4K94-8

AN OVERVIEW OF THE KODIAK MANAGEMENT AREA COMMERCIAL SALMON FISHERIES

A report to the Alaska Board of Fisheries

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Regional Information Report[1] No. 4K94-8

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211 Mission Road
Kodiak, Alaska 99615

February 1994

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[1]The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished division reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

ACKNOWLEDGEMENTS

The authors express their appreciation to all the Alaska Department of Fish and Game seasonal employees who worked so diligently during the past salmon seasons, and also to the employees of Alaska State Parks, the U.S. Fish and Wildlife Service, and the Kodiak Regional Aquaculture Association, who have aided data collection. Thanks to Lucinda Neel, Joanne Shaker, Joan Brodie, Jim Blackburn, and Sharon Theis for their technical support. Thanks to Charles Swanton, Jim McCullough, Bruce Barrett, and Robert Murphy for editorial assistance.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

LIST OF TABLES

LIST OF TABLES (Cont.)

LIST OF TABLES (Cont.)

LIST OF FIGURES

LIST OF FIGURES (Cont.)

LIST OF APPENDICES

KODIAK MANAGEMENT AREA DESCRIPTION

Location and Boundaries

The Kodiak Management Area (KMA) is comprised of the waters of the western Gulf of Alaska surrounding the Kodiak Archipelago, and along that portion of the Alaska Peninsula which drains into Shelikof Strait between Cape Douglas and Kilokak Rocks at Imuya Bay (Figure 1). The archipelago is approximately 150 miles long extending from Shuyak Island south to the Trinity Islands. The Alaska Peninsula portion is about 160 miles long and is separated from the archipelago by Shelikof Strait which averages 30 miles in width. Chirikof Island, located approximately 40 miles south southwest of the Trinity Islands, is also included in the Kodiak Management Area. The regulatory description of the KMA is all waters of Alaska south of a line extending east from Cape Douglas at 58°52' North latitude, west of 150° West longitude, north of 55°30' North latitude, and east of a line extending south from the southern entrance of Imuya Bay near Kilokak Rocks at 156°20'13" West longitude[1].

Physical Description

Glaciation shaped the Kodiak Archipelago. Kodiak's topography ranges from sharp crested alpine peaks (which run down the northeast-southwest axis of the island), to broad U shaped alpine valleys, to low flat bottomed wetlands. The coastline is mostly very rocky and irregular, deeply indented by numerous glacially scoured straits, inlets, and branching fjords. Though the archipelago cover approximately 5000 square miles of land area, there is no place on Kodiak Island that is more than 15 miles from the ocean (Buck et al. 1975). The southwest end of the island is lower with more subdued topography and a relatively smooth rounded coastline. Streams are generally short and steep, draining deep mountain lakes or small glaciers. In the southwest part of Kodiak streams are somewhat longer, flowing along wide valleys (the longest rivers, the Karluk and the Ayakulik, are located in this zone and each extend only about 30 miles). The western portion of the Kodiak Management Area lies along the Alaska Peninsula. While similar in many ways to the Kodiak Archipelago, and also greatly shaped by glaciation, it is an area strongly influenced by volcanism. The rugged Aleutian Range dominates the topography, running in a northeast-southwest direction, down the peninsula, and forms the boundary of the watersheds which drain into Shelikof Strait. The mountains here are higher than those of the Kodiak Archipelago, and there are many large glaciers. Generally, temperatures are lower on average and there is less annual precipitation. Again, streams are relatively short and steep. Because of the local occurrence of deep beds of volcanic ash some streams are unstable with shifting stream channels.

The marine waters of the area are influenced by the Alaska Current, which moves north along the Southeast Alaska panhandle, west by the north shore of the Gulf of Alaska (past Yakutat and Prince William Sound), then moves south and west past Kodiak Island. The current narrows

[1] All latitudes and longitudes currently used in ADF&G Commercial Fishing Regulations are based on North American datum of 1927 (5 AAC 39.997(b)). This document also follows that system.

and intensifies near the archipelago, and becomes the Alaska Stream, which passes down along the Alaska Peninsula. Little is known of the inshore circulation of marine waters over Kodiak's continental shelf. Actual surface currents are greatly influenced by tides and strong winds associated with frequent storms in the gulf. The climate of the Kodiak region is dominated by this strong marine influence. It is characterized by mild temperatures (the overall mean annual temperature is 40° F), predominantly cloudy skies (days are overcast more than half the year), and moderately to heavy precipitation (averaging over 68 inches per year, with up to 200 inches per year documented in specific locations).

The marine waters around Kodiak are among the most productive in the North Pacific. Offshore upwelling combines with abundant freshwater runoff to make near shore waters rich in nutrients. There are hundreds of species of marine fish native to the KMA, including 5 species of salmon: chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, pink *O. gorbuscha*, chum *O. keta*, and coho *O. kisutch* salmon.

Population and Communities

Kodiak is one of the most rapidly expanding communities in the state of Alaska, with the population growing approximately 19.1% from 1990 to 1992 (Alaska Department of Labor, Unpublished Report, 1993). Approximately 15,250 people currently reside within boundaries of the Kodiak Management Area (Kodiak Island Borough Census Report, October 1993). The majority of area residents reside in the city of Kodiak (approximately 7,500) and along the connecting road system (approximately 6,500; including the U.S.Coast Guard Base adjacent to town, and outlying communities of Monashka Bay, Bell's Flats, Pasagshak, and Chiniak). The remaining 1,250 people reside in small communities scattered around the island, including the cities of Akhiok, Larsen Bay, Old Harbor, Ouzinkie, Port Lions, the village of Karluk, and a logging camp located in Danger Bay (Figure 2). Approximately 15% of the population is of Alaska Native heritage (Northern Economics 1991).

Commercial fishing and processing is the largest employer in Kodiak. The seafood industry employees 55% of the private sector work force (Northern Economics 1991). During the commercial salmon fishing season (approximately June through September) 4,200 to 5,000 people may be involved in the KMA commercial salmon fishery. This includes approximately 1,800 to 2,000 fishers and crew, 200 to 300 tender operators and crew, and 2,200 to 2,700 processing personnel (based on Alaska Department of Fish and Game estimates and Alaska Department of Labor statistics). The economic value of the commercial salmon fishery, based soley on the average price paid to fishers (exvessel value), has averaged over $30,000,000 annually since 1975 (Figure 3).

SALMON RESOURCES

Salmon Producing Streams

There are approximately 800 streams within the KMA in which salmon migration or spawning has been documented (State of Alaska 1993a). Of these, 440 streams are shown on the current

Kodiak Area Salmon Statistical Area Map (Figure 4 and Appendices A.1-A.8). Three streams support viable chinook salmon stocks, 38 streams support sockeye salmon stocks of extremely varying size, 174 have coho salmon runs, approximately 150 have chum salmon runs, and all 440 streams support pink salmon stocks. Of these streams 92 are located in the Mainland District on the Alaska Peninsula, 18 are on Shuyak Island, 84 are on Afognak Island, 234 are on Kodiak Island, and 12 are on the Trinity Island group (Table 1).

Biological Escapement Goals

The Alaska Department of Fish and Game (ADF&G) Commercial Fisheries Management and Development Division (CFMADD) Kodiak salmon management and research staff has established biological escapement goals, or the annual number of spawning salmon required inriver to sustain production, for each salmon species. Escapement goals are expressed as a range; the low end of the range is considered a minimum escapement, and the high end of the range is the maximum escapement goal (Table 2). These escapement goals have been formulated for sockeye, pink, and chum salmon by river system (Appendices B.1-B.3). Escapement goals have also been prepared for most coho and major chinook salmon producing streams (Appendices B.4 and B.5). The KMA commercial salmon fisheries are managed to achieve escapement levels which are within the biological range. The "targeted" escapement goals for KMA salmon are: 15,000 chinook, 2,100,000 sockeye, 3,000,000 to 4,500,000 pink[2], 1,020,000 chum and 150,000 coho salmon.

Salmon Production Potential (Wild Stocks)

An "average salmon production potential" for the KMA can be calculated by multiplying the escapement goal by an assumed average return per spawner, for each species (Table 3). The annual "potential harvest" is calculated by subtracting the targeted escapement goal. Assuming that escapement requirements are achieved, and that the actual return per spawner values for each species are near the assumed values, the potential annual harvests should average 23,000 chinook, 3,150,000 sockeye, 7,500,000 to 11,250,000 pink, 1,800,000 chum, and 225,000 coho salmon. However, due to the variable environmental conditions encountered throughout the life cycle of these species, fluctuations in salmon production will occur.

Supplemental Production

There are two hatcheries located in the KMA which produce salmon to supplement natural salmon production (Figure 2). Both hatcheries, Kitoi Bay and Pillar Creek, are operated by the Kodiak Regional Aquaculture Association (KRAA). Kitoi Bay Hatchery has a rearing capacity

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[2] Pink salmon production in individual systems tend to be large one year, then small the next. On Kodiak there has been an "even year dominance"; that is, during even numbered years the major pink salmon systems produce larger returns. Hence the escapement goal is different between odd and even years, with odd numbered years having lower goals, and even years having higher goals.

of 230,000,000 eggs, and is located on the east side of Afognak Island. The Kitoi Bay facility produces primarily pink salmon, plus some sockeye, chum, and coho salmon. Some outstocking of coho and sockeye fry or smolt occurs, but the majority of the salmon are intended to return to the hatchery for common property harvest. Pillar Creek Hatchery, with a rearing capacity of 20,000,000 eggs, is located north of the city of Kodiak at Monashka Bay. It is utilized primarily as an incubation facility for sockeye salmon stocking projects.

As mentioned previously, KRPT identified sockeye salmon as the # 1 priority species for supplemental production. KRAA and ADF&G are involved in limnological studies of KMA lakes and ongoing lake fertilization to increase sockeye salmon fry growth and survival. Theoretically, fertilization could double sockeye salmon production (L. White, ADF&G, Kodiak, personal communication). Lake fertilization has been conducted on Malina, Laura, Portage, Frazer, and Karluk Lakes. Through the use of remote egg takes and hatchery incubation, sockeye salmon fry are being stocked to enhance future sockeye salmon harvest potential. Stocking of sockeye salmon is occurring at Spiridon, Hidden, Crescent, and Waterfall Lakes (Figure 2).

ADF&G Sport Fish Division annually stocks chinook and coho salmon fingerlings and smolt to enhance sport fishing opportunities (Schwarz *in press*). Chinook salmon smolt have been stocked into Island and Mission Lakes near the city of Kodiak. Coho salmon smolt have been stocked into Crescent, Island, Kalsin, Mayflower, Dark, Mission, Orbin, and Potato Patch Lakes near the city of Kodiak, into Crescent Lake near the city of Port Lions, into Ouzinkie lake on Spruce Island near the city of Ouzinkie, and into Little Kitoi, Hidden, and Jenifer Lakes on Afognak Island. As mentioned previously, most of these coho salmon stocking are intended to produce put-and-take fisheries, where all returning adults are expected to be harvested, and no escapement and subsequent spawning are possible.

Supplementing KMA salmon fisheries is an ongoing long term project, and returns are small at this time (Table 4). In the *Kodiak Regional Comprehensive Salmon Plan* KRPT (1992) states an objective of increasing the harvest of salmon (over and above the KMA wild salmon harvest) by an additional 3,000 chinook, 1,700,000 sockeye, 383,000 coho, 11,500,000 pink, and 1,100,000 chum salmon by the year 2002 (the subsequent section "Stock Status" contains additional information).

"Non Local" Salmon in the KMA

Salmon tagging studies have been conducted in the KMA to aid management of commercial fisheries through studies of stock composition present at a particular time and place, and to determine average travel time of major stocks through fishery management units. The earliest tagging study was done in 1927 (Rich and Morton 1929) and there were intermittent tagging studies through 1981 (Bower 1941; Bevan 1959; Simon et al. 1969; Nicholson 1978; Tyler et al. 1986). Most occurred along the south and west sides of the Kodiak Archipelago to learn more of the migration of sockeye salmon travelling to the major systems of Kodiak (Karluk, Ayakulik, Upper Station, and Frazer). Some sockeye salmon tagging was done along the north and east sides of the archipelago (Tyler et al. 1986) and at the south west end of the KMA, along the Alaska Peninsula near Wide Bay (Simon et al. 1969). Salmon migrating through KMA

waters to the Chignik and Cook Inlet Management Areas were documented in some of those studies[3].

Recent stock composition studies in the KMA used scale pattern analysis, run timing, and analysis of shifts in average weights of commercial catches (Barrett and Swanton 1991 and 1992; Barrett and Nelson 1994; Swanton and Nelson 1994; Vining and Barrett 1994). Samples of KMA spawning chinook, sockeye, and chum salmon have been collected to establish baseline data for genetic stock identification.

COMMERCIAL SALMON HARVEST

The salmon resources of the KMA have been exploited commercially for over 150 years (Roppel 1986). The first commercial fisheries were small salted salmon ventures by the occupying Russians in the early 1800's. Salmon streams were blocked and salmon captured as they became schooled behind these barriers. Sockeye salmon returning to the Karluk River brought fishermen and processors to Kodiak soon after the territory was transferred from the Russians in 1867. A record of commercial sockeye salmon harvest dating back to 1882 exists (Table 5). Intense competition led to expansion of the fishery to other areas and species. By the early 1900's fisheries for coho, pink, and chum salmon had developed.

Commercial Gear Use

Beach seines were the first gear type effectively used commercially. In the late 1800's, beach seines 40 fathoms in length were used to harvest sockeye salmon in Karluk Lagoon. As competition for fish grew the primary harvest location for Karluk sockeye salmon moved outside the lagoon, using heavily manned beach seines averaging 450 fathoms in length. The first fish trap was built in Kodiak in 1896, and until the late 1950's the Kodiak commercial salmon fishery was dominated by cannery owned fish traps, with some independent fishers owning purse seine, beach seine and set gillnet operations. When Alaska was granted statehood in 1959, fish traps were prohibited, and the KMA commercial salmon fishery was conducted by purse seine, set gillnet, and beach seine gear (in decreasing order of abundance). In 1974 a "limited entry system" was adopted by the State of Alaska which restricted the number of individuals allowed to participate in commercial salmon fisheries. This system formally established post statehood levels of purse seine, beach seine, and set gillnet gear participation.

There are 613 commercial salmon permits for the KMA: 387 purse seine (making this the second largest purse seine fleet in the state), 36 beach seine, and 190 set gillnet. Actual numbers of permits fished annually varies slightly (Table 6 and Figure 5). Over 75 % of KMA permits are owned by Alaska state residents, with ownership varying little since 1985 (Table 7).

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[3] It should be noted that salmon tagging studies conducted along the southwestern Alaska Peninsula and in Cook Inlet documented KMA salmon stocks migrating through those management areas (Rich and Morton, 1929; Tyler and Noerenberg 1961).

About 61 % of all permits are owned by Kodiak area residents, representing all communities (Table 8).

Management Units

The KMA is one of 13 designated salmon net registration areas in the State of Alaska. Inseason management of the commercial salmon fishery is structured around 7 districts subdivided into 52 sections (Figure 4 and Appendices A.1-A.8). These sections are occasionally subdivided inseason to adjust fishing effort on unexpected salmon surpluses or deficits. Each management unit (section) defines a traditional geographic harvest area, managed for specific stocks or traditional fishing patterns.

Legal Commercial Gear Areas

In the KMA there are restrictions on which gear types can operate in specific management units, based on historical gear use patterns. Both purse and beach seine gear are allowed to operate in the entire management area, except for the Moser-Olga Bay Section of the Alitak Bay District, where set gillnets is the only legal gear[4] (Appendix A.4). In the Central Section of the Northwest Kodiak District both set gillnet and seine gear are allowed (Appendix A.3). Since 1974, the geographical areas currently open to specific gear types have, with few exceptions, remained unchanged:

First, in the mid 1970's that portion of the Karluk District between Rocky Point and Cape Uyak was closed to set gillnet gear in an attempt to accelerate the rebuilding of the Karluk sockeye and pink salmon stocks. No documented gillnet gear had fished there since the early 1960's so no existing gillnetter's were affected. Several purse seine locations within this area, which could impact Karluk stocks, were brought under direct management control. This area was used to provide an expanded closed water sanctuary for severely depleted Karluk sockeye and pink salmon stocks.

Second, in the late 1970's a gear and area adjustment occurred in the Alitak District. The common boundary between the Cape Alitak, Moser-Olga Bay, and Humpy-Deadman Sections was adjusted in an effort to reduce gear conflicts caused by an unclear boundary description. The area open to set gillnet gear was reduced from Cape Alitak to Tanner Head and was increased in Deadman Bay to a point northwest of Fox Island.

Third, a gear and area adjustment was made in Zachar Bay to alleviate fixed and mobile gear conflicts. In the late 1970's closed water sanctuary markers were reduced (moved further into the bay) and the new area was designated "seine gear only". The creation of this small area

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[4] Prior to Alaska being granted statehood, this management unit was designated set gillnet only since before. In 1970 this rule was amended such that the Moser-Olga Bay Section remains gillnet only prior to September 5. Seine gear is then legal in the entire Alitak Bay District. The Dog Salmon Flats, Inner and Outer Akalura, and the Inner and Outer Upper Station Sections are normally closed to commercial fishing. In the event of over escapement "mop up" fisheries can occur in these sections. Prior to September 5 only set gillnet gear would be allowed in these sections.

adjacent to the closed waters within Zachar Bay was consistent with that of other major westside Kodiak bays.

Also, as a result of purse seine fishing activity in Shelikof Strait in 1988, the Alaska State Board of Fisheries stated that commercial salmon fishing activities should be restricted to those waters located within the State of Alaska territorial sea boundary (three mile limit). Due to conflicts between state and federal regulations, Kodiak ADF&G staff issued an emergency order closing all waters of the KMA seaward of the state territorial sea boundary for the 1991 and 1992 seasons. Beginning in 1993, a new regulation was in effect which states that all KMA district and section boundaries do not extend beyond the three mile limit.

Commercial Salmon Processing

Commercial salmon processing within the KMA began in the late 1860's with small salting and pickling operations located around Kodiak Island near major harvest areas. In 1882 processing evolved to canning, when the first cannery was built at Karluk. Kodiak's processing plants have further evolved from those scattered, seasonally operated, canning operations to today's efficient multi-tasked plants, mainly congregated within the city of Kodiak. The majority of these plants are now year round operations, processing crab and groundfish in addition to salmon. Kodiak's processors now produce fresh and frozen salmon products, supplemental to canned salmon. Recent technology used in processing other fish species has been adapted to salmon processing, yielding new, diverse salmon products (such as fillets, surimi, hams, nuggets, and burgers).

Up to 15 salmon buyers or processors participate annually in KMA salmon fisheries. Processing plants are located in the city of Kodiak, Port Bailey, Uganik Bay, Larsen Bay, and Alitak Bay (Figure 2). The latest estimate of the sustained processing capacity of Kodiak's shorebased salmon processors is approximately one million salmon per day. With this high processing capacity, it is common for Kodiak processors to "import" salmon harvested elsewhere in the state. At times, salmon from Bristol Bay, Cook Inlet, Prince William Sound, Alaska Peninsula, and Chignik Management areas are processed in Kodiak plants.

Subsistence Salmon Fishery

The KMA staff issues subsistence salmon permits annually to obtain harvest data. Only residents of the state of Alaska are eligible to take salmon for subsistence purposes. Since 1989 KMA ADF&G staff has mailed out permits, regulations, and a map showing closed water areas to eligible residents. Additional permits are issued to Alaska residents at the Kodiak ADF&G office. Subsistence fishermen are requested to return their permits to ADF&G after the salmon season, listing areas fished by date and salmon harvest by species.

With few restrictions, the entire KMA is open to subsistence salmon fishing. Reported harvests have averaged 25,500 fish annually for the past 10 years (Table 9). Sockeye salmon accounting for 62 % of the harvest, followed by coho salmon which accounted for 27 %. The most utilized subsistence fishery areas include the north end of Kodiak Island and the southeast side of Afognak Island (Table 10).

Salmon Sport Fishery

Since the early 1980's, commercial sport fishing activities have been increasing, particularly in remote areas of the KMA (Schwarz *in press*). Salmon sport fishing opportunities continue to be discovered in the KMA. Commercial sport activity includes lodge operations, charter vessels, guiding, and directed air charter flights. Although sport caught salmon may not be sold, the lodge, guiding, and charter activities are considered commercial uses since the owner is compensated monetarily for directing and providing fishing opportunities. Most charter boat operations are based out of the city of Kodiak. Remote lodges are currently being operated at Karluk Lagoon, Ayakulik River mouth, Olga Bay, Larsen Bay, Old Harbor, Saltery Lake, Port Lions, Port Bailey, Raspberry Straits, Seal Bay, Port Williams, Zachar Bay, Uyak Bay, Ugak Bay, and Uganik Bay. A temporary tent camp is set up annually at the Kashvik River and floating cabins are located in Paramanoff and Perenosa Bays. Fly in sport fishing areas include virtually all KMA chinook and sockeye salmon systems, and most major coho salmon systems.

Sport fishing activities are regulated by ADF&G's Sport Fish Division. The KMA sport fishery salmon harvest is estimated by an annual Sport Fish Division statewide mailout survey. Sport fish salmon harvest varies each year, but by looking at 5 year period averages over the last 15 years (1978-82, 1983-87, and 1988-92) an increasing trend can be shown (Table 11). The harvest averaged about 37,850 fish over the 1988-92 period, a 22% increase from the 1978-82 5 year period. By species, the largest increases in sport fish harvest over time have been sustained by sockeye (174%), chinook (151%) and coho salmon (96%). Pink salmon sport fish harvest has decreased (-26%).

COMMERCIAL SALMON FISHERIES MANAGEMENT

Staff

The ADF&G, CFMAD Division is responsible for the management of commercial harvest activities on Alaska's salmon stocks. KMA staff responsible for regulation of the commercial salmon fishery consists of an Area Management Biologist, two Assistant Area Management Biologists, and approximately 15 seasonal employees. The Kodiak salmon research staff includes an Area Research Biologist and approximately 10 seasonal employees. A Regional Salmon Management Coordinator and a Regional Salmon Research Biologist oversee these operations. The Kodiak salmon development staff (formerly the Fisheries Rehabilitation and Enhancement Division) includes an Area Biologist, and Assistant Area Biologist, and approximately 10 seasonal employees. Biologists and technicians from the Division of Sport Fish, Alaska State Parks, U.S. Fish and Wildlife Service (Kodiak National Wildlife Refuge), and KRAA, aid in the collection of data during the salmon fishing season.

Preseason Activities

Forecasts

Preseason salmon forecasts are developed jointly by management and research biologists. Pink salmon returns to the KMA are predicted by broad geographic area, while individual forecasts are made for major sockeye salmon stocks. Projected harvests are estimated by fishery and area (Table 12).

The KMA pink salmon forecast is based on a preemergent pink salmon sac fry survival study. This study has been conducted each spring by the KMA management staff since 1966. This annual program examines pink salmon egg overwinter survival in specific streams during March and April. Each year, data are compared to previous year's results to develop a preseason forecast of return and potential harvest. The KMA pink salmon forecasts are reliable in projecting extremes for major systems and total production. This forecast assists fishery managers in making preseason decisions concerning fishing time and areas open to fishing, especially during the early portion of the pink salmon run.

System specific sockeye salmon forecasts are developed for major stocks. Information which is used to develop these forecasts are: previous run strength information (escapement and catch); sockeye salmon smolt outmigration data; and samples of sockeye salmon escapement and commercial catch for sex and length data, and collection sockeye salmon scales for age determination.

Formal forecasts are not prepared for chinook, coho, or chum salmon. Potential harvest is estimated by the Area Management Biologist based on previous escapements and observed escapement/return relationships. Similarities exist between pink and chum salmon freshwater and early marine survival. Pink salmon forecasting information (fry overwinter survival estimates) is used along with escapement data to predict chum salmon production.

Inseason Activity

By regulation, the commercial salmon fishing season in the Kodiak Management Area may extend from June 5 through October 31 (State of Alaska 1993b). Inseason management activities focus around daily evaluations of actual run strength in comparison to preseason expectations (forecasts) by species. Commercial salmon fisheries may be allowed if there appears to be salmon surplus to escapement needs.

Escapement Estimation

The majority of KMA sockeye and all chinook salmon escapement counts are obtained with the use of fish weirs (Brodie 1993). Weirs are used up to 14 different spawning systems (Table 13, Figure 2). Escapement counts through fish weirs are hand tallied total counts, by species. Sonar, video, or timed periodic counts are not used. Escapement gates are closed when personnel are not present to count. All four major sockeye salmon systems and several of the minor sockeye salmon systems have been monitored by seasonal ADF&G workers at fish weirs.

The remainder are monitored by aerial observation using small fixed wing aircraft. Escapement counts are collected daily from fish counting weir stations by single side band radio contact. The timely and accurate data from weir camps allows for a more precise stock specific management.

While some KMA pink, chum, and coho salmon escapement counts are obtained from weirs, most escapement for these species is estimated by aerial survey, and a few streams are surveyed by foot. Aerial survey and foot survey counts are considered an index of the actual escapement, for use inseason to aid fishery management[5]. Salmon buildup estimates and escapement index counts are collected from frequent fixed wing aircraft surveys of KMA bays and streams.

Prosecuting and Monitoring Commercial Fisheries

Prior to the mid 1970's fishing periods were set by regulation and any inseason changes, such as closures, were announced by Emergency Orders (EO). Since the mid 1970's, actual fishing time has been regulated through the use of EO and News Releases which announce specific details of when and which areas will open to fishing. With analysis of all available data, the KMA management biologist writes an EO which describes details for upcoming or continued commercial salmon fishing periods. The EO describes the starting date, time, and duration of the fishery along with the geographical areas (Districts, Sections, or subsections) which are opened or closed to fishing, and in effect creates a new regulation. A news release (NR) is then issued which publicly announces the fishery. Over 40 EOs may be released in a season, describing hundreds of individual management actions affecting the fisheries within KMA sections (Figure 6).

The management staff's inseason duties include daily contact with all salmon buyers to obtain current harvest information by area and species. Also, staff have daily contact with fishermen to discuss run strength and distribution along with obtaining feedback concerning inseason management activities. As the season progresses, copies of fish tickets (harvest report for an individual landing) are collected from processors and tenders, and this information is entered into a computer database. Inseason fish ticket summaries are made and compared to previous verbal reports to refine the catch estimate to date.

Additional inseason information on returning sockeye salmon run strength in the Alitak Bay District (the Frazer and Upper Station stocks) is obtained from an ADF&G test fishery in Olga Narrows.

Commercial Salmon Harvest Strategy

There is a general chronology related to salmon run timing by species within the KMA (Figure 7). Generally, there are "early run" sockeye salmon present in the KMA throughout June to about mid July, and "late run" sockeye salmon are available from mid July through early

[5] Expansion of index counts to better estimate total return strength can be accomplished by various methods, and is done postseason by research staff. All escapement values in past Annual Management Reports are total counts from weir plus index counts, and this document follows that pattern.

September. Pink and chum salmon are available and targeted during July through August. Coho salmon are present in the KMA from about August through October. Commercial salmon fisheries are structured around the seasonal abundances of salmon (Table 14). Inseason management actions are structured to adhere to a generalized plan described in an annually issued harvest strategy (Prokopowich et al. 1993). This strategy recognizes a specific chronology of management actions related to salmon run timing by species.

Regulatory Management Plans

Guiding the KMA staff are several Alaska Board of Fisheries (BOF) approved "Management Plans" that describe biological and allocative constraints which the management staff must follow when structuring commercial salmon fisheries. Seven regulatory management plans are now in effect for the KMA (Table 15). These plans are part of the Kodiak Area Commercial Salmon Fishery Regulations (State of Alaska 1993b). These management plans reflect traditional fishing opportunities and the subsequent harvest allocations which have resulted between and within gear types participating in specific fisheries.

Three management plans establish in regulation the harvest strategies which developed over time to maintain the biological integrity of local salmon stocks and the allocative concerns of local fishers. Two plans affect Kodiak purse seine fishers ability to target on salmon migrating through the KMA to spawning systems in the Chignik and Cook Inlet Management Areas. Two plans allocate stocked salmon (put-and-take fisheries developed by ADF&G and KRAA). Normally the intent of these plans are that salmon should be harvested in "traditional" fisheries located in the management units covered by the plans.

Cape Igvak Salmon Management Plan (5AAC 18.360)

Beginning in 1964 a purse seine fishery developed along the capes in the Cape Igvak Section of the Mainland District (Appendix A.8). Tagging studies and stock identification studies using average weight and age composition conducted in 1968 and 1969 concluded that up to 80 percent of the sockeye salmon harvested in the Cape Igvak Section were of Chignik origin (Simon et al. 1969). From 1974 through 1978 this area was managed for "day for day" equal fishing time with Chignik. A specific management plan was adopted by the BOF in 1978. The Cape Igvak Salmon Management Plan covers the time period from June 5 through July 25 for fishing activity in the Cape Igvak Section of the Mainland District. This management plan allows the KMA fleet to harvest up to 15 % of the Chignik sockeye salmon harvest, and stipulates strict allocative and biological requirements which must be met prior to any fisheries occurring (Table 16). Since this plan was adopted, the catch of Chignik bound sockeye salmon from the Cape Igvak Section has ranged from 0.0 to 15.9 %, and has averaged 10.7 %, of the total Chignik sockeye salmon harvest (Table 17); only 3 times (1983, 1987 and 1993) has the harvest met the 15% allocation level (Figure 8).

Alitak Bay District Salmon Management Plan (5AAC 18.361)

The salmon fisheries of the Alitak Bay area are some of the oldest in the KMA. Sockeye salmon bound for Upper Station were targeted as early as 1880, and the first cannery was built in this area in 1889. As competition increased, sockeye salmon stocks declined, and pink salmon made up a substantial portion of the harvest from this district after 1924. With Alaska statehood came greater control over the fishery to conserve and rebuild salmon stocks. Sockeye salmon were introduce into the previously barren Frazer Lake beginning in 1951 (this introduction was successful, and since the early 1970's has been self sustaining).

The Alitak Bay District fishery is unique in the KMA, for the gear groups are segregated. Set gillnets are allowed only in the inside waters of the Moser-Olga Bay Section, while seine gear is limited to the outer waters of the Cape Alitak and Humpy-Deadman Sections (Appendix A.4). Prior to the mid 1980's various strategies were applied in the Alitak Bay District to conserve and build the sockeye salmon stocks returning to the Frazer, Akalura, and the Upper Station systems, while offering some protection to local pink, chum, and coho salmon stocks. In 1987 the existing harvest strategy was formalized into a regulatory management plan, and was adopted by the BOF. This plan details the key species and targeted stocks which are managed for in each section of the district throughout the fishing season (Table 18). The stated intent of this plan is that salmon be harvested in the "traditional" fisheries located in the Cape Alitak, Humpy-Deadman, and Moser-Olga Bay Sections (Table 19 and 20).

Westside Kodiak Management Plan (5AAC 18.362)

Commercial salmon fisheries along Kodiak Island's westside are the oldest in the KMA. Sockeye salmon returning to the Karluk River brought fishers and processors to Kodiak soon after the territory was transferred from the Russians in 1867. The Karluk system is said to have produced more sockeye salmon for its size than any other system in the world (Roppel 1986). In 1889 the catch at the mouth of this river totaled 3.5 million sockeye salmon. In 1896 the first catches from other areas were documented, with sockeye salmon being landed from Uganik River, Little River, and the Ayakulik River. Again, with increased fishing pressure sockeye stocks declined.

Fisheries spread along the westside to target mixed sockeye, pink, chum, and coho salmon stocks as they migrated toward their natal streams. Fish traps were heavily used and accounted for the majority of the harvest. There was much controversy concerning the use of cannery owned fish traps, due to allocative concerns of independent fishermen and biological concerns of management biologists. Traps were outlawed by the State of Alaska in 1959, and seine and gillnet gear competed for the available salmon resources. Gear specific fishing areas, closed water sanctuaries, and complex, stock specific harvest strategies developed to ease allocative conflicts and to aid in the rebuilding of depressed sockeye salmon stocks.

The mixing of various local salmon stocks during the inshore migration makes management very complex. The many tagging studies done along Kodiak Island's westside were intended to help discern migratory pathways and timing of the westside salmon stocks as well as salmon moving to the Alitak Bay District. Harvest strategies evolved until 1990, when the Westside Kodiak Management Plan was adopted by the Board of Fisheries (Table 21). It was hoped that placing this plan in regulation would clarify the management strategy which was in place to maintain the

biological integrity of local salmon stocks and the allocative concerns of local fishers. It is the intent of this plan that salmon bound to local systems be harvested in "traditional" fisheries located in all sections covered under this plan. The Westside Salmon Management Plan is effective for the entire salmon season, and covers the Southwest Kodiak and Northwest Kodiak Districts, and the Southwest Afognak Section of the Afognak District (Figure 9, Table 22).

North Shelikof Strait Sockeye Salmon Management Plan (5AAC 18.363.)

In 1988, there was a significant harvest of large (greater than 6 pounds) sockeye salmon in management units bordering the northern portion of Shelikof Strait. Analysis of average weights, salmon ages determined from scale analysis, review of past tagging studies, and estimates of migratory timing led to the determination that the majority of these sockeye salmon were bound for Cook Inlet (Barrett 1989). Though the Cook Inlet sockeye salmon return was at record level, the Board of Fisheries felt that this was an expanding, nontraditional harvest pattern. In 1990, the North Shelikof Strait Sockeye Salmon Management Plan was adopted into regulation (Table 23).

This plan covers the time period from July 6 through July 25 and limits purse seine fishing opportunities in the Southwest Afognak Section and North Shelikof units (the Dakavak Bay, Outer Kukak Bay, Hallo Bay, Big River, Shuyak Island, and Northwest Afognak Sections) in designated "seaward zones" through the use of sockeye harvest "caps" (Appendices A.1 and A.7). These caps are meant to limit the harvest of Cook Inlet bound sockeye salmon which migrate through management units located in Shelikof Strait from Dakavak Bay to Cape Douglas in the Mainland District and from Raspberry Cape to Shuyak Island in the Afognak District. By regulation the seaward zone of the Southwest Afognak Section will close to fishing if more than 50,000 sockeye are harvested between July 6 through July 25 (in 1993 the seaward zone boundary of the Southwest Afognak Section was modified by the BOF to provide traditional harvest opportunities on pink salmon within 1/2 mile of the capes and headlands). Also, the seaward zone of North Shelikof units will close to fishing if more than 15,000 sockeye salmon are harvested between July 6 through July 25. Permit holders who intend to fish in management units covered by this plan are advised that in period closures of the seaward zones may occur. In order to provide for an orderly in period closure, permit holders are notified of specific times when to listen for potential closure announcements.

In the three years this plan has been in effect, seaward zone closures in the North Shelikof units occurred in 1990, 1992, and 1993, and in the Southwest Afognak Section in 1992 and 1993 (Table 24).

Eastside Afognak Management Plan (5AAC 18.365)

This plan effects fisheries in the vicinity of Kitoi Bay Hatchery. Although occasionally modified, the plan has been in effect since 1981, and was formulated jointly by KMA commercial fishery managers and the Kitoi Bay Hatchery manager. The plan was brought to the Board of Fisheries and adopted into regulation in 1990. It is the goal of this plan to achieve escapement and harvest objectives for salmon stocks of the Southeast Afognak, Duck Bay, Izhut

Bay, and Kitoi Bay Section, and assure broodstock for the hatchery. The board intended that local stocks and hatchery fish be harvested within these sections. This plan details the key species and targeted stocks which are managed in each of these section throughout the fishing season (Table 25).

Crescent Lake Coho Salmon Management Plan (5AAC 18.364)

This plan, as adopted by the BOF in 1990, deals with the subsistence, sport, and commercial harvest of coho salmon stocked into Crescent lake, near the city of Port Lions (Figure 2). Coho smolt were first stocked into this lake in 1988 by ADF&G, to increase sport and subsistence fishing opportunities. Since returning coho can not get above a barrier fall in Crescent Creek, this is intended as a put-and-take fishery, with all returning salmon harvested. This plan provides for commercial fisheries on coho salmon surplus to sport and subsistence needs. Commercial fishing is allowed in the area of Crescent Creek only after September 10, and then only if there are 500 or more coho salmon in this area available for harvest.

Spiridon Lake Sockeye Salmon Management Plan (5AAC 18.366)

This plan was adopted by the Board of Fisheries in January of 1993. It provides for the full utilization of sockeye salmon returns from the Spiridon Lake enhancement project, while providing adequate protection to local wild stocks of Spiridon Bay. Again, this salmon stocking project is intended as a put-and-take project. Sockeye fry have been stocked into Spiridon Lake since 1989, and the return of adults to the lake is prevented by a large set of barrier falls in the river. Sockeye salmon returning are intended to be harvested in the existing fisheries along Kodiak's westside, but this plan provides for a terminal "special harvest area" and a strategy to harvest sockeye salmon which may escape the fishery and return to the river mouth. The first returns were evident in 1993 (about 4,000 fish), and significant harvests could be available in 1994 (up to 100,000 sockeye salmon).

Kodiak Management Area Pink Salmon Harvest Strategy

Though not a BOF management plan, there has been a specific harvest strategy guiding the pink salmon fisheries of KMA since the early 1970's. As mentioned previously, pink salmon constitutes up the bulk of the KMA salmon harvest. In order to provide the best quality pink salmon to the market, fisheries are structured to harvest pink salmon as they first migrate into the nearshore zones. With Kodiak Archipelago's deep, protected bays and abundant fresh water runoff, if fish are allowed to build up in terminal areas they quickly darken (they take on the prespawning dark color and humped back).

Providing a preseason plan within which to structure fisheries is essential to the prosecution of orderly fisheries. The pink salmon preemergent fry sampling program, conducted annually since 1966, provides a reliable forecast of pink salmon returns. Based on the predicted strength of the pink salmon run, fixed weekly fishing periods are planned for July and early August. Since 1978, the fixed opening date for pink salmon fisheries in the KMA has been July 6. Weekly fishing periods are initially based on the preseason forecast. If surveys of the escapement and inseason catch reports indicate the run has come in weaker or stronger than predicted

adjustments to the length of fishing periods can be announced. An accurate assessment of run strength, which may result in modification of fishing periods, usually occurs after the third weekly period in July (after approximately July 25). Many of the BOF approved management plans recognize this pink salmon harvest strategy, and the July 6 general pink salmon opening date is listed in the Westside Kodiak Management Plan (5AAC 18.362), the North Shelikof Strait Sockeye Salmon Management Plan (5AAC 18.363.), and the Eastside Afognak Management Plan (5AAC 18.365).

SALMON STOCK STATUS

Chinook Salmon

The Kodiak area has two naturally occurring chinook salmon populations, in the Ayakulik and Karluk Rivers. A small introduced chinook salmon run occurs in the Dog Salmon River. There are no directed commercial fisheries targeting these stocks and any commercial harvest occurs as bycatch in fisheries targeting sockeye and pink salmon. Sport fishing pressure on chinook salmon runs in the Ayakulik and Karluk Rivers is increasing, as commercial sport fish operators and recreational anglers continue to discover fishing opportunities in the Kodiak area. In the Dog Salmon River, to aid establishment of a viable spawning stock, sport fishing for chinook salmon is prohibited.

There are two other chinook runs in the KMA, both introduced. One is at Pasagshak River, where in the late 1970's eggs taken from Chignik River chinook salmon were used to begin a chinook run accessible by road to Kodiak sport fishers. The productivity of this run has been less than expected, and chinook sport fishing has remained closed in Pasagshak River. The second introduced chinook salmon run is located at Mill Bay near the city of Kodiak. This introduction was designed to support put-and-take recreational fisheries. Since 1989 ADF&G Sport Fish Division annually stocks up to 100,000 chinook salmon smolt from the Elmendorf Hatchery (in Anchorage) into Island Lake.
Currently, chinook salmon stocks are considered healthy. Minimum escapement requirements have been met annually since 1982, and has met or exceeded the upper end of the escapement range each year since 1987 (Table 26, Figure 10). Harvests have increased as well, for the subsistence, sport, and commercial fisheries (Tables 5, 9, and 11). Over the last 10 years, the commercial harvest has averaged approximately 15,200 chinook salmon (Figure 11).

Sockeye Salmon

There are 38 known sockeye salmon runs in the KMA. Large returns (greater than 500,000 fish) occur in four lake systems: Karluk, Ayakulik, Upper Station, and Frazer (Dog Salmon River) systems. The first three support naturally occurring runs, while the Frazer Lake sockeye stock is a very successful introduced run. There is a large set of falls below Frazer Lake which blocks natural migration; this run is maintained through the use of a large "fish ladder".

These systems provide approximately 80% of current KMA sockeye salmon production. Directed fisheries on these stocks are intense and require extensive management activities from June 5 through September 20. The Karluk and Upper Station systems have distinct early (May 25 through July 15) and late returns (July 16 through September 20). Frazer is primarily an early returning stock with most sockeye entering fresh water by July 20. Ayakulik also has an early returning stock which continues into mid August. The overall escapement goals for these four major systems has been achieved annually since 1988.

Twelve sockeye systems in the KMA have minor but significant runs. These include the Afognak, Uganik, Akalura, Saltery, Kaflia, Pauls, Buskin, Swikshak, Little, Malina, Thorsheim, and Perenosa systems. These systems annually account for approximately five percent of KMA's current sockeye salmon production. Escapement into each system is generally less than 60,000 sockeye salmon. These minor stocks offer a relatively high yield per unit effort to directed commercial seine effort, and so, are vulnerable to overexploitation. The exception is the sockeye salmon run into Buskin Lake, which is not targeted by a commercial fishery. All fish surplus to escapement requirements are currently harvested in a subsistence fishery and, to a lesser degree, in a recreational sport fishery. All these minor sockeye salmon stocks are considered to be moderately healthy with the exception of Malina, Pauls, and Perenosa. A more conservative management approach for these systems will prevail in upcoming years.

The remaining 20 systems are comparatively minor systems and are not usually exploited by directed commercial effort.

Commercial salmon harvest strategies have not limited sockeye salmon subsistence or sport fishing opportunities in the KMA. Both the Buskin and Barabara sockeye stocks receive substantial subsistence effort due to their proximity to communities. These two systems may be approaching maximum exploitation from subsistence effort alone. Sport fish interest in Barabara is low, while the Buskin is seeing increasing effort. These systems will require close monitoring in the future to ensure biological protection and that future subsistence use will not be jeopardized.

The Kodiak Regional Planning Team (KRPT)[6] established sockeye as the priority species for supplemental production (Kodiak Regional Planning Team 1992) . Currently, the Kodiak Regional Aquaculture Association (KRAA) in conjunction with ADF&G is active in providing additional sockeye salmon production, both by introducing sockeye runs into previously unutilized lakes and by enhancing weak natural runs.

Overall, KMA sockeye stocks are moderately healthy. The escapement goal for KMA sockeye salmon has been achieved annually since 1984 (Table 26, Figure 12). Commercial harvest has averaged 3,220,300 sockeye salmon over the 1983-1993 period (Table 5, Figure 13).

[6] The RPT is a group consisting of representatives of ADF&G, regional aquaculture associations, and the public, mandated by Alaska Statutes (16.10.375-470) to develop and amend comprehensive salmon production plans for salmon production regions.

Pink Salmon

All salmon streams within the KMA support pink salmon runs. Pink salmon represent the foundation of Kodiak salmon production, and may comprise over 80% of the total annual harvest (Table 5). Primarily due to the cyclic production from Ayakulik and Karluk Rivers, KMA pink salmon runs are usually larger during the even numbered years. However since 1989 odd year production has surpassed even year production[7].

Except for occasional local variations, KMA pink salmon stocks are considered very healthy. Escapement goals have been met or exceeded in each year since 1975 (Table 26, Figure 14). Over the last 10 year (1983-1993) period, the annual harvest has averaged 11,403,200 pink salmon; even year pink salmon harvest has averaged 9,271,200, odd year pink salmon harvest averaged 13,535,300 (Table 5, Figure 15). Pink salmon survival and subsequent returns are strongly influenced by environmental factors (Groot and Margolis 1991). Wild stock pink salmon production should remain above average as long as existing management strategies are retained (to ensure adequate escapement) and adverse environmental conditions do not persist. The long term outlook for Kodiak's wild pink salmon stocks is very good.

The Kitoi Bay Hatchery on Afognak Island primarily produces pink salmon. In recent years pink salmon returns to this hatchery have ranged from approximately 1,000,000 to 13,000,000 fish.

Chum Salmon

Chum salmon are present in at least 150 streams of the KMA. KMA chum salmon production has been variable, and has been at low levels for the past 2 years. Escapement estimates have been near or above the targeted goal in only 2 of the past 10 years, though the minimum escapement goal has been achieved in 9 of the past 10 years[8] (Table 26, Figure 16). The annual commercial harvest has averaged 828,300 chum salmon since 1983 (Table 5, Figure 17).

Chum salmon management has received increasing emphasis. Increases in directed fishing on specific chum salmon stocks combined with efforts to harvest better quality fish (bright vs. dark fish) requires more intensive chum salmon stock management strategies continue to be developed to prevent overexploitation. Currently, KMA management staff evaluates chum escapement goals, historical harvest and escapement data, age class information, and inseason harvest and escapement data to improve management of this species. It will be possible to improve chum salmon management by developing reliable escapement estimation methods and implementing a catch sampling program to collect more age class data. The future status of this species is expected to be very good.

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[7] Kodiak odd year pink salmon production was generally greater than even year production prior to 1948. The mechanism which has led to switches in odd vs. even year dominance are not known.

[8] Low escapement counts for chum salmon may be related to factors other than absolute abundance. Complete estimations may be hampered by difficulties associated with surveying chum salmon populations.

The Kitoi Bay Hatchery is developing an early run chum salmon return to the hatchery. The majority of the chum salmon currently returning to the hatchery are needed for brood stock. Significant supplemental production may occur within the next four years.

Coho Salmon

About 174 systems have been identified which support coho runs in the KMA. Twenty percent of KMA coho salmon systems (35 streams) produce 80% of the total KMA production. Concern exists for the other 80 percent (135 streams) where coho runs are relatively small and more susceptible to overexploitation. The rather precarious status of these small stocks will not improve unless a concentrated regulatory and management effort is implemented to provide safeguards. To provide adequate protection for these smaller stocks all user groups must be monitored inseason for potential changes in harvest rates which may not correspond with fluctuation in run strength.

The Kitoi Bay Hatchery, located on Afognak Island, produces coho salmon for return to the hatchery. Current returns are needed for broodstock, with little commercial harvest. Significant supplemental production will occur within the next four years. Coho salmon smolt are also produced for stocking, to provide additional sport and subsistence fishing opportunities. These are mostly put-and-take operations, with all returning adults expected to be harvested, and no escapement and subsequent spawning possible. Coho salmon have been stocked into stream and lakes along the Kodiak road system, and into small lakes near the communities of Port Lions and Ouzinkie.

In recent years, coho salmon have experienced a large increase in exploitation by commercial, sport, and subsistence users within the KMA (Tables 5, 9, and 11). The escapement goal for this species has been achieved annually since 1983 (Table 26, Figure 18). Over the past 10 years (1983-1993) commercial harvests have averaged 254,800 coho salmon (Table 5, Figure 19). Most stocks appear healthy. With knowledgeable inseason management at least minimum escapements should be annually achieved.

1993 SEASON SUMMARY

The 1993 Kodiak commercial salmon season began on June 9 with a 33 hour fishing period in the Alitak Bay and Northwest Kodiak District. The last reported landing was on September 24. Salmon returning to Kodiak in 1993 originated from the sockeye and chinook escapements achieved in 1987 through 1989, the pink salmon escapements in 1991, the chum salmon escapements in 1988 to 1990, and the coho salmon escapements in 1989 and 1990.

Harvest

Throughout the 1993 season, a total of 19 different buyer/processors, representing 15 companies were involved in the fishery (Table 27). Only 509 permit holders actually participated in 1993, making a record 21,560 deliveries (Table 28). By gear type, a total of 324 purse seine, 9 beach

seine, and 176 set gillnet permit holders fished. A record total of 39,341,000 salmon were harvested, shattering the previously high of 23,723,000 salmon (1991).

Chinook salmon are harvested incidentally during directed sockeye and pink salmon fisheries and are not subjected to a directed fishery. Approximately 42,200 chinook salmon (average weight 11.92 lbs, Table 29) were harvested in 1993, which surpassed the preseason harvest expectations of 21,000 fish and the previous high harvest of 24,300 chinook (1992).

The 1993 harvest included 4,377,700 sockeye salmon (average weight 5.13 lbs, Table 29 and 30). This is the fourth largest harvest on record; only the 1901, 1990, and 1991 harvests were larger (Table 5). The actual harvest was double the preseason forecast of 2,208,000 sockeye salmon. Early run sockeye returns to the Karluk, Ayakulik, and Frazer systems were much stronger than expected.

The 1993 pink salmon harvest of 34,019,400 fish (average weight 3.13 lbs, Table 29) established a new record high harvest, almost doubling the previous record 17,290,600 pink salmon harvest (1980). Thirty seven percent of the harvest (about 12,000,000 pink salmon) was taken in fisheries targeting pink salmon returning to the Kitoi Bay Hatchery. The 1993 pink salmon harvest was almost 60% greater than the preseason expectation of 21,575,000.

The chum salmon harvest in 1993 was 588,300 fish (average weight 5.99 lbs, Table 29), about one half of the preseason harvest expectation of 1,200,500 fish. This was the lowest chum salmon harvest since 1985 and is well below the recent 10 year average harvest.

A total of 313,400 coho salmon (average weight 6.72 lbs, Table 29) were harvested this season, which ranks as the third largest harvest on record; only 1991 and 1982 harvest were greater. This harvest level was just above the preseason harvest expectations of 290,000 coho.

Exvessel Value

The exvessel value of the Kodiak commercial salmon represents the average price paid to permit holders and generally does not include tender fees. Since the early 1970's the overall exvessel value of the KMA commercial salmon fishery has ranged from a low of $2,094,000 (1973) to a high of $103,817,000 (1988) all permit holders combined (Table 31). The average exvessel value for the last four years (1990-1993) is $40,759,000.

Although record numbers of salmon were harvested in 1993, low salmon prices depressed the value of this fishery. The estimated exvessel value of the 1993 salmon harvest is $32,909,000, over $7,000,000 less than 1992 and well below the record 1988 season. Purse seine harvest accounted for 78% of the total exvessel value, averaging $79,100 each. Beach seine harvest accounted for less than 1% of the value, averaging $6,400 per permit fished. Set gillnet harvest accounted for 22% of the total value, averaging $41,100 (22%) per permit. By species, the chinook salmon harvest was worth $252,000 (1.0%), the sockeye harvest was worth $17,955,000 (55%), pink salmon $12,769,000 (39%), chum salmon $881,000 (2.0%), and coho salmon $1,052,000 (3%) (Table 28).

Prior to the mid 1980's, pink salmon were considered the "bread and butter" fish since they consistently accounted for most of the annual value. In recent years, the extensive efforts at rebuilding Kodiak sockeye production have begun to pay off. Sockeye salmon have now become the "money fish" mainly due to increased production from Kodiak's sockeye systems combined with relatively low prices recently paid for pink salmon (Table 29).

Escapement

Chinook salmon escapement goals into the Ayakulik and Karluk Rivers were achieved. Escapement counts were 7,820 chinook salmon into the Ayakulik River and 13,940 chinook salmon into the Karluk River. The biological escapement goal range into the Ayakulik River is 6,500 to 10,000 fish. The biological escapement goal range into the Karluk River is 4,500 to 8,000 fish. An additional 340 chinook salmon were counted as escapement through the Dog Salmon weir.

Sockeye salmon escapements for major and selected minor systems were monitored through the use of fish counting weirs (Brodie 1993). A total of 1,579,456 sockeye salmon were counted through KMA weirs (Table 13). An additional 125,984 sockeye salmon were counted as escapement into other systems such as Kaflia Lake, Uganik Lake, Little River Lake, and Swikshak Lagoon, bringing the 1993 total indexed sockeye salmon escapement to 1,705,440 fish (Table 32). The biological escapement goal range for all systems is 1,400,000 to 2,100,000 sockeye salmon.

Pink salmon escapements, overall, were excellent. Although poor weather conditions in late August limited aerial surveys for peak escapement counts, the overall indexed escapement for pink salmon was 4,292,581 fish (Table 32). The biological escapement goal range for odd year pink salmon returns is 1,000,000 to 3,000,000 fish.

The 1993 indexed chum salmon escapement of 234,381 fish is about one half of the low end of the indexed escapement goal range of 500,000 to 1,500,000 fish. Again, poor weather conditions in late August limited aerial surveys for peak escapement counts (Table 32).

Overall, coho salmon escapements were very good with indexed escapement total of 159,996 fish (Table 32). The biological indexed escapement goal is 90,000 to 150,000 fish.

OUTLOOK FOR THE 1994 SEASON

Preliminary harvest projections for the 1994 Kodiak commercial salmon fishery indicate that approximately 25,000 chinook, 2,428,100 sockeye, 325,000 coho, 13,700,000 pink, and 610,000 chum salmon could be harvested (Table 12).

The 1994 harvest strategy should be available by mid May, 1994, and will contain a regulatory update dependent on any new regulations adopted by the Alaska State Board of Fisheries in March.

The first fishing period targeting sockeye salmon is expected to begin on June 9. The pink salmon fishery begins July 6. Based on the pink salmon forecast, the initial fishing period in July will be 2½ days with the second and third fishing periods expected to be 3½ days each.

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Table 1. Estimated number of salmon production systems per district, with species distribution, in the Kodiak Management Area, 1993.

Management District	Number of Streams[a]	Number of Streams with Each Species[b]				
		Chinook	Sockeye	Coho	Pink	Chum
Afognak	102	0	13	48	102	5
Northwest Kodiak	63	0	4	22	63	23
Southwest Kodiak	11	2	2	10	11	6
Alitak	30	1	5	15	30	14
Eastside Kodiak	116	1	8	32	116	47
Northeast Kodiak	26	0	1	20	26	9
Mainland	92	0	6	27	92	46
TOTAL	440	4	39	174	440	150

[a] The State of Alaska's Habitat Division identifies over 800 streams in the Kodiak Management Area which have documented use by anadromous fish (State of Alaska 1993). Many of these streams are very small and may only be used by pink salmon in years with very large returns. The streams identified in this table are depicted on the 1993 Kodiak Area salmon statistical map, and have documentable use each year.

[b] These estimates are based on current knowledge and, in fact, are expected to change as more system specific data is collected.

Table 2. Biological escapement goals for salmon, by species, by District, in the Kodiak Management Area, 1993.

DISTRICT	SOCKEYE ESCAPEMENT	PINK ESCAPEMENT		CHUM ESCAPEMENT	COHO ESCAPEMENT	CHINOOK ESCAPEMENT
	GOAL	GOAL		GOAL	GOAL	GOAL
		Minimum/Maximum				
	Minimum Maximum	Even Year	Odd Year	Minimum Maximum	Minimum Maximum	Minimum Maximum
AFOGNAK	83,000	83,000	148,00		13,500	
	154,000	249,000	444,000		23,600	
NORTHWEST	56,000	220,000	315,000	72,000	9,000	
	90,000	660,000	915,000	216,000	14,000	
SOUTHWEST	760,500	30,000	1,250,000	50,000	33,000	11,000
	1,201,000	90,000	2,550,000	150,000	52,000	19,000
ALITAK	386,000	212,000	162,000	38,000	10,500	100
	550,000	636,000	486,000	114,000	20,000	300
EASTSIDE	29,500	140,000	150,000	88,000	10,000	
	64,000	420,000	450,000	264,000	15,000	
NORTHEAST	10,000	110,000	120,000	20,000	10,475	
	15,000	330,000	360,000	60,000	16,555	
MAINLAND	33,500	215,000	256,000	242,000	4,000	
	66,000	645,000	768,000	726,000	9,000	
TOTAL	1,358,500	1,010,000	2,401,000	510,000	90,475	11,100
	2,140,000	3,030,000	6,003,000	1,530,000	150,155	19,300

Table 3. Potential vs. actual salmon production (wild stock) in the Kodiak Management Area, 1993.

SPECIES	PRODUCTION POTENTIAL			HARVEST		
	LONG TERM AVERAGE			POTENTIAL	ACTUAL	
	Targeted Escapement Goal[a]	Return Per Spawner[b]	Potenial Total Return	Long Term Average	45 Year Average (1948-1993)[c]	10 Year Average (1982-1993)[c]
CHINOOK	15,000	2.5	37,500	22,500	4,000	15,000
SOCKEYE	2,100,000	2.5	5,250,000	3,150,000	1,184,000	3,220,000
COHO	150,000	2.5	375,000	225,000	100,000	255,000
PINK Odd Year	3,000,000	3.5	10,500,000	7,500,000	7,182,000	13,535,000
PINK Even Year	4,500,000	3.5	15,750,000	11,250,000	8,654,000	9,271,000
CHUM	1,020,000	2.8	2,856,000	1,836,000	785,000	828,000
TOTAL Odd Year	6,285,000	-	19,018,500	13,454,000	9,255,000	17,853,000
TOTAL EvenYear	7,785,000	-	24,268,500	16,483,500	10,727,000	13,589,000

[a] The expected indexed escapement within the biological escapement goal range. KMA fisheries are normally managed to achieve this level of escapement.

[b] Return per spawner will vary each year. These values are averages around which natural survival and return will fluctuate somewhat (Barrett, Personal Communication, October 1993).

[c] 1989 harvest data not included in estimates.

Table 4. Expected harvest from supplemental salmon production, by system and species for the Kodiak Management Area, 1993.

System	Sockeye	Pink	Coho	Chum
Kitoi Bay Hatchery Complex	18,000[a]	6,500,000	5,700	5,000
Spiridon Lake	4,000	0	0	0
Hidden Lake	0	0	2,000	0
Waterfall Lake	0	0	0	0
Malina Lake	0	0	0	0
Crescent Lake	0	0	3,500	0

[a] Harvest is expected to occur during fisheries targeting pink salmon.

Table 5. Historical salmon catch by species in the Kodiak Management Area, 1882-1993.

Year	Salmon Harvest (in thousands)[a]					
	Chinook	Sockeye	Coho	Pink	Chum	Total
1882		58.8				58.8
1883		188.7				188.7
1884		282.2				282.2
1885		468.6				468.6
1886		646.1				646.1
1887		1,004.5				1,004.5
1888		2,781.1				2,781.1
1889		3,754.7				3,754.7
1890		3,592.7				3,592.7
1891		3,846.4				3,846.4
1892		3,126.5				3,126.5
1893		3,244.6				3,244.6
1894		3,830.3				3,830.3
1895		2,247.0	8.3			2,255.3
1896		3,328.8				3,328.8
1897		2,785.5	1.5			2,787.0
1898		2,033.1	19.2			2,052.3
1899	1.1	1,934.8	32.5			1,968.4
1900	4.8	3,450.5	32.2			3,487.6
1901	3.8	4,826.2		2.0		4,832.0
1902	2.9	3,868.1	35.0			3,906.0
1903	1.2	1,826.2	119.5	10.0		1,956.9
1904	3.2	2,875.1	103.1	5.2		2,986.6
1905	2.5	2,142.4	86.9			2,231.8
1906	3.6	3,980.5	23.7			4,007.8
1907	4.0	4,232.5	38.1			4,274.5
1908	3.0	2,487.8	73.8	286.4		2,851.0
1909	3.9	1,915.2	51.5	153.6		2,124.2
1910	1.6	1,954.7	44.3	215.4		2,216.0
1911	0.7	2,685.9	21.9	229.6	6.5	2,944.6
1912	0.7	2,246.5	17.5	547.2	24.6	2,836.4
1913	1.1	1,663.2	27.6	590.0	3.8	2,285.7
1914	1.3	1,255.4	32.1	1,726.4	13.1	3,028.3
1915	0.9	1,664.4	51.8	252.1	20.3	1,989.6
1916	1.0	3,373.1	49.7	3,181.9	29.0	6,634.6
1917	1.5	3,645.9	30.5	225.3	16.0	3,919.2
1918	2.0	1,894.5	78.2	2,467.3	81.7	4,523.7
1919	1.8	1,619.1	104.2	282.7	60.1	2,068.0
1920	1.6	1,957.6	89.0	1,977.4	55.2	4,080.8
1921	0.7	2,857.9	45.8	67.7	24.8	2,996.8
1922	0.7	1,097.4	119.7	2,766.3	224.0	4,208.0
1923	1.9	1,090.1	77.6	928.5	38.7	2,136.7
1924	1.0	1,407.5	120.7	5,435.1	117.9	7,082.2
1925	1.9	1,693.1	93.0	2,673.7	212.5	4,674.1
1926	0.6	3,015.4	174.5	4,606.7	324.7	8,121.8
1927	4.4	1,155.2	151.5	5,297.3	418.0	7,026.4
1928	2.5	1,592.0	290.6	1,535.3	726.5	4,147.0
1929	3.2	712.1	144.2	6,108.4	1,057.7	8,025.6
1930	5.0	466.4	228.8	1,651.4	419.0	2,770.6
1931	1.5	1,183.1	170.1	6,839.9	183.7	8,378.3
1932	1.9	1,058.4	52.2	4,719.9	237.0	6,069.5
1933	1.1	1,428.4	91.4	6,573.7	536.9	8,631.5
1934	1.3	1,829.0	89.6	7,641.9	661.3	10,223.1
1935	1.4	1,613.5	76.8	10,780.6	381.8	12,854.1
1936	2.5	2,657.2	183.9	5,647.7	328.2	8,819.6
1937	1.3	1,881.3	164.9	16,787.2	346.2	19,180.9
1938	1.2	1,965.9	155.0	8,398.0	640.1	11,160.2
1939	2.3	1,786.4	112.2	11,741.2	641.7	14,283.8
1940	1.2	1,318.2	148.0	9,997.9	673.3	12,138.6
1941	2.6	1,730.2	199.5	7,601.5	444.5	9,978.3
1942	1.3	1,281.5	106.9	6,092.5	564.9	8,047.2
1943	1.1	1,990.6	59.7	12,479.6	454.2	14,985.2
1944	0.7	1,817.9	51.7	4,955.4	506.7	7,332.3
1945	2.0	2,041.1	60.1	9,044.5	559.3	11,707.1
1946	0.1	838.9	56.4	9,545.9	298.5	10,739.8

-Continued-

Table 5. (page 2 of 3)

Year	Salmon Harvest (in thousands)[a]					
	Chinook	Sockeye	Coho	Pink	Chum	Total
1947	0.1	993.4	76.2	8,856.7	294.5	10,220.9
1948	1.4	1,260.5	32.4	5,968.5	330.8	7,593.5
1949	0.9	892.3	53.7	4,927.8	699.5	6,574.3
1950	2.1	920.9	40.7	5,304.7	685.1	6,953.5
1951	2.4	467.9	48.8	2,100.4	483.1	3,102.5
1952	1.1	603.7	51.6	4,576.7	1,243.2	6,476.3
1953	3.0	317.2	41.7	5,174.6	547.6	6,084.0
1954	0.9	325.2	66.4	8,439.2	1,250.8	10,082.6
1955	2.4	164.5	34.6	10,794.2	482.4	11,478.1
1956	1.1	271.2	52.8	3,318.8	705.0	4,349.1
1957	1.0	234.3	35.0	4,716.5	1,208.5	6,195.2
1958	1.9	288.0	20.6	4,038.9	930.7	5,280.1
1959	1.8	330.1	14.5	1,967.1	733.8	3,047.3
1960	1.2	362.5	54.3	6,737.8	1,300.4	8,456.3
1961	0.9	408.0	28.6	3,926.0	518.9	4,882.4
1962	1.1	784.7	54.6	14,113.9	794.7	15,748.9
1963	0.3	407.0	57.0	5,480.2	305.1	6,249.6
1964	1.3	498.5	35.5	12,044.3	1,134.2	13,713.8
1965	0.8	346.2	26.7	2,886.8	431.3	3,691.9
1966	0.6	631.6	67.7	10,755.6	762.8	12,218.3
1967	1.8	308.8	10.4	187.8	226.7	735.4
1968	1.9	760.4	56.6	8,768.1	750.4	10,337.5
1969	2.5	591.5	48.8	12,500.8	534.9	13,678.5
1970	1.1	917.0	66.4	12,036.6	919.1	13,940.3
1971	0.9	478.5	22.8	4,333.0	1,541.4	6,376.7
1972	1.3	222.8	16.6	2,485.8	1,163.8	3,890.3
1973	0.8	167.3	3.6	518.7	317.9	1,008.3
1974	0.5	418.8	13.6	2,646.1	249.3	3,328.3
1975	0.1	136.4	23.7	2,942.8	84.4	3,187.4
1976	0.8	641.5	23.7	11,078.0	740.5	12,484.5
1977	0.6	623.5	27.9	6,252.4	1,072.3	7,976.7
1978	3.2	1,071.8	48.8	15,004.1	814.3	16,942.2
1979	1.9	631.7	140.6	11,287.6	358.4	12,420.3
1980	0.5	651.4	139.2	17,290.6	1,075.6	19,157.2
1981	1.4	1,289.0	121.5	10,336.8	1,345.3	13,094.1
1982	1.2	1,204.8	343.5	8,076.2	1,266.2	10,892.0
1983	3.8	1,232.0	157.6	4,603.4	1,085.2	7,082.0
1984	4.7	1,950.4	229.5	10,844.3	649.1	13,678.0
1985	5.0	1,843.2	284.2	7,334.8	430.8	9,897.9
1986	4.4	3,188.3	168.8	11,807.7	1,134.6	16,303.7
1987	4.6	1,792.8	192.5	5,076.0	682.0	7,748.0
1988	22.4	2,698.6	303.3	14,409.3	1,426.4	18,860.0
1989	4.9	2,628.6	141.4	22,648.5	835.7	26,259.1
1990	18.8	5,248.3	293.7	5,983.8	577.7	12,122.4
1991	22.2	5,704.0	324.9	16,642.8	1,029.1	23,723.0
1992	24.3	4,167.9	280.1	3,310.6	679.6	8,462.5
1993	42.2	4,377.7	313.4	34,019.4	588.3	39,341.0
Averages All Years	**3.1**	**1,711.4**	**93.7**	**6,411.5**	**575.3**	**8,795.1**
Averages 1948-1993	**4.4**	**1,183.9**	**100.3**	**8,254.3**	**785.4**	**10,328.4**
Even Year (EY) 1948-1992				8,653.9		10,728.0
Odd Year (OY) 1949-1993[b]				7,182.3		9,256.3
Averages 1983-1993[b]	**15.2**	**3,220.3**	**254.8**	**11,403.2**	**828.3**	**15,721.8**
Even Year (EY) 1984-1992				9,271.2		13,589.8
Odd Year (OY) 1983-1993[b]				13,535.3		17,853.9

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Table 5. (page 3 of 3)

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[a] For the period 1882-1947, the harvest data was derived from "casepack" information supplies by commercial buyers and processors. For the period 1948-present, the harvest data was derived from "fish ticket" information summarized by ADF&G.

[b] Averages do not include harvest data for 1989. The 1989 harvest data shown is unique from all other years. The total harvest by species in this table is the summation of the actual harvest which did occur and the projected harvest which would have occurred if there had not been restrictions on the 1989 fishery. In 1989 there was only limited commercial salmon fishing allowed because of the presence of oil contaminated waters in the Kodiak Management Area due to the M/V Exxon Valdez oil spill.

Table 6. Summary of limited entry permit activity in the commercial salmon fishery, by gear type, in the Kodiak Management Area, 1975 - 1993.

	Purse Seine[a]		Beach Seine[a]		Set Gillnet[a]		Total[a]		
	Fishable	Fished	Fishable	Fished	Fishable	Fished	Fishable	Fished	Percent
1975	468	280	26	8	229	116	723	404	56
1976	394	325	23	17	187	140	604	482	80
1977	378	336	32	24	186	147	596	507	85
1978	389	372	34	29	188	160	611	561	92
1979	387	362	34	28	186	164	607	554	91
1980	387	370	35	33	187	168	609	571	94
1981	387	325	35	30	187	169	609	524	86
1982	386	345	35	30	187	170	608	545	90
1983	383	342	35	27	188	174	606	543	90
1984	384	296	35	25	188	168	607	489	81
1985	384	270	34	21	188	169	606	460	76
1986	385	287	34	14	187	174	606	475	78
1987	386	297	33	18	188	173	607	488	80
1988	387	323	33	21	188	179	608	523	86
1989[b]	388	4	33	1	189	87	610	92	15
1990	388	354	33	21	189	184	610	559	92
1991	388	348	33	17	189	185	610	550	90
1992	391	336	33	12	190	178	614	526	86
1993	387	324	36	9	190	176	613	509	83
18 Year Average (1975-93)[c]									
	391	327	33	21	190	166	614	515	84
5 Year Average (1988-93)[c]									
	388	337	34	16	189	180	611	533	87

[a] Data from Commercial Fisheries Entry Commission records and ADF&G Fish Ticket summaries.

[b] 1989 effort levels were very low due to extensive fishery closures because of the presence of oil from the Exxon Valdez spill.

[c] 1989 data not included in averages.

Table 7. Resident vs. nonresident commercial salmon fishing limited entry permit ownership in the Kodiak Management Area, 1986-1993.

YEAR/STATUS	PURSE SEINE		BEACH SEINE		SET GILLNET		TOTAL	
	Number	%	Number	%	Number	%	Number	%
1993[a]								
RESIDENT	286	74	32	89	151	79	469	76
NONRESIDENT	97	25	4	11	37	20	138	23
INTERIM	4	1	0	0	2	1	6	1
TOTAL	**387**		**36**		**190**		**613**	
1992[a]								
RESIDENT	284	73	30	91	140	74	454	74
NONRESIDENT	103	26	3	9	49	26	155	25
INTERIM	4	1	0	0	1	<1	6	1
TOTAL	**391**		**33**		**190**		**614**	
1991[a]								
RESIDENT	281	73	30	91	138	73	449	74
NONRESIDENT	102	26	3	9	50	27	155	25
INTERIM	5	1	0	0	1	<1	6	1
TOTAL	**388**		**33**		**189**		**610**	
1990[a]								
RESIDENT	283	73	29	88	142	75	454	75
NONRESIDENT	99	25	4	12	46	24	149	24
INTERIM	6	2	0	0	1	1	7	1
TOTAL	**388**		**33**		**189**		**610**	
1989[a]								
RESIDENT	285	73	29	88	145	77	459	75
NONRESIDENT	97	25	4	12	43	23	144	24
INTERIM	6	2	0	0	1	<1	7	1
TOTAL	**388**		**33**		**189**		**610**	
1988[a]								
RESIDENT	286	74	31	86	148	79	465	76
NONRESIDENT	96	24	2	6	39	21	137	23
INTERIM	5	2	0	8	1	<1	6	1
TOTAL	**387**		**33**		**188**		**610**	
1987[a]								
RESIDENT	295	73	31	83	151	80	477	79
NONRESIDENT	86	22	2	6	36	19	124	20
INTERIM	5	5	0	11	1	1	6	1
TOTAL	**386**		**33**		**188**		**607**	
1986[a]								
RESIDENT	294	74	30	80	148	79	472	78
NONRESIDENT	86	21	4	9	39	21	129	21
INTERIM	5	5	0	11	0	<1	5	1
TOTAL	**385**		**34**		**187**		**606**	

[a] Data from Commercial Fisheries Entry Commission records. Numbers reflect only permit ownership and not actual participation in Kodiak Area commercial salmon fisheries.

Table 8. Commercial salmon fisheries limited entry permits issued, by residence of permit holder, for the Kodiak Management Area, 1993.

Fishery	Residence[a]	Total # Permits	Alaskan Permits	% of Total	Kodiak Permits	% of Total
PURSE SEINE	Anchor Point, AK	3				
	Anchorage, AK	15				
	Big Lake, AK	2				
	Chignik, AK	1				
	Chignik Lagoon, AK	1				
	Chugiak, AK	1				
	Clam Gulch, AK	1				
	Cordova, AK	1				
	Eagle River, AK	1				
	Girdwood, AK	2				
	Homer, AK	16				
	Juneau, AK	2				
	Kasilof, AK	2				
	Kenai, AK	2				
	Kodiak, AK	**169**				
	Larsen Bay, AK	**6**				
	Ninilchik, AK	5				
	Old Harbor, AK	**27**				
	Ouzinkie, AK	**10**				
	Petersburg, AK	2				
	Port Lions, AK	**9**				
	Sand Point, AK	1				
	Seldovia, AK	3				
	Seward, AK	2				
	Soldotna, AK	3				
	Wasilla, AK	2				
	ARKANSAS	1				
	ARIZONA	1				
	CALIFORNIA	3				
	MAINE	1				
	MICHIGAN	1				
	OREGON	10				
	WASHINGTON	81				
	TOTAL =	387	289	75%	221	57%
BEACH SEINE	**Akhiok, AK**	**1**				
	Anchor Point, AK	1				
	Anchorage, AK	1				
	Chugiak, AK	1				
	Homer, AK	2				
	Karluk, AK	**1**				
	Kasilof, AK	1				
	Kodiak, AK	**18**				
	Larsen Bay, AK	**3**				
	Old Harbor, AK	**1**				
	Seward, AK	1				
	Sterling, AK	1				
	OREGON	1				
	WASHINGTON	3				
	TOTAL =	36	32	89%	24	67%

-Continued-

Table 8. (page 2 of 2)

Fishery	Residence[a]	Total # Permits	Alaskan Permits	% of Total	Kodiak Permits	% of Total
SET GILLNET	**Akhiok, AK**	**2**				
	Anchor Point, AK	1				
	Anchorage, AK	11				
	Douglas, AK	4				
	Fairbanks, AK	1				
	Homer, AK	1				
	Kodiak, AK	**106**				
	Larsen Bay, AK	**10**				
	Moser Bay, AK	**2**				
	Nikiski, AK	1				
	Old Harbor, AK	**4**				
	Ouzinkie, AK	**3**				
	Palmer, AK	4				
	Port Bailey, AK	**1**				
	Port Lions, AK	**1**				
	Soldotna, AK	1				
	ARIZONA	2				
	COLORADO	1				
	FLORIDA	3				
	IDAHO	1				
	INDIANA	3				
	MINNESOTA	1				
	MISSOURI	1				
	NEVADA	1				
	OREGON	4				
	SOUTH DAKOTA	1				
	TEXAS	3				
	WASHINGTON	16				
	TOTAL =	190	153	81%	129	68%

[a] Data from Commercial Fisheries Entry Commission records.

Table 9. Subsistence salmon fishery harvest summary by species by year for the Kodiak Management Area, 1962-1993.

Year	Permits Issued	Permits Returned	Percent Returned	Chinook	Sockeye	Coho	Pink	Chum	Total
1962	74	13	18	0	0	433	397	20	850
1963	74	15	20	0	297	576	836	195	1,904
1964	43	9	21	6	332	184	88	71	681
1965	67	7	10	2	19	318	244	12	595
1966	48	13	27	0	295	331	334	393	1,353
1967	84	29	35	2	1,306	571	894	344	3,117
1968	132	28	21	0	658	433	529	45	1,665
1969	242	30	12	1	481	338	620	30	1,470
1970	213	49	23	1	959	939	797	265	2,961
1971	267	131	49	5	3,442	1,720	1,276	472	6,915
1972	329	176	54	11	3,633	1,531	2,516	2,729	10,420
1973	400	149	37	7	4,453	2,289	1,393	1,166	9,308
1974	367	90	25	1	1,909	846	1,094	128	3,978
1975	508	90	18	1	1,141	922	947	221	3,232
1976	536	243	45	4	4,338	962	2,275	370	7,949
1977	739	451	61	54	8,119	2,508	2,849	317	13,847
1978	860	539	63	50	7,239	3,699	2,747	572	14,307
1979	1,085	697	64	111	10,376	3,840	3,300	333	17,960
1980	1,239	756	61	67	13,746	4,407	2,755	566	21,541
1981	1,166	733	63	44	12,756	3,729	2,278	470	19,277
1982	1,276	993	78	110	16,615	7,192	3,558	667	28,142
1983	1,307	1,082	83	111	15,526	6,283	2,536	800	25,256
1984	1,240	1,061	86	265	17,620	5,808	1,877	720	26,290
1985	1,476	1,196	81	172	16,231	8,873	2,756	855	28,887
1986	1,244	1,049	84	91	14,451	7,087	2,371	605	24,605
1987	1,124	904	80	101	13,277	6,737	2,409	1,316	23,840
1988	1,098	706	64	108	10,142	4,074	1,274	366	15,964
1989	2,800[a]	715	N/A	41	11,998	3,707	1,492	367	17,605
1990	2,900[a]	1,181	N/A	131	17,972	8,646	1,605	655	29,009
1991	1,406	1,239	88	175	21,590	8,201	1,743	714	32,423
1992	1,561	1,176	75	317	20,218	8,544	1,642	643	31,364
1993[b]	1,496	683	46	210	15,717	5,473	2,378	710	24,488
TOTAL 1962-1992				1,989	251,438	106,054	51,474	16,442	427,397
AVERAGE 1962-1992				64	8,111	3,421	1,660	530	13,787
10 YEAR AVERAGE 1983 - 1992				151	15,932	6,829	1,975	706	25,593

[a] Permits were mailed to all eligible applicants listed totaling approximately 2,800. In 1990 approximately 1/5 of the 2,900 permits issued were "returned to sender" as "undeliverable". These names were removed from the permittee list.

[b] Only partial data available. Data from permits returned through 2/8/94 only. Many harvest reports are returned in the spring when subsistence users come into the ADF&G office in Kodiak to renew their subsistence permits.

Table 10. Subsistence harvest by species and area, Kodiak Management Area, 1993.

Area	Chinook	Sockeye	Coho	Pink	Chum	Total[a]
Kizhuyak Section						
Ouzinkie Narrows	50	327	77	2	3	459
Monk's Lagoon	0	46	121	0	0	167
Spruce Island	0	410	84	46	16	556
Camel Rock	0	0	87	0	5	92
Anton Larsen Bay	0	3	8	19	5	35
Sheratine Bay	2	44	15	1	6	68
Kizhuyak	0	72	468	4	1	545
Barabara Cove	2	649	37	9	1	698
Doctor River	0	11	12	0	0	23
Settlers Cove	0	15	890	13	274	1192
Chiniak Section						
Monashka Bay	0	12	32	3	12	59
Buskin River	42	3810	1279	298	51	5480
Woman's Bay	0	0	4	3	10	17
Kalsin Bay	4	0	82	0	0	86
Roslyn Beach	4	1	97	2	4	108
Chiniak	2	0	37	51	0	90
Mayflower	0	0	25	0	6	31
Middle Bay	0	0	3	0	0	3
Ugak Bay Section						
Saltery Cove	1	164	20	13	0	198
Pasagshak	2	1924	135	111	15	2187
Ugak Bay	1	12	20	5	0	38
Portage Bay	0	82	5	0	0	87
Sitkalidak Section						
Midway Creek (Big Creek)	0	125	818	116	100	1159
Old Harbor	0	75	41	150	0	266
Barling Bay	0	50	20	50	37	157
Sitkalidak Island	0	17	14	7	0	38
Kiliuda Bay	0	0	0	0	0	0
Alitak Bay Section						
Olga Bay	1	621	138	175	110	1045
Moser Bay	0	263	9	9	1	282
Deadman's Bay	0	7	4	16	3	30
Alitak Unknown	0	243	46	0	0	289
Ayakulik River Section						
Bumble Bay	10	2	0	0	0	12
Sturgeon River Section						
Halibut Bay	0	0	50	0	0	50
Karluk Section						
Karluk	7	197	6	14	0	224

-Continued-

Table 10. (page 2 of 2)

Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Uyak Bay Section						
7 Mile Beach	0	35	0	0	0	35
Larsen Bay	0	322	34	0	2	358
Uyak Bay	0	107	22	30	4	163
Spiridon Bay	40	23	4	0	0	67
Zachar Bay	0	0	0	0	0	0
Uganik Bay Section						
Kupreanof	0	97	0	5	0	102
Onion Bay	0	99	3	18	0	120
Viekoda Bay	5	172	0	3	0	180
Uganik Bay	9	729	104	1111	12	1965
Terror Bay	0	42	12	3	5	62
Village Islands	1	81	0	3	0	85
Little River	0	149	1	0	0	150
Afognak Section						
Afognak Bay	20	3951	420	80	26	4501
Raspberry Straits	0	6	50	0	0	56
Selief	2	27	0	0	0	29
Malina Bay	0	155	50	0	0	205
Shuyak	0	0	0	0	0	0
Perenosa Bay	0	50	0	0	0	50
Pauls Bay	0	129	0	0	0	129
Kitoi Bay	0	0	0	0	0	0
Little Afognak	4	277	0	0	0	281
Duck Bay	0	30	0	2	0	32
Danger Bay	0	10	40	0	0	50
Marka Bay	0	0	44	0	0	44
Kazakof Bay	1	40	5	6	1	53
Grand Totals	**210**	**15717**	**5473**	**2378**	**710**	**24488**

[a] Only partial data available. Data presented are from permits returned through 2/8/94 only. Many harvest reports are returned in the spring when subsistence users come to the ADF&G office in Kodiak to renew their subsistence permits.

Table 11. Sport fish salmon harvest in the Kodiak regulatory area of the Kodiak Management Area, 1978-1992.

Year	Pink	Coho	Sockeye	Chinook	Chum	Total
1978	17,739	4,927	1,776	350	1,287	26,079
1979	15,871	11,522	2,436	752	500	31,081
1980	18,969	12,692	2,178	327	525	34,691
1981	12,259	10,584	1,620	789	637	25,889
1982	18,850	13,329	3,055	1,120	1,324	37,678
1983	8,936	7,823	3,150	729	816	21,454
1984	12,779	14,612	5,385	921	1,321	35,018
1985	13,423	13,625	7,536	762	865	36,211
1986	14,509	20,873	5,259	520	336	41,497
1987	11,662	16,912	4,165	379	560	33,678
1988	19,044	18,809	6,222	1,564	1,546	47,185
1989	17,794	19,802	6,789	1,087	631	46,103
1990	7,464	13,728	6,056	996	191	28,435
1991	12,106	17,691	5,049	2,508	1,517	38,871
1992	5,904	13,668	6,240	2,217	625	28,654
1978-82 Average	16,738	8,537	2,213	668	855	31,084
1983-87 Average	12,261	14,769	5,099	662	780	33,572
1988-92 Average	12,462	16,740	6,071	1,674	902	37,850

[a] Data from Schwarz (*in press*). The Kodiak regulatory area consists of only the Kodiak Island archipelago portion of the commercial fisheries Kodiak Management Area.

Table 12. Commercial salmon harvest in 1993 and harvest projections for the Kodiak Management Area, 1994.

	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
1993 Projected Harvest	21,000	2,208,000	290,000	21,575,000	1,200,500	25,294,500
1993 Actual Harvest	42,200	4,377,700	313,400	34,019,400	588,300	39,341,000
1994 Projected Harvest	25,000	2,428,100	325,000	13,700,000	610,000	17,088,100

FISHERY	1993 HARVEST[a] Projection	1993 HARVEST[a] Actual[c]	1994 HARVEST[a,b] Projection as of 12/13/93
Early Run Sockeye Salmon Fisheries (6/9-7/15)			
Cape Igvak	230,000	340,500	262,500
Karluk	350,000	1,366,300	400,000
Ayakulik	138,000	588,500	105,000
Frazer	232,000	624,800	420,000
Upper Station	35,000	58,700	70,000
Minor Systems	50,000	144,700	70,000
Other	70,000	187,600	100,000
SubTotal	**1,105,000**	3,311,100	1,427,500
Late Run Sockeye Salmon Fisheries (7/16-9/15)			
Afognak (Hatchery)	18,000	20,900	5,000
Cape Igvak	95,000	71,600	140,600
Karluk	325,000	464,400	175,000
Ayakulik	92,000	500	65,000
Frazer	58,000	58,200	105,000
Upper Station	410,000	258,300	250,000
Spiridon	-	-	135,000
Minor Systems	75,000	13,800	75,000
Other	30,000	178,900	50,000
SubTotal	**1,103,000**	**1,066,600**	**1,000,600**
TOTAL SOCKEYE	**2,208,000**	**4,377,700**	**2,428,100**
Coho Salmon Fisheries (8/1-10/1)			
Afognak (Hatchery)	5,000	16,000	75,000
Afognak (Natural)	35,000	55,700	40,000
Westside	135,000	95,600	85,000
Alitak	25,000	19,200	20,000
Eastside/Northend Kodiak	50,000	101,400	75,000
Mainland	40,000	25,500	30,000
SubTotal	**290,000**	**313,400**	**325,000**
Pink Salmon Fisheries (7/6-9/5)			
Afognak (Hatchery)	6,500,000	12,076,700	1,400,000
Afognak (Natural)	850,000	2,618,400	700,000
Westside Kodiak	4,750,000	9,079,700	5,000,000
Alitak	2,870,000	3,465,500	2,000,000
Eastside/Northend Kodiak	5,750,000	5,413,400	3,500,000
Mainland	855,000	1,365,700	1,100,000
SubTotal	**21,575,000**	**34,019,400**	**13,700,000**

-Continued-

Table 12. (page 2 of 2)

FISHERY	1993 HARVEST[a] Projection	1993 HARVEST[a] Actual[c]	1994 HARVEST[a,b] Projection as of 12/13/93
Chum Salmon Fisheries (6/6-9/5)			
Afognak (Hatchery)	500	600	10,000
Afognak (Natural)	60,000	73,000	50,000
Westside Kodiak	390,000	248,100	250,000
Alitak	70,000	53,700	50,000
Eastside/Northend Kodiak	275,000	128,700	150,000
Mainland	405,000	84,200	100,000
SubTotal	**1,200,500**	**588,300**	**610,000**
GRAND TOTAL	**25,294,500[d]**	**39,340,900[e]**	**17,088,100[f]**

[a] Numbers of fish.

[b] 1994 harvest projections as of 12/13/93.

[c] Actual harvest estimates by fishery as of 12/13/93.

[d] Includes 21,000 chinook - projected harvest.

[e] Includes 42,200 chinook - actual harvest.

[f] Includes 25,000 chinook - projected harvest.

Table 13. Escapement summary for systems with fish weirs in the Kodiak Management Area, 1993.

Weir Locations	Dates		Salmon Species Enumerated					Total
	Installed	Removed	Sockeye	Chinook	Pink	Coho	Chum	
1. Karluk	5/24	9/29	657,455	13,944	101,672	19,362	142	792,575
2. Red River	5/22	8/29	286,170	7,819	29,597	2,154	36	325,776
3. Dog Salmon	6/8-9	8/29	198,412	337	161,255	4,985	4,158	369,147
4. Frazer Lake[a]	6/14	8/14	178,391[a]	211[a]	14[a]	0[a]	1[a]	178,617[a]
5. Upper Station	5/29	9/11	222,381	0	21,829	6,580	3	250,793
6. Akalura	6/02	9/05	30,692	0	12,928	4,505	11	48,136
7. Saltery	6/23	8/08	77,186	9	92,078	5	3	169,281
8. Buskin	5/30 8/21	7/31 9/29	9,526	10	53,484	6,813	22	69,855
9. Litnik	5/23	9/11	71,460	2	21,830	6,637	0	99,929
10. Paul's Bay	6/10 8/06	7/15 9/01	12,442	1	3,996	10,664	0	27,103
11. Perenosa (Portage)	6/23	7/15	5,363	0	0	0	0	5,363
12. Malina	5/31	8/10	8,273	4	2,202	0	0	10,479
13. Bear Creek (Shuyak)	8/08	9/12	11	0	620	2,048	0	2,679
14. Big Creek (Shuyak)	8/08	9/25	85	0	1,760	2,281	0	4,126
TOTALS			1,579,456	22,126	503,251	66,034	4,375	2,175,242

[a] Numbers not used in species totals as Frazer Lake salmon are initially counted through Dog Salmon weir.

Table 14. Commercial salmon season opening times and dates by species for the Kodiak Area, 1993.

FISHERY	EARLIEST OPENING TIME/DATE Firm Time/Date	Approximate Time/Date
Early Run Sockeye Salmon Fisheries		
Cape Igvak Section [a]	-	12:01 A.M. June 5-9
N.W. Kodiak District [b]	12:00 Noon June 9	
Inner Ayakulik and Outer Ayakulik Sections [c]	-	Low tide June 7-9
Alitak District [b]	12:00 Noon June 9	
Minor Systems [d]		
Uganik	-	12:00 Noon June 14
Paramanof	-	12:00 Noon June 14
Pauls/Perenosa	-	12:00 Noon June 14
Litnik	-	12:00 Noon June 9-14
Saltery	-	12:00 Noon June 14
Kaflia/Swikshak	-	12:00 Noon June 14
Pink/Chum Salmon Fisheries [e]		
Mainland District	12:00 Noon July 6	-
Afognak District	12:00 Noon July 6	-
N.W. Kodiak District	12:00 Noon July 6	-
S.W. Kodiak District	12:00 Noon July 6	-
Alitak District	12:00 Noon July 6	-
Eastside Kodiak District	12:00 Noon July 6	-
N.E. Kodiak District	12:00 Noon July 6	-
Late Run Sockeye Salmon Fishery		
Cape Igvak Section [f]	-	12:01 A.M. July (?)
All remaining late run sockeye fisheries [g]	-	12:00 Noon July 15
System Specific Coho Salmon Fisheries [h]		
Mainland District	-	12:00 Noon Sept. 1
Afognak District	-	12:00 Noon Aug. 15
N.W. Kodiak District	-	12:00 Noon Sept. 1
S.W. Kodiak District	-	12:00 Noon Sept. 1
Alitak District	-	12:00 Noon Sept. 1
Eastside Kodiak District	-	12:00 Noon Sept. 5
N.E. Kodiak District	-	12:00 Noon Sept. 5

-Continued-

Table 14. (page 2 of 2)

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[a] Actual opening date will be determined by sockeye escapement levels into the Chignik River system. Fishing time will be in 24 hour increments.

[b] Actual opening time/date is as shown. This opening is considered a commercial test fishery; fishing time for this initial period will be 33 hours (12:00 nooon 6/9 through 9:00 P.M. 6/10).

[c] Actual opening date will be determined by the sockeye escapement level into Ayakulik River and opening time by low tide timing during daylight hours.

[d] Actual opening time will be determined by sockeye escapement levels into minor systems. Fishing time for this period will be 33 hours (12:00 noon through 9:00 P.M.)

[e] Actual opening time/date is as shown. Fishing time for this initial period will be 105 hours (12:00 noon 7/6 through 9:00 P.M. 7/10). See section on Fishing Periods for additional information.

[f] Actual opening date will be determined by sockeye escapement levels into the Chignik River System. Fishing time will be in 24 hour increments.

[g] Actual opening date for system specific fishing time will be determined by sockeye escapement levels into major systems. All fishing periods will begin at 12:00 noon and end at 9:00 P.M. prior to 8/16 and end at 6:00 P.M. from 8/16 to season's end.

[h] Actual opening date for system specific fishing time will be determined by overall coho run strength evaluation and by escapement levels into major systems and minor systems with reliable escapement data.

Table 15. Board of Fisheries approved fishery management plans for the Kodiak Management Area, 1993.

MANAGEMENT PLAN	YEAR INITIATED	MGMT. UNITS AFFECTED	DATES IN EFFECT
Cape Igvak Salmon Management Plan	1978	Cape Igvak Section Wide Bay Section	6/5 - 7/25
Alitak Bay District Salmon Management Plan	1987	Alitak Bay District	6/9 - 10/1
Westside Kodiak Management Plan	1990	N.W. Kodiak District S.W. Kodiak District S.W. Afognak Section	6/9 - 10/1
Crescent Lake Coho Salmon Management Plan	1990	Portion of the Central Section in Vicinity of Port Lions	8/1 - 9/15
North Shelikof Strait Sockeye Salmon Management Plan	1990	S.W. Afognak Section N.W. Afognak Section Shuyak Section Big River Section Hallo Bay Section Inner and Outer Kukak Sect. Dakavak Section	7/6 - 7/25
Eastside Afognak Management Plan[a]	1993	Kitoi Bay Section Izhut Bay Section Duck Bay Section	6/9 - 10/1
Spiridon Bay Sockeye Salmon Management Plan	1993	Special Harvest Area in Spiridon Bay Section	6/9 - 10/1

[a] This management plan has basically been in use since 1981, but was titled the Kitoi Bay Hatchery management plan. In 1993, it was adopted into regulation by the Alaaska Board of Fisheries.

Table 16. Biological and allocative criteria, and the management chronology, of the Cape Igvak Management Plan for the Kodiak Management Area, 1993.

BIOLOGICAL AND ALLOCATIVE CRITERIA FOR MANAGING THE CAPE IGVAK FISHERY ON CHIGNIK BOUND SOCKEYE

BIOLOGICAL REQUIREMENTS			ALLOCATIVE REQUIREMENTS		
REGULATION 5AAC 18.360	ESCAPEMENT NEEDS CHIGNIK (EARLY RUN)	CHIGNIK (LATE RUN)	REGULATION 5AAC 18.360	CHIGNIK MINIMUM HARVEST	IGVAK %
(a) (b) (c)	THROUGH 6/30 350,000-400,000	-	(a)	EXPECTATIONS OF LESS THAN 600.000	CLOSED
-	-	-	(b)	EXPECTATIONS OF 600,000 ARE IN DOUBT	CLOSED
(a) (b) (c)	-	THROUGH 7/30 195,000-200,000	(c)	EXPECTATIONS OF 600,000 OCCUR	OPEN TO ACHEIVE 15%
-	-	-	(d)	CHIGNIK SALMON % INTERCEPTION CALCULATIONS	80% OF CATCH AT IGVAK ARE CHIGNIK SOCKEYE
-	-	-	(e)	ALLOCATION PERIOD 600,000	6/5 - 7/25 % NOT APPLICABLE
(f)	FROM JUNE 26 - JULY 9 CAPE IGVAK SECTION CLOSED OR SEVERLY LIMITED UNTIL CHIGNIK LAKE RUN EVALUATED		-	-	-
-	-	-	(g)	-	ONE DAY ADVANCE NOTICE
	400,000	250,000		600,000 MINIMUM	15 %

MANAGEMENT CHRONOLOGY FOR CHIGNIK BOUND SOCKEYE AND KODIAK SALMON

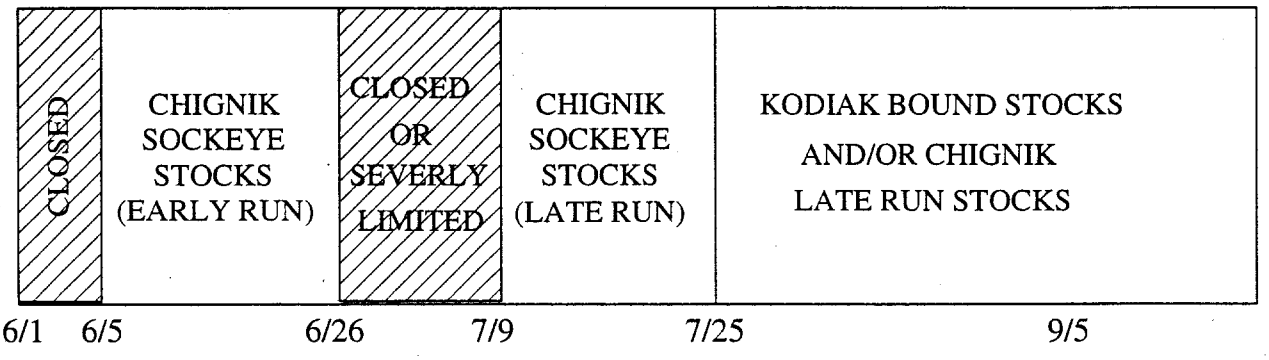

Table 17. Harvest of Chignik bound sockeye salmon in the Chignik, Cape Igvak, and Southeast District Mainland Areas from 1964-1993.

Year	Chignik Area Catch	Chignik Area Percent	Cape Igvak[a] Catch	Cape Igvak[a] Percent	Southeast District Mainland Area[a] Catch	Southeast District Mainland Area[a] Percent	Total
1964[b]	556,890	90.57	14,980	2.44	43,021	7.00	614,891
1965	599,553	89.94	11,021	1.65	56,020	8.40	666,594
1966	219,794	87.99	18,003	7.21	12,011	4.81	249,808
1967	462,000	91.48	23,014	4.56	20,021	3.96	505,035
1968	977,382	82.53	135,951	11.48	70,959	5.99	1,184,292
1969	394,135	78.96	97,982	19.63	7,013	1.41	499,130
1970	1,325,734	72.51	434,394	23.76	68,181	3.73	1,828,309
1971	1,016,136	76.95	253,044	19.17	51,272	3.88	1,320,452
1972	378,218	87.99	33,865	7.88	17,752	4.13	429,815

1964-72 catch and percentage figures are total for the entire season. Catch figures and percentages after 1972 are only through July 25.

1973[c]	769,256	89.01	57,348	6.64	37,613	4.35	864,217
1974	530,278	74.12	122,071	17.03	64,564	9.01	715,444
1975	115,984	81.78	23,635	16.67	2,205	1.55	141,824
1976	792,024	83.08	117,926	12.37	43,356	4.55	953,306
1977	1,547,285	90.61	128,852	7.55	31,498	1.84	1,707,635
1978[d,e]	1,454,389	85.38	227,014	13.33	21,952	1.29	1,703,335
1979[f]	794,504	80.30	139,550	14.10	55,352	5.59	989,406
1980	670,001	91.33	32	0.00	63,570	8.67	733,603
1981	1,606,300	79.88	282,727	14.06	121,870	6.06	2,010,897
1982	1,250,768	84.46	167,401	11.30	62,767	4.24	1,480,936
1983	1,450,832	72.68	318,048	15.93	227,392	11.39	1,996,272
1984	2,474,405	73.93	449,372	13.43	423,068	12.64	3,346,845
1985[g]	696,169	79.91	123,627	14.19	51,421	5.90	871,217
1986	1,456,729	82.64	188,017	10.67	118,006	6.69	1,762,752
1987	1,659,915	78.02	321,120	15.08	146,886	6.90	2,127,921
1988	678,912	95.70	11,218	1.58	19,320	2.72	709,450
1989	502,477	99.12	0	0.00	4,485	0.88	506,962
1990	1,196,599	83.51	107,706	7.52	128,599	8.97	1,432,904
1991[h]	1,966,986	80.48	324,329	13.27	152,714	6.25	2,444,029
1992[i]	1,066,732	81.25	152,358	11.60	93,845	7.15	1,312,935
1993[j]	1,500,459	77.78	300,055	15.56	128,536	6.66	1,929,150

a The Cape Igvak and Southeast District Mainland figures represent 80% of the total sockeye catches for those areas as it is estimated that roughly 80% of the sockeye caught in the Cape Igvak section and Southeast District Mainland Area are destined for Chignik.

b The data from 1964 - 1972 are based on total yearly catches. Prior to 1973, Cape Igvak and Southeast District Mainland fisheries were set by regulation to weekly fishing periods, usually 5 days per week. Time modifications were implemented when poor escapements occurred at Chignik.

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[c] During 1973 through 1977 all three fisheries were managed on a day by day basis.

[d] From 1978 - 1993, the Cape Igvak Fishery Management Plan allocated 15 percent of the total sockeye catch destined for Chignik.

[e] During 1978, seining prior to July 11 was disallowed in the Southeast District Mainland. The set gillnet fishery was allowed to fish 3 days per week through July 10 after which the fishery was managed on the basis of local stocks.

[f] During 1979-1984 and prior to July 11, fishing was allowed 5 days per week in the Southeast District Mainland Area (including Beaver Bay) with an estimated ceiling of 60,000 sockeye destined for Chignik. If the Chignik Area sockeye catch was 1,000,000 or more before July 11, the 60,000 ceiling was to be dropped.

[g] Beginning in 1985, Southeast District Mainland Area was placed on an allocation of 6.2 percent of the total estimated Chignik sockeye catch through July 25. After July 25, Southeast District Mainland Area is managed on a local stock basis. The allocation changed back to an even 6 percent beginning in 1988. Seining is still not allowed prior to July 11.

[h] Includes overescapement of 278,305 sockeye counted past the weir during the Chignik Area seiners' boycott (Jun 23 - Jul 4).

[i] Review of Orzinski Lake historical and current escapement records led the Board to redefine the Southeast District Mainland Management Plan. Beginning in 1992, the Southeast District Mainland fishery exclusive of the Orzinkie Bay was placed on an allocation of 7.0 percent of the total estimated chignik sockeye catch through July 25.

[j] 1993 data preliminary.

Table 18. Primary management species and fishery chronology of the Alitak Bay District Salmon Management Plan for the Kodiak Management Area, 1993.

ALITAK BAY DISTRICT MANAGEMENT PLAN

CAPE ALITAK SECTION (SEINE)	CLOSED XXXXXXX	FRAZER SOCKEYE (AGGRESSIVE MANAGEMENT STRATEGY)	FRAZER SOCKEYE (CONSERVATIVE MANAGEMENT STRATEGY)	ODD YEAR CYCLE FRAZER PINK SALMON EVEN YEAR CYCLE UP.STATION SOCKEYE (LATE RUN)	ODD YEAR CYCLE UP.STATION SOCKEYE EVEN YEAR CYCLE UP.STATION SOCKEYE & FRAZER PINK SALMON	ALL ALITAK DISTRICT COHO SYSTEMS
MOSER/OLGA BAY SECTION (GILLNET) (TRADITIONAL)	CLOSED XXXXXXX	FRAZER SOCKEYE (AGGRESSIVE MANAGEMENT STRATEGY)	FRAZER SOCKEYE (CONSERVATIVE MANAGEMENT STRATEGY)	ODD YEAR CYCLE FRAZER PINK SALMON EVEN YEAR CYCLE UP.STATION SOCKEYE (LATE RUN)	ODD YEAR CYCLE UP.STATION SOCKEYE EVEN YEAR CYCLE UP.STATION SOCKEYE & FRAZER PINK SALMON	ALL OLGA BAY COHO SYSTEMS
OUTER UPPER & INNER UPPER STATION (GILLNET) (NON-TRADITIONAL)	CLOSED CLOSED	UPPER STATION SOCKEYE (EARLY RUN)		UPPER STATION SOCKEYE (LATE RUN)	UP. STATION SOCK & COHO	UPPER STATION COHO
OUTER AKALURA & IN. AKALURA SECTIONS (GILLNET) (NON-TRADITIONAL)	CLOSED CLOSED	AKALURA SOCKEYE (EARLY RUN)		AKALURA SOCKEYE (LATE RUN)	AKALURA SOCK & COHO	AKALURA COHO
DOG SALMON FLATS SECTION (GILLNET) (NON-TRADITIONAL)	CLOSED CLOSED	FRAZER SOCKEYE (MOP UP FISHERY)		FRAZER PINK SALMON	FRAZER AND HORSE MARINE COHO	
HUMPY/DEADMAN SECTION (SEINE)	CLOSED XXXXXXX	FRAZER SOCKEYE (AGRESSIVE MANAGEMENT STRATEGY)	FRAZER SOCKEYE (CONSERVATIVE MANAGEMENT STRATEGY)	ALITAK BAY PINK, CHUM, AND COHO		

6/1 6/9-10 6/24 7/9 7/15 8/9 8/20 8/26 9/25

ALITAK BAY DISTRICT - PRIMARY MANAGEMENT SPECIES BY STREAM BY TIME

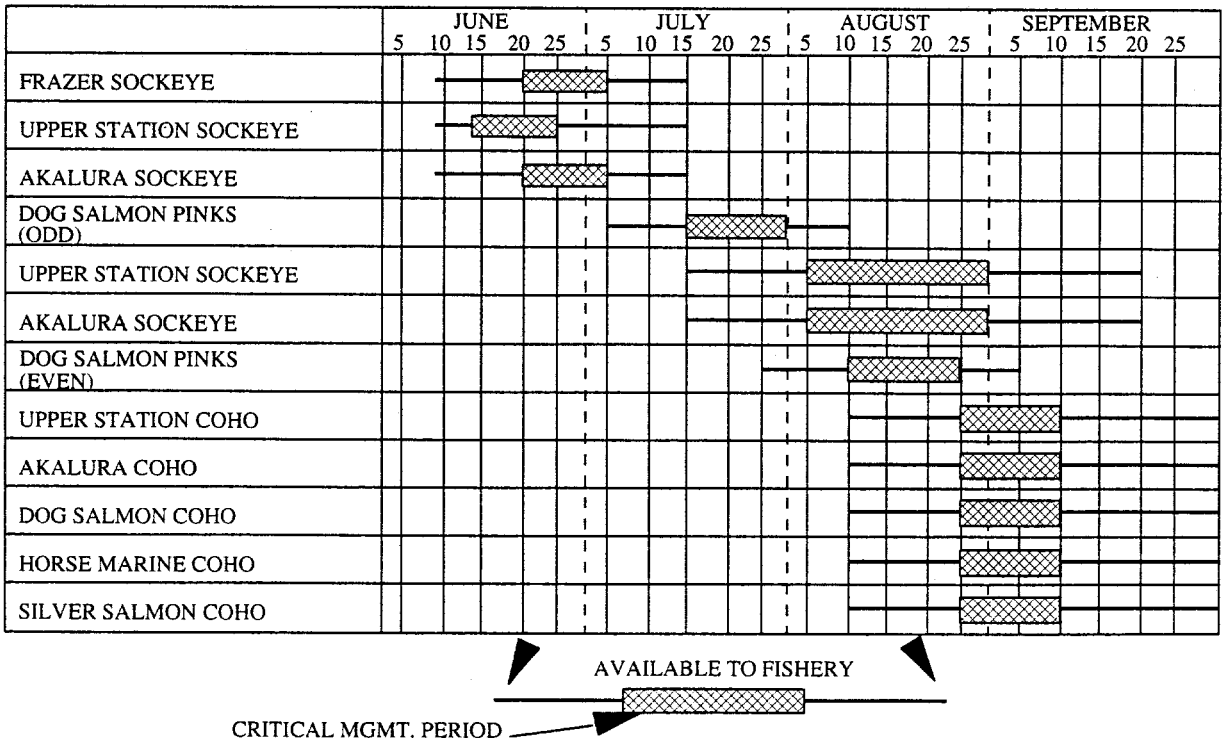


Table 19. Commercial salmon harvest, by species, and percentage by gear type, Alitak Bay District, Kodiak Management Area, 1954 - 1993.

YEAR	CHINOOK #	CHINOOK SN%	CHINOOK PS%	SOCKEYE #	SOCKEYE SN%	SOCKEYE PS%	COHO #	COHO SN%	COHO PS%	PINK #	PINK SN%	PINK PS%	CHUM #	CHUM SN%	CHUM PS%	TOTAL #	TOTAL SN%	TOTAL PS%
1954	3	33%	67%	44448	94%	6%	1118	93%	7%	490038	47%	53%	55788	19%	81%	591395	48%	52%
1955	38	74%	26%	56058	89%	11%	410	68%	32%	1656363	15%	85%	100031	17%	83%	1812900	18%	82%
1956	10	10%	90%	62673	77%	23%	904	25%	75%	335669	30%	70%	55967	11%	89%	455223	34%	66%
1957	7	14%	86%	15365	88%	12%	378	31%	69%	410620	12%	88%	49661	27%	73%	476031	16%	84%
1958	11	0%	100%	30542	79%	21%	488	33%	67%	770851	29%	71%	81255	8%	92%	883147	29%	71%
1959	11	18%	82%	24888	59%	41%	378	30%	70%	544592	23%	77%	70589	8%	92%	640458	23%	77%
1960	29	17%	83%	68472	77%	23%	2129	77%	23%	1561476	25%	75%	102432	13%	87%	1734538	26%	74%
1961	23	4%	96%	145781	67%	33%	1470	49%	51%	1589027	14%	86%	60600	18%	82%	1796901	19%	81%
1962	5	20%	80%	124496	75%	25%	1792	79%	21%	1886769	23%	77%	54115	26%	74%	2067177	26%	74%
1963	30	7%	93%	54992	60%	40%	1202	31%	69%	1522856	14%	86%	42836	10%	90%	1621916	15%	85%
1964	29	10%	90%	50167	72%	28%	2324	76%	24%	1408731	46%	54%	34460	13%	87%	1495711	46%	54%
1965	16	6%	94%	68876	68%	32%	688	16%	84%	1129185	11%	89%	20604	17%	83%	1219369	14%	86%
1966	2	50%	50%	70526	91%	9%	585	78%	22%	429204	40%	60%	33153	18%	82%	533470	46%	54%
1967	6	0%	100%	14227	82%	18%	50	0%	100%	84918	66%	34%	17377	55%	45%	116578	66%	34%
1968	16	44%	56%	40662	86%	14%	3701	79%	21%	1046221	21%	79%	29450	35%	65%	1120050	24%	76%
1969	27	37%	63%	98722	54%	46%	7240	7%	93%	3768917	8%	92%	45134	15%	85%	3920040	10%	90%
1970	8	50%	50%	81528	76%	24%	4540	73%	27%	949488	27%	73%	93306	15%	85%	1128870	30%	70%
1971	33	30%	70%	124480	55%	45%	2261	66%	34%	1066180	10%	90%	191437	7%	93%	1384391	14%	86%
1972	15	40%	60%	22127	70%	30%	1270	51%	49%	187154	17%	83%	93236	6%	94%	303802	18%	82%
1973	4	50%	50%	10338	62%	38%	125	70%	30%	49932	35%	65%	24408	19%	81%	84807	34%	66%
1974	19	16%	84%	66605	52%	48%	1284	49%	51%	363389	9%	91%	22220	9%	91%	453517	16%	84%
1975	0	0%	0%	16515	72%	28%	1627	3%	97%	235720	11%	89%	2855	40%	60%	256717	15%	85%
1976	18	28%	72%	96668	71%	29%	3518	53%	47%	1804003	26%	74%	66183	14%	86%	1970390	28%	72%
1977	20	40%	60%	78805	69%	31%	1343	57%	43%	961673	23%	77%	70978	12%	88%	1112819	26%	74%
1978	694	58%	42%	218165	59%	41%	2788	52%	48%	4191756	12%	88%	72166	16%	84%	4485569	14%	86%
1979	108	24%	76%	317906	50%	50%	15007	54%	46%	1664249	7%	93%	22454	32%	68%	2019724	14%	86%
1980	34	21%	79%	208200	83%	17%	12972	34%	66%	2033236	12%	88%	67471	12%	88%	2321913	18%	82%
1981	45	13%	87%	346073	74%	26%	17011	55%	45%	2073629	13%	87%	61513	37%	63%	2498271	22%	78%
1982	43	30%	70%	476862	86%	14%	29378	40%	60%	519880	27%	73%	101543	22%	78%	1127706	52%	48%
1983	159	12%	88%	460087	59%	41%	28953	45%	55%	1318526	7%	93%	107786	21%	79%	1915511	21%	79%
1984	290	11%	89%	382729	67%	33%	25299	51%	49%	433806	25%	75%	84924	24%	76%	927048	43%	57%
1985	199	21%	79%	703186	63%	37%	43914	48%	52%	1057912	14%	86%	84760	33%	67%	1889971	34%	66%
1986	134	17%	83%	1247976	58%	42%	30548	44%	56%	728205	17%	83%	75643	16%	84%	2082506	42%	58%
1987	105	11%	89%	515410	63%	37%	17959	53%	47%	916875	9%	91%	59723	37%	63%	1510072	29%	71%
1988	624	11%	89%	1123474	58%	42%	30001	38%	62%	385735	35%	65%	93391	35%	65%	1633225	51%	49%
1990	807	17%	83%	1435461	52%	48%	18176	65%	35%	144927	13%	87%	50304	36%	64%	1649675	48%	52%
1991	821	10%	90%	2062718	58%	42%	24601	52%	48%	2373516	5%	95%	83003	24%	76%	4544659	30%	70%
1992	1056	9%	91%	525158	53%	47%	24548	55%	45%	59268	28%	72%	34580	43%	57%	644610	50%	50%
1993	1828	10%	90%	998751	53%	47%	19271	40%	60%	3465473	6%	94%	53636	27%	73%	4538959	17%	83%
Average 1970-93	307	17%	83%	500836	60%	40%	15495	48%	52%	1173241	13%	87%	70327	21%	79%	1760206	27%	73%
Average 1983-93	602	11%	89%	945495	57%	43%	26327	48%	52%	1088424	10%	90%	72775	28%	72%	2133624	32%	68%
							Even Year Avg. 84-93			1477347	9%	91%						
							Odd Year Avg. 83-93			699502	10%	90%						

"SN" is set gillnet
"PS" is purse seine

Table 20. Sockeye salmon harvest and number of permits operating in the Alitak Bay District, by gear type and location of harvest, in the Kodiak Management Area, 1982 - 1993.

YEAR	GILLNET [a]									SEINE [a]			TOTAL DISTRICT HARVEST
	MOSER BAY			OLGA BAY			TOTAL [b]			TOTAL [b]			
	PERMIT	HARVEST	%	PERMIT	HARVEST	%	PERMIT	HARVEST	%	PERMIT	HARVEST	%	
1982	63	247,000	52	46	162,700	34	74	409,700	86	104	65,700	14	475,400
1983	67	183,400	40	43	85,900	19	80	269,300	59	157	189,900	41	459,200
1984	61	176,300	47	40	79,900	21	70	256,200	68	70	123,100	32	379,300
1985	70	301,600	43	45	138,700	20	75	440,300	63	117	261,200	37	701,500
1986	67	338,500	27	65	386,500	31	79	725,000	58	146	522,900	42	1,247,900
1987	60	188,300	37	61	133,900	26	73	322,200	63	151	193,200	37	515,400
1988	65	401,800	36	58	251,100	22	81	652,900	58	122	470,500	42	1,123,400
1989 [c]	45	134,000	10	80	1,150,000	90	87	1,284,000	100	1	100	0	1,284,100
1990	73	507,300	35	63	237,300	17	91	744,600	52	156	690,800	48	1,435,400
1991	65	626,000	30	67	571,700	28	86	1,197,700	58	187	864,900	42	2,062,600
1992	65	197,800	38	44	78,700	15	79	276,500	53	140	248,700	47	525,200
1993	64	384,500	39	35	140,200	14	76	524,700	53	115	474,100	47	998,800
AVERAGE 1982-93	65	323,000	35	52	206,000	23	78	529,000	59	133	373,200	41	902,200

a Harvest in number of fish.

b Gillnet harvest is from the Moser-Olga Bay Section; Seine harvest is from the Cape Alitak and Humpy-Deadman Sections.

b 1989 harvest patterns were unusual due to the presence of oil in the Kodiak Management Area from the M/V Exxon Valdez oil spill. 1989 harvest figures were not used to calculate averages.

Table 21. Primary management species and fishery chronology of the Westside Kodiak Management Plan for the Kodiak Management Area, 1993.

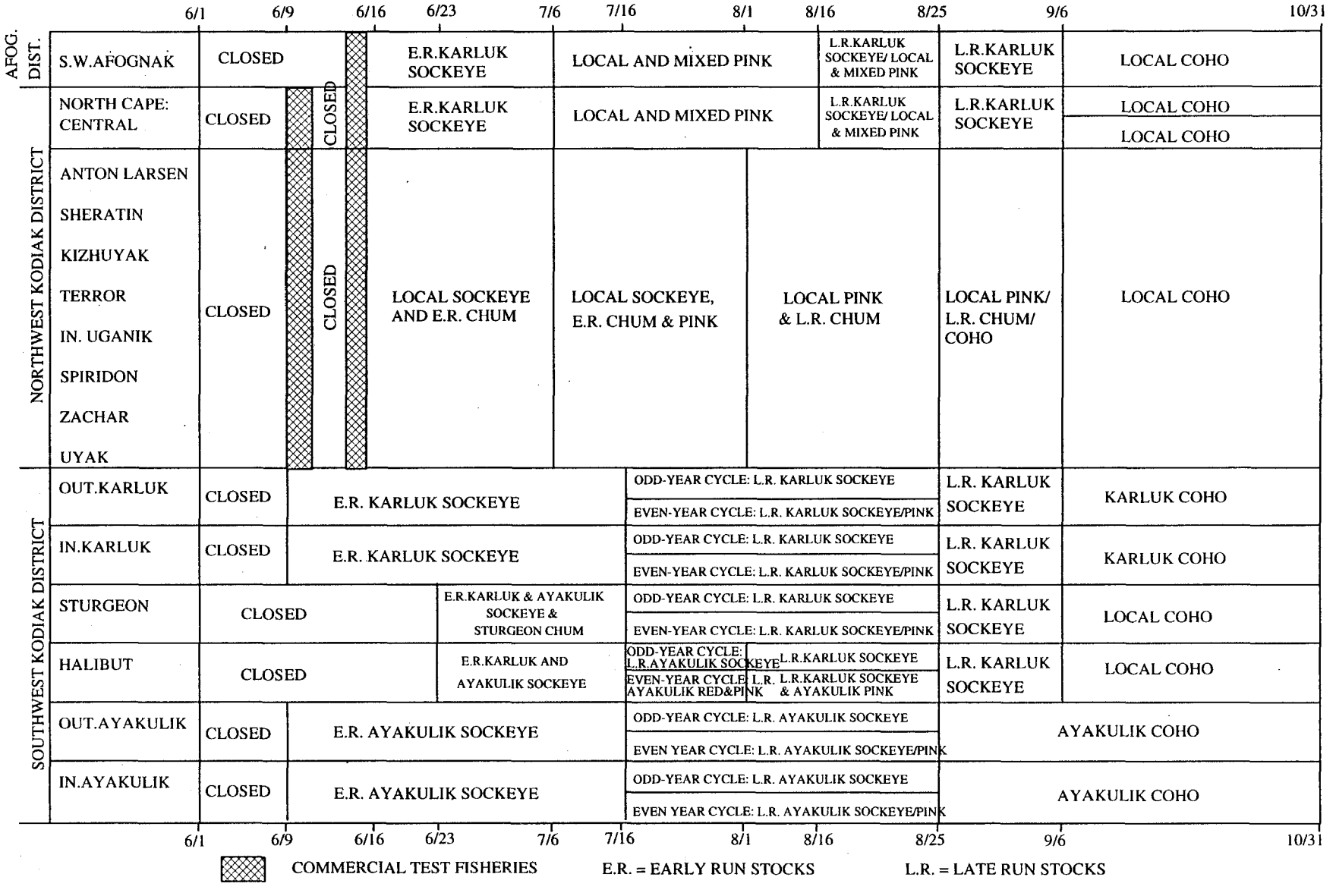


Table 22. Commercial salmon harvest by species for westside management units of the Kodiak Management Area, 1970-1993.

YEAR	CHINOOK	SOCKEYE	COHO	PINK	CHUM	TOTAL
70	702	230,424	36,038	3,485,342	135,658	3,888,164
71	96	66,199	5,596	752,869	128,747	953,511
72	867	121,203	4,990	608,989	193,569	929,618
73	145	76,010	1,403	288,568	49,931	416,057
74	227	181,075	4,919	930,645	34,214	1,151,080
75	50	75,983	14,439	1,441,658	36,358	1,568,488
76	253	350,403	10,412	4,786,866	91,524	5,239,458
77	454	363,690	12,619	2,107,769	115,435	2,599,967
78	1,352	491,503	20,216	6,245,588	134,794	6,893,453
79	611	185,363	47,043	3,860,734	59,469	4,153,220
80	385	411,862	44,639	11,344,424	132,910	11,934,220
81	899	415,018	36,650	3,183,618	246,825	3,883,010
82	858	427,454	128,718	5,538,196	450,819	6,546,045
83	2,344	297,045	49,393	1,728,428	374,187	2,451,397
84	3,634	925,236	104,347	9,291,637	166,069	10,490,923
85	4,304	920,015	97,474	1,979,788	226,726	3,228,307
86	3,728	1,632,227	102,304	9,472,330	584,538	11,795,127
87	2,268	754,943	85,055	1,643,187	261,601	2,747,054
88	11,848	998,895	141,115	8,574,478	609,946	10,336,282
89	0	3,489	986	1,005	53	5,533
90	12,090	3,383,351	176,475	3,674,278	218,883	7,465,077
91	11,780	2,842,802	179,852	5,588,982	346,193	8,969,609
92	17,238	2,306,791	128,737	1,538,305	302,779	4,293,850
93	22,189	2,425,370	124,497	10,344,080	300,571	13,216,707

Table 23. Primary management species and general fishery chronology in management units affected by the North Shelikof Strait Sockeye Salmon Management Plan for the Kodiak Management Area, 1993.

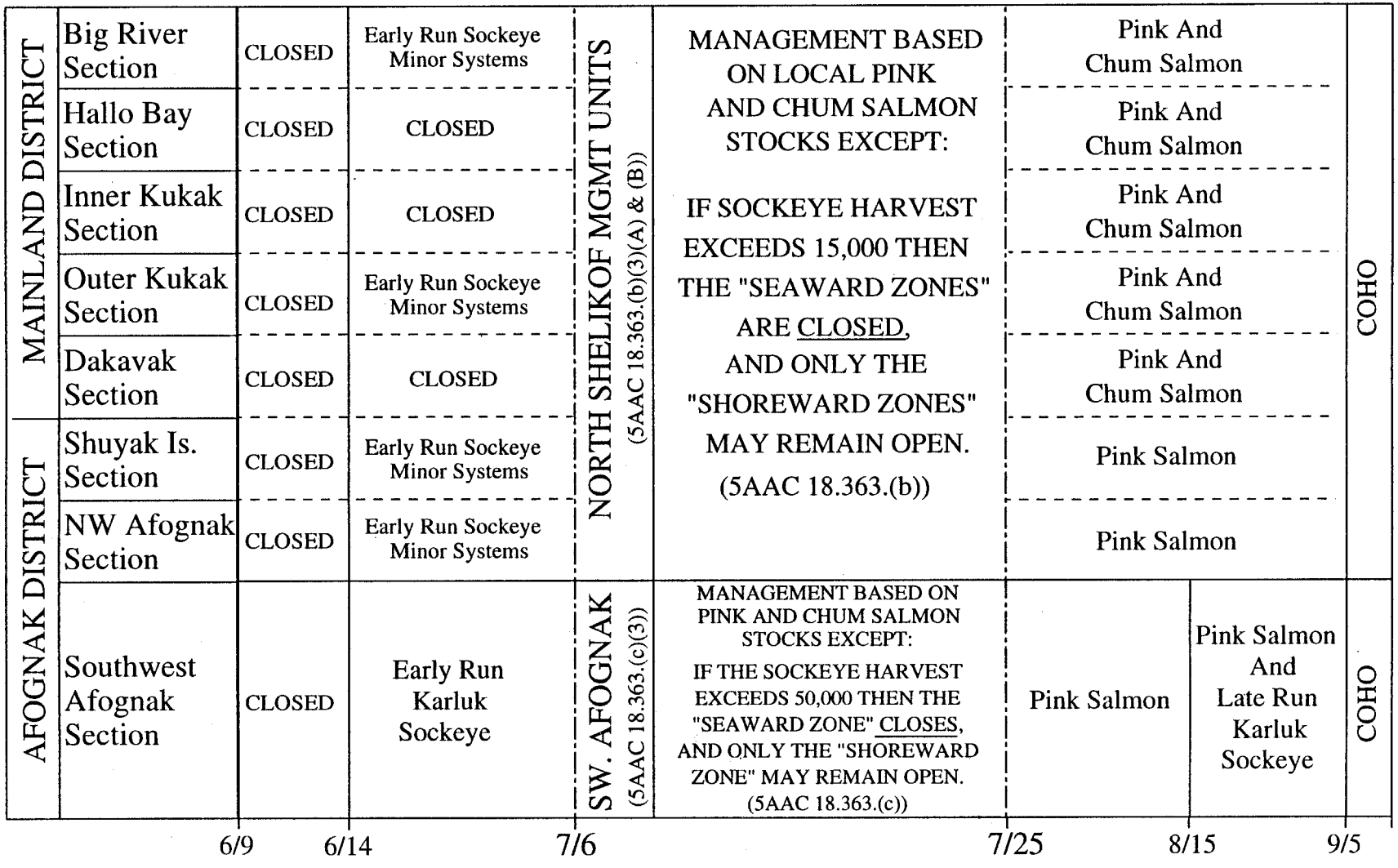


Table 24. Summary of fishing time, zone closures, effort, and harvest by species, for management units affected by the North Shelikof Sockeye Salmon Management Plan for the Kodiak Management Area, 1990 - 1993.

North Shelikof Units (15,000 Sockeye Harvest Cap) [a/]

YEAR	Total Number of Days Open to Fishing / Number of Days Seaward Zone Closed		Date and Time of Zone Closure	Sockeye Salmon Harvest at Time of Zone Closure	Number of Vessels	Total Harvest By Species July 6 through July 25					Upper Cook Inlet Sockeye Harvest
	MAINLAND	N. AFOGNAK				CHINOOK	SOCKEYE	COHO	PINK	CHUM	
1990	7.1 / 2.4	9.1 / 4.4	7/15 9 PM	36,800	69	140	57,700	3,900	18,600	19,400	3.6 MILLION
1991	7.1 / 0	13.1 / 0	No Zone Closure	N/A	42	2,500	18,800	2,700	44,800	3,800	2.2 MILLION
1992	7.1 / 5.1	9.1 / 7.1	7/8 1 PM	13,500	77	900	128,100	3,000	23,900	11,700	8.9 MILLION
1993	7.1 / 4.7	13.8 / 8.9	7/10 5 PM	15,220	89	1,220	78,420	1,950	75,640	4,250	4.7 MILLION

a/ In 1988, from 7/6 - 7/25, with 6.9 days open to fishing 392,000 sockeye were harvested in the " North Shelikof Units". In Upper Cook Inlet 6,800,000 sockeye were harvested.

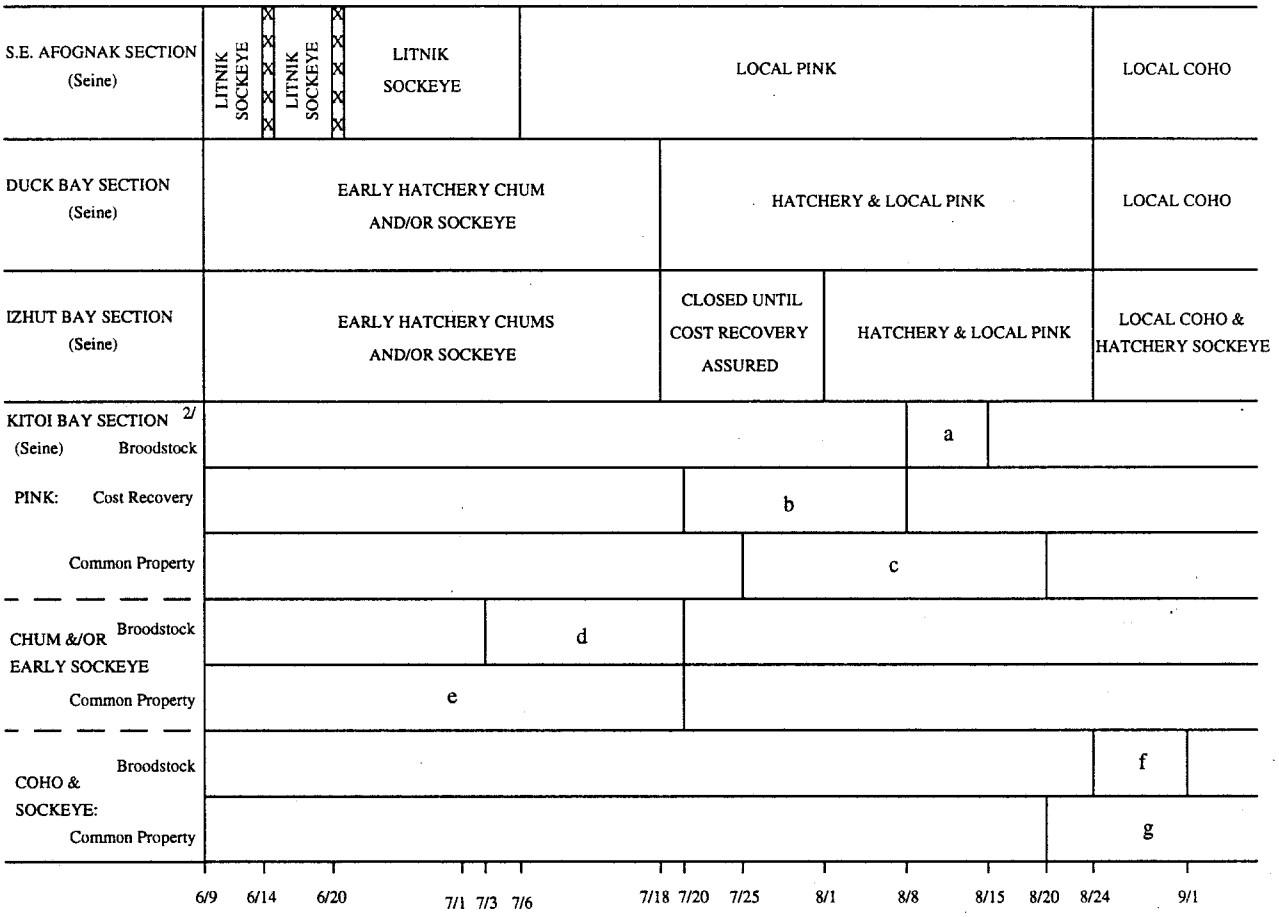
Southwest Afognak Section (50,000 Sockeye Harvest Cap) [b/]

YEAR	Total Number of Days Open to Fishing / Number of Days Seaward Zone Closed	Date and Time of Zone Closure	Sockeye Salmon Harvest at Time of Zone Closure	Number of Vessels	Total Harvest By Species July 6 through July 25					Upper Cook Inlet Sockeye Harvest
					CHINOOK	SOCKEYE	COHO	PINK	CHUM	
1990	9.1 / 0	No Zone Closure	N/A	64	300	22,900	3,600	53,800	6,000	3.6 MILLION
1991	13.1 / 0	No Zone Closure	N/A	55	300	34,200	3,600	100,700	4,000	2.2 MILLION
1992	9.1 / 4.7	7/14 1 PM	48,200	84	300	50,600	600	30,000	6,800	8.9 MILLION
1993	13.1 / 7.7	7/14 1 PM	45,900	87	845	73,160	7,020	240,710	7,320	4.7 MILLION

b/ In 1988, from 7/6 - 7/25, with 11.1 days open to fishing 86,000 sockeye were harvested in the "North Shelikof Units". In Upper Cook Inlet 6,800,000 sockeye were harvested.

Table 25. Primary management species and fishery chronology of the EastsideAfognak Management Plan for the Kodiak Management Area, 1993.

TARGETED SPECIES BY SYSTEM AND TIME FOR SPECIFIC MANAGEMENT UNITS [1/]



- fishing time dependant upon sockeye escapement into Litnik system.

1 Included in this management plan are the harvest strategies for current natural and hatchery prodution as well as future hatchery production.

2 The management plan required for the Kitoi Bay Section is rather complicated in order to achieve broodstock, cost recovery, and common harvest requirements. This is further complicated by the multispecies production currently occurring at Kitoi Bay hatchery. The diagram shown attempts to approximate dates for when specific management strategies should be implemented to insure achievement of hatchery goals and an orderly harvest of quality common property fish.

a Hatchery pink salmon broodstock captured.
b Hatchery pink salmon cost recovery fishery when necessary.
c Hatchery pink salmon common property fishery.
d Hatchery chum and/or early sockeye salmon broodstock captured.
e Hatchery chum and/or early sockeye salmon common property fishery.
f Hatchery coho and late sockeye salmon broodstock captured.
g Hatchery coho and late sockeye salmon common property fishery.

Table 26. Historical indexed salmon escapements by species in the Kodiak Management Area, 1962-1993.

Year	Chinook	Sockeye	Coho	Pink	Chum
1962		922,500		4,600,000	297,900
1963		502,227		1,026,075	75,520
1964		600,346		3,360,000	261,429
1965		561,980		772,874	67,156
1966		652,578		2,100,000	143,700
1967		720,683		698,710	136,079
1968	703	645,612		2,800,000	121,000
1969	7,752	592,020		1,581,335	77,285
1970	3,900	573,603		3,392,577	123,150
1971	4,524	456,197		1,070,173	249,327
1972	3,049	605,491		1,053,391	335,115
1973	4,762	543,111		604,592	258,044
1974	1,622	995,925		2,041,099	86,383
1975	3,059	704,801		1,100,555	156,761
1976	8,411	1,075,226		3,105,320	312,914
1977	13,824	1,269,374	59,095	2,212,488	742,384
1978	14,677	1,000,353	37,479	5,006,273	482,956
1979	14,441	1,410,800	94,000	3,067,647	607,430
1980	5,850	1,831,748	28,000	6,492,822	830,070
1981	15,720	1,391,593	59,000	3,188,869	741,981
1982	10,773	1,603,692	86,000	5,370,049	1,023,923
1983	27,445	1,300,506	104,000	2,089,704	824,954
1984	14,429	1,467,780	123,000	4,512,124	682,936
1985	13,876	2,574,539	191,417	3,168,197	727,883
1986	11,046	2,001,279	170,000	4,068,615	655,817
1987	23,744	1,551,543	153,000	2,978,510	641,579
1988	35,152	1,661,532	96,140	3,236,931	558,531
1989[a]	26,131	3,022,886	166,622	14,642,587	1,432,609
1990	25,972	2,006,241	151,420	6,024,900	474,620
1991	27,306	2,515,659	259,850	4,317,610	934,336
1992	19,013	1,968,058	289,592	3,515,624	530,128
1993	22,113	1,705,440	159,996	4,291,581	234,381
Total	359,294	40,435,323	2,228,611	107,491,232	14,828,281
Average all years	13,327	1,206,853	17,776	2,995,118	432,118
Recent Yr.Average (1987-1993)	25,911	1,971,386	191,400	4,277,329	546,399
Odd Year Average[b] (1983-1993)				3,369,120	
Even Year Average (1982-1992)				4,454,707	

[a] Limited commercial fisheries were conducted due to oil contamination from the Exxon Valdez oilspill.

[b] 1989 not included in averages.

Table 27. Commercial salmon buyers and processors, Kodiak Management Area, 1993.

Buyers/Processors[a]	Shorebased Processors			Floating Processors			Product	
	Kodiak City	Kodiak Borough	Other Areas	Kodiak City	Kodiak Borough	Other Areas	Canned	Frozen
Alaska Fresh Seafoods	X							X
All Alaskan Seafoods	X				X			X
Alaska Pacific Seafoods	X						X	X
Wards Cove Packing -Alitak		X					X	X
Wards Cove Packing-Port Bailey		X					X	X
Cook Inlet Processors	X							X
Cook Inlet Processors-Uganik		X					X	
East Point Seafoods	X							X
International Seafoods	X							X
Kodiak King Crab, Inc.	X			X			X	X
Kodiak Salmon Company-Larsen Bay		X					X	X
Western Alaska Seafoods	X							X
Seaside Seafoods	X							X
Inlet Salmon		X						X
Yamaya Seafoods		X						X
Ouzinkie Tribal Council		X						X
Kodiak Smoking & Processing		X						X
TOTALS	9	8	0	1	1	0	6	16

[a] In 1993 only 15 individual companies participated in the Kodiak Management Area commercial salmon fisheries. Two companies operated more than one shorebased processing plant, and two companies operated both shorebased and floating processors. The total number of salmon processing locations in the KMA in 1993 was 19.

Table 28. Preliminary commercial salmon harvest and value, by gear type, in the Kodiak Management Area, 1993.

	Chinook[a]	Sockeye[a]	Coho[a]	Pink[a]	Chum[a]	Total	Percent
Purse Seine							
Total #	37,802	2,972,343	246,317	31,715,891	449,104	35,421,457	90.04
Avg. Wt.	11.94	5.12	6.60	3.08	5.95		
Total Lbs.	451,544	15,224,464	1,626,495	97,743,160	2,671,231	117,716,894	87.21
Avg. $/Lb.	0.50	0.80	0.50	0.12	0.25		
Ex-Vessel $	225,772.00	12,179,571.20	813,247.50	11,729,179.20	667,807.75	25,615,577.65	77.84
# of Permits= 324							
Average Value	696.83	37,591.27	2,510.02	36,201.17	2,061.14	79,060.42	
Percent	0.88	47.55	3.17	45.79	2.61	100.00	
Beach Seine							
Total #	82	774	546	127,078	1,140	129,620	0.33
Avg. Wt.	21.06	4.78	8.57	3.23	6.25		
Total Lbs.	1,727	3,696	4,681	410,528	7,127	427,759	0.32
Avg. $/Lb.	0.50	0.80	0.50	0.12	0.25		
Ex-Vessel $	863.50	2,956.80	2,340.50	49,263.36	1,781.75	57,205.91	0.17
# of Permits= 9							
Average Value	95.94	328.53	260.06	5,473.71	197.97	6,356.21	
Percent	1.51	5.17	4.09	86.12	3.11	100.00	
Set Gillnet							
Total #	4,315	1,403,153	66,524	2,176,421	138,084	3,788,497	9.63
Avg. Wt.	11.53	5.14	7.12	3.79	6.12		
Total Lbs.	49,766	7,215,549	473,440	8,256,534	844,824	16,840,113	12.48
Avg. $/Lb.	0.50	0.80	0.50	0.12	0.25		
Ex-Vessel $	24,883.00	5,772,439.20	236,720.00	990,784.08	211,206.00	7,236,032.28	21.99
# of Permits= 176							
Average Value	141.38	32,797.95	1,345.00	5,629.46	1,200.03	41,113.82	
Percent	0.34	79.77	3.27	13.69	2.92	100.00	
Total All Gear							
Total #	42,199	4,376,270	313,387	34,019,390	588,328	39,339,574	100.00
Avg. Wt.	11.92	5.13	6.72	3.13	5.99		
Total Lbs.	503,037	22,443,709	2,104,616	106,410,222	3,523,182	134,984,766	100.00
Avg. $/Lb.	0.50	0.80	0.50	0.12	0.25		
Ex-Vessel $	251,518.50	17,954,967.20	1,052,308.00	12,769,226.64	880,795.50	32,908,815.84	100.00
% of Total Value	0.76	54.56	3.20	38.80	2.68		100.00
Test Fishery							
Total #	0	1,418	0	30	3	1,451	
Avg. Wt.	0.00	4.86	0.00	3.90	7.00		
Total Lbs.	0	6,897	0	117	21	7,035	
Avg. $/Lb.	0.50	0.80	0.50	0.12	0.25		
Ex-Vessel $	0.00	5,517.60	0.00	14.04	5.25	5,536.89	

[a] Numbers and pounds of fish are derived from fish ticket summaries. There were 21,594 fish tickets generated in 1993; each fish ticket represents a "landing". Each gear type had the following number of landings: Purse Seine: 12,730, Beach Seine: 165, and Set Gillnet: 8,668. Average $/lb. figures are based on inseason estimated average prices and do not reflect additional payments which might be made for dock deliveries or any postseason settlements.

Table 29. Salmon average weights and average price per pound, by species, from commercial salmon fisheries of the Kodiak Management Area, 1988-1993.

	Chinook	Sockeye	Coho	Pink	Chum
1988					
Avg. Wt.	13.22	5.73	8.47	3.78	8.89
Avg.$/lb.[a]	$1.45	$2.71	$1.28	$0.81	$1.13
1989					
Avg. Wt.	19.22	5.53	9.40	3.57	8.75
Avg.$/lb.[a]	$1.17	$1.79	$0.65	$0.37	$0.39
1990					
Avg. Wt.	12.19	5.20	8.23	3.18	7.69
Avg.$/lb.[a]	$1.03	$1.55	$0.77	$0.33	$0.50
1991					
Avg. Wt.	12.14	5.11	7.26	2.92	6.98
Avg.$/lb.[b]	$0.70	$0.80	$0.30	$0.12	$0.20
1992[c]					
Avg. Wt.	14.31	5.68	8.18	3.75	7.25
Avg.$/lb.	$1.25	$1.40	$0.60	$0.15	$0.40
1993[c]					
Avg. Wt.	11.92	5.13	6.72	3.13	5.99
Avg.$/lb.	$0.50	$0.80	$0.50	$0.12	$0.25

[a] Average price information from CFEC, based on Processor's end of season reports (includes postseason adjustments and bonuses).

[b] Average price listed is an estimate based on inseason reports from processors and fishermen and does not include postseason settlement or dock delivery bonuses.

[c] Preliminary information.

Table 30. Average weight and total harvest of sockeye salmon from the commercial fisheries of the Kodiak Management Area, 1969 - 1993.

YEAR	AVERAGE WEIGHT[a]	HARVEST[b]
1969	5.4	591,481
1970	6.0	917,045
1971	6.4	478,479
1972	5.9	222,800
1973	6.5	167,341
1974	6.3	418,761
1975	6.1	136,418
1976	6.3	641,484
1977	6.8	623,468
1978	6.4	1,071,782
1979	6.1	631,735
1980	5.4	651,394
1981	5.8	1,288,980
1982	6.0	1,204,793
1983	5.8	1,231,989
1984	5.7	1,950,439
1985	4.7	1,843,185
1986	5.8	3,188,269
1987	6.3	1,792,819
1988	5.7	2,698,637
1989	5.5	2,529,068
1990	5.2	5,248,339
1991	5.5	5,704,041
1992[c]	5.7	4,167,877
1993[c]	5.1	4,377,688

[a] Weight in pounds. Data from Kodiak Management Area Annual Reports.
[b] Harvest in number of fish.
[c] Preliminary data.

Table 31. Estimated salmon harvest and value by gear type in the Kodiak Management Area, 1970-1993.

Year	Total Catch[a]	Total Value[b]	Average Exvessel Value		
			Purse Seine	Beach Seine	Set Net
1970	13,949,206	$21,658,000	$41,880	$10,470	$21,083
1971	6,378,179	4,973,000	13,397	2,919	3,015
1972	3,883,197	3,909,000	9,233	647	1,451
1973	1,001,343	2,094,000	5,075	251	852
1974	3,329,427	4,808,000	15,993	4,406	4,828
1975	3,187,410	3,831,000	13,300	5,600	3,849
1976	12,484,451	16,976,000	43,017	11,035	14,481
1977	7,976,691	18,873,142	46,942	12,107	19,117
1978	16,942,215	30,357,179	70,685	14,772	22,711
1979	12,420,260	22,958,317	51,263	20,348	23,363
1980	19,157,249	27,410,296	62,363	23,385	21,215
1981	13,094,099	32,647,230	79,877	26,946	34,785
1982	10,891,952	18,803,822	39,309	11,038	28,889
1983	7,081,976	13,405,578	30,239	5,918	16,689
1984	13,678,005	25,948,012	71,550	12,341	26,552
1985	9,897,903	20,428,111	57,782	8,405	27,517
1986	16,304,165	38,723,877	92,696	11,885	68,700
1987	7,746,980	31,107,864	79,814	15,664	41,163
1988	19,009,757	103,816,936	252,403	47,017	119,013
1989[c]	26,455,944	61,046,024	146,502	28,288	72,955
1990	12,122,389	52,611,853	113,326	10,424	66,715
1991	23,723,008	37,018,734	77,509	5,257	53,817
1992[d]	8,462,464	40,495,222	98,086	5,436	41,984
1993[d]	39,341,188	32,908,816	79,060	6,356	41,114
Average 1970-1993:	13,413,882	$28,991,730	$69,187	$13,083	$33,733
Average 1970-1979:	8,155,238	$13,043,764	$31,079	$8,256	$11,475
Average 1980-1988[e]:	12,984,676	$34,699,081	$85,115	$18,067	$42,725
Average 1990-1993:	20,912,262	$40,758,599	$91,995	$6,868	$50,907

[a] Includes total commercial harvest, test fisheries, and Kitoi Hatchery cost recovery fishery harvests. These figures are in number of fish.

[b] 1970-1976, 1992 and 1993 values are exvessel values based upon inseason prices. They may not include additional value associated with dock deliveries or postseason settlements. 1977-1988 and 1990-1991 values are from Commercial Fisheries Entry Commission reports.

[c] Actual harvest was limited in 1989 due to fishery closures caused by the presence of oil from the Exxon Valdez spill. Harvest figures for 1989 include actual and projected harvests on wild stocks, and actual harvest of hatchery stocks from a supplemental cost recovery fishery. The 1989 total value is estimated by multiplying price information from the limited actual wild harvest (from CFEC records) by the projected total harvest had there been no oil spill. The 1989 exvessel value by gear type is estimated by using the 1988 gear levels and proportional harvest by gear type, as if a normal fishery had occurred on a normal distribution of fish.

[d] 1992 and 1993 data are preliminary, from ADF&G fish ticket summaries.

[e] 1989 data are not included in averages.

Table 32. Indexed peak salmon escapement by District and species, in the Kodiak Management Area, 1993.

District	Number of Fish					Number of Observations
	Sockeye	Pink	Chum	Coho	Chinook	
Afognak	102,589	407,757	74	26,702	3	49
Northwest	47,904	1,037,525	47,900	16,335	0	110
Southwest	943,625	131,669	1,553	28,707	21,763	19
Alitak	458,485	949,662	23,742	21,205	337	49
Eastside	96,586	873,258	63,900	22,137	0	128
Northeast	9,526	432,300	10,422	8,610	10	70
Mainland	46,725	459,410	86,790	36,300	0	68
TOTAL	1,705,440	4,291,581	234,381	159,996	22,113	493

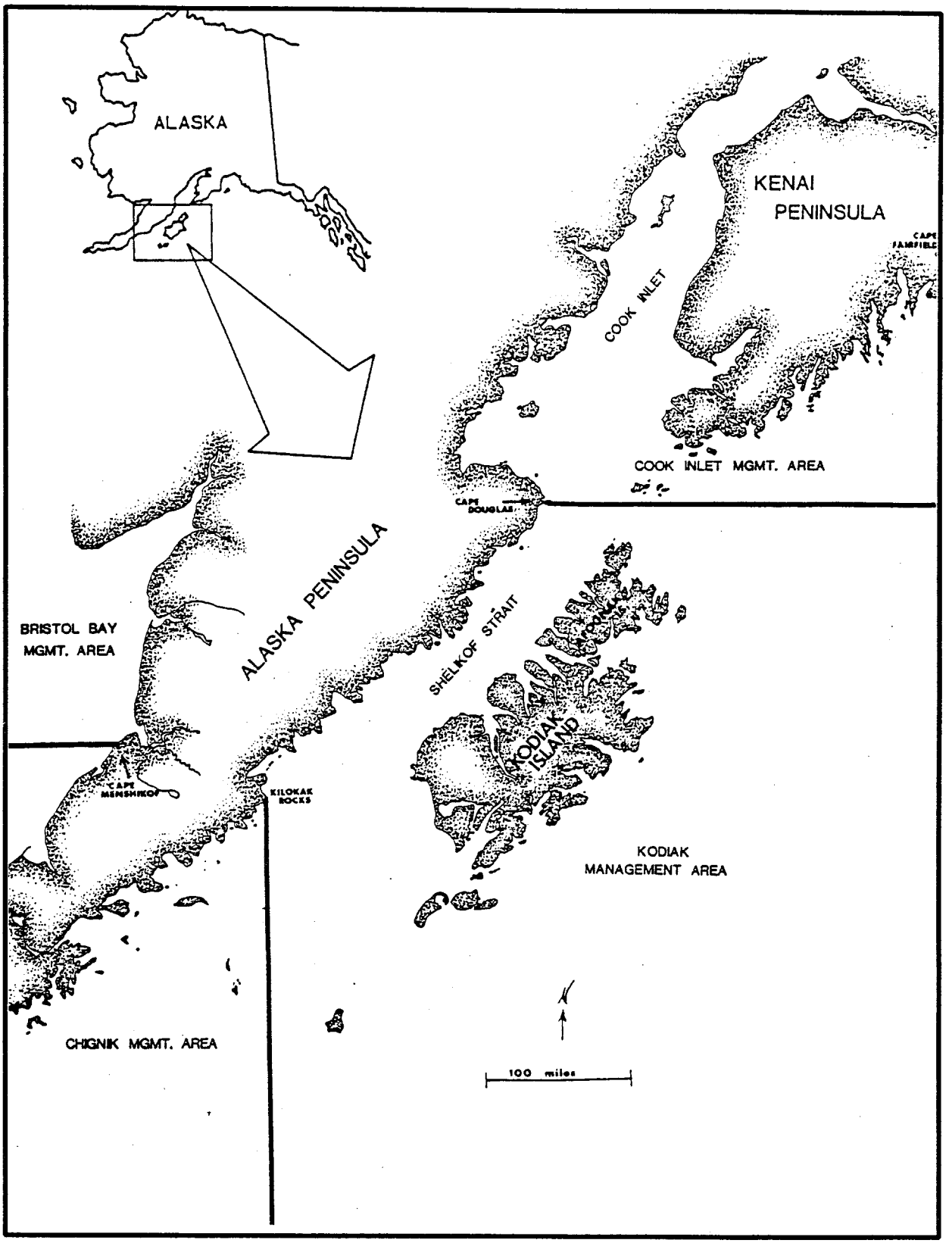


Figure 1. Location of the Kodiak Management Area, 1993.

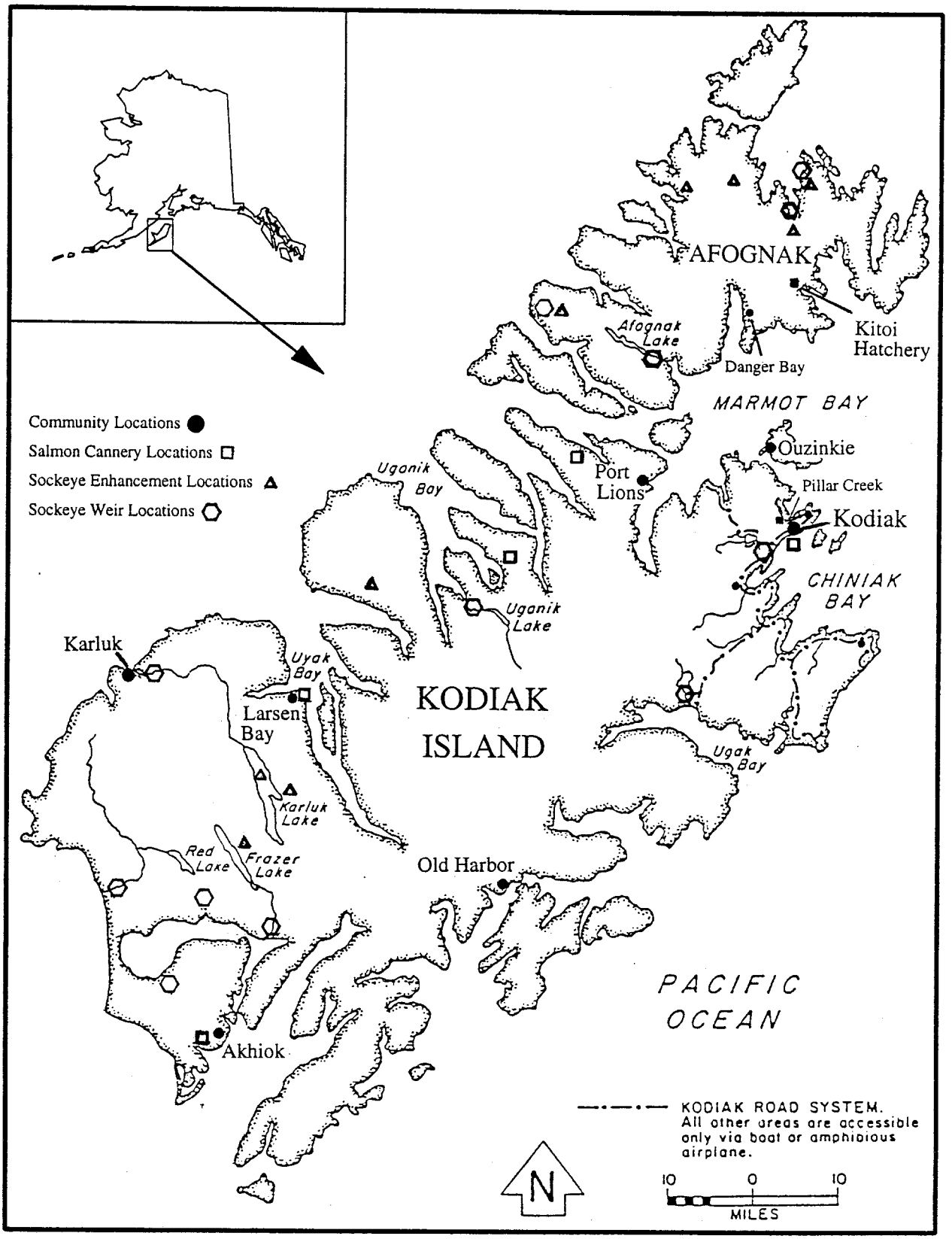


Figure 2. Map of Kodiak Island, showing communities, canneries, and sockeye salmon enhancement and weir locations, of the Kodiak Management Area, 1993.

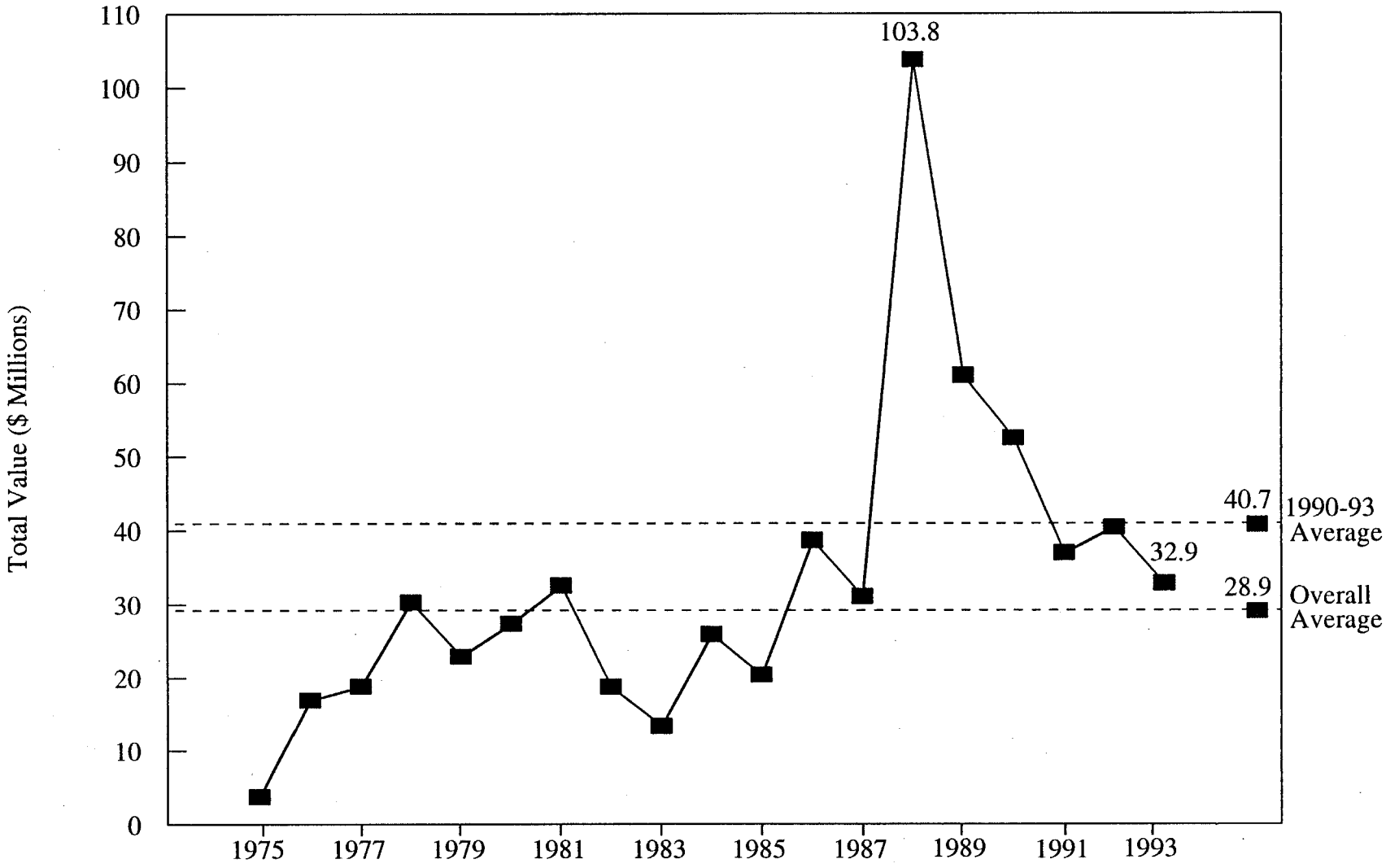


Figure 3. Average exvessel value of the commercial salmon fishery in the Kodiak Management Area, 1975 -1993.

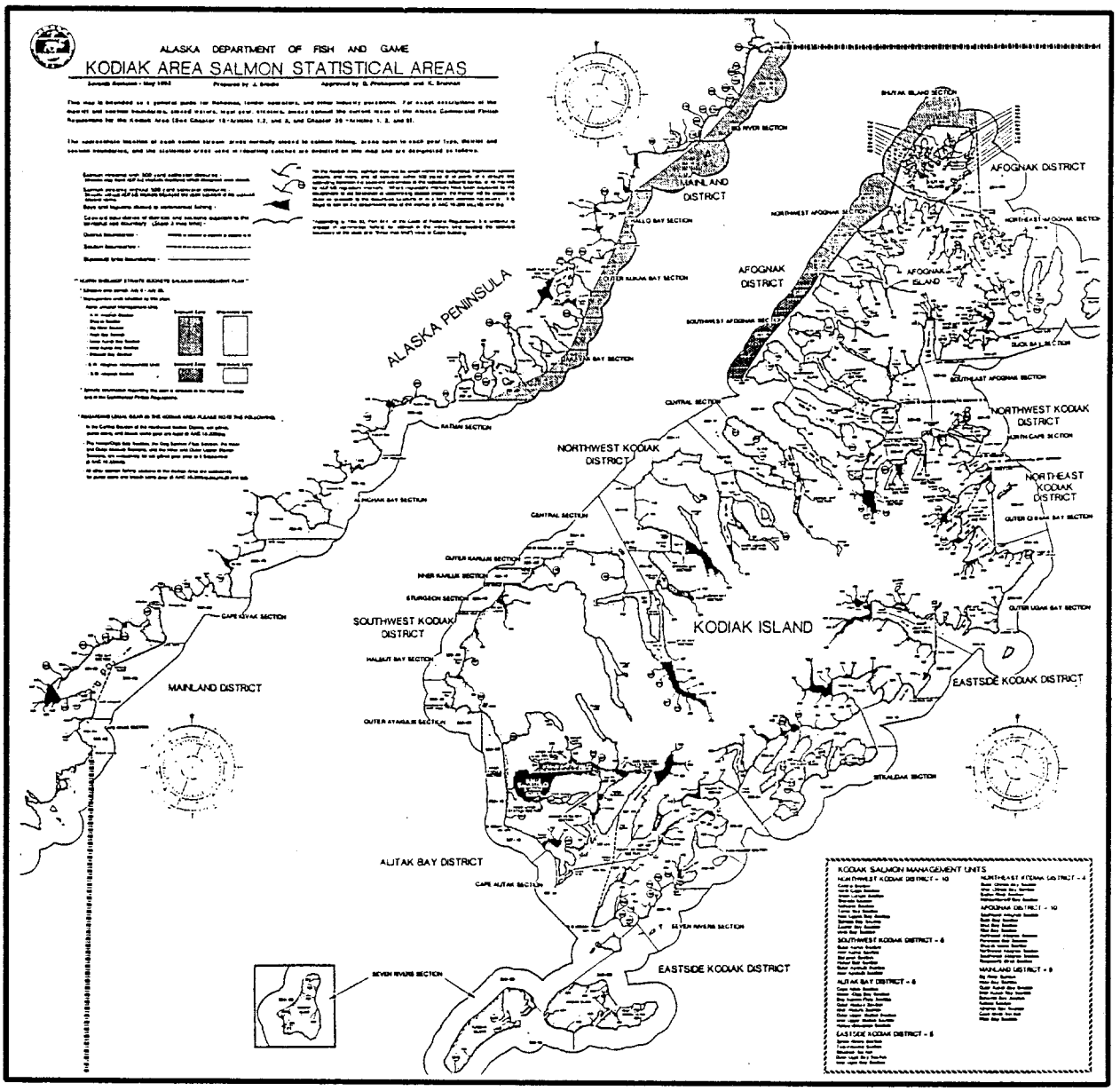


Figure 4. Salmon statistical area map for the Kodiak Management Area, 1993.

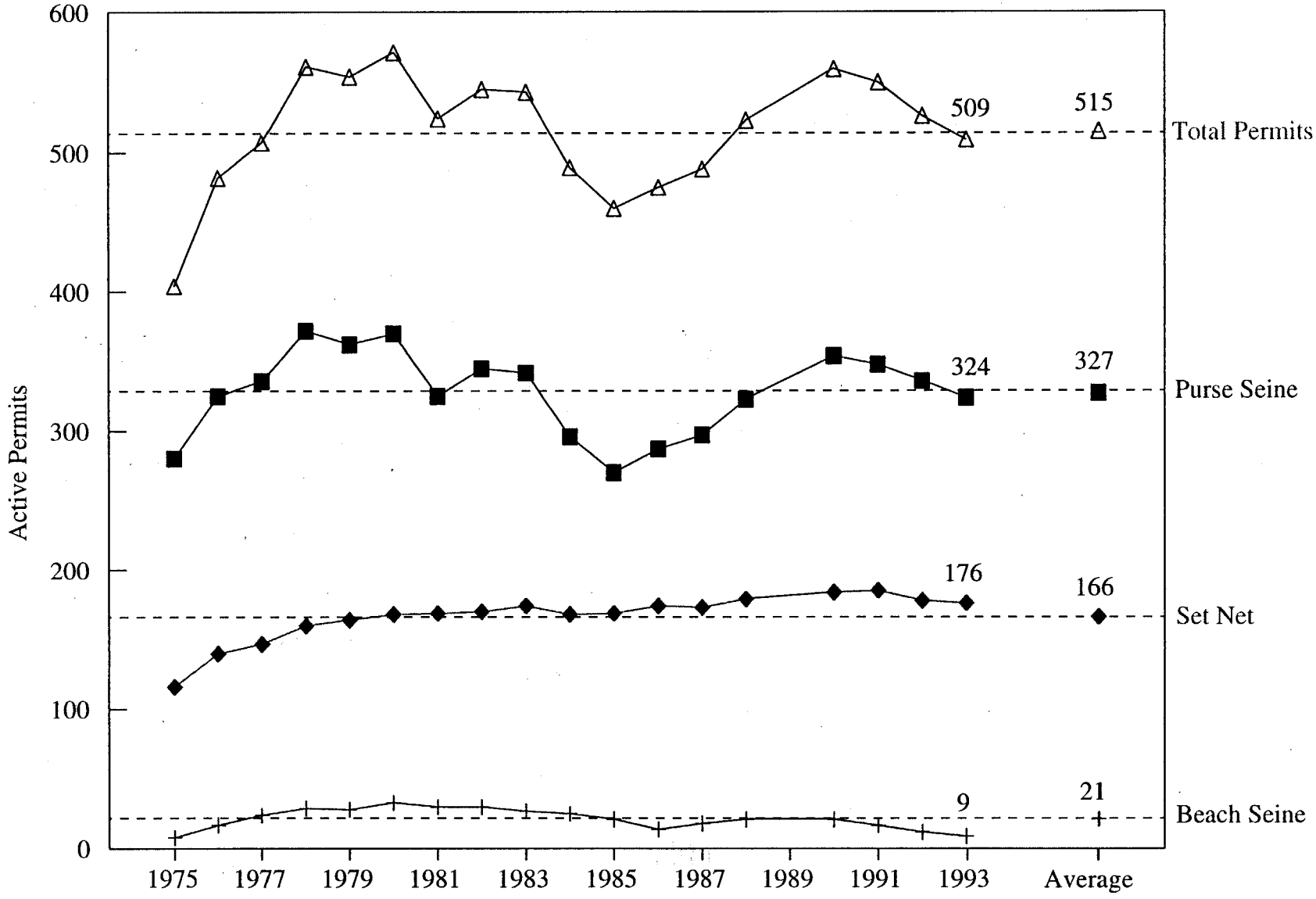
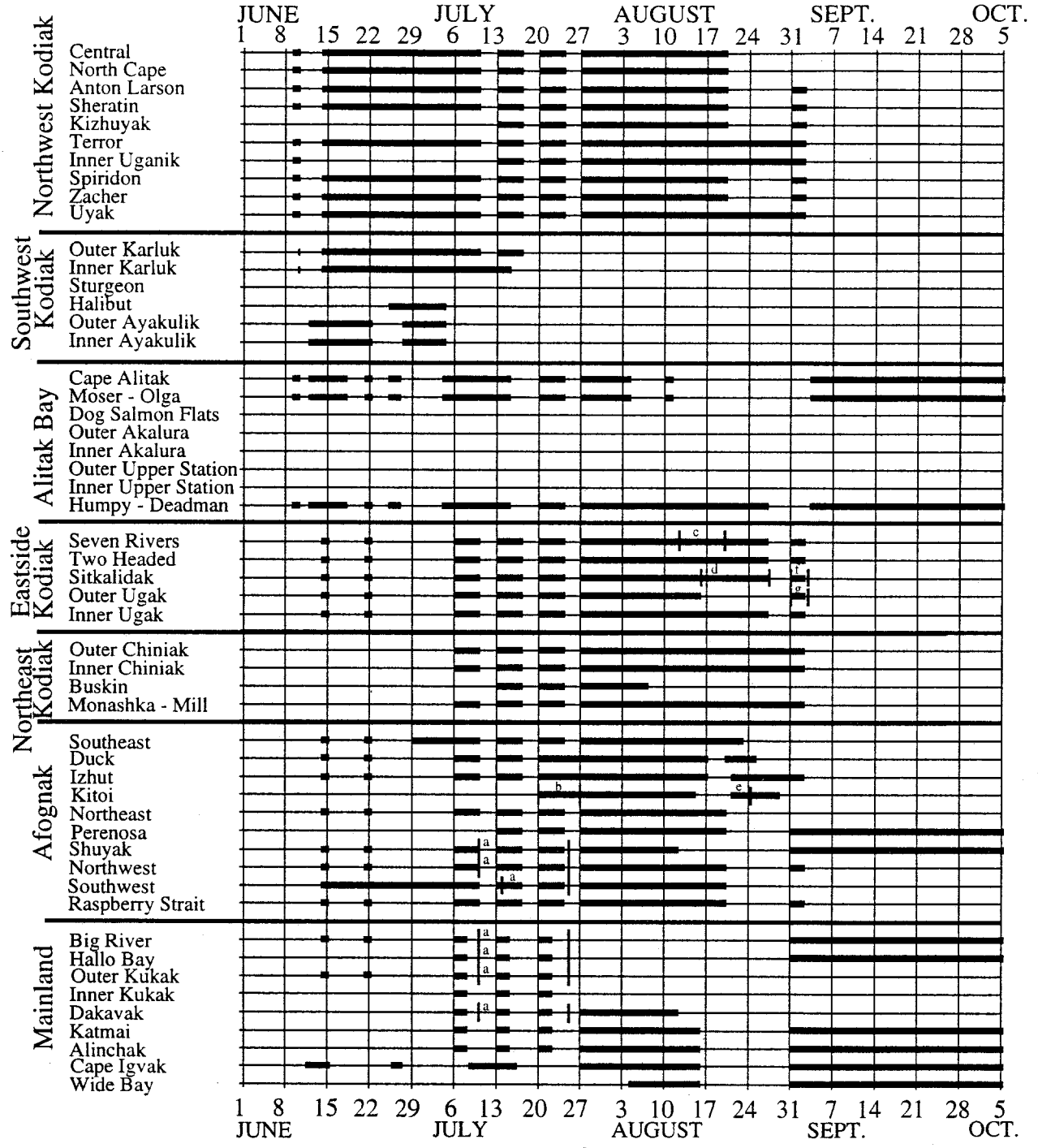


Figure 5. Number of active commercial salmon fishing permits in the Kodiak Management Area, 1975 - 1993.



BARS (▬) REPRESENT COMMERCIAL SALMON FISHERY OPENINGS

a Seaward Zones closed.

b That portion of Kitoi Section west of jaws remains closed.

c That portion of 7 Rivers Section north of 56 46' N. Lat. remains closed.

d That portion of Sitkalidak Section in Kiliuda north and east of a line from Pillar Point to Pivot Point remains closed.

e Kitoi Section west of jaws remains closed, except for 3 hour flare opener.

f That portion of Outer Ugak Section west of 152 30' W. Long. remains closed.

g That portion of Sitkalidak Section in Kiliuda north and east of a line from Pillar Point to Pivot Point remains closed.

Figure 6. Commercial salmon fishing time, by District and Section, for the Kodiak Management Area, 1993.

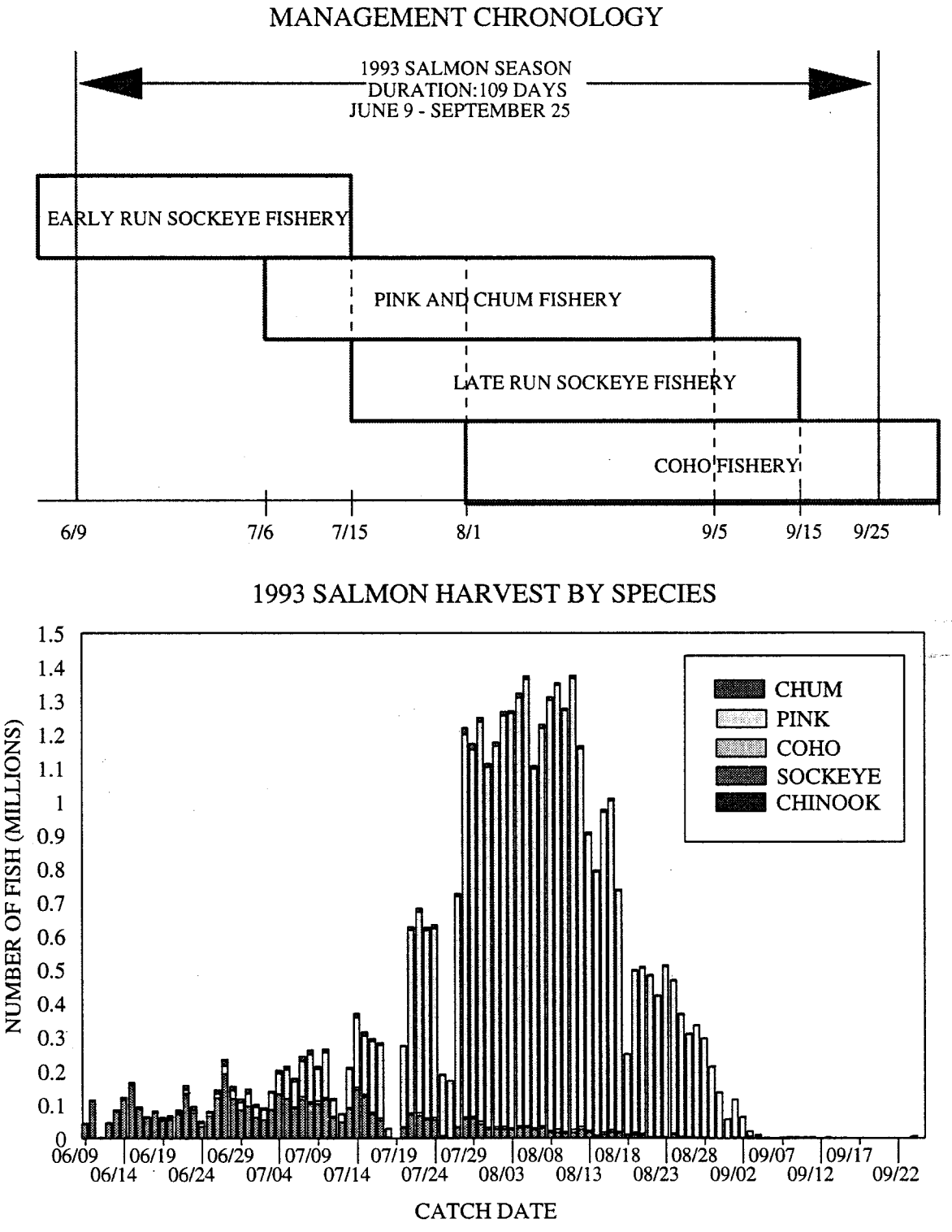


Figure 7. Fishery management and salmon run timing, general chronology of the harvest in the Kodiak Management Area, 1993.

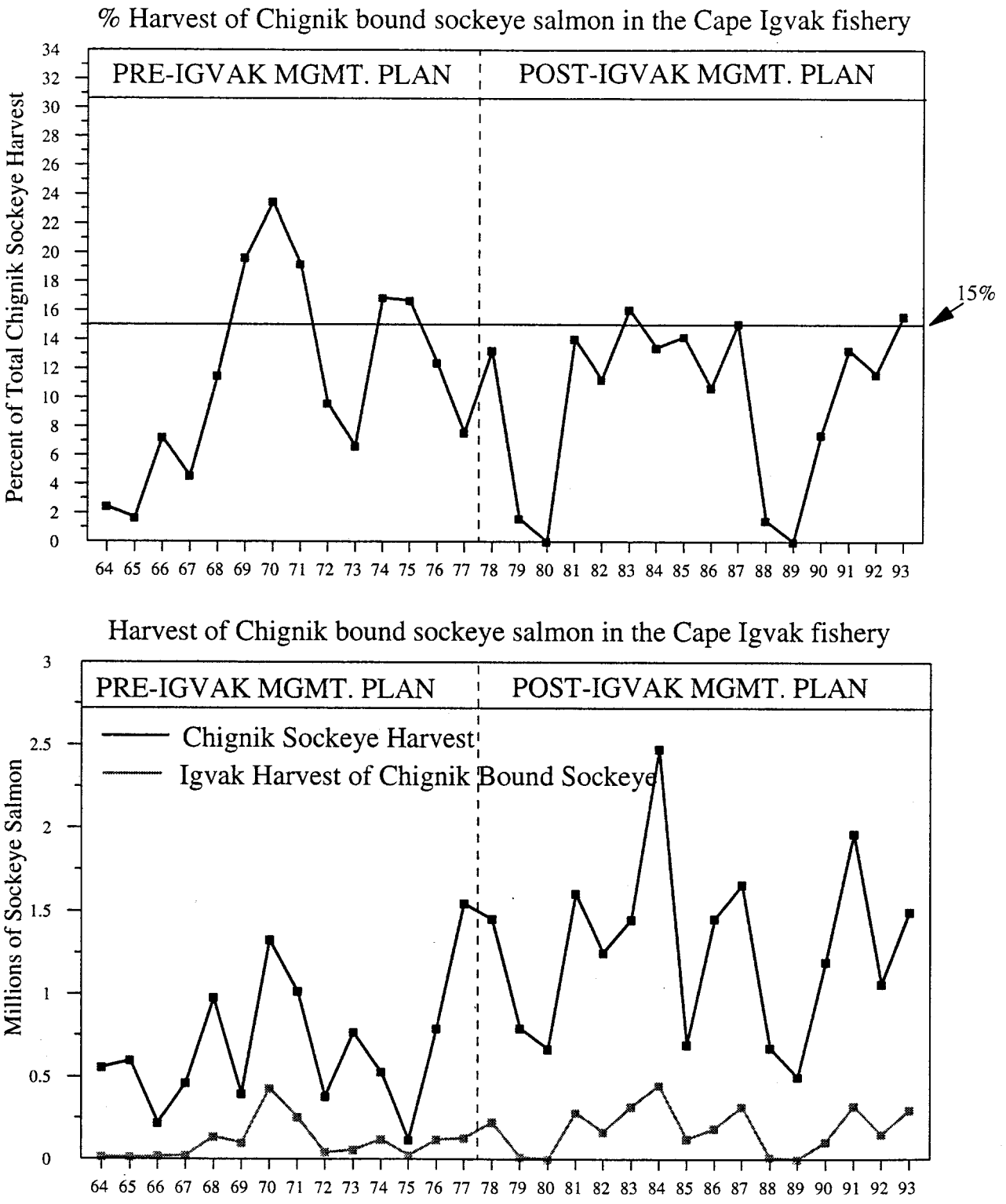


Figure 8. Impact of the Cape Igvak Management Plan on sockeye salmon harvest of the Kodiak Management Area, 1969 - 1993.

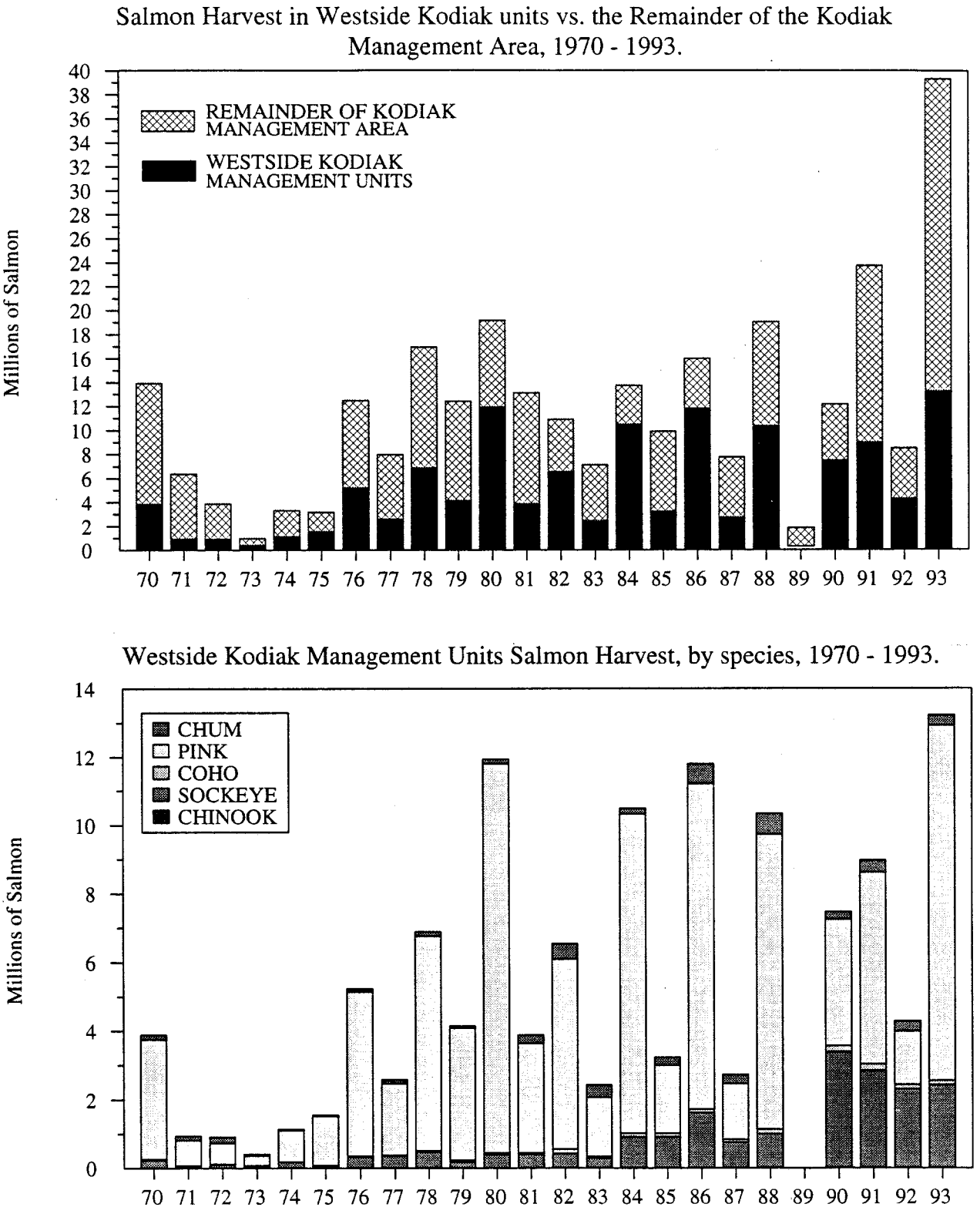


Figure 9. Salmon harvest in the Westside Kodiak Management Plan units of the Kodiak Management Area, 1970 - 1993.

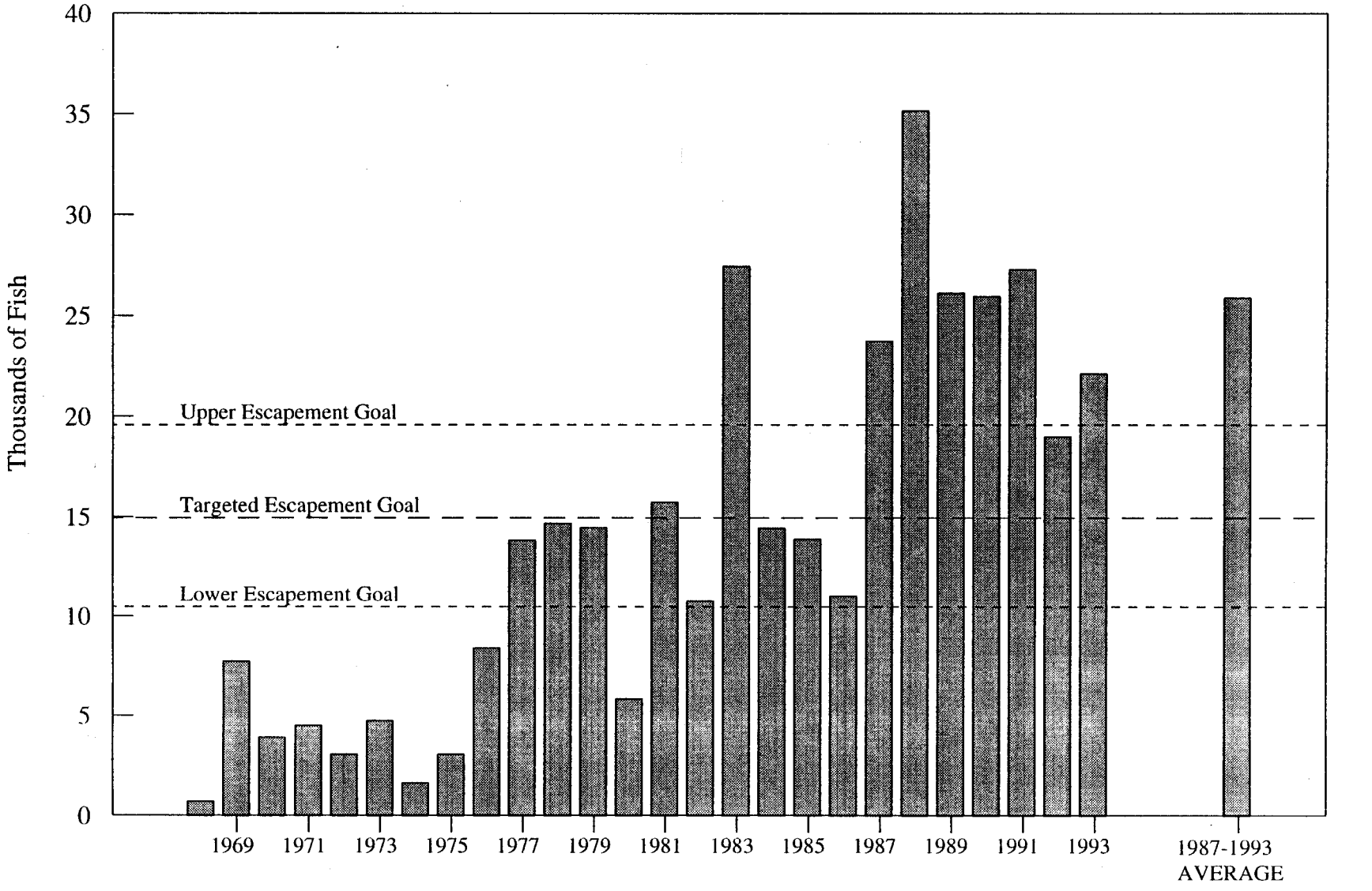


Figure 10. Chinook salmon escapement in the Kodiak Management Area, 1968 - 1993.

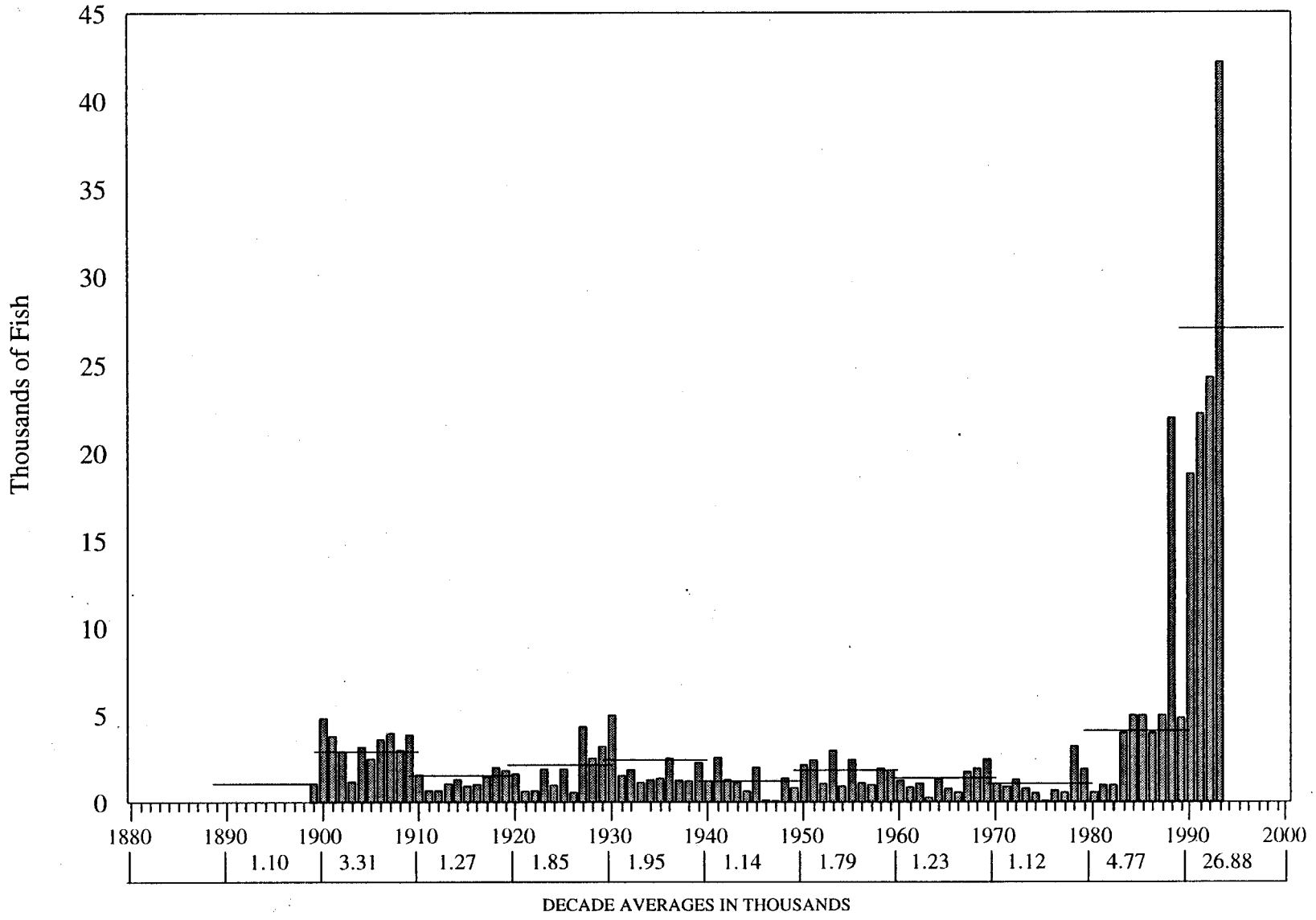


Figure 11. Chinook salmon harvest, all gear combined, in the Kodiak Management Area, 1899 - 1993.

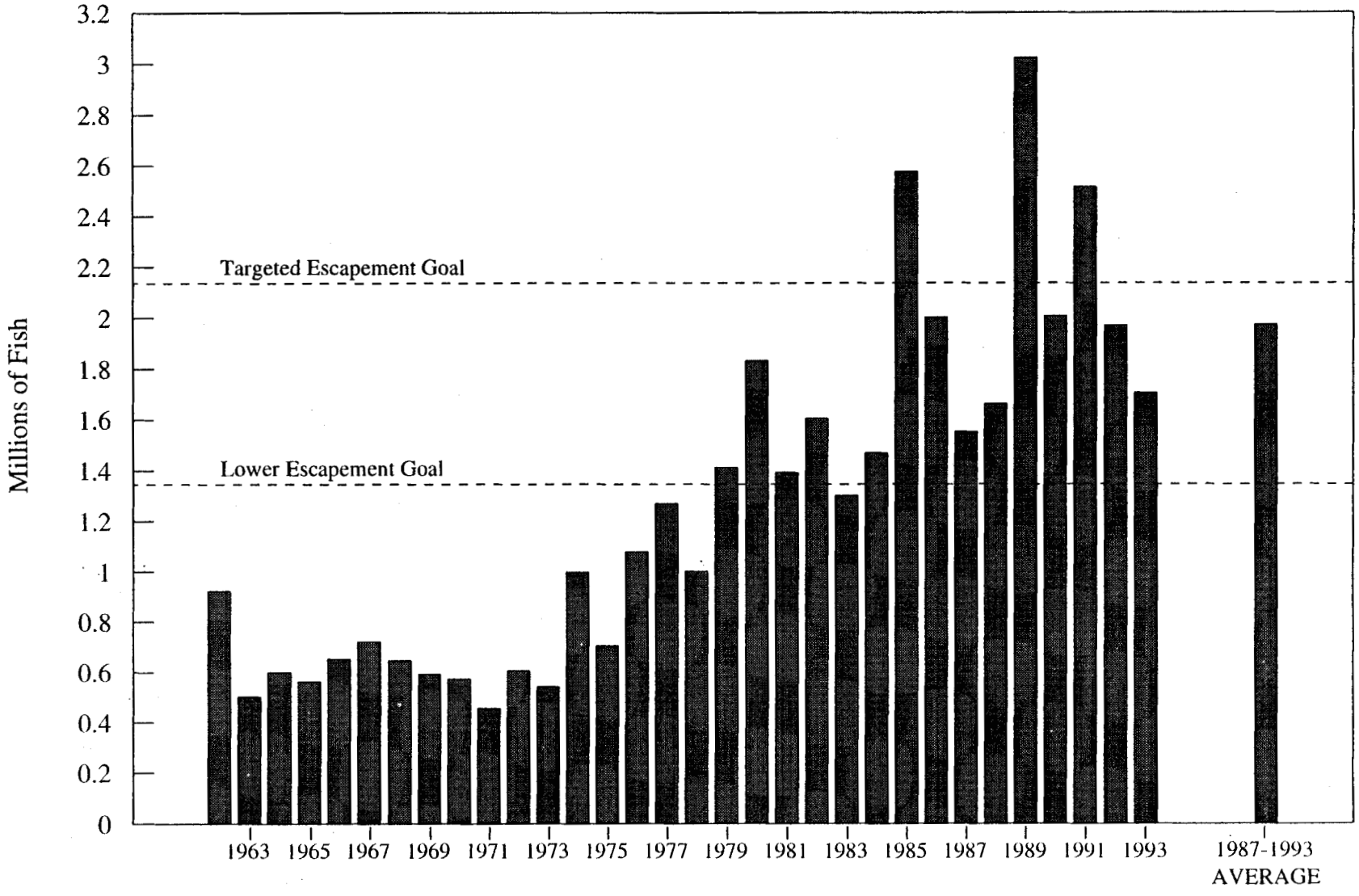


Figure 12. Sockeye salmon escapement in the Kodiak Management Area, 1962 - 1993.

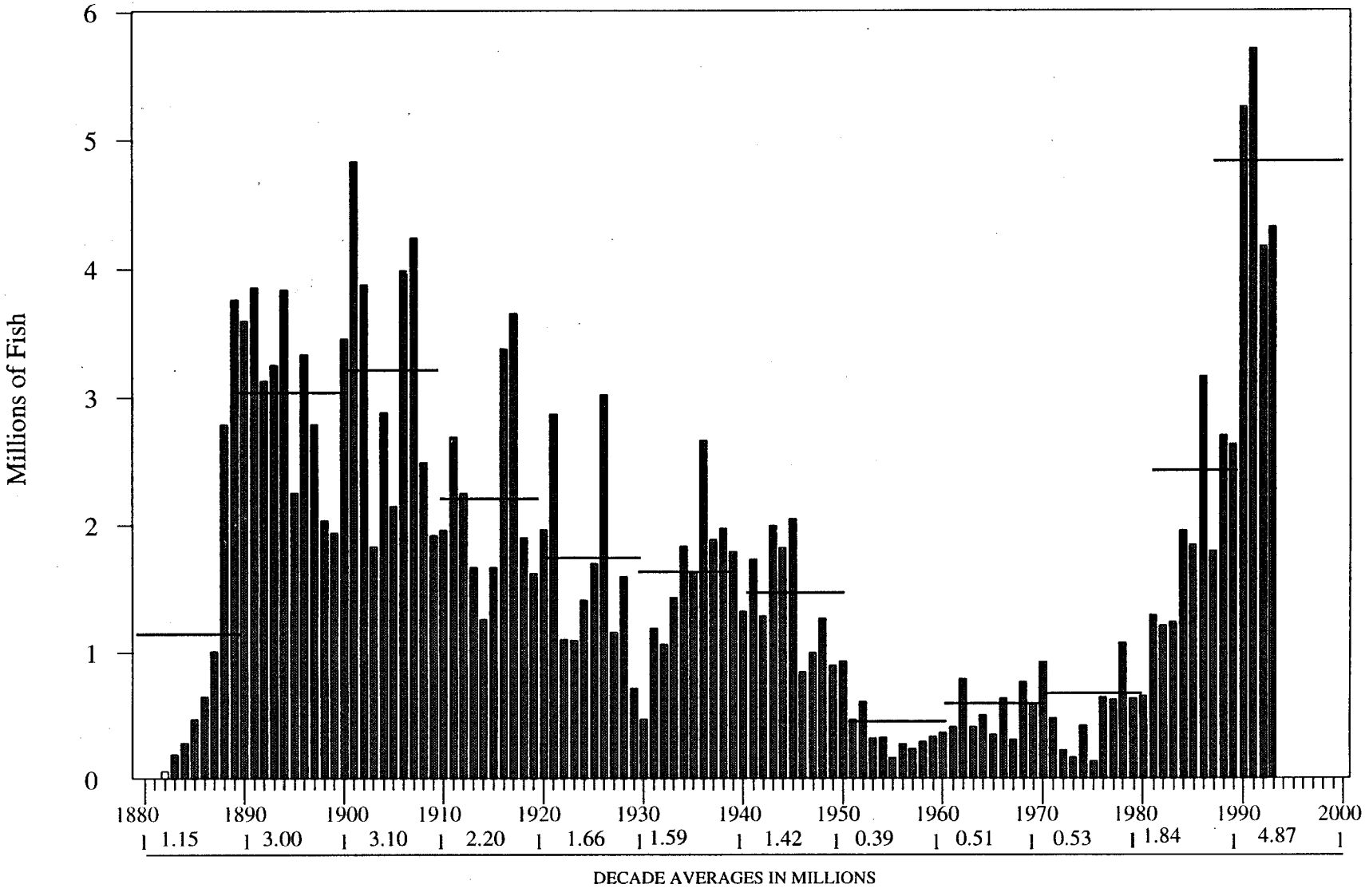


Figure 13. Sockeye salmon harvest, all gear combined, in the Kodiak Management Area, 1882 - 1993.

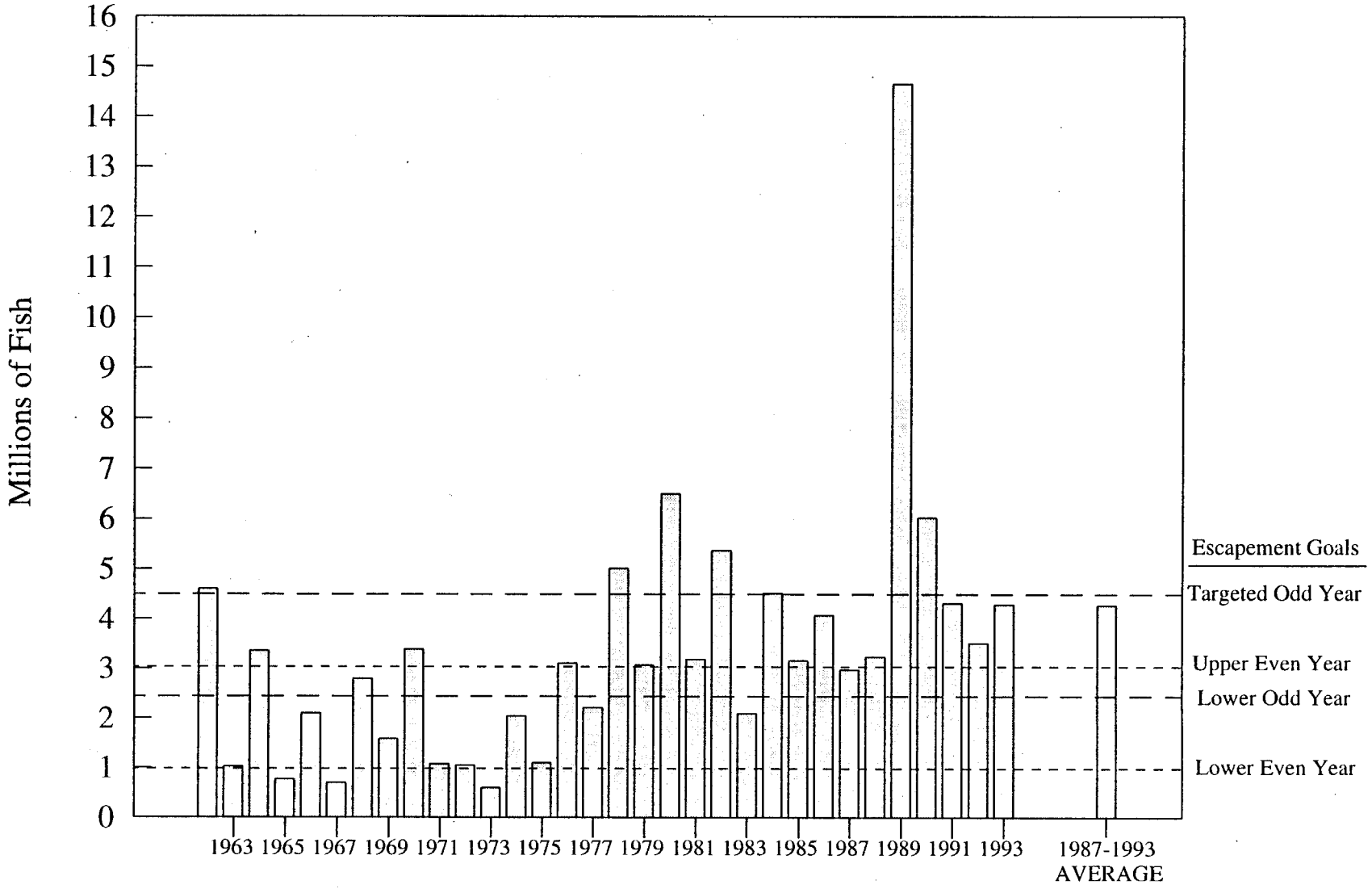


Figure 14. Pink salmon escapement in the Kodiak Management Area, 1962 - 1993.

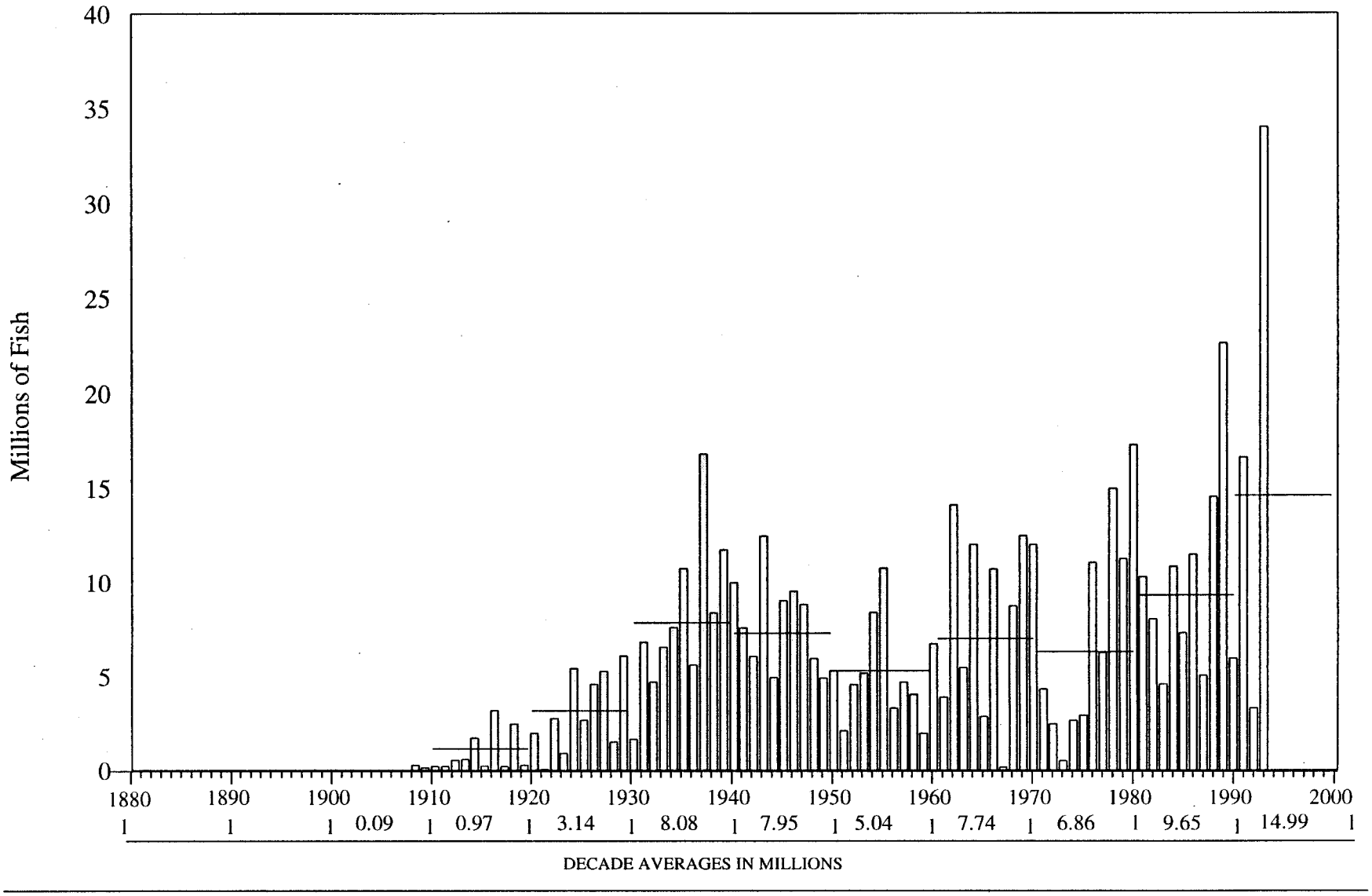


Figure 15. Pink salmon harvest, all gear combined, in the Kodiak Management Area, 1901 - 1993.

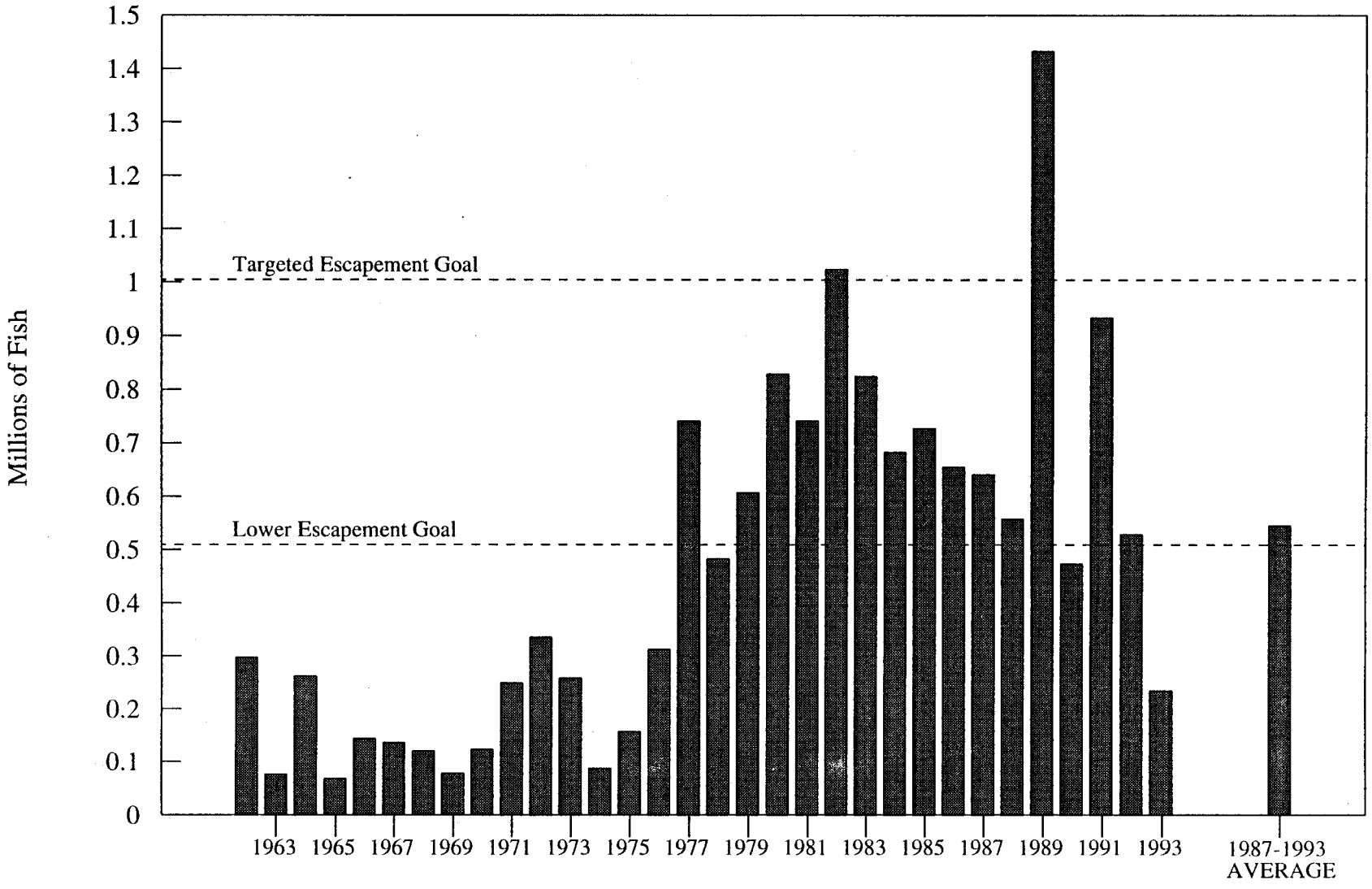


Figure 16. Chum salmon escapement in the Kodiak Management Area, 1962 -1993.

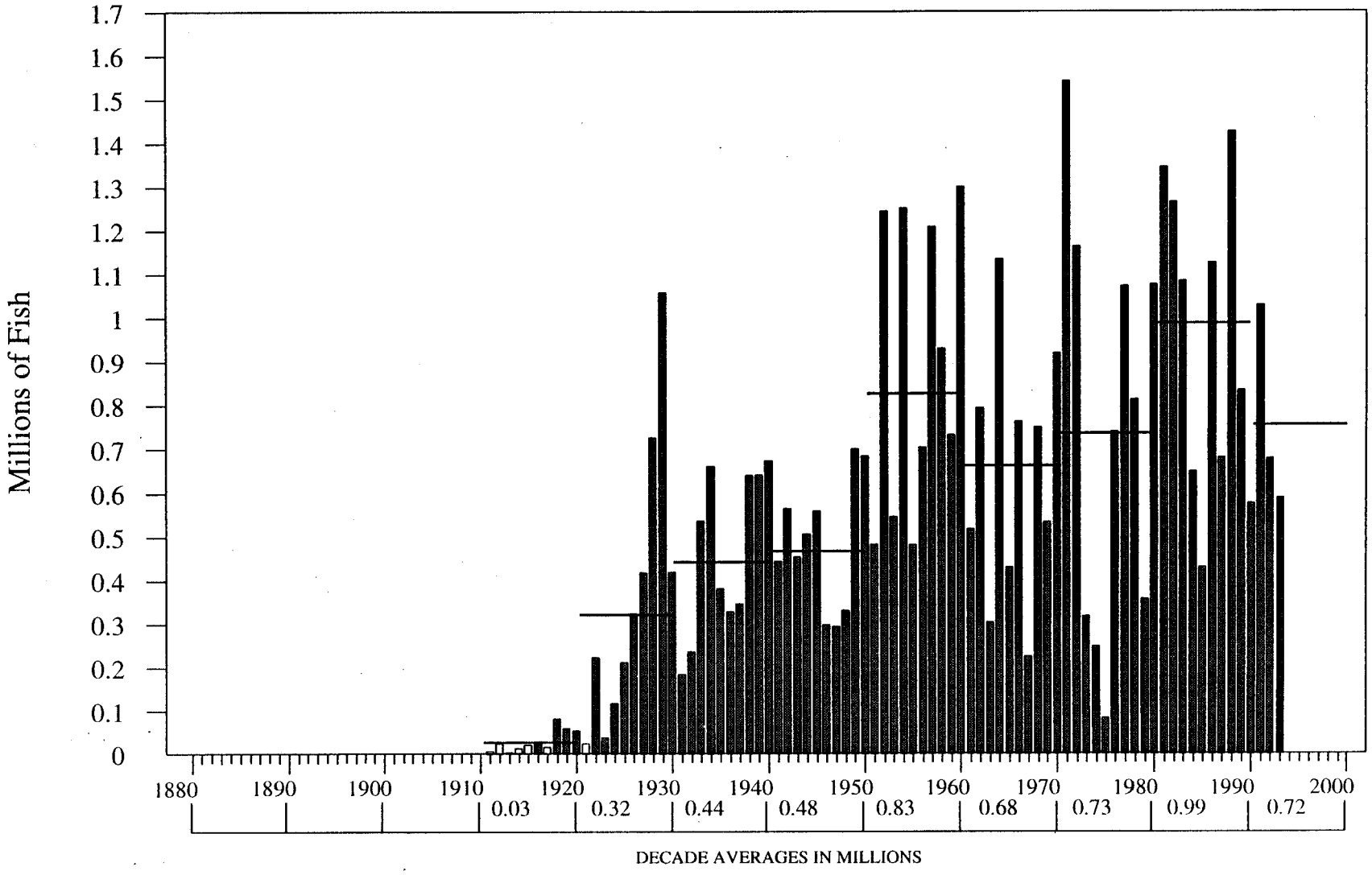


Figure 17. Chum salmon harvest, all gear combined, in the Kodiak Management Area, 1911 - 1993.

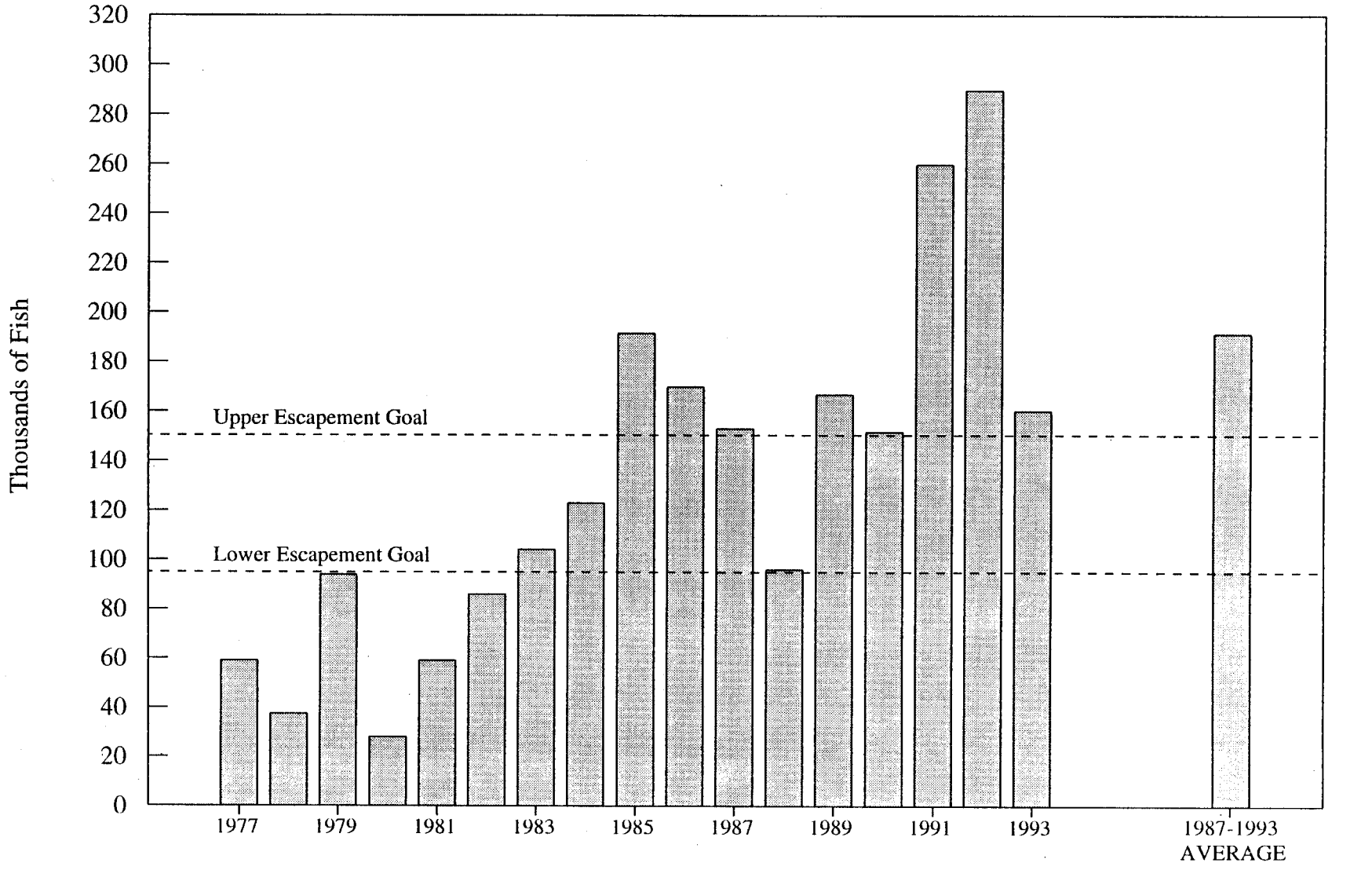


Figure 18. Coho salmon escapement in the Kodiak Management Area, 1977 - 1993.

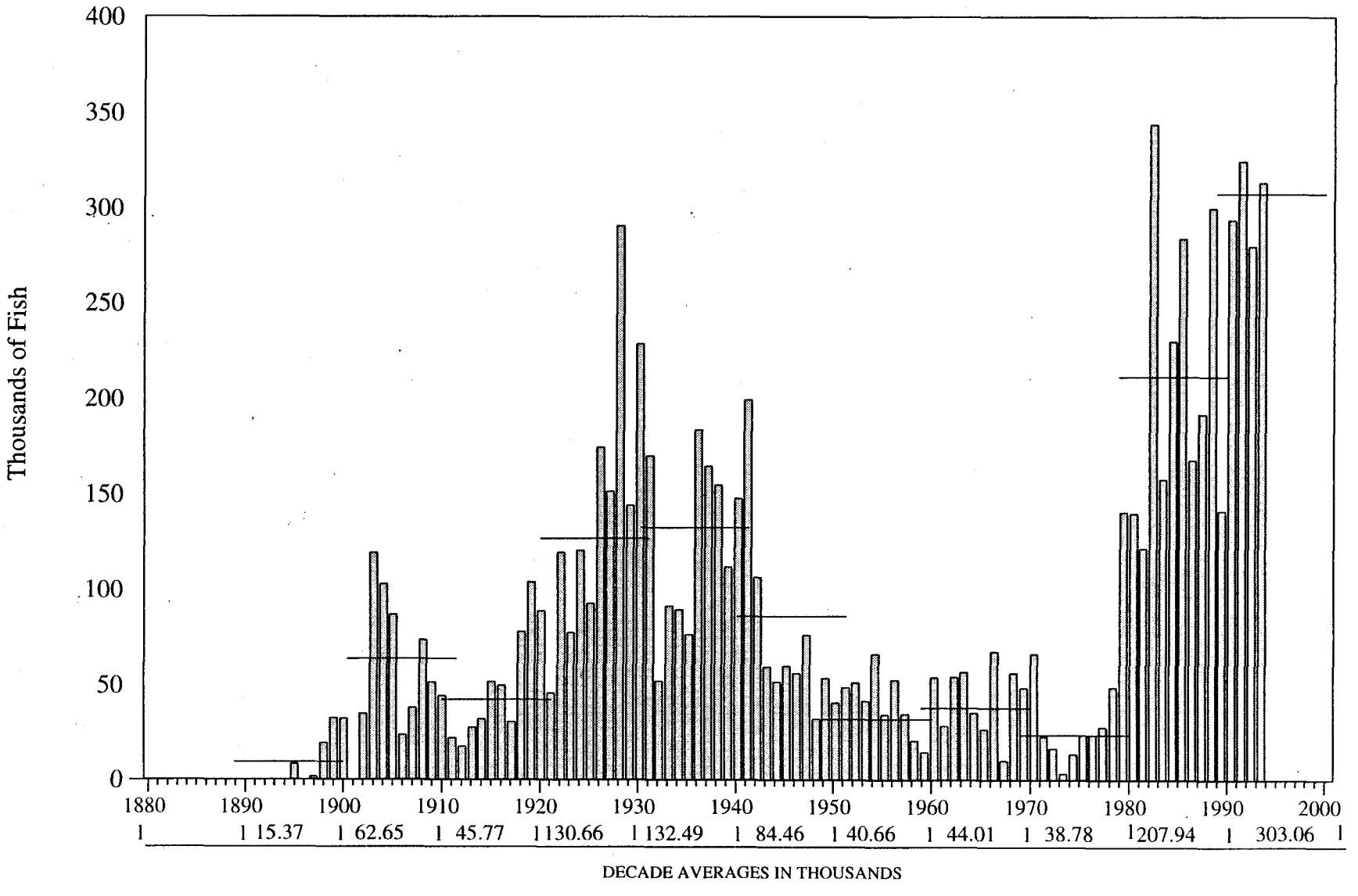
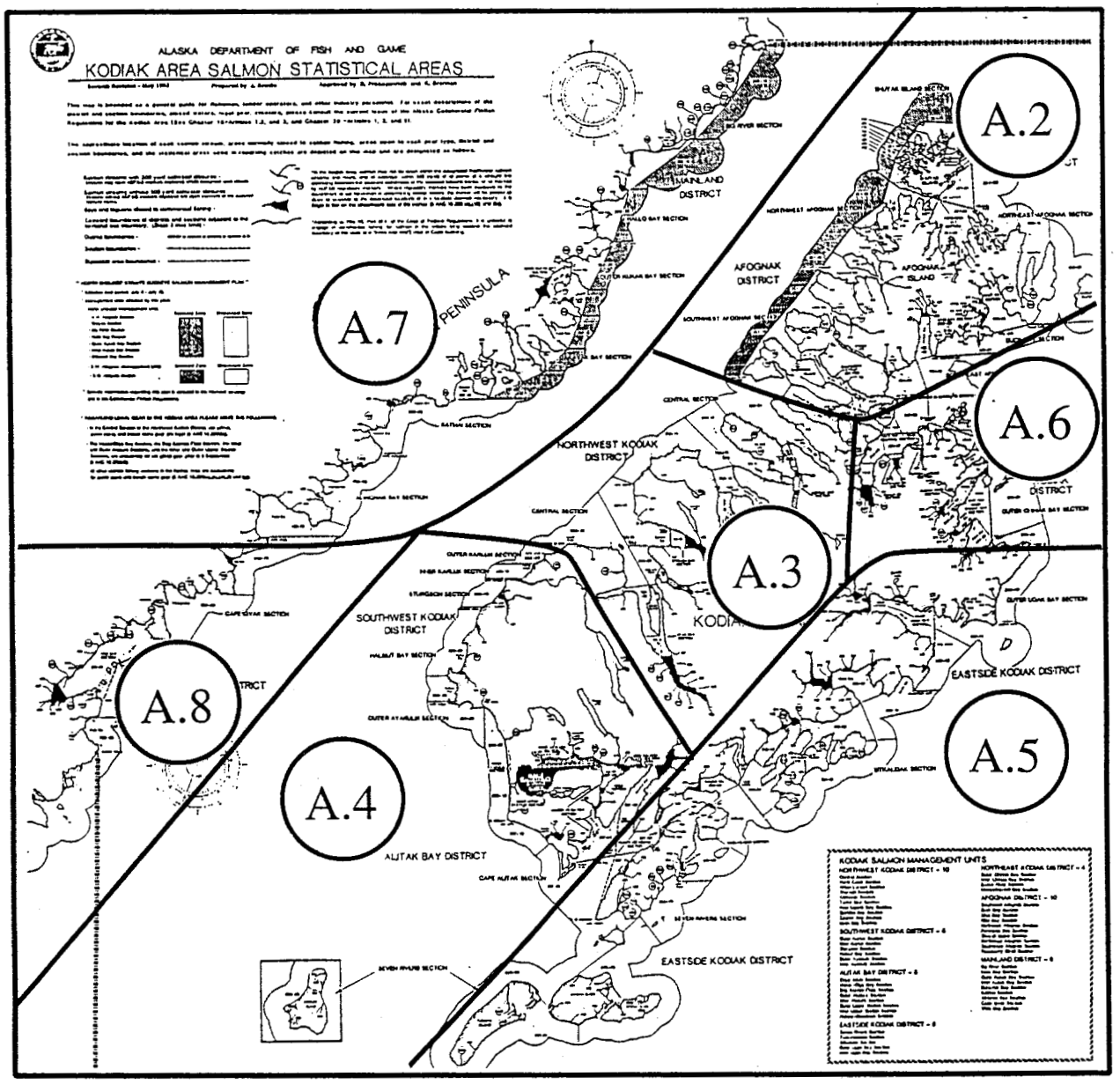
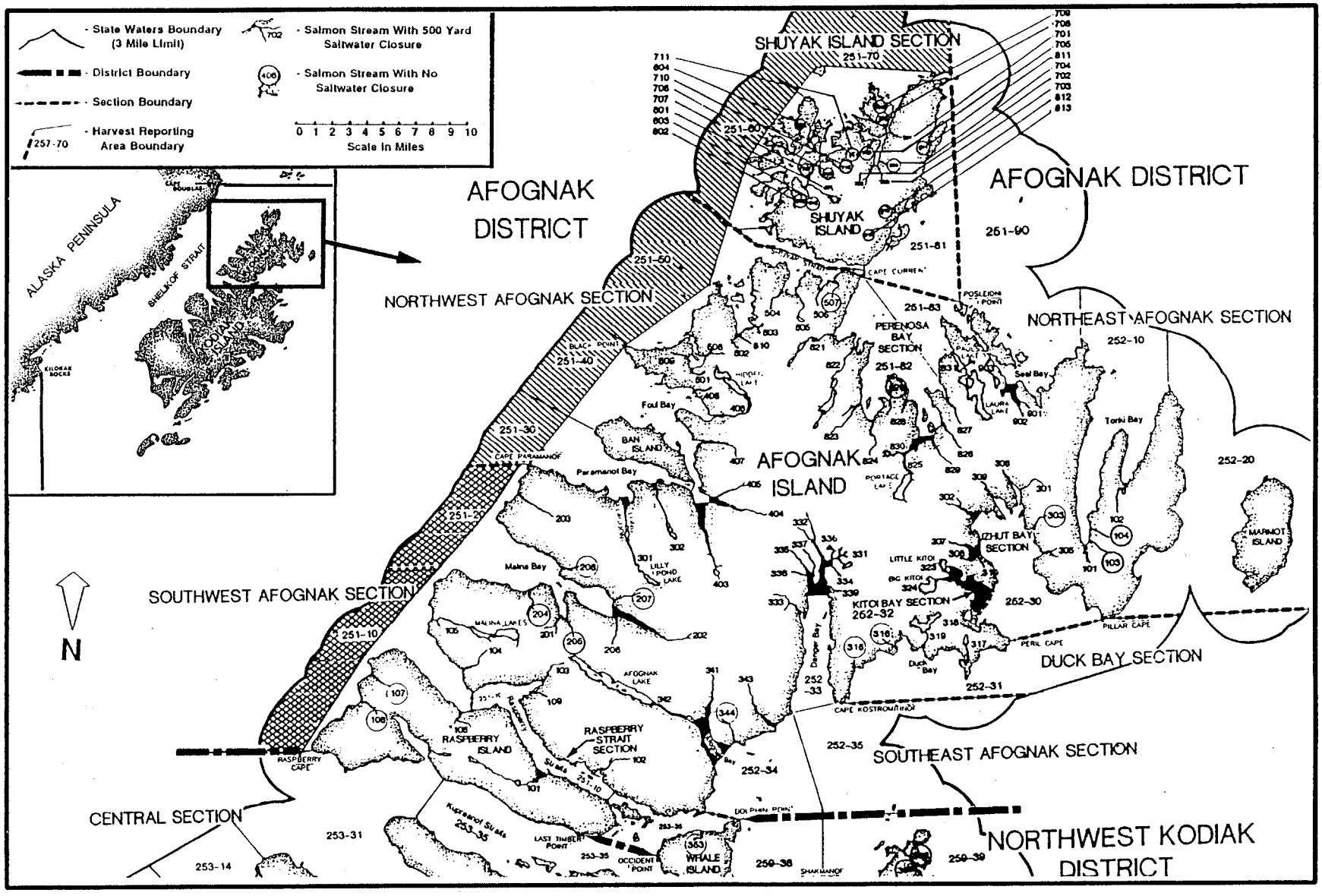


Figure 19. Coho salmon harvest, all gear combined, in the Kodiak Management Area, 1895 - 1993.

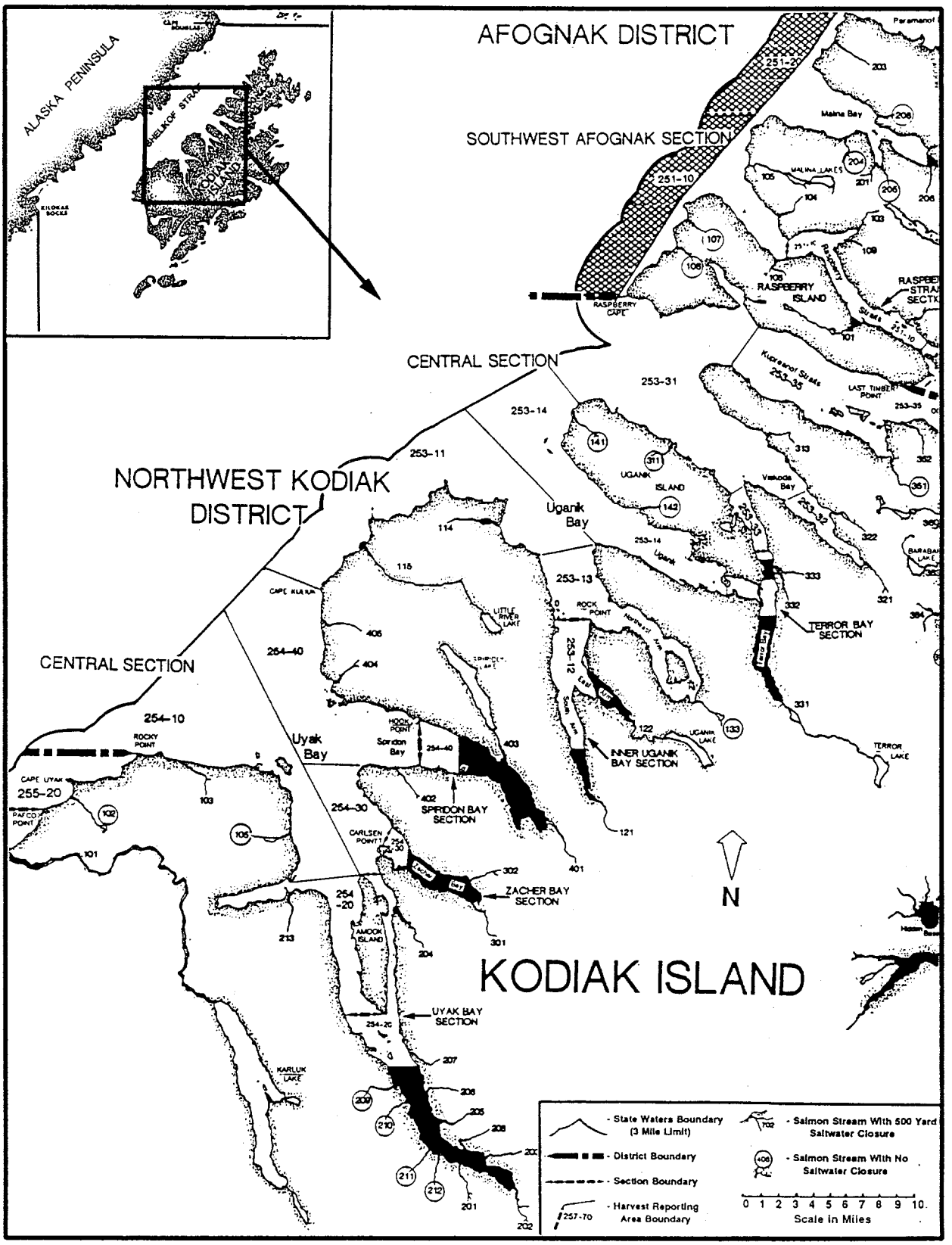
APPENDIX



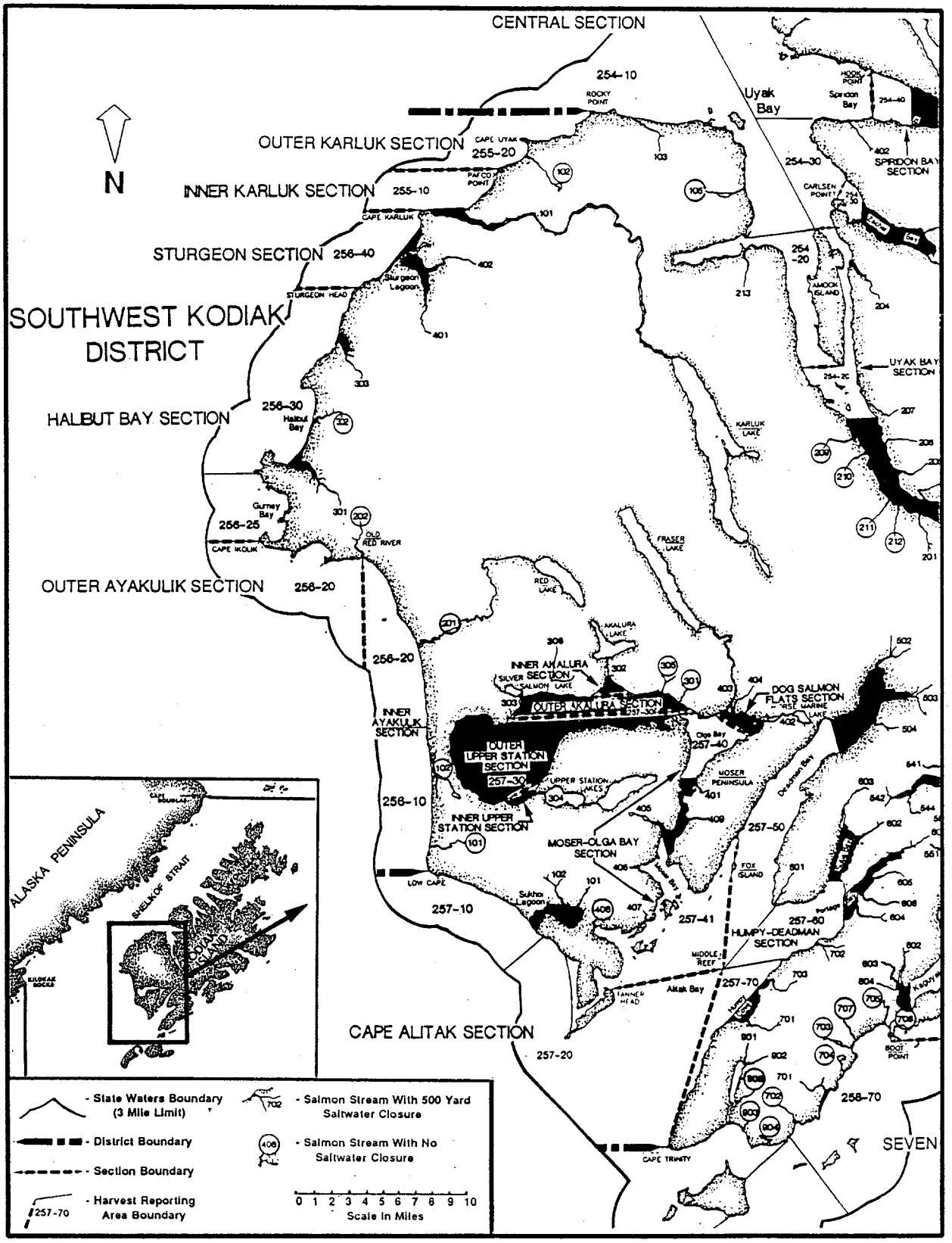
Appendix A.1. Kodiak Management Area salmon fishing district map, with key depicting Appendix number of map enlargements, 1993.



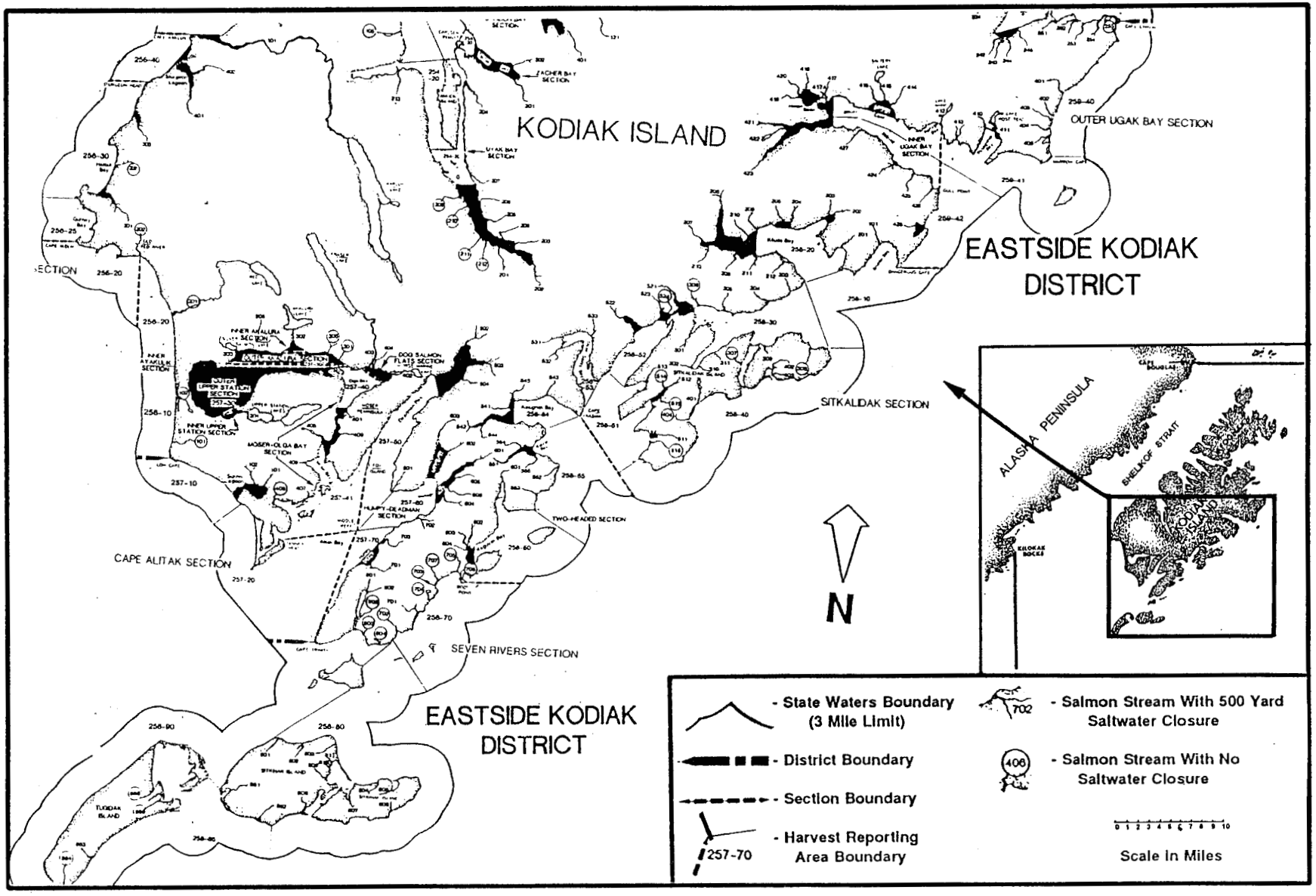
Appendix A.2. Afognak District of the Kodiak Management Area, 1993.



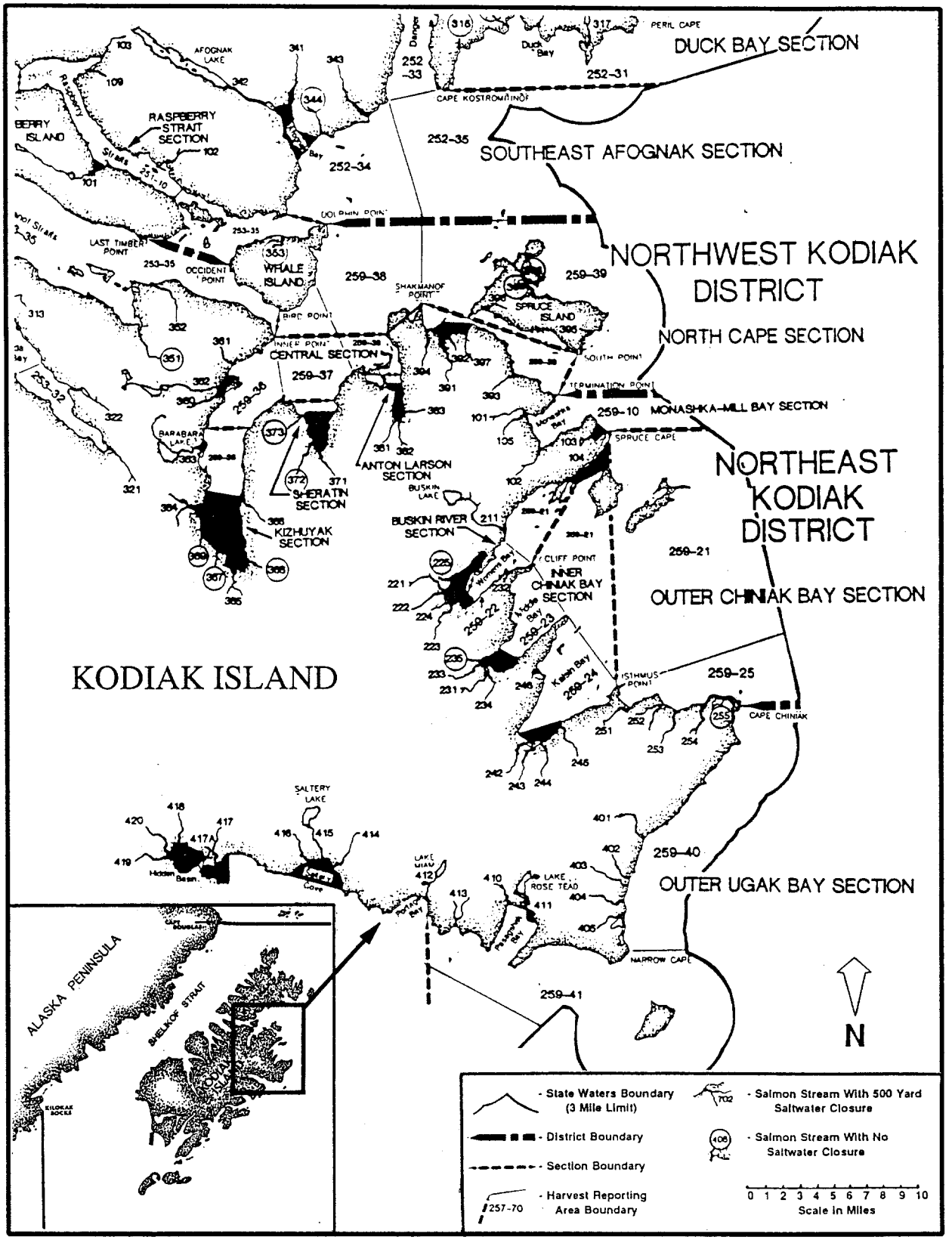
Appendix A.3. Northwest Kodiak District of the Kodiak Management Area, 1993.



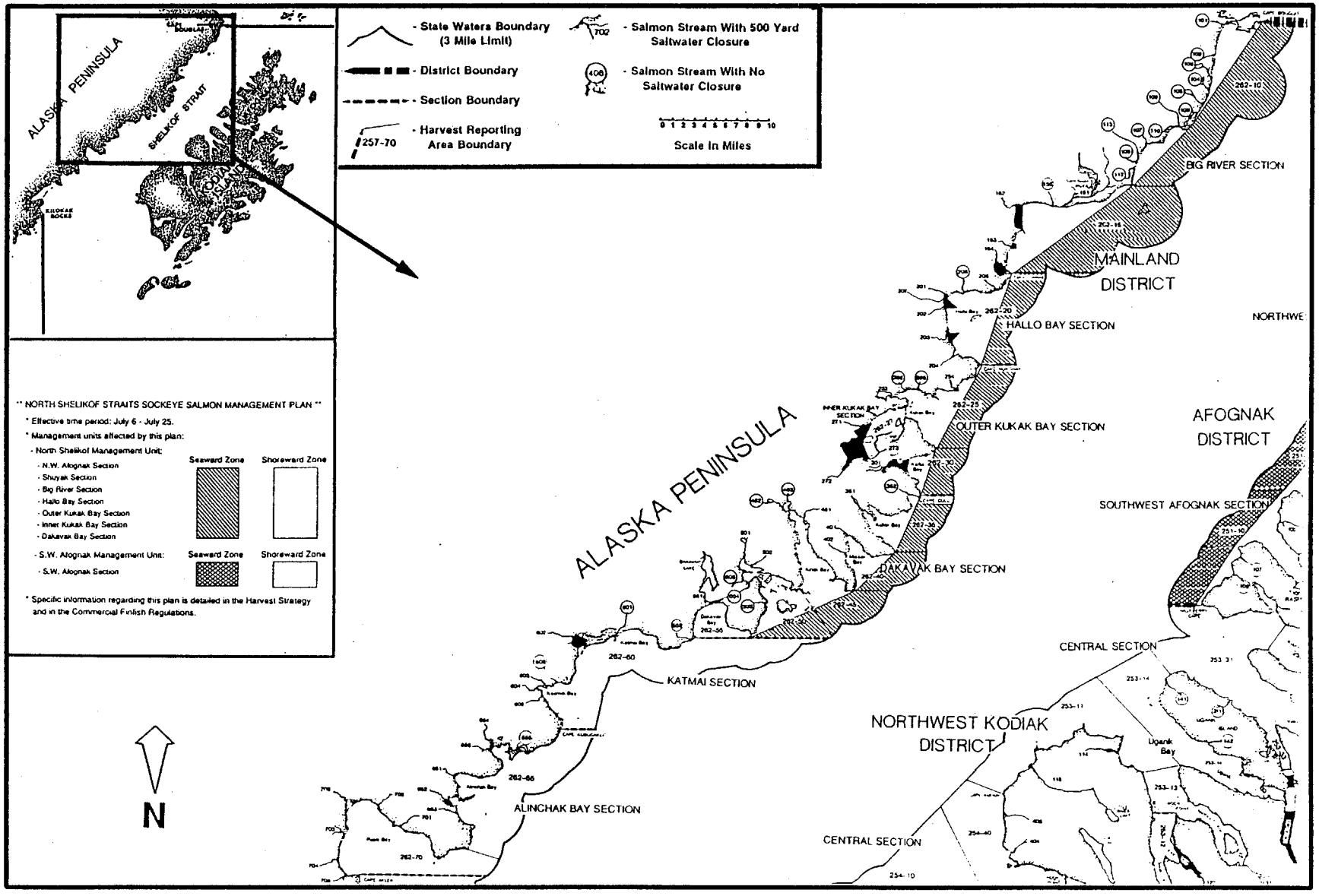
Appendix A.4. Southwest Kodiak and Alitak Bay Districts of the Kodiak Management Area, 1993.



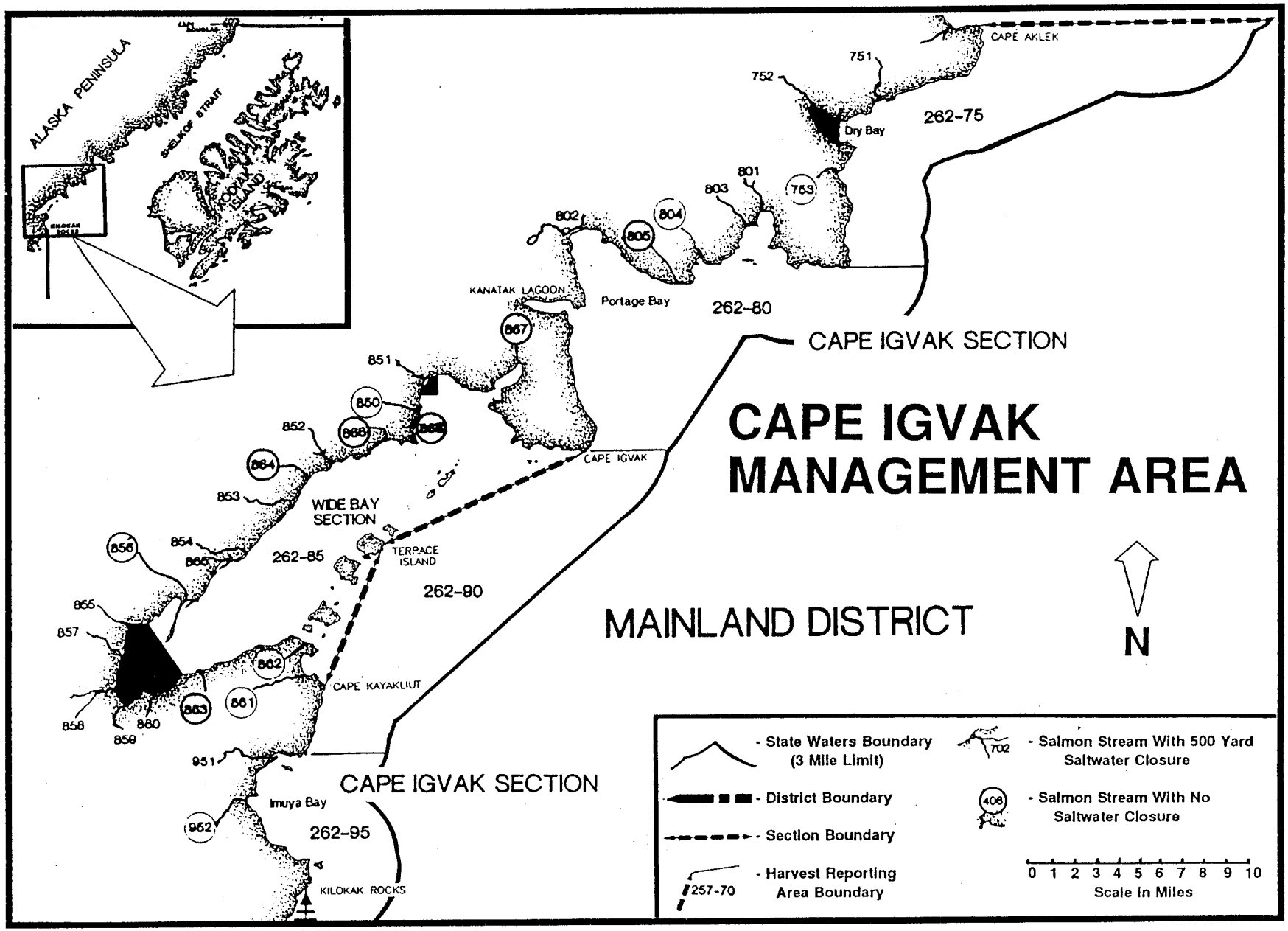
Appendix A.5. Eastside Kodiak District of the Kodiak Management Area, 1993.



Appendix A.6. Northeast Kodiak District, and the North Cape and eastern Central Sections of the Northwest Kodiak District, of the Kodiak Management Area, 1993.



Appendix A.7. North portion of the Mainland District of the Kodiak Management Area, 1993.



Appendix A.8. Cape Igvak management units in the Mainland District of the Kodiak Management Area, 1993.

Appendix B.1. Sockeye salmon escapement goals by spawning system for the Kodiak Management Area[a], 1993.

System		Escapement (in 1,000's of fish)[a]		
Name	Number	Minimum	Mid Pt.	Targeted
Weirs				
Karluk	255-101	560	730	900
Ayakulik	256-201	200	250	300
Upper Station	257-304	200	238	275
Frazer	257-401	140	170	200
Litnik	252-342	40	50	60
Saltery	259-415	20	30	40
Pauls	251-831	20	30	40
Buskin	259-211	10	13	15
Akalura	257-302	40	50	60
Uganik Lake	253-122	40	50	60
Subtotal		1,270	1,611	1,950
Non weir (indexed escapement)[b]				
Barabara Cove	259-363	1	3	5
Bear Lake	262-655	1	3	5
Big Bay	251-601	1	3	5
Horse Marine	257-402	5	8	10
Kaflia	262-301	15	20	25
Kaguyak	258-706	0.5	1	1
Kanatak	262-802	1	3	5
Kuliak	262-351	1	3	5
Little Afognak	252-319	1	3	5
Little Danger	252-331	1	1	1
Little Kitoi	252-323	1	1	1
Little River	253-116	15	20	25
Long Lagoon Cr.	251-301	1	3	5
Malina	251-105	5	8	10
Matfay	257-704	0.5	1	1
Miam	259-412	1	3	5
Ocean Beach	258-401	5	8	10
Old Red River	258-202	0.5	1	1
Paramonof	251-301	1	1	1
Pasagshak	259-411	1	3	5
Perenosa	251-825	5	8	10
Pivot Point	258-212	0.5	1	1
Red Fox	251-505	1	1	1
Russian Harbor	258-901	1	1	1
Selief	251-101	1	3	5
Silver Salmon	257-303	1	3	5

-Continued-

System Name	System Number	Escapement (in 1,000's of fish)[a] Minimum	Mid Pt.	Targeted
Swikshak	262-151	15	20	25
Slough Crk.	262-105	0.5	1	1
Thorsheim	251-302	5	8	10
Total indexed escapement [b]		88.5	143	190.0
Estimated total escapement for indexed systems[c]		177	286	380
Estimated total escapement for systems with weirs and indexed by aerial surveys		1,447	1,754	2,140

[a] Source: Barrett et al. (1990) and Malloy et al. (1992).

[b] Indexed escapement represents a peak aerial escapement count.

[c] Indexed escapement expanded by a factor of 2.0 for an estimate of total escapement (Barrett et al. 1985).

Appendix B.2. Pink salmon odd and even year index stream escapement goals for the Kodiak Management Area, 1993.

Index Stream	Stream Number	Even Year Indexed Goal[a,b] Minimum	Even Year Indexed Goal[a,b] Targeted	Odd Year Indexed Goal[a,b] Minimum	Odd Year Indexed Goal[a,b] Targeted
AFOGNAK DISTRICT					
Malina	(251-105)	20,000	60,000	5,000	15,000
Paramanof	(251-404)	10,000	30,000	5,000	15,000
Little Waterfall[c]	(251-822)	15,000	45,000	15,000	45,000
Discoverer	(251-830)	20,000	60,000	20,000	60,000
Pauls Bay[c]	(251-831)	3,000	9,000	3,000	9,000
Seal Bay	(251-901)	5,000	15,000	5,000	15,000
Big Danger	(252-332)	15,000	45,000	10,000	30,000
Marka	(252-334)	30,000	90,000	10,000	30,000
Litnik[c]	(252-342)	30,000	90,000	10,000	30,000
	Subtotal	148,000	444,000	83,000	249,000
N.W. KODIAK DISTRICT					
Sheratin	(253-371)	15,000	45,000	10,000	30,000
Baumans	(253-333)	5,000	15,000	5,000	15,000
Terror	(253-331)	40,000	120,000	30,000	90,000
Uganik	(253-122)	80,000	240,000	70,000	210,000
Little	(253-115)	40,000	120,000	15,000	45,000
Zachar	(254-301)	40,000	120,000	20,000	60,000
Browns	(254-204)	40,000	120,000	5,000	15,000
Uyak	(254-202)	50,000	150,000	50,000	150,000
Uyak	(259-203)	5,000	15,000	15,000	45,000
	Subtotal	315,000	945,000	220,000	660,000
S.W. KODIAK DISTRICT					
Karluk[c]	(255-101)	800,000	1,600,000	20,000	60,000
Sturgeon	(256-401)	50,000	150,000	5,000	15,000
Ayakulik[c]	(256-201)	400,000	800,000	5,000	15,000
	Subtotal	1,250,000	2,550,000	30,000	90,000
ALITAK DISTRICT					
Narrows	(257-401)	2,000	6,000	2,000	6,000
Dog Salmon[c]	(257-403)	50,000	150,000	60,000	180,000
Deadman	(257-502)	40,000	120,000	60,000	180,000
Humpy	(257-701)	70,000	210,000	90,000	270,000
	Subtotal	162,000	486,000	212,000	636,000
N.E. KODIAK DISTRICT					
Sid Olds	(259-242)	30,000	90,000	30,000	90,000
American	(259-231)	30,000	90,000	30,000	90,000
Buskin[c]	(259-211)	60,000	180,000	50,000	150,000
	Subtotal	120,000	360,000	110,000	330,000
EASTSIDE KODIAK DISTRICT					
7-Rivers	(258-701)	40,000	120,000	40,000	120,000
Kaiugnak	(258-542)	10,000	30,000	10,000	30,000
Barling	(258-522)	30,000	90,000	30,000	90,000
Kiliuda	(258-207)	20,000	60,000	10,000	30,000
Saltery[c]	(259-415)	20,000	60,000	30,000	90,000
Miam	(259-412)	20,000	60,000	10,000	30,000
Hurst	(259-414)	10,000	30,000	10,000	30,000
	Subtotal	150,000	450,000	140,000	420,000
MAINLAND KODIAK DISTRICT					
Big River	(262-152)	10,000	30,000	10,000	30,000
Village	(262-153)	15,000	45,000	15,000	45,000
Cape Chiniak	(262-205)	5,000	15,000	3,000	9,000
Big Hallo	(262-203)	2,000	6,000	2,000	6,000
Kukak	(262-271)	3,000	9,000	2,000	6,000
Missak	(262-402)	5,000	15,000	3,000	9,000
Kinak	(262-451)	20,000	60,000	20,000	60,000

-Continued-

Index Stream	Stream Number	Even Year Indexed Goal[a,b] Minimum	Even Year Indexed Goal[a,b] Targeted	Odd Year Indexed Goal[a,b] Minimum	Odd Year Indexed Goal[a,b] Targeted
MAINLAND KODIAK DISTRICT (continued)					
Geographic	(262-501)	4,000	12,000	4,000	12,000
Dakavak	(262-551)	25,000	75,000	20,000	60,000
Kashvik	(262-604)	25,000	75,000	25,000	75,000
Big Alinchak	(262-651)	30,000	90,000	20,000	60,000
Portage	(262-702)	15,000	45,000	10,000	30,000
Oil	(262-751)	15,000	45,000	10,000	30,000
Jute	(262-801)	2,000	6,000	1,000	3,000
Kanatak	(262-802)	10,000	30,000	10,000	30,000
Big Creek	(262-851)	70,000	210,000	60,000	180,000
	Subtotal	256,000	768,000	215,000	645,000
	GRAND TOTAL[d]	2,401,000	6,003,000	1,010,000	3,030,000

[a] Source: Barrett et al. (1990) and Malloy et al. (1992).

[b] Index escapement for non weir systems are peak counts.

[c] Systems where the escapement is counted through weirs.

[d] The 51 listed index streams average 73% of the total KMA escapement based on 1969-87 escapement distribution data from 1966 through 1991.

Appendix B.3. Chum salmon indexed escapement goals and estimated total escapement goals for selected streams, 1993.

Index Stream	Stream Number	Indexed Escapement[a] Minimum	Indexed Escapement[a] Targeted	Estimated Total Escapement[a] Minimum	Estimated Total Escapement[a] Targeted	Estimated Total Escapement[a] Mid Point
NORTHWEST KODIAK DISTRICT						
Red Cloud	(259-382)	3,000	9,000	4,173	12,518	8,345
Slough Trail	(259-383)	1,000	3,000	1,391	4,173	2,782
Sheratin	(259-371)	5,000	15,000	6,954	20,863	13,908
Kizhuyak	(259-365)	8,000	24,000	11,127	33,380	22,253
Terror	(253-331)	5,000	15,000	6,954	20,863	13,908
Uganik	(253-122)	10,000	30,000	13,908	41,725	27,817
Spiridon	(254-401)	15,000	45,000	20,863	62,588	41,725
Zachar	(254-301)	15,000	45,000	20,863	62,588	41,725
Uyak	(254-202)	10,000	30,000	13,908	41,725	27,817
Subtotal		72,000	216,000	100,140	300,421	200,281
SOUTHWEST KODIAK DISTRICT						
Sturgeon	(256-401)	50,000	150,000	69,542	208,626	139,084
Subtotal		50,000	150,000	69,542	208,626	139,084
ALITAK DISTRICT						
Big Sukhoi	(257-102)	20,000	60,000	27,817	83,450	55,633
Dog Salmon[b]	(257-403)	2,000	6,000	2,000	6,000	4,000
Narrows	(257-401)	2,000	6,000	2,782	8,345	5,563
Deadman	(257-502)	5,000	15,000	6,954	20,863	13,908
Sulua	(257-603)	8,000	24,000	11,127	33,380	22,253
Portage	(257-601)	1,000	3,000	1,391	4,173	2,782
Subtotal		38,000	114,000	52,070	156,210	104,140
NORTHEAST KODIAK DISTRICT						
Kalsin River	(259-243)	1,000	3,000	1,391	4,173	2,782
Sid Olds	(259-242)	6,000	18,000	8,345	25,035	16,690
American	(259-231)	6,000	18,000	8,345	25,035	16,690
Salt Creek	(259-233)	2,000	6,000	2,782	8,345	5,563
Salonie Creek	(259-223)	1,000	3,000	1,391	4,173	2,782
Russian River	(259-222)	2,000	6,000	2,782	8,345	5,563
Sargent Creek	(259-221)	2,000	6,000	2,782	8,345	5,563
Subtotal		20,000	60,000	27,817	83,450	55,633
EASTSIDE KODIAK DISTRICT						
Sitkinak Chum	(258-807)	3,000	9,000	4,173	12,518	8,345
Kaguyak	(258-602)	5,000	15,000	6,954	20,863	13,908
Kiavak Portage	(258-551)	1,000	3,000	1,391	4,173	2,782
Kaiugnak	(258-603)	3,000	9,000	4,173	12,518	8,345
Barling	(258-522)	3,000	9,000	4,173	12,518	8,345
Midway	(258-521)	5,000	15,000	6,954	20,863	13,908
Newman	(258-513)	3,000	9,000	4,173	12,518	8,345
Natalia	(258-512)	3,000	9,000	4,173	12,518	8,345
Rolling	(258-511)	4,000	12,000	5,563	16,690	11,127
Amee	(258-301)	1,000	3,000	1,391	4,173	2,782
McCord Beach	(258-302)	1,000	3,000	1,391	4,173	2,782
Pivot Point	(258-212)	1,000	3,000	1,391	4,173	2,782
Marker Grove	(258-211)	1,000	3,000	1,391	4,173	2,782
Dukaluk	(258-208)	2,000	6,000	2,782	8,345	5,563
W. Kiliuda	(258-207)	8,000	24,000	11,127	33,380	22,253
E. Kiliuda	(258-206)	3,000	9,000	4,173	12,518	8,345
Burn's Spit	(258-210)	1,000	3,000	1,391	4,173	2,782
Coxcomb Point	(258-205)	6,000	18,000	8,345	25,035	16,690
Dog Bay	(258-204)	6,000	18,000	8,345	25,035	16,690
Shearwater	(258-202)	1,000	3,000	1,391	4,173	2,782
Gull Cape	(259-428)	8,000	24,000	11,127	33,380	22,253
Eagle Harbor	(259-424)	4,000	12,000	5,563	16,690	11,127
Kiliuda Pass	(259-423)	2,000	6,000	2,782	8,345	5,563
Hidden Basin	(259-418)	4,000	12,000	5,563	16,690	11,127

-Continued-

Index Stream	Stream Number	Indexed Minimum	Indexed Desired	Est. Total Minimum	Est. Total Desired	Est. Total Mid Point
Wild Creek	(259-417)	2,000	6,000	2,782	8,345	5,563
Rough Creek	(259-416)	3,000	9,000	4,173	12,518	8,345
Saltery[b]	(259-415)	2,000	6,000	2,000	6,000	4,000
Miam	(259-412)	2,000	6,000	2,782	8,345	5,563
Subtotal		88,000	264,000	121,612	364,836	243,224
MAINLAND DISTRICT						
Productive Forks	(262-108)	1,000	3,000	1,391	4,173	2,782
Swikshak	(262-151)	2,000	6,000	2,782	8,345	5,563
Big River	(262-152)	40,000	120,000	55,633	166,900	111,267
Village Creek	(262-153)	10,000	30,000	13,908	41,725	27,817
Chiniak Lagoon	(262-154)	8,000	24,000	11,127	33,380	22,253
Ninagiak	(262-201)	5,000	15,000	6,954	20,863	13,908
Serpent	(262-203)	10,000	30,000	13,908	41,725	27,817
Cape Chiniak	(262-205)	1,000	3,000	1,391	4,173	2,782
Kukak River	(262-271)	60,000	180,000	83,450	250,351	166,900
Kukak Valley	(262-272)	3,000	9,000	4,173	12,518	8,345
Kinak Creek	(262-451)	2,000	6,000	2,782	8,345	5,563
Dakavak	(262-551)	10,000	30,000	13,908	41,725	27,817
Alagogshak	(262-602)	25,000	75,000	34,771	104,313	69,542
Kashvik	(262-604)	5,000	15,000	6,954	20,863	13,908
Big Alinchak	(262-651)	2,000	6,000	2,782	8,345	5,563
Little Alinchak	(262-652)	1,000	3,000	1,391	4,173	2,782
East Bear	(262-654)	8,000	24,000	11,127	33,380	22,253
West Bear	(262-656)	3,000	9,000	4,173	12,518	8,345
Portage	(262-702)	1,000	3,000	1,391	4,173	2,782
Teresa	(262-703)	8,000	24,000	11,127	33,380	22,253
Trail Creek	(262-704)	8,000	24,000	11,127	33,380	22,253
Dry Bay	(262-752)	8,000	24,000	11,127	33,380	22,253
Jute	(262-801)	1,000	3,000	1,391	4,173	2,782
Kanatak	(262-802)	1,000	3,000	1,391	4,173	2,782
Big Creek	(262-851)	10,000	30,000	13,908	41,725	27,817
Kialagvik	(262-858)	8,000	24,000	11,127	33,380	22,253
Icy Peak	(262-859)	1,000	3,000	1,391	4,173	2,782
Subtotal		242,000	726,000	336,583	1,009,748	673,165
GRAND TOTAL		510,000	1,530,000	707,764	2,123,291	1,415,528
Estimated Total Kodiak Management Area Escapement[c]				784,440	2,353,321	1,568,881

[a] Source: Barrett et al. (1990) and Malloy et al. (1992)

[b] Systems where the escapement is counted through weirs.

[c] The 78 listed index streams supported 90.2% of the total KMA chum escapement in 1989. The estimated total KMA escapement goal minimum, desired, and mid point values were determined from this relationship.

Appendix B.4. Coho salmon escapement goals for fish weir systems in the Kodiak Management Area, 1993.

Weir Site	Interim Goals[a]	Interim Dates 8/15 Weir	8/15 (Bldup)	8/20 Weir	8/20 (Bldup)	8/25 Weir	8/25 (Bldup)	8/31 Weir	8/31 (Bldup)	9/5 Weir	9/5 (Bldup)	9/10 Weir	9/10 (Bldup)	9/15 Weir	9/15 (Bldup)	9/20 Weir	9/20 (Bldup)
Karluk (255-101)	Min.	-	-	50	-	100	(1,400)	300	(2,200)	1,500	(3,500)	3,000	(7,000)	8,000	(5,000)	10,000	(5,000)
	Des.	-	-	500	-	1,000	(2,000)	3,000	(4,000)	3,000	(6,000)	6,000	(9,000)	9,000	(8,000)	20,000	(5,000)
Ayakulik (256-201)	Min.	500	(1,000)	3,000	(2,000)	4,000	(3,500)	7,000	(5,000)	10,000	(7,000)	12,000	(6,000)	-	(6,000)	-	(2,000)
	Des.	2,000	(1,500)	6,000	(2,500)	7,000	(5,000)	13,000	(6,000)	15,000	(8,000)	18,000	(9,000)	-	(8,000)	-	(4,000)
Dog Salmon (257-403)	Min.	-	(100)	50	-	500	-	1,500	-	2,000	-	2,500	-	3,500	-	-	(1,000)
	Des.	-	(200)	200	-	1,500	-	3,000	-	4,500	-	4,500	-	5,500	-	-	(3,000)
Upper Station (257-304)	Min.	-	-	50	-	500	-	1,500	-	2,000	-	2,500	-	3,500	-	-	-
	Des.	-	-	200	-	1,500	-	3,500	-	4,000	-	4,500	-	5,500	-	-	-
Akalura (257-302)	Min.	-	-	-	-	50	-	250	-	500	-	1,000	-	1,500	-	-	-
	Des.	-	-	-	-	200	-	1,000	-	1,500	-	2,500	-	3,500	-	-	-
Horse Marine (257-402)	Min.	-	-	-	-	50	-	200	-	400	-	800	-	1,000	-	-	-
	Des.	-	-	-	-	100	-	400	-	800	-	1,600	-	2,500	-	-	-
Saltery (259-415)	Min.	-	-	-	(100)	50	(500)	300	(1,000)	1,000	(1,000)	2,000	(1,000)	2,500	(2,000)	3,000	(2,000)
	Des.	-	-	-	(500)	100	(1,000)	1,000	(2,000)	2,000	(2,000)	3,000	(2,000)	4,000	(3,000)	5,000	(5,000)
Buskin (259-211)	Min.	25	-	100	-	300	-	400	-	1,000	-	2,000	-	2,000	-	3,000	(3,000)[b]
	Des.	100	-	300	-	500	-	1,000	-	2,000	-	3,500	-	4,000	-	5,000	(4,000)
Litnik (252-342)	Min.	500	-	1,000	-	1,500	-	2,000	-	2,500	-	3,000	-	3,500	-	-	-
	Des.	2,000	-	3,000	-	4,000	-	5,000	-	6,000	-	7,000	-	8,000	-	-	-
Pauls (251-831)	Min.	500	-	1,500	-	3,000	-	3,500	-	4,500	-	5,500	-	6,500	-	-	-
	Des.	2,000	-	3,000	-	5,000	-	6,000	-	7,000	-	8,000	-	9,000	-	-	-
Perenosa (251-830)	Min.	50	-	500	-	1,000	-	1,300	-	1,500	-	1,700	-	2,000	-	-	-
	Des.	500	-	1,000	-	3,000	-	2,800	-	3,000	-	3,200	-	3,500	-	-	-
Big Bay (251-601)	Min.	20	-	100	-	150	-	200	-	250	-	300	-	400	(600)	600	(400)
	Des.	100	(200)	200	(300)	300	(300)	400	(400)	500	(600)	600	(1,000)	800	(1,200)	1,300	(700)
Bear Creek (251-706)	Min.	10	-	50	-	100	-	125	-	150	-	175	-	150	-	350	-
	Des.	50	(50)	150	(100)	200	(150)	250	(200)	300	(400)	350	(600)	500	(500)	700	(400)

[a] Source: Malloy et al. (1992)

[b] Includes 2,000 coho for sport fish harvest.

Appendix B.5. Peak indexed coho salmon escapement goals for Northeast District nonweired systems in the Kodiak Management Area, 1993.

Geographical Location	Stream Name	Stream Number	Escapement Goals[a,b] Minimum	Escapement Goals[a,b] Desired
Monashka/Mill Bay	Monashka	(259-101)	20	35
	Virginia	(259-105)	30	45
	Pillar	(259-102)	30	45
	Island Lake	(259-103)	40	60
Subtotal	4 Streams		120	180
Woman's Bay[c]	Buskin	(259-211)	2,000[d]	4,210[d]
	Sargent	(259-221)	65	100
	Russian	(259-222)	40	60
	Paramanof	(259-224)	20	30
	Salonie	(259-223)	350	500
	Cliff Point	(259-232)	10	20
Subtotal	6 Streams		2,485	4,210
Middle Bay	Short	(259-235)	10	20
	Salt	(259-233)	20	30
	American	(259-231)	300	400
	Slough	(259-234)	100	200
Subtotal	4 Streams		430	650
Kalsin Bay	Mayflower	(259-246)	30	45
	Sid Olds	(259-242)	450	675
	Kalsin	(259-243)	100	150
	Frank	(259-244)	10	20
	Myrtle	(259-245)	30	45
Subtotal	5 Streams		620	935
Outer Chiniak Bay	Rosalyn	(259-251)	600	1,200
	Twin	(259-252)	40	60
	Capelin	(259-253)	20	30
	Chiniak	(259-254)	100	150
	Chiniak Lagoon	(259-255)	10	20
Subtotal	5 Streams		770	1,460

-Continued-

Geographical Location	Stream Name	Stream Number	Escapement Goals[a,b] Minimum	Escapement Goals[a,b] Targeted
Coastal Chiniak	Sacramento	(259-401)	40	60
	Twin Peaks	(259-402)	10	20
	Valley	(259-403)	10	20
	Barry's	(259-405)	10	20
	Burton's	(259-404)	10	20
Subtotal	5 Streams		70	120
GRAND TOTAL	29 Streams		4,475	7,555

[a] Total indexed escapement as of October and November aerial and foot surveys.

[b] Source: Malloy et al. (1992). These escapement goals were developed by Kodiak Area fishery biologists, Frank VanHulle and Pete Murray with the Sport Fish Division, and Ken Manthey, Larry Malloy and Dave Prokopowich with the Commercial Fisheries Division. The basis for these goals is the annual escapement and subsequent return data derived from approximately 1970 through 1988.

[c] Includes the Buskin River actual total escapement obtained by fish weir count.

[d] Buskin River actual weir escapement as of 9/10, an important date for management of the freshwater sport fisheries in Buskin River.

Appendix B.6. Chinook salmon escapement goals, by week, for systems with fish weirs, Kodiak Management Area, 1993.

River	Interim Goals[a]	Interim Dates 5/30	6/06	6/13	6/20	6/27	7/04	7/11	7/18
Karluk	Minimum	100	500	1,500	2,500	3,000	3,500	4,000	4,500
(255-101)	Desired	300	800	2,800	4,500	6,000	7,000	7,500	8,000
Ayakulik	Minimum	500	1,000	3,500	4,500	5,000	5,500	6,000	6,500
(256-201)	Desired	1,500	3,000	5,000	6,000	7,000	8,000	9,000	10,000
Dog Salmon	Minimum	-	-	-	20	40	80	100	110
(257-403)	Desired	-	-	-	60	120	240	300	330

[a] Escapement goals shown in this table are based upon historical escapement database for 10 year period 1980-1989 and the subsequent return from those escapements. As additional research is conducted on the nature of these chinook salmon populations as well as the carrying capacity/production potential for chinook salmon in these systems, adjustments in these goals may be recommended.

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