1,050,945
1976	88,671	598,227	163,282	761,509	5,197	855,377
1977	96,414	548,958	248,739	797,697	38,021	932,096
1978	97,602	1,045,092	243,737	1,288,829	25,960	1,412,391
1979	129,056	803,500	362,480	1,165,980	17,110	1,312,146
1980	155,088	1,057,761	298,123	1,355,884	8,741	1,519,713
1981	157,607	1,191,812	486,059	1,677,871	23,702	1,859,180
1982	123,658	614,166	225,021	839,187	37,176	1,000,021
1983 ^c	147,910	894,878	307,662	1,202,540	13,320	1,363,770
5-yr average (1978-1982)	132,602	942,466	323,084	1,265,550	22,538	1,420,690

a Does not include Canadian catches.

b Includes "equivalent numbers" of salmon converted from roe sales.

c Preliminary data.

Table 2. Yukon area commercial salmon catch and effort data, 1983.^a

District/ subdistrict	Fishermen	Kings	Summer chum ^b	Fall chum ^b	Total chum ^b	Coho ^b	Total
1		95,457	451,164	124,371	575,535	4,595	675,587
2		43,229	248,092	85,645	333,737	2,557	379,523
3		4,106	14,600	10,018	24,618	0	28,724
Total Lower Yukon		142,792	713,856	220,034	933,890	7,152	1,083,834
4-A	58	0	133,420	0	133,420	0	133,420
4-B	21	382	20,814	5,272	26,086	0	26,468
4-C	4	219	563	1,173	1,736	0	1,955
Subtotal District 4	79	601	154,797	6,445	161,242	0	161,843
5-A	4	0	242	3,143	3,385	0	3,385
5-B	16	632	306	19,771	20,077	0	20,709
5-C	24	2,738	1,350	17,987	19,337	0	22,075
5-D	3	236	0	3,092	3,092	0	3,328
Subtotal District 5	47	3,606	1,898	43,993	45,891	0	49,497
6-A	5	249	1,923	3,526	5,449	745	6,443
6-B	18	364	21,664	26,105	47,769	5,048	53,181
6-C	7	298	740	7,559	8,299	375	8,972
Subtotal District 6	30	911	24,327	37,190	61,517	6,168	68,596
Total Upper Yukon	156	5,118	181,022	87,628	268,650	6,168	279,936
Grand Total		147,910	894,878	307,662	1,202,540	13,320	1,363,770

^a Preliminary data.

^b Includes "equivalent numbers" of salmon converted from roe production.

Table 3. Upper Yukon area salmon and salmon roe production, 1983.*

Subdistrict	No. of fishermen	Kings	Summer chums			Fall chums			Coho
			Chums	Chum roe	Equiv. chums	Chums	Chum roe	Equiv. chums	
4-A	58	0	3,407	130,013	133,420	0	0	0	0
4-B	21	382	3,265	17,549	20,814	3,681	1,591	5,272	0
4-C	4	219	0	563	563	801	372	1,173	0
Subtotal District 4	79	601	6,672	148,125	154,797	4,482	1,963	6,445	0
5-A	4	0	0	242	242	3,143	0	3,143	0
5-B	16	632	37	269	306	19,771	0	19,771	0
5-C	24	2,738	5	1,345	1,350	17,987	0	17,987	0
5-D	3	236	0	0	0	3,092	0	3,092	0
Subtotal District 5	47	3,606	42	1,856	1,898	43,993	0	43,993	0
6-A	5	249	1,923	0	1,923	3,526	0	3,526	745
6-B	18	364	21,646	18	21,664	23,096	3,009	26,105	5,048
6-C	7	298	740	0	740	7,467	92	7,559	375
Subtotal District 6	30	911	24,309	18	24,327	34,089	3,101	37,190	6,168
Total	156	5,118	31,023	149,999	181,022	82,564	5,064	87,628	6,168

* Preliminary data.

Anuey

AYK REGION

SALMON BOF RPT #26

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

1983
KOTZEBUE DISTRICT
SALMON REPORT

to the

ALASKA BOARD OF FISHERIES

February 1984

Kotzebue District Office: P.O. Box 686, Kotzebue, Alaska 99572

Area Management Biologist - Leonard Schwarz (stationed in Nome)

Assistant Management Biologist - Joe Dinnocenzo

Project Biologist Brian Bigler

Clerk Typist - Judy Stein

TABLE OF CONTENTS

	<u>Page</u>
BACKGROUND.....	1
District Boundaries and Legal Gear.....	1
Management Objectives and Strategies.....	1
Status of Fishery and Stocks.....	1
SEASON SUMMARY.....	2
Commercial Fishery.....	2
Subsistence Fishery.....	3
Escapement.....	3
KOTZEBUE SOUND DISTRICT OUTLOOK FOR 1984.....	3

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Kotzebue Area.....	5
2. Statistical areas open to commercial salmon fishing in the Kotzebue District.....	9

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Commercial and subsistence salmon catches in the Kotzebue District.....	6
2. Comparative chum salmon catch, effort and escapement data, Kotzebue District, 1962-1983.....	7
3. Dollar value estimates of Kotzebue District fishery, 1962-1983.....	8

District Boundaries and Legal Gear

The Kotzebue District includes all waters from Cape Prince of Wales north to Point Hope. All commercial fishing effort occurs in marine waters near the village of Kotzebue (Figure 1). Commercial fishermen can legally operate set gillnets of up to 150 fathoms. Open skiffs powered by outboard motors are used to operate the fishing gear and deliver the fish to buyers.

Management Objectives and Strategies

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of commercial and subsistence fisheries in the Kotzebue area. The main objective of the Department's program is to manage both fisheries on a sustained yield basis in accordance with policies set forth by the Alaska Board of Fisheries, including assignment of subsistence as the highest priority among beneficial uses of the resource.

Chum salmon is the target species for both the commercial and subsistence salmon fisheries. Although a noticeable increase of pink salmon has occurred over the last several years, over 99% of the total salmon harvest is comprised of chum salmon. King, red and coho salmon occur in small numbers.

Department tagging studies have indicated that the bulk of the chum salmon returning to the Kotzebue District are bound for the Kobuk and Noatak Rivers. Consequently, commercial fishing is limited to an area near Kotzebue to prevent establishment of a cape fishery which would intercept salmon bound for other streams.

The majority of the Kobuk River run occurs in the commercial fishery during July, while the Noatak River run is dominant during August. Since the Kobuk River run is less abundant and sustains greater subsistence harvest, the July commercial fishery is generally restricted to two-24 hour periods a week. Fishing time is usually increased to at least two-36 hour periods a week in August. Further adjustments in fishing time are often made based on comparative catch and escapement data which are indicative of run strength.

Escapement data is obtained through aerial surveys of all major spawning areas and a side scan sonar project operated in the lower Noatak River.

The commercial fishing season closes by regulation on August 31 when the chum run has substantially decreased and the arctic char run is beginning. There is no closed season, closed periods or harvest limits for subsistence salmon fishing except that commercial fishermen, during the commercial fishing season, may only subsistence fish during open commercial periods.

STATUS OF FISHERY AND STOCKS

There was an early commercial salmon fishery during 1914-1918 and the recent fishery has occurred each year since 1962. Chum salmon harvests averaged about 85,000 fish during 1962-1972, but harvests increased to an average of 365,000 during 1973-1982 (Table 1). Chum salmon harvests during the last 10 years have fluctuated widely (from 111,000 to 677,000) which can be expected from a population which inhabits the northern extreme of the species range. Fishing effort increased drastically during the 1973-1975 period and has since

Forecast

estabilized at about 180 fishermen (Table 2).

Subsistence harvests have been documented by the Department since 1962 and have ranged from 10,000 to 70,000 chum salmon. These harvest figures are considered minimum estimates since not all fishermen are contacted during household surveys. During the first 10 years of surveys (1962-1971) the average documented catch was 34,000 with the average catch per fishermen averaging 354 chum. During the next 10 years (1972-1981), the average documented subsistence catch dropped to 17,000 fish with the average catch per fishermen dropping to 183 chum even though the five largest runs on record occurred during this time. These data indicated that subsistence use of chum salmon has declined over the last 10 years (Table 1).

Escapements have been documented in the Noatak and Kobuk River systems since 1962. Aerial surveys have been used as the main assessment technique and have many associated drawbacks. Surveys are prevented in some years by poor weather or turbid waters. Over the past decade, escapements have gone from record levels (1973-1975), to very low levels (1976-1979), and back to record levels (1980-1982) (Table 2). Average chum salmon escapements, as documented by aerial survey made under good conditions, are considered 80,000 in the Noatak River and 20,000 in the Squirrel, Salmon, Tutsuksuk tributaries of the lower Kobuk River.

SEASON SUMMARY

Commercial Fishery

Kotzebue commercial salmon fishermen harvested 175,762 chum during the 1983 season. This was the smallest catch on record since 1979 and only 48% of the recent 10 year average (Table 1). According to the Commercial Fisheries Entry Commission, there are a total of 222 salmon permits in existence in this district. A total of 189 fishermen actually made landings during the 1983 fishery, which is 6 below the recent 10 year average.

Commercial fishermen earned approximately \$420,736 for this season's catch, excluding bonuses. This was the lowest value of the fishery since 1972. The average fishermen earned \$2,226. The average price per pound for chum was \$.25 and the average weight was 9.4 pounds (Table 3).

The commercial fishery opens by regulation on July 10, but to allow for the normal scheduling of commercial fishing periods and the collection of comparable catch statistics, the first period of the 1983 season was opened on Monday, July 11. Initially, fishing periods were set at two-24 hour periods a week. Fishing was allowed to increase, by regulation, to two-36 hour periods per week on August 1, when comparative catch statistics on that date indicated that the chum salmon run was averaged in strength. By August 11, comparative catch and escapement statistics indicated that the run had decreased markedly in strength and was now below average. Accordingly, fishing time was decreased, first to two-24 hour periods per week on August 11, then on August 13 the next 24 hour period was cancelled. Finally, after one-24 hour period was allowed on August 18-19, all indices of abundance and escapement indicated that the run was smaller than indicated earlier and that adequate escapement levels probably would not be attained without further restricting harvest. Accordingly, the season was closed on August 20.

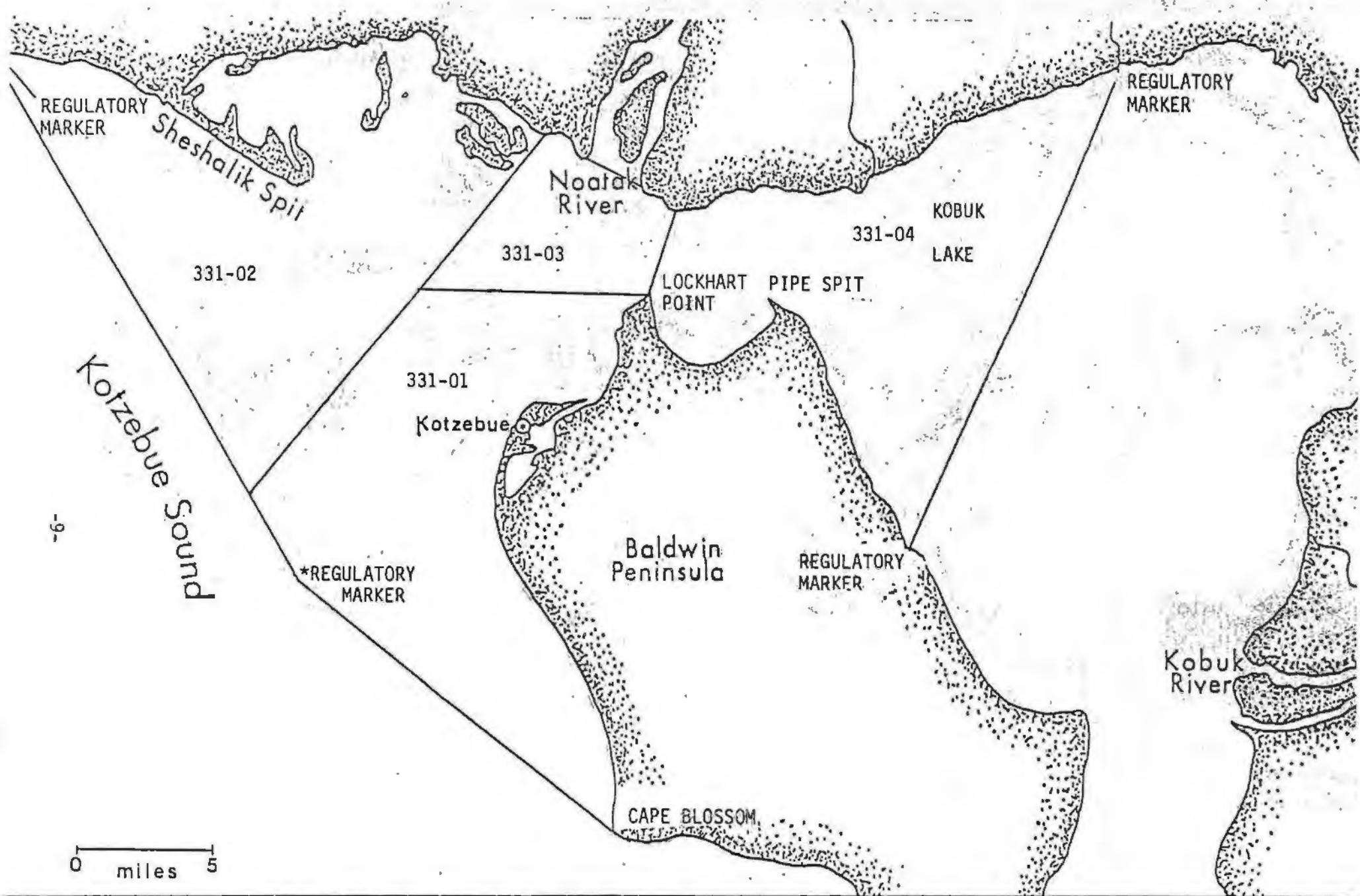


Figure 2. STATISTICAL AREAS OPEN TO COMMERCIAL SALMON FISHING IN THE KOTZEBUE DISTRICT