

1997 LOWER COOK INLET ANNUAL FINFISH MANAGEMENT REPORT



by

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1997 COMMERCIAL FISHERIES MANAGEMENT & DEVELOPMENT STAFF

The finfish operations for the Commercial Fisheries Management and Development Division, Lower Cook Inlet, employed eight permanent employees and nine permanent-seasonal employees in various area management and research programs during the 1997 season. Appreciation is extended to all personnel for a successful program during 1997.

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ANNUAL MANAGEMENT REPORT

LOWER COOK INLET

1997

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 is divided into five fishing districts (Figure 1). The Barren Islands District is the only non-salmon fishing district, with the remaining districts (Southern, Outer, Eastern, and Kamishak Bay) separated into approximately 40 subdistricts and sections to facilitate management of discrete stocks of salmon and herring.

The 1997 LCI salmon harvest of 3.073 million fish (Table 1, Figure 9) was the second highest during this decade and the fourth highest on record (Appendix Table 5). The overall harvest represented over 85% of the preseason forecast. However, the sockeye salmon harvest of 240,200 fish was significantly below the forecast of 343,000 fish, nearly equaling the recent 10-year average (Appendix Table 13). Unfortunately, the economic forces of worldwide salmon markets once again resulted in depressed prices, especially for pink salmon, yielding a LCI exvessel value of just over \$2.42 million (Table 7). Nevertheless, the value of the 1997 harvest was the second highest during this decade (Appendix Table 2). Seine fishing effort decreased significantly from last year, with 23 permit holders making deliveries (Appendix Table 1), while 24 set gillnet permits were actively fished, the same as in 1996.

Once again, LCI commercial salmon harvests in 1997 relied heavily on the success of hatchery and enhanced fish production. Over three-fourths 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), Cook Inlet Aquaculture Association (CIAA), and/or Chugach Regional Resources

Commission (CRRC) lake stocking and fertilization projects. These projects were conducted at Leisure, Hazel, and English Bay Lakes in the Southern District, Kirschner Lake in the Kamishak Bay District, and Bear and Grouse Lakes in the Eastern District. Additionally, sockeye salmon produced by the enhancement project at English Bay Lakes once again provided subsistence harvests for the villages of Nanwalek and Port Graham in the Port Graham Subdistrict of the Southern District. Pink salmon production from Tutka Hatchery, now operated by CIAA, was considered good, with an overall return of nearly 2.8 million fish (Table 9), about 5% greater than the preseason projection. But, as has been the case since hatchery programs were taken over by private non-profit (PNP) corporations 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. Over 80% of the total salmon harvest (Table 7) in numbers of fish was taken by CIAA and CRRC to support the lake stocking programs and Tutka Hatchery operations, representing about one-half of the exvessel value of the LCI salmon fishery. Natural returns bound for LCI drainages contributed only a very small percentage to commercial harvests in 1997, primarily from Windy and East Nuka Bays in the Outer District.

Several notable factors continued to affect the amount and distribution of seine effort, and ensuing harvest of salmon, in LCI during 1997. The first was the policy adopted in 1994 by major processors regarding tender service. Prior to that time processors routinely stationed a tender (or tenders) in remote districts in anticipation of salmon harvests, even when run strengths and catches were marginal. However, when the practice was abandoned seiners were forced to devise their own means to transport fish from these remote areas to a processing plant in Homer or elsewhere. Due to equipment limitations and the high cost of contracting out, some fishermen were unable to fish in remote areas, while others retained the flexibility to fish these traditional areas because of onboard chilling equipment.

The second influential element affecting harvest and effort revolved around world wide market situations. Prices for all salmon species remained depressed, with that for pinks (the most numerous species in LCI) and chums especially low. This pricing structure often dictated the

fishing strategy of individual fishermen, even to the point of total non-participation. Coupled with the lack of tender service in remote districts, low prices apparently kept effort and harvest artificially low.

PRESEASON FORECAST

The projected 1997 LCI all-species salmon harvest of 3.6 million fish was over twice as large as the most recent 20-year average. The majority of the harvest was expected to come as a result of hatchery and lake stocking enhancement projects involving pink and sockeye salmon. Formal total run forecasts for natural salmon returns other than pink salmon were not prepared because escapement and age-weight-length data are limited for those species. However, catch projections were calculated from relative estimates of parental run size, average age composition data, and recent relative productivity trends. Harvest projections and actual catches for all species in 1997 are listed in the following table:

SPECIES	PROJECTED HARVEST	ACTUAL HARVEST	1977-1996 AVERAGE
Chinook	1,600	1,262	1,286
Sockeye	342,600	240,184	204,878
Coho	13,300	11,004	13,908
Pink	3,213,000	2,814,431	1,177,530
Chum	11,700	5,908	100,831
TOTAL	3,580,500	3,072,789	1,498,432

Unlike recent years, strong sockeye returns were not anticipated in all areas. Enhanced runs to Kirschner Lake in the Kamishak Bay District and Bear and Grouse Lakes in the Eastern District were expected to comprise the bulk of the sockeye returns, although the Grouse Lake return was specifically designated for hatchery cost recovery. Commercial as well as subsistence harvests resulting from a sockeye enhancement project at English Bay Lakes in the Southern District were also anticipated. The enhanced returns to Leisure and Hazel Lakes in the Southern District,

normally dominating the LCI sockeye harvests, were both anticipated to be extremely low since these systems were not stocked in 1994. Although Chenik Lake in the Kamishak Bay District has benefited from regular fry stocking and intermittent fertilization during recent years, as well as from recent natural spawning escapements of up to 17,000 fish, adult sockeye returns in 1997 were predicted to be very poor due to the lingering effects of an epizootic of Infectious Hematopoietic Necrosis Virus (IHNV) within the system. As a result, the entire Chenik run was to be protected for escapement. Bruin and Ursus Lakes in the Kamishak Bay District were not expected to produce any sockeye returns in 1997 due to a discontinuation of stocking at those systems.

Returns to the Tutka Bay Hatchery were once again expected to provide the majority of the pink salmon, with a forecasted harvest totaling nearly 2.5 million fish. These fish were anticipated as a result of a record 105.0 million fry released from Tutka Hatchery in 1996 (Appendix Table 30), and typical ocean survival rates for even-year runs were expected to produce an overall adult return in excess of 2.6 million fish.

Generally fair to good 1995 pink salmon escapements to major systems contributed to a harvest projection of 636,000 naturally-produced pinks throughout the entire LCI management area this season. Bruin Bay and Ursus Cove in the Kamishak Bay District were forecasted to provide the largest potential for harvestable surpluses, but fishing effort in these remote districts was questionable.

Significant chum salmon harvests appeared unlikely again in 1997 since all major LCI systems experienced relatively poor escapements during the 1992 and 1993 parent years. Additionally, a trend of weak returns over the past seven seasons suggested that the 1997 chum return would be weak as well.

1997 SUMMARY BY SPECIES

Chinook Salmon

The harvest of chinook salmon, not normally a commercially important species in LCI, was nearly identical to the 20-year average at 1,262 fish (Table 2, Appendix Table 12). Virtually all of the catch came from the Southern District and can be primarily attributed to enhanced production at Halibut Cove Lagoon and Seldovia Bay. Set gillnetters accounted for about 90% of the LCI chinook catch, with purse seiners taking the remaining 10%.

Sockeye Salmon

The 1997 LCI sockeye salmon harvest of 240,200 fish (Figure 10, Table 3) was near the recent 10-year average (Appendix Table 13) but fell short of the preseason forecast by roughly 30%. Sockeyes accounted for less than 8% of the LCI salmon harvest in total numbers of fish, yet provided about 44% of the exvessel value of the entire salmon fishery this season (Table 7). The 1997 LCI commercial sockeye harvest was characterized by surprisingly significant contributions from Southern District enhancement programs at Leisure and Hazel Lakes, which were predicted to be extremely weak. As was the case in 1996, but to a lesser extent, non-local stocks were thought to have intermixed with local stocks while migrating through the Southern District terminal harvest areas and provided additional sockeyes for harvest. Additionally, the much anticipated return to Grouse Lake in the Eastern District once again failed to meet expectations for the second consecutive season.

Returns to enhancement sites, which typically have provided the bulk of the LCI sockeye catch, were considered only fair in 1997. In the Southern District, harvests of enhanced runs of sockeye salmon returning to Leisure and Hazel Lakes were predicted to total a mere 5,500 fish combined, due to a complete lack of stocking in 1994. However, the estimated combined total of 121,000 fish (Figure 12, Appendix Table 15) unexpectedly provided 50% of the LCI sockeye total and was approximately 20 times greater than the preseason forecast. Still, this

year's harvest figure represents only the fourth highest combined total since adults began returning to Hazel Lake in 1991 (prior to that year, only Leisure Lake sockeyes contributed to the harvests). Also in the Southern District, the sockeye run to English Bay Lakes achieved an escapement within the desired range for the third consecutive year but only the fourth time in the last 20 years, while providing a harvestable surplus to both subsistence and commercial set gillnetters 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 Chugach Regional Resources Commission in conjunction with the village of Nanwalek.

In the Kamishak Bay District, enhanced returns to Kirschner Lake produced a harvest of only 9,000 fish (Table 3), significantly less than the preseason harvest forecast of 27,500 fish. Returns to two former enhancement sites, Bruin and Ursus Lakes, were weak as expected since the stocking programs were discontinued at these systems. No fishing was allowed at Chenik Lake in the Kamishak Bay District since that return was expected to be poor due to the lingering effects of an outbreak of the naturally occurring viral disease IHN. This outbreak caused increased mortality to young salmon, subsequently resulting in weak adult returns. Additionally, no fry were stocked into the system in 1994, further reducing the chances for any significant returns in 1997.

At Bear Lake in Resurrection Bay of the Eastern District, a catch of 19,000 sockeyes was less than that of the previous two seasons, failing to achieve the harvest forecast of 35,000 sockeyes. The return to nearby Grouse Lake, with a projected harvest of 166,000 fish, was even more disappointing for a second consecutive year as only about 16,500 fish were documented.

Natural runs of sockeye salmon to LCI drainages were considered relatively good, with all systems achieving escapement goals. In the Outer District, the escapement goals for both Delight and Desire Lakes (10,000 sockeyes each) were exceeded, with Desire Lake totaling 14,700 fish and Delight Lake 27,800 (Appendix Table 23). Only a small harvestable surplus

was taken by the seine fleet in East Nuka Bay (Table 3) despite a relatively liberal fishing schedule which began early in the season. Returns to Delusion (Ecstasy) Lakes, a recently formed glacial lake system in East Nuka Bay which supported no documented salmon run prior to the mid-1980's, had a peak aerial escapement estimate of 1,400 sockeye salmon in 1997. Despite opening Aialik Bay in the Eastern District to fishing in late June, because the return appeared strong at that time, very little effort was directed at this stock and the majority of the run entered the system as escapement, estimated at over 11,000 fish (Table 3). At Mikfik Lake in the Kamishak Bay District, only minor fishing effort on the return occurred during the season and the entire run entered the system to spawn, with the final escapement index estimated at 8,500 fish (5-7,000 goal range).

Coho Salmon

The commercial harvest of 11,000 coho salmon (Table 4) in 1997 was the eighth lowest over the last 20 years but was only about 14% less than the recent 10-year average (Appendix Table 17). The harvest was almost equally split between the Southern District and the Eastern District, but catches in the Eastern District were primarily from the Seward Silver Salmon Derby and CIAA hatchery cost recovery at Bear Lake. Coho run assessment in LCI is limited, with commercial, sport, and personal use harvests providing the best indicators of run strength. Based on early indicators, returns during 1997 were initially considered weak. When combined with low prices and the lack of remote tender service, this discouraged the majority of the seine fleet from targeting cohos late in the season, especially in the Kamishak Bay District. Thus the commercial harvest was not truly indicative of run strengths. The staff subsequently believed that run timing of cohos in 1997 was simply later than normal and that run strengths were probably average. Only one aerial survey was flown specifically for coho salmon in September, at Clearwater Slough in the Northshore Subdistrict of the Southern District. The resulting index count indicated fair escapement at that system, but if run timing was indeed late, these counts would indicate adequate escapement.

Pink Salmon

Returns of pink salmon, usually the dominant species in numbers of commercially harvested fish in LCI, were generally good throughout the management area in 1997, with an overall harvest of over 2.8 million fish (Figure 14, Table 5). This number is similar to the 1995 harvest and represents the fourth highest commercial catch in the last 20 years (Appendix Table 18). Nearly all were taken in the Southern District (Table 5, Appendix Table 18) as a direct result of Tutka Hatchery production. However, about 88% of the Southern District total, or about 2.376 million fish, was utilized for Tutka Hatchery cost recovery (Tables 1 and 5), with an additional 217,000 fish taken for hatchery brood stock purposes (Table 9). The estimated overall hatchery return, including escapement into Tutka Creek, brood stock, and commercially harvested fish, was 2.77 million pinks (Table 9), exceeding the preseason projection by 5%. The 1997 survival rate of 2.7% was considered average for this facility.

The Outer District produced the greatest contribution of natural pinks to LCI catches, with a total harvest of 136,300 fish (Table 5, Appendix Table 18), coming primarily from a directed fishery in Windy Bay. East Nuka Subdistrict also contributed incidental pink catches during the directed sockeye fishery there. In the Kamishak Bay District, no pink harvest occurred during 1997 despite harvestable surpluses identified in Bruin Bay and Ursus Cove systems. Pink salmon escapements in all districts of LCI were generally good as most primary systems achieved escapement goals (Appendix Table 24). Notable exceptions were Port Graham River and Barabara Creek in the Southern District and Tonsina Creek in the Eastern District. Lack of remote tender service and low prices undoubtedly affected the directed effort levels for pink salmon.

Chum Salmon

The 1997 commercial chum salmon harvest of 5,900 fish (Table 6) represented only about 6% of the 20-year average and marked the ninth successive below-average season in Lower Cook Inlet (Figure 15, Appendix Table 21). The low numbers were anticipated based on the recent

trend of weak returns, and conservative fishing schedules were implemented in an effort to secure adequate escapements and reverse the decline in chum salmon numbers. The conservative strategy was hardly necessary, however, as low prices coupled with the lack of tender service in remote districts once again discouraged the fleet from targeting this species. Consequently, a number of systems, particularly those in northern Kamishak Bay, achieved their minimum escapement goals. One major system, McNeil River in the Kamishak Bay District, attained the lower end of its escapement goal range of 20,000 to 40,000 fish for the first time since 1989 (Appendix Table 25). Systems on the outer Gulf Coast, at Rocky River and Port Dick, failed to achieve minimum chum goals in 1997.

1997 EXVESSEL VALUE

The estimated exvessel value of the 1997 salmon harvest in LCI, not including any postseason adjustments in price paid to fishermen, was approximately \$2.421 million (Table 7, Appendix Table 2), making it the second highest since 1989. Purse seine gear in the common property fishery, which normally accounts for the majority of the catch, comprised only \$806,000 or one-third of the overall total (Table 7), while set gillnets accounted for \$368,000 or 15%. An estimated \$1.234 million, or about 51% of the entire exvessel value of the LCI salmon fishery, was utilized for hatchery cost recovery purposes. Average prices paid to fishermen in 1997, not including any postseason adjustments, were as follows: chinook - \$1.29/pound; sockeye - \$0.93/pound; coho - \$0.50/pound; pink - \$0.15/pound; and chum - \$0.23/pound (Appendix Table 3).

1997 DISTRICT INSEASON MANAGEMENT SUMMARIES

Southern District

Set Gillnet Fishery

An Area H set gillnet permit holder is allowed to fish in both Upper and Lower Cook Inlet, but there are only five beach areas in LCI, all located along the south shore of Kachemak Bay in the Southern District, where set gillnets may be used (Figure 2). The limited area provides only enough productive fishing sites to accommodate approximately 25 set net permits.

The 1997 LCI set gillnet harvest totaled 133,400 fish, the highest catch since 1981 and double the 20-year average (Appendix Table 7). Almost half of the catch was comprised of pinks, followed by sockeyes at 45%. For comparison, typical species composition in the commercial set gillnet fishery during the past decade has been 48% sockeyes, 38% pinks, 6% cohos, 5% chums, and 3% chinooks. Catches of chinook salmon, at 1,136 fish, were equal to the recent 10-year average. Enhancement efforts directed at recreational fisheries in Seldovia Bay and Halibut Cove Lagoon are primarily responsible for the commercial gillnet chinook catch during 1997.

For the third consecutive season, both the subsistence and commercial set gillnet fisheries in the Port Graham Subdistrict, including the English Bay Section, were allowed to target sockeyes returning to English Bay Lakes. Because the return appeared strong based on early indicators in June, cost recovery harvests by CRRC were also allowed seven days per week on English Bay sockeyes beginning June 19. Through judicious utilization of cost recovery opportunities by Port Graham Hatchery Corporation (PGHC), along with careful monitoring of escapements, the desired escapement goal of 15,000 sockeyes into English Bay Lakes was achieved (Table 3, Appendix Table 23), while the commercial set gillnet fishery harvested almost 17,000 sockeyes (Table 3). The harvest and escapement figures are both increases over recent years and once again demonstrated the potential for even greater returns in future years.

Several factors contributed to the above average set gillnet harvests in 1997. First it is believed that a significant portion of the sockeyes taken in the set gillnet fishery were of non-local origin, probably destined for Upper Cook Inlet based on average weight information. Strong returns of pink salmon to Tutka Hatchery and sockeye salmon to English Bay Lakes undoubtedly contributed to the above-average catches as well. In addition, increased fishing effort also boosted the set gillnet harvests in the Southern District. The number of set gillnet permits actively fished in LCI this season (24) matched that of 1996, which was the highest since the 1988 season (Appendix Table 1).

Seine Fishery

Sockeye Salmon

The overall catch of sockeye salmon by all gear types, at 188,400 fish, was the second highest for the Southern District over the last 20 years (Appendix Table 13) and was 35% greater than the recent 10-year average. Purse seiners in the common property fishery accounted for nearly two-thirds of the sockeye salmon landed in the district in 1997 (Table 1).

As in recent years, waters of China Poot Bay and Halibut Cove Subdistricts, and the outer waters of the Tutka Bay Subdistrict, were opened to seining five days per week beginning Monday, June 23, to target returns to Leisure and Hazel Lakes. Unlike previous years, however, no sockeye cost recovery harvests were anticipated by CIAA due to weak forecasted returns based on the lack of stocking at the two systems in 1994. As a result, the hatchery Special Harvest Areas (SHA's) were not utilized and commercial seining was allowed up to the stream mouths at both China Poot Creek and Wosnesenski River during open periods.

Preseason combined harvest projections for returns to the Leisure and Hazel Lakes stocking projects were estimated at only 5,500 fish. The actual commercial harvest of fish returning to the two sites was estimated at nearly 121,000 fish (Figure 11, Appendix Table 15), comprising 50% of the total LCI sockeye salmon harvest (Table 3). Because of the geographic proximity

of these two projects, the overlapping area of harvest, and the lack of tagging, no definitive assessment of separate returns to each system can be established. However, fish returning as a result of these two projects undoubtedly contributed to seine catches in the Halibut Cove and Tutka Bay Subdistricts, as well as those in China Poot Bay Subdistrict. It was estimated that personal use dip net fishermen and sport fishermen harvested another 5,600 sockeyes at the head of China Poot Bay based on average catches over the past 10 years. The 1997 total return from both projects was estimated at 127,600 sockeyes (Appendix Table 15). Although the large disparity between the preseason forecast and the actual return cannot be fully explained, observations of fry in Hazel Lake during 1994, when no hatchery fry were stocked, suggests that natural spawning occurred during 1993 and contributed to adult returns this season.

Common property catches in China Poot Subdistrict were the highest of the season on July 14, with a combined harvest of over 18,000 sockeyes taken by about a dozen vessels in the two sections and about 83% of the total coming from the Hazel Lake Section. Hazel Lake catches remained high during the following two Monday “buildups” (after the weekend closure), averaging about 5,100 fish for each of those days, then decreased steadily thereafter into mid-August, with the last landing from the Hazel Lake Section coming on August 3. Catches in the China Poot Section peaked during the week of July 14-19, with a daily average of 2,360 sockeyes, steadily declining thereafter until the last landing on August 4. The cumulative commercial catch in the two sections was 116,100 sockeyes (Table 3), with almost two-thirds taken in the Hazel Lake Section. Because very little directed seine effort for sockeyes occurred within adjacent waters of Tutka Bay Subdistrict, no seine harvest for this species occurred there.

Pink Salmon

Strong returns of pink salmon to the Tutka Bay Hatchery contributed to an overall Southern District harvest of 2.686 million fish (Table 5, Appendix Table 18), a new record for the district. Waters of Tutka Bay Subdistrict outside of Tutka Bay proper were open to commercial seining five days per week beginning June 23, as has been the case in recent years. Unlike

those years, however, the open waters were more restrictive in 1997, consisting of those waters offshore of a line running from the north shore of the mouth of Sadie Cove to Grass Island, then to Nubble Point. Waters within the Tutka Bay SHA (Figure 4) were open to hatchery brood stock and cost recovery harvest by authorized agents of CIAA on a continuous basis as established in the Tutka Hatchery Annual Management Plan beginning June 29. The plan called for hatchery incubators to be filled to maximum capacity if possible, and excess fish beyond brood stock and natural escapement requirements were to be harvested for cost recovery to help offset operational expenses, estimated at \$475,000 for FY98. In addition, the CIAA Board of Directors also designated last season's (FY97) Tutka Hatchery operating shortfall of \$215,000, as well as a \$100,000 "reserve fund" (to offset any future shortfalls), to be included as part of an overall \$790,000 revenue goal to be generated by the harvest and sale of pink salmon returning to Tutka in 1997. A minimum of 155,000 fish (115,000 females) was desired for hatchery brood stock in order to achieve the goal of 125 million eggs, and an additional 6-10,000 pinks were needed to meet the natural spawning escapement goal for Tutka Creek.

At a preseason estimated price of only \$0.05 to \$0.10 per pound, and a forecasted harvest of 2.475 million pinks, the majority of the hatchery return was needed to meet the revenue goal, therefore little or no common property effort specifically targeting pinks was expected during 1997. Achieving the revenue goal seemed very unlikely even with a successful return due to the severely depressed prices. The first cost recovery harvest took place on July 3 by one vessel working inside Tutka Lagoon. A second catcher boat, to work waters outside Tutka Lagoon as was the case in 1995, was kept "on call" should the run attain the strength to justify additional effort. Cost recovery fishing occurred on a daily basis throughout the entire month of July, with harvests peaking during the period July 17-23. Daily catches during the peak averaged nearly 117,000 pinks, with the single-day high of 157,600 taken on July 21. All fishing occurred within Tutka Lagoon, and the one vessel contracted by the hatchery was able to maintain a consistent, steady pace that prevented any significant buildups during the season.

At the end of July, the processor contracted by CIAA to purchase pink salmon announced a retroactive price increase. By this time, approximately 2.3 million pinks, or about seven million pounds, had been harvested for cost recovery purposes. The price increase correspondingly increased the revenue generated, and CIAA officials indicated that the revenue goal of \$790,000 was virtually assured. Therefore, waters of Tutka SHA (except for those of Tutka Lagoon) were closed to hatchery fishing beginning August 1, while all remaining waters of Tutka Bay Subdistrict were opened to commercial seining seven days per week. This strategy allowed the opportunity for seiners to harvest surplus fish while still allowing limited hatchery cost recovery fishing and brood stock collection.

No further cost recovery openings occurred, with the final landing made on July 31. Commercial landings occurred only during the first six days of August, but by this time the run was nearly over and only 105,000 pinks were taken by the seine fleet. The total commercial catch of pink salmon in Tutka Bay Subdistrict this season, including both seine and setnet catches but excluding hatchery cost recovery, amounted to 130,400 fish (Table 5). A total of 2.376 million pinks were sold by CIAA for cost recovery, with an additional 217,000 fish harvested for brood stock (Table 9).

The estimated pink salmon escapement of 45,000 fish (Table 5, Appendix Table 24) into Tutka Creek, which exceeded the desired range of 6-10,000 fish, was not based on the area under the curve (AUC) method normally utilized to derive escapement estimates. Due to the low number of escapement survey data points in 1997, the figure generated by the AUC method was believed to be considerably higher than the actual escapement. As a result, the peak individual survey count of approximately 44,000 pinks, plus an additional 900 fish counted in mid-September, was used to generate this year's estimate. As in recent years, the Tutka Creek escapement was thought to contain a disproportionately high percentage of males discarded during hatchery sorting operations. The total return of pinks to Tutka Hatchery, including commercial, cost recovery, brood stock, and sport harvest, as well as escapement, was estimated at 2.77 million fish (Table 9), which was about 5% higher than the preseason forecast.

At Port Graham, the Port Graham Hatchery Corporation (PGHC) was expecting a range of 80,000 to 200,000 pink salmon to the facility there, with approximately 45,000 desired for brood stock. An additional 25,000 wild pinks were forecasted to return to Port Graham River, but with a desired escapement range of 20,000 to 40,000 fish, few wild fish could be harvested if the run materialized. In an early effort to assess the run strength of the hatchery return, and to provide fish for brood stock purposes, the Port Graham SHA (Figure 7) was opened to the harvest of salmon by authorized agents of PGHC seven days per week beginning July 18. Any fish surplus to natural spawning or brood stock requirements could be made available for common property and/or hatchery cost recovery harvest.

By August 5, about 43,000 pinks had been collected for brood stock purposes, while the hatchery had also caught and sold approximately 85,000 pinks (300,000 pounds), for cost recovery, nearly achieving the revenue goal of \$50,000 set for the facility. It should be noted that all cost recovery and brood stock harvests occurred in close proximity to the hatchery net pens, where the juvenile pinks had originally been released, suggesting that the majority of fish harvested were of hatchery origin. In order to provide approximately 50% of the hatchery return for the common property harvest, as outlined in the Port Graham Hatchery Annual Management Plan, without jeopardizing hatchery requirements, commercial seining within waters of the Port Graham SHA was allowed for a 24-hour period beginning August 6. Waters of Port Graham Subdistrict outside of the Port Graham SHA remained closed to commercial purse seine fishing to protect wild stocks of pink salmon returning to Port Graham River. No effort occurred during that opening, but by the next day, it became evident that waters of Port Graham SHA could be opened to commercial seining on a continuous basis without jeopardizing either biological or hatchery requirements, so this action was effected beginning August 7. The run was dwindling by this time, however, and subsequent effort and harvest in the commercial seine fishery occurred for only about another week. Final catch for the seine fishery in the subdistrict totaled 40,600 pinks, while set gillnetters, whose fishing was allowed to proceed uninterrupted on a schedule of two 48-hour periods per week, harvested another 6,200 pinks. Escapement into Port Graham River, estimated at 12,500 pinks, fell short of the desired range of 20,000 to 40,000 fish for the sixth consecutive year.

Returns of wild pink salmon stocks to other systems in the Southern District were variable as indicated by ground survey escapement counts. At Humpy Creek, escapements increased steadily beginning in late July, and by August 7 a ground count revealed that the minimum desired goal of 25,000 pinks had been achieved. In response, waters of Humpy Creek Subdistrict were opened to commercial seining five days per week beginning August 11, but even this liberal fishing schedule failed to attract any effort and no fish were harvested in the subdistrict. Final escapement at Humpy Creek was estimated at 78,300. Pink escapement at Seldovia River also surpassed the desired range (Appendix Table 24), while desired minimums were not attained at China Poot Creek and Barabara Creek (Table 5, Appendix Table 24).

Other Species

Southern District chum salmon returns were poor for an eighth consecutive year. Nonetheless, the chum harvest of 4,260 fish (Table 6) represented the second highest total since 1988 and surpassed the recent 10-year average for the district (Appendix Table 21). Set gillnets accounted for almost the entire total, with the Tutka Bay and Port Graham Subdistricts accounting for the greatest proportions of the district-wide catch (Table 6). Escapements into Southern District chum systems were generally fair to poor, although the low end of the desired range was achieved at Port Graham River (Appendix Table 25).

Although minor in total numbers of fish, the majority of the Southern District chinook harvest usually consists of incidental catches of adult fish returning to three separate enhancement projects. The 1997 Southern District harvest of 1,260 chinooks was the third lowest since 1987 but equaled the 20-year average (Appendix Table 12). Approximately 90% of the chinook catch was taken by set gillnetters. The coho salmon harvest of 5,600 fish was the third highest this decade and was slightly greater than the district's 20-year average (Appendix Table 17). About 80% of the coho harvest was taken in the set gillnet fishery while seiners accounted for the remaining 20%.

Kamishak Bay District

Sockeye Salmon

Although the entire Kamishak Bay District, with the exception of the Chenik and Paint River Subdistricts, opened to salmon seining by regulation on June 1, the actual season began when two regular 48-hour weekly fishing periods were established by emergency order effective on the first Monday of the month, June 2. The earliest sockeye salmon return to the management area, at Mikfik Creek in the McNeil River Subdistrict, appeared average during the first aerial survey on June 2, with an estimate of 350 fish. By the next survey on June 6 the number jumped to 2,800 sockeyes, representing over half the lower end of the escapement range of 5,000 to 7,000 fish. An estimated 5,000 fish were observed on June 9, virtually assuring the desired escapement, and as a result fishing in McNeil River Subdistrict was extended to five days per week beginning June 11. Unfortunately, even the liberalized fishing schedule attracted little effort as fishermen were unwilling to gamble on fishing this traditionally small run considering the lack of tender service to this remote district. Aerial surveys conducted through June and into July revealed no significant increases in daily estimates, suggesting that fish were only trickling into the system after the peak survey of 5,700 sockeyes on June 16. As is frequently the case with this system, low water conditions delayed fish entry into the lake system during the late stages of the run in early July and probably resulted in increased predation by brown bears. The final escapement index at Mikfik Creek was 8,500 sockeyes (Table 3, Appendix Table 23), slightly exceeding the desired range of 5,000 to 7,000 fish, while approximately 200 sockeyes were harvested in the commercial fishery (Table 3).

With sparse early effort directed toward sockeye salmon in the McNeil River Subdistrict, seiners would next normally turn their attention to the Chenik or Douglas River Subdistricts during the last days of June. Once again, however, no fishing was expected to occur at Chenik Lake this year due to the lingering effects of the IHNV outbreak in previous years and the subsequent decrease in adult returns. A lack of stocking at the system in 1994 further decreased the likelihood of a significant return this year. Despite the forecasted weak return,

the staff was hopeful that the run would at least approach the escapement goal of 10,000 sockeyes. Unfortunately, a fourth consecutive year of dismal returns was manifested, and even with no fishing effort during the entire season, the total escapement past the weir at Chenik Lake was only 2,338 sockeyes (Table 3, Appendix Table 23). Modest effort in the Douglas River/Silver Beach Subdistrict produced a catch of 2,600 sockeyes, and seiners appeared to be waiting for more lucrative fishing elsewhere in the district.

The next stop on the Kamishak seine circuit was nearby Kirschner and Bruin Lakes in the Bruin Bay Subdistrict. Both lakes have been traditional sites of sockeye salmon lake stocking projects, but lack of stocking at the latter in 1994 led to a forecast of zero fish returning to this system in 1997. At Kirschner Lake, where a steep falls at tideline precludes escapement into the lake, over 27,000 sockeyes were predicted to return. As outlined in the Eklutna Hatchery Annual Management Plan (AMP) prior to the season, the revenue goal necessary to meet operational expenses incurred in LCI sockeye salmon lake stocking projects was set at \$40,000, to be secured entirely from combined cost recovery harvests at the Kirschner and Bruin Lakes SHA's in the Kamishak Bay District. Normally the goal would be split amongst these two SHA's and the Leisure and Hazel Lakes SHA's in the Southern District, but the low forecast at the latter two sites persuaded CIAA officials to target only the Kamishak Bay SHA's for cost recovery harvests. No cost recovery was planned at Chenik Lake in 1997 since weak returns were once again expected. Projected harvests of 14,300 sockeyes from the Kirschner and Bruin Lakes SHA's were necessary to achieve the revenue goal of \$40,000, assuming an average price of \$0.70 per pound and an average weight of 4.0 pounds per fish.

Preseason management strategy for the Bruin Bay Subdistrict, as outlined in the Eklutna Hatchery AMP, was to open the Kirschner and Bruin SHA's (Figure 6) to hatchery cost recovery fishing on a continuous basis beginning June 23 while keeping both closed to common property seining, thus allowing opportunity for CIAA to achieve the sales harvest goal at the beginning of the run. As soon as the goal was met, the two SHA's were to be closed to cost recovery harvest and opened to commercial seining so the fleet could work the areas uninhibited for the remainder of the season.

CIAA had made arrangements prior to the season for a CISA vessel to conduct cost recovery. The first effort occurred in the Kirschner Lake Section on July 19, resulting in a harvest of just over 6,100 fish. At \$0.90 per pound, the inseason price for Kirschner cost recovery sockeyes was slightly greater than the preseason estimate, but the cumulative poundage (28,300) from the first harvest was insufficient to achieve the revenue goal for the season. Unfortunately, the volunteer cost recovery vessel reported that the numbers of fish remaining on the grounds after this harvest were inadequate to effectively continue. The Eklutna Hatchery AMP contained provisions for a “harvest termination date” of July 24, explicitly stating that if the revenue goal was not achieved by that date then the SHA’s were to be closed to hatchery cost recovery fishing and opened to common property seining. Based on the actual catch during the first cost recovery harvest, and the post-harvest observations, CIAA decided that no further cost recovery efforts would be undertaken in the Kirschner and Bruin Lake SHA’s. In response, waters of both SHA’s were closed to hatchery cost recovery fishing effective July 24. Because sockeye salmon returning to the Kirschner Lake stocking site are prevented from entering the lake by a steep waterfall at tideline, no escapement is possible and a total harvest is desired. In an effort to provide maximum opportunity to achieve a 100% harvest, waters of the Kirschner Lake Section of Bruin Bay Subdistrict were therefore opened to commercial salmon seining seven days per week effective July 24. Concurrently, waters of the Bruin Bay Section of Bruin Bay Subdistrict, including waters of Bruin Lake SHA, were opened to seining on the standard fishing schedule of two 48-hour periods per week.

Only two boats fished the area opened to continuous fishing, targeting only sockeyes despite an optimistic pink forecast to nearby Bruin Bay River. Seinners focused their efforts on the Kirschner Lake return but only managed to land a paltry 2,800 sockeyes (Table 3), subsequently leaving the area prior to the end of July. Aerial surveys into August continued to document 1,000 to 3,000 sockeyes holding in saltwater near the waterfall at Kirschner Lake. Despite these unharvested fish, the total return to Kirschner Lake was estimated at only about 11,000 sockeyes, less than half the preseason prediction for the system.

Pink Salmon

Preseason pink salmon projections for the Kamishak Bay District were optimistic, with harvestable surpluses forecasted for Bruin Bay and Ursus Cove Subdistricts. Aerial surveys bore out this projection, but low prices for pinks coupled with a lack of tender service resulted in zero effort targeting pinks during 1997. The total harvest for the season was only 300 fish (Table 5, Appendix Table 18), all incidentally taken during hatchery sockeye cost recovery harvests. The three major pink systems, Bruin River, Sunday Creek, and Brown's Peak Creek, all exceeded their escapement goals by significant margins (Appendix Table 24).

Chum Salmon

Cumulative chum salmon catches for the entire Kamishak Bay District totaled only seven fish, a new record low harvest (Appendix Table 21) once again reflecting the lack of interest brought about by generally low prices paid for this species. The entire chum harvest occurred incidentally in the sockeye fishery.

Chum salmon escapement into McNeil River began slowly when less than 20 fish were first observed in salt water just outside McNeil spit during an aerial survey on June 25. Weather precluded another survey for almost two weeks, by which time the index estimate had increased to only 3,500 chums in fresh water, lending credence to an earlier assessment that the McNeil chum return appeared weak. One positive note during this survey, however, was the number of chums observed upstream of McNeil Falls (600), suggesting that at least some fish were able to avoid the large numbers of brown bears present at the falls preying on the fish as they migrated upstream. The following survey on July 15, a time when index counts should have been near their peak, revealed nearly 15,000 chums in freshwater, indicating that perhaps the return was stronger than initially believed. One week later, the peak daily count for the season was documented at over 17,000 chums in fresh water, with estimates steadily declining thereafter. In any case, all index counts, as well as informal ground observations

from the McNeil bear viewing camp, implied that in-river escapement was better than had been observed in any recent season.

Because chum runs had failed to achieve the lower end of the desired escapement range for the past seven consecutive seasons, the McNeil River Subdistrict was closed to commercial fishing beginning July 1 in an effort to provide maximum protection to returning fish in 1997. This strategy was hardly necessary since the combination of low prices and lack of tender service discouraged the fleet from targeting chums in any portion of the entire district, thus allowing entire runs to enter their natal streams. With an escapement goal of 20,000 to 40,000 chums for McNeil River, the final estimated escapement index at McNeil River was 27,500 chums (Appendix Table 25), marking the first year the river's goal has been met since 1989.

Elsewhere in the Kamishak Bay District, aerial surveys began to document variable late chum returns to northern Kamishak Bay systems in Ursus Cove, Cottonwood Bay, and Iniskin Bay Subdistricts by early August. Chum escapements into Iniskin River and Ursus Cove systems continued to increase while that into Cottonwood Creek lagged, but low prices and market demand once again kept most of the fleet away. Therefore, these chum runs were allowed to enter their natal streams as escapement, and two of the three major northern Kamishak Bay systems achieved their established goals (Appendix Table 25). No aerial survey information for the Big and Little Kamishak River systems in the southern portion of the district was obtained in 1997.

Other Species

Chinook salmon harvests in the Kamishak Bay District historically have been insignificant (Appendix Table 12). On the other hand, coho harvests within the district have at times been substantial, providing fishermen with some lucrative late season catches. Coho assessment in LCI is very limited, but early indications from other areas within LCI suggested average returns. Meanwhile, adjacent management areas such as Prince William Sound and Upper Cook Inlet were experiencing what appeared to be weak coho returns. Despite the seemingly

average returns in LCI, the lack of tender service and low prices conspired to preclude any effort or harvest (Appendix Table 17), yet another first for the district.

Outer District

Sockeye Salmon

Outer District sockeye harvests historically have focused on natural returns to the Delight and Desire Lakes systems in East Nuka Bay Subdistrict. A lake stocking project in the Port Dick area during the late 1980's provided additional fish for harvest in the early 1990's, but stocking was discontinued after 1989 and a small harvest in 1993 was the last documented catch. Preseason projections forecasted a harvest of up to 23,200 sockeyes for the entire Outer District. The actual harvest totaled only 6,300 fish (Table 3), just over half of the recent 10-year average (Appendix Table 13).

Aerial surveys, the traditional method of assessing sockeye returns to Delight and Desire Lakes in East Nuka Bay, were supplemented by counting weirs at these two systems in 1997. The weirs were a continuation of a salmon smolt outmigration enumeration project begun in May and provided a more precise assessment of the adult returns than aerial surveys, which are frequently plagued by poor viewing conditions induced by inclement weather. Prior to the season the staff decided to manage the returns by utilizing aerial surveys as opposed to the weir counts for several reasons, one of which was to retain consistency from previous years until the two different assessment methods could be compared and reconciled.

Surveys began on June 11, documenting small numbers of fish in freshwater at both systems although none were observed in either lake. By the next survey on June 17, over 1,200 sockeyes were observed in Desire Lake while smaller numbers of sockeyes were staging in the freshwater lagoon near tidewater at Delight Lake. Aerial counts at Desire Lake increased significantly by the time of the next survey on June 23 to nearly 5,000 fish in fresh water. Because of a slightly later run timing, the return at Delight Lake, just south of Desire Lake, during this time increased less

dramatically to an estimated 1,500 sockeyes on the same date. The numbers, especially those at Desire Lake, were considered relatively strong for the date, but with escapement goals of 10,000 sockeyes for each of these lake systems, the staff determined that a commercial opening was not yet warranted in East Nuka Bay. More frequent aerial surveys were planned in order to closely monitor escapement numbers.

The next two surveys, on June 27 and July 3, were conducted under fair to excellent conditions but produced disappointing results, with only minor increases noted at both systems. By July 8, an aerial survey once again resulted in a similar estimate to the previous two surveys at Desire Lake, forcing the staff to begin using the more reliable weir counts to determine actual escapement into that lake. When combined with the aerial estimates in freshwater downstream of the weir, the escapement figure from the weir represented over 90% of the established goal for the system. As a result, waters of East Nuka Subdistrict north of the latitude of James Lagoon were opened to seining five days per week beginning July 10. In addition, the regulatory markers protecting Desire Lake Creek were removed and fishing was allowed up to the stream mouth. Meanwhile at Delight Lake, about 6,000 sockeyes were observed in the freshwater lagoon, still well short of the 10,000 fish goal. Additionally, extremely low water conditions at that system were hampering upstream migration to the lake. Therefore, waters south of the latitude of James Lagoon remained closed to protect fish returning to Delight Lake.

Seine fishing effort commenced on July 12, but harvest numbers were meager at only 500 sockeyes that day. Rainfall along the outer Gulf coast finally raised water levels to a point that stimulated fish migration and passage through the weir at Delight Lake. By July 14, the escapement goal for this system had been achieved, so waters of East Nuka Bay, including McCarty Lagoon, were opened to seining five days per week beginning July 16. No markers were in effect at either Delight or Desire Lakes, so fishing was allowed up to each respective stream mouth during open periods. Only modest fishing effort and harvest took place over the course of the run, with a peak daily harvest of 1,000 sockeyes taken on both July 25 and July 26. By this time significant numbers of pink salmon bound for Desire Lake Creek were beginning to appear in saltwater and seiners began harvesting increasing numbers of this species while

pursuing the more lucrative sockeyes. Fishing continued through August, with the sockeye catch steadily dwindling. The final sockeye landing occurred on August 29, bringing the final total to 6,200 fish (Table 3, Appendix Table 14).

Aerial surveys were unable to detect any further increase in escapements over the remainder of the season. As is frequently seen in deep systems throughout the management area, once sockeyes reach the spawning lakes, they often descend to depths and cannot be visually enumerated from the air. With extremely warm water temperatures (up to 18° C in late July and August) this was particularly true at both Delight and Desire Lakes in 1997 as the weir counts at both systems documented considerably more sockeyes than the aerial surveys. Final escapement estimates as derived from weir counts were 27,800 sockeyes at Delight Lake and 14,700 at Desire Lake (Table 3, Appendix Table 23). It must be noted when comparing these escapements to previous historical escapements, that prior to 1997 escapement figures were solely derived from aerial surveillance.

A third system of lakes known as Delusion (or Ecstasy or Delectable) Lakes in East Nuka Subdistrict has been monitored over the last several seasons to document the sockeye return there. Located near the head of the East Arm of Nuka Bay, the two-lake system is relatively new, formed during the late 1970's and early 1980's by a receding glacier. This fact was substantiated by reviewing charts and maps drawn prior to the mid-1980's, as no lakes are indicated at the site of the present bodies of water. Prior to the 1980's, no salmon were known to utilize the system, but in approximately 1989, during a routine aerial survey, adult sockeye salmon were documented in the system by the staff for the first time. Each year since then, aerial surveys have revealed sockeye salmon as well as pink salmon in the system. The peak 1997 aerial count of 1,400 sockeyes was recorded during the last Nuka Bay survey of the season on August 4. Little is known of the origins of this return, although the predominant hypothesis suggests that sockeyes probably strayed from nearby Desire and/or Delight Lake to colonize this new lake system. Sampling of sockeyes in this system was conducted in 1992, 1993, and 1994 by ADF&G personnel, with help from University of Alaska students on site. Otoliths and length measurements indicated primarily large 3-ocean fish (six years old). Additional tissue samples

were taken from post-spawning individuals in 1993 and 1994 for inclusion into the genetic baseline data set and future genetic stock identification analysis.

Pink Salmon

Harvest forecasts for pink salmon in the Outer District were fairly conservative at 102,000 fish, about equal to the recent 10-year average, with the greatest potential for harvestable surpluses expected at Nuka Island, Port Dick, and Windy Bay. The actual harvest of 128,400 pinks (Table 5, Appendix Table 18) was the fifth highest catch for the district in the last 20 years. Once again the ubiquitous theme of low prices and market demand for this species combined to minimize effort.

For the sixth consecutive season, a management strategy was employed in the Port Dick area based on input from fishermen over the winter of 1991-92. Concerns over fish quality led to a plan whereby the outer areas of the subdistrict would be opened on a set calendar date earlier than the traditional opening date, unlike former years when openings were based on stream escapement rates and fish abundance in saltwater. It was hoped that opening areas further away from freshwater systems at an early date would allow the fleet opportunity to harvest higher quality fish before they became freshwater marked, thus increasing their market value. However, weak returns to Port Dick during the previous five years, combined with the depressed pink market, left the management plan essentially untested going into the 1997 season.

The outer waters of the Port Dick Subdistrict opened to fishing for two 40-hour weekly fishing periods, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and from Thursday 6:00 a.m. until Friday 10:00 p.m., beginning on Monday, July 14. At that time, chums were present in Port Dick (head end) Creek and on the nearby saltwater flats, but pinks had yet to show. The North Section of Port Dick Subdistrict remained closed to protect chums returning to streams within that section, primarily Island Creek.

Pinks first appeared in Port Dick (head end) Creek around the fourth week of July, as a ground survey on July 14 detected only three fish and the next survey on July 28 documented over 3,500. However, the low numbers suggested that the odd-year run strength, usually much greater than even years, might not prove as considerable as hoped. An aerial survey on July 21 produced an estimate of nearly 26,000 pinks in salt water at Port Dick, indicating that the run had the potential to meet escapement requirements and still provide opportunity for substantial commercial harvests. The next aerial survey on July 24 showed even greater promise when 37,000 pinks were estimated in saltwater at the head end of Port Dick, and waters in the South Section of Port Dick Subdistrict were opened to seining for two 40-hour periods per week beginning on July 25. Despite the liberal commercial openings, and a return that surely could have accommodated some level of fishing pressure, almost no effort occurred during the season and subsequently the harvest amounted to less than 700 pinks in the Port Dick Subdistrict (Appendix Table 20). Once again the recurrent theme of low prices for this species and a lack of tender service in remote districts kept effort and harvest levels low. Unfortunately, the actual escapement into Port Dick (head end) Creek did not build in the magnitude suggested by the aerial surveys. The peak daily survey recorded by the ground survey team occurred on August 14 with a total of about 18,000 pinks. Factoring in stream life over the course of the survey season produced a final estimated escapement of just under 37,000 pinks (Table 5, Appendix Table 24), falling within the desired escapement range of 20,000 to 100,000 fish.

The North Section of Port Dick Subdistrict was never opened to fishing in order to protect chums returning to Island Creek, but the closure had little effect on actual effort as low prices were a much stronger incentive to keep fishermen away. The final estimated escapement of 71,100 pinks at Island Creek (Appendix Table 24) was over four times the upper end of the desired range of 12,000 to 18,000 fish.

As expected, the odd-year phenomenon manifested itself in strong pink returns at nearby Windy Bay, where aerial surveys first recorded upwards of 47,000 pinks in saltwater on July 21. This impressive showing prompted the staff to open waters of Windy Bay to commercial seining for two 40-hour fishing periods per week beginning July 22. The opening was intended to allow

seiners the opportunity to harvest pinks during early stages of the return when product quality would be highest and when the run should normally be dominated by males, while still allowing adequate escapement. Several boats traveled to the district for the first day of the opening, taking a total of 34,000 pinks, which ended up being the single daily peak for the season. Fishing continued until the last day of July, with a final harvest total of 93,200 pinks (Table 5, Appendix Table 19).

Despite fishing pressure during the last 10 days of July, pinks had begun entering fresh water systems in Windy Bay during this time period, with a cumulative ground count of over 7,000 pinks into both systems on July 31. After fishing effort ceased, the remainder of the run entered the streams as escapement, with a final estimate of 64,600 pinks in Windy Left and 13,900 in Windy Right (Table 5, Appendix Table 24), both figures achieving the established goals for the respective systems. It is hoped that pink runs to Windy Bay systems can continue to experience strong returns despite extensive logging that has occurred in recent years, which has led to diverse speculation regarding future effects on fishery resources there. The ground survey team reported that nearly all trees in the prescribed 66-foot riparian buffer strip are now down, with few if any live trees left standing. High winds apparently caused many of the uncut trees in this strip to fall across or into the creek. The limited buffer strips obviously were not wide enough in this Outer Gulf coastal area to prevent damage caused by commonly high winds (hence the local name) or preclude the subsequent “domino effect” from blowdowns.

In the East Arm of Nuka Bay, pinks likely destined for Desire Lake Creek produced strong catches this season, beginning as incidental harvest during fishing effort directed at sockeyes in July and continuing well into August. Harvests totaled 33,300 pinks (Table 5, Appendix Table 18), amounting to about one-quarter of the district-wide catch for the season. No estimate of escapement was generated for Desire Lake Creek.

At Nuka Island, pink salmon were documented in fresh and salt water at South Nuka Island Creek during the first aerial survey of the season at that location on July 21, with 3,500 fish observed in fresh water and an additional 3,000 estimated in salt water. Totals jumped again

during the next survey three days later, with about 9,300 estimated in fresh water and 4,600 observed in salt water just off the mouth. Since the fresh water total nearly equaled the desired goal of 10,000 fish, waters of Nuka Island Subdistrict were opened to seining for two 40-hour periods per week beginning July 25. Similar to other Gulf Coast pink systems, effort was minimal and only 1,300 pinks were harvested for the season (Table 5). Strangely, ground surveys conducted at South Nuka Island Creek in August were unable to confirm the escapement numbers documented during aerial surveys, and the peak daily aerial estimate of 9,300 pinks (Table 5, Appendix Table 24) was used as the final escapement estimate.

Elsewhere in the Outer District, pink salmon returns to Port Chatham were considered very strong, with estimated escapements amounting to nearly 43,000 pinks (Appendix Table 24). The area was opened to seining five days per week beginning August 14, but by the this late date the majority of the fish were already protected by closed waters markers and no effort or harvest resulted. At Rocky River, the escapement goal of 50,000 pinks was nearly achieved with an estimated 48,000 pinks (Appendix Table 24), the seventh highest total since statehood.

Chum Salmon

Chum salmon numbers have experienced dramatic declines in the Outer District since the peak harvest years of the late 1970's and early 1980's. Large returns were once again not expected in 1997 due to a succession of poor returns over the past several seasons. No specific commercial openings targeting chum salmon occurred in 1997, yet the harvest of 1,600 incidentally caught fish (Appendix Table 21) was the highest since 1991 in this district. Nearly the entire catch was taken during the pink fishery in Windy Bay.

Escapements into the three monitored chum salmon systems in the Outer District were weak, with all failing to achieve their goals. Port Dick (head end) Creek fell short of its 4,000 chum escapement goal by 2,100 fish (Appendix Table 25). Island Creek chum escapement totaled 5,200 fish, only about half of the lower end of the escapement goal range of 10,000 to 15,000

fish, while Rocky River escapement amounted to 1,100 chum salmon, well short of the goal of 20,000.

Eastern District

Sockeye Salmon

The Eastern District had potential for harvestable surpluses of sockeye salmon in Aialik and Resurrection Bay Subdistricts during 1997, with a district-wide preseason projection of over 200,000 fish. However, the second consecutive failure of an enhanced Grouse Lake run to achieve preseason expectations in Resurrection Bay, and a smaller than expected return of sockeyes to nearby Bear Lake, resulted in a total catch of only 33,800 sockeyes (Appendix Tables 13 and 14) in the Eastern District. The 1997 catch was less than the last two years' harvests but still the fourth highest total during the last 20 years. About two-thirds of this total was taken as hatchery cost recovery at the Bear and Grouse Lakes weirs (Table 1).

At Bear Lake, near Seward in the Resurrection Bay Subdistrict, sockeye enhancement activities by CIAA fostered optimism for a total return ranging up to 43,000 fish assuming optimum survival of various smolt and fry releases. Based upon the expected long-term increase of sockeyes returning to this system, a Resurrection Bay Management Strategy was developed during the winter of 1991-92. This plan allows the seine fleet to begin fishing on the Bear Lake sockeye run at a relatively early date in the outer reaches of Resurrection Bay in order to promote product quality. In addition, several modifications to the plan, first implemented by emergency order in 1996, were once again utilized during the 1997 season. The first change increased fishing time from two 40-hour periods per week to a single five-day period. Based on experience over the past two seasons, this increase would allow greater opportunity to harvest sockeyes without jeopardizing the escapement goal for Bear Lake, set at 5,000 to 8,000 fish in the Trail Lakes Hatchery Annual Management Plan. Next, closed waters markers were once again posted at the mouth of the Resurrection River to better define the river's mouth and the fishing boundaries, which had been problematic prior to 1996. Finally, another section of closed waters

along the west side of Resurrection Bay between Caines Head and the city of Seward was implemented in order to protect returning chinook salmon, which are allocated entirely to the sport fleet and are illegal to retain in the commercial fishery by.

This season, in a deviation from previous years, the entire Resurrection Bay Subdistrict, up to a point one mile due south of Cape Resurrection and Aialik Cape, was opened to seining by emergency order beginning on Monday, May 26. Formerly these waters were opened on the second Monday in May, but experience had demonstrated that sockeyes did not begin arriving in Resurrection Bay in appreciable numbers until the end of the month. Despite presumption of an early run timing for this enhanced run (since brood stock utilized for the project had a documented run timing peaking in early June), the first three years of adult returns from 1992 through 1994 actually trickled in over the course of two months. In 1995 and 1996, with larger numbers of fish returning, the majority of the run appeared in waters at the head of Resurrection Bay during the first two weeks of June. When the area first opened in 1997, fishermen started immediately, anticipating that the later opening date should equate to more fish on the grounds. The first landing occurred on day one, but fish concentrations were rather small and only 500 sockeyes were landed during the first week of fishing. Effort increased the next week, with about a half-dozen seiners actively plying the waters of Resurrection Bay for Bear Lake sockeyes.

The peak harvests of the season in Resurrection Bay occurred June 2, 3, and 5, when up to four vessels harvested just over 1,400 sockeyes on each of those days. Escapement rates at CIAA's Bear Creek weir also began to increase during this time although no cost recovery harvest was yet occurring. The liberalized fishing schedule kept effort fairly constant, with fishermen waiting for a "big surge" of fish, but catch rates dropped after these three peak days. Effort continued, but at a reduced level starting the second week of June, until the last landing on July 9, with the final commercial seine harvest totaling only 8,900 sockeyes (Table 3). When combined with hatchery cost recovery harvests of 10,100 sockeyes from Bear Creek weir (Table 3), the cumulative Bear Lake sockeye catches totaled 19,000 fish, substantially less than the forecasted harvest of 35,000. Escapement counts at the Bear Creek weir facility amounted to 7,900 sockeyes (Appendix Table 23), similar to previous years' totals. Also comparable to the previous

five seasons, sockeye entry into fresh water was rather protracted, beginning on the first day of June and continuing through the end of July.

With an expected run timing later than Bear Lake fish, Grouse Lake sockeyes first began to show up at the fresh water weir during the second week of July, but numbers were small. Additionally, a small "spike" in commercial seine catches in Resurrection Bay occurred during this same week, potentially attributable to fish bound for Grouse Lake. During the latter part of July the run never built to levels suggested by the preseason projection, and in fact dropped to near zero by the first week of August. Numbers began to build again by the third week of that month, with the return peaking (at the weir) during the last week of August and the first week of September. The total return to Grouse Lake was not accurately determined since harvests for Bear Lake and Grouse Lake were combined in the database. Due to poor quality, over 6,000 fish harvested for cost recovery were donated to dog mushers or discarded completely because of a lack of buyers. The disappointing return was far short of the preseason forecast of 166,000 fish, but reasons for the shortfall are unclear at this time.

At Aialik Lake in the Aialik Subdistrict, aerial surveys began on June 17 with an estimate of 500 sockeyes present in fresh water, considered good for that early date. By the next survey six days later, the total had jumped to 2,500, virtually achieving the low end of the escapement goal range of 2,500 to 3,500 sockeyes. As a result, waters of Aialik Subdistrict, including Aialik Lagoon, were opened to seining five days per week beginning June 25. Despite the liberal fishing schedule and open waters, the opening attracted little effort, and fishermen harvested only 2,100 sockeyes (Table 3, Appendix Table 14) over the next three days, with the majority taken on the second day. One aerial surveillance flight in July was totally ineffective after a period of unseasonably warm ambient temperatures (in excess of 75° F.), which apparently caused turbidity from glacial runoff to completely obscure visibility in Aialik Lake. Another survey during the first week of August recorded a total of 11,000 sockeyes in the lake during the peak of spawning, and this number was used as the final escapement estimate (Table 3, Appendix Table 23).

Pink Salmon

A harvestable surplus of up to 65,000 pinks was forecast in Eastern District waters for 1997, but this projection was questionable due to weak returns in some recent years. Although surveys of Resurrection Bay systems were limited to on-grounds estimates in mid-August, results suggested returns were generally fair to poor overall, depending on individual systems. At Bear and Salmon Creeks, where the combined pink escapement goal is 15,000 fish, a total of only 6,300 pinks was estimated (Appendix Table 24). The figure for Thumb Cove, with a goal of 4,000, was estimated at 4,700 pinks, while at Humpy Cove (2,000 fish escapement goal) 2,200 fish were estimated. Tonsina Creek produced an estimate of only 400 pinks, a paltry total for the third straight year and far short of the 5,000 fish escapement goal. Due to the variability of returns and the limited assessment, no openings for pinks were allowed in Resurrection Bay and therefore no harvest occurred.

Aialik Subdistrict, originally opened to fishing five days per week on June 25 for sockeye salmon, was never closed after the sockeye run was effectively over. During some recent years, the subdistrict was allowed to remain open despite knowledge that fishermen were fishing the outer areas later in the season, targeting pink salmon bound primarily for Prince William Sound. The staff elected to leave the area open again in 1997 because the relatively modest catches in prior years did not threaten either local or non-local stocks. Similar to 1996, no vessels traveled to this open subdistrict late in the season, and no harvest occurred.

Other Species

Chum salmon are the only other commercially important species in the Eastern District, but catches during the previous six years have been dismal. This season's chum harvest amounted to 66 fish (Table 6, Appendix Table 21), with all fish taken incidentally in Resurrection Bay during the Bear Lake sockeye salmon fishery. An estimated 2,200 chums were estimated as escapement into Tonsina Creek (Table 6).

Coho salmon are not normally a commercially important species in the Eastern District but are an integral component of an enhancement project, originating from Bear Lake, which benefits sport fishermen in area waters. All coho salmon entered into the Seward Silver Salmon Derby are subsequently sold by the city of Seward, organizer of this sport fishing derby, to a commercial processor. Therefore, these catches are considered “commercial harvests” and are listed in the commercial catch tables to document this fact. In 1997, a total of nearly 2,200 cohos were entered into the Seward Silver Salmon Derby (Table 4). In addition, a portion of the returning adults from this project are harvested at the Bear Creek weir by CIAA as cost recovery for expenses incurred. Although CIAA normally sells most of these fish to a commercial processor(s), many of the fish were unmarketable due to excessive fresh water marking and they were subsequently donated to various individuals, many of whom were dog mushers. Total hatchery harvest from the Bear Creek weir (including brood stock and mortalities) was 3,300 cohos, while an additional 300 fish were allowed into Bear Lake as escapement (Table 4). Total commercial catch for the season in the entire Eastern District amounted to about 5,400 cohos (Table 4, Appendix Table 17).

SALMON ENHANCEMENT AND REHABILITATION

Introduction

Fisheries enhancement has played a major role in LCI salmon production during recent 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 88% (2.704 million salmon) of the total 1997 LCI commercial harvest of 3.073 million fish. The Leisure/Hazel, English Bay, Kirschner, Bear, and Grouse Lakes sockeye salmon enhancement projects produced over 80% (194,700 fish) of the total LCI sockeye harvest of 240,200 fish in 1997. Tutka Lagoon Hatchery production accounted for 89% (2.506 million fish) of the 1997 LCI commercial pink salmon harvest of 2.814 million fish.

Using average weights per fish and average prices per pound in LCI, the estimated contribution of ADF&G/CIAA/CRRC-produced salmon was 85% (\$2.05 million) of the \$2.42 million total value of the 1997 LCI commercial salmon harvest. About 51% (\$1.23 million) of the total exvessel value of the fishery was utilized for hatchery cost recovery purposes (Table 7). 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 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 1997 the adult pink salmon produced by Tutka Lagoon Hatchery totaled approximately 2.821 million fish (Table 9). No attempt was made to separate the contribution resulting from natural spawning in Tutka Creek. The estimated 2.7% 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 2.506 million pink salmon from Tutka Bay and Lagoon (Table 9), accounted for

approximately 93% 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 2.461 million fish, worth approximately \$1.120 million (Table 7) and exceeding CIAA's revenue goal of \$789,400. Approximately 89.0 million short-term reared pink salmon fry were released into Tutka Bay in 1997 (Appendix Table 30), 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, nearly 1.5 million adult sockeyes were estimated to have returned as a result of these stocking programs (Appendix Table 15), 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 1997 was estimated to be 127,600 fish (Figure 11, Appendix Table 15), over 75% greater than the 1979-96 average and over 40% greater than the recent 10-year average (which included returns to Leisure Lake only during the years 1986 through 1990). The cumulative commercial harvest of 120,900 fish comprised nearly two-thirds of the Southern District sockeye harvest and about half of the total LCI sockeye salmon harvest.

Approximately 2.0 million sockeye salmon fry were released into Leisure Lake in 1997 (Appendix Table 30), returning to the scheme of high-density stocking utilized from 1984 through 1993 after two consecutive years of reduced-density stocking for this system (no fry were stocked in 1994 due to an IHN virus outbreak at Crooked Creek Hatchery). At Hazel Lake, 1.0 million sockeye fry were stocked in 1997.

Halibut Cove Lagoon 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 just over 30% of the total return. Figures for this incidental harvest during 1997 were not available but were thought to be near the historical average.

Chenik Lake Sockeye Salmon Stocking

Chenik Lake, located in Kamishak Bay, historically 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 average annual return to this system was less than 500 fish.

In 1978 ADF&G initiated a program to re-establish the sockeye runs and subsequently increase commercial fishing opportunities in the Kamishak Bay area. Sockeye fry from Crooked Creek Hatchery were annually stocked in Chenik Lake through 1996, and work was done at the intertidal mouth of Chenik Creek to alleviate a partial migrational barrier. Beginning in 1987, lake enrichment occurred through the experimental application of liquid fertilizer, but not on an

annual basis. Increased sockeye escapements in the early 1980's augmented production, and the Chenik area was reopened to commercial fishing. Subsequent returns accounted for up to 50% of the total LCI commercial sockeye harvest in some years, approaching the historical record high runs of the 1930's.

In 1997, however, the sockeye return to Chenik Lake was the fourth consecutive sub-par run, with no commercial harvest and a documented escapement of only 2,340 adults (Figure 12, Appendix Table 16). Two factors were responsible for the anticipated low return this year. One major reason was a lack of stocking in this system during 1994 due to a loss of sockeye fry at the Crooked Creek Hatchery that year. The second reason was the continued lingering effects of Infectious Hematopoietic Necrosis Virus (IHNV), a disease commonly affecting juvenile salmon and trout. IHNV was documented in the Chenik system during the 1991, 1992, and 1993 smolt outmigrations, and is suspected of causing increased mortality to juvenile sockeyes, thereby reducing the adult returns. A thorough investigation of the relationship between the Chenik Lake sockeye stocking project and the IHNV problem was initiated during the winter of 1992-93, ultimately resulting in a staff recommendation to reduce fry stocking densities from peak levels occurring in 1989 and 1990.

The outmigration of sockeye smolts at Chenik Lake has been monitored in recent years through use of a weir and live trap. However, due to the low adult returns and smolt outmigrations during the past few years, operation of the smolt weir in 1997 could not be justified.

Factors relating to IHNV epizootics are very complex and currently not well understood. Although remotely possible that stocked sockeye salmon fry were the source of the virus, a more likely cause is that Chenik Lake has become a reservoir for IHNV released from the sex products of naturally spawning adult sockeyes or their decomposing carcasses. It has been hypothesized that the tremendous population declines experienced by the sockeye stock at Chenik Lake in the late 1930's and 1940's may have resulted from IHNV epizootics caused by record high escapements of up to 53,000 adults in the 1930's.

Unfortunately, there is no known practical onsite treatment of IHNV other than perhaps decreasing fry stocking densities, which was begun in 1993 with a reduction to just over one million sockeye fry (Appendix Table 30). This experiment was inadvertently stretched to its maximum limit by default in 1994 when no hatchery-produced fish were released into the system. The fry from Crooked Creek Hatchery which were slated for stocking at Chenik Lake that year were destroyed due to an outbreak of the IHN virus at the hatchery facility. It should be noted that this was the first documented incidence of IHNV at the Crooked Creek facility in its 23 years of operation. Stocking resumed in 1995 with the release of 1.13 million sockeye fry into Chenik Lake, while just under 1.0 million fry were stocked in 1996 (Appendix Table 30).

It was thought that cutting back the adult escapement would also help to decrease transmission of IHNV into the littoral zone of Chenik Lake. Adult escapement into Chenik Lake, once again enumerated through the use of a counting weir at the lake outlet in 1997, totaled only 2,340 fish, the fifth consecutive year in which the escapement has fallen substantially short of the 10,000 fish goal (Appendix Table 23). The escapement shortfall, when combined with the discontinuation of supplemental stocking, equates to reduced fry production, which in turn should theoretically benefit the system by reducing the potential for IHNV epizootics.

The aforementioned schemes of reduced adult escapements and decreased stocking levels have successfully reduced the incidence of IHN in the system as evidenced by the healthy smolt leaving the lake from 1994 - 1996. Unfortunately, the numbers of outmigrating smolts during that time were miniscule relative to the stocking levels, and measures taken thus far have failed to achieve the expected increase in production at Chenik Lake. As a result, CIAA could no longer justify the expense of stocking Chenik Lake and decided to discontinue the project beginning with the 1997 season. The Department and CIAA will continue to include Chenik Lake in future enhancement considerations, but new information will undoubtedly be required before any projects are undertaken.

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 (Appendix Table 23). 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 (Appendix Table 30). 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. The cumulative total that first year numbered 13,800 sockeyes (Appendix Table 23), the highest return since 1982 and the first year since 1984 in which the minimum desired goal of 10,000 fish was achieved. In 1995 and 1996, the weir totals were 22,500 and 12,400, respectively, with the former representing the highest figure over the past 20 years.

Optimum escapement for this system recently has been estimated to be less than the published maximum goal of 20,000 sockeyes (Edmundson et al. 1992). A plan to tightly control spawning escapement into the lake by harvesting those fish surplus to the maximum desired goal of 15,000 was adopted by ADF&G staff, representatives of CRRC, and village residents from Nanwalek during meetings held over the winter of 1995-96. Based on a preseason forecast of up to 32,000 returning adults in 1997, the subsistence, commercial, and sport

fisheries in the Port Graham Subdistrict were once again allowed to target English Bay sockeyes from the beginning of the run, whereas those fisheries had been kept closed until run strength could be assessed prior to 1996.

Both the commercial and subsistence set gillnet fisheries were open to fishing on the standard two 48-hour periods per week in 1997, with the commercial fishery starting on the first Monday in June by regulation. The return seemed to track well with the optimistic preseason projection based on early weir counts and catches, so no restrictions were imposed on the commercial or subsistence fisheries. Because the run appeared to be gaining strength, a Special Harvest Area (SHA) was opened in a limited section of fresh water downstream from the counting weir so that Port Graham Hatchery Corporation (PGHC) could conduct cost recovery harvests seven days per week beginning on June 20. By July 1, escapements had increased to 11,000 sockeyes, while cost recovery had netted an additional 2,300 fish, continuing to support the assessment of a strong return. The staff considered extending fishing time for the commercial fishery, but it was not allowed based on the previous year's experience in which the run declined abruptly late in the season shortly after a fishing extension was implemented.

Although the return peaked near the end of June and early July, it continued through the month of July. The enumeration weir was dismantled on July 21 after a final daily count of 12 sockeyes, but fish activity was noted downstream of the weir and in the saltwater lagoon at that time. The final count past the weir totaled 15,430 sockeyes, or slightly exceeding the desired goal. When combined with commercial and hatchery harvests, the estimated return to the English Bay Lakes systems was over 48,000 sockeyes (Table 3). Since subsistence set gillnet harvests in the Port Graham Subdistrict (Appendix Tables 28 and 29) were presumably comprised of a high percentage of English Bay sockeyes, the total return was estimated to be about 50,300 with the addition of these fish.

Approximately 199,000 sockeye fry (Appendix Table 30) were released into English Bay Lakes in the late fall/early winter via a long-term net pen rearing operation. An estimated 1.33

million sockeye eggs were collected in 1997 for incubation at Port Graham Hatchery during the winter of 1997-98. Unfortunately, a devastating fire completely destroyed the Port Graham hatchery and cannery in January, 1998, including all the incubating pink and sockeye salmon.

Bear 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 recent years. 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 (Appendix Table 30).

The first year of adult returns in 1992 was discouraging, with a total of less than 2,000 fish, but returns had been increasing during each successive season. The returns in 1995 and 1996 were almost identical in number, totaling nearly 53,000 sockeyes each year, and were the highest to date. Based on survival rates experienced since inception of this project, the 1997 forecast projected a harvestable surplus of up to 35,000 sockeyes as a result of Bear Lake enhancement. Due to experienced gained managing this fishery over the past several seasons, fishing time was liberalized to five days per week and closed waters markers were moved closer to the stream mouth of the Resurrection River. Unfortunately, the return was not as strong as expected, but the aforementioned modifications did allow more harvest opportunity for the seine fleet.

The total return to Bear Lake was estimated at around 27,000 sockeyes, with a common property harvest of only 8,900 fish or less than half of the run. An additional 10,100 sockeyes were harvested at the Bear Lake weir as hatchery cost recovery, while the desired escapement goal of 8,000 fish was achieved. Approximately 788,000 sockeye fry were released into Bear Lake during 1997 (Appendix Table 30), while 502,000 sockeye eggs were collected for incubation over the 1997-98 winter at Trail Lakes Hatchery in Moose Pass.

Other Sockeye Salmon Lake Stocking

One other LCI lake was stocked in 1997 with sockeye salmon fry produced by Eklutna Hatchery. At Kirschner Lake in the Kamishak Bay District, site of an ongoing fry stocking project since 1987, approximately 250,000 fry were stocked (Appendix Table 30). Four other lakes, evaluated through pre-stocking studies conducted between 1986 and 1989, and which were regularly stocked during recent years, were not stocked in 1997 as those enhancement programs have been discontinued. The four lakes included Bruin Lake, Ursus Lake, Upper Paint Lake, and Lower Paint Lake, all in the Kamishak Bay District (Appendix Table 30).

The eighth year of adult sockeye returns to Kirschner Lake occurred in 1997. Additional fish, albeit in very small numbers, returned to nearby Bruin Lake, also stocked with sockeye fry. The overlapping harvest areas, and the absence of any tagged fish, precludes separation of the returns for purposes of enumeration. The total combined return to Kirschner and Bruin Lakes was estimated at about 10-12,000 sockeyes, well short of the preseason forecast of 27,500 fish for the Kirschner system. No fish were forecasted to return to Bruin Lake this year as historical data suggested very low survival rates. Of the total, only 120 sockeyes escaped the commercial fishery and were documented via aerial surveys in Bruin Lake Creek, prevented from reaching the lake by a barrier falls in the creek. An estimated 1,000 to 2,500 unharvested sockeyes were documented in salt water at Kirschner Lake during August aerial surveys, unable to reach the lake due to the steep falls at tide line. Prior to 1997, the Kirschner Lake system had remained one of the steadiest producers of LCI stocked lakes since

the inception of the program at that site, but this season's return did not meet expectations for unknown reasons.

A relatively new sockeye enhancement project at Grouse Lake in Resurrection Bay of the Eastern District was expected to produce an adult return of up to 166,000 fish. However, the failure of the first year's return in 1996 left the 1997 forecast questionable. All returning fish were designated for hatchery cost recovery in accordance with the Trail Lakes Hatchery Basic Management Plan. Brood stock for this project, from Packers Lake on Kalgin Island in Upper Cook Inlet, were selected for late run timing characteristics so as not to overlap with the earlier Bear Lake sockeye return. Unfortunately and for unknown reasons, the Grouse Lake return once again was extremely disappointing in 1997, with only about 16,400 adults documented. Based on the disappointing returns the past two seasons, it is unclear at this time whether the Grouse Lake enhancement project will be continued or moved to a different location in the future.

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 (Appendix Table 30). Because adult returns from these plantings have been negligible, CIAA discontinued fry stocking after the 1996 season.

A peak of only 400 adult sockeyes was observed during aerial surveys of the Paint River mouth and Akjemguiga Cove during 1997, the seventh consecutive year of meager returns to this enhancement site. Because of the small numbers of returning fish, the fish pass was not opened to migrating salmon and no freshwater escapement occurred.

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 failed to appear in both 1992 and 1993 despite predictions of at least moderate returns. Because no fry were released in 1993, both the forecast and actual return for 1994 were zero. The 1995 pink return to Port Graham Hatchery was forecasted at 20,000 to 50,000 fish, with the actual return totaling an estimated 20,000 pinks, while only 2,700 fish returned in 1996, when the preseason forecast called for 7,000 to 10,000 returning pinks. In 1997, returns finally achieved the preseason forecast of 80,000 to 200,000 pinks, with a total run size estimated at about 130,000 fish (Table 5). 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.

The PNP permit for PGHC allows pink salmon brood stock collection from a natural run in the Port Graham River, at the head of Port Graham. However, the Port Graham River pink run historically has experienced significant natural fluctuations in escapements despite conservative fishing schedules, causing some concern for protection of the natural stocks. Consistent with the priority of managing for natural stocks (**AS 16.05.730**), a brood stock collection schedule based on the desired natural escapement into Port Graham River as well as historical

escapement levels has been developed to offer maximum protection to the wild pink salmon stock during years of weak returns. Harvest of returning hatchery stocks could potentially occur in commercial purse seine and set gillnet fisheries as well as a subsistence set gillnet fishery in Port Graham. Hatchery fish undoubtedly intermix with wild stocks bound for the Port Graham River. Management decisions attempt to address the effects of these various fisheries to protect natural stocks until adequate escapement into Port Graham River can be confirmed. A small natural return of chum salmon to Port Graham River also occurs, and since this run has been depressed in recent years, management measures also strive to protect this species as well.

The approved Port Graham Hatchery BMP designated a Special Harvest Area (SHA) to allow for brood stock collection and cost recovery harvest (Figure 8). The SHA was designed to provide a migration corridor on the northeast side of the bay for wild stocks traveling to Port Graham River at the head of the bay, thus affording some limited protection to the natural spawning stocks of pink and chum salmon. In an effort to assess run strength early in the 1997 return, and to provide fish for hatchery brood stock purposes, the Port Graham SHA was open to authorized agents of PGHC seven days per week beginning July 18. The effort and catch rates from the harvest were monitored to determine the overall run strength, while sex ratios were also collected by PGHC to provide data regarding run timing. Escapement into Port Graham River was tracked by Department ground and/or aerial surveys. Since the Port Graham AMP specified that approximately 50% of the hatchery return was intended for common property harvest, any fish surplus to natural spawning or brood stock requirements were to be made available for common property and/or hatchery cost recovery harvest.

When the SHA opened, there were virtually no pinks in fresh water at Port Graham River even though fish had begun staging off the mouth and in the vicinity of the hatchery net pens. Escapement lagged through the end of July, and on August 1 a ground survey documented only about 4,000 pinks in the system. In the meantime, brood stock collection and cost recovery harvest, which occurred entirely in close proximity to the hatchery net pens as fish appeared to be homing there, was proceeding on schedule, and by August 5 approximately 43,000 pinks

had been placed in net pens. In addition, PGHC officials indicated that the 85,000 pinks taken for cost recovery had nearly achieved the revenue goal of \$50,000 established for the Port Graham Hatchery. As a result, waters of the SHA were opened to commercial seining for a 24-hour period beginning August 6. No effort occurred during that opening, but because hatchery requirements had been effectively met, waters of the SHA were opened to commercial seining on a continuous basis effective August 7. Modest effort occurred for about a week, with a resulting total harvest of over 40,000 fish taken by the seine fleet. When coupled with the set gillnet harvest in Port Graham Subdistrict, the total common property harvest in Port Graham amounted to nearly 47,000 pinks (Table 5). Hatchery cost recovery efforts resulted in an additional catch of 85,400 pinks, while about 12,100 fish were utilized for brood stock purposes. The total return to the hatchery was estimated to be 186,200 pinks.

Unfortunately, the return of wild stock pinks to Port Graham River never gained sufficient strength to achieve the escapement goal of 20,000 to 40,000 fish, ending with a cumulative estimate of 12,500 fish. Although the staff was concerned about pink escapement throughout the course of the season, the staging pattern of the majority of pinks (within the SHA and especially concentrated around hatchery net pens) suggested that they were of hatchery origin. Undoubtedly fishing efforts within the SHA resulted in some harvest of wild fish, however the staff believes this number to be relatively small and that the majority of the wild return was allowed to enter Port Graham River as escapement.

Although all efforts prior to 1993 were directed towards pink salmon, sockeye salmon production 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. Eggs from this collection site were formerly incubated at Big Lake Hatchery near Wasilla.

In an effort to rehabilitate depressed coho salmon stocks in Port Graham River, a Permit Alteration Request (PAR) by PGHC to produce approximately 25,000 presmolts for stocking in the upper portion of Port Graham River was approved in 1995. PGHC began to monitor the

smolt outmigration from that system in 1996 and collected eggs from adults beginning in 1996. These eggs were incubated at the Port Graham hatchery and subsequently released into Port Graham River. Since the project has only been underway since 1996, no adult returns are expected from this stocking until 1999.

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 will not be available for release in 1997. Because the coho salmon module was housed separately from the cannery, that portion of the facility remained intact and the eggs in it remained safe.

1998 COMMERCIAL SALMON FISHERY OUTLOOK

Sockeye Salmon

Adult sockeye salmon returns to all LCI systems in 1998 could approach 323,000 fish, almost 35% greater than the 240,000 fish landed in 1997 and also well above the average annual catch of 249,000 sockeyes during the last decade. If realized, this harvest would be the second highest ever for sockeye salmon in LCI, lower only than that of 1996. Nearly three-fourths of the total sockeye harvest should be a result of continuing enhancement and lake stocking projects in LCI. However, this projection could be somewhat misleading in that about one-fourth of the entire harvest is projected to return to Grouse Lake in Resurrection Bay and is therefore allocated specifically for hatchery cost recovery in accordance with the Trail Lakes Hatchery Basic Management Plan.

Beneficial results of Leisure Lake fertilization should once again become evident in 1998, with an expected return of about 53,000 sockeyes to China Poot Bay. An additional 32,000 sockeyes are expected to return to Neptune Bay based on annual stocking and historical survival rates.

No harvest is expected to occur at Chenik Lake in 1998. Despite annual stocking of up to 1.4 million sockeye fry, an IHNV epizootic apparently caused significant mortality to juvenile sockeyes and reduced the numbers of emigrating smolt from the system in recent years. The 1994 - 1997 adult returns appear to have displayed the most significant effects of the IHN outbreak as escapements into Chenik Lake have ranged from only 800 to 2,990 fish during those years. Smolt outmigration data from the Chenik enumeration weir suggests that the 1998 return likely will be equally as poor. Additionally, informal predation studies conducted over the past several seasons have indicated that resident lake trout in Chenik Lake could be a major contributing factor in juvenile sockeye salmon survival.

Up until the 1997 season, adult sockeye returns to Kirschner Lake had been relatively encouraging and consistent. Despite a slight downturn in 1997, Kirschner is expected to produce 30,000 adult sockeyes in 1998. Stocking in other Kamishak Bay systems, such as Bruin, Ursus, and Paint River Lakes, has now been discontinued, and these systems are not expected to produce any harvestable sockeye returns in 1998.

The 1998 enhanced sockeye return to Bear Lake (seventh year of enhanced returns) is expected to be the lowest since 1994, with a harvest forecast of only 11,000 fish. Evaluation of recent returns to Bear Lake, as well as a re-analysis of smolt outmigration data, resulted in this reduced forecast for the 1998 return. The third year of enhanced sockeye returns to Grouse Lake, also near Seward in Resurrection Bay, is expected to be considerably less than recent years' forecasts, with estimates ranging up to 53,000 sockeyes. Since brood stock for this project was specifically selected for late run timing, it is hoped that the Grouse Lake return will peak in late July or early August and therefore not overlap with the much earlier run timing of Bear Lake sockeyes. As previously stated, the Grouse Lake return is designated entirely for CIAA hatchery cost recovery and no common property harvest of these fish is anticipated.

Natural sockeye run projections for LCI are based solely on average historical harvests and could be expected to contribute up to 88,000 fish to commercial catches in 1998. Despite not

reaching expectations during recent years, natural sockeye runs have been improving, with a concurrent improvement in spawning escapement to most systems. The Southern District is expected to contribute the most to the harvest of natural stocks, while additional catches could come from the East Nuka Bay systems of Delight and Desire Lakes in the Outer District, Aialik Lake in the Eastern District, and Mikfik Lake in the Kamishak Bay District.

Pink Salmon

Harvest of pink salmon in Lower Cook Inlet during 1998 could reach 2.8 million fish, with enhanced production expected to provide almost 90% of the total. However, if prices for this species continue to remain severely depressed, it is unlikely that the harvest forecast will be achieved even if returns are strong. Tutka Hatchery, in the Southern District, is expected to contribute up to 2.5 million pinks to commercial harvests. Depending on prices, a significant portion of the pink return will undoubtedly be necessary to meet the hatchery's revenue goal in 1998.

Natural spawning escapement levels into most major LCI systems were generally poor in 1996, contributing to a harvest projection of 323,000 naturally produced pinks throughout the entire LCI management area. Outer District systems are expected to harbor the greatest potential for harvest with a combined projection of over 262,000 pinks, returning primarily to Port Dick and Nuka Island drainages.

Chum Salmon

Based solely on recent years' average harvests (after 1988), the total LCI commercial chum salmon catch could be as high as 11,000 fish during 1998. The LCI chum harvest will consist exclusively of natural production since chum salmon enhancement is no longer conducted in LCI. Despite optimism for chum salmon during recent years, actual harvests during the past eight seasons have failed to meet the preseason projections by substantial amounts, suggesting that the average used to generate the forecast may be overly optimistic for 1998 as well.

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 1998.

The following table summarizes the projected harvest figures by species in the Lower Cook Inlet management area during 1998:

Species	Harvests of Enhanced Returns	Harvests of Natural Returns	Total Harvest
Chinook			1,300 ^a
Sockeye	235,000 ^b	87,700 ^c	322,700
Coho			14,800 ^a
Pink	2,464,000 ^b	323,300	2,787,300
Chum	0	11,100 ^c	11,100
TOTAL	2,699,000	438,200	3,137,200

^a 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.

^b Includes common property plus cost recovery harvests.

^c Harvest forecasts for naturally-produced sockeye and chum salmon are simply average commercial harvests since 1980 and 1989, respectively.

SUBSISTENCE AND PERSONAL USE SALMON NET FISHERIES

KACHEMAK BAY 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, 1995, and 1996, 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 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. This amount was determined by the Board to be appropriate after reviewing historical harvests in years prior to enhancement. 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 1997 personal use fishery. The regulatory opening date for the fishery was August 16. 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. Since intensive management began in 1991, the average fishing time allowed in this fishery has been 48 to 96 hours, or one to two regularly scheduled fishing periods.

Since no coho salmon harvest was reported from the early August Seldovia subsistence fishery, the guideline harvest range remained at 2,500 to 3,500 fish for the personal use fishery. The regulatory opening date of August 16 for the personal use fishery fell on a Saturday during 1997, which was the end of a regularly scheduled weekly fishing period. If allowed to open by regulation, the fishery would have begun at 12:01 a.m., during darkness, and would have closed only six hours later at 6:00 a.m. Because the staff felt that such an opening would cause difficulty for participants in determining minimum distances between nets, and would also make enforcement impractical, the opening was delayed by emergency order until the next regularly scheduled fishing period, which was 6:00 a.m. Monday, August 18.

Prior to the opening, the Department requested voluntary daily reporting from each permit holder during the fishery, as has been the case for the last several years. Based on those voluntary reports through the first 24-hours of fishing, early reports from the second fishing period, and fishery performance data from the previous six years, the staff estimated that the guideline harvest range would not be achieved by the end of the second (48-hour) fishing period which began at 6:00 a.m. Thursday, August 21. The fishery was therefore allowed to open for a third period beginning at 6:00 a.m. Monday, August 25. At this point the coho run appeared to be late and overall run strength was uncertain because recent years' fisheries had all been closed by this time. Staff concern over natural coho returns was particularly acute. Reacting in a conservative manner, the staff announced that the fishery would not reopen for the remainder of the 1997 season after the third period closed at 6:00 a.m. Wednesday, August 27. Total fishing time allowed was 144 hours.

A total of 276 permits was issued in 1997, representing a slight increase over the previous year (Appendix Table 27). Actual fishing effort was similar to the last five years but represented only about 45% of the peak level experienced in 1990 (Appendix Table 26). Ninety-six percent (264 in number) of the permit holders, the lowest percentage since 1990, reported their catches through returned permits. Of this number, 185 permit holders (67%) actively fished, 79 (29%) did not fish at all, and the remaining 15 permits holders (4%) did not report. Based on permits actually returned, the harvest was estimated to be 1,814 coho salmon (Appendix

Table 26), 252 pink salmon, 191 sockeye salmon, 383 chinook, and 12 chums. Anecdotal information suggests that net-sharing was a common occurrence among permit holders, as is the case in most years.

The 1997 Southern District personal use fishery was the longest since intensive management began in 1991, with a total of 144 hours actual fishing time. The staff made a concerted effort prior to the opening to inform the public of the anticipated short duration of the fishery. As in recent years, this prior knowledge of the brevity of the fishery led to intense competition for desirable fishing sites, especially along the east side of the Homer Spit. Similar to the last two seasons, but unlike previous years, compliance with the regulations along this hotly contested fishing area was generally good. No citations were issued, although several verbal warnings issued by ADF&G personnel resulted in expedient voluntary compliance.

Factors contributing to the longer duration of the fishery compared to recent years were twofold. First, 1997 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 no adult cohos returning to Caribou Lake this season. Second, in hindsight, the overall coho run timing appeared to be later than normal, although hard data to support this is scant because coho assessment is so limited in LCI. Sport and commercial catches are normally utilized as indicators of run strength, but unfortunately commercial catches in Lower Cook Inlet once again did not accurately reflect the strength of the 1997 coho return due to a lack of directed effort. Informal observations in the local sport fisheries indicated average returns, albeit slightly later than normal. Additionally, coho returns to adjacent management areas in Upper Cook Inlet and Prince William Sound appeared unexpectedly weak, causing concern that those of LCI would be weak as well. This information, along with catch rates from the first two 48-hour fishing periods, as well as previous experience managing this fishery, led the staff to project that a harvest within the guideline range would still not be achieved by the end of the third (48-hour) fishing period.

Even though coho returns to the Homer Spit enhancement lagoon were average, the uncertainty of the wild returns was cause for concern since run timing for these fish is slightly later than the enhanced fish returning to the Spit. The staff concluded that fishing after August 27th could easily result in an unacceptably high harvest rate on wild cohos, subsequently reducing the numbers available for escapement. Given the likely potential for weak returns, a conservative approach was adopted, and as a result the guideline harvest level was not achieved for the first time since 1993.

One interesting statistic regarding the 1997 fishery involved the chinook salmon catch. The 1997 harvest of 383 fish represents the highest catch ever recorded for this species, continuing a trend of increasing catches for this species over the past four years (Appendix Table 26). The primary reason for the increased chinook harvest was due to greater numbers of adult fish returning to the “enhancement lagoon”, or Fishing Hole, on the Homer Spit as a result of a relatively new “late run” project. Begun in recent years, this project specifically utilized brood stock which demonstrated late run-timing characteristics in an effort to expand and prolong sport fishing opportunities for chinooks on the Spit. The late run timing of returning adults overlapped the personal use fishery and, consequently, resulted in increased gillnet catches of chinook salmon, particularly along the Homer Spit.

The 1997 fishery continued to verify 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 encourage fishermen to clamor for fishing sites, a situation which resulted in numerous violations during previous gillnet fisheries, but during the last three seasons the Spit was surprisingly “quiet”. Perhaps the convictions of several violators during the 1994 fishery, combined with pre-fishery cautionary warnings contained in summary handouts, sufficiently deterred similar violations during the last two seasons.

One aerial survey of Clearwater Slough, the major coho index stream at the head of Kachemak Bay, was conducted in early September to gauge escapements. An estimate of 125 cohos generated during that survey might normally be considered relatively poor based on historical indices, but because of the later than usual run timing in 1997 the figure was actually considered quite good. Heavy rains in the area after that date precluded additional surveys.

The fishery in 1998 is expected to be similar to that of 1997. Once again, there will be no contribution of coho salmon from a traditional enhancement project at Caribou Lake, near the head of Kachemak Bay, due to a suspension of the stocking program after 1994. As in 1997, this likely will lengthen the duration of the fishery compared to years when Caribou Lake fish contributed to the catches. Despite concern for fishing mortality of natural stocks, the later run timing of these fish may act as a built-in protection as long as enhanced fish from the Homer Spit continue to contribute significantly to the personal use catches. Fishing effort and participation 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 1998 fishery. Based on experience gained during the past eight years' fisheries, it should be possible to keep the coho harvest within the guideline range.

NANWALEK/PORT GRAHAM SUBSISTENCE FISHERY

One of two subsistence fisheries in LCI during 1997 occurred near the villages of Nanwalek (formerly English Bay) and Port Graham, located approximately 21 nautical miles southwest of Homer on the south side of Kachemak Bay (Figure 2). Most fishing occurs within close proximity to the respective villages and targets sockeye salmon returning to the English Bay Lakes system. Some additional fishing also occurs in Koyuktolik ("Dogfish") Bay, located about seven nautical miles south of English Bay, targeting non-local stocks of chinook salmon as well as local stocks of chum salmon.

The sockeye salmon run to English Bay Lakes was severely depressed for much of the last decade, with returns failing to achieve the minimum escapement goal for nine consecutive years between 1985 and 1993. Recent returns have been bolstered as a result of a rehabilitation project initiated by ADF&G and subsequently taken over by the Chugach Regional Resources Commission (CRRC) on behalf of the village of Nanwalek. For the second straight year, the 1997 return was projected to produce harvestable surpluses, therefore the commercial, subsistence, and sport fisheries were all allowed to remain open in order to target on this return. An enumeration weir operated by CRRC monitored escapement inseason as has been the case since 1994. The subsistence fishery was allowed to remain open on the regular schedule of two 48-hour periods per week for the entire season as the sockeye escapement goal for English Bay Lakes never appeared to be in jeopardy.

The Port Graham and Nanwalek subsistence catch calendars are annually issued and tallied by ADF&G's Subsistence Division, but this data for 1997 was unavailable at the time of publishing. Historical subsistence harvests from both these areas prior to 1997 appear in Appendix Table 29.

SELDOVIA AREA SUBSISTENCE SALMON GILLNET FISHERY

A set gillnet fishery in the waters near Seldovia (Figure 2) on the south side of Kachemak Bay in 1997 was the second year of LCI's newest subsistence salmon fishery. Established by the Alaska Board of Fisheries at their LCI meeting in the fall of 1995, the fishery was designed to primarily target non-local stocks of chinook salmon as they transited these waters. In considering seasons and bag limits, the Board carefully restricted the fishery to reduce potential interception of enhanced chinook salmon bound for a popular stocking site in the Seldovia small boat harbor since these enhanced fish were intended to principally benefit sport fishermen and were not considered "customary and traditional" for subsistence purposes.

Regulations in the fishery included a “split” season, the first occurring from April 1 through May 20 and the second occurring during the first two weeks of August. A guideline harvest limit of 200 chinook salmon was established for the early season, while the annual possession limit was set at 20 chinooks per household. During the April/May season, fishing was allowed during two 48-hour periods each week, while in August the fishery was only open during the first two weekends of the month. Waters open to fishing included those along the eastern shore of Seldovia Bay as well as a short stretch of water outside of Seldovia Bay proper just west of Point Naskowhak (also called the “outside beach”). Gear was limited to set gillnets not exceeding 35 fathoms in length, 45 meshes in depth, and six inches (stretched) mesh size, identical to gear regulations governing the nearby Port Graham/English Bay subsistence fishery. A permit issued by the Department was required prior to fishing, and catches were to be recorded on the permit and also voluntarily reported to the Department’s Homer office inseason so that cumulative harvest totals could be monitored.

Prior to the season, in January of 1997, the Seldovia Village Tribe petitioned the Alaska Board of Fisheries to revise the regulations so as to provide additional time and area for the fishery. The Board considered this petition (additional time only) during their March, 1997, meeting, but because they were only considering the criteria necessary to subsequently deliberate on the petition, no regulations were adopted. Instead, the Board directed the Department to administratively adopt regulations extending the season by ten days (until May 30) and to do so in time for the 1997 fishery. Unfortunately, the Department was constrained by the state’s Administrative Procedures Act, which requires adequate public notice of such actions, and there was insufficient time to meet those requirements by the end of May. As a result, the season length in 1997 remained the same as stated in regulation, April 1 through May 20.

A total of 19 permits was issued for the early season, while one permit was issued for the August season. Inseason call-ins were nearly absent during the “early” season, until participants were informed that there was insufficient catch reporting to justify a potential extension. More calls came during the last week of the fishery, but by this time the staff realized that the season extension could not be adopted due to requirements contained in the

Administrative Procedures Act. Additionally, the staff believed that allowing gillnet fishing from May 20 to May 30 would actually target (and therefore increase the harvest of) enhanced king salmon bound for Seldovia harbor, which was in direct conflict with the Customary and Traditional Use findings for Seldovia area subsistence as stated in regulation (5 AAC 01.566. (1)).

At the close of each season, nearly all permits were returned to the Department as required by regulation, and catches were determined from records on each permit. For the early season, only 12 of 19 permit holders (63%) actively fished, four (21%) did not fish, and the remaining three permit holders (16%) failed to return their permits. Total reported catch was 44 chinook salmon and 19 sockeyes. In the late season, only one permit was issued but it was not actively fished and no harvest resulted.

The fishery in 1998 is expected to be somewhat different than the first two seasons because of a change adopted by the Alaska Board of Fisheries. The Board finally deliberated on the previously discussed petition during their February, 1998, meeting in Anchorage. They voted to extend the early season by 10 days, until May 30, added additional closed waters surrounding the Seldovia small boat harbor, and directed the Department to require mandatory reporting as part of the permit requirements. The intent was to allow more opportunity for participants to fulfill their subsistence needs while still attempting to minimize the harvest of enhanced chinook salmon returning to the harbor. Because the fishery is still relatively new, it may take some time for fishermen to learn the most productive fishing sites and successful techniques, however additional fishing time in the early season could result in harvests which may approach or exceed the guideline harvest limit in 1998.

COMMERCIAL HERRING FISHERY

INTRODUCTION

Similar to salmon, the LCI herring management area is divided into five separate fishing districts, with commercial herring fishing historically occurring in all but the Barren Islands District (Figure 1). Herring fishing began in the Southern District in 1914 as a gillnet fishery within 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 of average annual harvests approaching 8,000 short tons (st), herring populations, along with the fishery, collapsed.

The next LCI 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 through 1946, averaging 16,000 st each year, but stocks sharply declined thereafter, apparently due to overexploitation.

Japanese markets for a salted herring roe product resulted in development 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 overexploitation of the herring fisheries statewide.

1997 SEASON SUMMARY

A total of 1,746 st of Pacific herring was landed in the Kamishak Bay District during 1997 (Tables 10 and 11). The herring sac roe harvest was about 60% of the actual 1996 harvest of

2,984 st and was only about half of the preseason forecast of 3,420. Estimated exvessel value of the 1997 harvest was \$0.4 million (Appendix Table 32).

Of the 74 LCI herring permits issued, 45 permit holders made deliveries in 1997 (Table 10). A total of 11 processors/buyers registered to buy herring in LCI, with nine actually taking fish this season. Roe recoveries reported on fish tickets averaged 9.3% for the sac roe harvest (Appendix Table 32).

Due to invariably poor weather and water clarity, aerial surveys rarely provide reliable estimates of total biomass returning to Kamishak District Bay waters. As a result, an age-structured-analysis (ASA) model has been used for the past five years to forecast herring abundance for Kamishak Bay, as well as to “hindcast” previous years’ total abundance. This model incorporates a variety of heterogeneous data sources including: times series of commercial catch age composition; total run age composition; and aerial survey biomass estimates from years with adequate survey conditions and coverage. The model simultaneously minimizes the differences between expected and observed return data for each of its components, updates hindcasts of previous years’ abundance, and returns a forecasted estimate of the following year’s return. The ASA model estimated the total 1997 return at 16,100 st (Appendix Table 34), over 9,000 tons less than the preseason forecast and a decrease from the 27,600 st estimated for 1996. In the commercial fishery, the exceptionally strong 1988 cohort once again dominated samples as age-9 fish (Table 11), while younger age classes (ages-4 through -6) were stronger than anticipated and older age classes (ages-10 through -13+) were slightly weaker.

No sac roe herring fishery occurred in the Southern District in 1997 as fish were never present in sufficient numbers to allow a harvest. The Outer and Eastern Districts also were not opened to purse seining in 1997. The historical predominance of young (age-3 and age-4) fish, roe recoveries historically below 10%, and the exploratory nature of the fishery, have discouraged interest by processors and fishermen in these two districts.

ASSESSMENT METHODS

Aerial surveys were conducted throughout the herring spawning season to determine relative abundance and distribution of herring in the Kamishak Bay and Southern Districts. Data collection methods were consistent with those used since 1990. 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 st (water depths of 16 ft or less), 2.56 st (water depths between 16 and 26 ft), and 2.83 st (water depths greater than 26 ft) per 538 square feet were used to convert estimated herring school surface areas to biomass.

Survey conditions in the Kamishak Bay District were relatively good during mid-April but deteriorated near the end of the month and throughout several successive weeks. Nearly all May surveys were hampered to some extent by high winds which created substantial water turbidity and thus hindered aerial observation. A total of 12 comprehensive surveys were completed in the Kamishak Bay District, with two “gaps” occurring when no surveys were conducted during the mid-April to late May survey period: the first during the last week of April; and the second from May 9 through May 19. Four surveys were completed in the Southern District, while no comprehensive surveys of the Outer and Eastern Districts were conducted this season.

In the Kamishak Bay District, commercial landings were sampled to determine age, size, and sexual maturity of herring. In addition, test fishing by volunteer purse seine vessels was conducted to collect samples for roe recovery analysis prior to the fishery. This test fishing data was incorporated into postseason analysis to help interpret aerial survey biomass data. For the second consecutive year, post-fishery herring samples were also collected throughout the district during the month of May to further aid in understanding the dynamics of the Kamishak Bay herring stocks. Two commercial purse seine vessels were chartered during the month of May to collect herring samples from Kamishak Bay waters. Throughout the seven-day period beginning on May 16, the vessels made a cumulative total of eight sets near Chenik Head, outside Iniskin Bay, and near Oil and Dry Bays, resulting in the collection of nearly 1,600 fish for AWL samples. Additional surveillance was conducted with the aid of hydroacoustic gear in waters of

Fortification Bluff, Cottonwood Bay, Ursus Cove, Douglas Reef, and Silver Beach. Analysis of the samples confirmed significantly higher percentages of younger age fish, particularly ages-3 and -4, compared to those collected around the time of the commercial fishery in late April. The additional information gathered during these postseason sampling efforts provided age-class data that has not been obtained for many years and was useful in generating the 1998 herring forecast.

SPAWNING POPULATIONS

Kamishak Bay District

During the 1997 season aerial surveys to estimate biomass in the Kamishak Bay District were conducted from April 17 through June 2, with herring observed on the very first survey just south of Contact Point and at Douglas Reef. The highest daily biomass observation was made on May 8 with an estimate of 1,031 st. Unlike the past five seasons, but similar to previous years, there was a distinct separation in age composition between those fish appearing on the grounds initially and those following over the next one to two weeks. Formerly the first fish appearing on the grounds were larger and older, followed by a steady influx of younger age fish as the return progressed, which was the case in 1997. Test fishing documented a relatively high percentage of age-9 fish in the first samples collected on April 21, with the percentage decreasing by the time the second set of samples was collected only four days later. A further increase in younger age fish became apparent in the May (post-fishery) samples as percentages of ages-3 and -4 were higher than those collected around the time of the commercial fishery in late April.

As stated previously, the 1997 run was estimated at 16,100 st (Table 11, Appendix Table 34) using the ASA model because aerial surveys were hindered by inclement weather throughout the season. Postseason data analysis from pre- and post-fishery test fishing sources as well as commercial harvests showed that the strong 1988 (age-9) year class of herring observed in the last four fisheries was not dominant in the overall 1997 run, topped this year by the 1993 cohort (age-4) at 31% versus 21% of the total biomass by weight (Table 11). Next in order of

abundance were age-5 fish (15%) followed by age-3 fish (11%). Over one-half of the entire return was composed of fish younger than age-6 while only about 5% was age-10 or older (Figure 16, Table 11). It must be emphasized that these figures represent overall biomass spanning the time period between mid-April and the end of May, since samples were obtained at the time of the fishery as well as during the month of May. Prior to 1996, age composition samples usually were limited to the time period surrounding the commercial fishery in late April, thus making overall age composition estimation more difficult. Late season sampling efforts during the past two seasons confirmed the influx of younger fish, as was observed in earlier years.

The amount of active spawning documented in 1997 was relatively sparse. Only two sightings occurred during surveillance flights, totaling less than one linear mile of spawn. Due to the often sporadic schedule of surveillance flights, however, no correlation between documented spawning and herring abundance was attempted. Therefore the low number of spawn sightings this year is not considered indicative of a weak herring return.

Southern District

Four aerial surveys of the Southern District were flown between May 7 and May 27, nearly all conducted under excellent conditions. The 1997 run biomass, estimated as the sum of all daily biomass estimates, approached 3,000 st, slightly less than that of the past two seasons. The majority of herring was once again observed in Mallard Bay, with the peak individual biomass survey (1,246 st) occurring on May 27. Peak surveys in areas where herring historically have been observed were as follows: Bear Cove, 59 st on May 7; Glacier Spit, 154 st on May 21; Mallard Bay, 990 st on May 21; 84 st east of the Homer Spit/Mud Bay on May 7; and 565 st along the west side of the Homer Spit (most of which were believed to be spawned-out fish) on May 27.

Once again this season, limited sampling of Southern District herring stocks was conducted on an opportunistic basis. A commercial vessel chartered for one day (May 21) was directed to fish in

the vicinity of Mallard Bay, Humpy Creek, and Glacier Spit, based on aerial observations. Three test sets were made, from which just over 1,000 individual herring were collected. Preliminary analysis showed primarily younger age fish between ages-3 and -7. Fish in ages-3 and -4 year classes comprised the highest percentages, with each component making up approximately 28% and 48% of the sample, respectively, in numbers of fish. The overall average weight was 113 grams.

Outer and Eastern Districts

No aerial surveys of the Outer and Eastern Districts were conducted during the 1997 season. The size of the area and the characteristically poor weather in the Gulf of Alaska, which precludes surveys on a regular basis, makes aerial biomass estimation in these districts impractical. However, incidental observations of herring in June during the early part of the salmon season confirmed the presence of herring in these two districts again this year.

COMMERCIAL FISHERY

Kamishak Bay District

Spotter pilots and fishermen first located and fished the Kamishak Bay District herring populations in 1973, but after several years of commercial harvests in the late 1970's herring abundance severely declined and the district was completely closed beginning in 1980. Herring stocks appeared to quickly rebound in response to the closure, and the fishery was reopened in 1985. Since then, the fishery has been regulated to achieve a 10% to 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 and maintain the guideline harvest level while protecting younger age fish. Management strategy during the last eight years in the Kamishak

Bay District has stabilized the harvest at an average of just under 2,600 tons, or about 40% of the record high catch of 6,132 st set in 1987 (Appendix Tables 31 and 32).

Preseason management strategy in 1997 called for a guideline harvest level (GHL) of 3,420 st (after subtracting a 380 st allocation for the Shelikof Strait food and bait fishery) based on a 15% exploitation of the forecasted biomass as determined by the Kamishak Bay Herring Management Plan. Although management prior to 1990 allowed the fishery to open on a specific calendar date, since that time industry technicians have been asked to evaluate test fish samples for roe recovery prior to commercial harvests to help maximize product quality and value.

Management staff traveled to Kamishak Bay aboard the state's *R/V PANDALUS* on Thursday, April 17, reaching the grounds in late afternoon. An aerial survey was also conducted that day under excellent conditions, and an estimated 30 tons of herring were observed. Water temperatures were well above normal at 4.0 degrees C., and climatological conditions seemed accelerated with very little snow along the coastline and only isolated shore ice. The fleet was put on 12-hour advance notice effective at 6:30 p.m. Friday, April 18, to allow the Department to act quickly once a substantial biomass of fish were located. The excellent weather continued over the next several days, allowing aerial surveys to occur although the observed herring abundance was minimal. Two volunteer test vessels collected the first samples of the season near Chenik Reef and Nordyke Island on April 21. Analysis revealed age-9 fish dominating the samples, followed by age-5 and age-4 fish. Females in the sample were considered ripe with roe recoveries averaging 10.8% but ranging as high as 13.3%. Based on these results, the staff anticipated a fishery as soon as a significant biomass was located, and the notice period was accordingly reduced to six hours on April 22. Nearly 900 st of herring was observed during a survey that same day, prompting the staff to further reduce the notice period to three hours effective on April 23, but poor weather with winds exceeding 40 knots in the southern portion of the district precluded any test fishing or aerial surveillance over the next two days.

An aerial survey scheduled for April 25 was cancelled due to low ceilings, but test fishing was able to resume that day, and the advance notice period was reduced to one hour effective at 12:00

noon. Samples from two test sets in the Nordyke Island/Chenik Reef areas returned an average mature roe recovery of 10.5% (range 7.8% - 13.0%), an average immature roe content of 1.4%, a spawnout component of 4.3%, and a nearly equal sex ratio. These results, coupled with hydroacoustic reports from the fleet suggesting a building biomass, prompted the staff to announce that an opening was being considered for that afternoon's high tide. Despite limited sampling, the average fish weight (196 g) had decreased from that of samples taken on April 21-22 (228 g), further proof that younger fish were indeed appearing on the grounds. Even though a large volume had yet to be confirmed in the district, the staff believed that additional delay of a fishery opening could result in reduced roe recoveries due to an increase in the incidence of younger (immature) fish and/or an increase in the number of spawnouts should intensive spawning begin. Additionally, the weather pattern at the time and the tide stage were both favorable for fishing, aerial spotting, and tender pumping activities. Since the management strategy attempts to minimize the harvest of younger age fish, a 30-minute fishing period was announced for Management Area 5 (Figure 8), commencing by field announcement some time between 4:25 p.m. and 4:35 p.m. April 25. The field announcement on single sideband (SSB) and marine VHF radio was used to minimize the possibility of early sets.

In a display of surprising solidarity, the entire fleet elected not to fish during the opening due to ongoing price negotiations with buyers and processors. At 6:30 p.m. the fleet was advised that the advance notice period would be one hour effective at 1:00 p.m. April 26, and that additional test samples would be required before another opening would be considered. However, meetings between fishermen and processors continued through noon on April 26 and only one test set was made prior to 4:00 p.m. Therefore, the low number of herring samples available to industry technicians provided insufficient data on which to base a decision, and the fleet was advised to stand down until 1:00 p.m. the next day, April 27. As is common in the Kamishak Bay District, poor weather subsequently precluded further test fishing and aerial surveys until April 29.

Test fishing resumed on the morning of April 29, and a total of 13 samples from two sets near Chenik Reef and Amakdedori Creek had been analyzed by three different processors prior to the 1:00 p.m. announcement. The mature roe percentage of 10.0% and average fish weight of 229

grams suggested that potential roe recoveries from herring on the grounds at the time were acceptable and that older age components of the run remained dominant. Therefore a 30-minute fishing period was announced for Management Areas 5 and 6 (Figure 8), commencing by field announcement some time between 2:55 p.m. and 3:05 p.m. At the same time fishermen were advised that a second opening would be considered later that evening if the guideline harvest level was not achieved.

The majority of the fleet converged on and fished in a small area near the mouth of Amakdedori Creek. Only about 15 commercial spotter aircraft were observed during the opening, presumably because water turbidity was high and conditions were not particularly favorable for aerial observation. Two hours after the opening ended, preliminary catch reports from eight of the 11 registered processors totaled approximately 600 st, or about 20% of the preseason GHL, while roe recoveries averaged about 10% and average weights ranged from 218 grams to 232 grams. Although the total harvest indicated there was probably insufficient volume to achieve the GHL, a second opening of 60-minute duration was allowed at 6:30 p.m., resulting in an additional catch of 540 st. The relatively low volume of herring harvested during the two openings, combined with news that a substantial volume of herring had been observed in the Togiak District, induced most of the fleet to depart the Kamishak Bay District later that same evening.

By the next morning April 30, only seven to 10 fishing vessels and five tenders remained on the fishing grounds. Based upon the low catch per unit of effort (CPUE) from 90 minutes of fishing, the small remaining fleet, and the available tender capacity, a longer district-wide “exploratory” fishery opening was allowed from 1:00 p.m. until 9:00 p.m. The staff reasoned that the larger area would provide opportunity to collect additional biological information without the risk of exceeding the season’s GHL. Furthermore, weather conditions in Kamishak Bay had once again deteriorated and become somewhat marginal for safe fishing and tender pumping activities. Therefore the eight-hour opening throughout the district provided the remaining fleet with ample time and area to prospect for marketable fish without jeopardizing the safety of personnel or equipment.

The eight-hour opening on April 30 resulted in the additional harvest of an estimated 61st, bringing the preliminary cumulative total to approximately 1,300 st. Because nearly 2,100 st of harvestable surplus remained in order to reach the GHL, and given the low CPUE from the eight-hour opening, another 12-hour fishing period was allowed on May 1 from 9:00 a.m. until 9:00 p.m. An estimated 54 tons was orally reported from that opening. Considering the Department's time and budget constraints, the low CPUE, and the deteriorating weather, it became apparent that the GHL probably would not be achieved, so the Kamishak Bay District was closed at 9:00 p.m. May 1 for the remainder of the season.

Post-fishery compilation of fish ticket information showed a total harvest of 1,746 st of herring harvested by 45 different permit holders (Table 10, Appendix Table 32), which includes fish harvested and sold by the Department in May as part of the post-fishery research and sampling program. Overall roe percentage averaged 9.3%. By date, 1,580 st were harvested in 90 minutes of fishing time on April 29, while just 112 st were taken during 20 hours of fishing on April 30 – May 1. Age-weight-length analysis from the commercial harvest showed samples dominated by ages-9, -4 and -5 fish (28%, 22%, and 14%, respectively), followed in descending proportional order by ages-7, -6, and -8 fish (Table 11). The estimated exvessel value of the 1997 catch was \$0.4 million (Appendix Table 32) based on a sac roe estimated average price of \$200 per ton.

A single Department of Public Safety, Division of Fish and Wildlife Protection (FWP) enforcement vessel, the *P/V BERTRAM*, was stationed on the grounds for the 1997 herring fishery. One FWP officer from the Homer detachment, as well as two stationed aboard the *P/V BERTRAM*, actively monitored the fishery, with no major violations documented and only a few minor infractions, such as lack of crewmember licenses, noted. No doubt the conspicuous enforcement efforts of FWP during recent seasons in the Kamishak Bay herring fishery has discouraged blatant disregard for the regulations.

By Alaska Board of Fisheries directive, the Kamishak Bay District herring fishery is managed with the intent of harvesting 10% to 20% of the available biomass. Although the harvest failed to achieve the preseason guideline, the overall exploitation in 1997 still fell within the desired

range at approximately 11% of the estimated total biomass, based on a total catch of 1,745 st and an estimated escapement biomass of 14,357 st (Table 11, Appendix Table 34).

Southern District

Management strategy for the Southern District sac roe fishery was changed in 1989 to allow for a limited harvest of 150 to 200 st for the purposes of obtaining 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. Only one other fishery has occurred since that time, when 171 st of herring averaging 8.9% roe recovery were harvested by 10 vessels in a single 2.5-hour opening in Mallard Bay during 1989 (Appendix Table 31).

After the completion of the Kamishak Bay herring fishery, management attention was directed toward the Southern District on May 7 when the first aerial survey was flown. Surveys continued until the end of May, but a commercial harvest of sac roe herring was once again not allowed in the Southern District in 1997 because abundance estimates failed to document sufficient quantities of herring to warrant an opening.

Outer and Eastern Districts

During the early years of sac roe herring fishing in LCI, seining within the Outer and Eastern Districts primarily occurred in Resurrection Bay. Following a period of suspected over-exploitation, herring stocks throughout LCI generally declined after 1973. Concern over this decline prompted the Alaska Board of Fish and Game in 1974 to establish a 4,000 st quota for all of Lower Cook Inlet, with the Outer and Eastern 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 through 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 spawning biomass had been observed.

Because of reduced stock abundance and extreme vulnerability to fishing, guideline harvest levels were set at 150 to 200 st for each of the four fishing areas created within these two districts. Fishing effort in 1985 was minimal and the majority of the harvest (216 st; Appendix Table 31) once again occurred in Resurrection Bay.

Only limited and sporadic harvests have occurred in these two districts since 1985, with the majority of both the herring harvest and the observed biomass during the past eight years comprised of age-3 and age-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 very limited in recent years, no discernible shift to older age herring has ever been observed, suggesting the possibility that the Outer and Eastern Districts may be feeding and rearing grounds for juvenile fish of Prince William Sound origin.

Despite significant opportunity for exploratory fishing on a daily basis in the Outer and Eastern Districts during 1991 and 1992, the predominance of juvenile herring in the population and the history of marginally acceptable roe recoveries from fish caught in these areas has contributed to a lack of interest by fishermen and processors. These conditions were again prevalent during the years 1993 through 1997 and, consequently, the Outer and Eastern Districts were not opened to purse seining in any of the past five seasons.

HERRING OUTLOOK AND MANAGEMENT STRATEGY FOR 1998

Kamishak Bay District

The 1998 total biomass of herring in Kamishak Bay District is projected to be 19,800 st, approximately 23% greater than the 1997 estimated return (Figure 15, Table 11). The 1998 forecast was generated from an age-structured-analysis (ASA) model similar to that used for Kamishak Bay during the last four years and also for Sitka Sound, Prince William Sound, and Togiak. The model projects a slight increase in Kamishak herring abundance. Over 35% of the

1998 projected biomass (by weight) will be comprised of age-5 fish from the strong 1993 year class (Figure 16). Other relatively strong early recruit age classes (age-4 and -6 fish) observed during post-season sampling in May of 1997 are also expected to contribute to the 1998 return.

The Kamishak Bay District Herring Management Plan (regulation 5 AAC 27.465.) dictates that a maximum 10% exploitation rate be utilized to set the 1998 guideline harvest level since the projected biomass falls between 8,000 and 20,000 st. Based on the projected return of 19,800 st, a surplus of approximately 1,980 st would be available for harvest at the 10% exploitation rate. In addition to the spring sac roe fishery in Lower Cook Inlet, a fall food and bait fishery on Kamishak Bay herring stocks occurs in the Shelikof Strait area of the Kodiak Management Area. By regulation the Shelikof fishery is allocated 10% of the total allowable harvest for Kamishak Bay herring stocks, which equates to a maximum potential allocation of 2% of the total forecasted Kamishak Bay herring biomass. Harvest allocation in 1998, in accordance with the Kamishak Bay Herring Management Plan, will be as follows:

	Tons
KAMISHAK BAY SAC ROE HARVEST (9.0%)	1,780
SHELIKOF STRAIT FOOD & BAIT (1.0%)	200
TOTAL ALLOWABLE HARVEST (10.0%)	1,980

Even though the 1998 herring biomass forecast for the Kamishak Bay District is approximately 23% greater than the 1997 estimated return (Table 11, Figure 15), the guideline harvest level for 1998 is about 50% less than the 1997 guideline. This apparent contradiction in part resulted from differences between preseason and postseason biomass estimates. Figure 15 is based on the ASA model's hindcasts of previous years' biomasses. As the time series of age composition data for the Kamishak herring stock expands with each new year's sampling, the model estimates biomasses for previous years more accurately than it was able to forecast them into the future.

Thus, the best available information suggested that the model overestimated the available biomass for 1997, with a preseason forecast of 25,300 st and a postseason “hindcast” of 16,100 st.

A second factor in the decreased guideline for 1998 relates to the Kamishak Bay District Herring Management Plan (5 AAC 27.465). Under this plan, a maximum exploitation rate of 10% is allowed for a spawning biomass projection between 8,000 and 20,000 st. Because of model uncertainty and the fact that the 1998 forecasted biomass was less than 20,000 st, the 10% exploitation rate was applied. A higher exploitation rate was applied in 1997 because the preseason forecast was greater than 20,000 st. The 1998 model implies that the 1997 forecast overestimated the actual herring abundance.

As in recent years, 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 (ages-3 and -4) fish will be considered this season. Unless data becomes available indicating that significant recruitment has occurred, or that an unusually large biomass has moved into the district, the Kamishak Bay sac roe harvest will not be allowed to exceed 1,780 tons.

Other Districts

Based on recent trends in herring abundance and age structure in the Southern, Outer, and Eastern Districts of LCI, no commercial herring harvests are anticipated in these areas during 1998. Sufficient quantities of herring in the Southern District must be documented before a commercial opening is considered. Monitoring of the Southern District herring stocks will occur as in the past through the use of aerial surveys in conjunction with test fishing samples collected on an opportunistic basis. The Outer and Eastern Districts will only be allowed to open if adequate evidence becomes available suggesting commercial quantities of adult herring are present. Any potential fishery in these districts will be considered “exploratory” in nature and will be managed accordingly.

1997/98 ALASKA BOARD OF FISHERIES ACTIONS

In March of 1997, the Alaska Board of Fisheries accepted a petition submitted by the Seldovia Village Tribe which sought to increase the length of the “early” subsistence fishing season in the Seldovia area and increase the area open to subsistence fishing. Because this was a petition, and outside of the normal Board cycle for LCI, the Board could not adopt any regulations affecting the fishery at the time. Nevertheless, the Board, after considering the merits of the petition, directed the Department to increase the length of the season 10 days by Administrative Order so as to effect the change in time for the 1997 season. Unfortunately, the Department was constrained by a minimum public notice period as required by the Alaska Administrative Procedures Act and was unable to meet these requirements in time for the fishing season.

In order to address this issue prior to the 1998 season, the Board elected to consider the petition as an agenda change request (ACR) item at their January, 1998, meeting in Anchorage. However, the Board was prevented from deliberating and voting on this ACR at that time because the Division of Boards had failed to post adequate public notice prior to the meeting as required by law. Consequently the ACR was re-scheduled for consideration at the February, 1998, meeting. The Board met between February 4 and 15 in Anchorage to consider changes to the regulations governing statewide finfish issues and a variety of other miscellaneous proposals. The Seldovia subsistence proposal was taken up during this meeting, with the Board voting to increase the duration of the “early” subsistence season by 10 days, which effectively established a season running from April 1 through May 30. In addition, the Board elected to increase closed waters adjacent to the Seldovia small boat harbor, but did not create any additional areas open to fishing. The Board’s decision was complicated by the fact that, in regulation (**5 AAC 01.566 (1)**), there is no Customary and Traditional Use (C&T) finding for enhanced salmon, yet there is a run of hatchery-stocked chinook salmon that returns to the Seldovia small boat harbor. The changes effected by the Board in February were intended to provide participants in the subsistence fishery with increased opportunity to fulfill their chinook salmon subsistence needs while at the same time minimizing the targeted harvest of enhanced fish bound for the Seldovia

harbor. Table 12 summarizes the nature of the single proposal, the author, and the resulting Board action.

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Table 1. Commercial, hatchery, and derby salmon catches in numbers of fish by species, district, and gear type, Lower Cook Inlet, 1997.

<i>District</i>		Chinook	Sockeye	Coho	Pink	Chum	Total
Southern							
Commercial:							
Set gillnet		1,136	59,412	4,475	64,162	4,166	133,351
Purse seine		126	121,184	1,122	160,595	92	283,119
Hatchery:							
Purse seine		0	0	0	2,461,007	2	2,461,009
Weir		<u>0</u>	<u>7,817</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>7,817</u>
Total		1,262	188,413	5,597	2,685,764	4,260	2,885,296
Outer							
Commercial:							
Purse seine		0	6,255	63	128,373	1,575	136,266
Eastern							
Commercial:							
Purse seine		0	11,044	0	1	66	11,111
Hatchery:							
Weir		0	22,739	3,177	0	0	25,916
Derby ^a :							
Hook & Line		<u>0</u>	<u>0</u>	<u>2,167</u>	<u>0</u>	<u>0</u>	<u>2,167</u>
Total		0	33,783	5,344	1	66	39,194
Kamishak							
Commercial:							
Purse seine		0	5,608	0	0	3	5,611
Hatchery:							
Purse seine		<u>0</u>	<u>6,125</u>	<u>0</u>	<u>293</u>	<u>4</u>	<u>6,422</u>
Total		0	11,733	0	293	7	12,033
LCI Total		1,262	240,184	11,004	2,814,431	5,908	3,072,789
Percent		0.04	7.82	0.36	91.59	0.19	100.00
1977-96 Average		1,286	204,878	13,908	1,177,530	100,831	1,498,432

^a 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. Commercial chinook salmon catches, and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1997.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Halibut Cove	392		392
China Poot Bay	61		61
Neptune Bay	35		35
Tutka/Kasitsna Bays	214		214
Barabara Creek	54		54
Seldovia Bay	477		477
Port Graham	20		20
English Bay	9		9
SOUTHERN DISTRICT TOTAL	1,262		1,262
OUTER DISTRICT TOTAL	0		0
EASTERN DISTRICT TOTAL	0		0
KAMISHAK BAY DISTRICT TOTAL	0		0
TOTAL LOWER COOK INLET	1,262		1,262

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

Table 3. Commercial sockeye salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1997.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Humpy Creek		142	142
Halibut Cove	12,268		12,268
China Poot Bay			
Common Property Fishery	42,272		
China Poot Creek		1,130 ^b	
Total Run			43,402
Neptune Bay			
Common Property Fishery	73,822		
"Waterfall" Creek		900	
"Oxbow" Creek		100	
Total Run			74,822
Tutka/Kasitsna Bays	9,686		9,686
Barabara Creek	4,737		4,737
Seldovia Bay	12,557	35	12,592
Port Graham Bay/River	8,597	5	8,602
English Bay			
Common Property Fishery	16,657		
Hatchery Cost Recovery	7,817		
English Bay Lakes		15,430 ^d	
Total Run			39,904
SOUTHERN DISTRICT TOTAL	188,413	17,742	206,155
OUTER DISTRICT			
Dogfish Bay		69	69
Port Chatham		38	38
Windy Bay/Windy Left Creek	10	9	19
Port Dick			
Port Dick Head End Creek		10	
Island Creek		4	
Slide Creek		1	
Total Run			15
East Arm Nuka Bay (McCarty Fiord)	6,245		
Delight Lake		27,820	
Desire Lake		14,665	
Delusion Lake		1,400	
Total Run			50,130
OUTER DISTRICT TOTAL	6,255	44,016	50,271

-continued-

Table 3. (page 2 of 2)

Subdistrict/System	Catch	Escapement ^a	Total Run
EASTERN DISTRICT			
Aialik Bay/Aialik Lake	2,111	11,400	13,511
Resurrection Bay North			
Common Property Fishery	8,933		
Hatchery Cost Recovery	16,617		
Hatchery Carcasses	6,122		
Bear Lake		7,945 ^c	
Salmon Creek		2,201	
Grouse Creek		3,837	
Clear Creek		209	
Total Run			<u>45,864</u>
EASTERN DISTRICT TOTAL	<u>33,783</u>	<u>25,592</u>	<u>59,375</u>
KAMISHAK BAY DISTRICT			
Iniskin Bay/North Head Creek		50	50
Ursus Cove			
Brown's Peak Creek		10	
Ursus Cove Lagoon Creek		40	
Total Run			50
Kirschner Lake			
Common Property Fishery	2,842		
Hatchery Cost Recovery	6,125		
Total Run			8,967
Bruin Bay			
Bruin Lake Creek		120 ^b	
Bruin River		600	
Total Run			720
Chenik Lake			
Amakdedori Creek		1,540	
Chenik Creek/Lake		2,338 ^c	
Total Run			3,878
Paint River		400 ^d	400
McNeil Cove (Mikfik Creek/Lake)	210	8,500	8,710
Douglas River/Silver Beach	<u>2,556</u>		<u>2,556</u>
KAMISHAK BAY DISTRICT TOTAL	<u>11,733</u>	<u>13,598</u>	<u>25,331</u>
TOTAL LOWER COOK INLET	<u>240,184</u>	<u>100,948</u>	<u>341,132</u>

^a Escapement estimates derived from limited aerial surveys. Numbers represent unexpanded aerial live counts.

^b No freshwater escapement, prevented by barrier falls.

^c Weir counts.

^d No freshwater escapement, ladder not opened during 1997.

Table 4. Commercial coho salmon catches (including hatchery cost recovery and sport derby sold to commercial processors) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1997.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Northshore Subd./Clearwater Slough		125 ^b	125
Halibut Cove	545		545
China Poot Bay	543		543
Neptune Bay	525		525
Tutka/Kasitsna Bays	1,521		1,521
Barabara Creek	609		609
Seldovia Bay	138		138
Port Graham	302		302
English Bay	1,414		1,414
SOUTHERN DISTRICT TOTAL	5,597	125	5,722
OUTER DISTRICT			
East Arm Nuka Bay (McCarty Fiord)	63		63
OUTER DISTRICT TOTAL	63		63
EASTERN DISTRICT			
Resurrection Bay North			
Hatchery Cost Recovery	921		
Hatchery Carcasses	485 ^c		
Hatchery Donated/Discarded	1,771		
Sport Derby	2,167 ^d		
Bear Lake (weir counts)		276	
Hatchery Brood Stock		109	
Total Run			5,729 ^e
EASTERN DISTRICT TOTAL	5,344	385	5,729^e
KAMISHAK BAY DISTRICT TOTAL	0		0
TOTAL LOWER COOK INLET	11,004	510	11,514

^a Coho escapement in Lower Cook Inlet is very limited; only one escapement survey was conducted during 1997.

^b Only one escapement survey of Clearwater Slough was conducted during 1997.

^c These "hatchery carcasses" were originally harvested as brood stock and were subsequently sold after they were spawned. The cumulative total number of fish actually taken for brood stock purposes was 594.

^d Seward Silver Salmon Derby catches, sold to a commercial processor and considered "commercial harvest".

^e Eastern District coho totals do not include 19 mortalities documented at the Bear Lake weir.

Table 5. Commercial pink salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1997.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Humpy Creek		78,309	78,309
Halibut Cove	2,596		2,596
China Poot Bay/Creek	3,986	2,796	6,782
Neptune Bay	10,394		10,394
Tutka/Kasitsna Bays			
Common Property Fishery	130,406		
Hatchery Cost Recovery	2,371,272		
Hatchery Carcasses	4,381		
Hatchery Brood Stock		216,786	
Tutka Lagoon Creek		45,000 ^b	
Total Run			2,766,845
Barabara Creek	5,108	12,523	17,631
Seldovia Bay & River	12,336	39,105	51,441
Port Graham			
Common Property Fishery	46,854		
Hatchery Cost Recovery	85,354		
Hatchery Brood Stock		12,093	
Port Graham River		12,543	
Port Graham Left		2,381	
Total Run			159,225
English Bay	<u>12,940</u>		<u>12,940</u>
SOUTHERN DISTRICT TOTAL	2,685,764	421,536	3,107,220
OUTER DISTRICT			
Dogfish Bay		19,962	19,962
Port Chatham		42,732	42,732
Chugach Bay		3,726	3,726
Windy Bay	93,192		
Windy Right Creek		13,872	
Windy Left Creek		64,600	
Total Run			171,664
Rocky Bay/River		48,129	48,129
Port Dick	568		
Port Dick (head end) Creek		36,926	
Slide Creek		5,535	
Island Creek		71,120	
Total Run			114,149
Nuka Island/South Nuka Isl. Creek	1,331	9,265	10,596
East Arm Nuka Bay (McCarty Fiord)	<u>33,282</u>	^c	<u>33,282</u>
OUTER DISTRICT TOTAL	128,373	315,867	444,240

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Table 5. (page 2 of 2)

Subdistrict/System	Catch	Escapement ^a	Total Run
EASTERN DISTRICT			
Resurrection Bay North	1		
Bear/Salmon Creeks		6,287	
Clear Creek		1,444	
Sawmill Creek		21	
Spring Creek		538	
Tonsina Creek		360	
Thumb Cove		4,698	
Total Run			13,349
Renard Island/Humpy Cove		2,160	2,160
EASTERN DISTRICT TOTAL	1	15,508	15,509
KAMISHAK BAY DISTRICT			
Inisksin Bay			
North Head Creek		1,540	
Sugarloaf Creek		200	
Total Run			1,740
Ursus Cove			
Brown's Peak Creek		30,640	
Ursus Lagoon Creek		100	
Total Run			30,740
Rocky Cove/Sunday Creek		52,450	52,450
Kirschner Lake	293 ^d		293
Bruin Bay & River		162,712	162,712
KAMISHAK BAY DISTRICT TOTAL	293	247,642	247,935
TOTAL LOWER COOK INLET	2,814,431	1,000,553	3,814,984

^a Escapement estimates are derived from periodic ground or aerial surveys with stream life factors applied.

^d Due to inadequate number of escapement surveys, estimated escapement is the peak survey count (44,000) plus nearly 1,000 pinks counted during last survey of the season on 9/15.

^c Insufficient survey data to generate escapement estimate.

^d All Kirschner Lake pinks were caught during hatchery sockeye salmon cost recovery operations.

Table 6. Commercial chum salmon catches and escapements in numbers of fish by subdistrict, Lower Cook Inlet, 1997.

Subdistrict/System	Catch	Escapement ^a	Total Run
SOUTHERN DISTRICT			
Humpy Creek		605	605
Halibut Cove	66		66
China Poot Bay	45		45
Neptune Bay	30		30
Tutka Bay/Tutka Lagoon Creek	1,076		1,076
Barabara Creek	336		336
Seldovia Bay & River	658	2,332	2,990
Port Graham & River	756 ^b	4,092	4,848
English Bay	<u>1,293</u>		<u>1,293</u>
SOUTHERN DISTRICT TOTAL	4,260	7,029	11,289
OUTER DISTRICT			
Dogfish Bay		12,669	12,669
Port Chatham		691	691
Windy Bay	1,566		
Windy Right Creek		157	
Windy Left Creek		192	
Total Run			1,915
Rocky Bay & River		1,050	1,050
Port Dick			
Port Dick (head end) Creek		1,861	
Slide Creek		1,450	
Middle Creek		304	
Island Creek		5,213	
Total Run			8,828
East Arm Nuka Bay	<u>9</u>		<u>9</u>
OUTER DISTRICT TOTAL	1,575	23,587	25,162
EASTERN DISTRICT			
Resurrection Bay North	66		
Grouse Creek		2	
Sawmill Creek		198	
Spring Creek		191	
Tonsina Creek		2,174	
Thumb Cove		56	
Clear Creek		10	
Total Run			2,697
EASTERN DISTRICT TOTAL	66	2,631	2,697

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Table 6. (page 2 of 2)

Subdistrict/System	Catch	Escapement ^a	Total Run
KAMISHAK BAY DISTRICT			
Inisksin Bay			
Iniskin River		15,388	
Sugarloaf Creek		2,234	
North Head Creek		1,973	
Total Run			19,595
Cottonwood Bay & Creek		5,647	5,647
Ursus Cove			
Brown's Peak Creek		1,680	
Ursus Lagoon Right Creek		2,579	
Ursus Cove Lagoon Creek		3,643	
Total Run			7,902
Rocky Cove/Sunday Creek		9,095	9,095
Kirschner Lake	4 ^c		4
Bruin Bay & River		8,751	8,751
McNeil River	<u>3</u>	<u>27,495</u>	<u>27,498</u>
KAMISHAK BAY DISTRICT TOTAL	<u>7</u>	<u>78,485</u>	<u>78,492</u>
TOTAL LOWER COOK INLET	5,908	111,732	117,640

^a Escapement estimates are derived from periodic ground or aerial surveys with stream life factors applied.

^b Port Graham catch includes 2 chums taken during hatchery pink salmon cost recovery.

^c Kirschner Lake catch of chums was taken during hatchery sockeye salmon cost recovery.

Table 7. Exvessel value^a of the commercial salmon catch in numbers of dollars by species, gear type, and harvest type, Lower Cook Inlet, 1997.

	Chinook	Sockeye	Coho	Pink	Chum	Total
COMMON PROPERTY - PURSE SEINE						
No. of Fish	126	144,091	1,185	288,969	1,736	436,107
Pounds	800	659,806	7,268	935,896	14,225	1,617,995
Price/lb.	\$0.69	\$1.00	\$0.29	\$0.15	\$0.19	
Value	\$552	\$659,806	\$2,212	\$140,384	\$2,703	\$805,657
COMMON PROPERTY - SET GILLNET						
No. of Fish	1,136	59,412	4,475	64,162	4,166	133,351
Pounds	16,709	352,707	34,942	248,755	30,852	683,965
Price/lb.	\$1.32	\$0.84	\$0.49	\$0.10	\$0.25	
Value	\$22,056	\$296,274	\$17,122	\$24,876	\$7,713	\$368,041
HATCHERY - PURSE SEINE & WEIR						
No. of Fish		36,681	3,177	2,461,300	6	2,499,627
Pounds		157,723	23,933	7,486,521	32	7,688,209
Price/lb.		\$0.80 ^b	\$0.26 ^b	\$0.14	\$0.22	
Value		\$110,146	\$3,019	\$1,120,514	\$7	\$1,233,686
SPORT FISHING DERBY^c - HOOK & LINE						
No. of Fish			2,167			2,167
Pounds			19,517			19,517
Price/lb.			\$0.72			
Value			\$14,052			\$14,052
TOTAL ALL GEARS						
No. of Fish	1,262	240,184	11,004	2,814,431	5,908	3,072,789
Pounds	17,509	1,170,230	90,660	8,671,172	45,109	9,994,680
Price/lb.	\$1.29	\$0.93 ^b	\$0.50 ^b	\$0.15	\$0.23	
Value	\$22,608	\$1,066,226	\$36,405	\$1,285,774	\$10,423	\$2,421,436

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

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

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

Table 8. Emergency orders issued for the commercial, personal use, and subsistence salmon and herring fisheries in Lower Cook Inlet, 1997.

Number/ Issue Date	DESCRIPTION
2-F-H-001-97 April 25	Opens Management Area 5 in the Kamishak Bay District to commercial sac roe herring seining for approximately one-half hour commencing by an ADF&G field announcement some time between 4:25 p.m. and 4:35 p.m., Friday, April 25, 1997. The fishery will close at 5:00 p.m. Management Area 5 includes those waters south of 59° 16.68' N. latitude and west of 153° 37.0' W. longitude.
2-F-H-002-97 April 29	Opens Management Areas 5 and 6 in the Kamishak Bay District to commercial sac roe herring seining for approximately one-half hour commencing by an ADF&G field announcement some time between 2:55 p.m. and 3:05 p.m., Tuesday, April 29, 1997. The fishery will close at 3:30 p.m. Management Areas 5 and 6 include those waters south of 59° 23.13' N. latitude and west of 153° 37.0' W. longitude.
2-F-H-003-97 April 29	Opens Management Areas 5 and 6 in the Kamishak Bay District to commercial sac roe herring seining for approximately one hour commencing by an ADF&G field announcement some time between 6:25 p.m. and 6:35 p.m., Tuesday, April 29, 1997. The fishery will close at 7:30 p.m. Management Areas 5 and 6 include those waters south of 59° 23.13' N. latitude and west of 153° 37.0' W. longitude.
2-F-H-004-97 April 30	Opens the entire Kamishak Bay District to commercial sac roe herring seining for an eight-hour period from 1:00 p.m. until 9:00 p.m. Wednesday, April 30, 1997.
2-F-H-005-97 May 1	Opens all waters of the Kamishak Bay District to commercial sac roe herring seining for a 12-hour period from 9:00 a.m. until 9:00 p.m. Thursday, May 1, 1997.
2-F-H-006-97 May 21	Opens those waters of Resurrection Bay in the Eastern District enclosed by a line from Aialik Cape south to a point one mile due south of Aialik Cape, then northeast to a point one mile due south of Cape Resurrection, then north to Cape Resurrection, to commercial salmon seining on a weekly schedule of five days per week, from Monday 6:00 a.m. until Friday 10:00 p.m., effective Monday, May 26, 1997, until further notice. All waters along the west shore of Resurrection Bay west of a line from the old military dock pilings north of Caines Head to the former Alaska state ferry dock will remain closed to seining.
2-F-H-007-97 May 29	Establishes two 48-hour weekly fishing periods in the Kamishak Bay District commercial salmon seine fishery, which opens by regulation on June 1, 1997. These periods shall be from Monday 6:00 a.m. until Wednesday 6:00 a.m. and from Thursday 6:00 a.m. until Saturday 6:00 a.m. Since June 1 falls on a

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Table 8. (page 2 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-007-97 May 29 (cont'd)	<p>Sunday, which is closed to fishing on the above described schedule, the district effectively opens to seining on Monday, June 2.</p> <p>In addition, this emergency order closes the Chenik and Paint River Subdistricts within the Kamishak Bay District to commercial salmon seining until further notice.</p>
2-F-H-008-97 June 9	<p>Extends weekly commercial salmon seine fishing time in the McNeil River Subdistrict of the Kamishak Bay District to five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., effective at 6:00 a.m. Wednesday, June 11, 1997, until further notice.</p>
2-F-H-009-97 June 19	<p>Designates and establishes an English Bay Special Harvest Area (SHA) for the Port Graham Hatchery Corporation (PGHC) in the English Bay Section of Port Graham Subdistrict, located in the Southern District of the Lower Cook Inlet management area. This emergency order also opens the English Bay SHA to the harvest of salmon seven days per week by authorized agents of PGHC effective at 6:00 a.m. Friday, June 20, 1997, until further notice.</p> <p>In the Southern District, the English Bay SHA consists of all waters of English Bay River beginning at (and including) the adult sockeye salmon counting weir site operated by Chugach Regional Resources Commission (CRRRC) to a point approximately 300 yards downstream of this site. The English Bay SHA is defined as those waters of English Bay River between 59° 20' 32" N. latitude and 59° 20' 53" N. latitude.</p>
2-F-H-010-97 June 20	<p>Designates and establishes Special Harvest Areas (SHA) for the Cook Inlet Aquaculture Association (CIAA) in the Paint River and Bruin Bay Subdistricts of the Lower Cook Inlet management area. This emergency order also closes the Kirschner and Bruin Lakes SHA's to the common property salmon seine fishery while concurrently opening waters of the Kirschner and Bruin Lakes and Paint River SHA's in the Kamishak Bay District to the harvest of salmon seven days per week by authorized agents of CIAA effective at 6:00 a.m. Monday, June 23, 1997, until further notice.</p> <p>In the Kamishak Bay District, the Kirschner Lake SHA consists of all marine waters of the Bruin Bay Subdistrict northwest of a line drawn from a point on the north shore of the mouth of Bruin Bay at approximately 59° 23' 10" N. latitude, 153° 56' 54" W. longitude, to a point on Fortification Bluff at approximately 59° 25' 10" N. latitude, 153° 50' 30" W. longitude. The Bruin Lake SHA consists of all marine waters of the Bruin Bay Subdistrict north of a line drawn from a point</p>

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Table 8. (page 3 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-010-97 June 20 (cont'd)	<p>on the north shore of the mouth of Bruin Bay at approximately 59° 23' 10" N. latitude, 153° 56' 54" W. longitude, to a point on the north shore of Bruin Bay at approximately 59° 22' 30" N. latitude, 154° 01' 00" W. longitude. The Paint River SHA consists of all marine waters of Akjemguiga Cove west of a line drawn from a point on the south shore at approximately 59° 09' 30" N. latitude, 154° 12' 50" W. longitude to a point on the north shore at approximately 59° 10' 00" N. latitude, 154° 12' 30" W. longitude.</p> <p>This emergency order also opens portions of the China Poot, Tutka Bay, and Halibut Cove Subdistricts, all within the Southern District, to commercial salmon seining five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., effective 6:00 a.m. Monday, June 23, 1997, until further notice. In the China Poot Subdistrict, commercial seining shall be allowed five days per week in those waters outside (offshore) of the regulatory markers near the mouth of China Poot Creek. In Neptune Bay, no markers are in effect and fishing is allowed five days per week up to the mouth of Wosnesenski River. In the Halibut Cove Subdistrict, seining shall be allowed only in waters outside of Halibut Cove Lagoon beginning June 23 on a five days per week basis. In the Tutka Bay Subdistrict, commercial seining is restricted to those waters seaward of a line extending from Nubble Point at approximately 59° 29' 11" N. latitude, 151° 34' 07" W. longitude, then to Grass Island at approximately 59° 29' 54" N. latitude, 151° 29' 39" W. longitude, then to a point on the north shore at the mouth of Sadie Cove at approximately 59° 30' 44" N. latitude, 151° 27' 30" W. longitude five days per week effective 6:00 a.m. Monday, June 23, 1997.</p> <p>Also, this emergency order repeals the regulatory closed waters markers in China Poot Bay, and additionally establishes temporary closed waters at the head of China Poot Bay to provide a Dungeness crab sanctuary.</p>
2-F-H-011-97 June 23	<p>Opens waters of Aialik Subdistrict, including Aialik Lagoon, in the Eastern District to commercial salmon seining five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective 6:00 a.m. Wednesday, June 25, 1997, until further notice.</p>
2-F-H-012-97 June 26	<p>Designates and establishes a Special Harvest Area for the Cook Inlet Aquaculture Association (CIAA) in Tutka Bay Subdistrict within the Southern District of Lower Cook Inlet. The Tutka Bay Special Harvest Area (SHA) consists of all marine waters of Tutka Bay Subdistrict southeast of the Homer Electric Association powerline crossing, including waters of Tutka Lagoon.</p>

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Table 8. (page 4 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-012-97 June 26 (cont'd)	<p>This emergency order also designates and establishes a SHA for the Port Graham Hatchery Corporation (PGHC) in the Port Graham Subdistrict within the Southern District of Lower Cook Inlet. The Port Graham SHA consists of all marine waters of the Port Graham Subdistrict north of 59° 20' 44" N. latitude, east of 151° 53' 05" W. longitude, and south and west of a line from the southernmost tip of Passage Island to the Coast Guard navigational buoy at approximately 151° 50' 03" W. longitude, 59° 21' 27" N. latitude, then southeast to a point on the mainland at approximately 151° 48' 32" W. longitude, 59° 20' 50" N. latitude. This area is located along the south shore of Port Graham from Passage Island to Duncan Slough.</p> <p>In addition, this emergency order opens the Tutka Bay Special Harvest Area to the harvest and sale of salmon seven days per week by authorized agents of CIAA, effective at 6:00 a.m. Sunday, June 29, 1997, until further notice. Revenue obtained from the sale of these fish will be used for recovery of operational costs associated with the Tutka Lagoon Hatchery salmon enhancement programs in Lower Cook Inlet.</p>
2-F-H-013-97 July 1	Closes McNeil River Subdistrict of the Kamishak Bay District to commercial salmon fishing with purse seines, effective at 6:00 a.m. Thursday, July 3, 1997, until further notice.
2-F-H-014-97 July 3	Extends fishing time for commercial set gillnets in Halibut Cove Subdistrict of the Southern District to five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Monday, July 7, 1997, until further notice.
2-F-H-015-97 July 8	<p>Opens those waters of East Nuka Subdistrict in the Outer District between the latitude of the entrance to James Lagoon at approximately 59° 33' 30" N. latitude, and the regulatory markers near the Parks Service tent camp at approximately 59° 37' 30" N. latitude, to commercial salmon seining five days per week, from Monday 6:00 a.m. until Friday 10:00 p.m., effective at 6:00 a.m. Thursday, July 10, until further notice. Waters south of the entrance to James Lagoon, as well as waters north of the regulatory markers by the Parks Service camp, remain closed to fishing. Also, the closed waters markers at the mouth of Desire Lake Creek WILL NOT BE in effect for this opening, and fishing will be allowed up to the creek mouth.</p>
2-F-H-016-97 July 10	<p>Opens those waters of the Port Dick Subdistrict in the Outer District east of a line from a department marker on the south shore of Port Dick near Phillipino Cove at approximately 151° 06' 00" W. longitude, 59° 15' 20" N. latitude, to a department marker on the southwest shore of Taylor Bay at approximately 151°</p>

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Table 8. (page 5 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-016-97 July 10 (cont'd)	05° 00" W. longitude, 59° 16' 12" N. latitude, to commercial salmon seining for two 40-hour periods per week, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and from Thursday 6:00 a.m. until Friday 10:00 p.m., effective at 6:00 a.m. Monday, July 14, 1997, until further notice. Waters open to fishing include statistical reporting areas 232-06 and 232-08. Waters of the North Section (232-09) and the south shore of the South Section (232-07) of the Port Dick Subdistrict remain closed to fishing.
2-F-H-017-97 July 14	Opens waters of East Nuka Subdistrict in the Outer District to commercial salmon seining five days per week, from Monday 6:00 a.m. until Friday 10:00 p.m., effective at 6:00 a.m. Wednesday, July 16, until further notice. The closed waters markers at the mouths of Desire Lake Creek and Delight Lake Creek WILL NOT BE in effect for this opening, and fishing will be allowed up to both creek mouths. In addition, seining will be allowed inside waters of McCarty Lagoon near Delight Lake.
2-F-H-018-97 July 17	Opens the Port Graham Special Harvest Area (SHA) to the harvest and sale of salmon seven days per week by authorized agents of Port Graham Hatchery Corporation (PGHC), effective at 6:00 a.m. Friday, July 18, 1997, until further notice. Revenue obtained from the sale of these fish will be used for recovery of operational costs associated with the Port Graham Hatchery pink salmon enhancement program in Lower Cook Inlet. The Port Graham SHA consists of all marine waters of the Port Graham Subdistrict north of 59° 20' 44" N. latitude, east of 151° 53' 05" W. longitude, and south and west of a line from the southernmost tip of Passage Island to the Coast Guard navigational buoy at approximately 151° 50' 03" W. longitude, 59° 21' 27" N. latitude, then southeast to a point on the mainland at approximately 151° 48' 32" W. longitude, 59° 20' 50" N. latitude. This area is located along the south shore of Port Graham from Passage Island to Duncan Slough (see LCI Emergency Order #2-F-H-012-97).
2-F-H-019-97 July 21	Opens waters of Windy Bay Subdistrict in the Outer District to commercial salmon seining for two forty-hour periods per week, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and from Thursday 6:00 a.m. until Friday 10:00 p.m., effective at 12:00 noon Tuesday, July 22, 1997, until further notice.
2-F-H-020-97 July 23	Closes the Kirschner and Bruin Lakes Special Harvest Areas (SHA's; see LCI Emergency Order #2-F-H-010-97) to the harvest of salmon by authorized agents of Cook Inlet Aquaculture Association (CIAA) effective at 12:01 a.m., Thursday, July 24, 1997, until further notice. In addition, this emergency order opens waters of the Kirschner Lake Section (statistical reporting area 249-75)

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Table 8. (page 6 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-020-97 July 23 (cont'd)	of Bruin Bay Subdistrict to commercial salmon seining seven days per week, effective at 12:00 noon Thursday, July 24, 1997, until further notice. Concurrently, waters of the Bruin Lake SHA will open to commercial salmon seining on the same weekly schedule as is currently in place for the Bruin Bay Section of Bruin Bay Subdistrict, which is two 48-hour periods per week, from Monday 6:00 a.m. until Wednesday 6:00 a.m. and from Thursday 6:00 a.m. until Saturday 6:00 a.m., until further notice.
2-F-H-021-97 July 24	Opens waters of Nuka Island Subdistrict and the South Section of Port Dick Subdistrict, both in the Outer District, to commercial salmon seining for two forty-hour periods per week, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and from Thursday 6:00 a.m. until Friday 10:00 p.m., effective at 12:00 noon Friday, July 25, 1997, until further notice. Waters of the Port Dick Subdistrict opened to seining by this emergency order include statistical reporting area 232-07.
2-F-H-022-97 July 31	Closes the Tutka Bay Special Harvest Area (see <i>LCI E.O. # 2-F-H-012-97</i>), except for waters of Tutka Lagoon, to the harvest and sale of salmon by authorized agents of CIAA, effective at 10:00 a.m. Friday, August 1, 1997, until further notice. Concurrently, waters of Tutka Bay Subdistrict, excluding Tutka Lagoon, will open to commercial salmon seining seven days per week until further notice. Waters of Tutka Lagoon will remain open to hatchery fishing and closed to commercial seining.
2-F-H-023-97 August 1	Opens waters of Tutka Lagoon to commercial salmon seining from 12:00 noon Saturday, August 2, 1997, until 12:00 noon Tuesday, August 5, 1997.
2-F-H-024-97 August 5	Opens the Port Graham Special Harvest Area (SHA; see <i>LCI E.O. # 2-F-H-012-97</i>) to commercial salmon seining for a 24-hour period from 10:00 a.m. Wednesday, August 6, 1997, until 10:00 a.m. Thursday, August 7, 1997.
2-F-H-025-97 August 6	Opens the Port Graham Special Harvest Area (SHA; see <i>LCI E.O. # 2-F-H-012-97</i>) to commercial salmon seining seven days per week effective at 10:00 a.m. Thursday, August 7, 1997, until further notice.
2-F-H-026-97 August 8	Opens waters of Humpy Creek Subdistrict in the Southern District to commercial salmon seining five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m. effective at 6:00 a.m. Monday, August 11, 1997, until further notice.

-continued-

Table 8. (page 7 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-027-97 August 14	Opens waters of Port Chatham Subdistrict in the Outer District to commercial salmon seining five days per week, from Monday 6:00 a.m. until Saturday 6:00 a.m., effective at 10:00 a.m. Friday, August 15, 1997, until further notice. In addition, the regulatory closed waters markers in Port Chatham Subdistrict will not be in effect, and commercial seining will be allowed up to the stream mouths during this opening.
2-F-H-028-97 August 15	Delays the opening of the Southern District (Kachemak Bay) personal use set gillnet fishery for coho salmon until 6:00 a.m. Monday, August 18, 1997.
2-F-H-029-97 August 22	Closes the Southern District (Kachemak Bay) personal use set gillnet fishery for coho salmon for the remainder of the 1997 season, effective at 6:00 a.m. Wednesday, August 27, 1997.

Table 9. Total return of adult pink salmon to the Tutka Bay Hatchery in the Southern District of Lower Cook Inlet, 1997.

<u>COMMERCIAL HARVEST</u>	
Tutka Bay/Lagoon:	
Purse Seine	105,203
Set Gillnet	25,203 ^a
Hatchery Cost Recovery	<u>2,375,653^b</u>
TUTKA COMMERCIAL HARVEST	2,506,059
 <u>SPORT HARVEST</u>	
TOTAL SPORT HARVEST (Tutka Bay and Lagoon)	2,100^c
 <u>ESCAPEMENT</u>	
Tutka Creek and Channel	45,000 ^d
Tutka Hatchery Brood Stock	<u>216,786</u>
TOTAL ESCAPEMENT	261,786
<hr/>	
TOTAL RETURN	2,769,945
<hr/>	

^a Based primarily on run timing, all of the set gillnet pink salmon catch in the Tutka Bay Subdistrict was apportioned to the Tutka Hatchery return.

^b Cost recovery harvest included 4,381 discarded pink salmon carcasses.

^c Figure represents average estimated sport catch of pinks in Tutka Bay from 1990 – 1996.

^d Estimated escapement is the peak survey count (44,000) plus nearly 1,000 pinks counted during last survey of the season on 9/15; because of hatchery sorting and release of surplus broodstock, run timing is considered artificial and therefore no streamlife factor was applied.

Table 10. Commercial purse seine catch of sac roe herring in short tons and average roe recovery in percent, by statistical area and date, Kamishak Bay District, Lower Cook Inlet, 1997.

Date	Statistical Area	Nearest Location	No. of Permits	No. of Landings	Short Tons	Roe %
4/24	249-55	Chenik Head	35	46	1,309	9.30
	249-75	Contact Point	11	12	271	9.33
4/30	249-55	Chenik Head	2	2	61	9.18
5/1	249-75	Contact Point	^a	^a	51	9.69
5/22	249-90	Dry Bay/Oil Bay	1 ^b	1 ^b	54 ^b	9.46 ^b
KAMISHAK BAY DISTRICT TOTALS			45	66	1,746	9.29

^a To comply with AS 16.05.815 CONFIDENTIAL NATURE OF CERTAIN REPORTS AND RECORDS, effort data has been masked where fewer than four vessels fished in a given area.

^b Figures from 5/22 are for the single landing from ADF&G's post-season sampling and test fishing program.

Table 11. Total biomass estimates and commercial catch of Pacific herring (*Clupea pallasii*) in short tons by age class, Kamishak Bay District, Lower Cook Inlet, 1997, and 1998 forecast.

Age	1997 Est. Spawning Biomass	Percent by Weight	1997 Commercial Harvest	Percent by Weight	1997 Total Biomass	Percent by Weight	1998 Forecast Biomass	Percent by Weight
1								
2								
3	1,702.6	11.86	107.4	6.15	1,810.0	11.24	1,016	5.14
4	4,620.3	32.18	383.5	21.97	5,003.8	31.08	2,848	14.41
5	2,088.0	14.54	252.1	14.44	2,340.0	14.53	7,019	35.52
6	827.1	5.76	128.4	7.36	955.6	5.93	2,577	13.04
7	875.6	6.10	147.1	8.43	1,022.8	6.35	856	4.33
8	662.3	4.61	113.2	6.48	775.5	4.82	871	4.41
9	2,880.0	20.06	493.6	28.28	3,373.5	20.95	638	3.23
10	344.4	2.40	59.0	3.38	403.4	2.51	3,382	17.11
11	81.3	0.57	13.9	0.80	95.2	0.59	416	2.10
12	36.7	0.26	6.3	0.36	43.0	0.27	97	0.49
13+	238.3	1.66	40.9	2.34	279.2	1.73	45	0.23
TOTALS	14,356.6	100.00	1,745.4	100.00	16,102.0	100.00	19,765	100.01

Table 12. Proposed regulatory changes for the Lower Cook Inlet Seldovia subsistence salmon fishery, and resultant actions taken, at the Alaska Board of Fisheries meeting held in Anchorage, February, 1998^a.

PROPOSAL NUMBER	PROPOSED BY	DESCRIPTION	BOARD ACTION	BOARD VOTE
Agenda Change Request #24	Fred Elvsaas/ Seldovia Village Tribe	5 AAC 01.560. Increase the length of the subsistence salmon fishing season in Seldovia Bay area 10 days, resulting in an "early" season from April 1 – May 30. Amended by BOF to expand closed waters adjacent to the Seldovia small boat harbor.	Adopted	7 - 0

^a Proposed regulatory changes adopted by the Alaska Board of Fisheries become effective in April, 1998, upon approval of language by the Alaska Dept. of Law and subsequent signing by the Lt. Governor.

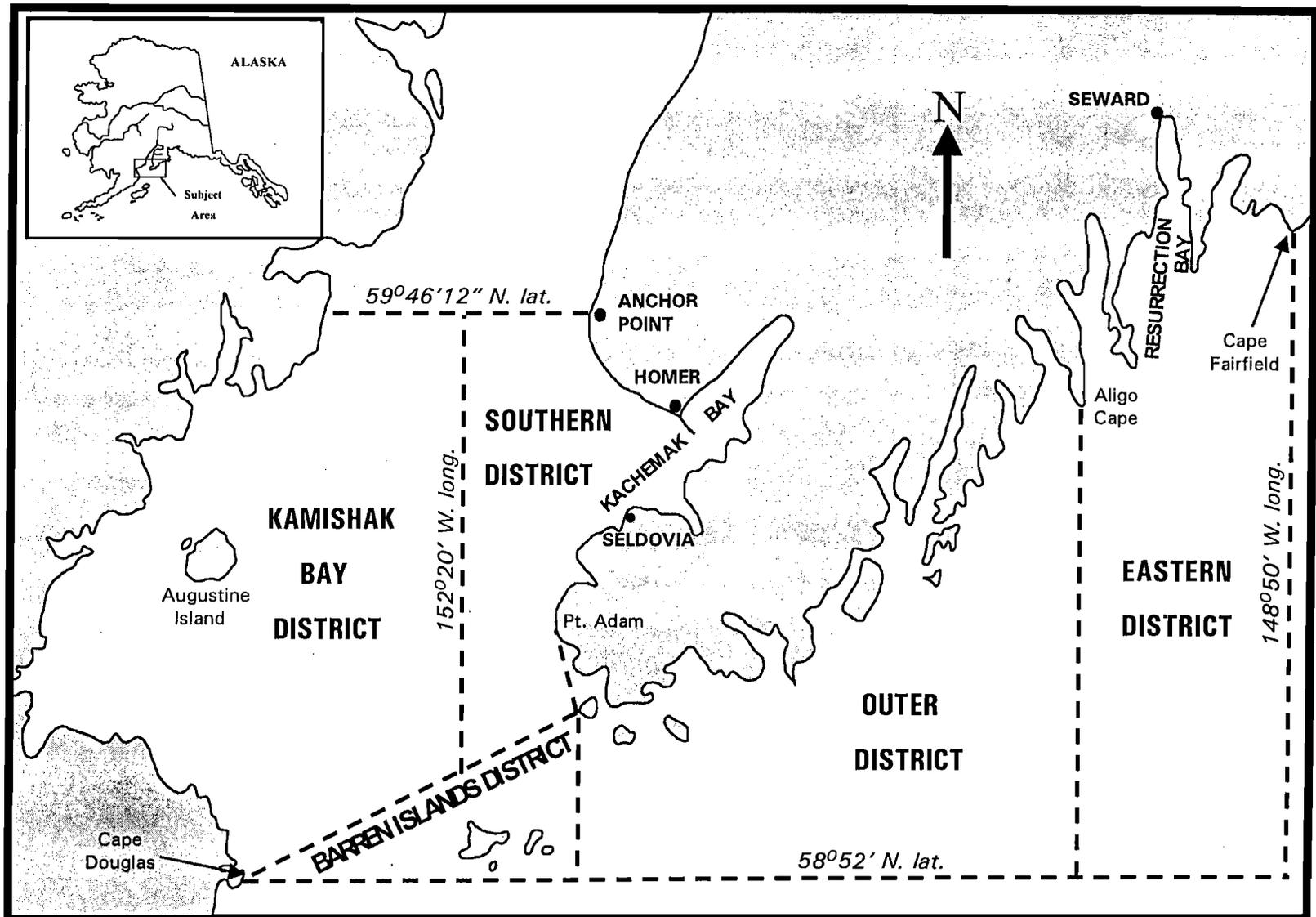


Figure 1. Lower Cook Inlet salmon and herring management area (not to scale).

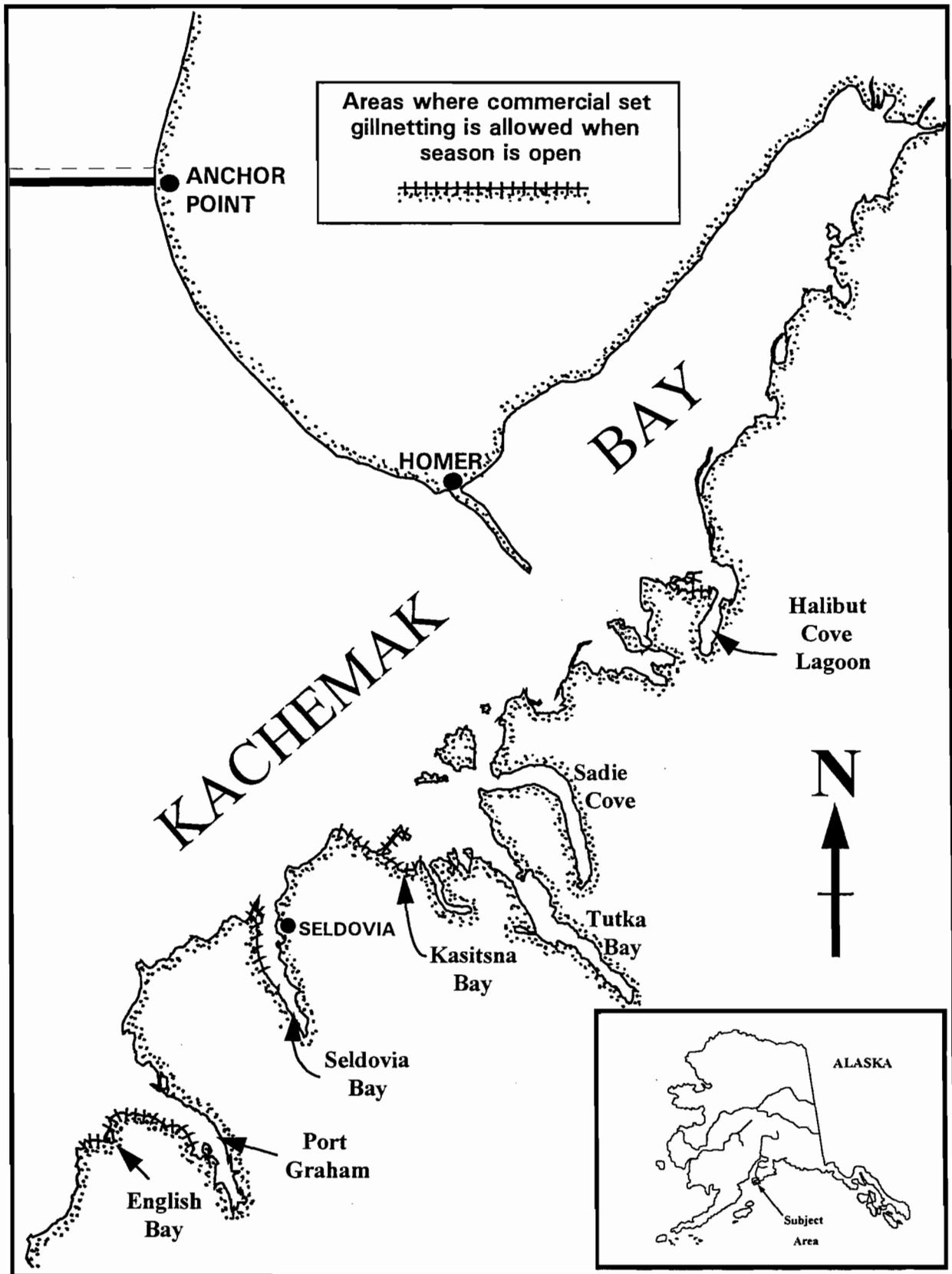


Figure 2. Commercial set gillnet locations in the Southern District of Lower Cook Inlet.

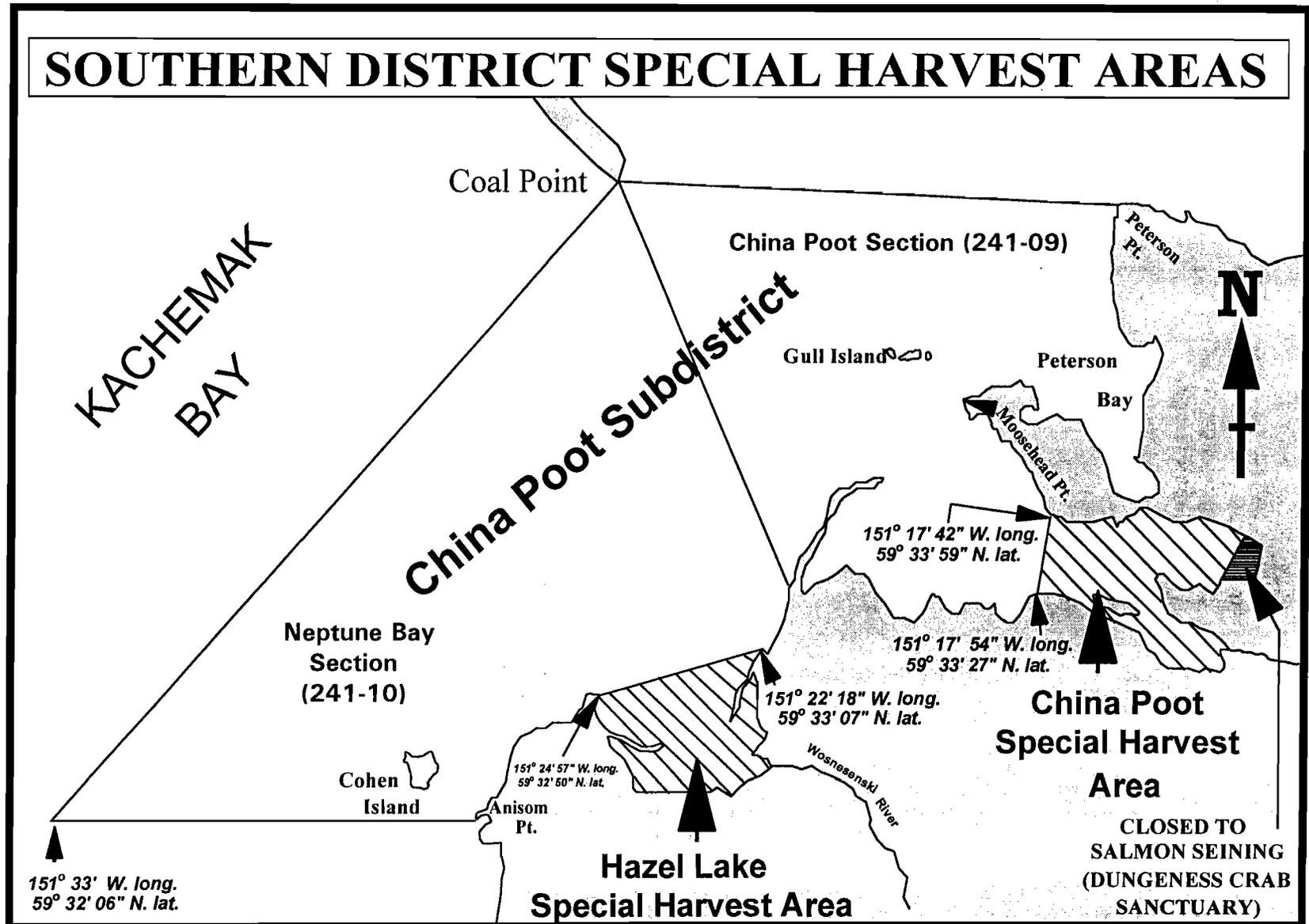


Figure 3. China Poot and Hazel Lake Special Harvest Areas for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

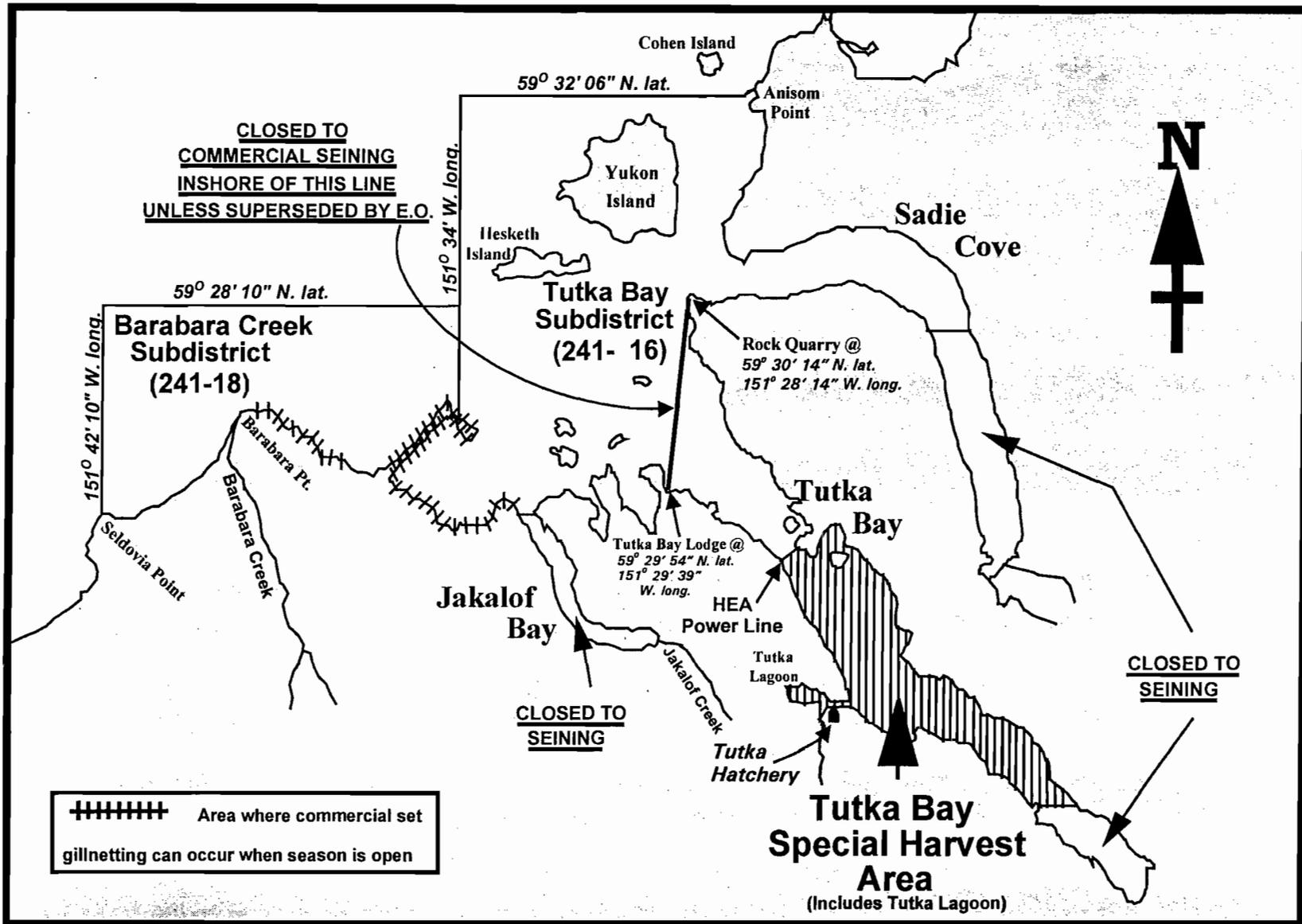


Figure 4. Tutka Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

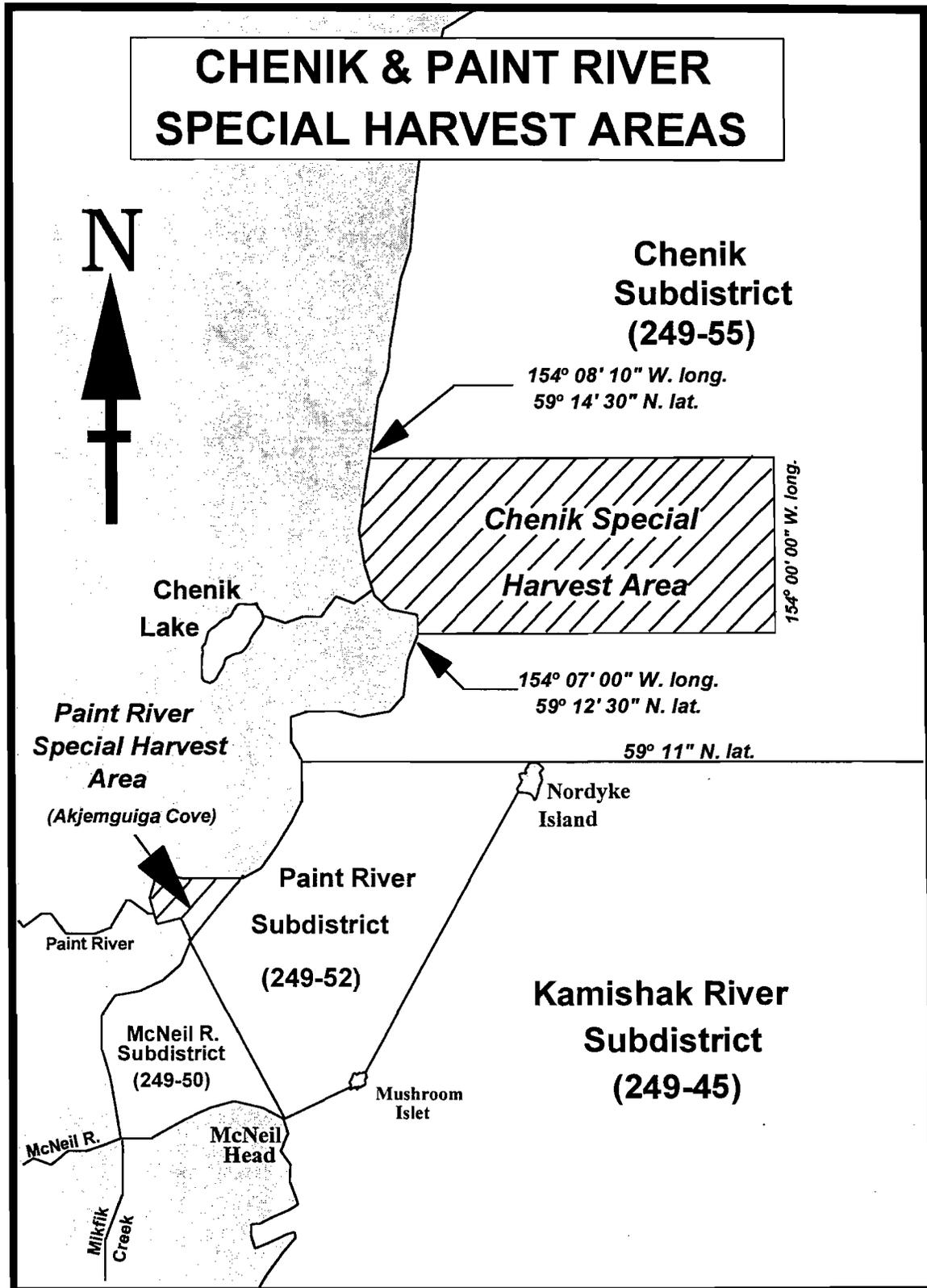


Figure 5. Chenik and Paint River Special Harvest Areas for salmon hatchery cost recovery in the Kamishak Bay District of Lower Cook Inlet.

KIRSCHNER & BRUIN LAKES SPECIAL HARVEST AREAS



Note: Regulations prohibit salmon net fishing in federal waters beyond territorial seas (3 nautical miles).

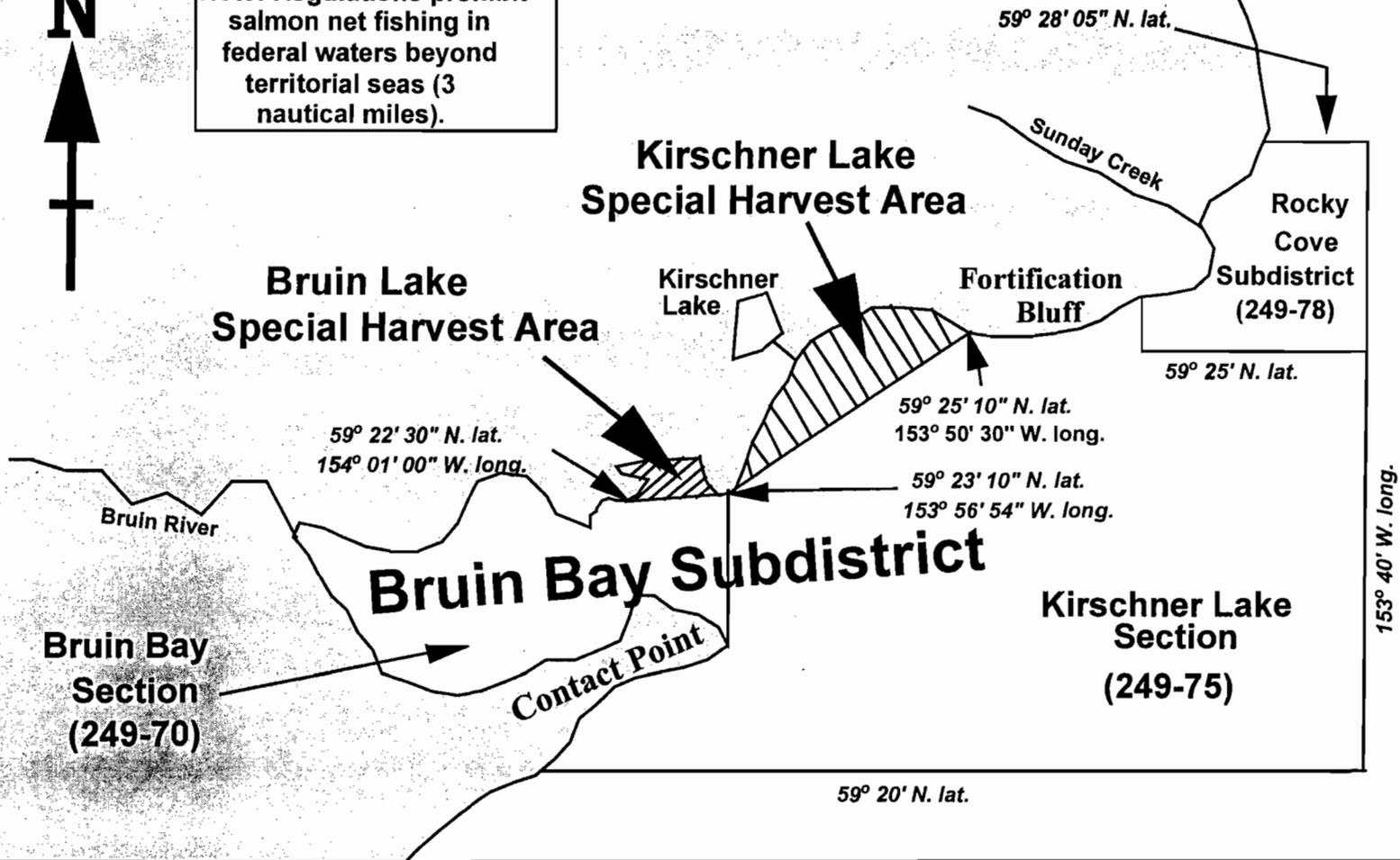


Figure 6. Kirschner and Bruin Lakes Special Harvest Areas for salmon hatchery cost recovery in the Kamishak Bay District of Lower Cook Inlet.

PORT GRAHAM HATCHERY SPECIAL HARVEST AREA

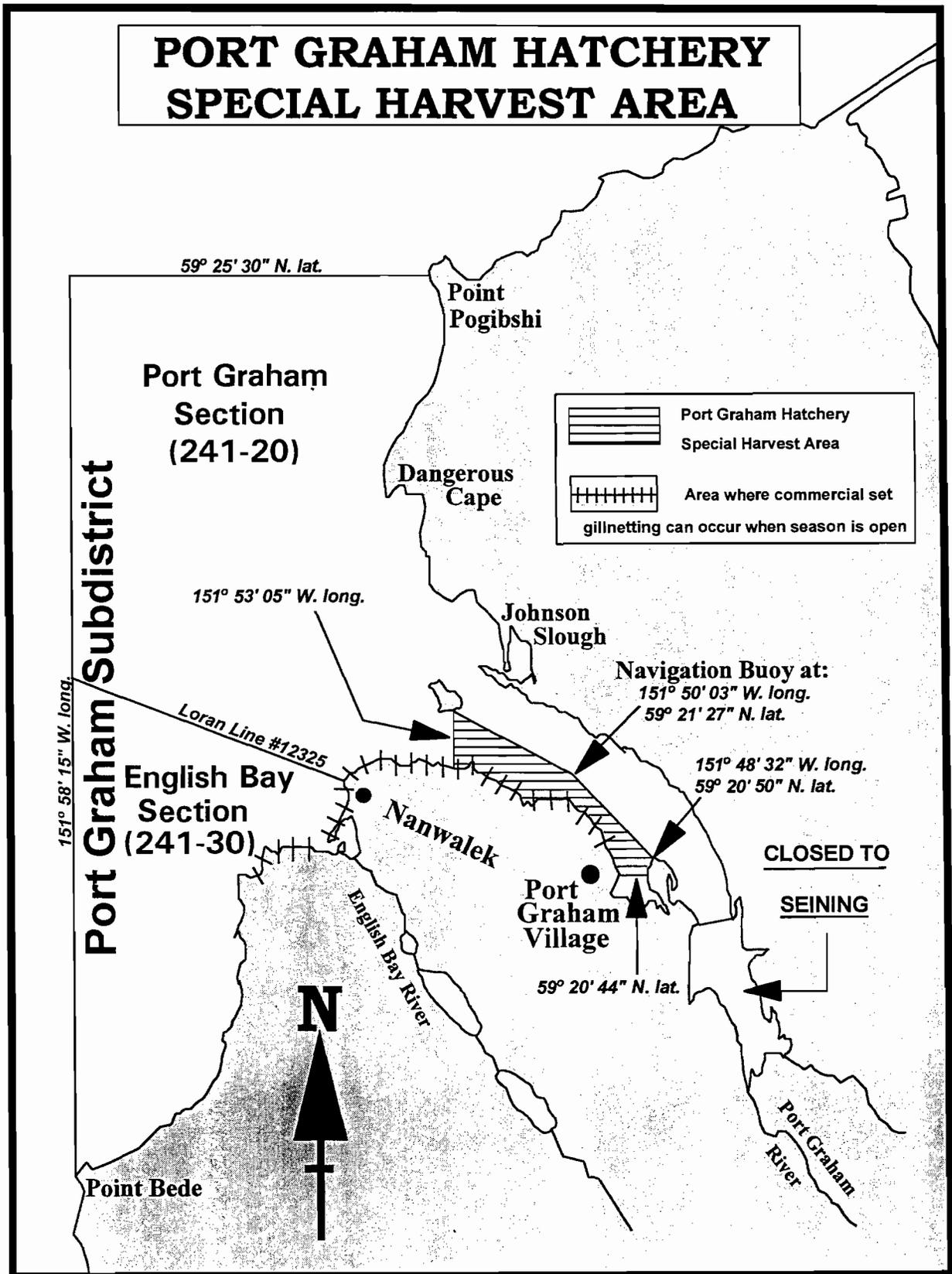


Figure 7. Port Graham Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

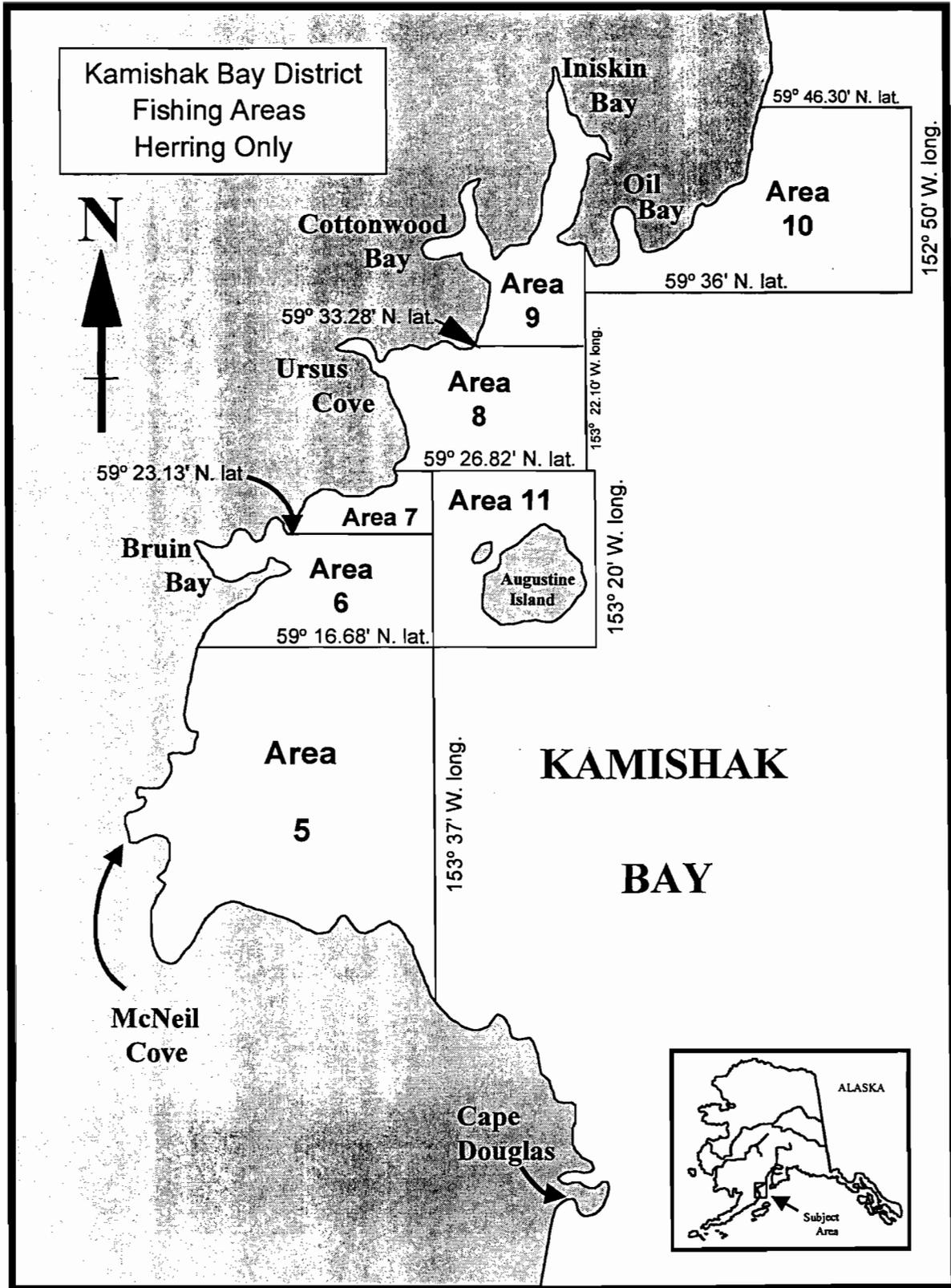


Figure 8. Commercial herring fishing areas in the Kamishak Bay District of Lower Cook Inlet.

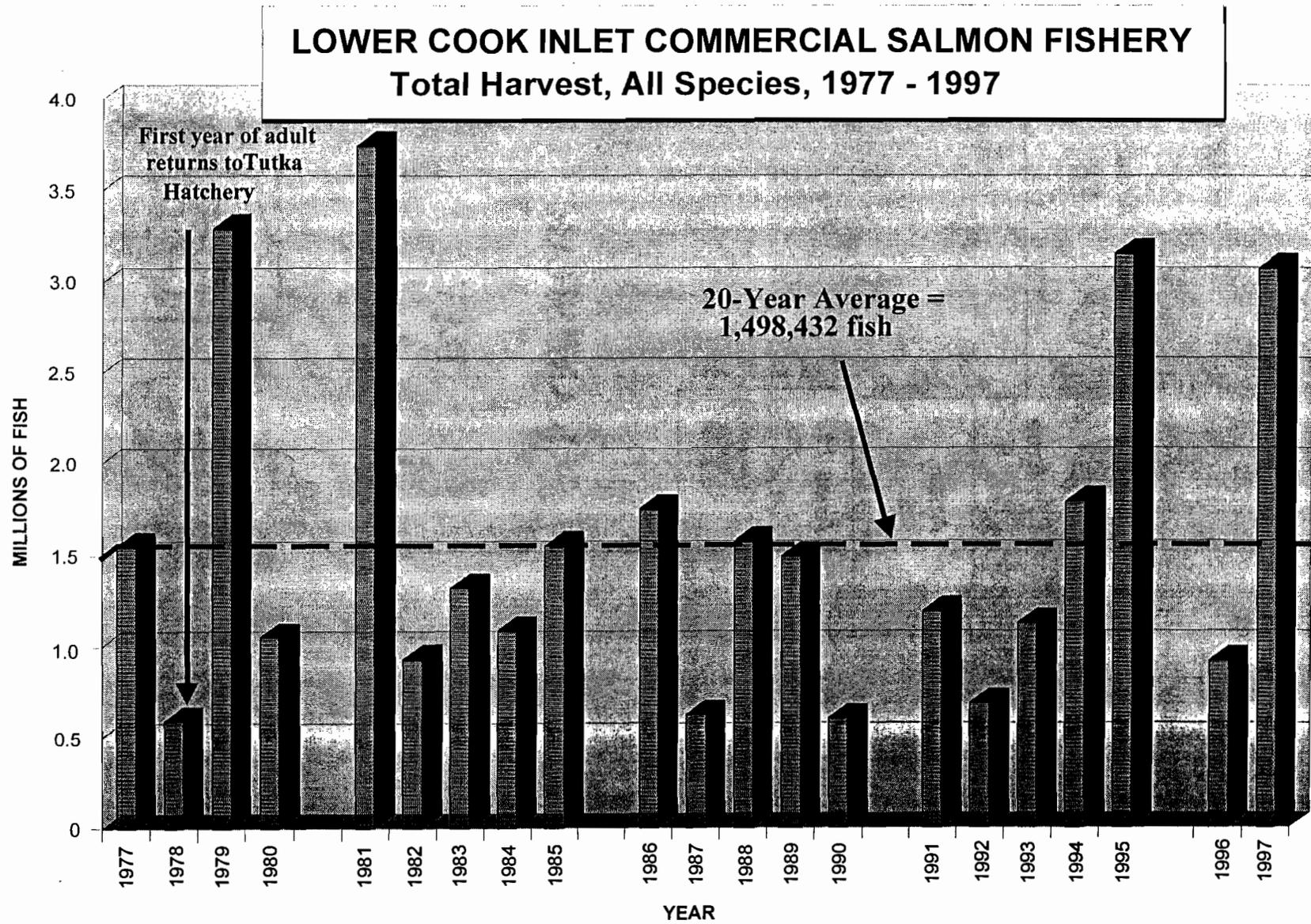


Figure 9. Total commercial salmon catch, Lower Cook Inlet, 1977 - 1997.

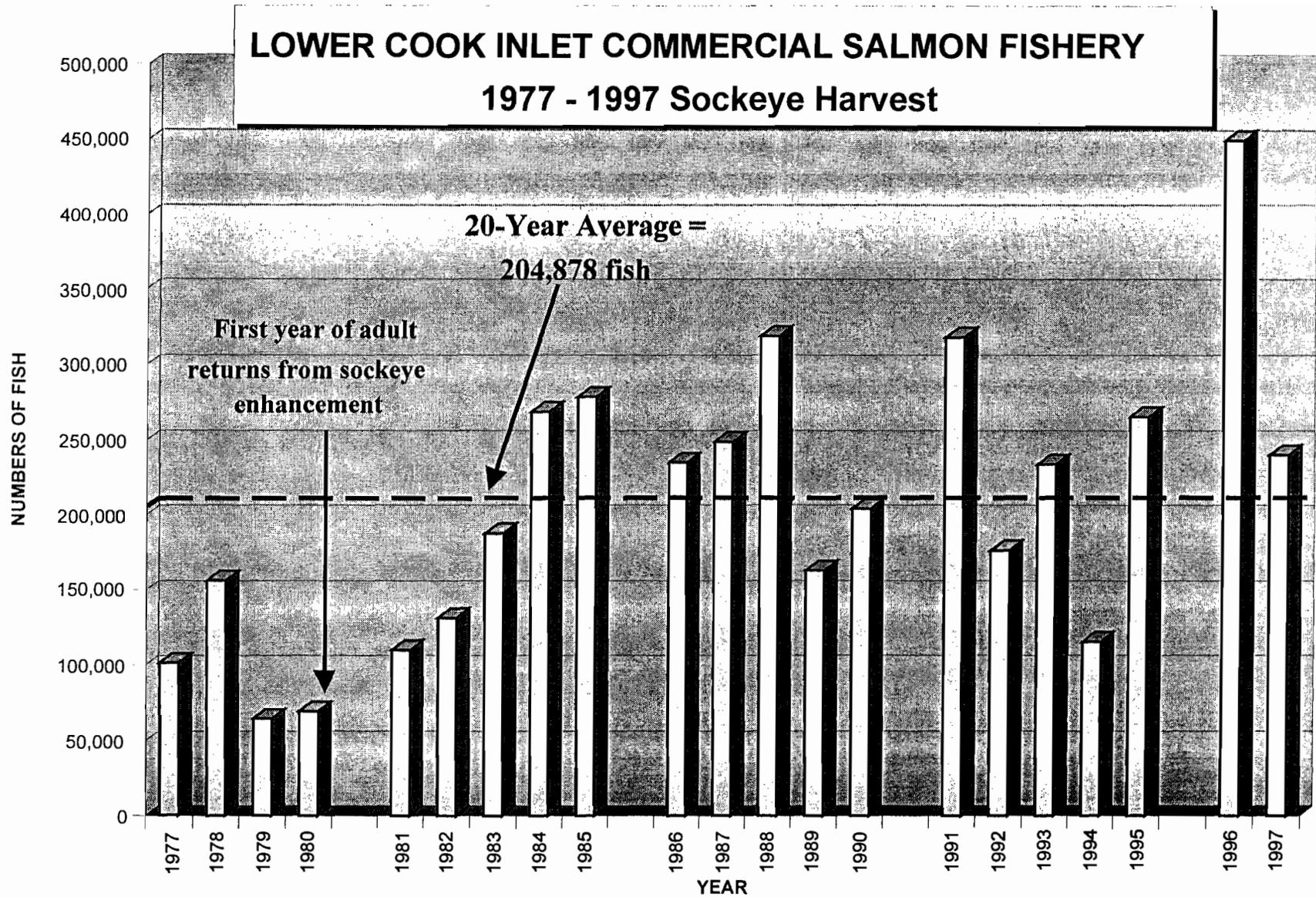


Figure 10. Commercial sockeye salmon catch, Lower Cook Inlet, 1977 - 1997.

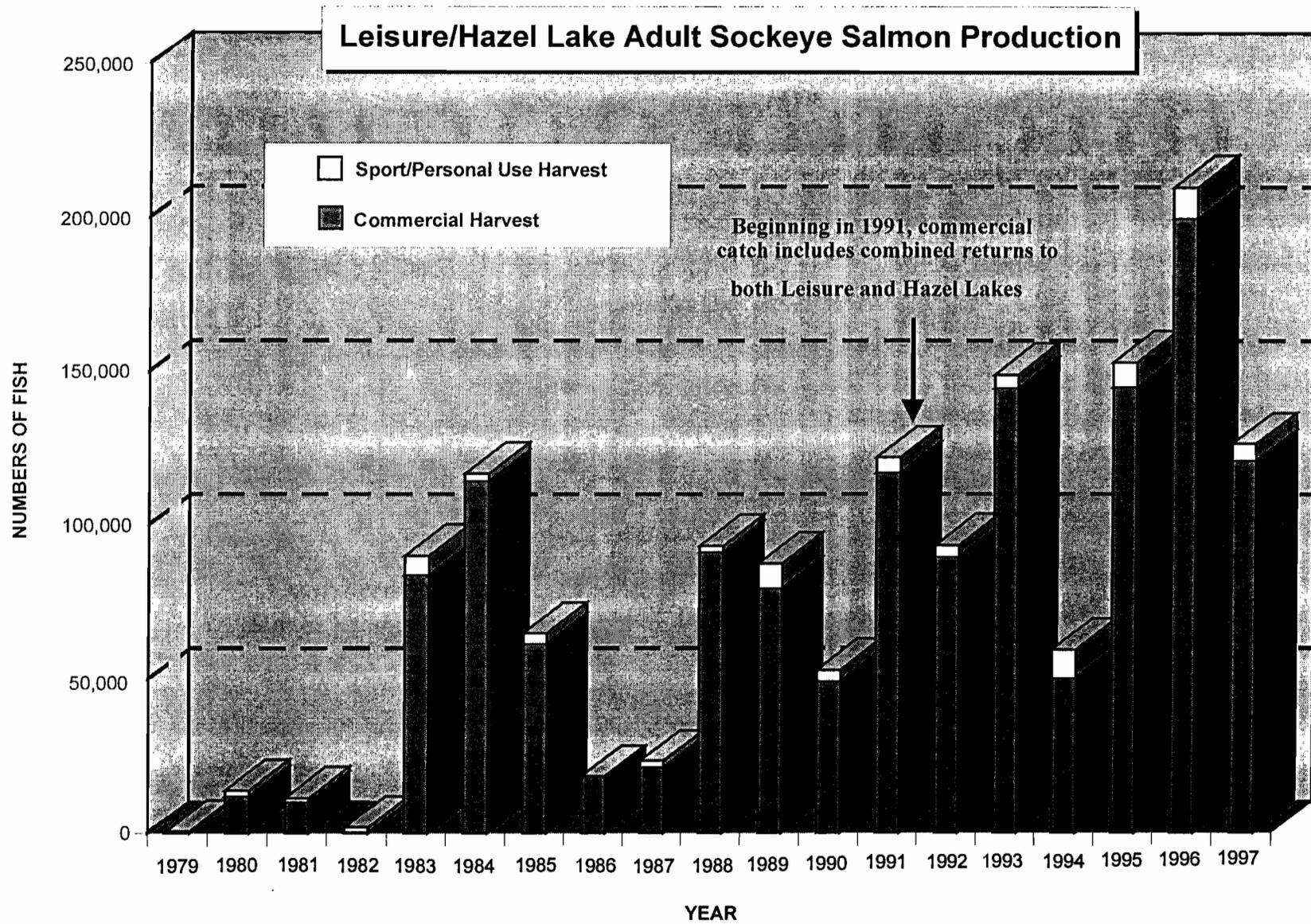


Figure 11. Sockeye salmon returns to Leisure and Hazel Lakes in the Southern District of Lower Cook Inlet, 1980 - 1997.

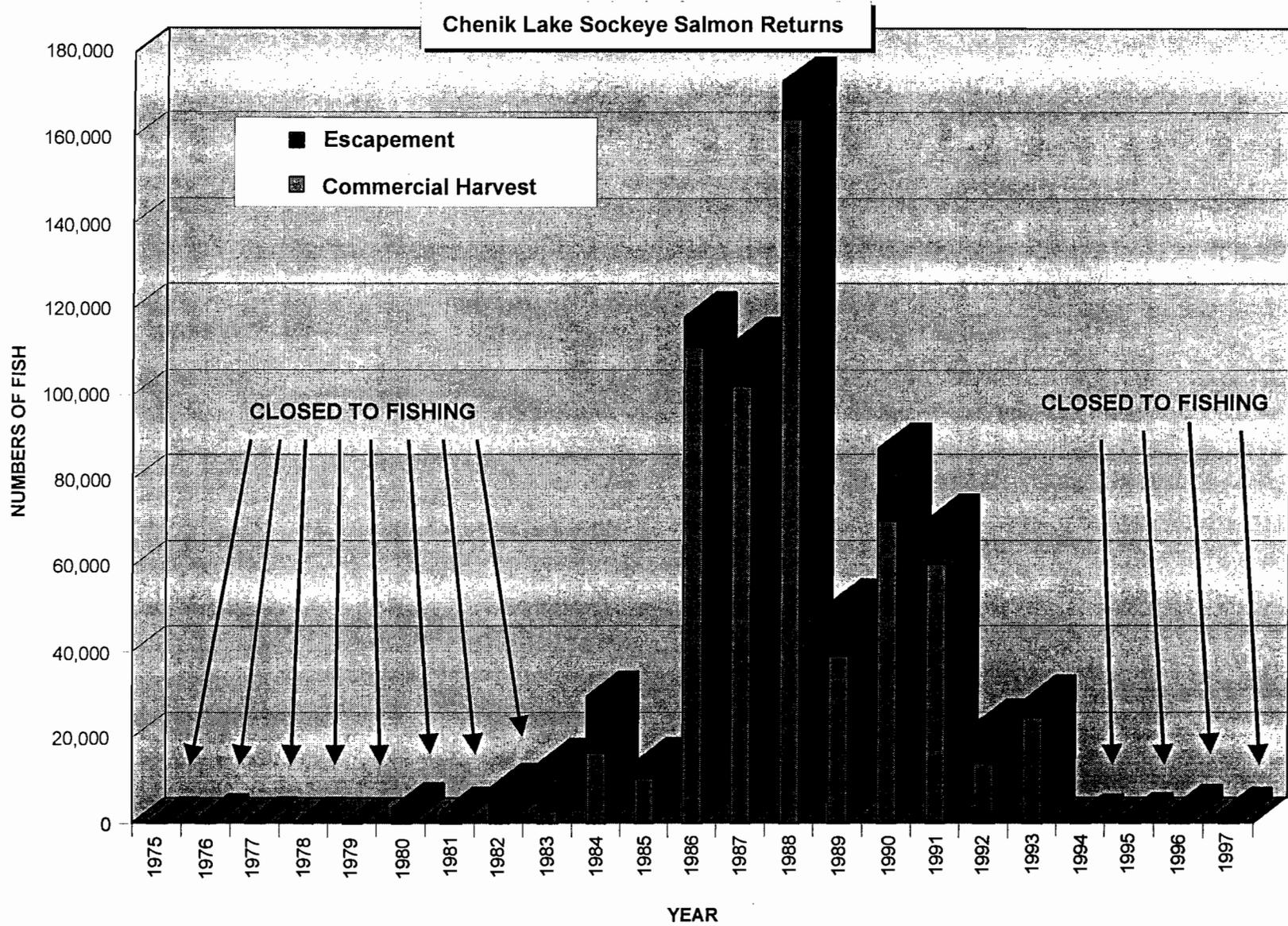


Figure 12. Sockeye salmon returns to Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 - 1997.

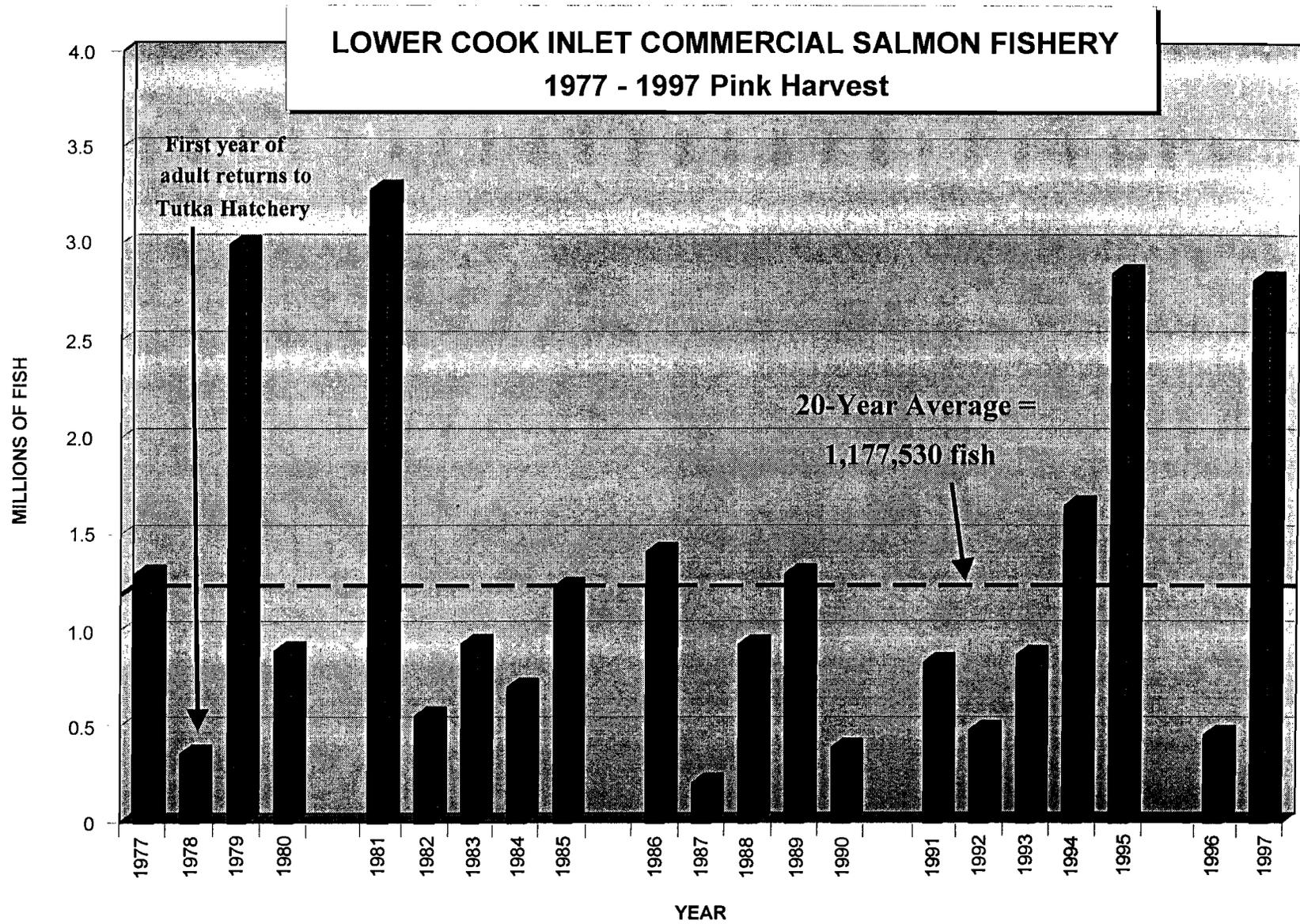


Figure 13. Commercial pink salmon catch, Lower Cook Inlet, 1977 - 1997.

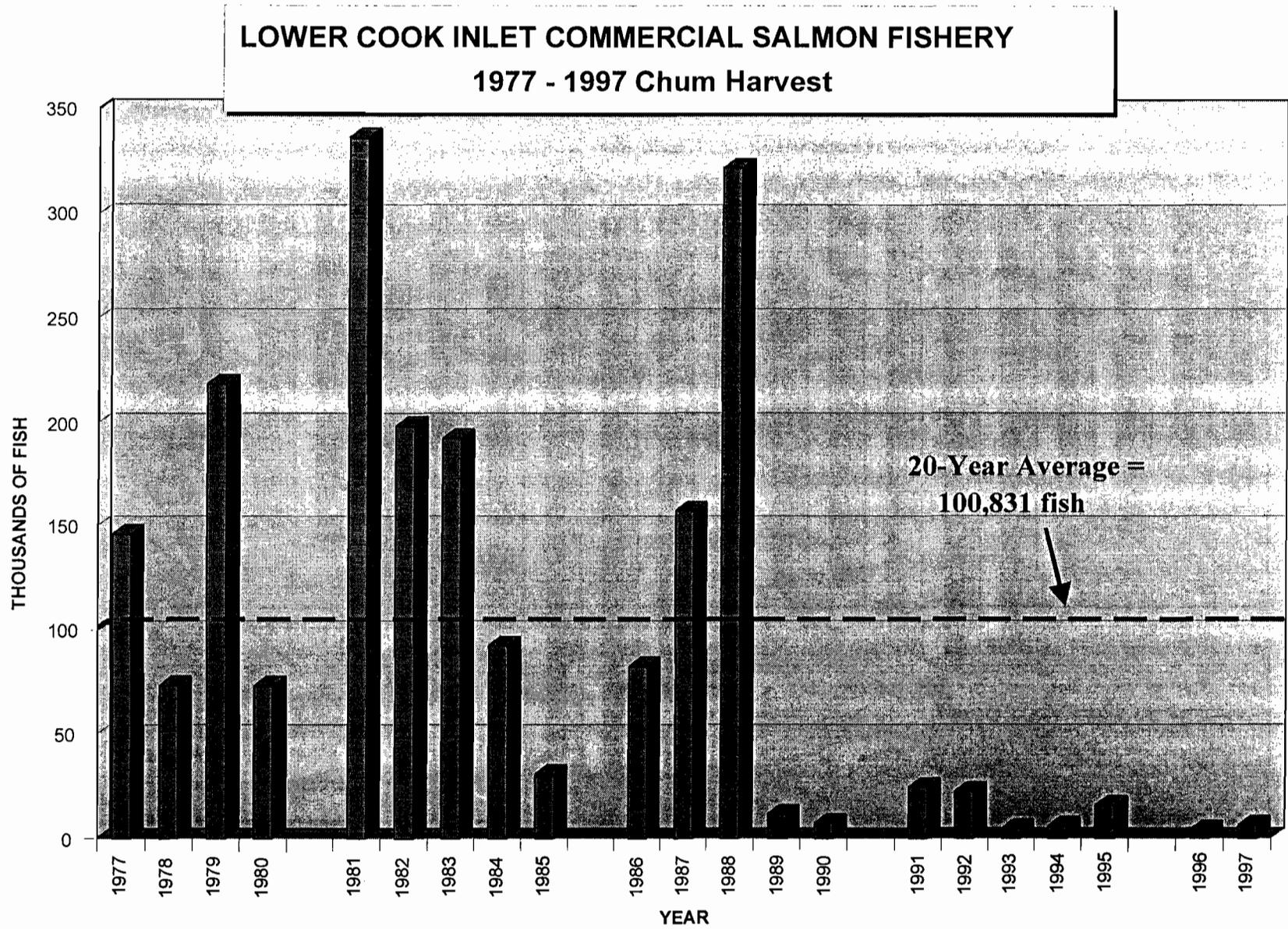


Figure 14. Commercial chum salmon catch, Lower Cook Inlet, 1977 - 1997.

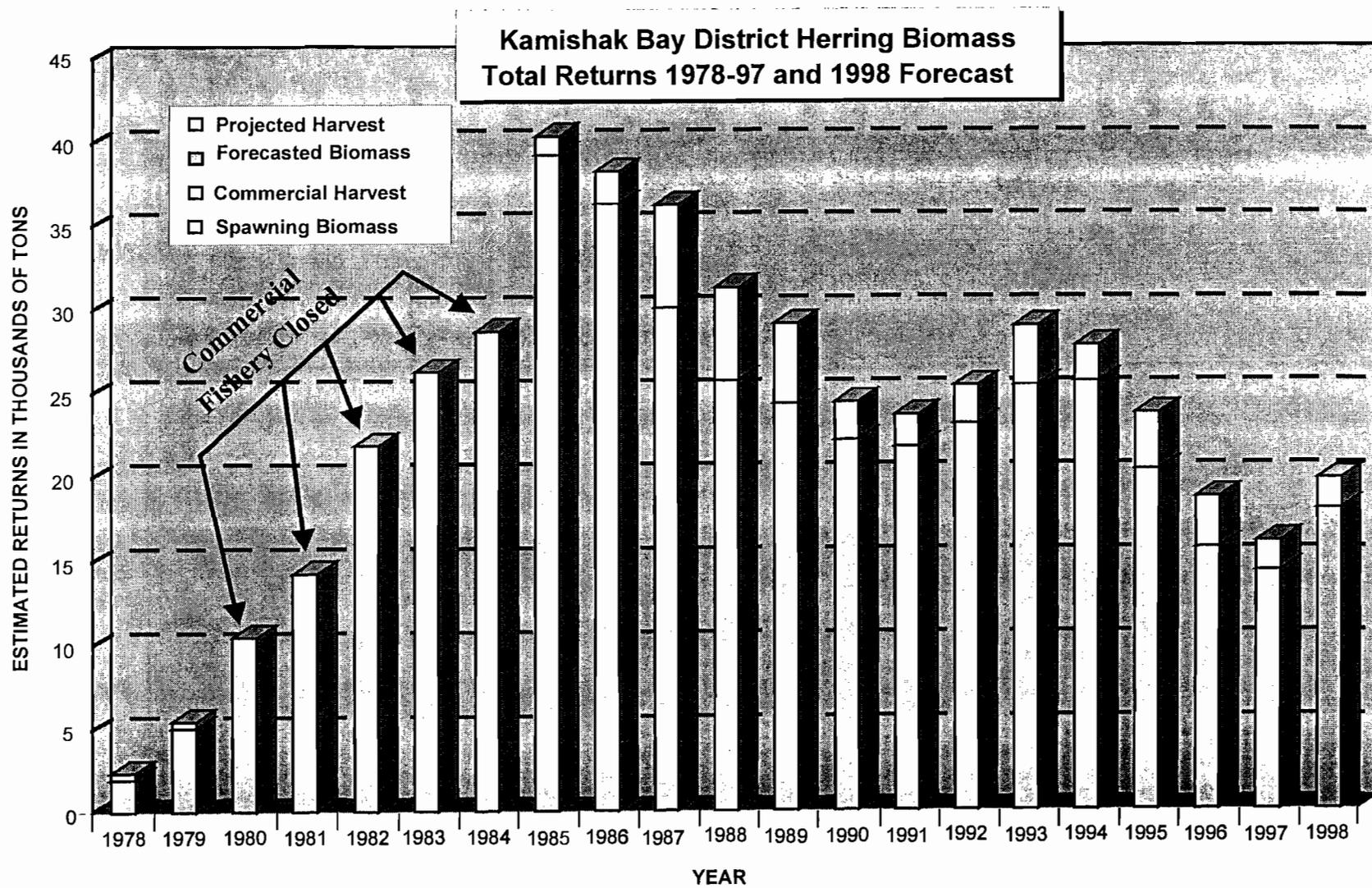


Figure 15. Biomass estimates and commercial harvests of Pacific herring in the sac roe seine fishery, Kamishak Bay District, Lower Cook Inlet, 1978 - 1997, and 1998 projection.

KAMISHAK BAY DISTRICT HERRING AGE CLASS
1997 Observed and 1998 Predicted

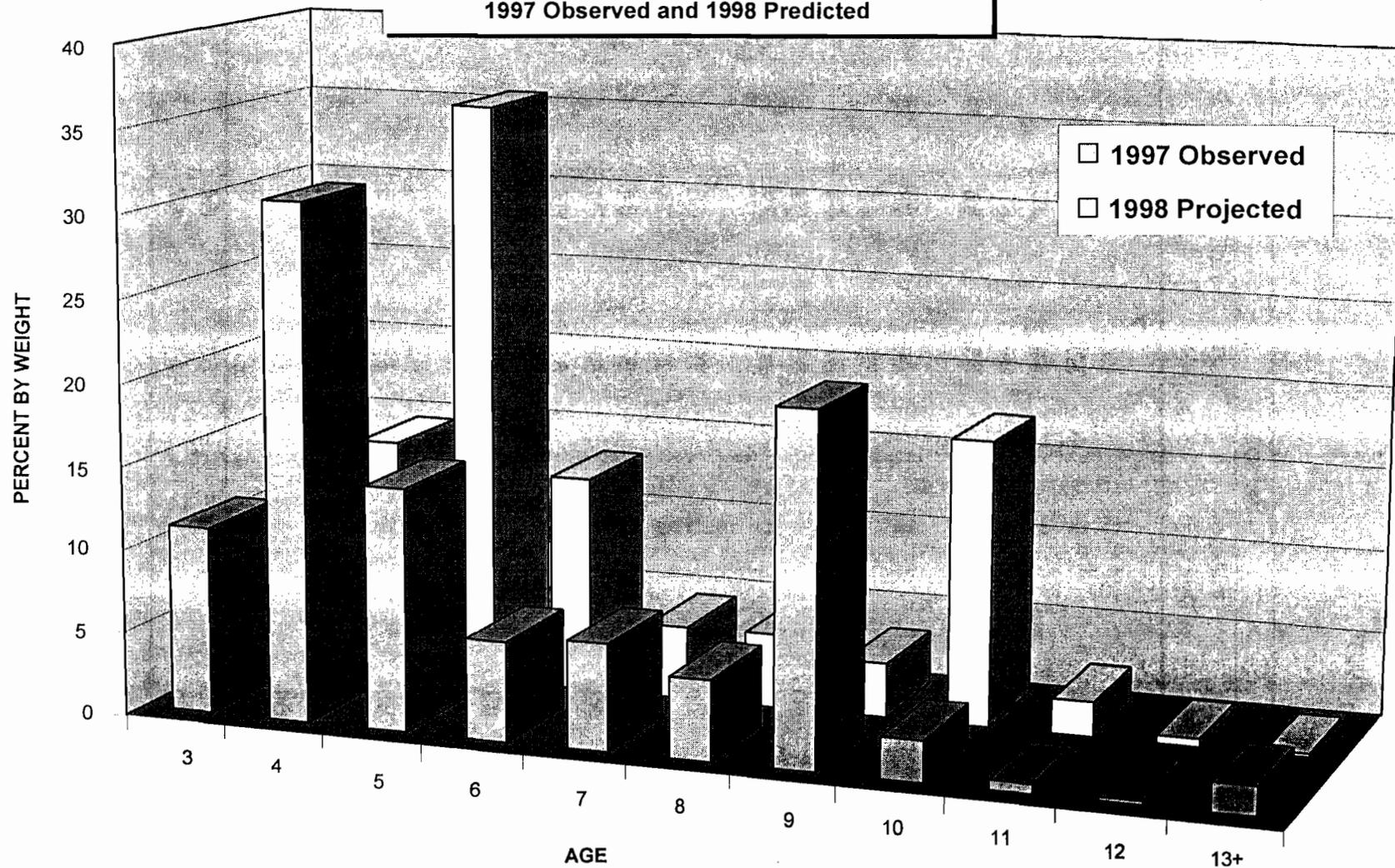


Figure 16. Herring age composition from samples collected in Kamishak Bay District, Lower Cook Inlet, 1997, and 1998 forecast.

Appendix Table 1. Salmon fishing permits issued and fished, by gear type, Lower Cook Inlet, 1977 - 1997^a.

Year	Seines			Actively fished	Set Net Permits fished
	Permanent Permits	Interim Permits	Total Issued		
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	82	1	83	71	20
1991	82	1	83	68	20
1992	82	1	83	63	21
1993	82	1	83	51	17
1994	82	1	83	32	16
1995	83	1	84	49	23
1996	84	1	85	34	24
1997	84	1	85	23	24
1977-96 Avg.	79	4	83	64	28
1987-96 Avg.	82	1	83	57	22

^a Data source: Commercial Fisheries Entry Commission and ADF&G fish ticket database.

Appendix Table 2. Exvessel value of the commercial salmon harvest in thousands of dollars by species, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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	3,004
1990	29	1,287	28	306	31	1,681
1991 ^b	19	1,115	36	275	48	1,493
1992 ^b	30	1,152	19	212	53	1,466
1993 ^b	27	802	41	287	7	1,164
1994 ^b	18	496	93	745	9	1,361
1995 ^b	48	1,381	62	1,245	24	2,760
1996 ^b	26	2,113	42	100	5	2,286
1997 ^b	23	1,066	36	1,286	10	2,421
1977-96 Avg.	24	1,101	79	1,238	458	2,901
1997 % of Total	0.95	44.03	1.49	53.12	0.41	100.00

^a 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.

^b Includes hatchery cost recovery.

Appendix Table 3. Average salmon price in dollars per pound by species, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum
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
1991	1.12	0.83	0.29	0.13	0.27
1992	1.29	1.47	0.43	0.14	0.27
1993	1.02	0.80	0.51	0.12	0.28
1994	0.95	1.06	0.62	0.15	0.25
1995	1.17	1.11	0.47	0.15	0.24
1996	1.33	0.91	0.40	0.08	0.18
1997	1.29	0.93 ^b	0.50 ^b	0.15	0.23
20-Year Avg.	1.19	1.20	0.75	0.32	0.42
1977-86 Avg.	1.15	0.99	0.74	0.34	0.45
1987-96 Avg.	1.23	1.41	0.77	0.29	0.39

^a Average prices are determined only from fish ticket information and may not reflect retroactive or postseason adjustments.

^b Average price for sockeyes and cohos includes only those fish actually sold and does not include hatchery cost recovery fish that were donated or discarded.

Appendix Table 4. Salmon average weight in pounds per fish by species in the commercial fishery, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum
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
1991	12.3	4.2	6.6	2.6	7.5
1992	12.3	4.4	7.7	3.2	8.8
1993	12.0	4.4	6.0	2.7	6.2
1994	15.0	4.1	10.2	3.0	6.4
1995	17.8	4.7	7.4	2.9	6.4
1996	16.9	5.2	7.6	2.9	8.0
1997	13.9	4.9	7.8	3.1	7.6
20-Year Avg.	19.2	5.1	7.7	3.2	8.2
1977-86 Avg.	23.6	5.7	7.7	3.4	8.5
1987-96 Avg.	14.8	4.5	7.7	3.0	7.8

^a Values obtained from ADF&G fish ticket database.

Appendix Table 5. Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
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
20-Year Avg.	1,286	204,878	13,908	1,177,530	100,831	1,498,432
1977-86 Avg.	920	160,359	15,009	1,362,413	144,375	1,683,076
1987-96 Avg.	1,652	249,397	12,807	992,647	57,286	1,313,789
1997 % of Total	0.04%	7.82%	0.36%	91.59%	0.19%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 6. Commercial salmon catch in numbers of fish by species in the Southern District, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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	1,552	178,087	2,433	266,030
1991	1,399	170,224	9,415	253,962	1,962	436,962
1992	1,852	106,793	1,277	417,021	1,885	528,828
1993	2,162	159,747	4,431	692,794	2,788	861,922
1994	1,230	64,531	1,373	1,589,709	2,631	1,659,474
1995	2,289	164,798	5,161	2,475,312	4,530	2,652,090
1996	1,180	358,163	9,543	444,236	3,511	816,633
1997	1,262	188,413	5,597	2,685,764	4,260	2,885,296
20-Year Avg.	1,246	110,617	5,084	684,701	6,677	808,325
1977-86 Avg.	856	81,265	5,711	571,251	9,789	668,871
1987-96 Avg.	1,636	139,968	4,457	798,151	3,565	947,778
1997 % of Total	0.04%	6.53%	0.19%	93.08%	0.15%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 7. Commercial set gillnet catch of salmon in numbers of fish by species in the Southern District, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
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
20-Year Avg.	905	32,862	3,664	24,255	3,604	65,290
1977-86 Avg.	622	42,937	4,324	30,574	4,639	83,097
1987-96 Avg.	1,189	22,787	3,005	17,936	2,568	47,484
1997 % of Total	0.85%	44.55%	3.36%	48.12%	3.12%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 8. Commercial salmon catch in numbers of fish by species in the Outer District, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1991	2	6,408	12	359,664	14,337	380,423
1992	0	572	1	146	181	900
1993	2	4,613	119	159,159	970	164,863
1994	0	5,930	993	13,200	32	20,155
1995	12	17,642	1,272	192,098	474	211,498
1996	0	14,999	96	7,199	3	22,297
1997	0	6,255	63	128,373	1,575	136,266
20-Year Avg.	29	24,145	717	369,742	38,707	433,339
1977-86 Avg.	54	36,369	921	638,940	65,762	742,046
1987-96 Avg.	4	11,920	512	100,545	11,652	124,633
1997 % of Total	0.00%	4.59%	0.05%	94.21%	1.16%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 9. Commercial salmon catch in numbers of fish by species in the Eastern District, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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	11,815	307	27,449
1991	1	4,703	7,283	167,250	80	179,317
1992	0	432	3,136	60,007	86	63,661
1993	0	1,824	8,924	10,616	9	21,373
1994	1	9,661	10,410	44,987	2,792	67,851
1995	0	46,556	5,192	12,000	330	64,078
1996	0	44,919	3,932	36	223	49,110
1997	0	33,783	5,344	1	66	39,194
20-Year Avg.	3	13,713	2,990	50,198	4,306	71,210
1977-86 Avg.	6	12,601	582	68,109	4,240	85,537
1987-96 Avg.	0	14,826	5,399	32,288	4,372	56,884
1997 % of Total	0.00%	86.19%	13.63%	0.00%	0.17%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 10. Commercial salmon catch in numbers of fish by species in the Kamishak Bay District, Lower Cook Inlet, 1977 - 1997^a.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1991	17	136,612	2,337	47,833	7,853	194,652
1992	39	68,847	1,488	2,594	20,051	93,019
1993	4	67,650	3	4,205	600	72,462
1994	0	35,296	1,897	33	14	37,240
1995	2	36,427	6,084	169,054	10,302	221,869
1996	1	31,604	1	35	27	31,668
1997	0	11,733	0	293	7	12,033
20-Year Avg.	8	56,404	5,117	72,888	51,141	185,558
1977-86 Avg.	5	30,124	7,795	84,112	64,585	186,622
1987-96 Avg.	12	82,683	2,439	61,664	37,696	184,494
1997 % of Total	0.00%	97.51%	0.00%	2.43%	0.06%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 11. Total commercial salmon catch in numbers of fish by district, Lower Cook Inlet, 1977 - 1997^a.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1991	436,962	380,423	194,652	179,317	1,191,354
1992	528,828	900	93,019	63,661	686,408
1993	861,922	164,863	72,462	21,373	1,120,620
1994	1,659,474	20,155	37,240	67,851	1,784,720
1995	2,652,090	211,498	221,869	64,078	3,149,535
1996	816,633	22,297	31,668	49,110	919,708
1997	2,885,296	136,266	12,033	39,194	3,072,789
20-Year Avg.	808,325	433,339	185,558	71,210	1,498,432
1977-87 Avg.	668,871	742,046	186,622	85,537	1,683,076
1987-97 Avg.	947,778	124,633	184,494	56,884	1,313,789
1997 % of Total	93.90%	4.43%	0.39%	1.28%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 12. Commercial chinook salmon catch in numbers of fish by district, Lower Cook Inlet, 1977 - 1997^a.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1991	1,399	2	17	1	1,419
1992	1,852	0	39	0	1,891
1993	2,162	2	4	0	2,168
1994	1,230	0	0	1	1,231
1995	2,289	12	2	0	2,303
1996	1,180	0	1	0	1,181
1997	1,262	0	0	0	1,262
20-Year Avg.	1,246	29	8	3	1,286
1977-86 Avg.	856	54	5	6	920
1987-96 Avg.	1,636	4	12	0	1,652
1997 % of Total	100.00%	0.00%	0.00%	0.00%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 13. Commercial sockeye salmon catch in numbers of fish by district, Lower Cook Inlet, 1977 - 1997^a.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1991	170,224	6,408	136,612	4,703	317,947
1992	106,793	572	68,847	432	176,644
1993	159,747	4,613	67,650	1,824	233,834
1994	64,531	5,930	35,296	9,661	115,418
1995	164,798	17,642	36,427	46,556	265,423
1996	358,163	14,999	31,604	44,919	449,685
1997	188,413	6,255	11,733	33,783	240,184
20-Year Avg.	110,617	24,145	56,404	13,713	204,878
1977-86 Avg.	81,265	36,369	30,124	12,601	160,359
1987-96 Avg.	139,968	11,920	82,683	14,826	249,397
1997 % of Total	78.45%	2.60%	4.89%	14.07%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 14. Commercial sockeye salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 - 1997^a.

Location	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Resurrection Bay	0	0.1	0	0	0	0	0	0	0	74.5	99.4	1.8	2.2
Aialik Bay	1.3	0.2	4.3	2.6	0.5	0	0	0	0	0	0	3.1	0
Nuka Bay	8.3	6.7	8.2	5.1	0.5	0	2.0	0	2.2	1.5	0	1.0	1.6
Port Dick	0	0	0	0	0	0	0	0	0	0	0	0	0
Halibut Cove & Lagoon	1.3	1.4	0.8	2.0	1.1	0.7	1.4	1.5	1.9	2.7	1.7	1.3	1.3
Tutka/Barabara	1.1	1.7	3.0	5.2	2.9	9.0	5.2	6.0	11.8	6.3	5.6	6.0	10.0
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	1.5
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	5.6
Kamishak/Douglas	0	0	0	0	0	0	0	0	0	0	0	0	0
McNeil (Mikfik)	0	0.7	0	0	0	1.9	0.2	0	0	0	8.9	2.8	0
Paint River	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenik Lake	0	0	0	0	0	0	0	0	0.2	0	1.9	0	0
Bruin (Kirschner)	0	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	0
Totals	21.6	24.7	22.8	25.3	15.1	20.7	14.0	15.3	29.0	95.2	122.8	20.9	22.2

Location	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Resurrection Bay	0.1	0	0	0	0	0	0	0	0	0.6	0	0	3.4
Aialik Bay	0.3	3.1	0.2	0.6	0	5.8	0	0	0.1	8.7	3.0	25.9	50.8
Nuka Bay	26.1	1.1	0.1	0	18.9	31.1	10.6	24.4	21.5	17.2	66.3	16.8	29.2
Port Dick	0	0	0	0	0	0	0	0	0	0	0	0	0
Halibut Cove & Lagoon	3.7	2.1	3.0	3.4	5.1	3.6	12.9	5.3	11.5	11.2	1.2	77.7	116.6
Tutka/Barabara	14.8	8.1	10.8	12.6	14.2	21.3	92.1	15.6	13.2	41.0	15.8	35.9	26.7
Seldovia Bay	2.3	2.2	2.3	2.1	2.1	3.0	5.6	2.6	1.6	5.3	5.0	6.7	4.9
Port Graham Bay	10.5	11.7	10.9	9.2	13.6	16.6	30.5	12.9	16.5	20.3	21.5	13.4	12.5
Kamishak/Douglas	0	0	0	0	0.2	5.3	4.6	0.5	0	4.9	0	2.8	0
McNeil (Mikfik)	0	0	0	0	3.8	2.1	0	1.2	3.9	0	17.8	5.8	10.7
Paint River	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenik Lake	0	0	0	0	0	0	0	0	0	0	0.3	2.7	13.9
Bruin (Kirschner)	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous	0.1	0.8	0.1	0.2	0.3	2.8	0.1	1.9	1.1	1.1	0.4	0	0.3
Totals	57.9	29.1	27.4	28.1	58.2	101.6	156.4	64.4	69.4	110.3	131.3	187.6	269.0

Location	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Resurrection Bay	0.3	0	0.2	0	0	0	0	0	1.7	9.0	44.6	43.9	31.7
Aialik Bay	24.1	3.0	3.5	20.2	8.5	7.7	4.7	0.4	0.2	0.6	2.0	1.0	2.1
Nuka Bay	91.8	48.4	31.8	9.5	10.3	5.7	1.8	0	3.5	5.9	17.6	15.0	6.2
Port Dick	0	0	0	0	0	11.7	4.6	0.6	1.0	0	0	0	0
Halibut Cove & Lagoon	63.2	15.2	69.1	24.9	46.6	20.3	36.0	14.7	19.0	12.2	9.0	75.3	12.3
China Poot ^b				63.6	35.8	49.9	116.7	76.0	127.6	38.7	133.4	225.2	116.1
Tutka/Barabara	14.9	16.3	14.7	12.9	13.4	7.9	13.4	12.9	8.4	11.0	15.4	27.8	14.4
Seldovia Bay	2.6	3.2	3.5	2.5	1.8	4.3	4.0	3.3	4.4	2.7	4.2	11.9	12.5
Port Graham Bay	3.5	2.0	2.4	1.4	0	0	0	0	0	0	2.6	17.9	33.1
Kamishak/Douglas	0.7	7.6	2.3	5	0	0.1	7.0	9.9	1.3	3.4	2.7	0	2.6
McNeil (Mikfik)	67.0	27.5	21.4	14.6	7.0	9.1	12.9	4.0	0.9	0	0.1	0	0.2
Paint River	0	0	0	0	0	0	0.4	0	0	0	0	0	0
Chenik Lake	10.6	111.3	98.5	164.2	38.9	70.3	60.4	14.4	24.6	0	0	0	0
Bruin/Kirschner	0	0	0	0	0.2	14.5	55.9	40.5	39.7	31.9	33.6	31.6	9.0
Miscellaneous	0	0.4	1.6	0.2	0.8	2.4	0.1	0	1.5	0	0.2	0	0
Totals	278.7	234.9	248.8	319.0	163.3	203.9	317.9	176.6	233.8	115.4	265.4	449.7	240.2

^a Data source: ADF&G fish ticket database.

^b China Poot Subdistrict, which includes China Poot, Peterson, and Neptune Bays, was part of Halibut Cove Subdistrict prior to 1988.

Appendix Table 15. Harvest of sockeye salmon returning to China Poot Bay in the Southern District of Lower Cook Inlet, by user group, 1979 - 1997^a.

Return Year	Sport Harvest	Personal Use Harvest	Commercial Harvest	Non-harvested fish	Total Return
1979	650	0	^b	0	650
1980	1,000	1,000	12,000	0	14,000
1981	1,500	0	10,000	0	11,500
1982	450	1,320	200	1,430	3,400
1983	480	5,910	84,020	10	90,420
1984	500	2,000	114,360	500	117,360
1985	500	3,000	61,500	920	65,920
1986	100	150	18,350	200	18,800
1987	200	2,000	21,500	0	23,700
1988	500	1,500	91,469	470	93,939
1989	1,000	7,000	79,714	0	87,714
1990	500	3,000	49,587	0	53,087
1991	1,000	4,000	117,000 ^c	0	122,000
1992	300	3,500	89,791 ^c	0	93,591
1993	400	4,000	144,677 ^c	0	149,077
1994	500	8,500	50,527 ^c	0	59,527
1995	1,000	7,000	145,392 ^c	450	153,842
1996	1,000	9,000	200,000 ^c	441	210,441
1997	640 ^d	4,950 ^d	120,900 ^c	1,130	127,620
1979-96 Average	622	3,169	68,112	234	72,137

^a Through 1990, "Commercial Harvest" and "Total Return" includes returns only to Leisure Lake in China Poot Bay; after 1990, these figures include combined returns to both Leisure Lake in China Poot Bay and Hazel Lake in Neptune Bay.

^b No data.

^c Portions of the commercial sockeye harvest in China Poot, Halibut Cove, and Tutka Bay Subdistricts were attributed to the Leisure and/or Hazel Lake returns.

^d The final "Sport Harvest" and "Personal Use Harvest" estimates for 1997 were not available at the time of publishing, therefore figures presented here represent the recent 10-year averages.

Appendix Table 16. Commercial catch and escapement of sockeye salmon at Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 - 1997.

Return Year	Commercial Harvest	Escapement ^a	Total Return
1975	b	100	100
1976	b	900	900
1977	b	200	200
1978	b	100	100
1979	b	c	b
1980	b	3,500	3,500
1981	b	2,500	2,500
1982	b	8,000	8,000
1983	2,800	11,000	13,800
1984	16,500	13,000	29,500
1985	10,500	3,500	14,000
1986	111,000	7,000	118,000
1987	102,000	10,000	112,000
1988	164,200	9,000	173,200
1989	38,905	12,000	50,905
1990	70,347	17,000	87,347
1991	60,397	10,189	70,586
1992	13,793	9,269	23,062
1993	24,567	4,000	28,567
1994	0 ^d	808	808
1995	0 ^d	1,086	1,086
1996	0 ^d	2,990	2,990
1997	0 ^d	2,338	2,338
Average Since 1985	49,642	7,237	56,879

^a Estimated from aerial surveys from 1975-1990, weir counts from 1991-1997.

^b Closed to fishing.

^c No data.

^d Due to low returns, the Chenik Subdistrict was closed to fishing for the entire season.

Appendix Table 17. Commercial coho salmon catch in numbers of fish by district, Lower Cook Inlet, 1977 - 1997^a.

Year	Southern	Outer	Kamishak	Eastern	Total
1977	1,255	78	105	360	1,798
1978	4,318	45	1,584	582	6,529
1979	10,846	135	1,116	296	12,393
1980	11,568	16	2,495	426	14,505
1981	7,976	485	1,845	470	10,776
1982	7,165	92	38,685	950	46,892
1983	3,433	54	7,138	594	11,219
1984	3,193	41	13,027	536	16,797
1985	4,258	3,210	2,024	835	10,327
1986	3,095	5,052	9,935	770	18,852
1987	2,163	2,481	8,079	1,631	14,354
1988	2,987	2	4,471	486	7,946
1989	6,667	72	4	5,346	12,089
1990	1,552	74	26	7,645	9,297
1991	9,415	12	2,337	7,283	19,047
1992	1,277	1	1,488	3,136	5,902
1993	4,431	119	3	8,924	13,477
1994	1,373	993	1,897	10,410	14,673
1995	5,161	1,272	6,084	5,192	17,709
1996	9,543	96	1	3,932	13,572
1997	5,597	63	0	5,344	11,004
20-Year Avg.	5,084	717	5,117	2,990	13,908
1977-86 Avg.	5,711	921	7,795	582	15,009
1987-96 Avg.	4,457	512	2,439	5,399	12,807
1997 % of Total	50.86%	0.57%	0.00%	48.56%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 18. Commercial pink salmon catch in numbers of fish by district, Lower Cook Inlet, 1977 - 1997^a.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1991	253,962	359,664	47,833	167,250	828,709
1992	417,021	146	2,594	60,007	479,768
1993	692,794	159,159	4,205	10,616	866,774
1994	1,589,709	13,200	33	44,987	1,647,929
1995	2,475,312	192,098	169,054	12,000	2,848,464
1996	444,236	7,199	36	35	451,506
1997	2,685,764	128,373	293	1	2,814,431
20-Year Avg.	684,701	369,742	72,888	50,198	1,177,530
1977-86 Avg.	571,251	638,940	84,112	68,109	1,362,413
1987-96 Avg.	798,151	100,545	61,664	32,288	992,647
1997 % of Total	95.43%	4.56%	0.01%	0.00%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 19. Commercial pink salmon catch in thousands of fish by subdistrict during odd-numbered years, Lower Cook Inlet, 1959 - 1997^a.

Location	1959	1961	1963	1965	1967	1969	1971	1973	1975	1977
Humpy Creek	13.2	34.5	20.6	6.7	6.9	0.6	0	37.3	242.1	26.4
Halibut Cove and Lagoon		33.4	36.9	7.1	33.4	0	11.4	7.2	97.2	16.3
Tutka/Barabara	14.4	106.8	37.7	44.6	31.6	32.9	3.9	20.0	89.2	21.9
Seldovia Bay	4.9	15.1	1.6	19.2	11.7	28.8	27.4	19.4	429.6	47.6
Port Graham Bay	5.3	1.0	2.7	12.4	5.1	2.0	1.0	13.9	18.3	44.8
Dogfish Bay	1.6	0	0	0.1	2.3	0	10.4	0.3	0	5.0
Port Chatham	1.2	0	0.8	0	0	0	26.3	20.6	16.0	1.4
Windy Bay	3.1	2.2	0	5.4	0	0	57.3	68.5	18.1	173.2
Rocky Bay	2.3	0	1.4	0.1	0	0	0.1	0.2	0	11.6
Port Dick Bay	28.2	92.9	19.0	15.3	259.9	51.5	94.6	96.6	90.3	881.7
Nuka Bay	33.3	2.0	0.3	0	0.1	0	119.7	8.1	35.4	56.3
Resurrection Bay	8.4	0	0	0	1.2	0	0	0	0	0
Bruin Bay	0	0	12.3	0.9	2.1	0	11.7	0	0	6.2
Rocky/Ursus Coves	3.7	2.7	44.2	0	13.0	52.8	16.4	7.9	0	0
Iniskin/Cottonwood Bays	1.5	3.3	21.8	0	0.1	26.0	0	4.7	0	0.1
Miscellaneous	3.6	9.5	4.3	3.8	8.1	7.8	12.7	2.7	27.1	1.4
Total	124.7	303.4	203.6	115.6	375.5	202.4	392.9	307.4	1,063.3	1,293.9

Location	1979	1981	1983	1985	1987	1989	1991	1993	1995	1997
Humpy Creek	277.0	239.9	8.1	5.6	0	91.4	0	0.2	13.7	0
Halibut Cove and Lagoon	27.1	11.1	18.8	5.9	30.5	254.4	91.1	100.2	1.9	2.6
China Poot ^b						8.5	135.7	50.6	12.9	14.5
Tutka/Barabara	416.8	1,026.6	616.0	491.2	56.5	632.1	117.6	539.4	2,428.5	2,511.2
Seldovia Bay	140.8	126.4	43.3	3.8	1.2	1.1	0.3	2.4	8.2	12.3
Port Graham Bay	124.7	45.9	4.1	12.5	2.3	0	0	0	10.2	145.1
Dogfish Bay	7.4	22.9	0.2	0	0	0	0	0	0	0
Port Chatham	174.4	55.8	3.3	7.0	0	9.7	7.5	14.7	17.6	0
Windy Bay	552.7	2.9	0	4.8	0	0	49.1	43.4	111.2	93.2
Rocky Bay	122.2	16.5	1.3	0	0	0	0	0	27.5	0
Port Dick Bay	964.8	1,140.9	140.0	455.6	3.0	0	289.7	26.6	0	0.6
Nuka Bay	121.7	395.1	55.0	150.8	20.9	43.0	10.6	13.8	21.4	33.3
Resurrection Bay	0	32.6	27.1	74.6	11.8	0	0	0.7	0	0
Bruin Bay	40.3	51.9	0.3	0	1.2	202.8	45.1	0.1	104.8	0.3
Rocky/Ursus Coves	14.4	14.1	0	0	69.4	53.8	0	0	58.0	0
Iniskin/Cottonwood Bays	0.2	0	0.3	0	0.2	0	0	0	0	0
Miscellaneous	6.4	16.6	9.8	17.9	4.4	0.1	82.0	74.7	32.6	1.3
Total	2,990.9	3,199.2	927.6	1,229.7	201.4	1,296.9	828.7	866.8	2,848.5	2,814.4

^a Data source: ADF&G fish ticket database.

^b China Poot Subdistrict, including Neptune Bay, was part of Halibut Cove Subdistrict prior to 1988.

Appendix Table 20. Commercial pink salmon catch in thousands of fish by subdistrict during even-numbered years, Lower Cook Inlet, 1960 - 1996^{a,b}.

Location	1960	1962	1964	1966	1968	1970	1972	1974	1976	1978
Humpy Creek	51.0	73.9	53.5	24.6	2.6	85.2	1.7	33.3	3.3	16.3
Halibut Cove and Lagoon	20.7	35.5	28.9	16.0	41.3	28.9	0.4	2.2	69.8	27.8
Tutka/Barabara	87.6	279.5	100.9	53.5	26.9	43.9	5.2	5.5	18.0	167.9
Seldovia Bay	42.6	142.8	37.4	44.1	23.6	19.0	0.2	3.5	3.0	35.8
Port Graham Bay	7.1	18.1	38.4	5.1	23.0	19.6	1.1	4.5	3.9	4.0
Dogfish Bay	1.8	1.4	0.1	7.1	0	9.8	0.3	0	0	0.3
Port Chatham	15.7	102.2	67.1	6.7	10.0	1.9	0	0	0	0
Windy Bay	29.2	85.5	68.6	20.1	3.4	0.8	0	0	0	0
Rocky Bay	17.0	225.9	53.2	0	10.8	36.8	0	0	0	0
Port Dick Bay	257.4	1,118.3	526.3	296.8	55.0	336.5	0	0.6	0	63.6
Nuka Bay	26.6	129.8	23.8	0	90.2	48.4	0.3	0.7	0.1	6.3
Resurrection Bay	5.8	0.1	0.3	0	37.4	40.2	18.2	0	35.4	29.7
Bruin Bay	2.6	0	0	0	126.2	10.2	0	0	0	0
Rocky/Ursus Coves	6.6	3.2	13.5	2.9	18.0	7.5	0	0	0	0.1
Iniskin/Cottonwood Bays	2.1	3.2	4.3	0	9.9	3.5	0	0	0.1	0.1
Miscellaneous	37.8	28.9	39.1	102.3	107.1	14.0	1.3	0.3	2.8	0.7
Total	611.6	2,248.3	1,055.4	579.2	585.4	716.2	28.7	50.6	136.4	352.6

Location	1980	1982	1984	1986	1988	1990	1992	1994	1996	1998
Humpy Creek	48.6	4.9	53.5	116.7	0	0	0	0	0	
Halibut Cove and Lagoon	4.7	1.0	10.9	14.0	106.8	91.0	58.4	105.6	2.3	
China Poot ^c					5.4	46.1	35.7	24.2	8.2	
Tutka/Barabara	312.5	184.9	262.0	400.2	723.9	37.4	320.9	1,454.5	428.2	
Seldovia Bay	81.7	70.3	2.2	2.8	5.5	3.6	1.9	5.4	4.1	
Port Graham Bay	30.5	35.4	8.0	8.8	10.7	0	0	0	1.5	
Dogfish Bay	4.7	1.7	0.1	0	0	0	0	0	0	
Port Chatham	1.8	12.6	0	0	0	22.1	0	0	0	
Windy Bay	0	0	0	0	0	0	0	0	0	
Rocky Bay	1.4	0	0	0	0	0	0	0	0	
Port Dick Bay	133.3	44.0	84.6	304.0	5.9	169.1	0.1	1.6	0	
Nuka Bay	12.8	8.7	4.4	97.8	0.2	0.2	0	11.6	7.2	
Resurrection Bay	155.8	137.4	122.3	36.5	0.5	0	0	T	T	
Bruin Bay	100.6	13.3	125.2	349.7	5.0	0.4	1.9	T	T	
Rocky/Ursus Coves	0	20.2	8.5	71.1	49.9	0	0.3	0	0	
Iniskin/Cottonwood Bays	0.1	0.4	0.4	0.2	1.3	0	T	0	0	
Miscellaneous	0.2	16.8	18.5	6.5	6.2	60.6	60.6	45.0	0	
Total	889.7	551.6	700.6	1,408.3	921.3	383.7	479.8	1,647.9	451.5	

^a Data source: ADF&G fish ticket database.

^b "T" denotes trace, less than 50 fish harvested.

^c China Poot Subdistrict, including Neptune Bay, was part of Halibut Cove Subdistrict prior to 1988.

Appendix Table 21. Commercial chum salmon catch in numbers of fish by district, Lower Cook Inlet, 1977 - 1997^a.

Year	Southern	Outer	Kamishak	Eastern	Total
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	18,466	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
1991	1,962	14,337	7,853	80	24,232
1992	1,885	181	20,051	86	22,203
1993	2,788	970	600	9	4,367
1994	2,631	32	14	2,792	5,469
1995	4,530	474	10,302	330	15,636
1996	3,511	3	27	223	3,764
1997	4,260	1,575	7	66	5,908
20-Year Avg.	6,677	38,707	51,141	4,306	100,831
1977-86 Avg.	9,789	65,762	64,585	4,240	144,375
1987-96 Avg.	3,565	11,652	37,696	4,372	57,286
1997 % of Total	72.11%	26.66%	0.12%	1.12%	100.00%

^a Data source: ADF&G fish ticket database.

Appendix Table 22. Commercial chum salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1976 - 1997^{a,b}.

Location	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Tutka Bay	0.1	2.4	1.8	2.9	2.4	5.6	1.1	3.9	4.0	1.3	0.7	1.6	0.5
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	2.0
Dogfish Bay	4.9	0.4	0.1	0	0.2	0	0	7.0	15.3	0.1	0	50.9	114.5
Port Chatham	1.0	2.5	0	2.8	4.3	5.2	0	17.8	0	1.0	0	0.1	2.4
Rocky/Windy Bays	14.9	6.4	2.2	8.5	0.3	33.8	8.1	1.7	0	0.5	0	39.4	1.4
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	0.7
Nuka Bay	1.7	8.4	1.7	0.5	1.5	0	0	0	1.5	6.9	0	5.9	0.1
Resurrection Bay	0.1	0.5	0	0	0	0	0	0	0.1	0.7	0	0.6	0.4
Douglas River	0.2	0	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	0
McNeil River	0	0.4	0	0	0	2.7	0.90	0	0.4	8.3	4.4	1.9	0
Bruin Bay	0	0.3	0.5	0	0.1	0	0.4	0	1.0	7.5	0	12.8	1.6
Ursus/Rocky Coves	8.5	8.6	1.8	1.1	2.8	1.2	0	4.0	2.9	1.0	3.6	8.9	10.3
Cottonwood/Iniskin	12.1	33.4	10.2	41.7	10.9	10.9	0	0	19.0	25.5	44.4	71.9	14.5
Miscellaneous	22.6	0	0	5.8	1.4	1.4	2.5	28.5	2.2	5.4	1.0	2.4	0.2
Totals	110.8	116.1	55.6	179.3	138.5	323.3	28.1	129.1	85.4	75.1	61.2	242.4	148.6

Location	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Tutka Bay	1.3	0.8	1.4	2.0	0.9	0.8	2.6	2.7	1.8	7.9	8.3	9.9	3.4
Port Graham	3.2	2.6	1.0	2.2	0.5	5.0	2.4	4.3	2.5	11.2	7.4	1.7	3.6
Dogfish Bay	41.1	0.4	0	0	0	9.4	0	8.5	2.1	71.8	15.6	2.8	1.1
Port Chatham	0	0.4	0	0.6	0	0.1	0	1.7	1.3	59.6	16.2	2.1	0
Rocky/Windy Bays	0	0.9	0	0.3	0	17.7	0	76.7	2.1	7.4	0	3.2	0
Port Dick	0	33.4	8.1	6.8	0	25.6	10.3	79.0	19.0	85.8	30.3	18.0	1.9
Nuka Bay	2.3	40.8	3.9	3.6	0.4	17.4	0.4	14.7	7.8	3.8	0.9	0.8	0.2
Resurrection Bay	0.7	0	0	0	0	0	0.1	0	0.7	2.4	7.7	6.9	3.0
Douglas River	0	0	0	0.1	7.1	4.0	2.9	0.7	10.1	46.7	37.1	27.2	9.2
Kamishak River	2.4	0	1.8	0	10.5	0	23.9	17.8	2.8	8.6	9.2	23.9	16.2
McNeil River	2.3	0	2.0	0	16.9	38.5	4.9	6.5	6.3	11.6	32.6	67.9	12.0
Bruin Bay	1.8	0	0.7	0	0	0	0	4.0	11.0	1.7	1.3	2.6	5.9
Ursus/Rocky Coves	0.2	5.7	0	2.0	2.8	7.8	1.9	0.5	0.3	1.5	13.5	0	3.7
Cottonwood/Iniskin	19.7	29.9	0	2.8	11.5	15.3	14.9	0.2	5.4	3.5	21.6	21.4	23.0
Miscellaneous	0.5	0.6	0.3	1.2	0.2	4.2	9.2	1.2	0.4	2.6	3.5	3.9	9.3
Totals	75.5	115.5	19.2	21.6	50.8	145.8	73.5	218.5	73.5	336.1	198.0	192.3	92.5

Location	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Tutka Bay	3.2	3.9	3.9	4.7	2.5	1.5	0.8	0.6	0.9	0.8	1.6	1.0	1.1
Port Graham	1.3	0.8	0.4	1.2	0	0	0	0	0	0	0.7	0.7	2.0
Dogfish Bay	0	0	0	0	0	0	0	0	0	0	0	0	0
Port Chatham	1.3	0	0	0	0	0.1	0.1	0	0.1	0	T	0	0
Rocky/Windy Bays	0	0	0	0	0	0	0.5	0	0.1	0	0.4	0	1.6
Port Dick	9.6	10.4	27.1	64.4	0	0.5	13.7	0.2	0.7	T	0	0	0
Nuka Bay	0.8	1.3	1.6	6.8	0	T	T	0	T	T	0.1	T	T
Resurrection Bay	3.0	3.5	13.9	23.9	0	0	0	0	0	2.5	0.3	0.2	0
Douglas River	8.0	11.6	23.7	24.8	0	0.1	3.0	12.5	T	T	0.7	0	0
Kamishak River	0.1	0.1	24.6	26.7	0	T	0.7	1.5	0	0	0.1	0	0
McNeil River	0	13.7	32.9	104.0	0.1	0.1	0.1	2.0	0.4	0	0	0	T
Bruin Bay	0	5.4	0.1	2.8	4.4	0.1	2.6	0.8	T	0	4.9	T	T
Ursus/Rocky Coves	0	22.1	17.2	20.7	3.4	0	0	2.7	0	0	2.2	0	0
Cottonwood/Iniskin	0	8.8	9.7	39.2	0	0	1.0	0.2	0	0	2.3	0	0
Miscellaneous	3.3	1.1	1.9	2.7	0.9	4.7	1.7	1.6	2.1	2.1	2.3	1.9	1.2
Totals	30.6	82.7	157.0	321.9	11.3	7.0	24.2	22.2	4.4	5.5	15.6	3.8	5.9

^a Data source: ADF&G fish ticket database.

^b "T" denotes trace, less than 50 fish harvested.

Appendix Table 23. Estimated sockeye salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1977 - 1997^a.

Year	English Bay	Delight Lake	Desire Lake	Bear Lake ^{b,c}	Aialik Lake	Mikfik Lake	Chenik Lake	Amakd. Creek	Kamish. Rivers	Douglas River	Total
1977	12.5	5.2	10.7	0.0	5.0	9.8	0.2	2.6	^d	2.6	48.6
1978	13.5	8.0	10.0	0.0	3.0	12.0	0.1	2.6	^d	^d	49.2
1979	4.4	8.0	12.0	0.0	5.0	6.0	0.0	1.0		^d	36.4
1980	12.0	10.0	17.0	1.5	6.6	6.5	3.5	2.6	^d	0.4	60.1
1981	10.5	7.3	12.0	0.7	1.8	5.3	2.5	1.9	^d	0.2	42.2
1982	20.0	25.0	18.0	0.5	22.4	35.0	8.0	3.2	1.0	4.2	137.3
1983	12.0	7.0	12.0	0.7	20.0	7.0	11.0	1.2	0.4	0.5	71.8
1984	11.1	10.5	15.0	0.5	22.0	6.0	13.0	1.4	0.1	0.0	79.6
1985	5.0	26.0	18.0	1.1	8.0	20.0	3.5	0.9	0.8	0.0	83.3
1986	2.8	13.0	10.0	0.8	7.6	7.8	7.0	1.9	5.0	0.2	56.1
1987	7.0	10.5	13.4	0.3	9.2	9.0	10.0	1.1	^d	0.1	60.6
1988	2.5	1.2	9.0	0.1	13.0	10.1	9.0	0.4	0.5	0.0	45.8
1989	4.5	7.7	9.0	0.1	6.5	11.5	12.0 ^c	1.2	0.5	0.6	53.6
1990	3.3	5.2	9.5	0.1	5.7	8.8	17.0	1.8	0.2	0.6	52.2
1991	7.0	4.1	8.2	0.7	3.7	9.7	10.2 ^c	1.9	0.7	^d	46.2
1992	6.4	5.9	11.9	1.9	2.5	7.8	9.3 ^c	1.9	4.9	0.2	52.7
1993	8.9	5.6	11.0	5.0	3.0	6.4	4.0 ^c	2.0	4.1	^d	50.0
1994	13.8 ^c	5.6	10.5	8.6	7.3	9.5	0.8 ^c	0.8	^d	^d	56.9
1995	22.5 ^c	15.8	15.8	8.3	2.6	10.1	1.1 ^c	2.4	^d	^d	78.6
1996	12.4 ^c	7.7	9.4	8.0	3.5	10.5	3.0 ^c	2.9	1.8	0.6	55.8
1997	15.4	27.8 ^c	14.7 ^c	7.9	11.4	8.5	2.3 ^c	1.5	^d	^d	89.5
<hr/>											
20-Year											
Average	9.6	9.5	12.1	1.9	7.9	10.2	6.3	1.8	1.7	0.7	61.7
1977-86											
Average	10.4	12.0	13.5	0.6	10.1	11.5	4.9	1.9	1.5	1.0	67.4
1987-96											
Average	8.8	6.9	10.8	3.3	5.7	8.9	7.6	1.6	1.8	0.4	55.9
Esc. Goal	10-20	10	10	1	2.5-5	5-7	10	1	^e	^e	49.5-64

^a Unless otherwise noted, 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.

^c Weir counts.

^d Insufficient survey data to generate escapement information.

^e No formal escapement goal established.

Appendix Table 24. Estimated pink salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1960 - 1997^a.

Location	Y E A R										
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Humpy Creek	10.0	22.6	56.0	34.7	18.5	28.0	30.0	25.0	24.7	5.4	55.2
China Poot Creek	9.0	2.0	26.0	—	—	—	—	2.5	6.0	0.2	1.5
Tutka Lagoon Creek	15.0	15.0	30.0	10.0	20.0	20.0	12.0	7.0	7.9	6.5	6.5
Barabara Creek	2.0	0.1	1.5	0.1	—	—	5.0	—	2.0	0.9	0.4
Seldovia River	25.0	25.0	50.0	13.0	60.0	30.0	86.0	55.0	53.2	60.0	23.0
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
Dogfish Lagoon	2.0	—	3.0	—	—	—	—	—	—	—	—
Port Chatham Creeks	4.0	7.0	7.0	—	—	—	10.0	—	—	—	3.0
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
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
Rocky River	130.0	2.0	200.0	12.0	80.0	0.3	44.0	1.0	43.1	1.0	32.0
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
Island Creek	23.2	2.0	15.0	3.6	30.0	0.5	7.0	0.5	4.3	0.1	5.5
South Nuka Island Creek	20.0	2.0	22.0	0.1	10.0	—	10.0	—	10.0	3.0	11.0
Desire Lake Creek	—	—	18.0	—	1.3	—	—	—	—	—	—
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
Sunday Creek	1.5	—	5.0	2.0	—	—	20.0	—	—	1.0	2.0
Brown's Peak Creek	—	—	25.0	10.0	20.0	10.0	11.0	—	—	2.0	—
Totals	387.1	111.7	1,181.6	237.2	392.6	152.3	379.0	129.0	220.3	128.9	261.3

-continued-

Appendix Table 24. (page 2 of 4)

Location	Y E A R										
	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Humpy Creek	45.0	13.8	36.9	17.4	64.0	27.2	86.0	46.1	200.0	64.4	115.0
China Poot Creek	2.1	1.0	6.0	5.2	21.6	2.0	3.9	11.2	20.6	12.3	5.0
Tutka Lagoon Creek	16.7	1.5	6.5	2.6	17.6	11.5	14.0	15.0	10.6	17.3	21.1
Barabara Creek	4.0	0.6	—	0.2	22.7	0.2	5.7	1.4	10.0	5.8	16.8
Seldovia River	31.1	5.8	14.5	13.7	36.2	25.6	35.7	24.6	43.7	65.5	62.7
Port Graham River	13.2	2.4	7.0	2.8	27.3	6.5	20.6	6.7	32.7	40.2	18.4
Dogfish Lagoon	0.3	—	1.0	—	2.3	—	8.1	0.6	7.3	0.3	2.6
Port Chatham Creeks	15.5	1.0	5.0	0.2	7.7	—	14.2	0.3	20.8	7.7	11.2
Windy Right Creek	13.0	0.1	4.6	0.1	18.7	0.2	11.1	0.3	10.4	3.3	4.7
Windy Left Creek	35.4	0.4	12.9	0.1	9.7	0.2	47.3	1.1	74.8	10.9	31.3
Rocky River	1.6	8.2	2.0	1.5	4.4	2.7	36.7	8.2	85.0	6.4	25.0
Port Dick Creek	97.8	10.0	26.4	1.5	62.8	12.7	109.3	44.9	116.0	56.1	106.0
Island Creek	0.1	1.7	0.5	0.5	0.1	—	0.6	0.4	0.6	2.2	25.0
South Nuka Island Creek	14.0	0.3	16.0	—	28.0	—	12.0	—	15.0	0.3	16.0
Desire Lake Creek	30.0	0.3	3.0	—	0.4	0.6	0.8	1.0	3.0	16.0	5.0
James Lagoon	—	—	—	—	—	—	—	—	—	4.6	14.0
Aialik Lagoon	—	—	—	0.1	—	0.4	—	—	—	—	—
Bear Creek	—	0.5	—	4.9	—	10.0	—	7.8	—	13.3	0.4
Salmon Creek	—	—	—	—	—	16.9	—	11.0	—	15.5	0.1
Thumb Cove	—	—	—	1.1	—	2.0	—	2.0	—	1.2	1.0
Humpy Cove	—	—	—	0.6	—	1.4	—	0.9	—	5.7	0.4
Tonsina Creek	—	—	—	1.4	—	5.7	—	1.5	—	0.7	0.2
Big Kamishak River	—	—	15.0	1.0	—	8.0	—	12.0	10.0	2.0	—
Little Kamishak River	—	—	13.0	—	—	6.0	—	0.4	3.5	0.6	—
Amakdedon Creek	—	0.2	3.0	1.0	5.0	—	—	0.9	6.0	3.8	1.5
Bruin Bay River	22.0	2.5	2.0	0.6	20.0	13.5	60.0	33.0	200.0	400.0	95.0
Sunday Creek	43.0	2.0	5.0	0.1	20.0	0.3	9.0	0.2	12.0	5.2	14.2
Brown's Peak Creek	8.0	1.2	3.2	0.1	10.0	1.2	13.0	0.9	15.0	2.3	17.7
Totals	392.8	53.5	183.5	56.7	378.5	154.8	488.0	232.4	897.0	763.6	610.3

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Appendix Table 24. (page 3 of 4)

Location	Y E A R										
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Humpy Creek	31.9	104.0	84.2	117.0	49.7	26.6	21.4	93.0	27.0	17.4	14.9
China Poot Creek	3.1	14.1	8.4	1.9	11.5	3.1	3.9	8.5	4.2	2.6	4.1
Tutka Lagoon Creek	18.5	12.9	10.5	14.0	13.4	4.8	11.2	11.9	38.5	16.8	26.7
Barabara Creek	2.1	14.8	1.0	1.6	1.8	0.3	0.7	4.5	3.9	10.9	2.2
Seldovia River	38.4	27.9	14.2	22.8	28.2	7.6	16.9	26.2	27.8	30.0	14.7
Port Graham River	28.9	4.6	10.9	26.3	17.5	3.8	7.9	19.1	20.1	29.0	5.4
Dogfish Lagoon	2.6	1.0	0.6	0.2	0.4	1.2	0.3	0.2	7.1	9.3	^c
Port Chatham Creeks	2.0	3.5	7.8	8.9	11.5	10.2	21.0	31.7	27.8	23.8	4.3
Windy Right Creek	4.7	4.3	3.4	5.4	2.5	2.0	1.3	6.6	7.1	20.7	3.9
Windy Left Creek	4.4	11.9	2.5	8.9	2.2	5.6	3.4	25.2	7.5	34.5	8.2
Rocky River	6.6	16.6	9.0	12.1	12.0	4.5	5.4	10.3	18.0	26.1	25.4
Port Dick Creek	19.9	64.1	44.6	65.3	41.6	4.5	12.0	55.4	41.7	54.2	6.9
Island Creek	15.0	15.3	35.0	27.9	16.6	0.1	7.2	6.7	25.0	24.4	12.5
South Nuka Island Creek	0.4	22.2	0.6	3.6	7.0	2.8	1.2	7.3	13.3	16.4	6.1
Desire Lake Creek	12.0	8.5	23.0	62.5	32.0	11.0	2.5	47.0	1.0	1.3	0.4
James Lagoon	6.0	5.1	4.0	9.0	6.6	1.1	1.7	4.9	3.8	4.4	0.4
Aialik Lagoon	5.0	3.0	4.0	9.4	6.0	1.5	0.7	0.8	—	—	^c
Bear Creek	7.9	0.8	7.7	4.1	14.0	3.5	0.2	1.7	4.4	15.4 ^b	2.3
Salmon Creek	21.0	0.5	10.2	2.1	8.3	1.7	0.1	1.6	—	^b	5.3
Thumb Cove	7.9	4.9	4.2	14.5	4.0	2.7	0.3	4.2	—	3.4	0.4
Humpy Cove	4.0	2.0	2.5	5.0	0.9	0.3	0.4	1.0	3.8	—	^c
Tonsina Creek	7.5	5.4	6.0	48.2	11.2	3.4	0.1	0.5	1.2	0.3	^c
Big Kamishak River	5.0	—	—	—	5.0	—	1.0	—	—	—	^c
Little Kamishak River	2.2	—	0.1	1.6	2.0	—	0.5	—	—	0.9	^c
Amakdedori Creek	6.3	0.2	—	1.0	6.0	0.4	1.0	2.0	0.1	0.7	3.2
Bruin Bay River	75.0	4.0	110.0	3.5	1,200.0	24.0	29.0	350.0	19.0	74.9	3.2
Sunday Creek	12.0	4.7	12.0	11.4	109.0	29.7	18.0	103.0	2.8	20.9	2.9
Brown's Peak Creek	3.5	1.7	6.8	7.0	28.0	40.2	17.0	120.0	1.0	16.7	5.0
Totals	353.8	358.0	423.2	495.2	1,648.9	196.6	186.3	943.3	306.1	455.0	158.4

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Appendix Table 24. (page 4 of 4)

Location	Y E A R									1960-96	Escapement
	1993	1994	1995	1996	1997	1998	1999	2000	Average	Goal	
Humpy Creek	36.0	14.1	89.3	9.0	78.3				47.6	25-50	
China Poot Creek	1.6	5.7	2.0	2.8	2.8				6.5	5	
Tutka Lagoon Creek	27.4	14.5	15.9	3.5	45.0				14.2	6-10	
Barabara Creek	11.9	4.5	10.8	2.4	12.5				4.6	18-24	
Seldovia River	43.4	24.4	48.5	17.8	39.1				33.2	25-35	
Port Graham River	12.8	7.6	10.0	7.0	12.5				14.8	20-40	
Dogfish Lagoon	0.3	1.3	13.3	2.3	20.0				2.8	-	
Port Chatham Creeks	22.2	3.3	14.0	8.6	42.7				10.5	10-15	
Windy Right Creek	13.6	2.2	11.4	9.9	13.9				6.2	10	
Windy Left Creek	25.9	3.0	31.6	2.5	64.6				13.6	30-50	
Rocky River	70.0	17.1	56.3	80.1	48.1				29.6	50	
Port Dick Creek	37.0	18.1	6.6	23.2	36.9				39.3	20-100	
Island Creek	12.1	28.3	10.6	40.1	71.1				11.1	12-18	
South Nuka Island Creek	34.3	1.4	6.2	6.8	9.3				10.0	10	
Desire Lake Creek	19.3	—	—	—	6.2				12.5	10-20	
James Lagoon	3.3	0.8	0.6	—	—				4.4	5-10	
Aialik Lagoon	—	—	1.1	—	—				4.2	5	
Bear Creek	6.6 ^b	34.8 ^b	38.6 ^b	8.0 ^b	6.3 ^b				8.0	5	
Salmon Creek	^b	^b	^b	^b	^b				7.3	10	
Thumb Cove	5.5	10.8	9.3	9.5	4.7				4.7	4	
Humpy Cove	0.9	2.2	1.8	3.4	2.2				2.1	2	
Tonsina Creek	3.2	7.0	0.5	0.4	0.4				5.1	5	
Big Kamishak River	—	—	—	16.7	—				24.2	20	
Little Kamishak River	—	—	—	—	—				11.1	20	
Amakdedon Creek	1.7	0.7	4.5	—	1.7				8.2	5	
Bruin Bay River	86.4	5.9	307.3	27.5	162.7				108.4	25-50	
Sunday Creek	57.8	3.1	95.9	2.8	52.5				19.6	10	
Brown's Peak Creak	41.6	1.3	96.7	2.4	42.3				16.9	10	
Totals	574.8	212.1	882.8	286.7	775.8				412.8	377-593	

^a Escapement estimates are derived from periodic ground surveys with stream life factors applied, or from periodic aerial surveys. Aerial survey estimates after 1990 incorporate stream life factors; prior to 1990, aerial estimates are peak aerial survey counts adjusted for survey conditions and time of surveys.

^b Escapement figure for Bear Creek represents the combined escapement for Bear and Salmon Creeks.

^c Insufficient data for escapement estimates.

Appendix Table 25. Estimated chum salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1977 - 1997^a.

Year	Port Graham	Dogfish Lagoon	Rocky River	Pt. Dick Head	Island Creek	Big Kamishak	Little Kamishak	McNeil River	Bruin Bay	Ursus Cove	Cotton- wood	Iniskin Bay	Total
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	3.0	8.6	0.3	9.0	7.8	15.0	13.0	49.0	7.0	9.4	16.0	9.5	147.6
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
1991	1.1	3.1		7.4	17.3	8.7	8.4	10.0	6.0	1.3	7.7	8.3	79.3
1992	1.4	0.8	1.7	5.4	6.7	4.5	7.1	19.2	8.5	1.7	6.1	3.4	66.5
1993	2.5	5.4	0.1	2.5	3.6	9.1	6.3	17.4	6.0	7.7	12.0	8.0	78.8
1994	5.2	11.3	1.9	3.5	8.8	—	9.0	15.0	6.1	6.2	10.2	18.9	96.1
1995	3.8	4.2	5.1	3.3	7.7	^b	^b	14.4	6.6	11.1	12.0	22.7	90.9
1996	3.7	6.7	2.0	2.3	6.9	11.1	4.4	16.1	14.9	7.6	16.1	7.8	99.6
1997	4.1	12.7	1.1	1.9	5.2	—	—	27.5	8.8	6.2	5.6	15.4	88.5
20-Year Avg.	2.6	5.7	6.1	4.1	12.0	14.8	12.6	22.3	8.3	7.2	9.2	9.3	114.1
1977-86 Avg.	2.6	6.9	10.2	3.8	16.1	17.6	15.6	23.7	9.0	8.0	7.4	8.4	129.1
1987-96 Avg.	2.6	4.5	1.5	4.4	7.9	11.6	9.6	20.9	7.7	6.5	10.9	10.2	98.3
Esc. goal	4-8	5-10	20	4	10-15	20	20	20-40	5-10	5-10	10	10	133-177

^a Escapement estimates are derived from periodic ground surveys with stream life factors applied, or from periodic aerial surveys. Aerial survey estimates after 1990 incorporate stream life factors; prior to 1990, aerial estimates are peak aerial survey counts adjusted for survey conditions and time of surveys.

^b Insufficient data to generate escapement estimates.

Appendix Table 26. Personal use/subsistence set gillnet salmon catch in numbers of fish by species and effort, Southern District, Lower Cook Inlet, 1969 - 1997^a.

Year	Permits Issued	Permits Returned		Permits		Total			Catch			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 ^b	4,765
1981	384	374	97.4	274	100	25	64	4,314	732	89	100	5,324
1982	395	378	95.7	307	71	39	46	7,303	955	123	8	8,474
1983	360	328	91.1	210	118	4	21	2,525	330	40	2	2,922
1984	390	346	88.7	219	127	4	25	3,666	821	87	25	4,628
1985	316	302	95.6	205	97	5	43	3,372	166	35	3	3,624
1986	338	310	91.7	247	63	7	68	3,831	3,132	56	0	7,094
1987	361	338	93.6	249	89	5	50	3,977	279	61	0	4,372
1988	438	404	92.2	287	117	14	60	4,877	1,422	75	0	6,448
1989	466	452	97.0	332	120	41	156	7,215	882	53	49	8,396
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	2,277	643	21	0	3,009
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
69-96												
Avg.	310	290	93.4	201	88	27	54	3190	773	48	34	4,125

^a Figures after 1991 include information from both returned permits and inseason oral reports.

^b Steelhead trout (*Onchorhynchus mykiss*).

Appendix Table 27. Summary of personal use/subsistence salmon gillnet fishermen in the Southern District of Lower Cook Inlet (excluding the Port Graham/Nanwalek subsistence fishery and the Seldovia subsistence fishery) by area of residence, 1977 - 1997.

Year	Homer/ Fritz Cr.		Anchorage Area ^a		Halibut Cove		Anchor Pt./ Ninilchik		Seldovia		Pt. Graham/ Nanwalek		Kenai/ Soldotna		Other		Total Permits Issued
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1977	153	77.3	8	4.0	8	4.0	17	8.6	7	3.5	0	0.0	2	1.0	3	1.5	198
1978	214	68.8	40	12.9	5	1.6	30	9.6	12	3.9	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	0.0	11	2.5	20	4.5	440
1980	310	57.9	81	15.1	0	0.0	80	15.0	7	1.3	0	0.0	42	7.9	13	2.4	535
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	0.0	7	1.8	21	5.3	395
1983	267	77.8	24	7.0	3	0.9	33	9.6	8	2.3	0	0.0	0	0.0	8	2.3	343
1984	266	72.1	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	4.7	6	1.9	33	10.4	6	1.9	0	0.0	2	0.6	3	0.9	316
1986	280	82.8	18	5.3	4	1.2	29	8.6	1	0.3	0	0.0	1	0.3	5	1.5	338
1987	284	78.7	25	6.9	3	0.8	37	10.2	7	1.9	0	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	0.0	10	2.3	0	0.0	438
1989	348	74.7	36	7.7	5	1.1	51	10.9	8	1.7	0	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	0.0	6	1.0	13	2.2	578
1991	384	81.4	27	5.7	8	1.7	41	8.7	6	1.3	0	0.0	4	0.8	2	0.4	472
1992	302	82.7	21	5.8	5	1.4	32	8.8	3	0.8	0	0.0	1	0.3	1	0.3	365
1993	242	74.2	25	7.7	5	1.5	44	13.5	3	0.9	0	0.0	5	1.5	2	0.6	326
1994	235	82.2	20	7.0	4	1.4	21	7.3	1	0.3	0	0.0	1	0.3	4	1.4	286
1995	191	81.3	15	6.4	7	3.0	20	8.5	1	0.4	0	0.0	0	0.0	1	0.4	235
1996	241	80.6	16	5.4	7	2.3	26	8.7	3	1.0	1	0.3	2	0.7	3	1.0	299
1997	232	84.1	13	4.7	3	1.1	20	7.2	4	1.4	0	0.0	1	0.4	3	1.1	276
20-Year Avg.	280	75.0	30	7.9	5	1.4	40	10.8	5	1.4	0	0.1	6	1.7	6	1.7	373
1977-86 Avg.	259	71.3	34	9.2	5	1.4	43	11.7	5	1.4	1	0.1	9	2.4	8	2.3	363
1987-96 Avg.	301	78.6	26	6.7	5	1.4	38	9.9	5	1.3	0	0.0	4	1.0	4	1.1	383

^a After 1989, "Anchorage Area" includes Mat-Su Valley, Eagle River, Chugiak, and or Fort Richardson.

Appendix Table 28. Subsistence salmon catch in numbers of fish by species for the village of Port Graham, Lower Cook Inlet, 1981 - 1997^a.

Year	SALMON HARVEST					Total	Households Reporting ^b
	Chinook	Sockeye	Coho	Pink	Chum		
1981 ^c	116	1,694	625	298	150	2,883	47
1982 ^b	98	798	508	851	193	2,448	38
1983 ^d	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	^e
1986 ^b	118	279	179	234	13	823	36
1987 ^f	21	186	574	264	69	1,114	31
1988 ^g	90	380	447	577	88	1,582	31
1989	48	94	555	524	46	1,267	32
1990	180	472	811	1,107	68	2,638	31
1991	178	61	355	1,454	173	2,221	32
1992 ^b	127	100	449	707	167	1,550	^e
1993 ^b	248	153	396	978	130	1,905	27
1994 ^b	267	246	872	858	452	2,695	43
1995 ^b	441	398	345	679	364	2,227	49 ^h
1996 ^b	251	669	373	267	227	1,787	45
1997 ^c							
1981-96 Average	151	573	455	577	140	1,895	36

^a Data source: ADF&G, Subsistence Division, data files.

^b Prior to 1995, figures represent only the single highest monthly total of households that *actually fished* over the course of the season; beginning in 1995, figures represent the total number of different households reporting over the course of the entire season, even if they did not fish.

^c Data include both subsistence set gillnet and rod/reel/handline harvest.

^d Data include only subsistence set gillnet harvest.

^e No data available.

^f 46% set gillnet harvest, 54% rod/reel harvest.

^g 51% set gillnet harvest, 49% rod/reel harvest.

^h Salmon totals and households include 3 reports from non-residents of Port Graham village.

Appendix Table 29. Subsistence salmon catch in numbers of fish by species for the village of Nanwalek (formerly English Bay), Lower Cook Inlet, 1981 - 1997^a.

Year	SALMON HARVEST					Total	Households Reporting ^b
	Chinook	Sockeye	Coho	Pink	Chum		
1981 ^c	24	1,075	314	621	19	2,053	29
1982 ^b	13	1,584	1,305	1,850	36	4,788	31
1983 ^d	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	°
1986 ^b	4	378	296	825	2	1,505	21
1987 ^f	2	626	322	476	45	1,471	21
1988 ^g	8	609	385	1,185	35	2,222	26
1989	0	60	651	868	0	1,579	29
1990	46	636	616	1,968	49	3,315	30
1991	4	574	1,508	3,087	46	5,219	35
1992 ^b	72	430	570	519	59	1,650	°
1993 ^b	24	1,018	570	1,703	115	3,430	21
1994 ^b	29	642	512	1,127	49	2,359	25
1995 ^b	77	1,126	150	431	0	1,784	29
1996 ^b	55	1,054	560	437	25	2,131	25
1997 ^c							
1981-96 Average	24	845	565	1011	31	2,476	27

^a Data source: ADF&G, Subsistence Division, data files.

^b Prior to 1995, figures represent only the single highest monthly total of households that *actually fished* over the course of the season; beginning in 1995, figures represent the total number of different households reporting over the course of the entire season, even if they did not fish.

^c Data include both subsistence set gillnet and rod/reel harvest.

^d Data include only subsistence set gillnet harvest.

^e No data available.

^f 63% set gillnet harvest, 37% rod/reel harvest.

^g 37% set gillnet harvest, 63% rod/reel harvest..

Appendix Table 30. 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 - 1997.

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	2.370		9.910
1993	2.000	1.000	1.400	0.500	0.250		0.250	0.250	0.250		0.581	1.813		8.294
1994	0	0	0	0	0		0.300	0	0		0.800	0.170		1.270
1995	1.632	1.061	1.129	0.337	0.251		0.251	0.251	0.252		0	0.360		5.524
1996	1.490	1.030	0.951	0.500	0		0.250	0.250	0.250		0.155	0.864	0.217	5.957
1997	2.000	1.000	0				0.250				0.199	0.788	2.425	6.662
AVG.	1.819	0.942	1.635	0.540	0.261	0.507	0.335	0.250	0.200	0.452	0.327	1.398	1.321	9.989

- continued -

Appendix Table 30. (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 Spit 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
AVG.	40.040	4.750	0.306	45.096	0.101	0.096	0.159	0.122	0.478	0.148	0.061	0.118	0.327

Appendix Table 31. Catch of Pacific herring in short tons and effort in number of permits by district in the commercial sac roe seine fishery, Lower Cook Inlet, 1977 - 1997^a.

Year	<u>Southern</u>		<u>Kamishak</u>		<u>Eastern</u>		<u>Outer</u>		<u>Total</u>	
	Tons	Permits	Tons	Permits	Tons	Permits	Tons	Permits	Tons	Permits
1977	291	13	2,908	57	---	---	---	---	3,199	58
1978	17	7	402	44	---	---	---	---	419	44
1979	13	3	415	35	---	---	---	---	428	36
1980	---	---	---	---	---	---	---	---	---	---
1981	---	---	---	---	---	---	---	---	---	---
1982	---	---	---	---	---	---	---	---	---	---
1983	---	---	---	---	---	---	---	---	---	---
1984	---	---	---	---	---	---	---	---	---	---
1985	---	---	1,132	23	204	7	12	2	1,348	29
1986	---	---	1,959	54	167	4	28	3	2,154	57
1987	---	---	6,132	63	584	4	202	9	6,918	69
1988	---	---	5,548	75	0	0	0	0	5,548	75
1989	170	6	4,801	75	0	0	0	0	4,971	75
1990	---	---	2,264	75	---	---	---	---	2,264	75
1991	---	---	1,992	58	0	0	0	0	1,992	58
1992	---	---	2,282	56	0	0	0	0	2,282	56
1993	---	---	3,570	60	---	---	---	---	3,570	60
1994	---	---	2,167	61	---	---	---	---	2,167	61
1995	---	---	3,378	60	---	---	---	---	3,378	60
1996	---	---	2,984	62	---	---	---	---	2,984	62
1997	---	---	1,746	45	---	---	---	---	1,746	45
<hr/>										
20-Year										
Average	67	5	2,788	57	136	2	35	2	2,887	58
<hr/>										
1977-86										
Average	15	5	977	39	---	---	---	---	1,087	42
<hr/>										
1987-96										
Average	170	6	3,512	65	117	1	40	2	3,607	65

^a Data source: ADF&G fish ticket database.

Appendix Table 32. Preseason estimates of biomass and projected commercial sac roe seine harvests, and actual harvests, for Pacific herring (*Clupea pallasii*) in short tons, average roe recovery, numbers of permits making landings, and exvessel value in millions of dollars, Kamishak Bay District, Lower Cook Inlet, 1978 - 1997.

Year	PRESEASON		Actual Commercial Harvest (st) ^a	Average Roe %	No. of Permits w/Landings	Exvessel Value ^b (\$\$ millions)
	Forecasted Biomass (st)	Projected Harvest (st) ^a				
1978	^c	^d	402	---	44	^e
1979	^c	^d	415	---	36	^e
1980	^c	---	CLOSED	---	---	---
1981	^c	---	CLOSED	---	---	---
1982	^c	---	CLOSED	---	---	---
1983	^c	---	CLOSED	---	---	---
1984	^c	---	CLOSED	---	---	---
1985	^c	^d	1,132	11.3	23	1.0
1986	^c	^d	1,959	10.4	54	2.2
1987	^c	3,833	6,132	11.3	63	8.4
1988	^c	5,190	5,548	11.1	74	9.3
1989	37,785	5,000	4,801	9.5	74	3.5 ^f
1990	28,658	2,292	2,264	10.8	75	1.8
1991	17,256	1,554	1,992	11.3	58	1.3
1992	16,431	1,479	2,282	9.7	56	1.4
1993	28,805	2,592	3,570	10.2	60	2.2
1994	25,300	3,421	2,167	10.6	61	1.5
1995	21,998	2,970	3,378	9.8	60	4.0
1996	20,925	2,250	2,984	10.1	62	6.0 ^f
1997	25,300	3,420	1,746	9.3	45	0.4
1978-96						
Average	24,645	3,058	2,788	10.5	57	3.6

^a Kamishak Bay allocation only, does not include Shelikof Strait food/bait allocation.

^b Exvessel values exclude any postseason retroactive adjustments (except where noted).

^c Prior to 1989, preseason forecasts of biomass were not generated.

^d Prior to 1987, preseason harvest projections were not generated.

^e Data not available.

^f Includes retroactive adjustment.

Appendix Table 33. Summary of herring sac roe seine fishery openings and commercial harvests in the Kamishak Bay District of Lower Cook Inlet, 1969 - 1997.

Year	Dates of Openings	Total Hrs. Open	Harvest (short tons)	Catch Rate (short tons/hour open)	Number of Permits w/Landings
1969-73	No closed periods				
1974	1/1 - 5/20		2,114		26
1975	1/1 - 6/6	(Closed Iniskin Bay 5/17)	4,119		40
1976	1/1 - 5/21	(Closed Iniskin Bay 5/17; reopened Kamishak 6/2)	4,824		66
1977	1/1 - 5/31	(Closed Kamishak Dist. 5/12; reopened 5/14 - 5/17; reopened 5/29 - 5/31)	2,908		57
1978 ^a	4/16 - 5/31	96	402	4.2	44
1979	5/12 - 5/15	72	415	5.8	36
1980 through 1984	CLOSED	0	0		
1985	4/20 - 6/15	1,350 (56.2 days)	1,132	0.8	23
1986	4/20 - 6/13	1,303 (54.3 days)	1,959	1.5	54
1987	4/21 - 4/23	65	6,132	94.3	63
1988	4/22 - 4/29	42	5,548	132.1	74
1989	4/17 - 4/30	24.5	4,801	196.0	74
1990	4/22 - 4/23	8	2,264	283.0	75
1991	4/26	1	1,922	1,922.0	58
1992	4/24	0.5	2,282	4,564.0	56
1993	4/21	0.75	3,570	4,760.0	60
1994	4/25	0.5	778	1,556.0	35
	4/29	1.0	1,338	1,338.0	53
1995	4/27	0.5	1,685	3,370.0	45
	4/28	1.0	1,693	1,693.0	44
1996	4/24	0.5	2,984	5,968.0	62
1997	4/25 ^b	0.5	0	0	0
	4/29	1.5	1,580	1,053.3	42
	4/30	8.0	61	7.6	^c
	5/1	12.0	51	4.3	4
	5/22 ^d	^d	54	54	^d

^a Management by emergency order began.

^b Despite the open fishing period, the entire fleet collectively agreed not to fish due to ongoing price negotiations with processors.

^c To comply with AS 16.05.815 CONFIDENTIAL NATURE OF CERTAIN REPORTS AND RECORDS, effort data has been masked where fewer than four vessels fished in a given area.

^d ADF&G test fishing harvest.

Appendix Table 34. Estimates of Pacific herring (*Clupea pallasii*) total biomass in short tons using two different methods, actual commercial sac roe seine harvest in short tons, and percent exploitation, Kamishak Bay District, Lower Cook Inlet, 1978 - 1997.

Year	Aerial Survey Total Biomass Estimate (st) ^a	ASA Model Total Biomass Estimate (st) ^{b,c}	Actual Commercial Harvest (st)	Estimated Exploitation Rate (%) ^b
1978	1,202	2,345	402	17.1
1979	3,315	5,514	415	7.5
1980	d	10,492	CLOSED	---
1981	5,130	14,293	CLOSED	---
1982	4,835	21,868	CLOSED	---
1983	4,750	26,311	CLOSED	---
1984	6,500	28,708	CLOSED	---
1985	13,320	31,977	1,132	3.5
1986	26,001	31,611	1,959	6.2
1987	35,332	31,002	6,132	19.8
1988	29,548	26,608	5,548	20.9
1989	35,701	25,367	4,801	18.9
1990	19,664	23,460	2,264	9.7
1991	18,163 ^e	25,171	1,992	7.9
1992	24,077	26,906	2,282	8.5
1993	32,439	30,682	3,570	11.6
1994	25,344 ^e	32,728	2,167	6.6
1995	25,115	32,104	3,378	10.5
1996	21,121	27,640	2,984	10.8
1997	-----	16,102	1,746	10.8
1978-96 Average	18,219	23,936	2,788	11.1

^a Diverse methods have been used to generate historical aerial survey biomass estimates; after 1989, see LCI herring forecast report or statewide herring forecast document to determine specific method for individual year.

^b Figures are based on the best available data at the time of publishing and are subject to change; therefore all figures herein supercede those previously reported.

^c ASA model integrates heterogeneous data sources and simultaneously minimizes differences between observed and expected return data to forecast the following year's biomass as well as hindcast previous years' biomass.

^d No data available.

^e Due to poor aerial survey conditions, biomass was calculated from the pre-season estimate of abundance, adjusted to match observed age composition samples in the commercial catch.

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