

# 2003 LOWER COOK INLET ANNUAL FINFISH MANAGEMENT REPORT



by

Lee F. Hammarstrom  
and  
Mark S. Dickson

Regional Information Report<sup>1</sup> 2A04-01

Alaska Department of Fish and Game  
Division of Commercial Fisheries  
Central Region  
333 Raspberry Road  
Anchorage, Alaska 99518-1599

January 2004

---

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 The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports.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

## ACKNOWLEDGMENTS

### 2003 DIVISION OF COMMERCIAL FISHERIES STAFF

The finfish operations for the Division of Commercial Fisheries in Lower Cook Inlet employed five permanent full-time employees, nine permanent/seasonal employees, and one non-permanent/seasonal employee in various area management and research programs during the 2003 season. Appreciation is extended to all personnel for a successful program during 2003.

#### Permanent Employees during the 2003 season:

Lee Hammarstrom	Area Finfish Management Biologist
Mark Dickson	Fish & Wildlife Technician IV
Edward O. "Ted" Otis	LCI Finfish Research Project Leader
Marnee Beverage	Program Technician
Mark Hottmann	Boat Officer III

#### Seasonal Employees:

Greg Demers	Fish & Wildlife Technician III
Jenny Cope	Fish & Wildlife Technician III
Robert "Bo" Fusco	Fish & Wildlife Technician III
S. "Tom" Sigurdsson	Fish & Wildlife Technician II
Carla Armstrong	Fish & Wildlife Technician II
Colby Sander	Fish & Wildlife Technician II
Frank Zellin	Vessel Technician II
Peter Vanstory	Vessel Technician II
Josh Mumm	Boat Officer I
Carolyn Bunker	Administrative Clerk II

# TABLE OF CONTENTS

	<u>Page</u>
LIST OF SALMON TABLES .....	vi
LIST OF HERRING TABLES.....	vi
LIST OF SALMON FIGURES .....	vii
LIST OF HERRING FIGURES .....	viii
LIST OF SALMON APPENDIX TABLES .....	ix
LIST OF HERRING APPENDIX TABLES .....	xii
COMMERCIAL SALMON FISHERY .....	1
Introduction.....	1
Preseason Forecast.....	3
2003 Summary by Species .....	5
Chinook Salmon .....	5
Sockeye Salmon.....	5
Coho Salmon .....	8
Pink Salmon.....	9
Chum Salmon .....	10
2003 Exvessel Value .....	10
2003 District Inseason Management Summaries.....	11
Southern District.....	11
Set Gillnet Fishery .....	11
Seine Fishery.....	13
Sockeye Salmon.....	13
Pink Salmon.....	16
Other Species .....	20
Kamishak Bay District.....	21
Sockeye Salmon.....	21
Pink Salmon.....	25
Chum Salmon .....	25
Other Species .....	27
Outer District .....	28
Sockeye Salmon.....	28
Pink Salmon.....	30
Chum Salmon .....	35
Eastern District .....	35
Sockeye Salmon.....	35
Pink Salmon.....	39
Other Species .....	40

**TABLE OF CONTENTS**  
(continued)

	<u>Page</u>
Salmon Enhancement and Rehabilitation .....	41
Introduction.....	41
Tutka Lagoon Hatchery .....	42
Leisure and Hazel Lakes Sockeye Salmon Stocking .....	43
English Bay Lakes Sockeye Salmon Rehabilitation .....	44
Bear Lake Sockeye Salmon Enhancement.....	47
Grouse Lake Sockeye Salmon Stocking .....	48
Chenik Lake Sockeye Salmon Enhancement.....	49
Other Sockeye Salmon Lake Stocking.....	52
Halibut Cove Lagoon and Seldovia Bay Chinook Salmon Enhancement .....	53
Port Graham Hatchery .....	53
Paint River Fish Pass .....	56
2004 Commercial Salmon Fishery Outlook.....	57
Sockeye Salmon.....	57
Pink Salmon.....	58
Chum Salmon .....	59
Chinook and Coho Salmon .....	59
 SUBSISTENCE AND PERSONAL USE SALMON NET FISHERIES.....	 60
Kachemak Bay Personal Use Fishery.....	60
Nanwalek/Port Graham Subsistence Fishery.....	66
Seldovia Area Subsistence Fishery .....	68
 COMMERCIAL HERRING FISHERY .....	 69
Introduction.....	69
History and Development of the Sac Roe Fishery .....	70
Introduction.....	70
Outer/Eastern Districts .....	71
Southern District.....	72
Kamishak Bay District.....	72
2003 Season Overview .....	74
Assessment Methods .....	74
Kamishak Bay District 2003 Season Summary .....	76
Southern District 2003 Season Summary .....	77
Outer/Eastern Districts 2003 Season Summary .....	78
Recent Research.....	78

**TABLE OF CONTENTS**  
(continued)

	<u>Page</u>
2004 Herring Season Outlook .....	79
Kamishak Bay District.....	79
Other Districts.....	80
REFERENCES.....	81

## LIST OF SALMON TABLES

<u>Table</u>	<u>Page</u>
1. Commercial, hatchery, and derby salmon catches in numbers of fish by species, district, and gear type, Lower Cook Inlet, 2003 .....	83
2. Commercial chinook salmon catches and escapements in numbers of fish by sub-district or section, Lower Cook Inlet, 2003 .....	84
3. Commercial sockeye salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict or section, Lower Cook Inlet, 2003 .....	85
4. Commercial coho salmon catches (including hatchery cost recovery and sport derby sold to commercial processors) and escapements in numbers of fish by subdistrict or section, Lower Cook Inlet, 2003 .....	87
5. Commercial pink salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict or section, Lower Cook Inlet, 2003 .....	88
6. Commercial chum salmon catches and escapements in numbers of fish by subdistrict or section, Lower Cook Inlet, 2003 .....	91
7. Exvessel value of the commercial salmon catch in numbers of dollars by species, gear type, and harvest type, Lower Cook Inlet, 2003 .....	93
8. Emergency orders issued for the commercial, personal use, and subsistence salmon fisheries in Lower Cook Inlet, 2003 .....	94
9. Total return of adult pink salmon to the Tutka Bay Hatchery in the Southern District of Lower Cook Inlet, 2003 .....	101

## LIST OF HERRING TABLES

<u>Table</u>	<u>Page</u>
10. Total biomass estimates and commercial catch of Pacific herring in short tons by age class, Kamishak Bay District, Lower Cook Inlet, 2003, and 2004 forecast .....	102

## LIST OF SALMON FIGURES

<u>Figure</u>	<u>Page</u>
1. Lower Cook Inlet salmon and herring management area .....	103
2. Commercial set gillnet locations in the Southern District of Lower Cook Inlet.....	104
3. China Poot and Hazel Lake Special Harvest Areas for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.....	105
4. Tutka Bay Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet .....	106
5. Kirschner and Chenik Lakes Special Harvest Areas for salmon hatchery cost recovery in the Kamishak Bay District of Lower Cook Inlet .....	107
6. Port Graham Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet .....	108
8. Total commercial salmon catch, Lower Cook Inlet, 1983 - 2003.....	110
9. Commercial sockeye salmon catch by district, Lower Cook Inlet, 1983 - 2003 .....	111
10. Sockeye salmon returns to Leisure and Hazel Lakes in the Southern District of Lower Cook Inlet, 1979 - 2003 .....	112
11. Commercial pink salmon catch by district, Lower Cook Inlet, 1983 - 2003 .....	113
12. Commercial chum salmon catch by district, Lower Cook Inlet, 1983 - 2003 .....	114

## LIST OF HERRING FIGURES

<u>Figure</u>	<u>Page</u>
7. Commercial herring fishing areas in the Kamishak Bay District of the Lower Cook Inlet Management Area .....	109
13. Biomass estimates and commercial harvests of Pacific herring in the sac roe seine fishery, Kamishak Bay District, Lower Cook Inlet, 1983 - 2003, and 2004 projection .....	115
14. Herring age composition from samples collected in Kamishak Bay District, Lower Cook Inlet, 2003, and 2004 forecast.....	116

## LIST OF SALMON APPENDIX TABLES

<u>Appendix</u>	<u>Page</u>
1. Salmon fishing permits issued and fished, by gear type, Lower Cook Inlet, 1983 - 2003.....	117
2. Exvessel value of the commercial salmon harvest in thousands of dollars by species, Lower Cook Inlet, 1983 - 2003 .....	118
3. Average salmon price in dollars per pound by species, Lower Cook Inlet, 1983 - 2003.....	119
4. Salmon average weight in pounds per fish by species, Lower Cook Inlet, 1983 - 2003.....	120
5. Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1983 - 2003.....	121
6. Commercial salmon catch in numbers of fish by species in the Southern District, Lower Cook Inlet, 1983 - 2003 .....	122
7. Commercial set gillnet catch of salmon in numbers of fish by species in the Southern District, Lower Cook Inlet, 1983 - 2003 .....	123
8. Commercial salmon catch in numbers of fish by species in the Outer District, Lower Cook Inlet, 1983 - 2003 .....	124
9. Commercial salmon catch in numbers of fish by species in the Eastern District, Lower Cook Inlet, 1983 - 2003.....	125
10. Commercial salmon catch in numbers of fish by species in the Kamishak Bay District, Lower Cook Inlet, 1983 - 2003 .....	126
11. Total commercial salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 - 2003 .....	127
12. Commercial chinook salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 - 2003 .....	128
13. Commercial sockeye salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 - 2003 .....	129

## LIST OF SALMON APPENDIX TABLES

(continued)

<u>Appendix</u>	<u>Page</u>
14. Commercial sockeye salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 - 2003.....	130
15. Harvest of sockeye salmon returns to China Poot and Neptune Bays in the Southern District of Lower Cook Inlet, by user group, 1979 - 2003.....	132
16. Commercial catch and escapement of sockeye salmon at Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 - 2003.....	133
17. Commercial coho salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 - 2003.....	134
18. Commercial pink salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 - 2003.....	135
19. Commercial pink salmon catch in thousands of fish by subdistrict during odd-numbered years, Lower Cook Inlet, 1959 - 2003.....	136
20. Commercial pink salmon catch in thousands of fish by subdistrict during even-numbered years, Lower Cook Inlet, 1960 - 2002.....	138
21. Commercial chum salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 - 2003.....	140
22. Commercial chum salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 - 2003.....	141
23. Estimated sockeye salmon escapements in thousands of fish for the major spawning systems in Lower Cook Inlet, 1983 - 2003.....	143
24. Estimated pink salmon escapements in thousands of fish for the major spawning systems in Lower Cook Inlet, 1960 - 2003.....	144
25. Estimated chum salmon escapements in thousands of fish for the major spawning systems in Lower Cook Inlet, 1983 - 2003.....	149
26. Biological escapement goals (BEG's) prior to 2002 and sustainable escapement goals (SEG's) beginning in 2002 for chum salmon systems in Lower Cook Inlet, Alaska.....	150
27. Biological escapement goals (BEG's) prior to 2002 and sustainable escapement goals (SEG's) beginning in 2002 for pink salmon systems in Lower Cook Inlet, Alaska.....	151

## LIST OF SALMON APPENDIX TABLES

(continued)

<u>Appendix</u>	<u>Page</u>
28. Biological escapement goals (BEG's) prior to 2002 and sustainable escapement goals (SEG's) beginning in 2002 for sockeye salmon systems in Lower Cook Inlet, Alaska .....	152
29. Personal use/subsistence set gillnet salmon catches, in numbers of fish by species, and effort, Southern District, Lower Cook Inlet, 1969 - 2003.....	153
30. 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, 1983 - 2003.....	154
31. Subsistence and sport salmon catch in numbers of fish by species for the village of Port Graham, Lower Cook Inlet, 1983 - 2003 .....	155
32. Subsistence and sport salmon catch in numbers of fish by species for the village of Nanwalek (formerly English Bay), Lower Cook Inlet, 1983 - 2003 .....	156
33. Salmon set gillnet catch in numbers of fish by species and permit/effort information for the Seldovia area subsistence fishery, Lower Cook Inlet, 1996 - 2003 .....	157
34. 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 - 2003 .....	158

## LIST OF HERRING APPENDIX TABLES

<u>Appendix</u>	<u>Page</u>
35. 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, 1983 - 2003 .....	161
36. Preseason estimates of biomass and projected commercial sac roe seine harvests, and actual harvests, for Pacific herring ( <i>Clupea pallasii</i> ) in short tons, average roe recovery, numbers of permits making landings, and exvessel value in millions of dollars Kamishak Bay District, Lower Cook Inlet, 1983 - 2003 .....	162
37. Summary of herring sac roe seine fishery openings and commercial harvests in the Kamishak Bay District of Lower Cook Inlet, 1969 - 2003 .....	163
38. Estimates of Pacific herring ( <i>Clupea pallasii</i> ) 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, 1983 - 2003 .....	164

***ANNUAL MANAGEMENT REPORT***  
***LOWER COOK INLET***  
***2003***

**COMMERCIAL SALMON FISHERY**

**INTRODUCTION**

The Lower Cook Inlet (LCI) management area, 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, is divided into five fishing districts (Figure 1). The Barren Islands District is the only fishing district where no salmon fishing occurs, with the remaining four 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 2003 LCI all-species salmon harvest of 1.549 million fish (Table 1, Figure 8) was the fourth lowest during the past decade and was about 84% of the recent 10-year average of 1.838 million (Appendix Table 5). Although the overall harvest failed to achieve the cumulative preseason forecast, a new record LCI sockeye catch of over 644,000 fish was established, surpassing the previous high of 477,000 set in 1999. Prices paid for salmon this season yielded an estimated LCI exvessel value of nearly \$2.2 million (Table 7), making the value of the 2003 harvest about 13% greater than the recent 10-year average and the highest since 1999 (Appendix Table 2). Seine fishing effort was up slightly from the previous two years, with 27 of 85 permit holders making deliveries this season (Appendix Table 1). The number of active set gillnet permits was 24 (Appendix Table 1), identical to the 2002 season and marginally greater than the recent 10-year average.

Once again, LCI commercial salmon harvests in 2003 relied heavily on the success of hatchery and enhanced fish production. Over three-fourths of the sockeye salmon harvest in numbers of fish was attributed to lake stocking and fertilization projects, most of which were originally begun by the

Alaska Department of Fish and Game (ADF&G) but are currently maintained by Cook Inlet Aquaculture Association (CIAA). These projects were conducted at Leisure and Hazel Lakes in the Southern District, Kirschner Lake in the Kamishak Bay District, and Bear Lake in the Eastern District. Another traditional sockeye salmon enhancement program, conducted by the Nanwalek Salmon Enhancement Project (NSEP) in conjunction with Chugach Regional Resources Commission (CRRC) at English Bay Lakes in the Southern District, contributed an estimated 68,000 sockeyes, or over 10% of the LCI sockeye total, to commercial set gillnet and hatchery cost recovery harvests this season. Additional fish resulting from this project were also harvested in local subsistence fisheries. Pink salmon production from Tutka Hatchery, now operated by CIAA, was once again very disappointing, with an overall estimated return of 751,000 fish (Table 9). This total represented only about two-thirds of the pre-season projection.

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. About 41% of the total salmon harvest in numbers of fish was taken by CIAA and Port Graham Hatchery Corporation (PGHC) to support the lake stocking programs and Tutka and Port Graham Hatcheries operations, representing about 16% of the exvessel value of the LCI salmon fishery (Table 7). Similar to the past several seasons, relatively strong natural returns of salmon bound for LCI drainages provided commercial harvest opportunities in 2003, but the lack of available markets, primarily for pink salmon, tended to suppress both effort and resultant catches.

The absence of regular tender service in remote districts, a notable factor that has affected the amount and distribution of seine effort, and ensuing harvest of salmon, in LCI over the past decade, indirectly influenced overall harvests during 2003. The policy to severely restrict or eliminate such remote tender service was adopted in 1994 by major processors as a means to reduce costs. 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. Once that policy was abandoned, however, 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 for tendering services, significant numbers of fishermen were often unable to fish in remote areas, while some retained the flexibility to fish these traditional areas because of onboard chilling equipment. Despite strong natural returns and relatively liberal fishing openings in 2003, weak markets for pinks and chums produced a general lack of buyers for these species, which in turn substantially reduced tender service in remote areas. As a result of this worldwide market situation, prices for salmon continued to remain depressed, especially for pinks and chums, with the price for pinks falling yet again to an all-time record low. This pricing structure, coupled with the lack of available buyers, frequently dictated the fishing strategy of individual fishermen, even to the point of total non-participation, thus contributing to continuing low levels of seine effort.

### PRESEASON FORECAST

The projected 2003 LCI all-species salmon harvest of nearly 1.9 million fish was only slightly greater than the recent 10-year average. 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. Preseason harvest projections and actual catches for all species in 2003 are listed in the following table:

SPECIES	PROJECTED HARVEST	ACTUAL HARVEST	1983-2002 AVERAGE
Chinook	1,300	1,180	1,389
Sockeye	306,900	644,257	260,649
Coho	13,800	11,302	12,208
Pink	1,528,600	856,711	1,177,787
Chum	22,700	35,686	59,751
<b>TOTAL</b>	<b>1,873,300</b>	<b>1,549,136</b>	<b>1,511,783</b>

Enhanced runs to Leisure and Hazel Lakes in the Southern District, Kirschner Lake in the Kamishak Bay District, and Bear Lake in the Eastern District were expected to comprise the bulk of the sockeye returns. The sockeye return to the English Bay Lakes system in the Southern District, increasingly important in recent years, was also predicted to produce a significant contribution to both commercial and subsistence set gillnet harvests in LCI. Although Chenik Lake in the Kamishak Bay District benefited from regular fry stocking and intermittent fertilization during the 1980's and early 1990's, adult sockeye returns in 2003 were again anticipated to be very poor due to the suspension of the stocking program (after 1996) as well as 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.

Returns to the Tutka Bay Hatchery were once again expected to be the mainstay of the pink salmon fishery, with a forecasted harvest approaching 1.0 million fish. The projection was based on a release of 100 million fry from Tutka Hatchery in 2002 (Appendix Table 34), and typical ocean survival rates for odd-year runs were expected to produce an overall adult return exceeding 1.1 million fish. The pink salmon return to Port Graham Hatchery was forecasted to produce nearly 160,000 fish, all of which would be required to meet brood stock requirements, thus no cost recovery or commercial harvest was anticipated.

Good to excellent pink salmon escapements to major Outer District systems in 2001 contributed to a harvest projection of nearly 570,000 naturally produced pinks throughout the entire LCI management area this season. Port Dick, Windy, Rocky, and Nuka Island Subdistricts in the Outer District all figured to provide the most potential for harvestable surpluses, but the projected fishing effort in this remote district was questionable due to the weak markets and unknown levels of available tender service.

After three consecutive seasons of relatively strong chum salmon returns and catches, the chum salmon harvest outlook in 2003 appeared positive. Most west-side LCI systems experienced reasonably good escapements during the 1998 and 1999 parent years, and recent years' returns to area systems have continued to display a generally encouraging trend. Numerous systems, such as

those in northern Kamishak Bay, seemed to be responding positively to conservative management measures employed in the 1990's decade, while chum returns to the larger Big and Little Kamishak Rivers have been comparatively strong during the previous three years. The good catches during the past three seasons, as well as the recent overall trend, suggested that harvest opportunities for chums could be numerous in 2003.

## **2003 SUMMARY BY SPECIES**

### **Chinook Salmon**

The harvest of Chinook salmon, not normally a commercially important species in LCI, was the second lowest for this species over the past decade at 1,180 fish (Table 2, Appendix Table 12) and was also shy of the 20-year average of 1,400. Virtually the entire catch came from the Southern District and can be primarily attributed to enhanced production at Halibut Cove Lagoon. Set gillnetters accounted for about three-fourths of the LCI Chinook catch, slightly less than the normal proportion for that gear group, with purse seiners taking the remaining 25%.

### **Sockeye Salmon**

The 2003 sockeye salmon harvest of over 644,000 fish (Figure 9, Table 3) established a new record high for LCI, exceeding the previous peak of 477,000 fish taken in 1999 (Appendix Table 13). Sockeyes accounted for over 40% of the LCI salmon harvest in total numbers of fish, which is considerably greater than the traditional average, while providing about 90% of the exvessel value of the entire salmon fishery this season (Table 7). The 2003 LCI commercial sockeye harvest was characterized by strong returns to virtually all systems, especially enhanced systems. The glaring exception to this trend occurred at Bear Lake in Resurrection Bay of the Eastern District, where the sockeye return fell far short of the preseason forecast. Natural returns to all systems within the management area were considered good, with those in East Nuka Bay of the Outer District contributing to seine harvests. As has been the case during past seasons, non-local

stocks were thought to have intermixed with local stocks while migrating through the Southern District terminal harvest areas, providing additional sockeyes for harvest there.

Returns to enhancement sites, which typically provide the bulk of the LCI sockeye catch, were mostly excellent in 2003. In the Southern District, harvests of enhanced runs of sockeye salmon returning to Leisure and Hazel Lakes were predicted to cumulatively total only about 82,000 fish. However, the estimated combined harvest total of over 427,000 fish (Figure 10, Appendix Table 15) produced as a result of these two enhancement projects was over five times the preseason forecast. This year's harvest figure represents the highest combined total since adults began returning to both the Leisure and Hazel Lakes enhancement sites in 1991 (prior to that year, only Leisure Lake sockeyes contributed to the harvests).

Also in the Southern District, the sockeye return to English Bay Lakes was exceptionally strong, as predicted, easily achieving the desired in-river return while providing a harvestable surplus of over 21,000 sockeyes to the commercial set gillnet fishery and additional harvest for subsistence set gillnetters. The Nanwalek Salmon Enhancement Project (NSEP) furthermore harvested 47,000 sockeyes for hatchery cost recovery. Unfortunately, the capsizing of a tender vessel in Port Graham Bay, and the subsequent threat of petrochemical contamination, forced the closure of both the commercial and subsistence set gillnet fisheries in Port Graham Subdistrict for about one week during the peak of the local sockeye migration. Had these fisheries remained open during this time, catches in both would have undoubtedly been higher, which would have consequently lowered the hatchery cost recovery harvest since fish avoiding salt water harvest during the closure ultimately ended up in the freshwater hatchery special harvest area. The continued viability of the sockeye return to this system may rest on the future success of the ongoing rehabilitation project originally initiated by ADF&G in the late 1980's and presently being conducted by Chugach Regional Resources Commission (CRRC) in conjunction with NSEP, operated by the village of Nanwalek. This sockeye project has encountered setbacks in recent seasons due to viral and disease outbreaks in the pen rearing of juveniles, as well as unexpected adult behavior that resulted in the failure to collect any brood stock in 2001 and difficulty in collecting brood stock in 2003. Additionally, because the long-term rearing of

juvenile sockeyes in waters containing actively spawning adult sockeyes violates state fish culture and disease policy, ADF&G will no longer allow this practice in English Bay Lakes after the 2003 season, which may jeopardize the future of the project. At this time, an acceptable alternative for this portion of the project has not been approved.

In the Kamishak Bay District, the enhanced return to Kirschner Lake produced a catch of over 50,000 sockeyes (Table 3), more than double the preseason harvest forecast of 22,000 fish. No fishing was allowed on sockeyes returning to Chenik Lake in the Kamishak Bay District since that return was expected to be poor due to the after-effects of an outbreak of IHN, a naturally occurring viral disease, in the early 1990's. The outbreak caused increased mortality to young salmon, subsequently resulting in weak adult returns. CIAA suspended the stocking program at Chenik Lake after the 1996 season. Surprisingly, the return to Chenik this year was the strongest since 1993, with an estimate of nearly 14,000 sockeyes, all of which entered the lake to spawn (Table 3, Appendix Table 23).

At Bear Lake in Resurrection Bay of the Eastern District, the cumulative commercial seine and hatchery cost recovery catch of "early run" sockeyes totaled just over 10,000 fish (Table 3), falling short of the preseason harvest forecast of 40,000 sockeyes. Despite the shortfall, the desired in-river sockeye return for Bear Lake was achieved.

The LCI management area has only four lake systems with significant naturally occurring sockeye salmon runs, and all four achieved their sustainable escapement goals (SEG's) in 2003. In the Outer District, Delight Lake escapement, enumerated via a picket weir and aerial surveys, achieved its goal of 6,000 to 12,600 sockeyes with an estimate of 7,500 fish (Appendix Table 23), while the peak daily aerial survey escapement estimate at nearby Desire Lake totaled 8,400 sockeyes. Although the latter figure failed to achieve the lower end of the SEG for that system (8,800), the staff believed the actual escapement to be considerably greater than the final estimate because aerial surveys to assess the system were plagued by poor survey conditions throughout the season. The seine fleet harvested about 27,000 fish (Table 3) from returns bound for these two systems in East Nuka Bay. Waters of Aialik Bay, including Aialik Lagoon, in the Eastern District

were opened to fishing in mid-July, but because the run had already peaked no effort or resultant harvest occurred. The final estimate of escapement at Aialik Lake fell near the midpoint of the SEG range of 3,700 to 8,000 sockeyes (Table 3, Appendix Table 23). At Mikfik Lake in the Kamishak Bay District, a relatively strong return resulted in an escapement estimated at nearly 13,000 sockeyes (Table 3, Appendix Table 23), but no seine effort occurred despite continuous fishing time allowed in June. A fifth LCI lake known as Delusion (Ecstasy) Lake is a recently formed glacial system in East Nuka Bay of the Outer District that supported no documented salmon run prior to the mid-1980's. Sockeye returns to this system had a peak aerial escapement estimate of 2,000 sockeye salmon in 2003.

### **Coho Salmon**

The coho salmon resource in the LCI management area is not extensive, and as a result this species rarely attains commercial prominence. The 2003 commercial harvest of 11,300 coho salmon (Table 4) was the highest LCI total for this species since 1998, nearly equaling the average catch during the past ten years (Appendix Table 17). As is typical, the majority (just over 50%) of the harvest came as a combination of hatchery cost recovery operations at Bear Lake and entries into the Seward Silver Salmon Derby, both in Resurrection Bay of the Eastern District. The remaining catch was split between set gillnetters (20%) and seiners (28%) in the Southern District. Because the coho resource in LCI, and assessment of it, is limited, commercial coho harvests can sometimes be used to gauge coho run strength. However, market conditions in recent years have discouraged directed effort, making the incidental commercial harvest of this species an unreliable indicator. Sport and personal use harvests generally provide the best indicators of run strength. Despite the reasonably good commercial catches, returns during 2003 were only considered average to slightly better than average. Two aerial surveys were flown in September at Clearwater Slough in the Northshore Subdistrict of the Southern District, specifically for coho salmon assessment. The resulting peak daily index count of 800 cohos, recorded during a survey on September 11, was considered good by historical standards.

## **Pink Salmon**

Returns of pink salmon, usually the dominant species in numbers of commercially harvested salmon in LCI, were considered mostly excellent this year, but the overall harvest of only about 857,000 fish (Figure 11, Table 5) misleadingly suggests otherwise. This number represents the third lowest commercial catch during the last 10 years and only about half the average catch during that time period (Appendix Table 18). However, many natural returns were exceedingly strong, but the numerous and liberal fishery openings to target these strong returns failed to result in significant harvests.

The majority of the pink salmon catch this season was taken in the Southern District (Table 5, Appendix Table 18) as a direct result of Tutka Hatchery production, but 90% of this district's total, or about 508,000 fish, was utilized for hatchery cost recovery (Tables 1, 5, and 9). An additional 285,500 pinks, not accounted for in commercial catch totals, were taken for hatchery broodstock purposes (Tables 5 and 9) by two different facilities. The estimated overall Tutka Hatchery return, including escapement into Tutka Creek, brood stock, commercially harvested fish, and sport harvest, was 751,000 pinks (Table 9), falling far short of the preseason projection of over 1.1 million fish. The 2003 estimated survival rate of less than 1% was one of the lowest on record and considered well below the potential for this facility. At Port Graham Hatchery, the return was also much poorer than expected, with an estimate of about 83,000 fish, nearly all of which were taken for brood stock.

The Outer District produced the greatest contribution of naturally produced pinks to LCI catches, with a total harvest of approximately 282,000 fish (Table 5, Appendix Table 18). Over 90% of the Outer District harvest was taken by directed effort in Port Dick and Windy Bay Subdistricts, with the remainder coming from East Nuka Subdistrict primarily as incidental harvest during the sockeye fishery there. In the Kamishak Bay District on the west side of LCI, the paltry pink salmon harvest of 12,000 fish (Table 5, Appendix Table 18) all came as incidental catch during directed efforts targeting Kirschner Lake sockeyes, despite extraordinary pink returns to Brown's Peak and Sunday Creeks. Pink returns to virtually all remaining systems within the management

area were considered good to excellent, and pink salmon SEG's at all major systems throughout LCI were achieved (Appendix Table 24).

### **Chum Salmon**

The 2003 commercial chum salmon harvest of nearly 36,000 fish (Table 6), which was about 40% greater than the recent 10-year average (Figure 12, Appendix Table 21), maintained a four-year trend of relatively strong catches in LCI. The harvest was not surprising based on the recent pattern of comparatively strong returns and concurrently good escapements, especially to systems in Kamishak Bay. Virtually the entire Kamishak District harvest, totaling 30,000 chums this season, was taken in the northern end of the district by effort targeting the exceptional Cottonwood Creek return. The remainder of the LCI harvest came as incidental catch during other directed effort, primarily in the Southern District. All chum systems achieved their SEG's as a result of the reasonable returns, including McNeil River in the Kamishak Bay District, which attained its SEG range of 13,800 to 25,800 fish (Appendix Table 25) for only the fifth time in the past 14 years.

### **2003 EXVESSEL VALUE**

The estimated exvessel value of the 2003 commercial salmon harvest in LCI, not including any postseason adjustments in price paid to fishermen, was approximately \$2.19 million (Table 7, Appendix Table 2), making it the highest since 1999. This elevated value was undoubtedly due to the outstanding catch of sockeye salmon. Purse seine gear in the common property fishery, which normally accounts for the majority of the catch and value, comprised about \$1.43 million or 65% of the overall total (Table 7), while set gillnets accounted for \$390,000 or 18%. An estimated \$361,000, or about 16% of the entire exvessel value of the LCI salmon fishery, was utilized for hatchery cost recovery purposes, while the remaining 2% consisted of cohos entered into the Seward Silver Salmon Derby and subsequently sold by event organizers. Estimated average prices paid to fishermen in 2003, not including any postseason adjustments, were as follows: Chinook - \$1.03/pound; sockeye - \$0.60/pound; coho - \$0.28/pound; pink - \$0.06/pound; and

chum - \$0.16/pound (Appendix Table 3). The pink price in LCI this season was the lowest on record.

## **2003 DISTRICT INSEASON MANAGEMENT SUMMARIES**

### **Southern District**

#### **Set Gillnet Fishery**

An Area H commercial set gillnet permit is valid for fishing in any part of Cook Inlet (Upper or Lower), 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 during open fishing periods (Figure 2). The limited area provides only enough productive fishing sites to accommodate approximately 25 set net permits.

The 2003 LCI all-species set gillnet harvest totaled 97,000 fish, over 50% greater than the recent 10-year average (Appendix Table 7) and the second highest all-species total in the past 20 years. The sockeye catch of nearly 82,000 fish was the second highest ever recorded in the fishery, surpassed only by the harvest of 87,000 sockeyes in 1978. For comparison, species composition in 2003, with sockeyes at 84% and pinks at 8%, was considerably different than that of the past decade, where typical species composition in the commercial set gillnet fishery was 52% sockeyes, 36% pinks, 6% chums, 4% cohos, and 2% Chinooks. Catches of Chinook salmon, at 878 fish, were the second lowest over the last 10 years, representing only about 70% of the average during that time frame. Enhancement efforts, directed at recreational fisheries in Halibut Cove Lagoon and secondarily in Seldovia Bay, are primarily responsible for the commercial gillnet Chinook catch during 2003.

Based on an optimistic preseason forecast for sockeyes returning to English Bay Lakes, the commercial set gillnet fishery in the Port Graham Subdistrict, including both the English Bay and Port Graham Sections, was allowed to open as scheduled by regulation at the beginning of the

season. For the second consecutive year, the forecast proved accurate, resulting in a commercial set gillnet harvest of nearly 22,000 sockeyes in the two sections (Table 3), while hatchery cost recovery harvests netted an additional 47,000 fish. The desired in-river return of 7,300 to 15,000 sockeyes was slightly exceeded (Appendix Table 23), while local fishermen from the villages of Nanwalek and Port Graham caught additional fish for subsistence needs. This situation contrasted sharply with the 2000 and 2001 seasons, when complete fishing closures or severe restrictions were implemented due to weak sockeye returns.

The commercial and subsistence set gillnet harvests of sockeyes in Port Graham Subdistrict would have undoubtedly been greater, and the hatchery cost recovery harvests consequently lower, if not for a temporary and unforeseen inseason closure of the two gillnet fisheries. The closure was brought about when a tender/fishing vessel, the 43-foot *F/V American Eagle*, capsized on the fishing grounds in Port Graham Bay late on June 24 or early June 25, around the time of the peak of the local sockeye migration. Since the capsized vessel presented a potential hazard from petroleum contamination, the local commercial and subsistence set gillnet fisheries were closed as a precautionary measure, remaining so for approximately one week. Although removal of the vessel took longer than hoped, no fouling of fishing gear or product was reported. Unfortunately, by the time the two fisheries reopened, the local sockeye return was already beginning to diminish and catch rates likely reflected this.

After the English Bay Lakes sockeye return was over, waters of Port Graham Subdistrict remained open to commercial set gillnet fishing despite the weak forecast of pinks returning to Port Graham Hatchery. The projected return was expected to total only about 158,000 pinks, and hatchery operators indicated that all would be required for brood stock purposes. Nonetheless, the anticipated amount of gillnet effort, as exemplified by the past several years, was not expected to pose a threat to either the hatchery pink return or the natural return to nearby Port Graham River. The hatchery return proved considerably weaker than predicted, and no set gillnet effort occurred after the sockeye return was over. Due to the weakness of the pink return to Port Graham Hatchery, no cost recovery effort was attempted, but the brood stock and egg take goals

were still not achieved. Escapement of pinks into Port Graham River achieved the SEG for that system (Appendix Table 24).

LCI set gillnet fishing effort in 2003 was identical to the previous year, with a total of 24 set gillnet permits actively fished. This figure equaled the 20-year average (Appendix Table 1) but was slightly more than the recent 10-year average (21).

## **Seine Fishery**

### Sockeye Salmon

The overall catch of sockeye salmon by all gear types in the Southern District, at 556,000 fish, easily surpassed the previous high harvest of 358,000 fish taken in 1996 (Appendix Table 13) and was approximately three times the recent 10-year average. Purse seiners in the common property fishery accounted for about 70% of the sockeye salmon landed in the district in 2003, or approximately 392,000 fish, while an additional 35,600 sockeyes (6%) were harvested by purse seine for hatchery cost recovery (Table 1).

As in recent years, waters of Halibut Cove Subdistrict, as well as the outer waters of China Poot Bay and Tutka Bay Subdistricts, were opened to seining five days per week beginning Monday, June 16, to target enhanced sockeye returns to Leisure and Hazel Lakes. Within these subdistricts, however, waters of the China Poot and Hazel Lake Special Harvest Areas (SHA's; Figure 3) were opened only to authorized agents of CIAA at this time, seven days per week, for the express purpose of hatchery cost recovery. The SHA's were to be kept closed to the common property commercial fishery until the preseason revenue goal established for each SHA was achieved.

Preseason combined harvest projections for returns to the Leisure and Hazel Lakes stocking sites were estimated at only 82,000 sockeyes. The actual commercial harvest of adult fish produced as a result of the two enhancement projects was estimated at over 427,000 fish (Figure 10,

Appendix Table 15), comprising about two-thirds of the entire LCI sockeye salmon harvest (Table 3). Because of the close 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 not only contributed to seine catches in China Poot Subdistrict but also to those in adjacent Halibut Cove and Tutka Bay Subdistricts. It was estimated that personal use dip net and sport fishermen harvested another 4,900 sockeyes at the head of China Poot Bay based on average catches from the early 1990's. The 2003 total cumulative return from both projects was estimated at 433,000 sockeyes (Appendix Table 15). Although the disparity between the preseason forecast and the actual return cannot be fully explained, exceptional fresh and/or salt water survival was likely responsible.

As outlined in the Trail Lakes Hatchery Annual Management Plan (AMP) prior to the season, the CIAA revenue goal necessary to meet operational expenses incurred in LCI sockeye salmon lake stocking projects was set at \$132,000 this year. This figure was to be split amongst locations as follows: 70% from combined China Poot and Hazel Lake SHA's, both in the Southern District, and 30% from the Kirschner Lake SHA in the Kamishak Bay District. No cost recovery was planned at Chenik Lake in 2003 since stocking has been discontinued and weak returns were expected. Cost recovery harvests inside the China Poot and Hazel Lake SHA's (Figure 3) were to occur at CIAA's discretion as early as possible in the runs since harvests could take place without interference or competition from the fleet at large. A minimum harvest of 38,600 sockeyes from the China Poot and Hazel Lake SHA's was necessary to achieve the combined goal of \$92,600 for these two areas, assuming an average price of \$0.60 per pound and an average weight of 4.0 pounds per fish. As previously described, these SHA's were to remain closed to common property seining until the combined goal established for the two areas was achieved.

Similar to past years, CIAA once again contracted the Cook Inlet Seiners Association (CISA) to undertake sockeye cost recovery in LCI for the 2003 season. Instead of dedicating a single vessel from within the fleet to direct efforts solely at cost recovery, as had been done the past two seasons, CISA instead relied on the use of volunteer vessels to undertake hatchery harvest, as during prior years. The first hatchery harvest in the China Poot Subdistrict occurred on June 25 in

the China Poot SHA, netting about 2,000 fish. This harvest was considered early by historical standards, suggesting that the return could be stronger than forecasted. Additionally, vessels participating in the common property fishery outside the SHA's had already been harvesting sockeyes for over a week, reporting that numbers of fish present in area waters were quite good considering the early date. Although the inseason contract price for cost recovery sockeyes had dropped to \$0.50 per pound, this low price was offset by a higher than expected average weight of about 5.0 pounds per fish. As a result, the number of fish necessary to achieve the revenue goal was revised downward slightly to a new combined total of approximately 37,000 fish.

The buildup of sockeyes within the China Poot SHA was so steady that volunteer vessels concentrated their efforts there, finding it unnecessary to attempt any harvest in the Hazel Lake SHA. Cost recovery efforts persisted on a daily basis (except for two days) for a week and a half after the first harvest, with the peak daily hatchery harvest of the season occurring on June 30 when over 7,800 fish were taken. During that same time period, CIAA officials announced that a retroactive price increase on sockeyes taken for cost recovery during the 2002 season effectively reduced the revenue goal for the 2003 season by approximately \$14,000, to a new total of \$82,800. A final harvest effort on July 6 brought the cumulative reported catch in the China Poot SHA to 37,600 sockeyes, totaling just over 165,000 pounds and effectively achieving the desired revenue goal. As a result, the China Poot and Hazel Lakes SHA's were closed to cost recovery harvest on the morning of July 7, and waters of both the China Poot and Hazel Lake Sections of China Poot Subdistrict were opened to common property seining seven days per week beginning that same evening. A small portion of the China Poot Section near the mouth of China Poot Creek remained closed to commercial fishing on weekends in deference to the heavy sport/personal use traffic in the vicinity. An inseason reporting error was discovered after cost recovery fishing had already ceased, and the actual revenue obtained from hatchery fishing fell short of the desired goal by about \$2,800.

As mentioned earlier, common property seine catches in China Poot Subdistrict, outside of the SHA's, showed relatively good strength during the last week of June, providing justification for an optimistic outlook. Catches were fairly strong during the first week of July in both sections,

with a “spike” in the daily Neptune Bay Section catches occurring on July 1 (6,000 sockeyes) and an even larger increase in China Poot Section catches on July 3 (8,600). On July 7, the day that common property fishing was allowed in all waters of China Poot Subdistrict (since the hatchery revenue goal had been achieved), combined catches for both sections reached over 23,000 sockeyes for the day, taken by an estimated 10-15 vessels. Catches in the China Poot Section averaged 13,600 sockeyes per day over the next week, while those in the Neptune Bay Section averaged about 8,400 fish per day. These outstanding catches suggested that the return was peaking, but harvests inexplicably continued to remain strong. The highest combined single-day catch for the two sections occurred on July 18, when an estimated 8-10 vessels took over 25,000 sockeyes. Catch rates in the China Poot Section dropped off significantly after this date, but those in the Neptune Bay Section continued to hold up for another week. The final landing came on July 30, bringing the cumulative commercial catch in the two sections to over 330,000 sockeyes (Table 3). Approximately 58% of this harvest, or about 190,600 sockeyes, was taken in the China Poot Section, suggesting that the Leisure Lake sockeye return was slightly stronger than the Hazel Lake return.

Very little seine effort for sockeyes occurred within adjacent waters of Tutka Bay Subdistrict to the southwest of the China Poot Subdistrict, resulting in an additional harvest of less than 2,700 fish. However, seiners fishing in Halibut Cove Subdistrict to the northeast caught over 58,000 sockeyes (Table 3).

### Pink Salmon

Returns of pink salmon to the Tutka Bay Hatchery contributed to an overall (all gear types) Southern District harvest of 563,000 fish (Table 5, Appendix Table 18), representing less than half of the recent 10-year average and disappointingly short of the preseason hatchery-only harvest forecast of just under 1.0 million fish. Of the pink harvest in the district, seiners in the common property fishery took less than 10% of the total, while hatchery cost recovery accounted for about 90% of the harvest.

Waters of Tutka Bay Subdistrict outside of Tutka Bay proper first opened to commercial seining five days per week beginning June 16, as has been the case in recent years. The open waters consisted of those waters offshore of a line running from the "rock quarry" on the north shore of Tutka Bay to the Tutka Bay Lodge on the south shore (Figure 4). 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 (AMP), beginning June 23. 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 \$688,000 for FY03. A minimum of 178,000 fish (133,000 females) was desired for hatchery brood stock in order to achieve the goal of 125 million eggs, and an additional 12-19,000 pinks were needed to meet the sustainable escapement goal established for Tutka Creek. At a projected average weight of 2.8 pounds and a preseason projected price range of \$0.05 to \$0.15 per pound for cost recovery fish, about 1.64 million to 4.91 million fish would be required to achieve hatchery objectives. The forecast suggested that all hatchery pinks would be necessary for revenue, brood stock, and escapement goals. If the aforementioned goals could not be projected by July 5, virtually assured based on the projection, additional common property fishery restrictions within Tutka Bay Subdistrict would be implemented as outlined in the Tutka Hatchery AMP.

The contracted hatchery cost recovery vessels and crews were available and ready to begin fishing in early July, with the first harvest occurring on July 4. Once again, three cost recovery vessels were employed this season, and the hatchery harvest strategy was designed to encourage as much fishing outside of Tutka Lagoon as possible in order to promote product quality and reduce the logistical difficulties of moving tender vessels through waters of the shallow access channel connecting the lagoon to Tutka Bay proper. Day-to-day operations of the catcher boats and tenders were adjusted depending on fish returns, tides, and weather. In addition, the processor under contract to purchase hatchery fish stationed a small floating processing vessel in waters of Tutka Bay.

Initial cost recovery catches showed very little promise, averaging about 21,000 pinks per day over the first four days of active harvest, suggesting that the return was either late or very weak. As expected, no common property effort directed at Tutka pinks had yet occurred, and attainment of hatchery goals could not be projected by July 4. As a result, the common property seine closure line in Tutka Bay Subdistrict was moved seaward beginning July 5 to discourage effort on this stock and allow as many fish as possible to reach waters near the facility.

The hatchery cost recovery vessels fished on a daily basis between July 1 and July 16, when CIAA announced that the contracted processor would discontinue purchasing operations and remove its floating processing vessel from area waters. CIAA was forced to search for another buyer after this time, which proved difficult given the weak pink market as well as the ongoing and approaching Prince William Sound pink salmon hatchery returns. As a result, only two more “cleanup” harvests of hatchery pinks took place, on July 22 and 28. The peak daily cost recovery harvest of the season occurred on July 8, with a total of only 73,000 pinks taken, while daily catches averaged less than 34,000 pinks for each day fished during the month. Pinks harvested for cost recovery averaged almost 3.2 pounds per fish, slightly greater than the expected average weight of 2.8 pounds. Catches and catch rates dropped off significantly after July 10, and it became abundantly clear that the return was much weaker than anticipated and that the revenue goal cost would not be achieved. Waters of Tutka SHA were never opened to common property seining at any time during the 2003 season. The cumulative hatchery cost recovery catch totaled only 507,200 pinks for the season (Table 9). The overall value of the harvest was about \$97,000 (Table 7), substantially short of the revenue goal of \$688,000. An additional 207,000 fish were utilized for hatchery brood stock.

The weak return and low price provided no incentive for seiners to target pinks destined for Tutka Hatchery, and as a result the seine fleet took less than 100 pinks in Tutka Bay Subdistrict during 2003. The estimated pink salmon escapement of 31,000 fish into Tutka Creek (Table 5, Appendix Table 24) exceeded the system’s SEG range of 12-19,000 fish, likely the result of CIAA’s difficulty to consistently secure a secondary buyer after the originally contracted processor pulled out. The total return of pinks to Tutka Hatchery, including commercial, cost

recovery, brood stock, and sport harvest, as well as escapement, was estimated at 751,200 fish (Table 9), representing only two-thirds of the preseason forecast.

At Port Graham in the Southern District, a spring 2002 fry release of about 6.6 million pinks from Port Graham Hatchery was expected to produce an adult return with a mid-point of about 158,000 fish this season. The Port Graham Hatchery Corporation (PGHC) anticipated that no cost recovery or common property harvest of hatchery fish would occur if the forecast were accurate, unless the maximum number of fish returned, since all returning fish would be required to meet brood stock goals.

Although achievement of the Port Graham Hatchery pink salmon brood stock goal of 191,000 fish (of hatchery origin) was unlikely, the recent trend of predominantly weak natural returns to nearby Port Graham River suggested that the capture of wild stock fish near the mouth of or within the river, for use as hatchery broodstock, would not be allowed. Nonetheless, a hatchery egg removal schedule for Port Graham River was summarized in the AMP as a contingency. The forecast for the wild stock return to Port Graham River was estimated at nearly 22,000 pinks, slightly exceeding the SEG range of 7,000 to 20,000 fish. Given the poor forecast for the hatchery pink return and the low price for pinks, no commercial set gillnet fishing effort was expected despite the open season, and a closure of the set gillnet fishery was not anticipated unless hatchery and/or escapement requirements appeared in jeopardy.

The first ground survey of Port Graham River confirming the presence of pink salmon was completed on July 15, but counts numbered less than 100 fish. The next survey's total on July 23 showed less than 1,000 pinks in fresh water. Ground and aerial surveys during this time noted less substantial pink salmon jumper activity in salt water near the mouth of Port Graham River than last season, when the natural return was strong. By August 5, Port Graham Hatchery officials reported significant numbers of pinks staging in waters adjacent to the hatchery net pens, located at the source of fresh water for imprinting purposes, and near Duncan Slough, adjacent to the hatchery facility. Such observations annually imply that these fish are primarily of hatchery origin. In order to allow PGHC to initiate brood stock collection, waters of the Port Graham SHA east of the U.S.

Coast Guard navigational buoy were opened to harvest by authorized agents of PGHC on a continuous basis beginning August 6. Restricting PGHC to this relatively small area was felt to provide sufficient protection to natural-stock fish bound for Port Graham River while still allowing the hatchery opportunity to pursue its objectives. Further manipulation of time and area within the SHA would be considered in order to secure escapement and/or hatchery requirements.

Hatchery broodstock collection in the Port Graham SHA began on August 14 and proceeded through September 9, with a final cumulative harvest estimated at around 78,000 pinks (Table 5). This figure, representing the total return to the hatchery, was less than half of the preseason forecast. The final escapement into Port Graham River, estimated at nearly 15,000 pinks (Table 5, Appendix Table 24), fell within the established SEG range. The commercial set gillnet fishery in Port Graham Subdistrict remained open to fishing on a schedule of the two standard 48-hour weekly fishing periods for the duration of the pink salmon return, but a lack of interest and low prices for pinks resulted in no effort or harvest.

Returns of wild pink salmon stocks to other systems in the Southern District, as indicated by ground survey escapement counts, were generally good, but after the recent trend of erratic and mostly weak returns to area systems, no directed seine openings were allowed. As a result, pink escapements into Seldovia River and Barabara and China Poot Creeks all fell within the respective established SEG ranges, while that of Humpy Creek slightly exceeded the upper end of its range (Table 5, Appendix Table 24).

### Other Species

The Southern District chum salmon harvest increased over that of recent years, cumulatively totaling 5,700 fish for all gear types, the highest total since 1988 (Table 6, Appendix Table 21). Seiners took only about 13% of the total, with set gillnetters accounting for the remainder. Catches from Tutka Bay and Barabara Creek Subdistricts dominated the totals (Table 6) at about 45% and 22%, respectively. Escapements into Southern District chum systems were generally only fair, and an escapement within the SEG range was achieved at Port Graham River

(Appendix Table 25). Seldovia River, with no formal SEG, experienced a weaker chum return than the previous three seasons, with a final escapement totaling 3,600 fish.

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 2003 Southern District harvest of 1,179 Chinooks by all gear types was about 20% less than the recent 10-year average of 1,468 fish (Appendix Table 12). However, seiners took approximately three-fourths of the Chinook total this season, a higher than normal proportion, with set gillnetters harvesting the remainder. The district-wide coho salmon catch of 5,400 fish was over 40% greater than the recent 10-year average (Appendix Table 17), with seiners accounting for about 42% of the total and set gillnetters taking the rest (Table 1).

### **Kamishak Bay District**

#### **Sockeye Salmon**

The entire Kamishak Bay District, with the exception of Chenik Subdistrict, opened to salmon seining by regulation on June 1. For the fourth consecutive year, waters of Paint River Subdistrict were included in this district-wide opening because the stocking program at Paint River Lakes has been discontinued (except for an experimental, one-time-only stocking in 2002), and once again few if any sockeyes were expected back to that location this season. The weekly fishing schedule for open waters within the district was set at seven days per week for the fifth successive year. This schedule was originally implemented because the complexion of the fishery had evolved since 1994, when fish processors ended the routine practice of stationing a tender(s) in this remote district at the start of each season. As a result, effort and ensuing catches declined as fishermen were forced to devise their own transport of all salmon harvested. Recognizing this shift in effort levels, as well as the harsh weather that typically limits effective fishing activity, the staff reasoned that opening waters of Kamishak Bay District to commercial seine fishing seven days per week would allow opportunity to harvest salmon without unduly jeopardizing spawning escapement requirements.

The earliest natural sockeye salmon return to the management area, at Mikfik Creek in the McNeil River Subdistrict, appeared either slightly early or potentially strong after 150 fish were estimated in fresh water during the first aerial survey on May 28. However, it should be noted that winter conditions throughout the LCI management area, including Kamishak Bay, were considered much milder than normal, which could have been a contributing factor for the early show of sockeyes. Numbers expectedly continued to build during the first half of the month, with the peak daily survey estimate of the season coming on June 17 at an estimated 12,800 sockeyes. Despite the continuous fishing time allowed in McNeil River Subdistrict, no effort directed at Mikfik sockeyes occurred this season and therefore no harvest was recorded. Run timing for the Mikfik sockeye return was considered relatively normal based on historical standards. No increase in escapement was detected after the June 17 survey, and the fresh water total from this survey was used as the final estimated escapement index (Table 3, Appendix Table 23), slightly exceeding the established SEG of 6,300 to 12,150 fish.

After the Mikfik sockeye return, seiners would next normally turn their attention to the Chenik or Douglas River Subdistricts during the final days of June. Once again, however, no fishing was anticipated at Chenik Lake this year due to the suspension of the stocking program, the lingering effects of the IHNV outbreak in previous years, and the subsequent fishing closures to protect the few returning fish for escapement. Despite the weak projection, modestly increasing returns to Chenik Lake during recent seasons fostered optimism that the run might approach the escapement goal of 10,000 sockeyes. In sharp contrast to recent years, the sockeye return to Chenik Lake was relatively strong this season. Aerial surveys began to detect a surprising buildup of fish in salt waters of Chenik Lagoon in early July, with an estimate of 8,000 sockeyes made on July 3. Similar estimates were made throughout the month, and by early August most fish had passed into the lake. The final aerial survey of the season, on August 4, proved to be the peak fresh water count of the year, with an estimate of nearly 14,000 sockeyes. This figure was used as the final index of escapement (Table 3, Appendix Table 23), representing the highest escapement estimate for Chenik Lake since 1990 and the largest overall return since 1993 (Appendix Table 16).

Only minimal effort directed at sockeyes occurred in the Douglas River (Silver Beach) Subdistrict, resulting in a cumulative harvest of just over 800 fish (Table 3). Apparently the low numbers discouraged any further effort in this subdistrict during 2003.

The next sockeye return in Kamishak Bay District was to Kirschner Lake in the Bruin Bay Subdistrict, the traditional site of a sockeye salmon lake stocking project. A similar project at nearby Bruin Bay Lake was discontinued after 1996, and no fish were expected to return to that site this season. At Kirschner Lake, where a steep falls at tideline precludes escapement into the lake, almost 22,000 sockeyes were predicted to return. As outlined in the Trail Lakes Hatchery Annual Management Plan (AMP) prior to the season, the revenue goal necessary to meet operational expenses incurred in all LCI sockeye salmon lake stocking projects was set at \$132,000. This amount was to be split between the Southern District SHA's (Leisure/Hazel) at 70% of the total and the Kamishak SHA (Kirschner) at 30%. No cost recovery was planned at Chenik Lake in 2003 since the trend of weak returns over the past decade fostered little hope for improvement this year. A projected harvest of 21,900 sockeyes from the Kirschner Lake SHA (Figure 5), or virtually the entire return, was anticipated in order to achieve CIAA's revenue goal of \$39,400, assuming an average price of \$0.45 per pound and an average weight of 4.0 pounds per fish.

Preseason management strategy for the Bruin Bay Subdistrict, as outlined in the Trail Lakes Hatchery AMP, was to open the Kirschner SHA to hatchery cost recovery fishing on a continuous basis beginning June 16 while simultaneously keeping it closed to common property seining. The intent was to allow opportunity for CIAA to achieve the sales harvest goal quickly at the beginning of the run. As soon as the goal was met or could be projected, the SHA was to be closed to cost recovery harvest and opened to commercial seining so the fleet could work the area uninhibited for the remainder of the season.

CIAA had made arrangements prior to the season for a CISA vessel to conduct cost recovery in Kamishak Bay. Just prior to the onset of cost recovery efforts, and similar to the situation involving the China Poot/Hazel Lake sockeye cost recovery, CIAA announced that a retroactive

price increase for sockeyes taken during the 2002 season effectively reduced the 2003 Kirschner cost recovery goal from the original total of \$39,400 to a new total of \$35,200. Initiation of cost recovery fishing generally requires a substantial buildup of fish in salt water near the Kirschner falls, and 2003 was no exception. The first effort occurred in the Kirschner Lake SHA on July 14, netting an estimated harvest of nearly 18,000 fish. Unfortunately, the inseason contract price for Kirschner sockeyes, at \$0.24 per pound, was considerably less than the preseason projection. This decrease, when coupled with the previously mentioned reduction in the Kirschner revenue goal, resulted in a revision of the number of fish necessary to achieve the revenue goal, to a new total of 36,700 sockeyes. The revised figure suggested that the revenue goal would not likely be achieved given the forecasted return.

In spite of the modest forecast, sockeyes continued to build near the Kirschner falls. Two more cost recovery harvests occurred over the next eight days, resulting in a cumulative catch of 38,700 sockeyes (and a small incidental harvest of other species) with a total value of \$38,600. Since this value exceeded the revised revenue goal of \$35,200, CIAA ceased cost recovery efforts after the harvest on July 26. In response, waters of the Kirschner SHA were closed to hatchery cost recovery fishing on July 27.

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, all waters of Bruin Bay Subdistrict were opened to continuous commercial salmon seining 18 hours after waters of the SHA were closed to hatchery fishing, or beginning July 28. Since the return had already peaked, directed common property effort on Kirschner sockeyes was light after the opening, and the cumulative seine harvest totaled about 11,700 sockeyes (Table 3). The total return to Kirschner Lake was estimated at 51,000 sockeyes (including unharvested fish), or more than twice the preseason prediction for the system. The Kirschner Lake sockeye enhancement project has remained one of LCI's steadiest producers.

## **Pink Salmon**

Preseason pink salmon projections for the Kamishak Bay District in 2003 were modest, with the only harvestable surplus, totaling 40,000 fish, forecasted for Ursus Cove Subdistrict. Aerial surveys of the district began to document pinks in fresh water during the middle part of July, and those early estimates suggested that the forecast appeared accurate. However, as surveys continued through the remainder of the month and into August, observations revealed that pink returns at several systems quickly exceeded preseason expectations and were ultimately the strongest on record. Because of these strong returns, regulatory markers protecting stream mouths in Rocky and Ursus Cove Subdistricts were repealed on August 5, and continuous fishing was allowed in all waters of the subdistricts beginning on that date. Regulatory markers at the mouth of Bruin Bay River in Bruin Bay Subdistrict remained intact because the pink return there, although relatively strong, did not appear as strong as the two more northerly Rocky Cove (Sunday Creek) and Ursus Cove (Brown's Peak Creek) systems.

Unfortunately, and in a familiar scenario, the apparent lack of available buyers precluded any effort directed at the excellent pink returns, therefore no such harvest took place in Kamishak Bay District in 2003. The cumulative pink harvest for the season, totaling 12,000 fish (Table 5, Appendix Table 18), came entirely as incidental catch during both hatchery and common property efforts directed at Kirschner Lake sockeyes. Two of the three major monitored pink systems in the district, Sunday Creek and Brown's Peak Creek, exceeded their SEG ranges by astonishing margins (Table 5, Appendix Table 24) given the size of the creeks, while the Bruin Bay River final pink salmon escapement estimate fell within but near the upper end of its SEG range.

## **Chum Salmon**

For the fourth consecutive season, significant effort directed at relatively strong chum salmon returns resulted in good catches in the LCI management area. Seiners in Kamishak Bay District

took over 80% of the total LCI catch of 36,000 chums this season (Table 6, Appendix Table 21), and chum returns throughout the district were once again generally strong.

Aerial surveys to monitor chum returns in Kamishak Bay began in mid/late June, with the first chums of the season noted in McNeil River on June 26. Because chum runs to McNeil River have not been strong over the past decade, waters of McNeil River Subdistrict were closed to commercial fishing as a precaution beginning June 28, even though no seiners were present in area waters. Escapement into McNeil River showed relatively steady increases into mid-July, with a daily aerial estimate of 15,500 chums made on July 21 ultimately proving to be the season's peak. The return was stronger than any in recent years, and since no effort occurred the entire return was allowed to enter the system as escapement. Post-season analysis of aerial survey data using the standard area under the curve (AUC) method yielded a final estimated escapement index at McNeil River of slightly over 23,000 fish, falling near the upper end (25,750) of the SEG range and the largest escapement since 1998 (Appendix Table 25).

Chum returns to nearly all other Kamishak Bay systems were strong. After experiencing three consecutive seasons of impressive chum returns, a few seiners were anxious to see if the trend would continue. In the southern portion of the district, which had been opened to fishing seven days per week at the beginning of the season, aerial surveys suggested that escapement rates into the Big and Little Kamishak Rivers were sufficient to attain the SEG's for these systems, and although harvestable surpluses existed, the volumes were insufficient to attract any directed effort by seiners. Final escapement estimates of 16,400 chums into Big Kamishak River and 22,200 into Little Kamishak River (Table 6, Appendix Table 25) both fell within the respective SEG's established for each system.

Following the same pattern as that in the Kamishak Rivers, central and northern Kamishak Bay chum returns were also relatively strong this season. At Bruin Bay River, chums began to show in fresh water in early July, continually building well into mid-July. The peak individual aerial survey of Bruin Bay River occurred on July 21, when over 12,000 chums were documented. No

effort was directed specifically at this stock, thus the majority of the return entered the river as escapement, which was estimated at 13,100 chums (Appendix Table 25).

Because the run timing for the more northerly chum systems is later than that in southern and central Kamishak areas, aerial evaluation of northern Kamishak systems typically begins in late July, and this season fish were already in fresh water at that time. By August 4, exceptionally good chum numbers were observed at Iniskin River, Cottonwood Creek, and Ursus Cove systems, suggesting that returns would be strong. Due to these good early escapement figures, and with all systems on track to achieve their respective SEG's, the regulatory markers in Ursus Cove, Cottonwood/Iliamna Bay, and Iniskin Bay Subdistricts were repealed beginning August 5 in order to allow additional opportunity for seiners to target the strong chum returns. Escapements continued to increase into mid-August, with the most dramatic upsurge coming at Cottonwood Creek, where an aerial survey on August 18 revealed 40,000 chums in fresh water.

Despite continuous fishing time and absence of markers protecting stream mouths, directed effort at northern Kamishak chum systems remained light. Final harvest for the Kamishak Bay District for the season totaled 29,800 for the season (Table 6, Appendix Table 21), virtually all coming from the Cottonwood/Iliamna Subdistrict. This figure was the fourth highest since 1988, and interestingly, the four largest annual catch totals in this district since 1988 have all occurred during the past four years. Escapements at all Kamishak chum systems met their respective SEG's (Appendix Table 25), with the estimate of nearly 73,000 chums in Cottonwood Creek standing out as the highest ever observed at that system. The fourth successive season of strong district-wide returns was a continuing sign that the trend of weak chum salmon runs has passed a turning point and will hopefully remain at more traditional levels.

### **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 signs from other areas within LCI suggested that returns were average. Unfortunately, low prices and uncertain run strengths conspired to preclude any effort or harvest, other than a negligible incidental catch (Appendix Table 17), for the eighth consecutive season in this district.

## **Outer District**

### **Sockeye Salmon**

Outer District sockeye harvests have traditionally 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, based solely on the long-term average catch, forecasted a harvest of up to 23,000 sockeyes for the entire Outer District this year. The actual harvest totaled 26,600 fish (Table 3), slightly greater than the 2002 harvest and about 60% greater than the recent 10-year average (Appendix Table 13).

Aerial surveys to assess the Delight and Desire Lake systems in East Nuka Bay began in mid-June, with small numbers of fish first observed only at Delight Lake beginning June 20. Although reasonable numbers of fish were observed in fresh water at Desire Lake by the end of the month, escapement appeared to be lagging at Delight Lake. By July 3, however, an aerial survey revealed that fresh water escapements into both systems had increased markedly, to a level within the SEG range (6,000 – 12,600) at Delight Lake and on track to achieve the SEG (8,800 – 15,200) at Desire Lake. As a result, waters of East Nuka Subdistrict were open to seining five days per week beginning July 4, and in addition, regulatory markers near the stream mouths of both Delight Lake Creek and Desire Lake Creek were repealed to allow seiners additional opportunity to harvest sockeyes returning to these two systems. Waters of nearby McCarty Lagoon were also opened to fishing on the same aforementioned fishing schedule.

The initial commercial seine catches in East Nuka Subdistrict on the first day of the opening, at nearly 3,000 sockeyes, suggested relatively strong returns since fishing time on that day cumulatively totaled only 24 hours. Reasonable numbers of fish were escaping the fishery near Delight Lake and continuing to build in fresh waters of Delight Lagoon, as evidenced by aerial surveys over the next week. Although no such trend was detected at Desire Lake, it must be noted that aerial surveys there were hampered all season by poor survey conditions, leading the staff to believe that actual escapement was considerably higher than the aerial estimates. Consequently, no changes to the fishing schedule were being considered.

Effort in East Nuka Subdistrict, which began on July 4, remained modest but steady for the duration of the season. Two separate days of peak catches occurred, on July 15 and July 21, with approximately 4,500 sockeyes taken on each of those dates. By the end of July, sockeye catches were dwindling. Although fishing continued into early August, catches by that time were dominated by pink salmon returning in good numbers to Desire Lake Creek. The final sockeye landing was made on August 8, bringing the cumulative catch in East Nuka Subdistrict to 26,600 sockeyes for the season (Table 3, Appendix Table 14).

Low water levels, and subsequent cessation of upstream salmon migration, are typical conditions observed at Delight Lake following extended periods of warm weather and limited precipitation during mid-summer periods. This chronic problem once again factored into the 2003 sockeye return, with water levels and flow rates at Delight Lake reaching the “critically” low stage, i.e. making fish passage impossible, sometime between July 7 and July 14. Prior to this time, the field crew manning the adult counting weir at the lake outlet had not observed any fish passage since the weir’s installation on July 3, although one aerial survey in late June had documented less than 1,000 sockeyes already in the lake. Numbers of sockeyes in the fresh water lagoon continued to increase into mid-July, with a peak aerial estimate of 9,000 fish made on July 7, but the fish were unable to migrate to the lake because the lagoon’s inlet creek was dry. The outlet creek of the lagoon dried up shortly thereafter, as noted during a survey on July 18, totally eliminating water flow through the lagoon. These extreme conditions apparently stressed fish stranded in the lagoon, and although aerial surveys were unable to quantify dead fish observed on the bottom of the lagoon due to thick

aquatic vegetation, some undetermined number eventually succumbed. Precipitation near the end of July finally brought relief to the system, and the fish left in the lagoon were able to successfully reach the lake. The final escapement estimate at Delight Lake, derived from weir counts combined with the single aerial survey that documented fish in the lake prior to the weir installation, was 7,500 sockeyes (Table 3, Appendix Table 23), falling within the established SEG. At Desire Lake, aerial surveys were utilized to generate a final escapement index of 8,400 sockeyes, nearly achieving the low end of the SEG range (8,800), but as previously mentioned the actual escapement was likely higher due to poor aerial observation conditions this season.

A third system of lakes known as Delusion (or Ecstasy or Delectable) Lakes in East Nuka Subdistrict has been monitored over the last fourteen years 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. A review of charts and maps drawn prior to the mid-1980's substantiated this fact 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 2003 aerial count of 2,000 sockeyes was recorded during an aerial survey on July 14. 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. ADF&G personnel conducted sampling of sockeyes in this system during 1992, 1993, and 1994, 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**

Reasonably good escapements during the 2001 parent year fostered an optimistic pink salmon harvest forecast of over 500,000 fish for the Outer District in 2003, more than three times the recent

10-year average. The bulk of the harvestable surpluses were expected at Port Dick, although lesser amounts were forecasted at Windy Bay, Rocky Bay, and Nuka Island. The actual harvest of nearly 282,000 pinks (Table 5, Appendix Table 18) was just over half the forecast but still exceeded the recent 10- and 20-year averages.

For the second consecutive year, the staff announced prior to the season that certain waters in Port Dick Subdistrict would open on a set calendar date, as opposed to a management strategy based on real-time aerial assessment of returns and escapements in the Outer District. Based on the relatively optimistic forecast, as well as low levels of anticipated effort, waters of the South, Outer, and Taylor Bay Sections of the subdistrict were opened to seining on a schedule of two 40-hour periods per week beginning July 14. This set opening date was intended to encourage effort early in the return, normally dominated by males, and to promote product quality.

Aerial surveys in Port Dick began on the same day the seine fishery opened, and unexpectedly good numbers of pinks were observed on the shallow “flats” near the head end and along the south shore to Paradise Cove. Estimates made during this survey totaled over 40,000 pinks, suggesting that the preseason forecast was accurate. Given this excellent early show of pinks, the fishing schedule in waters of Port Dick already opened to fishing was liberalized to five days per week beginning July 15. Although an aggressive fishing schedule at such an early date sometimes creates concern for incidental harvest of chums, a ground survey on July 14 documented nearly 3,500 chums in fresh water at Port Dick (head end) Creek, indicating a reasonably strong chum return and thus alleviating the fear that commercial fishing would jeopardize chum salmon escapement. Furthermore, historical run timing for chum salmon at Port Dick (head end) Creek indicated that regulatory markers already protected most chums destined for this system.

Over the next week, aerial observations showed pinks entering fresh water at the head end creek, while numbers of pinks on the salt water “flats” continued to build. Although pink escapement into fresh water was not yet approaching the low end of the SEG range (19,000 fish), the numbers staging in salt water inside the regulatory markers at the head end suggested that the return was at

least as strong as forecasted and that the SEG would likely be met. Despite the strong returns and the liberal fishing schedule, no seine effort had yet occurred in Port Dick.

An aerial survey on July 22 showed a major buildup of pinks at the head end of Port Dick, totaling an estimated 114,000 fish, as well as in nearby Taylor Bay. In an effort to attract effort and exploit the “front end” of this obviously strong pink return, waters west of Middle Creek in the North Section of Port Dick, as well as all areas of Port Dick previously opened to fishing, were extended to a continuous fishing schedule beginning July 24. Additionally, regulatory markers protecting stream mouths in Taylor Bay were repealed, but waters adjacent to and between Middle and Island Creeks on the north shore of Port Dick were kept closed to fishing to protect pinks and chums returning to both those systems, where run timing for both species is slightly later than that of the head end system. Regulatory markers protecting the head end of Port Dick were also repealed for a six-hour period on July 26. The copious amount of fishing time and open waters finally attracted light effort on July 25 and 26, but after a harvest of only 13,000 pinks in Port Dick, seiners left area waters due to an absence of buyers.

By July 29, escapement into the head end creek at Port Dick was estimated to fall within the upper half of the SEG range. An additional 170,000 pinks were estimated by aerial observation in salt water on the flats adjacent to the head end streams, all of which were protected by regulatory markers. Since escapement objectives were already assured, the regulatory markers at the head end of Port Dick were rescinded beginning July 30 to allow seiners maximum opportunity to harvest pink salmon surplus to biological escapement requirements without jeopardizing runs to any of the streams.

Removal of the regulatory markers at the head end of Port Dick once again managed to attract only light effort. Seine harvests totaling just over 124,000 pinks occurred from August 6 – 9, all from the head end of Port Dick, but once again a lack of buyers halted fishing efforts and any further harvest after this time. Similarly liberal openings and marker adjustments at Island and Middle Creeks later in the month, to target the later-returning pinks to those two north shore Port Dick systems, also failed to attract any seine effort. The final cumulative harvest in waters of Port Dick Subdistrict for

the season was slightly over 137,000 pinks (Table 5, Appendix Table 19). Ground assessment showed that movement of pink salmon into fresh water of Port Dick (head end) Creek progressed steadily into late August, and the final escapement estimate of 106,000 pinks (Table 5, Appendix Table 24) was considered a minimal figure. The lack of any directed effort allowed the entire Island Creek return to enter fresh water as escapement, with a final estimate of nearly 119,000 pinks (Table 5, Appendix Table 24). Escapements at Middle Creek and Slide Creek, at 16,000 and 33,000 pinks respectively (Table 5), were also considered excellent. Interestingly, the seven highest pink salmon escapement totals on record for Island Creek have all occurred after 1995.

A number of other systems throughout the Outer District exhibited strong pink salmon returns in 2003, rivaling those of Port Dick. Waters of Windy Bay and Rocky Bay Subdistricts were opened to commercial seining five days per week beginning July 21, after aerial surveys indicated that the numbers of pink salmon in fresh water or protected by markers at systems in both locations substantiated the preseason forecast calling for harvestable surpluses. Given the active and expected effort levels in LCI, this aggressive schedule would allow ample opportunity for seiners to harvest a portion of the apparently strong returns without jeopardizing escapements. However, the familiar theme of a lack of buyers discouraged all but a minor amount of effort in Windy Bay Subdistrict, resulting in a cumulative harvest of 120,000 pinks (Table 5, Appendix Table 19). Aerial surveys continued to document large numbers of pinks in salt water at all locations throughout August, with final escapements totaling 287,000 pinks at Rocky River, 83,000 pinks at Windy Left Creek, and 23,000 pinks at Windy Right Creek (Table 5, Appendix Table 24). The escapement figure for Rocky River is the highest on record.

Aerial surveillance of Nuka Island streams began on July 7, with a buildup of pinks estimated at over 16,000 fish in salt water at South Nuka Island Creek, considered good for the early date. Low fresh water levels, brought on by a lack of precipitation, discouraged fish entry into the creek. Additionally, it appeared that a mortality event was also triggered by the low water level, as evidenced by an aerial survey on July 14 noting 1,000 to 2,000 dead bright pinks at the salt water line near the creek mouth. The delayed entry of fish into the creek left those fish in salt water rather

vulnerable to fishing, therefore no opening was called in order to protect fish for escapement. The dry conditions persisted for the entire month of July, with relief finally coming near the end of the month. A ground survey on August 1 showed that freshwater escapement fell near the upper end of the established SEG for this system, and additional pinks were observed still staging in salt water off the creek mouth. In response, waters on the south end of Nuka Island, including those normally protected by regulatory markers near the mouth of South Nuka Island Creek, were opened to seining beginning August 2 seven days per week. Waters along the western shore of Nuka Island were kept closed to fishing to protect the smaller systems there, where returns showed insufficient strength to support commercial exploitation. Despite the opening, no effort occurred in Nuka Island Subdistrict, and the final escapement into South Nuka Island Creek was estimated at 24,600 pinks (Table 5, Appendix Table 24).

Elsewhere in the Outer District, early aerial observations at Port Chatham suggested that the pink return was sufficient to withstand anticipated effort levels, thus the subdistrict was opened to seining five days per week beginning July 24. The return proved less strong than those of previously mentioned systems and failed to generate any fishing interest. Postseason analysis of ground survey data indicated an estimated cumulative escapement of 35,000 pinks into Port Chatham systems (Table 5, Appendix Table 24). Desire Lake Creek, with an SEG range of 2-20,000 pinks, experienced another relatively strong pink return. With waters of East Nuka Subdistrict opened to seining during July to target the sockeye returns to both Delight and Desire Lakes, seiners first began harvesting pinks incidentally to the sockeyes in early July. As the sockeye returns tapered off, the pink catches escalated, and persistent efforts by fishermen into early August resulted in a final harvest totaling nearly 27,000 pinks in East Nuka Subdistrict (Table 5, Appendix Table 20). Even with the liberal five-day-per-week fishing schedule allowed in East Nuka Subdistrict, the pink salmon SEG for Desire Lake Creek was never in jeopardy, with a final escapement estimate totaling 35,000 pinks (Table 5, Appendix Table 24).

Although no formal SEG exists for the small unnamed stream at the head of Chugach Bay, aerial surveys revealed that the pink return to the system was relatively strong in 2003. Waters of Chugach Bay were therefore opened to continuous seining, with no markers in effect, beginning

August 19. No effort resulted and the entire return entered the system as escapement, estimated at nearly 13,000 pinks (Table 5).

### **Chum Salmon**

Chum salmon numbers had experienced dramatic declines in the Outer District since the peak harvest years of the late 1970's and early 1980's, and large returns were once again not expected in 2003 due to a succession of poor runs over the past decade. The chum returns to systems in the Outer District this season were considered relatively good compared to recent years. However, in a continuing effort to reverse the trend of weak returns and allow stocks maximum protection, no specific commercial openings targeting chum salmon occurred in the Outer District this season. The final harvest of less than 200 chums (Table 6, Appendix Table 21), all taken incidentally during other directed fisheries in the district, was the lowest since 1996.

The lack of any directed fishing effort likely contributed to escapements slightly exceeding the goals at the four monitored chum salmon systems in the Outer District. At Koyuktolik (Dogfish) Bay systems, with a combined SEG range of 3,300 – 9,200 chums, the returns were estimated at 13,300 chums (Table 6, Appendix Table 25). Port Dick (head end) Creek experienced its second highest escapement since 1991, with a total of nearly 6,000 fish, while Rocky River escapement amounted to 5,500 chum salmon, the second highest total over the past two decades (Appendix Table 25). Chum escapement at Island Creek fell just above the upper end of the SEG range of 6,400 to 15,600 fish, with a final total of 16,300 fish.

### **Eastern District**

#### **Sockeye Salmon**

The Eastern District showed potential for harvestable surpluses of sockeye salmon in Aialik and Resurrection Bay Subdistricts during 2003, with a district-wide preseason projection totaling over 50,000 fish. Actual harvest totaled just 10,400 sockeyes (Table 3, Appendix Tables 13 and 14), far

short of the forecast and representing only about one-fourth of the recent 10-year average. Of the total catch, which occurred entirely in the Resurrection Bay Subdistrict, the seine fleet harvested approximately 71%, with the remaining 29% taken for hatchery cost recovery (Tables 1 and 3) at the Bear Lake enhancement project near Seward.

Sockeye enhancement activities by CIAA at Bear Lake resulted in a projected return ranging up to 59,000 fish assuming optimum survival of various smolt and fry releases. If the forecast proved true, the projected harvestable surplus was about 46,000 fish after accounting for the desired in-river escapement requirements for Bear Lake, established at 5,600 – 13,200 sockeyes in the 2003 Trail Lakes Hatchery Annual Management Plan (AMP).

Based upon the expected long-term increase of sockeyes returning to the Bear Lake system, a Resurrection Bay Management Strategy was developed during the winter of 1991-92. The 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, have commonly been utilized since that time. The first change increased fishing time from two 40-hour periods per week to a single five-day period (Monday through Friday). Based on experience during the seasons prior to 1996, this increase would allow greater opportunity to harvest sockeyes without jeopardizing the desired in-river escapement goal for Bear Lake. The second change posted closed waters markers 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, an area 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.

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 19, in keeping with the traditional recent year opening time of mid-May. Prior to 1998, 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. Between 1995 and 2002, 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.

For the first time since the inception of the Bear Lake sockeye enhancement program, CIAA established a revenue goal for the project. As outlined in the 2003 Trail Lakes Hatchery AMP, CIAA hoped to generate \$88,000 from the sale of sockeyes harvested at their Bear Creek weir site, equating to approximately 17,000 fish using projected figures of \$1.00 per pound and 5.0 pounds per fish. In an effort to provide opportunity for the commercial seine harvest of a portion of the surplus, while still allowing adequate numbers of sockeyes into fresh water for both escapement and cost recovery purposes, the weekly fishing schedule in 2003 was set at two 40-hour periods per week, as was the case during the previous two seasons. This contrasted with the five-days-per-week schedule employed from 1997 - 2000, when forecasted and actual returns were stronger and/or no revenue goal existed.

When the area first opened in 2003, fishermen were expectedly optimistic given the prediction, the highest for the Bear Lake return since 1996. As usual, all effort was concentrated at the head end of Resurrection Bay, with the first landing occurring on May 20, a day after the opening. Although fish concentrations were meager at the time, the fact that fish were present in area waters on this early date signaled that the forecast might be on track. By the end of that week, the cumulative reported harvest totaled around 400 sockeyes, still a positive sign given the date. Additionally, a few sockeyes had shown up at the Bear Creek weir that week, indicating that the seine fishing schedule was effectively allowing fish into fresh water and further buoying hopes for a strong return.

Both effort and harvest increased as expected the next week, the last week of May, since fishermen had come to anticipate an increase in numbers of fish based on traditional run timing for this stock. However, catches that week were disappointing, cumulatively totaling about 2,300 sockeyes taken

by 6 – 8 vessels for the week. With the total seine harvest of only about 2,700 sockeyes landed by the end of May, and an escapement of less than 100 sockeyes past the weir, a significant influx of fish would be required in order to attain the preseason forecast. Unfortunately, that influx was never realized, as catches during the first week of June were only slightly better than the previous week's. Cumulative harvest at the end of that week totaled about 5,400 fish, and despite the weekly seine fishing schedule designed to allow for adequate escapement during mid-week and weekend closures, only about 1,000 sockeyes had been documented past the Bear Creek enumeration weir through June 7. Suddenly hopes shifted from a weak return to a late return.

In one last effort to determine whether the sockeye return to Bear Lake would materialize later than expected, the seine fishery was allowed to reopen for a regular weekly period on June 9. However, the modest catches reported that day effectively sealed the fate of the fishery. Since an escapement near the upper end of the desired in-river range of 5,600 to 13,200 was sought, as well as the relatively substantial size of the revenue goal, the staff reasoned that the remainder of the return would likely be necessary to achieve these objectives. Therefore, the commercial seine fishery in Resurrection Bay was closed at the end of the fishing period on June 10 for the remainder of the season. Total harvest for the fleet in Resurrection Bay Subdistrict was about 7,300 sockeyes (Table 3).

The closure indeed allowed all remaining sockeyes to enter fresh water, but the return ultimately proved far weaker than the preseason forecast. Escapement progressed slowly but steadily after the closure, peaking on June 21 with the passage of nearly 2,000 sockeyes through the weir for the day. Passage rates through the weir dropped after this time but were still sufficient to allow both escapement into the lake and initiation of cost recovery by CIAA. The desired in-river return was achieved in mid-July, with a final cumulative escapement past the weir totaling about 13,200 sockeyes (Table 3, Appendix Table 23). Unfortunately, the available surplus provided CIAA with only about 3,000 fish for cost recovery (Tables 1 and 3), about 10% of which were unmarketable due to quality concerns and were consequently donated to local individuals (primarily dog mushers). When hatchery harvest totals were combined with the commercial seine catch and Bear

Lake escapement, the total Bear Lake sockeye return was estimated at 23,600 fish, representing only about 40% of the expected return.

A second sockeye enhancement project was initiated at nearby Grouse Lake in 1996, when over 200,000 juvenile fish were planted in this Resurrection Bay system. As outlined in past years Trail Lakes Basic and Annual Management Plans, the entire sockeye return to Grouse Lake was allocated specifically to CIAA for the express purpose of hatchery cost recovery. Grouse Lake was subsequently stocked for two additional years, but adult returns failed to meet expectations for unknown reasons, and CIAA suspended the enhancement of Grouse Lake after the 1998 season. No sockeyes were expected to return to Grouse Lake in 2003, therefore no provisions to facilitate hatchery cost recovery harvest of Grouse Lake sockeyes were enacted.

At Aialik Lake in Aialik Subdistrict, aerial surveys were initiated in mid-June, but fish were first documented in significant numbers on July 1 when 200 sockeyes were observed in the outlet creek of the lake. Such a count was considered late by historical accounts, raising concerns for a weak return. Two more surveys were flown over the next two weeks, both showing increasing numbers, with the latter of the two producing an estimate of over 5,000 sockeyes in fresh water on July 14. Since this escapement figure fell within the SEG (3,700 – 8,000), waters of Aialik Subdistrict, including Aialik Lagoon, were opened to seining five days per week beginning July 15. However, the relative lateness of the opening, coupled with what could only be termed a modest return at best, resulted in no effort or harvest. The aforementioned aerial survey estimate on July 14 proved to be the season's peak and was used to generate the final escapement index of 5,400 sockeyes for Aialik Lake (Table 3, Appendix Table 23).

### **Pink Salmon**

A harvestable surplus of only 2,500 pinks was forecasted in Eastern District waters for 2003, on par with the primarily weak returns in most recent years. Surveys of Resurrection Bay systems were limited to on-grounds estimates in early August and early September. Results and final estimates suggested that returns were as weak as expected. At Bear and Salmon Creeks, where the combined

pink SEG is 4,900 – 21,700 fish, a total of 4,400 pinks were estimated (Table 5, Appendix Table 24), the third lowest total since 1989. The figure for Thumb Cove, with an SEG of 2,400 – 8,900, was estimated at 5,100 pinks, while at Humpy Cove (900 – 3,200 SEG) about 2,600 fish were estimated. Tonsina Creek produced an estimate of 5,200 pinks, falling within the SEG range of 500 – 5,900 pinks. Due to the trend of primarily weak but highly variable returns during recent years, no openings for pinks were allowed in Resurrection Bay this season and therefore no harvest occurred.

The fishing schedule in Aialik Subdistrict, originally set at five days per week beginning July 15 for sockeye salmon, was never altered after the sockeye run was effectively over. During some seasons in the 1990's, the subdistrict was allowed to remain open despite knowledge that seiners 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 2003 because the relatively modest historical catches would not likely threaten either local or non-local stocks. No effort resulted, however, therefore no pink salmon harvest occurred in Aialik Subdistrict.

### **Other Species**

Chum salmon have occasionally been an important component of commercial catches in the Eastern District, but catches during the past 10 years have averaged only about 600 fish annually. This season's chum harvest amounted to only a trace (Table 6, Appendix Table 21), with all fish taken incidentally during the Resurrection Bay directed sockeye fishery in June. Due to a pattern of weak Eastern District returns over the past 10-15 years, no directed openings for chum salmon were allowed in the Eastern District this season. An estimated 2,000 chums were estimated as escapement into Tonsina Creek in Resurrection Bay (Table 6), continuing the trend of weak returns to this system.

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. Because the Resurrection Bay Salmon Management Plan specifically directs the Department to manage coho stocks there for recreational use only, coho salmon may not

be retained in the commercial fishery. However, all sport-caught 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 2003, a total of over 3,800 cohos were entered into the Seward Silver Salmon Derby (Tables 1 and 4). In addition, a portion of the returning adults from the enhancement project are traditionally harvested at the Bear Creek weir by CIAA as cost recovery for expenses incurred. During years when the salmon market was strong, CIAA customarily sold most cost recovery cohos to a commercial processor(s). Because market forces now make product quality a central issue, many of the cohos taken at the weir are unmarketable due to excessive fresh water marking. As has become commonplace, the majority of cohos caught for cost recovery this season were donated to various individuals, many of whom were dog mushers, although the association did sell a small percentage. Total hatchery harvest from the Bear Creek weir was just under 2,100 cohos (Tables 1 and 4), comprising almost one-fifth of the entire LCI coho catch this season. Just over 1,000 cohos were collected for hatchery brood stock, while an additional 400 fish were allowed into Bear Lake as escapement (Table 4). Total commercial catch in the entire Eastern District amounted to about 5,900 cohos (Table 4, Appendix Table 17), about 87% of the recent 10-year average of 6,800.

## **SALMON ENHANCEMENT AND REHABILITATION**

### **Introduction**

Fisheries enhancement has played a major role in LCI salmon production for over two decades. Natural adult salmon returns to the LCI area continue to demonstrate wide fluctuations, often the result of environmental impacts such as streambed scour, de-watering, or redd freeze-out on spawning grounds, all of which potentially lower overall survival rates. 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 provided an estimated 65% (999,630 salmon) of the total 2003 LCI commercial harvest of 1.5 million fish, while CRRC-managed projects produced a commercially harvested total of 68,500 fish in 2003. The Leisure/Hazel, Kirschner and Bear Lakes sockeye salmon enhancement projects produced approximately 76% (488,090 fish) of the total LCI sockeye harvest of 644,250 fish in 2003, up slightly from the 69% contribution last year but still lower than the record high of 84% contributions in both 1995 and 1999. Tutka Lagoon Hatchery production accounted for 60% (511,539 fish) of the 2003 LCI commercial pink salmon harvest of 856,700 fish.

Using average weights per fish and average prices per pound in LCI, the estimated contribution of ADF&G, CIAA and CRRC-produced salmon was 78% (\$1.71 million) of the \$2.2 million total value of the 2003 LCI commercial salmon harvest. About 16.5% (\$0.361 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 more 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 to the smolt stage have been plagued by the IHN virus, resulting in an indefinite suspension of the sockeye program.

In 2003, the total return of adult pink salmon produced by Tutka Lagoon Hatchery amounted to approximately 751,200 fish (Table 9). No attempt was made to identify the contribution resulting from natural spawning in Tutka Creek. The estimated 0.8% overall survival rate this season is

slightly lower than the 0.9% survival experienced in 2002 and the third lowest since hatchery operations began. The commercial harvest, including cost recovery, of 511,500 pink salmon from Tutka Bay and Lagoon (Table 9), accounted for approximately 91% of the pink salmon landed in the Southern District and 60% of the entire LCI commercial pink salmon harvest. Pinks taken for hatchery cost recovery purposes from the Tutka Bay Subdistrict totaled 507,200 fish, worth approximately \$96,800, falling short of the \$688,000 sales revenue goal for 2003. Approximately 68.0 million short-term reared pink salmon fry were released from Tutka Hatchery in 2003 (Appendix Table 34), the lowest total since the 2000 release of 65.1 million fry. Just over 22% of these fry were released outside of Tutka Lagoon in Tutka Bay proper, with the remainder released inside Tutka Lagoon.

### **Leisure and Hazel Lakes Sockeye Salmon Stocking**

Leisure (China Poot) Lake, located on the south side of Kachemak Bay across from the Homer Spit, 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 inception of these projects, over 2.7 million adult sockeyes were estimated to have returned as a result of these stocking programs (Appendix Table 15), making significant contributions 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 2003 was estimated at 433,000 fish (Figure 11, Appendix Table 15), a record high for the project. The cumulative commercial

harvest of 427,300 fish comprised over three-fourths of the Southern District sockeye harvest and about two-thirds of the total LCI sockeye salmon harvest.

Leisure Lake was stocked with 2.24 million sockeye fry in 2003 (Appendix Table 34), while Hazel Lake was stocked with 1.54 million fry. These figures compare similarly to those of most other years during the past decade.

### **English Bay Sockeye Salmon Rehabilitation**

The English Bay Lakes system has the only significant stock of sockeye salmon native to the Southern District of LCI. Unfortunately, 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 34). Chugach Regional Resources Commission (CRRC), in cooperation with the village of Nanwalek (formerly English Bay) and the Bureau of Indian Affairs (BIA), has since taken over this enhancement project, now known as the Nanwalek Salmon Enhancement Project (NSEP). NSEP has continued broodstock and egg collections/incubation, fry rearing, fry stocking, 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/NSEP. 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.

In the early 1990's, optimum escapement for this system was estimated to be less than the original 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/NSEP, and village residents from Nanwalek during meetings held over the winter of 1995-96. This escapement goal remained in place during the years 1996 – 2001. After the 2001 season, the Department conducted an escapement goal review for all salmon systems in the LCI management area and presented the results to the Alaska Board of Fisheries (BOF) at its Anchorage meeting in November 2001. The BOF approved the new sustainable escapement goals (SEG's) proposed by the Department, and the new goals were implemented for the first time in 2002. Based on the Department's analysis, the new SEG for English Bay Lakes was expressed as a range of 6,000 to 13,500 sockeyes. When the sockeye enhancement project's annual brood stock requirements, which are removed from the escapement into the lakes, were added onto the SEG, the desired in-river return became a range of 7,300 – 14,800 sockeyes (mid-point 11,050) for the 2003 season.

Approximately 75,500 harvestable adult sockeye salmon were forecasted to return to English Bay Lakes in 2003 due to the record high number of smolts that emigrated from the system in 2000 (the age composition of adults returning to the English Bay Lake system has historically been dominated by 1.3-aged fish). Inseason, both the commercial and subsistence fisheries were allowed to open by regulation and continue to the regulatory closing date of September 30, except for a one-week closure in both fisheries during late June as a precautionary measure due to the capsizing of a tender vessel on the local fishing grounds. Over 21,500 sockeyes were harvested in the Port Graham Subdistrict during the 2003 commercial set gill net fishery (Table 3). Hatchery cost recovery efforts netted another 47,000 fish for NSEP (Table 3), while escapement into the lake was estimated to total around 20,000 fish (Table 3, Appendix Table 23). The subsistence harvest by villagers from Port Graham totaled over 2,300 sockeyes (Appendix Table 31), while that for Nanwalek was not available at the time of publishing. For comparison,

the cumulative subsistence catch exceeded 10,000 sockeyes for the two villages in 2002 (Appendix Table 32), a year in which the English Bay Lakes sockeye return was similarly strong. The cumulative total return of sockeyes to English Bay Lakes in 2003 was estimated at over 90,000 fish (plus an undetermined amount taken by the villagers of Nanwalek for subsistence), exceeding this year's forecast by a substantial margin.

The CRRC/NSEP enumeration weir was installed and became operational on June 4, with the first recorded fish passage occurring the next day with a total of eight fish. Relatively strong passage rates were documented throughout the return, with cumulative counts consistently greater than the historical average. The peak daily count occurred on June 13 when 2,444 fish were tallied, and on the last day of weir operation (July 24) the escapement totaled 18,378 sockeyes, while NSEP personnel estimated an additional 1,600 sockeyes escaped into the lakes during times that the weir was inoperable. The cumulative escapement figure of 20,000 sockeyes (Table 3, Appendix Table 23) surpassed the desired in-river goal.

An estimated 695,000 sockeye "pre-smolts" were released in late September after being reared in "Second" Lake during the spring and summer (Appendix Table 34). Capture of brood stock in Second Lake during 2003 was less successful than anticipated, resulting in the collection of approximately 237,000 green eggs from 219 adults, falling below the goal of 1.35 million eggs.

Viral and disease outbreaks in the pen rearing of juveniles since the project's inception, as well as unexpected adult behavior that resulted in the failure to collect any brood stock in 2001 and difficulty in collecting brood stock in 2003, has caused concerns regarding the English Bay Lakes sockeye program. Additionally, because the long-term rearing of juvenile sockeyes in waters containing actively spawning adult sockeyes violates state fish culture and disease policy, ADF&G intends to no longer allow this practice in English Bay Lakes after the 2003 season, potentially jeopardizing the future of the project. At this time, an acceptable alternative for this portion of the project has not been approved.

## **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 for over a decade. Since 1962, this system has also been the centerpiece of a Sport Fish Division coho salmon enhancement program, 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 34).

The first year of adult returns in 1992 was discouraging, with a total of less than 2,000 fish, but returns increased during each of the following three seasons. The return in 1996 was almost identical to that of 1995, totaling nearly 53,000 sockeyes, the highest to date. Since 1996, returns have not met the system’s hypothesized potential.

The forecast for harvestable sockeye bound for Bear Lake increased to 45,500 fish in 2003 (up from 11,000 in 2002), primarily due to greater estimated wild stock components in the 2000 and 2001 smolt emigrations. Despite the increased projection, a conservative commercial seine fishing schedule was implemented in waters of Resurrection Bay because CIAA had, for the first time, established a revenue goal for the Bear Lake project. For the third consecutive season, fishing time was limited to two 40-hour periods per week (from 6:00 a.m. Monday until Tuesday at 10:00 p.m. and from 6:00 a.m. Thursday until 10:00 p.m. on Friday), beginning May 19.

Although the harvest forecast had increased significantly over 2002, the commercial harvests as well as escapement trends were monitored closely, and by June 8 Resurrection Bay seine catches as well as escapement through the Bear Lake weir appeared weak at 5,400 and 1,200 fish, respectively, indicating that the return would not achieve the forecast. The escapement for the

given date was far short of the 5,600 to 13,200 fish needed to meet the desired in-river escapement goal. Additionally, no fish had been harvested for hatchery cost recovery since all fish escaping commercial nets were allowed into Bear Lake for escapement. Therefore, in an effort to increase the escapement rate into Bear Lake, and allow opportunity to attain the hatchery revenue goal, commercial salmon seining was closed effective 6:00 a.m. Monday June 10, until further notice. Despite the closure, daily escapement rates remained slow until June 19, when the daily passage increased to nearly 1,600 fish. Counts peaked on June 21 with just under 2,000 fish for the day, and the final cumulative escapement for 2003 tallied 13,200 sockeyes (Table 3, Appendix Table 23). The common property purse seine fishery never reopened after the initial closure, ending the season with a harvest of 7,300 sockeyes (Tables 1 and 3), while CIAA cost recovery harvests of the early run at the Bear Creek weir totaled an additional 2,700 fish. When combined with the escapement and the 300 fish that were harvested at the weir and donated (due to product quality concerns), the 2003 Bear Lake total return equaled 23,600 sockeyes, making both the total return and the commercial catch (common property, hatchery cost recovery and donations) the second lowest since 1994.

Approximately 1.80 million sockeye fry were released into Bear Lake during 2003 (Appendix Table 34), while 5.05 million sockeye eggs were collected for incubation over the 2003-2004 winter at Trail Lakes Hatchery in Moose Pass. Increased stocking levels in Bear Lake over the past two seasons are expected to increase adult returns commensurately beginning in 2005.

### **Grouse Lake Sockeye Salmon Stocking**

A second sockeye enhancement project in Resurrection Bay of the Eastern District was initiated at Grouse Lake in 1994. From the project's inception, all returning Grouse Lake sockeyes were designated for hatchery cost recovery in accordance with the Trail Lakes Hatchery Basic Management Plan, therefore a directed common property seine fishery has never been allowed on this return. Brood stock for this project was originally collected from Packers Lake on Kalgin Island in Upper Cook Inlet (UCI), but in subsequent years brood stock was also taken from Tustamena Lake in UCI. These two stocks were selected specifically for

their late run timing characteristics so as not to overlap with the earlier Bear Lake sockeye return.

The first adult salmon from the initial 1994 release returned in 1996. Smolt releases continued annually through 1998, except in 1996 when the IHN virus was detected during Trail Lakes Hatchery operations and all fish were destroyed. The number of smolts released into Grouse Lake ranged from 0.57 million in 1994 to 1.9 million in 1997 (Appendix Table 34), but sockeye stocking at Grouse Lake was discontinued after 1998. Because of inconsistent adult returns to Grouse Lake, ranging from an estimated 800 fish in 1996 to 100,000 in 1999, and also because of issues regarding product quality, CIAA ceased sockeye enhancement at Grouse Lake and instead began to increase early-run sockeye production at nearby Bear Lake. Due to the discontinuation of stocking after 1998, no adult return forecast was generated for Grouse Lake in 2003, and no attempt was made to harvest or enumerate the few adults that may have returned to the system this year. In the future, sockeye adults resulting from natural spawning may continue to return to Grouse Lake, but numbers are expected to be minimal.

### **Chenik Lake Sockeye Salmon Enhancement**

Chenik Lake, located in Kamishak Bay on the west side of LCI, historically was an excellent sockeye producer prior to the 1940's when annual runs approached 150,000 fish. After 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 Chenik sockeye run and subsequently increase commercial fishing opportunities in the Kamishak Bay area. Sockeye fry, collected from Tustamena Lake brood stock and incubated at the now closed Crooked Creek Hatchery, were annually stocked in Chenik Lake from 1986 through 1996 (except for one year, Appendix Table 34), and a partial migrational barrier at the intertidal mouth of Chenik Creek was modified to allow easier fish passage. Beginning in 1987, and from 1989-1991, lake enrichment occurred through the experimental application of liquid fertilizer. Increased sockeye escapements in the early 1980's augmented production, and the Chenik area was reopened to commercial fishing. Subsequent adult

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. Beginning in 1989, sockeye returns to Chenik Lake inexplicably began to steadily decline.

Between 1991 and 1996, the outmigration of sockeye smolts at Chenik Lake was monitored with a weir and live trap. Infectious Hematopoietic Necrosis Virus (IHNV), a disease commonly affecting both juvenile salmon and trout, was documented in the Chenik system during the 1991-1993 smolt outmigrations and is suspected of causing increased mortality to juvenile sockeyes. The lingering effects of IHNV are believed to be the main cause for reduced adult returns to the system in subsequent years. 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.

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 became a reservoir for IHNV released from the sex products of naturally spawning adult sockeyes or their decomposing carcasses. It was 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 34). 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, the last year stocking occurred (Appendix Table 34).

It was thought that reduced adult escapement would also help to decrease transmission of IHNV into the littoral zone of Chenik Lake. Because of the small returns of sockeyes to Chenik Lake over the past decade, and in an effort to protect the few returning fish for escapement, no directed commercial fishing effort has been allowed on this stock since 1993. The sockeye return and final estimated escapement to Chenik Lake in 2003, estimated at 13,800 fish by aerial surveys (Table 3, Appendix Table 23), was the highest total return in the past ten years (Appendix Table 16). This year's escapement exceeded the recently adopted sustainable escapement goal (SEG) range of 1.9-9.3 thousand fish (Appendix Tables 16, 23, and 28). The reasons for the significantly higher return to Chenik Lake this year are more likely similar to those responsible for the strong adult sockeye returns experienced at other LCI systems (i.e., Leisure/Hazel and Kirschner Lakes) rather than to previous efforts at reducing fry rearing densities. Nonetheless, 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. Furthermore, informal studies indicated that the resident lake trout population in Chenik Lake predictably benefited from the regular stocking of sockeye fry, and these inflated lake trout numbers may have contributed to the suppression of juvenile sockeye levels in the lake, thereby reducing the size of annual smolt outmigrations.

The aforementioned schemes of reduced adult escapements and decreased stocking levels appeared to successfully reduce the incidence of IHNV 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 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, discontinuing the project after the 1996 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 at the system.

### **Other Sockeye Salmon Lake Stocking**

Kirschner Lake in the Kamishak Bay District was stocked with sockeye fry for the first time in 1987 (Appendix Table 34), and 2003 marked the fifteenth year that adult sockeyes have returned to this site. The 2003 return totaled just over 50,400 fish, which included 38,700 fish taken for hatchery cost recovery and nearly 12,000 harvested in the commercial purse seine fishery (Table 3). This year's return was over double the preseason forecast of approximately 22,000 fish. The Kirschner Lake system has remained one of the steadiest producers of LCI stocked lakes since the inception of the program at that site. Approximately 300,000 fry were stocked into Kirschner Lake in 2003 (Appendix Table 34).

No sockeye salmon were expected to return to four other Kamishak Bay lake systems (Bruin, Ursus, Upper Paint, and Lower Paint) in 2003. All of these systems were evaluated through pre-stocking studies conducted between 1986 and 1989 and were regularly stocked with sockeye fry between 1988 and 1996 (Appendix Table 34). After that time, all stocking at these sites was suspended. However, CIAA was allowed to experimentally stock Upper Paint Lake with 536,000 sockeye "pre-smolts" in early October of 2002. An amendment to the 2002 Trails Lake Annual Management Plan granted the aquaculture association authorization to stock juveniles that were surplus to the 2002 AMP stocking schedule, a result of unexpectedly high survival rates during the incubation phase at Trails Lake Hatchery. This was the first time the Paint River Lakes system has ever been stocked in the fall with fry that were reared to the pre-smolt stage; all previous releases were of traditional spring/early summer fry releases. Permit conditions for this experimental stocking required that CIAA conduct smolt outmigration studies in the spring of 2003, which resulted in a smolt count of only 7,000 fish, suggesting that over-winter survival was poor. Furthermore, follow-up hydroacoustic surveys in October 2003 revealed that no fingerlings were over-wintering in the lake system, refuting the hypothesis that the stocked juveniles may have held over in the lake for an additional year. The first adult sockeyes resulting from the pre-smolt release are expected to return to Paint River in 2005 as age-1.2 fish, but the 2003 assessment work, as well as historical success rates for the Paint River stocking program, imply that adult returns from the experimental stocking will be minimal.

## **Halibut Cove Lagoon and Seldovia Bay Chinook Salmon Enhancement**

Chinook salmon enhancement projects at Halibut Cove Lagoon and Seldovia Bay involve the release of Chinook salmon smolts, with the objective of increasing sport fishing opportunities in Kachemak Bay. The program at Halibut Cove Lagoon 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 two stocking programs 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 approximately 30% of the total return. No such estimates are available for the commercial fishery in Seldovia Bay Subdistrict. Figures for the incidental Chinook harvest during 2003 were not generated but were thought to be near the historical average. The commercial harvest of Chinook salmon in Halibut Cove and Seldovia Bay Subdistricts this season totaled approximately 667 and 99 fish, respectively, while 178 Chinook were caught in Tutka Bay Subdistrict (Table 2). Historical releases of juvenile Chinook salmon at these two project sites are found in Appendix Table 34.

## **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 subsequently been permitted in the Port Graham Hatchery Basic and Annual Management Plans (BMP/AMP). Original startup brood stock was collected from a natural run of pinks in the Port Graham River, at the head of Port Graham, and the PNP permit for PGHC allows for continued pink salmon brood stock collection from this source. 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 sustainable escapement goal for 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 both natural and hatchery stocks could potentially occur in commercial purse seine and set gillnet fisheries, as well as a subsistence set gillnet fishery, in Port Graham since the returning hatchery fish would 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 salt water Special Harvest Area (SHA) to allow for brood stock collection and cost recovery harvest (Figure 6). 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.

Initial adult returns to the hatchery in both 1992 and 1993 failed to appear 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 fell within the preseason forecast range of 80,000 to 200,000 pinks, with a total run size estimated at about 130,000 fish. Despite a forecast of 30,000 to 50,000 fish in 1998, the return totaled less than 13,000 pinks. Because of a fire in January 1998 that destroyed all of the hatchery pinks and sockeyes in incubation at the time, no pink salmon returned to the hatchery in 1999. In 2000, all returning pink salmon (38,500 fish) were taken for broodstock, as

was the case in 2001 when 19,000 fish were tallied. Despite an optimistic forecast calling for a return of 864,000 pinks in 2002, only about 335,000 fish returned as a result of a 2001 release of 27.3 million fry. Just over 70% of that year's return was harvested for cost recovery, with the remainder used to fulfill broodstock requirements. Despite failing to achieve the projection, the 2002 pink return to Port Graham Hatchery represented a record high for the facility.

The release of 6.6 million pink salmon fry from the Port Graham Hatchery in the spring of 2002 was down from the 27.3 million released the previous year (a record high at that time, Appendix Table 34), and generated an adult return forecast for 2003 of approximately 158,000 fish. However, the actual return totaled only about 83,000 fish, or slightly over one-half of the projection. Almost the entire return was utilized for brood stock purposes, although a minor number was used for a value-added product test while about 5,000 pinks were estimated by hatchery personnel to have entered Duncan Slough to spawn. In the Port Graham River approximately 14,900 pink salmon were counted as escapement, falling within the established SEG for the system (Appendix Table 24). An estimated 57.2 million pink salmon fry were released from the Port Graham Hatchery in the spring of 2003 (Appendix Table 34), setting a new record for the facility.

Although all efforts prior to 1993 were directed towards pink salmon, sockeye salmon production has also been underway at the Port Graham Hatchery. Since 1993, the facility has incubated sockeye salmon eggs collected from English Bay Lakes brood stock as part of that enhancement project, with the resulting fry destined for eventual release back into the lake system. Prior to 1993, eggs from this collection site were incubated at Big Lake Hatchery near Wasilla. After incubation and hatching at the Port Graham Hatchery, fry are transported back to the English Bay Lakes the following spring for either direct release or long-term rearing in net pens prior to release (for additional information, see the previous **“English Bay Sockeye Salmon Rehabilitation”** section).

In 2003, a hatchery permit alteration request (PAR) was submitted by the PGHC to allow development of a sockeye salmon return to waters near the village of Port Graham. The permit

was eventually approved, allowing the corporation to collect up to 1.8 million sockeye eggs from English Bay Lakes brood stock for incubation at the Port Graham Hatchery (this figure is in addition to the 1.35 million permitted egg capacity for the separate English Bay Lakes sockeye project). The new project's plans called for rearing the emergent fry in impermeable rearing pens, also known as "vertical raceways", anchored in salt waters of Port Graham Bay near the hatchery facility. During the rearing process, fry will be fed while gradually being acclimated to salt water. Upon full salt water acclimation, fry will be transferred into salt water net pens, where rearing will continue until fry reach a size of 12 to 15 grams, at which time they will be released. Because the sockeye salmon brood stock goal at English Bay Lakes was not achieved in 2003, all collected eggs were utilized for the English Bay Lakes sockeye enhancement project, and no eggs were available for this newly created Port Graham sockeye project.

### **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 34). Because adult returns from these plantings proved negligible, CIAA discontinued fry stocking after the 1996 season (except for an experimental release in 2002, see previous heading "**Other Sockeye Salmon Lake Stocking**"). Due to the small numbers of annually returning fish, the Paint River fish pass has never opened to migrating adult salmon and no freshwater escapement has ever occurred.

Approximately 520 adult sockeyes were unexpectedly observed during aerial surveys of the Paint River mouth and Akjemguiga Cove during 2003. Based on the brood stock (Tustamena Lake) traditionally used for the Paint River Lakes enhancement project, and the projected age composition of returning adults, sockeyes observed at the mouth of the Paint River this year, and in 2002, are not likely the result of the last fry release in 1996. The origins of the 2002 and 2003 adult sockeye returns to the Paint River therefore remain questionable.

## **2004 COMMERCIAL SALMON FISHERY OUTLOOK**

### **Sockeye Salmon**

Commercial sockeye salmon harvests in LCI during 2004 could approach 200,000 fish, which is slightly over two-thirds of the recent 10-year average. Just over half of the total sockeye harvest should be a result of continuing enhancement and lake stocking projects in LCI. Forecasted returns to enhancement sites at Leisure and Hazel Lakes in the Southern District during 2004 are substantially below the estimated average over the past decade, with a return of about 29,000 sockeyes anticipated at Leisure Lake/China Poot Bay and an additional 20,000 sockeyes expected to return to Hazel Lake/Neptune Bay.

Kirschner Lake in the Kamishak Bay District is expected to produce only 10,000 adult sockeyes in 2004. This projection is based on actual stocking rates combined with average assumed survival rates over the past decade. Stocking in other Kamishak Bay systems, such as Bruin, Ursus, and Paint River Lakes, has now been discontinued, and no returns are expected back to these systems in 2004. Although no harvest is expected to occur at Chenik Lake in the Kamishak Bay District during 2004, due to the discontinuation of the stocking program and also the lingering effects of the previously described IHNV epizootic there, it should be noted that the adult sockeye return to that site in 2003 was unexpectedly the strongest since 1993, leaving open the possibility that another strong return could produce a harvestable surplus.

The 2004 enhanced sockeye return to Bear Lake (thirteenth year of enhanced returns) is expected to produce a harvest of about 43,000 fish after accounting for brood stock and escapement requirements. No sockeyes are expected to return to Grouse Lake, also near Seward in Resurrection Bay, in 2004 due to a suspension of the stocking program there.

The preseason forecast for English Bay Lakes in the Southern District calls for a harvest of around 8,200 sockeyes in 2004. This pessimistic projection results from lower than anticipated stocking levels and low smolt outmigration counts during previous years.

Based solely on average historical harvests, natural sockeye run projections for LCI could be expected to contribute up to 87,000 fish to commercial catches in 2004. Despite not reaching the preseason prediction during recent years, natural sockeye runs have nevertheless improved, with a concurrent improvement in both spawning escapements to and harvestable surpluses at most systems. The Southern District is expected to contribute the most to the harvest of non-enhanced 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 LCI during 2004 could exceed 3.2 million fish, with enhanced production expected to provide half of the total. Tutka Hatchery in the Southern District is expected to contribute only about 462,000 pinks to commercial harvests, but since the facility will likely require all of its pink salmon return in order to meet brood stock and revenue requirements, a directed common property harvest is not anticipated. The pink return to Port Graham Hatchery is projected to produce a harvest approaching 1.2 million fish based on a release of over 57.0 million fry 2003. However, the assumed survival rate of 2.4% used to generate this forecast is twice the historical average for the facility, suggesting that the actual return could be much lower than predicted.

Natural pink salmon spawning escapement levels into most major LCI systems were considered excellent in 2002, contributing to a harvest projection of over 1.6 million naturally produced pinks throughout the entire LCI management area. The bulk of the predicted surplus is expected to occur at Bruin Bay in the Kamishak Bay District and at Port Dick in the Outer District, with a number of other potential surpluses occurring in both districts. This relatively strong forecast, however, could be tempered by the recent history of erratic tender service and a lack of active buyers, and it remains questionable whether the harvest forecast of naturally produced pinks will be attained in 2004.

### **Chum Salmon**

Based solely on recent years' average harvests (after 1988), the total LCI commercial chum salmon catch is projected to reach nearly 24,000 fish during 2004. Chum runs have rebounded during the past four seasons, however, resulting in commercial catches that exceeded the 2004 forecast figure in each of those years. This suggests that actual harvests during 2004 could be greater than the projection. The LCI chum harvest will consist exclusively of natural production since chum salmon enhancement is no longer conducted in LCI.

### **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 14,000 coho salmon can be expected to contribute to LCI commercial harvests in 2004.

The following table summarizes the projected harvest figures by species in the Lower Cook Inlet management area during 2004:

Species	Harvests of Enhanced Returns	Harvests of Natural Returns	Total Harvest
Chinook	<sup>a</sup>	<sup>a</sup>	1,300 <sup>a</sup>
Sockeye	109,900 <sup>b</sup>	86,500 <sup>c</sup>	196,400
Coho	<sup>a</sup>	<sup>a</sup>	13,700 <sup>a</sup>
Pink	1,643,300 <sup>b</sup>	1,612,000	3,255,300
Chum	0	23,600 <sup>c</sup>	23,600
<b>TOTAL</b>	<b>1,753,200</b>	<b>1,722,100</b>	<b>3,490,300</b>

<sup>a</sup> Commercial harvest forecasts of chinook and coho salmon represent average harvests since 1980 and are comprised of a combination of naturally-produced fish as well as fish produced from enhancement programs in LCI; no attempt is made to separate the two components.

<sup>b</sup> Includes common property plus cost recovery harvests.

<sup>c</sup> 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, and 1995-present, and as a “subsistence” fishery in 1991, 1992, and 1994. Numerous court rulings have affected the status of this fishery over the past 20 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 (BOF) 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 BOF re-adopted personal use regulations governing this fishery into permanent regulation for the 1995 season and rescinded 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/Caribou Lake near the head of Kachemak Bay. The regulations governing the fishery are found in the

Personal Use Coho Salmon Fishery Management Plan (5 AAC 77.549). The BOF last addressed this fishery during its 1998 meeting in Homer. After hearing the staff's concerns regarding the harvest of wild stocks of cohos, the BOF adopted a change to the regulatory guideline harvest range (GHR), from a former range of 2,500 to 3,500 coho salmon to a new range of 1,000 to 2,000 cohos. The new GHR was implemented for the first time during the 1999 season. Incorporated into the management plan is a requirement that cohos taken during the earlier Seldovia area subsistence salmon fishery be included as part of the personal use guideline.

All other regulations from the previous year's fishery remained essentially unchanged for the 2003 personal use fishery. 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. By regulation the Southern District personal use salmon set gillnet fishery opens August 16, however, this year if allowed to open by regulation, the fishery would have begun in darkness at 12:01 a.m., and closed just six hours later at the regular weekly closing time of 6:00 a.m. Saturday. Therefore, the opening was delayed by emergency order until the next regularly scheduled period beginning at 6:00 a.m. Monday, August 18, in order to give participants adequate daylight to set gear and allow more efficient enforcement. Prior to 1991, little Department management interaction occurred and the fishery often proceeded until the regulatory closing date of September 15, regardless of the harvest level. Between 1991 and 2002, years of intensive management for the GHR, fishing time allowed in this fishery ranged from 72 to 192 hours.

Only one coho was reported during the early August Seldovia subsistence fishery, thus having no effect on the later personal use fishery guideline harvest range. Prior to the opening on August 18, the Department requested voluntary daily reporting from each permit holder during the fishery, as has been the case since 1991. Catch information collected after the first 48-hour period indicated

that the catch rate was slow compared to the past three years; the reported catch through the first 48-hour period this year was less than 500 cohos (approximately 50% of the lower end of the 1,000-2,000 fish harvest range) compared to over 900 cohos reported through the first 24-hour period last year. With a reduced catch rate apparent, staff allowed the fishery to continue for a second period while closely monitoring catch reports. The slow harvest rates continued, and after three periods (144 hours) of fishing time, a catch of only 817 cohos was reported by 59 (or about 57%) of the permit holders, still short of the lower end of the GHR. After comparing this year's catch-permit and call-in reporting rate to the previous three years' information (when the lower end of the GHR was achieved after three or less 48-hour periods), the catch and catch rate in the fishery this year suggested an average coho return at best. Given this information, the staff allowed a fourth 48-hour period and, again using previous years' catch data, predicted that the total coho salmon catch would fall within the GHR by the close of that fourth period. Therefore *LCI Emergency Order 2-F-H-026-03* was issued closing the 2003 Personal Use Coho Salmon Fishery at 6:00 a.m. Saturday August 30, for the remainder of the year. Since the 2003 fishery had already progressed further than any other fishery since 1999, the staff believed that additional fishing could result in an unacceptably high harvest of wild coho bound for the Fox River drainage at the head of Kachemak Bay.

A total of 104 permits were issued for the 2003 fishery (Appendix Table 29), with approximately 92%, or 96 permit holders, reporting their catches by phone or returned their permits. Of the total issued number issued, 72 permit holders (69%) actively fished, 24 (23%) did not fish at all, and the remaining 8 permit holders (8%) did not report or return their permit. Based on permits actually returned and voluntary catch reports, the harvest was estimated to be 1,071 coho salmon, 170 pink salmon, 57 sockeye salmon, 17 Chinooks, and 9 chums (Appendix Table 29).

The number of permits issued for the 2003 Southern District personal use fishery (104) was the lowest since 1970, well before production from Kachemak Bay coho enhancement programs started contributing to the fishery. Also, the percentage of permits that actually fished, at 69% of the total issued (or 72 of 104 permits), was down from 76% last year and the record high in 1994 of 78%, but was only slightly less than the recent 10-year average. Perhaps more importantly, only 29

permits fished on the Homer Spit this season, compared to an annual average number of 61 permits fished there since 1999. The duration of the 2003 fishery, at 192 hours of fishing time, was the longest since 1998 and 1999, when fishing time was identical, but was significantly more than the previous year's 72 hours. The total coho catch of 1,071 fish was approximately 38% lower than the 1,742 fish average annual harvest between 1999 and 2002, years that the personal use fishery was managed for the lower 1,000-2,000 coho GHR.

The low number of permits, both fished and issued, is likely reflected in the low catch and long season duration, but reasons for the decreased effort are difficult to explain. Permits for, and catches in, the personal use fisheries north of Homer (e.g. the Kasilof and Kenai River dip and set gill net fisheries) have been relatively high in recent years. Since current regulations prohibit issuance of more than one Cook Inlet personal use permit to a household in any calendar year, individuals must choose only one Cook Inlet fishery in which to potentially participate. Many individuals now choose to forego the LCI coho fishery and instead participate in one of the Upper Cook Inlet personal use sockeye fisheries, perhaps due to a preference for sockeyes over cohos, or perhaps due to a preference for dip netting as opposed to set gillnetting.

In an effort to provide added sport fishing opportunities and continuity with the earlier return of Chinook salmon to the Homer Spit fishing lagoon, the Sport Fish Division for a second consecutive year stocked coho salmon with earlier run timing characteristics (Ship Creek brood) than the traditional "late run" cohos (Bear Lake brood) previously stocked. Juvenile cohos from the traditional late run Bear Lake brood stock were released in 2002, meaning that both early and late run fish would be returning to the lagoon during 2003. Adults resulting from the early run release return as early as the third week of July, which roughly coincides with the end of the enhanced Chinook return. The midpoint of the early run coho return is approximately mid-August and nearly corresponds with the regulatory opening date of the personal use fishery, while the midpoint of the late run return is approximately the end of August. It was assumed that the recently introduced earlier returning coho, combined with the beginning of the traditional later run, should theoretically increase catch rates in the personal use fishery, particularly during the first 24-hour period. Since

this was not the case in 2003, the reduced effort levels appear responsible for the lower than expected catches and catch rates in the personal use fishery.

Due to the abbreviated nature of the personal use fishery during most of this decade, the staff made a concerted effort prior to the opening to inform the public of the anticipated short duration, which has become common knowledge among experienced local participants. Although this prior knowledge of the brevity of the fishery usually leads to intense competition for desirable fishing sites along the east side of the Homer Spit, the reduced participation in the fishery this season somewhat tempered the competitive character. Nonetheless, this area continues to remain the most sought after location to fish, undeniably due to the coho enhancement project at the Homer Spit fishing lagoon. As expected, the most fishing success this season occurred in those waters adjacent to the Homer Spit enhancement lagoon. Other areas that previously produced reasonable catches during years of Caribou Lake enhancement, especially along the north shore of Kachemak Bay from Mud Bay to Swift Creek, were not expected to produce significant harvests this season and indeed didn't.

Prior to enhancement, the Spit was considered only average in terms of harvest productivity. The Spit's easy road access and the enhanced coho return have combined to incite fishermen to clamor for fishing sites on the Spit, a situation which resulted in numerous violations during some previous gillnet fisheries. The last time that Fish and Wildlife Protection (FWP) officers issued citations during this fishery was in 1994. Since then, numerous verbal warnings have been issued, and many complaints received via telephone in the Homer ADF&G office, regarding infractions. This year FWP officers were on site for the beginning of the fishery, and as is usually the case, the presence of these uniformed FWP officers generated relatively expedient voluntary compliance. As a result, no formal citations were issued.

The lower GHR implemented in 1999 appears to have succeeded at protecting the majority of naturally produced cohos by prompting a fishery closure prior to the peak of those stocks' migration. Although no tagged adult fish returned to the enhancement lagoon this year, tag recovery analysis from 2000 indicated that approximately 80% of the cohos caught during the set gillnet

fishery were of hatchery origin. This information, when combined with a personal use coho harvest near the lower end of the 1,000-2,000 fish GHR, suggests that a relatively low number of wild stock fish were likely taken in the gillnet fishery this year.

Overall run strength of coho returns to Kachemak Bay this year was estimated to be average or slightly better than average. Sport and commercial catches are normally utilized as indicators of run strength, and although commercial catches in the Southern District of LCI were greater this season than in recent years, the lack of directed effort tends to impart ambiguity to this statistic. Informal observations conducted in the local sport fishery by Sport Fish Division staff indicated relatively strong returns to the enhancement lagoon. This year's aerial surveys of Clearwater Creek, the major coho index stream at the head of Kachemak Bay, also suggested good returns of cohos to the area. Two surveys were conducted, the first on September 2 when 200 cohos were estimated, and the second on September 11 when over 800 cohos were estimated. The latter figure was considered good for this drainage by historical standards but not as strong as the previous two seasons.

The 2003 catch of 17 Chinook salmon (Appendix Table 29) is considerably lower than the long term average (1969-2002) of 52 fish and the lowest since returns of late-run Chinook salmon, stocked by the Sport Fish Division in the fishing lagoon, began overlapping personal use season dates. Furthermore, the Sport Fish Division discontinued stocking the late-run Chinook in 1999, which will undoubtedly result in reduced catches of Chinook in future personal use fisheries.

The catch for the 2004 personal use fishery is expected to be comparable to the previous five-year period, 1999-2003, a period when adult returns from Caribou Lake enhancement no longer contributed to the fishery. However, the length of time to achieve a harvest within the GHR is difficult to forecast, particularly when comparing this year's prolonged fishery (192 hours) to that of last year's 72 hours. Additionally, run timing of the earlier returning stocked cohos should hypothetically serve to reduce the length of time needed to achieve a harvest within the GHR. This in turn would provide further protection to the wild stock coho salmon bound primarily for the Fox River drainage at the head of Kachemak Bay, which exhibit a later run timing. However, low participation and effort levels in, and thus a longer duration of, the 2004 fishery could easily

negate the previous statement. Once again, other alternative personal use fisheries elsewhere in Cook Inlet will likely affect effort levels in the LCI fishery. Although limited as an inseason management tool, voluntary catch reports will once again be employed to help determine an appropriate closure time. Based on experience gained during the past ten years' fisheries, and especially that of the past five seasons, it should be possible to keep the harvest within the GHR.

### **NANWALEK/PORT GRAHAM SUBSISTENCE FISHERY**

One of LCI's two subsistence fisheries during 2003 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). Gear in this fishery is limited to set gillnets. Most fishing occurs within close proximity to the respective villages, primarily targeting sockeye salmon returning to the English Bay Lakes system early in the summer, although participants will occasionally target pink salmon returning to Port Graham and English Bay Rivers later in the summer. 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. Despite being open to fishing for each of the past two seasons, waters of Port Chatham and Windy Bay Subdistricts also provide opportunity for participants to meet subsistence requirements but have not experienced any known effort.

The sockeye salmon run to English Bay Lakes was severely depressed for much of the late 1980's and early 1990's, with returns failing to achieve the minimum escapement goal for nine consecutive years between 1985 and 1993 (Appendix Table 23). Recent returns have been bolstered as a result of a rehabilitation/enhancement project initiated by ADF&G and subsequently taken over by the Nanwalek Salmon Enhancement Project (NSEP) in conjunction with Chugach Regional Resources Commission (CRRC) and the village of Nanwalek.

Approximately 75,500 harvestable adult sockeye salmon were forecasted to return to English Bay Lakes in 2003 as a result of a record high number of smolts that emigrated the English Bay Lake system in 2000 (adult sockeyes returning to English Bay Lakes are predominantly 3-ocean fish).

This year the subsistence fishery was allowed to open on the regulatory opening date of April 1 and continue to the regulatory closing date of September 30, except for a one-week inseason closure resulting from the capsizing of a fishing/tender vessel in local waters. Subsistence Division end-of-year summaries indicate that all-species salmon harvests for the village residents of Port Graham cumulatively totaled over 3,500 fish in 2003, the highest figure over the past two decades (Appendix Table 31). Subsistence salmon harvest figures for the village of Nanwalek were unavailable at the time of publishing, but for comparison villagers took over 13,000 salmon the previous year (Appendix Table 32), when the local sockeye return was similarly strong. Port Graham's excellent catches were once again comprised primarily of sockeyes, dominating the 2003 harvests at 2,300 fish, also no doubt due to the strong return of sockeyes to English Bay Lakes. The enumeration weir operated by NSEP at English Bay River monitored sockeye escapement inseason, as has been the case since 1994, with a final escapement estimate of 20,000 fish (Table 3, Appendix Table 23), surpassing the upper end of the 6,000 – 13,500 fish desired in-river goal. It should be noted that NSEP collects hatchery brood stock from English Bay Lakes' sockeye escapement, with a total of 220 fish captured for this purpose in 2003.

Because of sub-par salmon returns to the Port Graham Subdistrict in some recent seasons, village residents have sometimes encountered difficulty meeting their subsistence salmon needs when restricted to fishing only in the Port Graham and Koyuktolik Subdistricts. Consequently, a proposal to add the previously mentioned waters of Port Chatham and Windy Bay to these areas open to subsistence fishing was submitted to the Alaska Board of Fisheries (BOF) at their November 2001 meeting. The BOF amended and subsequently adopted the proposal, allowing fishing weekly from 10:00 p.m. Thursday to 10:00 a.m. Wednesday between April 1 and September 30 in waters of Port Graham and Koyuktolik Subdistricts. However, in waters of Port Chatham and Windy Bay Subdistricts, the BOF established identical weekly fishing periods but chose season dates for these two subdistricts from April 1 until August 1 to protect returning coho salmon in those waters. Because of the strong sockeye returns to English Bay Lakes during the past two seasons, no subsistence fishing effort was known to occur in Port Chatham or Windy Bay Subdistricts during 2002 and 2003.

## SELDOVIA AREA SUBSISTENCE SALMON GILLNET FISHERY

The set gillnet fishery in waters near Seldovia on the south side of Kachemak Bay in 2003 was the eighth year of LCI's newest subsistence salmon fishery. Established by the BOF 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 initial seasons and bag limits, the BOF carefully restricted the fishery to reduce potential interception of enhanced Chinook salmon bound for a popular stocking site in the Seldovia small boat harbor. 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 30 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 reported to the Department's Homer office inseason so that cumulative harvest totals could be monitored.

A total of 19 permits was issued for the early season, while one permit was issued for the August season. Although permit holders were required to call in their catches inseason, few actually did, and therefore inseason catch totals were severely underreported. At the close of the early season, 13 of the 19 permits were returned to the Department as required by regulation, and catches were determined from records on each permit. For the early season, 10 of 19 permit holders (53%) actively fished, three (16%) did not fish, and six permit holders

(31%) failed to return his/her permit. Total reported salmon catch was 67 Chinooks, 210 sockeyes, 54 chums, and 1 pink (Appendix Table 33). In the late season, the single permit holder reported a harvest of 10 sockeyes, one coho, 12 pinks and one chum.

The 2003 early season all-species Seldovia subsistence harvest of 332 fish was the third highest since the fishery was established, surpassed by the 2002 fishery of 348 fish and the 2000 record harvest of 452 fish (Appendix Table 33). This season's cumulative harvest was also higher than the historical average of 243 fish. Sockeye salmon comprised the greatest part of the catch with 210 harvested, down slightly from the 222 caught in 2002 and the record high of 249 sockeyes taken in 2000. The Chinook harvest totaled 67 fish, just over half of last year's harvest of 123 fish, and lower than the historical average of 118 fish. The relatively high all-species harvest can be attributed to a longer season for the sixth straight year (the BOF adopted a 10-day extension for the early season, from May 20 to May 30, beginning with the 1998 season). This extra time equated to additional opportunity for participants during a time when numbers of both Chinook and sockeye salmon in Seldovia area waters were theoretically building, subsequently increasing subsistence harvests. Given this information, it is unclear why Chinook catches were down this season, although the six outstanding permits that failed to report their catches could significantly alter the actual catch figures.

The Seldovia subsistence fishery in 2004 is expected to be similar to those of the past five years. With the fishery now relatively well established, knowledgeable fishermen have learned the most productive fishing sites and successful techniques. Based on these factors, the harvest during the early season could approach or exceed the guideline harvest limit in 2004.

## **COMMERCIAL HERRING FISHERY**

### **INTRODUCTION**

Similar to the salmon fishery, commercial herring fishing in LCI has historically occurred in four of the five management districts, with the Barren Islands District the sole area where commercial

herring fishing has not occurred (Figure 1). LCI herring fishing first began in the Southern District in 1914 with the development of a gillnet fishery within Kachemak Bay. Eight saltries, including six near Halibut Cove, were operating during the peak of the fishery. A purse seine fishery in Kachemak Bay began in 1923, but after three successive years of average annual harvests approaching 8,000 short tons (st; 1 short ton = 2,000 pounds), herring populations, and hence the fishery, collapsed.

The next LCI herring fishery began in 1939 and was centered in the Resurrection Bay and Day Harbor areas of the Eastern District (Figure 1). Product from this purse seine fishery was used exclusively for oil and meal reduction. Although the fishery continued through 1959, peak harvests occurred from 1944 to 1946, averaging 16,000 st each of those years. After this time period, stocks sharply declined, apparently due to over-exploitation.

## **HISTORY AND DEVELOPMENT OF THE SAC ROE FISHERY**

### **Introduction**

Japanese market demand for salted herring roe resulted in the development of a sac roe fishery in the 1960s. The relatively high prices paid to fishermen caused rapid expansion of the fishing fleet and harvest, and efforts to manage the resource frequently encountered difficulty keeping pace with this strong market demand and growth. In order to decrease the risk of a stock collapse and to sustain the fishery, the Department established conservative management strategies and guideline harvest levels. Following a period of suspected over-exploitation, herring stocks throughout LCI generally declined after 1973. Concern over the declining trend led the Alaska Board of Fish and Game, prior to the start of the 1974 season, to establish a quota of 4,000 st for all of LCI.

Historically the only allowable gear type in the LCI herring sac roe fishery has been purse seine. The limited entry permit system for sac roe herring seining in Cook Inlet was implemented in 1977, and at the present time 74 permanent and two interim use permits are issued for the management area.

## **Outer/Eastern Districts**

During the early years of sac roe herring fishing in LCI, seining occurred primarily in the Outer and Eastern Districts (Figure 1), with the majority of effort and harvest once again concentrated in Resurrection Bay of the Eastern District. The first major harvest occurred in 1969, when 760 st of herring were taken in the Eastern District. The catch increased dramatically in 1970 to a record high of 2,100 st in this district, but the stocks, and resultant harvests, declined over the next three seasons. The Alaska Board of Fish and Game allocated 1,000 st from the total LCI quota of 4,000 st to each of the Outer and Eastern Districts beginning with the 1974 season. However, stock abundance continued to decline and these quotas were never achieved. As a result, the Outer and Eastern Districts were closed to herring fishing from 1975 to 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 the stocks' reduced 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) once again was taken in Resurrection Bay. Only limited and sporadic harvests occurred in these two districts after 1985, with the majority of both the herring catch and the observed biomass comprised of fish age 4 and younger.

Despite considerable opportunity for exploratory fishing on a daily basis in the Outer and Eastern Districts during 1991 and 1992, the predominance of juvenile herring and the history of marginally acceptable roe recoveries from fish caught in these areas contributed to a lack of interest by fishermen and processors. These conditions prevailed from 1993 – 2001 and, consequently, the Outer and Eastern Districts were not opened to purse seining in any season during that nine-year period. During their November 2001 meeting, the Alaska Board of Fisheries (BOF) closed these districts to commercial herring fishing by regulation and simultaneously adopted a management plan containing seven specific criteria that must be addressed prior to allowing any commercial

herring fishing in the Outer and/or Eastern Districts. Consequently, no harvest or effort occurred in the Outer and Eastern Districts during the 2003 season.

### **Southern District**

Sac roe herring seining in the Southern District began in the early 1960's, but catches were sporadic and relatively insignificant until 1969. That year, over 550 st were taken, followed the next season by a district record high harvest of 2,700 st. Commercial harvests continued during the 1970's, albeit at much lower levels, but observed low abundance of herring during the past 20 years has virtually precluded commercial openings in the Southern District. The only exception occurred in 1989, when 10 vessels in a single 2.5-hour opening harvested 170 st of herring (Appendix Table 35) averaging 8.9% roe recovery.

Similar to the Outer and Eastern Districts, the BOF expressed concern for the herring stock in the Southern District and responded at their November 2001 meeting by closing the Southern District to commercial fishing by regulation and also including it in the previously mentioned management plan adopted for the Outer and Eastern Districts. Under the new plan, the BOF must address seven specific management considerations prior to allowing a commercial herring fishery in this district.

### **Kamishak Bay District**

Since 1973, the majority of LCI sac roe harvest and effort has occurred within the Kamishak Bay District (Figures 1 and 7). Historical commercial harvests ranged from a low of 240 st taken in 1973 to a high of 6,100 st taken in 1987 (Appendix Table 35), with estimated exvessel values ranging from \$70,000 to \$9.30 million (Appendix Table 36). After the initial harvest in 1973, Kamishak Bay herring catches increased dramatically over the next three years, peaking at 4,800 st in 1976. Harvests dropped sharply during the ensuing three seasons, and by the end of the decade the stock had declined to a point that the Kamishak Bay fishery was closed entirely beginning with the 1980 season.

Although the Kamishak Bay District herring season remained fairly constant during the 1970's, roughly from late April through June, a significant management change occurred during this time. From 1973 through 1977, the fishery was basically "open season until closed", but in 1978 it was changed to "closed season until opened by emergency order" (Appendix Table 37). This change required more active assessment of the herring stock by the Department in order to determine appropriate opening times and harvest levels.

The Kamishak Bay herring stock appeared to respond positively and rebuild rather quickly following the 5-year closure that began in 1980. The fishery was reopened in 1985, with a resulting harvest of 1,100 st that season (Appendix Table 38). Beginning in 1985, the commercial fishery in Kamishak Bay District was regulated to achieve a 10 – 20% exploitation rate mandated by the Board of Fisheries. From 1985 through 1989, harvests averaged about 3,900 st, with a peak catch of 6,100 st in 1987 (Appendix Table 35). By 1989, fishing efficiency had increased to a level where intensive regulatory management was required to maintain harvests within guideline levels, to direct the fishery at herring aggregations with high quality roe, and to protect younger age herring from harvest.

Management of the Kamishak Bay District between 1990 and 1997 stabilized the average harvest at roughly 40% of the 1987 record high catch. However, hindcast biomass estimates generated by an age-structured-assessment (ASA) model show that stocks were declining steadily throughout the decade (Appendix Table 38, Figure 14), and by 1998 the cumulative commercial herring catch in the Kamishak Bay District totaled only 300 st despite several extended district-wide openings. The fishery was closed beginning with the 1999 season due to low abundance levels and has remained closed since.

The initial Kamishak Bay District Herring Management Plan (KBDHMP) was formally adopted into regulation beginning with the 1993 season. Highlights of the original plan included a minimum biomass threshold of 8,000 st, a maximum exploitation rate of 20% (scaled depending on the forecasted biomass), and a management strategy intended to limit the harvest of herring age 5 and younger. In addition, because the spawning stock of Kamishak Bay herring is believed to reside in

waters of north Shelikof Strait in the Kodiak Management Area for at least a part of the year, the KBDHMP dictated that 10% of the allowable harvest of Kamishak Bay herring be allocated to the Shelikof food/bait fishery.

At the November 2001 BOF meeting, Department staff proposed amendments to the KBDHMP in order to make it more conservative. The two key components of the new plan included a reduction in the maximum exploitation rate allowed in the fishery, from a former level of 20% of the forecasted herring biomass to a new level of 15%, and a reduction in the biomass threshold (the minimum volume necessary in order to allow a fishery) from 8,000 st to 6,000 st. The staff reasoned that the decreased exploitation rate, although equating to a smaller annual harvest for the fleet, would help to preclude the extended closures that have plagued the Kamishak Bay commercial herring fishery since its inception. The new threshold level was the result of a biomass threshold analysis conducted by the LCI research staff (Otis, 2001). After careful review, the BOF unanimously adopted the amended KBDHMP into regulation.

## **2003 SEASON OVERVIEW**

### **Assessment Methods**

The primary method of herring biomass assessment in LCI is the aerial survey. Aerial surveys are conducted annually throughout the herring spawning season in the Kamishak Bay and Southern Districts, from late April through early June, to determine relative abundance and distribution of herring. Aerial surveys of the Outer and Eastern Districts are not normally conducted due to the size of the area and the characteristically poor weather in the Gulf of Alaska, which precludes surveys on a regular basis and makes aerial biomass estimation in these districts impractical. Data collection methods in the Kamishak Bay and Southern Districts are consistent between seasons, with numbers and distribution of herring schools, location and extent of milt, and visibility factors affecting survey results recorded on index maps for each survey. Three standard conversion factors are used to estimate herring biomass based on each 538 ft<sup>2</sup> (50 m<sup>2</sup>) of school surface area sighted and the following water depth parameters: 1) 1.52 st for water depths of 16 ft or less; 2) 2.56 st for water

depths between 16 and 26 ft; and 3) 2.83 st for water depths greater than 26 ft (Lebida and Whitmore 1985).

Due to invariably poor weather and water clarity, aerial surveys rarely provide reliable estimates of total herring biomass returning to Kamishak District Bay waters (Otis et al. 1998). As a result, an age-structured-assessment (ASA) model has been used for the past ten years to forecast herring abundance for Kamishak Bay, as well as to “hindcast” previous years’ total abundance. This dynamic 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.

Another tool the Department annually utilizes to aid in herring assessment in the Kamishak Bay District, and opportunistically in the Southern District, is a chartered commercial seine vessel. In years when no commercial fishery occurs, the Department is unable to utilize the fleet to collect samples for age composition analysis. By chartering a commercial purse seine vessel, samples and other related information can be collected and used to further aid in understanding the dynamics of the herring stocks. As long as sufficient funding is available, separate sampling charters are conducted to sample different portions of the spawning migration (early and late). In years when a fishery occurs (traditionally in the early part of the migration), a single “late season” sampling charter is employed to obtain a more complete picture of the overall return. Hydroacoustic observations and water temperature/depth parameters are concurrently accumulated during the charters. The information gathered during these sampling efforts provides age class data that: 1) allows the staff to generate an age composition estimate of the overall biomass observed by aerial surveyors throughout the entire duration of the spawning migration; and 2) facilitates the evaluation of the relative strength of recruiting year classes. This is critical in generating the annual herring forecast. The charters further serve to informally verify the relative magnitude of herring biomass observed by aerial surveyors.

## Kamishak Bay District 2003 Season Summary

Aerial survey coverage for Kamishak Bay in 2003 was considered good, while overall observation conditions were considered fair. A total of 13 surveys were completed in the Kamishak Bay District between April 17 and June 2. Two significant “gaps” in coverage, or periods during which no surveys were flown due to poor weather, occurred this year, each of six days duration. Based on historical observations, the arrival of herring in 2003 was considered normal for the district, with fish first documented during a survey on April 25 when about 30 tons were estimated just north of Chenik Reef. The highest daily biomass estimation during the seasonal surveying period was made on May 12, with a cumulative estimate of about 800 st made on that date. Approximately half of that survey’s total biomass was observed in the Oil Bay index area, in the north end of the district, followed by the Chenik/Nordyke area with about 39% of the total.

Only three sightings of spawning activity occurred during surveillance flights, considered relatively normal by recent standards and cumulatively amounting to 1.5 linear miles 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 in itself considered indicative of a weak herring return.

Despite the good coverage and reasonable weather, Department aerial surveyors observed a cumulative total of only 1,938 st of herring in the Kamishak Bay District, just over half of the 2002 season’s observed total of around 3,700 st and the lowest volume in the past 12 years. Although the last three seasons’ totals were disappointingly low, they all served to confirm that the relatively large biomass observed during the 2000 season did not result in the expected recruitment of younger fish into the Kamishak spawning population during the ensuing three years. One hypothesis for this lack of recruitment includes the possibility that a significant portion of the herring observed in Kamishak Bay during 2000 was not of Kamishak origin. Another suggests that poor fitness of the fish, characterized by low average weights-at-age, contributed to higher than normal over-winter mortality.

Good weather once again contributed to the success of the Department's two vessel charters to collect age composition samples during the periods April 25 – May 3 and May 13 – 20. The early sampling period coincided with the arrival of the first fish on the grounds, which in turn corresponds to the traditional timing of the commercial fishery. The second charter, to collect age composition samples during the latter portion of the return in 2003, was particularly crucial in documenting the overall low abundance of the population. During the 16 days spent in the district, the contracted vessel made a cumulative total of 8 successful sets, resulting in the collection of over 3,300 fish for age/weight/length (AWL) analysis. Information and samples collected during the 2003 charters confirmed that the influx of young, newly recruited fish did not materialize to the extent suggested by the information collected in the 2000 season.

Although herring biomass had been declining in Kamishak Bay through 1998, that trend now appears to have ceased, but since that time the stock abundance has remained nearly static. The ASA model estimated the total 2003 return at just under 3,500 st (Otis, *in preparation*; Table 10, Appendix Table 38, Figure 14), a rather insignificant increase over the 2002 hindcast estimate of 3,400 st. Recruitment into the spawning population did occur in 2003, but the magnitude of this recruitment does not appear to be as great as was hoped. Nonetheless, postseason data analysis of test fishing samples indicate that the overall return this season was dominated by fish age 7, age 4, and age 6 at 24%, 16%, and 14% of the biomass by weight, respectively (Table 10, Figure 14). While the 1993 and 1994 cohorts each appeared relatively strong at approximately 12-13% of the forecasted biomass, they were estimated to be only about one-quarter of the size of the very strong 1988 cohort that supported the commercial fishery throughout most of the 1990's.

### **Southern District 2003 Season Summary**

A total of four aerial surveys of the Southern District were flown between May 6 and 29 in 2003, all conducted under good conditions. The 2003 run biomass, estimated as the sum of all daily biomass estimates, totaled only 558 st, which was considerably less than any recent year's estimate. The lower than average number of surveys conducted this season was likely responsible for the lower figure. The peak 2003 individual biomass survey (183 st) occurred on May 29, with the majority of herring observed that day between the tip of the Homer Spit and Anchor Point. Peak

surveys in areas where herring historically have been observed were as follows: Mallard Bay, 46 st on May 20; east of the Homer Spit/Mud Bay, 117 st on May 13; Glacier Spit/Halibut Cove, 20 st on May 3; and Tutka Bay, 3 st on May 29. As has been the persistent trend over the past two decades, low abundance levels in the Southern District, combined with the newly adopted regulatory management plan mentioned previously, precluded any commercial fishing during the 2003 season.

### **Outer/Eastern District 2003 Season Summary**

As in previous recent seasons, no herring assessment occurred in the Outer and Eastern Districts during 2003. Unlike the Southern and Kamishak Bay Districts, historical samples from the Outer and Eastern Districts have contained up to 14% age-2 (sexually immature) herring. Formal sampling has not occurred in recent years and was very limited in previous years. However, two small, informal samples of herring from two separate schools observed aurally in Day Harbor (Eastern District, late June) and Port Dick (Outer District, early July) were obtained by handline jigging during the 2000 season. Scales were not collected for age composition analysis, but the size of all fish caught suggested that they were age-2 juveniles. No discernible shift to older age herring has ever been observed in this area, suggesting the possibility that the Outer and Eastern Districts may be feeding and rearing grounds for juvenile fish from another area.

### **Recent Research**

Two additional research projects were recently undertaken to better understand Kamishak Bay herring stock structure and its relationship to other North Gulf of Alaska herring stocks. The KBDHMP dictates that 10% of the allowable harvest for Kamishak Bay be allocated to the Shelikof food/bait fishery because it appears these two stocks mix during part of the year around the north end of Shelikof Strait (Johnson et. al. 1988; unpublished data). The extent to which these stocks intermix is poorly understood, however, the ramifications of their mixing greatly complicate the assessment and management of each stock. Therefore, the Department successfully applied for a grant from the Exxon Valdez Trustee Council (EVOS-TC) to investigate the feasibility of using two relatively new stock identification techniques, fatty acid

composition of heart tissue and elemental composition of otoliths, to distinguish between several Alaska herring stocks. Representative samples were collected from Sitka, Prince William Sound, Kamishak, Kodiak, and Togiak spawning aggregations during the spring of 2001. Chemical analysis of those samples was completed during 2002. Results showed that fatty acid composition of heart tissue has the potential to become a reliable stock identification biomarker. Using discriminant analysis, 157 of the 163 samples taken were correctly identified to their original herring stock. Unfortunately, stocks could not be reliably distinguished using the elemental composition of otoliths. Project findings have been documented in a manuscript that was recently submitted for publication in a peer-reviewed journal.

The second recent research project undertaken by the Department also stems from an alternative funding source. In 2002, the National Marine Fisheries Service funded a Department project to synthesize all of the historical Kamishak Bay herring stock assessment and commercial fishery data into a geo-referenced database. Much of this historical information, dating back to 1973, previously existed only in hard copy form on aerial survey field maps. The Department captured those data into electronic maps, making them available for a variety of more in-depth analyses. The completed database is available on CD-ROM and is updated annually with new information.

## **2004 HERRING SEASON OUTLOOK**

### **Kamishak Bay District**

The forecasted herring biomass generated by the ASA model for 2004 in the Kamishak Bay District is 3,554 st (Table 10, Figure 14). This total falls below the KBDHMP regulatory threshold of 6,000 st for which a commercial harvest can be considered. Additionally, over 40% of the predicted return in 2004 should be comprised of fish age 5 and younger, with the single age-5 year class projected to make up over one-fourth of the overall return (Table 10, Figure 15). Since the KBDHMP directs the Department to limit the harvest of fish age 5 and younger, and because the forecasted abundance falls below threshold, the sac roe fishery in the Kamishak Bay district will remain closed for the 2004 season. The resource, and hence the commercial fishery,

is best served by protecting the remaining spawning population in order to rebuild it to a harvestable level.

Without a commercial fishery in 2004, the Department's ability to collect age composition information will be greatly reduced. The Department expects to once again obtain samples using a chartered commercial seine vessel throughout the duration of the 2004 run, with sufficient funding expected for both an early and a late season charter. The Department will also attempt to conduct comprehensive aerial surveys throughout the spawning season, from mid-April to early June, as conditions permit.

### **Other Districts**

Based on the persistent trend of low herring abundance in the Southern District and a historical preponderance of juvenile herring in the Outer and Eastern Districts, as well as the stipulations contained within the Eastern, Outer, and Southern Districts Management Plan, the commercial herring fishery in these areas will remain closed during 2004. Monitoring of the Southern District herring stocks will occur as in the past through the use of aerial surveys, possibly in conjunction with test fish sampling conducted on an opportunistic basis.

## REFERENCES

- Commercial Fisheries Entry Commission. License Statistics. Unpublished data, 1974 – 2003, Juneau.
- Edmundson, J.A., G.B. Kyle, and T. Balland. 1992. Rearing Capacity, Escapement Level, and Potential for Sockeye Salmon (*Oncorhynchus nerka*) Enhancement in English Bay Lakes. Alaska Department of Fish and Game, Fisheries Enhancement and Rehabilitation (FRED) Division, Report No. 120.
- Hammarstrom, L.F., and M.S. Dickson. 2003. 2002 Lower Cook Inlet Area Annual Finfish Management Report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 2A03-04, Anchorage.
- Johnson, B.A., C. Burkey, and D. Gaudet. 1988. Stock identification of Pacific herring in the bait fishery in Shelikof Strait, Alaska, 1985-86. Alaska Department of Fish and Game, unpublished report. 28 p.
- Lebida, R.C., and D.C. Whitmore. 1985. Bering Sea Aerial Survey Manual. Alaska Department of Fish and Game, Bristol Bay Data Report No. 85-2. 31 p.
- Otis, E.O., W.R. Bechtol, and W.A. Bucher. 1998. Coping with a challenging stock assessment situation: the Kamishak Bay sac-roe herring fishery. Pages 557-573 In Fishery Stock Assessment Models: Proceedings of the International Symposium on Fishery Stock Assessment Models for the 21<sup>st</sup> Century, October 8-11, 1997, Anchorage, Alaska. Eds. F. Funk, T.J. Quinn, J. Heifetz, J.N. Ianelli, J.E. Powers, J.F. Schweigert, P.J. Sullivan, and C.-I. Zhang. University of Alaska Sea Grant College Program AK-SG-98-01.
- Otis, E.O., and M.S. Dickson. *In prep.* Abundance, age, sex, and size statistics for sockeye, chum, and pink salmon in Lower Cook Inlet, 2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Anchorage.
- Otis, E.O. *In prep.* Forecast of the Kamishak herring stock in 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Anchorage.
- Otis, E.O. *In prep.* Abundance, age, sex, and size statistics for Pacific herring in Lower Cook Inlet, 1995-1999. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Anchorage.
- Otis, E.O., and J. L. Cope. *In prep.* Abundance, age, sex, and size statistics for Pacific herring in Lower Cook Inlet, 2000-2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Anchorage.
- Otis, E.O. *In prep.* Lower Cook Inlet Pink Salmon Forecast for 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Anchorage.

Otis, E.O. 2001. Overview of the Lower Cook Inlet Area Commercial Herring Fishery and Recent Stock Status – A Report to the Alaska Board of Fisheries. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 2A01-17, Anchorage.

Yuen, H.J. 1994. A model to predict Pacific herring age composition in early and late spawning migrations in Kamishak Bay, Alaska. Alaska Fishery Research Bulletin 1:35-54.

Table 1. Commercial, hatchery, and derby salmon catches in numbers of fish by species, district, and gear type, Lower Cook Inlet, 2003.

<b>District</b>		Chinook	Sockeye	Coho	Pink	Chum	Total
	<b>Gear Type</b>						
<b>Southern</b>							
<b>Commercial:</b>							
	Set gillnet	878	81,722	2,291	7,325	4,998	97,214
	Purse seine	301	391,768	3,117	47,913	732	443,831
<b>Hatchery:</b>							
	Purse seine		35,559		507,805		543,364
	Weir		46,988				46,988
	<b>Total</b>	<b>1,179</b>	<b>556,037</b>	<b>5,408</b>	<b>563,043</b>	<b>5,730</b>	<b>1,131,397</b>
<b>Outer</b>							
<b>Commercial:</b>							
	Purse seine	1	26,615	4	281,663	137	308,420
<b>Eastern</b>							
<b>Commercial:</b>							
	Purse seine	0	7,341	0	0	19	7,360
<b>Hatchery:</b>							
	Weir		3,011	2,065			5,076
<b>Derby<sup>a</sup>:</b>							
	Hook & Line			3,821			3,821
	<b>Total</b>	<b>0</b>	<b>10,352</b>	<b>5,886</b>	<b>0</b>	<b>19</b>	<b>16,257</b>
<b>Kamishak</b>							
<b>Commercial:</b>							
	Purse seine	0	12,512	0	5,571	29,737	47,820
<b>Hatchery:</b>							
	Purse seine		38,741	4	6,434	63	45,242
	<b>Total</b>	<b>0</b>	<b>51,253</b>	<b>4</b>	<b>12,005</b>	<b>29,800</b>	<b>93,062</b>
<b>LCI Total</b>		1,180	644,257	11,302	856,711	35,686	1,549,136
<b>Percent</b>		0.08%	41.59%	0.73%	55.30%	2.30%	100.00%
<b>1983-2002</b>							
<b>Average</b>		1,389	260,649	12,208	1,177,787	59,751	1,511,783

<sup>a</sup> Derby catches are fish entered into the Seward Silver Salmon Derby that 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 or section, Lower Cook Inlet, 2003.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Halibut Cove			
Common Property (seine)	132		
Common Property (set gillnet)	535		
Total Catch			667
China Poot Bay (seine)	128		128
Neptune Bay (seine)	41		41
Tutka/Kasitsna Bays (set gillnet)	178		178
Barabara Creek (set gillnet)	53		53
Seldovia Bay (set gillnet)	99		99
Port Graham (set gillnet)	7		7
English Bay	6		6
<b>SOUTHERN DISTRICT TOTAL</b>	<b>1,179</b>		<b>1,179</b>
<b>OUTER DISTRICT</b>			
East Arm Nuka Bay (McCarty Fiord)	1		1
<b>OUTER DISTRICT TOTAL</b>	<b>1</b>		<b>1</b>
<b>EASTERN DISTRICT TOTAL</b>	<b>0</b>		<b>0</b>
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>0</b>		<b>0</b>
<b>TOTAL LOWER COOK INLET</b>	<b>1,180</b>		<b>1,180</b>

<sup>a</sup> 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 or section, Lower Cook Inlet, 2003.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Humpy Creek		13	13
Halibut Cove			
Common Property (seine)	58,473		
Common Property (set gillnet)	15,679		
Total Catch			74,152
China Poot Bay			
Common Property (seine)	190,621		
Hatchery Cost Recovery	35,557		
China Poot Creek		121 <sup>b</sup>	
Total Run			226,299
Neptune Bay			
Common Property (seine)	140,021		
Hazel Lake/Creek		20	
Oxbow Creek		20	
Total Run			140,061
Tutka/Kasitsna Bays			
Common Property (seine)	2,655 <sup>c</sup>		
Common Property (set gillnet)	21,437		
Total Catch			24,092
Barabara Creek	9,260 <sup>d</sup>		9,260
Seldovia Bay/River	13,787 <sup>d</sup>	15	13,802
Port Graham/Port Graham River	5,034 <sup>d</sup>	2	5,036
English Bay			
Common Property (set gillnet)	16,525		
Hatchery Harvest (sold)	45,011		
Hatchery Harvest (donated)	1,977		
English Bay Lakes		19,422 <sup>e</sup>	
Hatchery Brood Stock		578 <sup>f</sup>	
Total Run			83,513
<b>SOUTHERN DISTRICT TOTAL</b>	<b>556,037</b>	<b>20,191</b>	<b>576,228</b>
<b>OUTER DISTRICT</b>			
East Arm Nuka Bay (McCarty Fiord)	26,615		
Delight Lake		7,538	
Desire Lake		8,400	
Delusion Lake		2,000	
Total Run			44,553
<b>OUTER DISTRICT TOTAL</b>	<b>26,615</b>	<b>17,938</b>	<b>44,553</b>

-continued-

Table 3. (page 2 of 2)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>EASTERN DISTRICT</b>			
Aialik Bay & Aialik Lake		5,370	5,370
Resurrection Bay North			
Common Property (seine)	7,341		
Hatchery Harvest (sold)	2,713		
Hatchery Harvest (donated)	298		
Bear Lake Escapement		9,498 <sup>g</sup>	
Hatchery Brood Stock		3,735 <sup>h</sup>	
Bear & Salmon Creeks		24	
Clear Creek		10	
Spring Creek		3	
Total Run			<u>23,622</u>
<b>EASTERN DISTRICT TOTAL</b>	<b>10,352</b>	<b>18,640</b>	<b>28,992</b>
<b>KAMISHAK BAY DISTRICT</b>			
Kirschner Lake			
Common Property (seine)	11,671		
Hatchery Cost Recovery	38,741		
Total Run			50,412
Bruin Bay/ Bruin Bay River		200	200
Chenik Lake			
Amakdedori Creek		11,800	
Chenik Creek/Lake		13,825	
Total Run			25,625
Paint River		520 <sup>i</sup>	520
McNeil Cove			
Mikfik Creek & Lake		12,830	
McNeil River		12	
Total Run			12,842
Kamishak Bay/ Big Kamishak R.		2,600	2,600
Douglas River/Silver Beach	841		841
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>51,253</b>	<b>41,787</b>	<b>93,040</b>
<b>TOTAL LOWER COOK INLET</b>	<b>644,257</b>	<b>98,556</b>	<b>742,813</b>

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

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

<sup>c</sup> Tutka purse seine catch includes 2 sockeyes caught incidentally during pink salmon hatchery cost recovery.

<sup>d</sup> Set gillnet catches in the common property fishery.

<sup>e</sup> Weir counts for English Bay Lakes includes 18,378 sockeyes actually counted and an estimated 1,622 sockeyes that entered the lake system while the weir was not operational.

<sup>f</sup> English Bay Lakes sockeye brood stock total includes 200 adults actually used for egg take and 378 mortalities.

<sup>g</sup> Weir counts.

<sup>h</sup> Bear Lake sockeye brood stock total includes 142 mortalities.

<sup>i</sup> No freshwater escapement, ladder not opened during 2003.

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 or section, Lower Cook Inlet, 2003.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Northshore Subd./Clearwater Slough		800 <sup>a</sup>	
Halibut Cove			
Common Property (seine)	726		
Common Property (set gillnet)	433		
Total Catch			1,159
China Poot Bay (seine)	1,164		1,164
Neptune Bay (seine)	1,227		1,227
Tutka/Kasitsna Bays (set gillnet)	1,437		1,437
Barabara Creek (set gillnet)	347		347
Seldovia Bay (set gillnet)	72		72
English Bay (set gillnet)	<u>2</u>		<u>2</u>
<b>SOUTHERN DISTRICT TOTAL</b>	<b>5,408</b>	<b>800</b>	<b>6,208</b>
<b>OUTER DISTRICT</b>			
East Arm Nuka Bay (McCarty Fiord)	<u>4</u>		<u>4</u>
<b>OUTER DISTRICT TOTAL</b>	<b>4</b>		<b>4</b>
<b>EASTERN DISTRICT</b>			
Resurrection Bay North			
Hatchery Harvest (sold)	249		
Hatchery Harvest (donated)	1,816		
Sport Derby	3,821		
Bear Lake (weir counts)		420 <sup>b</sup>	
Hatchery Brood Stock		1,021	
Total Run			<u>7,327</u>
<b>EASTERN DISTRICT TOTAL</b>	<b>5,886</b>	<b>1,441</b>	<b>7,327</b>
<b>KAMISHAK BAY DISTRICT</b>			
Kirschner Lake (Hatchery incidental)	<u>4</u>		<u>4</u>
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>4</b>		<b>4</b>
<b>TOTAL LOWER COOK INLET</b>	<b>11,302</b>	<b>2,241</b>	<b>13,543</b>

<sup>a</sup> Coho escapement estimates in Lower Cook Inlet are very limited; 2 escapement surveys were conducted during 2003, escapement figure represents unexpanded peak aerial live count.

<sup>b</sup> Bear Lake weir counts in 2003 include 395 cohos passed through the weir and 25 cohos visually enumerated in the creek downstream from the weir when the weir operation ceased for the season.

Table 5. Commercial pink salmon catches (including hatchery cost recovery) and escapements in numbers of fish by subdistrict or section, Lower Cook Inlet, 2003.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Humpy Creek		90,853	90,853
Halibut Cove			
Common Property (seine)	6,505		
Common Property (set gillnet)	1		
Total Catch			6,506
China Poot Bay/Creek	15,518	6,694	22,212
Neptune Bay	25,800		25,800
Tutka/Kasitsna Bays			
Common Property (seine)	90		
Common Property (set gillnet)	4,234		
Hatchery Cost Recovery	507,215		
Hatchery Brood Stock		207,285	
Tutka Lagoon Creek		30,866	
Total Run			749,690
Barabara Creek	277 <sup>b</sup>	5,062	5,339
Seldovia Bay & River	2,731 <sup>b</sup>	35,138	37,869
Port Graham			
Hatchery (donated)	590		
Port Graham River		14,916	
Port Graham Left River		703	
Duncan Slough		5,000 <sup>c</sup>	
Hatchery Brood Stock		78,241 <sup>d</sup>	
Total Run			100,209
English Bay	82 <sup>b</sup>		82
<b>SOUTHERN DISTRICT TOTAL</b>	<b>563,043</b>	<b>474,758</b>	<b>1,037,801</b>
<b>OUTER DISTRICT</b>			
Dogfish Bay		5,186	5,186
Port Chatham		34,979	34,979
Chugach Bay		12,806	12,806
Windy Bay	119,829		
Windy Right Creek		23,341	
Windy Left Creek		82,814	
Total Run			225,984
Rocky Bay			
Scurvy Creek		10,209	
Rocky River		287,443	
Total Run			297,652

-continued-

Table 5. (page 2 of 3)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>OUTER DISTRICT (cont'd)</b>			
Port Dick			
South Section	124,177		
North Section	6,866		
Taylor Bay Section	6,344		
Port Dick (head end) Creek		106,055	
High Tech Creek		750	
Well Flagged Creek		770	
Slide Creek		33,042	
Middle Creek		16,029	
Island Creek		118,637	
Taylor Bay Creeks		30,694	
Total Run			443,364
Nuka Island			
Tonsina Bay		4,056	
South Nuka Island Creek		24,619	
Mike's Bay		5,280	
Home Cove		5,690	
Herring Pete Bay		3,226	
Total Run			42,871
East Arm Nuka Bay (McCarty Fiord)	24,447		
Delight Lake		3,746	
Desire Lake		34,766	
Delusion Lake		1,875	
Total Run			64,834
<b>OUTER DISTRICT TOTAL</b>	<b>281,663</b>	<b>846,013</b>	<b>1,127,676</b>
<b>EASTERN DISTRICT</b>			
Resurrection Bay North			
Bear/Salmon Creeks		4,435	
Clear Creek		970	
Sawmill Creek		377	
Spring Creek		1,201	
Tonsina Creek		5,180	
Humpy Cove		2,563	
Thumb Cove (Likes Creek)		5,050	
Total Run			19,776
<b>EASTERN DISTRICT TOTAL</b>	<b>0</b>	<b>19,776</b>	<b>19,776</b>

-continued-

Table 5. (page 3 of 3)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>KAMISHAK BAY DISTRICT</b>			
Inisksin Bay			
North Head Creek		58,286	
Sugarloaf Creek		200	
Total Run			58,486
Ursus Cove			
Ursus Head Creek		1,577	
Brown's Peak Creek		285,049	
Ursus Lagoon Creek		500	
Ursus Lagoon Righthand Cr.		2,000	
Total Run			289,126
Rocky Cove/Sunday Creek		346,657	346,657
Kirschner Lake	12,005 <sup>e</sup>		12,005
Bruin Bay/Bruin Bay River		138,674	138,674
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>12,005</b>	<b>832,943</b>	<b>844,948</b>
<b>TOTAL LOWER COOK INLET</b>	<b>856,711</b>	<b>2,173,490</b>	<b>3,030,201</b>

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

<sup>b</sup> Set gillnet catches in the common property fishery.

<sup>c</sup> Duncan Slough pink escapement estimated by Port Graham Hatchery personnel.

<sup>d</sup> Brood stock figure for Port Graham Hatchery includes 76,241 pinks actually spawned plus an estimated 2,000 mortalities.

<sup>e</sup> Harvest figure for Kirschner Lake includes 5,571 pinks taken during common property seine fishing and 6,434 pinks incidentally taken during hatchery sockeye cost recovery efforts.

Table 6. Commercial chum salmon catches and escapements in numbers of fish by subdistrict or section, Lower Cook Inlet, 2003.

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>SOUTHERN DISTRICT</b>			
Humpy Creek		878	878
Halibut Cove			
Common Property (seine)	73		
Common Property (set gillnet)	131		
Total Catch			204
China Poot Bay	372		372
Neptune Bay	287		287
Tutka Bay	2,574 <sup>b</sup>		2,574
Barabara Creek	1,255 <sup>b</sup>		1,255
Seldovia Bay & River	905 <sup>b</sup>	3,590	4,495
Port Graham/Port Graham River	47 <sup>b</sup>	2,925	2,972
English Bay	86 <sup>b</sup>		86
<b>SOUTHERN DISTRICT TOTAL</b>	<b>5,730</b>	<b>7,393</b>	<b>13,123</b>
<b>OUTER DISTRICT</b>			
Dogfish Bay		13,287	13,287
Port Chatham		645	645
Windy Bay	88		
Windy Right Creek		237	
Windy Left Creek		273	
Total Run			598
Rocky Bay & River		5,549	5,549
Port Dick			
South Section	27		
Port Dick (head end) Creek		5,547	
Well Flagged Creek		48	
Slide Creek		2,808	
Middle Creek		790	
Island Creek		16,274	
Total Run			25,494
Nuka Island/Petrof River		10,912	10,912
East Nuka Bay	22		22
<b>OUTER DISTRICT TOTAL</b>	<b>137</b>	<b>56,370</b>	<b>56,507</b>

-continued-

Table 6. (page 2 of 2)

Subdistrict/System	Catch	Escapement <sup>a</sup>	Total Run
<b>EASTERN DISTRICT</b>			
Resurrection Bay North	19		
Bear/Salmon Creeks		2	
Clear Creek		56	
Sawmill Creek		145	
Spring Creek		461	
Thumb Cove		72	
Tonsina Creek		1,975	
Total Run			2,730
<b>EASTERN DISTRICT TOTAL</b>	<b>19</b>	<b>2,711</b>	<b>2,730</b>
<b>KAMISHAK BAY DISTRICT</b>			
Iniskin Bay			
Iniskin River		18,709	
Sugarloaf Creek		1,649	
North Head Creek		2,700	
Total Run			23,058
Cottonwood Bay & Creek	29,679	72,764	102,443
Ursus Cove			
Brown's Peak Creek		1,600	
Ursus Lagoon Right Creek		19,200	
Ursus Cove Lagoon Creek		11,210	
Total Run			32,010
Rocky Cove/Sunday Creek		2,000	2,000
Kirschner Lake	120 <sup>c</sup>		120
Bruin Bay & River		13,080	13,080
McNeil River		23,275	23,275
Kamishak River/Reef			
Big Kamishak River		16,357	
Little Kamishak River		22,194	
Strike Creek		1,378	
Total Run			39,929
Douglas River/Silver Beach	1		
Douglas Beach Creek		1,600	
Total Run			1,601
<b>KAMISHAK BAY DISTRICT TOTAL</b>	<b>29,800</b>	<b>207,716</b>	<b>237,516</b>
<b>TOTAL LOWER COOK INLET</b>	<b>35,686</b>	<b>274,190</b>	<b>309,876</b>

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

<sup>b</sup> Set gillnet catches in the common property fishery.

<sup>c</sup> Kirschner catch includes 57 chums taken during common property seine fishing and 63 chums incidentally taken during hatchery sockeye cost recovery efforts.

Table 7. Exvessel value<sup>a</sup> of the commercial salmon catch in numbers of dollars by species, gear type, and harvest type, Lower Cook Inlet, 2003.

	Chinook	Sockeye	Coho	Pink	Chum	Total
<b>COMMON PROPERTY – PURSE SEINE</b>						
No. of Fish	302	438,236	3,121	335,147	30,625	807,431
Pounds	1,898	2,192,246	20,047	1,110,212	223,551	3,547,954
Price/lb.	\$0.25	\$0.61	\$0.20	\$0.05	\$0.15	
Value	\$475	\$1,337,270	\$4,009	\$55,511	\$33,533	\$1,430,798
<b>COMMON PROPERTY – SET GILLNET</b>						
No. of Fish	878	81,722	2,291	7,325	4,998	97,214
Pounds	12,946	494,559	15,553	24,923	33,879	581,860
Price/lb.	\$1.14	\$0.74	\$0.11	\$0.02	\$0.20	
Value	\$14,758	\$365,974	\$1,711	\$498	\$6,776	\$389,717
<b>HATCHERY – PURSE SEINE &amp; WEIR</b>						
No. of Fish		124,299	2,069	514,239	63	640,670
Pounds		593,812	14,319	1,637,505	490	2,246,126
Price/lb.		\$0.45 <sup>b</sup>	\$0.75 <sup>b</sup>	\$0.06	\$0.12	
Value		\$261,592 <sup>b</sup>	\$1,252 <sup>b</sup>	\$98,121	\$59	\$361,024
<b>SPORT FISHING DERBY<sup>c</sup> - HOOK &amp; LINE</b>						
No. of Fish			3,821			3,821
Pounds			26,751			26,751
Price/lb.			\$0.40			
Value			\$10,700			\$10,700
<b>TOTAL ALL GEARS</b>						
No. of Fish	1,180	644,257	11,302	856,711	35,686	1,549,136
Pounds	14,844	3,280,617	76,670	2,772,640	257,920	6,402,691
Price/lb.	\$1.03	\$0.60 <sup>b</sup>	\$0.28 <sup>b</sup>	\$0.06	\$0.16	
Value	\$15,233	\$1,964,836 <sup>b</sup>	\$17,672 <sup>b</sup>	\$154,130	\$40,368	\$2,192,239

- <sup>a</sup> Exvessel value is calculated from average prices, which are determined only by fish ticket information and may not reflect retroactive or postseason adjustments.
- <sup>b</sup> Average price per pound and value for hatchery cost recovery sockeyes and cohos reflect only those fish actually sold and do not include hatchery fish that were donated.
- <sup>c</sup> Fish entered into the Seward Silver Salmon Derby are subsequently sold to a commercial processor and are therefore considered “commercial harvest”.

Table 8. Emergency orders issued for the commercial, personal use, and subsistence salmon fisheries in Lower Cook Inlet, 2003.

Number/ Issue Date	DESCRIPTION
2-F-H-001-03 May 14	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 two 40-hour periods per week, from Monday 6:00 a.m. until Tuesday 10:00 p.m. and Thursday 6:00 a.m. until Friday 10:00 p.m., effective Monday, May 19, 2003, 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 a regulatory marker near the Seward Airport will remain closed to seining.
2-F-H-002-03 May 14	Designates and establishes a Special Harvest Area (SHA) for Cook Inlet Aquaculture Association (CIAA) in Resurrection Bay North Subdistrict of the Lower Cook Inlet (LCI) management area. The SHA includes those fresh waters of Bear Creek, Salmon Creek, and Resurrection River downstream of, and including, the Bear Creek weir. In addition, this emergency order opens waters of the Resurrection Bay SHA in the Eastern District to the harvest and sale of salmon seven days per week by authorized agents of CIAA effective at 6:00 a.m. Monday, May 19, 2003, until further notice.
2-F-H-003-03 May 28	Establishes a seven-day-per-week fishing schedule in the Kamishak Bay District commercial salmon seine fishery, which opens by regulation on June 1, 2003. Waters of Chenik Subdistrict within the Kamishak Bay District will remain closed to commercial salmon seining until further notice based on the provisions of this emergency order.
2-F-H-004-03 June 10	Closes waters of Resurrection Bay in the Eastern District to commercial salmon seining effective at 10:00 p.m. Tuesday, June 10, 2003, until further notice.
2-F-H-005-03 June 10	Designates and establishes Special Harvest Areas (SHA's) for Cook Inlet Aquaculture Association (CIAA) in China Poot and Bruin Bay Subdistricts of the Lower Cook Inlet (LCI) management area. It also designates and establishes an English Bay SHA for the Port Graham Hatchery Corporation (PGHC) in the English Bay Section of Port Graham Subdistrict, located in the Southern District of the LCI management area. This emergency order closes the Kirschner Lake SHA to the common property salmon seine fishery, while concurrently opening waters of the Kirschner Lake SHA in the Kamishak Bay District, and the China Poot and Hazel Lake SHA's in the Southern District, to the harvest of salmon seven days per week by authorized agents of CIAA effective at 6:00 a.m. Monday, June 16, 2003, until further notice. The English Bay SHA will remain closed to hatchery fishing until the desired in-river return of 7,300 to 14,800 sockeyes into English Bay Lakes can be projected and the sockeye salmon subsistence needs of Nanwalek and Port Graham villagers are met.

-continued-

Table 8. (page 2 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-005-03 June 10 (continued)	<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 16, 2003, until further notice. In the China Poot Subdistrict, commercial seining shall be allowed five days per week only in those waters outside (offshore) of a line beginning at a marker on the west shore of Neptune Bay at approximately 59° 32.83' N. latitude, 151° 24.95' W. longitude, then to Lancashire Rock, then to the navigational light on Gull Island, then to Moosehead Point, effective June 16. In the Halibut Cove Subdistrict, seining shall be allowed only in waters outside of Halibut Cove Lagoon beginning June 16 on a five-days-per-week basis; waters within Halibut Cove Lagoon will remain closed to commercial fishing. In the Tutka Bay Subdistrict, commercial seining is restricted to those waters seaward of a line extending from the "rock quarry" on the north side of the bay at approximately 59° 30.23' N. latitude, 151° 28.23' W. longitude, to the Tutka Bay Lodge on the south side of the bay at approximately 59° 28.27' N. latitude, 151° 28.57' W. longitude, five days per week, effective 6:00 a.m. Monday, June 16, 2003.</p> <p>This emergency order also repeals the regulatory closed waters markers near the HEA power lines in China Poot Bay, and establishes temporary closed waters at the head of China Poot Bay to provide a Dungeness crab sanctuary.</p>
2-F-H-006-03 June 18	<p>Opens the English Bay Special Harvest Area (SHA) to the harvest of salmon seven days per week by authorized agents of Port Graham Hatchery Corporation (PGHC) effective at 8:00 a.m. Thursday, June 19, 2003, until further notice. 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 (CRRC) 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° 20.53' N. latitude and 59° 20.88' N. latitude (see <b>LCI Emergency Order #2-F-H-005-03</b>). Revenue obtained from the sale of these fish will help defray the cost of operational expenses associated with the English Bay Lakes sockeye salmon enhancement program.</p> <p>In addition, this emergency order designates and establishes a SHA for the Cook Inlet Aquaculture Association (CIAA) in Tutka Bay Subdistrict within the Southern District of Lower Cook Inlet. The Tutka Bay SHA consists of all marine waters of Tutka Bay Subdistrict southeast of the Homer Electric Association powerline crossing, including waters of Tutka Lagoon. This emergency order also opens the Tutka Bay SHA to the harvest and sale of salmon seven days per week by authorized agents of CIAA, effective at 6:00 a.m. Monday, June 23, 2003, until further notice. Revenue obtained from the</p>

-continued-

Table 8. (page 3 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-006-03 June 18 (continued)	sale of these fish will be used for recovery of operational expenses associated with the Tutka Lagoon Hatchery salmon enhancement programs in Lower Cook Inlet.
2-F-H-007-03 June 25	<p>Closes waters of Port Graham Subdistrict, including both the Port Graham and English Bay Sections, to commercial salmon set gillnet fishing, effective at 6:00 a.m. Thursday, June 26, 2003, until further notice.</p> <p>In addition, this emergency order closes waters of McNeil River and Paint River Subdistricts in the Kamishak Bay District to commercial salmon seining effective at 6:00 a.m. Saturday, June 28, 2003, until further notice.</p>
2-F-H-008-03 June 25	Closes waters of Port Graham Subdistrict, including both the Port Graham and English Bay Sections, to subsistence salmon set gillnet fishing, effective at 10:00 p.m. Thursday, June 26, 2003, until further notice.
2-F-H-009-03 June 28	<p>Opens waters along the north shore of the Port Graham Section of Port Graham Subdistrict to subsistence salmon set gillnet fishing, effective at 6:00 p.m. Saturday, June 28, 2003, until further notice. The north shore of Port Graham Subdistrict is described as that portion of shoreline on the north side of Port Graham between Point Pogibshi at approximately 59° 25.27' N. latitude and the ADF&amp;G regulatory closed waters marker near the head of Port Graham at approximately 59° 20.36' N. latitude, 151° 46.96' W. longitude. Weekly fishing periods for this opening are the regularly scheduled periods as established in regulation, from 10:00 p.m. Thursday until 10:00 a.m. Wednesday.</p>
2-F-H-010-03 July 2	<p>Reopens the commercial salmon set gillnet fishery in waters of Port Graham Subdistrict, including both the Port Graham and English Bay Sections, on the regular weekly schedule of two 48-hour weekly fishing periods, from 6:00 a.m. Monday until 6:00 a.m. Wednesday and from 6:00 a.m. Thursday until 6:00 a.m. Saturday, effective at 6:00 a.m. Thursday, July 3, 2003, until further notice. In addition, this emergency order 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. Saturday, July 5, 2003, until further notice.</p> <p>This emergency order also restricts commercial salmon seining in Tutka Bay Subdistrict within the Southern District to those waters seaward (northwest) of a line beginning at the "rock quarry" on the north side of the bay at approximately 59° 30.23' N. latitude, 151° 28.23' W. longitude, to a point on the west shore of the entrance to Little Tutka Bay at approximately 59° 28.73' N. latitude, 151° 30.37' W. longitude, effective at 6:00 a.m. Saturday, July 5,</p>

-continued-

Table 8. (page 4 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-010-03 July 2 (continued)	2003. The weekly fishing period for purse seining in waters of Tutka Bay Subdistrict, already established at five days per week (see <b>LCI Emergency Order #2-F-H-005-03</b> ), is not altered and remains the same.
2-F-H-011-03 July 2	Opens all waters of Port Graham Subdistrict to subsistence salmon set gillnet fishing, effective at 10:00 p.m. Thursday, July 3, 2003, until further notice. Weekly fishing periods for this opening are the regularly scheduled periods as established in regulation, from 10:00 p.m. Thursday until 10:00 a.m. Wednesday.
2-F-H-012-03 July 3	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 Saturday 6:00 a.m., effective at 6:00 a.m. Friday, July 4, 2002, until further notice. The closed waters markers at the mouths of both Desire and Delight Lake Creeks <b>WILL NOT BE</b> in effect for this opening, and fishing will be allowed up to the stream mouths at both locations. In addition, seining will be allowed inside waters of McCarty Lagoon near Delight Lake, but fishing is prohibited inside the freshwater lagoon at Delight Lake Creek. Fishing is also prohibited north of the regulatory markers near the former Parks Service tent camp.
2-F-H-013-03 July 7	Closes waters of the China Poot and Hazel Lakes Special Harvest Areas (see <b>LCI E.O. #2-F-H-005-03</b> ) in the Southern District to salmon hatchery cost recovery harvest by Cook Inlet Aquaculture Association effective immediately. In addition, this emergency order opens waters of China Poot Subdistrict, including both the China Poot and Hazel Lake Sections, to commercial salmon seining <b>west</b> (or offshore) of the regulatory markers located near the HEA power lines in China Poot Bay on a <b>seven-day-per-week basis</b> , effective at 9:00 p.m. Monday, July 7, 2003, until further notice. Waters of China Poot Bay <b>east</b> (or inshore) of these markers will open to commercial seining <b>five days per week</b> , from Monday 6:00 a.m. until Saturday 6:00 a.m., also effective at 9:00 p.m. Monday, July 7, until further notice. The regulatory markers designating the Dungeness crab sanctuary in the north arm of China Poot Bay remain in effect for these openings. At China Poot Creek, the regulatory markers near the creek mouth will be in effect during the Monday through Saturday opening. At Neptune Bay, no markers will be in effect and fishing is allowed up to the Wosnesenski River mouth.
2-F-H-014-03 July 11	Opens waters of the South, Outer, and Taylor Bay Sections of Port Dick Subdistrict, or statistical reporting areas 232-06, 232-07, and 232-08, in the Outer District, to commercial salmon seining on a schedule of two 40-hour periods per week, from 6:00 a.m. Monday until 10:00 p.m. Tuesday and from 6:00 a.m. Thursday until 10:00 p.m. Friday, effective at 6:00 a.m. Monday,

-continued-

Table 8. (page 5 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-014-03 July 11 (continued)	July 14, 2003, until further notice. All normal regulatory markers and closed waters, including those in Taylor Bay, Tacoma Cove, and Sunday Harbor, will be in effect for this opening. Additionally, waters of the North Section of Port Dick Subdistrict, or statistical reporting area 232-09, will remain closed to fishing.
2-F-H-015-03 July 14	<p>Opens waters of the South, Outer, and Taylor Bay Sections of Port Dick Subdistrict, or statistical reporting areas 232-06, 232-07, and 232-08, in the Outer District, to commercial salmon seining on a schedule of five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Tuesday, July 15, 2003, until further notice. All normal regulatory markers and closed waters, including those in Taylor Bay, Tacoma Cove, and Sunday Harbor, will be in effect for this opening. Additionally, waters of the North Section of Port Dick Subdistrict, or statistical reporting area 232-09, will remain closed to fishing.</p> <p>In addition, this emergency order opens waters of Aialik Subdistrict, including Aialik Lagoon, in the Eastern 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. Tuesday, July 15, 2003, until further notice.</p>
2-F-H-016-03 July 18	Opens waters of Windy Bay and Rocky River Subdistricts, in the Outer District, to commercial salmon seining five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Monday, July 21, 2003, until further notice. All normal regulatory markers will be in effect in both subdistricts for this opening.
2-F-H-017-03 July 23	<p>Opens those waters of the North Section of Port Dick Subdistrict, or statistical reporting area 232-09, <b>west of 151° 14' W. longitude</b> to commercial salmon seining seven days per week, effective at 6:00 a.m. Thursday, July 24, 2003, until further notice. Waters of the North Section of Port Dick Subdistrict <b>east of 151° 14' W. longitude</b> remain closed to fishing. In addition, this emergency order extends commercial salmon seine fishing time in waters of the South, Outer, and Taylor Bay Sections of Port Dick Subdistrict, or statistical reporting areas 232-06, 232-07, and 232-08 (see <b>LCI Emergency Orders #2-F-H-014 and -15-03</b>), as well as waters of Windy Bay and Rocky River Subdistricts (see <b>LCI Emergency Order #2-F-H-016-03</b>), to a schedule of seven days per week, also effective at 6:00 a.m. Thursday, July 24, 2003, until further notice. This emergency order also opens waters of Port Chatham Subdistrict to commercial salmon seining five days per week, from 6:00 a.m. Monday until 6:00 a.m. Saturday, effective at 6:00 a.m. Thursday, July 24, 2003, until further notice.</p>

-continued-

Table 8. (page 6 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-017-03 July 23 (continued)	Finally, this emergency order repeals the closed waters markers in the Taylor Bay Section (statistical reporting area 232-08) of Port Dick Subdistrict, and fishing is allowed up to the stream mouths in Taylor Bay, effective at 6:00 a.m. Thursday, July 24, 2003, until further notice. All other closed waters and normal regulatory markers will be in effect in Port Dick, Windy Bay, Rocky River, and Port Chatham Subdistricts.
2-F-H-018-03 July 26	Rescinds the regulatory markers protecting streams at the head end of the South Section of Port Dick Subdistrict for a 6-hour period, from 3:30 p.m. until 9:30 p.m. Saturday, July 26, 2003. During this 6-hour period only, fishing is allowed up to the stream mouths at the head end of Port Dick. At the close of the 6-hour period at 9:30 p.m. Saturday, July 26, the regulatory markers will once again become effective for regularly scheduled fishing periods, currently set at seven days per week in waters open to fishing in Port Dick Subdistrict (see <b>LCI Emergency Order #2-F-H-017-03</b> ).
2-F-H-019-03 July 27	Closes waters of the Kirschner Lake Special Harvest Area (SHA) in the Kamishak Bay District (see <b>LCI Emergency Order #2-F-H-005-03</b> ) to hatchery cost recovery harvest, effective immediately, and also opens all waters of Bruin Bay Subdistrict, including the Kirschner Lake SHA, to commercial salmon seining effective at 6:00 a.m. Monday, July 28, 2003, until further notice. The weekly fishing period in those waters of Bruin Bay Subdistrict previously open to commercial salmon seining, established at seven days per week by <b>LCI Emergency Order #2-F-H-003-03</b> , remains in effect and also applies to waters of the Kirschner Lake SHA included in this emergency order.
2-F-H-020-03 July 29	In the Outer District, this emergency order rescinds the regulatory markers protecting streams at the head (west) end of the South Section of Port Dick Subdistrict and in Windy Bay and Rocky Bay Subdistricts, effective at 6:00 a.m. Wednesday, July 30, 2003, until further notice. The weekly fishing period in waters open to fishing in Port Dick Subdistrict, previously set at seven days per week (see <b>LCI Emergency Order #2-F-H-016-03</b> ), also applies to areas specified within this Emergency Order. Waters of the North Section of Port Dick Subdistrict <b>east of 151° 14' W. longitude</b> remain closed to fishing (see <b>LCI Emergency Order #2-F-H-017-03</b> ), therefore fishing is prohibited in waters adjacent to and between Middle and Island Creeks.
2-F-H-021-03 August 1	Opens those waters of South Nuka Island Subdistrict south of the latitude of the southwestern-most point of Westdahl Cove at approximately 59° 19.00' N. latitude and east of the longitude of the entrance to Tonsina Bay at approximately 150° 52.87' W. longitude to commercial salmon seining seven

-continued-

Table 8. (page 7 of 7)

Number/ Issue Date	DESCRIPTION
2-F-H-021-03 August 1 (cont'd)	days per week, effective at 6:00 a.m. Saturday, August 2, 2003, until further notice. Closed waters markers near the mouth of South Nuka Island Creek will <b>NOT</b> be in effect for this opening, and fishing is allowed up to the stream mouth.
2-F-H-022-03 August 4	Repeals the regulatory closed waters markers in Rocky Cove, Ursus Cove, Cottonwood/Illiamna Bay, and Iniskin Bay Subdistricts of the Kamishak Bay District, and allows continuous commercial salmon seine fishing inside Ursus Cove Lagoon and up to the stream mouths at Sunday Creek, Brown's Peak Creek, Cottonwood Creek, and Iniskin River, effective at 6:00 a.m. Tuesday, August 5, 2003, until further notice.
2-F-H-023-03 August 5	Opens those waters of the Port Graham Special Harvest Area (see <b>LCI Emergency Order #2-F-H-006-03</b> ) east of the longitude of the U.S. Coast Guard navigational buoy at approximately 151° 50.05' W. longitude to the harvest of salmon seven days per week by authorized agents of Port Graham Hatchery Corporation (PGHC), effective at 6:00 a.m. Wednesday, August 6, 2003, until further notice. Pink salmon harvested during this opening may be utilized for both hatchery brood stock and hatchery cost recovery.
2-F-H-024-03 August 13	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, 2003.
2-F-H-025-03 August 18	Opens all waters of the North Section of Port Dick Subdistrict (or statistical reporting area 232-09) and waters of Chugach Bay, both in the Outer District, to commercial salmon seining seven days per week, effective at 6:00 a.m. Tuesday, August 19, 2003, until further notice. No regulatory makers will be in effect in waters of the North Section of Port Dick Subdistrict and in Chugach Bay for this opening, and fishing will be allowed up to the stream mouths in those locations on a continuous basis.
2-F-H-026-03 August 27	Closes the Southern District (Kachemak Bay) personal use set gillnet fishery for coho salmon, effective at 6:00 a.m. Saturday, August 30, 2003, for the remainder of the 2003 season.

Table 9. Total return of adult pink salmon to the Tutka Bay Hatchery in the Southern District of Lower Cook Inlet, 2003.

---

<b><u>COMMERCIAL HARVEST</u></b>	
Tutka Bay/Lagoon (stat area 241-16):	
Purse Seine	90
Set Gillnet	4,234 <sup>a</sup>
Hatchery Cost Recovery	<u>507,215</u>
<b>TUTKA COMMERCIAL HARVEST</b>	<b>511,539</b>
 <b><u>SPORT HARVEST</u></b>	
<b>TOTAL SPORT HARVEST (Tutka Bay and Lagoon)</b>	<b>1,500<sup>b</sup></b>
 <b><u>ESCAPEMENT</u></b>	
Tutka Creek and Channel	30,866
Tutka Hatchery Brood Stock	<u>207,285</u>
<b>TOTAL ESCAPEMENT</b>	<b>238,151</b>
<hr/>	
<b>TOTAL RETURN</b>	<b>751,190</b>

---

<sup>a</sup> 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.

<sup>b</sup> Figure represents estimated average sport catch of pinks in Tutka Bay from 1990 – 1999.

Table 10. Total biomass estimates and commercial catch of Pacific herring (*Clupea pallasii*) in short tons by age class, Kamishak Bay District, Lower Cook Inlet, 2003, and 2004 forecast.

Age	2003 Est. Spawning Biomass	Percent by Weight	2003 Commercial Harvest <sup>a</sup>	Percent by Weight	2003 Total Biomass	Percent by Weight	2004 Forecast Biomass	Percent by Weight
1								
2								
3	38	1.1			38	1.1	436	12.3
4	544	15.9			544	15.9	120	3.4
5	144	4.2			144	4.2	914	25.7
6	473	13.8			473	13.8	147	4.1
7	831	24.3			831	24.3	382	10.8
8	310	9.1			310	9.1	617	17.4
9	412	12.0			412	12.0	214	6.0
10	466	13.6			466	13.6	295	8.3
11	143	4.2			143	4.2	321	9.0
12	34	1.0			34	1.0	83	2.3
13+	29	0.9			29	0.9	25	0.7
<b>TOTALS</b>	<b>3,424</b>	<b>100.1</b>	<b>0</b>		<b>3,424</b>	<b>100.1</b>	<b>3,554</b>	<b>100.00</b>

<sup>a</sup> Due to the low forecasted biomass, the commercial herring fishery in Kamishak Bay was not opened in 2003.

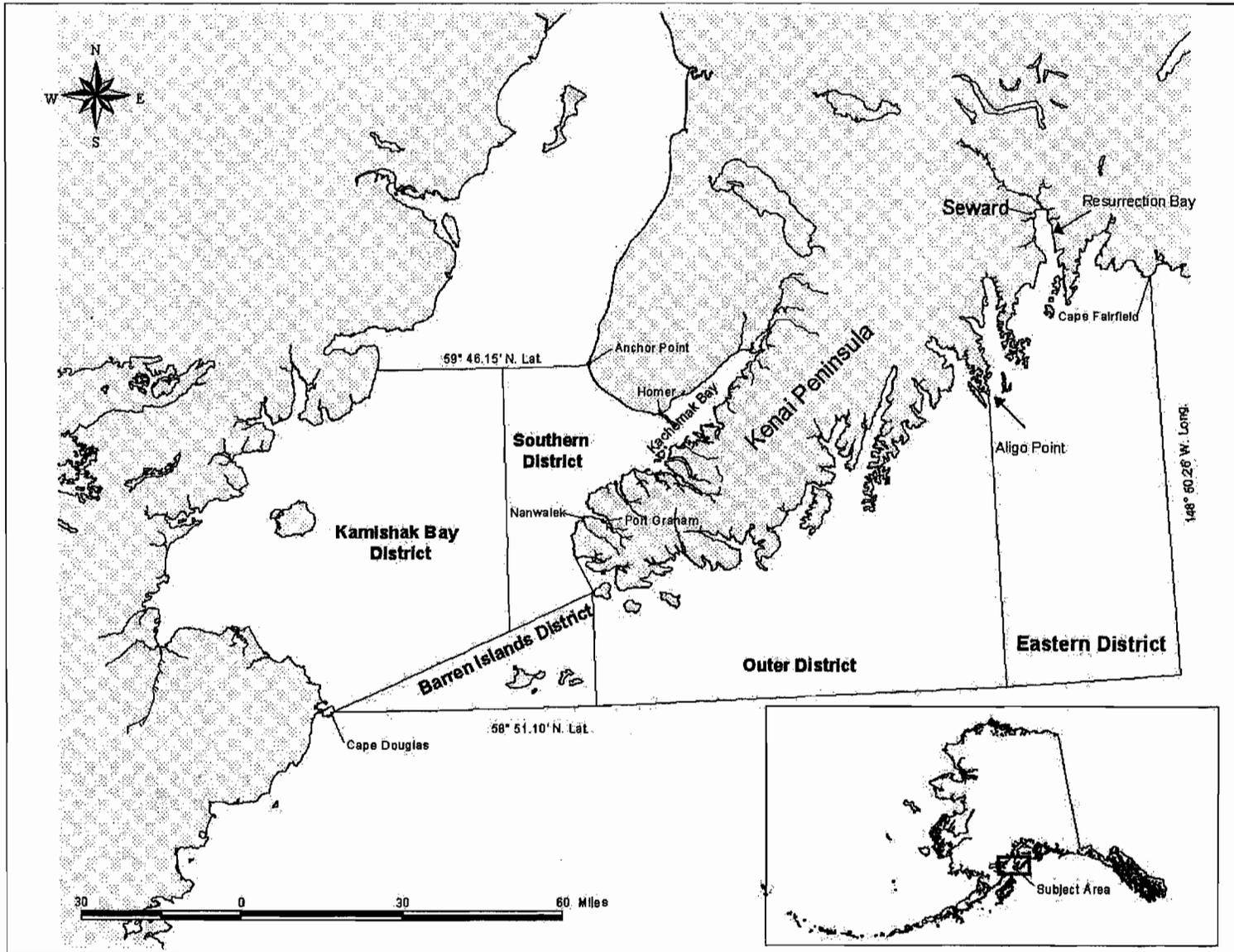


Figure 1. Lower Cook Inlet salmon and herring management area.

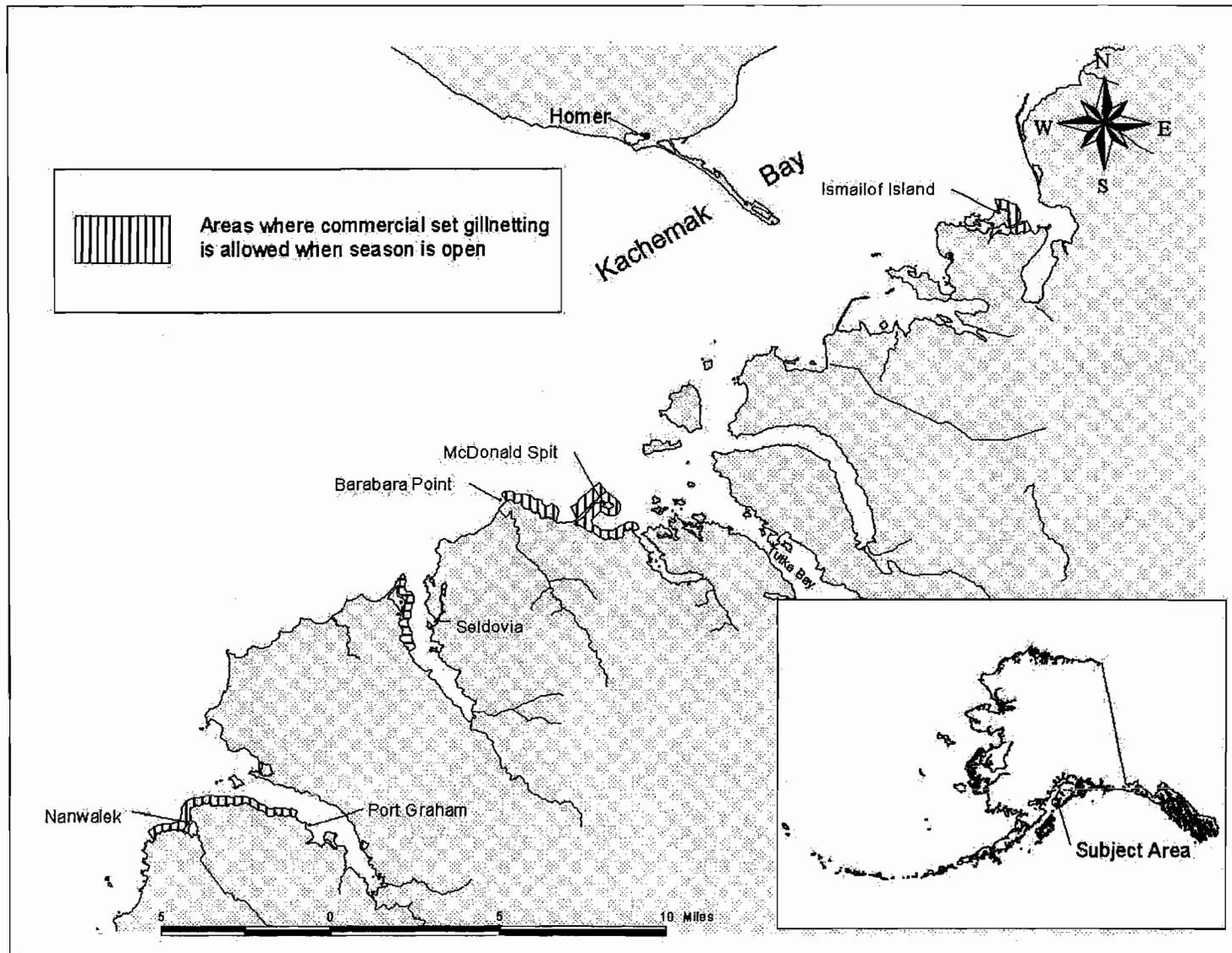


Figure 2. Commercial set gillnet locations in the Southern District of Lower Cook Inlet.

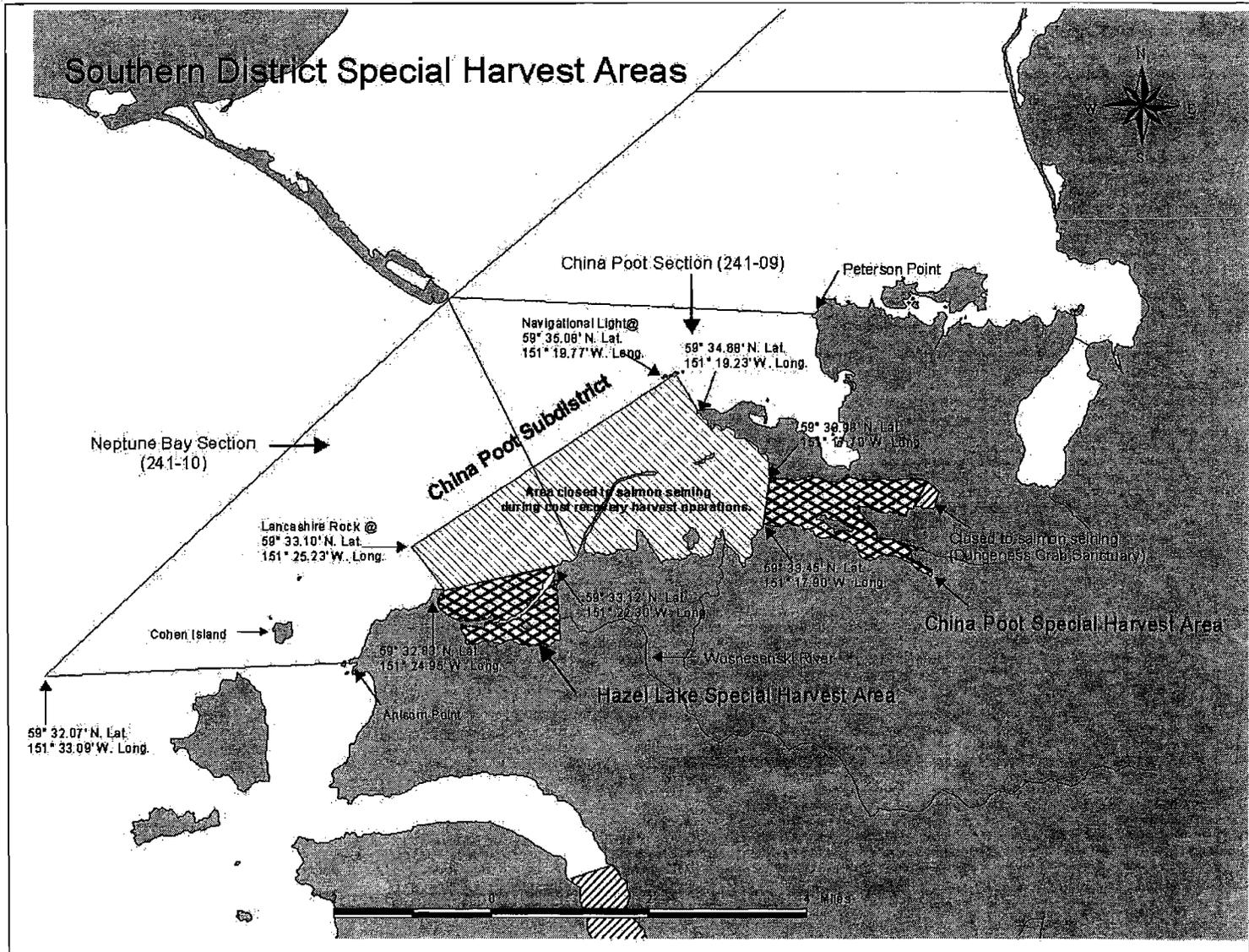


Figure 3. China Poot and Hazel Lake Special Harvest Areas for hatchery cost recovery in the Southern District of Lower Cook Inlet.

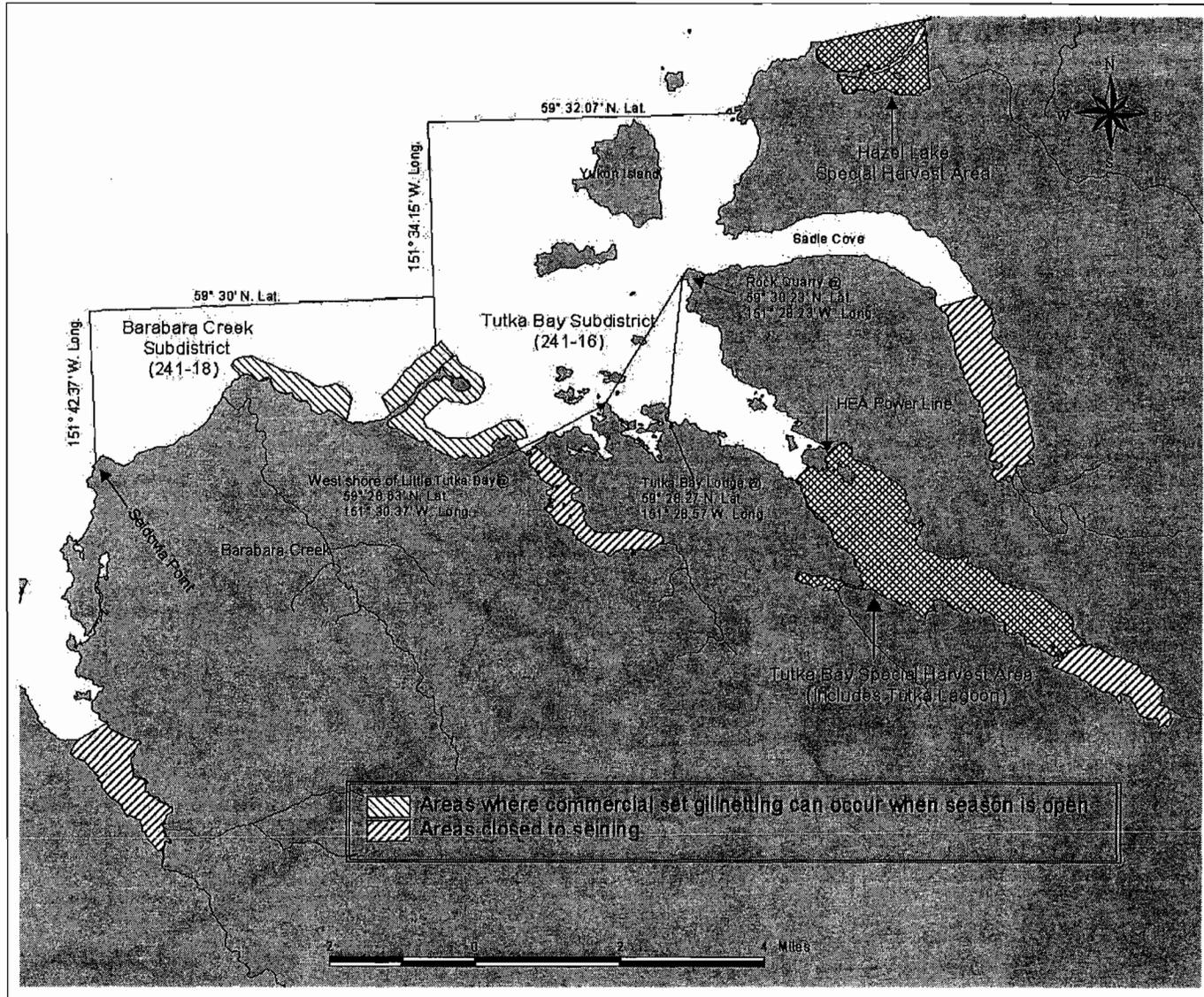


Figure 4. Tutka Bay Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

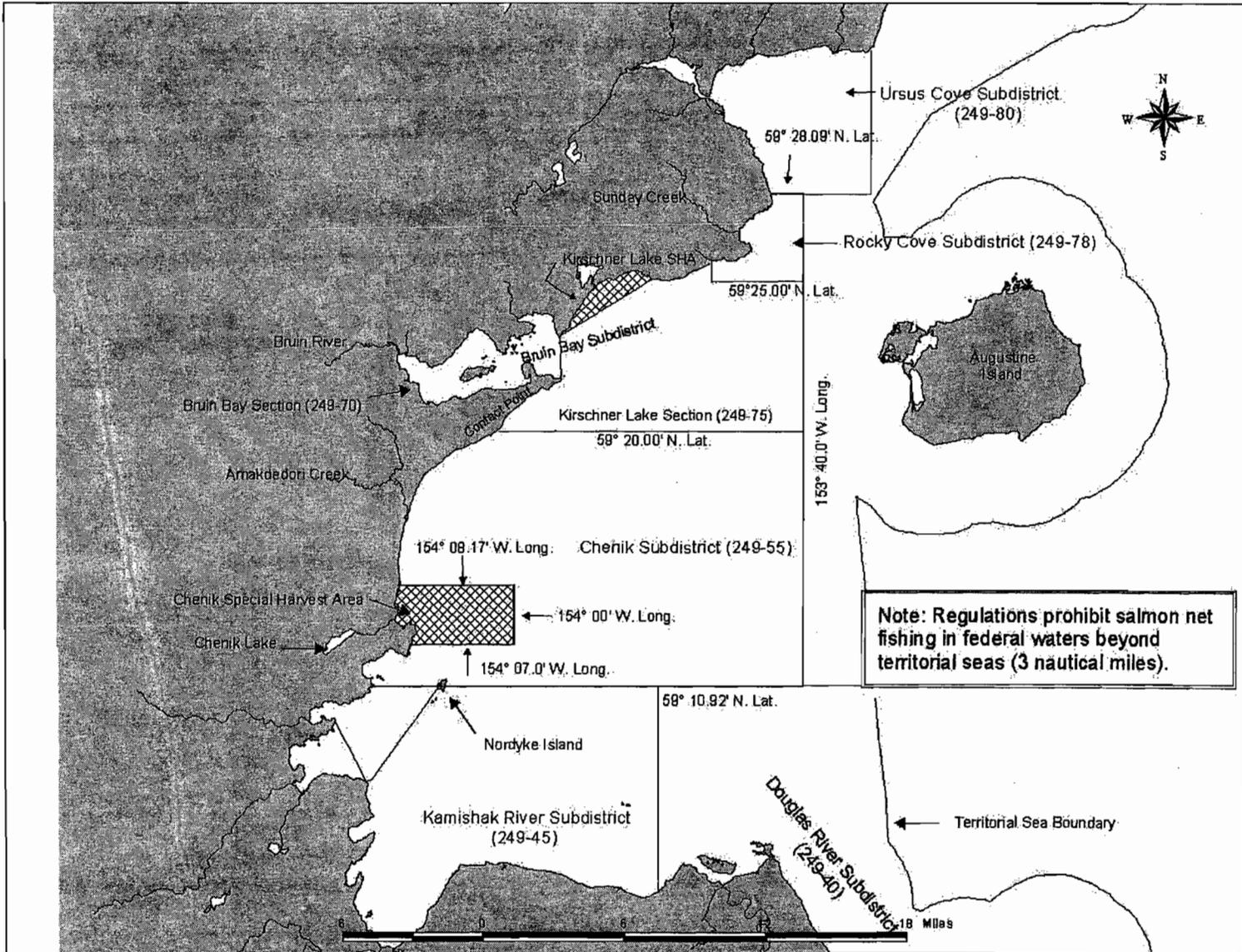


Figure 5. Kirschner and Chenik Lakes Special Harvest Areas for salmon hatchery cost recovery in Kamishak Bay District of Lower Cook Inlet.

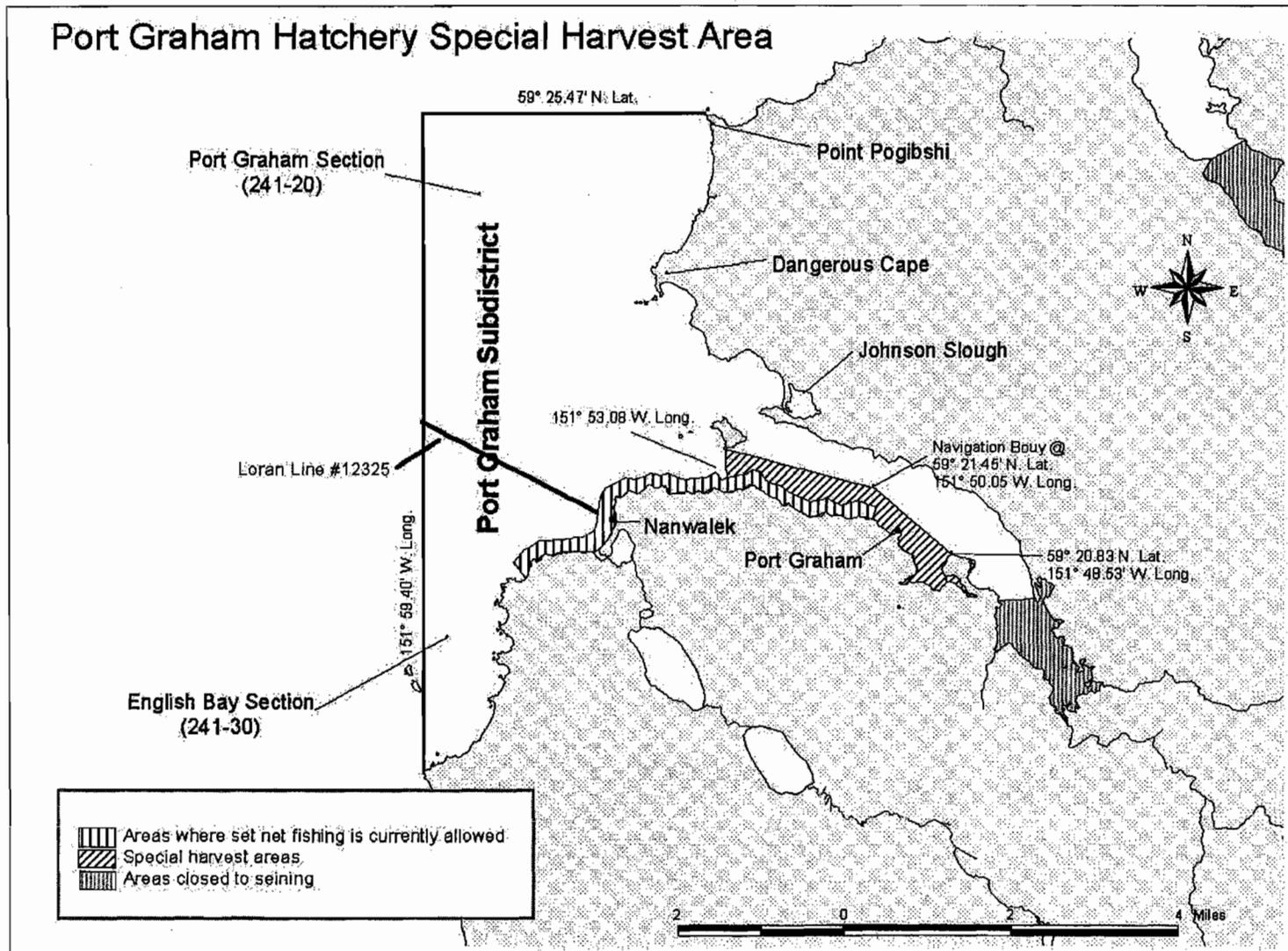


Figure 6. Port Graham Special Harvest Area for salmon hatchery cost recovery in the Southern District of Lower Cook Inlet.

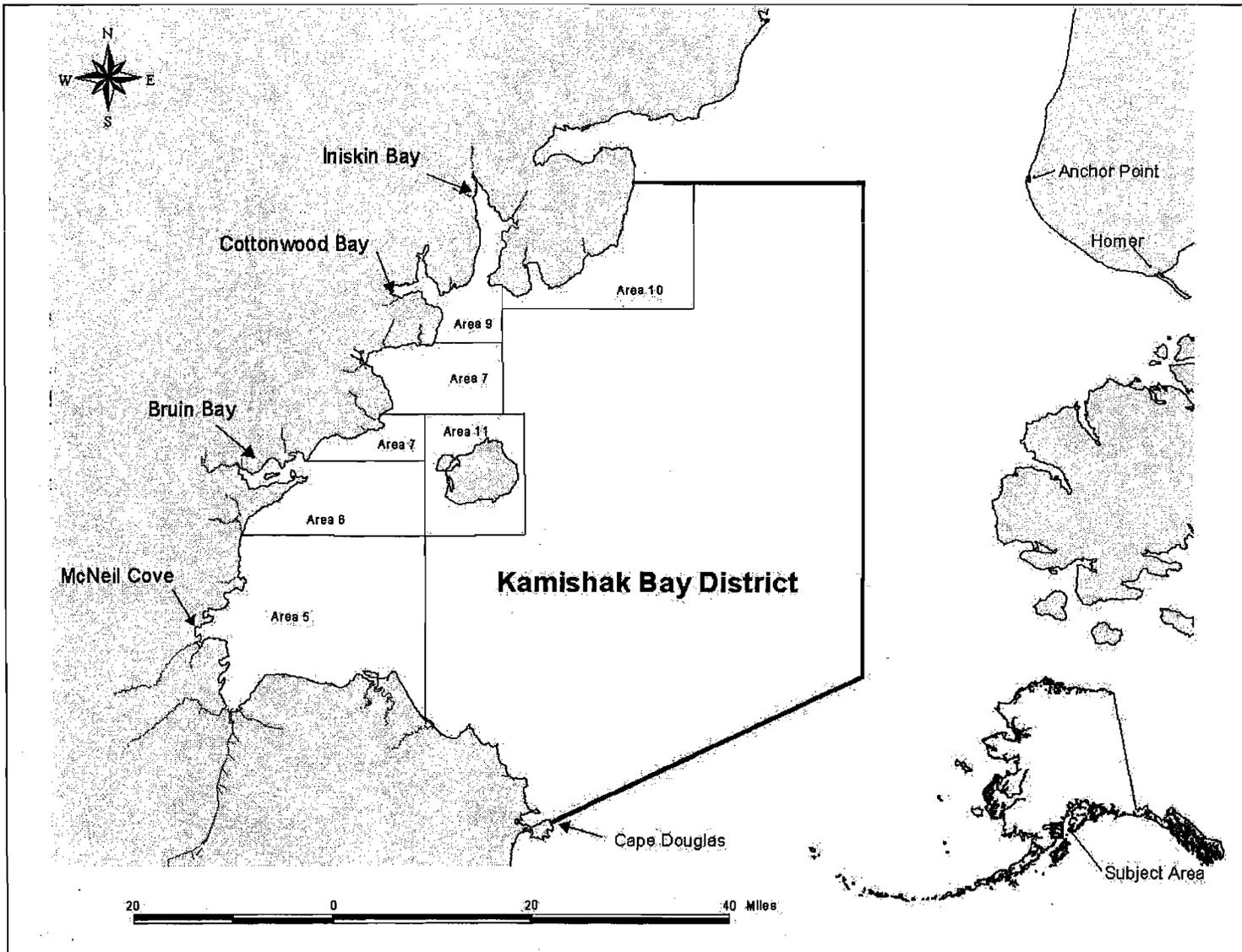


Figure 7. Commercial herring fishing areas for management purposes in Kamishak Bay District of Lower Cook Inlet.

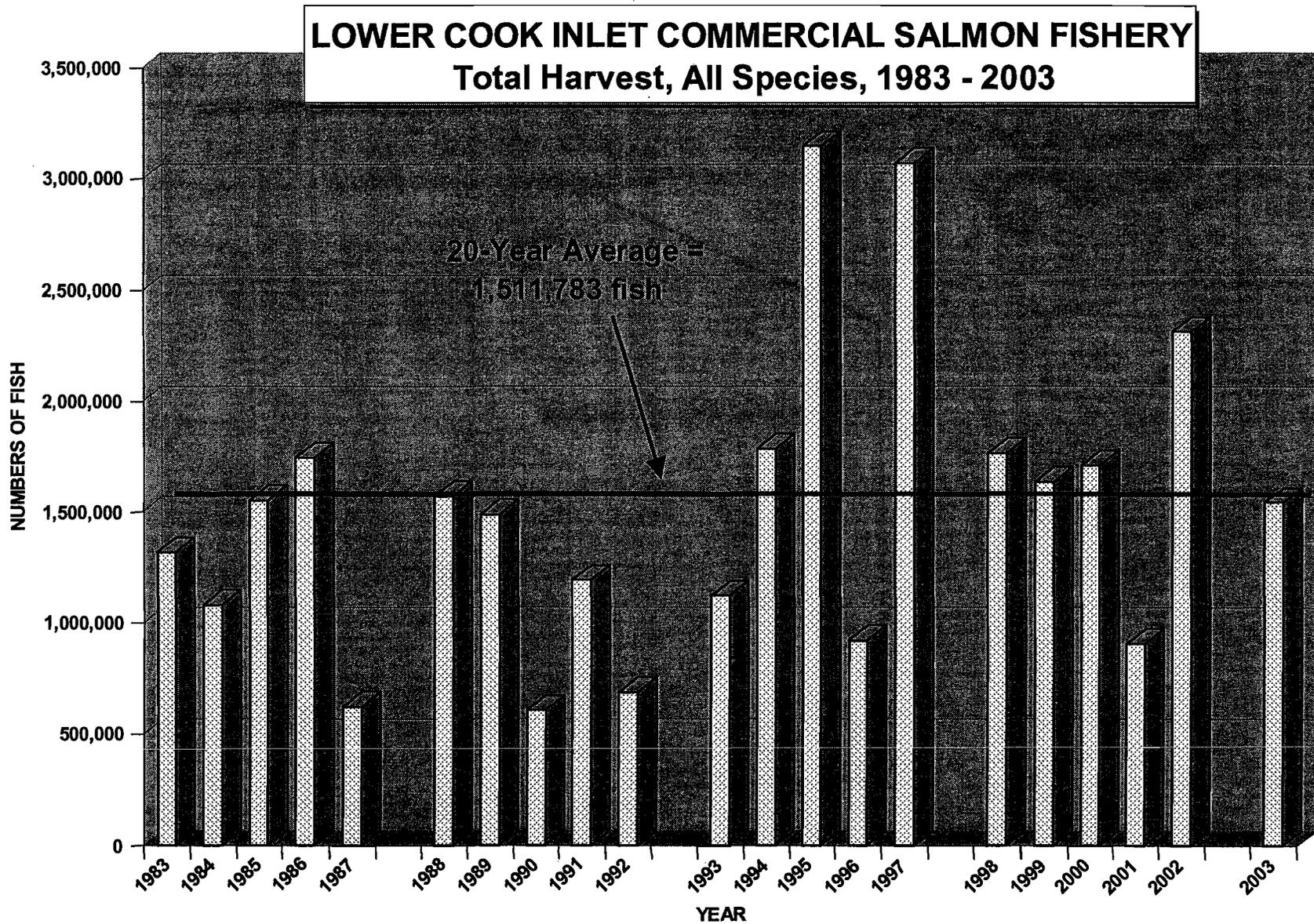


Figure 8. Total commercial salmon catch, Lower Cook Inlet, 1983 -2003.

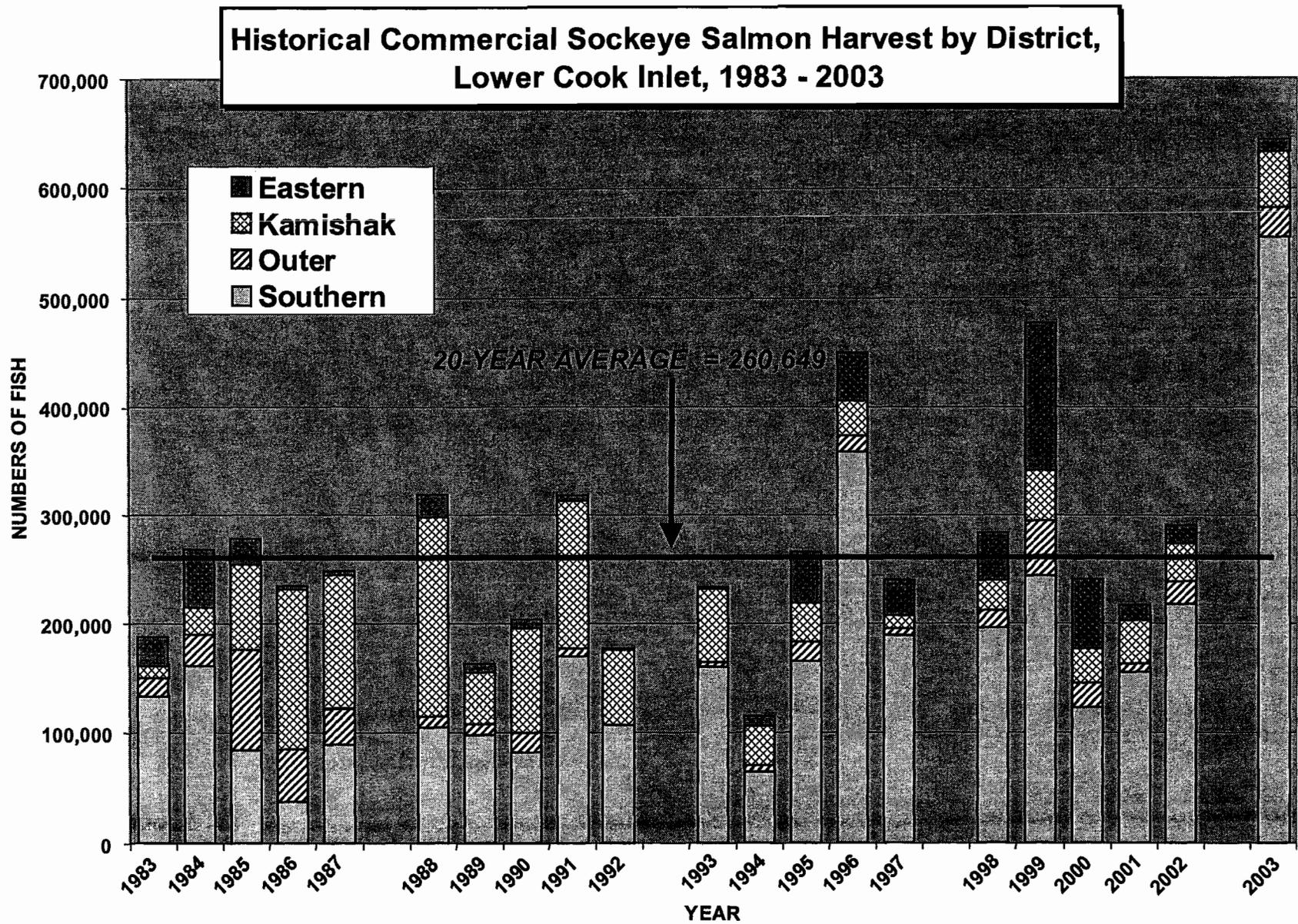


Figure 9. Commercial sockeye salmon catch by district, Lower Cook Inlet, 1983 - 2003.

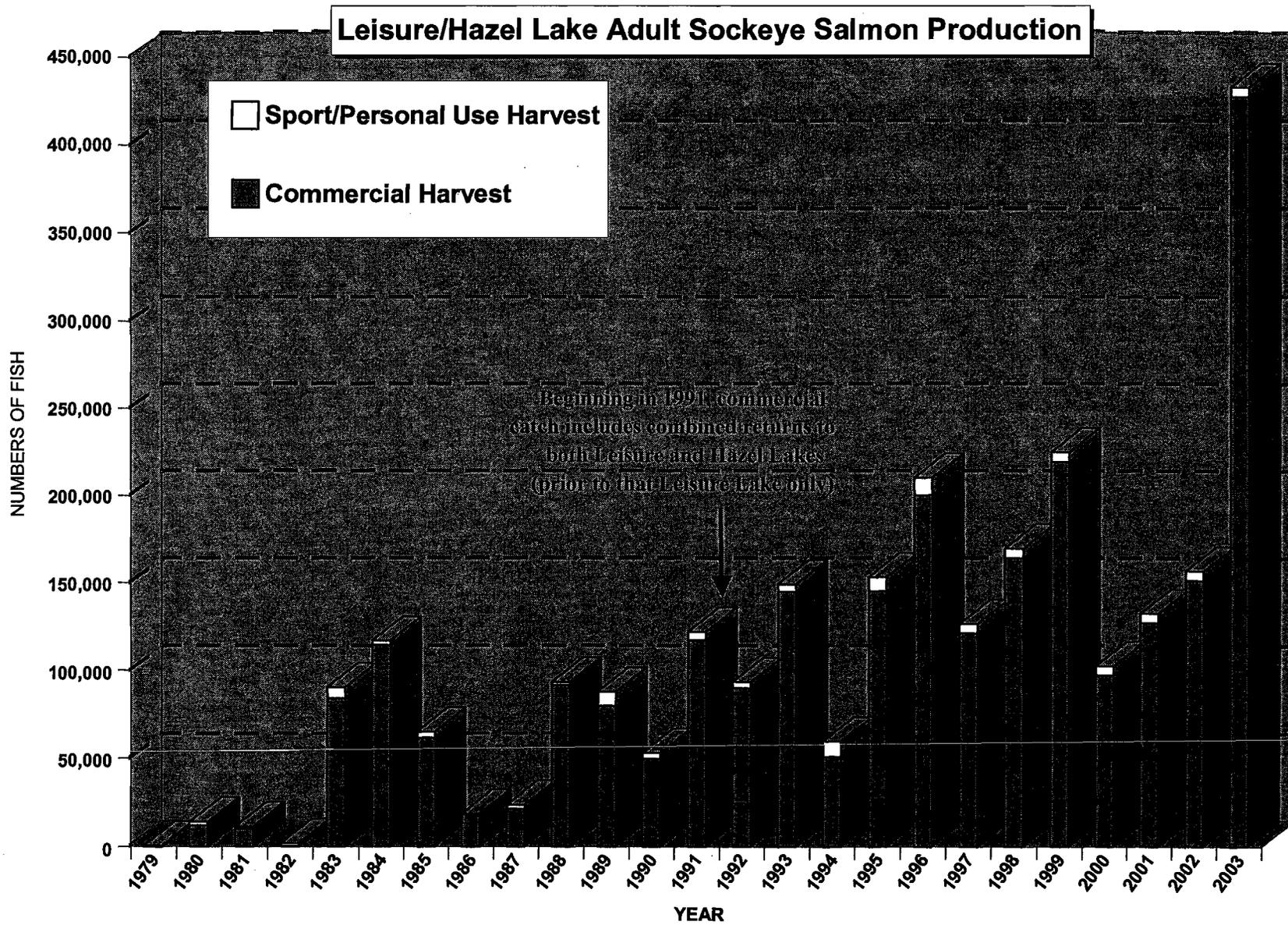


Figure 10. Sockeye salmon returns to Leisure and Hazel Lakes in the Southern District of Lower Cook Inlet, 1979 -2003.

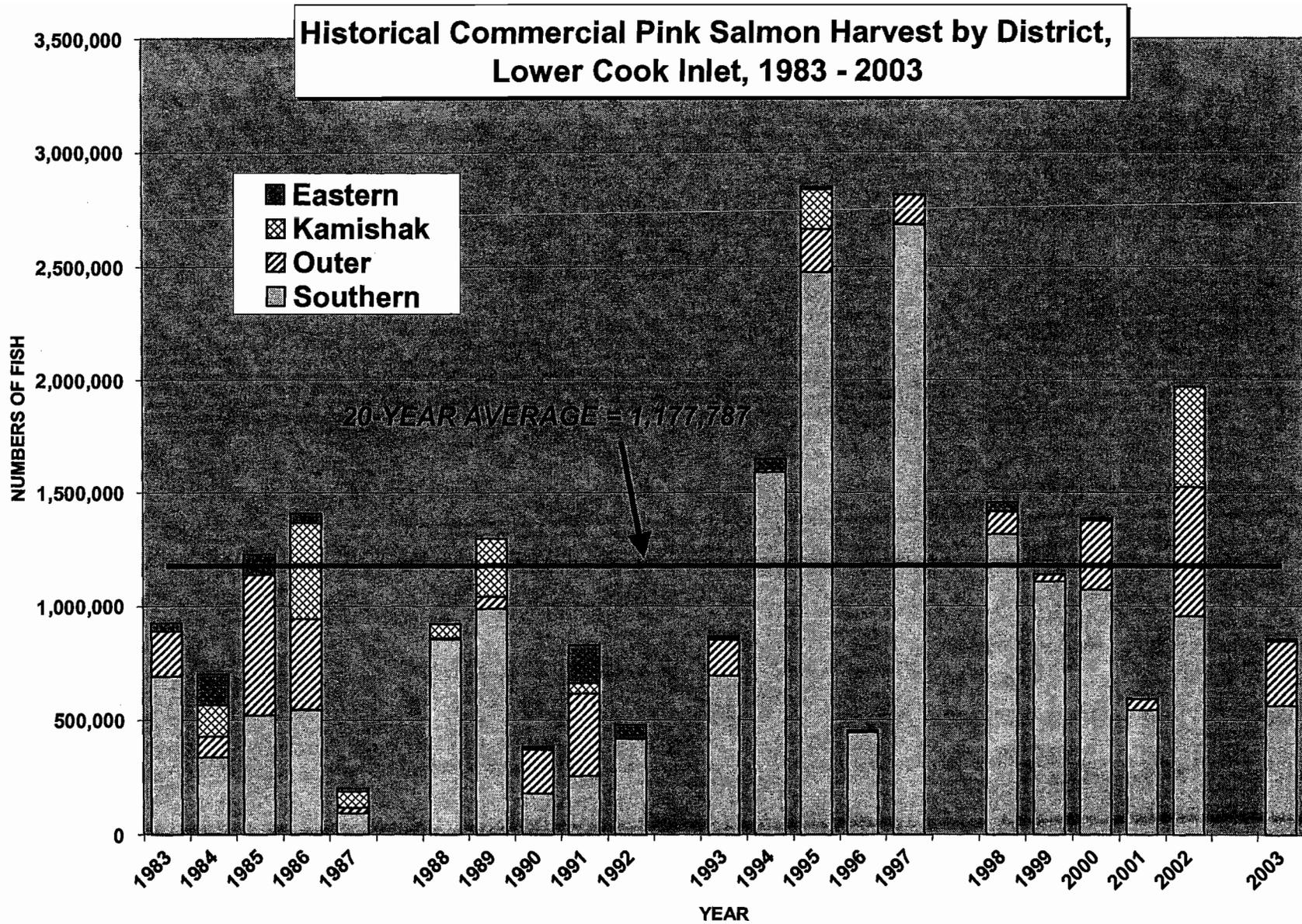


Figure 11. Commercial pink salmon catch by district, Lower Cook Inlet, 1983 - 2003.

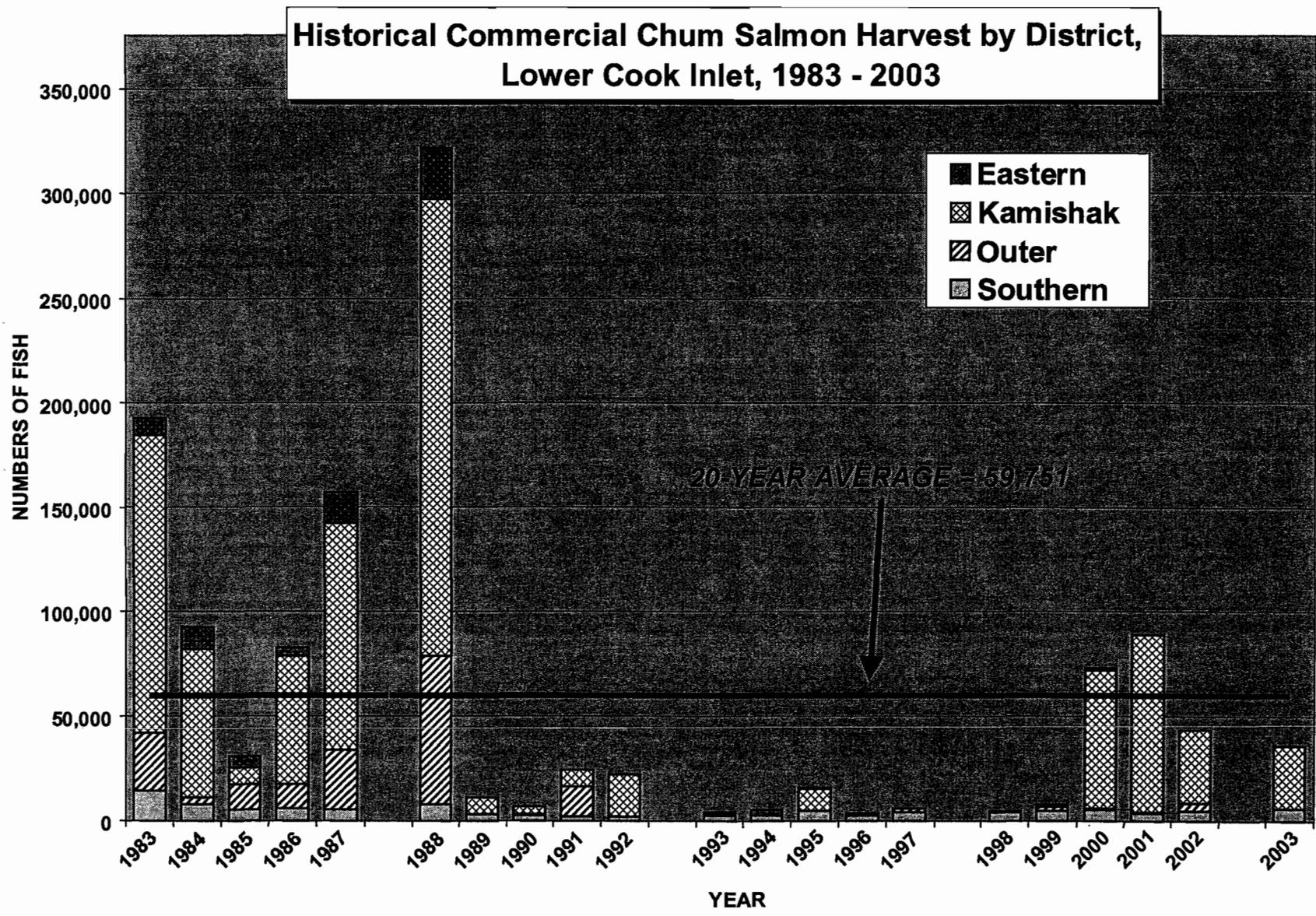


Figure 12. Commercial chum salmon catch by district, Lower Cook Inlet, 1983 - 2003.

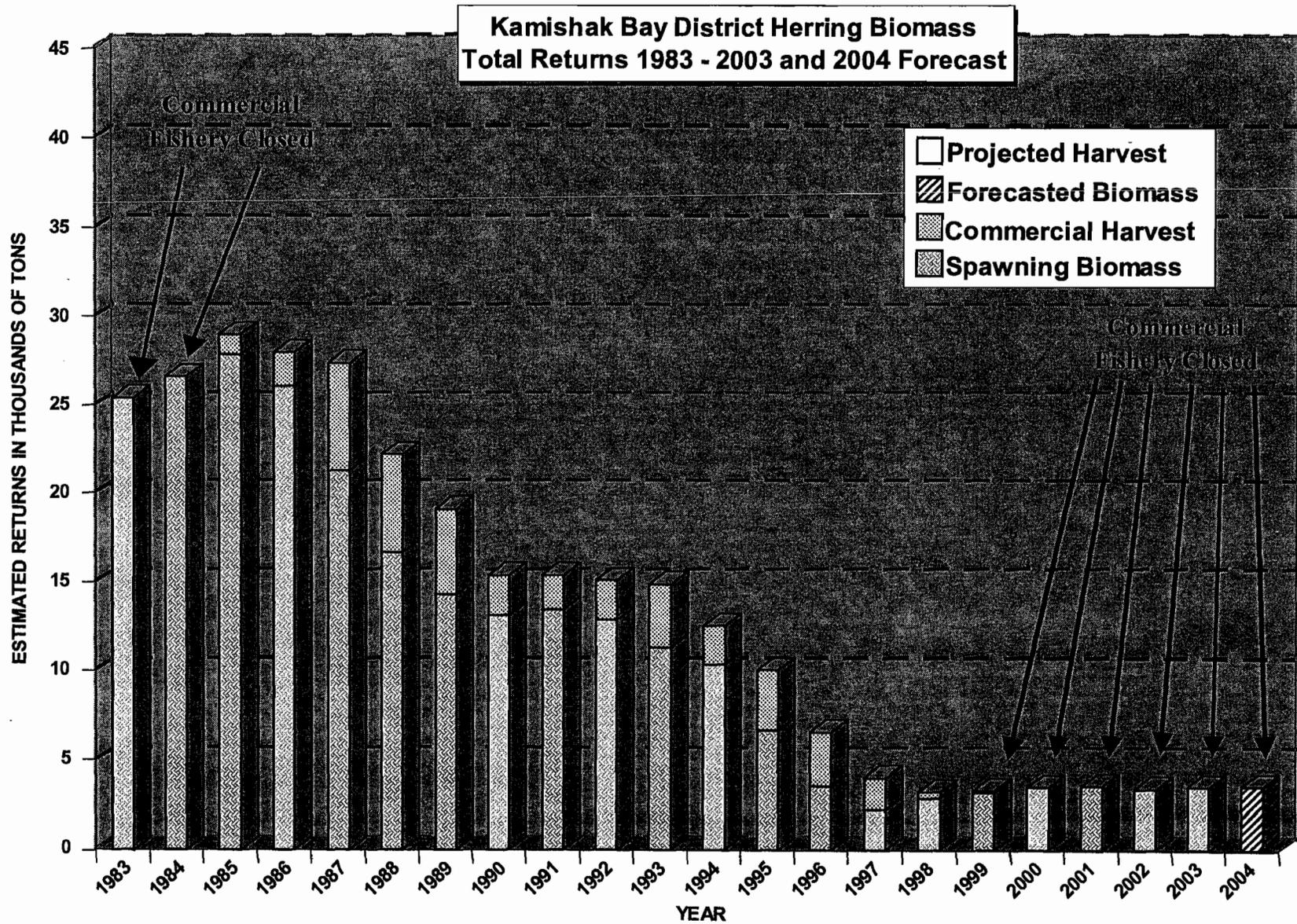


Figure 13. Biomass estimates and commercial harvests of Pacific herring in the sac roe seine fishery, Kamishak Bay District, Lower Cook Inlet, 1983 - 2003, and 2004 projection.

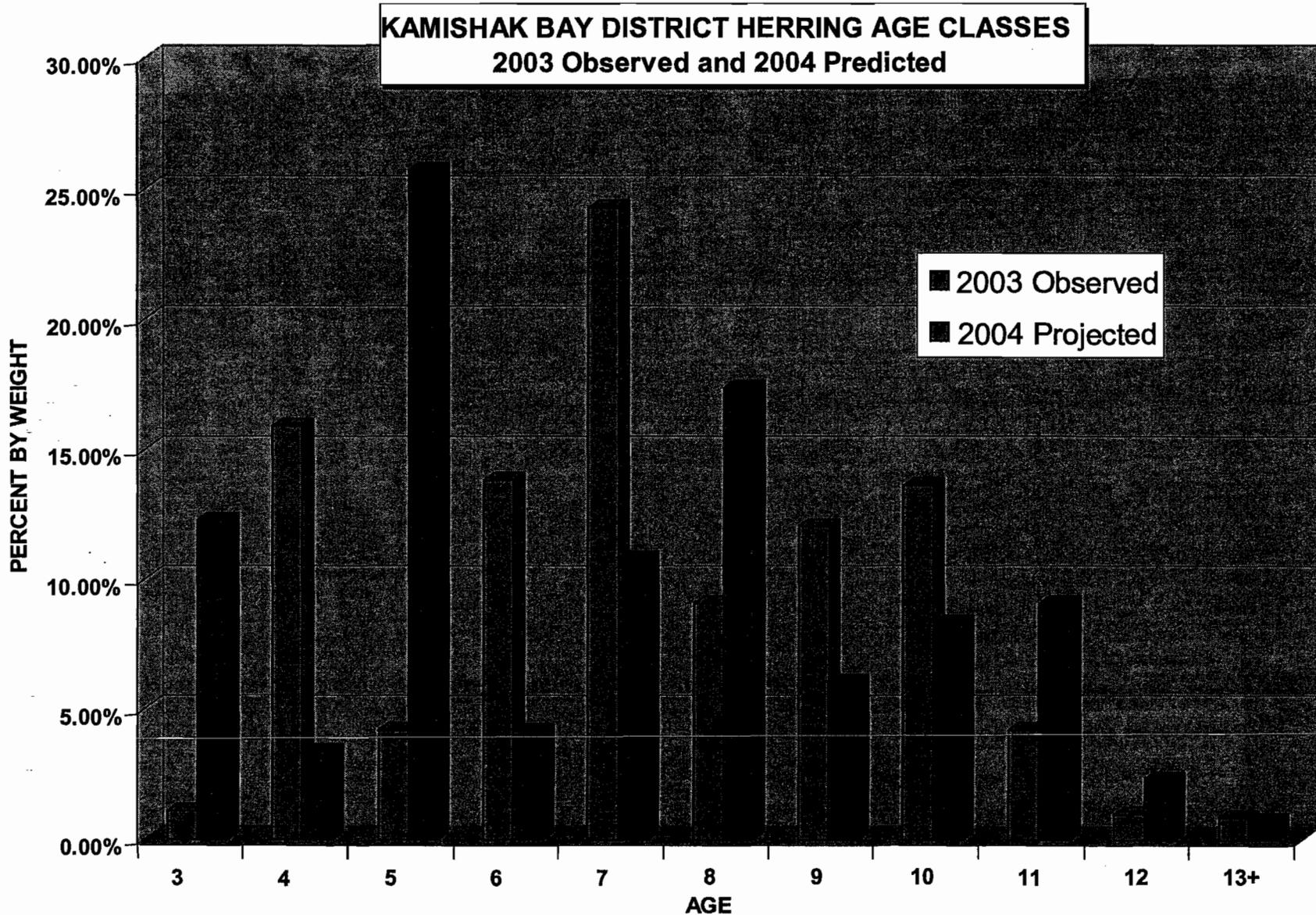


Figure14. Herring age composition from samples collected in Kamishak Bay District, Lower Cook Inlet, 2003, and 2004 forecast.

Appendix Table 1. Salmon fishing permits issued and fished, by gear type, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Seines			Actively fished	Set Net Permits fished
	Permanent Permits	Interim Permits	Total Issued		
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	25
1998	84	1	85	41	24
1999	84	1	85	45	20
2000	84	1	85	36	24
2001	84	1	85	25	18
2002	84	1	85	25	24
2003	84	1	85	27	24
1983-2002 Avg.	82	1	83	51	24
1993-2002 Avg.	84	1	85	36	22

<sup>a</sup> 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, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1983	20	704	57	696	513	1,990
1984	23	1,393	120	635	242	2,413
1985	47	1,637	86	974	78	2,822
1986	21	1,414	132	1,245	201	3,013
1987	27	1,951	118	295	598	2,989
1988	32	3,812	127	2,237	2,548	8,756
1989	33	1,213	59	1,660	39	3,004
1990	29	1,287	28	306	31	1,681
1991 <sup>b</sup>	19	1,115	36	275	48	1,493
1992 <sup>b</sup>	30	1,152	19	212	53	1,466
1993 <sup>b</sup>	27	802	41	287	7	1,164
1994 <sup>b</sup>	18	496	93	745	9	1,361
1995 <sup>b</sup>	48	1,381	62	1,245	24	2,760
1996 <sup>b</sup>	26	2,113	42	100	5	2,286
1997 <sup>b</sup>	23	1,066	36	1,286	10	2,421
1998 <sup>b</sup>	20	1,224	37	712	9	2,002
1999 <sup>b</sup>	51	2,459	23	470	20	3,023
2000 <sup>b</sup>	31	1,112	19	431	192	1,786
2001 <sup>b</sup>	24	627	15	277	295	1,238
2002 <sup>b</sup>	24	817	18	441	58	1,359
2003 <sup>b</sup>	15	1,965	18	154	40	2,192
20 Year Avg.	29	1,389	58	726	249	2,451
1983–1992 Avg.	28	1,569	78	854	435	2,963
1993–2002 Avg.	29	1,210	39	599	63	1,940
2003 % of Total	0.68%	89.64%	0.82%	7.03%	1.82%	100.00%

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

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

Appendix Table 3. Average salmon price in dollars per pound by species, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum
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 <sup>b</sup>	0.50 <sup>b</sup>	0.15	0.23
1998	1.45	0.96 <sup>b</sup>	0.36 <sup>b</sup>	0.16	0.27
1999	1.96	1.22 <sup>b</sup>	0.45 <sup>b</sup>	0.16	0.32
2000	1.86	0.87 <sup>b</sup>	0.60 <sup>b</sup>	0.12	0.28
2001	1.76	0.62 <sup>b</sup>	0.41 <sup>b</sup>	0.15	0.28
2002	1.11	0.55 <sup>b</sup>	0.33 <sup>b</sup>	0.07	0.16
2003	1.03	0.60 <sup>b</sup>	0.28 <sup>b</sup>	0.06	0.16
20-Year Avg.	1.33	1.15	0.63	0.22	0.32
1983-92 Avg.	1.27	1.40	0.80	0.32	0.39
1993-2002 Avg.	1.39	0.90	0.46	0.13	0.25

<sup>a</sup> Average prices are determined only from fish ticket information and may not reflect retroactive or postseason adjustments.

<sup>b</sup> Average price for sockeyes and cohos includes only those fish actually sold and does not include hatchery cost recovery fish that were donated, discarded, or harvested but not paid for due to contractual agreement with the processor.

Appendix Table 4. Salmon average weight in pounds per fish by species in the commercial fishery, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum
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
1998	13.1	4.6	8.5	3.1	7.4
1999	14.8	4.7	6.6	2.5	7.9
2000	14.7	5.3	8.2	2.5	9.3
2001	13.6	4.9	7.5	3.1	9.4
2002	14.0	5.2	7.8	3.4	8.3
2003	12.6	5.1	6.8	3.2	7.2
20-Year Avg.	16.6	4.7	7.9	3.0	8.1
1983-92 Avg.	18.6	4.6	8.0	3.2	8.6
1993-2002 Avg.	14.6	4.8	7.8	2.9	7.7

<sup>a</sup> Values obtained from ADF&G fish ticket database.

Appendix Table 5. Commercial salmon catch in numbers of fish by species, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1983	873	187,645	11,219	927,607	192,319	1,319,663
1984	714	268,950	16,797	700,622	92,540	1,079,623
1985	1,043	278,694	10,327	1,229,708	30,640	1,550,412
1986	796	234,861	18,852	1,408,293	82,688	1,745,490
1987	1,179	248,848	14,354	201,429	157,018	622,828
1988	1,694	319,008	7,946	921,296	321,911	1,571,855
1989	1,893	163,271	12,089	1,296,926	11,305	1,485,484
1990	1,560	203,895	9,297	383,670	6,951	605,373
1991	1,419	317,947	19,047	828,709	24,232	1,191,354
1992	1,891	176,644	5,902	479,768	22,203	686,408
1993	2,168	233,834	13,477	866,774	4,367	1,120,620
1994	1,231	115,418	14,673	1,647,929	5,469	1,784,720
1995	2,303	265,423	17,709	2,848,464	15,636	3,149,535
1996	1,181	449,685	13,572	451,506	3,764	919,708
1997	1,262	240,184	11,004	2,814,431	5,908	3,072,789
1998	1,071	284,029	16,653	1,457,819	4,647	1,764,219
1999	1,764	476,779	8,033	1,140,488	7,941	1,635,005
2000	1,188	240,932	8,203	1,387,307	73,254	1,710,884
2001	988	216,271	6,667	592,931	88,969	905,826
2002	1,553	290,654	8,329	1,970,061	43,259	2,313,856
2003	1,180	644,257	11,302	856,711	35,686	1,549,136
20-Year Avg.	1,389	260,649	12,208	1,177,787	59,751	1,511,783
1983-92 Avg.	1,306	239,976	12,583	837,803	94,181	1,185,849
1993-2002 Avg.	1,471	281,321	11,832	1,517,771	25,321	1,837,716
2003 % of Total	0.08%	41.59%	0.73%	55.30%	2.30%	100.00%

<sup>a</sup> 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, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1998	1,070	196,262	2,243	1,315,042	3,956	1,518,534
1999	1,760	243,444	2,757	1,105,267	4,624	1,357,852
2000	1,184	123,574	768	1,070,065	5,340	1,200,931
2001	986	155,411	2,706	542,975	3,789	705,867
2002	1,553	218,203	3,769	953,960	4,803	1,182,288
2003	1,179	556,037	5,408	563,043	5,730	1,131,397
20-Year Avg.	1,374	147,015	3,819	887,142	4,792	1,044,143
1983-92 Avg.	1,280	106,776	3,804	486,772	5,561	604,193
1993-2002 Avg.	1,468	187,255	3,835	1,287,512	4,023	1,484,093
2003 % of Total	0.10%	49.15%	0.48%	49.77%	0.51%	100.00%

<sup>a</sup> 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, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1983	822	41,707	1,799	20,533	4,377	69,238
1984	639	40,987	2,862	17,836	5,008	67,332
1985	958	23,188	3,908	22,898	4,221	55,173
1986	745	21,807	2,827	14,244	2,426	42,049
1987	653	28,209	2,025	9,224	2,419	42,530
1988	1,145	14,758	2,819	29,268	4,423	52,413
1989	1,281	13,970	4,792	16,210	1,877	38,130
1990	1,361	15,863	1,046	12,646	1,938	32,854
1991	842	20,525	5,011	3,954	1,577	31,909
1992	1,288	17,002	848	15,958	1,687	36,783
1993	1,089	14,791	3,088	12,008	2,591	33,567
1994	1,103	14,004	1,073	23,621	2,419	42,220
1995	2,078	19,406	3,564	41,654	3,958	70,660
1996	1,054	69,338	5,779	14,813	2,792	93,776
1997	1,136	59,412	4,475	64,162	4,166	133,351
1998	952	26,131	1,057	24,403	3,754	56,297
1999	1,491	27,646	1,374	5,348	4,313	40,194
2000	1,019	26,503	621	21,845	5,214	55,202
2001	865	28,503	1,811	13,393	3,487	48,059
2002	1,513	46,812	2,393	6,741	4,681	62,140
2003	878	81,722	2,291	7,325	4,998	97,214
20-Year Avg.	1,102	28,528	2,659	19,538	3,368	55,194
1983-92 Avg.	973	23,802	2,794	16,277	2,995	46,841
1993-2002 Avg.	1,230	33,255	2,524	22,799	3,740	63,547
2003 % of Total	0.90%	84.06%	2.36%	7.53%	5.14%	100.00%

<sup>a</sup> 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, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1998	0	15,991	45	102,172	611	118,819
1999	3	51,117	1,482	32,484	2,062	87,148
2000	2	21,623	20	306,555	302	328,502
2001	0	7,339	5	48,559	408	56,311
2002	0	21,154	74	569,955	3,810	594,993
2003	1	26,615	4	281,663	137	308,420
20-Year Avg.	4	21,461	758	175,120	8,962	206,306
1983-92 Avg.	7	26,256	1,100	194,265	16,899	238,526
1993-2002 Avg.	2	16,666	417	155,975	1,025	174,085
2003 % of Total	0.00%	8.63%	0.00%	91.32%	0.04%	100.00%

<sup>a</sup> 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, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1998	1	44,274	14,365	38,829	51	97,520
1999	1	135,305	3,794	1,930	1,232	142,262
2000	1	64,099	7,408	4,473	1,540	77,521
2001	0	13,809	3,947	0	6	17,762
2002	0	17,376	4,432	0	5	21,813
2003	0	10,352	5,886	0	19	16,257
20-Year Avg.	3	28,232	4,801	33,685	3,700	70,421
1983-92 Avg.	6	15,304	2,826	56,083	6,774	80,993
1993-2002 Avg.	0	41,161	6,775	11,287	625	59,848
2003 % of Total	0.00%	79.66%	20.32%	0.00%	0.02%	100.00%

<sup>a</sup> 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, 1983 – 2003<sup>a</sup>.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1998	0	27,502	0	1,776	29	29,307
1999	0	46,913	0	807	23	47,743
2000	1	31,636	7	6,214	66,072	103,930
2001	2	39,712	9	1,397	84,766	125,886
2002	0	33,921	54	446,146	34,641	514,762
2003	0	51,253	4	12,005	29,800	93,062
20-Year Avg.	7	63,940	2,829	81,839	42,297	190,913
1983-92 Avg.	14	91,641	4,853	100,683	64,947	262,137
1993-2002 Avg.	1	36,239	806	62,996	19,648	119,690
2003 % of Total	0.00%	55.07%	0.00%	12.90%	32.02%	100.00%

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

Appendix Table 11. Total commercial salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1998	1,518,573	118,819	29,307	97,520	1,764,219
1999	1,357,852	87,148	47,743	142,262	1,635,005
2000	1,200,931	328,502	103,930	78,227	1,711,590
2001	705,867	56,311	125,886	17,762	905,826
2002	1,182,288	594,993	514,762	21,813	2,313,856
2003	1,131,397	308,420	93,062	16,257	1,549,136
20-Year Avg.	1,044,143	206,306	190,913	70,421	1,511,783
1983-92 Avg.	604,193	238,526	262,137	80,993	1,185,849
1993-2002 Avg.	1,484,093	174,085	119,690	59,848	1,837,716
2003 % of Total	73.03%	19.91%	6.01%	1.05%	100.00%

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

Appendix Table 12. Commercial Chinook salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1998	1,070	0	0	1	1,071
1999	1,760	3	0	1	1,764
2000	1,184	2	1	1	1,188
2001	986	0	2	0	988
2002	1,553	0	0	0	1,553
2003	1,179	1	0	0	1,180
20-Year Avg.	1,374	4	7	3	1,389
1983-92 Avg.	1,280	7	14	6	1,306
1993-2002 Avg.	1,468	2	1	0	1,471
2003 % of Total	99.92%	0.08%	0.00%	0.00%	100.00%

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

Appendix Table 13. Commercial sockeye salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1998	196,262	15,991	27,502	44,274	284,029
1999	243,444	51,117	46,913	135,305	476,779
2000	123,574	21,623	31,636	64,099	240,932
2001	155,411	7,339	39,712	13,809	216,271
2002	218,203	21,154	33,921	17,376	290,654
2003	556,037	26,615	51,253	10,352	644,257
20-Year Avg.	147,015	21,461	63,940	28,232	260,649
1983-92 Avg.	106,776	26,256	91,641	15,304	239,976
1993-2002 Avg.	187,255	16,666	36,239	41,161	281,321
2003 % of Total	75.07%	7.28%	11.67%	5.98%	100.00%

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

Appendix Table 14. Commercial sockeye salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 – 2003<sup>ab</sup>.

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 <sup>c</sup>				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

- continued -

Appendix Table 14. (page 2 of 2)

Location	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Resurrection Bay	35.0	135.2	64.1	13.8	16.2	10.4							
Aialik Bay	8.6	0.1	T	0	1.2	0							
Nuka Bay	16.0	51.1	21.6	7.3	21.2	26.6							
Port Dick	0	0	T	T	0	0							
Halibut Cove & Lagoon	62.3	42.9	24.3	5.8	27.5	74.2							
China Poot <sup>c</sup>	100.2	170.6	78.3	117.7	126.5	366.							
Tutka/Barabara	9.8	22.9	12.4	23.0	19.4	33.4							
Seldovia Bay	6.0	6.3	6.4	9.0	9.5	13.8							
Port Graham Bay	17.9	0.7	2.1	0	35.3	68.5							
Kamishak/Douglas	0	0	T	0.5	1.4	0.8							
McNeil (Mikfik)	0	7.2	0	0.3	0	0							
Paint River	0	0	0	0	0	0							
Chenik Lake	0	0	0	0	0	0							
Bruin/Kirschner	27.5	39.8	31.6	38.9	32.5	50.4							
Miscellaneous	0.7	0	T	0	0	0							
<b>Totals</b>	<b>284.0</b>	<b>476.8</b>	<b>240.9</b>	<b>216.3</b>	<b>290.7</b>	<b>644.3</b>							

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

<sup>b</sup> "T" denotes trace, less than 50 fish caught.

<sup>c</sup> 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 and Neptune Bays in the Southern District of Lower Cook Inlet, by user group, 1979 – 2003<sup>a</sup>.

Return Year	Sport Harvest	Personal Use Harvest	Commercial Harvest	Non-harvested fish	Total Return
1979	650	0	<sup>b</sup>	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 <sup>c</sup>	0	122,000
1992	300	3,500	89,791 <sup>c</sup>	0	93,591
1993	400	4,000	144,677 <sup>c</sup>	0	149,077
1994	500	8,500	50,527 <sup>c</sup>	0	59,527
1995	1,000	7,000	145,392 <sup>c</sup>	450	153,842
1996	1,000	9,000	200,000 <sup>c</sup>	441	210,441
1997	650 <sup>d</sup>	4,900 <sup>e</sup>	120,900 <sup>c</sup>	1,130	127,620
1998	650 <sup>d</sup>	4,900 <sup>e</sup>	164,000 <sup>c</sup>	380	170,542
1999	650 <sup>d</sup>	4,900 <sup>e</sup>	219,300 <sup>c</sup>	522	225,983
2000	650 <sup>d</sup>	4,900 <sup>e</sup>	97,100 <sup>c</sup>	256	102,906
2001	650 <sup>d</sup>	4,900 <sup>e</sup>	126,900 <sup>c</sup>	57	132,507
2002	650 <sup>d</sup>	4,900 <sup>e</sup>	151,100 <sup>c</sup>	51	156,701
2003	650 <sup>d</sup>	4,900 <sup>e</sup>	427,327 <sup>c</sup>	121	432,998
1983-2002					
Average	594	4,501	107,347	269	112,711

<sup>a</sup> 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.

<sup>b</sup> No data.

<sup>c</sup> 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.

<sup>d</sup> The final "Sport Harvest" figures for 1997 - 2003 represent the estimated previous 10-year average.

<sup>e</sup> The final "Personal Use Harvest" figures for 1997 - 2003 represent the statewide sport fish harvest survey average for the years 1990 - 1995.

Appendix Table 16. Commercial catch and escapement of sockeye salmon at Chenik Lake in the Kamishak Bay District of Lower Cook Inlet, 1975 – 2003.

Return Year	Commercial Harvest	Escapement <sup>a</sup>	Total Return
1975	b	100	100
1976	b	900	900
1977	b	200	200
1978	b	100	100
1979	b	c	c
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 <sup>d</sup>	808	808
1995	0 <sup>d</sup>	1,086	1,086
1996	0 <sup>d</sup>	2,990	2,990
1997	0 <sup>d</sup>	2,338	2,338
1998	0 <sup>d</sup>	1,880	1,880
1999	0 <sup>d</sup>	2,850	2,850
2000	0 <sup>d</sup>	4,800	4,800
2001	0 <sup>d</sup>	250	250
2002	0 <sup>d</sup>	4,650	4,650
2003	0 <sup>e</sup>	13,825	13,825
Average Since 1985	31,353	6,181	37,534

<sup>a</sup> Estimated from aerial surveys between 1975-90 and 1998-present, weir counts between 1991-97.

<sup>b</sup> Closed to fishing.

<sup>c</sup> No data.

<sup>d</sup> Due to low returns, the Chenik Subdistrict was kept closed to fishing for the entire season.

<sup>e</sup> Due to the previous decade of low returns to Chenik Lake, the Chenik Subdistrict was kept closed to all fishing to protect fish for escapement..

Appendix Table 17. Commercial coho salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1998	2,243	45	0	14,365	16,653
1999	2,757	1,482	0	3,794	8,033
2000	768	20	7	7,408	8,203
2001	2,706	5	9	3,947	6,667
2002	3,769	74	54	4,432	8,329
2003	5,408	4	4	5,886	11,302
20-Year Avg.	3,819	758	2,829	4,801	12,208
1983-92 Avg.	3,804	1,100	4,853	2,826	12,583
1993-2002 Avg.	3,835	417	806	6,775	11,832
2003 % of Total	47.85%	0.04%	0.04%	52.08%	100.00%

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

Appendix Table 18. Commercial pink salmon catch in numbers of fish by district, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1998	1,315,042	102,172	1,776	38,829	1,457,819
1999	1,105,267	32,484	807	1,930	1,140,488
2000	1,070,065	306,555	6,214	4,473	1,387,307
2001	542,975	48,559	1,397	0	592,931
2002	953,960	569,955	446,146	0	1,970,061
2003	563,043	281,663	12,005	0	856,711
20-Year Avg.	887,142	175,120	81,839	33,685	1,177,787
1983-92 Avg.	486,772	194,265	100,683	56,083	837,803
1993-2002 Avg.	1,287,512	155,975	62,996	11,287	1,517,771
2003 % of Total	65.72%	32.88%	1.40%	0.00%	100.00%

<sup>a</sup> 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 – 2003<sup>a,b</sup>.

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 Island	33.3	2.0	0.3	0	0.1	0	25.0	5.2	31.4	40.6
E. Nuka Bay							94.6	T	0	8.7
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	12.8	5.6	31.1	8.4
<b>Total</b>	<b>124.7</b>	<b>303.4</b>	<b>203.6</b>	<b>115.6</b>	<b>375.5</b>	<b>202.4</b>	<b>392.9</b>	<b>307.4</b>	<b>1,063.3</b>	<b>1,293.9</b>

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 <sup>c</sup>						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	47.6	3.3	7.0	0	9.7	7.5	14.7	17.6	0
Windy Bay	552.7	82.9	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 Island	87.2	244.9	30.2	9.6	0	0	10.6	51.9	6.0	33.3
E. Nuka Bay	0.9	121.0	18.1	141.2	20.9	43.0	T	13.8	21.4	1.3
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	40.0	54.0	16.5	17.9	4.4	0.1	82.0	22.8	26.6	0
<b>Total</b>	<b>2,990.9</b>	<b>3,279.2</b>	<b>927.6</b>	<b>1,229.7</b>	<b>201.4</b>	<b>1,296.9</b>	<b>828.7</b>	<b>866.8</b>	<b>2,848.5</b>	<b>2,814.4</b>

- continued -

Appendix Table 19. (page 2 of 2)

Location	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017
Humpy Creek	0	0	0							
Halibut Cove and Lagoon	3.4	0.2	6.5							
China Poot <sup>c</sup>	19.6	4.8	41.3							
Tutka/Barabara	1,080.8	533.1	511.8							
Seldovia Bay	1.5	4.9	2.7							
Port Graham Bay	0	0	0.7							
Dogfish Bay	0	0	0							
Port Chatham	0	0	0							
Windy Bay	0	9.4	119.8							
Rocky Bay	0	0	0							
Port Dick Bay	0	16.7	137.4							
Nuka Island	0	0	0							
E. Nuka Bay	32.5	22.4	24.5							
Resurrection Bay	0	0	0							
Bruin Bay	0.8	0	12.0							
Rocky/Ursus Coves	0	0.1	0							
Iniskin/Cottonwood Bays	0	0	0							
Miscellaneous	1.9	1.3	0							
<b>Total</b>	<b>1,140.5</b>	<b>592.9</b>	<b>856.7</b>							

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

<sup>b</sup> "T" denotes trace, less than 50 fish harvested

<sup>c</sup> China Poot Subdistrict, which includes China Poot, Neptune, and Peterson Bays, 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 – 2002<sup>a,b</sup>.

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	29.0	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 Island	26.6	129.8	23.8	0	90.2	48.4	0	0	0	0
E. Nuka Bay							0.3	T	0.1	3.3
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	1.0	2.8	3.4
<b>Total</b>	<b>611.6</b>	<b>2,248.3</b>	<b>1,055.4</b>	<b>579.2</b>	<b>585.4</b>	<b>716.2</b>	<b>28.7</b>	<b>50.6</b>	<b>136.4</b>	<b>352.6</b>

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	0
Halibut Cove and Lagoon	4.7	1.0	10.9	14.0	106.8	91.0	58.4	105.6	2.3	2.4
China Poot <sup>c</sup>					5.4	46.1	35.7	24.2	8.2	3.3
Tutka/Barabara	312.5	184.9	262.0	400.2	723.9	37.4	320.9	1,454.5	428.2	1,300.6
Seldovia Bay	81.7	70.3	2.2	2.8	5.5	3.6	1.9	5.4	4.1	7.4
Port Graham Bay	30.5	35.4	8.0	8.8	10.7	0	0	0	1.5	0.6
Dogfish Bay	4.7	1.7	0.1	0	0	0	0	0	0	0
Port Chatham	1.8	12.6	0	0	0	22.1	0	0	0	9.4
Windy Bay	0	0	0	0	0	0	0	0	0	0
Rocky Bay	1.4	0	0	0	0	0	0	0	0	35.0
Port Dick Bay	133.3	44.0	84.6	304.0	5.9	169.1	0.1	1.6	0	2.4
Nuka Island	0	0	0	0	0	0	0	0	0	41.1
E. Nuka Bay	12.4	8.7	4.4	97.8	0.1	0.2	0	11.6	7.2	14.2
Resurrection Bay	155.8	137.4	122.3	36.5	0.5	0	0	T	T	0
Bruin Bay	100.6	13.3	125.2	349.7	5.0	0.4	1.9	T	T	1.8
Rocky/Ursus Coves	0	20.2	8.5	71.1	49.9	0	0.3	0	0	0
Iniskin/Cottonwood Bays	0.1	0.4	0.4	0.2	1.3	0	T	0	0	0
Miscellaneous	1.6	16.8	18.5	6.5	6.3	13.8	60.6	45.0	0	39.6
<b>Total</b>	<b>889.7</b>	<b>551.6</b>	<b>700.6</b>	<b>1,408.3</b>	<b>921.3</b>	<b>383.7</b>	<b>479.8</b>	<b>1,647.9</b>	<b>451.5</b>	<b>1,457.8</b>

- continued -

Appendix Table 20. (page 2 of 2)

Location	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018
Humpy Creek	0	0.0								
Halibut Cove and Lagoon	0.5	0.3								
China Poot <sup>c</sup>	4.0	4.7								
Tutka/Barabara	1,055.4	709.0								
Seldovia Bay	10.2	1.3								
Port Graham Bay	0	238.7								
Dogfish Bay	0	0.0								
Port Chatham	0	0.0								
Windy Bay	0	0.0								
Rocky Bay	0	0.0								
Port Dick Bay	306.6	454.1								
Nuka Island	0	0.0								
E. Nuka Bay	0.3	115.9								
Resurrection Bay	0.4	0.0								
Bruin Bay	5.5	333.7								
Rocky/Ursus Coves	0	110.1								
Iniskin/Cottonwood Bays	0	0.1								
Miscellaneous	4.4	2.2								
<b>Total</b>	<b>1,387.3</b>	<b>1,970.1</b>								

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

<sup>b</sup> "T" denotes trace, less than 50 fish harvested

<sup>c</sup> China Poot Subdistrict, which includes China Poot, Neptune, and Peterson Bays, 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, 1983 – 2003<sup>a</sup>.

Year	Southern	Outer	Kamishak	Eastern	Total
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
1998	3,956	611	29	51	4,647
1999	4,624	2,062	23	1,232	7,941
2000	5,340	302	66,072	1,540	73,254
2001	3,789	408	84,766	6	88,969
2002	4,803	3,810	34,641	5	43,259
2003	5,730	137	29,800	19	35,686
20-Year Avg.	4,792	8,962	42,297	3,700	59,751
1983-92 Avg.	5,561	16,899	64,947	6,774	94,181
1993-2002 Avg.	4,023	1,025	19,648	625	25,321
2003 % of Total	16.06%	0.38%	83.51%	0.05%	100.00%

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

Appendix Table 22. Commercial chum salmon catch in thousands of fish by subdistrict, Lower Cook Inlet, 1959 – 2003<sup>a,b</sup>.

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	0.9	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	38.4	0	0	19.0	25.5	44.4	71.9	14.5
Miscellaneous	22.6	0	0	5.8	1.4	6.9	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	59.5	14.1	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	95.8	32.5	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	10.0	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	7.2	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	2.7	2.5	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	1.6	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	3.0	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

- continued -

Appendix Table 22. (page 2 of 2)

Location	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Tutka Bay	0.9	1.5	1.8	1.4	2.7	2.6							
Port Graham	0.8	0	T	0	0.4	0.1							
Dogfish Bay	0	0	0	0	0	0							
Port Chatham	0.1	0	0	0	0	0							
Rocky/Windy Bays	0.3	0	0	0.3	0	0.1							
Port Dick	0.1	0	0.1	0.1	3.8	T							
Nuka Bay	T	2.1	0.2	T	0.1	T							
Resurrection Bay	0	0	1.5	T	T	T							
Douglas River	0	0	19.9	10.3	7.0	T							
Kamishak River	0	0	43.7	73.0	5.1	0							
McNeil River	0	0	0	T	0	0							
Bruin Bay	T	T	2.4	0	2.0	0.1							
Ursus/Rocky Coves	0	0	0	1.5	3.4	0							
Cottonwood/Iniskin	0	0	0	0	17.0	29.7							
Miscellaneous	2.3	4.4	3.6	2.4	1.8	3.1							
<b>Totals</b>	<b>4.6</b>	<b>7.9</b>	<b>73.3</b>	<b>89.0</b>	<b>43.3</b>	<b>35.7</b>							

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

<sup>b</sup> "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, 1983 – 2003<sup>a</sup>.

Year	English Bay	Delight Lake	Desire Lake	Bear Lake <sup>b,c</sup>	Aialik Lake	Mikfik Lake	Chenik Lake	Amak-dedori Creek	Kami-shak Rivers	Douglas River	Total
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	<sup>d</sup>	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 <sup>c</sup>	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 <sup>c</sup>	1.9	0.7	<sup>d</sup>	46.2
1992	6.4	5.9	11.9	1.9	2.5	7.8	9.3 <sup>c</sup>	1.9	4.9	0.2	52.7
1993	8.9	5.6	11.0	5.0	3.0	6.4	4.0 <sup>c</sup>	2.0	4.1	<sup>d</sup>	50.0
1994	13.8 <sup>c</sup>	5.6	10.5	8.6	7.3	9.5	0.8 <sup>c</sup>	0.8	<sup>d</sup>	<sup>d</sup>	56.9
1995	22.5 <sup>c</sup>	15.8	15.8	8.3	2.6	10.1	1.1 <sup>c</sup>	2.4	<sup>d</sup>	<sup>d</sup>	78.6
1996	12.4 <sup>c</sup>	7.7	9.4	8.0	3.5	10.5	3.0 <sup>c</sup>	2.9	1.8	0.6	55.8
1997	15.4 <sup>c</sup>	27.8 <sup>c</sup>	14.7 <sup>c</sup>	7.9	11.4	8.5	2.3 <sup>c</sup>	1.5	<sup>d</sup>	<sup>d</sup>	89.5
1998	15.4 <sup>c</sup>	9.2 <sup>c</sup>	7.9	8.4	4.9	12.6	1.9	4.1	<sup>d</sup>	<sup>d</sup>	63.1
1999	15.8 <sup>c</sup>	17.0 <sup>c</sup>	14.6	7.8	3.8	15.7	2.9	8.8	2.2	0.4	89.0
2000	12.6 <sup>c</sup>	12.3	4.0	11.9	4.3	10.9	4.8	3.3	1.5	0.4	66.0
2001	10.5 <sup>c</sup>	10.1	5.5	12.8	5.1	5.4	0.3	2.7	2.5	<sup>d</sup>	54.9
2002	16.9 <sup>c</sup>	19.6 <sup>c</sup>	16.0	12.5	6.1	16.7	4.7	3.2	3.3	<sup>d</sup>	99.0
2003	20.0 <sup>c</sup>	7.5 <sup>g</sup>	8.4	13.2	5.4	12.8	13.8	11.8	2.6	<sup>d</sup>	93.9
20-year Average	10.2	11.1	11.3	4.9	7.5	10.0	6.4	2.3	1.9	0.3	65.8
1983-92 Average	6.2	9.1	11.6	0.6	9.8	9.8	10.2	1.4	1.5	0.2	60.4
1993-2002 Average	14.3	13.1	10.9	9.1	5.2	10.2	2.6	3.2	2.6	0.5	71.6
Sustainable Esc. Goal <sup>f</sup>	6.0 – 13.5	5.95 – 12.55	8.8 – 15.2	0.7 – 8.3	3.7 – 8.0	6.3 – 12.15	1.88 – 9.3	<sup>h</sup>	<sup>h</sup>	<sup>h</sup>	33.33 – 79.0

<sup>a</sup> Unless otherwise noted, estimated escapements are either peak aerial survey counts or adjusted aerial survey counts based on survey conditions and time of surveys.

<sup>b</sup> Escapement limited by Bear Lake Management Plan since 1971.

<sup>c</sup> Weir counts.

<sup>d</sup> Insufficient survey data to generate escapement estimate.

<sup>e</sup> Combination of weir and video counts.

<sup>f</sup> New sustainable escapement goals (SEG's) implemented for the first time beginning with the 2002 season.

<sup>g</sup> Combination of weir and aerial counts.

<sup>h</sup> 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 – 2003<sup>a</sup>.

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 <sup>b</sup>	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 5)

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 <sup>b</sup>	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	—
Amakdedori 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

-continued-

Appendix Table 24. (page 3 of 5)

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	d
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 <sup>b</sup>	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	—	—	d
Bear Creek	7.9	0.8	7.7	4.1	14.0	3.5	0.2	1.7	4.4	15.4 <sup>c</sup>	2.3
Salmon Creek	21.0	0.5	10.2	2.1	8.3	1.7	0.1	1.6	—	c	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	—	d
Tonsina Creek	7.5	5.4	6.0	48.2	11.2	3.4	0.1	0.5	1.2	0.3	d
Big Kamishak River	5.0	—	—	—	5.0	—	1.0	—	—	—	d
Little Kamishak River	2.2	—	0.1	1.6	2.0	—	0.5	—	—	0.9	d
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 Creak	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

-continued-

Appendix Table 24. (page 4 of 5)

Location	Y E A R										
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Humpy Creek	36.0	14.1	89.3	9.0	78.3	17.5	12.8	22.4	30.5	37.1	90.9
China Poot Creek	1.6	5.7	2.0	2.8	2.8	5.7	0.7	7.5	6.6	6.5	6.7
Tutka Lagoon Creek	27.4	14.5	15.9	3.5	45.0	17.5	27.9	19.0	4.5	15.9	30.9
Barabara Creek	11.9	4.5	10.8	2.4	12.5	2.8	3.9	5.6	2.3	3.2	5.1
Seldovia River	43.4	24.4	48.5	17.8	39.1	31.5	12.2	53.5	12.3	26.9	35.1
Port Graham River	12.8	7.6	10.0	7.0	12.5	12.6	9.7	15.6	10.3	58.5	14.9
Dogfish Lagoon	0.3	1.3	13.3	2.3	20.0	6.7	12.4	11.1	2.0	1.3	5.2
Port Chatham Creeks	22.2	3.3	14.0	8.6	42.7	22.2	10.7	16.7	17.9	18.1	35.0
Windy Right Creek	13.6	2.2	11.4	9.9	13.9	19.5	5.2	23.0	10.3	14.4	23.3
Windy Left Creek	25.9	3.0	31.6	2.5	64.6	12.9	24.0	20.1	61.8	28.9	82.8
Rocky River	70.0	17.1	56.3	80.1	48.1	165.0	17.2	131.6	73.0	112.5	287.4
Port Dick Creek <sup>b</sup>	37.0	18.1	6.6	23.2	36.9	59.1	8.5	124.4 <sup>c</sup>	44.7	108.0	107.7
Island Creek	12.1	28.3	10.6	40.1	71.1	83.6	8.6	70.8	81.8	44.1	118.6
South Nuka Island Creek	34.3	1.4	6.2	6.8	9.3	14.0	2.4	13.6	20.7	14.8	41.4
Desire Lake Creek	19.3	—	—	—	6.2	6.2	6.8	21.1	67.5	78.4	34.8
James Lagoon	3.3	0.8	0.6	—	—	—	—	3.9	2.3	3.1	—
Aialik Lagoon	—	—	1.1	—	—	0.4	0.9	—	—	—	—
Bear Creek	6.6 <sup>c</sup>	34.8 <sup>c</sup>	38.6 <sup>c</sup>	8.0 <sup>c</sup>	6.3 <sup>c</sup>	13.2 <sup>c</sup>	7.8 <sup>c</sup>	35.6 <sup>c</sup>	3.0 <sup>c</sup>	2.7 <sup>c</sup>	4.4 <sup>c</sup>
Salmon Creek	c	c	c	c	c	c	c	c	c	c	c
Thumb Cove	5.5	10.8	9.3	9.5	4.7	21.0	9.2	8.5	3.1	3.7	5.1
Humpy Cove	0.9	2.2	1.8	3.4	2.2	1.2	4.0	1.7	0.3	1.8	2.6
Tonsina Creek	3.2	7.0	0.5	0.4	0.4	2.3	0.5	6.6	2.8	6.9	5.2
Big Kamishak River	—	—	—	16.7	—	2.0	5.7	14.9	—	—	—
Little Kamishak River	—	—	—	—	—	—	4.2	13.0	—	3.4	—
Amakdedori Creek	1.7	0.7	4.5	—	1.7	—	—	—	6.0	0.9	—
Bruin Bay River	86.4	5.9	307.3	27.5	162.7	134.9	2.9	176.7	18.5	1,598.5	138.7
Sunday Creek	57.8	3.1	95.9	2.8	52.5	24.0	5.3	39.8	26.2	81.9	346.7
Brown's Peak Creek	41.6	1.3	96.7	2.4	42.3	7.9	2.6	9.8	19.2	27.5	285.0
Totals	574.8	212.1	882.8	286.7	775.8	683.7	205.9	865.0	527.6	2,299.0	1,707.5

-continued-

Appendix Table 24. (page 5 of 5)

Location	Y E A R							1960-2002	Sustainable
	2004	2005	2006	2007	2008	2009	2010	Average	Escapement Goal <sup>f</sup>
Humpy Creek								45.6	21.65 – 85.55
China Poot Creek								6.3	2.9 – 8.2
Tutka Lagoon Creek								15.2	11.6 – 18.9
Barabara Creek								4.7	1.9 – 9.0
Seldovia River								32.6	19.05 – 38.95
Port Graham River								15.5	7.0 – 19.85
Dogfish Lagoon								4.0	-
Port Chatham Creeks								12.3	7.8 – 21.0
Windy Right Creek								7.4	3.35 – 10.95
Windy Left Creek								16.7	3.65 – 29.95
Rocky River								38.2	9.35 – 54.25
Port Dick Creek <sup>b</sup>								42.7	18.55 – 58.3
Island Creek								18.1	7.2 – 28.3
South Nuka Island Creek								10.4	2.7 – 14.25
Desire Lake Creek								16.2	1.9 – 20.2
James Lagoon								4.2	-
Aialik Lagoon								3.8	-
Bear Creek								8.7	2.95 – 8.45
Salmon Creek								7.3	1.9 – 13.25
Thumb Cove								5.6	2.35 – 8.85
Humpy Cove								2.0	0.9 – 3.2
Tonsina Creek								4.7	0.5 – 5.85
Big Kamishak River								21.3	3.5 – 11.0
Little Kamishak River								10.5	0.6 – 3.7
Amakdedori Creek								7.7	-
Bruin Bay River								145.4	18.65 – 155.75
Sunday Creek								22.6	4.85 – 28.85
Brown's Peak Creek								17.1	2.45 – 18.8
Totals								479.8	157.25 – 675.35

<sup>a</sup> 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.

<sup>b</sup> Escapement figures for Port Dick Creek include escapements for High Tech and Well Flagged Creeks beginning in 1998.

<sup>c</sup> Escapement figure for Bear Creek represents the combined escapement for Bear and Salmon Creeks.

<sup>d</sup> Insufficient data for escapement estimates.

<sup>e</sup> Port Dick Creek counts derived from aerial data in 2000. Other methods also used to generate escapement estimates that season included ground surveys (91,795) and weir counts (142,450).

<sup>f</sup> New sustainable escapement goals (SEG's) implemented for the first time beginning with the 2002 season.

Appendix Table 25. Estimated chum salmon escapements in thousands of fish for the major spawning systems of Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	Port Graham	Dogfish Lagoon	Rocky River	Pt. Dick Head	Island Creek	Big Kamishak	Little Kamishak	McNeil River	Bruin Bay	Ursus Cove	Cottonwood	Iniskin Bay	Total
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	15.4	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
1998	5.1	9.8	0.7	1.8	3.4	7.1	9.7	23.5	9.4	4.6	2.3	18.6	96.0
1999	6.6	18.8	5.4	2.9	16.4	11.6	8.9	13.5	10.3	21.0	12.0	23.3	150.7
2000	11.4	19.6	4.2	3.4	12.1	45.3	26.9	18.6	13.6	41.7	24.1	23.6	244.5
2001	6.0	6.1	3.0	1.8	6.3	36.3	27.2	17.0	21.8	37.7	15.9	13.8	192.9
2002	5.3	10.1	5.7	12.3	15.3	17.4	16.4	11.3	9.9	17.1	42.2	28.5	191.6
2003	2.9	13.3	5.5	5.6	16.3	16.4	22.2	23.3	13.1	30.4	72.8	18.7	240.5
20-Year Avg.	3.5	7.2	2.4	3.9	10.9	16.7	13.0	21.1	8.4	11.1	12.2	12.9	123.2
1983-92 Avg.	1.6	3.9	1.8	4.2	13.2	14.7	12.5	24.7	6.1	6.1	8.8	7.7	105.2
1993-2002 Avg.	5.4	10.5	2.9	3.6	8.6	19.7	13.6	17.4	10.7	16.1	15.6	18.1	142.1
Sustainable Esc. Goal <sup>c</sup>	1.45 – 4.8	3.35 – 9.15	1.2 – 5.4	1.9 – 4.45	6.4 – 15.6	9.35 – 24.0	6.55 – 23.8	13.75 – 25.75	6.0 – 10.25	6.05 – 9.85	5.75 – 12.0	7.85 – 13.7	69.6 – 158.75

<sup>a</sup> 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.

<sup>b</sup> Insufficient data to generate escapement estimates.

<sup>c</sup> New sustainable escapement goals (SEG's) implemented for the first time beginning with the 2002 season.

Appendix Table 26. Biological escapement goals (BEG's) prior to 2002 and sustainable escapement goals (SEG's) beginning in 2002 for chum salmon systems in Lower Cook Inlet, Alaska.

System	District	Former BEG			New SEG				% Change in Midpoint
		BEG	Mid-point	Year Adopted	Low	High	Mid-point	n <sup>a</sup>	
<b>Chum Salmon</b>									
Port Graham River	Southern	4,000-8,000	6,000	1982	1,450	- 4,800	3,125	26	-48%
Dogfish Lagoon	Outer	5,000-10,000	7,500	1982	3,350	- 9,150	6,250	26	-17%
Rocky River	Outer	20,000	20,000	1982	1,200	- 5,400	3,300	25	-84%
Port Dick Creek	Outer	4,000	4,000	1982	1,900	- 4,450	3,175	26	-21%
Island Creek	Outer	10,000-15,000	12,500	1979	6,400	- 15,600	11,000	26	-12%
Big Kamishak River	Kamishak	20,000	20,000	1982	9,350	- 24,000	16,675	22	-17%
Little Kamishak River	Kamishak	20,000	20,000	1982	6,550	- 23,800	15,175	23	-24%
McNeil River	Kamishak	20,000-40,000	30,000	1988	13,750	- 25,750	19,750	26	-34%
Bruin River	Kamishak	5,000-10,000	7,500	1988	6,000	- 10,250	8,125	26	8%
Ursus Cove	Kamishak	5,000-10,000	7,500	1982	6,050	- 9,850	7,950	26	6%
Cottonwood Creek	Kamishak	10,000	10,000	1982	5,750	- 12,000	8,875	26	-11%
Iniskin Bay	Kamishak	10,000	10,000	1982	7,850	- 13,700	10,775	26	8%

<sup>a</sup> n = number of years of escapement data used in analysis.

Mean: -20%
------------

Appendix Table 27. Biological escapement goals (BEG's) prior to 2002 and sustainable escapement goals (SEG's) beginning in 2002 for pink salmon systems in Lower Cook Inlet, Alaska.

System	District	Former BEG			New SEG				% Change in Midpoint	
		BEG	Mid-point	Year Adopted	Low	High	Range Mid-point	n <sup>a</sup>		
<b><u>Pink Salmon</u></b>										
Humpy Creek	Southern	25,000-50,000	37,500	1982	21,650	- 85,550	53,600	26	43%	
China Poot Creek	Southern	5,000	5,000	1982	2,900	- 8,200	5,550	26	11%	
Tutka Creek	Southern	6,000-10,000	8,000	1982	11,600	- 18,900	15,250	18	91%	
Barabara Creek	Southern	18,000-24,000	21,000	1982	1,900	- 9,000	5,450	26	-74%	
Seldovia Creek	Southern	25,000-35,000	30,000	1982	19,050	- 38,950	29,000	26	-3%	
Port Graham River	Southern	20,000-40,000	30,000	1977	7,000	- 19,850	13,425	26	-55%	
Port Chatham	Outer	10,000-15,000	12,500	1982	7,800	- 21,000	14,400	25	15%	
Windy Creek Right	Outer	10,000	10,000	1982	3,350	- 10,950	7,150	26	-29%	
Windy Creek Left	Outer	30,000-50,000	40,000	1982	3,650	- 29,950	16,800	26	-58%	
Rocky River	Outer	50,000	50,000	1982	9,350	- 54,250	31,800	26	-36%	
Port Dick Creek	Outer	20,000-100,000	60,000	1982	18,550	- 58,300	38,425	26	-36%	
Island Creek	Outer	12,000-18,000	15,000	1982	7,200	- 28,300	17,750	25	18%	
S. Nuka Island Creek	Outer	10,000	10,000	1982	2,700	- 14,250	8,475	24	-15%	
Desire Lake	Outer	10,000-20,000	15,000	1986	1,900	- 20,200	11,050	23	-26%	
Bear Creek	Eastern	5,000	5,000	1982	2,950	- 8,450	5,700	24	14%	
Salmon Creek	Eastern	10,000	10,000	1981	1,900	- 13,250	7,575	23	-24%	
Thumb Cove	Eastern	4,000	4,000	1985	2,350	- 8,850	5,600	23	40%	
Humpy Cove	Eastern	2,000	2,000	1985	900	- 3,200	2,050	22	3%	
Tonsina Creek	Eastern	5,000	5,000	1982	500	- 5,850	3,175	23	-37%	
Big Kamishak River	Kamishak	20,000	20,000	1982	3,500	- 11,000	7,250	11	-64%	
Little Kamishak River	Kamishak	20,000	20,000	1982	600	- 3,700	2,150	12	-89%	
Bruin River	Kamishak	25,000-50,000	37,500	1982	18,650	- 155,750	87,200	26	133%	
Sunday Creek	Kamishak	10,000-20,000	15,000	1989	4,850	- 28,850	16,850	26	12%	
Brown's Peak Creek	Kamishak	10,000-20,000	15,000	39	2,450	- 18,800	10,625	26	-29%	

<sup>a</sup> n = number of years of escapement data used in analysis.

Mean:	-8%
-------	-----

Appendix Table 28. Biological escapement goals (BEG's) prior to 2002 and sustainable escapement goals (SEG's) beginning in 2002 for sockeye salmon systems in Lower Cook Inlet, Alaska.

System	District	Former BEG			New SEG				% Change in Midpoint
		BEG	Mid-point	Year Adopted	Low	High	Mid-point	n <sup>a</sup>	
<b><u>Sockeye Salmon</u></b>									
English Bay	Southern	10,000-20,000	15,000	1982	6,000	- 13,500	9,750	25	-35%
Delight Lake	Outer	10,000	10,000	1982	5,950	- 12,550	9,250	26	-8%
Desire Lake	Outer	10,000	10,000	1982	8,800	- 15,200	12,000	26	20%
Bear Lake	Eastern	5,000-8,000	6,500	1985	700	- 8,300	4,500	23	-31%
Aialik Lake	Eastern	2,000-5,000	3,500	1982	3,700	- 8,000	5,850	26	67%
Mikfik Lake	Kamishak	5,000-7,000	6,000	1988	6,300	- 12,150	9,225	26	54%
Chenik Lake	Kamishak	10,000	10,000	1990	1,880	- 9,300	5,590	25	-44%
Amakdedori Creek	Kamishak	1,000	1,000	1984	1,250	- 2,600	1,925	26	93%

<sup>a</sup> n = number of years of escapement data used in analysis.

Mean: 15%
-----------

Appendix Table 29. Personal use/subsistence set gillnet salmon catches, in numbers of fish by species, and effort, Southern District, Lower Cook Inlet, 1969 – 2003<sup>a</sup>.

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 <sup>b</sup>	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
1998	227	214	94.3	142	72	135	20	1,461	167	5	0	1,788
1999	146	141	96.6	111	30	276	119	1,803	168	3	0	2,369
2000	213	206	96.7	151	55	104	28	2,064	304	4	0	2,504
2001	154	148	96.1	112	34	86	27	1,579	150	16	0	1,858
2002	122	113	92.6	93	20	61	33	1,521	251	12	0	1,878
2003	104	96	92.3	72	24	17	57	1,071	170	9	0	1,324
69-02 Avg.	289	271	93.6	190	81	53	57	2,940	673	42	25	3,789
93-02 Avg.	228	221	96.8	163	59	154	75	2,260	430	12	0	2,931

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

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

Appendix Table 30. 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, 1983 – 2003.

Year	Homer/ Fritz Cr.		Anchorage Area <sup>a</sup>		Halibut Cove		Anchor Pt./ Ninilchik		Seldovia		Pt. Graham/ Nanwalek		Kenai/ Soldotna		Other		Total Permits Issued
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
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
1998	175	77.1	18	7.9	2	0.9	24	10.6	5	2.2	0	0.0	2	0.9	1	0.4	227
1999	96	65.8	18	12.3	1	0.7	23	15.8	3	2.1	0	0.0	4	2.7	1	0.7	146
2000	168	78.9	15	7.0	2	0.9	21	9.9	4	1.9	0	0.0	1	0.5	2	0.9	213
2001	109	70.8	10	6.5	3	1.9	20	13.0	5	3.2	0	0.0	4	2.6	3	1.9	154
2002	85	69.7	7	5.7	3	2.5	14	11.5	6	4.9	0	0.0	6	4.9	1	0.8	122
2003	74	61.2	9	7.4	2	1.7	11	9.1	4	3.3	0	0.0	4	3.3	0	0.0	104
20-Year Avg.	247	78.0	21	6.6	4	1.4	33	10.4	5	1.5	0	0.0	3	1.0	4	1.1	316
1983-92 Avg.	316	78.1	26	6.4	5	1.2	43	10.5	6	1.5	0	0.0	4	0.9	5	1.3	405
1993-02 Avg.	177	77.7	16	6.9	4	1.6	23	10.2	4	1.5	0	0.0	3	1.1	2	0.9	228

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

Appendix Table 31. Subsistence and sport salmon catch in numbers of fish by species for the village of Port Graham, Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	S A L M O N H A R V E S T						Dolly Varden	Households Reporting
	Chinook	Sockeye	Coho	Pink	Chum	Total		
1983	67	1,026	431	174	95	1,793	1	30
1984	27	2,037	125	269	6	2,464	0	23
1985	141	481	91	32	24	769	0	23
1986	123	274	179	237	13	826	12	27
1987	20	219	575	230	70	1,114	20	33
1988	96	411	459	542	75	1,583	18	27
1989	51	94	460	640	58	1,303	159	20
1990	211	524	803	1,013	102	2,653	666	32
1991	155	58	541	1,494	185	2,433	257	33
1992	129	98	475	745	178	1,625	398	36
1993	253	154	346	997	135	1,885	214	31
1994	273	260	859	866	461	2,719	1,133	42
1995	486	379	369	786	376	2,396	66	49 <sup>b</sup>
1996	255	684	341	312	251	1,843	161	48
1997	202	324	203	497	152	1,378	57	25
1998	164	271	243	459	240	1,377	20	16
1999	383	360	427	150	214	1,534	64	21
2000	241	784	252	355	483	2,115		35
2001	104	176	57	32	20	889		15
2002	250	417	90	150	74	981		23
2003	321	2,313	151	266	493	3,544	87	16
<hr/>								
1983-2002								
Average	182	453	366	499	161	1,660	191	29

<sup>a</sup> Data source: ADF&G, Subsistence Division, data files; gear types include set gillnet, rod/reel, and handline.

<sup>b</sup> Salmon totals and permits include 3 reports from non-residents of Port Graham Village.

Appendix Table 32. Subsistence and sport salmon catch in numbers of fish by species for the village of Nanwalek (formerly English Bay), Lower Cook Inlet, 1983 – 2003<sup>a</sup>.

Year	S A L M O N H A R V E S T						Dolly Varden	Households Reporting
	Chinook	Sockeye	Coho	Pink	Chum	Total		
1983	0	1,454	40	13	0	1,507	0	16
1984	18	1,225	385	404	0	2,032	0	1
1985	5	696	530	313	2	1,546	0	1
1986	2	373	302	825	1	1,503	144	17
1987	1	682	339	484	44	1,550	20	22
1988	8	610	385	1,214	35	2,252	70	21
1989	0	63	695	855	16	1,629	523	24
1990	54	638	614	1,947	49	3,302	2,833	28
1991	8	630	1,512	3,093	36	5,279	848	30
1992	71	437	675	676	58	1,917	1,331	35
1993	24	994	567	1,666	122	3,373	577	25
1994	27	570	511	1,113	43	2,264	473	28
1995	99	1,416	169	487	0	2,171	465	38
1996	55	1,060	598	437	25	2,175	221	27
1997	0	1	0	14	1	16	0	1
1998	5	18	0	0	0	23	31	3
1999	102	2,755	1,320	1,873	890	6,940	631	32
2000	18	3,880	1,579	1,251	471	7,199		32
2001	29	909	1,434	196	1,238	3,806		
2002	96	10,203	967	1,681	414	13,441	230	56
2003 <sup>b</sup>								
<hr/>								
1983-2002								
Average	31	1,432	631	927	172	3,193	467	23

<sup>a</sup> Data source: ADF&G Subsistence Division, data files; gear types include set gillnet, rod/reel, and handline.

<sup>b</sup> Information for 2003 was unavailable at time of publishing.

Appendix Table 33. Salmon set gillnet catch in numbers of fish by species and permit/effort information for the Seldovia area subsistence fishery, Lower Cook Inlet, 1996 - 2003.

YEAR	NUMBER OF PERMITS				NUMBER OF SALMON HARVESTED					
	Issued	Returned	Fished	Not Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
<b>Early Season: April – May<sup>a</sup></b>										
1996	41	41	13	28	51	7	0	0	0	58
1997	19	16	12	4	44	19	0	0	0	63
1998	20	19	10	9	132	61	0	8	0	201
1999	16	15	12	3	150	130	0	0	38	318
2000	28	21	17	4	189	249	0	0	14	452
2001	19	17	14	3	134	124	0	0	0	258
2002	20	18	12	6	123	222	0	0	3	348
2003	19	13	10	3	67	210	0	1	54	332
<b>Average</b>	23	20	13	8	111	128	0	1	14	254
<b>Late Season: August</b>										
1996	4	3	1	2	0	1	0	0	0	1
1997	1	1	0	1	0	0	0	0	0	0
1998	3	2	1	1	0	0	0	0	0	0
1999	0									
2000	0									
2001	0									
2002	1	1	1	0	0	9	13	31	6	59
2003	1	1	1	0	0	10	1	12	1	24
<b>Average</b>	1	2	1	1	0	4	3	9	1	17

<sup>a</sup> Season dates in 1996 and 1997 were from April 1 – May 20; subsequent years were from April 1 – May 30.

Appendix Table 34. 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 - 2003.

YEAR	JUVENILE SOCKEYE SALMON													
	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	0.570	1.327
1995	1.632	1.061	1.129	0.337	0.251		0.251	0.251	0.252		0	0.360	0.793	6.287
1996	1.490	1.030	0.951	0.500	0		0.250	0.250	0.250		0.155	0.864	0	5.657
1997	2.000	1.000	0				0.250				0.199	0.788	1.966	6.203
1998	2.005	1.302					0.250				0	0.265	1.288	5.610
1999	0.265	0.453					0.173				1.149 <sup>a</sup>	1.380	0	3.420
2000	1.708	1.248					0.248				1.006 <sup>b</sup>	1.794		6.004
2001	0.089	0					0				0	0.145		0.234
2002	2.249	1.280		0.500 <sup>c</sup>			0.302				0	2.407		6.738
2003	2.240	1.547					0.298				0.695	1.801		6.581
AVG.	1.695	0.948	1.635	0.536	0.261	0.507	0.291	0.250	0.200	0.452	0.390	1.350	0.691	5.956

<sup>a</sup> Sockeye release at English Bay consisted of 918,000 fry released in Nov. 1999 and 231,000 fry held over winter for release in spring 2000.

<sup>b</sup> Sockeye release at English Bay consisted of 906,000 fry released in summer 2000 and an estimated 100,000 fry held over winter for release in spring 2001.

<sup>c</sup> Fall fry ("pre-smolt") release.

- continued -

Appendix Table 34. (page 2 of 3)

YEAR	JUVENILE PINK SALMON					JUVENILE CHINOOK SALMON					
	Tutka Bay Hatchery	Halibut Cove Lagoon	Homer Spit	Port Graham Hatchery	TOTAL PINKS	Seldovia Bay	Halibut Cove Lagoon	Homer Early	Spit Late	Resurrection Bay <sup>d</sup>	TOTAL CHINOOK
1984	19.560				19.560			0.080		0.111	0.191
1985	23.500				23.500		0.098	0.152		0.186	0.436
1986	23.100	2.000			25.100		0.101	0.104		0.101	0.306
1987	20.500	3.000	0.295		23.795	0.084	0.094	0.104		0.096	0.378
1988	12.000	3.000	0.300		15.300	0.084	0.094	0.104		0.205	0.487
1989	30.100	6.000	0.332		36.432	0.108	0.115	0.104		0.307	0.634
1990	23.600	6.000	0.303		29.903	0.099	0.112	0.212		0.329	0.752
1991	23.600	6.000	0.303	0.255	30.158	0.091	0.092	0.191		0.466	0.840
1992	23.600	6.000	0.300	1.800	31.700	0.113	0.117	0.226	0.126	0.370	0.952
1993	43.000	6.000		0	49.000	0.107	0.100	0.212	0.100	0.290	0.809
1994	61.000			1.295	62.295	0.106	0.107	0.192	0.157	0.270	0.832
1995	63.000			0.358	63.358	0.113	0.036	0.228	0.124	0.315	0.816
1996	105.000			6.470	111.470	0.109	0.103	0.101	0.121	0.415	0.849
1997	89.000			0.910	89.910	0.092	0.078	0.216	0.105	0.321	0.812
1998	90.000			0	90.000	0.079	0.073	0.137	0.120	0.307	0.716
1999	60.132			4.617	64.749	0.074	0.079	0.163	0.059	0.174	0.549
2000	65.120			1.144	66.264	0.068	0.083	0.220		0.322	0.693
2001	99.336			27.299	126.635	0.103	0.107	0.208		0.228	0.646
2002	100.000			6.604	106.604	0.083	0.106	0.190		0.194	0.573
2003	67.967			57.158	125.125	0.108	0.107	0.206		0.220	0.641
AVG.	52.156	4.750	0.306	8.301	59.543	0.095	0.095	0.168	0.114	0.261	0.646

<sup>d</sup> Chinook releases in Resurrection Bay are a cumulative total for all locations.

- continued -

Appendix Table 34. (page 3 of 3)

YEAR	JUVENILE COHO SALMON					TOTAL COHO
	Caribou Lake	Seldovia Lake	Homer Spit		Resurrection Bay <sup>e</sup>	
			Early	Late		
1984					0.341	0.341
1985	0.139	0.083			0.407	0.629
1986	0.138	0.072			0.622	0.832
1987	0.150	0.045			0.604	0.799
1988	0.150	0.045		0.060	0.530	0.785
1989	0.182	0.080		0.143	0.339	0.744
1990	0.180	0.050		0.123	1.126	1.479
1991	0.180	0.050		0.100	0.599	0.929
1992	0.150			0.100	0.265	0.515
1993	0.150			0.116	0.844	1.110
1994	0.064			0.156	0.560	0.780
1995				0.110	0.701	0.811
1996				0.150	0.676	0.826
1997				0.120	0.808	0.928
1998				0.148	0.726	0.874
1999				0.137	1.603	1.740
2000				0.122	0.618	0.740
2001			0.125	0.100	0.431	0.656
2002			0.096	0.121	0.241	0.458
2003			0.223	0.103	0.905	1.231
AVG.	0.148	0.061	0.148	0.119	0.647	0.841

<sup>e</sup> Coho releases in Resurrection Bay are a cumulative total for all locations.

Appendix Table 35. 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, 1983 - 2003<sup>a</sup>.

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
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 <sup>b</sup>	45 <sup>b</sup>	---	---	---	---	1,746	45
1998	---	---	331 <sup>b</sup>	20 <sup>b</sup>	---	---	---	---	331	20
1999	---	---	100 <sup>c</sup>	1 <sup>c</sup>	---	---	---	---	100	1
2000	---	---	---	---	---	---	---	---	---	---
2001	---	---	---	---	---	---	---	---	---	---
2002	---	---	---	---	---	---	---	---	---	---
2003	---	---	---	---	---	---	---	---	---	---
<hr/>										
20-Year										
Average	170	6	2,692	56	136	2	35	2	2,784	57
1983-92										
Average	170	6	3,264	60	136	2	35	2	3,435	62
1993-2002										
Average	---	---	2,039	51	---	---	---	---	2,039	51

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

<sup>b</sup> Includes both commercial harvest and ADF&G test fish harvest.

<sup>c</sup> Commercial fishery closed, ADF&G test fish harvest only.

Appendix Table 36. 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, 1983 - 2003.

Year	PRESEASON		Actual Commercial Harvest (st) <sup>a</sup>	Average Roe %	No. of Permits w/Landings	Exvessel Value <sup>b</sup> (\$\$ millions)
	Forecasted Biomass (st)	Projected Harvest (st) <sup>a</sup>				
1983	<sup>c</sup>	---	CLOSED	---	---	---
1984	<sup>c</sup>	---	CLOSED	---	---	---
1985	<sup>c</sup>	<sup>d</sup>	1,132	11.3	23	1.00
1986	<sup>c</sup>	<sup>d</sup>	1,959	10.4	54	2.20
1987	<sup>c</sup>	3,833	6,132	11.3	63	8.40
1988	<sup>c</sup>	5,190	5,548	11.1	74	9.30
1989	37,785	5,000	4,801	9.5	74	3.50 <sup>e</sup>
1990	28,658	2,292	2,264	10.8	75	1.80
1991	17,256	1,554	1,992	11.3	58	1.30
1992	16,431	1,479	2,282	9.7	56	1.40
1993	28,805	2,592	3,570	10.2	60	2.20
1994	25,300	3,421	2,167	10.6	61	1.50
1995	21,998	2,970	3,378	9.8	60	4.00
1996	20,925	2,250	2,984	10.1	62	6.00 <sup>e</sup>
1997	25,300	3,420	1,746	9.3	45	0.40
1998	19,800	1,780	331	8.5	20	0.07
1999	<sup>f</sup>	---	CLOSED	---	---	---
2000	6,330	---	CLOSED	---	---	---
2001	11,352	---	CLOSED	---	---	---
2002	9,020	---	CLOSED	---	---	---
2003	4,771	---	CLOSED	---	---	---
<b>1983-2002</b>						
Average	20,689	2,982	2,878	10.3	56	3.08

<sup>a</sup> Kamishak Bay allocation only, does not include Shelikof Strait food/bait allocation.

<sup>b</sup> Exvessel values exclude any postseason retroactive adjustments (except where noted).

<sup>c</sup> Prior to 1989, preseason forecasts of biomass were not generated.

<sup>d</sup> Prior to 1987, preseason harvest projections were not generated.

<sup>e</sup> Includes retroactive adjustment.

<sup>f</sup> 1999 preseason biomass calculated as a range of 6,000 to 13,000 st.

Appendix Table 37. Summary of herring sac roe seine fishery openings and commercial harvests in the Kamishak Bay District of Lower Cook Inlet, 1969 - 2003.

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 <sup>a</sup>	4/16 - 5/31	96	402	4.2	44
1979	5/12 - 5/15	72	415	5.8	36
1980 through 1984	CLOSED				
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 <sup>b</sup>	0.5	0	0	0
	4/29	1.5	1,580	1,053.3	42
	4/30	8.0	61	7.6	<sup>c</sup>
	5/1	12.0	51	4.3	4
	5/22 <sup>d</sup>	<sup>d</sup>	54	<sup>d</sup>	-
1998	4/21	0.5	160	320.0	12
	4/22	2.0	136	68.0	11
	5/14 <sup>d</sup>	<sup>d</sup>	10	<sup>d</sup>	-
	5/22 <sup>d</sup>	<sup>d</sup>	23	<sup>d</sup>	-
1999 through 2003	CLOSED				

<sup>a</sup> Management by emergency order began.

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

<sup>c</sup> 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.

<sup>d</sup> ADF&G test fishing harvest.

Appendix Table 38. 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, 1983 - 2003.

Year	Aerial Survey Total Biomass Estimate (st) <sup>a</sup>	ASA Model Total Biomass Estimate (st) <sup>b,c</sup>	Actual Commercial Harvest (st)	Estimated Exploitation Rate (%) <sup>b</sup>
1983	4,750	25,419	CLOSED	---
1984	6,500	26,604	CLOSED	---
1985	13,320	28,980	1,132	3.9
1986	26,001	27,993	1,959	7.1
1987	35,332	27,385	6,132	23.3
1988	29,548	22,197	5,548	25.9
1989	35,701	19,096	4,801	25.2
1990	19,664	15,351	2,264	14.7
1991	18,163 <sup>d</sup>	15,351	1,992	13.6
1992	24,077	15,112	2,282	15.8
1993	32,439	14,866	3,570	24.0
1994	25,344 <sup>d</sup>	12,546	2,167	16.8
1995	25,115	10,029	3,378	32.8
1996	21,121	6,573	2,984	45.2
1997	-----	4,012	1,746	43.5
1998	-----	3,229	331	9.6
1999	-----	3,313	CLOSED	---
2000	-----	3,482	CLOSED	---
2001	-----	3,541	CLOSED	---
2002	-----	3,411	CLOSED	---
2003	-----	3,484	CLOSED	---
<hr/>				
1983-2002				
Average	22,648	14,357	2,878	21.5

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> Due to poor aerial survey conditions, biomass was calculated from the preseason estimate of abundance, adjusted to match observed age composition samples in the commercial catch.