1990 LOWER COOK INLET AREA

ANNUAL FINFISH MANAGEMENT REPORT

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1990 COMMERCIAL FISHERIES STAFF

The finfish operations for the Commercial Fisheries Division, Lower Cook Inlet, employed six permanent employees and 13 seasonal employees who participated in various area management programs during the 1990 season. Thanks is extended to all personnel for a successful 1990 season.

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ANNUAL MANAGEMENT REPORT
LOWER COOK INLET
1990

COMMERCIAL SALMON FISHERY

INTRODUCTION

The Lower Cook Inlet (LCI) management area is comprised of all waters west of the longitude of Cape Fairfield, north of the latitude of Cape Douglas and south of the latitude of Anchor Point and has been divided into five fishing districts (Figure 1). The Barren Islands District is the only non-salmon fishing district and the remaining four districts have been divided into 30 subdistricts and sections to facilitate management of discrete stocks of salmon and herring.

The 1990 Lower Cook Inlet salmon fishery fell well below expectations by all accounts. The total harvest of 605,373 fish was only 25% of the preseason forecast and represents the lowest catch since 1976 (Figure 3, Appendix Table 5). Fishing effort was slightly higher than 1989 levels with 71 seine and 20 set gillnet permit holders making deliveries (Appendix Table 1). The harvest was about half of the long-term (1970-89) average with an exvessel value just over $1.68 million (Table 7, Appendix Table 2).

Over 67% of the sockeye salmon harvest was produced by two FRED Division lake stocking projects at Chenik Lake in the Kamishak District and Leisure (China Poot) Lake in the Southern District. Natural pink salmon returns were poor to most systems, and harvestable surpluses occurred only in Port Chatham and Port Dick.

Pink salmon returns to Tutka Hatchery and a satellite release site at Halibut Cove, both in the Southern District, have recently comprised the bulk of Lower Cook Inlet pink salmon harvests. However, despite poor natural runs, Tutka Hatchery returns accounted for less than half of the total pink salmon harvest in 1990.

PRESEASON FORECAST

The 1990 Lower Cook Inlet salmon harvest was projected to be very good and considerably above the previous two years. The majority of the harvest was to be from hatchery and lake stocking enhancement projects. Formal total run forecasts for natural salmon returns other than pink salmon were not available because long-term escapement and age-weight-length data are limited for those species. However, catch projections were calculated based on relative estimates of parental run size, average age composition data, and recent relative productivity patterns. Harvest potential and actual catches for all species in 1990 are listed below:

SPECIES	PROJECTED HARVEST	ACTUAL HARVEST	1970-1989 AVERAGE
Chinook	2,000	1,560	758
Sockeye	485,000	203,895	128,930
Coho	10,000	9,297	10,701
Pink	1,815,000	383,670	936,966
Chum	60,000	6,951	130,388
TOTAL	2,372,000	605,373	1,207,742

Sockeye returns were anticipated to be good to all areas, with the exception of English Bay in the Southern District. Enhanced runs to Leisure and Chenik Lakes were expected to dominate the returns. Besides the excellent escapements to Chenik Lake, one million fry

originating from the Crooked Creek Hatchery were stocked in 1987 and the lake was fertilized to increase food production. The majority of those fish left the lake in 1988, with adult returns expected in 1990 and 1991. Adult sockeye were also expected to return from two additional lake stocking projects at Port Dick Lake in the Outer District and Kirschner Lake in the Kamishak District for the first time in 1990.

Pink salmon escapements were generally poor in 1988 with the exception of the Kamishak District. No pink salmon harvest was anticipated in the Eastern District, but there was potential for isolated harvests in the Outer District at Desire Lake Creek, Port Dick and Island Creeks, and in Port Chatham. Returns to all naturally producing streams in the Southern District were expected to provide only limited harvests, with Humpy Creek and Seldovia Bay having the best prospects.

Returns to the Tutka Bay Hatchery and a secondary fry release site at Halibut Cove Lagoon were expected to be the mainstay of the pink salmon fishery. A record return of over one million pinks was expected at Tutka Bay with an additional 400,000 fish projected for Halibut Cove Lagoon. Over 36 million fry were released in 1989 at these locations and good ocean survival rates should have produced adult returns approaching 2.0 million fish.

Healthy escapements were achieved in the three major pink streams in the Kamishak District in 1988 and these spawners were expected to produce a 248,000 pink salmon harvest in Kamishak Bay District in 1990. In contrast, significant chum salmon harvests appeared unlikely in 1990. Weak returns were anticipated as a result of severe flooding in the fall of 1986, the low 1985 escapement, and the poor showing of age-4 chums in 1989.

SUMMARY BY SPECIES

Chinook Salmon

The harvest of chinook salmon, which is not a commercially important species in Lower Cook Inlet, was two times higher than the 1970-89 average and the fourth highest on record (Appendix Table 12). The catch of 1,560 was primarily due to enhanced production in Halibut Cove Lagoon and Seldovia Bay (Table 2). Set gillnets accounted for 87% of the catch (Table 1).

Sockeye Salmon

The total LCI harvest of 203,895 sockeye just slightly exceeded the recent year average, but was still 42% higher than the 1970-89 average (Figure 4, Appendix Table 13). Weak enhanced returns, combined with continued poor natural production, resulted in a total sockeye harvest considerably below the preseason projection of 485,000 fish. Nevertheless, sockeye comprised over 75% of the total value of the Lower Cook Inlet fishery (Appendix Table 2).

Although the sockeye harvest was 6% below the 1980-89 average in the Southern District, it was 50% higher than the same recent-year average in the Kamishak Bay District (Appendix Table 13). Adult returns to FRED Division's Chenik Lake stocking project combined with significant first year returns to the Kirschner Lake stocking project contributed to the increased harvests in Kamishak. Nevertheless, returns to the two stocking projects at Chenik and Leisure Lakes were much weaker than projected. Despite large fry releases, excellent natural escapements, and lake fertilization, the Chenik Lake harvest was only about half of that expected (Appendix Table 16).

Sockeye harvests in the Outer and Eastern Districts were 35-40% below average despite additional catches of first-year returns

(5,839 fish) to Port Dick Lake. The natural sockeye runs to Delight and Desire Lakes did not materialize as expected. Escapements to these two lakes of 5,200 and 9,500 sockeye salmon, respectively, were below the goals of 10,000 fish for each system (Table 3, Appendix Table 23).

Sockeye salmon escapements were generally considered good to the major spawning systems, with the exception of the English Bay Lake system (Table 3). Returns to the English Bay Lakes continued to be poor, resulting in complete set gillnet and subsistence closures.

At Mikfik Lake in the Kamishak District, the 1990 escapement of 8,800 sockeye slightly exceeded the goal of 5-7,000 fish, but the majority of the excess escapement came late in the season after effort had shifted to other areas.

Coho Salmon

Natural returns of coho salmon were generally weak throughout Lower Cook Inlet, and the commercial harvest of 9,300 coho was slightly lower than the 1970-89 average (Appendix Table 17). Over 80% of the catch came from the Eastern District. The Silver Salmon Derby in Resurrection Bay and the Cook Inlet Aquaculture Association (CIAA) cost recovery effort at Bear Lake accounted for the Eastern District harvest. Set gillnets in the Southern District harvested 68% of the remaining coho (Table 1).

Poor coho returns were anticipated in the Kamishak Bay District and a conservative management approach allowed only a portion of the Douglas River Subdistrict open to fishing. This action, in conjunction with the weak run and low prices, discouraged the fleet from fishing cohos altogether. Although adverse weather and stream conditions in late August and September hampered aerial escapement estimates, most indicators reflected relatively poor production from natural coho stocks throughout Lower Cook Inlet.

Pink Salmon

Returns of pink salmon, normally the dominant species in both numbers of fish and exvessel value, were weak throughout Lower Cook Inlet. The harvest of 384,000 was the second lowest since 1976 and only 41% of the long-term average (Figure 7, Appendix Table 18). The biggest disappointment was the failure of the 1.4 million projected adult harvest from Tutka Hatchery releases. Tutka Bay and Halibut Cove Lagoon contributed only 160,000 fish to this season's commercial harvest (Table 5). The Outer District produced the only other significant returns of pink salmon with Port Dick and Port Chatham accounting for 169,000 and 22,000 fish, respectively.

Pink salmon escapement goals were achieved in all major producing systems except for those in the Kamishak Bay District (Table 5, Appendix Table 23). Although no directed pink salmon fishery was allowed in the Kamishak Bay District in 1990, only maintenance level escapements were achieved.

Chum Salmon

Chum salmon returns to Lower Cook Inlet were extremely weak and the harvest of 6,951 fish (Table 6) was the lowest on record. The catch was only 5% of the recent 20-year average harvest for Lower Cook Inlet and well under the previous low of 11,300 chums landed in 1989 (Figure 8, Appendix Table 21). The poor returns were generally anticipated, again due to flooding in the fall of 1986, and conservative fishing schedules were implemented throughout the Kamishak and Outer Districts to protect chum salmon stocks. Chum salmon escapements were poor to most major spawning systems (Table 6, Appendix Table 25), and although maintenance level escapements were achieved, several streams were below desired levels.

EXVESSEL VALUE

The exvessel value of the 1990 salmon harvest in Lower Cook Inlet was $1,681,015 (Table 7). Purse seines, which normally account for the majority of the catch, comprised $1,474,645 or 88% of the total (Appendix Table 2). Set gillnets accounted for $186,041. Average prices paid to fishermen were as follows: chinook - $1.35/lb., sockeye - $1.55/lb., coho - $0.60/lb., pink - $0.30/lb., and chum - $0.50/lb. Prices paid in 1990 are compared to previous years in Appendix Table 3. These figures do not include postseason bonuses paid by many of the processors.

DISTRICT INSEASON MANAGEMENT SUMMARIES

Southern District

Set Gillnet Fishery

Commercial set gillnetting in Lower Cook Inlet is limited to specific beaches within the Southern District. Although an Area H set gillnet permit is allowed to fish in both Upper and Lower Cook Inlet, there are only five beach areas in Lower Cook Inlet, all located along the south shore of Kachemak Bay, where set gillnets may be used (Figure 2). The limited areas provide only enough productive fishing sites to accomodate approximately 25 set nets.

The Southern District set gillnet harvest totalled 32,854 fish in 1990 (Table 1). Although the mixed-species harvest was 50% below the 1970-89 average, species composition of the catch was similar to the long-term average, with the exception of chinook salmon abundance, which was nearly three times higher than average (Appendix Table 7). Typically the gillnet harvest is comprised of 50% sockeye salmon, 30% pink salmon, 5% chums, 5% cohos, and less than 1% chinook. Enhancement efforts at Seldovia Bay and Halibut

Cove Lagoon are believed responsible for the higher chinook catches. An additional 24 hours of fishing per week was allowed in the Halibut Cove area from July 5 through the end of the season, resulting in an increased harvest of all species in this area.

The set gillnet fishery in the Barabara Creek Subdistrict was closed from July 10-17 when it became apparent that pink salmon returns were extremely weak. The early portion of the Tutka Hatchery return had not materialized and even brood stock requirements appeared to be in jeopardy. This was the second time on record that the set gillnet fishery has been closed for protection of pink salmon. A similar situation occurred in 1987 when poor returns necessitated a closure. The 1990 fishery was re-opened as soon as it was determined that pink salmon returns were sufficient to meet hatchery requirements.

Seldovia Bay was also closed to set gillnet fishing from July 10 until July 17 due to the weak pink salmon return. Although this run typically peaks 10-14 days later than Tutka, escapement estimates for Seldovia River and catch per unit effort data indicated that a cautious approach was necessary to ensure that escapement requirements would be met. The final pink salmon escapement into Seldovia River was estimated at 27,780 fish (Table 5).

Coho catches by set gillnets were the lowest since 1983. The catch of 1,046 coho was less than half the 1980-89 average (Appendix Table 7). The low catches were a reflection of the weak area-wide coho returns to lower Kenai Peninsula streams.

Several factors contributed to the low set gillnet harvests in 1990. The sockeye salmon return to the English Bay Lakes system was extremely weak for the sixth consecutive year. In anticipation of this weak return, the Port Graham/English Bay Subdistrict was closed to commercial set gillnet fishing on May 29 prior to the

scheduled regulatory opening on June 4. Even with complete closures of the subsistence, commercial and recreational fisheries, the sockeye salmon escapement to the English Bay system reached only 3,300 fish, 66% below the low end of the desired escapement range (Table 3, Appendix Table 23). After the sockeye run was nearly over, the subsistence fishery was reopened (July 12), but the commercial fishery was not allowed to resume because of the poor pink salmon returns to Port Graham River.

Fishing effort also affected the set gillnet harvest in the Southern District. The number of set gillnet permits fished this season (20) was down by three from the previous year (Appendix Table 1).

Perhaps the most important effect on the set gillnet catches was the absence of significant numbers of Upper Cook Inlet sockeye salmon in Kachemak Bay for a third straight year. Average weights of sockeye salmon caught after June 25 indicated the presence of higher numbers of sockeye returning to Leisure Lake rather than Upper Cook Inlet spawning systems.

Seine Fishery

Sockeye Salmon

Purse seiners accounted for over 80% of the 82,412 sockeye salmon harvested in the Southern District in 1990 (Table 1). The overall catch was approximately 6% lower than the recent 10-year average for the entire district (Appendix Table 13).

The Halibut Cove, China Poot Bay and Tutka Bay Subdistricts were opened to seining five days per week beginning Monday June 25 in anticipation of strong returns to Leisure Lake. Preseason harvest projections for returns to the Leisure Lake stocking and fertilization project were estimated at 150,000 sockeye salmon.

Although the actual commercial harvest was only about one-third of the projection (49,587 fish), it still comprised 24% of the total LCI sockeye salmon harvest (Table 3, Figure 5). Fish returning to the Leisure Lake project contributed significantly to the seine catches in the Halibut Cove and Tutka Bay Subdistricts, as well as the China Poot Bay Subdistrict. Personal use dip net fishermen and sport fishermen harvested another 3,500 sockeye at the head of China Poot Bay. The 1990 total return was estimated at 53,087 fish (Appendix Table 15).

Pink Salmon

Returns of pink salmon to the Tutka Bay Hatchery and to the satellite rearing project in Halibut Cove Lagoon contributed to a total Southern District harvest of 178,087 pink salmon, second lowest since 1976 (Table 5, Appendix Table 18). No seining was allowed in the Port Graham or Seldovia Subdistricts in 1990. Despite the season-long closures, only the minimum spawning escapement goals were achieved in these systems (Table 5, Appendix Table 24). With an escapement goal of 25-50,000 fish for Humpy Creek, this season's escapement of 27,042 pink salmon was also considered to be minimal for this stream.

The opening of Halibut Cove Lagoon to seining was delayed until July 5 to allow the recreational fishery, targeting on hatchery reared chinook salmon, to continue through the 4th of July holiday without interference from the commercial seine fleet. In Tutka Bay fishing was allowed five days per week beginning June 26. However, catches started slowly and never gained momentum. Aerial surveys of Tutka Lagoon failed to show a significant buildup of pink salmon and by July 10 the harvest stood at less than 20,000 fish for the entire Southern District. At least 60,000 fish were needed at the hatchery to meet brood stock requirements, and an additional 10,000 pinks were needed to meet the natural spawning escapement goal for Tutka Creek. Returns of wild pink salmon stocks to other systems

in the Southern District also appeared to be weak as indicated by escapement and set gillnet catch per unit effort data for the Seldovia River and Barabara Creek Subdistricts.

In response to the weak runs, a closure of the seine fishery in Tutka Bay Subdistrict, along with the set gillnet fishery in the Barabara Creek and Seldovia Subdistricts, was announced on July 10. Monitoring of Tutka Lagoon by aerial survey continued throughout the following week, but the run responded very slowly to the closure. By July 18 escapement into the lagoon was estimated at only 35-40,000 fish.

During the closure, a rather unique situation developed which affected the management strategy for the Tutka pink salmon return. Funding for the FRED Division Tutka Hatchery was cut from the State's general operating budget for the following fiscal year. Regional administrators announced that the hatchery would have to be closed unless an alternate funding source could be found. Necessity for the fishery closure came into question since hatchery brood stock would no longer be required if the hatchery was to be closed.

The Cook Inlet Aquaculture Association (CIAA) expressed a qualified interest in assuming operation of the hatchery. Two conditions were put forth: the incubators in the hatchery should be filled to maximum capacity if possible, and any excess fish (beyond brood stock and natural escapement requirements) would need to be harvested for cost recovery to help offset operational expenses. During the on-going discussions and negotiations, Tutka Subdistrict remained closed to ensure adequate brood stock and natural escapement to Tutka Creek. On July 22 CIAA voted to take over the hatchery operations. Tutka Lagoon was subsequently designated as a Special Harvest Area by emergency regulation, and an emergency order was issued on July 23 to allow cost recovery harvests of

pink salmon inside the lagoon. The common property fishery outside the lagoon remained closed to bolster escapements.

After the cost recovery harvest had begun, aerial surveys of Tutka Lagoon and Tutka Creek indicated that numbers of pink salmon continued to build despite efforts by CIAA to harvest all fish surplus to brood stock and natural spawning escapement goals. It was decided that additional fishing opportunity for the commercial fleet outside the lagoon was justified to harvest surplus fish before they mixed with the less valuable fish that had become freshwater-marked inside the lagoon. The Tutka Bay Subdistrict was subsequently opened to seining five days per week, effective at 6:00 a.m. Thursday, August 9, until further notice. However, the relatively small number of fish that were accumulating failed to attract any effort, and the last delivery was reported on July 11.

The final seine catch of pink salmon in Tutka Bay Subdistrict this season, excluding hatchery cost recovery, was only 12,385 fish (Table 9). After brood stock requirements had been met, a total of 17,243 pinks were sold by CIAA for cost recovery. The pink salmon escapement of 38,500 fish (Table 5) into Tutka Creek was considered excessive but thought to be comprised of a relatively high proportion of males which were discarded during hatchery egg-take operations.

Humpy Creek was also expected to produce a significant harvestable surplus of pink salmon this season. However ground surveys and weir counts indicated a cumulative escapement of 4,220 fish through July 31. A closure of the Halibut Cove Subdistrict was announced for August 1 to reduce interceptions and bolster the escapement of pink salmon bound for Humpy Creek. At the same time waters of the China Poot Bay Subdistrict south and east of the Kachemak Bay Wilderness Lodge were closed to seining to protect pink salmon beginning to show there. The Humpy Creek Subdistrict was never opened to commercial fishing during 1990, resulting in a final

escapement estimate of 27,042 pink salmon (Table 5), slightly exceeding the minimum goal of 25,000 fish.

Other Species

Southern District chum salmon returns were very poor for a second straight year. Only 2,433 chum salmon were harvested, 70% below average for the district (Table 6, Appendix Table 21). Set gillnets accounted for the bulk of the harvest (Table 1) with 60% of the catch landed in the Tutka Bay Subdistrict (Table 6).

Although minor in total numbers of fish, the majority of the Southern District chinook harvest consists of interceptions of adult returns to three separate enhancement projects. The 1990 harvest of 1,560 chinooks was the fourth highest on record in this district (Appendix Table 12). The coho salmon harvest of 1,552 fish was considered very poor and only 30% of the recent (1980-89) average (Appendix Table 17). The weak return was consistent with coho runs in the other districts throughout Lower Cook Inlet.

Kamishak Bay District

Sockeye Salmon

The entire Kamishak Bay District opened to salmon seining by regulation on Friday, June 1, on the regular schedule of two 48-hour fishing periods per week. However, the sockeye run appeared to develop slowly as the first two deliveries for June 1-2 were less than 100 fish each. An aerial survey of the McNeil River area on June 4 revealed 12 seine boats fishing the Mikfik area, with escapement into Mikfik Creek estimated at 120-150 fish. Following the regulatory weekend closure, eight vessels harvested 4,500 sockeye on June 4 and an additional 3,000 fish on June 5. These catches indicated a potentially strong sockeye return. However, catch rates declined rapidly, and another survey conducted on June

7 showed an escapement into Mikfik Creek of only 600 fish, mostly located in the lower creek and intertidal area. Because of the lagging escapement rate at Mikfik, the McNeil and Paint River Subdistricts were closed at 6:00 a.m. Friday, June 8, with a cumulative catch just over 9,000 sockeyes.

Results from another survey of Mikfik on June 10 showed little change with an estimated escapement of 450 sockeyes. The majority of these fish were still located in the lower section of the creek. Therefore, the area remained closed until further notice. By June 12 approximately 1,200 sockeye were distributed throughout the length of the creek. The cumulative escapement increased to an estimated 3,000 fish on June 15, but the run never developed enough strength to warrant additional fishing time. The final escapement of 8,800 sockeye salmon to Mikfik Lake was considered excellent, slightly exceeding the goal of 5,000 to 7,000 fish (Table 3, Appendix Table 23).

With the McNeil Subdistrict closed due to the lagging escapement into Mikfik, fishermen shifted their efforts to the Chenik Lake sockeye run. By June 21 a dozen boats were working the area but landings averaged less than 100 fish per boat. In anticipation of strong returns to Chenik and Kirschner Lakes, seining was allowed five days per week beginning June 25 in the Chenik Subdistrict, Bruin Bay Subdistrict, and that portion of the Rocky Cove Subdistrict west of the longitude of the unnamed creek between Fortification Bluff and Step Mountain at 153° 46′ 18" W. longitude. The regulatory markers in Chenik Lagoon were covered and seining was allowed up to the stream mouth. The rest of the Kamishak District remained open on the regular schedule of two 48-hour fishing periods each week.

In addition to preventing large numbers of fish from accumulating inside closed waters, covering the markers at Chenik Lagoon would

also open a larger area to fishing, thus effectively eliminating the need for flare openings to harvest surplus fish inside the lagoon. The marker adjustments had the desired effect, and by June 30 nearly 13,000 sockeye had been harvested in the Chenik Subdistrict.

Although no sockeye were observed in the Chenik Lake system during an aerial survey of the district on July 2, the sockeye catch at Chenik that day totalled 7,200 from 23 deliveries, indicating that the run was developing rapidly. Good fishing continued throughout the week with 25,000 sockeye landed by 12-15 boats. Another survey of the Chenik system on Monday, July 9, showed an escapement of only 400 sockeye in the creek, an expectedly small number considering the liberal fishing schedule in effect for that subdistrict. Despite the low escapement count and general indicators pointing to a run weaker than forecast, the Chenik Subdistrict was allowed to remain open through the week since the catches were holding steady and the high tides were diminishing. Preseason strategy for achieving the escapement goal of 10,000 fish was to close the area during a relatively high tide series, thus facilitating fish entry into the creek. The practice of attempting to spread the escapement out over the duration of the run was no longer necessary since Chenik Lake production is enhanced by the FRED Division through annual stocking with fry from Crooked Creek Hatchery.

By July 13 the cumulative sockeye catch in the Chenik Subdistrict exceeded 60,000 fish, less than half the forecasted harvest, while the estimated escapement was fewer than 1,000 fish. The liberal five day per week fishing schedule, combined with the marker adjustments allowing fishing immediately adjacent to the stream mouth, produced harvests of 4-6,000 fish per day, but it became obvious that a closure of the Chenik Subdistrict was necessary to ensure that the escapement goal would be achieved. The closure was

announced for Monday, July 16, to coincide with a series of 18-20 foot high tides to "encourage" rapid fish passage into the lake.

Escapement rates, monitored by aerial surveys throughout the week and ground observations at the lake outlet during the period July 20-22, indicated that the closure had the desired effect. With the cumulative sockeye escapement estimated at 12-13,000 fish by Monday, July 23, the Chenik Subdistrict was allowed to re-open to fishing five days per week effective July 24. The final catch of 70,347 sockeyes was less than half of the projected 150,000 fish (Table 3, Appendix Tables 14 and 16).

During the week-long closure at Chenik, a few boats began prospecting for sockeye in the vicinity of Kirschner Lake where approximately 30,000 sockeye were forecasted to return as a result of the FRED Division lake stocking project. The effort succeeded for four vessels which landed over 7,600 fish on July 18. This proved to be the highest single-day catch of the season at Kirschner as landings after that date only ranged from 1,800 to 800 fish. The cumulative sockeye harvest from Kirschner Lake (Bruin Bay Subdistrict) was only half of the preseason projection, totalling 14,465 fish (Table 3, Appendix Table 14).

Pink Salmon

Pink salmon returns to the Kamishak Bay District were expected to be strong with a preseason projected harvest of 248,000 fish. Bruin Bay River, Sunday Creek located in Rocky Cove, and Brown's Peak Creek in Ursus Cove have historically been the primary producing systems. Spawning escapements in 1988 to these three streams ranged from 17,000 to 29,000 fish and were considered good to excellent.

Despite good brood year escapements, pink salmon returns to these streams were poor in 1990. Aerial surveys failed to document any

harvestable surplus and therefore no directed fishery was allowed on Kamishak District pink salmon stocks this season. The entire Kamishak Bay District was closed to salmon seining July 28 with the exception of the Chenik Subdistrict and those waters within a quarter mile of the Kirschner Lake waterfall. Even so, only maintenance level escapements were achieved in the major pink salmon streams in this district (Table 5, Appendix Table 24). The total catch of pink salmon in the Kamishak Bay District amounted to only 2,448 fish, the lowest since 1985 and the third lowest in the last 10 years (Appendix Table 18).

Chum Salmon

Chum salmon returns were expected to be low in 1990, and initial catch per unit effort data as well as aerial escapement estimates for the McNeil, Kamishak, and Douglas River systems confirmed chum salmon abundance in the southern Kamishak District was well below the long-term average. Consequently, a closure of the Kamishak and Douglas River Subdistricts was invoked on July 10 and no specific chum salmon openings were subsequently allowed in the Kamishak Bay District during 1990. The harvest of 3,597 fish occurred incidentally to the sockeye salmon harvests primarily at Chenik and Kirschner Lakes (Table 6). Despite the conservative fishing schedules, most chum salmon spawning escapements fell below desired levels, notably in the Kamishak and McNeil Rivers (Appendix Table 25).

Outer District

Introduction

Because fishing in the Outer District in 1989 was affected by the presence of oil from the ***Exxon Valdez*** oil spill, a second Memorandum of Understanding between the Department of Fish & Game and the Department of Environmental Conservation was drafted for

the 1990 season. According to the memorandum, before areas could be opened to fishing, test fishing had to be conducted and beaches surveyed to confirm the presence or absence of oil. Test fishing was conducted by purse seine in the East Nuka, Port Dick, and Aialik Subdistricts. Salmon samples were shipped to the State's Environmental Health Laboratory in Palmer and results of both tissue and bile analyses for oil contamination were all negative. Although no oil was observed, rubbed off, or smelled on the seine gear during the operations at any of the test fish locations, beach surveys in Port Dick Bay and Windy Bay confirmed the presence of oil in isolated areas. However, these required only minor adjustments to the management strategy during the 1990 season.

Sockeye Salmon

Delight and Desire Lakes located in the East Nuka Subdistrict continue to be the only major sockeye salmon systems in the Outer District. Aerial surveys during 1990 confirmed the presence of approximately 300 sockeye "pioneering" the newly created glacial lake north of Desire Lake. This lake, temporarily named Ecstasy Lake, began to form in 1975 due to a receding glacier. Two separate basins exist in this system and the fish were observed schooled near the mouth of a small inlet stream on the west side of the upper lake.

Aerial surveys of Delight and Desire Lakes were first flown on June 22. Only 700 fish were seen at Delight, but 2,500 sockeye were observed in Desire Lake with an estimated 200 fish in saltwater outside the markers. Surveys on June 26 showed little change at Delight, but numbers of fish were beginning to build in saltwater off Desire Lake Creek (1,650), so the East Nuka Subdistrict was opened to seining on the regular schedule of two 48-hour periods each week beginning Thursday June 28. An opening of the Aialik Subdistrict in the Eastern District was announced at the same time, but Aialik Lagoon remained closed.

Approximately 2,000 fish were landed from East Nuka during the June 28 opener. Another survey on July 3 showed 4,700 sockeye in Desire Lake, and approximately 1,700 fish had moved into the freshwater lagoon at Delight Lake. Between July 3 and July 10 only 2,700 fish were landed from the Delight and Desire Lakes area. Cumulative escapements into Delight and Desire Lakes through July 9 stood at 2,050 and 4,730 fish, respectively. Based on catch per unit effort and lagging escapement rates, the East Nuka Subdistrict was closed until further notice to allow additional sockeye escapement to both lakes. Aerial surveys were attempted on July 9 and 12, but conditions were poor and very little change in escapement rates was noted. The cumulative sockeye harvest of 5,700 sockeye for the season was considerably below the fleet's expectations. Final escapement estimates to Delight and Desire Lakes of 5,200 and 9,500 fish were below the goals of 10,000 fish for each system (Table 3, Appendix Table 23).

Approximately 30,000 sockeye salmon were projected to return to Port Dick Lake Creek in 1990 for the first time as a result of the FRED Division lake stocking project. The South Section of the Port Dick Subdistrict was opened to seining on the regular schedule of two 48-hour periods each week beginning Monday, July 2. Oil spill clean-up operations, which had begun earlier, continued in Port Dick into the open fishing period. Regulatory markers were erected near the mouth of Mars Cove to create a buffer zone designed to avoid any potential gear fouling problems that might result from the clean-up activities.

No fishing boats were present and no fish were observed during aerial surveys on July 2 and 3. Surveys continued on a regular basis but only 200 sockeye were seen at the mouth of Port Dick Lake Creek by July 12. By July 17 approximately 4,300 sockeye were estimated near the inside markers. A two-hour opening of the South Section of Port Dick Subdistrict between a regulatory marker at the mouth of Port Dick Lake Creek and a marker on the west side of

Shelter Cove at approximately 151° 15′ w. longitude was announced for July 19. A subsequent aerial survey confirmed nearly complete removal of sockeye schooled in front of Port Dick Lake Creek during that opening, producing a harvest of 5,800 sockeye and an additional 1,400 pinks. A few fish remained near the outlet falls, but sampling by a field crew on July 21 showed approximately 30% of those fish were pink salmon. Escapement at Port Dick (head-end) Creek showed only 2,500-3,000 pinks and 400 chums present in the lower end of the creek and an additional 500 pinks on the saltwater flats. Island Creek contained only 50 chums in the creek with another 500 chums observed in saltwater off the creek mouth. Escapement into that system appeared to be extremely weak at the time.

Based on the escapement rates, no further fishing was allowed until August 1 when another two-hour period was announced for the same area of the South Section between the inside marker and Shelter Cove to harvest a late build-up of sockeye at the waterfall. At the same time the East Nuka Subdistrict was closed until further notice. Only three boats fished the second two-hour period since high winds prevented several others from reaching the Port Dick area. That period produced a harvest of 3,200 sockeye, but nearly 20,000 pink salmon were caught during the opening, many more than anticipated. It was obvious that pink salmon returns were finally beginning to show some strength.

Pink Salmon

Based on the pink catches of August 1, all waters of the South Section of the Port Dick Subdistrict were opened to seining on the regular weekly schedule of two 48-hour periods effective at 6:00 a.m. Thursday, August 2. An aerial survey that evening showed a minimum of 16,000 pinks on the intertidal flats at the head end of Port Dick in one thin band, with another 5-6,000 fish (all species)

in the creek. In contrast, Island Creek escapement was still slow with only 30 pinks and 540 chums reported by a ground survey.

Although the number of fish schooled near the mouth of Port Dick (head end) Creek was sufficient to to meet the lower range of the escapement goal (20,000 fish), there was concern that the forthcoming minus tide series the following week would prevent those fish from entering or staying in the creek. If fishing was allowed to occur during the low tides, the minimum pink salmon escapement requirement could be jeapordized since it is common for fish to "back out" beyond closed waters regulatory markers during extreme low tides. To avoid this possibility, the Port Dick Subdistrict was closed at 6:00 a.m. Saturday, August 4.

During the following week, pink salmon numbers continued to build and several emergency orders were issued between August 6 and August 13 to coincide with the high tides allowing the fleet to target on incoming fish while affording protection for fish staging on the intertidal flats (Table 8).

Aerial surveys continued to monitor pink and chum salmon escapement rates at Island and Middle Creeks throughout the week of August 11. By August 13 the pink run appeared to be building at Island Creek with 10-15,000 fish in the right hand or east saltwater byte and another 15,000 fish on the intertidal flats off the creek mouth. Based on this information, the remainder of the north section of the Port Dick Subdistrict was opened to fishing on the regular schedule of two 48-hour periods per week effective August 14. The eastern-most regulatory marker at Island Creek was covered and fishing was allowed east of the island up into the east byte. Since the chum salmon runs to Middle Creek and Island Creek were virtually over, protection of those northshore streams was no longer necessary.

August 14 proved to be the best day of the season in Port Dick with 22,000 pinks landed by 13 vessels. The final catch for the entire Port Dick Subdistrict totalled 169,000 pinks, with over 16,000 of those taken from the Taylor Bay section (Table 5). This represented the second best even-year catch since 1970, exceeding the preseason projection by 140,000 fish (Appendix Table 20).

Port Chatham was the only other subdistrict in the Outer District to produce a harvestable surplus of pink salmon in 1990. An aerial survey on August 6 showed 8-9,000 fish in the creeks with up to 20,000 additional fish observed in the bay. A four-hour fishing period was allowed on August 7 in the Port Chatham Subdistrict, again during high tide to protect those fish inside the markers. This strategy effectively limited the catch, and only 4,900 pinks were harvested. A second four-hour period on August 8 produced even fewer fish (1,200) as most fish were holding well inside the closed waters markers or were moving into the spawning streams. A third two-hour opening was announced for 12:00 noon the following day and was timed to coincide with the minus tide in order to harvest fish farther out in the bay. This attempt failed since the fleet had become discouraged and abandoned the area for more lucrative fishing elsewhere. Therefore, another four-hour period was scheduled for August 10, and marker adjustments were made by management personnel on the grounds at the start of the opening. Six boats cooperatively participated in this opening, resulting in a harvest of 13,000 pink salmon. On August 13 fishing was allowed to resume on the regular schedule of two 48-hour periods each week for the remainder of the season.

The final season's catch in the Port Chatham Subdistrict totalled 22,100 pinks, and the escapement of 27,800 fish was well above the upper end of the desired escapement range of 10,000-15,000 (Table 5, Appendix Tables 20 and 24).

Aerial surveys monitoring pink salmon escapement into Desire Lake Creek indicated a cumulative total 1,000 fish, far short of the goal of 10-20,000. The area was never opened to fishing for pink salmon in 1990.

Eastern District

Aialik Lake produced the only commercially harvestable salmon return in the Eastern District in 1990. Approximately 60 sockeye salmon were first observed in Aialik Lagoon on a June 26 aerial survey. The Aialik Bay Subdistrict was opened to fishing on the regular schedule of two 48-hour periods beginning June 28. Aialik Lagoon remained closed. No fishing effort occurred and during the following six days, escapements into the lake increased to 1,450 fish with an additional unknown quantity observed in the lagoon during a July 3 survey. A two-hour opening was subsequently announced for Aialik Lagoon to begin by flare on July 6. However, poor weather prevented management staff from being on location for the opening and arrangements were quickly made by side-band radio for the fishery to proceed as scheduled without the flare since a "cooperative style" fishery was planned by the seven boats present. The catch from the first Aialik Lagoon opening was relatively small with only 1,300 sockeye being taken. An additional 1,000 fish were landed from outside the lagoon the following day. No further catches were reported until July 12 when a second (one-hour) lagoon opening was allowed, producing a harvest of nearly 3,000 sockeye. This was also a cooperative fishery with six boats participating. At the time escapement into the lake was still estimated at 1,500 fish, but survey conditions were poor. Another survey on July 16 produced an escapement estimate of 3,250 fish in the lake. Since that was within the desired escapement goal range of 2,500-5,000 fish, Aialik Subdistrict, including Aialik Lagoon, was opened at noon July 19 until further notice. The final sockeye harvest was nearly 7,700 fish and the escapement of 5,700 fish into Aialik Lake was considered excellent (Table 3, Appendix Table 23).

No other commercial harvests were allowed in the Eastern District in 1990. Catches shown in Tables 1 and 4 reflect deliveries from the recreational Seward Silver Salmon Derby and cost recovery deliveries of 5,876 coho salmon from the Bear Lake weir project. Pink salmon escapements to streams in Resurrection Bay were generally only fair, however Humpy Cove exceeded its escapement goal by nearly 2,000 fish (Appendix Table 24). The chum salmon escapement of 650 fish to Tonsina Creek was well below the 2-4,000 fish escapement typical for this system, but the run strength was similar to other Lower Cook Inlet chum salmon returns this season (Table 6).

SUBSISTENCE AND PERSONAL USE FISHERIES

Kachemak Bay Personal Use

The Kachemak Bay personal use fishery, formerly a subsistence fishery dating back prior to statehood, was eliminated by Alaska Board of Fisheries action in 1977. However, the fishery was authorized and allowed to continue by subsequent court order. Although gear regulations have remained essentially unchanged, harvest limits have varied. A limit of 50 fish for each permit holder was in effect from 1966-1978. Currently catches are limited to 25 salmon for the head of households and 10 salmon for each dependent of the permit holder. The 1970-89 average catch for all salmon species in this fishery is 3,980 fish (Appendix Table 26).

According to the Southern District Personal Use Coho Salmon Fishery Management Plan (5 AAC 77.546), all waters of the Southern District are currently open to personal use fishing with the exception of areas at the base and tip of the Homer Spit and from the terminus of the Anchor River south to the terminus of Troublesome Creek. Salmon may only be taken by set gillnets, and no set gillnet may exceed 35 fathoms in length, 6" in mesh size and 45 meshes in

depth. Salmon may only be taken from August 16-September 15 by means of a permit issued through the Department's Homer office. There are two regularly scheduled 48-hour fishing periods per week.

The Personal Use Management Plan directs the Department to close this fishery when approximately 2,500 to 3,500 coho salmon have been taken. This harvest level was based on historical average coho catches and adopted prior to any coho salmon stock enhancement by FRED Division in Kachemak Bay. A majority of the natural returns of coho salmon in the Southern District originate from Clearwater Slough, a tributary to the Fox River at the head of Kachemak Bay.

In recent years the natural component of the personal use fishery has been augmented by significant returns from coho fry stocking projects at Caribou Lake and the Homer Spit, which now contribute a large proportion of the coho salmon landed in this fishery. Due to the absence of suitable coho salmon spawning habitat at Caribou Lake or at the Homer spit fry release site, all adults returning as a result of fry stocking projects are intended for harvest. Catches have, therefore, been allowed to exceed the published guideline to allow these additional fish to be harvested.

The number of personal use fishing permits issued this season continued a sharp upward trend for the third consecutive year after remaining relatively stable from 1980-1987. The 578 permits issued this year represents a 24% increase over last year (Appendix Table 27). This year's total harvest of 10,450 fish set a new record, exceeding the previous highs of 8,500 and 8,400 fish taken for personal use in 1982 and 1989, respectively (Appendix Table 26). Coho salmon comprised 80% of the catch followed by pink salmon at 18%. The sockeye catch of 200 fish was also new record high for this fishery. No escapement estimates were attempted for the Fox River drainage due to the glacial nature of the system.

English Bay - Port Graham Subsistence

Subsistence fishing in Lower Cook Inlet during 1990 was still confined by regulation to the Port Graham and English Bay areas. Poor returns of sockeye salmon to the English Bay Lake system during the previous five years had prompted serious concerns for the health of this stock. In an attempt to increase the spawning escapement and to provide brood stock for a FRED Division rehabilitation project, a total closure of the Port Graham and English Bay areas to commercial, sport, and subsistence gillnet fishing was invoked from June 4 - July 12. The area was re-opened to subsistence fishing on July 13 after the bulk of the sockeyes had returned. The closure resulted in a peak aerial escapement estimate of 3,300 fish on July 14, still less than half the long-term average of 7,100.

Closure of the subsistence fishery during the sockeye run had little effect on overall fishing success. Although catches of sockeye salmon were below average for village residents, harvests of chinook, coho, pink, and chum were all above average. Set gillnet catches totalled 5,666 fish with 53% of the harvest comprised of pink salmon (Appendix Tables 28 and 29).

ENHANCEMENT AND REHABILITATION

Introduction

Fisheries enhancement has played a major role in LCI salmon production during recent years. Adult salmon returns to the LCI area continue to demonstrate wide fluctuations, often the result of flooding or ice scouring in the spawning streams and rivers. Salmon produced by enhancement and rehabilitation projects make a significant contribution to commercial as well as sport fishing

harvests. This contribution has historically ranged from 24-90% and is expected to remain high in future years.

FRED Division projects provided 52% (317,118 salmon) of the total 1990 LCI commercial harvest of 605,373 fish. The Leisure, Chenik, Port Dick and Kirschner Lakes sockeye salmon enhancement projects produced approximately 72% (145,945) of the total LCI harvest of 203,895 sockeye in 1990. Tutka Lagoon Hatchery production, along with the FRED/CISA cooperative rearing project at Halibut Cove Lagoon, accounted for 40% (154,601 fish) of the 1990 LCI commercial pink salmon harvest of 383,670 fish.

The contribution of FRED-produced salmon accounted for at least 64% ($1.1 million) of the $1.7 million value of the 1990 LCI commercial salmon harvest. A brief description of the current enhancement projects in LCI follows.

Tutka Lagoon Hatchery

The Tutka Lagoon Salmon Hatchery/Rearing Facility was constructed in 1976 with an initial production capacity of 10 million salmon eggs, but has been expanded to a current capacity of 50 million eggs. Pink salmon have been the primary species produced at the hatchery, although work has recently begun on sockeye production.

In 1990 the Tutka Lagoon Hatchery had its fourth lowest return in the facility's 13-year history. Approximately 276,000 pink salmon were accounted for in the return to the hatchery and it's various release sites. This yielded only a 0.8% overall survival rate, the second lowest in the facility's history. The reasons for the poor pink salmon returns to the enhancement sites are not clear at this time. However, very weak pink salmon returns were evident in most areas of LCI except the Outer District.

The commercial harvest, including cost recovery, of 37,426 pink salmon from Tutka Bay and Lagoon, combined with the 117,175 pinks harvested from returns to the Halibut Cove Lagoon remote release project, accounted for 87% of the Southern District and 40% of the entire LCI commercial pink salmon harvest.

Leisure Lake Sockeye Salmon Stocking

Leisure Lake, also called China Poot Lake, historically was a system barren of sockeye salmon. A study initiated in 1976 involved the stocking of hatchery produced sockeye salmon fry to determine optimum stocking levels prior to and after lake enrichment through fertilization. Because a barrier falls below the lake prevents upstream migration, and therefore precludes any adult spawning, it is desirable to harvest all returning fish in the terminal harvest area. Since the initiation of this project, nearly 600,000 adult sockeye have returned as a result of the stocking program and have made a significant contribution to the commercial sockeye harvest in the Southern District.

The total sockeye return to Leisure Lake in 1990 was estimated to be 53,087 fish (Figure 5). The commercial harvest of 49,587 fish (Appendix Table 15) comprised 24% of the LCI sockeye salmon harvest.

Approximately 1.75 million fry were again released into Leisure Lake in 1990, the eighth consecutive year of high-density stocking (Appendix Table 30). The fry originated from Glacier Flat (Tustumena Lake) brood stock.

Halibut Cove Lagoon Salmon Enhancement

Pink Salmon

Pink salmon enhancement at Halibut Cove Lagoon was initiated several years ago as a cooperative program with the Cook Inlet Seiners Association, Cook Inlet Aquaculture Association, and ADF&G. Pink salmon fry are transported from Tutka Hatchery to Halibut Cove Lagoon where they are held in floating net pens and fed for 30 days before release. The goal of this project is to disperse fry releases from the Tutka Hatchery over more underutilized rearing areas. It also serves to disperse the commercial seine fleet over larger areas.

The return from last year's release of six million pink salmon fry was estimated at 117,175 fish, representing a survival rate of 1.9%. Previous tagging studies have shown that an additional 15% of the fry released from Halibut Cove may have imprinted and returned to Tutka Creek, the original parent stream. The reasons for this year's poor pink salmon survival are currently unknown, but the 1990 return was very disappointing considering the 10% ocean survival rate exhibited by the 1989 pink salmon return to Halibut Cove.

Chinook Salmon

The chinook salmon enhancement project at Halibut Cove Lagoon involves the release of chinook salmon smolts with the objective of increasing sport fishing opportunities in Kachemak Bay. This is the oldest and one of the most popular sport fishing enhancement projects in LCI. Over 2,300 adult chinook salmon returned to Halibut Cove Lagoon in 1990.

Although adult returns from the Halibut Cove Lagoon stocking program are not intended for commercial harvest, there is

incidental interception of these chinook salmon in the commercial fishery, creating concern for all user groups. In 1990 the incidental harvest by commercial fishermen was estimated at 809 fish, or 34.9% of the total return, which was lower than the previous two years. The bulk of the incidental commercial harvest is by set gillnets operated in the Halibut Cove Subdistrict, accounting for an estimated 687 fish, or 30% of the run this season. This is within the long-term average interception rate of chinook salmon bound for Halibut Cove Lagoon. The remaining 120 chinook salmon were harvested very late in the chinook return by the pink salmon seine fishery within Halibut Cove Lagoon. This terminal pink salmon fishery occurs near the end of the chinook return.

It should be noted that many chinook harvested incidentally while seining during the early part of the pink return were voluntarily released by the fishermen. Most of the commercially harvested chinook were only retained at the very end of the chinook salmon return after many sport fishermen had diverted their efforts to other fishing areas and species. These fish, which were mainly small 2-ocean age chinook, would probably not have been harvested by anglers and cannot spawn at Halibut Cove Lagoon due to a lack of suitable spawning habitat.

Chenik Lake Sockeye Salmon Stocking

Historically, Chenik Lake, located in Kamishak Bay, was an excellent sockeye producer prior to the 1940's when annual runs approached 150,000 fish. Since that time, however, sockeye runs declined dramatically, forcing a complete closure of the Chenik area fishery beginning in 1952. By the mid-70's the annual return to this system was less than 500 fish.

In 1978 FRED Division initiated a program to re-establish the sockeye returns and subsequently increase commercial fishing

opportunities in the Kamishak Bay area. Sockeye fry from Crooked Creek Hatchery have been annually stocked in Chenik Lake since that time and a fish pass was developed at the intertidal mouth of Chenik Creek, alleviating a partial migrational barrier.

Increased escapements in the early 1980's enhanced subsequent production, and the Chenik area was re-opened to commercial fishing. Recent returns have produced nearly 50% of the total Lower Cook Inlet commercial sockeye harvest, approaching the historical record high runs of the 1930's.

The 1990 commercial harvest of Chenik Lake sockeye salmon totalled 70,347 fish (Figure 6, Appendix Table 16) which was 34% of the entire LCI sockeye harvest. Escapement into the lake was estimated at 17,000 fish.

English Bay Sockeye Salmon Rehabilitation

The English Bay Lake system has the only significant natural run of sockeye salmon in the Southern District of Lower Cook Inlet. Unfortunately, the English Bay sockeye returns have declined in recent years to their lowest recorded levels. Sockeye escapements currently range from 2,000-3,000 fish annually, roughly only 20% of the escapement levels documented through the 1960's. Optimum escapement for this system is estimated at 15,000-20,000 fish.

The recent declining trend in the English Bay sockeye run has resulted in a very restrictive management strategy for this area. The commercial, sport, and subsistence fisheries have been closed for most of the last several seasons. Efforts to rehabilitate the depressed sockeye salmon return to the English Bay Lakes system were initiated with an egg take in 1989. The first stocking of sockeye salmon fry took place this summer with the release of 350,000 fry.

Other Sockeye Salmon Lake Stocking

Several other LCI lakes were stocked in 1990 with sockeye salmon fry produced by Crooked Creek Hatchery. A total of 4.0 million sockeye fry were stocked in six different lakes (Appendix Table 30) after pre-stocking studies were conducted from 1986-1989. The six lakes included: Kirschner Lake, Bruin Lake, Upper and Lower Paint Lakes, and Elusivak Lake in the Kamishak District as well as Hazel Lake in the Southern District. Sockeye salmon fry releases into Port Dick Lake were discontinued due to low plankton population levels observed in 1989.

The first returns of adult sockeye salmon to Kirschner and Port Dick Lakes occurred in 1990. Over 12,000 sockeye salmon were harvested from Port Dick and nearly 18,000 returned to Kirschner Lake. Although these returns were less than forecasted levels, both systems' returns were proportionally similar to those of Chenik and Leisure Lakes. It was encouraging to note that smolt mortality rates through the extensive waterfall outlets may not be as high as initially expected.

Paint River Fish Pass

The Paint River system in the Kamishak Bay District contains at least 40 kilometers (25 miles) of potential salmonid spawning and rearing habitat for an estimated 1,600,000 sockeye, pink and chum salmon. The Paint River system is currently barren of Pacific salmon because of an impassible waterfall at tide line. FRED Division and CIAA initiated feasibility studies for a fishway in 1979. CIAA received State and Federal grant funds to build the fishway in 1990-1991. The Paint River lake system has been stocked with sockeye fry in 1986, 1988, 1989 and 1990 to test the feasibility of developing a sockeye salmon return to the fish pass project site. A total of 1.5 million sockeye salmon fry were

released into the two Paint Lakes via air drop in 1990. No adult sockeye from the 1986 stocking of the Paint Lakes returned to the system in 1990.

Projected Returns from Enhancement Projects in 1991

Sockeye salmon adult returns to enhancement sites could approach 300,000 fish in 1991 as several more lake stocking projects come on line. Beneficial results of Leisure Lake fertilization should again be evident in the 1991 sockeye returns. Based on the total emigration of 650,000 age 1.0 and 2.0 smolt in 1989, and estimates from annual releases of 2 million fry, over 100,000 sockeye salmon are projected to return to China Poot Bay in 1991.

The 1991 sockeye salmon return to Chenik Lake should exceed 100,000 fish based on return rates at that system in recent years. Escapement levels of the parent brood years for the 1991 return were estimated at over 6,500 sockeye in 1987 and 6,000 in 1986. Additionally, over 1 million sockeye fry were stocked in Chenik Lake in 1987, and an additional 2.6 million released in 1988.

The Paint River lakes in the Kamishak Area were also stocked in 1988 with 2.2 million sockeye salmon fry from the Crooked Creek Hatchery. Adult returns from this project may approach 22,000 fish in 1991.

Port Dick and Kirschner Lakes will have their second adult returns of sockeye salmon in 1991. The initial returns of 12,000 sockeye salmon to Port Dick Lake and 18,000 sockeye to Kirschner Lake were very encouraging considering the overall relative weakness of LCI sockeye returns in 1990. It was very difficult to predict the initial returns to these systems due to the series of waterfalls at each lake. The smolt must traverse these falls on their seaward migration and mortality was expected to be higher than the other sockeye salmon stocked lakes. The 1991 sockeye salmon return to

Port Dick and Kirschner Lakes is conservatively forecasted at 9,200 and 13,800 fish, respectively. Hazel Lake's initial adult sockeye return is forecasted at nearly 40,000 fish.

COMMERCIAL HERRING FISHERY

INTRODUCTION

Commercial herring fishing occurs in all of the fishing districts in Lower Cook Inlet except for the Barren Islands District (Figure 1). Herring fishing began in the Southern District in 1914 as a gillnet fishery in Kachemak Bay. Eight saltries, six near Halibut Cove, were operating during the peak of the fishery. Fishing with purse seines began in 1923, and after three subsequent years with average annual harvests approaching 8,000 short tons (st), herring populations, and the fishery, collapsed.

The next Lower Cook Inlet herring fishery began in 1939 and was centered in the Resurrection Bay and Day Harbor area of the Eastern District. This was a purse seine fishery with the product used exclusively for oil and meal reduction. Peak harvests occurred from 1944-46 averaging 16,000 st each year, and stocks sharply declined thereafter, apparently due to over-exploitation.

Japanese markets for a salted herring roe product resulted in developement of a sac roe fishery in the 1960's. Market demand and the relatively high prices paid to fishermen caused rapid expansion of the fishing fleet and harvest. Although Department management and research efforts lagged behind the rapid growth of the fishery, conservative management strategies and guideline harvest levels were established in response to historical over-exploitation of these fisheries.

A total of 2,264 short tons (st) of Pacific herring was harvested in the Kamishak Bay District during 1990 (Tables 1 and 2). The herring sac roe harvest was less than half the 1989 harvest of 4,801 st and continued a declining trend in catches from the peak harvest of 6,132 st in 1987 (Appendix Table 31). Estimated total value of the 1990 harvest to fishermen was $1.8 million (Appendix Table 32).

The number of purse seine vessels participating in 1990 was similar to previous years, reflecting the limited number of permits (75) issued for Lower Cook Inlet. A total of 12 processors/buyers purchased herring this season. Roe recoveries averaged 10.8% for the 1990 commercial sac roe harvest (Table 10).

The total Pacific herring biomass in the Kamishak Bay District, estimated from aerial surveys and postseason age composition analysis, was 19,650 st (Table 11, Figure 9, and Appendix Table 32). Although this was 9,100 st less than the preseason forecast, age composition was very similar to the preseason projection. A significant recruitment of younger fish (age 4) was observed in the samples.

No commercial harvest of sac roe herring occurred in the Southern District as fish with uniformly acceptable roe maturity were never present in appreciable numbers. There were also no open fishing periods in the Outer and Eastern Districts during 1990. Very little interest was expressed by processors and fishermen for fish from these areas due to past years' predominance of young (age 3 and 4) fish and roe recoveries consistently below 10%.

ASSESSMENT METHODS

Aerial surveys were conducted throughout the herring spawning season to determine relative abundance and distribution of Pacific

herring in the Kamishak Bay and Southern Districts. Data collection methods were consistent with those developed and used in the Togiak District of Bristol Bay. Numbers and distribution of herring schools, location and extent of milt, and visibility factors affecting survey results were recorded on index maps for each survey. Standard conversion factors of 1.52 (water depths of 16 ft or less), 2.56 (water depths between 16 and 26 ft) and 2.83 st/538 sq. ft (water depths greater than 26 ft) were used to convert estimated herring school surface areas to biomass.

Survey conditions, although quite variable, were generally excellent throughout the early part of the season. There were relatively few days in the Kamishak Bay District when surveying was hampered by low cloud ceilings, fog, or high winds. However, poor weather limited surveys of the Outer and Eastern Districts. A total of 23 aerial surveys comprehensively covering the entire Kamishak Bay District were completed during 1990, 12 in the Southern District, and only two in the Outer and Eastern Districts.

Commercial landings were sampled to determine age, size, and sexual maturity of herring. In addition, extensive test fishing by volunteer purse seine vessels was conducted to collect samples for roe recovery analysis prior to the fishery. Test fishing data was also used in postseason analysis to interpret aerial survey biomass data. Additional test fishing and sampling was conducted from May 9-13 in conjunction with aerial survey calibration.

SPAWNING POPULATIONS

Kamishak Bay District

From April 19 - June 12, 34 aerial surveys were flown in the Kamishak Bay District on 25 days during the 1990 season; herring were first observed April 21. Daily biomass estimates never

exhibited the normal trends in abundance, ie. build-up, peak, and decline. The highest daily biomass observations were made on April 30 (2,949 st) and June 4 (4,485 st). Observed peaks in abundance coincided with a distinct separation in age composition of the population, with the early fish showing a high proportion of older age fish and later fish showing a high proportion of younger (recruit age) fish.

Postseason data analysis from aerial surveys, test fishing, and commercial harvests resulted in a total biomass estimate of 19,650 st (Table 11, Figure 9, and Appendix Table 32). This was considered a minimal estimate since an additional undocumented quantity of herring were present in mid-late June.

Approximately 15% of the total biomass (by weight) was composed of age 9-15 herring. Ages 7-8 accounted for 29%, ages 5-6 herring 39%, while newly recruited age 3 and 4 herring represented 17% of the total spawning population (Figure 10).

Spawning was observed from April 21 - May 29 throughout the district. Most spawning was recorded between April 21-25, but spawn sightings were relatively few and small in size. Most observations were recorded near Chenik Head and Amakdedulia Cove.

Southern District

Aerial surveys of the Southern District were flown from April 28 through June 5 and resulted in a final biomass estimate of 4,213 st. The majority of the herring were observed in Mud Bay, Bear Cove, Mallard Bay, and Tutka Bay. The peak biomass survey (1,487 st) occurred on April 30 when 1,311 st of mostly "spawned-out" herring were observed several miles east of the Homer Spit. Peak surveys in other areas where herring have historically been observed were as follows: Bear Cove, 333 st on May 6; Mallard Bay, 324 st on May 10; and Tutka Bay, 265 st on June 5.

Age composition and roe recovery samples were collected from the Mud Bay, Mallard Bay and Glacier Spit areas between April 29 and May 8. Five different sample sets were collected by volunteer commercial seine vessels, and samples were examined for roe recovery by local processors. Roe recoveries varied greatly between sets, ranging from 6-12% mature roe, and most samples contained a mixture of "green", ripe, and spawned-out fish. Southern District samples were dominated by fish in the age 3-6 year classes, with a range from age 2-13.

Six additional roe recovery and age composition samples were collected on May 16 in conjunction with aerial survey calibrations. Four test sets were made at Mallard Bay, one at Glacier Spit, and one at Mud Bay. These samples were also dominated by fish in the age 3-6 year classes. Three sets totalling 48 st were actually pumped, but only two sets (one in Mallard Bay and one in Mud Bay) produced mature roe recoveries over 10%.

Outer and Eastern Districts

Only two comprehensive aerial surveys of the Outer and Eastern Districts were flown during the 1990 season. Continually poor weather in the Gulf of Alaska prevented surveys on a regular basis during the traditional survey window. Approximately 300 st of herring were observed on May 22 between Day Harbor and Port Dick. A second survey on June 5 resulted in a biomass estimate of 1,560 st distributed throughout the district from Day Harbor to Nuka Passage. During the June 5 survey, the largest herring concentrations (approximately 725 st) were observed in the Black Bay, Thunder Bay, and Two Arm Bay areas. No herring were observed in the Port Dick area this season.

COMMERCIAL FISHERY

Kamishak Bay District

Following several years of commercial fishing in the late 1970's, a severe decline in Kamishak Bay herring abundance prompted a complete closure beginning in 1980. Kamishak Bay stocks appeared to rebound quickly in response to the closure, and the fishery was re-opened in 1985. Since then the Kamishak Bay District has been regulated to achieve a 10-20% exploitation rate mandated by the Alaska Board of Fisheries. By 1989, fishing efficiency had evolved to a level where intensive regulatory management was required to ensure maximum value of the harvest while maintaining the guideline harvest level.

Preseason management strategy in 1990 called for a guideline harvest level of 2,292 tons based on a 10% exploitation of the previous year's final biomass estimate. The conservative harvest rate was selected because of concern regarding the low abundance of recruit age herring during 1989. In contrast to past years when the fishery was opened on a specific calendar date, the management plan was changed in 1990 to allow the openings by Emergency Order. Industry technicians were asked to evaluate test fish samples for roe recovery prior to commercial harvests to help maximize product quality and value.

Two commercial openings were allowed on April 22-23 for a total fishing time of 8.0 hours. A two-hour fishing period was announced each day, followed by a two-hour extension. On both days, aerial observations during the first two hours of fishing indicated that the fleet experienced difficulty locating marketable fish in waters suitable for seining. The entire harvest occurred in areas south of Contact Point with the total catch amounting to 2,264 st (Table 10). This was nearly 1,500 st less than the 1985-89 average catch for Kamishak Bay District (Appendix Table 31).

Preliminary value of the Kamishak Bay District herring harvest to fishermen was estimated at $1.879 million (Appendix Table 32). Sac roe prices were estimated at $750 per short ton for 10% roe, plus or minus $100 for each 1.0% change. The estimated average roe recovery of 10.8% for the sac roe harvest yielded an exvessel price of $830 per short ton without accounting for any postseason adjustments. Most companies paid an "on-grounds" base price with additional postseason settlements to be paid after price finalization with the foreign market. An increase of up to 30% of the estimated exvessel value is possible.

By Board of Fisheries directive, the Kamishak Bay District herring fishery is managed with the intent of harvesting 10-20% of the available biomass. The overall 1990 exploitation was 11.5% of the estimated biomass, based on a total harvest of 2,264 st and a total biomass estimate of 19,650 st.

Southern District

Management strategy for the Southern District sac roe fishery was changed in 1989 to allow for a limited harvest of 150-200 st in order to obtain age, weight, length, and roe recovery information. Sac roe herring had not been fished in the Southern District since 1979 when poor stock conditions forced an area-wide closure. In 1989, 171 st of 8.9 percent herring were harvested by 10 vessels in one 2.5-hour opening in Mallard Bay.

A commercial harvest of sac roe herring was not allowed in the Southern District in 1990 because sampling failed to produce any appreciable quantity of herring with uniformly acceptable roe recoveries. The management staff was hesitant to conduct a fishery when the fleet could not be limited to areas known to contain herring with desirable roe recoveries. Test fish catches indicated the fleet would have to "sift" the entire biomass to harvest 150 st of herring with roe recoveries equal to or greater than 10%. At

the time, industry representatives indicated roe recoveries of less than 10% would be difficult to market and therefore unacceptable.

Outer and Eastern Districts

Sac roe herring fishing in Lower Cook Inlet began in 1969, and during those early years, fishing within the Outer and Eastern Districts primarily occurred in Resurrection Bay. Following a period of suspected overexploitation, herring stocks generally declined throughout Lower Cook Inlet after 1973. Concern over this decline prompted the Board of Fish and Game in 1974 to establish a 4,000 ton quota for all of Lower Cook Inlet with the Eastern and Outer Districts each allocated 1,000 st. The quotas were never utilized since stock abundance continued to decline, and the Outer and Eastern Districts were closed to fishing from 1975-1984.

In 1985, the sac roe fishery was allowed to resume in the Outer and Eastern Districts on a very conservative basis, even though no noticeable change in the spawning biomass had been observed. Because of the reduced stock abundance and extreme stock vulnerability to fishing, the guideline harvest levels were set at 150-200 st for each of four fishing areas created within these two districts. Fishing effort in 1985 was minimal and the majority of the harvest (216 st) once again occurred in Resurrection Bay (Appendix Table 31).

Only limited and sporadic harvests have occurred in these two districts since 1985 and the majority of the herring harvest and biomass during the past six years have been age 3-4 fish. Unlike the Southern and Kamishak Bay Districts, samples from the Outer and Eastern Districts have contained up to 14% age-2 (sexually immature) herring. Although sampling has been limited, no discernable shift to older age herring has ever been observed, suggesting the possibility that the Eastern and Outer Districts may be feeding and rearing grounds for juvenile fish of Prince William

Sound origin. Until questions about abundance and stock composition within these two districts are resolved, a conservative management approach to the herring fishery is deemed appropriate.

The management staff did not allow a harvest in the Eastern and Outer Districts in 1990 for several reasons: (1) lack of interest by fishermen and processors, (2) no fishing boats were available to test for roe recoveries or collect AWL samples, (3) the historical predominance of juvenile herring in the population, (4) the history of marginally acceptable roe recoveries from fish caught in these areas, and (5) the limited data on herring abundance and distribution along the outer coast.

It should be noted that a proposal was submitted to the Board of Fisheries that would allow set gillnets as legal gear for herring in the Eastern, Outer, and Southern Districts of Lower Cook Inlet.

OUTLOOK AND MANAGEMENT STRATEGY FOR 1991

The 1991 total biomass of herring in Kamishak Bay District is projected to be 17,256 st or approximately 12% lower than the 1990 biomass (Table 11 and Figure 9). A schedule of increasing natural mortality with age was used to project the 1991 return. An estimated 60% of the biomass will be 7 years or older. The 1983 and 1984 year classes that have supported the fishery in recent years should represent 55% of the biomass by weight.

Available data indicates a continued decline in herring abundance due to a lack of significant recruitment of young fish into the population. Although factors responsible for this decline have yet to be identified, continuation of this trend dictates a cautious management approach. A 10% exploitation rate was again used to set the 1991 guideline harvest level.

Based on the 1991 projected return of 17,257 st, a surplus of approximately 1,727 st would be available for harvest at a 10% exploitation rate. Harvest allocation in accordance with the current management plan would be as follows:

	Tons
TOTAL ALLOWABLE HARVEST	1,727
SHELIKOF STRAITS FOOD & BAIT	173
KAMISHAK BAY SAC ROE HARVEST	1,554

The model used to prepare the 1991 herring forecast has a performance history of underestimating (by 42%) two out of every three biomass estimates. However, when it overforecasts, the error is twice as large, i.e. the actual biomass is only half of the forecast. There is a 67% chance that the 1991 biomass will be greater than the forecasted 17,256 st.

A very conservative approach will be taken with regard to any harvest of young, newly recruited herring since these fish will provide future spawning stock and contribute to future harvests. No fishery on young (age 3-4) fish will be considered unless this recruit population exceeds 40-50% of the observed biomass.

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Table 1. Commercial salmon catch in numbers of fish by species, district, and gear type, Lower Cook Inlet, 1990.

District	Chinook	Sockeye	Coho	Pink	Chum	Total
Southern						
Set Net	1,361	15,863	1,046	12,646	1,938	32,854
P. Seine	185	66,549	506	148,198	495	215,933
Total	1,546	82,412	1,552	178,087	2,433	266,030
Outer	2	17,404	74	191,320	614	209,414
Eastern	0	7,682	7,645[a]	11,815	307	27,449
Kamishak	12	96,397	26	2,448	3,597	102,480
LCI Total	1,560	203,895	9,297	383,670	6,951	605,373
Percent	0.1	9.7	0.8	77.8	11.7	100.0
30-Year Average	562	102,155	8,392	819,426	122,786	1,053,322

[a] Includes 127 cohos taken by commercial purse seine, 1,642 cohos taken during Seward Silver Salmon Derby, and 5,876 cohos taken for private hatchery cost recovery.

Table 2. Commercial catch and escapement of chinook salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[a]	Total Run
SOUTHERN DISTRICT			
Halibut Cove - China Poot	761		761
Halibut Cove Lagoon	46		46
China Poot Bay	48		48
Tutka Bay	321		321
Seldovia Bay	370		370
SOUTHERN DISTRICT TOTAL	1,546		1,546
OUTER DISTRICT			
Port Dick (Outer)	1		1
McCarty Fiord	1		1
OUTER DISTRICT TOTAL	2		2
EASTERN DISTRICT TOTAL	0		0
KAMISHAK DISTRICT			
Chenik Lake	8		8
McNeil River	2		2
Paint River	2		2
KAMISHAK DISTRICT TOTAL	12		12
TOTAL LOWER COOK INLET	1,560		1,560

[a] Chinook escapement in Lower Cook Inlet is very limited; no escapement surveys are conducted.

Table 3. Commercial catch and escapement of sockeye salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[a]	Total Run
SOUTHERN DISTRICT			
Halibut Cove	17,920		17,920
Halibut Cove Lagoon	2,349		2,349
China Poot Bay	49,900		49,900
Tutka Bay	7,922		7,922
Seldovia Bay	4,321		4,321
English Bay		3,300	3,300
SOUTHERN DISTRICT TOTAL	82,412	3,300	85,712
OUTER DISTRICT			
Port Chatham	19		19
Port Dick (West Arm)	11,546		11,546
Port Dick (Taylor Bay)	111		111
McCarty Fiord	5,728		
Desire Lake		9,500	
Delight Lake		5,200	
Ecstasy Lake		300	
			20,728
OUTER DISTRICT TOTAL	17,404	15,000	32,404
EASTERN DISTRICT			
Aialik Bay	7,682	5,700	13,382
EASTERN DISTRICT TOTAL	7,682	5,700	13,382

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Table 3. (page 2 of 2)

Fishery	Catch	Escapement[a]	Total Run
KAMISHAK DISTRICT			
Kirschner Lake	14,465		14,465
Bruin Bay	2,224		2,224
Amakdedori Creek		1,800	1,800
Chenik Lake	70,347	17,000	87,347
Mikfik Creek	9,066	8,800	17,866
Augustine Is.	243		243
Kamishak River	34		
Little Kamishak River		30	
Big Kamishak River		200	
Douglas River	18	600	
			882
KAMISHAK DISTRICT TOTAL	96,397	28,430	124,827
TOTAL LOWER COOK INLET	203,895	52,430	256,325

[a] Peak aerial live counts.

Table 4. Commercial catch and escapement of coho salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[a]	Total Run
SOUTHERN DISTRICT			
Halibut Cove	281		281
Halibut Cove Lagoon	9		9
China Poot Bay	342		342
Tutka Bay	671		671
Seldovia Bay	249		249
SOUTHERN DISTRICT TOTAL	1,552		1,552
OUTER DISTRICT			
Port Chatham	1		1
Port Dick (West Arm)	69		69
Port Dick (Taylor Bay)	3		3
McCarty Fiord	1		
Desire Lake		80	
Delight Lake		60	
			141
OUTER DISTRICT TOTAL	74	140	214
EASTERN DISTRICT			
Aialik Bay	127		127
Resurrection Bay	1,642[b]		
Bear Lake	5,876[c]		
			7,518
EASTERN DISTRICT TOTAL	7,645		7,645
KAMISHAK DISTRICT			
Chenik Lake	3		3
Douglas River		1,800	1,800
Little Douglas River		3,500	3,500
Augustine Island	23		23
KAMISHAK DISTRICT TOTAL	26	5,300	5,326
TOTAL LOWER COOK INLET	9,297	5,440	14,737

[a] Escapement estimates derived from limited aerial surveys. Numbers represent unexpanded aerial live counts.
[b] Cohos taken during Seward Silver Salmon Derby.
[c] Cohos taken for private hatchery cost recovery.

Table 5. Commercial catch and escapement of pink salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[a]	Total Run
SOUTHERN DISTRICT			
Humpy Creek		27,042	27,042
Halibut Cove	51,068		51,068
Halibut Cove Lagoon	39,915		39,915
China Poot Bay	46,100	4,178	50,278
Tutka Bay	37,426		
Sadie Cove		113	
Tutka Lagoon Creek		38,500	
Jakolof Bay		1,081	
Barabara Creek		3,904	
			81,024
Seldovia Bay	3,578	27,782	31,360
Port Graham		20,053	20,053
SOUTHERN DISTRICT TOTAL	178,087	122,653	300,740
OUTER DISTRICT			
Dogfish Bay		7,067	7,067
Port Chatham	22,103	27,822	49,925
Windy Bay			
Windy River Left		7,521	
Windy River Right		7,097	
			14,618
Rocky Bay			
Scurvey Creek		250	
Rocky River		18,000	
			18,250
Port Dick (Outer)	2		
Port Dick (West Arm)	152,581		
Port Dick (Taylor Bay)	16,473		
Port Dick-Head End Creek		41,706	
Port Dick-Slide Creek		7,992	
Port Dick-Middle Creek		234	
Port Dick-Island Creek		25,000	
			243,988

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Table 5. (page 2 of 2)

Fishery	Catch	Escapement[a]	Total Run
Nuka Island South Creek		13,299	13,299
McCarty Fiord	161		
James Lagoon		3,787	
Desire Lake		1,000	
Delight Lake		400	
			5,348
OUTER DISTRICT TOTAL	191,320	161,175	352,495
EASTERN DISTRICT			
Aialik Bay	11,815		11,815
Resurrection Bay			
Tonsina Creek		1,180	
Bear Creek		4,414	
Jap Creek		9	
Spring Creek		274	
Humpy Cove		3,829	
			9,706
EASTERN DISTRICT TOTAL	11,815	9,706	21,521
KAMISHAK DISTRICT			
Ursus Cove		550	550
Rocky Cove		2,830	2,830
Kirschner Lake	1,312		1,312
Bruin Bay	410	19,000	19,410
Chenik Lake	639		639
Amakdedori Creek		50	50
Augustine Island	86		86
Kamishak River	1		1
KAMISHAK DISTRICT TOTAL	2,448	22,430	24,878
TOTAL LOWER COOK INLET	383,670	315,964	699,634

[a] Escapement estimates in the Southern, Outer, and Eastern Districts derived from periodic ground surveys with stream life factors applied. Kamishak estimates are unexpanded peak aerial live counts.

Table 6. Commercial catch and escapement of chum salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[a]	Total Run
SOUTHERN DISTRICT			
Humpy Creek		500	500
Halibut Cove	128		128
Halibut Cove Lagoon	3		3
China Poot Bay	279	1,108	1,387
Tutka Bay	1,451		
Tutka Lagoon Creek		70	
Jakolof Bay		76	
			1,597
Seldovia Bay	572		
Seldovia River		5,000	
			5,572
Port Graham			
Port Graham River		2,600	2,600
SOUTHERN DISTRICT TOTAL	2,433	9,354	11,787
OUTER DISTRICT			
Dogfish Bay		1,000	1,000
Port Chatham	89	745	834
Windy Bay			
Windy River Left		103	
Windy River Right		64	
			167
Rocky Bay			
Rocky River		800	800
Port Dick (Taylor Bay)	4		4
Port Dick West Arm	492		
Port Dick-Head End Creek		1,100	
Port Dick-Slide Creek		122	
Port Dick-Middle Creek		30	
Port Dick-Island Creek		2,276	
			4,020
McCarty Fiord	29		
James Lagoon		151	
			180
OUTER DISTRICT TOTAL	614	6,391	7,005

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Table 6. (page 2 of 2)

Fishery	Catch	Escapement[a]	Total Run
EASTERN DISTRICT			
Aialik Bay	307		307
Resurrection Bay North			
Tonsina Creek		651	
Bear Creek		28	
Jap Creek		23	
Spring Creek		72	
			774
EASTERN DISTRICT TOTAL	307	774	1,081
KAMISHAK DISTRICT			
Augustine Island	15		15
Iniskin Bay			
Iniskin River		8,350	8,350
Cottonwood Bay			
Cottonwood Creek		4,300	4,300
Browns Peak Creek		1,500	1,500
Ursus Cove			
Ursus Lagoon		3,800	3,800
Rocky Cove			
Sundy Creek		1,500	1,500
Kirschner Lake	1,572		1,572
Bruin Bay	59	4,000	4,059
Chenik Lake	1,649		1,649
McNeil River	138	8,000	8,138
Kamishak River	28		
Little Kamishak River		7,900	
Big Kamishak River		2,500	
			10,428
Douglas River	136	1,200	1,336
Little Douglas River		1,500	1,500
KAMISHAK DISTRICT TOTAL	3,597	44,550	48,147
TOTAL LOWER COOK INLET	6,951	61,069	68,020

[a] Escapement estimates in the Southern, Outer, and Eastern Districts derived from periodic ground surveys with stream life factors applied. Kamishak estimates are unexpanded peak aerial live counts.

Table 7. Exvessel value of the commercial salmon catch in thousands of dollars, by species and gear type, Lower Cook Inlet, 1990.

	Chinook	Sockeye	Coho	Pink	Chum	Total
PURSE SEINE						
No. Fish	199	188,032	733	291,024	5,013	575,519
Pounds	2,607	742,576	4,843	977,529	47,935	1,775,490
Price/ Pound	1.35	1.55	.60	.30	.50	
Value	3,519	1,150,993	2,906	293,259	23,968	1,474,645
SET GILLNET						
No. Fish	1,361	15,863	1,046	12,646	1,938	32,854
Pounds	18,844	87,935	7,361	43,353	13,760	171,253
Price/ Pound	1.35	1.55	.60	.30	.50	
Value	25,439	136,299	4,417	13,006	6,880	186,041
TOTAL ALL GEAR						
No. Fish	1,560	203,895	9,297[a]	383,670	6,951	605,373
Pounds	21,451	830,511	65,838[a]	1,020,882	61,695	2,000,377
Value	28,958	1,287,292	27,652[a]	306,265	30,848	1,681,015

[a] In addition to set gillnet and purse seine catches, 1,642 cohos taken during Seward Silver Salmon Derby and 5,876 silvers taken for private hatchery cost recovery.

Table 8. Emergency Order commercial fishing periods, Lower Cook Inlet, 1990.

Number/ Issue Date	DESCRIPTION
2-F-H-01-90 April 22	Opens the entire Kamishak Bay District to herring sac roe seining for approximately two hours starting with an ADF&G announcement some time between 9:55 and 10:05 a.m. , Sunday April 22, 1990. The fishery will close at 12:00 noon.
2-F-H-02-90 April 22	Extends the open fishing period in the entire Kamishak Bay District for herring sac roe seining for two additional hours from 12:00 noon until 2:00 p.m. Sunday, April 22, 1990. The fishery will close at 2:00 p.m.
2-F-H-03-90 April 23	Opens the entire Kamishak Bay District to herring sac roe seining for approximately two hours starting with an ADF&G field announcement some time between 10:25 and 10:35 a.m. Monday, April 23, 1990. The fishery will close at 12:30 p.m.
2-F-H-04-90 April 23	Extends the open fishing period in the Kamishak Bay District for herring sac roe seining for two additional hours, from 12:30 p.m. until 2:30 p.m. Monday, April 23, 1990. The fishery will close at 2:30 p.m.
2-F-H-05-90 May 29	Closes the Port Graham and English Bay area to commercial set gillnet fishing prior to the scheduled opening date of June 4, 1990.
2-F-H-06-90 May 29	Closes the Port Graham and Koyuktolik (Dogfish) subdistricts to subsistence gillnet fishing effective at 6:00 a.m. Wednesday May 30, 1990 until further notice.
2-F-H-07-90 June 7	Closes McNeil River and Paint River subdistricts to salmon seining effective at 6:00 a.m. Friday June 8, 1990 until further notice.
2-F-H-08-90 June 19	Beginning Monday, June 25, at 6:00 a.m., this emergency order opens the following areas within the Southern District to salmon seining five days per week until further notice: China Poot, Tutka Bay and Halibut Cove Subdistricts. The markers at the HEA powerline in China Poot will not be in

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Number/ Issue Date	DESCRIPTION
	effect and fishing will be allowed up to the Department marker at the mouth of China Poot Creek. Halibut Cove Lagoon will open to seining five days per week effective 6:00 a.m. Thursday July 5. In addition, beginning Monday June 25 at 6:00 a.m., this emergency order opens the following areas within the Kamishak District to salmon seining five days per week until further notice: Chenik Subdistrict, Bruin Bay Subdistrict, and that portion of the Rocky Cove subdistrict west of the longitude of the unnamed creek between Fortification Bluff and Step Mountain at 153°46'18" W. longitude. The markers in Chenik Lagoon have been covered and seining will be allowed up to the stream mouth. The remainder of the Kamishak District will be open on the regular schedule of two 48-hour periods each week with the exception of the McNeil River and Paint River subdistricts which will remain closed.
2-F-H-09-90 June 26	Opens the East Nuka Subdistrict in the Outer District and Aialik Bay Subdistrict in the Eastern District to salmon seining on the regular schedule of two 48-hour periods each week beginning at 6:00 a.m. Thursday June 28, 1990, until further notice. Aialik Lagoon will remain closed. Opens waters of the South Section *only* of the Port Dick Subdistrict in the Outer District to salmon seining on the regular schedule of two 48-hour periods each beginning at 6:00 a.m. Monday, July 2, 1990, until further notice.
2-F-H-10-90 July 3	Amends the weekly fishing schedule beginning at 6:00 Thursday July 5, 1990, to allow the taking of salmon by set gill net in the Halibut Cove Subdistrict five days per week from 6:00 a.m. Monday until 6:00 a.m. Saturday until further notice.

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Number/ Issue Date	DESCRIPTION
	Waters of Aialik Lagoon shall be open to purse seining for two hours from 10:00 a.m. until 12:00 noon Friday July 6, 1990.
2-F-H-11-90 July 10	Closes the Tutka Bay, Seldovia Bay and Barabara Creek Subdistricts to commercial salmon fishing effective at 6:00 a.m. Wednesday July 11, 1990, until further notice. Closes the East Nuka and Port Dick Subdistricts to commercial salmon fishing effective at 6:00 a.m. Wednesday, July 11, 1990, until further notice. Opens Aialik Lagoon to commercial salmon fishing for a one-hour period from 12:00 noon until 1:00 p.m. Thursday, July 12, 1990. Closes the Kamishak and Douglas River Subdistricts to commercial salmon fishing effective at 6:00 a.m. Wednesday, July 11, 1990, until further notice.
2-F-H-12-90 July 10	Re-opens the Port Graham Subdistrict to subsistence salmon fishing effective 6:00 a.m. Thursday, July 12, 1990 until further notice.
2-F-H-13-90 July 13	Closes the Chenik Sudistrict to commercial salmon fishing effective at 6:00 a.m. Monday, July 16, 1990 until further notice.
2-F-H-14-90 July 17	Opens the Tutka Bay, Seldovia Bay and Barabara Creek Subdistricts to the commercial taking of salmon by set gillnet on the regular weekly schedule of two 48-hour periods effective at 6:00 p.m. Tuesday, July 17, 1990 until further notice. Opens waters of the South Section of the Port Dick Subdistrict to commercial salmon fishing between the ADF&G regulatory marker at the mouth of Port Dick Lake Creek, and a marker on the west side of Shelter Cove at approx. 151°15′ W. longitude, for a 2-hour period from 10:00 a.m. until 12:00 noon Thursday, July 19, 1990.

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Table 8. (page 4 of 7)

Number/ Issue Date	DESCRIPTION
	Opens the Aialik Subdistrict including Aialik Lagoon to commercial salmon fishing effective at 12:00 noon Thursday, July 19, 1990 until further notice. Closes the Kamishak District to commercial salmon fishing except waters of the Bruin Bay Subdistrict, and that portion of the Rocky Cove Subdistrict west of the longitude of the unnamed creek between Fortification Bluff and Step Mountain at 153°46'18" W. longitude, effective 6:00 a.m. Wednesday July 18, 1990 until further notice.
2-F-H-15-90	This E.O. was not issued.
2-F-H-16-90 July 20	Opens those waters of the East Nuka Subdistrict within a two-mile radius of Desire Lake Creek to commercial salmon fishing. The two regular 48-hour weekly fishing periods will be allowed effective at 6:00 a.m. Monday July 23, 1990, until further notice. Regulatory markers will remain in effect at Desire Lake Creek.
2-F-H-17-90 July 23	Re-opens the Chenik Subdistrict to commercial salmon fishing five days per week effective at 6:00 a.m. Tuesday July 24, 1990, until further notice.
2-F-H-18-90 July 23	Allows authorized agents of the Cook Inlet Regional Aquaculture Assoc. to harvest salmon in the Tutka Lagoon Special Harvest Area by purse seine seven days per week effective 6:00 p.m. Monday, July 23, 1990 until further notice.
2-F-H-19-90 July 31	Closes waters of the China Poot Bay Subdistrict south and east of the Kachemak Bay Wilderness Lodge to commercial salmon fishing effective 6:00 a.m. Wednesday, August 1, 1990 until further notice. Closes waters of Halibut Cove Subdistrict with the exception of Halibut Cove Lagoon to commercial purse seine fishing effective at 6:00 a.m. Wednesday, August 1, 1990 until further notice.

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Table 8. (page 5 of 7)

Number/ Issue Date	DESCRIPTION
	Opens waters of the South Section of the Port Dick Subdistrict between the ADF&G regulatory marker at the mouth of Port Dick Lake Creek, and a marker on the west side of Shelter Cove at approx. 151°15′ W. longitude to commercial salmon fishing for a two-hour period on Wednesday, August 1, 1990 from 10:00 a.m. until 12:00 noon. Closes all waters of the East Nuka Subdistrict to commercial salmon fishing effective at 6:00 a.m. Wednesday, August 1, 1990.
2-F-H-20-90 August 1	Opens all waters of the South Section of Port Dick Subdistrict east of the ADF&G regulatory marker at the mouth of Port Dick Lake Creek to commercial salmon fishing on the regular weekly schedule of two 48-hour periods effective at 6:00 a.m. Thursday, August 2, 1990.
2-F-H-21-90 August 3	Closes all waters of the Port Dick Subdistrict to commercial salmon fishing effective at 6:00 a.m. Saturday, August 4, 1990 until further notice.
2-F-H-22-90 August 6	Opens waters of the South Section only of the Port Dick Subdistrict west of a line extending from the waterfall at approx. 151°05′55" W. longitude to the south shore at 59°15′20" N. latitude to commercial salmon fishing for a four-hour period from 2:00 p.m. until 6:00 p.m. Tuesday, August 7, 1990. Opens all waters of the Port Chatham Subdistrict to commercial salmon fishing for a four-hour period from 2:00 p.m. until 6:00 p.m. Tuesday, August 7, 1990.
2-F-H-23-90 August 8	Opens all waters of the Tutka Bay Subdistrict to commercial salmon fishing five days per week from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Thursday, August 9, 1990, until further notice.

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Table 8. (page 6 of 7)

Number/ Issue Date	DESCRIPTION
	Opens waters of the Douglas River Subdistrict east of 153°40′ W. longitude to commercial salmon fishing five days per week from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Monday, August 13, 1990 until further notice.
	Opens waters of the South Section only of the Port Dick Subdistrict west of a line extending from the waterfall at approx. 151°05′55" W. longitude to the south shore at 59°15′20" N. latitude to commercial salmon fishing for a four-hour period from 2:00 p.m. until 6:00 p.m. Wednesday, August 8, 1990.
	Opens all waters of the Port Chatham Subdistrict to commercial salmon fishing for a four-hour period from 2:00 p.m. until 6:00 p.m. Wednesday, August 8, 1990.
2-F-H-24-90 August 9	Opens waters of the South Section only of the Port Dick Subdistrict west of a line extending from the waterfall at approx. 151°05′55" W. longitude to the south shore at 59°15′20" N. latitude to commercial salmon fishing for a four-hour period from 2:00 p.m. until 6:00 p.m. Thursday, August 9, 1990.
	Opens all waters of the Port Chatham Subdistrict to commercial salmon fishing for a two-hour period from 12:00 noon until 2:00 p.m. Thursday, August 9, 1990.
2-F-H-25-90 August 9	Opens waters of the South Section only of the Port Dick Subdistrict west of a line extending from the waterfall at approx. 151°05′55" W. longitude to the south shore at 59°15′20" N. latitude to commercial salmon fishing for a four hour period from 2:00 p.m. until 6:00 p.m. Friday, August 10, 1990.
2-F-H-26-90 August 10	Opens all waters of the Port Dick Subdistrict except that portion of the North Section from the waterfall at approx. 151°05′55" W. longitude to the westernmost marker at Middle Creek to commercial

-continued-

Table 8. (page 7 of 7)

Number/ Issue Date	DESCRIPTION
	salmon fishing on the regular schedule of two 48-hour periods from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Monday, August 13, 1990 until further notice. Opens all waters of the Port Chatham Subdistrict to commercial salmon fishing on the regular schedule of two 48-hour periods from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Monday, August 13, 1990 until further notice.
2-F-H-27-90 August 13	Opens all waters of the Port Dick Subdistrict to commercial salmon fishing on the regular weekly schedule of two 48-hour periods effective at 6:00 p.m. Tuesday, August 15, 1990 until further notice. The eastern-most regulatory marker at Island Creek will be covered and fishing will be allowed in the bay east of the island.
2-F-H-28-90 August 23	Allows commercial salmon fishing up to the stream mouths in waters of the Port Chatham Subdistrict from 3:00 p.m. Thursday, August 23 until 6:00 a.m. Saturday, August 25, 1990.

Table 9. Total return of adult pink salmon to Tutka Bay and Lagoon in the Southern District of Lower Cook Inlet, 1990.

Commercial Harvest:	
Purse Seine	12,385
Set Gillnet	7,798
Cost Recovery	17,243
Total Commercial Harvest	37,426
Sport Catch	2,000
Escapement:	
Tutka Creek and Channel	38,500
Egg-Take	62,000
Total Return	139,926

Table 10. Commercial purse seine catch of sac roe herring in short tons, and average roe recovery by area and date, Kamishak Bay District, Lower Cook Inlet, 1990.

Area	Date	Tons	Roe %
Douglas Reef	4/23	4.8	10.7
Kamishak Reef	4/22	648.8	11.0
Kamishak Reef	4/23	106.5	11.1
Kamishak Reef (Test Fishery)	5/14	18.8	9.2
McNeil-Amakdedulia Cove	4/22	38.5	11.8
McNeil-Amakdedulia Cove	4/23	30.5	10.6
Chenik Reef	4/22	553.7	11.0
Chenik Reef	4/23	413.3	10.4
Contact Point South	4/22	250.6	10.6
Contact Point South	4/23	198.0	10.2
Total		2,263.5	10.8

Table 11. Total biomass estimates and commercial catch of Pacific herring in short tons by age class, Kamishak Bay District, 1990, and 1991 forecast.

Age	1990 Estimated Biomass	1990 Commercial Harvest	Percent	1991 Forecast Biomass	Percent by Weight
1	0.1	0.0	0.0		
2	0.1	0.0	0.0		
3	507.3	17.6	0.8	7	0
4	1,587.6	53.2	2.3	2,115	12
5	1,396.5	113.7	5.0	1,836	11
6	5,798.3	878.6	38.8	1,368	8
7	5,221.8	562.2	24.8	4,946	29
8	1,122.3	170.5	7.5	4,407	26
9	1,749.0	220.9	9.8	753	4
10	1,178.5	134.6	5.9	965	6
11	553.4	61.0	3.0	537	3
12	257.1	32.0	1.4	192	1
13	151.4	9.0	0.4	91	1
14	65.7	4.6	0.2	28	0
15	33.2	1.5	0.1	12	0
16	27.3	3.9	0.2		
TOTAL	19,650	2,264		17,257	

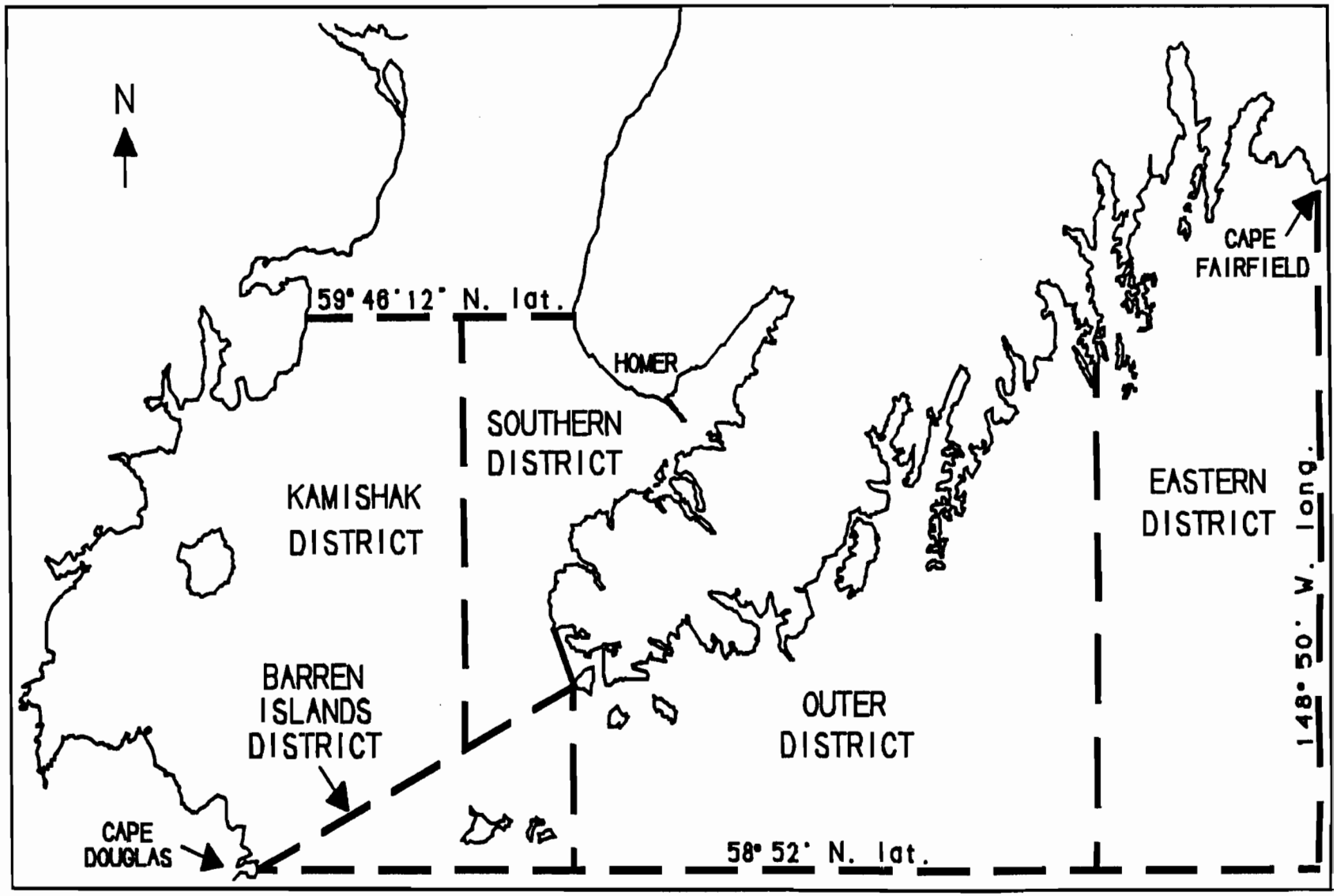

Figure 1. Lower Cook Inlet salmon and herring management area (not drawn to scale).

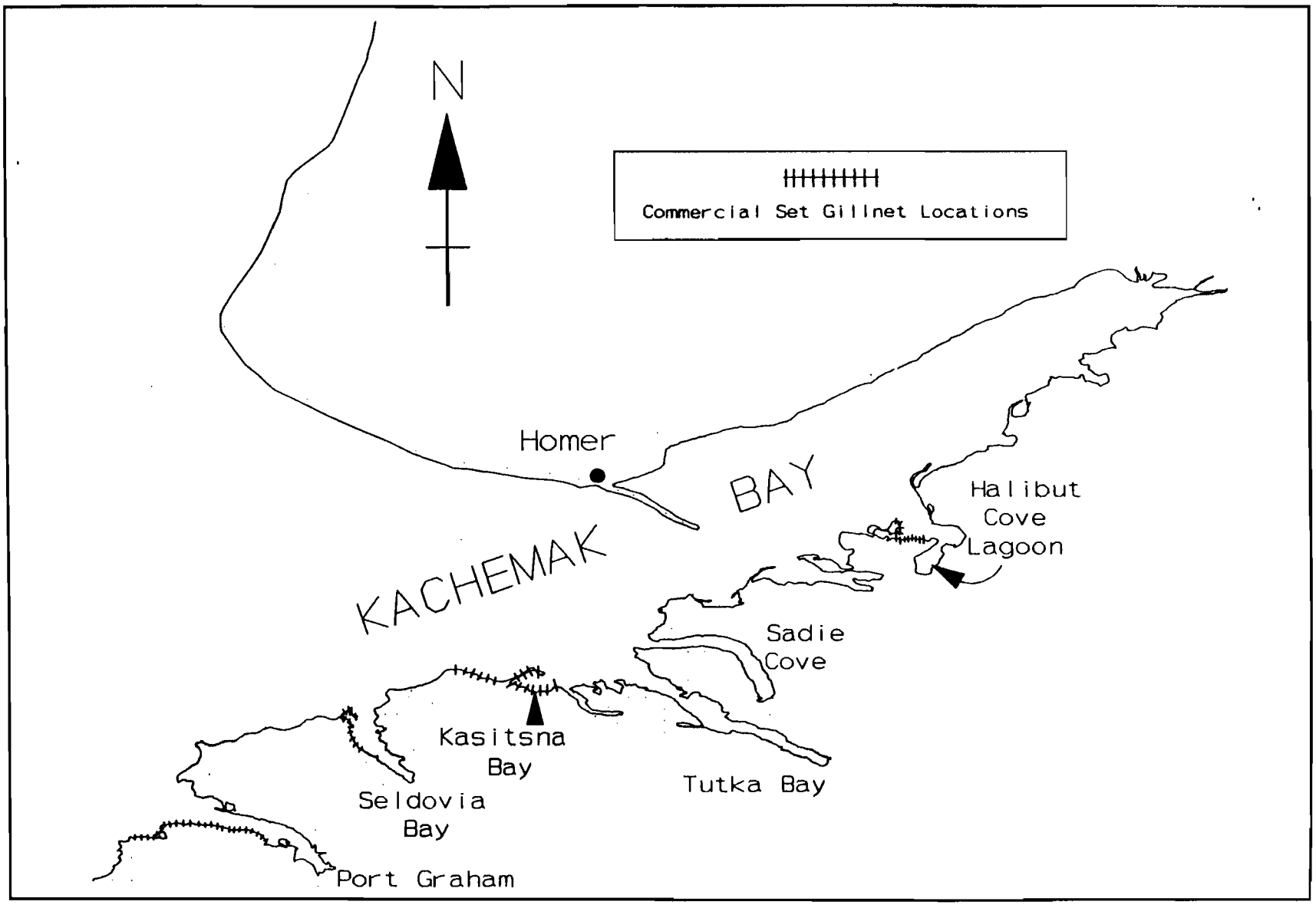

Figure 2. Commercial set gillnet locations in the Southern District of Lower Cook Inlet.

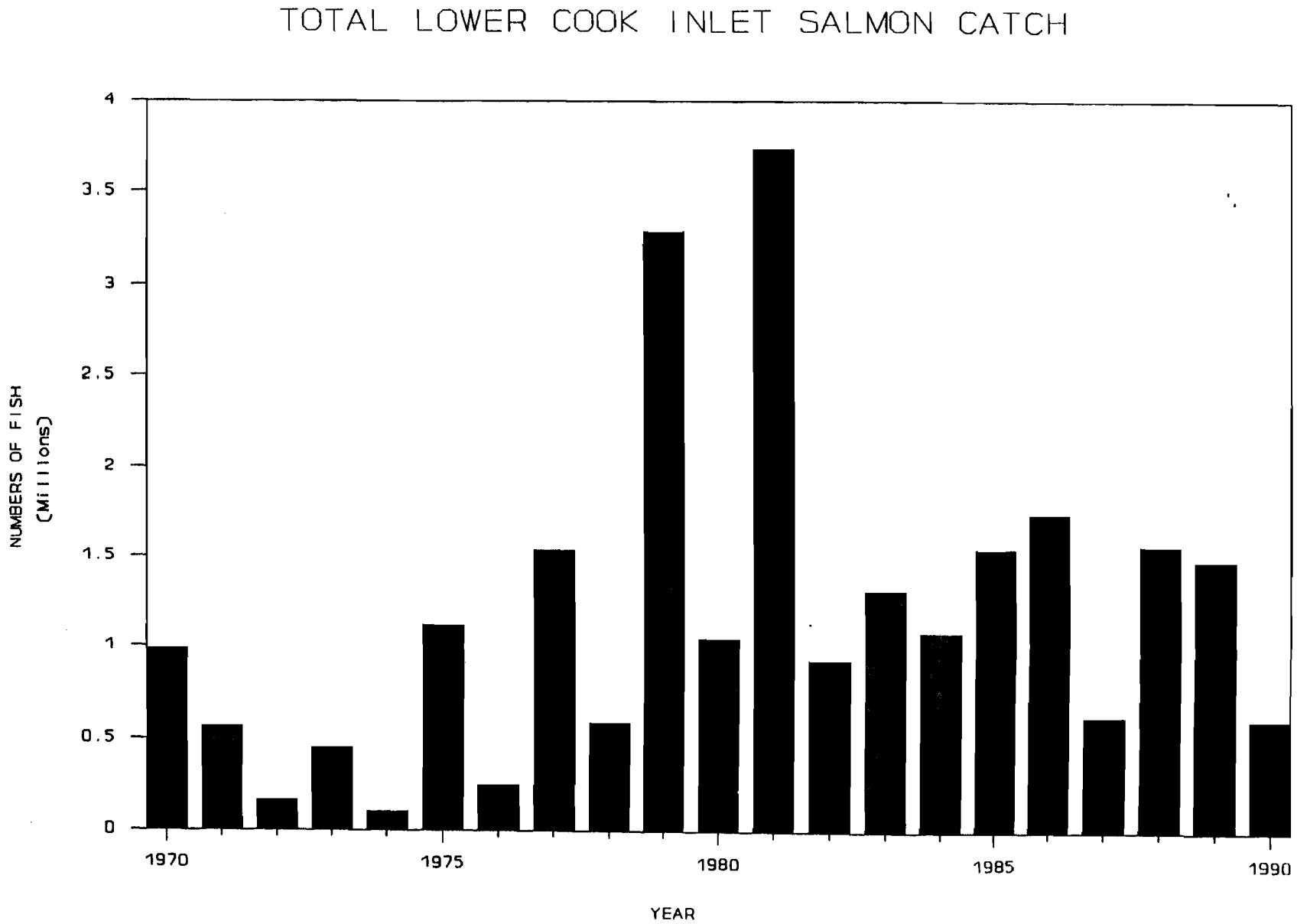

Figure 3. Total commercial salmon catch, Lower Cook Inlet, 1970 - 1990.

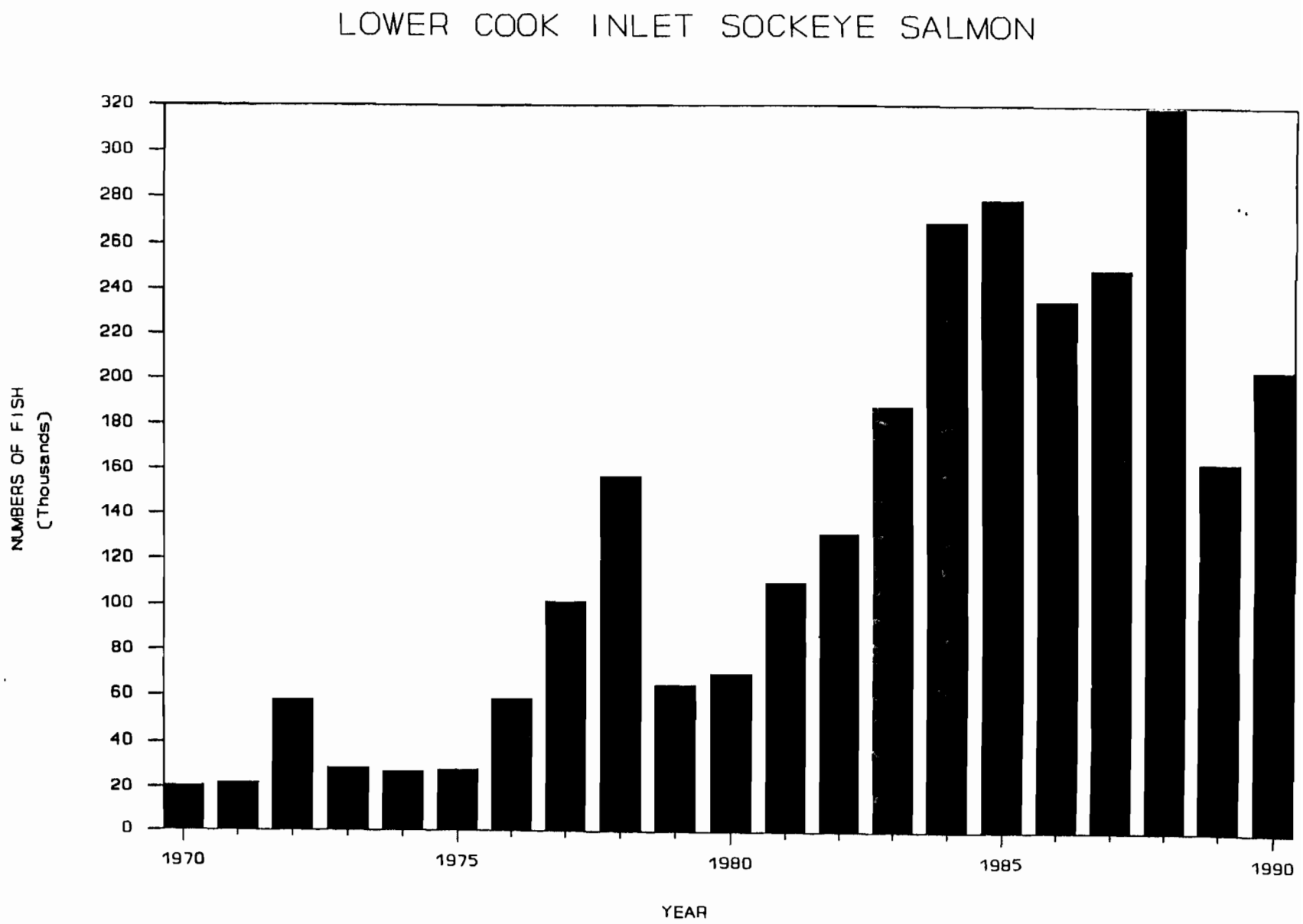

Figure 4. Commercial sockeye salmon catch, Lower Cook Inlet, 1970 - 1990.

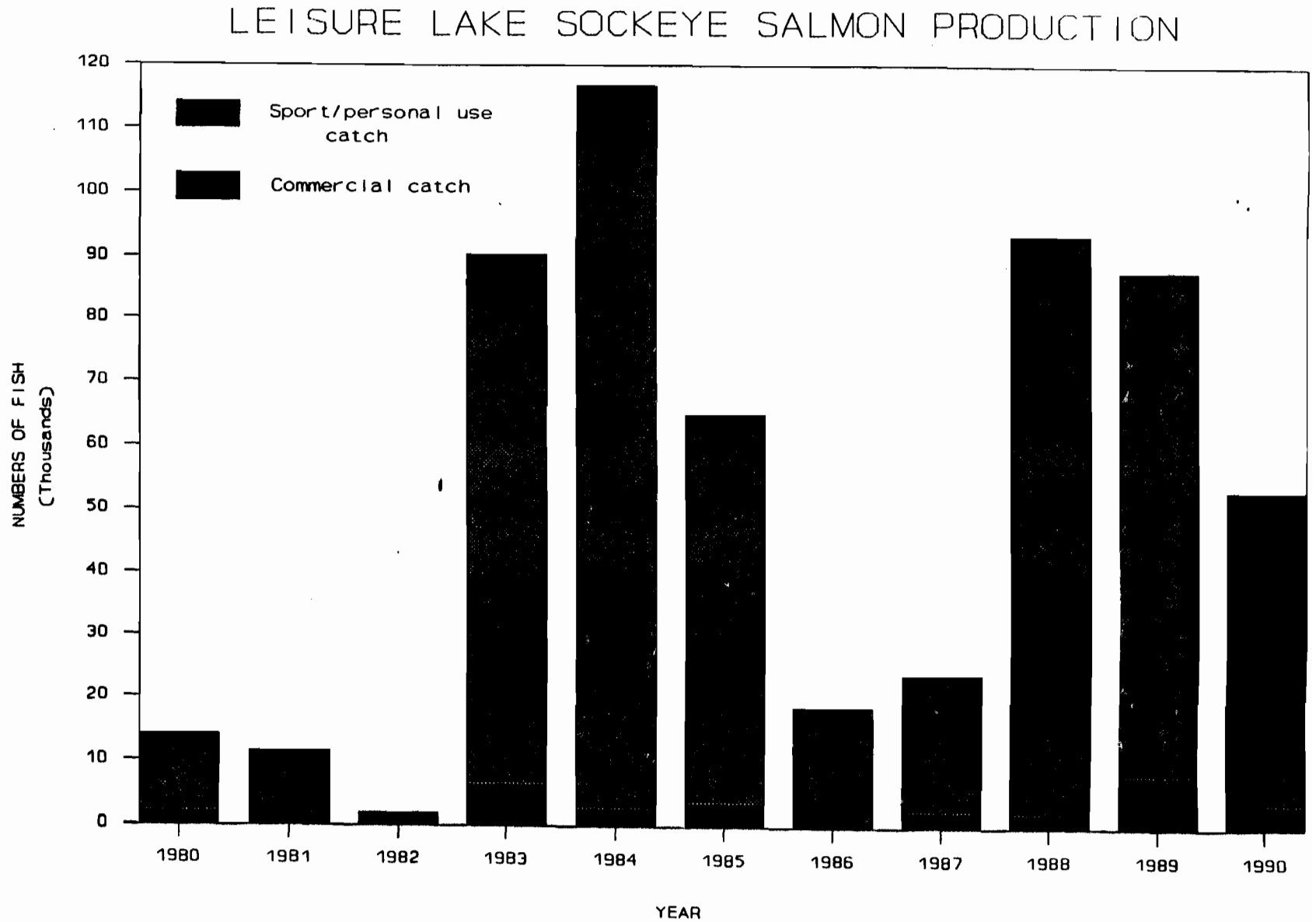

Figure 5. Sockeye salmon returns to Leisure Lake in the Southern District of Lower Cook Inlet, 1980 - 1990.

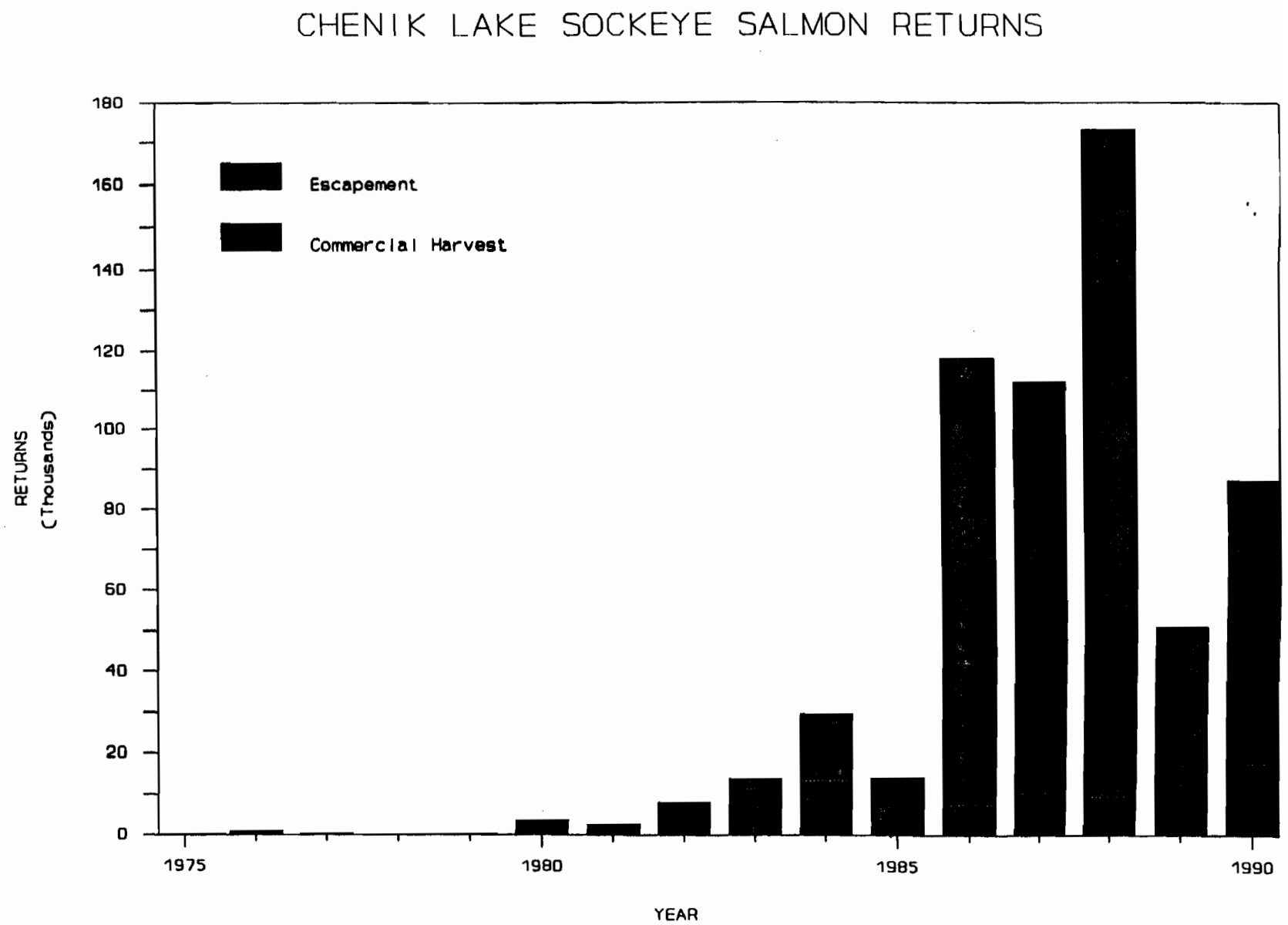

Figure 6. Sockeye salmon returns to Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 - 1990.

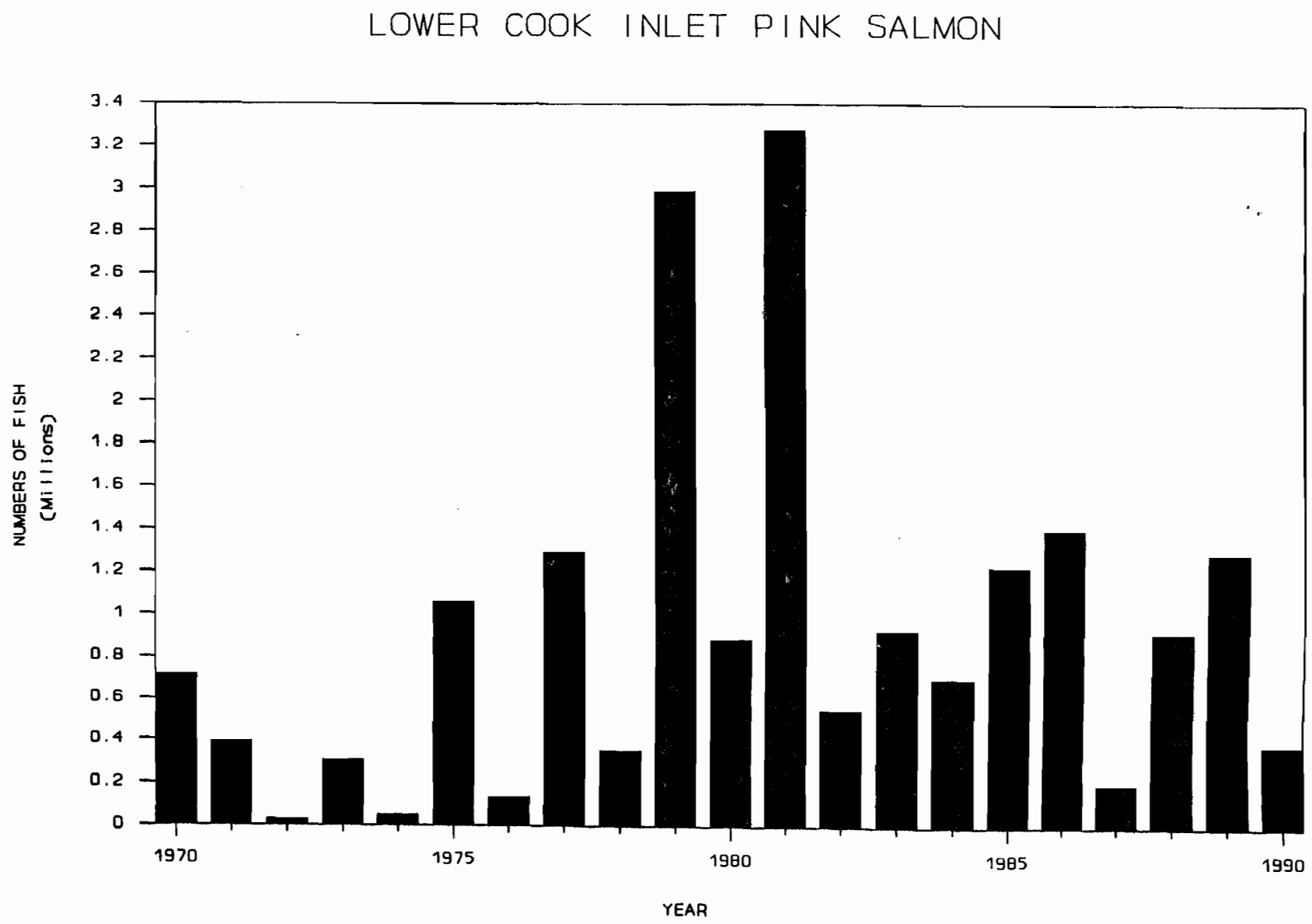

Figure 7. Commercial pink salmon catch, Lower Cook Inlet, 1970 - 1990.

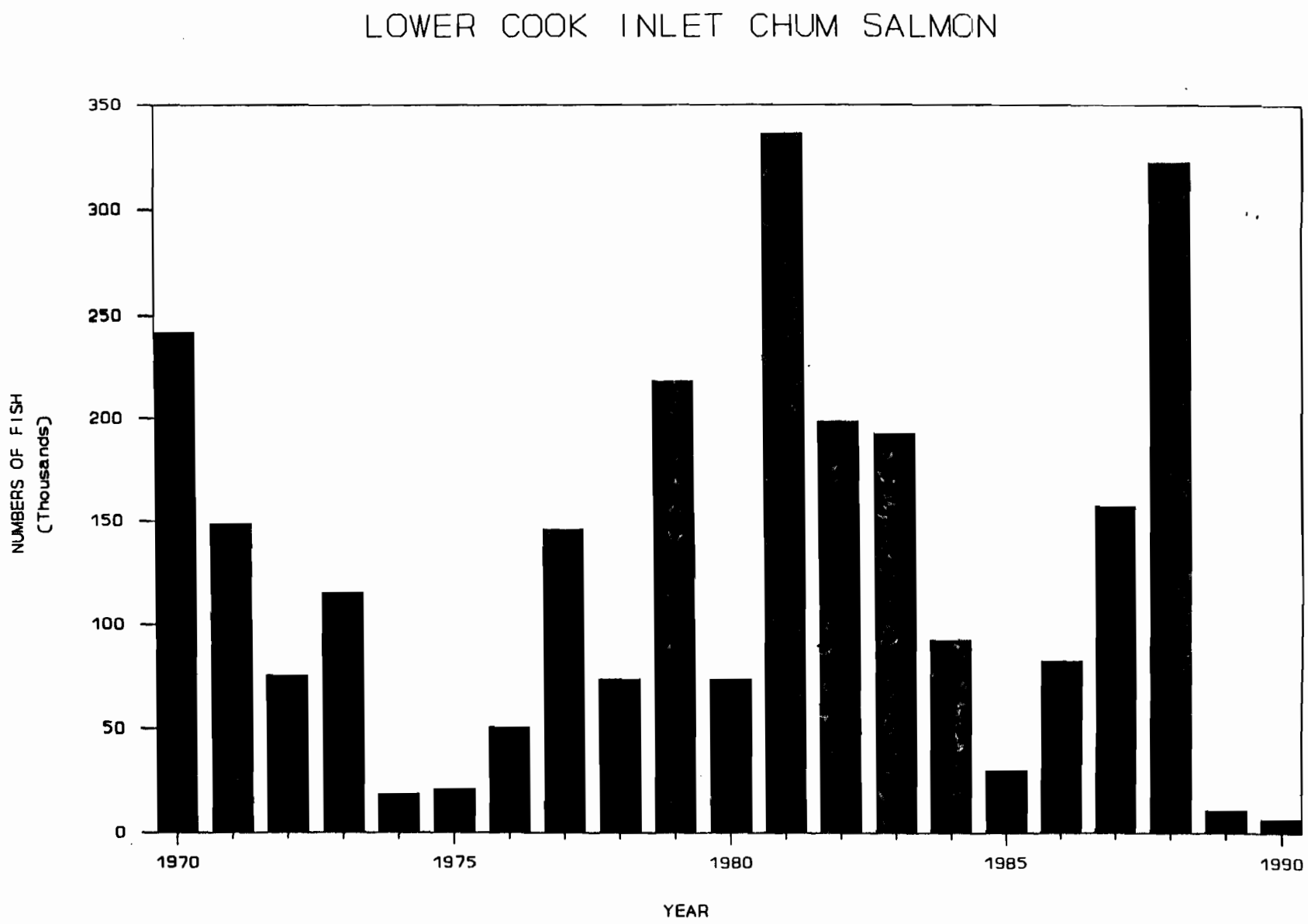

Figure 8. Commercial chum salmon catch, Lower Cook Inlet , 1970 - 1990.

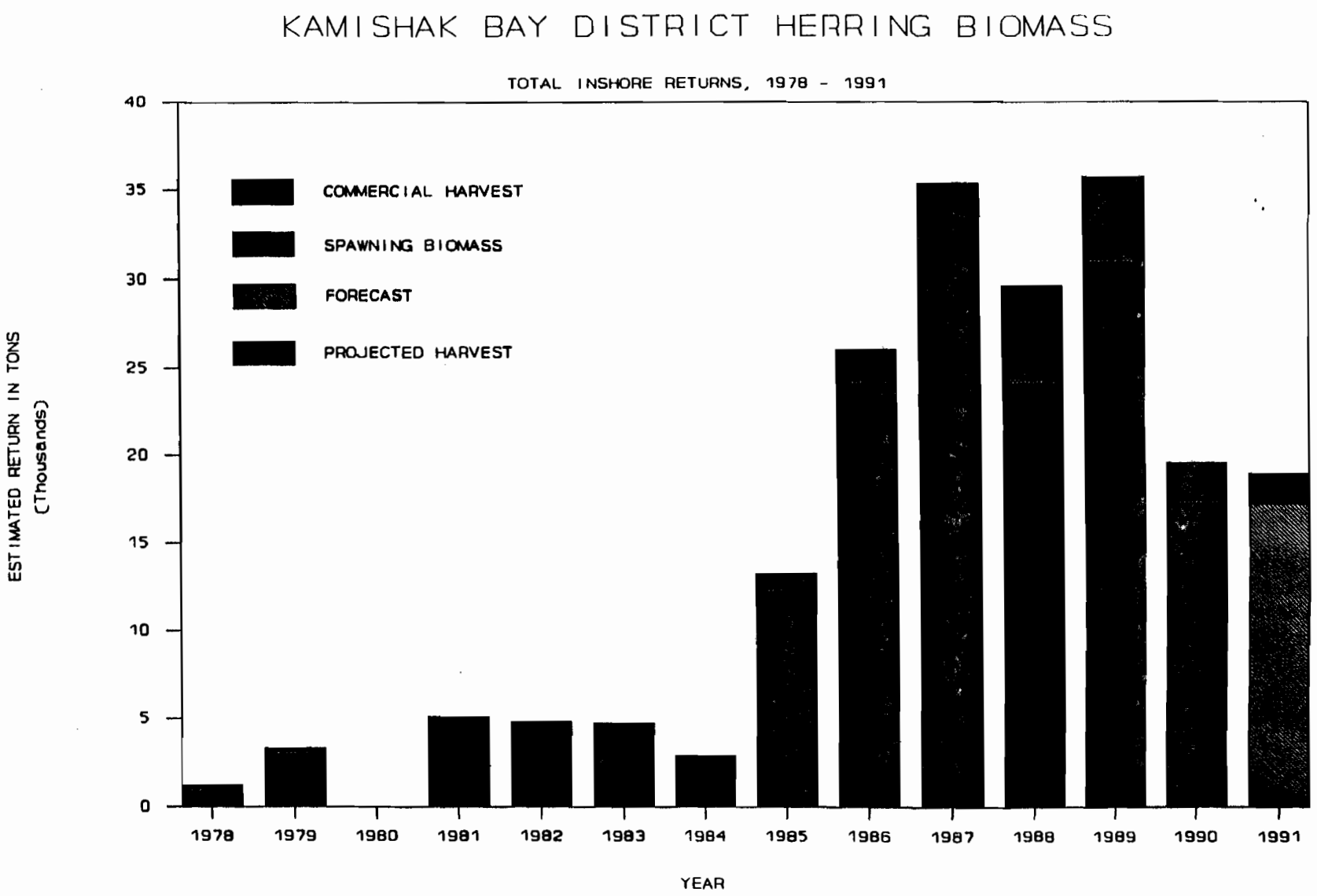

Figure 9. Biomass estimates and commercial harvests of Pacific herring in the sac roe seine fishery, Kamishak Bay District, Lower Cook Inlet, 1978 - 1990, and 1991 projection.

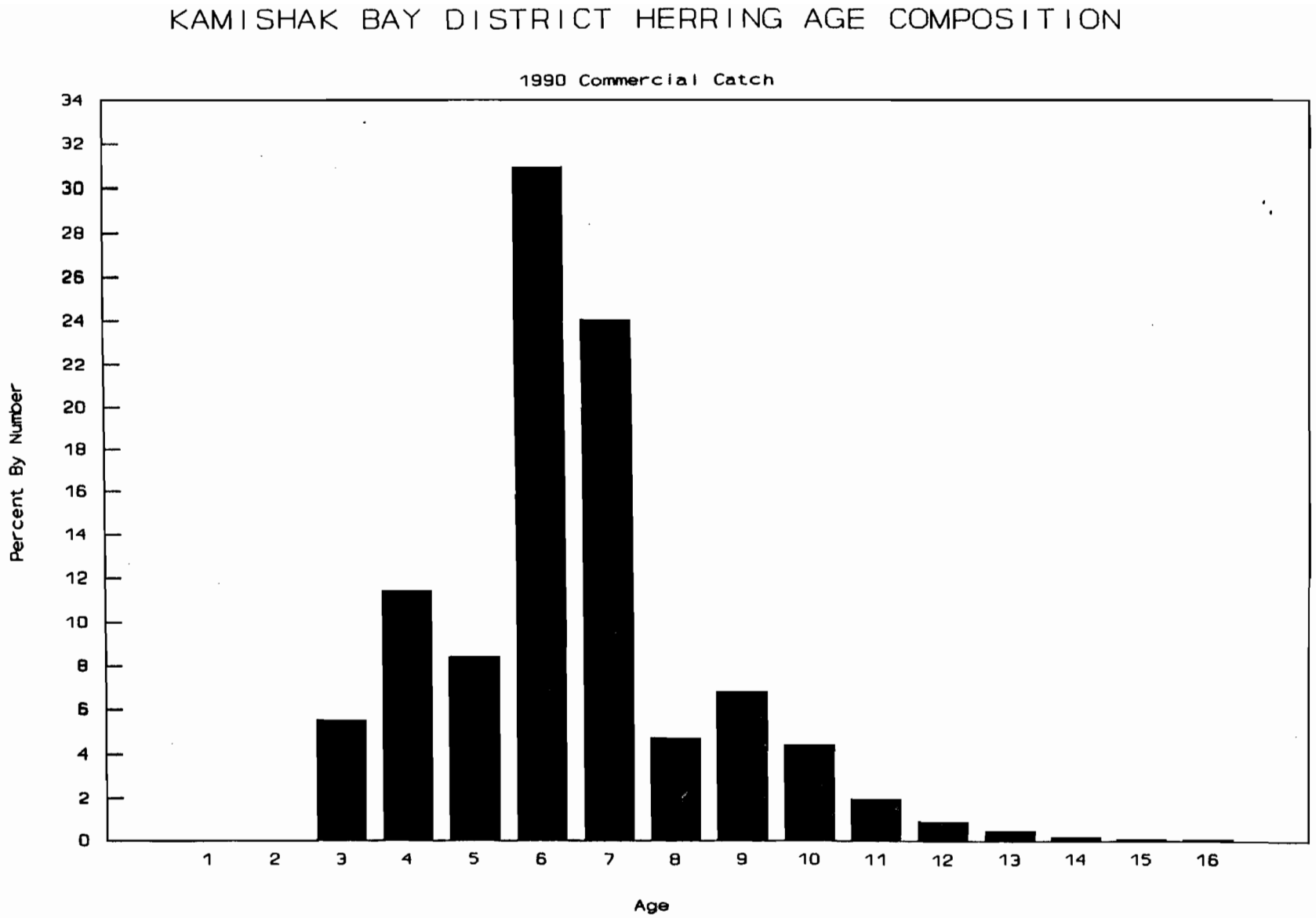

Figure 10. Weighted age class composition of the Pacific herring commercial sac roe harvest, Kamishak Bay District, Lower Cook Inlet, 1990.

Appendix Table 1. Salmon fishing permits issued and fished, by gear type, Lower Cook Inlet, 1975 - 1990[a].

Year	Seines			Seines Fished	Set Nets Fished
	Permanent Permit	Interim Permit	Total		
1975	49	51	100	63	27
1976	63	16	79	53	25
1977	72	10	82	72	26
1978	74	9	83	72	39
1979	75	9	84	75	38
1980	75	9	84	83	40
1981	75	10	85	85	40
1982	77	7	84	69	39
1983	78	5	83	83	24
1984	78	3	81	54	35
1985	80	1	81	51	34
1986	79	0	79	62	34
1987	79	0	79	66	29
1988	79	0	79	71	27
1989	83	0	83	64	23
1990	83	0	83	71	20
1975-89 Average	74	9	83	58	30

[a] Data source: Commercial Fisheries Entry Commission and final IBM computer runs.

Appendix Table 2. Exvessel value of the commercial salmon harvest in thousand of dollars by species, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	1	35	6	273	215	530
1971	1	38	7	248	144	438
1972	1	130	6	22	146	305
1973	3	113	5	310	251	682
1974	5	283	30	100	77	495
1975	3	106	27	1,456	71	1,663
1976	7	287	13	207	217	731
1977	7	620	9	1,719	604	2,959
1978	62	1,516	52	370	341	2,341
1979	36	621	68	4,495	1,097	6,317
1980	12	336	64	1,196	298	1,906
1981	18	740	69	5,334	1,346	7,507
1982	28	827	367	406	820	2,448
1983	20	704	57	696	513	1,990
1984	23	1,393	120	635	242	2,413
1985	47	1,637	86	974	78	2,822
1986	21	1,414	132	1,245	201	3,013
1987	27	1,951	118	295	598	2,989
1988	32	3,812	127	2,237	2,548	8,756
1989	33	1,213	59	1,660	39	2,936
1990	29	1,287	28	306	31	1,681
1970-89 Average	19	889	71	1,194	492	2,662

[a] Values obtained by using the formula: (average price per lb.) x (average weight of fish) x (catch) = Exvessel value.

Appendix Table 3. Average salmon price in dollars per pound by species, Lower Cook Inlet, 1970 - 1990.

Year	Chinook	Sockeye	Coho	Pink	Chum
1970	0.35	0.27	0.18	0.12	0.13
1971	0.53	0.28	0.24	0.18	0.15
1972	0.45	0.36	0.44	0.20	0.28
1973	0.93	0.48	0.39	0.27	0.29
1974	0.76	1.54	0.72	0.48	0.56
1975	0.61	0.61	0.49	0.37	0.43
1976	0.91	0.77	0.59	0.37	0.48
1977	1.07	0.86	0.55	0.35	0.45
1978	1.09	1.31	0.97	0.30	0.54
1979	1.54	1.53	0.89	0.43	0.60
1980	1.30	0.88	0.85	0.42	0.52
1981	1.35	1.10	0.75	0.44	0.49
1982	1.29	1.05	0.87	0.23	0.46
1983	1.00	0.75	0.70	0.25	0.29
1984	1.29	1.05	0.77	0.26	0.28
1985	1.60	1.25	0.85	0.22	0.31
1986	1.25	1.40	0.85	0.26	0.30
1987	1.25	1.60	1.00	0.42	0.46
1988	1.25	2.50	1.80	0.80	0.84
1989	1.25	1.60	0.70	0.40	0.40
1990	1.35	1.55	0.60	0.30	0.50

Appendix Table 4. Salmon average weight in pounds per fish by species, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum
1970	26.6	5.8	6.8	3.9	7.1
1971	25.9	6.0	6.3	3.5	6.6
1972	25.0	6.2	6.1	3.9	6.9
1973	22.3	8.1	6.1	3.7	7.4
1974	36.1	6.7	6.4	4.1	7.2
1975	33.2	6.2	8.8	3.7	7.6
1976	16.1	6.4	7.0	4.1	8.9
1977	30.1	7.2	5.9	3.8	9.2
1978	32.3	7.4	8.2	3.5	8.6
1979	18.9	6.3	6.2	3.5	8.2
1980	21.7	5.5	5.2	3.2	7.8
1981	12.5	6.1	8.5	3.7	8.1
1982	20.6	6.0	9.0	3.2	9.0
1983	22.8	5.0	7.2	3.0	9.2
1984	28.8	4.7	8.8	3.5	8.9
1985	28.0	4.7	9.8	3.5	8.2
1986	20.6	4.3	8.6	3.4	8.1
1987	18.1	4.9	8.2	3.5	8.3
1988	15.3	4.8	8.9	3.0	9.4
1989	14.1	4.6	7.0	3.1	8.6
1990	13.8	4.1	7.1	2.8	8.9
1970-89 Average	23.4	5.8	7.5	3.5	8.6

[a] Values obtained from commercial fish catch & production statistical leaflets (1970-74); remaining years from IBM computer runs.

Appendix Table 5. Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	106	20,898	4,696	716,212	242,427	984,339
1971	73	22,234	4,561	392,871	148,602	568,341
1972	88	57,897	2,234	28,663	75,543	164,425
1973	145	29,136	2,101	307,403	115,513	454,298
1974	183	27,428	6,514	50,601	19,210	103,936
1975	142	28,142	6,211	1,063,338	21,646	1,119,479
1976	450	58,159	3,216	136,445	50,822	249,092
1977	217	101,597	1,798	1,293,932	145,789	1,543,333
1978	1,747	156,404	6,529	352,561	73,518	590,759
1979	1,238	64,417	12,393	2,990,929	218,490	3,287,467
1980	424	69,442	14,505	889,703	73,492	1,047,566
1981	1,086	110,255	10,776	3,279,183	336,093	3,737,393
1982	1,066	131,320	46,892	551,589	198,185	929,052
1983	873	187,645	11,219	927,607	192,319	1,319,663
1984	714	268,950	16,797	700,622	92,540	1,079,623
1985	1,043	278,694	10,327	1,229,708	30,640	1,550,412
1986	796	234,861	18,852	1,408,293	82,688	1,745,490
1987	1,179	248,848	14,354	201,429	157,018	622,828
1988	1,694	319,008	7,946	921,296	321,911	1,571,855
1989	1,893	163,271	12,089	1,296,926	11,305	1,485,484
1990	1,560	203,895	9,297	383,670	6,951	605,373
20 Year Avg.	758	128,930	10,701	936,966	130,388	1,207,742
1970-79 Avg.	439	56,631	5,025	733,296	111,156	906,547
1980-89 Avg.	1,077	201,229	16,376	1,140,636	149,619	1,508,937
Percent	0.26	33.68	1.54	63.38	1.15	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 6. Commercial salmon catch in numbers of fish by species in the Southern District, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	90	12,120	3,544	208,066	7,873	231,693
1971	41	18,403	3,151	50,066	2,857	74,518
1972	69	31,345	1,283	9,126	4,936	46,759
1973	139	24,072	1,241	97,574	3,588	126,614
1974	182	27,029	3,054	48,875	2,725	81,865
1975	142	27,393	3,039	893,615	5,428	929,617
1976	442	35,280	1,905	99,817	1,517	138,961
1977	182	54,663	1,255	157,025	6,734	219,859
1978	1,511	141,088	4,318	251,761	5,525	404,203
1979	1,199	37,342	10,846	986,909	8,221	1,044,517
1980	414	42,929	11,568	478,019	4,605	537,535
1981	1,024	77,880	7,976	1,453,982	20,920	1,561,782
1982	926	43,433	7,165	296,556	18,466	366,546
1983	858	133,671	3,433	690,254	14,281	842,497
1984	661	160,654	3,193	336,595	8,065	509,168
1985	1,007	84,149	4,258	518,889	5,513	613,816
1986	776	36,838	3,095	542,521	5,560	588,790
1987	1,158	89,662	2,163	90,522	5,030	188,535
1988	1,655	105,302	2,987	852,382	7,742	970,068
1989	1,889	98,052	6,667	987,488	3,141	1,097,237
1990	1,546	82,412	1,522	178,087	2,433	266,030
20 Year Avg.	718	64,065	4,307	452,502	7,136	528,729
1970-79 Avg.	400	40,874	3,364	280,283	4,940	329,861
1980-89 Avg.	1,037	87,257	5,251	624,721	9,332	727,597
Percent	0.58	30.98	0.57	66.94	0.91	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 7. Commercial salmon set gillnet catch in numbers of fish by species in the Southern District, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	26	11,455	1,154	18,512	1,575	32,722
1971	41	18,398	1,449	8,564	1,352	29,804
1972	69	31,340	323	6,303	2,819	40,854
1973	134	23,970	1,089	20,222	2,374	47,789
1974	175	26,996	3,010	11,097	2,713	43,991
1975	96	26,588	2,337	49,490	4,020	82,531
1976	176	33,993	1,321	13,412	1,353	50,255
1977	175	54,404	869	38,064	2,765	96,277
1978	1,052	86,934	3,053	11,556	4,117	106,712
1979	483	34,367	7,595	69,368	5,266	117,079
1980	225	29,922	8,038	26,613	2,576	67,374
1981	222	53,665	6,735	68,794	8,524	137,940
1982	894	42,389	5,557	15,838	7,113	71,791
1983	822	41,707	1,799	20,533	4,377	69,238
1984	639	40,987	2,862	17,836	5,008	67,332
1985	958	23,188	3,908	22,898	4,221	55,173
1986	745	21,807	2,827	14,244	2,426	42,049
1987	653	28,209	2,025	9,224	2,419	42,530
1988	1,145	14,758	2,819	29,268	4,423	52,413
1989	1,281	13,970	4,792	16,210	1,877	38,130
1990	1,361	15,863	1,046	12,646	1,938	32,854
20 Year Ave.	501	32,952	3,178	24,402	3,566	64,599
1970-79 Ave.	243	34,845	2,220	24,659	2,835	64,801
1980-89 Ave.	758	31,060	4,136	24,146	4,296	64,397
Percent	4.14	48.28	3.18	38.49	5.90	100.00

[a] Data source: Final IBM computer runs.

Appendix Table 8. Commercial salmon catch in numbers of fish by species in the Outer District, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	5	1,037	243	434,700	137,408	573,393
1971	0	1,625	174	310,706	118,995	431,500
1972	7	26,092	17	963	43,466	70,545
1973	1	2,006	31	195,342	76,286	273,666
1974	1	206	21	1,300	11,924	13,452
1975	0	124	7	159,908	11,348	171,387
1976	7	18,886	0	93	412	19,398
1977	34	33,733	78	1,129,250	70,167	1,233,262
1978	236	10,695	45	70,080	19,224	100,280
1979	30	25,297	135	1,945,536	180,558	2,151,556
1980	10	22,514	16	154,041	32,246	208,827
1981	61	18,133	485	1,714,115	238,393	1,971,187
1982	129	66,781	92	67,523	63,075	197,600
1983	14	16,835	54	199,794	27,203	243,900
1984	3	29,276	41	89,085	3,204	121,609
1985	19	91,957	3,210	618,222	11,844	725,252
1986	6	48,472	5,052	401,755	11,701	466,986
1987	14	31,845	2,481	23,890	28,663	86,893
1988	5	9,501	2	6,094	71,202	86,804
1989	1	10,286	72	52,677	43	63,079
1990	2	17,404	74	191,320	614	209,414
20 Year Avg.	29	23,265	613	378,754	57,868	431,859
1970-79 Avg.	30	11,970	75	424,788	66,979	446,505
1980-89 Avg.	31	34,560	1,151	332,720	48,757	417,214
Percent	0.00	8.31	0.04	91.36	0.29	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 9. Commercial salmon catch in numbers of fish by species in the Eastern District, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	11	4,895	691	50,946	1,305	57,848
1971	32	2,203	1,115	5	423	3,778
1972	12	413	903	18,232	767	20,327
1973	5	3,057	801	1,919	55	5,837
1974	0	193	524	378	7	1,102
1975	0	596	124	383	2	1,105
1976	0	5	200	35,423	45	35,673
1977	0	5,776	360	1,349	3,229	10,714
1978	0	2	582	29,738	100	30,422
1979	0	0	296	0	0	296
1980	0	122	426	155,779	720	157,047
1981	0	9,270	470	44,989	3,279	58,008
1982	0	3,092	950	143,639	7,698	155,379
1983	0	25,932	594	36,154	7,934	70,614
1984	47	54,420	536	136,797	10,535	202,335
1985	11	24,338	835	92,403	5,144	122,731
1986	0	3,055	770	40,243	3,757	47,825
1987	0	3,687	1,631	14,333	14,913	34,564
1988	1	20,253	486	1,740	24,668	47,148
1989	0	8,538	5,346	92	312	14,288
1990	0	7,682	7,645[b]	11,815	307	27,449
20 Year Avg.	6	8,492	882	40,227	4,245	50,960
1970-79 Avg.	6	1,714	560	13,837	593	10,925
1980-89 Avg.	6	15,271	1,204	66,617	7,896	90,994
Percent	0.00	27.99	27.85	43.04	1.12	100.0

[a] Data source: Final IBM computer runs.
[b] Includes 127 cohos taken by commercial purse seine, 1,642 cohos taken during Seward Silver Salmon Derby, and 5,876 cohos taken for private hatchery cost recovery.

Appendix Table 10. Commercial salmon catch in numbers of fish by species in the Kamishak Bay District, Lower Cook Inlet, 1970 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1970	0	2,846	218	22,500	95,841	121,405
1971	0	3	121	32,094	26,327	58,545
1972	0	47	31	342	26,374	26,794
1973	0	1	28	12,568	35,584	48,181
1974	0	0	2,915	48	4,554	7,517
1975	0	29	3,041	9,432	4,868	17,370
1976	1	3,988	1,111	1,112	48,848	55,060
1977	1	7,425	105	6,308	65,659	79,498
1978	0	4,619	1,584	982	48,669	55,854
1979	9	1,778	1,116	58,484	29,711	91,098
1980	0	3,877	2,495	101,864	35,921	144,157
1981	1	4,972	1,845	66,097	73,501	146,416
1982	11	18,014	38,685	43,871	108,946	209,527
1983	1	11,207	7,138	1,405	142,901	162,652
1984	3	24,600	13,027	138,145	70,736	246,511
1985	6	78,250	2,024	194	8,139	88,613
1986	14	146,496	9,935	423,774	61,670	641,889
1987	7	123,654	8,079	72,684	108,412	312,836
1988	33	183,952	4,471	61,080	218,299	467,835
1989	3	46,395	4	256,669	7,809	310,880
1990	12	96,397	26	2,448	3,597	102,480
20 Year Avg.	5	33,108	4,899	65,483	61,138	158,562
1970-79 Avg.	1	2,074	1,027	14,387	38,644	43,992
1980-89 Avg.	8	64,142	8,770	116,578	83,633	273,132
Percent	0.01	94.06	0.03	2.39	3.51	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 11. Total commercial salmon catch in numbers of fish by district, Lower Cook Inlet, 1970 - 1990[a].

Year	Southern	Outer	Kamishak	Eastern	Total
1970	231,693	573,393	121,405	57,848	984,339
1971	74,518	431,500	58,545	3,778	568,341
1972	46,759	70,545	26,794	20,327	164,425
1973	126,614	273,666	48,181	5,837	454,298
1974	81,865	13,452	7,517	1,102	103,936
1975	929,617	171,387	17,370	1,105	1,119,479
1976	138,961	19,398	55,060	35,673	249,092
1977	219,859	1,233,262	79,498	10,714	1,543,333
1978	404,203	100,280	55,854	30,422	590,759
1979	1,044,517	2,151,556	91,098	296	3,287,467
1980	537,535	208,827	144,157	157,047	1,047,566
1981	1,561,782	1,971,187	146,416	58,008	3,737,393
1982	366,546	197,600	209,527	155,379	929,052
1983	842,497	243,900	162,652	70,614	1,319,663
1984	509,168	121,609	246,511	202,335	1,079,623
1985	613,816	725,252	88,613	122,731	1,550,412
1986	588,790	466,986	641,889	47,825	1,745,490
1987	188,535	86,893	312,836	34,564	622,828
1988	970,068	86,804	467,835	47,148	1,571,855
1989	1,097,237	63,079	310,880	14,288	1,485,484
1990	266,030	209,414	102,480	27,449	605,373
20 Year Avg.	515,154	460,529	164,632	47,372	1,185,632
1970-79 Avg.	329,861	503,844	56,132	16,710	906,547
1980-89 Avg.	700,447	417,214	273,132	78,034	1,464,717
Percent	43.94	34.59	16.93	4.53	100.00

[a] Data source: Final IBM computer runs.

Appendix Table 12. Commercial chinook salmon catch in numbers of fish by district, Lower Cook Inlet, 1970-1990[a].

Year	Southern	Outer	Kamishak	Eastern	Total
1970	90	5	0	11	106
1971	41	0	0	32	73
1972	69	7	0	12	88
1973	139	1	0	5	145
1974	182	1	0	0	183
1975	142	0	0	0	142
1976	442	7	1	0	450
1977	182	34	1	0	217
1978	1,511	236	0	0	1,747
1979	1,199	30	9	0	1,238
1980	414	10	0	0	424
1981	1,024	61	1	0	1,086
1982	926	129	11	0	1,066
1983	858	14	1	0	873
1984	661	3	3	47	714
1985	1,007	19	6	11	1,043
1986	776	6	14	0	796
1987	1,158	14	7	0	1,179
1988	1,655	5	33	1	1,694
1989	1,889	1	3	0	1,893
1990	1,546	2	12	0	1,560
20 Year Avg.	718	29	5	6	758
1970-79 Avg.	400	32	1	6	439
1980-89 Avg.	1,037	26	8	6	1,077
Percent	99.10	0.13	0.77	0.00	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 13. Commercial sockeye salmon catch in numbers of fish by district, Lower Cook Inlet, 1970-1990[a].

Year	Southern	Outer	Kamishak	Eastern	Total
1970	12,120	1,037	2,846	4,895	20,898
1971	18,403	1,625	3	2,203	22,234
1972	31,345	26,092	47	413	57,897
1973	24,072	2,006	1	3,057	29,136
1974	27,029	206	0	193	27,428
1975	27,393	124	29	596	28,142
1976	35,280	18,886	3,988	5	58,159
1977	54,663	33,733	7,425	5,776	101,597
1978	141,088	10,695	4,619	2	156,404
1979	37,342	25,297	1,778	0	64,417
1980	42,929	22,514	3,877	122	69,442
1981	77,880	18,133	4,972	9,270	110,255
1982	43,433	66,781	18,014	3,092	131,320
1983	133,671	16,835	11,207	25,932	187,645
1984	160,654	29,276	24,600	54,420	268,950
1985	84,149	91,957	78,250	24,338	278,694
1986	36,838	48,472	146,496	3,055	234,861
1987	89,662	31,845	123,654	3,687	248,848
1988	105,302	9,501	183,952	20,253	319,008
1989	98,052	10,286	46,395	8,538	163,271
1990	82,412	17,404	96,397	7,682	203,895
20 Year Avg.	64,065	23,265	33,108	8,492	128,930
1970-79 Avg.	40,874	11,970	2,074	1,714	56,631
1980-89 Avg.	87,257	34,560	64,142	15,271	201,229
Percent	40.42	8.54	47.28	3.77	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 14. Commercial sockeye salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 - 1990[a].

Location	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Resurr. Bay	0	0.1	0	0	0	0	0	0	0	74.5	99.4	1.8
Aialik Bay	1.3	0.2	4.3	2.6	0.5	0	0	0	0	0	0	3.1
Nuka Bay	8.3	6.7	8.2	5.1	0.5	0	2.0	0	2.2	1.5	0	1.0
Port Dick	0	0	0	0	0	0	0	0	0	0	0	0
Humpy Creek	1.3	1.4	0.8	2.0	1.1	0.7	1.4	1.5	1.9	2.7	1.7	1.3
Tutka Bay	1.1	1.7	3.0	5.2	2.9	9.0	5.2	6.0	11.8	6.3	5.6	6.0
Seldovia Bay	0.4	1.2	1.2	1.7	1.2	2.1	0.9	1.0	2.2	1.9	1.1	1.2
Port Graham Bay	6.6	7.8	5.2	6.8	7.8	5.5	3.5	2.7	10.4	7.7	4.3	3.7
Kamishak-Douglas	0	0	0	0	0	0	0	0	0	0	0	0
Mikfik Creek	0	0.7	0	0	0	1.9	0.2	0	0	0	8.9	2.8
Paint River	0	0	0	0	0	0	0	0	0	0	0	0
Chenik Creek	0	0	0	0	0	0	0	0	0.2	0	1.9	0
Bruin (Kirschner)	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	2.6	4.9	0.1	1.9	1.1	1.5	0.8	4.1	0.3	0.6	0.1	0
Total	21.6	24.7	22.8	25.3	15.1	20.7	14.0	15.3	29.0	95.2	122.8	20.9

Location	1971	1972	1973	1974	1975	1976	1977	1978.	1979	1980	1981	1982
Resurr. Bay	2.2	0.1	0	0	0	0	0	0	0	0	0.6	0
Aialik Bay	0	0.3	3.1	0.2	0.6	0	5.8	0	0	0.1	8.7	3.0
Nuka Bay	1.6	26.1	1.1	0.1	0	18.9	31.1	10.6	24.4	21.5	17.2	66.3
Port Dick	0	0	0	0	0	0	0	0	0	0	0	0
Humpy Creek	1.3	3.7	2.1	3.0	3.5	5.4	3.8	12.9	6.2	11.5	11.3	1.2
Tutka Bay	10.0	14.8	8.1	10.8	12.6	14.2	21.3	92.1	15.6	13.2	41.0	15.8
Seldovia Bay	1.5	2.3	2.2	2.3	2.1	2.1	3.0	5.6	2.6	1.6	5.3	5.0
Port Graham Bay	5.6	10.5	11.7	10.9	9.2	13.6	26.6	30.5	12.9	16.5	20.3	21.5
Kamishak-Douglas	0	0	0	0	0	0.2	5.3	4.6	0.5	0	4.9	0
Mikfik Creek	0	0	0	0	0	3.8	2.1	0	1.2	3.9	0	17.8
Paint River	0	0	0	0	0	0	0	0	0	0	0	0
Chenik Creek	0	0	0	0	0	0	0	0	0	0	0	0.3
Bruin (Kirschner)	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	0	0.1	0.8	0.1	0.1	0	2.6	0.1	1.0	1.1	1.0	0.4
Total	22.2	57.9	29.1	27.4	28.1	58.2	101.6	156.4	64.4	69.4	110.3	131.3

Location	1983	1984	1985	1986	1987	1988	1989	1990
Resurr. Bay	0	3.4	0.3	0	0.2	0	0	0
Aialik Bay	25.9	50.8	24.1	3.0	3.5	20.2	8.5	7.7
Nuka Bay	16.8	29.2	91.8	48.4	31.8	9.5	10.3	5.7
Port Dick	0	0	0	0	0	0	0	11.7
China Poot[b]	84.0	116.3	61.5	18.4	21.5	91.5	79.7	49.9
Tutka Bay	29.5	26.7	14.9	13.2	14.7	6.9	9.5	7.9
Seldovia Bay	6.7	4.9	2.6	3.2	3.5	2.5	1.8	4.3
Port Graham Bay	13.4	12.5	3.5	2.0	2.4	1.4	0	0
Kamishak-Douglas	2.8	0	0.7	7.6	2.3	5.0	0	0.1
Mikfik Creek	5.8	10.7	67.0	27.5	21.4	14.6	7.0	9.1
Paint River	0	0	0	0	0	0	0	0
Chenik Creek	2.7	13.9	10.6	111.3	98.5	164.2	38.9	70.3
Bruin (Kirschner)	0	0	0	0	0	0	0.2	14.5
Miscellaneous	0	0.6	1.7	0.3	49.2	3.2	7.4	22.7
Total	187.6	269.0	278.7	234.9	248.8	319.0	163.3	203.9

[a] Data source: Final IBM computer runs.
[b] China Poot Subdistrict was previously a part of Humpy Creek Subdistrict.

Appendix Table 15. Harvest of sockeye salmon returns to China Poot Bay in the Southern District of Lower Cook Inlet, by user group, 1979 - 1990.

Return Year	Sport Harvest	Personal Use	Commercial Harvest	Total Return[a]
1979	650	0	[b]	650
1980	1,000	1,000	12,000	14,000
1981	1,500	0	10,000	11,500
1982	450	1,320	200	3,400
1983	480	5,910	84,020	90,420
1984	500	2,000	114,360	117,360
1985	500	3,000	61,500	65,920
1986	100	150	18,350	18,800
1987	200	2,000	21,500	23,700
1988	500	1,500	91,469	93,939
1989	1,000	7,000	79,714	87,714
1990	500	3,000	49,587[c]	53,087
1979-89 Avg.	625	2,171	44,828	47,946

[a] Total return counts include estimates for escapements (i.e. non-harvested fish).
[b] No data.
[c] Portions of the commercial sockeye harvest in China Poot Bay, Halibut Cove, and Tutka Bay Subdistricts were attributed to the Leisure Lake sockeye return.

Appendix Table 16. Commercial catch and escapement of sockeye salmon at Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1979 - 1990.

Year	Escapement	Harvest	Total Return
1975	100	[a]	100
1976	900	[a]	900
1977	200	[a]	200
1978	100	[a]	100
1979	[b]	[a]	[a]
1980	3,500	[a]	3,500
1981	2,500	[a]	2,500
1982	8,000	[a]	8,000
1983	11,000	2,800	13,800
1984	13,000	16,500	29,500
1985	3,500	10,500	14,000
1986	7,000	111,000	118,000
1987	10,000	102,000	112,000
1988	9,000	164,200	173,200
1989	12,000	38,905	50,905
1990	17,000	70,347	87,347

[a] Closed to fishing.
[b] No data.

Appendix Table 18. Commercial pink salmon catch in numbers of fish by district, Lower Cook Inlet, 1970 - 1990[a].

Year	Southern	Outer	Kamishak	Eastern	Total
1970	208,066	434,700	22,500	50,946	716,212
1971	50,066	310,706	32,094	5	392,871
1972	9,126	963	342	18,232	28,663
1973	97,574	195,342	12,568	1,919	307,403
1974	48,875	1,300	48	378	50,601
1975	893,615	159,908	9,432	383	1,063,338
1976	99,817	93	1,112	35,423	136,445
1977	157,025	1,129,250	6,308	1,349	1,293,932
1978	251,761	70,080	982	29,738	352,561
1979	986,909	1,945,536	58,484	0	2,990,929
1980	478,019	154,041	101,864	155,779	889,703
1981	1,453,982	1,714,115	66,097	44,989	3,279,183
1982	296,556	67,523	43,871	143,639	551,589
1983	690,254	199,794	1,405	36,154	927,607
1984	336,595	89,085	138,145	136,797	700,622
1985	518,889	618,222	194	92,403	1,229,708
1986	542,521	401,755	423,774	40,243	1,408,293
1987	90,522	23,890	72,684	14,333	201,429
1988	852,382	6,094	61,080	1,740	921,296
1989	987,488	52,677	256,669	92	1,296,926
1990	178,087	191,320	2,448	11,815	383,670
20 Year Avg.	452,502	378,754	65,483	40,227	936,966
1970-79 Avg.	280,283	424,788	14,387	13,837	733,296
1980-89 Avg.	624,721	332,720	116,578	66,617	1,140,636
Percent	46.42	49.87	0.64	3.08	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 19. Commercial pink salmon catch in thousands of fish by subdistrict during odd-numbered years, Lower Cook Inlet, 1959 - 1989[a].

Location	1959	1961	1963	1965	1967	1969	1971	1973	1975	1977	1979	1981	1983	1985	1987	1989
Humpy Creek	13.2	67.9	57.4	13.8	40.4	0.6	11.4	44.3	339.3	42.7	304.0	250.9	26.9	11.4	2.0	91.4
Halibut Cove and Lagoon[b]														0	28.5	249.6
Tutka Bay	14.4	106.8	37.7	44.6	31.6	32.9	10.3	20.0	89.2	21.9	416.8	1,026.6	616.0	491.2	56.5	632.1
Seldovia Bay	4.9	15.1	1.6	19.2	11.7	28.8	27.3	19.4	429.6	47.6	140.8	126.4	43.3	3.8	1.2	1.1
Pt. Graham Bay	5.3	1.0	2.7	12.4	5.1	2.0	1.0	13.9	18.3	44.8	124.7	45.9	4.1	12.5	2.3	0
Dogfish Bay	1.6	0	0	0.1	2.3	0	10.4	0.3	0	5.0	7.4	22.9	0.2	0	0	0
Port Chatham	1.2	0	0.8	0	0	0	26.3	20.6	16.0	1.4	174.4	55.8	3.3	7.0	0	9.7
Windy Bay	3.1	2.2	0	5.4	0	0	57.3	68.5	18.1	173.2	552.7	2.9	0	4.8	0	0
Rocky Bay	2.3	0	1.4	0.1	0	0	0.1	0.2	0	11.6	122.2	16.5	1.3	0	0	0
Port Dick Bay	28.2	92.9	19.0	15.3	259.9	51.5	94.6	96.6	90.3	881.7	964.8	1,140.9	140.0	455.6	3.0	0
Nuka Bay	33.3	2.0	0.3	0	0.1	0	119.7	8.1	35.4	56.3	121.7	395.1	55.0	150.8	20.9	43.0
Resurrection Bay	8.4	0	0	0	1.2	0	0	0	0	0	0	32.6	27.1	74.6	11.8	0
Bruin Bay	0	0	12.3	0.9	2.1	0	11.7	0	0	6.2	40.3	51.9	0.3	0	1.2	202.8
Rocky/Ursus Coves	3.7	2.7	44.2	0	13.0	52.8	16.4	7.9	0	0	14.4	14.1	0	0	69.4	53.8
Iniskin and Cottonwood Bays	1.5	3.3	21.8	0	0.1	26.0	0	4.7	0	0.1	0.2	0	0.3	0	0.2	0
Miscellaneous	3.6	9.5	4.4	3.8	8.0	7.8	6.4	2.9	27.1	1.4	6.5	16.7	9.8	18.0	4.4	13.4
Total	124. 7	303.4	203.6	115.6	375.5	202.4	392.9	307.4	1,063.3	1,293.9	2,990.9	3,199.2	927.6	1,229.7	201.4	1,296.9

[a] Data source: IBM computer runs, 1959 - 1989.
[b] Halibut Cove and Lagoon were part of Humpy Creek Subdistrict prior to 1984.

Appendix Table 20. Commercial pink salmon catch in thousands of fish by subdistrict during even-numbered years, Lower Cook Inlet, 1960 - 1990[a].

Location	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978	1980	1982	1984	1986	1988	1990
Humpy Creek	71.6	108.8	82.4	40.7	43.9	114.1	2.1	35.4	73.1	44.0	53.3	6.0	53.5	116.7	0	0
Halibut Cove and Lagoon[b]													10.9	0	111.0	91.0
Tutka Bay	87.6	279.5	100.9	53.5	26.9	43.9	5.2	5.5	18.0	167.9	312.5	184.9	262.0	400.2	723.9	37.4
Seldovia Bay	42.6	142.8	37.4	44.1	23.6	29.0	0.2	3.5	3.0	35.8	81.7	70.3	2.2	2.8	5.5	3.6
Pt. Graham Bay	7.1	18.1	38.4	5.1	23.0	19.6	1.1	4.5	3.9	4.0	30.5	35.4	8.0	8.8	10.7	0
Dogfish Bay	1.8	1.4	0.1	7.1	0	9.8	0.3	0	0	0.3	4.7	1.7	0.1	0	0	0
Port Chatham	15.7	102.2	67.1	6.7	10.0	1.9	0	0	0	0	1.8	12.6	0	0	0	22.1
Windy Bay	29.2	85.5	68.6	20.1	3.4	0.8	0	0	0	0	0	0	0	0	0	0
Rocky Bay	17.0	225.9	53.2	0	10.8	36.8	0	0	0	0	1.4	0	0	0	0	0
Pt. Dick Bay	257.4	1,118.3	526.3	296.8	55.0	336.5	0	0.6	0	63.6	133.3	44.0	84.6	304.0	5.9	169.1
Nuka Bay	26.6	129.8	23.8	0	90.2	48.4	0.3	0.7	0.1	6.3	12.8	8.7	4.4	97.8	0.2	0.2
Resurrection Bay	5.8	0.1	0.3	0	37.4	40.2	18.2	0	35.4	29.7	155.8	137.4	122.3	36.5	0.5	0
Bruin Bay	2.6	0	0	0	126.2	10.2	0	0	0	0	100.6	13.3	125.2	349.7	5.0	0.4
Rocky/Ursus Coves	6.6	3.2	13.5	2.9	18.0	7.5	0	0	0	0.1	0	20.2	8.5	71.1	49.9	0
Iniskin and Cottonwood Bays	2.1	3.2	4.3	0	9.9	3.5	0	0	0.1	0.1	0.1	0.4	0.4	0.2	1.3	0
Miscellaneous	37.9	29.5	39.1	102.2	107.1	14.0	1.3	0.4	2.8	0.8	0.2	16.7	18.5	20.5	7.4	59.9
Total	611.6	2,248.3	1,055.4	579.2	585.4	716.2	28.7	50.6	136.4	352.6	889.7	551.6	700.6	1,408.3	921.3	383.7

[a] Data source: IBM computer runs, 1960 - 1990.
[b] Halibut Cove and Lagoon were part of Humpy Creek Subdistrict prior to 1984.

Appendix Table 21. Commercial chum salmon catch in numbers of fish by district, Lower Cook Inlet, 1970 - 1990[a].

Year	Southern	Outer	Kamishak	Eastern	Total
1970	7,873	137,408	95,841	1,305	242,427
1971	2,857	118,995	26,327	423	148,602
1972	4,936	43,466	26,374	767	75,543
1973	3,588	76,286	35,584	55	115,513
1974	2,725	11,924	4,554	7	19,210
1975	5,428	11,348	4,868	2	21,646
1976	1,517	412	48,848	45	50,822
1977	6,734	70,167	65,659	3,229	145,789
1978	5,525	19,224	48,669	100	73,518
1979	8,221	180,558	29,711	0	218,490
1980	4,605	32,246	35,921	720	73,492
1981	20,920	238,393	73,501	3,279	336,093
1982	18,446	63,075	108,946	7,698	198,185
1983	14,281	27,203	142,901	7,934	192,319
1984	8,065	3,204	70,736	10,535	92,540
1985	5,513	11,844	8,139	5,144	30,640
1986	5,560	11,701	61,670	3,757	82,688
1987	5,030	28,663	108,412	14,913	157,018
1988	7,742	71,202	218,299	24,668	321,911
1989	3,141	43	7,809	312	11,305
1990	2,433	614	3,597	307	6,951
20 Year Avg.	7,136	57,868	61,138	4,245	130,388
1970-79 Avg.	4,940	66,979	38,644	593	111,156
1980-89 Avg.	9,332	48,757	83,633	7,896	149,619
Percent	35.00	8.83	51.75	4.42	100.0

[a] Data source: Final IBM computer runs.

Appendix Table 22. Commercial chum salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 - 1990[a].

Location	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Tutka	0.1	2.4	1.8	2.9	2.4	5.6	1.1	3.9	4.0	1.3	0.7	1.6
Port Graham	2.3	1.8	0.5	4.0	3.8	2.1	0.9	5.3	3.0	2.3	1.3	4.8
Dogfish	4.9	0.4	0.1	0	0.2	0	0	7.0	15.3	0.1	0	50.9
Port Chatham	1.0	2.5	0	2.8	4.3	5.2	0	17.8	0	1.0	0	0.1
Rocky-Windy	14.9	6.4	2.2	8.5	0.3	33.8	8.1	1.7	0	0.5	0	39.4
Port Dick	42.4	51.0	36.8	112.0	110.8	227.4	14.2	60.9	36.0	10.9	5.4	41.2
Nuka	1.7	8.4	1.7	0.5	1.5	0	0	0	1.5	6.9	0	5.9
Resurrection	0.1	0.5	0	0	0	0	0	0	0.1	0.7	0	0.6
Douglas River	0.2	0	0	0	0	0	0	0	0	0	0	0
Kamishak River	0	0	0	0	0	0	0	0	0	3.7	0.4	0
McNeil River	0	0.4	0	0	0	2.7	0.9	0	0.4	8.3	4.4	1.9
Bruin	0	0.3	0.5	0	0.1	0	0.4	0	1.0	7.5	0	12.8
Ursus/Rocky	8.5	8.6	1.8	1.1	2.8	1.2	0	4.0	2.9	1.0	3.6	8.9
Cttnwood/Iniskin	12.1	33.4	10.2	41.7	10.9	38.4	0	0	19.0	25.5	44.4	71.9
Miscellaneous	22.6	0	0	5.8	1.4	6.9	2.5	28.5	2.2	5.4	1.0	2.4
Total	110.8	116.1	55.6	179.3	138.5	323.3	28.1	129.1	85.4	75.1	61.2	242.4

Location	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Tutka	0.5	1.3	0.8	1.4	2.0	0.9	0.8	2.6	2.7	1.8	7.9	8.3
Port Graham	2.0	3.2	2.6	1.0	2.2	0.5	5.0	2.4	4.3	2.5	11.2	7.4
Dogfish	114.5	41.1	0.4	0	0	0	9.4	0	8.5	2.1	71.8	15.6
Port Chatham	2.4	0	0.4	0	0.6	0	0.1	0	1.7	1.3	59.6	16.2
Rocky-Windy	1.4	0	0.9	0	0.3	0	17.7	0	76.7	2.1	7.4	0
Port Dick	0.7	0	33.4	8.1	6.8	0	25.6	10.3	79.0	19.0	95.8	30.3
Nuka	0.1	2.3	40.8	3.9	3.6	0.4	17.4	0.4	14.7	7.8	3.8	0.9
Resurrection	0.4	0.7	0	0	0	0	0	0.1	0	0.7	2.4	7.7
Douglas River	0	0	0	0	0.1	7.1	4.0	2.9	0.7	10.0	46.7	37.1
Kamishak River	0	2.4	0	1.8	0	10.5	0	23.9	17.8	2.8	8.6	9.2
McNeil River	0	2.3	0	2.0	0	16.9	38.5	4.9	6.5	6.3	11.6	32.6
Bruin	1.6	1.8	0	0.7	0	0	0	0	4.0	11.0	1.7	1.3
Ursus/Rocky	10.3	0.2	5.7	0	2.0	2.8	7.8	1.9	0.5	0.3	1.5	13.5
Cttnwood/Iniskin	14.5	19.7	29.9	0	2.8	11.5	15.3	14.9	0.2	5.4	3.5	21.6
Miscellaneous	0.2	0.5	0.6	0.3	1.2	0.2	4.2	9.2	1.2	0.4	2.6	3.5
Total	148.6	75.5	115.5	19.2	21.6	50.8	145.8	73.5	218.5	73.5	336.1	198.0

Location	1983	1984	1985	1986	1987	1988	1989	1990
Tutka	9.9	3.4	3.2	3.9	3.9	4.7	2.5	1.5
Port Graham	1.7	3.6	1.3	0.8	0.4	1.2	0	0
Dogfish	2.8	1.1	0	0	0	0	0	0
Port Chatham	2.1	0	1.3	0	0	0	0	0.1
Rocky-Windy	3.2	0	0	0	0	0	0	0
Port Dick	18.0	1.9	9.6	10.4	27.1	64.4	0	0.5
Nuka	0.8	0.2	0.8	1.3	1.6	6.8	0	T
Resurrection	6.9	3.0	3.0	3.5	13.9	23.9	0	0
Douglas River	27.2	9.2	8.0	11.6	23.7	24.8	0	0.1
Kamishak River	23.9	16.2	0.1	0.1	24.6	26.7	0	T
McNeil River	67.9	12.0	0	13.7	32.9	104.0	0.1	0.1
Bruin	2.6	5.9	0	5.4	0.1	2.8	4.4	0.1
Ursus-Rocky	0	3.7	0	22.1	17.2	20.7	3.4	0
Cttnwood/Iniskin	21.4	23.0	0	8.8	9.7	39.2	0	0
Miscellaneous	3.9	9.3	3.3	1.1	1.9	2.7	0.9	4.7
Total	192.3	92.5	30.6	82.7	157.0	321.9	11.3	7.0

[a] Data source: IBM computer runs, 1959-90.

Appendix Table 23. Estimated sockeye salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1960 - 1990[a].

Year	English Bay	Ander. Beach	Delight Lake	Desire Lake	Bear Lake[b]	Aialik Lake	Mikfik Lake	Chenik Lake	Amakde. Creek	Kam. River	Doug. River	Doug. Beach	Total
1960	16.0	-	1.0	4.0	9.3	-	-	0.8	1.5	-	0.4	-	33.0
1961	10.0	1.0	10.0	10.0	3.0	10.0	3.0	0.1	2.5	-	-	-	49.6
1962	2.0	0.2	5.0	4.0	3.6	16.0	2.6	1.5	2.5	-	2.5	-	39.9
1963	10.0	-	8.0	1.4	8.9	20.0	0.2	0.3	7.0	-	-	-	55.8
1964	-	-	0.3	10.0	4.7	2.0	-	-	-	-	-	-	17.0
1965	3.0	-	-	-	3.8	-	-	-	-	-	-	-	6.8
1966	3.0	-	4.3	9.0	1.9	4.0	-	0.2	2.0	-	-	-	24.4
1967	6.0	-	-	0.3	3.3	-	-	2.5	0.2	-	-	-	12.3
1968	-	-	-	0.3	59.0	-	0.7	-	-	-	-	-	60.0
1969	5.0	-	-	8.0	21.2	-	-	-	1.5	-	-	-	35.7
1970	8.0	-	4.6	2.0	5.8	-	1.0	-	0.3	-	-	-	21.7
1971	6.5	-	5.0	5.0	0.4	3.0	5.0	2.0	1.2	-	-	-	28.1
1972	14.5	-	10.0	8.0	0.7	0.6	13.0	0.7	1.0	-	-	-	48.5
1973	4.4	-	2.5	5.2	0.2	1.5	2.7	0.3	2.2	-	-	-	19.0
1974	-	-	-	-	0.1	2.2	0.9	0.1	0.4	-	-	-	3.7
1975	2.5	-	2.0	6.5	0	8.0	6.0	0.1	0.8	-	-	-	25.9
1976	6.0	-	6.0	11.0	0.6	8.0	10.0	0.9	1.6	-	0.2	0.1	44.4
1977	12.5	-	5.2	10.7	0	5.0	9.8	0.2	2.6	-	2.6	0.4	49.0
1978	13.5	0.6	8.0	10.0	0	3.0	12.0	0.1	2.6	1.0	-	0.1	50.9
1979	4.4	-	8.0	12.0	0	5.0	6.0	0	1.0	0.4	-	0.3	37.1
1980	12.0	0.3	10.0	17.0	1.5	6.6	6.5	3.5	2.6	0.1	0.4	0.5	61.0
1981	10.5	-	7.3	12.0	0.7	1.8	5.3	2.5	1.9	0.8	0.2	0.3	43.3
1982	20.0	0.6	25.0	18.0	0.5	22.4	35.0	8.0	3.2	10.0	4.2	1.6	148.5
1983	12.0	0.5	7.0	12.0	0.7	20.0	7.0	11.0	1.2	5.0	0.5	0.4	77.3
1984	11.1	1.2	10.5	15.0	0.5	22.0	6.0	13.0	1.4	2.5	0	0.1	83.3
1985	5.0	0.1	26.0	18.0	1.1	8.0	20.0	3.5	0.9	0.8	0	0	83.4
1986	2.8	0.9	13.0	10.0	0.8	7.6	7.8	7.0	1.9	5.0	0.2	0.2	57.2
1987	7.0	0.2	10.5	13.4	0.3	9.2	9.0	10.0	1.1	-	0.1	-	60.8
1988	2.5	0.3	1.2	9.0	0.1	13.0	10.1	9.0	0.4	0.5	0	0.1	46.2
1989	4.5	-	7.7	9.0	0.1	6.5	11.5	12.0	1.2	0.5	0.6	0.2	53.8
1990	3.3	-	5.2	9.5	1.1	5.7	8.8	17.0	1.8	0.2	0.6	-	53.2
Total	214.7	5.9	198.1	250.8	132.8	205.4	191.1	89.3	46.7	26.6	11.9	4.3	1,377.6
1960-89 Avgerage	8.0	0.5	7.9	9.0	4.4	8.6	8.0	3.6	1.7	2.4	0.9	0.3	55.3
Es.Goal	10-20	1	10	10	1	2.5-5	5-7	10	1	*	*	*	51-66

[a] Estimated escapements are either peak aerial survey counts or adjusted aerial survey counts based on survey conditions and time of surveys.

[b] Limited by Bear Lake Management Plan since 1971.

Appendix Table 24. Estimated pink salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1960 - 1990[a].

Stream	Year											
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Humpy Creek	10.0	22.6	56.0	34.7	18.5	28.0	30.0	25.0	24.7	5.4	55.2	45.0
China Poot	9.0	2.0	26.0	-	-	-	-	2.5	6.0	0.2	1.5	2.1
Tutka Lagoon	15.0	15.0	30.0	10.0	20.0	20.0	12.0	7.0	7.9	6.5	6.5	16.7
Barabara Creek	2.0	0.1	1.5	0.1	-	-	5.0	-	2.0	0.9	0.4	4.0
Seldovia River	25.0	25.0	50.0	13.0	60.0	30.0	86.0	55.0	53.2	60.0	23.0	31.1
Port Graham River	15.0	5.0	50.0	2.0	16.0	1.5	24.0	2.0	24.4	4.0	16.6	13.2
Dogfish Lagoon	2.0	-	3.0	-	-	-	-	-	-	-	-	0.3
Port Chatham Creeks	4.0	7.0	7.0	-	-	-	10.0	-	-	-	3.0	15.5
Windy Right Creek	8.0	10.0	12.5	4.9	6.2	2.0	7.0	6.0	2.8	3.2	2.1	13.0
Windy Left Creek	8.0	5.0	12.5	4.5	7.7	10.0	7.0	6.0	6.9	23.0	13.0	35.4
Rocky River	130.0	2.0	200.0	12.0	80.0	0.3	44.0	1.0	43.1	1.0	32.0	1.6
Port Dick Creek	35.0	14.0	40.0	16.0	31.5	50.0	35.0	20.0	29.0	12.0	34.5	97.8
Island Creek	23.2	2.0	15.0	3.6	30.0	0.5	7.0	0.5	4.3	0.1	5.5	0.1
South Nuka Creek	20.0	2.0	22.0	0.1	10.0	-	10.0	-	10.0	3.0	11.0	14.0
Desire Lake Creek	-	-	18.0	-	1.3	-	-	-	-	-	-	30.0
James Lagoon	-	-	-	-	-	-	-	-	-	-	-	-
Aialik Lagoon	-	-	25.0	0.3	-	-	2.0	-	-	-	-	-
Bear Creek	1.4	-	3.1	-	6.4	-	-	-	3.1	-	-	-
Salmon Creek	-	-	-	-	-	-	-	-	-	-	-	-
Thumb Cove	-	-	-	-	-	-	-	-	-	-	-	-
Humpy Cove	-	-	-	-	-	-	-	-	-	-	-	-
Tonsina Creek	-	-	-	-	-	-	-	-	2.9	0.1	-	-
Big Kamishak River	-	-	100.0	75.0	75.0	-	13.0	-	-	-	-	-
Little Kamishak River	-	-	100.0	24.0	-	-	28.0	3.5	-	0.5	2.0	-
Amakdedori Creek	60.0	-	80.0	-	10.0	-	8.0	-	-	1.0	13.0	-
Bruin Bay River	18.0	-	300.0	25.0	-	-	20.0	0.5	-	5.0	40.0	22.0
Sunday Creek	1.5	-	5.0	2.0	-	-	20.0	-	-	1.0	2.0	43.0
Brown's Peak Creek	-	-	25.0	10.0	20.0	10.0	11.0	-	-	2.0	-	8.0
Total	387.1	111.7	1181.6	237.2	392.6	152.3	379.0	129.0	220.3	128.9	261.3	392.8

-continued-

Appendix Table 24. (page 2 of 3)

Stream	Year											
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Humpy Creek	13.8	36.9	17.4	64.0	27.2	86.0	46.1	200.0	64.4	115.0	31.9	104.0
China Poot	1.0	6.0	5.2	21.6	2.0	3.9	11.2	20.6	12.3	5.0	3.1	14.1
Tutka Lagoon	1.5	6.5	2.6	17.6	11.5	14.0	15.0	10.6	17.3	21.1	18.5	12.9
Barabara Creek	0.6	-	0.2	22.7	0.2	5.7	1.4	10.0	5.8	16.8	2.1	14.8
Seldovia River	5.8	14.5	13.7	36.2	25.6	35.7	24.6	43.7	65.5	62.7	38.4	27.9
Port Graham River	2.4	7.0	2.8	27.3	6.5	20.6	6.7	32.7	40.2	18.4	28.9	4.6
Dogfish Lagoon	-	1.0	-	2.3	-	8.1	0.6	7.3	0.3	2.6	2.6	1.0
Port Chatham Creeks	1.0	5.0	0.2	7.7	-	14.2	0.3	20.8	7.7	11.2	2.0	3.5
Windy Right Creek	0.1	4.6	0.1	18.7	0.2	11.1	0.3	10.4	3.3	4.7	4.7	4.3
Windy Left Creek	0.4	12.9	0.1	9.7	0.2	47.3	1.1	74.8	10.9	31.3	4.4	11.9
Rocky River	8.2	2.0	1.5	4.4	2.7	36.7	8.2	85.0	6.4	25.0	6.6	16.6
Port Dick Creek	10.0	26.4	1.5	62.8	12.7	109.3	44.9	116.0	56.1	106.0	19.9	64.1
Island Creek	1.7	0.5	0.5	0.1	-	0.6	0.4	0.6	2.2	25.0	15.0	15.3
South Nuka Creek	0.3	16.0	-	28.0	-	12.0	-	15.0	0.3	16.0	0.4	22.2
Desire Lake Creek	0.3	3.0	-	0.4	0.6	0.8	1.0	3.0	16.0	5.0	12.0	8.5
James Lagoon	-	-	-	-	-	-	-	-	4.6	14.0	6.0	5.1
Aialik Lagoon	-	-	0.1	-	0.4	-	-	-	-	-	5.0	3.0
Bear Creek	0.5	-	4.9	-	10.0	-	7.8	-	13.3	0.4	7.9	0.8
Salmon Creek	-	-	-	-	16.9	-	11.0	-	15.5	0.1	21.0	0.5
Thumb Cove	-	-	1.1	-	2.0	-	2.0	-	1.2	1.0	7.9	4.9
Humpy Cove	-	-	0.6	-	1.4	-	0.9	-	5.7	0.4	4.0	2.0
Tonsina Creek	-	-	1.4	-	5.7	-	1.5	-	0.7	0.2	7.5	5.4
Big Kamishak River	-	15.0	1.0	-	8.0	-	12.0	10.0	2.0	-	5.0	-
Little Kamishak River	-	13.0	-	-	6.0	-	0.4	3.5	0.6	-	2.2	-
Amakdedori Creek	0.2	3.0	1.0	5.0	-	-	0.9	6.0	3.8	1.5	6.3	0.2
Bruin Bay River	2.5	2.0	0.6	20.0	13.5	60.0	33.0	200.0	400.0	95.0	75.0	4.0
Sunday Creek	2.0	5.0	0.1	20.0	0.3	9.0	0.2	12.0	5.2	14.2	12.0	4.7
Brown's Peak Creek	1.2	3.2	0.1	10.0	1.2	13.0	0.9	15.0	2.3	17.7	3.5	1.7
Total	53.5	183.5	56.7	378.5	154.8	488.0	232.4	897.0	763.6	610.3	353.8	358.0

-continued-

Appendix Table 24. (page 3 of 3)

Stream	Year							1960-89		Goal
	1984	1985	1986	1987	1988	1989	1990 [b]	Total	Avg.	
Humpy Creek	84.2	117.0	49.7	26.6	21.4	93.0	27.0	1,553.7	51.8	25-50
China Poot	8.4	1.9	11.5	3.1	3.9	8.5	4.2	192.6	7.1	5
Tutka Lagoon	10.5	14.0	13.4	4.8	11.2	11.9	38.5	381.5	12.7	6-10
Barabara Creek	1.0	1.6	1.8	0.3	0.7	4.5	3.9	106.2	3.9	18-24
Seldovia River	14.2	22.8	28.2	7.6	16.9	26.2	27.8	1,021.5	34.0	25-35
Port Graham River	10.9	26.3	17.5	3.8	7.9	19.1	20.1	457.3	15.2	20-40
Dogfish Lagoon	0.6	0.2	0.4	1.2	0.3	0.2	7.1	34.0	1.8	-
Port Chatham Creeks	7.8	8.9	11.5	10.2	21.0	31.7	27.8	211.2	9.2	10-15
Windy Right Creek	3.4	5.4	2.5	2.0	1.3	6.6	7.1	161.4	5.4	10
Windy Left Creek	2.5	8.9	2.2	5.6	3.4	25.2	7.5	391.8	13.1	30-50
Rocky River	9.0	12.1	12.0	4.5	5.4	10.3	18.0	803.6	26.8	50
Port Dick Creek	44.6	65.3	41.6	4.5	12.0	55.4	41.7	1,267.9	42.3	20-100
Island Creek	35.0	27.9	16.6	0.1	7.2	6.7	25.0	247.2	8.5	12-18
South Nuka Creek	0.6	3.6	7.0	2.8	1.2	7.3	13.3	234.8	9.4	10
Desire Lake Creek	23.0	62.5	32.0	11.0	2.5	47.0	1.0	277.9	13.9	10-20
James Lagoon	4.0	9.0	6.6	1.1	1.7	4.9	3.8	57.0	5.7	5-10
Aialik Lagoon	4.0	9.4	6.0	1.5	0.7	0.8	-	58.2	4.5	5
Bear Creek	7.7	4.1	14.0	3.5	0.2	1.7	4.4	90.8	5.3	5
Salmon Creek	10.2	2.1	8.3	1.7	0.1	1.6	-	89.0	7.4	10
Thumb Cove	4.2	14.5	4.0	2.7	0.3	4.2	-	50.0	3.8	4
Humpy Cove	2.5	5.0	0.9	0.3	0.4	1.0	3.8	25.1	1.9	2
Tonsina Creek	6.0	48.2	11.2	3.4	0.1	0.5	1.2	94.8	6.3	5
Big Kamishak River	-	-	5.0	-	1.0	-	-	322.0	24.8	20
Little Kamishak River	0.1	1.6	2.0	-	0.5	-	-	187.9	11.7	20
Amakdedori Creek	-	1.0	6.0	0.4	1.0	2.0	0.1	210.3	10.0	5
Bruin Bay River	110.0	3.5	1200.0	24.0	29.0	350.0	19.0	3,052.6	117.4	25-50
Sunday Creek	12.0	11.4	109.0	29.7	18.0	103.0	2.8	442.3	17.7	10
Brown's Peak Creek	6.8	7.0	28.0	40.2	17.0	120.0	1.0	374.8	15.0	10
Total	423.2	495.2	1648.9	196.6	186.3	943.3	306.1	12,397.4	486.6	377-593

[a] Estimated escapements are either peak aerial survey counts or adjusted aerial survey counts based on survey conditions and time of surveys.

[b] Escapement estimates in the Southern, Outer, and Eastern Districts derived from periodic ground surveys with stream life factors applied. Kamishak estimates are unexpanded live counts.

Appendix Table 25. Estimated chum salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1965 - 1990[a].

Year	Port Grhm.	Dogfish Lagoon	Rocky River	Pt.Dk Head	Is. Creek	Big Kam.	Little Kam.	McNeil River	Bruin Bay	Ursus Cove	Cotton. Creek	Inisk Bay	Total
1965	-	3.5	-	3.5	4.0	-	-	-	-	-	-	0.7	11.7
1966	-	11.0	7.0	4.0	6.0	5.0	0.5	-	-	-	-	-	33.5
1967	-	15.0	5.0	3.0	5.0	-	-	-	-	-	-	-	28.0
1968	1.5	1.5	3.0	20.0	1.5	-	-	-	-	-	5.0	5.0	37.5
1969	-	-	3.0	4.5	4.0	-	-	-	-	-	-	-	11.5
1970	0.9	5.0	-	6.0	8.5	-	-	-	-	-	0.6	-	21.0
1971	1.0	5.0	7.0	3.0	3.5	-	-	-	1.0	-	9.0	13.0	42.5
1972	1.5	3.0	3.0	6.0	2.0	-	-	-	1.0	1.6	4.0	10.0	32.1
1973	2.0	1.0	2.0	9.0	7.0	4.0	1.0	10.0	8.0	3.0	4.0	12.0	63.0
1974	0.5	0.6	1.0	0.8	5.0	7.1	0.6	1.5	3.0	3.5	2.5	7.0	33.1
1975	3.0	5.0	25.0	4.0	7.4	1.1	1.9	1.5	1.5	5.0	8.0	7.0	70.4
1976	0.4	3.0	12.0	1.5	1.0	24.0	21.0	10.0	4.0	6.0	5.0	13.5	101.4
1977	5.2	6.4	10.5	5.0	11.1	-	-	20.0	18.0	9.3	10.0	4.4	99.9
1978	4.8	9.3	6.3	8.9	16.9	23.0	30.0	45.0	4.0	9.7	12.5	11.4	181.8
1979	2.2	8.2	35.0	4.0	16.8	15.0	15.0	8.0	15.0	5.0	2.5	4.0	130.7
1980	1.1	4.0	23.0	4.2	10.9	10.0	13.0	8.0	15.0	8.0	4.2	9.3	110.7
1981	4.8	11.5	12.5	4.1	17.5	11.0	6.0	30.0	10.0	10.0	9.0	9.0	135.4
1982	2.5	8.5	2.8	1.7	8.7	25.0	18.0	25.0	10.0	9.0	7.0	12.8	131.0
1983	1.9	5.3	4.0	4.5	36.2	25.0	25.0	48.0	5.5	7.7	8.3	12.0	183.4
1984	2.1	8.6	3.5	2.7	25.6	19.0	12.0	21.0	8.0	7.0	6.5	9.8	125.8
1985	0.5	4.9	2.5	1.0	9.1	6.0	4.5	9.5	2.0	3.0	3.0	5.0	51.0
1986	0.6	2.5	2.0	1.7	8.6	24.0	17.0	22.0	2.0	11.0	11.0	5.9	108.3
1987	1.5	2.0	0.2	6.1	13.2	12.0	18.0	26.0	10.0	9.9	17.0	9.1	125.0
1988	3.5	8.6	0.3	9.0	7.8	15.0	13.0	49.0	7.0	9.4	16.0	9.5	148.1
1989	1.3	1.8	1.2	3.3	4.8	30.0	12.0	34.0	8.0	6.3	8.0	5.9	116.6
1990	2.6	1.0	0.8	1.1	2.3	2.5	7.9	8.0	4.0	3.8	4.3	8.4	46.7
1965-89 Total	42.8	135.2	171.8	121.5	242.1	256.2	208.5	368.5	133.0	124.4	153.1	176.3	2,133.4
1965-89 Average	2.0	5.4	7.5	4.9	9.7	15.1	12.3	21.7	7.0	6.9	7.3	8.4	108.2
Es.Goal	4-8	5-10	20	4	10-15	20	20	20-40	5-10	5-10	10	10	133-177

[a] Estimated escapements are either peak aerial survey counts or adjusted aerial survey counts based on survey conditions and time of surveys.

Appendix Table 26. Personal use set gillnet salmon catch in numbers of fish by species, Southern District, Lower Cook Inlet, 1970 - 1990.

Year	Permits Issued	Chinook	Sockeye	Coho	Pink	Chum	Other	Total
1970	78	0	12	1,179	143	13	39	1,386
1971	112	2	16	1,549	44	7	20	1,638
1972	135	1	11	975	48	69	19	1,123
1973	143	0	18	1,304	84	40	9	1,455
1974	148	0	16	376	43	77	27	539
1975	157	4	47	1,960	632	61	95	2,799
1976	260	16	46	1,962	1,513	56	75	3,668
1977	198	12	46	2,216	639	119	84	3,116
1978	311	4	35	2,482	595	34	89	3,239
1979	440	6	37	2,118	2,251	41	130	4,583
1980	533	43	32	3,491	1,021	25	153[a]	4,765
1981	384	25	64	4,314	732	89	100	5,324
1982	395	39	46	7,303	955	123	8	8,474
1983	343	4	21	2,525	330	40	2	2,922
1984	369	4	25	3,666	821	87	25	4,628
1985	316	5	43	3,372	166	35	3	3,624
1986	338	7	68	3,831	3,132	56	0	7,094
1987	361	5	50	3,977	279	61	0	4,372
1988	438	14	60	4,877	1,422	75	0	6,448
1989	466	41	156	7,215	882	53	49	8,396
1990	578	12	200	8,323	1,846	69	0	10,450
1970-89 Average	281	12	42	3,035	787	58	46	3,980

[a] Steelhead.

Appendix Table 27. Summary of personal use fishermen by area of residence, Lower Cook Inlet, 1974 - 1990.

Year	AREA RESIDENCE OF PERMITTEE: Homer No.	Homer %	Anchorage Area No.	Anchorage Area %	Halibut Cove No.	Halibut Cove %	Anch. Pt. Nanilchik No.	Anch. Pt. Nanilchik %	Seldovia No.	Seldovia %	Pt. Graham/ Eng. Bay No.	Pt. Graham/ Eng. Bay %	Kenai/ Soldotna No.	Kenai/ Soldotna %	Other No.	Other %	Total Permits Issued
1974	108	73.0	20	13.5	6	4.1	4	2.7	1	0.7	3	2.0	5	3.4	1	0.7	148
1975	118	75.2	13	8.3	6	3.8	7	4.5	5	3.2	2	1.3	4	2.5	2	1.3	157
1976	182	70.0	24	9.2	9	3.5	25	9.6	5	1.9	4	1.5	6	2.3	5	1.9	260
1977	153	77.3	8	4.0	8	4.0	17	8.6	7	3.6	0	0	2	1.0	3	1.6	198
1978	214	68.8	40	12.9	5	1.6	30	9.6	12	3.8	3	1.0	4	1.3	3	1.0	311
1979	276	62.7	67	15.2	2	0.5	61	13.9	3	0.7	0	0	11	2.5	20	4.6	440
1980	310	58.2	81	15.2	0	0	80	15.0	7	1.3	0	0	42	7.9	13	2.4	533
1981	274	71.4	43	11.2	8	2.1	37	9.6	3	0.8	1	0.3	14	3.6	4	1.0	384
1982	295	74.7	19	4.8	9	2.3	44	11.1	0	0	0	0	7	1.8	21	5.3	395
1983	267	77.9	24	7.0	3	0.9	33	9.6	8	2.3	0	0	0	0	8	2.3	343
1984	266	72.0	20	5.4	6	1.6	62	16.8	5	1.4	1	0.3	5	1.4	4	1.1	369
1985	251	79.4	15	4.8	6	1.9	33	10.4	6	1.9	0	0	2	0.6	3	1.0	316
1986	280	82.8	18	5.3	4	1.2	29	8.6	1	0.3	0	0	1	0.3	5	1.5	338
1987	284	78.7	25	6.9	3	0.8	37	10.3	7	1.9	0	0	2	0.6	3	0.8	361
1988	338	77.2	36	8.2	5	1.1	43	9.8	6	1.4	0	0	10	2.3	0	0	438
1989	348	74.7	36	7.7	5	1.1	51	10.9	8	1.7	0	0	6	1.3	12	2.6	466
1990	441	76.3	36	6.2	5	0.9	65	11.2	12	2.1	0	0	6	1.0	13	2.3	578
1974-89 Total	3,964		489		85		593		84		14		121		107		5,457
1974-89 Average	248	72.7	31	9.1	5	1.4	37	10.8	5	1.4	1	0.3	8	2.3	7	2.0	341

Appendix Table 28. Subsistence salmon catch in numbers of fish by species for the village of Port Graham, Lower Cook Inlet, 1981 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total	House-holds
1981[b]	116	1,694	625	298	150	2,883	47
1982[b]	98	798	508	851	193	2,448	38
1983[c]	57	1,066	440	169	65	1,797	31
1984[c]	21	2,095	166	215	6	2,503	34
1985[c]	156	469	190	42	22	879	[d]
1986[b]	118	279	179	234	13	823	36
1987[e]	21	186	574	264	69	1,114	31
1988[f]	90	380	447	577	88	1,582	31
1989	48	94	555	524	46	1,267	32
1990	180	470	743	1,102	64	2,559	31
1981-89 Average	81	785	409	353	72	1,700	35

[a] Data source: ADF&G, Subsistence Division, data files.
[b] Data include both subsistence set gillnet and rod/reel harvest.
[c] Data include only subsistence set gillnet harvest.
[d] No data.
[e] Forty-six percent set gillnet harvest, fifty-four percent rod/reel.
[f] Fifty-one percent set gillnet harvest, forty-nine percent rod/reel.

Appendix Table 29. Subsistence salmon catch in numbers of fish by species for the village of English Bay, Lower Cook Inlet, 1981 - 1990[a].

Year	Chinook	Sockeye	Coho	Pink	Chum	Total	House-holds
1981[b]	24	1,075	314	621	19	2,053	29
1982[b]	13	1,584	1,305	1,850	36	4,788	31
1983[c]	0	1,784	367	363	10	2,524	28
1984[c]	18	1,225	385	404	0	2,032	26
1985[c]	5	696	530	313	2	1,546	[d]
1986[b]	4	378	296	825	2	1,505	21
1987[e]	2	626	322	476	45	1,471	21
1988[f]	8	609	385	1,185	35	2,222	26
1989	0	60	651	868	0	1,579	29
1990	46	603	471	1,938	49	3,107	30
1981-89 Average	8	893	506	767	17	2,191	26

[a] Data source: ADF&G, Subsistence Division, data files.
[b] Data include both subsistence set gillnet and rod/reel harvest.
[c] Data include only subsistence set gillnet harvest.
[d] No data.
[e] Sixty-three percent set gillnet harvest, thirty-seven percent rod/reel harvest.
[f] Thirty-seven percent set gillnet harvest, sixty-three percent rod/reel.

Appendix Table 30. FRED Division salmon stocking projects and releases of salmon fry, fingerling and smolt, in millions of fish, Lower Cook Inlet, 1984-1990.

Lake, River or Bay	Species	1984	1985	1986	1987	1988	1989	1990
Leisure Lake	Sockeye	2.110	2.018	2.350	2.022	2.100	2.000	1.750
Chenik Lake	Sockeye	-	-	0.839	1.000	2.600	3.500	3.250
Paint River Lakes								
Upper	Sockeye			0.500	-	1.100	1.000	1.000
Lower	Sockeye			0.320	-	0.552	0.500	0.500
Elusivak	Sockeye					0.521	0.500	0.500
Kirschner Lake	Sockeye				0.867	0.521	0.250	0.250
Port Dick Lake	Sockeye				0.705	0.222	0.430	0
Hazel Lake	Sockeye					0.783	1.000	1.250
English Bay Lakes								0.350
Total		2.110	2.018	4.009	4.594	8.399	9.180	8.850
Tutka Bay Hatchery	Pink	14.730	19.560	22.500	19.570	12.000	30.100	23.600
	Chum	0.026	0.018	0.449	4.050	3.180	2.103	1.500
Caribou Lake	Coho		0.139	0.138	0.150	0.150	0.182	0.180
Seldovia Lake	Coho		0.083	0.072	0.045	0.045	0.080	0.050
Seldovia Bay	Chinook				0.084	0.084	0.108	0.099
Hal. Cove Lag.	Chinook		0.098	0.101	0.094	0.094	0.115	0.112
	Pink			2.000	3.000	3.000	6.000	6.000
Homer Spit	Chinook		0.152	0.104	0.104	0.104	0.212	0.220
	Pink				0.295	0.300	0.332	0.303
	Coho					0.060	0.143	0.123

Appendix Table 31. Catch of Pacific herring in short tons by district in the commercial sac roe seine seine fishery, Lower Cook Inlet, 1970-1990[a].

Year	Southern	Kamishak	Eastern	Outer	Total
1970	2,709	0	2,100	0	4,809
1971	13	0	831	0	844
1972	1	0	30	0	31
1973	204	243	831	301	1,579
1974	110	2,114	47	384	2,655
1975	24	4,119	-	-	4,143
1976	0	4,842	-	-	4,842
1977	291	2,908	-	-	3,199
1978	17	402	-	-	419
1979	13	415	-	-	428
1980	-	-	-	-	-
1981	-	-	-	-	-
1982	-	-	-	-	-
1983	-	-	-	-	-
1984	-	-	-	-	-
1985		1,132	204	12	1,348
1986	-	1,959	167	28	2,154
1987	-	6,132	584	202	6,918
1988	-	5,548	0	57	5,605
1989	170	4,801	0	0	4,971
1990	-	2,264	-	-	2,264
Average					
1970-1989	323	2,885	599	141	2,930
1970-1979	338	2,149	769	343	2,295
1980-1989	-	3,914	318	75	4,199

[a] Data Source: Final IBM computer runs.

Appendix Table 32. Estimated herring biomass and commercial purse seine catch of herring in short tons, exploitation rates, average roe recovery, and exvessel value in millions of dollars, Kamishak Bay District, Lower Cook Inlet, 1978 - 1990.

Year	Spawning Biomass[a]	Commercial Catch	Total Biomass	Percent Exploitation	Average Roe %	Exvessel Value[b]
1978	800	402	1,202	33.4	-	[c]
1979	2,900	415	3,315	12.5	-	[c]
1980	-	0	-	-	-	-
1981	5,130	0	5,130	-	-	-
1982	4,835	0	4,835	-	-	-
1983	4,750	0	4,750	-	-	-
1984	2,885[d]	0	6,500	-	-	-
1985	12,188	1,132	13,320	8.5	11.3	1.0
1986	24,042	1,959	26,001	7.5	10.4	2.2
1987	29,200	6,132	35,332	17.4	11.3	8.4
1988	24,000	5,548	29,548	18.8	11.1	9.3
1989	30,900	4,801	35,701	13.5	9.5	3.5[e]
1990	17,400	2,264	19,650	11.5	10.8	1.8
Average[f]	13,253	1,888	15,440			

[a] Spawning biomass estimates are minimal estimates based on aerial surveys.
[b] Exvessel values exclude any postseason retroactive adjustments.
[c] Data not available.
[d] Spawning had already begun on first survey. Total spawning biomass estimate was higher than the peak survey estimate of 2,885 tons.
[e] Includes retroactive adjustment.
[f] Average excludes 1980 when no data was available.