REVIEW OF THE 1990 LOWER COOK INLET SALMON FISHERY

REPORT TO THE ALASKA BOARD OF FISHERIES

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Regional Information Report[1] No. 2H90-10

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

October 1990

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[1] Contribution 90-10 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 The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports.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 or the Division of Commercial Fisheries.

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Introduction

The 1990 Lower Cook Inlet salmon fishery fell well below expectations by all accounts. The total harvest of 605,000 fish was only 25% of the preseason forecast and represents the lowest catch since 1976 (Tables 1 and 2). The harvest was about half of the long-term (1960-89) average with an exvessel value just over $1.6 million.

Over 67% of the sockeye salmon harvest was produced by two FRED Division lake stocking projects at Chenik and Leisure Lakes. Natural pink salmon returns were poor to most systems, and harvestable surpluses occurred only in Port Chatham and Port Dick. Pink salmon returns to Tutka Hatchery, and a secondary release site at Halibut Cove, normally produce the bulk of Lower Cook Inlet pink salmon harvests. However, despite poor natural runs, Tutka Hatchery returns accounted for less than half of the total pink salmon harvest in 1990. The following table compares the catch by species to the preseason forecast:

SPECIES	PROJECTED HARVEST	ACTUAL HARVEST	1960-1989 AVERAGE
Chinook	2,000	1,560	562
Sockeye	485,000	203,895	102,155
Coho	10,000	9,094	8,392
Pink	1,815,000	383,670	819,426
Chum	60,000	6,951	122,786
TOTAL	2,372,000	605,170	1,053,322

Chinook Salmon

The harvest of chinook salmon, which is not a commercially important species in Lower Cook Inlet, was three times higher than the 1960-89 average and the fourth highest on record. The catch of 1,560 was primarily due to enhanced production in

Halibut Cove Lagoon and Seldovia Bay (Table 3). Set gillnets accounted for 87% of the catch.

Sockeye Salmon

Returns to lake stocking projects at Chenik and Leisure Lakes were much weaker than projected. Despite large fry releases, excellent natural escapements, and lake fertilization, the Chenik Lake harvest was only about half of that expected. Weaker than expected enhanced returns, combined with continued poor natural production from English Bay Lakes and from Delight and Desire Lakes in Nuka Bay, resulted in a total sockeye harvest of 204,000, considerably below the pre-season projection of 485,000 fish (Table 4). Nevertheless, sockeye comprised 75% of the total value of the Lower Cook Inlet fishery. Spawning escapements were good to excellent in all systems except English Bay Lakes.

Coho Salmon

While natural returns of coho salmon were generally weak throughout Lower Cook Inlet, the commercial harvest of 9,100 coho was slightly higher than the 1960-89 average (Table 2). Over 80% of the catch came from the Eastern District. The Silver Salmon Derby in Resurrection Bay and the Cook Inlet Aquaculture Association cost recovery effort at Bear Lake accounted for the Eastern District harvest. Set gillnets in the Southern District harvested 68% of the remaining coho (Table 1).

Weak coho returns were anticipated in the Kamishak Bay District as a result of severe flooding in the fall of 1986. Because a conservative management approach was necessary, only a portion of the Douglas River Subdistrict was opened to fishing. This action, in conjunction with the weak run and low prices, discouraged the fleet from fishing cohos altogether. Although adverse weather and stream conditions in late August and September hampered aerial escapement estimates, most indicators

reflected relatively poor production from natural coho stocks throughout Lower Cook Inlet.

Pink Salmon

Pink salmon returns, normally the dominant species in both numbers of fish and ex-vessel value, were weak throughout Lower Cook Inlet. The harvest of 384,000 was the second lowest since 1976 and only 47% of the long-term average. The biggest disappointment was the 1.4 million projected harvest from Tutka Hatchery releases. Tutka Bay and Halibut Cove Lagoon, a secondary release site for Tutka Hatchery fry, contributed only 160,000 fish this season (Table 6). The Outer District produced the only other significant returns of pink salmon with Port Dick and Port Chatham accounting for 169,000 and 22,000 fish, respectively.

Pink salmon escapement goals were achieved in all major producing systems except in the Kamishak Bay District. Although no directed pink salmon fishery was allowed in the Kamishak Bay District in 1990, only maintenance level escapements were achieved.

Chum Salmon

The chum salmon harvest of 6,900 fish was the lowest on record. The catch was only 5% of the long-term average and well under the previous low of 11,300 landed in 1989. The poor returns were generally anticipated, again due to flooding in the fall of 1986, and conservative fishing schedules were implemented throughout the Kamishak Bay and Outer Districts to protect chum salmon stocks (Table 7). Maintenance level escapements were achieved, but several streams were below desired levels.

Set Gillnet Fishery

Commercial set gillnetting in Lower Cook Inlet is limited to specific beaches within the Southern District (Figure 1).

Although an Area H set gillnet permit is allowed to fish in both Upper and Lower Cook Inlet, there are only five beaches in Lower Cook Inlet, all located along the south shore of Kachemak Bay, where set gillnets may be used. The limited areas provide only enough productive fishing sites to accommodate approximately 25 setnets.

The Southern District set gillnet harvest totalled 33,000 fish in 1990 (Tables 1 and 8). Although the mixed-species harvest was 36% below the 1960-89 average, species composition of the catch reflect the long-term average, with the exception of chinook salmon abundance, which was four times higher than average. Species composition of the gillnet fishery is typically 50% sockeye salmon, 30% pink salmon, 5% chums, 5% cohos, and less than 1% is normally dominated by pink salmon. Enhancement efforts at Seldovia Bay, and Halibut Cove Lagoon are thought responsible for the higher chinook catches this season.

The Tutka Bay, Barabara Creek, and Seldovia Bay Subdistricts were closed to commercial set gillnetting from July 10-17 when it was determined that pink salmon returns to Tutka Bay were extremely weak and hatchery broodstock requirements had not been met. This was the second time on record that these subdistricts were closed to commercial set gillnetting for protection of pink salmon. A similar situation occurred in 1987 when poor returns necessitated a closure. The subdistricts were re-opened as soon as it was determined that hatchery requirements would be met.

NOTE: A proposal has been submitted to the Board of Fisheries that would allow set gillnets of not less than 5 3/8" stretch mesh to fish when the fishery is closed by emergency order.

SUBSISTENCE AND PERSONAL USE FISHERIES

Kachemak Bay Personal Use

The Kachemak Bay personal use fishery, formerly a subsistence fishery dating back before the 1960's, was eliminated by Board action in 1977. However, the fishery was authorized and allowed to continue by subsequent court order. Although gear regulations have remained essentially the same, harvest limits have varied. A limit of 50 fish for each permit holder was in effect from 1966-1978. Currently catches are limited to 25 salmon for the head of households and 10 salmon for each dependent of the permit holder. The 1969-89 average catch for all salmon species in this fishery is 3,600 (Table 9).

According to the Southern District Personal Use Coho Salmon Fishery Management Plan, (5 AAC 77.546) all waters of the Southern District are currently open to personal use fishing with the exception of areas at the base and tip of the Homer Spit and from the terminus of the Anchor River south to the terminus of Troublesome Creek. Salmon may only be taken by set gillnets, and no set gillnet may exceed 35 fathoms in length, 6" in mesh size and 45 meshes in depth. Salmon may only be taken by means of a permit issued through the Department's Homer office from August 16-September 15. There are two regularly scheduled 48-hour fishing periods.

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

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

The number of personal use fishing permits issued this season continued a sharp upward trend for the third consecutive year after remaining relatively stable from 1980-1987. The 578 permits issued this year represents a 24% increase over last year. With approximately 85% of this year's permits now returned, the coho harvest stands at 7,900 fish, setting a new record and exceeding the previous highs of 7,300 and 7,200 fish taken for personal use in 1982 and 1989, respectively.

If coho stocking projects continue, the current guideline harvest level in the management plan is inappropriate and should be changed or eliminated. If, on the other hand, management is based on the existing published guideline, the fishery can no longer be allowed to go unchecked. More restrictive measures will be necessary to provide timely catch reporting throughout the season rather than after the fact.

<u>English Bay - Port Graham Subsistence</u>

Subsistence fishing in Lower Cook Inlet is confined to the Port Graham and English Bay areas. Sockeye salmon returns to the English Bay Lake system were poor for the sixth consecutive year and resulted in a total closure of the Port Graham and English Bay areas to commercial, sport, and subsistence gillnet fishing from June 4 - July 12. This closure resulted in a peak aerial

escapement estimate of 3,300 fish on July 14, still less than half the long-term average of 7,100.

Closure of the subsistence fishery during the sockeye run had little affect on overall fishing success. Although catches of sockeye salmon were below average for residents of the villages of English Bay and Port Graham, the harvests of chinook, coho, pink, and chum were all above average (Tables 10 and 11).

NOTE: A proposal has been submitted to the Board of Fisheries that would allow subsistence gillnet fishing from Dogfish Bay to Anchor Point and all waters of Kachemak Bay.

1991 SALMON HARVEST PROJECTIONS

Sockeye Salmon

The 1991 sockeye harvest is expected to exceed 318,000 fish, almost 1.6 times the 204,000 fish harvested in 1990. Enhancement projects at Chenik Lake, on the west side of Cook Inlet, and at Leisure Lake, on the southeast side of Kachemak Bay, are each expected to contribute approximately 100,000 fish to the commercial harvest. Additional enhancement projects in the Southern, Outer and Kamishak Districts should bring total production from enhancement activities to 291,000 or 92% of next year's total sockeye harvest. Total natural production from several small systems in the Outer, Eastern and Kamishak Districts are expected to contribute less than 28,000 fish.

Resurrection Bay Sockeye Salmon

Natural runs of sockeye salmon do not presently return to streams within Resurrection Bay. Commercial catch records indicate Bear Lake, located at the head of Resurrection Bay, historically produced small natural returns of sockeye and coho salmon, which seldom resulted in commercial catches exceeding 10,000 fish of either species. In 1962 enhancement work, primarily fry stocking

at Bear Lake, was initiated. This project focused on increased coho production for the recreational coho fishery in Resurrection Bay. In 1988, Board of Fisheries action broadened the scope of enhancement efforts in Bear Lake to include the production of sockeye salmon intended for commercial harvest as set forth in the Bear Lake Management Plan (5AAC 21.375). Adult sockeye salmon produced from the lake stocking project at Bear Lake are expected to begin returning in 1992. Returns are projected to range from 60-220,000 adults, with the majority of these fish returning in 1993.

NOTE: A proposal has been submitted to the Board of Fisheries that would allow drift gillnetting in Resurrection Bay to target on the expected sockeye return.

Pink Salmon

The Lower Cook Inlet pink salmon harvest is expected to exceed two million fish in 1991. Good spawning escapements to most streams in 1989 should push the contribution from natural production to one million fish. Production from Tutka Hatchery and a secondary release site at Halibut Cove Lagoon is expected to produce the remaining 1.06 million pink salmon available for harvest.

It is uncertain what effect, if any, oil from the Exxon Valdez will have on 1991 reutrns to the Outer District. During 1989 beaches in the district were heavily oiled and oil was present as juveniles migrated out of estuaries.

Chum Salmon

The total Lower Cook Inlet chum salmon harvest could be as high as 165,000 fish in 1991. An estimate of natural production, based on long-term average harvests, could contribute 125,000 fish surplus to escapement needs. Production from enhancement efforts at Tutka Hatchery could contribute as many as 40,000

additional fish to the total harvest. Poor stream survival was suspected due to flooding in 1986, which is expected to result in below normal returns of age five fish in 1991. Because age five fish dominate several of the larger chum runs, the actual 1991 harvest may fall below projected levels.

The following table summarizes the projected harvest, by species for Lower Cook Inlet in 1991:

	Natural	Enhanced	Total
CHINOOK		11,500[1]	11,500
SOCKEYE	27,600	291,000	318,600
COHO		11,800[1]	11,800
PINK	1,000,000	1,066,750	2,066,750
CHUM	125,200	39,800	165,000
Total	1,152,800	1,420,850	2,573,650

[1] Returns from enhancement projects primarily intended for recreational fisheries.

Table 1. Commercial salmon catch by species, district, and gear type, Lower Cook Inlet, 1990.[a]

District	Chinook	Sockeye	Coho	Pink	Chum	Total
Southern						
Set Net	1,361	15,863	1,046	12,646	1,938	32,854
P. Seine	185	66,549	506	148,198	495	215,933
Total	1,546	82,412	1,552	178,087	2,433	266,030
Outer	2	17,404	74	191,320	614	209,414
Eastern	0	7,682	7,442[b]	11,815	307	27,246
Kamishak	12	96,397	26	2,448	3,597	102,480
Total	1,560	203,895	9,094	383,670	6,951	605,170
Percent	0.1	9.7	0.8	77.8	11.7	100.0
1960-89 Average	528	98,786	8,558	833,997	126,648	1,068,518

[a] Preliminary data

[b] includes 1,642 coho caught in the Seward Salmon Derby and subsequently sold.

Table 2. Commercial salmon catch by species, Lower Cook Inlet, 1960-1990.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1960	27	24,726	2,692	611,647	116,082	755,174
1961	41	22,776	1,619	303,377	55,593	383,406
1962	60	25,286	7,727	2,248,341	179,259	2,460,673
1963	96	15,121	6,736	203,616	138,510	364,079
1964	91	20,654	9,460	1,055,417	323,335	1,408,957
1965	10	14,002	862	115,598	28,076	158,548
1966	62	15,333	5,411	579,240	129,062	729,108
1967	176	29,044	2,726	375,488	85,445	492,879
1968	64	95,242	4,883	585,441	75,134	760,764
1969	64	122,796	623	202,444	61,203	387,130
1970	106	20,898	4,696	716,212	242,427	984,339
1971	73	22,234	4,561	392,871	148,602	568,341
1972	88	57,897	2,234	28,663	75,543	164,425
1973	145	29,136	2,101	307,403	115,513	454,298
1974	183	27,428	6,514	50,601	19,210	103,936
1975	142	28,142	6,211	1,063,338	21,646	1,119,479
1976	450	58,159	3,216	136,445	50,822	249,092
1977	217	101,597	1,798	1,293,932	145,789	1,543,333
1978	1,747	156,404	6,529	352,561	73,518	590,759
1979	1,238	64,417	12,393	2,990,929	218,490	3,287,467
1980	424	69,442	14,505	889,703	73,492	1,047,566
1981	1,086	110,255	10,776	3,279,183	336,093	3,737,393
1982	1,066	131,320	46,892	551,589	198,185	929,052
1983	873	187,645	11,219	927,607	192,319	1,319,663
1984	714	268,950	16,797	700,622	92,540	1,079,623
1985	1,043	278,694	10,327	1,229,708	30,640	1,550,412
1986	796	234,861	18,852	1,408,293	82,688	1,745,490
1987	1,179	248,848	14,354	201,429	157,018	622,828
1988	1,694	319,008	7,946	921,296	321,911	1,571,855
1989	1,893	163,271	12,089	1,296,926	11,305	1,485,484
1990[a]	1,560	203,895	9,094	383,670	6,951	605,170
1960-89	528	98,786	8,558	833,997	126,648	1,068,518
Percent	.1	9.7	0.8	77.8	11.7	100.0

[a] Preliminary data

Table 3. Chinook salmon total run summary, by subdistrict, Lower Cook Inlet, 1990.

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

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

Table 4. Sockeye salmon total run summary, by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[1]	Total Run
SOUTHERN DISTRICT			
Halibut Cove - China Poot	34,558		34,558
Halibut Cove Lagoon	3,384		3,384
China Poot Bay	29,783		29,783
Tutka Bay	10,384		10,384
Seldovia Bay	4,303		4,303
English Bay		3,300	3,300
DISTRICT TOTAL	82,412	3,300	85,712
OUTER DISTRICT			
Port Chatham	19		19
Port Dick (West Arm)	11,546		11,546
Port Dick (Taylor Bay)	111		111
McCarty Fiord	5,728		
Desire Lake		9,500	
Delight Lake		5,200	
Ecstasy Lake		300	
			20,728
DISTRICT TOTAL	17,404	15,000	32,404
EASTERN DISTRICT			
Aialik Bay	7,682	5,700	13,382
DISTRICT TOTAL	7,682	5,700	13,382
KAMISHAK DISTRICT			
Kirschner Lake	10,426		10,426
Bruin Bay	6,263	700	6,963

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Table 4. (Page 2 of 2)

Fishery	Catch	Escapement[1]	Total Run
Amakdedori Creek		1,800	1,800
Chenik Lake	70,150	17,000	87,150
Paint River	215		215
Mikfik Creek	9,065	8,800	17,865
Augustine Is.	243		243
Kamishak River	35		
Little Kamishak River		30	
Big Kamishak River		200	
Douglas River		600	
			865
DISTRICT TOTAL	96,397	29,130	125,527
TOTAL LOWER COOK INLET	203,895	53,130	257,025

[1] Peak aerial live counts.

Table 5. Coho salmon total run summary, by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[1]	Total Run
SOUTHERN DISTRICT			
Halibut Cove - China Poot	379		379
Halibut Cove Lagoon	19		19
China Poot Bay	11		11
Tutka Bay	901		901
Seldovia Bay	242		242
DISTRICT TOTAL	1,552		1,552
OUTER DISTRICT			
Port Chatham	1		1
Port Dick (West Arm)	69		69
Port Dick (Taylor Bay)	3		3
McCarty Fiord	1		
Desire Lake		80	
Delight Lake		60	
			141
DISTRICT TOTAL	74	140	214
EASTERN DISTRICT			
Aialik Bay	127		127
Resurrection Bay	1,642		1,642
Bear Lake	5,673		5,673
DISTRICT TOTAL	7,442		7,442
KAMISHAK DISTRICT			
Chenik Lake	3		3
Douglas River		1,800	1,800
Little Douglas River		3,500	3,500
Augustine Is.	23		23
DISTRICT TOTAL	26	5,300	5,326
TOTAL LOWER COOK INLET	9,094	5,440	14,534

[1] Escapement estimates derived from limited aerial surveys. Numbers represent unexpanded aerial live counts.

Table 6. Pink salmon total run summary, by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[1]	Total Run
SOUTHERN DISTRICT			
Humpy Creek		27,042	27,042
Halibut Cove	75,324		75,324
Halibut Cove Lagoon	43,522		43,522
China Poot Bay	6,052	4,178	10,230
Tutka Bay	49,679		
Sadie Cove		113	
Tutka Lagoon Creek		38,500	
Jakolof Bay		1,081	
Barabara Creek		3,904	
			92,277
Seldovia Bay	3,510	27,782	31,292
Port Graham		20,053	20,053
DISTRICT TOTAL	178,087	122,653	300,740
OUTER DISTRICT			
Dogfish Bay		7,067	7,067
Port Chatham	22,103	27,822	49,925
Windy Bay			
Windy River Left		7,521	
Windy River Right		7,097	
			14,618
Rocky Bay			
Scurvey Creek		250	
Rocky River		18,000	
			18,250

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Table 6. (Page 2 of 3)

Fishery	Catch	Escapement[1]	Total Run
Port Dick (West Arm)	151,819		
Port Dick (Taylor Bay)	17,237		
Port Dick-Head End Creek		41,706	
Port Dick-Slide Creek		7,992	
Port Dick-Middle Creek		234	
Port Dick-Island Creek		25,000	
			243,988
Nuka Island South Creek		13,299	13,299
McCarty Fiord	161		
James Lagoon		3,787	
Desire Lake		1,000	
Delight Lake		400	
			5,348
DISTRICT TOTAL	191,320	161,175	352,495
EASTERN DISTRICT			
Aialik Bay	11,815		11,815
Resurrection Bay			
Tonsina Creek		1,180	
Bear Creek		4,414	
Jap Creek		9	
Spring Creek		274	
Humpy Cove		3,829	
			9,706
DISTRICT TOTAL	11,815	9,706	21,521
KAMISHAK DISTRICT			
Ursus Cove		550	550
Rocky Cove		2,830	2,830
Kirschner Lake	925		925
Bruin Bay	797	19,000	19,797

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Table 6. (Page 3 of 3)

Fishery	Catch	Escapement[1]	Total Run
Chenik Lake	639		
Amakdedori Creek		50	689
Augustine Island	86		86
Kamishak River	1		1
DISTRICT TOTAL	2,448	22,430	24,878
TOTAL LOWER COOK INLET	383,670	315,964	699,634

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

Table 7. Chum salmon total run summary, by subdistrict, Lower Cook Inlet, 1990.

Fishery	Catch	Escapement[1]	Total Run
SOUTHERN DISTRICT			
Humpy Creek		500	500
Halibut Cove-China Poot	210		210
Halibut Cove Lagoon	18		18
China Poot Bay	109	1,108	1,217
Tutka Bay	1,526		
Tutka Lagoon Creek		70	
Jakolof Bay		76	
			1,672
Seldovia Bay	570		
Seldovia River		5,000	
			5,570
Port Graham			
Port Graham River		2,600	2,600
DISTRICT TOTAL	2,433	9,354	11,787
OUTER DISTRICT			
Dogfish Bay		1,000	1,000
Port Chatham	89	745	834
Windy Bay			
Windy River Left		103	
Windy River Right		64	
			167
Rocky Bay			
Rocky River		800	800
Port Dick (Taylor Bay)	4		4
Port Dick West Arm	492		
Port Dick-Head End Creek		1,100	
Port Dick-Slide Creek		122	
Port Dick-Middle Creek		30	
Port Dick-Island Creek		2,276	
			4,020

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Table 7. (Page 2 of 3)

Fishery	Catch	Escapement[1]	Total Run
OUTER DISTRICT (cont.)			
McCarty Fiord	29		
James Lagoon		151	
			180
DISTRICT TOTAL	614	6,391	7,005
EASTERN DISTRICT			
Aialik Bay	307		307
Resurrection Bay North			
Tonsina Creek		651	
Bear Creek		28	
Jap Creek		23	
Spring Creek		72	
			774
DISTRICT TOTAL	307	774	1,081
KAMISHAK DISTRICT			
Augustine Island	15		15
Iniskin Bay			
Iniskin River		8,350	
			8,350
Cottonwood Bay			
Cottonwood Creek		4,300	
			4,300
Browns Peak Creek		1,500	1,500
Ursus Cove			
Ursus Lagoon		3,800	
			3,800
Rocky Cove			
Sundy Creek		1,500	
			1,500
Kirschner Lake	591		591
Bruin Bay	1,040	4,000	5,040
Chenik Lake	1,648		1,648
Paint River	137		137

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Table 7. (Page 3 of 3)

Fishery	Catch	Escapement[1]	Total Run
McNeil River	101	8,000	8,101
Kamishak River	65		
Little Kamishak River		7,900	
Big Kamishak River		2,500	
			10,465
Douglas River		1,200	1,200
Little Douglas River		1,500	1,500
DISTRICT TOTAL	3,597	44,550	48,147
TOTAL LOWER COOK INLET	6,951	61,069	68,020

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

Table 8. Commercial set gillnet salmon catch, by species, Southern District, Lower Cook Inlet, 1960-1990.

Year	Chinook	Sockeye	Cohos	Pinks	Chums	Total
1960	6	7,007	398	3,894	347	11,652
1961	15	8,631	216	8,201	425	17,488
1962	13	11,793	1,281	12,207	1,558	26,852
1963	9	8,305	314	1,490	812	10,930
1964	5	16,632	1,576	25,935	1,972	46,120
1965	9	10,998	314	7,267	679	19,267
1966	31	10,317	505	24,981	1,790	37,624
1967	112	22,097	504	13,962	1,929	38,604
1968	31	15,741	1,431	12,614	1,289	31,106
1969	33	11,570	246	10,717	1,298	23,864
1970	26	11,455	1,154	18,512	1,575	32,722
1971	41	18,398	1,449	8,564	1,352	29,804
1972	69	31,340	323	6,303	2,819	40,854
1973	134	23,970	1,089	20,222	2,374	47,789
1974	175	26,996	3,010	11,097	2,713	43,991
1975	96	26,588	2,337	49,490	4,020	82,531
1976	176	33,993	1,321	13,412	1,353	50,255
1977	175	54,404	869	38,064	2,765	96,277
1978	1,052	86,934	3,053	11,556	4,117	106,712
1979	483	34,367	7,595	69,368	5,266	117,079
1980	225	29,922	8,038	26,613	2,576	67,374
1981	222	53,665	6,735	68,794	8,524	137,940
1982	894	42,389	5,557	15,838	7,113	71,791
1983	822	41,707	1,799	20,533	4,377	69,238
1984	639	40,987	2,862	17,836	5,008	67,332
1985	958	23,188	3,908	22,898	4,221	55,173
1986	745	21,807	2,827	14,244	2,426	42,049
1987	653	28,209	2,025	9,224	2,419	42,530
1988	1,145	14,758	2,819	29,268	4,423	52,413
1989	1,281	13,970	4,792	16,210	1,877	38,130
1990	1,361	15,863	1,046	12,646	1,938	32,854
1960-89 Average	343	26,071	2,345	20,310	2,781	51,850
Percent	0.7	50.3	4.5	39.2	5.3	100.00

Table 9. Personal use set gillnet salmon catch, by species, Southern District, Lower Cook Inlet, 1969-1990.

Year	Permits Issued	Chinook	Sockeye	Coho	Pink	Chum	Other	Total
1969	47	0	9	752	38	0	17	816
1970	78	0	12	1,179	143	13	39	1,386
1971	112	2	16	1,549	44	7	20	1,638
1972	135	1	11	975	48	69	19	1,123
1973	143	0	18	1,304	84	40	9	1,455
1974	148	0	16	376	43	77	27	539
1975	292	4	47	1,960	632	61	95	2,799
1976	242	16	46	1,962	1,513	56	75	3,668
1977	197	12	46	2,216	639	119	84	3,116
1978	311	4	35	2,482	595	34	89	3,239
1979	437	6	37	2,118	2,251	41	130	4,583
1980	533	43	32	3,491	1,021	25	153[a]	4,765
1981	384	25	64	4,314	732	89	100	5,324
1982	395	39	46	7,303	955	123	8	8,474
1983	360	4	21	2,525	330	40	2	2,922
1984	390	4	25	3,666	821	87	25	4,628
1985	316	5	43	3,372	166	35	3	3,624
1986	338	7	68	3,831	3,132	56	0	7,094
1987	361	5	50	3,977	279	61	0	4,372
1988	438	14	60	4,877	1,422	75	0	6,448
1989	466	41	156	7,215	882	53	49	8,396
1990[b]	578	11	156	7,929	1,758	59	0	9,913
1969-89 Average	280	10	35	2,711	744	55	45	3,601

[a] Steelhead.

[b] Incomplete - Not all permits returned.

Table 10. Subsistence set gillnet salmon catch, by species, Port Graham, 1981-1990.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1981	116	1,694	625	298	150	2,883
1982	98	798	508	851	193	2,448
1983	57	1,066	440	169	65	1,797
1984	21	2,095	166	215	6	2,503
1985	156	469	190	42	22	879
1986	118	279	179	234	13	823
1987	21	170	251	139	25	606
1988	28	369	635	660	40	1,732
1989	48	78	168	178	17	489
1990	180	470	743	1,102	64	2,559
1981-89 Average	74	780	351	310	59	1,573

Table 11. Subsistence set gillnet salmon catch, by species, English Bay, 1981-1990.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1981	24	1,075	314	621	19	2,053
1982	13	1,584	1,305	1,850	36	4,788
1983	0	1,784	367	363	10	2,524
1984	18	1,225	385	404	0	2,032
1985	5	696	530	313	2	1,546
1986	4	378	296	825	2	1,505
1987	1	563	178	183	4	929
1988	72	430	199	613	36	1,350
1989	0	15	0	0	0	15
1990	46	603	471	1,938	49	3,107
1981-89 Average	15	861	397	575	12	1,860

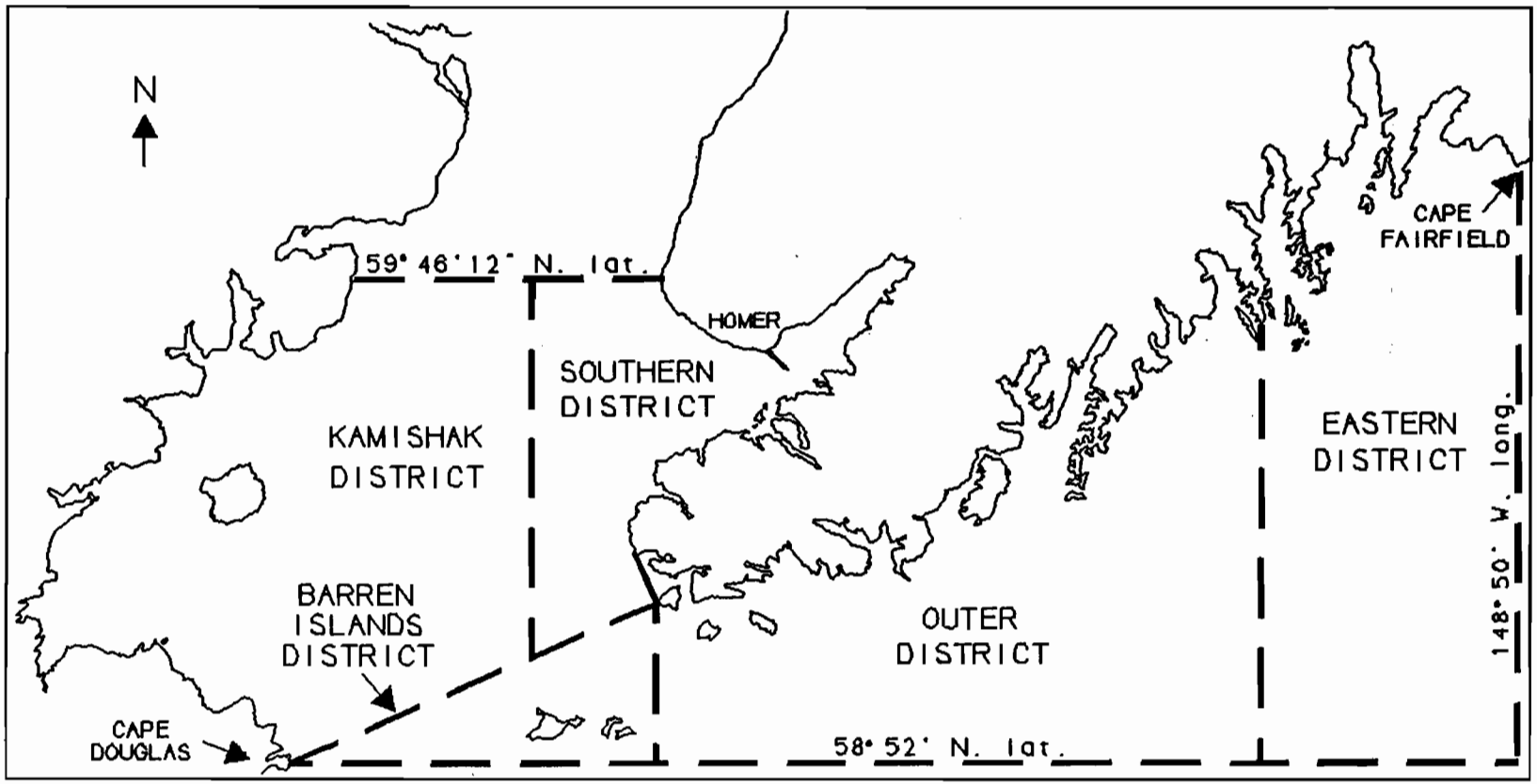

Figure 1. Lower Cook Inlet salmon management area.

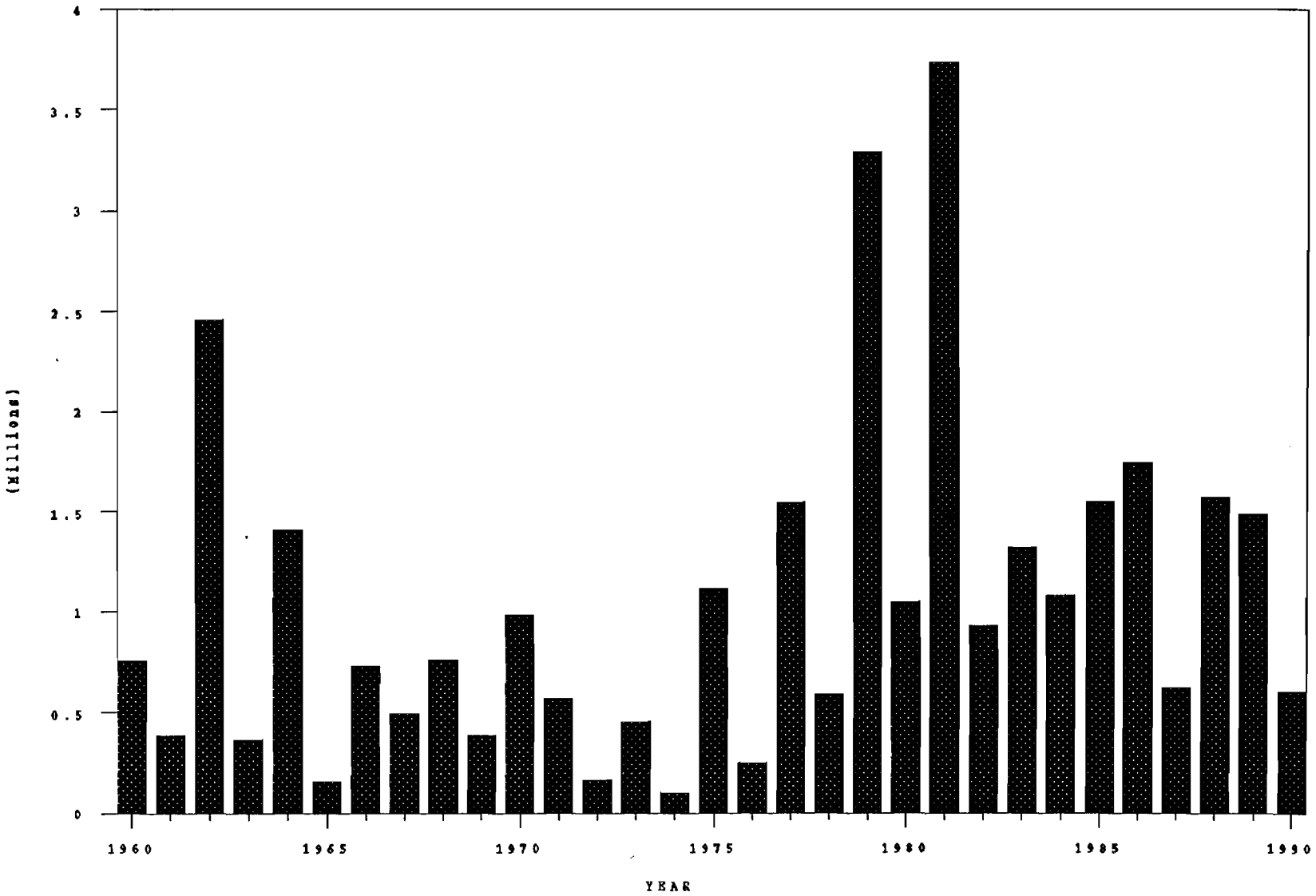

Figure 2. Total commercial salmon catch (all species) Lower Cook Inlet, 1960 - 1990.

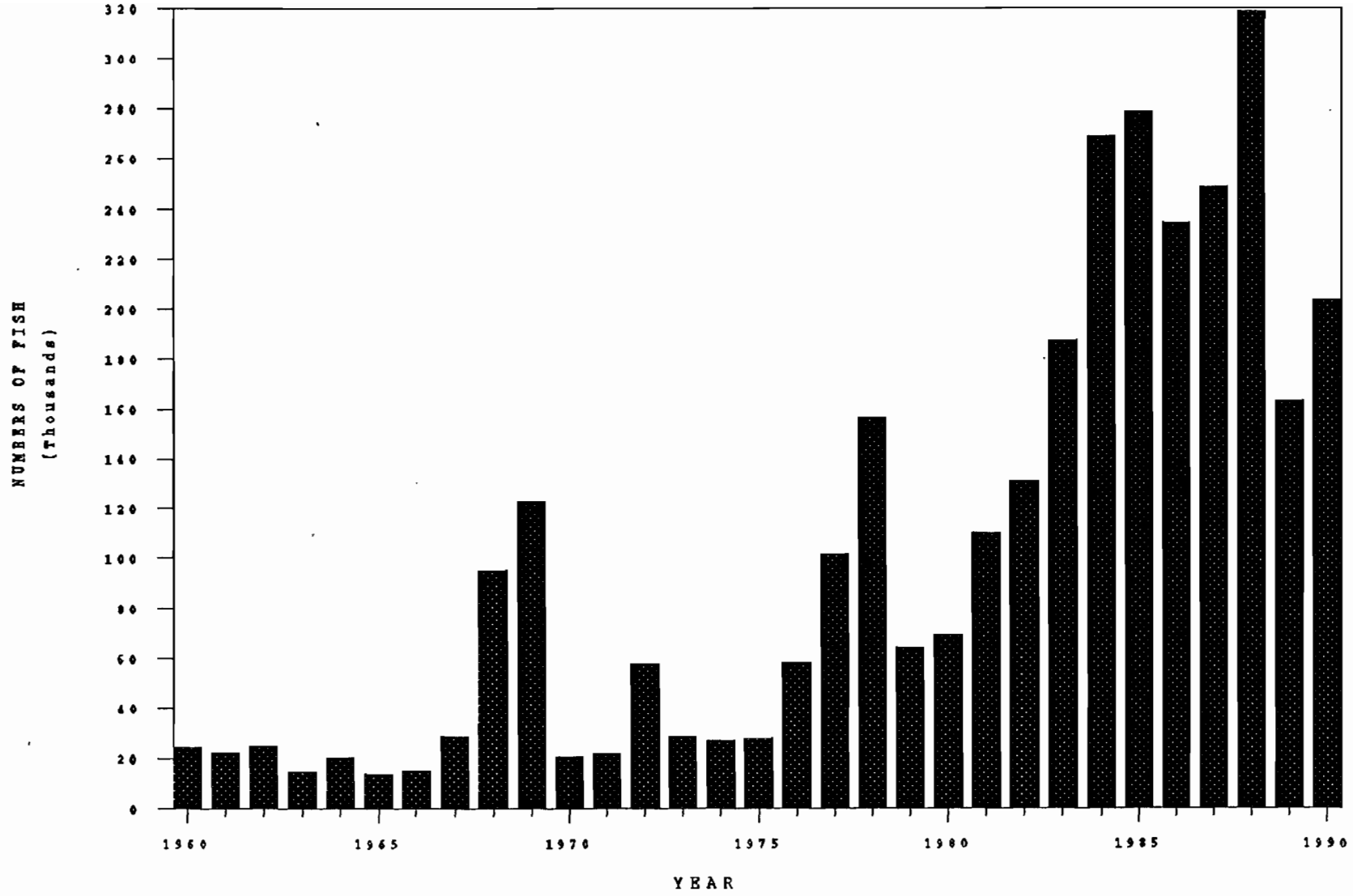

Figure 3. Commercial catch of sockeye salmon, Lower Cook Inlet, 1960 - 1990.

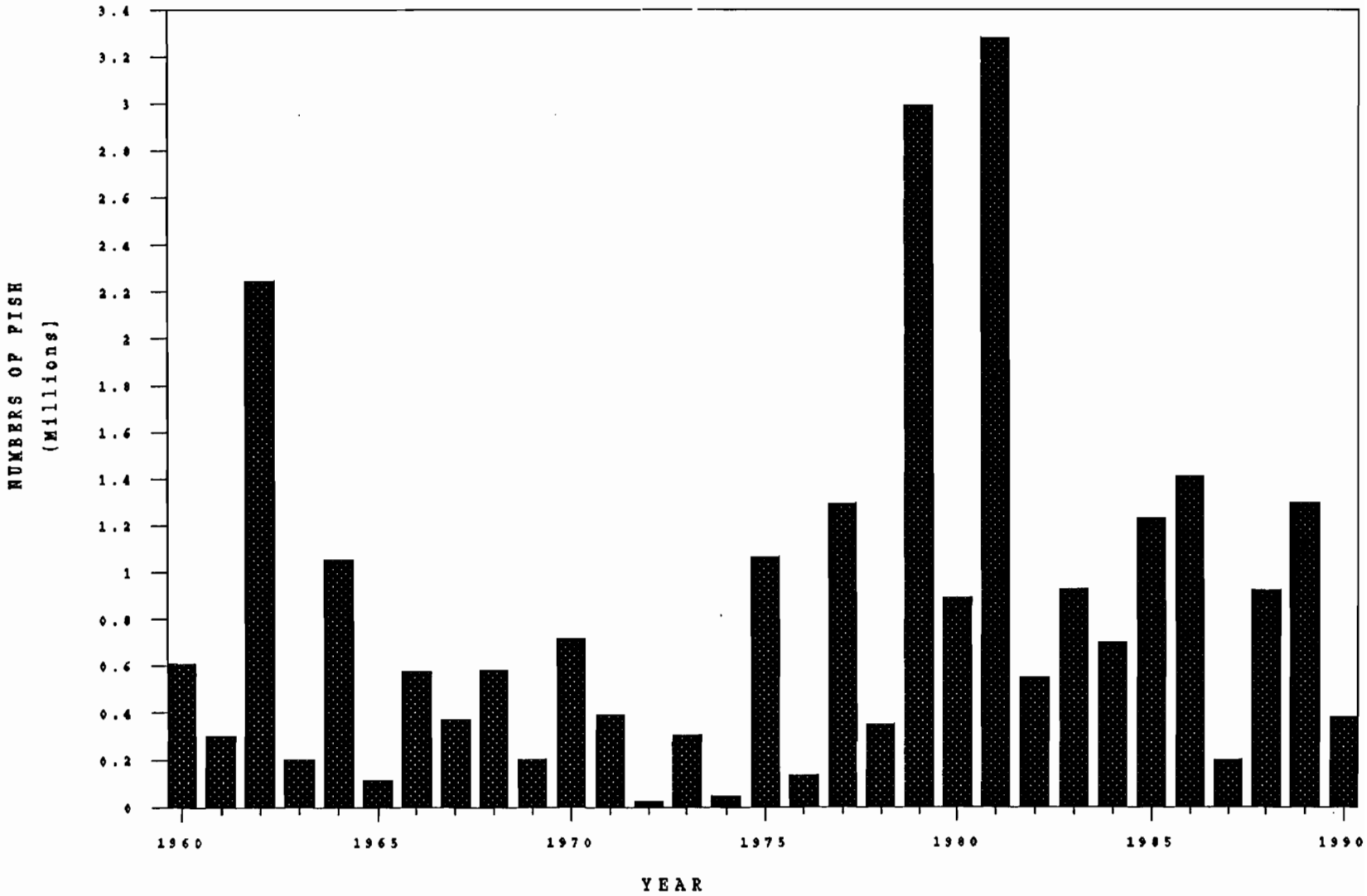

Figure 4. Commercial catch of pink salmon, Lower Cook Inlet, 1960 - 1990.

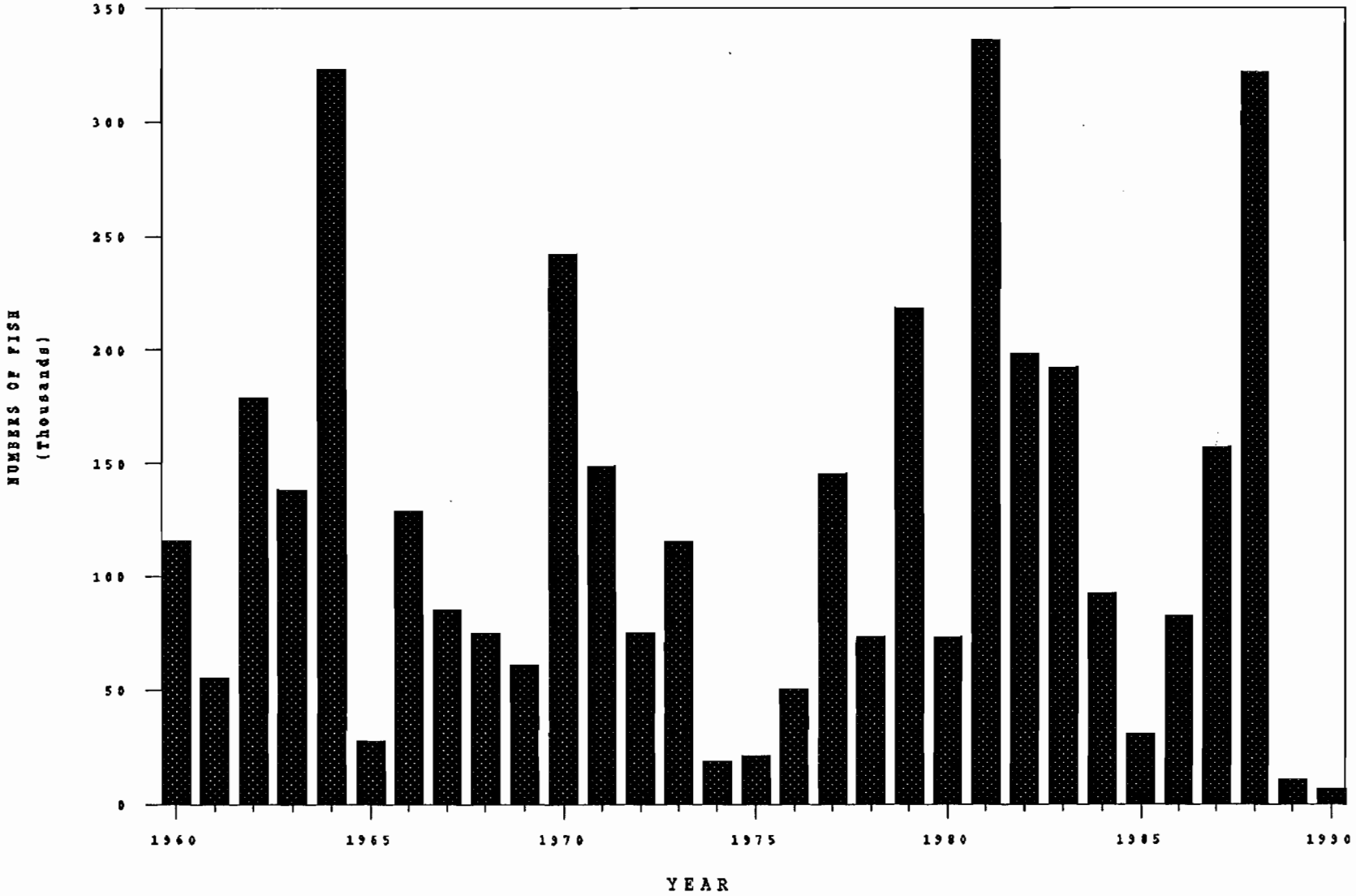

Figure 5. Commercial catch of chum salmon, Lower Cook Inlet, 1960 - 1990.