

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

1978

PRINCE WILLIAM SOUND AREA
REGION II

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Area Biologist

March 23, 1979

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PREFACE

This is the nineteenth annual management report prepared since the State assumed control of the fisheries from the federal government in 1960. The 1978 data is preliminary and will be finalized and corrected in subsequent reports. Data presented here supersedes information presented in previous management reports.

The report presents a brief description of the 1978 fishery and summarizes recent historical catch, escapement and related data on each species harvested by the commercial fishery.

The report is compiled primarily for use as a reference source for management purposes. Persons desiring additional information should direct a specific request to the area office in Cordova.

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ACKNOWLEDGEMENTS

The Commercial Fisheries Division, Prince William Sound Area, employed 11 permanent employees and 23 seasonal employees in 1978 who participated in various area management programs.

Thanks is extended to all personnel for a successful 1978 fisheries season.

Special acknowledgement is given to Peter J. Fridgen and Michael McCurdy for their contribution in preparation of the contents of this report. Also, to Jeannette Bailey for editorial comments and the task of typing and collating the 1978 report.

Following is a list of personnel, general duty assignments and dates of employment.

Permanent Employees

Ralph B. Pirtle	Area Management Biologist
Peter J. Fridgen	Assistant Area Management Biologist
Michael McCurdy	Research Biologist, Project Leader
Al Kimker	Research Biologist, Project Leader
Kenneth Roberson	Research Biologist, Project Leader
Frank Bird	Fishery Biologist
John M. Jackson	Fisheries Technician V
Kenneth Carrasco	Fisheries Technician III
Jeannette Bailey	Clerk - Stenographer
Janice Shaw	Clerk Typist
Kathy Adler	Clerk Typist

Seasonal Employees

George Addington	*** Crab Tagging Program Coghill Weir	6/ 5 - 8/31
James Bowman	*** Crab Tagging Program	6/ 1 - 9/15
Denise Branshaw	*** Crab Tagging Program	8/ 5 - 8/16
Lawrence Boyle	Eshamy Weir	6/ 5 - 8/31
Shannon Butler	* Incubation System	4/27 - 8/31
Angelle Craig	* Glennallen Office	5/15 - 8/11
Sharif Daugherty	Eshamy Weir	6/ 5 - 8/31
Janelle Eklund	* Miles Lake Sonar	4/ 1 - 11/30
	* Glennallen Office	
Craig Gardner	* Miles Lake Sonar	4/17 - 10/20
	* Incubation System	
Kathleen Helkenn	* Subsistence Fishery	5/31 - 8/15
Russell Holder	* Miles Lake Sonar	6/ 8 - 10/31
	* Incubation System	
Randy Hughes	* Tanada Lake Weir	6/ 5 - 8/15
Ruth Ivey	* Subsistence Fishery	6/12 - 8/15
Debra James	*** Catch Sampling	12/16 - 9/15
Nettie Johnson	* Subsistence Fishery	6/ 2 - 6/15
Harley King	* Long Lake Weir	8/16 - 9/30
Thomas McCall	* Copper River Tagging	5/ 8 - 8/17
Margery Osborne	* Incubation System	5/ 9 - 9/13
Alison Rabich	* Subsistence Fishery	5/31 - 7/15

Seasonal Employees, cont.

P. J. Roberts	Data Control Clerk	4/17 - 1/15
Dale Russell	* Copper River Tagging	5/ 4 - 8/22
	* Tanada Lake Weir	
Chris Sundby	* Miles Lake Sonar	5/ 9 - 7/28
	* Copper River Tagging	
Chris Young	** Stream Surveys	7/17 - 8/31

- * Projects under the supervision of Kenneth Roberson.
- ** Projects under the supervision of Michael McCurdy.
- *** Projects under the supervision of Al Kimker.

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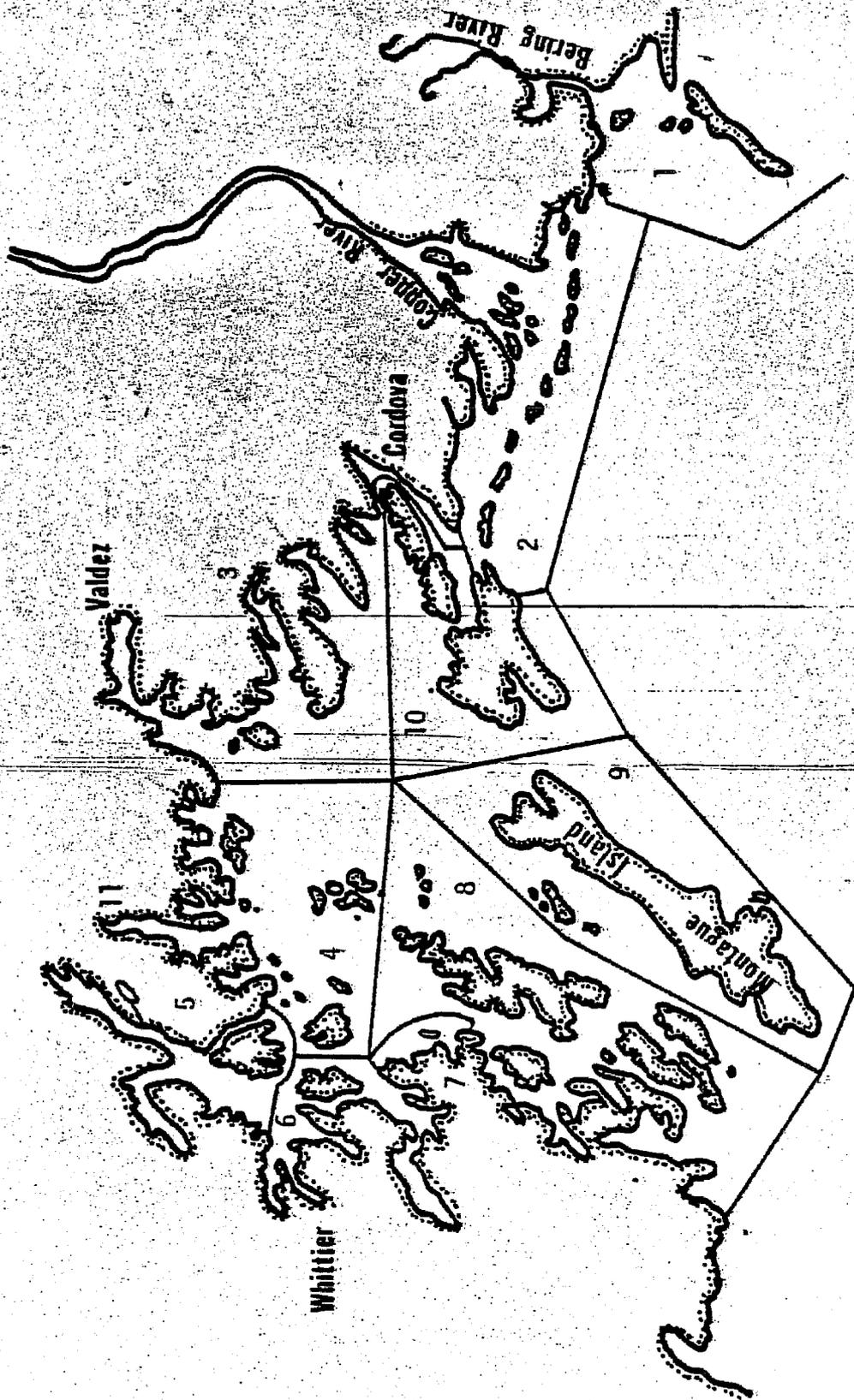
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Fishing Districts

- | | | | |
|----|--------------|-----|--------------|
| 1. | Bering River | 6. | Northwestern |
| 2. | Copper River | 7. | Eshamy |
| 3. | Eastern | 8. | Southwestern |
| 4. | Northern | 9. | Montague |
| 5. | Coghill | 10. | Southeastern |
| | | 11. | Unakwik |

Figure 1. Prince William Sound Area commercial fisheries salmon management area

INTRODUCTION

The Prince William Sound commercial fisheries management area is located in the northcentral Gulf of Alaska and comprises all of the drainages in Alaska from Cape Suckling on the east to Cape Fairfield on the west. This area encompasses the water of Controller Bay, Copper River, Prince William Sound and several small rivers and streams entering the Copper River Delta and Gulf of Alaska. In land area, the Prince William Sound commercial fisheries management area includes approximately 38,000 square miles, most of which is drained by the Copper River entering the Gulf of Alaska east of Prince William Sound, Figure 1.

SALMON

The Prince William Sound management area is divided into eleven salmon management districts (Figure 1) and five salmon management subdistricts which conform to geographical and biological distribution of the salmon species harvested.

Bering River district includes all the water between Cape Martin on the west and Cape Suckling on the east including Controller Bay and Katalia Bay. This small drift gill net salmon fishery harvests about one percent of the area's sockeye catch and about 25 percent of the coho catch. Small incidental catches of king, pink and chum salmon are taken during each season and amount to less than one percent of the district catch. During the peak of the 1978 spring fishery 57 units of gear were fished, and 92 during the coho fishery.

Copper River district includes all the water between Cape Martin on the east and Hook Point, Hinchinbrook Island on the west, and is separated from Prince William Sound's Eastern District by a boundary line from Boswell Rock, Hinchinbrook Island to the radio tower at Whitshed Village on the mainland shore southwest of Cordova. The Copper River district supports the major drift gill net salmon fishery of the area and harvests all five species of salmon although the target species of the district are sockeye during the spring and summer fishery and coho in the fall. The district fishery harvests about 97 percent of the area's king salmon catch, 65 percent of the sockeye, 72 percent of the coho, and incidental amounts of pink and chum salmon. During the peak of the 1978 spring sockeye fishery 458 units of drift gill net gear were fished, 133 during the summer period and 270 during the coho fishery.

The Unakwik district is located in the northcentral part of Prince William Sound and includes the water of northern Unakwik Inlet north of 61° 01' N. lat. The district was established to harvest small runs of sockeye salmon returning to Cowpen Lake and Miner's Lake systems. Usually less than 10,000 sockeye are taken each year. In 1978 the district sockeye catch of 9,384 represented less than two percent of the Area's sockeye catch.

The Unakwik season coincides with the Coghill district season and gear. Both purse seine and drift gill net gear are fished from June 18 until the end of the general season. In 1978, during the peak of the season, 22 units of drift gill net gear were being fished.

Coghill district, located in northwestern Prince William Sound, includes all of the water of Port Wells north of 60° 48' 30" N. lat., all the water within one nautical mile of the south shore of Esther Island including Esther Passage. (Prior to 1976 the western one-half of Port Wells was included in the Northwestern district).

Coghill district was established primarily to harvest the sockeye salmon returning to Coghill Lake; however, significant numbers of pinks and chums are taken and the numbers of these species commonly exceed the sockeye catch. There is a tremendous variation in the numbers of odd and even year pinks returning to Coghill River. Spawning escapement estimates have ranged from 552,060 in 1975 to an even year average of about 9,000 pinks. The district catch by species in 1978 contributed about 40 percent of the Area's sockeye catch, two percent of the pink catch and about 26 percent of the chum catch. Small incidental catches of kings and coho are taken each year.

Both purse seine and drift gill net gear are used in the district. In 1978 peak gear counts totaled 405 drift gill nets and 25 purse seines. When the Coghill district season begins on June 18 a large influx of gear moves into the district from the Copper River flats and consequently reduces the Copper River effort by almost one-half.

Eshamy district is located on the western central mainland shore of Prince William Sound. The district includes the water within one nautical mile of the mainland shore from the outer point on the north shore of Granite Bay on the south end of the district to the light on the south shore of the entrance to Port Nellie Juan on the north end of the district.

The district was established to harvest a run of sockeye salmon returning to the Eshamy Lake system. The Eshamy district fishery catches all five species of salmon. Sockeye is the target species; however, substantial numbers of pinks and chums are intercepted which are primarily bound for other districts in the Sound. Small numbers of kings and cohos are caught in the district. In 1978 the district was closed to fishing.

Both set and drift gill net gear are used in the Eshamy district with drift gear far outnumbering the set gear.

The General Districts of Prince William Sound include the Eastern, Northern, Northwestern, Southwestern, Montague and Southeastern districts, which include the remainder of Prince William Sound. Purse seines are the legal gear, and the primary target species are pink and chum salmon. Forecasts of returning pinks and chums are made each year based on pre-emergent fry data, and purse seine seasons set accordingly. Season openings are usually published in the regulations, and season closures made by emergency order.

Purse seines normally harvest the majority of the pinks and chums of the Area's catch from the General Districts. In 1978 the General Districts produced about two percent of the sockeye, 95 percent of the pinks and 72 percent of the area chum catch. Incidental and usually insignificant numbers of king and coho are also taken from the General Districts.

In 1978 a peak number of 178 units of purse seine gear were fished.

The management area for shellfish is the same as described for salmon. Each species of shellfish is managed on its own merits and separate management districts have been established for Tanner and Dungeness crab (Figures 2 and 3). Razor clams taken commercially for human consumption are taken from certain described certified beach areas.

Four Tanner crab districts were established by regulation in 1977 as follows: Northern District - is generally the area of the northern one-half of Prince William Sound described by a line from the south entrance to Port Nellie Juan, to Point Eleanor (north tip of Knight Island group), to the eastern tip of Smith Island, to Johnstone Point, and north of a line from Point Bentinck to Point Whitshed; Hinchinbrook District - is generally the Hinchinbrook Entrance area of the Sound extending in a pie-shape to the east end of Smith Island described by a line from the eastern tip of Smith Island to Montague Point, from Zaikof Point to Seal Rocks, from Seal Rocks to Cape Hinchinbrook, and from Johnstone Point to the beginning to the eastern tip of Smith Island; Eastern District - is generally the Gulf water from the longitude of Seal Rocks east to the longitude of Cape Suckling, water east of a line from Seal Rocks to Cape Hinchinbrook, and water south of a line from Point Bentinck to Point Whitshed; and, Western District - is generally the southwest Sound and Gulf of Alaska west of the longitude of Seal Rocks and is described as all water east of the longitude of Cape Fairfield, south of a line from the southern entrance of Port Nellie Juan to Point Eleanor to the eastern tip of Smith Island to Montague Point, west of a line from Zaikof Point to Seal Rocks, and west of the longitude of Seal Rocks.

Tanner crab fishing is relatively new to the Prince William Sound Area, but has developed into the largest crab fishery within the short time since inception of the fishery in 1968. The fishery has spread throughout most of Prince William Sound and into the Gulf of Alaska south of Montague Island and eastward along the Gulf to Cape St. Elias.

With the exception of the 1970-71 season the catch continued to increase each year reaching a high of about 14 million pounds in the 1972-73 season, and dropping rapidly to about 2.3 million pounds in the 1976-77 season (Table 1).

A guideline harvest level of 3.5 million pounds for the "Inside" area (Prince William Sound) and 12.0 million pounds "Outside" (Gulf) area, established in 1973, was never reached during the time the harvest level was in effect. In 1977 the guideline harvest level was changed to a more realistic level of 3 - 7 million pounds based on a sampling program initiated in 1976.

Prior to 1976 no size limit for male Tanners was in effect, and brood stock crab were being heavily exploited. In 1976 a minimum legal size of 5.3 inches was established to protect the breeding population. The reduced catch in the 1976-77 season is due in part to the enforcement of the minimum size limit.

Three Dungeness crab management areas were established in 1978 as follows: Orca Inlet District includes all water of statistical area E north of a line from Point Bentinck to Point Whitshed, east of a line from Salmo Point to a point on the mainland at 60° 37' 54" N. lat., 145° 45' 33" W. long., and south of a line from Makaka Point to a point on Hinchinbrook Island at 60° 28' 54" N. lat., 146° 22' 51" W. long.; Northern District: all water of statistical area E west of a line from Salmo Point to a point on the mainland at 60° 28' 54" N. lat., 145° 45' 33" W. long., north of a line from Makaka Point to a point on Hinchinbrook Island at 60° 28' 54" N. lat., 146° 22' 51" W. long., north of a line from Cape Hinchinbrook to Seal Rocks (60° 10' N. lat., 146° 50' W. long.), and west of the longitude of Seal Rocks (60° 10' N. lat., 146° 50' W. long.). Copper River District: all water of

statistical area E south of a line from Point Bentinck to Point Whitshed, south of a line from Cape Hinchinbrook to Seal Rocks (60° 10' N. lat., 146° 50' W. long.), and east of the longitude of Seal Rocks (60° 10' N. lat., 146° W. long.).

The districts have as their seaward boundary the 200 fathom (366 mm) depth contour.

Prior to 1978 two areas were managed separately. Orca Inlet and Orca Bay area of Prince William Sound had a fishery season from August 31 to June 1, with the remaining Prince William Sound and Gulf area having no closed season. The two areas of historical catch have been Orca Bay/Orca Inlet and Copper River Flats/Controller Bay (Figure 3).

Orca Inlet, which is immediately adjacent to Cordova, provides a fishery that allows participation by small vessels in an area protected from adverse sea conditions. Crab fishermen can leave the harbor in the morning, pick their gear during the day, and deliver to the processor in the afternoon.

The Copper River Flats/Controller Bay area, although it is a summer and early fall fishery, is subject to more adverse sea conditions that requires larger vessels. Run time to and from this crabbing ground requires at least one day, not including fishing time.

The Dungeness crab fishery is strongly influenced by West Coast market conditions, therefore, historical catch statistics are not always reliable indicators of stock status.

In Orca Inlet the catch has decreased steadily from a level in excess of one million pounds in 1965 to the 1975 level of 165,000 pounds (Figure 4). Factors responsible for the declining catch are not known, but environmental changes caused by the 1964 earthquake which raised the area about six feet, and food availability may have changed when local processors complied with environmental standards in disposing of crab and salmon wastes are both suspects.

Until 1969 catch records from Copper River/Controller Bay have included catches from the Icy Bay area which is not in the Prince William Sound Management Area. Since 1969 West Coast market conditions are constantly reflected in the catch, especially in 1970 and 1971 when catches were under 100,000 pounds (Table I).

The king crab fishery has not been heavily exploited, and it has not been necessary to establish restrictive management districts. Two species, the blue and red king crab, are fished commercially in the Prince William Sound Area. Both the blue and red king crab are fished in the Port Wells/Unakwik area, and red king crab is also fished in the Orca Bay/Port Gravina/Port Fidalgo area (Figure 5).

In 1971 a quota of 500,000 pounds was set for king crab, but annual catch has never approached this figure. The high catch of 296,200 pounds was taken in 1972 (Table I). Regulations limit the commercial catch to male king crab with a minimum size of seven inches in width of shell for red king crab, and five inches in length from the eye notch to the rear center of the carapace for blue king crab.

Razor clams have been harvested from the area since the early 1900's, but during the early 1960's major processing ceased and subsequent years' harvests have been used primarily for bait. The commercial harvest has continued to decline due to health regulations and the apparent decline in populations (Table I). Department research has shown a decreased survival of juvenile razor clams in the Orca Inlet area with

the decreased survival appearing to be caused by changing substrate in the razor clam habitat. Desposition by the Copper River and the 1964 earthquake are the two major factors influencing substrate change. Areas of historical harvest are Orca Inlet, Copper River Flats and Controller Bay areas as depicted in Figure 6.

A small pot shrimp fishery has operated for several years in northern Prince William Sound, and in recent years a small otter trawl fishery has operated in eastern Prince William Sound (Figure 1). In 1976 and 1977 an exploratory trawl fishery by one large vessel from Kodiak was conducted in Icy Bay (western Prince William Sound) with catches of less than 200,000 pounds each year (Table 1). The fishery involved six trawl vessels in 1978 which reported the majority of the total landings of 448,417 pounds which more than doubles previous catches.

A recent decision was made by regional and local staff to prepare a separate shellfish and bottom fish report because of the seasonal difference between salmon and crab fisheries. Therefore, the shellfish text in this report will be limited to the introduction, and interested persons are referred to a separate shellfish - bottom fish report which will be forthcoming at a later date.

HERRING

Herring fishing districts were established by regulation in 1977 as a result of limited entry into the herring sac roe fishery. These districts generally include the water surrounding Montague and Green Island and designated the Montague district; the Northern district which includes all of Port Fidalgo, all of Valdez Arm and Port Valdez, all of Columbia Bay and Long Bay and water surrounding Glacier Island and Bligh Island; and, the General district which includes all water of Alaska between the longitude of Cape Fairfield and the longitude of Cape Suckling, exclusive of the Montague and Northern district described earlier. Because of limited entry into the herring sac roe fishery, the Montague and Northern districts were established exclusively for this herring fishery. The General district remained unregulated to limited entry allowing open fishing for the so-called herring food and bait fishery.

Herring have a long history of commercial fishing in the Prince William Sound Area dating back to 1914, and until about 1958 was used exclusively for reduction purposes. From the demise of the reduction fishery until 1969 only occasional catches were made for bait purposes. The year 1969 was the beginning of a new fishery where herring were taken for roe which was salted in containers and sold in Japanese markets. This herring sac roe fishery grew rapidly with good market conditions, reaching a peak harvest of 6,983 tons in 1973 (Table 2).

As a result of the intensiveness of the herring sac roe fishery, vulnerability and the high exploitation rate of the herring, a quota of 5,000 tons was established in 1974. The quota was exceeded two years, in 1974 and 1975, after the quota was established (Table 2).

The herring spawn on kelp fishery started the same year the roe fishery was initiated in 1969. The first experimental harvest of herring spawn on kelp was taken from Johnson Cove and Landlocked Bay in northeastern Prince William Sound. It has grown into an annual fishery with a peak harvest of 458.5 tons in 1975 (Table 2). Recent concern about the depletion of kelp beds (*Laminaria* sp.) resulted in several regulations. Notable of these was the recent Board of Fisheries regulation to limit the method of harvesting to a hand-held unpowered blade-cutting device, and required the kelp blades to be cut at least four inches above the stipe.

Herring spawning areas of Valdez Arm in 1978 are shown in Figure 7.

Table 1. Prince William Sound Management Area shellfish catch in pounds by species, 1960 - 1978.

<u>Year</u>	<u>Dungeness Crab</u>	<u>King Crab</u>	<u>Tanner Crab</u>	<u>Shrimp</u>	<u>Razor Clams</u>
1960	2,722,470	246,965		2,494	433,930
1961	2,756,194	236,081			261,628
1962	2,643,775	31,478		1,788	208,698
1963	3,234,383	43,569		550	86,340
1964	3,393,171	14,028		2,124	39,275
1965	2,174,287	5,500		2,178	86,477
1966	999,341	11,000			27,063
1967	2,529,288	41,800		374	98,446
1968	2,280,310	200,000	245,100	3,433	72,806
1969	1,413,993	48,100	936,500	2,573	26,887
1970	742,732	94,300	1,292,400	9,888	27,909
1971	509,890	144,200	642,300	6,537	37,972
1972	724,673	296,200	8,550,709	8,627	30,326
1973	806,377	207,916	12,696,852	7,428	30,818
1974	559,164	85,379	9,597,758	13,834	29,747
1975	818,041	53,423	5,016,665	29,036	15,443
1976	290,332	18,023	6,000,444	135,320	1,516
1977	735,579	88,597	2,894,752	174,515	2,160
1978*	2,053,461	92,934	4,979,888	448,417	29,865

* Preliminary.

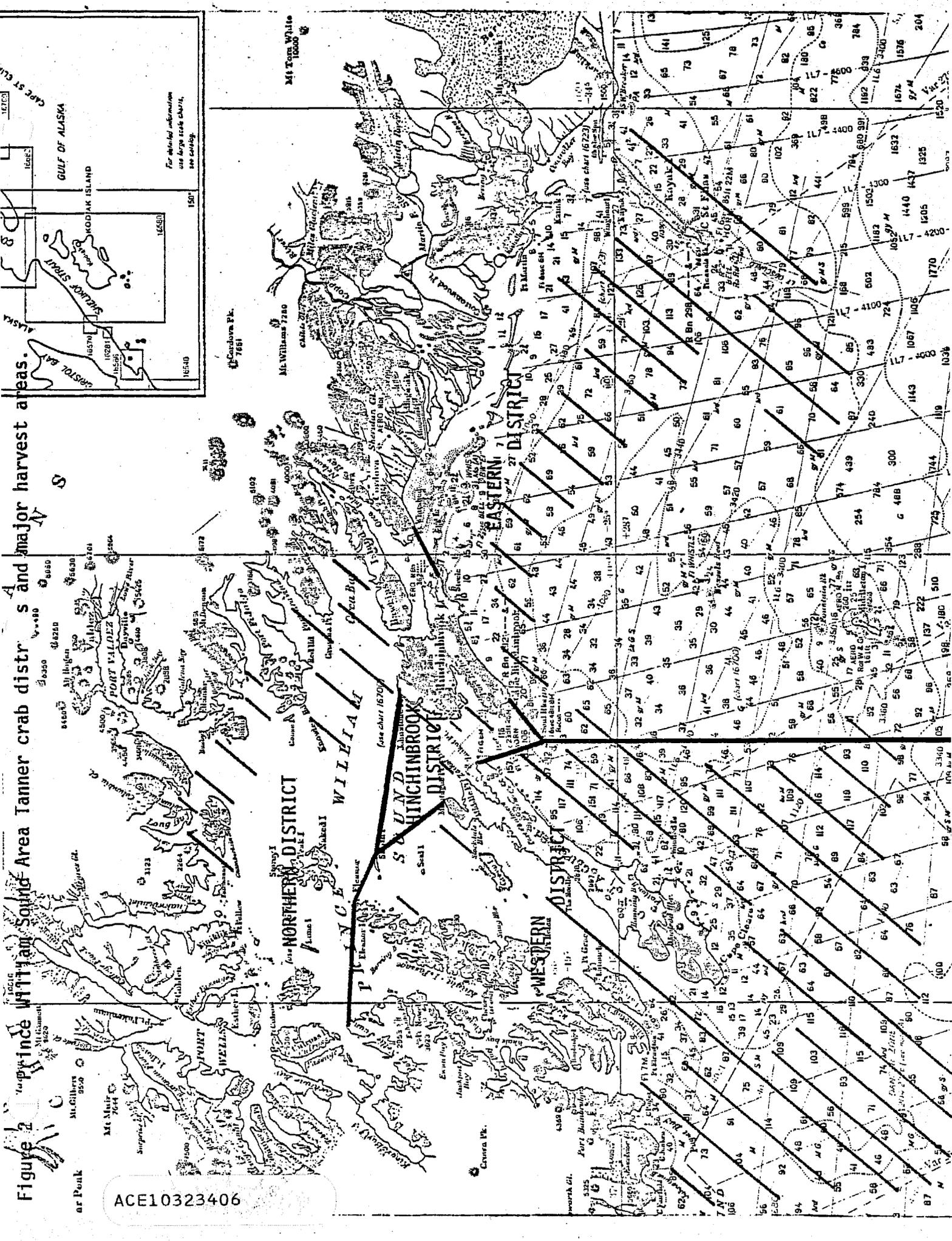
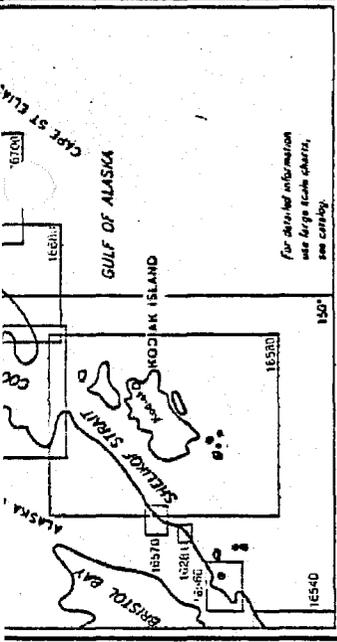
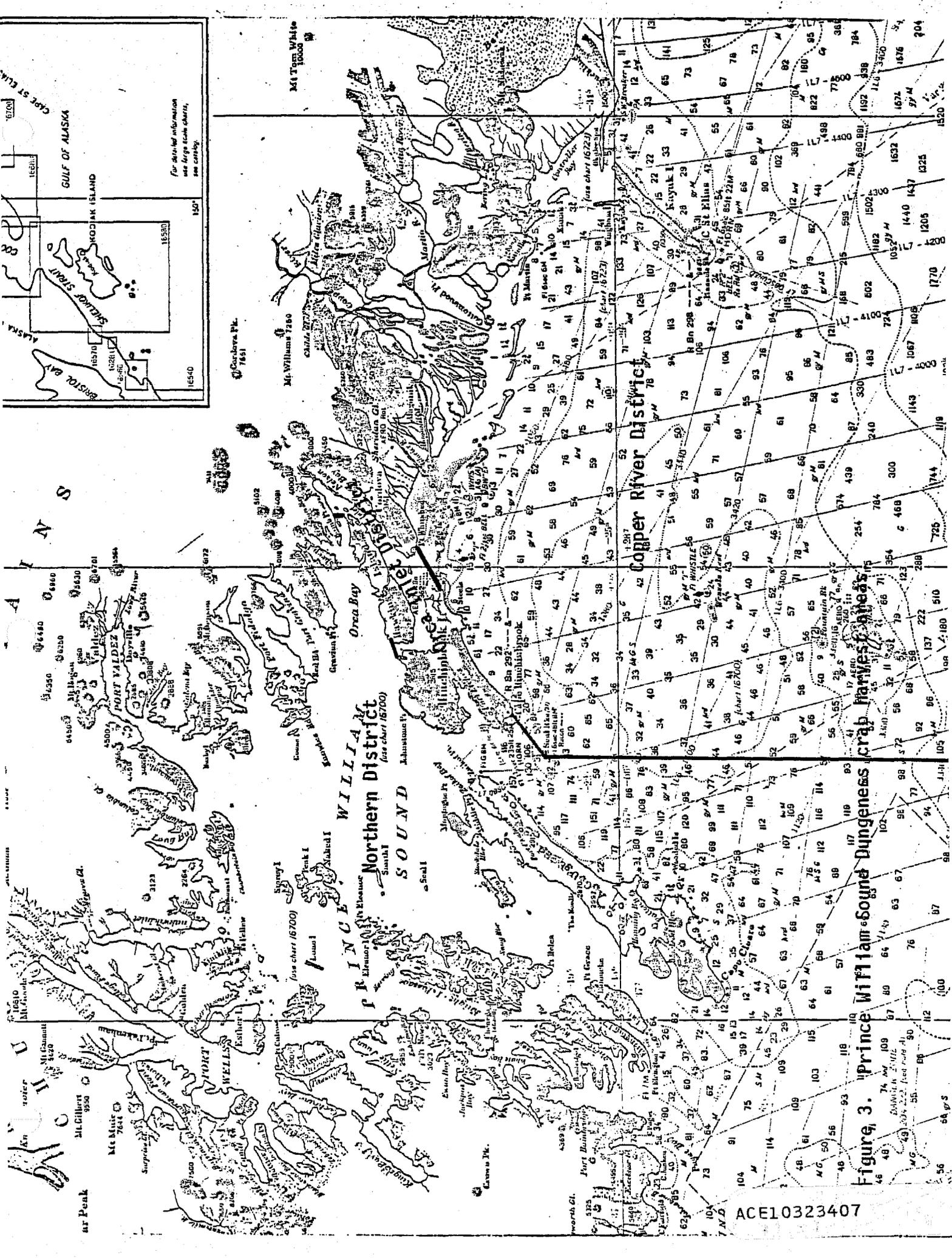


Figure 2. Prince William Sound Area Tanner crab districts and major harvest areas.

ACE10323406



For detailed information
see large scale charts,
see contour.

Corobara Pt.
1851

Mt Tom White
1800

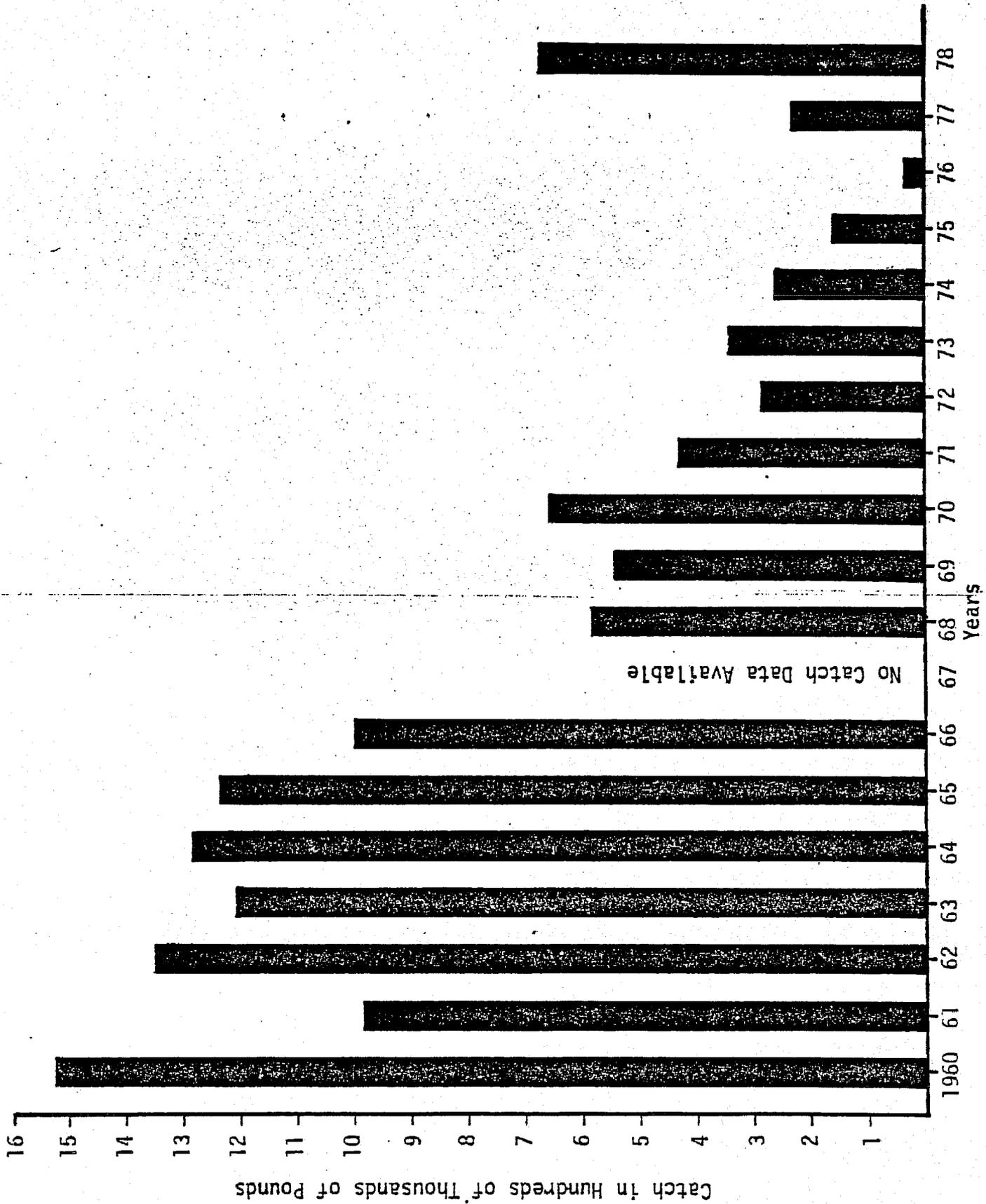
Mt Williams 7260

WILLIAM
Northern District
(see chart 16700)

Copper River District

Prince William Sound
Dungeness crab harvests

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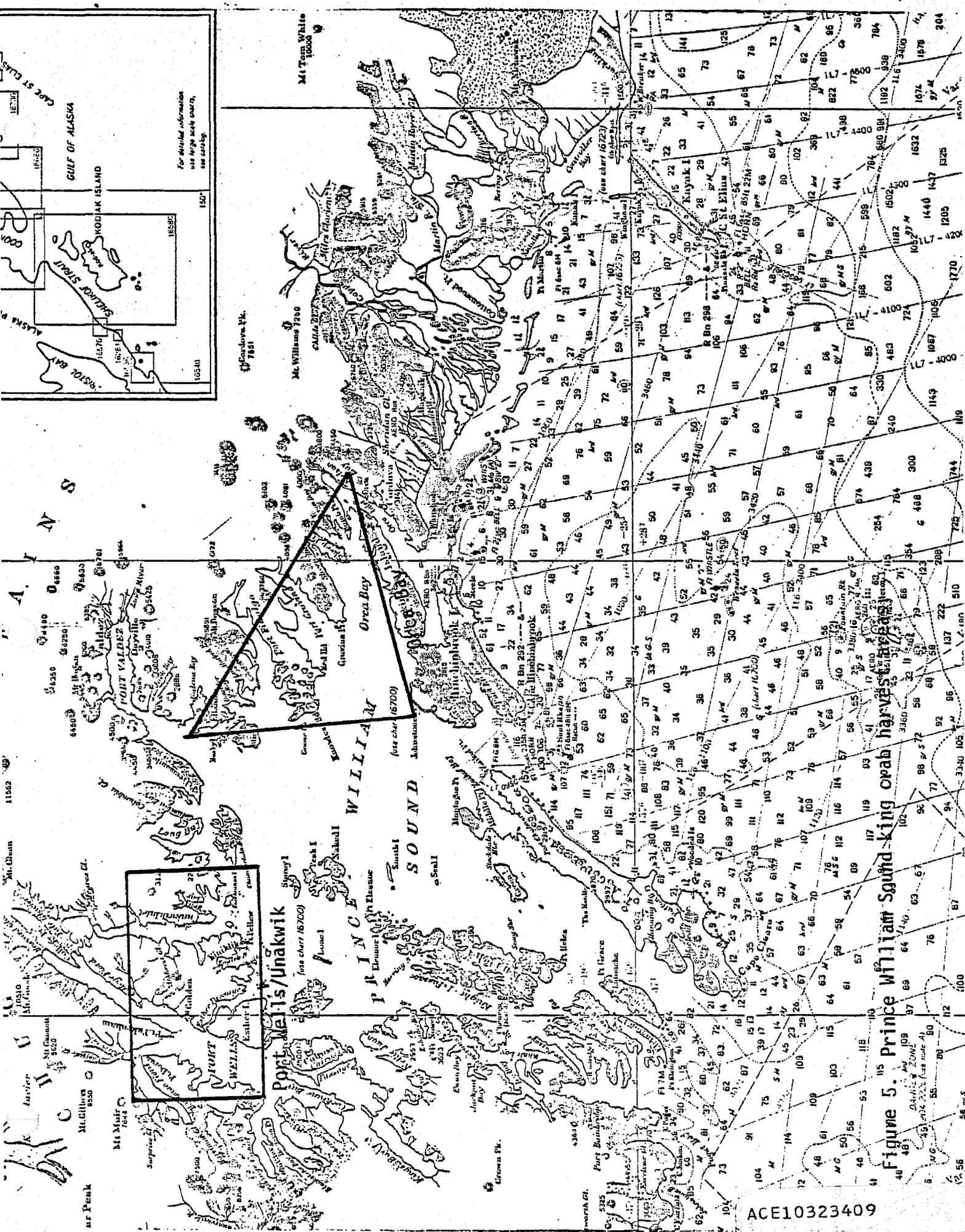
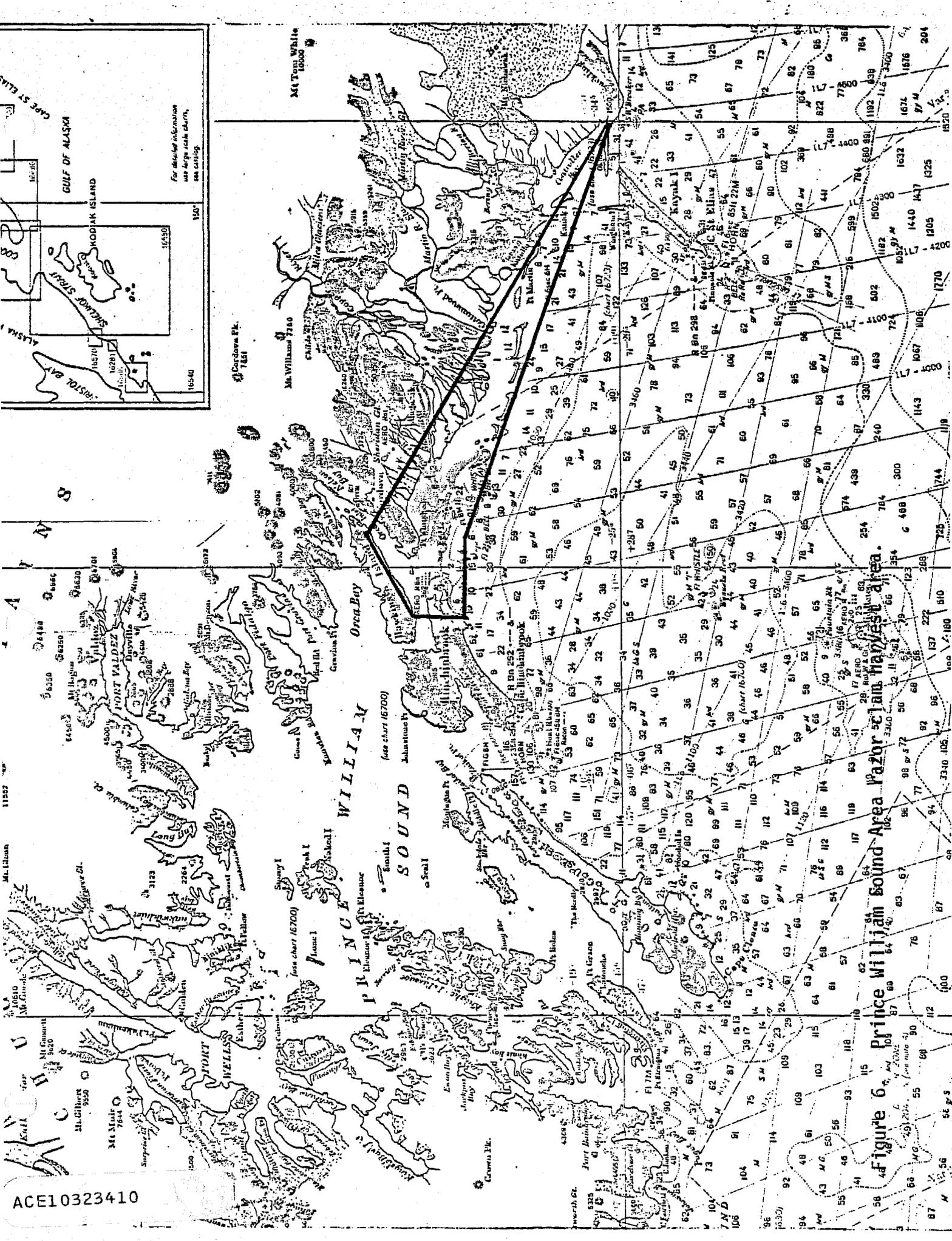


Figure 5. Prince William Sound - King crab harvest areas

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Figure 6. Prince William Sound Area

For detailed information
use large scale charts,
see catalog.

Table 2. Herring and herring spawn on kelp in tons from Prince William Sound, 1967 - 1978.

Year	HERRING				HERRING SPAWN ON KELP			
	Number Boats *	Used For Bait	Used For Roe	Total Tons	Number Permits	Number Kelpers	Number Boats	Total Tons
1967		30		30				
1969	6		355.7	355.7	3	3	3	2.7
1970	1	10		10	58		29	95.2
1971	14	20	919.2	939.2	487		34	384.7
1972	15	8.9	1,768.3	1,777.2	1,100		397	299.7
1973	28		6,983	6,983	504		176	153.2
1974	72 ^{1/}		6,371	6,371	295	166	143	276.1
1975	76	266.7	5,853.8	6,080.5	765	437	328	458.5
1976 ^{2/}	66		2,584.1	2,584.1	662	357		242.5
1977 ^{3/}	61 ^{4/}	17	2,282.5	2,299.5	251	164		208.5
1978 ^{3/5/}	110 ^{6/}	1,254.5	1,356.5	2,611	30	66		70.5

1/ Three drift gill net boats also fished.

2/ No Northern District fishery. Fishermen on strike.

3/ No Montague District fishery.

4/ One drift gill net boat also participated in the sac roe fishery.

5/ Preliminary data.

6/ 70 seine, 39 drift gill net and 1 set net participated in the sac roe fishery.

7/ October 1 to February 28 season.

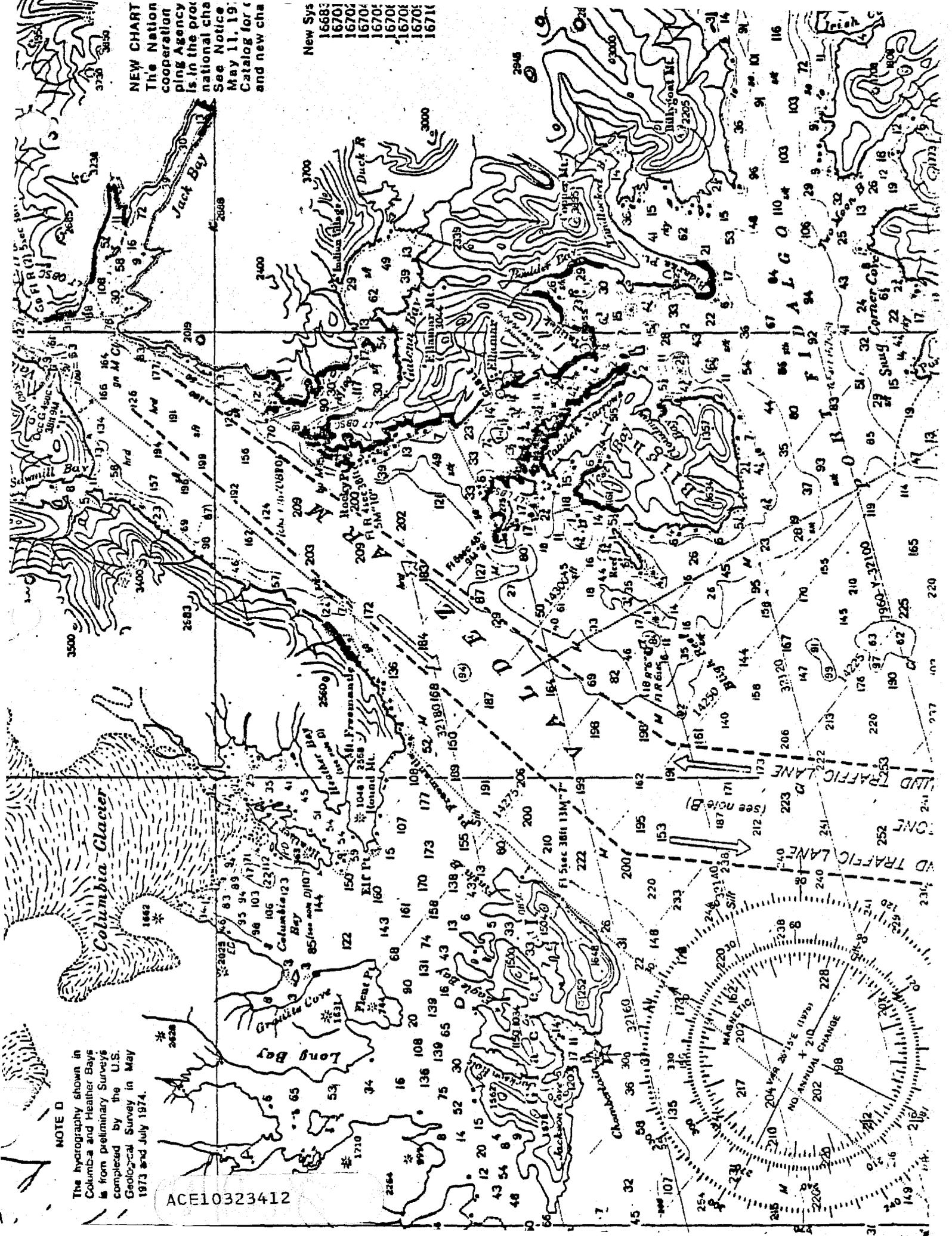
* Number of boats refers to purse seine boats participating in the sac roe fishery.

NOTE D

The hydrography shown in Columbia and Heather Bays is from preliminary surveys completed by the U.S. Geological Survey in May 1973 and July 1974.

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SALMON FISHERY

BERING RIVER DISTRICT

Introduction. - The Bering River district includes all water between Cape Martin and Cape Suckling. Salmon commercially harvested in this district normally spawn in streams and rivers emptying into Controller Bay. Sockeye and coho salmon are the primary important species harvested in this district and are taken with drift gill net gear.

Weekly fishing periods are divided into two equal open and closed periods of three and one-half days each prior to August 7. Open fishing periods begin at 6:00 a.m. Monday and close at 6:00 a.m. Wednesday and from 6:00 p.m. Thursday until 6:00 a.m. Saturday. From August 7 to August 31 fishing is allowed from 6:00 a.m. Monday until 6:00 p.m. Thursday. After August 31 fishing is permitted from 7:00 a.m. Monday until 7:00 p.m. Thursday.

SOCKEYE SALMON

Catch. - The drift gill net season in this district commenced at 6:00 a.m. on June 12 with 57 boats participating. This fishery probably received some increased effort due to the closure that was in effect for the Copper River district, and because of the closure, fishermen fished the district longer. An anticipated catch of 25,000 sockeye was predicted, and when the season closed a total harvest of 33,554 was realized which was slightly below average. Table 3 presents the catch by week.

Escapement. - Sockeye salmon escapements into this district have exceeded the catch in most years without any resultant increases in returning run size. Since the 1964 earthquake Bering Lake, which is the common rearing area for almost all juvenile sockeye salmon hatched in spawning streams of this district, has been gradually drying up. This "dewatering" has resulted in a decreased rearing area, and in periods of severe winters, abnormal mortalities may occur due to oxygen depletion in the lake. Because of this it appears that the sockeye production will continue to decrease until the lake reaches a point of stabilization. From that time on, very little fluctuation in run size is anticipated.

Figure 9 presents sockeye catch and escapement for this district.

COHO SALMON

Catch. - Although the opening of the coho season on August 7 coincides with the opening of the Copper River district, this district was not fished until the week of August 13. Like the coho return to the Copper River, the return to this district was also strong. Although storms hindered fishing effort for two periods, the total catch of 90,874 cohos for the season was the highest recorded for this district since statehood. Table 3 presents the total catch by species by week for the district.

Escapement. - Comparative year to year escapement estimates are very difficult to obtain. The weather at this time of the year is normally adverse with heavy rain and high wind. Streams become high and silt laden, and turbulence caused by high wind makes aerial surveys almost an impossibility; however,

estimates from early surveys indicated that escapements would be above average.

Figure 10 presents the coho salmon catch from 1965 to 1978.

COPPER RIVER DISTRICT

Introduction. - The Copper River district includes all water of Hinchinbrook Island between Hook Point and Boswell Rock including Boswell Bay water south of a line from Boswell Rock to the radio tower at Whitshed Village, and water between Whitshed Village and Cape Martin.

Commercial fishing for sockeye salmon in this district begins on May 15 of each year, and is regulated by a series of equal open and closed fishing periods. Prior to August 7 fishing is permitted from 6:00 a.m. Monday to 6:00 a.m. Wednesday, and from 6:00 p.m. Thursday until 6:00 a.m. Saturday. From August 7 to August 31, fishing is permitted from 6:00 a.m. Monday until 6:00 p.m. Thursday. After August 31, fishing is permitted from 7:00 a.m. Monday until 7:00 p.m. Thursday.

The major commercial harvest occurs on sockeye and coho salmon although king, chum and pink salmon are also taken incidentally. Each boat registered to fish this district is allowed a maximum of 150 fathoms of drift gill net gear.

Prior to 1978 the in-season management of this fishery was based upon catch per unit of effort data. Escapement trends were unknown until sockeye returns reached the subsistence fishery in the Chitina area of the upper Copper River. The time lag between the commercial fishery and the subsistence fishery may be 30 or more days. Because of this, adjustments in fishing times have been made after the fact, and if overharvest occurred, adjustments were late.

In 1978 an electronic system was installed above the fishery which utilized a sonar method of enumerating escapement. Although initial management decisions to decrease fishing time were dictated by catch per unit of effort information, the sonar enumeration system verified the catch per unit of effort data and identified weaker portions of the return and indicated when the fishery could be resumed.

SOCKEYE SALMON

Catch. - The district opened on May 15 and was one of the few years when fish prices were settled prior to the opening, and actual fishing commenced on schedule. The staff had anticipated a below average return and had attempted to make the fishing fleet aware of what to expect.

The first period catch of 63,687 sockeye was approximately 40,000 above the 16 year average, and it appeared that the run was going to be stronger than presumed. However, during the first half of the second period the catches fell off drastically, and the fishery was closed for the last half of the period.

During the five days that the fishery was closed, escapement counts, as indicated from the sonar counter, showed immediate improvement, and the fishery was reopened for the normal three and one-half day fishing period beginning May 29. The catch for the first half of that period was roughly 60,000 sockeye, but a severe storm interrupted the last half of the period, and a slightly below average catch of 101,075 sockeye was made. Sonar counts again dipped, and the

season was closed for the next two weeks. On June 20 the season was again opened for two days, but catches were again below average, and the season was again closed.

During the second week in July sonar counts indicated that the upriver run had passed through the fishery. Since the staff was expecting an average return to delta spawning streams the fishery was opened for the normal three and one-half days per week fishing period. The fishery remained open for the rest of the season, but the total seasonal catch of 251,523 sockeye salmon was the lowest recorded catch since statehood.

Table 4 presents the total catch of all species by week for the district. Figure 11 shows catch and escapement of sockeye salmon for the past 10 years.

Subsistence Fishery. - In 1978, 3,313 dip net and 392 fish wheel permits were issued for the subsistence fishery in the Chitina area of the upper Copper River. This was 361 permits less than were issued in 1977. Preliminary figures show individuals fishing these permits harvested 22,416 sockeye and 1,947 king salmon for a total of 24,363. The total catch was 14,199 less than the 1977 reported catch. However, due to the weak upriver return, subsistence fishing time in the Chitina and Glennallen subdistricts was curtailed from June 23 to August 11.

Subsistence fishermen utilizing drift gill net gear on the Copper River flats harvested 18 sockeye, 37 king and 12 coho salmon. Thirty-four permits were issued for this area.

Table 5 presents catch data for the upper Copper River area and the Copper River flats.

Escapement. - Upper Copper River sockeye salmon escapements, as derived from the newly installed sonar counter, were 194,372. This was approximately 6,000 to 10,000 below escapement goals, but the overall distribution of spawners into the various spawning streams was very good.

Escapements of sockeye salmon into spawning systems of the Copper River delta were extremely good, and as in the streams of the upper Copper River, the distribution was excellent.

Table 6 shows Copper River and Bering River sockeye, chinook and coho salmon escapements, and Table 7 compares estimated sockeye salmon spawning escapements in selected systems from 1973 to 1978. Table 8 presents sonar counts of sockeye salmon escapement to the spawning tributaries of the upper Copper River, and Table 9 gives expected escapement by week based upon percent of average weekly sockeye salmon catch from the Copper River district to produce 250,000 desired escapement and 200,000 minimum escapement. Figure 11 shows graphically the escapement of Copper River sockeye salmon for the years 1969 to 1978.

KING SALMON

Catch. - The king salmon fishery is an incidental catch fishery with the run timing coinciding with the upriver sockeye salmon run.

Unlike the sockeye return, the 1978 king salmon return was strong, and although the drift gill net season was closed for a period of over four and one-half weeks, the above average catches were made during most periods that fishing was allowed. The total king salmon catch of 29,115 for the season (Table 4) was approximately 14,000 above average.

Escapement. - Escapement of king salmon to the upper Copper River spawning tributaries is shown in Table 6.

COHO SALMON

Catch. - The coho salmon season opened on August 7, and as in the sockeye season, a price settlement between fishermen and processors was reached early in the season.

It was evident, after the first two periods, that the returning run was strong, and the fishery continued uninterrupted until the week ending October 7, when the final delivery was made. The season total catch of 220,743 coho salmon (Table 4) was the largest recorded for this district since 1968. Figure 12 presents the coho catch from 1965 to 1978.

Escapement. - Because of the normal adverse weather encountered during the fall, comparable annual salmon escapement indices are not available. However, early surveys indicated above average escapement, and conversations with sport fishermen along with informal creel censuses verified strong escapements.

Table 3. Bering River commercial salmon catch by week, 1978.

Week	King	Sockeye	Coho	Pink	Chum	Total	No. Boats
24	84	6,678	8	3	415	7,188	57
25	62	10,198	214	10	764	11,248	38
26	27	4,602	75	44	605	5,353	12
27	15	1,955	292	-	190	2,452	11
28	28	7,114	164	30	253	7,589	7
29	96	2,063	352	43	117	2,671	9
30	13	624	196	13	56	902	6
31	4	305	85	27	3	424	3
32	CLOSED						
33	-	-	103	-	-	103	2
34	1	12	7,158	57	-	7,228	47
35	1	1	19,044	16	-	19,062	61
36	-	2	38,508	11	-	38,521	90
37	-	-	10,611	1	-	10,612	92
38	-	-	11,193	-	-	11,193	45
39	-	-	2,422	-	-	2,422	8
40	-	-	449	-	-	449	3
TOTAL	331	33,554	90,874	255	2,403	127,417	

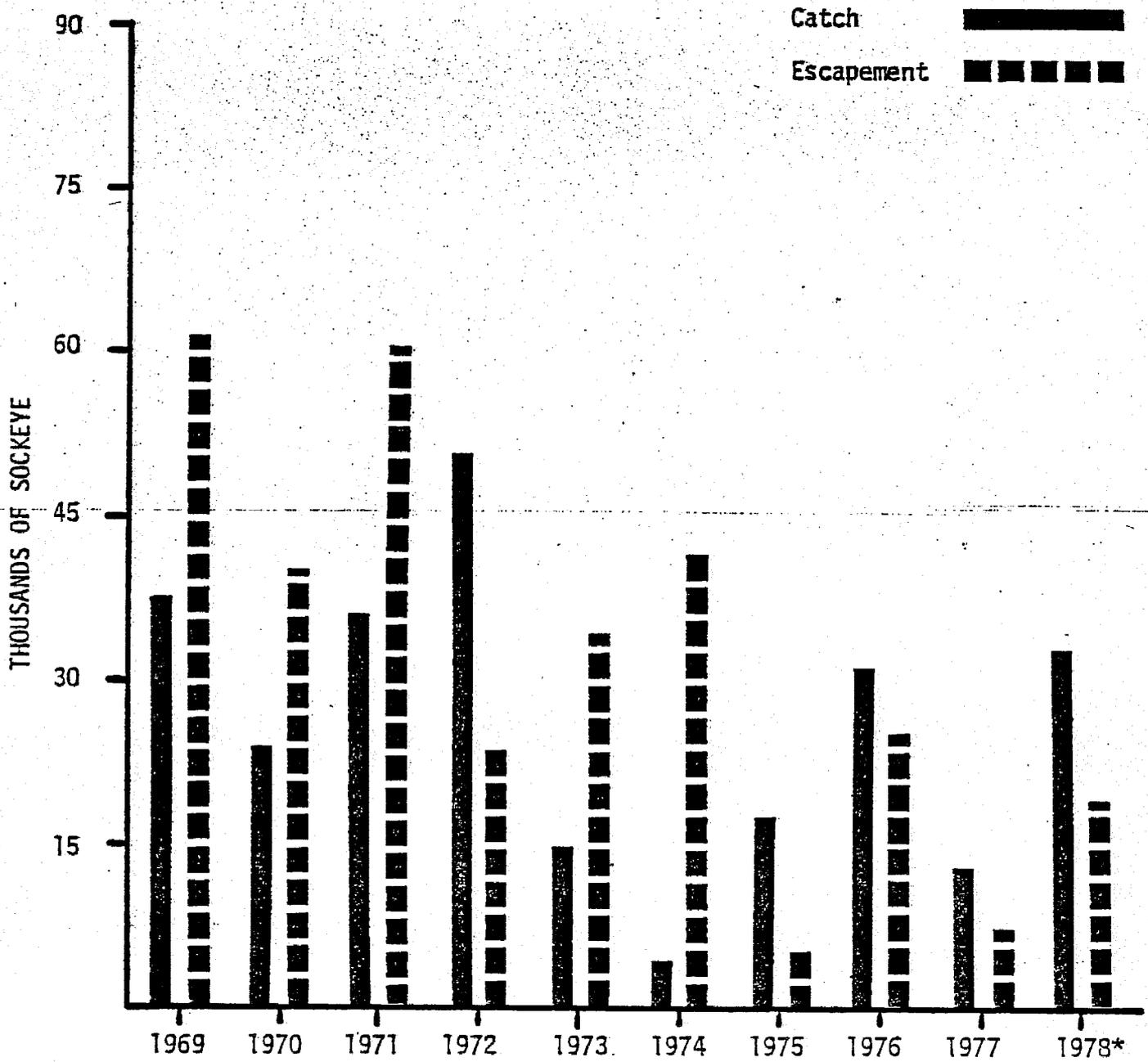


Figure 9. Bering River sockeye salmon catch and escapement, 1969 - 1978.

* Preliminary.

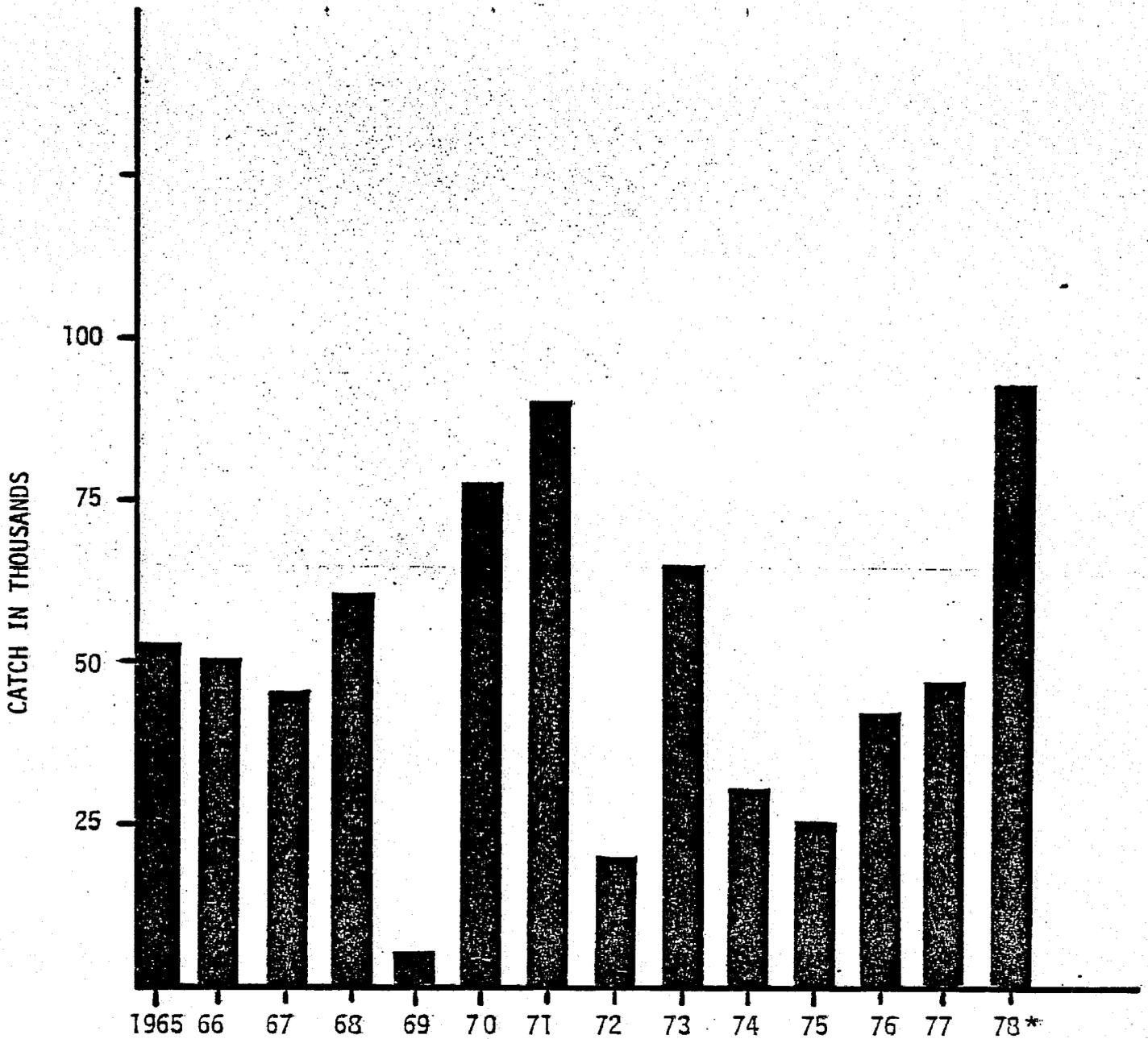


Figure 10. Bering River coho salmon catch, 1965 - 1978.

* Preliminary.

Table 4. Copper River commercial salmon catch by week, 1978,

Week	King	Sockeye	Coho	Pink	Chum	Total	No. Boats
20	9,129	63,687	-	-	199	73,015	430
21	5,642	28,862	-	-	41	34,545	437
22	12,029	101,075	3	-	1,594	114,701	458
23	CLOSED						
24	CLOSED						
25	2,225	30,327	23	3	254	32,832	165
26	CLOSED						
27	CLOSED						
28	26	8,003	9	8	6	8,052	69
29	13	7,348	12	62	36	7,471	57
30	18	7,199	1,429	757	29	9,432	133
31	22	3,756	2,724	1,168	26	7,696	115
32	1	745	4,787	921	1	6,455	63
33	4	371	29,151	377	9	29,912	115
34	4	129	32,191	156	38	32,518	263
35	1	15	60,063	42	1	60,122	270
36	1	6	51,428	16	1	51,452	250
37	-	2	10,840	3	-	10,845	186
38	-	-	15,204	1	-	15,205	121
39	-	-	10,871	-	-	10,871	99
40	-	-	2,008	-	-	2,008	38
TOTAL	29,115	251,525	220,743	3,514	2,235	507,132	

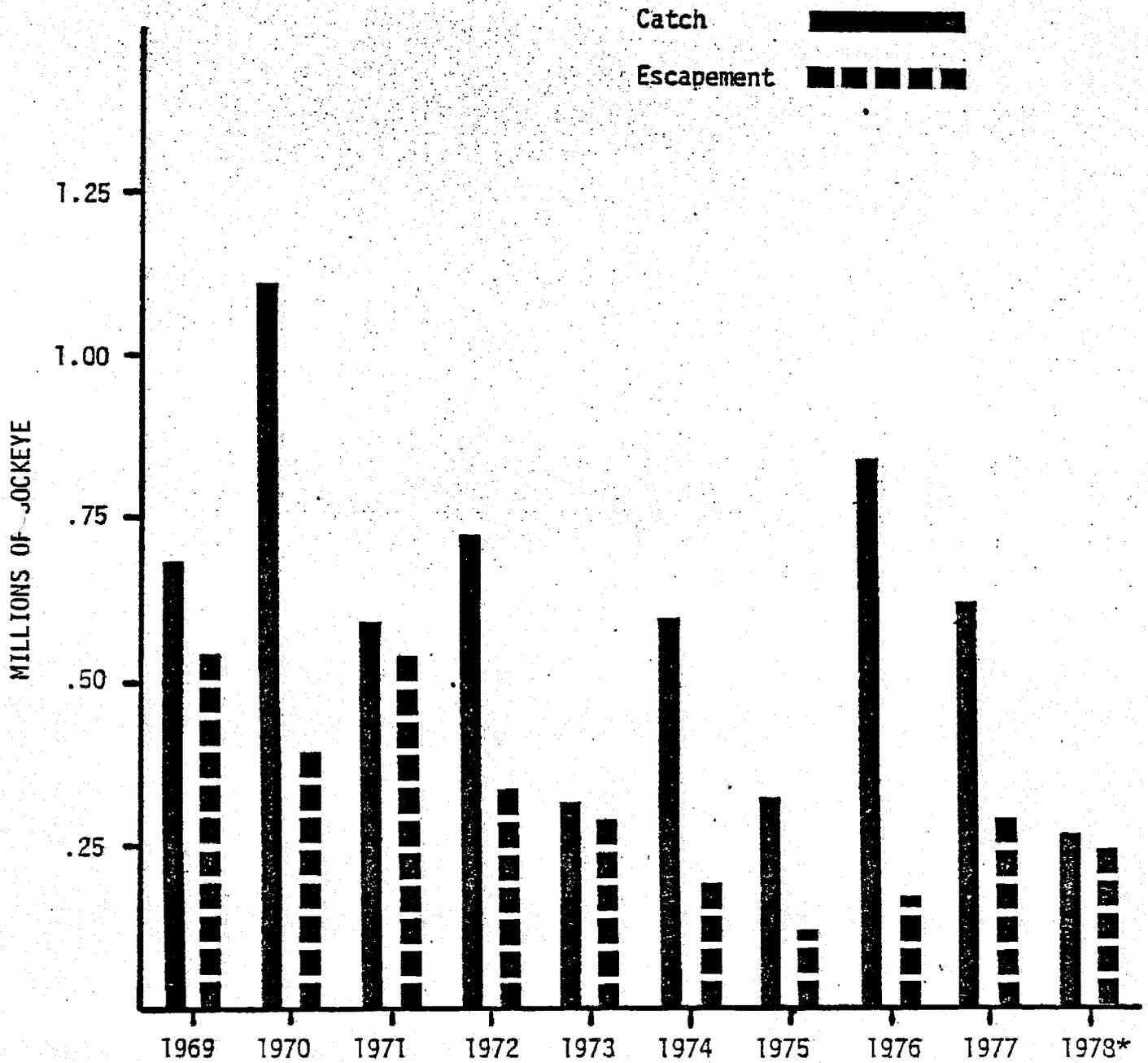


Figure 11. Copper River sockeye salmon catch and escapement, 1969 - 1978.

* Preliminary.

Table 5. Prince William Sound Area subsistence fishery, 1978.

Area	Number Permits Issued	Type of Gear	Catch			
			Sockeye	Kings	Cohos	Other ^{2/}
Upper Copper River ^{1/}	3,313	Dip Net	16,863	1,554	424	5
Upper Copper River ^{1/}	392	Fish Wheel	5,553	393	163	11
Copper River Flats ^{3/}	34	Drift Gill Net	18	37	12	10
Prince William Sound	2	Purse Seine	0	0	0	0
McKinley Lake	1	Set Net	0	0	0	0
TOTAL	3,742		22,434	1,984	599	26

^{1/} Compiled from reports received through 12/1/78. Estimated 1,500 sockeye to be reported on late returns.

^{2/} Includes pink salmon, whitefish, steelhead, cutthroat, Dolly Varden, lamprey, lingcod and grayling.

^{3/} Catch from nine fishermen.

^{4/} Whitefish permit.

Table 6. Copper River and Bering River sockeye, chinook and coho salmon escapement, 1978. 1/

Location	Glacial	Date ^{2/}	Method	Sockeye	Chinook	Coho
Eyak River						
Hatchery Creek		8/25	W	300		
Eyak Lake		8/25	A	13,450		
Ibek Creek			A	0		
Scott Lake			A	0		
Bear Lake						
Power Creek		8/25	A	2,500		
Alganik Slough						
McKinley Lake		8/17 & 18	A	17,000+		
Salmon Creek		8/17 & 18	A	2,819+		
Pete Dahl Slough						
Mile 26 and 27 Creeks		7/25	A	2,000		
Copper River Delta						
Mile 39 Creek		8/18	A	6,900		
		9/20	A			4,500
Goat Mountain Creek		7/20	A	1,000		
Pleasant Creek	turbid	NS				
Martin River						
Tokun Lake		8/18	A	3,500		150
Tokun Lake		8/25	A	6,600		
Tokun River		8/25	A	4,000		
Martin Lake		8/18	A	10,500		
Martin Lake Outlet		8/18	A	(included with Martin L. count)		
Martin Feeders		7/25	A	1,500+ (poor conditions)		
Little Martin Lake		8/18	A	4,500		
Pothole Lake		8/18	A	(22 schools - est. 1,500+ reds)		
Ragged Point Lake		8/18	A	5,500		
Ragged Point Outlet		8/18	A	0		
Martin River Slough						
		6/28	A	6,300		
		8/25				1,700
Bering River						
Bering Lake		6/28	A	5,000		
Dick Creek		7/25	A	6,300		
Shepard Creek		6/28	A	6,000		
Carbon Creek	muddy	NS				
Maxwell Creek	muddy	NS				
Kushtaka Lake		7/25	A	3,500		
Clear Creek		NS				
Trout Creek		NS				
Katailla River		8/25	A			3,200
Stillwater Creek		NS				

Table 6, cont. Copper River and Bering River sockeye, chinook and coho salmon escapement, 1978. 1/

Location	Glacial	Date ^{2/}	Method	Sockeye	Chinook	Coho
Bremner River						
Peninsula Lake		8/18	A	10		
Salmon Creek		8/18	A	50		
Steam Boat Lake		8/18	A	25		
Unnamed Creek		8/18	A	3		
Tieket River Lake		8/18	A	15		
Tonsina River						
Lower Tonsina Creek	Glacial					
Little Tonsina River		8/2	A		285	
Tonsina Lake	Glacial	10/26	A	4		
Bernard Creek		8/18	A		0	
Grayling Creek		8/2	A		92	
Klutina River						
Manker Creek	Glacial	8/2	A			20
Mahlo Creek		8/2	A	300		
Hallet Slough	Glacial	8/25	A	20		
Curtis Creek		8/2	A	0		
St. Anne Creek		8/2	A	1,150		24
Tazlina River						
Mendeltna Creek	Glacial	8/25	A	725		
Kiana Creek		8/25	A	2		
Gulkana River						
Middle to West Fork		7/31	A	1,000	328	
West Fork		7/31	A	125	21	
Moose Creek		NS				
Keg Creek		7/28	A	1,050		
Victor Creek		7/28	A	2,500		
Middle Fork		7/31	A	800	88	
Dickey Lake		6/29	A	75		
Swede Lake		8/23	A	80		
Hungry Hollow Creek		10/1	A	232	0	
East Fork to Paxson Lake		7/28	A	2,500	45	
Paxson Lake		7/28	A	0		
Paxson Lake Inlet		7/28	A	5,000		
Paxson Lake to Mud Creek		7/28	A	2,700		
Mud Creek		7/28	A	150		
Mud Creek to Summit Lake		7/28	A	800		
Fish Lake		7/17	A	2,650	(W 3,896 in total count)	
Summit Lake		7/28	A	0		
Gunn Creek		7/28	A	2		
Gakona River						
Spring Creek		7/31	A			74

Table 6, cont. Copper River and Bering River sockeye, chinook and coho salmon escapement, 1978. 1/

Location	Glacial	Date ^{2/}	Method	Sockeye	Chinook	Coho
Chistochina River	Glacial					
East Fork		7/31	A		137	
Eagle Creek		7/28	A	20	10	
Mankomen Lake		7/28	A	0		
Stana River	Glacial					
Mentasta Lake		7/28	A	3,600		
Fish Creek		7/28	A	1,300		
Bad Crossing #1		7/28	A	100		
Bad Crossing #2		7/28	A	500		
Suslota Lake		8/23	A	1,200		
Bone Creek		8/23	A	20		
Indian River		7/31	A		9	
Ahtel Creek		NS				
Tanada Creek		8/23	A	100		
Tanada Lake		8/23	A	525		
Tanada Outlet		8/23	A	2,000		
Lakina River	Glacial					
Long Lake		10/26	A W	1,425 (15,458 in total count)		
Clear Creek		NS				
Tana River	Glacial					
Tana R. Clear Channels	Glacial	8/18	A	434	10	
Tana Lake Inlet		8/18	A	0		
West Fork Clear Channels		8/18	A	70		
TOTAL				159,210	1,143	9,550

1/ Escapement refers to peak survey.

2/ Date refers to peak sockeye salmon escapement. May or may not refer to chinook or coho salmon counts.

A Signifies survey from air.

W Signifies survey on the ground.

Table 7. Comparable estimated sockeye salmon spawning escapements in selected systems, Copper River, 1973 - 1978. 1/

System	1973	1974	1975	1976	1977	1978
Eyak Lake	6,000	4,625	17,500	8,500	11,000	16,250
McKinley Lake	1,800	2,000	8,000	6,000	15,000	17,500
39 Mile Creek	5,511	2,400	2,500	3,500	4,500	6,500
Lake Tokun	8,000	1,468 <u>2/</u>	1,200 <u>3/</u>	8,500	5,500	6,600
Little Martin Lake	1,500	1,500	2,000	8,000	1,550	3,500
Martin Lake	2,000	1,500	460	4,000	6,087	10,500
Martin River Slough	1,990	5,000	400	2,500	3,100	6,300
Copper River Delta Subtotal	26,801	18,493	32,060	41,000	46,737	67,150
Mentasta Lake	6,196	700	450	600	3,500	3,600
Gulkana River	32,812	15,780	7,766	19,693	28,071	1,000
St. Anne Creek	7,400	2,100	499	1,700	7,100	1,150
Mahlo River	4,500	500	314	600	5,200	300
Mendelta Creek	2,868	332	325	900	1,250	725
Upper Copper River Subtotal	53,776	19,412	9,254	23,493	45,121	6,775 <u>4/</u>
TOTAL	80,577	37,905	41,314	64,493	91,858	73,925

1/ Peak count estimates from aerial and ground counts unless otherwise noted.

2/ Weir counts.

3/ Weir count was 329 sockeye.

4/ Upper Copper River counts from aerial surveys.

Table 8. Sonar counts of sockeye salmon escapement to the spawning tributaries of the upper Copper River, 1978.

<u>Date</u>	<u>Actual Sonar Count</u>	<u>Doubled ^{1/} to Include Both Banks</u>	<u>Cumulative Count</u>	<u>Date</u>	<u>Actual Sonar Count</u>	<u>Doubled ^{1/} to Include Both Banks</u>	<u>Cumulative Count</u>
5/26	456	912	912	7/13	152	304	189,978
27	761	1,522	2,434	14	264	528	190,506
28	349	698	3,132	15	250	500	191,006
29	1,111	2,222	5,354	16	489	978	191,984
30	2,946	5,892	11,246	17	276	552	192,536
31	2,317	4,634	15,880	18	258	516	193,052
6/ 1	2,378	4,756	20,636	19	292	584	193,636
2	2,555	5,110	25,746	20	216	432	194,068
3	1,670	3,340	29,086	21	74	148	194,216
4	2,960	5,920	35,006	22	16	32	194,248
5	2,700	5,400	40,406	23	14	28	194,276
6	3,016	6,032	46,438	24	36	72	194,348
7	3,462	6,924	53,362	25	12	24	194,372
8	2,977	5,954	59,316				
9	2,047	4,094	63,410				
10	3,159	6,318	69,728				
11	2,264	4,528	74,256				
12	1,893	3,786	78,042				
13	2,199	4,398	82,440				
14	2,577	5,154	87,594				
15	2,648	5,296	92,890				
16	2,529	5,058	97,948				
17	2,526	5,052	103,000				
18	2,055	4,110	107,110				
19	2,759	5,518	112,628				
20	2,759	5,518	118,146				
21	2,286	4,572	122,718				
22	1,880	3,760	126,478				
23	2,583	5,166	131,644				
24	2,378	4,756	136,400				
25	1,936	3,872	140,272				
26	1,610	3,220	143,492				
27	1,980	3,960	147,452				
28	1,003	2,006	149,458				
29	1,458	2,916	152,374				
30	1,484	2,968	155,342				
7/ 1	1,443	2,886	158,228				
2	2,303	4,606	162,834				
3	2,297	4,594	167,428				
4	2,709	5,418	172,846				
5	2,063	4,126	176,972				
6	1,475	2,950	179,922				
7	1,047	2,094	182,016				
8	755	1,510	183,526				
9	861	1,722	185,248				
10	1,138	2,276	187,524				
11	765	1,530	189,054				
12	310	620	189,674				

^{1/} Only one sonar available for counts.

Table 9. Expected escapement by week based upon percent of average weekly sockeye salmon catch from the Copper River district to produce 250,000 desired escapement and 200,000 minimum escapement.

<u>Week</u>	<u>Average Catch</u>	<u>Years</u>	<u>Percent</u>	<u>Minimum Escapement</u>	<u>Expected Average Escapement</u>	<u>Cumulative Expected Average Escapement</u>
20	32,602	(9)	4.7	9,400	11,750	11,750
21	102,868	(15)	14.8	29,600	37,000	48,750
22	144,653	(16)	20.9	41,800	52,250	101,000
23	132,503	(18)	19.1	38,200	47,750	148,750
24	76,753	(18)	11.1	22,200	27,750	176,500
25	61,650	(18)	8.9	17,800	22,250	198,750
26	48,838	(17)	7.0	14,000	17,500	216,250
27	33,387	(18)	4.8	9,600	12,000	228,250
28	27,032	(18)	3.9	7,800	9,750	238,000
29	16,415	(18)	2.4	4,800	6,000	244,000
30	10,429	(18)	1.5	3,000	3,750	247,750
31	4,660	(17)	0.7	1,400	1,750	249,500
32	1,476	(17)	0.2	400	500	250,000
33	298	(13)	0.04	80	100	250,100
AVERAGE				200,080	250,100 *	

* Escapement upriver.

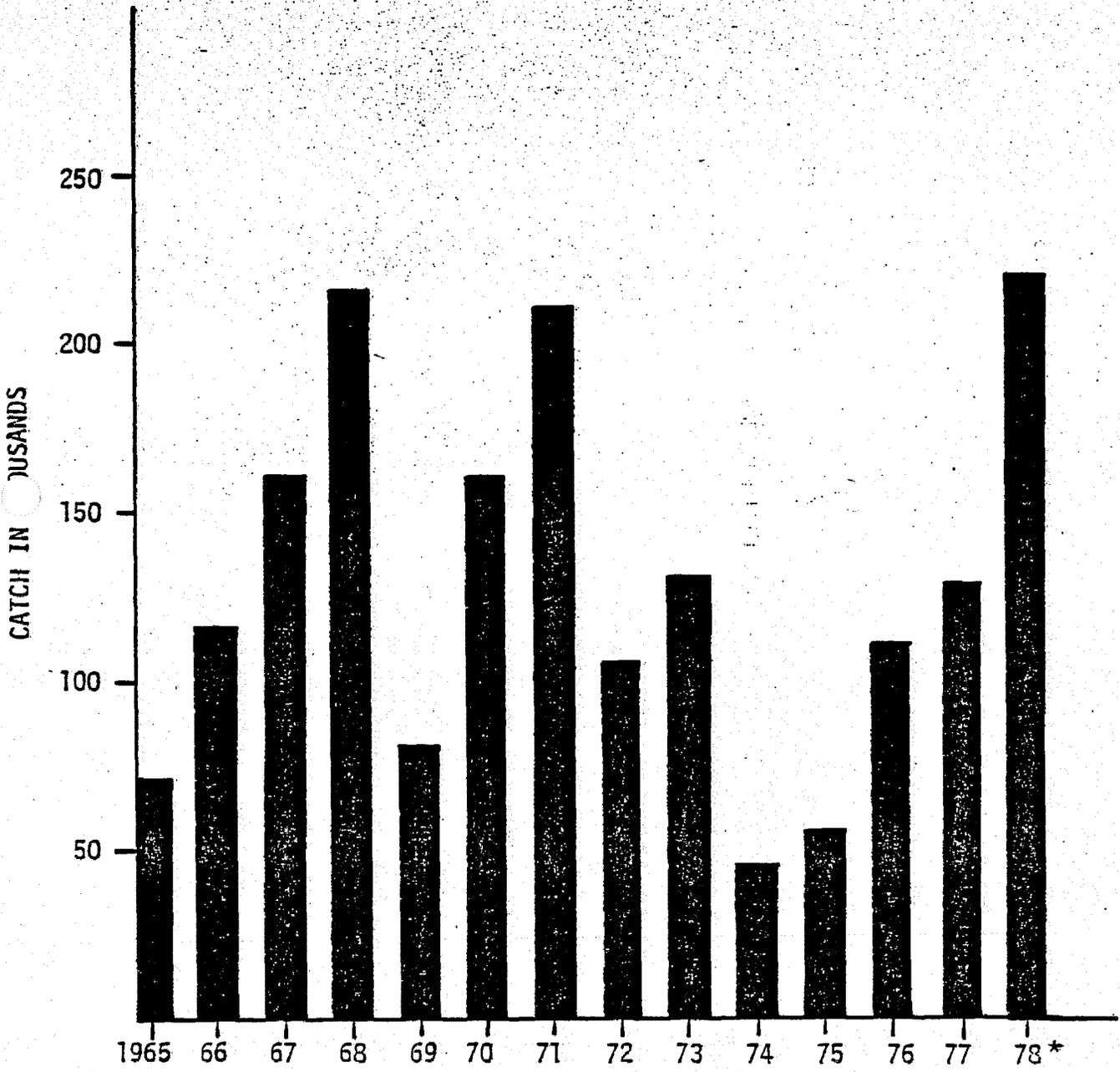


Figure 12. Copper River coho salmon catch, 1965 - 1978.

* Preliminary.

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PRINCE WILLIAM SOUND GENERAL DISTRICTS

Introduction. - The General districts include all of Prince William Sound exclusive of the Coghill, Unakwik and Eshamy districts, and is made up of the Eastern, Northern, Northwestern, Southwestern, Montague and Southeastern districts inclusively (Figure 1). The legal gear is purse seine, and the fishery is managed primarily for pink and chum salmon which provide about 95 percent of all the species catch.

Fishing seasons vary from year to year, but generally begin in early or mid-July (late July in some years) depending upon the strength of various segments of the runs, and usually extend into the first or second week of August. For several years the weekly fishing was five days per week, 6:00 a.m. Monday until 6:00 a.m. Saturday, but in 1970 the weekly fishing time was changed to 6:00 a.m. Monday until 9:00 p.m. Friday, which is the present weekly fishing period.

Legal gear, as indicated, is purse seine, and each seine is limited to a maximum of 150 fathoms in length and a maximum depth of 17 fathoms. Leads of a maximum length of 75 fathoms may be used with the purse seine. Two methods of using seine leads have been employed in Prince William Sound: 1) attaching the lead to the shore and fastening the outer end to the seine by use of the seine jitney (skiff). Fishing done in this manner is referred to as a hook haul; and, 2) double-pinning the lead and seine (overlapping) and using the whole as a single net. The seine and lead are often used in this manner to make open water tow-hauls.

The 1978 general purse seine fishery was scheduled to open in the Northern and Eastern district on July 17. Aerial surveys conducted during June showed earlier runs of both pink and chum salmon and strong returns of chum salmon to early spawning streams and the season was opened one week earlier on July 10. The fishery in the Northern and Eastern district remained open until closed on July 21 because of a weak showing of early and middle run pink salmon.

The purse seine fishery was subsequently reopened in the Northern, Eastern and Southeastern district for two days on August 3. The fishery closed on August 4 and reopened again in these districts on August 9 on an every other day basis until closed in the Southeastern district on August 11 and in the Northern and Eastern district on August 16.

A limited fishery was later allowed in Port Valdez and Port Fidalgo on August 22 to harvest primarily surplus pink salmon. Strong runs of pink salmon to Duck River in Galena Bay allowed the bay to remain open and fishing continued there until late August when processors quit purchasing pink salmon.

The Northwestern, Southwestern and Montague districts remained closed throughout the season.

PINK SALMON

Forecast. - The preliminary forecast of the 1978 pink salmon return was a point estimate of 4.2 million with a range estimate of 2.7 million to 5.7 million, based upon pre-emergent fry indices obtained from a standard list of streams and sample zones. (Informational Leaflet No. 173, February 1978).

The total pink salmon return estimated from catch and escapement was 3.9 million which compares favorably with the point forecast of 4.2 million and falls in the lower range of the forecast. The percent of error is +7.14, Table 10.

Catch. - The catch for the general districts by week by purse seines is shown in Table 11. Figures 13 and 14 show the odd and even year pink salmon catch and escapement for all districts since 1964.

The parent year pink salmon (1976) produced strong returns of early and middle run pinks, and the same pattern was expected from the 1978 returns. Aerial surveys conducted during late June and early July indicated runs of both pinks and chums were early and were returning as forecast with strong early runs. The purse seine season was opened July 10, one week earlier than the scheduled July 17 date, on the basis of strong showings in some early spawning streams.

Early and middle runs of pink salmon failed to materialize and poorer than expected buildup in bay sanctuaries and continuing small catches through mid-July prompted an early purse seine season closure on July 21.

Monitoring of the pink runs by both aerial and ground surveys was continued which showed strong and unexpected late runs of pinks returning to both the Northern and Eastern districts and average buildups in the Southeastern district. A good showing of migrating salmon was particularly evident in the northern and northeastern areas of Prince William Sound. On the basis of these observations the Eastern, Northern and Southeastern districts were opened for a limited fishery on August 3 and 4. Pink salmon catches on these dates were good and catches of chums continued to be excellent. The Eastern, Northern and Southeastern districts were reopened to fishing on August 9 on an every other day basis; however, it was necessary to close the Southeastern district on August 11 in order to obtain adequate pink salmon escapement.

As the season progressed it became evident from aerial surveys that very late run stocks of pinks to Eastern district streams were strong and would support a limited fishery. Fishing was closed in the Northern and Eastern districts on August 16 and reopened in Port Fidalgo and Valdez Arm on August 22. Fishing was allowed to continue in Galena Bay after August 22 to harvest surplus stocks of pinks destined for Duck River. Sufficient quantities of pink salmon were in the streams of Galena Bay so the purse seine fishery was allowed to continue uninterrupted until processors stopped purchasing Galena Bay pinks in late August.

Table 12 presents the pink salmon catch for all gear for all Prince William Sound districts from 1968 to 1978.

Escapement. - Weekly aerial spawning escapement counts and periodic ground surveys were conducted throughout the season beginning in late June and terminating in early September. Escapement estimates of pinks in closed areas and in streams are used for in-season management and for calculating season escapements. Estimated pink salmon escapement by district is summarized in Table 13 which also shows a comparison with desired escapement levels.

The estimated pink salmon spawning escapement totaled 1.05 million as compared to a desired maximum level of 1.50 million. The desired escapement was obtained in two districts, namely, the Northern and Southwestern - Eshamy. The Eastern district which received about 67 percent of the minimum desired escapement suffered a loss of early and middle run pinks.

Montague district made substantial gains over the parent year pink escapement. In 1976 the district produced only 12 percent of the minimum desired escapement and in 1978 about 46 percent. The district was closed to fishing both of these years.

The distribution of the 1978 pink escapement was generally good and showed an improvement over recent even-year returns. The complete fishing closures in the southwestern portions of the Sound produced excellent spawning escapement of pinks to the Northwestern, Eshamy and Southwestern districts. The Southwestern district received the largest pink salmon escapement since statehood.

CHUM SALMON

Forecast. - The preliminary forecast for the 1978 chum salmon return was a point estimate of 640,000 with a range of 280,000 to 920,000 based upon pre-emergent fry indices similar to those used for pink salmon (Informational Leaflet No. 173).

Total chum salmon return estimated from catch and escapement totaled 646,000 which compares very closely with the point forecast of 640,000. The percent of error is -1.56, Table 10.

Catch. - The catch for the General districts by week for all species is shown in Table 11. Figure 15 shows the chum salmon catch and escapement since 1969. A catch of 353,000 chum salmon was reported taken from the General districts by purse seines which represents 72 percent of the total chums reported from the Prince William Sound Area. As expected, the majority of the catch was obtained from the northern and eastern section of Prince William Sound with early runs making up the bulk of the catch. Late chums and pinks in Port Fidalgo allowed one day of extended fishing along with late runs of pinks in Galena Bay. An emergency order opening on August 22 in Port Fidalgo and Valdez Arm produced a chum catch of 12,262 or about 2.5 percent of the total area catch. The total area catch of 438,200 compares to a ten year average of 423,400 or a little better than average catch of chums. Table 12 presents the chum salmon catch for all gear for all Prince William Sound districts from 1968 to 1978.

Table 14 shows the age composition of the 1978 chum salmon from the commercial catch to be predominately four-year fish; however, a high (23.5) percent of five-year chums was also present. In 1977 about 90 percent of the chums were four-year and only seven percent five-year fish.

Escapement. - Weekly aerial spawning escapement counts and periodic ground surveys were conducted throughout the season beginning in late June and terminating in early September. Estimated chum salmon escapement by district is summarized in Table 13 which also shows a comparison with desired escapement levels.

The estimated chum salmon spawning escapement was 161,880 for all districts, Table 13, with only the Eastern district receiving the desired escapement level. The Northern district had an escapement level of 86 percent of the desired minimum level while the Northwestern - Coghill was 57 percent of the minimum. The other districts received disasterously low escapements with the Montague district receiving no observed chum salmon for the second year in a row. The very poor chum escapements occurred in the Southwestern - Eshamy and Montague districts despite the complete fishing closure of these areas during the 1978 season. No, or minor, improvement is evident over the poor parent year chum escapements observed in 1974 in these districts. Figure 15 presents a graph of both catch and escapement for all districts for the past ten-year period.

OTHER SALMON

Catch. - Other incidental salmon catches taken during the General Districts purse seine fishery include sockeye, coho and king. Significant catches of sockeye salmon are taken from the General District by purse seines with a recent high catch of 285,584 being taken in 1969. Table 11 shows the 1978 catch to be 9,017. Several lake systems in Prince William Sound contribute to the sockeye catch, and among the more significant sockeye producers are Coghill and Eshamy Lakes which are dealt with separately in this report. The low sockeye catch from the General Districts is due primarily to a complete fishing closure of several districts in 1978.

Coho salmon are the next most abundant of the incidentally taken species with a recent high catch of 30,551 in 1970. The 1978 catch of 1,392 is shown in Table 11. Coho salmon are produced in numerous small stocks throughout Prince William Sound. The most notable production areas being Stream No. 19 in Simpson Bay; Stream No. 65 at Hell's Hole; and Stream No. 137, Lowe River at the head of Port Valdez.

King salmon contribute insignificant numbers in the General Districts purse seine catch with a recent high catch of 3,551 in 1971. Table 11 shows a 1978 catch of 340.

There are no known king salmon spawning areas in Prince William Sound, and purse seine catches generally consist of small immature kings.

Table 12 presents the king, sockeye and coho salmon catch for all gear for all Prince William Sound districts from 1968 to 1978.

Escapement. - Only sockeye salmon spawning escapements are regularly recorded from streams (Lakes) in the General Districts (Table 15). Peak counts are used as the estimated spawning escapement. Since 1960 sockeye escapements into Bainbridge Lake have ranged from 100 to 2,000; in Billy's Hole Lake from 0 to 3,600; in Jackpot Lake from 300 to 7,000; in Lake Shrode from 50 to 8,000; and in Robe Lake from 500 to 9,000 (see Data Report No. 10, 1978).

HATCHERIES

In 1978 the Prince William Sound Aquaculture Corporation hatchery at Port San Juan was in operation. Their annual report for the year is presented in Appendix D.

Table 10. Comparison of Prince William Sound pink, chum and sockeye salmon run forecasts showing the percent of error, 1962 - 1978.

Year	Pink		Chum		Sockeye	
	Mean Forecast	Percent Error	Mean Forecast	Percent Error	Mean Forecast	Percent Error
1962	8.9	+ 2.25				
1963	5.0 ^{3/}	-32.00	0.92	+ 8.00	0.19	+ 5.26
1964	6.1	+ 1.64	0.39	+46.58	0.09	+55.55 *
1965	4.2	+19.05	0.65	-12.07		
1966	6.3	+36.51	0.45	- 2.27		
1967	3.3	-15.15	0.55	+19.12		
1968	3.1	-12.90	0.48	- 9.09		
1969	5.8	- 1.72	0.33	+ 2.94		
1970	4.4	+13.64	0.74	+ 2.63.		
1971	6.2	-34.57	0.47	+41.25		
1972	1.7	+47.06	1.28	100.00		
1973	2.7	-17.85	0.28	+ 3.45		
1974	2.0	+35.00	0.15	+31.81		
1975	4.3	-41.86	0.46	+74.44		
1976	6.7	+41.79	0.71	+ 5.63		
1977	6.3	+ 1.59	0.65	- 1.56		
1978	4.2	+ 7.14				

1/ In millions of fish.
 2/ (Mean Forecast minus Actual Estimated Return)
 Mean Forecast

3/ Weighted fry densities to include upstream production indicated 5.8 million, or an error of -13.2 percent.
 4/ Using expanded estimate of 4 year return to total.
 * Estimated.

Table 11. General districts purse seine salmon catch by week, by species, 1978.

Week	King	Sockeye	Coho	Pink	Chum	Total	No. Boats
28	138	4,761	244	267,627	120,417	393,187	155
29	172	2,767	202	332,329	94,714	430,184	184
30	CLOSED						
31	13	681	78	834,253	37,219	872,244	167
32	13	552	732	750,705	47,495	799,497	178
33	3	246	134	348,600	40,840	389,823	157
34	-	9	2	124,975	12,262	137,248	58
35	1	1	-	5,273	15	5,290	6
TOTAL	340	9,017	1,392	2,663,762	352,962	3,027,473	

Table 12. Annual commercial salmon catch from all Prince William Sound districts, by all gear, by species, 1968--1978.

Year	King	Sockeye	Coho	Pink	Chum	Total
1968	1,523	121,804	11,693	2,452,168	342,939	2,930,127
1969	3,340	285,584	12,866	4,828,579	320,977	5,451,346
1970	1,031	104,169	11,485	2,809,996	230,661	3,157,342
1971	3,551	88,368	30,551	7,310,964	574,265	8,007,699
1972 ^{1/}	547	197,526	1,634	54,783	45,370	299,860
1973	2,405	124,802	1,399	2,056,878	729,839	2,915,323
1974 ^{1/}	1,590	129,366	801	448,773	88,544	669,074
1975	2,519	189,613	6,142	4,452,805	100,479	4,751,558
1976	1,044	112,809	6,171	3,018,991	370,478	3,509,493
1977	648	310,358	843	4,513,082	572,610	5,397,541
1978*	1,043	220,329	1,464	2,785,156	483,559	3,491,551

^{1/} General purse seine season closed.

* Preliminary data.

Table 13. Prince William Sound escapement estimates, 1978.

<u>Pink Salmon</u>		
<u>District</u>	<u>Desired Escapement</u>	<u>Estimated Escapement</u>
Eastern	403,750 - 484,500	268,940
Northern	140,000 - 168,000	159,870
Northwestern & Coghill	262,500 - 315,000	200,950
Southwestern & Eshamy	112,500 - 135,000	220,610
Montague	106,250 - 127,500	48,680
Southeastern	225,000 - 270,000	156,830
TOTAL	1,250,000 - 1,500,000	1,055,610

<u>Chum Salmon</u>		
<u>District</u>	<u>Desired Escapement</u>	<u>Estimated Escapement</u>
Eastern	87,200 - 109,000	102,290
Northern	29,400 - 36,750	25,410
Northwestern & Coghill	48,600 - 60,750	27,650
Southwestern & Eshamy	3,400 - 4,250	500
Montague	11,400 - 14,250	0
Southeastern	20,000 - 25,000	6,030
TOTAL	200,000 - 250,000	161,880

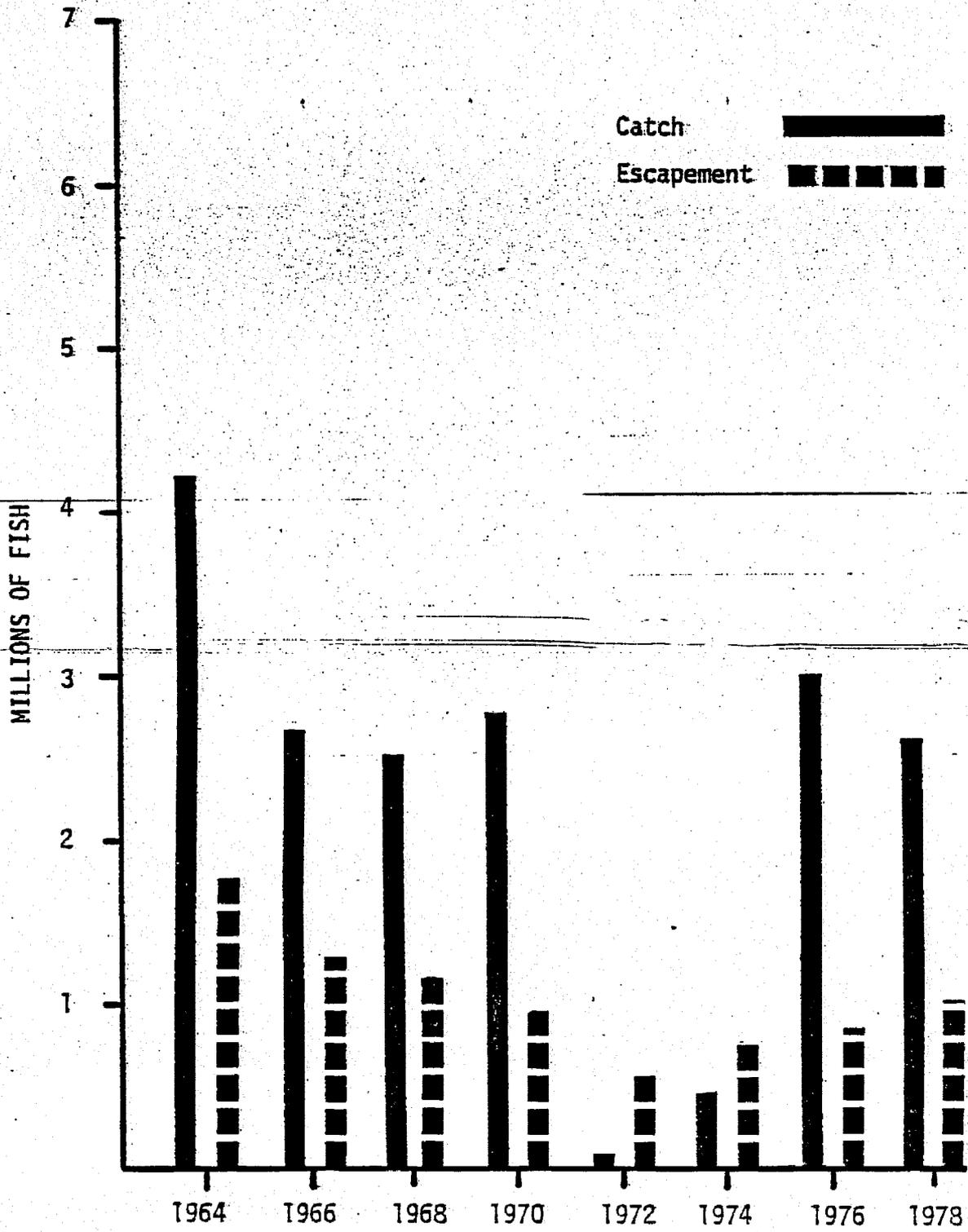
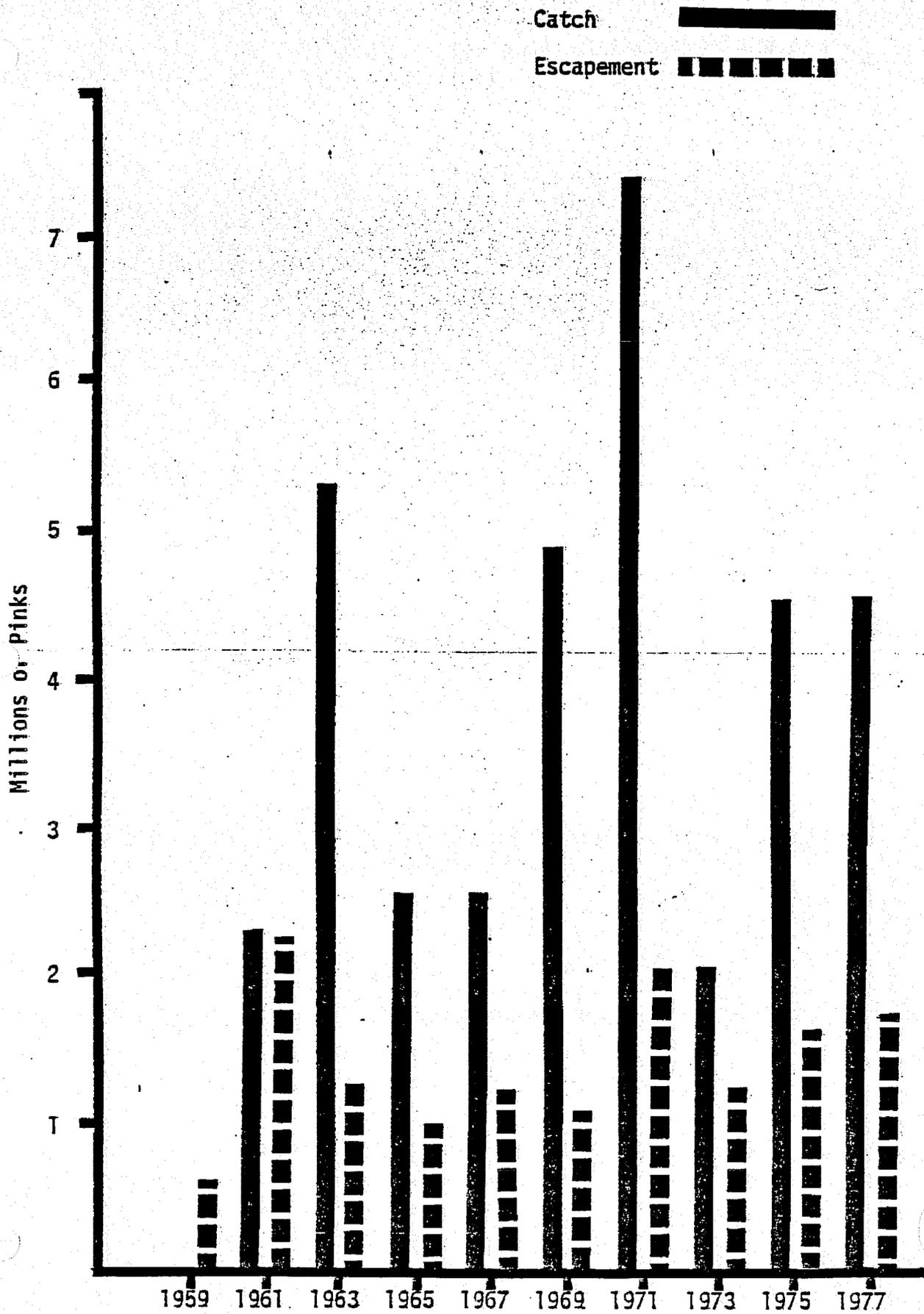


Figure 13. Prince William Sound pink salmon even year catch and escapement.



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Figure 14. Prince William Sound pink salmon odd year catch and escapement.

Table 14. Chum salmon commercial catch age composition, by sex and date, Prince William Sound, 1978.

Date and Sex	Age Class				Total
	3	4	5	6	
<u>6/18 - 7/29 1/</u>					
Males					
Number	6,003	34,536	23,122	0	63,661
Percent	9.43	54.25	36.32	0.00	50.96
Females					
Number	7,801	39,943	19,218	300	61,262
Percent	2.94	65.20	31.37	0.49	49.04
Sexes Combined					
Number	7,804	74,479	42,340	300	124,923
Percent	6.25	59.62	33.89	0.24	100.00
<u>- 7/15 2/</u>					
Males					
Number	7,603	54,872	22,479	0	84,954
Percent	8.95	64.59	24.46	0.00	50.69
Females					
Number	5,289	55,865	21,487	0	82,641
Percent	6.40	67.60	26.00	0.00	49.31
Sexes Combined					
Number	12,892	110,737	43,966	0	167,595
Percent	7.69	66.08	26.23	0.00	100.00
<u>7/16 - 29 2/</u>					
Males					
Number	5,254	45,606	6,005	0	56,865
Percent	9.24	80.20	10.56	0.00	50.08
Females					
Number	4,127	37,355	15,015	187	56,684
Percent	7.28	65.90	26.49	0.33	49.92
Sexes Combined					
Number	9,381	82,961	21,020	187	113,549
Percent	8.26	73.06	18.51	0.17	100.00
<u>7/30 -</u>					
Males					
Number	4,137	25,881	2,788	0	32,806
Percent	12.61	78.89	8.50	0.00	42.47
Females					
Number	5,675	35,302	3,462	0	44,439
Percent	12.77	79.44	7.79	0.00	57.53

Table 14, continued. Chum salmon commercial catch age composition, by sex and date, Prince William Sound, 1978.

Date and Sex	Age Class				Total
	3	4	5	6	
Sexes Combined					
Number	9,812	61,183	6,250	0	77,245
Percent	12.70	79.21	8.09	0.00	100.00
Total Catch					
Males					
Number	22,997	160,895	54,394	0	238,286
Percent	9.65	67.52	22.83	0.00	49.30
Females					
Number	16,892	168,465	59,182	487	245,026
Percent	6.89	68.76	24.15	0.20	50.70
Sexes Combined					
Number	39,889	329,360	113,576	487	483,312
Percent	8.25	68.15	23.50	0.10	100.00

1/ Coghill District fish only.

2/ General District fish only.

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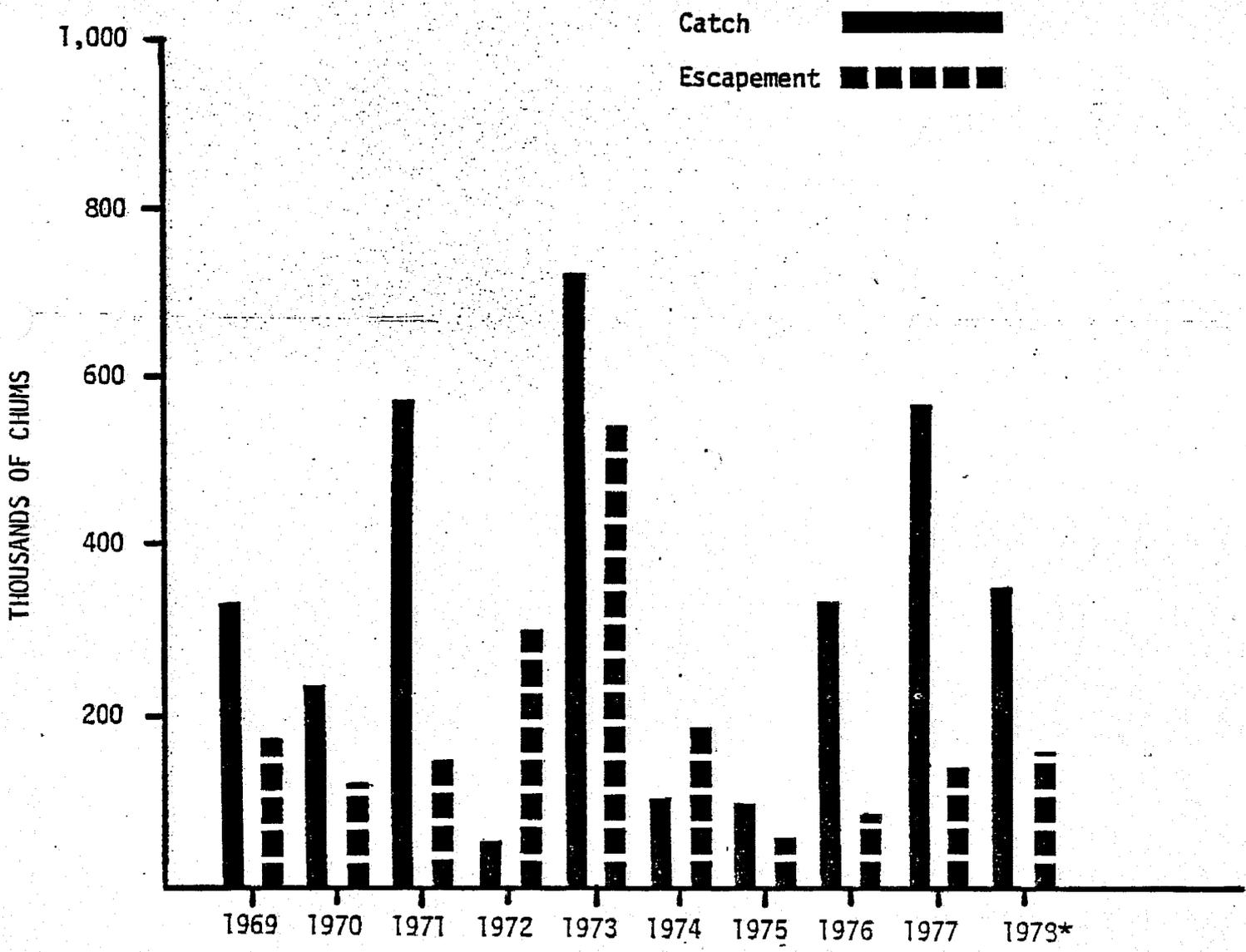


Figure 15. Prince William Sound chum salmon catch and escapement.

* Preliminary.

Table 15. Sockeye salmon estimated spawning escapement from selected systems in Prince William Sound, 1978.

Lake	Stream Number	7/7	7/17-18	7/27	8/1-4	8/7	8/11	8/14-15	TOTAL ^{1/}
Bainbridge	630		300	600	800		800		800
Billy's Hole	218	0	700		800			500	800
Jackpot	608						3000	1500	3000
Shrode	476		20	100	1700			900	1700
Robe	137		850					600	850
TOTAL									7150

^{1/} Peak count used.

SALMON FISHERY

COGHILL AND UNAKWIK DISTRICTS

Introduction. - The Coghill district is located in the northwest corner of Prince William Sound. The district is described in the Commercial Fishing Regulations as including water within one nautical mile of Esther Island on the south shore beginning at a point on the mainland shore at 60° 49' 22" N. lat., 147° 51' W. long.; all water of Esther Passage, all water of College Fjord and all water of Port Wells north of 60° 48' 30" N. lat., a boundary point to point line from Esther Rock to Pigot Point (Figure 1).

Unakwik district is located in northcentral Prince William Sound and is described in the Commercial Fishing Regulations as the waters of Unakwik Inlet north of 61° 01" N. lat.

The legal gear for both districts includes both purse seines and drift gill nets although drift gill nets far outnumber the purse seine gear, and in most years only gill net fishermen operate in the Unakwik district. The districts are managed separately from other Prince William Sound districts primarily to harvest sockeye salmon returning to Coghill River in the Coghill district and to Cowpen and Miners Lake in the Unakwik district. Substantial numbers of both pink and chum salmon are also taken in the Coghill district, and during recent pink salmon odd-year cycles a concerted effort has been made to manage separately the very large pink salmon runs returning to Coghill River. Very few pink and chum salmon are caught in the Unakwik district; the catch being primarily sockeye taken by drift gill nets. The catch from the Unakwik district seldom exceeds 10,000 sockeye.

SOCKEYE SALMON

Catch. - Historical catches of sockeye from the Coghill district date back to 1961 when the district was first established to manage separately the run of sockeye returning to Coghill lake. Unakwik district was established in 1962 to manage separately the sockeye runs returning to Cowpen and Miners Lakes. Sockeye catches from the Coghill district have ranged from the 1978 high catch of 201,928 to a low catch of 36,273 in 1970 (Table 17) and Figure 16. The high catch of sockeye was taken in 1978 despite the fact that the weekly fishing time prior to July 1 had been reduced to four days in the Coghill district where prior to 1977 fishing was allowed five days per week; also, a complete fishing closure was in effect in 1978 from 6/29 to 7/10. Table 16 presents the catch by species by week for both districts.

Unakwik district sockeye catches have ranged from 1,508 in 1971 to 11,922 in 1975 during the past ten year period, Table 18.

Escapement. - The escapement of sockeye into the Coghill district is monitored by counting at the Coghill River weir located approximately 1.5 miles upriver from the mouth. A permanent weir was installed in Coghill River in 1974 from which total sockeye escapement into Coghill Lake can be determined. Prior to 1974 sockeye escapement was estimated using a combination weir-tower estimate and aerial surveys. Estimated sockeye escapements have ranged from 9,658 in 1970 to 80,000 in 1966. Since installation of the permanent weir in 1974 the total sockeye escapement has ranged from 9,056 in 1976 to 42,284 in 1978 (Table 19 and Figure 16). The sockeye escapement into Coghill Lake in 1978 represents about 17.3 percent of the estimated total run (catch and escapement).

Table 20 presents the 1978 sockeye age composition for catch and escapement from the Coghill district. The predominant age in 1978 was 1.3's which is similar to past years.

Coghill River daily sockeye salmon weir count; air and water temperatures; and cloud cover is presented in Appendix B.

Periodic aerial surveys of spawning sockeye have been made in Miners Lake and Cowpen Lake (see Data Report No. 10).

PINK SALMON

Catch. - The Coghill district has several pink salmon producing streams with Coghill River being the major producer particularly during the odd-year cycle. The 1978 catch of 64,200, Table 16, is the smallest even-year catch since 1972 when reduced effort and a relatively short season produced a catch of 5,961 pinks. Direct comparisons of district catches for all years cannot be made since the Coghill district was enlarged in 1976 to include the western one-half of Port Wells. Also, in 1978 the Coghill district was closed to fishing from June 20 through July 9 in order to allow sockeye to escape to Coghill River.

Escapement. - The Coghill district contains 13 pink salmon spawning streams that are regularly surveyed by air, and seven of these by foot surveys. These 13 pink streams comprise most of the known pink spawning streams of the district (Technical Data Report No. 35) and are used to calculate the annual escapement.

Table 19 shows the 1978 district escapement of 75,270 pink salmon and both odd and even year pink escapements since 1968. Coghill River is the major pink producer of the district, and in recent odd-year cycles has produced tremendously large returns that have significantly influenced both catch and escapement for all of Prince William Sound. In 1978 Coghill River represented about 20 percent of the district pink salmon escapement.

CHUM SALMON

Catch. - The Coghill district is a significant producer of chum salmon although the fishery probably intercepts stocks of chums enroute to the Northern and Eastern district, and to a lesser degree, those headed for the Northwestern district. Coghill River again is the major chum salmon stream in the district and contributes about 90 percent of the chums. Since 1968 the district chum catch has ranged from 13,966 in 1970 to a high of 164,578 in 1977, Table 17. The 1978 catch of 124,974 is the second highest catch for the ten year period.

Escapement. - The Coghill district has seven chum salmon spawning streams that are regularly monitored for escapement. The surveyed streams are the only known spawning areas in the district and are used to calculate the annual district chum salmon escapement.

During the ten year period beginning in 1968 the Coghill district chum salmon escapement has ranged from 7,100 in 1975 to a high of 78,810 in 1973. The 1978 chum escapement was calculated to be 13,550, Table 19.

OTHER SALMON

Catch. - Small numbers of both king and coho salmon are taken each year in the Coghill district. Feeder populations of king salmon are taken incidental to the target species. Table 17 shows a high king catch of 771 since 1968. The 1978 catch of 676 is the second highest catch for the period shown.

Some coho stocks are indigenous to the Coghill district as indicated by casual observations, but none are known to occur in the Unakwik district.

Table 17 shows the Coghill district catch of coho from 1968 to 1978. Coho catches have ranged from 67 in 1978 to a high catch of 1,219 in 1968.

Escapement. - Coho are known to spawn in Coghill River system and have been reported in the streams at the head of Pigot Bay. No other spawning areas are known although small numbers probably spawn in other streams in the districts.

No king salmon spawning areas are known in Prince William Sound.

Table 16. Coghill and Unakwik district drift gill net and purse seine weekly catch, 1978.

Coghill Drift Gill Net

Week	King	Sockeye	Coho	Pink	Chum	Total	No. Boats
24	108	22,701	6	39	4,847	27,701	251
25	122	48,732	0	1,057	18,243	68,154	302
26	177	93,351	17	7,222	36,940	137,707	405
27	CLOSED						
28	26	23,480	8	10,050	34,615	68,179	260
29	37	4,540	2	32,405	16,326	53,310	182
Sub-total	470	192,804	33	50,773	110,971	355,051	

Coghill Purse Seine

24	7	835	0	0	75	917	3
25	6	1,691	2	75	832	2,606	10
26	178	6,038	0	1,319	3,189	10,724	25
27	CLOSED						
28	15	539	32	5,537	9,600	15,723	19
29	0	21	0	6,496	307	6,824	8
Sub-total	206	9,124	34	13,427	14,003	36,794	

Unakwik Drift Gill Net

24	1	559	0	1	9	570	15
25	3	1,182	0	3	9	1,197	6
26	14	5,369	0	670	198	6,251	22
27	CLOSED						
28	5	1,555	0	559	186	2,305	10
29	1	451	0	851	196	1,499	2
Sub-total	24	9,116	0	2,084	598	11,822	

Unakwik Purse Seine

28	2	136	0	19,271	2,777	22,186	
29	1	132	5	35,839	2,248	38,225	
Sub-total	3	268	5	55,110	5,025	60,411	
TOTAL	703	211,312	72	121,394	130,597	464,078	

Table 17. Coghill district annual salmon catch by species and gear, 1968 to 1978. 1/

Year	<u>Purse Seine</u>					Peak Units of Gear
	King	Sockeye	Coho	Pink	Chum	
1968	109	35,255	1,000	95,068	29,213	66
1969	523	63,269	120	22,112	23,687	73
1970	100	15,547	336	66,902	8,842	40
1971	348	15,652	393	64,877	41,680	68
1972	NO FISHING					
1973	40	2,856	18	68,918	16,403	73
1974	192	4,273	22	54,268	7,720	45
1975	246	4,985	30	145,155	2,561	45
1976	83	6,159	29	56,967	30,328	111
1977	40	16,436	50	230,215	37,102	47
1978	206	9,124	34	13,427	14,003	25

<u>Drift Gill Net</u>						
1968	64	40,853	219	19,108	16,863	128
1969	61	71,627	121	1,324	8,446	91
1970	4	20,726	102	6,694	5,124	80
1971	73	29,862	54	4,006	11,149	133
1972	67	134,628	296	5,961	18,503	142
1973	144	74,426	237	61,328	68,311	160
1974	156	95,610	103	98,149	51,428	212
1975	525	142,864	357	99,492	32,438	311
1976	102	54,334	72	53,219	89,170	229
1977	124	154,342	49	332,859	127,476	207
1978	470	192,804	33	50,773	110,971	405

<u>All Gear</u>						
1968	173	76,108	1,219	114,176	46,076	194
1969	584	134,896	241	23,436	32,135	164
1970	104	36,273	438	73,596	13,966	120
1971	421	45,514	447	68,883	52,829	201
1972	67	134,628	296	5,961	18,503	142
1973	184	77,282	255	130,246	84,714	233
1974	348	99,883	125	152,417	59,148	257
1975	771	147,849	387	244,647	34,999	356
1976	185	60,493	101	110,186	119,498	340
1977	164	170,778	99	563,074	164,578	254
1978	676	201,928	67	64,200	124,974	430

1/ Catch through week 29.

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Table 18. Unakwik district annual salmon catch by species, by gear, 1968 to 1978. 1/

Year	<u>Drift Gill Net</u>					Peak Units of Gear
	King	Sockeye	Coho	Pink	Chum	
1968	1	6,537	3	349	62	17
1969	-	8,351	-	9	16	9
1970	-	7,018	-	1,892	672	16
1971	-	1,470	-	111	216	6
1972	2	10,010	-	3,445	859	13
1973	1	8,858	-	119	91	12
1974	5	10,449	3	10,911	500	16
1975	4	11,922	-	84	70	14
1976	4	8,421	-	2,744	331	15
1977	3	7,912	2	257	141	16
1978	24	9,116	-	2,084	598	22

Year		<u>Purse Seine</u>				
		Sockeye	Coho	Pink	Chum	Peak Units of Gear
1968	-	16	1	2,526	3,837	3
1969	-	-	-	8,297	743	2
1970	-	232	-	24,743	1,294	7
1971	-	38	68	14,207	1,621	6
1972	No Fishing					
1973	" "					
1974	" "					
1975	" "					
1976	-	7	-	8,526	225	4
1977	No Fishing					
1978	3	268	5	55,110	5,025	

Year		<u>All Gear</u>				
		Sockeye	Coho	Pink	Chum	Peak Units of Gear
1968	1	6,553	4	2,875	3,899	21
1969	-	8,351	-	8,306	759	11
1970	-	7,250	-	26,635	1,966	23
1971	-	1,508	68	14,318	1,837	12
1972	2	10,010	-	3,445	859	13
1973	1	8,858	-	119	91	12
1974	5	10,449	3	10,911	500	16
1975	4	11,922	-	84	70	14
1976	4	8,428	-	11,270	556	19
1977	3	7,912	2	257	141	16
1978	27	9,384	5	57,194	5,623	

1/ Catch through week 29.

Table 19. Coghill district annual salmon escapement by species, 1968 to 1978.

Year	Sockeye	Pink ^{4/}	Chum ^{4/}
1968	11,800 <u>1/</u>	104,340	22,950
1969	10,142 <u>1/</u>	114,520	37,700
1970	9,658 <u>1/</u>	80,060	17,330
1971	15,000 <u>2/</u>	526,950	15,450
1972	16,392 <u>1/</u>	24,050	25,890
1973	13,281 <u>1/</u>	561,200	78,810
1974	22,333 <u>3/</u>	42,660	39,700
1975	34,855 <u>3/</u>	570,950	7,100
1976	9,056 <u>3/</u>	50,930	35,750
1977	31,562 <u>3/</u>	387,310	41,640
1978	42,284 <u>3/</u>	75,270	13,550

1/ Weir-tower estimates.

2/ Aerial count.

3/ Total weir count.

4/ From 1968 through 1975 the district totals have been adjusted to include the west side of Port Wells.

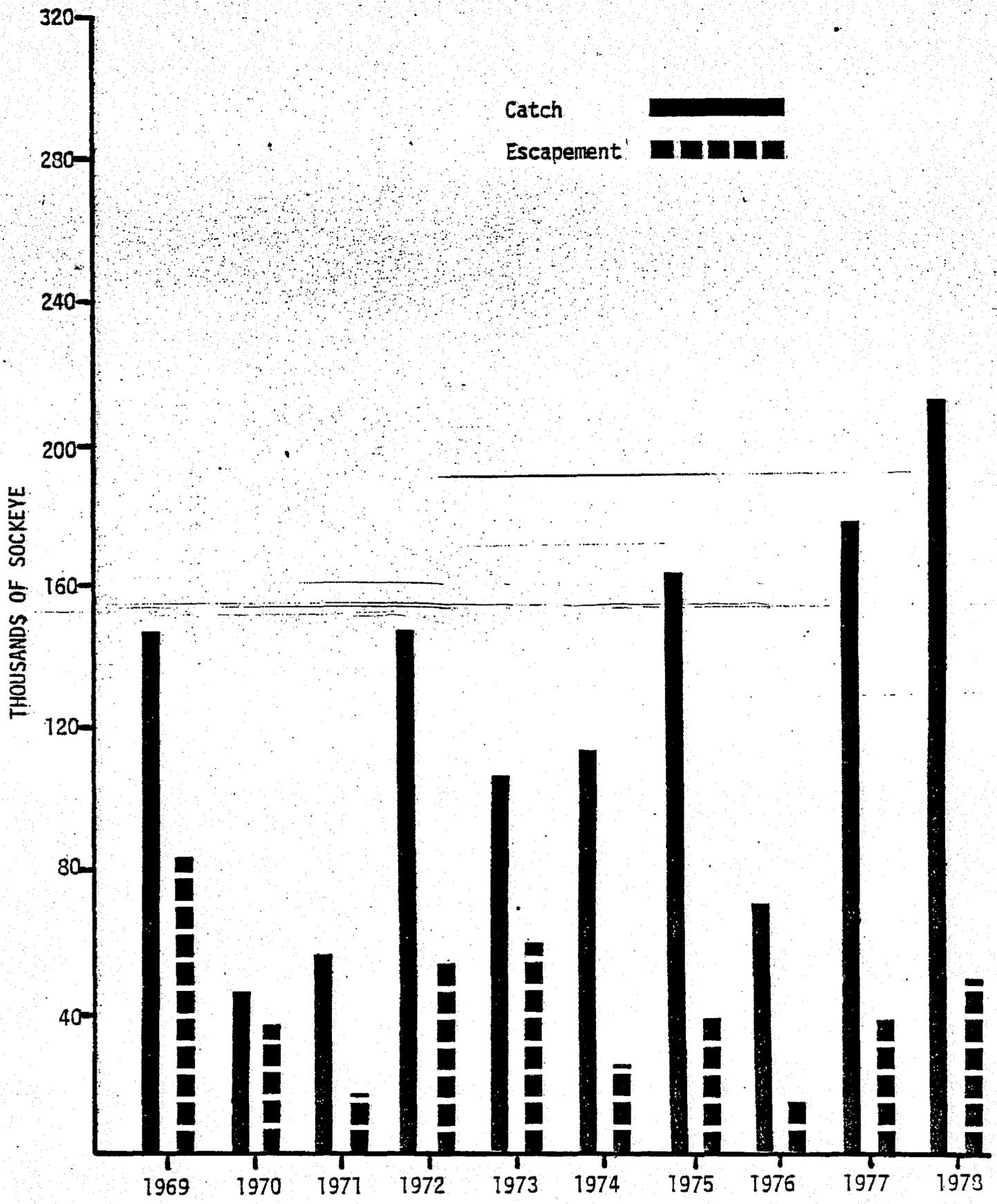


Figure 16. Coghill district sockeye salmon catch and escapement.

Table 20. Coghill district sockeye salmon commercial catch and escapement age composition, by sex, Prince William Sound, 1978.

Sex	AGE CLASS				Total
	1.2	1.3	2.2	2.3	
Commercial Catch					
MALES					
Number	8,075	74,885	2,203	5,872	91,035
Percent	8.87	82.26	2.42	6.45	45.09
FEMALES					
Number	10,033	88,589	488	11,751	110,861
Percent	9.05	79.91	0.44	10.60	54.91
SEXES COMBINED					
Number	18,108	163,474	2,691	17,623	201,896 ^{1/}
Percent	8.97	80.97	1.33	8.73	100.00
Escapement					
MALES					
Number	627	31,635	312	627	33,201
Percent	1.89	95.28	0.94	1.89	78.52
FEMALES					
Number	2,193	6,577	313	0	9,083
Percent	24.14	72.41	3.45	0.00	21.48
SEXES COMBINED					
Number	2,820	38,212	625	627	42,284
Percent	6.67	90.37	1.48	1.48	100.00
Total Return					
MALES					
Number	8,702	106,520	2,515	6,499	124,236
Percent	7.00	85.74	2.03	5.23	50.88
FEMALES					
Number	12,226	95,166	801	11,751	119,944
Percent	10.19	79.34	0.67	9.80	49.12
SEXES COMBINED					
Number	20,928	201,686	3,316	18,250	244,180
Percent	8.57	82.60	1.36	7.47	100.00

^{1/} Preliminary

ESHAMY DISTRICT

Introduction. - Eshamy district is located on the western mainland shore of Prince William Sound. The district includes the water within one nautical mile of the mainland shore from the outer point on the north shore of Granite Bay to the light on the south shore of the entrance to Port Nellie Juan (Figure 1).

The legal gear for the district is set gill net and drift gill net, and the fishery is managed primarily to harvest sockeye salmon returning to Eshamy Lake; however, substantial numbers of both pink and chum salmon are taken, and in many years their numbers far exceed the total catch of sockeye from the district. Historical catches of sockeye from the district have approached or exceeded 100,000 several times, although the average is considerably less, and since 1940 the catch has averaged about 36,000 sockeye.

Since statehood the management strategy has been to regulate the fishery on the basis of the counted sockeye escapement at Eshamy River weir by opening the fishery during years when parent escapements were considered adequate, and closing the district when parent escapements were low. This method of regulating the fishery has not always been successful as experienced by the 1974 fishery where a catch of 19,034 and an escapement of 633 sockeye were recorded. The reason for the unusually low ratio of escapement to catch is not known and no suspected reasons are readily apparent.

SOCKEYE SALMON

Catch. - The Eshamy district was closed to fishing in 1978. The Eshamy district annual catch by species and gear from 1968 to 1978 is presented in Table 21.

Escapement. - The Eshamy district is managed separately from other Prince William Sound districts primarily to harvest sockeye salmon returning to the Eshamy Lake system. For many years the principal management tool has been a weir placed in Eshamy River to count sockeye returning to the lake to spawn. The weir was first placed in the river in 1931, and was operated for two years, but because of budget limitations was abandoned after the 1932 season, (ADF&G Technical Data Report No. 26). Counting was initiated again in 1950 and has been an annual management tool since that time.

Sockeye escapement counts at Eshamy River weir have ranged from a high of 229,668 in 1932 to a low count of 633 sockeye in 1974. The average sockeye escapement for the past ten year period is 15,854 with a range of 61,196 to 633 (Table 22 and Figure 17). The Eshamy River count for the 1978 season is contained in Appendix C.

Age composition of the sockeye escapement is presented in Table 23 which shows the majority ages to be 1.2's with a significant number of 2.2's.

PINK SALMON

Catch. - The Eshamy district was closed to fishing in 1978. Eshamy district annual catch by species and gear from 1968 to 1978 is shown in Table 21.

Escapement. - Escapement foot surveys are conducted on several small streams in the district in addition to the weir count and surveys of Eshamy River (ADF&G Technical Data Report No. 35). In 1978 five streams were surveyed which produced a calculated spawning escapement of 5,690 pink salmon. This compares to the five year even-year average spawning escapement of 5,290 with a range of 1,510 in 1972 and 7,420 in 1970, Table 22.

CHUM SALMON

Catch. - The Eshamy district was closed to fishing in 1978. Eshamy district annual catch by species and gear from 1968 to 1978 is presented in Table 21.

Escapement. - Very few chum salmon spawn in the Eshamy district as indicated in Table 22. The largest spawning escapement for the last ten years was calculated to be 440 in 1975 and no escapement of chums was recorded for five of the ten years. No chums were observed spawning in the district in 1978.

OTHER SALMON

Catch. - Incidental catches of both king and coho salmon are taken during years the fishery is operating. The highest recorded catch of 3,895 coho was taken in 1962, and the highest recorded catch of 82 kings was taken in 1972. (Technical Data Report No. 26). The district was closed to fishing in 1978.

Escapement. - Coho salmon are known to spawn in one stream in the district, namely Eshamy River. The highest recorded escapement of 6,372 was counted at Eshamy River weir in 1932, and subsequent escapements have ranged down to a low of none being counted in 1974. A total of 21 coho were counted in the river in 1978.

King salmon do not normally spawn in Prince William Sound streams although occasional strays have been recorded at Eshamy River weir (Technical Data Report No. 26).

Research. - No work was done on the proposed lake fertilization of Eshamy Lake due to the lack of funding in 1978.

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Table 21. Eshamy district annual salmon catch by species and gear, 1968 to 1978.

Year	<u>Set Gill Net</u>					Peak Units of Gear
	King	Sockeye	Coho	Pink	Chum	
1968	CLOSED					
1969	13	56,785	182	22,133	7,120	23
1970	2	15,310	515	38,607	4,672	27
1971	CLOSED					
1972	33	37,771	520	25,103	10,345	11
1973	28	8,969	78	9,724	10,914	15
1974	4	6,394	11	68,300	5,408	10
1975	CLOSED					
1976	CLOSED					
1977	9	9,889	2	24,743	4,218	12
1978	CLOSED					

Year	<u>Drift Gill Net</u>					Peak Units of Gear
	King	Sockeye	Coho	Pink	Chum	
1968	CLOSED					
1969	3	4,984	29	3,327	1,016	10
1970	-	1,982	64	5,774	960	8
1971	CLOSED					
1972	49	15,117	626	20,362	15,663	53
1973	41	7,470	71	11,777	16,632	42
1974	18	12,640	114	217,141	23,488	146
1975	CLOSED					
1976	CLOSED					
1977	22	16,916	49	63,036	8,344	53
1978	CLOSED					

Year	<u>All Gear</u>					Peak Units of Gear
	King	Sockeye	Coho	Pink	Chum	
1968	CLOSED					
1969	16	61,769	211	25,460	8,136	33
1970	2	17,292	579	44,381	5,632	35
1971	CLOSED					
1972	82	52,888	1,146	45,375	26,008	64
1973	69	16,439	149	21,501	27,546	57
1974	22	19,034	125	285,441	28,896	156
1975	CLOSED					
1976	CLOSED					
1977	31	26,805	51	87,779	12,562	65
1978	CLOSED					

Table 22. Eshamy district annual salmon escapement from weir and stream foot survey counts, 1968 to 1978. 1/

Year	King	Sockeye <u>2/</u>	Coho	Pink	Chum
1968	1	68,048	450	12,030	
1969		61,196	96	12,280	
1970		11,460	25	7,420	390
1971		954	97	7,800	120
1972		28,683	71	1,510	70
1973		10,202	205	5,390	170
1974		633		6,330	
1975		1,724	41	5,720	440
1976		19,367	125	5,500	
1977		11,746	230	32,080	
1978		12,580	20	5,690	

1/ Number of streams surveyed varied from 3 to 5 for pink and chum salmon, (See Technical Data Report No. 35 and Data Report No. 9).

2/ Weir count.

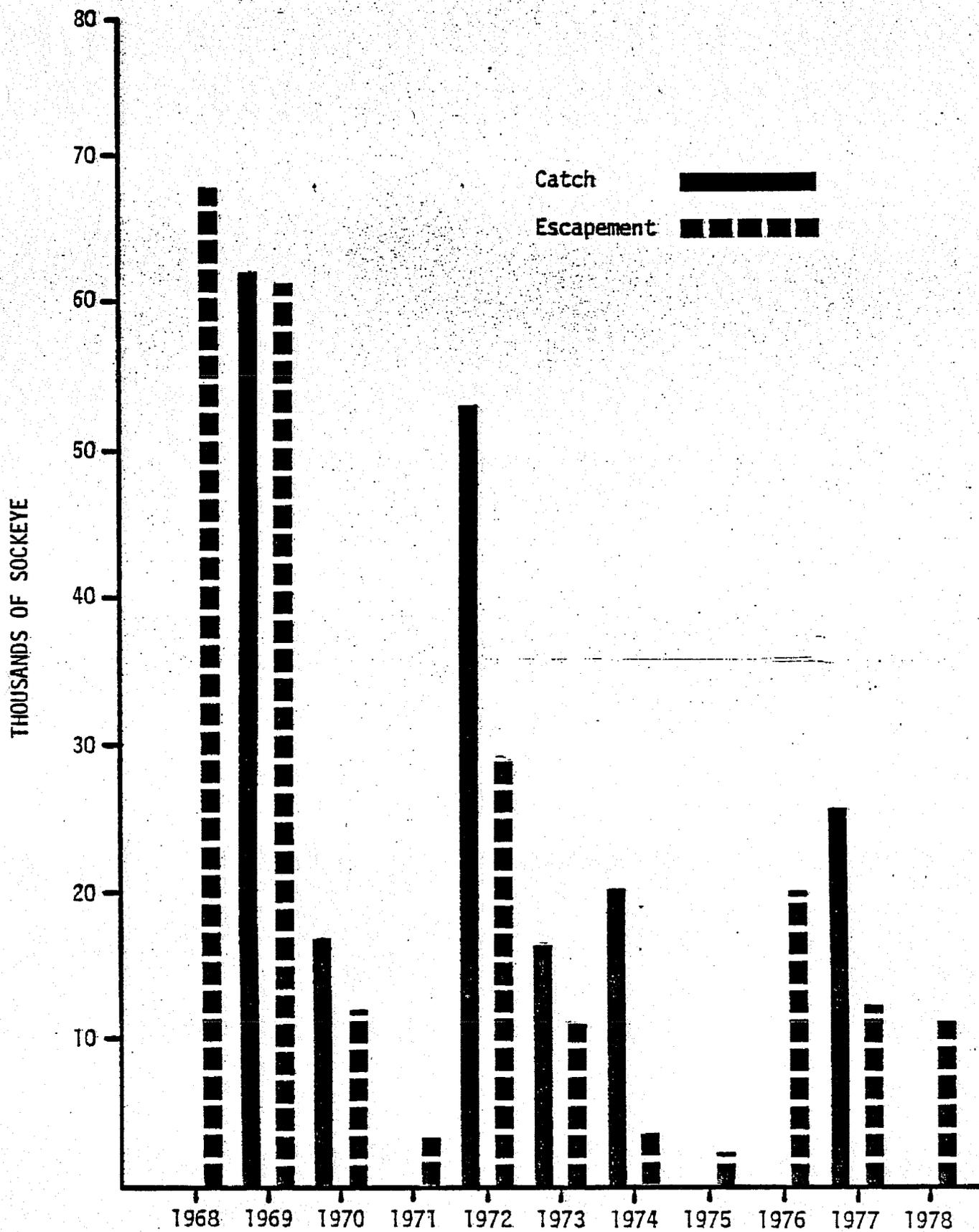


Figure 17. Eshamy district sockeye salmon catch and escapement.

Table 23. Eshamy River sockeye salmon escapement age composition, by sex, Prince William Sound, 1978.

Sex	AGE CLASS						Total
	1.1	1.2	1.3	2.1	2.2	2.3	
Males							
Number	110	7,037	192	55	1,264	110	8,768
Percent	1.25	80.25	2.19	0.63	14.42	1.26	64.57
Females							
Number	0	4,041	27	0	743	0	4,811
Percent	0.00	84.00	0.57	0.00	15.43	0.00	35.43
Sexes Combined							
Number	110	11,078	219	55	2,007	110	13,579 <u>1/</u>
Percent	0.81	81.59	1.61	0.40	14.78	0.81	100.00

1/ Includes 1,400 fish estimated to be in river below the weir, at the river's mouth and the lagoon at the time the weir operation was terminated.

HERRING FISHERY

Introduction. - Prince William Sound has two major areas where sac roe harvests occur. Basically they are: 1) the Columbia Bay, Glacier Island area of the Northern District, and 2) the Green Island, Montague Island area of the Montague District.

Since spawning occurs in each of these districts at different times, and with a time lag of from 15 to 30 days, each is managed separately. The 5,000 ton guideline harvest level imposed by regulation for Prince William Sound is manipulated so that 2,500 tons can be harvested from each district. However, if herring stocks returning to these districts warrant increased or decreased harvest, levels of harvest can be adjusted as required.

Population assessment surveys are initiated during the winter months utilizing hydroacoustical electronic gear which has been installed aboard the research vessel M/V Montague. During these surveys, sonar or audio impulses collected from located herring schools are recorded on magnetic tape aboard the research vessel. These tapes, along with echo sounding graphs and other pertinent information, are later analyzed by computer at the University of Washington, resulting in tonnage estimates of surveyed herring populations.

Season opening dates are determined by roe recovery calculations obtained from herring samples taken during test fishing operations. When roe weight of the samples taken during test fishing operations approaches ten percent of the total sample weight, the opening period is announced. The season closure is made when the total catch reaches guideline harvest levels.

~~Herring for bait can be harvested from October 1 through February 28 of each year. All districts, with the exception of sac roe harvest districts, are open for this fishery.~~

SAC ROE FISHERY

Hydroacoustical surveys began in mid-February, and as in 1977, warm ocean temperatures appeared to influence the normal schooling behavior of the herring. Herring schools were located in areas surveyed in 1977, but were active and migrating or moving continuously. Herring schools located during the day and early evening would move out of survey areas prior to when surveys could be conducted. Because of this, no population estimate could be made prior to the season.

Aerial surveys began on April 1, and first spawning was observed on April 11 when three small schools were sited, all in the immediate vicinity of Busby Island, Tatitlek Narrows.

Daily vessel and air surveys continued, and on April 15 herring schools were observed throughout Valdez Arm. Estimates of herring tonnage made by both private aircraft spotters and biologists ranged from 7,000 tons to 9,000 tons at that time. Test sets were made by volunteer fishermen and roe recovery samples obtained. Since roe recovery percentages averaged 10.5 percent from five different test sets, an announcement was made to open the season at 6:00 a.m. April 17.

The opening day fishery was disappointing. Catches were much lower than anticipated, and roe recovery varied from zero percent to 13 percent. Most

seine fishermen held fish in their seines until sampled by Japanese technicians. If unacceptable roe recovery percentages were found, the herring were released. Some juvenile and spawned out herring were sold for bait during the opening.

Because of the low tonnage harvested during the opening day, and because of the presence of juvenile and spawned out herring appearing in some catches, the closed portion of Valdez Arm, excluding bays and known areas of spawning, was opened to fishing on April 18.

Although the season remained open until the evening of April 21, catches were below anticipated levels. Herring that should have been available to the fishing fleet disappeared. During the four days that this fishery remained open 1,103 tons of herring were harvested.

Due to the poor Copper River drift gill net salmon season, fishermen began searching for roe herring during emergency closures of the salmon net season.

On June 10 harvestable populations of herring were again located and samples obtained for analysis produced roe recovery percentages of 10.7 percent. On June 14, the Northern District was again opened for a special six hour season. During this opening 29 boats harvested 254.3 tons of herring.

After the closure the Department monitored several other sightings of herring populations by fishermen in the Montague Island - Green Island area. Samples of herring taken by one vessel from this area demonstrated that these herring were immature two and three year old juveniles.

The 1978 sac roe season can only be characterized as unusual. Juvenile and adult stocks were mixed, and reports were received from some fishermen that sets had been made on spawned out fish. In the past, juvenile herring were never found mixed with adult spawning stocks, and spawned outs were never available since spawning normally occurred after the fishery was closed.

The disappearance of the herring after the season was opened seemed to follow the behavior reported in herring fisheries in British Columbia and Southeastern Alaska. The staff could not attribute this behavior to any unusual climatic or marine conditions, but only noted that 8,000 to 12,000 tons of herring were estimated in "closed" and "open" fishing areas the day before the season opened and that only 1,103 tons were harvested from April 17 to April 21. Table 2 presents catch and effort data of this fishery.

BAIT - FOOD FISHERY

During 1978 pair trawling for bait herring was introduced into Prince William Sound. Purse seining during this winter fishery had been attempted in the recent past, but due to the characteristic behavior of the herring to sound during seining attempts, or to lay below seine depths, this fishing method was unsuccessful; however, two boats using lengthened seines harvested 185 tons in 1978.

Four boats were involved in the pair trawl fishery. After much experimentation they along with one other mid-water trawler landed 858.5 tons. The total 1978 bait - food harvest was 1,043.5 tons, Table 2.

It is expected than more interest will be shown in this fishery during the 1979 - 80 winter fishery. With the increased experience gained an increased harvest is anticipated also.

HERRING SPAWN ON KELP FISHERY

During the 1977 Board of Fisheries meeting the Board introduced and passed a 50 ton kelp harvest quota. At the spring meeting of the Board this regulation was rescinded and a more liberal, 165 ton, harvest quota was allowed. This final quota regulation was passed only 10 days prior to the season. Some fishermen and processors that may have participated in this fishery did not due to the low initial quota.

Herring began spawning in the vicinity of Busby Island, Tatitlek Narrows on April 11. By April 20 spawning appeared to be at its peak and was widespread throughout the Narrows, Galena Bay, Rocky Point and Virgin Bay. On that day the season opened.

Underwater surveys made during the season indicated a fair egg cover, but in areas of ribbon kelp, Laminaria saccharina, the most desirable of the kelp species harvested, spawning was sparse. Processors bought kelp for approximately ten days before leaving the area.

Spawning surveys continued until the first week in May, and it was interesting to note that on May 1 spawning was recorded at Bidarka Point, and several large schools of unspawned herring were also noted in this area. Bidarka Point is an area of dense ribbon kelp which in the past has been harvested quite heavily.

During the season 66 kelp pickers harvested 71 tons of kelp. Seive kelp, Agarum cribrosum, made up about half of the total, with ribbon kelp, Laminaria saccharina, accounting for 16 tons, L. Groenlandica and hair kelp, Desmarestia sp., made up the remainder of the harvest.

Table 2 presents both effort and harvest of herring and spawn on kelp for the past 11 years.

HERRING RESEARCH

Herring research in Prince William Sound consists of ongoing programs in hydroacoustical assessment of overwintering herring stocks; biological sampling of the commercial catch for age, length and sex structures of harvested populations to assess overall condition and recruitment of herring into the commercial fishery; beach and air surveys of spawning areas to determine relative magnitudes of spawning intensity and egg deposition; and continuing studies evaluating effects of past kelp harvests and the growth and recruitment of kelp in areas of intense harvests.

Tables 24 through 27 give age, length, weight and sex compositions of herring samples collected by mid-water trawl and purse seine gear. Figure 18 presents age class contributions from the commercial fishery from 1974 to 1978.

Table 24. Age, length, weight and sex composition of 94 herring collected by mid water trawl gear from Goose Island, Prince William Sound, Alaska on February 27, 1978.

Age Group	Year Class	MALES				FEMALES				SEXES COMBINED		
		Frequency		Mean		Frequency		Mean		Frequency		
		No.	%	Lgth. mm.	Wt. grams	No.	%	Lgth. mm.	Wt. grams	No.	%	
II	1976	8	14.0	152.0	39.6							8.5
III	1975	5	8.8	152.2	37.2	2	5.4	176.0	59.5			7.5
IV	1974	22	38.6	175.9	63.6	18	48.7	181.7	73.5			42.6
V	1973	11	19.3	179.5	68.6	9	24.3	192.2	88.1			21.3
VI	1972	8	14.0	195.1	93.0	6	16.2	192.3	87.0			14.9
VII	1971	2	3.5	225.5	138.0	1	2.7	212.0	138.0			3.2
VIII	1970	1	1.8	220.0	121.0	1	2.7	199.0	96.0			2.1
TOTALS		57				37						
Ave. Lgth.				176.4				186.9				
Ave. Wt.					66.6				76.3			

Sex Composition = 61% males, 39% females

Table 25. Age, length, weight and sex composition of 175 herring collected by seine from Galena Bay, Prince William Sound, Alaska on April 15 and 16, 1978.

Age Group	Year Class	MALES				FEMALES				SEXES COMBINED	
		Frequency		Mean		Frequency		Mean		Frequency	%
		No.	%	Lgth. mm.	Wt. grams	No.	%	Lgth. mm.	Wt. grams		
III	1975	7	7.1	173.4	71.3	4	5.3	166.0	64.5		6.3
IV	1974	24	24.2	184.5	84.0	22	29.0	184.7	85.3		26.3
V	1973	28	28.3	187.5	92.3	23	30.3	193.1	101.4		29.1
VI	1972	19	19.2	200.8	112.0	9	11.8	202.6	117.1		16.0
VII	1971	15	15.2	206.7	120.5	10	13.2	206.7	132.5		14.3
VIII	1970	4	4.0	214.5	137.8	6	7.9	219.3	148.0		6.9
IX	1969	2	2.0	217.0	143.0	1	1.3	215.0	152.0		1.1
XI	1967										.57
TOTALS		99				76					
Ave. Lgth.				192.9				192.0			
Ave. Wt.					99.7				101.8		

Sex Composition = 57% males, 43% females

Table 26. Age, length, weight and sex composition of 63 herring collected by seine from Jack Bay, Valdez Arm, Prince William Sound, Alaska on April 21, 1978.

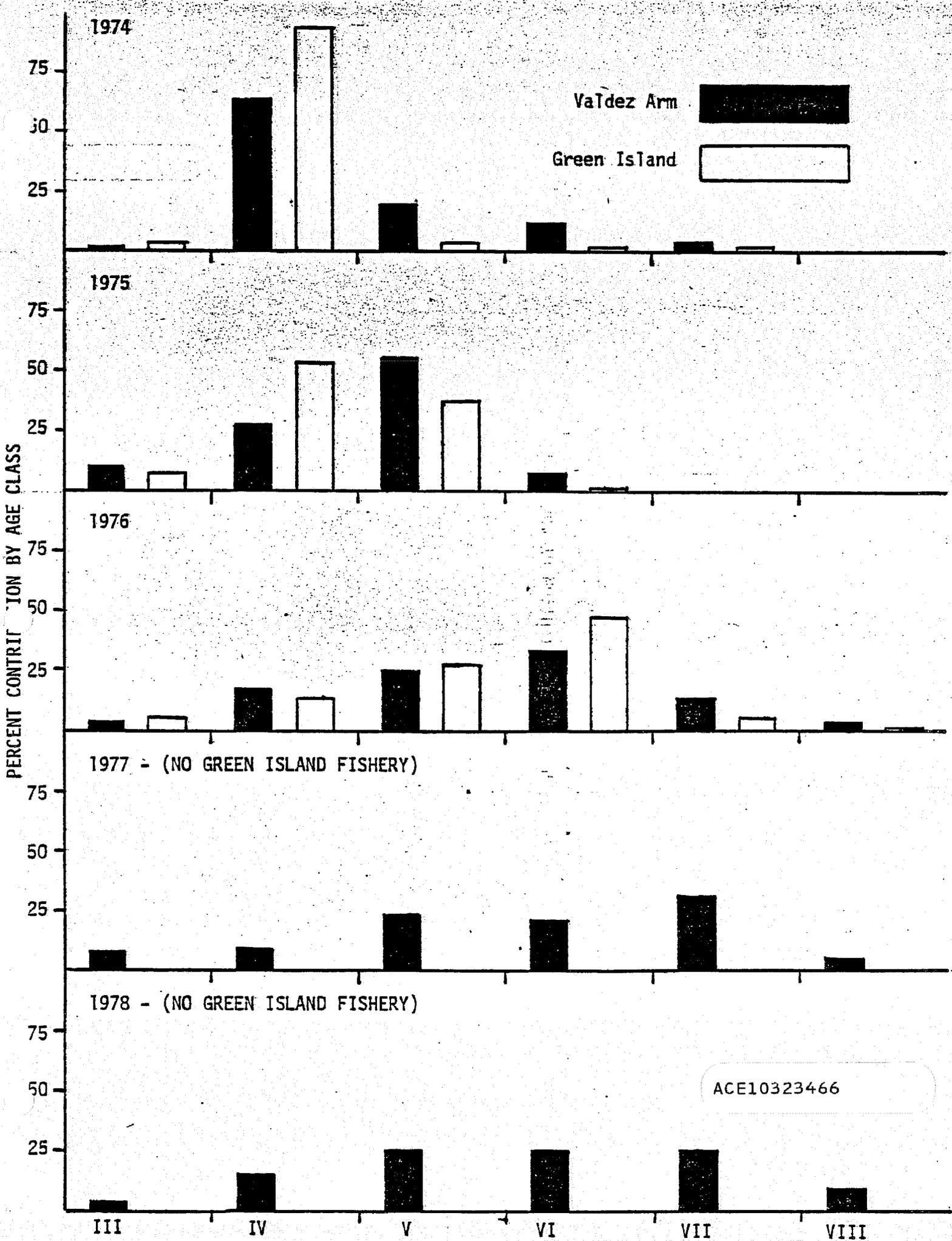
Age Group	Year Class	MALES			FEMALES			SEXES COMBINED		
		Frequency		Mean	Frequency		Mean	Frequency		
		No.	%	Lgth. mm.	Wt. grams	No.	%	Lgth. mm.	Wt. grams	
III	1975					2	7.7	169.5	66.0	3.2
IV	1974	8	21.6	183.6	75.0	13	50.0	189.2	87.2	33.3
V	1973	11	29.7	188.8	84.1	6	23.1	190.3	93.2	27.0
VI	1972	4	10.8	191.5	86.0	3	11.5	190.0	89.3	11.1
VII	1971	7	18.9	205.9	112.4	1	3.9	224.0	145.0	12.7
VIII	1970	6	16.2	210.5	120.5					
IX	1969	1	2.7	216.0	113.0	1	3.9	216.0	112.0	3.2
TOTALS		37				26				
Ave. Lgth.				195.5				190.4		
Ave. Wt.				94.4					90.4	

Sex Composition = 59% males, 41% females

Table 27. Age, length, weight and sex composition of 168 herring collected by seine from Long Bay, Prince William Sound, Alaska on June 14, 1978.

Age Group	Year Class	MALES				FEMALES				SEXES COMBINES	
		Frequency		Mean		Frequency		Mean		Frequency	
		No.	%	Lgth. mm.	Wt. grams	No.	%	Lgth. mm.	Wt. grams	No.	%
II	1976	6	7.1	135.5	32.8	3	3.6	134.3	35.3	3	5.4
III	1975	6	7.1	146.5	43.8	8	9.5	136.3	36.9	8	8.3
IV	1974	8	9.5	170.1	71.5	9	10.7	185.3	72.0	9	10.1
V	1973	24	28.6	178.4	82.0	17	20.2	183.1	93.3	17	24.4
VI	1972	38	45.2	187.3	92.1	37	44.1	186.1	94.4	37	44.6
VII	1971	2	2.4	185.1	94.5	10	11.9	192.1	110.9	10	7.1
TOTALS		84				84				84	
Ave. Lgth.				176.5				177.3			
Ave. Wt.				79.6					125.7		

Sex Composition = 50% males, 50% females



GROUND FISH

Ground fish taken from the Prince William Sound Area and the Gulf of Alaska were used mostly for crab bait with the exception of halibut. Otter trawl gear was used exclusively for bait fish harvesting a total of 120,095 pounds. The catch of 31,163 pounds from long line and other gear was taken incidentally while fishing for the 221.25 tons of halibut taken from Area 3 (Gulf of Alaska).

Table 28 presents the 1978 ground fish catch by species by sub-area.

Table 28. Ground fish catch in pounds by sub-area, gear and species, 1978. *

Sub-Area	Gear	Ground Fish General	Pacific Cod	Flounder	Rockfish and		Black Cod
					Red Snapper	Pollock	
201-00	Long Line	573					
201-01	" "		65				25
201-05	" "		1,561		120		
202-01	" "	1,435	11				
202-05	" "	143					920
203-07	" "	4,843	201				315
203-08	" "		1,285		205		
203-12	" "	13,547	3,813				
204-01	" "	1,320	95				
Sub-Total		21,866	7,031		325		1,260
203-06	Otter Trawl	7,706	1,000			36,554	
203-07	" "	65,670	3,630	300		2,465	
203-08	" "	2,770					
Sub-Total		76,146	4,630	300		39,019	
203-07	Other Gear	526					155
Sub-Total		526					155
TOTAL		98,538	11,661	300	325	39,019	1,415

* The halibut landings from Area 3 (Gulf of Alaska) totaled 221.25 tons.

PROCESSORS

In 1978 three major canneries and three smaller operations processed salmon in the Prince William Sound Area. Two of the major operators custom processed salmon for five other companies. Three processors purchased salmon for processing in areas outside of the Prince William Sound Area.

Three major and one minor companies processed king, Dungeness and Tanner crab.

Herring sac roe was processed by 14 companies, and seven operators processed herring spawn on kelp.

Approximately 76 tons of bottom fish and 15 tons of razor clams were purchased mainly for crab bait.

Other species included 221 tons of halibut, 224 tons of shrimp and minor amounts of octopus and snails.

The average price per pound paid for salmon, shellfish and miscellaneous fish harvested in the Prince William Sound Area is recorded in Table 29.

Table 30 gives the 1978 salmon case pack and frozen production by species, by week, for the area while Table 31 shows the production from 1972 to 1978.

A sequential listing of fish and shellfish processors, location of operation, size of cans, lines of machinery and type of product processed in 1978 is presented in Appendix A.

Table 29. Average price paid per pound for salmon, shellfish and miscellaneous fish in the Prince William Sound Area, 1978. 1/

<u>Salmon</u>				
<u>King</u>	<u>Sockeye</u>	<u>Coho</u> ^{2/}	<u>Pink</u> ^{3/}	<u>Chum</u>
\$1.39	\$1.23	\$.39 - \$1.10	\$.3701	\$.4258

<u>Shellfish</u>			
<u>King Crab</u>	<u>Dungeness Crab</u>	<u>Tanner Crab</u>	<u>Razor Clams (bait)</u>
\$1.63	\$.66	\$.41	\$1.00

<u>Miscellaneous Fish</u>				
<u>Herring Sac Roe</u>	<u>Herring Spawn on Kelp</u>	<u>Herring (bait)</u>	<u>Halibut</u>	<u>Bottom Fish (bait)</u>
\$.363	\$1.247	\$.189	\$1.367	\$.25 - .30

1/ From Annual Reports of Operators.

2/ The settlement price reached for silvers caught in Prince William Sound was \$.39, and \$1.10 for Copper River and Bering River.

3/ The pink salmon egg recovery adjustment paid to fishermen was .007 percent.

Table 30. Prince William Sound Area case pack and pounds of frozen salmon by species, by week, 1978. 1/

Week	<u>Kings</u>		<u>Sockeye</u>		<u>Cohos</u>		<u>Pinks</u>		<u>Chums</u>	
	Pounds Frozen	Cases	Pounds Frozen	Cases	Pounds Frozen	Cases	Pounds Frozen	Cases	Pounds Frozen	Cases
20	154037	12	257873	224					193	36
21	122652	19	159463	182						28
22	244572	59	448931	561						200
23	FISHERY CLOSED			18						
24	150		121386	1345					6150	172
25	55868	26	457951	3126		16	6	29	33685	1920
26	59		522058	1466		37	1893	460	68091	4136
27	462	5	126293	4446		36			6014	257
28	1000	5	204916	3869		165	31518	11043	180753	14355
29	1763		152234	160	845	595	20689	14576	152701	7793
30	322	7	44605	166	3866	105	30644	2709	19368	852
31			16697	70	5598	109	91754	22309	52464	2042
32	436		3750	6	18151	189	41251	38153	117932	2950
33			1000	14	126380	517	2845	23451	51219	3691
34	32	4	990	11	214935	189	9144	4381	17226	939
35		2			346570	717		752		5
36					563060	762				
37					139320	637				
38					145935	408				
39					86536					
40					39675					
<hr/>										
TOTAL	581353	139	2518147	15664	1690871	4482	229744	117863	705796	39376

1/ From reports of processors. Frozen salmon reported in processed weight, and cases on a basis of 48 one pound cans. Includes 2,781 pounds of frozen king salmon, 153,799 pounds of sockeye, 30,717 pounds of coho, 39,369 pounds of pinks, and 22,052 pounds of chums; 5 cases of king salmon, 9,924 cases of sockeye, 52 cases of coho, 8,385 cases of pinks, and 932 cases of chum salmon.

Table 3T. Prince William Sound Area case pack and pounds of frozen salmon by species, 1972 - 1975. 1/

Year	<u>Kings</u>		<u>Sockeye</u>		<u>Cohos</u>		<u>Pinks</u>		<u>Chums</u>	
	Pounds Frozen	Cases	Pounds Frozen	Cases	Pounds Frozen	Cases	Pounds Frozen	Cases	Pounds Frozen	Cases
1972	839638	177	40736	81632	672305	5523	23586	3102	19673	5684
1973	611482	164	222978	40850	1293847	6053	39584	73635	292380	59284
1974	408662	1507	62725	68576	2620	14127	0	30335	1187	10925
1975	293657	183	553541	24281	564579	1254	0	133358	63154	6266
1976	758172	151	1294110	99436	918509	5564	351944	121762	514854	2302
1977	356567	253	2741166	41860	861761	2420	1232766	178151	931911	38850
1978 ^{2/}	581353	139	2518147	15664	1690871	4482	229744	117863	705796	39376

1/ Case pack on basis of 48 one pound cans per case. Frozen salmon in round weight.

2/ Frozen salmon in processed weight. Previous years weight was from uneviscerated salmon.

MISCELLANEOUS

Introduction. - Each year miscellaneous data is gathered on the commercial fisheries of the Prince William Sound Area that is not related specifically to any particular fishery. Items of this nature are discussed briefly in this section.

Calendar Weeks. - The 1978 calendar of weeks presented in Table 32 was used in reporting catch statistics. The calendar weeks are presented here as a reference for the several tables used in the report that list catches by week.

Economic Conditions. - A fair to good economic condition exists at the present time as indicated by the continuing trend of upgrading of the area's fishing fleet and the recent addition of several new fishing vessels. The fishing fleet is continuing to diversify by engaging in several fisheries instead of primarily salmon. Prices for all items continued to climb in 1978 and reflect the national inflationary trend which, in part, has caused the processors of salmon to shift more and more to frozen products which require less labor and demand higher prices.

The overall economic view for 1978 was a substantial decrease to fishermen over 1977 due primarily to the decreased catches of sockeye, pinks and chums. The Copper River sockeye fishery was a disaster to fishermen who depend on this fishery to produce the bulk of their salmon fishing income. The season catch of about 250,000 compares to a long term average of 650,000 sockeye.

The salmon price per pound settlement reached between fishermen and processors was: Copper River - Bering River kings, \$1.25; sockeye, \$1.15; silvers, \$1.10; and chums, \$.44; Prince William Sound, sockeye, \$1.15; silvers, \$.39; pinks, \$.3476 and chums, \$.3857. As the season progressed and buying became more competitive the price for kings and sockeye respectively escalated to \$1.50 and \$1.30 per pound.

The average prices paid for salmon, shellfish and miscellaneous fish is shown in Table 29.

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Table 32. Calendar weeks used in reporting catch statistics from 1978 landings.

<u>Week</u>	<u>From</u>	<u>Thru</u>	<u>Week</u>	<u>From</u>	<u>Thru</u>
1	Jan. 1	Jan. 7	28	July 9	15
2	8	14	29	16	22
3	15	21	30	23	29
4	22	28	31	30	Aug. 5
5	29	Feb. 4	32	Aug. 6	12
6	Feb. 5	11	33	13	19
7	12	18	34	20	26
8	19	25	35	27	Sept. 2
9	26	March 4	36	Sept. 3	9
10	March 5	11	37	10	16
11	12	18	38	17	23
12	19	25	39	24	30
13	26	April 1	40	Oct. 1	Oct. 7
14	April 2	8	41	8	14
15	9	15	42	15	21
16	16	22	43	22	28
17	23	29	44	29	Nov. 4
18	30	May 6	45	Nov. 5	11
19	May 7	13	46	12	18
20	14	20	47	19	25
21	21	27	48	26	Dec. 2
22	28	June 3	49	Dec. 3	9
23	June 4	10	50	10	16
24	11	17	51	17	23
25	18	24	52	24	30
26	25	July 1	53	31	31
27	July 2	8			

Appendix A. A sequential listing of fish and shellfish processors, location of operation, size of cans, lines of machinery and type of product processed in 1978.

Name, Executive, Address, Location of Operation	Size of Cans Lines of Machinery	Type of Product
Alaska Packers Association 1/ Merle Wickett, Supt. P. O. Box 380 Cordova, AK 99574		Salmon
Alaska Sea Products P. O. Box 1477 Seward, AK 99664		Shrimp
American Eagle Seafoods, Inc. P. O. Box 277 Cordova, AK 99574		Salmon
Atco Seafoods, Inc. P. O. Box 5538 Seattle, WA 98105		Salmon
B & B Fisheries, Inc. P. O. Box 2367 Kodiak, AK 99615		Herring Sac Roe
Bayside Cold Storage Fred Pettingill, Supt. P. O. Box 636 Cordova, AK 99574		Herring Sac Roe, Salmon, Halibut
Bergit Fishing Company Stanley Samuelson, Owner P. O. Box 936 Cordova, AK 99574		Herring Spawn on Kelp Herring Sac Roe
Blake's Canning Margaret Blake, Supt. P. O. Box 94 Cordova, AK 99574	6 1/2 oz. - hand pack	Salmon
Caples Seafood Jene Caples, Owner P. O. Box 35 Valdez, AK 99686		Dungeness Crab
Dragnet Fisheries P. O. Box 3993 Kenai, AK 99611		Herring Sac Roe, Salmon
Farm-N-Sea of Alaska, Inc. Steve Howell, Operations V. P. Pouch 600 Valdez, AK 99686		King Crab, Tanner Crab, Octopus, Herring (Bait), Bottom Fish (Bait)

Appendix A, cont.

Name, Executive, Address, Location of Operation	Size of Cans Lines of Machinery	Type of Product
The Fish Company P. O. Box 1227 Valdez, AK 99686		King Crab, Tanner Crab
Glacier Packing Company Percy Conrad, Owner P. O. Box 176 Big Point - Cordova, AK	6 1/2 oz. - hand pack 7 1/2 oz. - hand pack	Salmon
J M C Enterprises, Ltd. P. O. Box 10048 South Sta. Anchorage, AK 99511		Herring Spawn on Kelp
Johnson Fish Company Eric Johnson, Owner P. O. Box 460 Cordova, AK 99574		Bottom Fish (Bait)
Kodiak King Crab P. O. Box 1457 Kodiak, AK 99615		Herring Sac Roe
M S P Corporation C. Ross Mullins, President P. O. Box 1249 Cordova, AK 99574		Herring Spawn on Kelp
William Maness Vessel - HASTA P. O. Box 394 Seward, AK 99664		Shrimp
Mid-Gulf Seafoods John Young, President P. O. Box 201 Yakutat, AK 99689		Salmon
Morpac, Inc. 1/ Jim Forsell, Supt. P. O. Box 638 Cordova, AK 99574	1 line - 7 3/4 oz. 1 line - 15 1/2 oz.	Herring Sac Roe, Salmon, Dungeness Crab, Tanner Crab (Herring, Bottom Fish, Razor Clams - Bait)
North Coast Seafood Export, Inc. James Nagai, Manager P. O. Box 1262 Cordova, AK 99574		Herring Sac Roe, Herring Spawn on Kelp
North Pacific Processors Ken Roemhildt, Supt. P. O. Box 1040 Cordova, AK 99574	1 line - 1/4 lb. 1 line - 1/2 lb. 1 line - 1 lb.	Salmon, Dungeness Crab, Tanner Crab, King Crab, Halibut, (Bottom Fish, Razor Clams, Herring - bait Herring Sac Roe

Appendix A, cont.

Name, Executive, Address, Location of Operation	Size of Cans Lines of Machinery	Type of Product
M/V Miss Natural Dolores Moss, Owner P. O. Box 554 Valdez, AK 99686		Halibut
Orca Packing Company <u>2/</u> J. Jacobson, Supt. P. O. Box 120 Cordova, AK	1 line - 1/4 lb. 2 lines - 1/2 lb. 2 lines - 1 lb.	Salmon
Pelican Cold Storage Bruce Mitchell, Manager P. O. Box 601 Pelican, AK 99832		Salmon
R. Lee Seafoods D. M. Lashley, President P. O. Box 3171 Kenai, AK 99611		Herring Sac Roe
St. Elias Ocean Products <u>2/</u> Jim Poor, Supt. P. O. Box 548 Cordova, AK 99574	1 line - 1/4 lb. 1 line - 1/2 lb. 1 line - 1 lb. 1 line - 4 lb.	Salmon, Dungeness Crab, Tanner Crab, King Crab, Halibut, (Bottom Fish, Razor Clams, Herring - bait
Salamatof Seafoods, Inc. P. O. Box 1045 Kenai, AK 99611		Herring Sac Roe
Seafoods of Alaska 606 W. Northern Lights Blvd. Anchorage, AK 99503		King Crab
Seward Fisheries, Inc. <u>2/</u> P. O. Box 516 Seward, AK 99664		Herring Sac Roe, Salmon, Halibut, Bottom Fish
Seward Marine Services P. O. Box 335 Seward, AK 99664		Herring Sac Roe
Taylor Aquatic Enterprise Gary Taylor, Owner P. O. Box 131 Cordova, AK 99574		Herring Spawn on Kelp
Connie Taylor P. O. Box 969 Cordova, AK 99574		Shrimp, Bottom Fish - bait

Appendix A, cont.

<u>Name, Executive, Address, Location of Operation</u>	<u>Size of Cans Lines of Machinery</u>	<u>Type of Product</u>
Virgin Bay Kelp Company Steve Smith, Owner P. O. Box 277 Cordova, AK 99574		Herring Spawn on Kelp
Whitney-Fidalgo Seafoods <u>2/</u> AT O'Leary, Supt. P. O. Box 670 Cordova, AK 99574		Herring Sac Roe, Herring Spawn on Kelp, Salmon

- 1/ Morpac, Inc. custom canned salmon for Alaska Packers Association and
Icicle Seafoods, Seward.
- 2/ St. Elias Ocean Products custom canned salmon for Orca Packing Company,
Seward Fisheries, Inc. and Whitney-Fidalgo Seafoods.

Appendix B. Coghill River daily sockeye salmon weir count; air and water temperature in degrees centigrade; precipitation in millimeters; and cloud cover. I/

Date	Daily Count Sockeye	Weekly Total	Cumulative Total	Temperatures		Precip.		Cloud Cover		
				Air Min.	Air Max.	Water 9 am	Water 9 pm	9 am	9 am	9 pm
6/11	0		0	0	21.0	2.0	7.0	0	1	4
12	0		0	2.0	18.0	7.0	7.0	0	3	3
13	262		262	6.5	15.0	7.0	7.0	.25	4	4
14	76		338	7	12.0	8.0	8.0	19.93	4	4
15	6		344	7	14.5	9.0	9.5	8.64	4	4
16	1		345	5.5	10.0	9.5	9.5	15.24	4	4
17	55	400	400	1.5	12.0	8.0	8.0	.25	2	4
18	723		1,123	5.5	12.5	9.0	9.0	4.43	4	4
19	2,274		3,397	5.5	16.0	8.0	9.0	3.1	4	4
20	183		3,580	3.0	20.5	7.5	8.5	0	1	1
21	388		3,968	1.0	21.5	8.5	8.5	0	2	2
22	564		4,532	6.5	14.0	8.0	8.0	7.37	4	4
23	707		5,239	6.0	16.0	9.0	9.0	3.56	4	4
24	381	5,220	5,620	6.0	12.5	8.5	9.0	3.30	4	4
25	448		6,068	6.5	12.0	9.0	9.0	10.67	4	4
26	1,265		7,333	6.5	14.5	9.5	9.0	19.05	4	4
27	207		7,540	6.0	12.5	8.5	8.5	3.56	4	4
28	695		8,235	2.5	19.5	8.5	8.5	0	1	1
29	128		8,363	5.0	20.0	9.0	8.5	0	1	4
30	363		8,726	6.0	13.5	7.5	8.0	5.43	4	4
7/ 1	440	3,546	9,166	7.0	13.5	10.0	10.0	3.81	4	4
2	510		9,676	6.0	14.5	10.0	10.0	.76	4	4
3	348		10,024	9.0	12.5	9.0	9.0	33.14	4	4
4	1,687		11,711	7.5	13.0	10.0	10.0	41.91	4	4
5	11,303		23,014	6.0	13.0	10.0	9.5	60.20	4	4
6	4,435		27,449	7.0	13.0	9.5	10.0	8.64	4	4
7	3,360		30,809	6.5	16.5	10.0	10.0	1.78	2	2
8	3,399	25,042	34,208	2.5	19.5	9.0	9.0	0	2	2
9	2,867		37,075	9.0	19.5	8.0	8.0	0	3	2
10	1,617		38,692	3.0	22.0	8.0	8.0	0	1	1
11	1,175		39,867	3.5	15.5	9.0	9.0	1.52	4	4
12	366		40,233	6.0	16.0	8.5	8.5	7.87	4	4
13	65		40,298	8.0	15.0	8.5	8.5	2.03	4	4
14	193		40,491	6.5	16.5	8.5	8.5	3.05	4	3
15	138	6,421	40,629	6.0	16.0	9.0	9.0	.254	4	4
16	364		40,993	6.5	14.5	9.0	9.5	2.29	4	4
17	362		41,355	6.5	16.5	8.0	8.0	0	4	4
18	76		41,431	7.0	15.5	8.0	8.0	1.78	4	4
19	194		41,625	9.0	14.5	9.5	9.5	27.18	4	4
20	52		41,677	7.5	13.0	10.5	10.5	1.78	4	4
21	72		41,749	6.5	13.0	10.0	10.0	22.35	4	4
22	101	1,224	41,850	6.5	15.5	9.5	9.5	4.06	4	4
23	34		41,884	5.0	18.0	9.5	9.5	.51	1	4
24	171		42,055	7.0	15.0	9.0	9.0	3.81	4	4
25	57		42,112	7.5	18.0	9.0	9.0	.76	4	4
26	27		42,139	7.5	16.5	9.5	9.5	1.27	4	4
27	24		42,163	7.0	16.5	9.5	9.5	0	4	4
28	25		42,188	4.0	19.5	9.5	9.5	0	2	4
29	25	363	42,213	4.5	21.5	10.0	10.0	0	1	1

Appendix B. Coghill River daily sockeye salmon weir count; air and water temperature in degrees centigrade; precipitation in millimeters; and cloud cover.

Date	Daily Count Sockeye	Weekly Total	Cumulative Total	Temperatures				Precip. 9 am	Cloud Cover	
				Air		Water			9 am	9 pm
				Min.	Max.	9 am	9 pm			
7/30	51		42,264	2.0	23.5	10.0	10.0	0	1	1
31	20		42,284	2.0	24.5	10.0	10.0	0	1	1
8/ 1	weir pulled			2.5	25.0	10.0	10.0	0	1	1
2				2.0	25.0	10.5	10.0	0	1	1

1/ Code numbers: 1 = Clear
 2 = Less than 1/2 cloud cover
 3 = Greater than 1/2 cloud cover
 4 = Complete cloud cover

Weir count of other species: 2 king
 1 coho
 123 pink
 202 chum

Appendix C. Eshamy River daily sockeye salmon weir count; air and water temperatures in degrees centigrade; precipitation in millimeters; and cloud cover. 1/

Date	Daily Count Sockeye	Weekly Total	Cumulative Total	Temperatures				Precip. 9 am	Cloud Cov	
				Air		Water			9 am	9 pm
				Min.	Max.	9 am	9 pm			
6/11	0		0	6.1	17.7	8.0	8.5	0	1	1
12	0		0	7.2	13.3	8.5	6.5	0	4	3
13	0		0	9.4	13.8	7.5	8.5	.45	4	4
14	0		0	8.8	11.1	9.0	9.0	.64	4	4
15	0		0	10.0	11.6	9.0	9.0	.38	4	4
16	0		0	6.6	10.0	9.0	8.5	.07	4	3
17	0	0	0	3.8	9.4	8.5	8.5	.80	4	4
18	0		0	8.3	8.8	8.5	8.0	.32	4	4
19	0		0	8.3	12.2	8.0	8.0	0	4	3
20	5		5	6.1	16.6	8.0	8.0	0	1	1
21	19		24	7.2	15.5	8.0	8.0	0	3	1
22	8		32	7.2	14.4	10.0	10.0	*	4	4
23	8		40	8.8	13.3	11.1	11.4		4	2
24	16	56	56	7.7	12.7	11.4			4	2
25	2		58	10.0	10.5	11.4	11.1	R	4	4
26	16		74	9.4	10.5	10.8	11.1	R	4	4
27	28		102	8.8	11.1	11.1	11.1	R	4	4
28	8		110	6.6	16.1	11.1	12.2		2	1
29	21		131	7.2	15.0	11.6	11.1		1	4
30	30		161	10.0	14.4	12.2	12.2	R	4	4
7/01	20	125	181	10.0	12.2	12.2	12.2	R	4	4
02	21		202	8.8	11.1	12.2	12.2	R	4	4
03	8		210	10.5	10.5	12.2	12.2	R	4	4
04	10		220	10.5	10.5	11.1	11.1	R	4	4
05	2		222	10.5	12.2	10.5	10.5	R	4	4
06	10		232	10.0	11.6	10.5	10.5	T	4	3
07	32		264	9.4	12.7	11.1	11.1		3	2
08	30	113	294	7.7	15.5	11.6	12.2		2	2
09	58		352	8.3	15.5	12.2	12.7		2	2
10	24		376	9.4	17.7	12.7	13.3		1	2
11	20		396	9.4	11.6	13.8	13.3	R	4	4
12	18		414	11.6	12.7	13.3	13.3	R	4	4
13	17		431	10.5	11.6	13.3	13.3	R	4	4
14	24		455	9.4	13.3	13.3	13.3		4	3
15	30	191	485	9.4	15.0	13.8	13.8		4	4
16	26		511	11.1	15.0	13.8	13.8	R	3	4
17	14		525	9.4	12.2	13.8	13.8	T	4	4
18	20		545	11.1	13.3	13.8	13.8	T	4	4
19	88		633	11.1	12.7	13.8	13.8	R	4	3
20	114		747	10.0	13.3	12.7	13.3	T	4	4
21	13		760	10.0	12.2	13.3	13.3	R	4	4
22	118	393	878	11.1	14.4	13.3	13.3	T	4	3

1/ Cloud cover code numbers: 1 = Clear
 2 = Less than 1/2 cloud cover
 3 = Greater than 1/2 cloud cover
 4 = Complete cloud cover

* Gauge broken. R = Rain; T = Trace.

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Appendix C. Eshamy River daily sockeye salmon weir count; air and water temperatures in degrees centigrade; precipitation in millimeters; and cloud cover. 1/

Date	Daily Count Sockeye	Weekly Total	Cumulative Total	Temperature		Water		Precip. 9 am	Cloud Cov	
				Air Min.	Air Max.	9 am	9 pm		9 am	9 pm
7/23	52		930	9.4	13.8	13.3	13.3		2	3
24	9		939	11.6	12.2	13.3	13.3	R	4	4
25	1,430		2,369	11.6	13.3	13.8	13.8		3	4
26	159		2,528	11.6	14.4	13.8	13.8	R	4	3
27	114		2,642	11.1	13.3	13.8	13.8	T	4	3
28	105		2,747	10.5	15.5	13.8	13.8		3	3
29	85	1,954	2,832	11.1	16.1	13.8	14.4		3	1
30	17		2,849	11.1	20.5	15.0	15.5		1	1
31	3		2,852	11.1	19.4	15.5	16.1		1	1
8/01	0		2,852	11.6	21.1	16.6	16.6		1	1
02	15		2,867	12.2	20.0	16.6	16.6		1	1
03	7		2,874	13.3	17.2	16.6	17.2		4	1
04	27		2,901	12.2	17.2	17.2	17.2	R	1	4
05	4	73	2,905	11.6	17.7	16.6	16.6		4	3
06	482		3,387	10.5	16.6	16.6	16.6		1	4
07	17		3,404	13.3	15.5	16.6	16.6		4	4
08	4		3,408	12.7	13.8	16.6	16.6	R	4	4
09	852		4,260	13.8	13.8	16.1	16.1	R	4	4
10	202		4,462	13.3	14.4	15.5	15.5	R	4	3
11	477		4,939	11.1	13.3	16.1	16.1		2	2
12	147	2,181	5,086	12.7	13.3	15.5	15.5	R	4	4
13	895		5,981	11.1	13.3	15.5	15.5	R	3	4
14	550		6,531	11.1	14.4	15.0	15.5		4	2
15	801		7,332	9.4	17.2	15.5	15.5		1	1
16	391		7,723	11.1	13.3	15.5	15.0	R	4	4
17	543		8,266	10.0	18.3	15.0	15.5		1	1
18	843		9,109	10.0	17.7	15.5	15.5		1	1
19	660	4,683	9,769	10.0	16.6	15.5	15.5	R	1	4
20	246		10,015	12.2	16.1	15.5	15.5		1	1
21	641		10,656	11.6	18.3	15.5	15.5		1	1
22	333		10,989	12.2	20.0	15.0	15.0		1	1
23	519		11,508	10.5	17.7	15.0	15.0		1	1
24	218		11,726	8.8	17.7	15.0	15.0		1	1
25	154		11,880	9.4	17.7	15.0	15.0		1	1
26	60	2,171	11,940	8.8	16.6	15.0	15.0		1	1
27	75		12,015	8.8	15.5	15.0	15.5		1	1
28	100		12,115	10.0	15.5	15.5	15.5		4	4
29	316		12,431	11.1	13.3	15.5	15.5	R	4	4
30	149	640	12,580	12.2	12.2	15.5		R	4	4
31	weir pulled									

1/ Cloud cover code numbers: 1 = Clear
 2 = Less than 1/2 cloud cover
 3 = Greater than 1/2 cloud cover
 4 = Complete cloud cover

R = Rain; T = Trace.

Weir count of other species: 20 coho
 552 pink

Appendix D.

ANNUAL REPORT

PRIVATE NONPROFIT HATCHERY

Year Ended December 31, 1978

HATCHERY NAME/LOCATION	Port San Juan, Prince William Sound
PERMIT HOLDER NAME/ADDRESS	Prince William Sound Aquaculture Corp. P. O. Box 1110 Cordova, Alaska 99574
PERSON TO CONTACT REGARDING THIS REPORT	<u>Armin F. Koernig</u> , President and Chief Administrative Officer 907-424-7511

Part I Report of Prior Year Performance

A. General Discussion of 1978 Calendar Year Activities

This reporting year is the fourth since 1975 that the Corporation has operated and reported to the Department of Fish and Game on those operations, and associated construction. Due to existence of voluminous background information on previous developments, constructed components and techniques employed, there will be no effort here to review that information.

Briefly, PWSAC carried out operations on fish, eggs and fry from the first year (1975) despite the fact a permanent hatchery facility was not available until the fall of 1976. This resulted in very significant adult returns both in 1977 and 1978 which enhanced the ability of the corporation to expand full egg capacity expeditiously and provided some surplus fish revenues in both years to help offset the considerable cost of operations and construction. These returns amounted to about 55,000 pinks in 1977 and 155,000 pinks in 1978 and allowed PWSAC not only to achieve but to significantly exceed by 1977 the originally planned capacity of 20,000,000 eggs at Port San Juan.

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At the time of application for permit amendment in the Spring of 1978, the Corporation, through technological advances and minimal addition of incubation and rearing units, had proposed a 40 million egg take on pink salmon from the stock expected to return to the hatchery in 1978 and an importation of 3 million chum eggs from the same stream complexes in Port Fidalgo which were used in 1977 to initiate the San Juan brood stock. These goals were approved by the Commissioner's office on August 4, 1978.

It should be understood that an important rationale for the above large numbers of eggs was the result of intense long-range economic studies of budget requirements for annual operations, administrative overhead, and debt retirement on State loans to construct and operate the hatchery. That is, when large loans for construction became necessary to complete the hatchery in 1976-79, and to assist in operating the hatchery in 1978-79, entirely different run levels than originally planned became necessary, especially in view of a continued objective that 60 to 70 percent of future runs be caught by the common property commercial and sport fisheries. The corporation is rapidly working towards sustained annual total return runs of about 735,000 pinks and 480,000 chums in order to arrive at these financial and common property fishery objectives.

The 1978 return of pinks to Port San Juan did not reach expectations of the joint ADF&G-PWSAC forecast of 223,000 pinks, despite a unique situation whereby the adjacent commercial fisheries were closed throughout the year to protect a weak wild stock situation. It is likely no significant interception by distant fisheries occurred and the statistics generated by catching and counting all fish appearing in the zone near the hatchery stream mouth plus those which entered and spawned in the stream are an unusually accurate assessment of the actual return. The 1978 return was 154,620 pinks or about 69 percent of anticipated return and 1.47 percent of the fry released in 1977. The deficiency was absorbed by lesser fish sales and neither that portion set aside for brood stock (32,900) or stream escapement (1200) was shorted. The stream escapement, in fact, was assessed at 6,430 fish, spread over several waves of middle- and late-run fish. Given a very large run and inability to weir or fence off completely a stream which is entirely in the intertidal zone, ability to avoid some "over escapement" is very limited.

The 1978 return of pink salmon was a combination of returns from about 500,000 fry produced from a small stock of "middle-run", naturally occurring pinks in 1976 in the hatchery streams (#669, Larsen Creek) and 10,000,000 fry generated from "late-run" stocks from a remote egg take in Galena Bay, Valdez Arm, some 90 miles northeast of the hatchery. Overlap in timing of these runs prevented complete separation of returns from the two sources but day by day observations indicated that 2 percent (10,000) or more of the homestream fish returned and the deficiency in return was in the imported stock. Also, mark recovery efforts in 1978 indicated a much higher rate of return from pink fry fed for 30 days prior to release, than from unfed fry that made up most (9.2 million) of the release in 1977.

Another serious deficiency during the 1978 season was caused by an unusually high (compared to 1977) rate of adult mortality in the brood stock pens. Thus the pink egg take totalled 28,645,626 eggs, rather than 40 million, when large numbers died in pens prior to artificial spawning. Densities of adults placed in pens were lower than in 1977 (83 percent), but weather was less favorable (extended very hot, dry weather, followed by high winds which caused serious wave action in the pen complex). Length of time required for penned fish to fully mature was much longer in both years than has been demonstrated in wild stocks and this is a major contributor to unspawned mortality in the pens; maturing periods of 25 to 35 days have not been uncommon in the pens, whereas 14 to 21 days would be expected in middle- and late-run stocks based upon past tagging experiments on these stocks. In 1978 it was observed that many wild stocks in adjacent small drainages were extensively delayed in spawning due to dried up spawning beds during a prolonged (3 week) stretch of hot, dry weather, however, spawning occurred at normal times where sufficient stream flows existed.

The San Juan hatchery set aside, by written agreement, one PWSAC incubation modual (6 boxes = 12 compartments) for use in handling to the eyed stage 3,000,000 pink salmon eggs taken by the State at Cannery Creek hatchery site. Eggs were received the last week of August and after eying were transferred to State owned Zenger boxes installed at Port San Juan.

Offsetting to some extent the above "lost" eggs among the brood stock was a much higher survival success of the 1978 pink eggs from the green- to eyed-egg stage. A survival of 90.44 percent occurred in this stage. Thus mortalities in this stage were only 1/3 to 1/2 the rate of that experienced in 1975, 1976 and 1977 brood years; in those years eggs were waterhardened at the spawning location and the first two years much handling and other extra stress was necessary because of airplane transportation of eggs from remote sites. In 1978, eggs and sperm were retained in a "dry" state after stripping and following weighing of each batch (bucket), fertilization and waterhardening was accomplished within the incubation boxes. It is believed this change in technique in handling of freshly spawned eggs was the main factor in reducing early egg-stage mortalities, but some contribution from other factors may have been important also. Much effort has gone into better methods of securing an abundance of viable sperm, of reducing handling and holding stress in the brood and of reducing the amount of sorting by dipnetters checking maturity. A key factor was better pre-planning of the "sperm bank" or rate of catching of males to be used in spawning than occurred in 1977. Result was fertilization rates of all batches in the 98-100 percent range versus serious losses from this source in 1977.

Further proof of success of the new techniques was shown by mortalities in 1978 among 3 million pink eggs taken by the State at Cannery Creek, Unakwik Inlet and flown to Port San Juan for incubation. These waterhardened eggs experienced mortalities of about 14 percent or about 50 percent higher than the 1978 PWSAC eggs handled by the dry method.

Finally, the net result of the occurrences reported above should be a fry outmigration in Spring 1979 of about 24.6 million fry. This is calculated using the 95 percent survival to fry experienced at Port San Juan in 1976-77 and 1977-78 from eyed-egg to emergent fry. This will be 7.7 million (45.6 percent) more fry than was produced the previous year.

The remote egg take on chum salmon permitted by the Department at Sunny River, Port Fidalgo had very poor success due to a number of factors. Only 441,192 eggs were obtained of a planned take of 3 million eggs. Principal source of failure was lack of escapement of this species, following extensive and unusually late commercial fishing on these stocks and a smaller forecasted run than in 1977. Another serious problem was that an intensive wind and rainstorm caused close-down of flying and most egg-take operations for 4 of the 7 days

PWSAC was in Port Fidalgo. A portion of the 1978 egg take was accomplished using saltwater holding pens; live fish were trapped or seined in the lower portions of the streams or at the stream mouths and transported offshore to male and female pens. This method had the advantage of delaying actual egg take until transportation by plane was available, but had disadvantages of moderate pre-spawn mortality occurring in the pens during a 4-day period when storms stopped aircraft operations and also tremendous effort and expense was involved in securing each fish because of distances and tidal flat access problems. Some 44 percent of the eggs were obtained from stream bank spawning, with mature fish being seined, speared or trapped on the riffles. Final egg quality of shipments was poor in 1978 and only 256,000 or 58 percent of these eggs survived to the eyed stage at Port San Juan hatchery.

Other than egg-take goals for 1978, the 1978 permit did not spell out any other operational, evaluation or construction goals. Also, the draft hatchery production plan (Schedule E) was not a part of earlier annual reports. However, a number of other planned programs were accomplished during the reporting year. Examples are:

1. A joint ADF&G/PWSAC fin clipping project successfully marked 72,000 pink and 30,000 chum fry during the 1978 release period.
2. A Sea Grant sponsored, 3-year, estuarine carrying capacity program successfully completed its third year.
3. A Sea Grant assisted fry diet study using three diets was accomplished, including fin clipping of pinks fed the three diets.
4. A fry enumeration station was designed and built, along with associated collection-pipe system from the individual incubation moduals, which enabled automatic sorting of 10 percent of outmigrating fry for measurement and counting. Ninety percent fry passed uncounted and unhandled through a pipe directly to the feeding pens, thus greatly reducing handling stress and incidently, providing protection from stream mouth predator populations which may have seriously reduced survival of the 1977 outmigrants (and the 1978 adult return). Most fry releases were accomplished at night in the general absence of predators.
5. An intensive mark-recovery program was carried out, searching for the returning marked fish of the 1976 brood

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in the (1) hatchery stream escapement, (2) escapements in seven wild stock streams of Evans and Latouche Islands, (3) sales fish loaded on tenders, and (4) among the brood stock processed at egg-take.

6. An alternate water delivery system was purchased and put in place as a result of a siphon break and mainline water stoppage in mid-winter 1977-78. This enabled retrieval of emergency water from Larson Creek near its mouth for delivery to the incubation building.

7. Major construction did not take place in this reporting year. However, several minor projects on housing units, the incubation building, the hydro-electric controls and the holding pen complex were completed. Pens were rebuilt to 10' X 20' X 7' dimensions and the inventory of floats and nets expanded to greatly increase operating capacity in brood stock holding, sale fish holding and fry feeding pens. Temporary freshwater raceways were constructed to handle the 1 million chum fry in Spring 1978, since exclusive saltwater feeding did not prove feasible as in pink salmon. A trailer was moved to the site to provide additional permanent housing.

8. A special hydraulic box with high speed rollers was designed and built to clean used Astroturf from the incubation boxes following winter incubation.

9. A substantial supply of PVC saddles was purchased to allow comparative studies with Astroturf incubation and allow for some replacement of artificial substrate being used.

10. Egg-alevin density experiments were conducted in the 1977-78 incubation units; results were written up and shared with F.R.E.D. Division personnel. These experiments were expanded upon in 1978-79, with addition of PVC saddle vs Astroturf comparisons on a larger scale.

11. Thirty new Zenger aluminum incubation units were installed in the San Juan hatchery in October, 1978 (3 stacks of 5 owned by State for Cannery Creek eggs; 3 stacks of 5 by PWSAC for experiments and comparison with existing incubators). These represent the first change in incubation capacity additions since the Fall of 1976; i.e. in-place space for 6 million or more eggs.

12. The Corporation successfully negotiated a contract with a group of seven local processors which guarantees a market, price and tender service for surplus fish sales at San Juan for the years 1978, 1979, and 1980.

13. The Corporation negotiated an agreement which successfully marketed nearly all spawned-out carcasses from the 1978 egg-take operations (shellfish fishery bait).

It can be readily seen that aside from the limited progress assessment illustrated by comparison of egg-take permit goals versus actual egg-take achievements, numerous other significant gains were made during the reporting year. Another measure of progress is the transmittal of benefits from this project to the common property fisheries. During the reporting year the Corporation successfully worked through the regulatory structure of Department-Advisory Committee-Board of Fisheries regulatory proposals for a special San Juan subdistrict and subdistrict commercial fishing season in 1979 which will deposit an estimated 182,000 of the expected 339,000 pinks returning in 1979 as direct benefits to the common property purse seine fishery.

B. Production statistics for the reporting year are shown on the attached Schedules A, B, and C.

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ANNUAL BROODSTOCK REPORT
Schedule A

Port San Juan Hatchery - Prince William Sound Aquaculture Corp.

Dec. 16, 1977 - Dec. 15, 1978

CODE BROODSTOCK DATA

Species: Pink Brood Year: 1978 Lot#/Batch # Combined

Donor Stream #669, Larsen Creek, Evans Island, P. W. Sound

Total Escapement 154,620

Adults Captured 148,140

Age 2

Dates July 25 - Sept. 1, 1978

Number of Eggs Taken 28,645,626

Male - Female Ratio 25.5/74.5 (5505M - 16,076F)

Average Weight - Length 1.59Kg - 469mm (males 1.49Kg, 457mm MEFO
(females 1.69Kg, 481 mm M)

Fecundity (average) 1782

Holding Mortalities 9,763

Spawning method used Dry

Evaluation Program for this operation and results:

1. Weight/length samples from 3 50-fish samples of sale fish during tender loading on Aug. 7, 16 and 25, 1978. Run weight average confirmed by large volume of weights checked during sale of 114,188 fish.

2. Sex ratio of fish actually used in artificial spawning; additional 968 females discarded at egg-take site as waterhardened, bloody or immature. Sperm of 5 or more males actually mixed with eggs from each female at time of spawning.

3. Fertilization rates determined by microscopic examination of eggs from each incubation unit 24 hours after egg-take. Rates varied from 98 to 100 percent in samples.

4. Estimated number of eggs per batch first determined by dry weights at time of spawning; Jensorter counts at time of eyed egg sorting revealed 2.28 percent error in original estimates.

ANNUAL BROODSTOCK REPORT
Schedule A

Port San Juan Hatchery - Prince William Sound Aquaculture Corp.

Dec. 16, 1977 - Dec. 15, 1978

CODE

BROODSTOCK DATA

Species Chum Brood Year 1978 Lot #/ Batch # Combin

Donor Stream Streams # 83,84, 87A, Sunny River, Port Fidalgo

Total Escapement 5,000 (wild stock, 9/10 counts in 3 streams)

Adults Captured 344 (for artificial spawning)

Ages 3,4, and 5

Dates 9/11 - 16/ 1978

Number of eggs taken 441,192

Male - Female Ratio 34.6/65.4 (83M, 157F spawned)

Average weight - length 3.63Kg 600mm MEFOT (est.)

Fecundity (average) 2642

Holding Mortalities 65

Spawning method used Waterhardened in buckets; air shipped 90 miles to hatchery

Evaluation program for this operation and results:

1. No weight - length sample in 1978; see data from same streams in 1977. Fecundity increase of 532 eggs per female indicates somewhat larger 1978 fish.
2. 43.7 percent of egg take on stream bank from fish speared, seined or trapped; 56.2 percent of egg take from seined fish transported to holding pens in bay and held for 1 - 4 days before spawning.
3. Egg counts from eggs per ounce samples of waterhardened eggs received at hatchery.
4. Fecundity from all fish and eggs processed; since a substantial portion of stream fish were partially spawned, actual original fecundity of these stocks higher than 2642 eggs. (1977 fec = 2110)
5. Egg quality rated low compared to 1977 egg take at same place, as measured by 58 percent survival in 1978, 95 percent survival in 1977 from green egg to eyed egg stage.

ANNUAL FISH CULTURE PRODUCTION REPORT

Schedule B

Port San Juan Hatchery-Prince William Sound Aquaculture Corp.
Dec. 16, 1977 - Dec. 15, 1978

CODE	FISH CULTURE REPORT		1977		Lot #/Batch # Combined
	Species	Pink	Brood Year	Planned	
	Green Eggs			20,000,000	23,424,000
	Eyed Eggs			18,000,000	17,788,000
	Emergent Fry			17,100,000	16,950,784
	Unfed Fry Released			12,100,000	15,081,149
	Location/Date*		Dockside		Dockside 3/30 to 5/4
	Size at release			31mm - 0.2gr	32.2mm - 0.2gr
	Expected adult return & year			242,000	301,623 (1979)

If fry were fed complete the following:

	Number of fry to feed			5,000,000	1,869,635
	Swimup size (ave. length & wt.)			31mm - 0.2gr	
	Fed Fry Released**			4,500,000	1,859,629
	Release Location/Date***		Pens at Dock		Face of dock 3/30 and 5/4
	Size at Release (lg. & wt.)			40mm - 0.3gr	32.3mm - 0.2gr
	Expected adult return & year			135,000-1979	36,393 (1979)

State any disease history or rearing problems:

* Pink fry began leaving first boxes on Feb. 20, 1978, but first releases (859,000 2/20 - 3/31 outmigration) did not begin until March 30.

** No assessment of minimal mortalities during feeding experiments.

*** Early box outmigrants fed and released March 30 (859,087); outmigrants of April 17-18 fed and released May 4 (960,539 fry).

No disease problems noted by operators or ADF&G Inspectors. Rearing problems related entirely to lack of acceptance to "Abernathy Dry" diet; feeding experiments discontinued early due to poor growth.

ANNUAL FISH CULTURE PRODUCTION REPORT

Schedule B

Port San Juan Hatchery-Prince William Sound Aquaculture Corp.
Dec. 16, 1977 - Dec. 15, 1978

CODE

FISH CULTURE REPORT

Species	Chum	Brood year 1977	Lot #/Batch # Combined	
			<u>Planned</u>	<u>Actual</u>
Green Eggs		5,000,000	1,445,700	
Eyed Eggs		4,500,000	1,356,000	
Emergent Fry		4,275,000	1,025,000	
Unfed Fry Released		0	0	
Location/Date		N/A	N/A	
Size at Release		N/A	N/A	
Expected Adult Return & year		N/A	N/A	
Fed Fry:				
Number of fry to feed		4,275,000	1,025,000	
Swimup Size (ave. length & wt.)		33mm - 0.3gr	36mm - 0.3067gr	
Fed Fry Released		3,847,500	1,014,000	
Release Location/Date		Dock-May-June	Dock-June 15	
Size at Release (lgth. - wt.)		45mm - 0.6gr	41.35mm - 0.5747gr	
Expected Adult Return & Year		115,425/1980-82	30,420/1980-82	

Disease history or rearing problems:

No disease history noted by operators or State inspector. Initial deposition of emerging fry into saltwater pens indicated stress and mortality from change in salinity. Therefore, chum fry were fed in temporary freshwater raceways for about two weeks prior to transfer to saltwater pens to complete 30-day rearing program.

ANNUAL REPORT

Schedule C

Port San Juan Hatchery-Prince William Sound Aquaculture Corp.

Dec. 15, 1977 - Dec. 15, 1978

CODE	HARVEST MANAGEMENT & HATCHERY RETURNS	Species: Pink Date: 1/10/	
		<u>Planned</u>	<u>Actual</u>
1.	Total Hatchery Returns	223,000	154,620
	<u>Escapement Requirement</u>		
2.	Hatchery Brood Stock	29,629	32,932
3.	Broodstock for Associated Water System	1,200	6,430
4.	Other Escapement Required	0	0
	<u>Harvest Allocation</u>		
5.	Number of fish taken	186,100	114,188
	Age	2	2
	Weight & Length	1.54Kg-450mm	1.59Kg-469mm
	Date/Location	San Juan Harvest Area	
	Gear Used or Method	Purse Seine	18,809
		Beach Seine	95,379
	\$ per pound received	\$0.3476	\$0.3476**
	\$ Total Received	\$219,940	\$140,318
6.	Total Harvest (2 & 5)	222,600	147,120
7.	Harvest Required to Meet Hatchery Requirements	717,008*	691,993
	TOTAL SURPLUS (DEFICIT) AT HATCHERY 7 - 6	(494,408)	(544,873)

* Based upon \$803,000 budgetary need which included in excess of \$300,000 in debts carried over from previous fiscal year; actual fish requirement reduced by fact fish were 0.1 pound heavier than planning average.

**All fish sold for this contract base price; total also includes \$5,245.10 in additional egg and other bonuses; quality problems with last sale of year caused price drop to \$0.20 per pound; also 3,000 surplus males of poor quality from broodstock pens sold for \$0.10 per pound. Total does not include \$4,283.80 received for spawned-out carcasses.

Part II Plan for Next Operating Year

A. Overview

1. Level of activity in 1979, capital expenditures and finances

The exact egg-take target for pink salmon at Port San Juan cannot be exactly stated at this time, since finances and construction schedule for a hatchery building addition allowing expansion are not firm at this time. Given the worst case, i.e. no additional incubation facilities, the goal will be 40 million pink eggs and 3 million imported chum eggs, as in 1978. Should the building addition, complete with operational substrate incubators, be forecasted as in place by October 1, 1979, the pink salmon egg-take goal will be expanded to the 50 - 60 million range in the application for permit alteration to the Commissioner about July 1, 1979.

Should the higher egg-take goals be requested, only moderate changes in broodstock holding capacity and manpower requirements will be required. Space for 50,000 in broodstock versus 32,900 in 1978 will be required. The egg-take staff (presently 1 culturist and 12 technicians) will need a moderate expansion. Some changes are anticipated in procedures to catch the returning run, primarily due to need to upgrade quality of fish to be sold to processors. In 1978, a four-man fishing crew using an 18-foot outboard skiff and beach seine captured and transported to pens or tender 95,379 sale fish and 32,932 broodstock fish during a 5-week period. Three purse seine vessels worked on a voluntary basis one weekend at the height of the run catching 18,800 pink salmon for sale to tenders. It is anticipated that in 1979 a greater portion of the return will be taken by contract or volunteer purse seiners in the outer portions of the Special Harvest Area to improve sale fish quality, and the beach seine operations will concentrate on broodstock operations near the hatchery stream mouth.

Please note here that the fish management plan already approved by the Department, Cordova Advisory Committee and Board of Fisheries prior to December 16, 1978 calls for an escapement to the Special Harvest Area at San Juan of 157,000 pinks or the same level as handled in 1978. The remaining portion (182,000) of the larger 1979 run has been allotted to the common property seine fishery.

At this time we do not anticipate changes in the quantity of the existing permanent staff at the hatchery: Hatchery Manager (biologist), Fish Culturist III and Maintenance Technician. All other work will be performed by temporary

technicians in about the same number as in prior years. The addition of a Cordova-based, full time Operations Manager may occur after July 1, 1979, and such would greatly enhance the planning, coordination, and general supervisory strength of PWSAC.

The principal capital expenditure anticipated in fiscal year 1979-80 is the hatchery building addition, which will contain about 1200 square feet of new incubation space, 1000 square feet of work space useable for short term freshwater rearing and/or temporary projects such as fin clipping, egg-sorting, etc., 400 square feet of new wet-lab space, and 500 square feet of basement water processing (recycle, filtration, etc.). A second floor of this building will be designed into two apartments for permanent or transient supervisory personnel. Funding for this construction is only partially secure (E.D.A.--75%, State 25% = \$177,000); that portion of funding needed for inside features such as apartment finishing and incubation units must receive State loan or other financing which is not now secure.

The budgetary requirement for FY80 (beginning July 1, 1979) is now estimated at \$489,750 for only that portion of the PWSAC budget related to (1) operation of the San Juan hatchery and (2) administrative supervision and overhead costs at the Cordova office. It is anticipated the principal source of funding for this budget will be the fishermen's voluntary assessment on catches (\$200,000) and processor matching of this assessment (\$200,000). These amounts are based on an ADF&G preliminary catch forecast of 6.6 million pinks, 0.1 million chums and 0.1 million other species in the Sound in 1979, plus an average catch of about 0.8 million salmon in the Copper-Bering gillnet districts. These would be the largest receipts of any year in the five-year (1975-79) voluntary assessment-matching program for PWSAC support voted in May, 1975, by fishermen and concurred in by processors in the same year. Note that this financial plan is highly dependent upon an unusually large 1979 pink run, that is, the biggest catch since 1971.

The above financial planning interacts with the surplus fish sale plan of 1979 at San Juan, i.e., the request for only 31.6 percent of the hatchery run for offsetting revenues. Missing from this combined plan is any proposal to set up a reserve fund for future short falls in revenue. The transmittal of substantial benefits in 1979 to the common property seine fishery (proposed 182,000 fish worth \$225,000) has been tentatively placed as a higher priority than establishment of a reserve fund.

The plan for fish allotments in 1980 will obviously have to be quite different if the assessment-matching funds no longer are forthcoming, as originally conceived. A larger run of pink salmon (500,000 plus) and the first chum return (3200 fish) will assist in securing a break-even financial status.

2. Changes in Operational Methods or Locations

Only minor modifications of prior methods for pink salmon culture are anticipated, as previously discussed.

The securing of any chum salmon egg-take in 1979 is a serious and unsolved problem at this time. The 1975-1979-1983 wild fish cycle in the Sound has been and may continue to be at disastrously low levels. The 1979 forecast calls for some improvement over 1975 on the basis of holdover 5-year-olds from 1973 spawning, while the usual (75 percent) main run component of 4-year-olds remains very weak.

The economic viability of the San Juan operations hinges heavily on initiation of a strong chum broodstock, but to date only 1.9 million eggs (in 1977 and 1978 only) could be secured. The problem was increased by State of Alaska needs for chum eggs at both Main Bay and Cannery Creek hatchery sites beginning in 1978.

A serious effort to specifically allot some of the 1979 and 1980 chum returns to hatchery cultural work needs to be made. Meetings to solve this problem will be held in Spring 1979 and outcome may require actions such as special bay or season closures which should have concurrence of a majority of the user groups. The egg-take requirements do not involve a large number of fish (less than 10,000) but they cannot be achieved without some special manipulation of catches and/or escapement goals in the wild stocks.

Further on this matter, PWSAC may be forced to mix stocks of "middle-run" fish with the pure, late, Port Fidalgo stock obtained heretofore in order to obtain any eggs in 1979 and 1980. This is because source options will be very limited.

B. Hatchery Staffing Plan

I. List of Personnel

a. On Site:

<u>Title</u>	<u>Percentage of Time</u>	<u>Cost</u> *
Hatchery Manager	100	\$ 26,418
Fish Culturist III	100	24,990
Maintenance Technician	100	24,990
(1) Cook (temp.)	30	8,500
(1) Asst. Cook-Bullcook (temp.)	25	3,500
(12) Hatchery Technicians (temp.)	30	30,400
(4) Fishing Technicians (temp.)	20	<u>14,660</u>
Subtotal	59 man-months	\$133,458

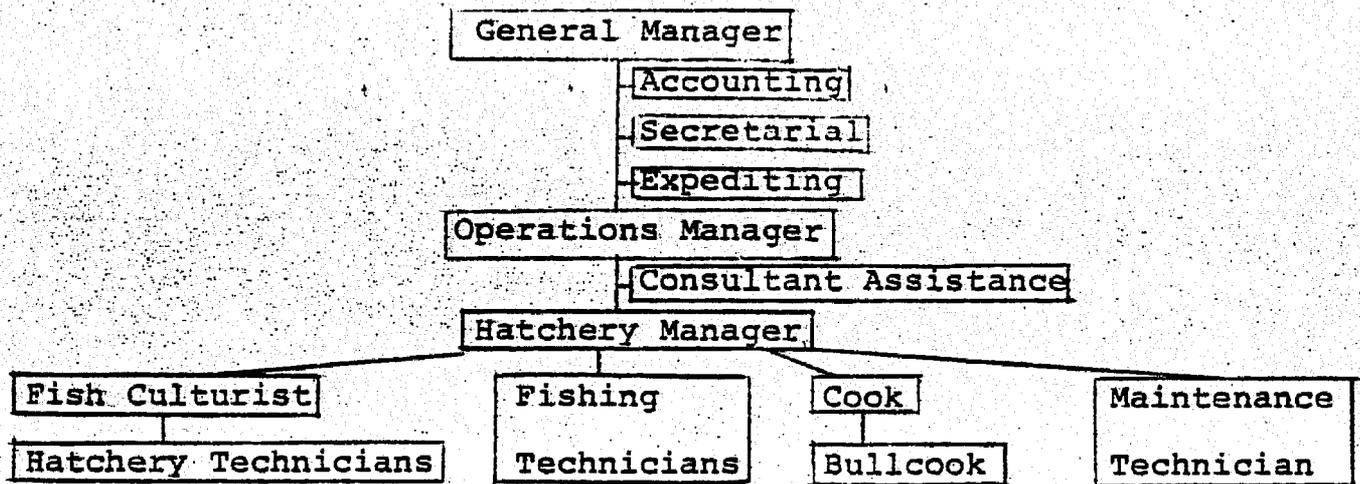
*Including salary plus W.C. and payroll taxes. Also note that numerous operational costs beyond the pure personnel costs shown above must be added to establish the total operational costs. Examples are transportation, communication, food service, medical costs, building heating costs, etc. These add tens of thousands of dollars to the operational costs.

b. Cordova Headquarters

<u>Title</u>	<u>Percentage of Time</u>	<u>Cost</u>
Operations Manager	100	\$ 29,750
All other personnel costs *	---	<u>37,994</u>
Subtotal		\$ 67,744

*An estimate of salary costs only of administration of the operational program, including supervising, accounting, secretarial, expediting, etc. Salary costs represent only about 60 percent of total administrative costs. Data from FY78 CPA report of PWSAC.

2. Organizational Chart



C. Production Plans

The 1979 project production plan for both pink and chum salmon, together with the long-range design production goals for Port San Juan, is shown on the attached Schedule E forms.

D. Rearing Methods

The final permit application for Port San Juan (Spring 1975) did not detail rearing facilities since rearing was not anticipated for pinks and chums at this site. In subsequent years, interest in rearing to increase marine survival came from investigation of the Japanese experience and test lots in Alaska at Beaver Falls, Kitoi, Little Port Walter and Halibut Cove Lagoon. By 1977, PWSAC was holding and feeding early emerging (February-March) pinks in freshwater boxes within the hatchery building and four test lots totalling 1.3 million pinks were held and fed for 30 days in saltwater pens prior to release. In 1978, the saltwater complex was expanded in capacity and small (temporary) freshwater raceways were also constructed to handle the first chum fry production. About 1.8 million pink and 1.0 million chum fry were reared for short periods in 1978.

Final design rearing capacity for Port San Juan is presently defined as 16,000,000 chum fry and 5,000,000 pink fry. Evaluation presently in progress on value of the rearing programs may alter the defined goals at a later date. Development of an Alaska-manufactured fish diet will be a critical component in the evolution of this program and similar programs at State hatcheries, due to unsatisfactory quality and transportation costs of feed manufactured in Oregon and Washington. The present saltwater rearing complex has a capacity for 12,800,000 fry.

SCHEDULE E

Hatchery Production Plan for Calendar Year 1979

A. Design Production Goal:

The design production goal of Port San Juan hatchery is to produce 736,000 returning adult pinks by 1981 by taking 41,000,000 green eggs, incubating 36,900,000 eyed eggs, and rearing 34,555,000 fry to a release size of 4,800 fish per kg. (average of fed and unfed release sizes).

B. Projected Production Plan:

Species:	Pink	Brood Year:	1979
		#	% Survival
Green Eggs		57,000,000	--
Eyed Eggs		51,300,000	90
Emerging Fry		48,735,000	95
Fry Released (unfed)		43,735,000	100
Location		San Juan Dockside	
Expected survival to ret. adult		874,700	.02
Expected Year of return		1981	
Fed Fry:			
Fry to be held over for feeding		5,000,000	
Fingerlings released		4,500,000	90
Location		San Juan Dockside	
Size at release		4000/kg	
Expected survival to ret. adult		135,000	.03
Year of return		1981	

Note unused space from missing chums in early years used for pinks in excess of final or design production.

SCHEDULE E

Hatchery Production Plan for Calendar Year 1979

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Design Production Goal:

The design production goal of Port San Juan hatchery is to produce 480,000 returning adult chums by 1988 by taking 20,800,000 green eggs, incubating 18,720,000 eyed eggs and rearing 16,000,000 fry to a release size of 1,500 fish per kg.

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Projected Production Plan:

Species:	Chum	Brood Year:	1979	
		#	% Survival	
Green Eggs		3,000,000	N/A	Y,
Eyed Eggs		2,700,000	90	
Emerging Fry		2,565,000	95	
Fry Released (unfed)		0	N/A	
Location		N/A		
Expected Survival to ret. adult		N/A		
Expected year of return		N/A		

Fed Fry:

Fry to be held over for feeding	2,565,000			7e
Fingerlings released	2,308,500	90		
Location	San Juan Dockside			
Size at release	1740/Kg			
Expected survival to ret. adult	69,255	.03		
Year of return	1982-1984			

Note available eggs of chums in 1979 assumed far less than design production goal.