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**REVIEW OF THE 1998 LOWER COOK INLET AREA  
COMMERCIAL AND PERSONAL USE SALMON  
FISHERIES AND SALMON ENHANCEMENT  
PROGRAMS**

**A REPORT TO THE ALASKA BOARD OF FISHERIES**



by

Lee F. Hammarstrom  
and  
Wesley A. Bucher

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Alaska Department of Fish and Game  
Division of Commercial Fisheries  
Central Region  
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**LOWER COOK INLET**  
**REPORT TO THE ALASKA BOARD OF FISHERIES**  
**1998**

**COMMERCIAL SALMON FISHERY**

**INTRODUCTION**

The Lower Cook Inlet (LCI) salmon management area is bounded on the north by the latitude of Anchor Point, on the south by the latitude of Cape Douglas, and on the east by the longitude of Cape Fairfield (Figure 8). The area is divided up into five districts: Southern, Kamishak Bay, Barren Islands, Outer, and Eastern. Commercial salmon fishing occurs in all but the Barren Islands District. Purse seining and set gillnetting are the only allowable gear types. Approximately 80 seine permits exist for LCI, but the areas where set gillnetting is permitted is extremely limited with an average of 22 permits participating in the fishery over the past decade.

*NOTE: PROPOSAL #45 seeks to allow an additional gear type, drift gillnetting, in waters of Resurrection Bay in the Eastern District.*

Pink salmon have historically provided the bulk of the commercial salmon harvests, while sockeye salmon have provided the greatest exvessel value due to a variety of lake stocking and enhancement projects throughout the management area. Enhancement continues to play a dominant role in both sockeye and pink salmon production in LCI.

**1998 SEASON OVERVIEW**

The 1998 Lower Cook Inlet salmon harvest of 1.760 million fish (Tables 1 and 4) was the seventh highest on record, surpassing both the most recent 10- and 20-year averages. The catch yielded an exvessel value of approximately \$2.0 million, about 17% less than that of the 1997 season (Table 2). The overall harvest represented just over half of the preseason forecast. The

following table compares the actual catch by species to the preseason forecast and the long-term average:

SPECIES	'98 PROJECTED HARVEST	'98 ACTUAL HARVEST <sup>a</sup>	1978-1997 AVERAGE
Chinook	1,600 <sup>b</sup>	1,067	1,338
Sockeye	322,700	283,961	211,807
Coho	14,800 <sup>b</sup>	15,702	14,368
Pink	2,787,300	1,455,325	1,253,555
Chum	11,100 <sup>b</sup>	4,647	93,836
<b>TOTAL</b>	<b>3,137,200</b>	<b>1,760,702</b>	<b>1,574,905</b>

<sup>a</sup> Preliminary data.

<sup>b</sup> Commercial harvest forecasts for chinook and coho salmon represent average annual harvests since 1980, while that for chum salmon represents average harvest since 1989.

Once again, LCI commercial salmon harvests relied heavily on the success of hatchery and enhanced fish production. Pink salmon production from Tutka Hatchery, operated by Cook Inlet Aquaculture Association (CIAA), did not meet expectations, yet the harvest of this species returning to the facility comprised over 80 percent of the all-species catch. The overall return of pinks to Tutka Hatchery, estimated at nearly 1.5 million fish, was the fourth highest on record for the facility. Almost 60 percent of the sockeye salmon harvest in both numbers of fish and exvessel value was attributed to joint Alaska Department of Fish and Game (ADF&G)/CIAA lake stocking and fertilization projects at Leisure and Hazel Lakes in the Southern District, Kirschner and Bruin Lakes in the Kamishak Bay District, and Bear and Grouse Lakes in the Eastern District. Another enhancement/rehabilitation project, undertaken by Chugach Regional Resources Commission (CRRC) and Port Graham Hatchery Corporation (PGHC) at English Bay Lakes in the Southern District, provided a harvestable surplus of sockeye salmon for both subsistence and commercial set gillnet fishermen in Port Graham Subdistrict. However, as has been the case since hatchery programs were taken over by private non-profit agencies in LCI, a significant portion of the salmon harvest was utilized as hatchery cost recovery to recoup expenses incurred by the various stocking and enhancement projects throughout the management

area. One-half of the total salmon harvest was taken by CIAA and PGHC (Table 3) to support the sockeye lake stocking programs and Tutka Hatchery operations, equating to approximately 37% of the exvessel value of the LCI salmon fishery.

One notable factor continuing to affect the amount and distribution of seine effort, and ensuing harvest of salmon, in LCI during the past five seasons was the change in policy by major processors regarding tender service. Previously processors routinely stationed a tender (or tenders) in remote districts, such as the Outer or Kamishak Bay Districts, in anticipation of salmon harvests and subsequent deliveries, even when run strengths and catches were marginal. This practice was abandoned in 1994, however, which forced seiners to devise their own means to transport fish from these remote areas to a processing plant in Homer or elsewhere. In several instances during 1998, harvestable surpluses of pink salmon were identified and areas opened to fishing in remote districts, but tender availability effectively limited the amount of effort and actual catch. Additionally, the continuing low prices paid for pinks suppressed the overall exvessel value of the salmon harvest in LCI.

## **SUMMARY BY SPECIES**

### **Chinook Salmon**

The 1998 harvest of chinook salmon, not normally a commercially important species in Lower Cook Inlet, was the lowest catch since 1986 at 1,100 fish. This was less than the long-term average of 1,340 and well below the record high harvest of 2,300 fish taken in 1995 (Figure 1, Table 4). Virtually all of the catch came from the Southern District (Table 5) and can be primarily attributed to enhanced production at Halibut Cove Lagoon and Seldovia Bay. Set gillnetters accounted for 89 percent of the Southern District chinook catch, with purse seiners taking the remaining 11 percent.

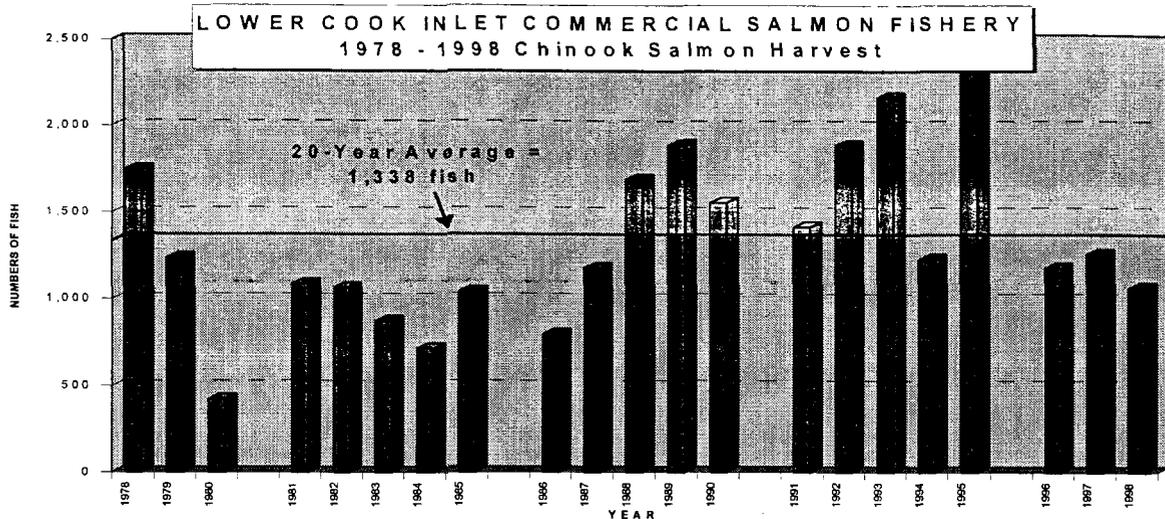


Figure 1. Historical commercial harvests of chinook salmon, Lower Cook Inlet, 1978 - 1998.

### Sockeye Salmon

The 1998 LCI sockeye salmon harvest of 284,000 fish (Figure 2, Table 4) was the fourth highest during the last twenty years but fell short of the preseason forecast by about 16%. Despite accounting for only 16% of the LCI salmon harvest in numbers of fish, sockeyes provided over 60% of the exvessel value of the entire salmon fishery during 1998 (Tables 2 and 3). Harvests of enhanced runs of sockeye salmon returning to Leisure and Hazel Lakes in the Southern District, at a combined total of 100,000 fish, provided over one-third of the LCI sockeye total and exceeded the combined preseason forecast of 85,000 fish to both systems. In the Kamishak Bay District, enhanced returns to Kirschner and Bruin Lakes produced a harvest of 27,500 fish, virtually achieving the combined preseason forecast of 30,000 fish since several thousand unharvested fish were documented in salt water off Kirschner Lake and in Bruin Lake Creek after the fishing season. At Bear Lake in Resurrection Bay of the Eastern District, a forecasted harvest of 11,000 sockeyes was surpassed by an actual catch of approximately 23,000 fish, while the Grouse Lake return contributed an additional 12,000 sockeyes to commercial catches in the form of hatchery cost recovery. Commercial harvests as a result of the English Bay Lakes enhancement project in the Port Graham Subdistrict of the Southern District totaled over 14,000 sockeyes.

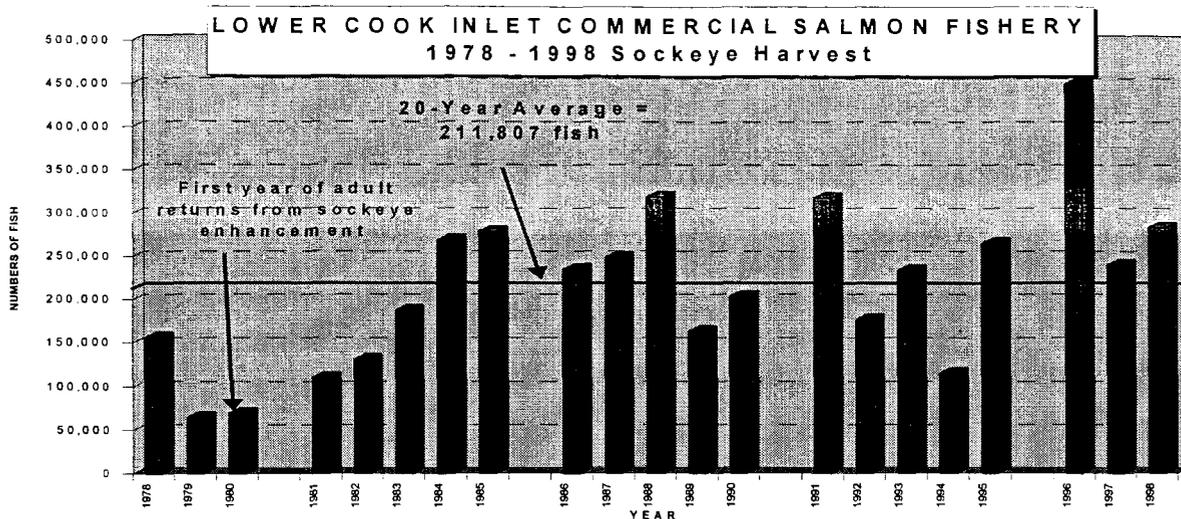


Figure 2. Historical commercial harvests of sockeye salmon, Lower Cook Inlet, 1978 - 1998.

Natural returns of sockeye salmon to LCI systems were considered good, with all systems achieving escapement goals. In the Outer District, both Delight and Desire Lakes attained their respective escapement goals of 10,000 sockeyes each, with a small harvestable surplus taken by the seine fleet at Desire Lake (Table 6). At Mikfik Lake in the Kamishak Bay District, no fishing effort occurred during the season and the entire run entered the system as escapement, easily achieving the desired goal. A fairly strong sockeye return to small Aialik Lake in the Eastern District resulted in a modest harvest for the seine fleet while still attaining the escapement goal. At English Bay Lakes in the Southern District, the sockeye return attained the desired escapement goal of 15,000 fish for the second consecutive season while still providing a significant harvestable surplus to both subsistence and commercial set gillnetters as well as hatchery cost recovery in the Port Graham Subdistrict. The strong return to this system can be attributed to the success of an ongoing rehabilitation project originally initiated by ADF&G in the late 1980's and presently being conducted by CRRC in conjunction with the village of Nanwalek.

### Coho Salmon

The commercial harvest of 15,700 coho salmon in 1998 represented the second highest LCI total for this species during the 1990's (Figure 3, Table 4), slightly exceeding the 20-year average.

The majority of the harvest once again occurred in the Eastern District, primarily for CIAA cost recovery at Bear Lake and the Seward Silver Salmon Derby. Seiners in the Southern District accounted for most of the remaining coho catch.

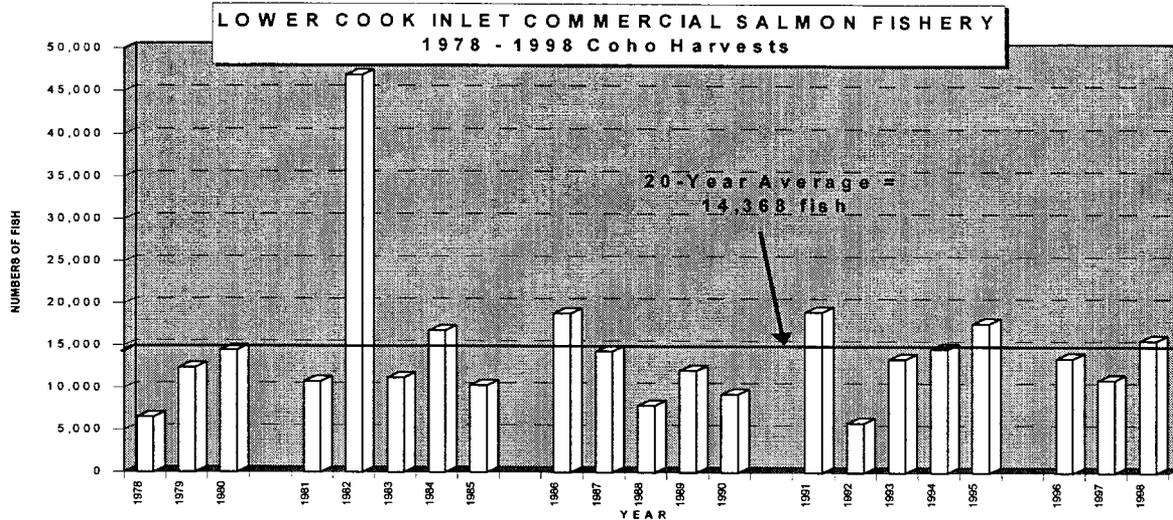


Figure 3. Historical commercial harvests of coho salmon, Lower Cook Inlet, 1978 - 1998.

Coho run assessment in LCI is limited, with commercial, sport, and personal use harvests providing the best indicators of run strength, and the returns during 1998 were considered strong. Despite the relative strength of the returns, low prices, low market demand, and the lack of remote tender service discouraged the majority of the seine fleet from targeting this species late in the season. Only one aerial survey was flown specifically for coho salmon, indicating good escapement into the major index stream at the head of Kachemak Bay, but heavy rainfall experienced throughout the management area in late August and throughout September precluded additional surveys.

**Pink Salmon**

Returns of pink salmon, the dominant species in numbers of commercially harvested fish in LCI, fell below preseason expectations in 1998, with an overall harvest of 1.455 million fish (Figure 4, Table 4). Still, this number is about 16% greater than the most recent 20-year average and

represents the seventh highest catch on record. Approximately 90% (1.313 million pinks) of the total was taken in the Southern District (Table 8), the bulk of which came as a direct result of Tutka

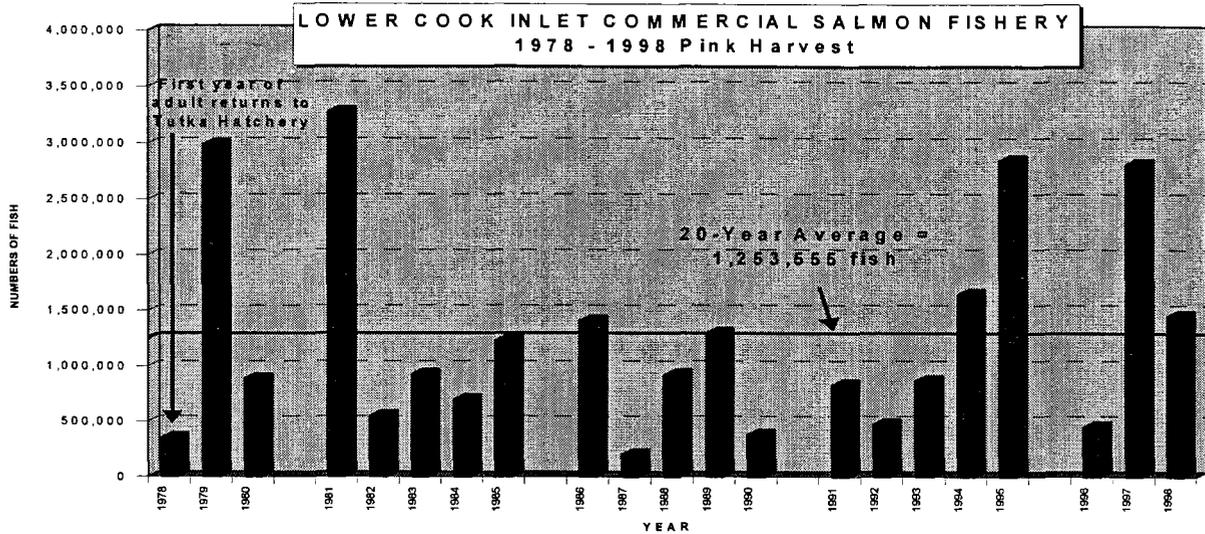


Figure 4. Historical commercial harvests of pink salmon, Lower Cook Inlet, 1978 - 1998.

Hatchery production. However, about 60% (0.793 million pinks) of the Southern District total was utilized for Tutka Hatchery cost recovery. The estimated hatchery return, including escapement, brood stock, and commercially harvested fish, was 1.47 million pinks, about 40% less than the preseason projection of 2.46 million fish.

The Outer District produced the greatest contribution of naturally produced pinks in LCI, with a total harvest of 102,000 fish (Table 8). The majority of the catch came from Nuka Island Subdistrict, closely followed by Rocky Bay Subdistrict. Port Dick experienced strong returns but almost no fishing effort due to the lack of tender service to this remote district. East Nuka and Port Chatham Subdistricts also added to the Outer District harvests in 1998. In the Kamishak Bay District, Bruin Bay Subdistrict experienced a strong return of pinks, but low prices and lack of tender service precluded any effort or harvest. Pink salmon escapements within the management area were highly variable, as many Outer District (Gulf coast) systems and Bruin Bay River

(Kamishak Bay) experienced strong returns and achieved escapement goals, whereas most other systems followed the traditional pattern of weak even-year returns.

### Chum Salmon

The 1998 commercial chum salmon harvest of 4,600 fish was the tenth successive below-average season in Lower Cook Inlet, representing only about five percent of the 20-year average (Figure 5, Table 4). The low numbers were anticipated based on the recent years' trend of weak returns coupled with a soft market and low prices. Although restrictive fishing schedules were anticipated in an effort to secure adequate escapements and reverse the declines in chum salmon numbers, the conservative strategy was hardly necessary as low prices, combined with the lack of tender service in remote districts, discouraged the fleet from targeting this species. Despite the

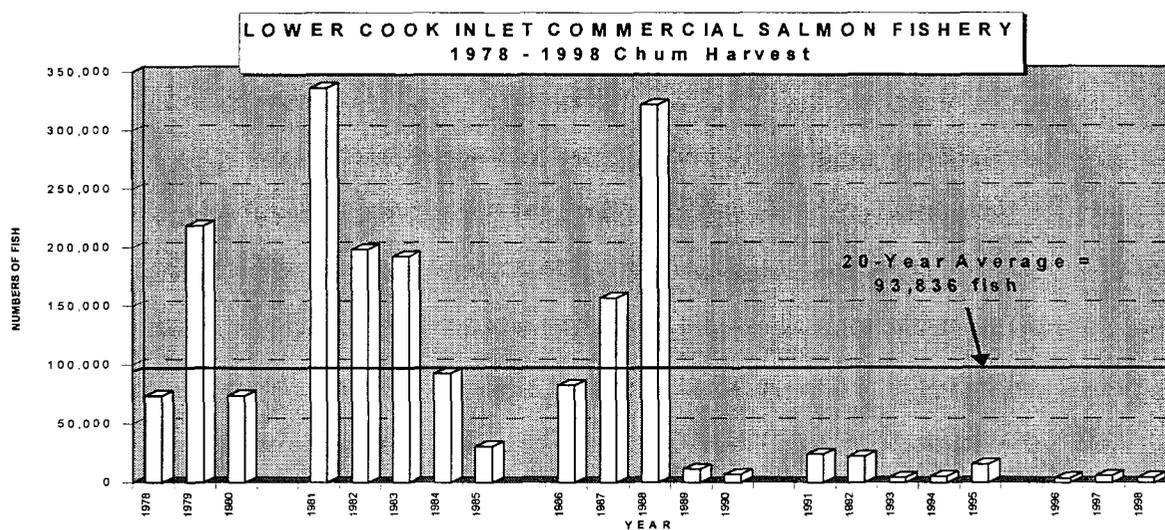


Figure 5. Historical commercial harvests of chum salmon, Lower Cook Inlet, 1978 - 1998.

low harvest, few systems achieved their minimum escapement goals. In Kamishak Bay, northern chum streams generally fared well, while McNeil River attained the lower end of its escapement goal range of 20,000 to 40,000 fish for the second consecutive year but only the second time this decade (Table 9).

## SET GILLNET FISHERY

An Area H set gillnet permit allows fishing in any part of Cook Inlet (both Upper and Lower), but there are only five beaches in Lower Cook Inlet, all located along the south shore of Kachemak Bay in the Southern District (Figure 9), where commercial set gillnets may be used. The limited area provides only enough productive fishing sites to accommodate approximately 25 set gillnet permits.

**NOTE: PROPOSALS #43 and #44 seek to amend LCI commercial set gillnet fishing seasons and gear specifications within the Halibut Cove and Seldovia Bay Subdistricts.**

The 1998 LCI set gillnet harvest totaled 56,200 fish, less than the 1978-97 average (Figure 6, Table 10) but equal to the most recent 10-year average. Catches were dominated by sockeyes at 46% followed by pinks at 43%. For comparison, typical species composition in the commercial set gillnet fishery during the past decade has been 52% sockeyes, 36% pinks, 6% cohos, 6% chums, and less than 1% chinooks. Catches of chinook salmon, at 950 fish, were the second

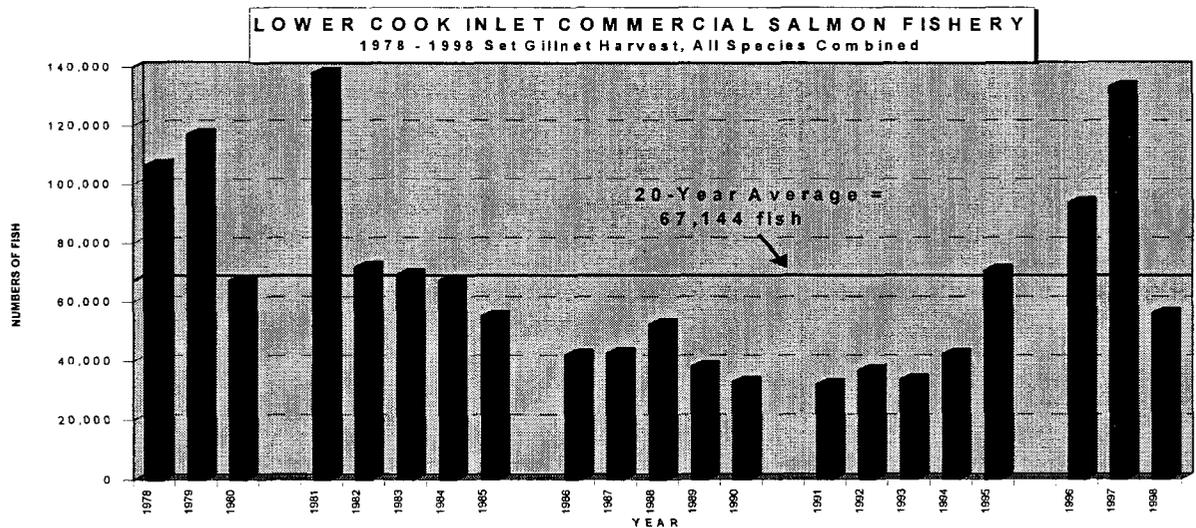


Figure 6. Historical commercial set gillnet harvests, Lower Cook Inlet, 1978 - 1998.

lowest during the last 10 years but equal to the 20-year average. Enhancement efforts directed at recreational fisheries in Seldovia Bay and Halibut Cove Lagoon are primarily responsible for producing the chinooks taken by commercial gillnets during 1998.

## **1999 LOWER COOK INLET SALMON HARVEST PROJECTIONS**

### **SOCKEYE SALMON**

Sockeye salmon harvest projections in Lower Cook Inlet are based on both forecasts of fish returning to enhancement sites and average historical harvests of natural runs. The preliminary 1999 forecasted harvest of sockeye salmon is 390,700 fish, nearly 40% greater than the 284,000 fish landed in 1998 and almost 60% greater than the average annual catch of 212,000 fish during the last decade. If realized, this harvest would represent the second highest on record for sockeye salmon in LCI. However, this optimistic prediction includes a projected return of over 150,000 sockeyes to Grouse Lake in the Eastern District, where runs have not reached expectations during the last several years. Returns to Leisure and Hazel Lakes in the Southern District, with a harvest forecast of 104,000 fish, to Bear and Grouse Lakes in the Eastern District, with a combined catch predicted to approach 187,000 fish, and to Kirschner and Bruin Lakes in the Kamishak Bay District, with a combined harvest forecast of 31,000 fish, are once again expected to be the major contributors to enhanced sockeye production. It should be noted that the Grouse Lake return is produced solely for hatchery cost recovery. Natural returns to the Southern, Outer, Eastern, and Kamishak Bay Districts are expected to contribute up to 89,000 sockeyes to the 1998 harvests.

### **PINK SALMON**

Following the trend of stronger odd-year returns, the 1999 LCI pink salmon harvest is projected to approach 3.4 million fish. Returns to Tutka Bay Hatchery are once again expected to provide

the bulk of the catch, contributing 3.062 million pinks to the harvest. Pink salmon escapements to most major systems in 1997 were considered good, and the resulting natural production is expected to contribute up to 337,000 fish to the 1999 harvests. However, as has been the case in recent years, market conditions and tender availability in remote districts will likely play a larger role in actual commercial pink harvests than the magnitude of the returns themselves.

### **CHUM SALMON**

Based solely on the average annual catch since 1989, chum salmon harvests in LCI during 1999 could approach 10,000 fish. However, LCI runs of chum salmon have been below average for the last ten seasons, and despite fair escapements to some chum systems during those years, the resultant returns have generally failed to achieve preseason expectations. Because the price paid and market demand for this species will likely affect the actual harvests, the forecast should be interpreted with caution.

### **CHINOOK AND COHO SALMON**

No formal harvest forecast is prepared for chinook or coho salmon in LCI. However, average annual harvests since 1980 indicate that about 1,300 chinook and 15,000 coho salmon can be expected to contribute to LCI commercial harvests in 1999.

The following table summarizes the preliminary projected harvest figures by species in the Lower Cook Inlet management area during 1999:

	<u>Enhanced</u>	<u>Natural</u>	<u>Total</u>
CHINOOK	a	a	1,300 <sup>a</sup>
SOCKEYE	303,000 <sup>b</sup>	87,700 <sup>c</sup>	390,700
COHO	a	a	14,700 <sup>a</sup>
PINK	3,062,000 <sup>b</sup>	336,500	3,398,500
CHUM	0	10,400 <sup>c</sup>	10,400
<b>Total</b>	<b>3,365,000</b>	<b>434,600</b>	<b>3,815,700</b>

- <sup>a</sup> Commercial harvest forecasts of chinook and coho salmon represent average harvests since 1980 and are comprised of a combination of naturally-produced fish as well as fish produced from enhancement programs in LCI; no attempt is made to separate the two components.
- <sup>b</sup> Includes common property plus cost recovery harvests.
- <sup>c</sup> Forecasts for naturally-produced sockeye and chum salmon are simply average commercial harvests since 1980 and 1989 (respectively).

## **SALMON ENHANCEMENT AND REHABILITATION**

### **INTRODUCTION**

Fisheries enhancement has played an important role in LCI salmon production for nearly 20 years. Natural adult salmon returns to the LCI area continue to demonstrate wide fluctuations, often the result of environmental impacts such as flooding or ice scouring on spawning grounds. Since their inception in the mid-1970's, enhancement and rehabilitation projects have made significant contributions to both commercial and sport fishing harvests. These contributions have historically ranged from 24% to 90% of the entire LCI commercial salmon harvest and are expected to remain high in future years.

Projects initiated by the ADF&G and presently being undertaken by CIAA and/or CRRC provided an estimated 89% (1.482 million salmon) of the total 1998 LCI commercial harvest of 1.76 million fish. The Leisure/Hazel, English Bay, Kirschner/Bruin, and Bear/Grouse Lakes sockeye salmon enhancement projects produced nearly two-thirds (177,700 fish) of the total LCI

sockeye harvest of 284,000 fish in 1998. Tutka Lagoon Hatchery production accounted for 89% (1.295 million fish) of the 1998 LCI commercial pink salmon harvest of 1.455 million fish.

Using average fish weights and average prices per pound in LCI, the estimated contribution of ADF&G/CIAA/CRRC-produced salmon was 70% (\$1.413 million) of the \$2.0 million total value of the 1998 LCI commercial salmon harvest. About 37% (\$0.74 million) of the total exvessel value of the fishery was utilized for hatchery cost recovery purposes (Table 3). A brief description of the current enhancement projects specifically affecting the commercial fishery 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 expansion over time, including major renovation work during the winter of 1993-94, has increased its capacity to the present level of approximately 150 million eggs. Pink salmon have been the primary species produced at the hatchery, while secondary chum enhancement was discontinued in favor of recent efforts directed toward sockeye salmon. Although the hatchery now has a sockeye egg capacity of 1.8 million eggs, and raceways to accommodate the resulting fry, efforts to incubate and rear sockeye smolts have been plagued by the IHN virus, resulting in an indefinite suspension of the sockeye program.

In 1998 the adult pink salmon produced by Tutka Lagoon Hatchery totaled approximately 1.472 million fish (Table 8). No attempt was made to separate the contribution resulting from natural spawning in Tutka Creek. The estimated 1.7% overall survival rate was lower than the average for short-term reared fry (only) of roughly 5.5%. The commercial harvest, including cost recovery, of 1.295 million pink salmon from Tutka Bay and Lagoon (Table 8), accounted for approximately 99% of the pink salmon landed in the Southern District and 89% of the entire LCI commercial pink salmon harvest. Pinks taken for hatchery cost recovery purposes from the Tutka Bay Subdistrict totaled 0.793 million fish, worth approximately \$434,000 which exceeded

CIAA's revenue goal of \$424,300. Approximately 90.0 million short-term reared pink salmon fry were released into Tutka Bay in 1998 (Table 12), the second highest on record.

### **LEISURE AND HAZEL LAKES 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 precludes any adult spawning, it is desirable to harvest all returning adult fish in the terminal harvest area, China Poot Bay. Beginning in 1988, a similar sockeye stocking program was initiated at Hazel Lake, which empties into Neptune Bay and is located approximately three miles south of Leisure Lake. Since the initiation of these projects, approximately 1.5 million adult sockeyes were estimated to have returned as a result of these stocking programs, making a significant contribution to the commercial and recreational sockeye harvests in the Southern District.

Because of the close proximity of the two terminal harvest areas, and the absence of a mark/recovery program, adult returns to Leisure and Hazel Lakes cannot be separately identified through sampling within the commercial catches and are therefore presented as a combined total. The cumulative total sockeye return to Leisure and Hazel Lakes in 1998 was estimated to be 106,000 fish, about 35% greater than the 1979-97 average and equal to the recent 10-year average (which only included returns to Leisure Lake from 1986 through 1990). The cumulative commercial harvest of 100,000 fish comprised over half of the Southern District sockeye harvest and about 35% of the total LCI sockeye salmon harvest.

Just over 2.0 million sockeye salmon fry were released into Leisure Lake in 1998 (Table 12), continuing the scheme of high-density stocking adopted in 1984. At Hazel Lake, 1.3 million sockeye fry were stocked in 1998.

## ENGLISH BAY SOCKEYE SALMON REHABILITATION

The English Bay Lake system has the only significant stock of sockeye salmon native to the Southern District of LCI. Unfortunately, the English Bay sockeye returns declined to their lowest recorded levels in the last half of the 1980's decade. Sockeye escapement estimates between 1985 and 1993 ranged from 2,500 to 8,900 fish; all but one of these years (1993) was well below the 20-year average of 7,800 fish. The decline of the English Bay sockeye run resulted in a very restrictive management strategy for this area. The commercial, sport, and subsistence fisheries were closed during the sockeye run for most years mentioned. Efforts to rehabilitate this depressed stock were initiated by ADF&G with an egg take in 1989 and the subsequent release of 350,000 sockeye salmon fry in 1990 (Table 12). Chugach Regional Resources Commission (CRRC), in cooperation with the village of Nanwalek (formerly English Bay) and the Bureau of Indian Affairs, has since taken over this enhancement project and continued egg collections, fry stockings, and operation of a smolt/adult enumeration weir.

Whereas the escapement figures for English Bay Lakes prior to 1994 were index estimates based on aerial surveys, escapements beginning with the 1994 season have been monitored through the use of a counting weir, operated by CRRC. Sockeye returns have improved significantly since 1994 with escapements approaching the desired level. Extensive closures of the subsistence, commercial, and sport fisheries have been unnecessary during the past several seasons due to improved returns.

In 1998 the final escapement count past the weir totaled 14,100 sockeyes and, when combined with the 1,300 fish taken for hatchery broodstock, exceeded the desired goal of 15,000 fish. Added to commercial and hatchery harvests, the estimated return to the English Bay Lakes systems was nearly 30,000 sockeyes (Table 6). Because subsistence set gillnet harvests in the Port Graham Subdistrict were presumably comprised of a high percentage of English Bay sockeyes, the total return was estimated to be about 32,000 with the addition of these fish.

Between 150,000 and 200,000 sockeye fry were released annually into English Bay Lakes in 1996 and 1997 in the late fall via a long-term net pen rearing operation (Table 12). Due to a devastating fire that destroyed the Port Graham Hatchery and cannery, where English Bay sockeye eggs were being incubated, no fry were available for stocking in 1998.

### **BEAR LAKE AND GROUSE LAKE SOCKEYE SALMON ENHANCEMENT**

Bear Lake, located at the head of Resurrection Bay in the Eastern District, has been the target of sockeye salmon enhancement efforts over the past decade. In addition, this system has been the centerpiece of a Sport Fish Division coho salmon enhancement program since 1962, part of which included limiting the escapement of sockeye salmon into the lake. As a result, only a small remnant run of naturally spawning sockeye salmon remained at Bear Lake. In an effort to produce increasing numbers of adult sockeyes without adversely affecting coho salmon production, as mandated by Board of Fisheries policy, CIAA undertook a sockeye stocking program beginning in 1989 with the release of 2.2 million sockeye fingerlings. Since then, additional releases of fry, fingerlings, and accelerated growth ("zero check") smolts have occurred, ranging from 0.2 to 2.4 million juvenile sockeye salmon each year (Table 12).

Adults returning to this stocking site are specifically intended for the commercial seine user group, with a 5-8,000 fish escapement range in place for Bear Lake. The first year of adult returns in 1992 was discouraging, with a total of less than 2,000 fish, but returns increased during each successive season, peaking in 1995 and 1996 at nearly 53,000 sockeyes each year. The 1997 and 1998 returns experienced slight downturns, with approximately 27,000 and 30,000 sockeyes, respectively, returning to Resurrection Bay waters as a result of this project. Nonetheless, the program at Bear Lake has provided increased opportunity for commercial harvest, with annual seine catches ranging up to 36,000 fish and hatchery cost recovery harvests ranging as high as 21,000 fish.

A relatively new sockeye enhancement project at Grouse Lake, also in Resurrection Bay of the Eastern District, was begun by CIAA for the express purpose of hatchery cost recovery. No

directed commercial seine fishery was planned or intended for the adult returns to this site. Since coming on line with the first adult return in 1996, the run has not achieved the results desired by CIAA, with returns ranging from 800 to 16,000 fish. Based on the disappointing returns since inception of the program, it is unclear at this time whether the Grouse Lake enhancement project will be continued or moved to a different location in the future. Spring Creek, located on the eastern side of Resurrection Bay near the Seward marine industrial complex, has been discussed as a potential alternative release site for this project's juvenile sockeye salmon.

***NOTE: PROPOSAL #46 seeks to prohibit the stocking of Spring Creek in Resurrection Bay of the Eastern District with hatchery-produced juvenile sockeye salmon. This proposal additionally seeks to prohibit commercial salmon fishing in waters of Resurrection Bay.***

#### **OTHER SOCKEYE SALMON LAKE STOCKING**

Kirschner Lake in the Kamishak Bay District has been the site of an ongoing fry stocking project since 1987, with annual fry plantings ranging from 0.250 to 0.867 million. Nearby Bruin Lake was also stocked between 1990 and 1996. Returning adults are prevented from reaching the spawning grounds by a steep falls at tideline (Kirschner Lake) and by a barrier falls in the outlet creek of Bruin Lake, therefore all fish are targeted for harvest by the seine fleet. Combined adult returns to these two stocking sites have averaged about 30,000 sockeyes annually.

Several other lakes in the Kamishak Bay District, evaluated through pre-stocking studies conducted between 1986 and 1989, were stocked regularly in the late 1980's and early 1990's but failed to produce significant adult returns and the programs were recently discontinued. These lakes included Ursus Lake, Upper Paint Lake, Lower Paint Lake, and Elusivak Lake.

## **HALIBUT COVE LAGOON/SELDOVIA BAY CHINOOK SALMON ENHANCEMENT**

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, operating continually with an annual release of smolts since 1979. Although adult returns from the Halibut Cove Lagoon stocking program are not intended for commercial harvest, there is incidental harvest of these chinook salmon in the commercial set gillnet and seine fisheries. The long-term estimated incidental harvest of enhanced chinook salmon by commercial fishermen in Halibut Cove Subdistrict has been around 30% of the total return. Figures for this incidental harvest during 1998 are presently unavailable but are thought to be near the historical average. Total commercial harvest of chinook salmon in Halibut Cove Subdistrict in 1998 was 426 fish.

The Seldovia Bay chinook salmon enhancement project is very similar to that of Halibut Cove but has been in place only since 1987. Smolts are released into the small boat harbor at Seldovia, with adults returning to this site primarily for the benefit of recreational fishermen. Incidental harvest of these fish occurs in the Seldovia Bay commercial and subsistence gillnet fisheries, but because no mark/recovery program is in place to assess the returns, no attempt is made to identify the proportion of hatchery fish in the catches. Total chinook harvest in Seldovia Bay in 1998 was 328 in the commercial fishery and 132 in the subsistence fishery.

## **PORT GRAHAM HATCHERY**

In an effort to supplement natural fish production and provide increased employment opportunities in the native village of Port Graham, the Port Graham Hatchery Corporation (PGHC) applied for and received a permit to operate a private non-profit (PNP) hatchery in 1992. Port Graham is located approximately 21 nautical miles southwest of Homer on the south side of Kachemak Bay (Figure 2). The hatchery had conducted experimental egg-takes and fry releases via a scientific/educational permit from 1990 through 1992, while these activities have since been permitted in the Port Graham Hatchery Basic and Annual

Management Plans (BMP/AMP). Adult returns to the hatchery prior to 1997 were disappointing and/or complete failures despite predictions of at least moderate returns. In 1997, returns finally achieved the preseason forecast level of 80,000 to 200,000 pinks, with a total run size estimated at about 130,000 fish. Few fish returned to the site in 1998 due to low stocking levels. Reasons for the poor returns prior to 1997 are not fully understood, but the hatchery plans to continue fry releases in an effort to establish a successful pink salmon program.

Although all efforts prior to 1993 were directed towards pink salmon, sockeye salmon production also has been underway at the Port Graham Hatchery. The facility has incubated sockeye salmon eggs collected from English Bay Lakes, destined for release back into that system, since 1993. In January of 1998, a devastating fire completely destroyed the Port Graham Cannery, which also housed the pink and sockeye salmon modules for the Port Graham Hatchery. All eggs for these two species being incubated at the facility were lost and therefore were not available for release in 1998, but a separate module used temporarily for coho incubation and rearing was converted to sockeye and pink production and will continue to be utilized until a permanent structure can be built.

### **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. Currently the Paint River system is barren of salmon because of a waterfall at tide line that was impassable prior to 1993. ADF&G and CIAA initiated feasibility studies for a fishway in 1979. CIAA received State and Federal grant funds to build the fishway, completing construction in the fall of 1991. ADF&G Commissioner Carl Rosier declared the fish pass officially operational in January 1993.

To test the feasibility of developing a sockeye salmon return to the fish pass project site, the Paint River Lakes were first stocked with sockeye fry in 1986 and annually from 1988 through 1996, except in 1994 when no fry were available (Table 12). Eight consecutive years of

meager adult returns, with a high of 1,900 fish observed in 1998, have characterized this project's history. Because adult returns from the plantings have been negligible, CIAA discontinued fry stocking after the 1996 season.

## **PERSONAL USE SALMON FISHERY**

### **KACHEMAK BAY FALL COHO SALMON PERSONAL USE FISHERY**

The Southern District (Kachemak Bay) fall coho salmon gillnet fishery dates back prior to statehood under varying names, being known as a "personal use" fishery during the years 1986-1990, 1993, and 1995-1997, and as a "subsistence" fishery in 1991, 1992, and 1994. Numerous court rulings have affected the status of this fishery over the past 15 years, causing it to change in status between the two categories. The most recent court action, after the 1994 fishery, reestablished the "subsistence" and "non-subsistence" areas originally created by the Alaska Board of Fisheries in 1992, and because most of Kachemak Bay was included in a "non-subsistence" area, the subsistence fishery and the regulations governing it were no longer valid. The Board responded by re-adopting personal use regulations governing this fishery into permanent regulation for the 1995 season and rescinding the subsistence regulations formerly governing the fishery. Those personal use regulations have remained in effect since that time.

The target species in the Kachemak Bay gillnet fishery is coho salmon, with returning fish a mixture of natural stocks primarily bound for the Fox River drainage at the head of Kachemak Bay and enhanced runs bound for the Homer Spit fishing lagoon and, formerly, Fox Creek/Cabibou Lake near the head of Kachemak Bay. The regulations governing the fishery are found in the Personal Use Coho Salmon Fishery Management Plan (5 AAC 77.549), which directs the Department of Fish and Game to close the fishery when an estimated 2,500 to 3,500 coho salmon are harvested. Included in this guideline harvest range was the requirement that

any cohos taken during the Seldovia area subsistence salmon fishery be included as part of the personal use guideline.

All regulations from the previous year's fishery remained essentially unchanged for the 1998 personal use fishery. The published regulatory season for the fishery was August 16 through September 15. Legal gear was limited to a single set gillnet not exceeding 35 fathoms in length, 45 meshes in depth, and 6 inches in mesh size. Nets were not permitted more than 500 feet from the mean high water mark, and a net could not be set offshore of another net. A permit from the Homer office was required, with an Alaska resident sport fishing license necessary to obtain a permit. The seasonal limit was 25 salmon per head of household and 10 additional salmon per each dependent. There were two scheduled 48-hour fishing periods each week, from Monday 6:00 a.m. until Wednesday 6:00 a.m. and Thursday 6:00 a.m. until Saturday 6:00 a.m. Between 1991 and 1997, years of intensive management, the total fishing time allowed in this fishery was between 48 and 144 hours, or one to three regularly scheduled fishing periods.

*NOTE: PROPOSAL #39 seeks to shorten the published regulatory season for the Southern District personal use coho salmon gillnet fishery by 18 days.*

No coho salmon harvest was reported from the early August Seldovia subsistence fishery, therefore the guideline harvest range remained at 2,500 to 3,500 fish for the personal use fishery. Because August 16 fell on a closed weekly period (Sunday), the 1998 fishery actually began on August 17. As has been the case during recent personal use fisheries in LCI, the Department requested voluntary daily reporting from each permit holder during the fishery. Based on those voluntary reports through the first 48 hours of fishing, early reports from the second fishing period, and fishery performance data from the previous seven years, the staff estimated that the guideline harvest range would not be achieved by the end of the second (48-hour) open fishing period which ended at 6:00 a.m. Saturday, August 22. The fishery was therefore allowed to open for a third period beginning at 6:00 a.m. Monday, August 24. As catch reports came in from the third weekly period, it surprisingly appeared that the guideline would not be attained

when the period ended at 6:00 a.m. Wednesday, August 26. Despite an apparently strong coho run (based strictly on observations in local sport fisheries), and after a week and a half of gillnet fishing, the reported personal use harvest seemed to be inexplicably lagging. Recent years' fisheries had all been closed by this time, leading to the assumption that the actual harvest was simply being under-reported. The relatively late date heightened the staff's concern for natural coho returns since their run timing is generally later than hatchery returns. Despite a reported harvest below the GHF, the staff maintained a conservative stance towards wild stock returns and announced one additional (fourth) 48-hour fishing period, followed by the issuance of *LCI E.O. No. 2-F-H-019-98*, which closed the fishery for the remainder of the 1998 season after the fourth period ended at 6:00 a.m. Saturday, August 29.

A total of 227 permits was issued for the 1998 fishery (Table 11). A total of 214 permit holders (94%) reported their catches by phone or returned permits. Of this number, 142 permit holders (63%) actively fished, 72 (32%) did not fish at all, and the remaining 13 permit holders (6%) did not report. A total of 212 permit holders (93%) actually returned their permits. Based on permits actually returned and voluntary catch reports, the harvest was estimated to be 1,461 coho salmon (Figure 2), 167 pink salmon, 20 sockeye salmon, 135

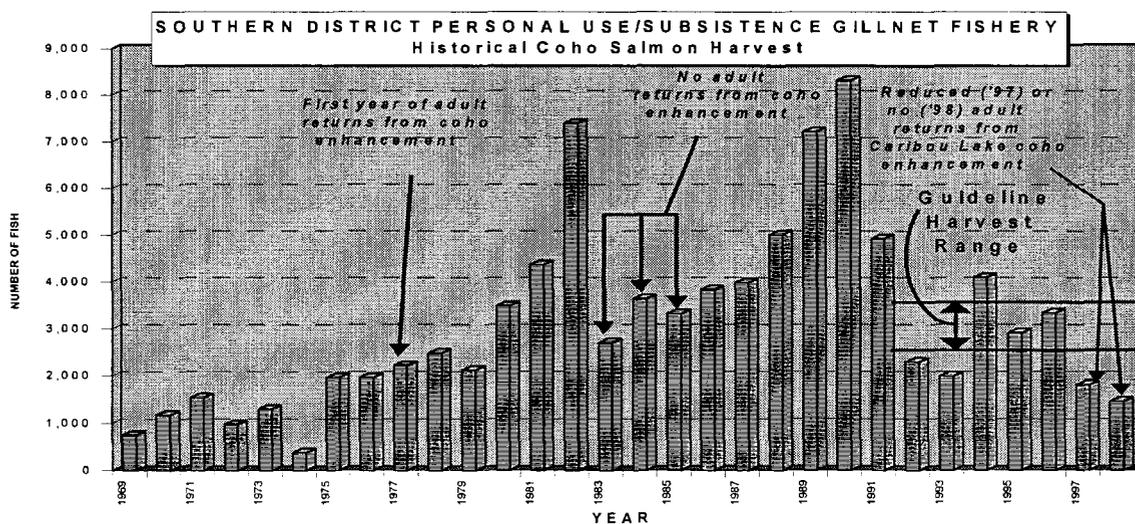


Figure 7. Historical harvests of coho salmon in the Southern District Coho Salmon Personal Use/Subsistence Set Gillnet Fishery, Lower Cook Inlet, 1969 - 1998.

chinooks, and 5 chums. The coho total represents just over half of the lower end of the guideline harvest range of 2,500 to 3,500 fish.

The duration of the 1998 Southern District personal use fishery (192 hours of fishing time) was the longest since intensive management was implemented in 1991. The number of permits issued was slightly less than the previous three years and was the lowest total since 1977 (Table 11). Actual fishing effort was similarly down, representing only about one-third of the peak level experienced in 1990 (Table 11) and the lowest since 1977. The coho harvest of 1,455 fish was, remarkably, the lowest total in almost 25 years.

Factors contributing to the longer duration of the fishery compared to other years this decade were twofold. First, 1998 represented the first season since 1985 that no adult coho salmon from the Caribou Lake stocking project, located at the head of Kachemak Bay, augmented the personal use catches. That stocking program was eliminated after 1994, which resulted in reduced numbers of adult cohos returning to Caribou Lake in 1997 and none during this past season. Second, run timing of naturally-produced cohos generally is later than that of enhanced fish, occurring near the end of August, thus the natural component of the gillnet catch during the first two weeks after opening tends to be diminished in most years.

The low coho harvest in the 1998 personal use fishery was not expected. Prior to the season, the lack of Caribou Lake cohos was predicted to perhaps lengthen the time necessary to reach the GHL but not preclude achieving it. During the fishery, good catches were anticipated based on the strong coho return, as evidenced by informal observations in local sport fisheries. Sport and commercial catches are normally utilized as indicators of run strength, but as has become commonplace in recent years, commercial catches in Lower Cook Inlet did not accurately reflect the strength of the 1998 coho return due to a lack of directed effort. Additionally, coho returns to the adjacent Upper Cook Inlet management area were reportedly strong. This information, as well as previous experience managing this fishery, led the staff to believe that a harvest within the guideline range should easily have been achieved by the end of the third (48-hour) fishing period. Inseason call-ins and postseason permit returns, however, proved that the harvest was far

below expectations, and the most success occurred in that area adjacent to the Homer Spit enhancement lagoon. Other areas that normally produce reasonable catches, especially the north shore of Kachemak Bay from Mud Bay to Swift Creek, reported smaller harvests compared to prior years. Even though coho returns to the Homer Spit enhancement lagoon were strong, the uncertainty of the wild returns was cause for concern since the run timing for these fish is slightly later than the enhanced fish returning to the Spit. The staff inevitably decided that fishing after August 29<sup>th</sup> could result in an unacceptably high harvest rate on wild cohos, subsequently reducing the numbers available for escapement. Given the lack of real-time coho escapement information, a conservative approach was adopted.

The 1998 catch of 131 chinook salmon (Table 11) was lower than the previous two seasons but still much greater than the long-term average. The primary reason for this above-average chinook harvest was due to greater numbers of adult fish returning to the “enhancement lagoon” on the Homer Spit as a result of a relatively new “late run” stocking project. Initiated in 1992, this project specifically selected brood stock for late run-timing characteristics in an effort to expand and prolong sport fishing opportunities for chinooks on the Homer Spit. The late run timing of returning adults overlapped the personal use season dates and, consequently, resulted in increased gillnet catches of chinook salmon, particularly along the Homer Spit.

The 1998 fishery once again demonstrated the extreme popularity of the east side of the Homer Spit as the most sought after fishing area, undeniably due to the coho enhancement project at the Homer Spit fishing lagoon. Prior to enhancement, the Spit was considered only average in terms of harvest productivity. The Spit's easy road access and the enhanced coho return have combined to incite fishermen to clamor for fishing sites on the Spit, a situation which resulted in numerous violations during some previous gillnet fisheries and was once again the case in 1998. The last time that FWP issued significant citations during this fishery was in 1994, and it appeared that participants in the 1998 fishery were not as concerned about being cited for non-compliance as in recent years. Pre-fishery cautionary warnings contained in summary handouts were apparently not sufficient to deter violations this season. Additionally, the opening of local moose hunting season, August 20, was a higher priority for FWP officers, reducing enforcement effort.

Experience in managing this fishery has demonstrated that uniformed FWP officers on the Homer Spit during an open period command a great deal of respect from participants, inducing generally good compliance with the regulations. The presence of non-uniformed Fish & Game personnel simply does not generate the same level of compliance, resulting in an increased number of complaints this season.

One aerial survey of Clearwater Creek, the major coho index stream at the head of Kachemak Bay, was conducted in early September to gauge escapements. An estimate of nearly 700 cohos generated during that survey was considered quite good. Heavy rains in the area prior to and since that time precluded additional surveys.

The fishery in 1999 is expected to be similar to this year's fishery. Once again, there will be no contribution of coho salmon from Caribou Lake, near the head of Kachemak Bay, due to a lack of stocking at this former enhancement site. As during the past two fisheries, this could likely prevent attainment of the GHL after two full weeks of fishing. The staff believes that fishing after this time could potentially inflict unacceptably high fishing mortalities on the natural stocks due to their later run timing. In response to this situation, and considering that the fishery has closed on or before August 29<sup>th</sup> for nearly all of this decade, the staff submitted a proposal (#39) to the Board of Fisheries shortening the regulatory personal use season. If adopted, the regulatory season would run from August 16 to August 28, which should provide additional protection for wild coho stocks.

Fishing effort and participation in 1999 is expected to be similar to recent years but could be affected by other alternative fisheries elsewhere in Cook Inlet. Although limited as an inseason management tool, voluntary catch reports will once again be employed to help determine an appropriate closure time for the 1999 fishery. Based on experience gained during the past eight years' fisheries, especially the last two, attainment of the guideline harvest range of 2,500 to 3,500 cohos now appears questionable.

Table 1. Commercial, hatchery, and derby salmon catches in numbers of fish by species, district, and gear type, Lower Cook Inlet, 1998.

<b>District</b>		Chinook	Sockeye	Coho	Pink	Chum	Total
	<b>Gear Type</b>						
<b>Southern</b>							
Commercial:							
	Set gillnet	948	26,074	1,034	24,403	3,754	56,213
	Purse seine	118	143,350	3,641	495,596	201	642,906
Hatchery:							
	Purse seine	0	20,579	0	792,548	0	813,127
	Weir	<u>0</u>	<u>6,202</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>6,204</u>
	<b>Total</b>	<b>1,066</b>	<b>196,205</b>	<b>4,675</b>	<b>1,312,548</b>	<b>3,956</b>	<b>1,518,450</b>
<b>Outer</b>							
Commercial:							
	Purse seine	<b>0</b>	<b>15,991</b>	<b>45</b>	<b>102,172</b>	<b>611</b>	<b>118,819</b>
<b>Eastern</b>							
Commercial:							
	Purse seine	1	9,797	1,094	38,829	51	49,772
Hatchery:							
	Weir	0	34,466	7,334	0	0	41,800
Derby <sup>a</sup> :							
	Hook & Line	<u>0</u>	<u>0</u>	<u>2,554</u>	<u>0</u>	<u>0</u>	<u>2,554</u>
	<b>Total</b>	<b>1</b>	<b>44,263</b>	<b>10,982</b>	<b>38,829</b>	<b>51</b>	<b>94,126</b>
<b>Kamishak</b>							
Commercial:							
	Purse seine	0	8,112	0	414	20	8,546
Hatchery:							
	Purse seine	<u>0</u>	<u>19,390</u>	<u>0</u>	<u>1,362</u>	<u>9</u>	<u>20,761</u>
	<b>Total</b>	<b>0</b>	<b>27,502</b>	<b>0</b>	<b>1,776</b>	<b>29</b>	<b>29,307</b>
<hr/>							
	LCI Total	1,067	283,961	15,702	1,455,325	4,647	1,760,702
	Percent	0.06	16.13	0.89	82.66	0.26	100.00
1978-97							
	Average	1,338	211,807	14,368	1,253,555	93,836	1,574,905

<sup>a</sup> Derby catches are fish entered into the Seward Silver Salmon Derby which are subsequently sold to a commercial processor, therefore these catches are considered part of the LCI "commercial harvest".

Table 2. Exvessel value of the commercial salmon harvest in thousands of dollars by species, Lower Cook Inlet, 1978 - 1998<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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	3,004
1990	29	1,287	28	306	31	1,681
1991 <sup>b</sup>	19	1,115	36	275	48	1,493
1992 <sup>b</sup>	30	1,152	19	212	53	1,466
1993 <sup>b</sup>	27	802	41	287	7	1,164
1994 <sup>b</sup>	18	496	93	745	9	1,361
1995 <sup>b</sup>	48	1,381	62	1,245	24	2,760
1996 <sup>b</sup>	26	2,113	42	100	5	2,286
1997 <sup>b</sup>	23	1,066	36	1,286	10	2,421
1998 <sup>b</sup>	21	1,226	36	711	9	2,003
1978-97 Avg.	29	1,279	84	1,200	415	3,007
1998 % of Total	1.05%	61.21%	1.80%	35.50%	0.45%	100.00%

<sup>a</sup> Values obtained by using the formula: (average price per lb.) x (average weight per fish) x (catch) = Exvessel value; average prices are determined only from fish ticket information and may not reflect retroactive or postseason adjustments.

<sup>b</sup> Includes hatchery cost recovery.

Table 3. Exvessel value<sup>a</sup> of the commercial salmon catch in numbers of dollars by species, gear type, and harvest type, Lower Cook Inlet, 1998.

	Chinook	Sockeye	Coho	Pink	Chum	Total
<b>COMMON PROPERTY - PURSE SEINE</b>						
No. of Fish	119	177,250	4,780	637,011	883	820,043
Pounds	1,116	772,919	25,354	2,044,669	7,194	2,851,252
Price/lb.	\$0.68	\$1.00	\$0.34	\$0.13	\$0.19	
Value	\$759	\$772,919	\$8,620	\$265,807	\$1,367	\$1,049,472
<b>COMMON PROPERTY - SET GILLNET</b>						
No. of Fish	948	26,074	1,034	24,403	3,754	56,213
Pounds	12,851	149,881	8,110	96,119	27,299	294,260
Price/lb.	\$1.58	\$1.01	\$0.65	\$0.14	\$0.29	
Value	\$20,305	\$151,380	\$5,272	\$13,457	\$7,917	\$198,331
<b>HATCHERY - PURSE SEINE &amp; WEIR</b>						
No. of Fish		80,637	7,334	793,911	10	881,892
Pounds		369,769	63,891	2,396,615	84	2,830,359
Price/lb.		\$0.86 <sup>b</sup>	\$0.16 <sup>b</sup>	\$0.18	\$0.17	
Value		\$301,777	\$7,084	\$431,391	\$14	\$740,266
<b>SPORT FISHING DERBY<sup>c</sup> - HOOK &amp; LINE</b>						
No. of Fish			2,554			2,554
Pounds			22,993			22,993
Price/lb.			\$0.65			
Value			\$14,945			\$14,945
<b>TOTAL ALL GEARS</b>						
No. of Fish	1,067	283,961	15,702	1,455,325	4,647	1,760,702
Pounds	13,967	1,292,569	120,348	4,537,403	34,577	5,998,864
Price/lb.	\$1.51	\$0.95 <sup>b</sup>	\$0.36 <sup>b</sup>	\$0.16	\$0.27	
Value	\$21,064	\$1,226,076	\$35,921	\$710,654	\$9,298	\$2,003,012

<sup>a</sup> Exvessel value is calculated from average prices, which are determined only by fish ticket information and may not reflect retroactive or postseason adjustments.

<sup>b</sup> Average price for sockeyes and cohos include only those fish actually sold and does not include hatchery fish that were donated or discarded.

<sup>c</sup> Fish entered into the Seward Silver Salmon Derby are subsequently sold to a commercial processor and are therefore considered "commercial harvest".

Table 4. Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1978 - 1998<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1991	1,419	317,947	19,047	828,709	24,232	1,191,354
1992	1,891	176,644	5,902	479,768	22,203	686,408
1993	2,168	233,834	13,477	866,774	4,367	1,120,620
1994	1,231	115,418	14,673	1,647,929	5,469	1,784,720
1995	2,303	265,423	17,709	2,848,464	15,636	3,149,535
1996	1,181	449,685	13,572	451,506	3,764	919,708
1997	1,262	240,184	11,004	2,814,431	5,908	3,072,789
1998	1,067	283,961	15,702	1,455,325	4,647	1,760,702
20-Year Avg.	1,338	211,807	14,368	1,253,555	93,836	1,574,905
1978-87 Avg.	1,017	175,084	16,264	1,253,162	145,498	1,591,025
1988-97 Avg.	1,660	248,531	12,472	1,253,947	42,175	1,558,785
1998 % of Total	0.06%	16.13%	0.89%	82.66%	0.26%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

Table 5. Commercial chinook salmon catches and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1998.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Halibut Cove	426		426
China Poot Bay	28		28
Neptune Bay	3		3
Tutka/Kasitsna Bays	159		159
Barabara Creek	34		34
Seldovia Bay	328		328
Port Graham	12		12
English Bay	76		4
<b>SOUTHERN DISTRICT TOTAL</b>	<b>1,066</b>		<b>1,066</b>
<b>OUTER DISTRICT TOTAL</b>	<b>0</b>		<b>0</b>
<b>EASTERN DISTRICT</b>			
Aialik Bay	1		1
<b>EASTERN DISTRICT TOTAL</b>	<b>1</b>		<b>1</b>
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>0</b>		<b>0</b>
<b>TOTAL LOWER COOK INLET</b>	<b>1,067</b>		<b>1,067</b>

<sup>a</sup> Chinook escapement in Lower Cook Inlet is very limited; no escapement surveys are conducted.

Table 6. Commercial sockeye salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1998.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Northshore Subdistrict			
Clearwater Slough		6	
Helicopter Creek		20	
Total Run			26
Humpy Creek		408	408
Halibut Cove	62,301		62,301
China Poot Bay			
Common Property Fishery	61,154		
Hatchery Cost Recovery	19,294		
China Poot Creek		380 <sup>b</sup>	
Total Run			80,828
Neptune Bay			
Common Property Fishery	18,488		
Hatchery Cost Recovery	1,285		
"Waterfall" Creek		12	
"Oxbow" Creek		325	
Total Run			20,110
Tutka/Kasitsna Bays & Tutka Creek	8,480	439	8,919
Barabara Creek	1,288		1,288
Seldovia Bay	5,981	8	5,989
Port Graham	3,652		3,652
English Bay			
Common Property Fishery	8,080		
Hatchery Cost Recovery	6,202		
English Bay Lakes		14,136 <sup>c</sup>	
Hatchery Broodstock		1,296	
Total Run			29,714
<b>SOUTHERN DISTRICT TOTAL</b>	<b>196,205</b>	<b>17,030</b>	<b>213,235</b>
<b>OUTER DISTRICT</b>			
Koyuktolik (Dogfish)		1	1
Port Chatham	5	1	6
Windy Left		2	2
Port Dick			
Head End		6	
Island Creek		1	
Total Run			7

-continued-

Table 6. (page 2 of 2)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>OUTER DISTRICT (continued)</b>			
East Arm Nuka Bay (McCarty Fiord)	15,986		
Delight Lake		9,154 <sup>c</sup>	
Desire Lake		7,880	
Delusion Lake		1,090	
Total Run			<u>34,110</u>
<b>OUTER DISTRICT TOTAL</b>	<b>15,991</b>	<b>18,135</b>	<b>34,126</b>
<b>EASTERN DISTRICT</b>			
Aialik Bay & Aialik Lake	8,568	4,900	13,468
Resurrection Bay North			
Common Property Fishery	1,229		
Hatchery Cost Recovery	30,837		
Hatchery Discards/Donations	3,629		
Bear Lake Escapement		6,487 <sup>c</sup>	
Hatchery Brood Stock		1,944	
Bear/Salmon Creeks		1,094	
Lost Creek		900	
Grouse Creek		840	
Total Run			<u>44,126</u>
<b>EASTERN DISTRICT TOTAL</b>	<b>44,263</b>	<b>16,165</b>	<b>60,428</b>
<b>KAMISHAK BAY DISTRICT</b>			
Ursus Cove Lagoon Creek		1,000	1,000
Kirschner Lake			
Common Property Fishery	8,112		
Hatchery Cost Recovery	19,390		
Total Run			<u>27,502</u>
Bruin Bay			
Bruin Lake Creek		360 <sup>b</sup>	
Bruin Bay River		405	
Total Run			<u>765</u>
Chenik Lake			
Amakdedori Creek		4,140	
Chenik Creek/Lake		1,880	
Total Run			<u>6,020</u>
Paint River		1,870 <sup>d</sup>	1,870
McNeil Cove (Mikfik Creek/Lake)		12,630	12,630
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>27,502</b>	<b>22,285</b>	<b>49,787</b>
<b>TOTAL LOWER COOK INLET</b>	<b>283,961</b>	<b>73,615</b>	<b>357,576</b>

<sup>a</sup> Escapement estimates derived from limited aerial surveys. Numbers represent unexpanded aerial live counts.

<sup>b</sup> No freshwater escapement, prevented by barrier falls.

<sup>c</sup> Weir counts.

<sup>d</sup> No freshwater escapement, ladder not opened during 1998.

Table 7. Commercial coho salmon catches (including hatchery cost recovery and sales from sport derby) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1998.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Northshore Subd./Clearwater Slough		662	662
Halibut Cove	918		918
China Poot Bay	290		290
Neptune Bay	38		38
Tutka/Kasitsna Bays	3,146		3,146
Barabara Creek	196		196
Seldovia Bay	53		53
Port Graham/Port Graham River	11		11
English Bay	23		23
<b>SOUTHERN DISTRICT TOTAL</b>	<b>4,675</b>	<b>662</b>	<b>5,337</b>
<b>OUTER DISTRICT</b>			
East Arm Nuka Bay (McCarty Fiord)	45		45
<b>OUTER DISTRICT TOTAL</b>	<b>45</b>		<b>45</b>
<b>EASTERN DISTRICT</b>			
Aialik Bay	1,094		1,094
Resurrection Bay North			
Hatchery Cost Recovery	4,944		
Hatchery Discards/Donations	2,390		
Sport Derby	2,554		
Bear Lake (weir counts)		300	
Hatchery Brood Stock		463	
Total Run			10,651
<b>EASTERN DISTRICT TOTAL</b>	<b>10,982</b>	<b>763</b>	<b>11,745</b>
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>0</b>		<b>0</b>
<b>TOTAL LOWER COOK INLET</b>	<b>15,702</b>	<b>1,425</b>	<b>17,127</b>

<sup>a</sup> Coho escapement estimates in Lower Cook Inlet are very limited; only one escapement survey was conducted during 1998, number represents unexpanded aerial live count.

Table 8. Commercial pink salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1998.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
SOUTHERN DISTRICT			
Humpy Creek		17,492	17,492
Halibut Cove	2,417		2,417
China Poot Bay/Creek	2,312 <sup>b</sup>	5,653	7,965
Neptune Bay	957		957
Tutka/Kasitsna Bays			
Common Property Fishery	502,265		
Hatchery Cost Recovery	792,542		
Hatchery Brood Stock		159,406	
Tutka Lagoon Creek		17,473	
Total Run			1,471,686
Barabara Creek	3,298	2,840	6,138
Seldovia Bay & River	7,398	31,535	38,933
Port Graham			
Common Property Fishery	598		
Hatchery Brood Stock		12,706	
Port Graham River		12,559	
Total Run			25,863
English Bay	761 <sup>b</sup>		761
<b>SOUTHERN DISTRICT TOTAL</b>	<b>1,312,548</b>	<b>259,664</b>	<b>1,572,212</b>
OUTER DISTRICT			
Dogfish Bay		6,695	6,695
Port Chatham	9,435	22,162	31,597
Chugach Bay		24,551	24,551
Windy Bay			
Windy Right Creek		19,522	
Windy Left Creek		12,934	
Total Run			32,456
Rocky Bay	35,003		
Scurvy Creek		260	
Rocky River		164,961	
Total Run			200,224
Port Dick	2,387		
Port Dick (head end) Creek		57,082	
High Tech Creek		1,343	
Well Flagged Creek		638	
Slide Creek		39,281	
Island Creek		83,585	
Total Run			184,316

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Table 8. (page 2 of 2)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
OUTER DISTRICT (cont'd)			
Nuka Island/South Nuka Island Creek	41,101	14,000	55,101
East Arm Nuka Bay (McCarty Fiord)	14,246		
Delight Lake		300	
Desire Lake		6,156	
Delusion Lake		1,991	
Total Run			<u>22,693</u>
<b>OUTER DISTRICT TOTAL</b>	<b><u>102,172</u></b>	<b><u>455,461</u></b>	<b><u>557,633</u></b>
EASTERN DISTRICT			
Aialik Bay	38,828	350	39,178
Resurrection Bay North	1		
Bear/Salmon Creeks		13,230	
Grouse Creek		180	
Sawmill Creek		1,118	
Spring Creek		646	
Tonsina Creek		2,327	
Humpy Cove		1,180	
Thumb Cove		21,032	
Total Run			<u>39,804</u>
<b>EASTERN DISTRICT TOTAL</b>	<b><u>38,829</u></b>	<b><u>40,153</u></b>	<b><u>78,982</u></b>
KAMISHAK BAY DISTRICT			
Inisksin Bay			
North Head Creek		106	
Sugarloaf Creek		109	
Total Run			215
Ursus Cove/Brown's Peak Creek		7,869	7,869
Rocky Cove/Sunday Creek		24,029	24,029
Kirschner Lake	1,776 <sup>c</sup>		1,776
Bruin Bay & River		134,887	134,887
Kamishak/Douglas Reef		<u>1,954</u>	<u>1,954</u>
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b><u>1,776</u></b>	<b><u>168,954</u></b>	<b><u>170,730</u></b>
<b>TOTAL LOWER COOK INLET</b>	<b><u>1,455,325</u></b>	<b><u>924,232</u></b>	<b><u>2,379,557</u></b>

<sup>a</sup> Escapement estimates are derived from periodic ground or aerial surveys with stream life factors applied.

<sup>b</sup> China Poot and English Bay catches include 6 and 1 pinks respectively caught during hatchery sockeye salmon cost recovery.

<sup>c</sup> Kirschner Lake pinks include 414 taken during common property fishing and 1,362 taken during hatchery sockeye cost recovery operations.

Table 9. Commercial chum salmon catches and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1998.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Humpy Creek		101	101
Halibut Cove	71		71
China Poot Bay	15		15
Tutka Bay	852		852
Barabara Creek	422		422
Seldovia Bay & River	1,789	3,058	4,847
Port Graham & River	463	5,092	5,555
English Bay	344 <sup>b</sup>		344
<b>SOUTHERN DISTRICT TOTAL</b>	<b>3,956</b>	<b>8,251</b>	<b>12,207</b>
<b>OUTER DISTRICT</b>			
Dogfish Bay		9,760	9,760
Port Chatham	127	494	621
Windy Bay			
Windy Right Creek		606	
Windy Left Creek		482	
Total Run			1,088
Rocky Bay & River	327	700 <sup>c</sup>	1,027
Port Dick	145		
Port Dick (head end) Creek		1,840	
High Tech Creek		82	
Well Flagged Creek		12	
Slide Creek		367	
Middle Creek		2,427	
Island Creek		3,446	
Total Run			8,319
Nuka Island/Petrof River	0	462	462
East Arm Nuka Bay	12		12
<b>OUTER DISTRICT TOTAL</b>	<b>611</b>	<b>20,678</b>	<b>21,289</b>
<b>EASTERN DISTRICT</b>			
Aialik Bay	51		51
Resurrection Bay North	0		
Sawmill Creek		66	
Spring Creek		292	
Tonsina Creek		3,224	
Total Run			3,582
<b>EASTERN DISTRICT TOTAL</b>	<b>51</b>	<b>3,582</b>	<b>3,633</b>

-continued-

Table 9. (page 2 of 2)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>KAMISHAK BAY DISTRICT</b>			
Inisksin Bay	0		
Iniskin River		18,626	
Sugarloaf Creek		651	
North Head Creek		440	
Total Run			19,717
Cottonwood Bay & Creek	0	2,316	2,316
Ursus Cove	0		
Brown's Peak Creek		394	
Ursus Lagoon Right Creek		1,584	
Ursus Cove Lagoon Creek		3,036	
Total Run			5,014
Rocky Cove/Sunday Creek	0	713	713
Kirschner Lake	29 <sup>d</sup>		29
Bruin Bay & River	0	9,439	9,439
McNeil River	0	23,530	23,530
Kamishak/Douglas Reef	0		
Big Kamishak River		7,122	
Little Kamishak River		9,728	
Douglas Reef Creek		586	
Total Run			17,436
Douglas River/Douglas Beach Creek	0	4,061	4,061
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>29</b>	<b>82,226</b>	<b>82,255</b>
<b>TOTAL LOWER COOK INLET</b>	<b>4,647</b>	<b>114,737</b>	<b>119,384</b>

<sup>a</sup> Escapement estimates are derived from periodic ground or aerial surveys with stream life factors applied.

<sup>b</sup> English Bay catches include 1 chum taken during hatchery sockeye cost recovery operations.

<sup>c</sup> Rocky River escapement considered minimal estimate; due to the large numbers of pinks in the system, visual enumeration of chums via aerial surveys was nearly impossible.

<sup>d</sup> Kirschner Lake catches include 9 chums taken during hatchery sockeye cost recovery operations.

Table 10. Commercial set gillnet catch of salmon in numbers of fish by species in the Southern District, Lower Cook Inlet, 1978 - 1998<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1991	842	20,525	5,011	3,954	1,577	31,909
1992	1,288	17,002	848	15,958	1,687	36,783
1993	1,089	14,791	3,088	12,008	2,591	33,567
1994	1,103	14,004	1,073	23,621	2,419	42,220
1995	2,078	19,406	3,564	41,654	3,958	70,660
1996	1,054	69,338	5,779	14,813	2,792	93,776
1997	1,136	59,412	4,475	64,162	4,166	133,351
1998	948	26,074	1,034	24,403	3,754	56,213
20-Year Avg.	954	33,112	3,845	25,560	3,674	67,144
1978-87 Avg.	669	40,318	4,440	27,690	4,605	77,722
1988-97 Avg.	1,238	25,907	3,250	23,429	2,743	56,566
1998 % of Total	1.69%	46.38%	1.84%	43.41%	6.68%	100.00%

<sup>a</sup> Data source: ADF&G fish ticket database.

Table 11. Personal use/subsistence set gillnet salmon catch in numbers of fish by species and effort, Southern District, Lower Cook Inlet, 1969 - 1998<sup>a</sup>.

Year	Permits Issued	Permits Returned		Permits		Catch in Numbers of Fish						Total
		Number	%	Did Fish	Not Fished	Chinook	Sockeye	Coho	Pink	Chum	Other	
1969	47	44	93.6	35	9	0	9	752	38	0	17	816
1970	78	73	93.6	55	18	0	12	1,179	143	13	39	1,386
1971	112	95	84.8	53	42	2	16	1,549	44	7	20	1,638
1972	135	105	77.8	64	41	1	11	975	48	69	19	1,123
1973	143	128	89.5	82	46	0	18	1,304	84	40	9	1,455
1974	148	118	79.7	52	66	0	16	376	43	77	27	539
1975	292	276	94.5	221	55	4	47	1,960	632	61	95	2,799
1976	242	221	91.3	138	83	16	46	1,962	1,513	56	75	3,668
1977	197	179	90.9	137	42	12	46	2,216	639	119	84	3,116
1978	311	264	84.9	151	113	4	35	2,482	595	34	89	3,239
1979	437	401	91.8	238	163	6	37	2,118	2,251	41	130	4,583
1980	533	494	92.7	299	195	43	32	3,491	1,021	25	153 <sup>b</sup>	4,765
1981	403	383	95.0	283	100	15	73	4,370	718	68	0	5,244
1982	395	372	94.2	301	71	41	49	7,398	956	154	0	8,598
1983	344	328	95.3	210	118	5	17	2,701	305	44	2	3,074
1984	368	346	94.0	219	127	3	25	3,639	804	105	27	4,603
1985	328	302	92.1	205	97	5	49	3,317	138	34	3	3,546
1986	349	310	88.8	247	63	7	68	3,831	3,132	56	0	7,094
1987	363	339	93.4	250	89	5	50	3,979	279	61	0	4,374
1988	439	417	95.0	300	117	14	73	5,007	1,445	75	0	6,614
1989	477	453	95.0	333	120	41	156	7,219	883	53	49	8,401
1990	578	543	93.9	420	123	12	200	8,323	1,846	69	0	10,450
1991	472	459	97.2	295	164	8	47	4,931	366	23	0	5,375
1992	365	350	95.9	239	111	5	63	2,292	643	21	0	3,024
1993	326	317	97.2	215	102	6	44	1,992	463	18	0	2,523
1994	286	284	99.3	224	60	66	80	4,097	1,178	18	0	5,439
1995	235	232	98.7	178	54	118	108	2,916	343	7	0	3,492
1996	299	293	98.0	213	80	302	102	3,347	1,022	24	0	4,797
1997	276	264	95.7	185	79	383	191	1,814	252	12	0	2,652
1998	227	214	94.3	142	72	135	20	1,461	167	5	0	1,788
69-97												
Avg.	310	289	93.5	201	88	39	59	3,157	753	48	29	4,084

<sup>a</sup> Figures after 1991 include information from both returned permits and inseason oral reports.

<sup>b</sup> Steelhead trout (*Onchorhynchus mykiss*).

Table 12. ADF&G, CIAA, and/or CRRC salmon stocking projects and releases of salmon fry, fingerling, and smolt, in millions of fish, Lower Cook Inlet, 1984 - 1998.

JUVENILE SOCKEYE SALMON														
YEAR	Leisure Lake	Hazel Lake	Chenik Lake	Paint Upper	River Lower	Lakes Elusivak	Kirschner Lake	Bruin Lake	Ursus Lake	Port Dick Lake	English Bay Lakes	Bear Lake	Grouse Lake	TOTAL SOCKEYE
1984	2.110													2.100
1985	2.018													2.018
1986	2.350		0.839	0.500	0.320									4.009
1987	2.022		1.000				0.867			0.705				4.594
1988	2.100	0.783	2.600	1.100	0.552	0.521	0.521			0.222				8.399
1989	2.000	1.000	3.500	1.000	0.500	0.500	0.250			0.430		2.200		11.380
1990	1.750	1.250	3.250	1.000	0.500	0.500	0.250	0.500			0.350	2.400		11.750
1991	2.000	1.300	2.200	0.500	0.250		0.250	0.250			0.241	1.619		8.610
1992	2.000	1.000	2.750	0.500	0.250		0.250	0.250	0.250		0.290	2.361		9.901
1993	2.000	1.000	1.400	0.500	0.250		0.250	0.250	0.250		0.581	1.810		8.291
1994	0	0	0	0	0		0.300	0	0		0.800	0.170	0.057	1.327
1995	1.632	1.061	1.129	0.337	0.251		0.251	0.251	0.252		0	0.330	0.083	5.577
1996	1.490	1.030	0.951	0.500	0		0.250	0.250	0.250		0.155	0.781	0	5.657
1997	2.000	1.000	0				0.250				0.199	0.788	1.928	6.165
1998	2.005	1.302					0.250					0.256	2.019	5.832
AVG.	1.832	0.975	1.635	0.540	0.261	0.507	0.328	0.250	0.200	0.452	0.327	1.272	0.817	6.375

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Table 12. (page 2 of 2)

YEAR	JUVENILE PINK SALMON				JUVENILE CHINOOK SALMON					JUVENILE COHO SALMON			
	Tutka Bay Hatchery	Halibut Cove Lagoon	Homer Spit	TOTAL PINKS	Seldovia Bay	Halibut Cove Lagoon	Homer Early	Spit Late	TOTAL CHINOOK	Caribou Lake	Seldovia Lake	Homer Spit	TOTAL COHO
1984	19.560			19.560			0.080						
1985	23.500			23.500		0.098	0.152		0.250	0.139	0.083		0.222
1986	23.100	2.000		25.100		0.101	0.104		0.205	0.138	0.072		0.210
1987	20.500	3.000	0.295	23.795	0.084	0.094	0.104		0.282	0.150	0.045		0.195
1988	12.000	3.000	0.300	15.300	0.084	0.094	0.104		0.282	0.150	0.045	0.060	0.255
1989	30.100	6.000	0.332	36.432	0.108	0.115	0.104		0.327	0.182	0.080	0.143	0.405
1990	23.600	6.000	0.303	29.903	0.099	0.112	0.212		0.423	0.180	0.050	0.123	0.353
1991	23.600	6.000	0.303	29.903	0.091	0.092	0.191		0.374	0.180	0.050	0.100	0.330
1992	23.600	6.000	0.300	29.900	0.113	0.117	0.226	0.126	0.582	0.150		0.100	0.250
1993	43.000	6.000		49.000	0.107	0.100	0.212	0.100	0.519	0.150		0.116	0.266
1994	61.000			61.000	0.106	0.107	0.192	0.157	0.562	0.064		0.156	0.220
1995	63.000			63.000	0.113	0.036	0.228	0.124	0.501			0.110	0.110
1996	105.000			105.000	0.109	0.103	0.101	0.121	0.434			0.150	0.150
1997	89.000			89.000	0.092	0.078	0.216	0.105	0.491			0.120	0.120
1998	90.000			90.000	0.079	0.073	0.137	0.120	0.409			0.148	0.148
AVG.	43.371	4.750	0.306	48.426	0.099	0.094	0.158	0.122	0.472	0.148	0.061	0.121	0.330

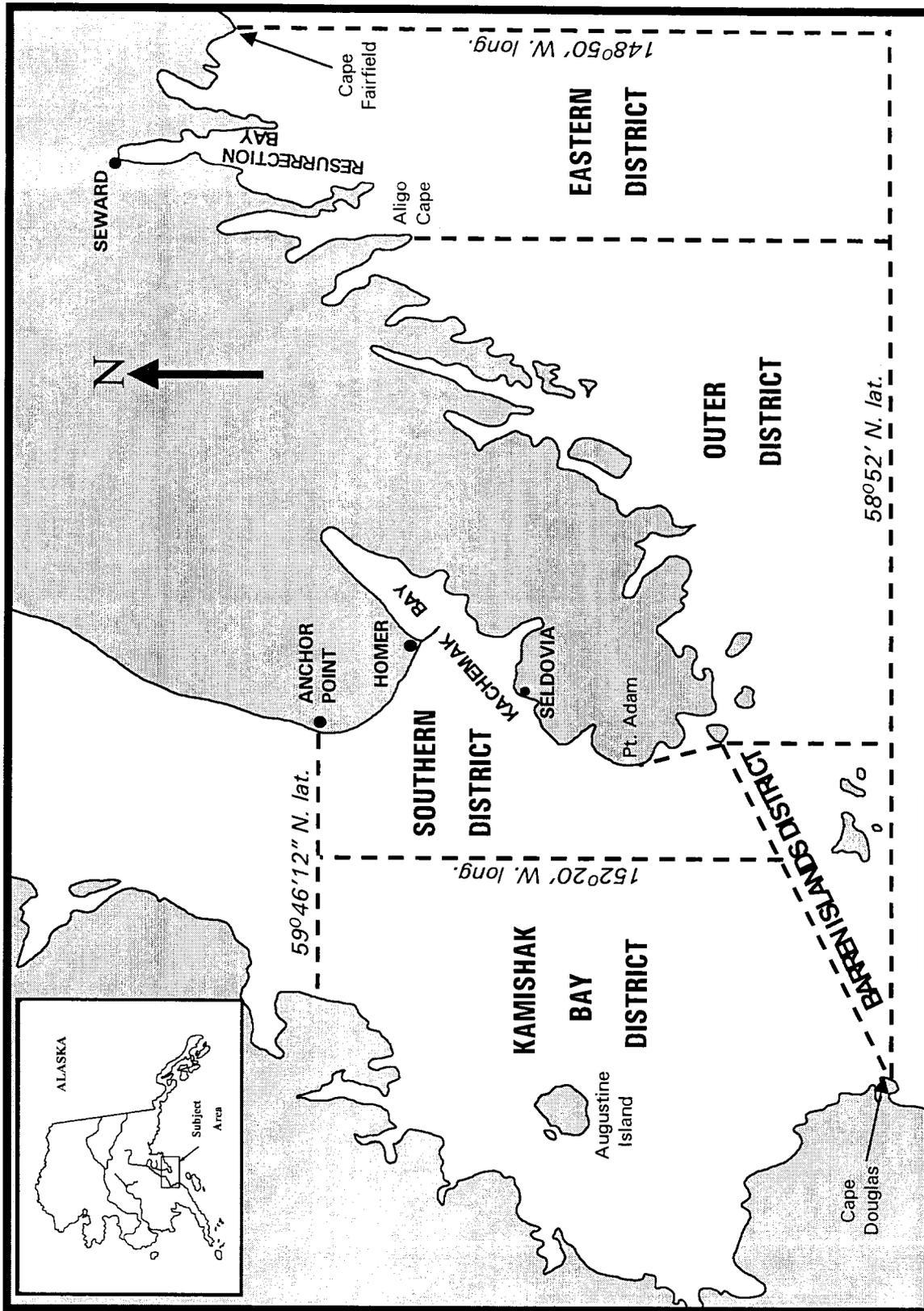


Figure 8. Lower Cook Inlet salmon and herring management area (not to scale).

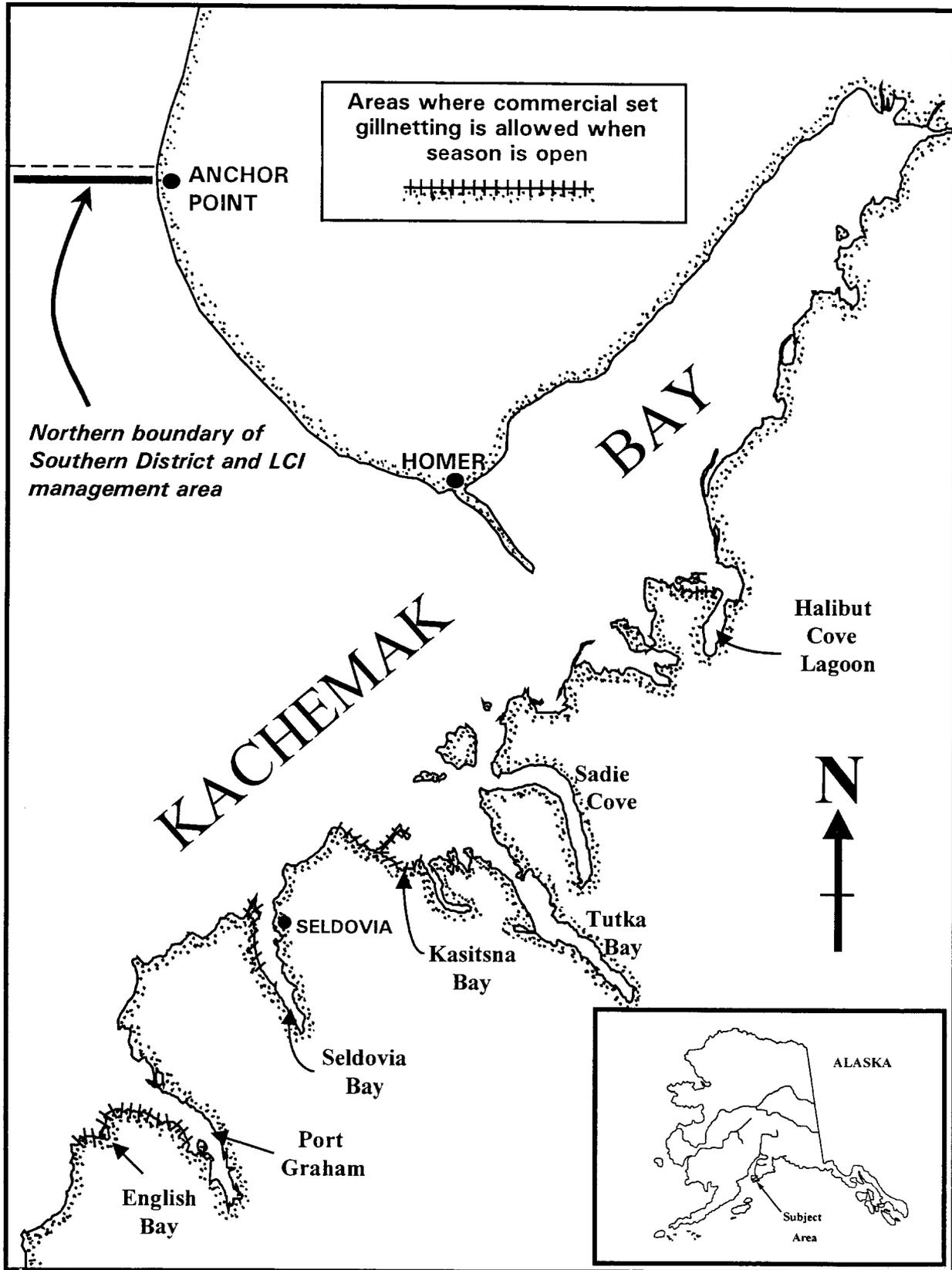


Figure 9. Commercial set gillnet locations in the Southern District of Lower Cook Inlet.

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