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CURRENT STATUS OF SALMON STOCKS IN THE COPPER RIVER  
A Report to the Alaska Board of Fisheries



By:

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and  
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## INTRODUCTION

The *Copper River Personal Use Salmon Fishery Management Plan* provides the management framework for all the salmon fisheries in the Copper River. The management plan is described in the briefing document provided. This report provides a description of the run timing of the salmon stocks and escapement enumeration techniques, provides an overview of the four fisheries utilizing salmon resources from the Copper River, and addresses the proposed regulatory changes.

### Area Description

The Copper River drainage and estuary encompasses approximately 24,000 square miles and is Alaska's fifth largest river system (Figure 1). The river drains large portions of interior Alaska. The drainage includes the communities of Glennallen, Gulkana, Gakona, Chitina, McCarthy, Kenny Lake, Copper Center, Paxson, Mentasta, and Slana/Nabesna. Adjacent to the outlet of the Copper River is the community of Cordova. The state's major highways, together with secondary roads and trails, in conjunction with the Copper River itself, provide relatively good access to most of the area's major fisheries. Boats are used in the coastal fisheries. Principal land managers in the Copper River drainage are the National Park Service, National Forest Service, Bureau of Land Management, Ahtna Native Corporation, Chitina Native Corporation, Eyak Native Corporation, and the Alaska Department of Natural Resources.

### RUN TIMING AND ESCAPEMENT ENUMERATION

Several stocks of salmon with different run timing characteristics migrate through the Copper River's commercial fishery. Most chinook salmon that migrate through the district spawn in tributaries of the upper Copper River. Three major stock groupings of sockeye salmon also return to the Copper River. The most abundant group, referred to as the upper Copper River stock, has both early and late components which spawn in Copper River tributaries above Miles Lake. The second group, which has a later run timing, returns to the upper Copper River and is produced at the Gulkana Hatchery. The Gulkana Hatchery

has been producing sockeye salmon since the early 1970s and produces a total run near 250,000 annually. The third group, referred to as the lower delta stocks, spawns in systems below the Chugach Mountains, between Eyak Lake and Katalla River. Finally, there are two stocks of coho salmon that return to the District: a small upriver stock and a much larger stock that returns to streams along the Copper River delta.

Chinook salmon returning to the Copper River drainage begin passing through the Copper River delta and enter the Copper River during early May. The peak migration into the river is generally from mid-May through mid-June, the run is essentially over by July 1. The sockeye salmon run to the Copper River District begins in mid-May and ends in mid-August. The upper Copper River stock with early run timing enters the commercial fishing district during mid-May to mid-June. The upper Copper River with late run timing and the hatchery stock enter the fishery from mid- to late June through August. The lower delta stock occurs in the mid-May harvest, but is not abundant until early June. Coho salmon return to the Copper River District from mid-August through October.

#### Escapement Enumeration

There are two techniques that are used to count the salmon that return to the Copper River District: side-scan sonar at Miles Lake, and aerial surveys of the upper Copper River tributaries and lower delta streams.

#### Miles Lake Sonar:

The Miles Lake sonar project began in 1978 with a single Bendix side-scan sonar unit on the south bank of the Copper River. In 1979, an additional unit was placed on the north bank. The system has gone through few changes over the years. Sonar units are installed each spring after lake and shore ice of Miles Lake is gone, which generally occurs around May 20.

The escapement goal at the Miles Lake sonar site is 516,000 salmon as established in the plan. The sonar operates from mid-May to early August. Daily anticipated escapement projections are used to ensure adequate

escapement for all upriver sockeye salmon components. It is recognized that chinook and coho salmon pass the sonar site, but constitute a minor portion of the total count. Since the numbers represent such a small portion of the counts at Mile Lake, this information cannot be used for anything else but inseason sockeye management. Sonar is the primary management tool until mid-June, when aerial surveys are also used to estimate escapement into lower delta systems. When the sonar operation ends in early August, coho salmon begin to enter the river.

#### Aerial Surveys:

Aerial surveys of lower delta streams are conducted weekly or bi-weekly beginning in mid-June and end in late October. Due to the large number of spawning systems in the lower Copper River delta, actual escapement enumerations cannot be obtained. Instead, an escapement index is estimated from the aerial surveys. The observed weekly escapement indices are compared to the anticipated weekly escapement indices that are averages of past years' (1971-1992) escapement observations. The season's escapement goal for the delta is the combined total of the peak count for each stream for the year. Aerial surveys are also used to monitor sport fishing activities along the road system.

Aerial surveys are also used to estimate escapement of chinook salmon into the upper Copper River. Chinook salmon are broadly distributed throughout the Copper River basin, having been observed in approximately 40 tributaries. Aerial surveys have been conducted for 35 of these systems; however, only nine of these streams have been surveyed consistently since 1966. As with delta coho and sockeye, assessment of chinook salmon spawning escapements through aerial surveys of key index areas does not provide an estimate of the total spawning population.

#### Forecast Methodology

Forecasts of both sockeye and chinook salmon runs are calculated yearly. Forecasts of Copper River delta and upper Copper River wild stocks of sockeye

and chinook salmon are calculated using average return-per-spawner data and parent year escapement weighted by age class.

Supplemental production of sockeye salmon from the Gulkana Hatchery is predicted using survival estimates based on coded wire tag recoveries in spawning escapements to Crosswind and Summit lakes. An assumed harvest rate of 60% is used to estimate contribution to the commercial catch.

The harvest projection for the run of coho salmon to the Copper and Bering River areas is based on the average catch of the commercial fishery since 1980.

#### OVERVIEW OF SALMON FISHERIES IN COPPER RIVER

The salmon fisheries in the Copper River District primarily harvest chinook, sockeye, and coho salmon. These salmon stocks are harvested in four fisheries: (1) a commercial gill net fishery on the Copper River Delta, (2) a personal use dip net fishery in the Copper River near Chitina, (3) a subsistence dip net and fish wheel fishery in the Copper River between Chitina and the Slana River confluence, and (4) sport fisheries which occur in various spawning tributaries. Since 1984, the total harvest of salmon has ranged from 27,000 to 49,000 chinook salmon (Figure 2); from 638,282 to slightly more than 1,500,000 sockeye salmon (Figure 3); and from 115,000 to 590,000 coho salmon (Figure 4).

#### Commercial Fisheries

The Copper River District includes all waters of Alaska between Hook Point and Point Martin. The seaward boundary of the Copper River District is a line 3 miles seaward from the southernmost tip of Pinnacle Rock on Kayak Island to the tip of Hook Point on Hinchinbrook Island. The inshore boundary line is from Government Rock to a point 500 yards seaward of the junction of Mountain Slough, Center Slough and Eyak River, then east within a line bounded by markers located approximately 2 miles seaward of the grass banks and in Boswell Bay. The inshore boundary line has remained in effect since the 1964

earthquake when the delta area rose 2 meters. Before the earthquake, the inshore boundary was within 500 yards of the grass banks. After the earthquake, the inshore boundary was moved seaward to protect rivers and sloughs from gill nets closing off the entire channel during low water sets. With the loss of fishing area inside the islands, many fishermen moved outside the islands. This move outside the barrier islands lessened some of the congestion on the inside waters.

The average harvest from the Copper River District over the past 3 years (1991-1993) has been 35,000 chinook and 1,190,000 sockeye salmon. The Bering River District harvest over the same period has averaged 24,300 sockeye salmon.

The Copper River District is managed with three primary tools: weekly anticipated harvest estimates, escapement enumeration at the Miles Lake sonar site, and aerial escapement surveys of lower delta systems. Prior to the installation of the sonar, actual catches are compared to the anticipated catches. The anticipated catch is the average weekly catch from 1971-1992, including only those years that have similar fishing patterns (i.e., nonstrike years). Two evenly spaced 24-hour periods per week beginning 7:00 a.m. on Mondays and 7:00 p.m. on Thursdays are the objective, but fishing schedules are adjusted inseason to account for variations in river flow, run timing, run strength and other factors.

#### Personal Use Fishery

The personal use dip net fishery is managed under the *Copper River Personal Use Salmon Fishery Management Plan*. The Board allocated 60,000 fish to the personal use fishery, not including any salmon harvested after August 31. The Board also mandated that 25% of any escapement in excess of the goal (516,000 salmon) be allocated to the personal use fishery. Additionally, the Board established the following weekly harvest quotas to apportion the harvest throughout the season:

<u>Week</u>	<u>Percent of Total Harvest</u>
1	10
2	20
3	25
4	20
5	15

The remaining 10% of the harvest may be taken during the rest of season. When establishing these quotas the Board tried to reduce the harvest of wild stocks during the early portion of the run and increase harvest of hatchery returns during the later part of the run.

Only Alaska residents may participate in the Copper River personal use salmon fishery. This fishery is opened by emergency order, normally in the first week of June. Both a valid Alaska sport fishing license and a special permit (costing \$10) are required to participate in the personal use fishery. Anglers must record their harvest on their permit and return the permit to the department. The limits are 15 salmon for a single person and 30 salmon for a household of two or more, only 5 of which may be chinook salmon. Only dip nets may be used to harvest salmon. The entire mainstem Copper River between the downstream edge of the Chitina-McCarthy Bridge and a department marker located about 200 yards upstream of Haley Creek (in Woods Canyon) is opened to personal use fishing. The Board has mandated that residents may participate in either the subsistence or personal use fishery in the Copper River drainage, but not both.

Harvests in the personal use fishery have been estimated from returned permits since the fishery was established in 1984 (Table 1). From 1986 through 1988, harvests remained relatively stable (Figure 5). Since 1988, harvests in the personal use fishery have increased annually. The 1993 harvest of over 99,000 salmon was the highest on record. Trends in the number of permits issued to participate in the fishery closely follows harvest trends (Figure 6).

Harvests in the personal use fishery are dominated by sockeye salmon (Figure 5). Sockeye salmon have comprised an average of 94% of the harvest since 1984. Chinook salmon have comprised 5% of the harvest over this same period. The remaining harvest is made up of coho salmon.

Salmon harvests in the personal use fishery exceeded Board-allowed allocations during both the 1991 and 1992 seasons (Figure 7). The 1991 harvest exceeded the allowable harvest by about 9,300 salmon whereas the 1992 harvest exceeded the allowable harvest by about 7,800 salmon (Table 2). These correspond to an 11% and 9% overharvest during 1991 and 1992, respectively. During both years, harvests during the early part of the run were lower than allowed while harvests during the later part of the run exceeded allowable harvests (Figure 8). This was especially evident during the period after the fifth week of the fishery. Under the *Copper River Personal Use Fishery Management Plan*, 10% of the harvest may be taken during this period. During both years, however, harvests greatly exceeded the quota: 500% in 1991 and 425% in 1992. Increased fishing opportunities were given to increase harvest during the later part of both these seasons to replace that lost during the early portion of the run, when an approach of cautious incremental openings was used.

There is a concern expressed by the department and Department Public Safety, Fish and Wildlife Protection that there could be under reporting and disregard of the regulations that govern this fishery. These concerns are outlined in a briefing document prepared by the Department of Public Safety and is found in the Board of Fisheries report notebook binder provided by the department.

#### Subsistence

Subsistence fishing is restricted to three areas on the Copper River: (1) Copper River District (commercial fishing area), (2) Upper Copper River District, and (3) Batzulnetas area. Of the three subsistence areas, the Upper Copper River District has the highest effort and harvest. Over the last 3 years in the Upper Copper River District, an average of 720 permits was issued annually and an average total catch of approximately 45,000 salmon was reported. In the Copper River District, an average of only 188 permits was issued and an average harvest of 900 salmon was reported. Only two permits have been issued for the Batzulnetas fishery in the last 3 years. The boundary lines for the Copper River District are the same ones used for the commercial gillnet fishery. Subsistence fishing is only allowed during commercial gillnet periods. The Upper Copper River District opens June 1 through September 30 for continuous fishing in all waters of the mainstem

Copper River upstream of the Chitina-McCarthy bridge to the mouth of the Slana River. The Batzulnetas fishery encompasses all waters from the regulatory markers near the mouth of Tanada Creek and approximately one-half mile downstream from that mouth and in Tanada Creek between ADF&G regulatory markers identifying the open waters of the creek. The fishery opens June 1 for 2 days a week fishing and in July opens for 3.5 days a week until September 1 when the fishery closes.

Within the Copper River District, gill nets are the only legal gear and may have a maximum length, as specified on the subsistence permit, of 50 fathoms. In addition to the subsistence fishery, commercial fishermen may withhold a portion of their commercial catch for personal use. There is currently no mechanism to monitor this catch and it continues to go unreported. This issue is addressed by proposal #412.

#### Upper Copper River Subsistence Fishery:

During the 1991 Board of Fisheries meeting, the *Copper River Personal Use Salmon Fishery Management Plan* was modified to increase the subsistence harvest guideline from 25,000 to 35,000 salmon. The fishery opens June 1 to 7-day per week fishing by emergency order and fish wheels and dip nets are legal gear. Participants are allowed one permit per household and the permit identifies the gear type to be used. The total annual possession limit cannot exceed 500 salmon for a household of two or more and 200 for a household of one. No more than 5 chinook salmon may be taken by each dip net permit holder. The dorsal fin must be removed from all salmon that are harvested.

Over the last 3 years, an average of 560 fish wheel and 150 dip net permits were issued (Table 3). The subsistence harvest has been increasing steadily since 1988 and a record number of approximately 56,000 salmon were harvested in 1993 (Figure 9). Sockeye salmon dominate the harvest followed by chinook and coho salmon (Figure 9).

#### Batzulnetas Subsistence Fishery:

In 1987, an interim subsistence fishery was provided for by emergency regulation at Batzulnetas to settle the United States District Court case of John vs. Alaska. The fishery was conducted near the mouth of Tanada Creek near the historical village site of Batzulnetas. Eight permits were issued to individuals or family groups from Mentasta and Dot Lake, and the fishery was conducted during July and early August. A total harvest of 22 sockeye salmon was reported in 1987. The Board of Fisheries reviewed the fishery before the 1988 season and set seasons, eliminated the quota, and provided for additional gear types. No permits were issued for this fishery between 1988 and 1992. However, in 1993, one permit was issued and 160 sockeye salmon were harvested by the permit holder.

#### Sport Fisheries

The sport fisheries for salmon in the Copper River target primarily chinook and sockeye salmon. The chinook salmon fishery is the most important recreational salmon fishery in the Copper River in terms of effort and economic value. All regulatory proposals submitted address the sport fishery for chinook salmon. None address the sockeye salmon fishery. Because of this, the following discussion will only focus on the sport fishery for chinook salmon. For informational purposes only, data on the sport harvest of sockeye salmon are presented (Figure 10).

The main source of information regarding the sport fishery is the statewide mail survey. Based on this, the sport harvest of chinook salmon from Copper River tributaries has increased substantially since 1988, with the 1991 harvest of 4,427 the highest on record (Figure 11). Since 1988, the average harvest of chinook salmon by recreational anglers in the Copper River has been about 3,200 fish. The fishery primarily occurs in various tributaries to the Copper River with the largest harvest occurring in the Gulkana and Klutina rivers. Approximately 94% of the estimated sport harvest of chinook salmon are taken from these two drainages. Since 1970, the daily bag and possession limit has been 1 chinook salmon over 20 inches in length per day and in possession. Further protection was afforded area chinook salmon stocks

through spawning season closures beginning in 1989. During 1991, chinook salmon fishing was closed in Indian, Bernard, Ahtel, Nataat, and Smith creeks. This action was taken in an effort to bolster escapements to these small clearwater tributaries which had shown a decline in recent year returns.

In general, chinook salmon returns to the nine index streams were above historical averages from 1982 through 1991 (Table 4). The escapement in 1992 to these nine streams, however, was the lowest observed since 1969. All nine streams were not surveyed in 1993 so a comparison to the historical mean was not possible. However, the escapement in 1993 of 1,156 chinook salmon into the Gulkana River was above the historical mean for that system and was nearly twice the 1992 count.

Overall, Copper River chinook salmon stocks are considered fully utilized. Although harvests have increased over the past decade, observed spawning escapements have remained relatively stable (Figure 12).

#### Gulkana River Chinook Salmon Fishery:

The Gulkana River drainage has historically supported the largest sport fishery for chinook salmon in the Copper River. Access to the river is available from various secondary roads and trails off the Richardson Highway which parallels much of the river. Anglers utilize rafts and power boats to gain access to the more remote sections of the river. Raft anglers frequent the various sections of the river from Paxson Lake downstream to the Richardson Highway bridge. Power boat operators generally launch at Sourdough and utilize that section of the river from approximately 2 miles below Sourdough upstream to the confluence of the West Fork. More recently, power boat operators have begun launching from the Richardson Highway bridge and utilizing the 5 mile reach of the river above the bridge and the area downstream to the confluence with the Copper River.

Since 1991, there has been a significant increase in the use of power boats in the Gulkana River from the Richardson Highway bridge upstream for about 5 miles. Also, a notable increase in the number of guides specializing in chinook salmon has occurred on the river below the West Fork confluence over

the past several years. Prior to the 1986 season, only one individual specialized in guiding anglers targeting chinook salmon on this section of the river. During the 1987 and 1988 seasons, a minimum of eight guides operated on the lower portions of the river, while the number increased to at least 10 guides during the 1989 and 1990 season. Increased participation by float and power boat operators on the Gulkana River is leading to increased conflict between users. Floaters fish primarily from the bank and do not like power boats back trolling through holes they are fishing.

Chinook salmon typically begin entering the Gulkana River in early June. The sport fishery typically peaks during late June, but limited fishing for chinook salmon continues until the season closes. Spawning begins in mid-July and continues through late August. Most spawning occurs upstream of the confluence of the West Fork.

Under current regulations, all waters upstream of the confluence with Middle Fork are closed to fishing for chinook salmon to protect spawning fish. Waters downstream of the Middle Fork confluence to the Alyeska Pipeline crossing are open from January 1 through July 19. All waters downstream of the Alyeska Pipeline crossing are open to chinook salmon fishing from January 1 through July 31. The early closure of the river upstream of the Alyeska Pipeline crossing is intended to offer protection to spawning fish. The Gulkana River downstream from the Richardson Highway bridge to the confluence of the Copper River is designated as single-hook, artificial flies only from June 1 through July 31. In all waters upstream of a marker 7.5 miles upstream from the West Fork confluence only unbaited, artificial lures may be used. This regulation is intended to protect rainbow trout stocks.

The sport harvest of chinook salmon in the Gulkana River has averaged about 1,700 fish annually since 1977, with harvests remaining relatively stable since 1979 (Figure 13). The 1992 harvest of 3,071 chinook salmon was the largest on record and accounted for nearly 70% of the sport harvest of chinook salmon in the Copper River.

The spawning escapement of chinook salmon in the Gulkana River has been documented since 1966 by aerial surveys of index areas. Since 1977,

escapement indices averaged 1,282, ranging from a high of 3,182 in 1986 to a low of 656 in 1992 (Figure 14). The observed spawning escapement in 1993 (1,156) was near average. With the exceptions of a low escapement during 1985 and a high escapement during 1986, escapements have remained relatively stable since 1977. Overall, chinook salmon stocks in the Gulkana River are considered fully utilized.

#### Klutina River Chinook Salmon Fishery:

The Klutina River supports the second largest sport fishery for chinook salmon in the Copper River. This semiglacial stream drops rapidly out of Klutina Lake to enter the Copper River at the community of Copper Center. Access to the river is available along the Richardson Highway and from the Klutina Lake Road which parallels the river. Shore anglers participate in the fishery adjacent to the highway and the Klutina Lake Road. Jet boats are used by experienced operators to access the upstream reaches.

Chinook salmon typically begin entering the Klutina River in late June, with the run continuing well into August. The sport fishery typically peaks during the second week of July; however, fishing for chinook salmon continues until the season closes on August 10. Peak spawning occurs from late July through August.

The chinook salmon season runs from January 1 through July 19 upstream of Mile 19.2 of the Klutina River Road, and from January 1 through August 10 downstream from this point. As with the Gulkana River, the upper reach has a shorter season to protect spawning fish.

The sport harvest of chinook salmon from the Klutina River drainage has averaged 665 fish from 1983 through 1992, ranging from a low of 189 fish in 1983 to a high of 1,588 fish in 1991 (Figure 15). Harvests have remained relatively stable since 1983. During 1988 and 1989, creel surveys of the chinook salmon sport fishery were conducted in the Klutina River. These surveys indicated that guided boat anglers accounted for nearly 80% of the harvest and 90% of the catch of chinook salmon. Approximately 12 guides operated on the river during 1989 and 1990, all of whom conducted boat trips.

Most of shore anglers fished the portion of the river downstream from the Richardson Highway.

Since the Klutina River is glacial, escapement surveys can only be conducted in two small clear upriver tributaries. Aerial surveys have been conducted in St. Anne and Manker Creek since 1966. The escapement has averaged 102 fish during 1966 through 1992, ranging from a high of 433 fish in 1986 to a low of 21 in 1976 (Table 4). Since 1986, observed escapements have declined (Figure 16). No escapement surveys were flown on the Klutina River index area in 1993. There are other areas in the Klutina River in which chinook salmon are reported to spawn, but the water is too turbid to effectively count fish.

#### Other Copper River Chinook Salmon Fisheries:

Less than 10% of the harvest of chinook salmon in the Copper River occurs in systems other than the Gulkana and Klutina rivers. The majority of this harvest occurs in the Tonsina River. The Tonsina River is glacial and flows from Tonsina Lake into the Copper River downstream of the Klutina River confluence. The Tonsina River crosses under the Richardson Highway at Mile 79 and the Edgerton Highway at Mile 19. Shore anglers participate in the fishery adjacent to the Edgerton Highway, some angling is conducted by raft between the Richardson and Edgerton Highways and some angling is conducted by fly-in anglers fishing the outlet of the Tonsina River at Tonsina Lake and Grayling Creek. It appears that run timing of chinook salmon returning to Tonsina River is similar to Klutina River, late June through August.

Current regulations allow sport fishing for chinook salmon in the Tonsina River from January 1 through July 19. The July 19 date was established in 1989 to allow chinook salmon to spawn unmolested. The Little Tonsina River, Bernard Creek, and all flowing waters within a 1/4 radius of their confluence with the Tonsina River are closed to chinook salmon fishing to protect spawning fish. The sport harvest of chinook salmon in the Tonsina River is less than 50 fish annually.

The Tonsina River is also glacially fed, so the escapement can only be determined by surveying two index streams which have clear water. The

spawning escapement of chinook salmon to the Tonsina River has been documented by aerial surveys of the Little Tonsina River and Grayling Creek since 1966 (Table 4). The spawning escapement to these index sites has averaged 265 fish through 1992, ranging from a high of 847 fish in 1984 to a low of 23 fish in 1968. There appears to be a declining escapement in recent years, although there has been no apparent trend of increasing angler participation or harvest within the drainage.

#### GULKANA HATCHERY

The Gulkana Hatchery is located on the Gulkana River approximately 6 miles north of Paxson Lake. The hatchery was built in 1973 and was operated by the Department of Fish and Game, Division of Commercial Fisheries. In 1992, the hatchery was transferred to Prince William Sound Aquaculture Association. The donor stock for the facility came from local wild stocks on the Gulkana River. The Gulkana Hatchery was expanded to two facilities in 1986. The Gulkana I facility has grown from a 225,000 egg capacity in 1973, to a 35.5 million egg capacity in 1993 which generates an annual adult return of approximately 250,000 sockeye salmon. The Gulkana II facility has a permitted capacity of 2.5 million eggs.

The hatchery produces sockeye salmon for the common property fisheries which include commercial, personal use, subsistence and sport fisheries. In addition to the common property harvest, hatchery returns are able to meet brood stock needs plus an additional hatchery brood stock surplus. Since the run timing of hatchery stocks coincides with that of wild stocks, the harvest rate for hatchery returns can not be any greater than that which can sustain wild stocks. Excess hatchery returns are considered the hatchery surplus.

Sockeye stocks from both the Gulkana I and II facilities coincide with wild stock run timing. The run timing from the two release sites of the Gulkana II facility vary somewhat between the Crosswind Lake release and the onsite release which overlaps the early and middle segments of the adult returns. Sockeye salmon returns from the three release sites (Summit Lake, Paxson Lake,

and Crosswind Lake) from the Gulkana I Facility occur throughout the entire escapement period.

#### 1994 BOARD OF FISHERIES PROPOSALS

There have been a number of proposals that have been submitted to the Board of Fisheries to modify the management and allocation of the salmon stocks in the Copper River and Copper River delta. The following proposals are listed by fishery and geographic area.

##### Copper River Delta Coho Sport Fishery

Proposal 421: Recommends a complete closure of Clear Creek to salmon fishing except for the area within 100 yards of the Copper River. Additionally, it recommends that Alaganik Slough and its tributaries are also closed to the taking of salmon except in the area within 100 yards of the main slough.

##### Copper River District Commercial Fishery

Proposal 412: This proposal would require each commercial fisherman to report on the ADF&G fish ticket at the time of landing the number of chinook salmon and steelhead trout taken but not sold.

Proposal 419: Seeks the closure of the outside beaches from Kokinhenik Island to Cape Suckling to a depth of 5 fathoms to commercial salmon gill nets to protect dungeness crab rookeries. Proposal 419 also asks for a depth restriction for gill nets inside the barrier islands of not more than 30 meshes in depth.

Proposal 420: Proposes moving the inshore boundary within 500 yards of the grass banks.

### Copper River Personal Use Fishery

Proposal 422: The Board of Fisheries is asked to establish a working group comprised of affected or interested users to rewrite the *Copper River Personal Use Salmon Fishery Management Plan* and the *Copper River District Salmon Management Plan*. The working group would present a proposal to the Board during the next scheduled meeting for Prince William Sound finfish in 1997.

Proposal 423: This proposal would increase the allocation of the personal use fishery from 60,000 salmon to 100,000 salmon.

Proposal 424: This proposal would require all chinook salmon captured in the Chitina Subdistrict personal use fishery be released.

Proposal 426: This was a housekeeping proposal intended have the regulation booklet reflect changes in the codifieds.

### Copper River Subsistence Fisheries

Proposal 425: This proposal seeks to change the marking of a subsistence caught salmon to removing both lobes of the caudal or tail fin.

### Copper River Sport Fisheries

Proposal 427: This proposal would establish a seasonal bag limit of 5 chinook salmon 20 inches or more in length and would require anglers to immediately, upon landing a chinook, record in ink on their license the harvest of that chinook salmon including its location and date of harvest.

Proposal 428: This proposal would increase the daily bag and possession limit to 2 chinook salmon and would establish a seasonal bag limit of 5 chinook salmon. The seasonal bag limit would be enforced by a tagging or punch card system.

Proposal 429: This proposal would restrict fishing from a power boat in the Gulkana River from Richardson Highway bridge upstream to the confluence with Poplar Grove Creek.

Proposal 430: The proposal would change the closure date of the chinook salmon season in that reach of the Gulkana River downstream from the Alyeska Pipeline crossing bridge from August 1 to July 19.

Proposal 431: This proposal would extend the open season for chinook salmon fishing on the Tonsina River from July 19 to August 10. The closed areas around the mouths of Bernard Creek and Little Tonsina River would remain in effect.

Proposal 432: This proposal would not allow guides to fish while guiding clients in the Upper Copper/Upper Susitna Regulatory Area.



TABLES

Table 1. Number of permits issued and salmon harvested during the personal use salmon fishery in the Copper River, 1984-1993.

Year	Number Permits Issued	Estimated Salmon Harvest
1984	5,328	49,940
1985	--- <sup>a</sup>	--- <sup>a</sup>
1986	4,031	44,047
1987	4,259	46,908
1988	4,251	45,921
1989	4,584	58,914
1990	5,689	70,478
1991	6,222	85,136
1992	6,387	89,279
1993	7,914	99,327

<sup>a</sup> Data not available.

Table 2. Allowable versus observed salmon harvests during the personal use salmon fishery in the Copper River, 1984-1993.

Year	Sonar Goal	Estimated Sonar	Difference	Allowable Harvest <sup>a</sup>	Estimated Harvest	Difference
1984	411,000	536,806	125,806	91,452	49,940 <sup>b</sup>	(41,512) <sup>b</sup>
1985	411,000	436,313	25,313	66,328	---	---
1986	411,000	508,600	97,600	84,400	44,047	(40,353)
1987	411,000	475,734	64,734	76,184	46,908	(29,276)
1988	411,000	488,398	77,398	79,350	45,921	(33,429)
1989	411,000	607,869	196,869	109,217	58,914	(50,303)
1990	411,000	581,859	170,859	102,715	70,478	(32,237)
1991	516,000	579,435	63,435	75,400	85,136	9,277
1992	516,000	601,952	85,952	81,500	89,279	7,779
1993	516,000	833,387	317,387	139,350	99,327	(40,023)

<sup>a</sup> If sonar difference less than 0, then guideline harvest equals 60,000.  
 If sonar difference greater than 0, then guideline harvest equals 60,000 +  
 (0.25 \* sonar difference).

<sup>b</sup> Data not available

Table 3. Number of permits issued and salmon harvested during the subsistence salmon fishery in the Copper River, 1965-1993.

Year	Number of Dipnet Permits	Number of Fishwheel Permits	Total Number of Permits Issued	Total Estimated Salmon Harvest
1965	982	143	1,125	16,818
1966	1,132	138	1,270	21,896
1967	1,166	154	1,320	19,007
1968	1,235	143	1,378	20,383
1969	1,415	167	1,582	29,266
1970	3,220	267	3,487	42,757
1971	4,168	374	4,542	48,449
1972	3,485	205	3,690	32,468
1973	3,840	305	4,145	29,248
1974	3,305	288	3,593	26,001
1975	2,452	350	2,802	15,357
1976	2,512	451	2,963	23,623
1977	3,526	540	4,066	41,815
1978	3,313	392	3,705	22,029
1979	2,730	470	3,200	30,963
1980	2,804	399	3,203	35,081
1981	3,555	523	4,078	68,746
1982	5,475	615	6,090	110,006
1983	6,911	630	7,541	118,728
1984	104	458	562	23,093
1985 <sup>a</sup>				
1986	39	366	405	28,423
1987	59	372	431	34,142
1988	70	339	409	30,514
1989	78	308	386	29,317
1990	95	311	406	32,290
1991	293	418	711	41,417
1992	151	504	655	42,910
1993 <sup>b</sup>	14	759	773	56,655

<sup>a</sup> Data not available.

<sup>b</sup> Preliminary data.

Table 4. Upper Copper River chinook salmon aerial escapement index counts, 1966-1993.

Year	Copper R. Upstream of Gulkana <sup>a</sup>			Tazlina Drainage <sup>a</sup>		Klutina Drainage <sup>a</sup>		Tonsina Drainage <sup>a</sup>		Total
	Gulkana R.	E. Fork Chistochina R.	Indian R.	Mendeltna Ck.	Kiana Ck.	St. Anne Ck.	Marker Ck.	Little Tonsina R.	Grayling Ck.	
1966	250	152	20 <sup>b</sup>	12	272	48	64	42	22	982
1967	757 <sup>b</sup>	291 <sup>b</sup>	20 <sup>b</sup>	6	123 <sup>b</sup>	53	2	129 <sup>b</sup>	48 <sup>b</sup>	1,429
1968	757 <sup>b</sup>	150	20 <sup>b</sup>	100	100	26 <sup>b</sup>	9	19	4	1,185
1969	147	200	20 <sup>b</sup>	38 <sup>b</sup>	34	26 <sup>b</sup>	19 <sup>b</sup>	129 <sup>b</sup>	7	620
1970	364	368	20 <sup>b</sup>	38 <sup>b</sup>	162	35	17	129 <sup>b</sup>	48 <sup>b</sup>	1,181
1971	269	512	20 <sup>b</sup>	56	81	4	30	200	45	1,217
1972	1,200	348	13	49	89	25	4	129 <sup>b</sup>	47	1,904
1973	623	476	20 <sup>b</sup>	15	172	26 <sup>b</sup>	17	100	47	1,496
1974	1,317	137	4	15	55	32	29	65	49	1,654
1975	741	71	6	38 <sup>b</sup>	123 <sup>b</sup>	26 <sup>b</sup>	19 <sup>b</sup>	161	48 <sup>b</sup>	1,233
1976	777	289	61	35	37	15	6	98	17	1,335
1977	1,090	132	20	73	91	10	15	35	48 <sup>b</sup>	1,514
1978	921	137	9	52	125	24	20	285	92	1,665
1979	1,380	810	29	5	279	16	16	285	153	2,973
1980	718	575	24	3	247	8	35	70	66	1,746
1981	754 <sup>b</sup>	120	20 <sup>b</sup>	51	191	19	23	191	107	1,486
1982	1,656	1,260	179	70	200	35	49	440	127	4,016
1983	931	575	41	12	166	87	141	330	287	2,570
1984	2,189	577	17	26	382	89	264	568	279	4,391
1985	321	360	14	26	91	15	22	203	58	1,110
1986	3,182	618	29 <sup>b</sup>	76	328	182	251	424	224	5,314
1987	1,228	764	33	10	80	192	141	247	112	2,807
1988	967	684	0	17	249	62	115	75	161	2,330
1989	1,993	740	3	185	344	90	165	65	72	3,657
1990	1,356	615	15	320	411	42	41	57	49	2,906
1991	1,303	865	18	305	520	115	101	54	151	3,432
1992	656	88	1	83	79	12	14	107	17	1,057
1993	1,156	— <sup>c</sup>	— <sup>c</sup>	126	65	— <sup>c</sup>	— <sup>c</sup>	— <sup>c</sup>	— <sup>c</sup>	— <sup>c</sup>
Mean	1,036	455 <sup>d</sup>	26 <sup>d</sup>	66	186	50 <sup>d</sup>	62 <sup>d</sup>	174 <sup>d</sup>	91 <sup>d</sup>	2,115 <sup>d</sup>

<sup>a</sup> Some data published in Brady et al. 1991, remainder is unpublished.

<sup>b</sup> Estimated.

<sup>c</sup> No aerial surveys conducted in 1993.

<sup>d</sup> Average of 1966 through 1992 data.



FIGURES

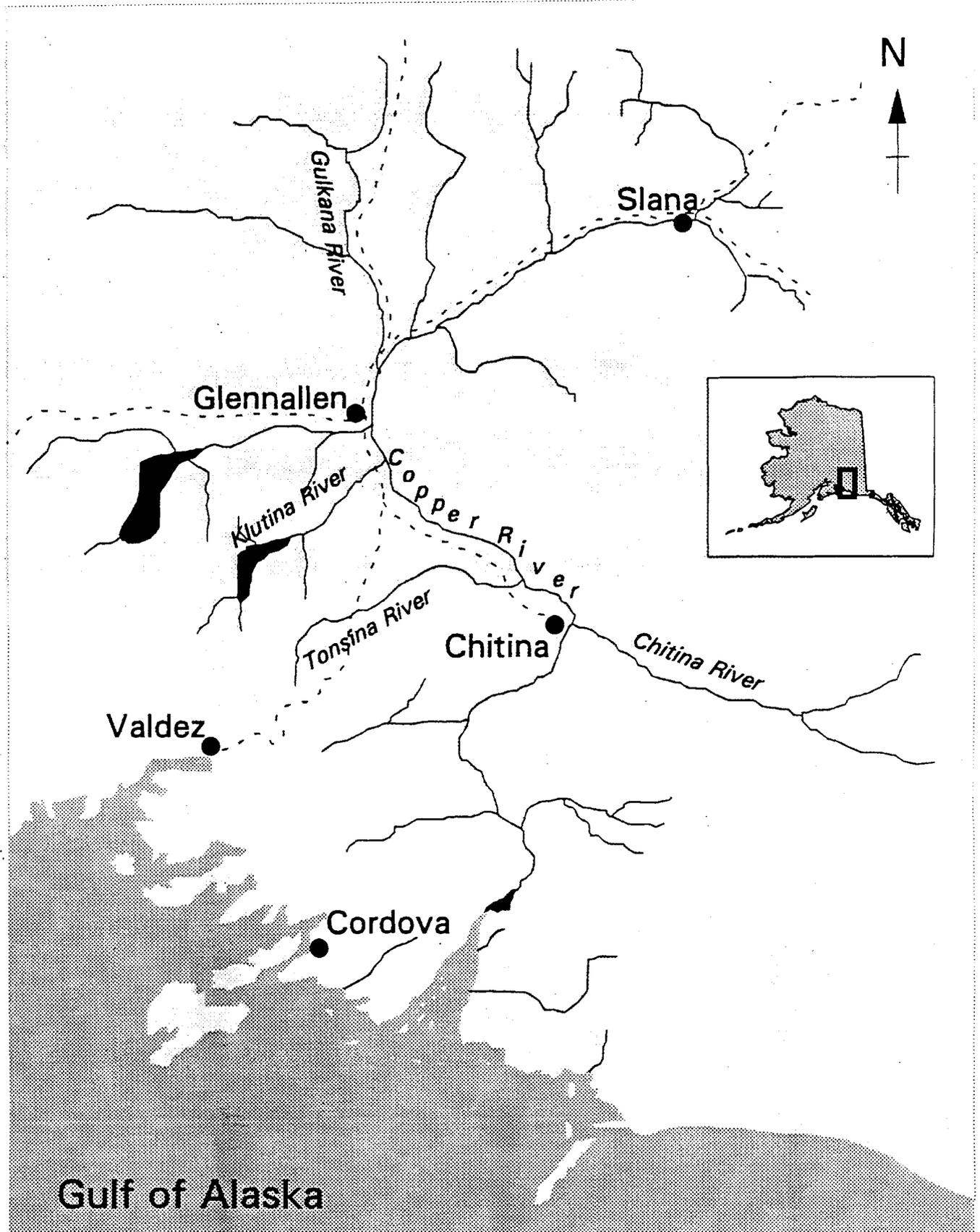
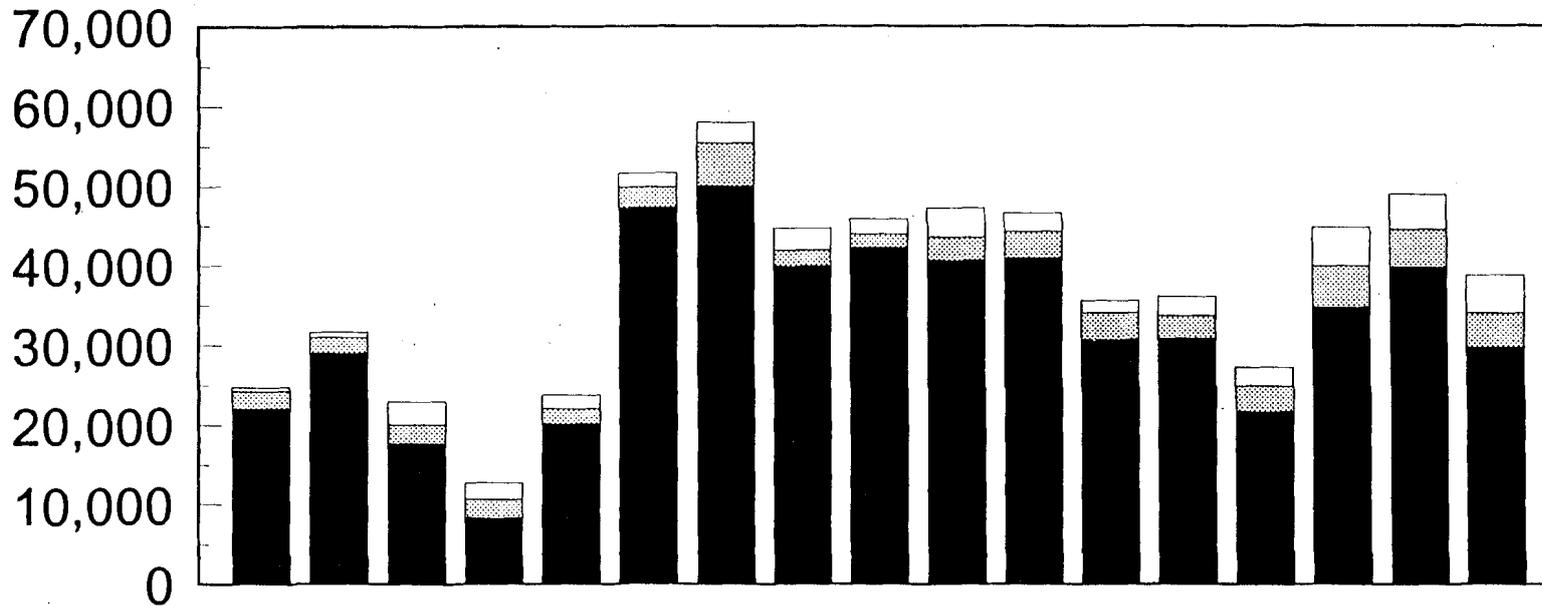


Figure 1. The Copper River and Copper River delta area.

# Copper River Chinook Salmon Harvest by Fishery

Number Harvested

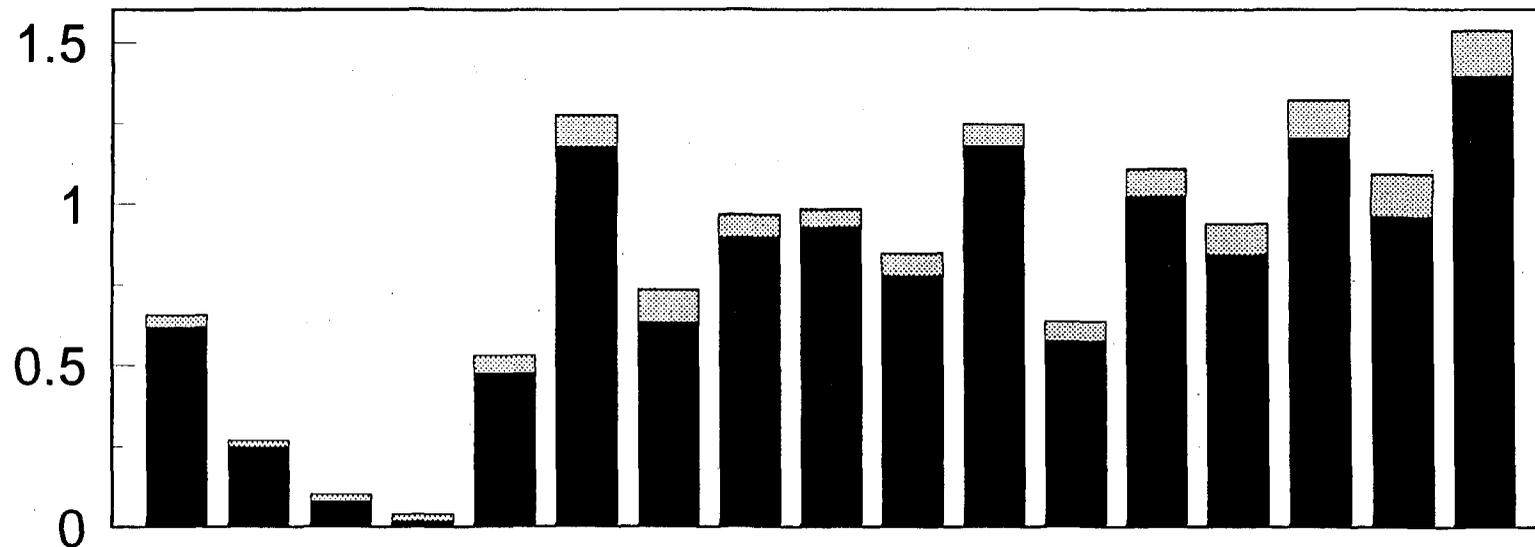


	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Commercial	22,089	29,062	17,678	8,454	20,178	47,362	50,022	39,955	42,333	40,670	41,001	30,741	30,863	21,702	34,787	39,819	29,716
Sub/PU	2,171	2,050	2,372	2,256	1,913	2,532	5,421	2,007	1,673	2,916	3,349	3,395	2,904	3,198	5,164	4,705	4,362
Sport	532	641	2,948	2,101	1,717	1,802	2,576	2,787	1,939	3,663	2,301	1,562	2,356	2,302	4,884	4,412	4,700
Total	24,792	31,753	22,998	12,811	23,808	51,696	58,019	44,749	45,945	47,249	46,651	35,698	36,123	27,202	44,835	48,936	38,778

Figure 2. Harvest of chinook salmon by fishery in the Copper River, 1977-1993 (1993 sport harvest estimated).

# Copper River Sockeye Salmon Harvest by Fishery

Number Harvested  
Millions

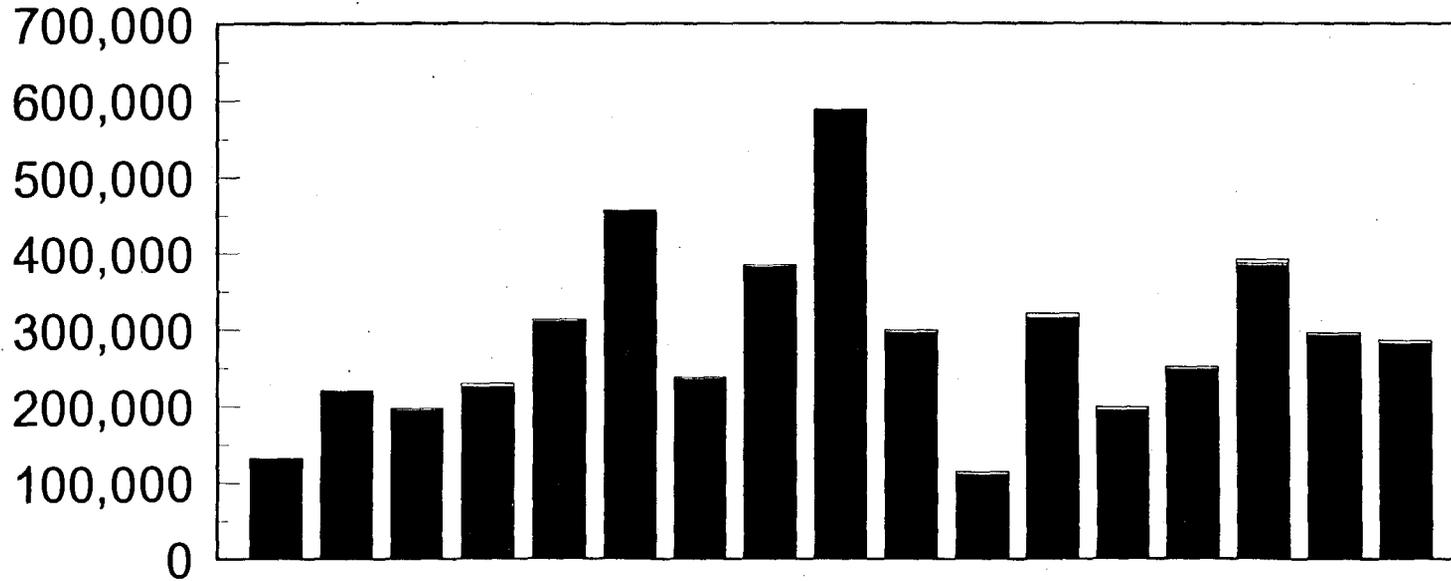


	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Commercial	619,140	249,872	80,528	18,908	477,662	1,177,632	633,010	899,776	931,132	780,808	1,180,782	576,950	1,025,923	844,778	1,206,811	960,696	1,395,371
Sub/PU	35,363	19,207	22,138	21,437	53,008	96,799	100,995	65,078	50,488	64,684	64,841	58,294	80,221	93,740	111,788	127,670	137,234
Sport	3,662	1,606	1,599	2,109	1,523	3,343	2,619	3,267	4,752	4,129	4,876	3,038	4,509	3,569	5,511	4,560	5,000
Total	658,165	270,685	104,265	42,454	532,193	1,277,774	736,624	968,121	986,372	849,621	1,250,499	638,282	1,110,653	942,087	1,324,110	1,092,926	1,537,605

Figure 3. Harvest of sockeye salmon by fishery in the Copper River, 1977-1993 (1993 sport harvest estimated).

# Copper River Coho Salmon Harvest by Fishery

Number Harvested

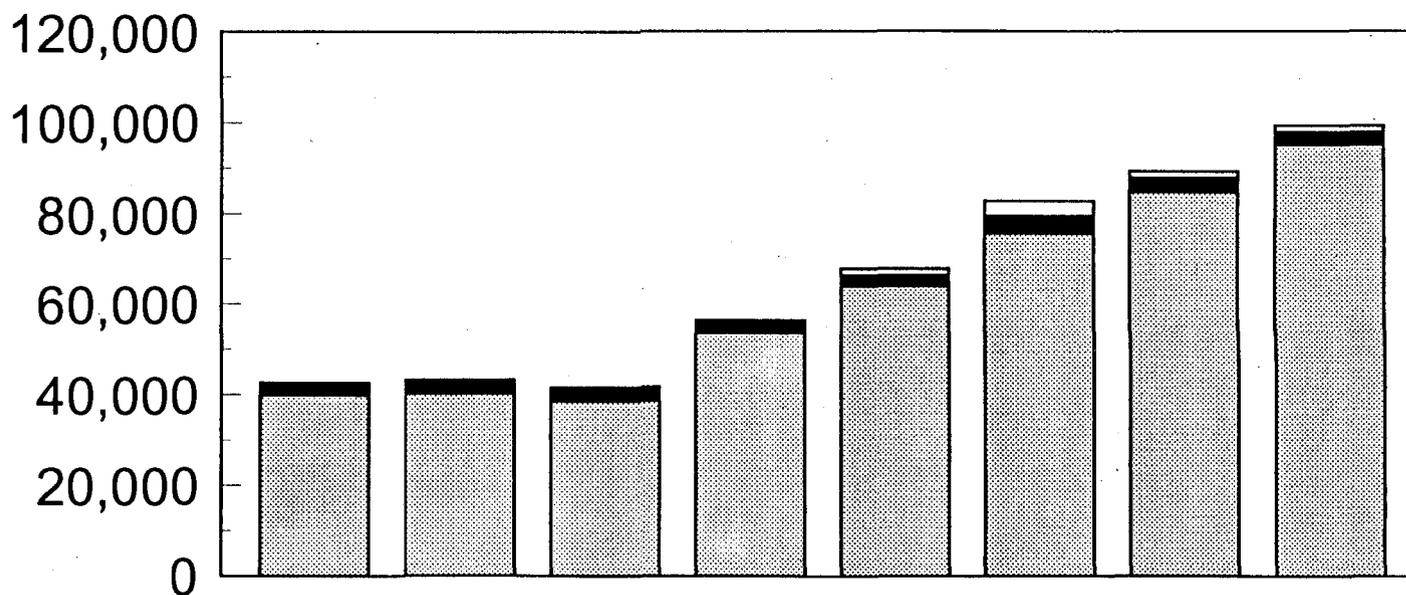


	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Commercial	131,356	220,338	194,885	225,299	310,154	454,763	234,243	382,432	587,990	295,980	111,599	315,568	194,454	246,797	385,086	291,627	281,469
Sub/PU	454	633	705	639	849	1,246	1,690	789	544	785	502	695	890	1,533	3,477	1,817	1,426
Sport	1,229	704	2,633	4,822	2,948	2,096	2,233	2,718	1,283	3,776	3,254	5,693	4,144	4,097	4,875	4,243	4,200
Total	133,039	221,675	198,223	230,760	313,951	458,105	238,166	385,939	589,817	300,541	115,355	321,956	199,488	252,427	393,438	297,687	287,095

Figure 4. Harvest of coho salmon by fishery in the Copper River, 1977-1993 (1993 sport harvest estimated).

# Copper River Personal Use Harvest

## Number Harvested

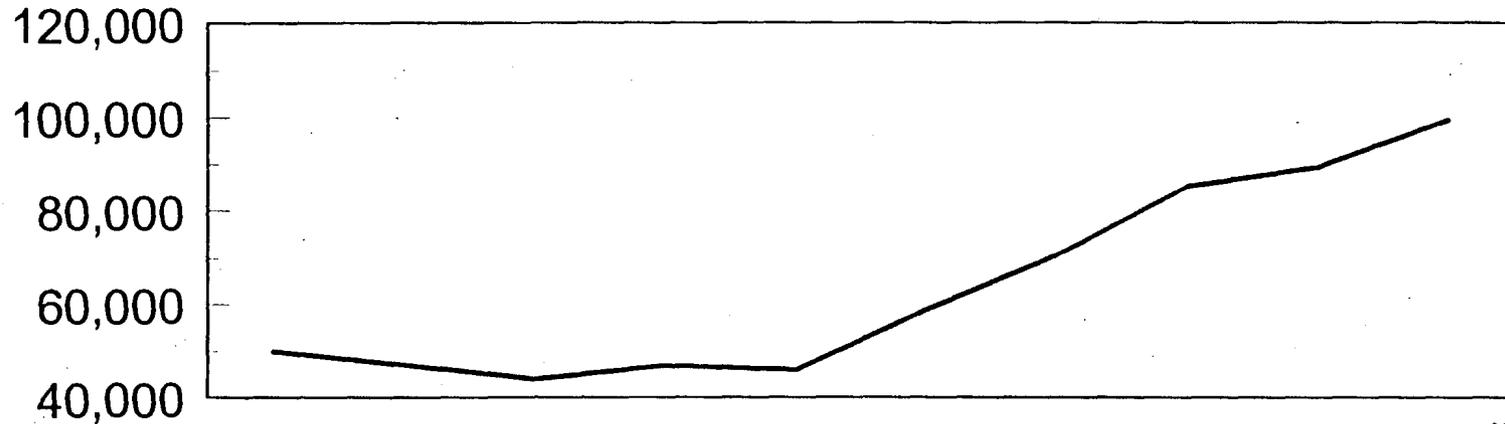


Year	1986	1987	1988	1989	1990	1991	1992	1993
Sockeye	39,794	40,225	38,533	53,505	63,793	75,475	84,450	94,998
Chinook	2,294	2,762	2,723	2,160	2,594	3,947	3,316	2,886
Coho	521	402	450	825	1,446	3,264	1,478	1,443
Total	42,609	43,389	41,706	56,490	67,833	82,686	89,244	99,327

Figure 5. Harvest of salmon by species in the personal use fishery of the Copper River, 1986-1993.

# Copper River Personal-Use Fishery

Estimated Harvest



# Permits

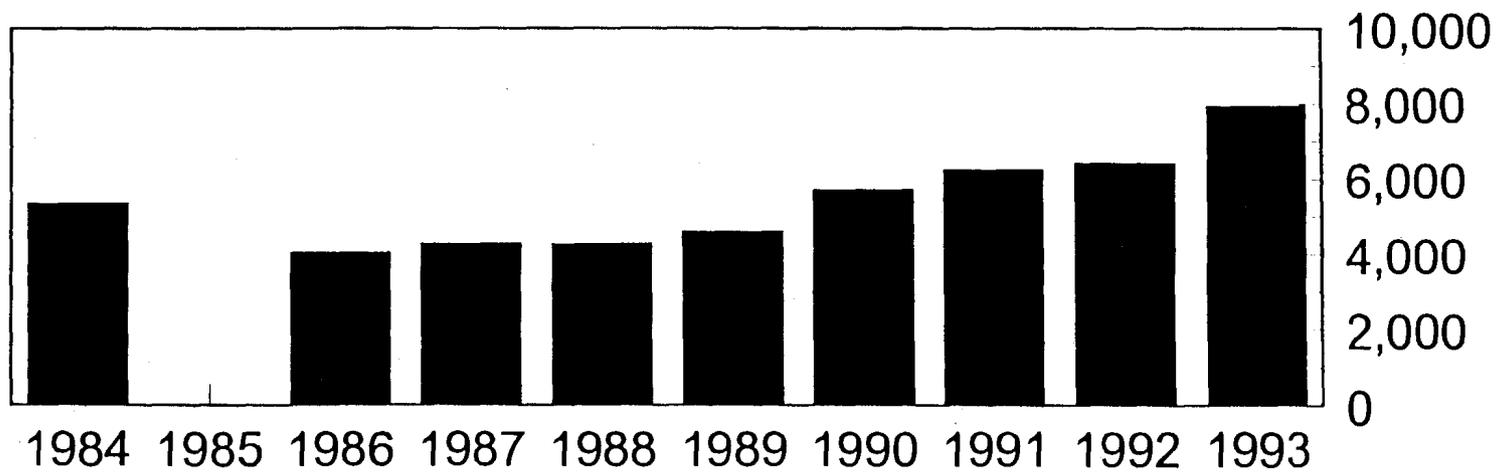


Figure 6. Harvest and number of permits issued during the Copper River personal use fishery, 1984-1993.

# Copper River Personal-Use Salmon Fishery

Difference between estimated and allowable harvests

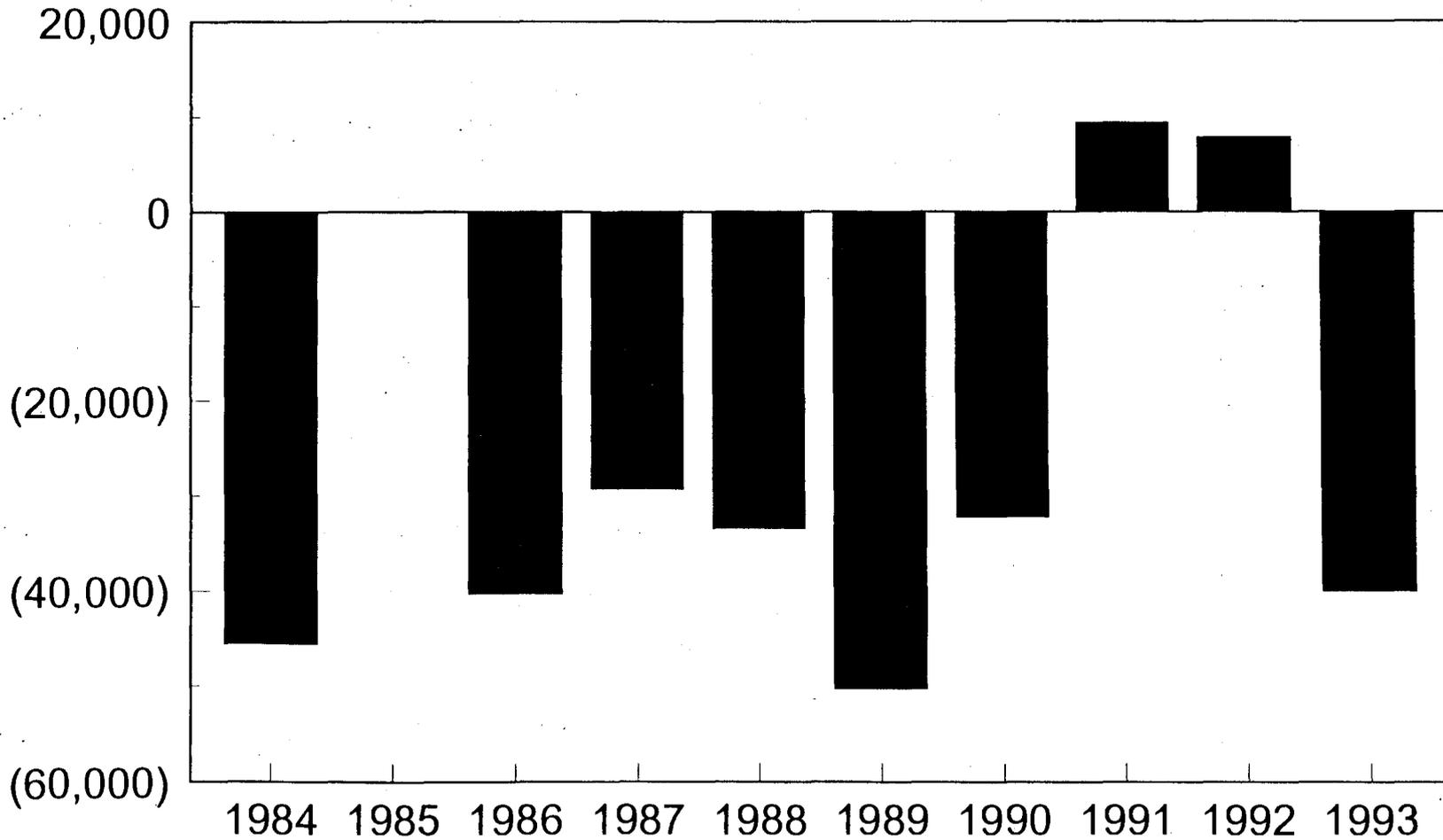


Figure 7. Estimated versus allowable harvests during the Copper River personal use salmon fishery, 1984-1993.

# Copper River Personal-Use Salmon Fishery

Difference between Allowed and Actual Harvest

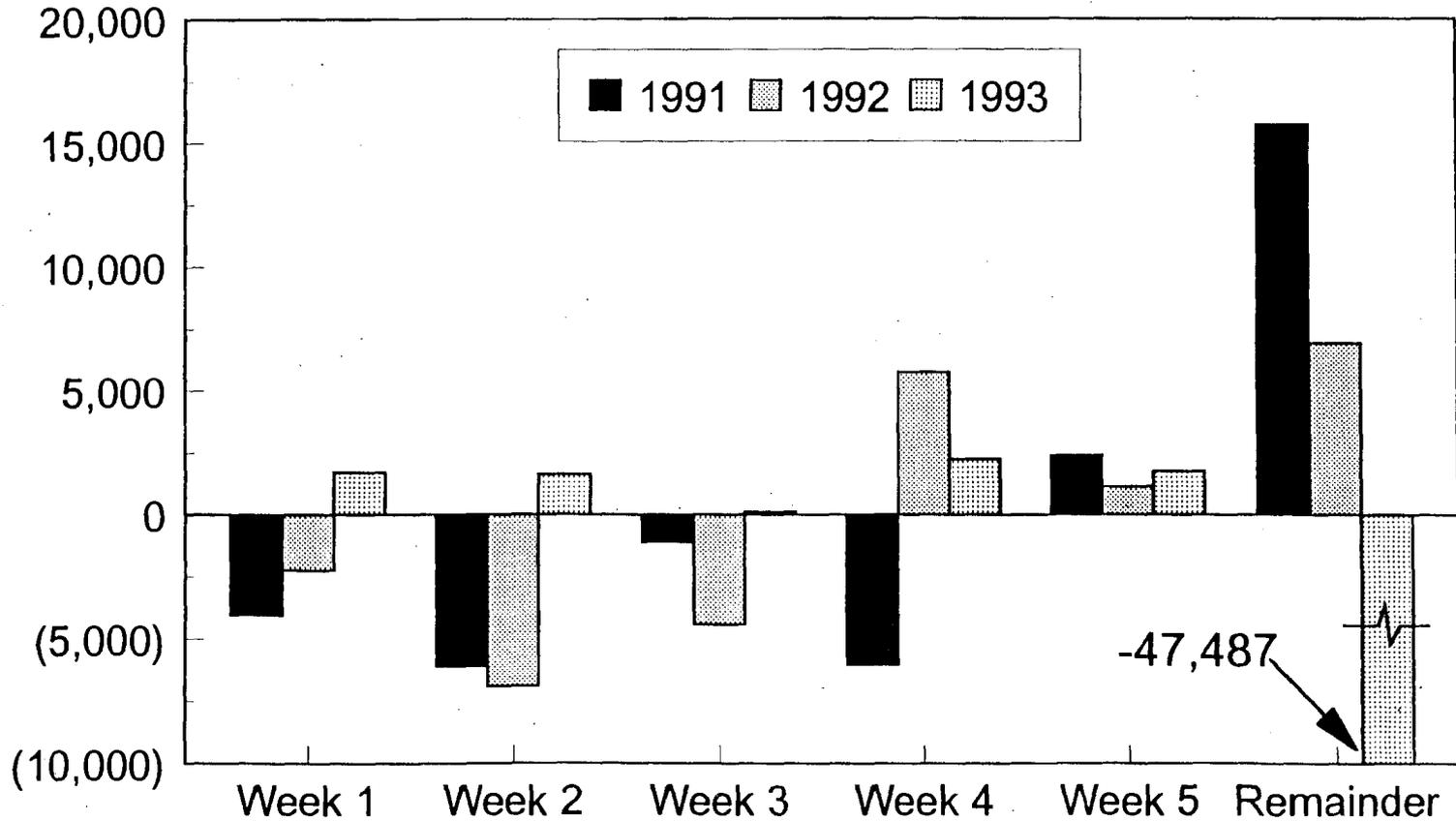
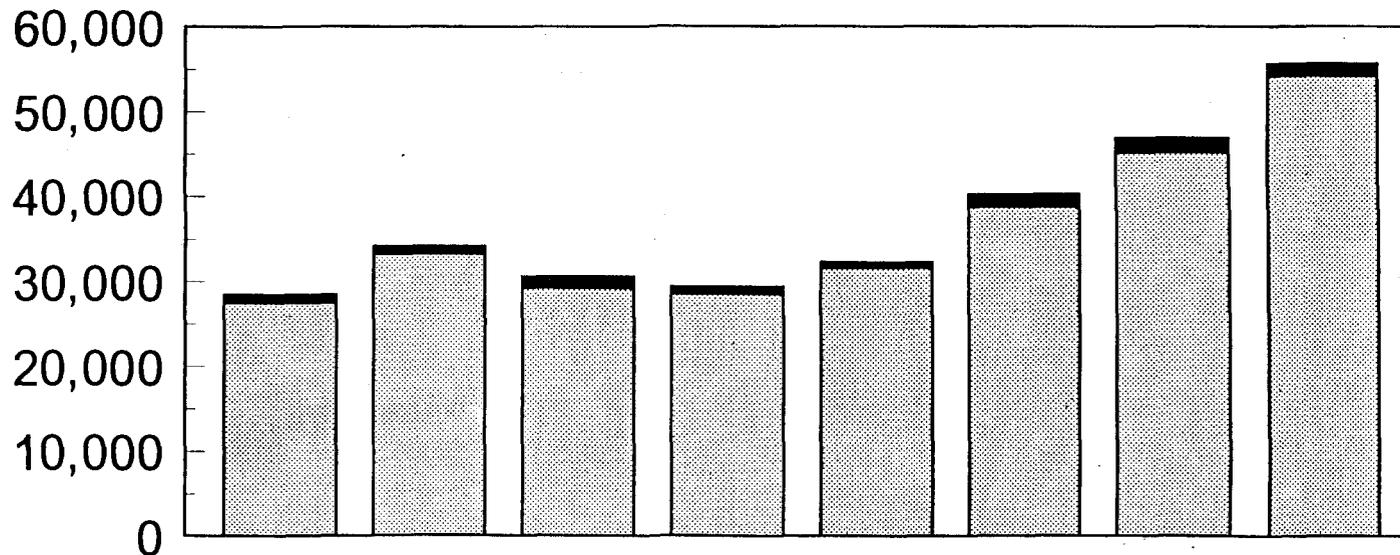


Figure 8. Estimated versus allowable harvests by weekly periods during the Copper River personal use salmon fishery, 1991-1993.

## Copper River Subsistence Salmon Harvest

### Number Harvested

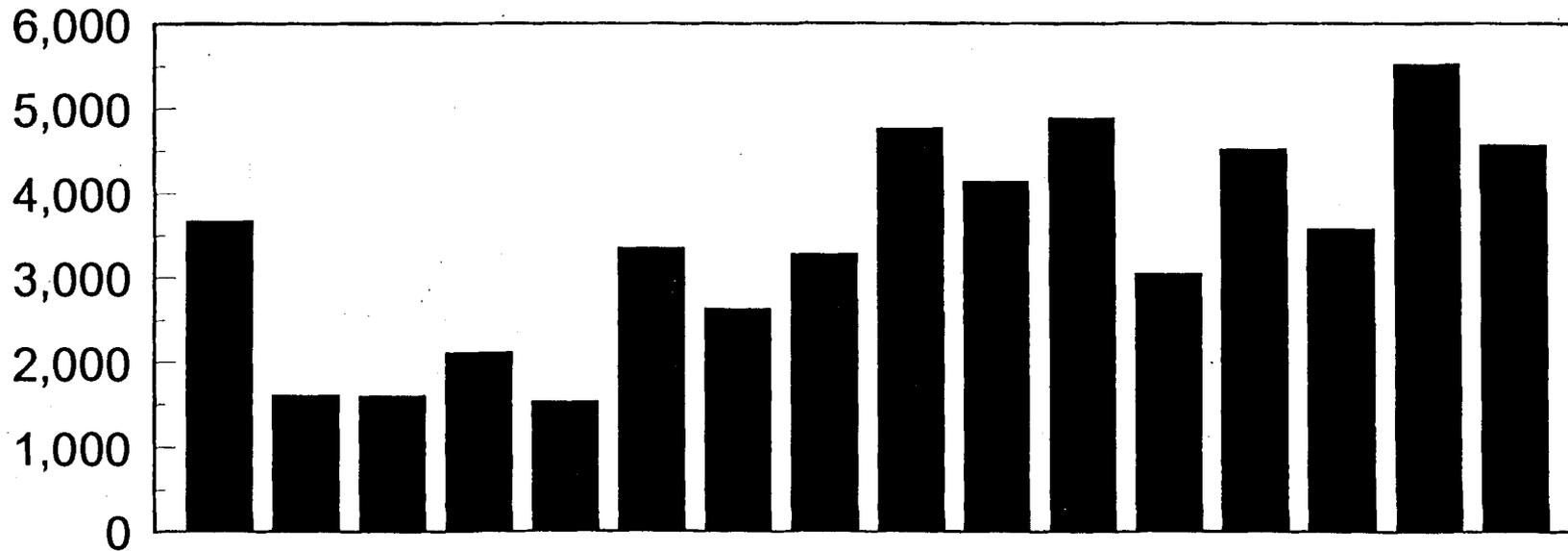


Year	1986	1987	1988	1989	1990	1991	1992	1993
Sockeye	27,446	33,215	29,161	28,455	31,561	38,731	45,138	54,135
Chinook	686	792	992	793	637	1,300	1,446	1,441
Coho	291	135	361	69	92	228	362	79
Total	28,423	34,142	30,514	29,317	32,290	40,259	46,946	55,655

Figure 9. Harvest of salmon by species in the Upper Copper River District subsistence fishery, 1986-1993.

# Copper River Sockeye Salmon Sport Harvest

Number Harvested

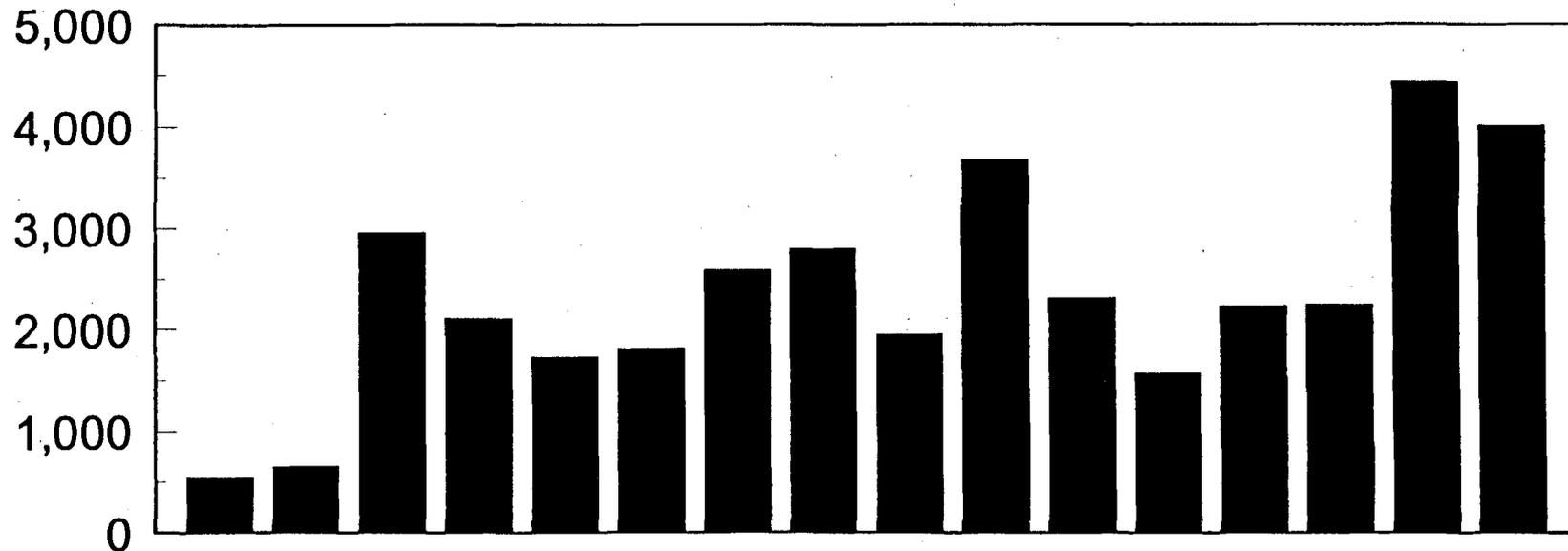


1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
3,662	1,606	1,599	2,109	1,523	3,343	2,619	3,267	4,752	4,129	4,876	3,038	4,509	3,569	5,511	4,560

Figure 10. Sport harvest of sockeye salmon in the Copper River, 1977-1992.

# Copper River Chinook Salmon Sport Harvest

Number Harvested

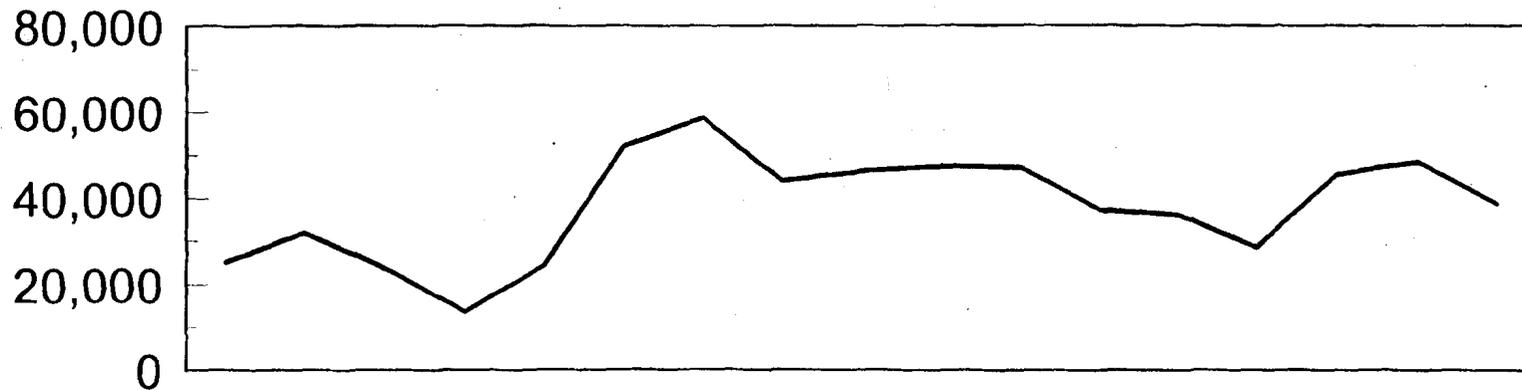


1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
532	641	2,948	2,101	1,717	1,802	2,569	2,787	1,939	3,663	2,301	1,562	2,219	2,232	4,427	3,997

Figure 11. Sport harvest of chinook salmon in the Copper River, 1977-1992.

# Copper River Chinook Salmon

Number Harvested



Escapement Index

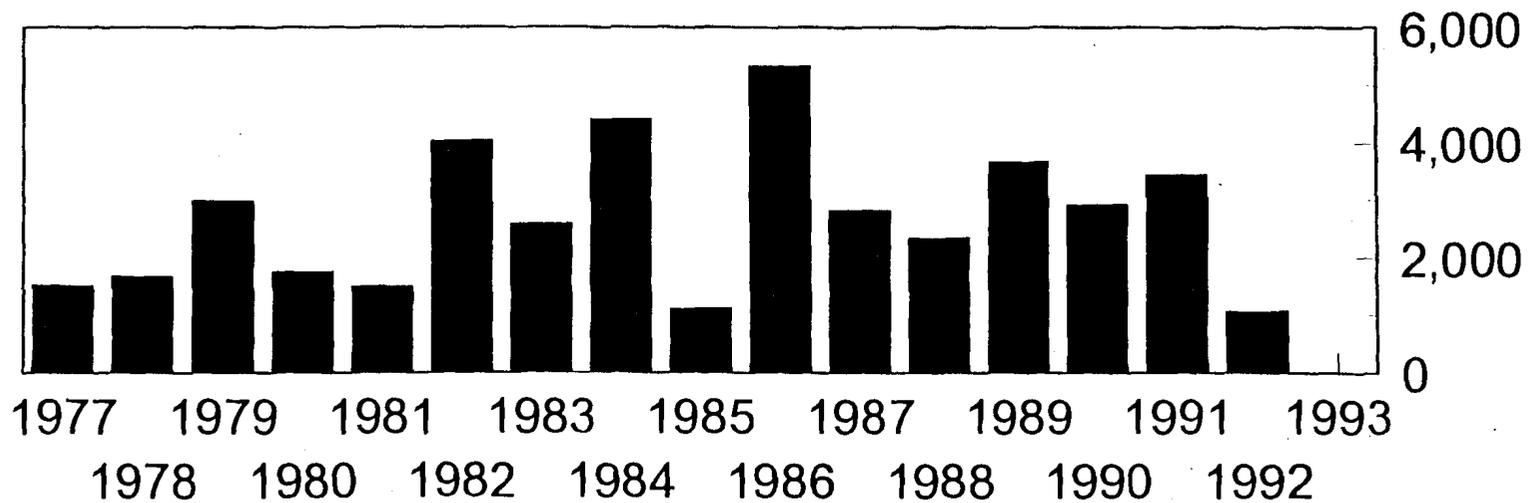
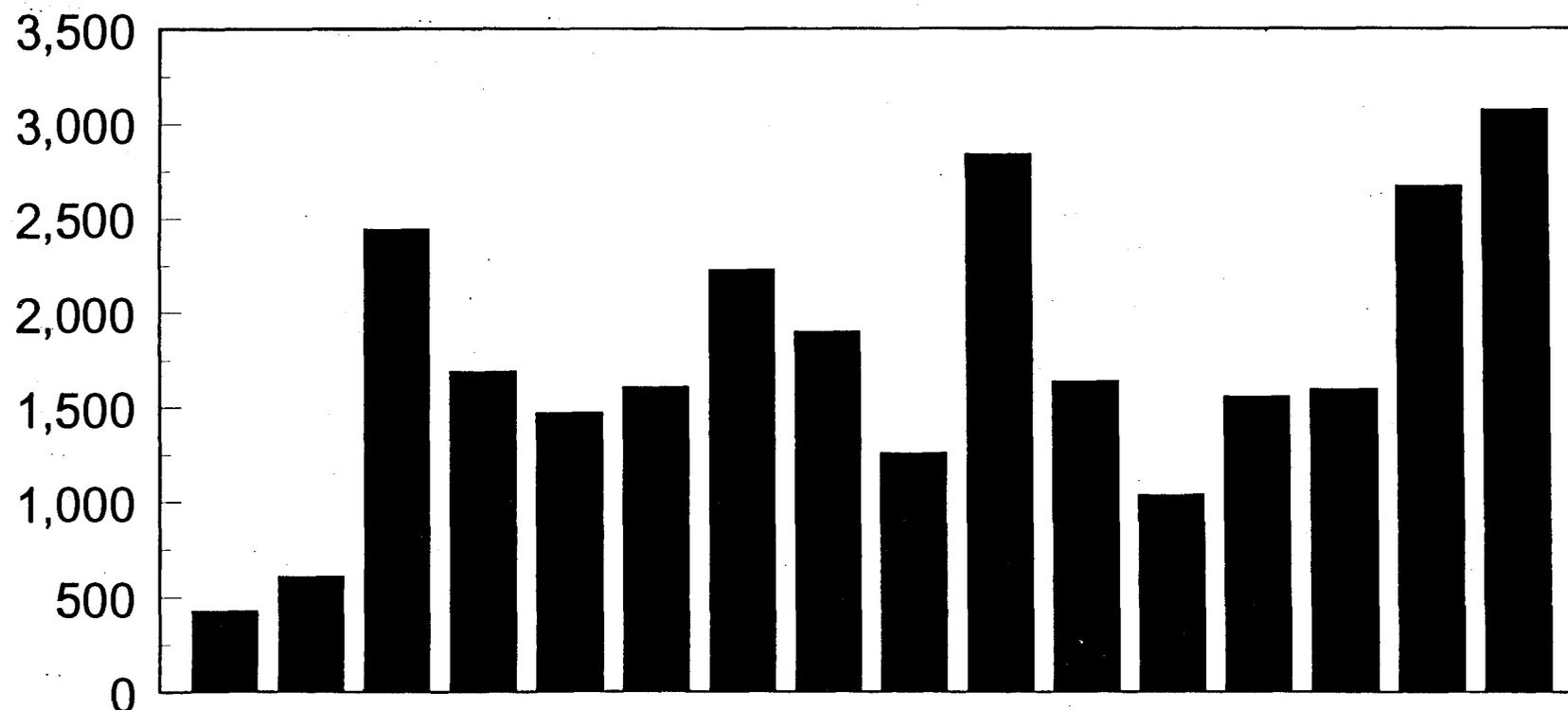


Figure 12. Comparison of Copper River chinook salmon harvest and spawning escapement index counts, 1977-1993.

# Gulkana River Chinook Salmon Sport Harvest

Number Harvested



1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
421	606	2,440	1,688	1,469	1,603	2,224	1,898	1,256	2,833	1,631	1,033	1,551	1,592	2,667	3,071

Figure 13. Sport harvest of chinook salmon in the Gulkana River, 1977-1992.

# Gulkana River Chinook Salmon Observed Spawning Escapement

Number Salmon Counted

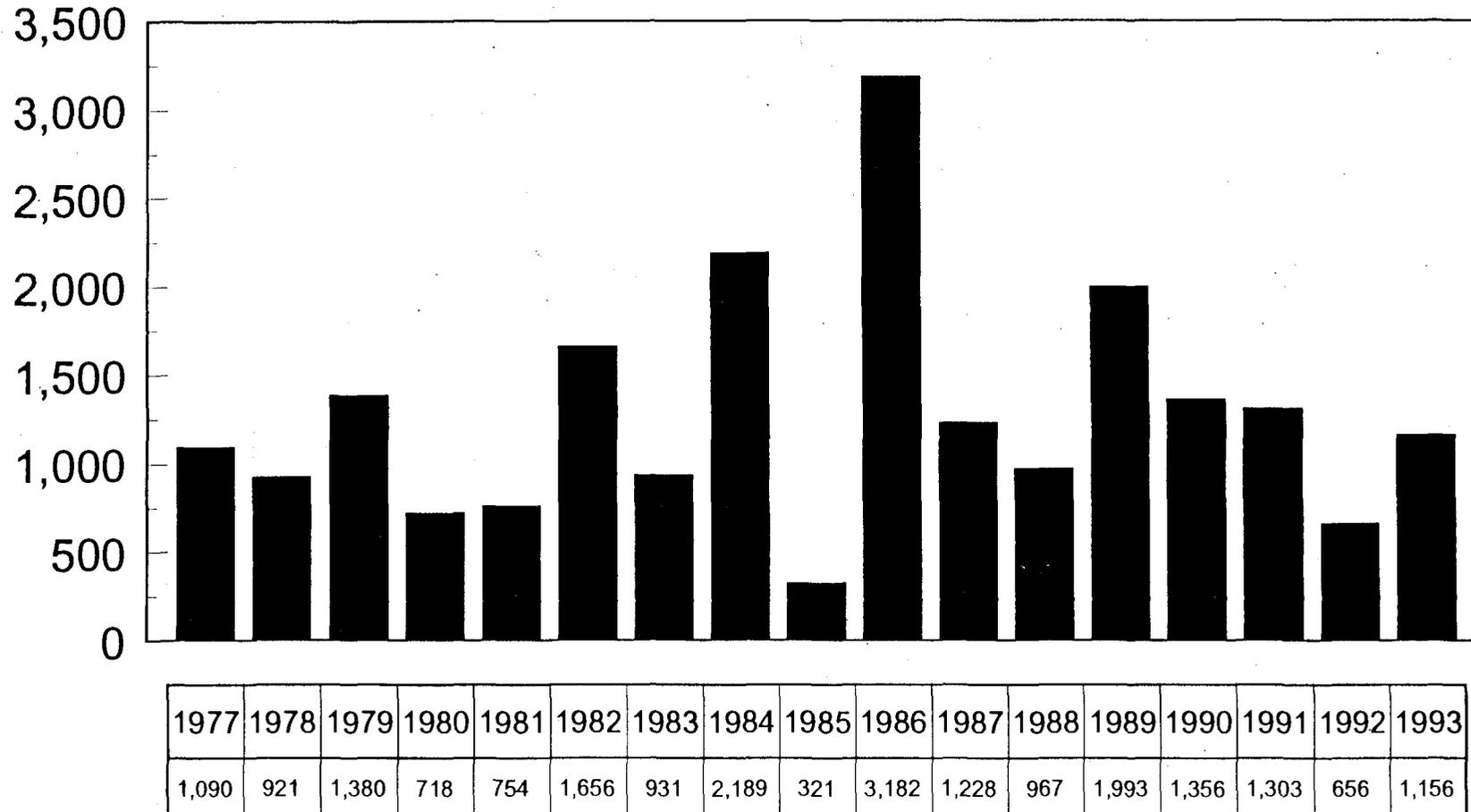
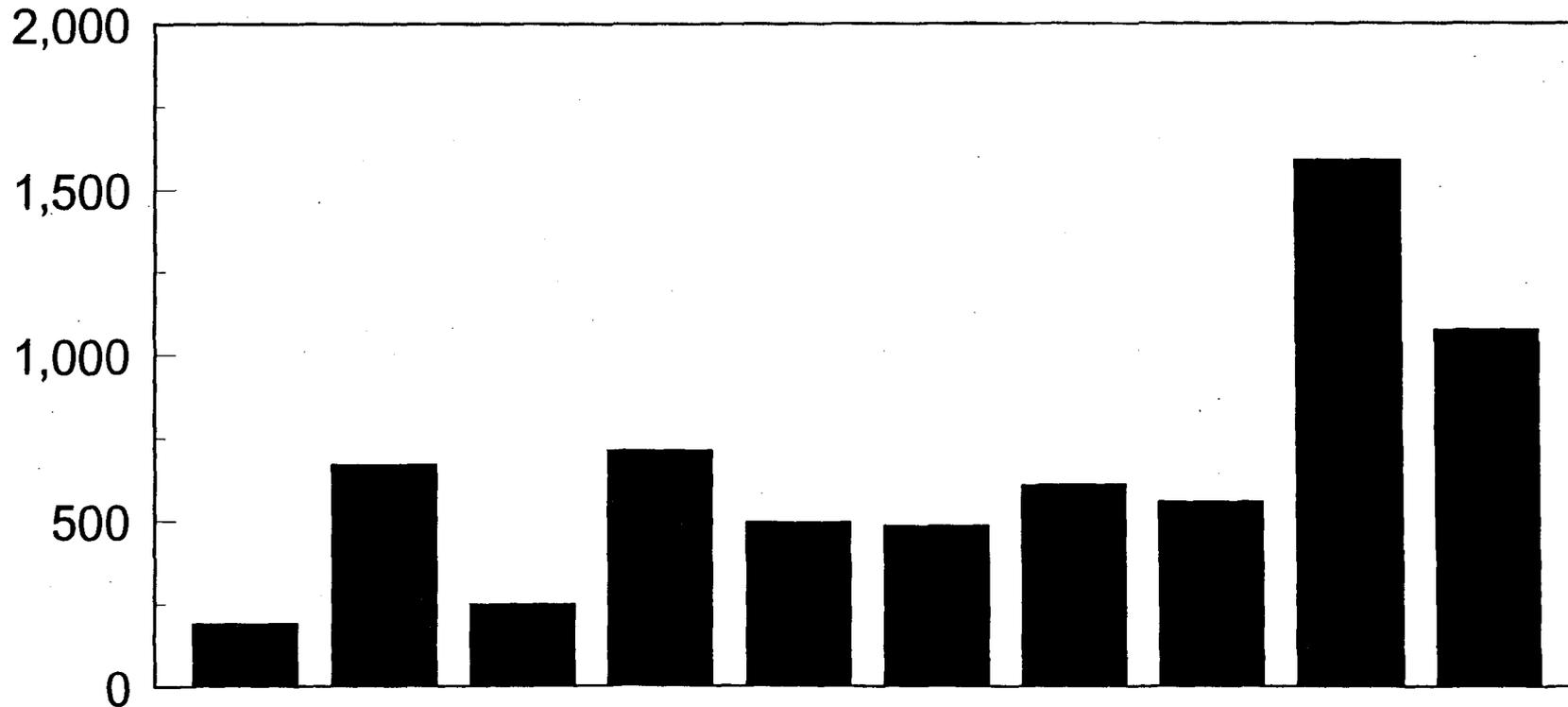


Figure 14. Observed spawning escapement of chinook salmon in the Gulkana River, 1977-1993.

# Klutina River Chinook Salmon Sport Harvest

Number Harvested

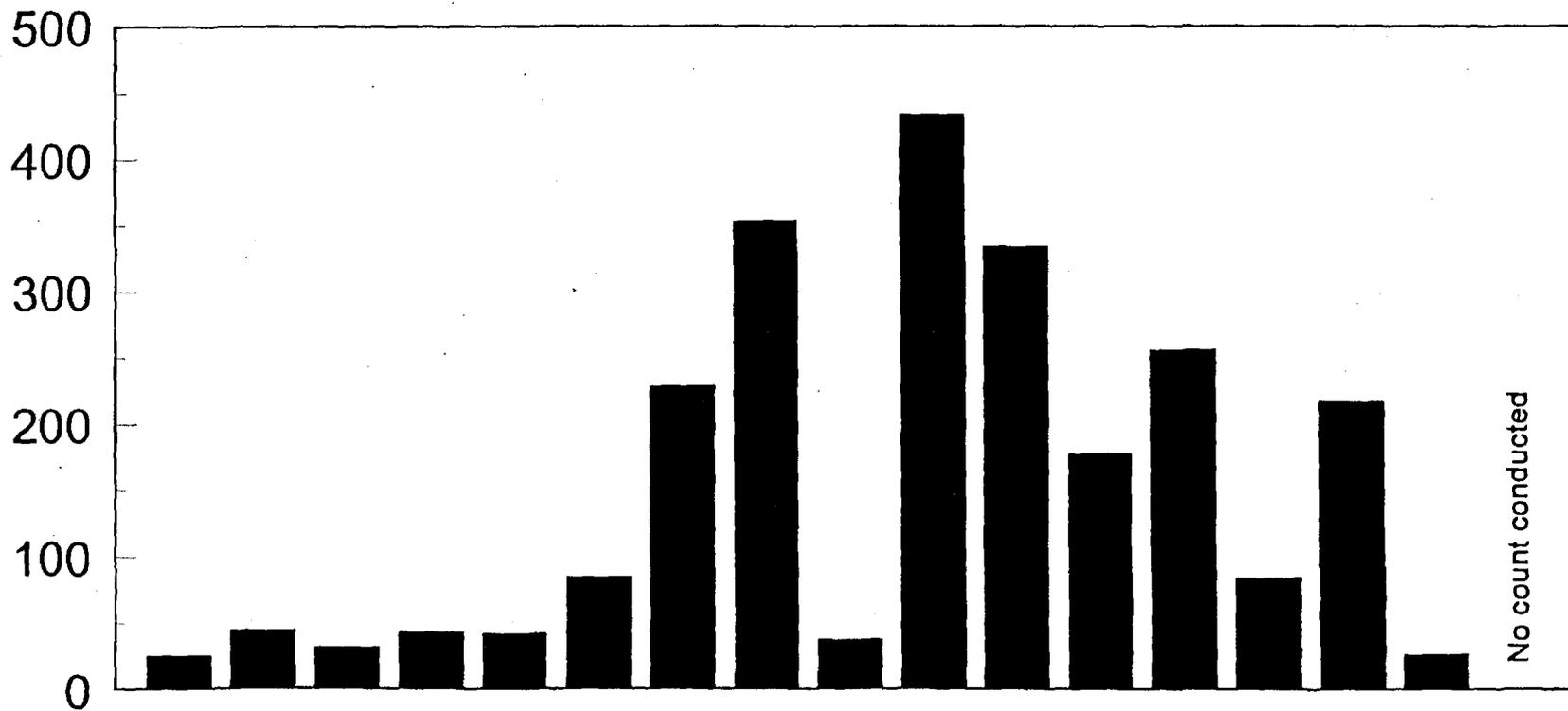


1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
189	667	249	710	495	483	606	554	1,588	1,075

Figure 15. Sport harvest of chinook salmon in the Klutina River, 1983-1992.

# Klutina River Chinook Salmon Observed Spawning Escapement

Number Salmon Counted



1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
25	44	32	43	42	84	228	353	37	433	333	177	255	83	216	26	No count

Figure 16. Observed spawning escapement of chinook salmon in the Klutina River, 1977-1993.

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