ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

PRINCE WILLIAM SOUND AREA
ANNUAL FINFISH MANAGEMENT REPORT

1989

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1990 COMMERCIAL FISHERIES STAFF

The finfish operations for the Commercial Fisheries Division, Prince William Sound Area, employed 2 college interns, 41 seasonal and 7 permanent employees during the 1989 season who participated in various area management programs. Thanks is extended to all personnel for a successful 1989 season.

Permanent Employees during the 1989 season:

James A. Brady	Area Management Biologist
Keith Schultz	Assistant Area Biologist
Sam Sharr	Research Project Leader
Kenneth Roberson	Research Project Leader
Drew Crawford	Research Biologist
Cheryl "Jo" Mala	Field Office Assistant
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Permanent Seasonal Employees:

Leah Gilman	Clerk III	Jeannie Gilman	Miles Lake
Jill Phillips	Fish Tickets	Susan Kerndt	Miles Lake
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1989 PRINCE WILLIAM SOUND SALMON AND HERRING FISHERIES

Management Area Description

The Prince William Sound (PWS) management area encompasses all coastal waters and inland drainages entering the northcentral Gulf of Alaska between Cape Suckling and Cape Fairfield (Appendix A.1). The area includes the Bering River, Copper River and all of Prince William Sound along with a total adjacent land area of approximately 38,000 square miles.

There are five different herring fisheries in the PWS management area, that all target on what is treated as a single major stock of herring in the Sound. The PWS herring management plan calls for a maximum exploitation rate of 20% for the PWS herring biomass for all fisheries combined. The food and bait fishery is the only one that occurs in the fall and winter, generally in the Knowles Head area. This fishery is not limited, but generally has fewer than 10 boats participating annually. The four spring fisheries usually occur in the month of April, coinciding with the spawn timing of the PWS herring stock. The spring fisheries include: (1) a purse seine sac roe fishery, that accounts for a large portion of the harvest and limited to approximately 108 permit holders, (2) a gill net sac roe fishery with 25 limited entry permit holders, (3) a roe on kelp produced in pounds fishery with 128 limited entry permit holders, and (4) a wild harvest fishery of natural roe on kelp, that is open to entry and has annual participation of 100 to 200.

The Prince William Sound salmon management area is divided into eleven management districts that correspond to the local geography and distribution of the five species of salmon harvested by the commercial fishery. The management objective for all districts is the achievement of desired escapement goals for major species while at the same time allowing for the orderly harvest of all fish surplus to spawning requirements. In addition, regulatory management plans have been developed directing the department to manage fisheries to assist specific PNP (private non profit) hatcheries in achieving cost recovery and brood stock objectives.

Legal gear for the salmon fishery includes purse seines and both drift and set gill nets. Drift gill net fishermen are the most numerous and are permitted to fish in the Bering River, Copper River, Coghill, Unakwik, and Eshamy districts. During the 1989 season, 408 drift gill net permit holders participated. Set gill net gear is legal only in the Eshamy district. There are 30 total permits for this gear type; however, none were active in 1989 due to the closure of the Eshamy district resulting from the Exxon Valdez oil spill. Purse seine gear is legal in the Eastern, Northern, Unakwik, Coghill, Northwestern, Southwestern, Montague and Southeastern districts. An estimated 243 permits were active during the 1989 season.

Overview of Area-Wide Fisheries

The Prince William Sound Area combined commercial salmon harvest for 1989 amounted to 24.4 million fish (Appendix A.2). This catch exceeds the average harvest over the past 10 years (Appendix A.3). However, an exceptionally large portion of this catch (33%) was composed of hatchery sales fish from the PNP hatcheries, leaving a common property portion of the catch below the 10 year average.

A poor return of wild stock pink salmon was again observed in the Sound, which was particularly disappointing in light of the bright forecast. Sockeye returns were above average in the Copper and Bering River Districts but especially weak in the Coghill district. Coho and chum production fell close to the average harvest level for the past ten years.

In separate incidents on consecutive days in the Esther Subdistrict and in the Cannery Creek Hatchery terminal area, oil posing an appreciable likelihood of contaminating catch or fouling gear, was encountered by the commercial fishing fleet that required an immediate closure of the fishery. The fishery was reopened 10 days later, with a highly regulated on the grounds monitoring program, and field announced openings and closures similar to herring sac roe fisheries. The ten day closure, which occurred near the peak of hatchery returns to Cannery Creek and Esther, resulted in a delay in the harvest and a high percentage of lower grade fish in the commercial catch.

The value of the combined commercial salmon harvest is estimated at $41.3 million, excluding hatchery sales (Appendix A.5 and A.6). The drift gill net catch is valued at $23.8 million, setting the average earnings for the estimated 480 permit holders that fished in 1989 at $49,470. Seiners harvested $18.9 million worth of fish setting the average earnings for the estimated 235 permit fleet at $80,610. Because the Eshamy district was closed for the season, set net fishermen had no opportunity to fish in The Prince William Sound area in 1989. Average prices paid to fishermen are summarized in Appendix A.7.

Escapements throughout the Sound were mixed but for the most part adequate. The wild stock pink systems of the Southwestern and Montague districts and adjacent areas that remained closed through the season had unexploited returns that resulted in escapements exceeding minimum objectives by a factor of 1.5. The areas of the northern mainland that were actively fished received escapements below desired levels. Chum escapements were high throughout the Sound. The Coghill sockeye escapement fell below minimum desired levels while the Eshamy Lake sockeye escapement was substantially above. In the Copper River system spawning goals were met for chinook salmon but were below minimum levels for sockeye and coho salmon. Minimum escapement objectives were met for sockeye salmon in the Bering River system but were not met for coho salmon.

Exxon Valdez Oil Spill Impacts on Management

At 12:04 a.m. on March 24, 1989, the tanker "Exxon Valdez" ran aground on Bligh Reef, at the southern entrance to Valdez Arm, spilling 260,000 barrels of north slope crude oil into the waters of Prince William Sound. Directed by the strong north winds and prevailing water currents following the accident, the oil from the spill moved southwestward from the site of the grounding, impacting many of the Sound's islands and portions of the mainland. Much of the oil exited the Sound through the straights and passages of the Southwestern district. Islands that suffered moderate to heavy oil impacts from the spill included Naked, Smith, Eleanor, Ingot, Knight, Perry, Green, Montague, Chenega, Latouche and Evans. Hardest hit of the mainland shore areas of the Sound was the shoreline of the Eshamy District, including Main Bay and Eshamy Lagoon.

Spring Herring Fishery Closures

On April 3, 1989, the Department announced that due to the Exxon Valdez oil spill, the spring herring fisheries in Prince William Sound would not open. The following observations, factors and sources of information led to this decision.

1.) Immediately following the grounding, Department biologists began compiling an inventory of the beach areas affected by the oil spill. By April 3, oil had impacted the beach areas of the Naked Island group, including Peak, Storey, and Lone Islands. These islands have been a major spawning location in Prince William Sound for six of the past seven years. During the 1988 season Naked Island accounted for 11% of the total miles of spawning observed by aerial and skiff surveys, and 24% of the total estimated spawning biomass based on under water spawn deposition surveys. The Department research vessel Resolution reported schools of herring observed by sonar off the east and south sides of Naked Island and near Smith Island on March 29, 1989. Based on these observations and the history of spawning activity on the Naked Island group, there was a high likelihood that herring spawning would occur in this location again in 1989.

2.) Prior to the April 3 announcement, oil had severely impacted the north shoreline of Green Island, and minor impacts had been reported on Montague Island in Stockdale Harbor, Rocky Bay and Zaikoff Bay. The existence of heavy oil concentrations north of Montague Island combined with current trajectories suggested that more extensive oil impacts to these areas may occur. The areas threatened most included those areas where most of the 1988 spawning activity took place, from south of Port Chalmers along the shoreline to Zaikof Point. During the 1988 season Montague and Green Islands accounted for 43% of the miles of spawn observed by aerial and skiff surveys and 53% of the spawning biomass as estimated by spawn deposition surveys. The R/V Resolution reported on March 31, 1989 and April 1 1989, a significant biomass of herring observed by sonar at depths of 25 to 40 fathoms along the north side of Green Island and between Green Island and Stockdale Harbor, suggesting that a spawning pattern similar to the 1988 season would develop.

3.) The remaining herring spawning areas in the Sound include Valdez Arm, where the pound fishery takes place, and Fairmount and Wells Bays where sac roe fisheries have occurred. Herring schools were observed by aerial surveys on April 1 and 2 in Tatitlek Narrows, in Fairmount and Wells Bays and inside of Cabin Bay on Naked Island. Schools observed in Tatitlek Narrows were adjacent to the grounded tanker and schools observed in Cabin Bay were adjacent to an oil sheen. Fish preparing to spawn in these areas may have traversed or were schooling in areas jeopardized by oil and therefore there was an appreciable likelihood of contamination.

4.) The related oil spill literature concerning herring demonstrate that exposure of developing herring eggs and larvae to north slope crude oil results in direct mortality, gross morphological abnormalities, and genetic and cellular defects even at relatively low concentrations (Rice et. al., 1987). There was no evidence to suggest that herring might avoid traditional spawning areas contaminated by hydrocarbons. Based on these factors and the assessment of impacted or threatened traditional herring spawning areas, it was anticipated that the hatch success from the 1989 herring spawn could be heavily affected by the "Exxon Valdez" oil spill.

5.) Oil contamination was thought to pose an appreciable likelihood of killing or injuring herring.

6.) At the time of the announcement, the "Exxon Valdez" still remained grounded on Bligh Reef with much of its unspilled cargo onboard, thus posing additional uncertainties regarding the final impact to the Sound's herring stocks and spawning beds, particularly in the Valdez Arm area which to that date had suffered minimal impacts. Also there was the further possibility that a change in wind patterns might cause a redistribution of oil from elsewhere in the Sound, thus threatening undisturbed areas.

Taking into account all of the potential effects to Prince William Sound herring stocks, it was the conclusion of the Department that a harvestable surplus could not be demonstrated for any of the spring herring fisheries. Consequently, the following four fisheries were not opened for the 1989 season; the purse seine sac

roe fishery, gill net sac roe fishery, roe on kelp in pounds fishery and the wild harvest fishery.

Seafood Quality Concerns for the Salmon Season

Recognizing that the Exxon Valdez oil spill had the potential to impact seafood quality within the Prince William Sound Management Area, the Department of Fish and Game (ADF&G) and the Department of Environmental Conservation (ADEC) agreed to develop a cooperative program to ensure that seafood safety and wholesomeness was maintained. Much of the planning was focused on the coming salmon season and the concern that the oil spill might compromise seafood quality. On April 24, a town meeting was held in Cordova to discuss these concerns. A panel consisting of ADF&G, ADEC, and Alaska Seafood Marketing Institute (ASMI) presented current ideas and sought input for the State's plans to implement measures to ensure seafood quality standards in areas impacted by the oil spill. On May 12, 1989, ADEC finalized a set of emergency regulations pertaining to fishermen, tendermen and processors. These regulations required all vessels that worked on the spill to be inspected prior to participation in the commercial fishery. ADEC also required fishermen, tender operators, and processors to inspect their boats, gear and catch for any indication of contamination from oil. If oil contamination was encountered, the regulations provided a required course of action to ensure that no further contamination occurred.

In early May, the ADF&G area biologist called a meeting of the leadership from Cordova Fishermen United (CDFU) gillnet and seine divisions, the PWS Seiner's Association, the PWS set netters association, fishermen at large, plant managers from the major salmon processors in PWS, Alaska Seafood Marketing Institute, Prince William Sound Aquaculture Corp.(PWSAC), Exxon, National Atmospheric and Oceanic Administration (NOAA), and the ADEC Environmental Health Director and Seafood Inspection Chief, to discuss management options for the 1989 salmon season. This industry working committee was named the Prince William Sound Salmon Harvest Task Force (SHTF), and was chaired by the ADF&G area biologist. The task force met twice a week between early May and late June to develop recommendations to the agencies and Exxon in efforts to preserve the quality of the 1989 salmon harvest. The possibility of conducting a cooperative harvest of the 1989 salmon returns was discussed and dismissed as not a viable alternative. In late May, the

SHTF developed the "Zero Tolerance Policy" that was submitted to the agencies as a recommendation for management of the 1989 salmon season. The "Zero Tolerance Policy" recommended closure of any area or subdistrict where the shoreline has been impacted by oil or has evidence of contamination from free floating oil.

On June 8, 1989, after much negotiation between ADEC and among the oil spill affected management areas within ADF&G, the Memorandum of Understanding (MOU) addressing the oil contamination concerns with the salmon fisheries was signed by the two State agencies, (Appendix A.9). This document outlined the responsibilities of the two agencies and specified guidelines for evaluating fisheries. As the first line of defense to prevent contaminated salmon from entering the marketplace, fishing areas would remain closed if there was an indication of oil in any quantity in the area or the proximity of the area (including beaches), such that there was an appreciable likelihood that gear would be fouled, fish harvest adulterated, or such that the conduct of an orderly fishery could not take place. Additionally, ADF&G conducted test fisheries prior to district openings to evaluate the likelihood of contamination occurring. The catches from the test fishery were inspected by ADEC for oil tainting. Fishing areas were to remain closed if it was determined that oil contamination of fishing gear or oil adulteration of product was likely to occur.

Revised Management Outlook

On June 14, 1989, the department released a revised management outlook for the Prince William Sound management area outlining the management strategy for the coming salmon season under the guidelines of the MOU. The revised outlook announced that in addition to the Eshamy District, the Southwestern and Montague Districts would remain closed during the 1989 season.

The Southwestern District suffered the most extensive oil impacts of any of the areas affected by the March 24 oil spill. Areas heavily hit included Eleanor, Ingot, Knight, Latouche, Evans, Elrington and Chenega Islands. In the Montague District, the northwestern shoreline of Green Island was heavily impacted by oil. Beach oiling had also been documented along the shoreline areas of the northern portions of Montague Island, including areas in Zaikoff Bay, Rocky Bay and at Graveyard Point.

Prevailing water currents in Prince William Sound enter through Hinchinbrook Entrance and exit through the straits and passages of the southwestern sections of the Sound including Montague Straits. Owing to this fact, any oil that is resuspended from tidal action, storms, or beach cleaning, has the potential to pass through the Southwestern and Montague Districts as it exits the Sound. This is the course that the main body of oil took in the months following the spill and continued to be the pathway for smaller oil sheens and tar balls to exit the Sound. It was determined that through the course of the 1989 season continued oiling presented an appreciable likelihood that gear will be fouled or the fish harvest adulterated if fisheries were conducted in the Southwestern and Montague Districts.

No major problems from oil contamination were anticipated in the Eastern and Southeastern Districts, and in the inner waters of the Northern and Coghill Districts. Aerial surveys, beach walks, and test fisheries were conducted to further evaluate these areas. Specific boundaries for closures were to be determined from evaluation programs in waters along the fringe of oil impacted areas such as around Perry and Culross Islands.

Hatchery Fish

The pre-season harvest strategy for hatchery stocks was altered for the returns to the three PWSAC hatcheries to shift the majority of cost recovery efforts to the Armin F. Koernig (AFK) Hatchery in Sawmill Bay on Evan's Island. Waters inside of the booms at the AFK hatchery had been maintained clean and free of oil through the course of the oil spill. However, it was not possible to conduct a common property fishery (CPF) harvest in this area, due to the potential for oil to be transported inside the booms by boats transiting from contaminated waters in the Southwestern District. To most efficiently utilize these fish, the entire PWSAC cost recovery goal was to be taken at the AFK Hatchery. This would relieve the need for sales harvests to be conducted at the Cannery Creek and Esther hatcheries, and hopefully permit the CPF to harvest all returning fish that are surplus to brood stock needs.

SALMON SEASON SUMMARY BY DISTRICT/SPECIES

Copper River District Season Summary

Pre-Season Outlook And Harvest Strategy

The 1989 harvest forecast for the Copper River District was 42,000 chinook, 972,000 sockeye, and 304,000 coho salmon. The Gulkana Hatchery is expected to contribute 127,000 sockeye salmon to this 1989 harvest.

The early season management strategy is based on anticipated weekly catches for the entire Copper River District and the attainment of desired escapements for the upper Copper River as measured at Miles Lake. Two evenly spaced periods each week will be optimum; however, the fishing schedule will be adjusted inseason as the situation dictates. By mid-June aerial estimates of sockeye salmon escapement trends on the Copper River delta are evident and will also be considered when periods are scheduled.

On August 7, the coho management strategy will be implemented that provides a single fishing period per week but of longer duration than commonly used during sockeye season. The poor coho salmon escapements experienced over the past three years have led to concern that the 72 hour per week fishing schedule is excessive. This has resulted in a majority of the harvest being taken from the early run timing coho stocks, whereas the majority of the escapement has come from the later stocks. To prevent this happening during the 1989 season, the weekly commercial fishing periods will initially be reduced to 48 hours, from 12:00 noon Monday until 12:00 noon Wednesday. Modifications of fishing times during the coho salmon season may occur based on escapement trends in the principal delta spawning streams. If the reduced fishing periods result in a reduction in the harvest rate, the season may be extended late into September or October.

Oil Spill Assessment

From the aerial tracking of the boundaries of the oil spill through early May, it was clear that it had not had any impact on the Copper and Bering River Districts. However, in recognition of the Copper River District being the first

area to open for commercial salmon fishing in the PWS management area, a full pre-fishery evaluation program was implemented. On May 8, 9 and 10, the Department chartered three gill net vessels to test fish in the Copper River District for the purpose of evaluating the likelihood of encountering oil from the Exxon Valdez spill. The test boats made in total 48 sets (46.3 fishing hours) at 20 predescribed stations spread throughout the district. A total of 75 chinook and 171 sockeye salmon were harvested in the test fishery. ADEC conducted a dockside inspection (organoleptic) of the entire catch, and reported no oil contamination (Schultz 1989). A random sample of 35 fish was selected and shipped to ADEC's Palmer laboratory for further testing. The Palmer laboratory reported no oil contamination and the decision was made to proceed with the Copper River District commercial salmon season opening on May 15. Through the remainder of the Copper River District's season that ended on September 30, sampling of commercial salmon catches by DEC detected no oil contamination.

Chinook and Sockeye Salmon Season

The commercial season in the Copper River District opened at 7:00 a.m. on Monday, May 15, with a 24 hour period and landed 48,157 sockeye and 4,132 chinook. Due to the higher than anticipated catch of early run sockeye (Appendix B.1 and B.2), the first period was proceeded by a schedule of two fishing periods per week through June 29, where the schedule was altered to one period per week. The fishery was closely monitored and openings were announced period by period based on evaluation of the strength of the return. (For specific period openings and species catches refer to Appendix B.3)

Probably due to displacement of boats working on the oil spill, effort was reduced by about 15% through much of the season. Catches were strong from the start of the season supporting the above average forecast. On May 18, the second fishing period, fishermen were restricted to gill nets with a mesh size smaller than six inches. The restriction was intended to provide a limited amount of protection to the chinook salmon stocks while targeting on the more numerous smaller sockeye salmon. A significant portion of the fleet was using large mesh gear during the first period that contributed to the higher than anticipated harvest of chinook salmon (Appendix. B4). This mesh restriction remained effective until August 1.

Early in the season the actual catch as compared to what is anticipated provides the most reliable method of evaluating the run strength. Effort, tides and environmental conditions also enter into the interpretation of the data. In late May, the upriver escapement data from the Miles Lake sonar project becomes the primary factor governing the management of the fishery, and in late June aerial escapement data from the delta systems becomes an important factor as well.

The Bendix side-scanning sonar counter was deployed in the Copper River near Miles Lake from May 17 until August 2, 1989 (Appendix B.7). Although species apportionment of the sonar counts is difficult, sockeye salmon are estimated to comprise more than 90 percent of the daily counts. It is estimated to take seven to nine days for a salmon to travel from the Copper River district to the sonar site.

By late May, the Miles Lake daily and cumulative sonar estimates were tracking above minimum expectations (Appendix B.8), supporting all indications of a strong return. In response to the favorable trends in both the catch and the escapement, the two fishing periods commencing on May 25 and May 29 were increased from 24 to 36 hours duration.

The effects of the aggressive two 36-hour fishing periods within one week caused the corresponding daily counts at the Miles Lake sonar escapement monitoring project to fall below daily objectives. As a result of the decline in the escapement rate the Department resumed the more "normal" schedule of two 24 hour periods each week in the Copper River District. This commercial fishing schedule remained in effect until June 29.

Although sockeye catches in the Copper River district were strong and minimum escapement requirements were being met at the Miles Lake sonar project, the escapement for the delta stock component was lagging behind in late June (Appendix B.9). An aerial survey flown on June 27 of the index spawning systems revealed counts amounting to only 41% of historic averages, in spite of good survey conditions. The delta stocks have suffered poor escapements over the past four years, and in an effort to reverse this trend a strategy of permitting only a single 24-hour period per week was adopted starting the week of June 26. Owing to this strategy, delta escapements improved through July and August but remained

below historic averages, while the upriver escapements at Miles Lake increased substantially above the desired escapement curve.

At the season's end, the escapement index for the Copper River delta sockeye systems amounted to 51,700, falling 56% below the 10 year average (1979 - 1988) (Appendix B.10). The final count for the upriver escapement component measured at Miles Lake was 607,797 fish, exceeding the escapement objective by 123,000 fish or 25% of the preseason goal. Because the delta and upriver (wild and enhanced) stocks are mixed in the fishing district, it is difficult if not impossible to manage for minimum spawning objectives for one stock without impacting the other. The trade off for this season's effort to bolster the escapement for delta stocks was the passage of surplus fish into the upriver systems. Compounding this problem is the contribution of enhanced fish from the Gulkana incubation facility that benefit the upriver stock component but not the delta. These mixed stock management challenges will multiply as the Gulkana returns increase in future years.

At the end of the season, the cumulative commercial harvest for the Copper River district was 30,863 chinook and 1,025,923 sockeye salmon. Whereas the chinook harvest was near average, the sockeye harvest was outstanding, ranking as the third largest since statehood.

Coho Salmon Season

Coho salmon normally becomes the predominate species in the district in early August. A majority of the coho production comes from spawning systems in the Copper and Bering River delta. Escapement performance is monitored by weekly aerial surveys.

The harvest strategy for Copper River cohos has historically called for a single weekly fishing period per week of longer duration than the two period per week schedule normally used during the sockeye season. A single period per week schedule was established in late June for management of the delta sockeye stocks, and was continued into the coho season commencing in late July and early August. The Duration of the weekly fishing periods was increased on the week of July 24 from 24 hours to 48 hours.

Early catches in the coho fishery fell below expectations indicating some weakness in the return (Appendix B.5). Aerial surveys of the coho spawning systems revealed escapement counts significantly below historic averages (Appendix B.11). This pattern has occurred a number of times in the past requiring that the fishery be closed early in order to recover escapement. This year, however, a new strategy was employed in efforts to reduce the harvest exposure to early returning fish. Commencing the last week in August, an eight or nine day span was scheduled in between each 48-hour fishing period. This strategy reduced the harvest exposure to the early returning fish and allowed the fishery to remain open until September 28, when the 1989 season closed following this final 48-hour period. Escapement surveys continued until October 30. The season's escapement index amounted to 52,673 coho, 22% below the historical averages (1980 - 1988) (Appendix B.12) At season's close the coho harvest amounted to 194,454 fish in the Copper River District, falling 38% below the recent ten year average harvest.

Bering River District Season Summary

Pre-Season Outlook

The 1989 harvest forecast for the Bering River District was 25,000 sockeye and 136,000 coho salmon. The management strategy for this district was for the weekly fishing schedule to coincide with the Copper River District's. However, with no significant chinook salmon stocks and a later sockeye salmon run timing, the Bering River District's season opener is typically a month later than the Copper River. Coincidental fishing periods in the two districts should stabilize effort and permit a more manageable harvest.

Sockeye Salmon Season

The Bering River District season opened on June 19. Harvest was below anticipated levels, with 14 fishermen landing 29 chinook and 7,479 sockeye salmon (Appendix B.21). On June 22, 13 fishermen landed a disappointing 1 chinook and 1,708 sockeye salmon. For the remainder of the sockeye season no effort occurred in the Bering River District. The final sockeye salmon harvest for the Bering River

District was 9,225 63% below the anticipated catch and 86% below the 10 year average (Appendix B.23). Even with the limited effort the 1989 sockeye salmon escapement index was 11% below the five year average (Appendix B. 10 and B.22).

Coho Salmon Season

During the coho season effort increased beyond the effort observed during the sockeye season. The peak of 57 vessels made deliveries during the September 11 period. After September 11 effort dropped significantly, and only 23 deliveries were recorded in the following two periods. The final fishing period occurred on September 28, with a cumulative harvest of 26,952 coho salmon, 80% below the anticipated harvest of 136,000. Similarly, the escapement index for coho salmon in the Bering River and Controller Bay area was 15,835, 25% below the historic average (Appendix B.12 and B. 22).

Coghill and Unakwik Districts (Sockeye season)

Pre-Season Outlook

The return of sockeye salmon to Coghill Lake in 1989 was forecast to yield an above average harvest of 343,500 fish, nearly 100,000 fish greater than the recent 15 year average. Daily escapements into Coghill River are monitored by a weir that begins operation in early June. During the sockeye season, the district is managed with a weekly fishing schedule designed to achieve a sockeye salmon escapement of 50,000 to 60,000 fish.

The return of early chum salmon to the Esther Hatchery was forecast to be only 134,000 fish, of which 103,000 (77% of the total) were required to meet brood stock objectives at the hatchery. In light of the strong anticipated return of sockeyes to Coghill Lake and the weak return of early chums to Esther, it was expected that the Esther Subdistrict would be closed during the early chum return (mid June through the later portions of July).

The Board of Fisheries adopted regulations in January, 1989, that restricted the Esther Subdistrict prior to July 20 to gill net gear only. Fishing with purse

seine gear is not permitted in the rest of the Coghill District prior to July 6. Board action also eliminated the larger closed waters area in front of Coghill River.

Oil Spill Assessment

Two test fishing vessels under contract to the Department operated in the Coghill and Unakwik districts from June 11 through June 14, to evaluate the likelihood of oil contamination occurring if the fishery were to open in these districts. A total of 504 salmon were taken in the Coghill district and 27 salmon were taken in the Unakwik District. All of these fish were organoleptically inspected by ADEC seafood inspectors upon delivery to Cordova and no indication of oil contamination was detected. A subsample consisting of 25 fish was sent to the Palmer Laboratory for further inspection and analysis. The results of these tests were negative for any detection of oil contamination. A helicopter survey of the area was conducted on June 6. Landings and beach surveys were made on Fool Island, Esther Rocks and Culross Island and no likely sources of oil problems were detected. Based on these findings it was determined that there was not an appreciable likelihood for contamination of gear or adulteration of fish by oil in the Coghill and Unakwik districts.

Coghill Sockeye & Esther Early Chum Season

The Coghill River weir was installed and operational on June 12. Early fish passage was slow. However, in anticipation of the large forecast return, the season was opened on June 19 with a 60 hour period in the Coghill and Unakwik districts. The Esther Subdistrict remained closed for the protection of hatchery brood stock. The sockeye harvest was below expectations, but with the strong forecast in mind, a second 60-hour period was scheduled for the following week. At the close of this period the cumulative sockeye catch amounted to 76,600 sockeyes, less than 50% of the anticipated catch for this date (Appendix C.1 & C.2). Weir counts were lagging significantly behind schedule. As of June 29, the sockeye escapement into Coghill Lake totaled 2,300 fish, amounting to only 13% of the desired level for that date (Appendix C.4 & C.5). In 1987, the Coghill sockeye return was very compressed with a very large portion of the return entering the river during a very brief period of time, corresponding to a high

tide series. In order to detect such a turnaround in the fishery, a third period was scheduled on July 3, with a reduced duration of 12 hours. Catches from this opening showed no significant improvement in the strength of the return. As a result the Coghill district remained closed for the balance of the sockeye season. The cumulative catch for the season amounted to 108,000 sockeye salmon, 31% of the anticipated harvest. Daily weir counts tracked at a disappointingly slow pace through the last day of operation on July 27. At the conclusion of the season the total escapement amounted to only 36,683 sockeyes, falling below the desired goal of 55,000.

The chum harvest through the first three periods in the Coghill District amounted to approximately 93,500 fish. In spite of the Esther Subdistrict closure, a portion of this catch was probably from the early chum return to the Esther Hatchery. Wild stock chum production in the northwestern portion of the Sound made up the balance of the catch. The early chum egg take goal at the Esther Hatchery was 100 million eggs, requiring 103,000 brood fish. However because of the small chum return to the hatchery, the egg take goal was not met. A total of 65,000 chum salmon brood fish were collected that resulted in a chum egg take of 54.1 million eggs.

No fishing was permitted in the Coghill district until July 26 when the Esther Subdistrict was opened for harvest of hatchery returns.

Eshamy District

Pre-Oil Spill Management Outlook

The anticipated return to the state hatchery at Main Bay was 244,800 adult chum salmon in 1989. With the changeover of this hatchery to sockeye production, there are no brood stock requirements on this return and a total harvest of all returning fish was planned. The district was scheduled to open on June 5 with a weekly fishing schedule for the Crafton Island subdistrict from 8:00 a.m. Monday until 8:00 p.m. Friday. The Main Bay subdistrict open to continuous fishing 7 days per week.

Commencing the week of July 17, the Crafton Island subdistrict was to be managed according to sockeye escapement trends at the Eshamy weir. It was anticipated that there would not be a harvestable surplus of sockeyes in the Eshamy district this year. A new management strategy was to be adopted to implement closures outside of the Eshamy District to improve escapement success.

Resulting from actions taken by the Alaska Board of Fisheries in January, 1989, this year would have been the first season for the Main Bay Harvest Management Plan to be in effect.

Oil Assessment/Eshamy District Closure

The oil spilled from the Exxon Valdez on March 24, 1989, contaminated the water and shoreline beaches of the Eshamy district, including most of the Crafton Island subdistrict and over two thirds of the Main Bay subdistrict. The only area saved from oil was a portion of Main Bay that was protected by oil booms. On May 19, the Department issued a news release stating that the Eshamy district would stay closed to commercial fishing for the entire 1989 season.

The Department of Environmental Conservation (ADEC) had established criteria for determining areas that would have a high likelihood of producing product that could not be certified as safe and wholesome. Such areas included waters adjacent to oiled shoreline and waters with visible oil sheens, slicks or tar balls. Consistent with these criterion, the only oil free area in the Eshamy district was that area inside the oil boom at the head of Main Bay. All other waters of the district were not suitable for a commercial fishery due to the likelihood for contamination of product.

The oil free area inside the booms was very small, approximately one mile long and half a mile wide. If an open competitive fishery were to occur in this restricted area, it was estimated that 30 set gill net permit holders and from 100 to 200 drift gill net fishermen would participate. It was the Department's judgement that this would not result in an orderly or efficient harvest. Further, vessel traffic moving into this protected area of Main Bay from the oil contaminated areas of Prince William Sound could transport oil into this area thus producing an oiled area where the fish quality could not be assured per the

ADEC criteria. In addition to the risk to seafood quality, the transport of oil into the area could pose a threat to the juvenile salmon rearing and adult salmon holding areas for the hatchery.

To utilize the surplus hatchery return, the state agreed to allow the PWSAC to conduct a controlled harvest of the chum salmon returning to Main Bay. In order to keep the area free of oil contamination, a single purse seine vessel operated inside the oil booms harvesting the hatchery return and delivering to tenders outside of the booms. The return turned out to be smaller than anticipated, with the total harvest amounting to only 101,400 chum salmon.

The Eshamy Lake weir was operated from June 15 through August 31. With season closures in place for both the Southwestern District and the Eshamy District the escapement represented a total return for the system. The season's escapement amounted to 57,007 sockeyes (Appendix D.2 & D.3), exceeding the escapement goal of 30,000 to 40,000.

Prince William Sound General Seine Season

Pre-Oil Spill Outlook And Harvest Strategy

The 1989 pink salmon harvest forecast was 39.3 million fish. This estimate included 18.8 million pinks from the Sound's wild stocks and 20.5 million from the Sound's hatcheries. The wild stock pink forecast was the largest on record, driven by the 1988 pre-emergent fry index that was the largest ever recorded in Prince William Sound. The hatchery forecast was based on a record release of 534 million pink fry and the mean fry to adult survival rates, as experienced at each facility. Of the estimated 28.8 million pink salmon returning to the hatcheries, some 20.5 million were anticipated to be available for the common property fishery with the remaining going to cost recovery sales and brood stock. Adult forecast pink salmon returns to each facility are summarized below.

FORECAST PINK SALMON RETURNS TO PRINCE WILLIAM SOUND HATCHERIES, 1989.

(millions of fish)

Hatchery	Total Return	Brood	Sales	Common Property Harvest
Solomon Gulch	6.94	.21	1.76	4.97
Armin F. Koernig	6.05	.21	1.61	4.24
Esther	10.74	.34	2.59	7.81
Cannery Creek	5.03	.28	1.23	3.52
	28.76	1.04	7.19	20.54

The forecast harvest of chum salmon in Prince William Sound for 1989 was 1.15 million fish. Half of this production (583,000 chums) was anticipated to be the result of hatchery returns. The forecast for wild stock return was below average.

Esther hatchery coho salmon are present in the fishery from early August through mid-September. The total return of 81,000 coho salmon was expected to produce a harvest to the common property fishery of 79,700 fish. An estimated 82,000 coho salmon were forecast to return to the Solomon Gulch hatchery.

The general waters of the eight seine districts are managed on wild stock strength. Escapement performance for wild stock pink and chum salmon is monitored by aerial surveys of 200 index spawning streams in the Sound. Current year escapement trends are compared to average historical performance to determine the duration of openings in these districts.

While wild stock escapement performance determines the openings in the general districts of the Sound, specific management of hatchery returns is restricted to the terminal areas in front of the facilities. Hatchery returns are evaluated daily by tracking the performance of sales harvests, brood stock collection, and sex ratios taken in the hatchery special harvest areas.

Plans were made during the 1988-89 Board of Fisheries meeting to manage the waters along the eastern shoreline of Chenega Island for the preservation of Eshamy Lake sockeye escapements.

The Eastern District has the earliest pink and chum returns and is typically the first district to open. Odd-year-pink returns are normally earlier than even years.

The timing of the odd-year brood stock at the Solomon Gulch hatchery is earlier than the even-year stock. It was likely that the sales harvest goals would be well on track by the first opening of the Eastern district. The Valdez Narrows subdistrict was to remain closed during the first opening unless cost recovery efforts were significantly ahead of schedule by that time.

Assessment Of Oil Spill Impacts On The Fishery

From June 15 through July 11, six purse seine vessels were used in Prince William Sound under a test fishing charter to evaluate the likelihood of encountering oil in areas planned for commercial fishery openings. (Schultz, 1989). These boats were dispatched to test fish predesignated areas covering the main waters of the Southeastern, Eastern, Northern, Coghill Northwestern and outside waters of the Montague Districts. A total of 204 sets were made, representing 92 fishing hours. A total of 10,566 salmon were harvested by the test fish program. Of these, 4,984 fish representing all areas fished, were inspected by ADEC seafood inspectors in Cordova. A subsample of 164 fish was sent to the ADEC Palmer Laboratory for further analysis. No oil contamination was detected on any of the fish inspected by ADEC including all fish sent to the Palmer Laboratory. The fishing vessels and gear were inspected following the test fishery and were found to have no evidence of oil contamination.

Summary of the Late June and July Fishery

The earliest pink and chum returns in the Sound occur in the Eastern and Northern Districts. The Department's first aerial survey of wild pink and chum spawning areas was flown on June 21. Early buildups of chum salmon were observed in the bays and stream mouths of the traditional early spawning systems of the Eastern

and Northern districts. Although the strength of these early showing fish was somewhat below levels seen in recent years, a harvest was warranted on the small surplus. A 12-hour harvest of the early bright chums in these two districts was scheduled for June 28.

The harvest rate of sales fish at the Solomon Gulch hatchery indicated severe weakness in the early return component. As of June 22, only 7,000 pink salmon had been harvested for cost recovery, representing less than 1% of the anticipated fish sales for that date. The Valdez Narrows subdistrict and waters of Valdez Arm thus remained closed to assist the hatchery operator Valdez Fisheries Development Association (VFDA) in achievement of the corporate pink salmon escapement goal. Waters of Galena, Jack and Sawmill Bays remained open for harvest of surplus wild stock chums.

In addition, the waters of the Northern District south of the latitude of the west island of the Bald Head Chris Islands (60°48' N. lat.) were closed to preclude the likelihood for contamination of product or gear which could result from fishing near oiled beaches on Naked and Perry Islands.

The harvest from the 12-hour seine opening on June 28 was 461,100 pink salmon and 103,300 chum salmon, falling within the bounds of preseason expectations. Aerial surveys of wild pink and chum spawning areas, flown on June 26 and 28, continued to show early buildups of chum salmon in the bays and stream mouths of the traditional early spawning systems of the Eastern and Northern Districts. Pink salmon, however were clearly lagging behind expectations.

At the Solomon Gulch hatchery sales harvests continued to indicate severe weakness in the early return component. As of June 29, only 107,000 fish had been harvested for cost recovery, representing only 7% of the anticipated fish sales for that date.

The second seine fishery opening was scheduled for July 5, and was again of 12-hour duration, encompassing the same areas of Eastern and Northern Districts as the first period. The harvest amounted to 472,900 pink salmon and 31,000 chum salmon. A majority of the pink production continued to come from lower Valdez Arm and was attributed to the Solomon Gulch hatchery return. Wild stock pink salmon

were clearly offering little to the catch. Although chums were not strong in the catch, returns were sufficiently strong to meet or exceed minimum escapement requirements. Thus a continuation of the same strategy was carried into the following week, with a 12-hour period on July 12.

As of July 6, 513,000 fish had been harvested for cost recovery at the Solomon Gulch hatchery. Harvest rates were now averaging around 50,000 fish per day, and at the current rate the hatchery cost recovery goal of $1.645 million would be reached by July 10. In addition to cost recovery needs, 211,000 pink salmon were required at the hatchery for brood stock. No brood stock had yet been collected at the hatchery. Sex ratios of the sales fish taken in the Special Harvest Area (SHA) stood at 40% female, whereas the ratio of pinks taken outside Valdez Arm by the commercial fishery was as high as 61% female. These data indicated that the run had progressed significantly, and a portion of the later timing component had been taken in the fishery. With sales and brood stock objectives now assured, fishing was permitted in Valdez Arm and inside Port Valdez up to and inside portions of the hatchery SHA.

The 12-hour period on July 12 resulted in a harvest of 1.37 million pink salmon and 20,000 chum salmon. The vast majority of the pink harvest was attributed to production from the Solomon Gulch Hatchery. The cost recovery objective at the Solomon Gulch hatchery had been achieved prior to the opening. Additional hatchery fish remained in the area following the 12-hour period. Since these were surplus to the hatcheries needs, a special opening of the waters of the Port and in front of the hatchery was scheduled on July 15 to harvest the remaining surplus. A total of 392,000 pink salmon were taken during this opening.

Aerial surveys of the wild stock systems through July 21 continued to show weakness in wild stock pink salmon particularly in the Eastern District, consequently no commercial openings could be justified.

By this time, however, the first returning pink salmon were starting to show up at the PWSAC hatcheries. Due to the closure of the Southwestern District and the plans for PWSAC to shift as much of its sales harvest requirements as possible to the AFK facility, it was anticipated that nearly all of the 10.7 million pink salmon to return to the Esther Hatchery and 5.0 million pink salmon forecast to

return to the Cannery Creek hatchery would be surplus to hatchery needs and available for harvest by the common property fishery. In order to ensure the high quality harvest of these fish as they migrate into the terminal areas, the Esther Subdistrict and eastern waters of Unakwik Inlet were opened to continuous seven day per week fishing on July 26.

Test fishing was conducted during the first two weeks of July in the Esther Subdistrict to determine if any evidence of oil sheens or tar balls existed that might interfere with the fishery. None of the fish harvested or fishing gear used during this test fishery showed any signs of oil contamination. Further, none of the fishery openings in the adjacent waters of Port Wells on July 3 and 4, and portions of the Northern District on July 5 and 12 produced any evidence of an appreciable likelihood for oil contamination of fishing gear or fish. Thus the openings of these areas was determined to be consistent with the ADF&G and ADEC MOU.

During the last week of July, the short fall in escapement of pink salmon in the Eastern District continued. However, the index streams in the Northern, Southeastern and Northwestern Districts had shown improvement and were now tracking at or above minimum desirable levels. A 36-hour commercial opening was scheduled in these districts on July 27 and 28.

With the hatchery terminal areas open, and the overlapping 36 hour opening of these three districts, the seine harvest of pink salmon was starting to develop smoothly into the late stock component provided by the PWSAC hatcheries. From July 26 through the 28, the harvest averaged over 600,000 pink salmon each day, indicating that the hatchery returns to Esther and Cannery Creek were due to come in at forecast magnitude.

July 29 and 30 Oil Closures of Esther and Unakwik Fisheries

During the evening of Friday, July 28, the Department received a number of reports from fishermen and spotter pilots that an oil sheen had moved into the Esther Subdistrict and may have contaminated some fishing gear in the vicinity of Esther Rocks. The sheen was described as 1/2 to 3/4 miles in length and 300 yards wide extending from Esther Rocks towards shore. Five or six seine boats

were reported to be fishing in the area. The Department investigated these reports and received further reports Saturday morning through radio communications on SSB 2509 from seine vessels that confirmed to have encountered oil that had contaminated their fishing gear near Esther Rocks. Consistent with the MOU, an immediate closure of the Esther Subdistrict was announced at 12:00 noon on July 29, to ensure that additional boats would not encounter oil that might contaminate fishing gear or adulterate fish.

At approximately 5:30 p.m. on Saturday, July 29, the Department received reports that a seine vessel had encountered an oil sheen at Payday Point in Unakwik Inlet, that contaminated its fishing gear. Other vessels in the area reported seeing an oil sheen at Payday Point, but it did not contaminate their fishing gear. The vessel returned to Cordova Saturday evening and was inspected by ADF&G in the Cordova boat harbor. The cork line and chaffing gear of the seine, and the vessel's hatch cover were found to be spotted with oil. On Sunday morning a second vessel reported encountering an oil sheen near Payday Point that also had left a stain on the corks of his seine. Consistent with the MOU, an immediate closure of the open waters in Unakwik Inlet was announced at 12:00 noon on July 30, to ensure that additional boats would not encounter oil that would pose an appreciable likelihood of contaminating fishing gear or adulterating product.

As a result of this emergency closure of the fishery in the Sound, the expanded seafood inspection effort was concentrated on fish coming from this area. A number of deliveries were delayed due to fishermen requesting ADEC inspections of their catch, and tenders were delayed to facilitate the inspection of the fish they had taken from the areas where the closures occurred.

The overall atmosphere among the fishing fleet at this time was one of distrust and anger stemming from the uncertainties that the oil spill had forced onto their livelihoods. The general feeling that was expressed by the seine fleet was that it would be best for the Department to close the fishery for the balance of the season. The processing industry, however, felt that it was critical for their survival to take advantage of any fish that could be harvested. The processors previously had their own inspection programs and recognizing the attention that may be focused on the PWS salmon pack, had stepped up measures. This procedure in combination with the expanded inspection programs conducted by ADEC, provided

an unprecedented safety net to ensure that no contaminated fish would be processed.

Because the Cannery Creek and Esther Hatchery returns were just starting to build, the rate of entry of new fish into these hatchery areas probably exceeded 200,000 fish per day. As a fall back strategy for this occurrence, PWSAC started to cost recovery harvest the build up of fish in the SHA's of the two hatchery areas.

August Fishery Harvest Strategy

Following the fishery closures on July 29 and 30, a major effort was mobilized to evaluate the water quality of the affected areas in order to determine if fish could be harvested without an appreciable likelihood of contamination of fishing gear or fish. The Department research vessel Pandalus was stationed on the grounds to serve as the on scene command post for the Department assessment effort. On August 5, it was estimated that 2 million surplus hatchery fish had built up inside of the Unakwik Inlet area. This large concentration of fish provided promise for a controlled common property harvest. The fleet was placed on 24-hour advance notice and a course of action was set to attempt to utilize these fish.

In a coordinated aerial survey effort involving NOAA, ADEC, Exxon and ADF&G, up to four independent over flights were conducted daily of the areas around the Esther and Cannery Creek hatcheries to record any observations of oil sheens. Survey result were channeled to the R/V Pandalus for Department review. Observers reported numerous bands of white scum and other non-petroleum substances that build up along tidal rips and windrows within the Unakwik and Wells Bay area. Samples of these substances were collected by ADEC personnel and laboratory analysis by florescence indicated no detectable levels of petroleum. ADF&G, ADEC and NOAA observers all concurred that these were biological in origin and not oil sheens.

The Department received numerous reports of oil sheens in this area from spotter pilots and fishermen. Many of these were traced to vessels in the area that had pumped out bilge oil or diesel. To eliminate this potential source of oil sheens

during this critical assessment period, all tenders and fishing vessels were requested to stay outside of the proposed fishing area in Unakwik Inlet.

Four test fishing boats started surveys on August 3. These vessels collected water quality samples and sampled for oil sheens and tar balls by systematically towing purse seines through the water at prescribed locations throughout the area considered for the Unakwik opener. The test seines had absorbent pads sewn in panels through the web so that any encounter with oil would be detected. The vessels observed no confirmed oil sheens and no signs of oil contamination was observed on any of the seines or absorbent pads. Passive monitoring stations and pompoms deployed in the area also revealed no indication of oil contamination.

The fleet was placed on one hour notice effective 8:00 a.m., August 10, and an early morning aerial survey was flown of the proposed fishing area prior to making the final decision on the opening. The southern portion of the area boundary was modified slightly to exclude a bilge oil sheen left by a tender entering the area. At 8:00 a.m., the announcement was made to proceed with a fishery of 12-hour duration commencing by field announcement from the R/V Pandalus at approximately 9:00 a.m. The area included all waters of Unakwik Inlet, and Wells, Granite, and Cedar Bays north of a line from Fairmount Point to the northern most tip of Oleson Island.

In excess of 2 million pink salmon were harvested in this 12-hour opening. During the opening, a number of reports of boats encountering oil sheens were received. The ADF&G area biologist and ADEC seafood inspection chief responded to these via float plane or skiff, and in no case were the reported sheens judged to pose an appreciable likelihood of contaminating gear or product. In some instances boats were advised to fish away from obvious bilge oil sheens from tenders or other fishing boats.

The surveillance program continued and test fishing efforts were redirected to the Esther Subdistrict. By the morning of August 14, with the fleet placed back on one hour notice, sufficient evidence had been collected to assure that the Esther Subdistrict and surrounding areas, as well as the Unakwik Inlet area were free of oil that might pose an appreciable likelihood to contaminate fishing gear

or adulterate product. Following a morning survey of the proposed fishing area, a 12-hour opening was announced from the R/V Pandalus.

The harvest from this opening totaled in excess of 2.3 million pink salmon. ADF&G and ADEC personnel again responded to a number of reports of oil sheens in the area open to fishing, and these were again attributed to bilge oil and diesel from the tenders and fishing boats of the fleet. No fouled nets or adulterated fish were observed.

The harvest continued following this format through August 29. A total of 12 field announced openings were conducted during this time period with constant surveillance of the fishery by ADF&G and ADEC. Although boundaries were modified on a daily basis, the area opened generally included Unakwik Inlet, the Esther Subdistrict, and the waters in between.

On August 30, with a majority of the pink catch over and effort drastically reduced, the fishery was placed on a schedule with a daily opener of 12 hours duration in the Esther Subdistrict.

Outside of the two hatchery areas, a few openings were scheduled in August in the Eastern and Southeastern Districts to harvest wild stock production. Overall, wildstock pinks contributed little to the final commercial catch of 13.8 million. In those districts where commercial harvests were conducted (Eastern, Northern, Coghill, Northwestern, and Southeastern), wild stock pink salmon escapements were at or below the lower end of the desired escapement range (Appendix E.4). In those districts where there was no commercial harvest (Eshamy, Southwestern, and Montague), the escapement indices exceeded the upper end of the desired ranges by only 40% to 60%.

Hatchery Sales Harvests

Hatchery sales harvests are detailed by facility in Appendices F.1 though F.5. The total pink sales harvest for all PWS facilities was 7.8 million fish (Appendix F.6.). This was the highest sales harvest on record. Due to the Eshamy District CPF closure, an additional 102,811 chum salmon were harvested and sold by PWSAC at the state owned Main Bay Hatchery. Although PWSAC had

anticipated taking their entire cost recovery goal at the AFK Hatchery, this was not possible. Commercial fishing closures in the Coghill and Northern districts prevented interception of hatchery returns to Wally Noerenberg and Cannery Creek hatcheries and the surplus fish at each facility were sold for cost recovery.

PRINCE WILLIAM SOUND AND COPPER RIVER SUBSISTENCE FISHERIES

Subsistence and personal use fisheries harvests are relatively minor by comparison to the commercial harvest in the Prince William Sound management area. The largest subsistence and personal use fisheries occur on the upper Copper River at and above Wood Canyon. In the commercial fishing districts of Prince William Sound and the Copper River delta, commercial fishermen may withhold a portion of their catch for personal use. Currently there is no mechanism to monitor this catch thus it continues to go unreported. Subsistence fishing permits are issued from the Cordova office for the Copper River flats, Prince William Sound, and Chenega (Southwestern), and Tatitlek residents.

The Exxon Valdez spill affected the subsistence fishery in Prince William Sound by effectively forcing restriction of resource use areas. Many areas traditionally utilized for subsistence were heavily oiled and special use areas, within protected and boomed bays including Eshamy, Jackpot and Sawmill Bays, were opened by Emergency Order by the Department to provide alternatives. In addition, the Copper River Flats commercial fishing area was opened to alternative subsistence use since this area is close to Tatitlek Village subsistence users who reside within 6 miles of Bligh Reef where the tanker ran aground.

An interagency subsistence foods testing program, the Oil Spill Health Task Force, was initiated by the Department of Public Health, Indian Health Services, shortly after the spill and includes involvement from the Department of Health and Social Services, Department of Fish and Game, Department of Environmental Conservation, National Atmospheric and Oceanic Administration, the North Pacific Rim, the Kodiak Area Native Association and Exxon. Aromatic hydrocarbon compounds resulting from contamination from Exxon Valdez oil, were found in low levels in pink salmon collected near Chenega. However, reports from August 1989

samples stated that the fish were safe to eat. Shellfish at certain beaches (some from traditional use areas) were found to be contaminated above acceptable levels and were considered a health hazard; however, generally mollusks taken from uncontaminated beaches were safe.

Upper Copper River Subsistence and Personal Use Fisheries

Subsistence Fishery

In 1989, the Copper River salmon return was anticipated to be ample enough to allow unrestricted fishing for the subsistence fish wheel and dip net fishery. Sonar counts in May indicated near normal entry of salmon into the Copper River with sufficient strength to meet upriver escapement and subsistence fishery needs. The fish wheel and dip net fishery was opened June 1 to seven days per week fishing. Throughout most of the subsistence fishing season, sonar counts at Miles Lake tracked along anticipated performance curves, indicating that the minimum escapement goal of 485,600 salmon would be reached. The subsistence season went without change as it related to sockeye salmon. There were 78 dip net and 308 fish wheel permits issued and resultant harvest is estimated at 28,300 fish (Appendix G-4) composed primarily of sockeye (97%).

Batzulnetas Subsistence Fishery

In 1989, a revised subsistence fishery was provided for at Batzulnetas, in the Upper Copper River drainage, resulting from a court order relative to a United States District Court case John versus State of Alaska, 85.698 Civil. The fishery was to occur near the mouth of and within Tanada Creek near the historical village site of Batzulnetas. Permits were to be issued to residents residing in the villages of Dot Lake and Mentasta, with the fishery open during June, July and early August. A weekly harvest limit and a season quota of 1,000 fish was authorized. No salmon were reported taken in the fishery in 1989.

Personal Use Fishery

The personal use fishery was conducted in 1989 as in the last two years, with periods of two to three days or less, early in the season to comply with guideline harvest levels. An extensive public information effort was continued by the Department incorporating frequent news releases and dedicated phone lines with recorded messages in Glennallen, Fairbanks and Anchorage.

A total of 4,448 dip net and 132 fish wheel personal use permits were issued in 1989, representing a significant increase from the past for both permit types. The estimated harvest for the season was 58,408 salmon (Appendix G-4), primarily sockeye (95%). Harvest reports indicated that 95% of the catch was taken by dip net gear. The combined upper river personal use and subsistence estimated catch of 87,231 fish ranks as the largest since 1983.

Prince William Sound Area Subsistence Fisheries

Prince William Sound and Lower Copper River Fisheries

In 1989, a total of 11 permits were issued, but only 1 actually fished versus in 1988 when 7 were issued and 4 fished. The reported catch was 3 in 1989 compared to 79 in 1988. The totals from either year still represent a minor amount of use of this subsistence fishery (Appendices G.1 and G.2)

For the Copper River Flats, 75 permits were issued and 32 fished for a total catch of 454 fish, 339 of which were reds. The 1989 use dropped considerably from 1988 use when 11 permits were issued, 57 fished but the catch increase from 1989 to 1988, with more individuals reaching their quota this year.

Tatitlek and Southwestern Prince William Sound Fisheries

Residents of both Chenega Bay and Tatitlek villages are issued special subsistence use permits (this being the second year for the program). The permit holders are allowed to fish in their respective areas from May 15 until the commercial fishery openings, and from the closure of commercial fishery openings

until October 31, for seven days a week. During the commercial salmon fishing season, they are allowed to fish whenever a commercial opening occurs.

In the Southwestern area, total permits issued dropped from 17 in 1988 to 8 in 1989, mainly to residents of Chenega Bay village; nine were fished in 1988 and seven were fished in 1989. However, the total catch increased to 1,056 fish, (322 sockeye), from a total catch of 851, (210 sockeye), in 1988 (Appendices G.1 and G.3). Much of the effort was concentrated inside the special use area in Eshamy Lagoon. However, two individuals made use of the Jackpot Bay area. Villagers may have geared up considerably, increasing individual catches, from last year since this is only the second year of use for these special subsistence permits.

In the Tatitlek area, residents were allowed to fish on the Copper River Flats with the same restrictions that would apply to their normally assigned area in Northwestern Prince William Sound. The number of permits increased from 10 in 1988 to 14 in 1989 with 5 permits being fished for both years. The catch increased slightly from 604 in 1988 to 766 in 1989, however the catch composition changed to mainly coho. 628 of the 766 caught were coho (107 were sockeye) compared to 58 sockeye and coho combined out of 604 fish in 1988. The use of the Copper River Flats allowed this increase use of the sockeye and coho resources (Appendices G.1 and G.3).

Overall, even though use areas were greatly restricted and changed, total catches were not affected and subsistence resource use increased for the two areas.

1989 PRINCE WILLIAM SOUND HERRING FISHERIES

Pre-Season Harvest Outlook

The 1988 spawn deposition study indicated a post fishery spawning biomass of 48,800 tons. Four year old fish were estimated to constitute 81% of this biomass. Using a schedule of increasing natural mortality with age, the 1989 population was forecast to be composed of 84% five year old fish, having a mean size of 127 grams. Accounting for normal growth rates and recruitment, the 1989 spawning

biomass was projected to be 54,900 tons. At the full 20% exploitation rate, a harvest of 10,980 tons of herring would have been permitted for all fisheries combined. At the anticipated stock size, the purse seine fishery will be managed for a harvest of 6,400 tons. The gill net fishery will be managed for a total harvest of 375 tons. The guideline harvest level for the wild harvest of natural roe on kelp was set at 110 tons of roe on kelp and the guideline harvest level for the pound fishery was set at 125 tons of spawn on kelp.

Oil Spill Impact on Fishing Season

The impact of the Exxon Valdez spill on the 1989 herring fishery was previously discussed in detail on pages 3 - 6 of this report. All spring herring fisheries were canceled in 1989. The five major spawning areas delineated by the spawn deposition biomass estimate and 1989 herring spawn is shown in Appendix H.1. Historic records of herring catches for all fisheries are included in Appendices H.3 - H.11, and historic fishery values are contained in Appendices H.20 and H.21.

Food and Bait Fishery

The herring food and bait fishery opened by emergency order on Nov. 1, 1989. Only 3 purse seine vessels participated, landing 646.1 tons of herring from the Knowles Head area by Nov. 12 (Appendix H.9.). There was no interest in the fishery after that date and the guideline harvest level of 1,694 tons was never reached. The 1989 harvest was the smallest on record since 1984 (Appendix H.10). A majority of the herring were 5-year olds (36.5%) with an average weight of 111 grams and average length of 182 mm. Buyers paid $250 per ton for herring used as bait, setting the exvessel value at $161,525. The fishery closed by regulation on Jan.31, 1990.

1989 Stock Assessment & 1990 Outlook

Records of the 1989 biomass indices and herring spawn extent and locations are reported in Appendices H.1 and H.12 - H.18. The 1989 herring spawning population was dominated by the 1984 year class, as expected, that recruited last year as four year olds and returned in force as five year olds. Five year olds represent

64% to 88% of the population specific to area and date caught, and probably would have made up 79.3% of the sac roe harvest had it proceeded (Appendices H.22 - H.24).

The aerial survey program was conducted in 1989, as usual, from late March through late May. Herring schools were recorded and biomass estimated on a daily basis as well as extent of spawning activity. The peak aerial biomass estimate was 56,915 short tons in 1989 with half of the biomass recorded by air occurring in the Montague Island area (Appendix H.12). Shore mileage was recorded as 98.4 linear miles in 1989, compared to 166.3 miles in 1988, as a result of aerial survey data corrected and confirmed by skiff survey (Appendix H.1 and H.12). Areas utilized for spawn did not change significantly from 1988.

The spawn deposition survey was continued for the second year consecutively with a few changes. Because of the oil spill, the survey was included in an overall project to examine the impact of oil contamination on the herring in Prince William Sound (Trustee Council, 1989). In addition, a skiff survey program was added to record any herring kills due to oil and to accurately correct the spawn maps derived from the aerial survey program. The total herring escapement in 1989 was estimated at 57,580 short tons which is close to both the peak aerial estimate of 56,915 tons and the prediction of 54,900 tons.

The breakdown by area resulted in 32% of the biomass and 29% of the shore mileage of spawn recorded in the Northern Montague area (Appendix H.17), compared to 35% of the biomass and 31% of the shore mileage in the North Shore area (Appendix H.15), 19% of the biomass and 14% of the shore mileage in the Naked Island area (Appendix H.16) and 14% of the biomass and 22% of the shore mileage in the Northeast area (Appendix H.14). Had a sac roe fishery proceeded, it probably would have occurred in the North Shore area as in 1988. Egg densities at the spawning grounds were generally higher in 1989 with the 57,580 ton biomass stretched over 98.4 miles (resulting in 1.2 million pounds of spawners per mile) versus the previous year's 60,157 ton biomass spread out over 166.3 miles (resulting in .7 million pounds of spawners per mile). Heaviest egg deposition per mile occurred at Naked Island (1.6 million pounds per mile), as in 1988. However, egg depositions at Rocky Bay on Montague Island and in Fairmont Bay of the North Shore area were nearly as high (1.3 million pounds per mile).

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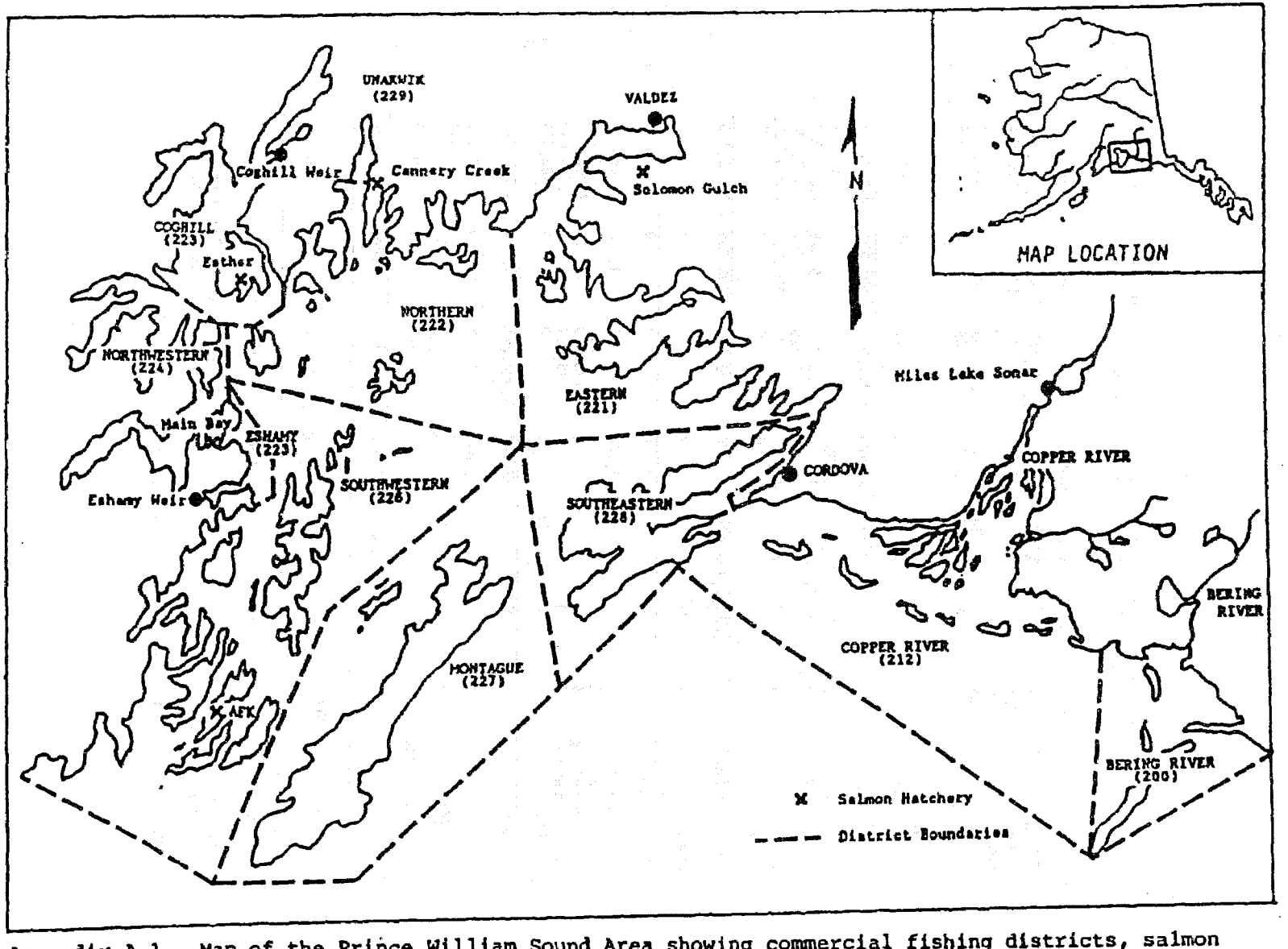
APPENDIX A

PRINCE WILLIAM SOUND

AREA WIDE INFORMATION



Appendix A.1. Map of the Prince William Sound Area showing commercial fishing districts, salmon hatcheries, weir locations and the Miles Lake sonar site.

Appendix A.2. Commercial salmon harvest by species, gear type and district in the Prince William Sound Management Area, 1989.

District	Effort	Chinook	Sockeye	Coho	Pink	Chum	Total
Eastern	225	528	3,135	20,894	3,151,096	341,142	3,516,795
Northern	231	83	4,134	7,044	6,422,270	193,155	6,626,686
Unakwik	0	0	0	0	0	0	0
Coghill	185	61	2,030	39,484	3,296,965	124,639	3,463,179
Northwestern	28	2	406	1,684	181,565	7,862	191,519
Southwestern [a]	0	0	0	0	0	0	0
Montague [a]	0	0	0	0	0	0	0
Southeastern	28	5	146	322	73,177	765	74,415
Purse Seine		679	9,851	69,428	13,125,073	667,563	13,872,594
Bering River	40	30	9,225	26,952	7	2	36,216
Copper River	476	30,863	1,025,923	194,454	25,877	5,845	1,282,962
Unakwik	98	31	21,412	27	41,820	404	63,694
Coghill	353	364	106,114	80,737	628,522	194,584	1,010,321
Eshamy [a]	0	0	0	0	0	0	0
Drift Gill Net		31,288	1,162,674	302,170	696,226	200,835	2,393,193
Eshamy [a]	0	0	0	0	0	0	0
Set Gill Net	0	0	0	0	0	0	0
Solomon Gulch	2	9	11	52,307	873,002	1,658	926,987
Cannery Creek	2	0	0	0	631,284	0	631,284
Wally Noerenberg	3	0	0	0	2,786,348	16,172	2,802,520
Armin F Koernig	1	0	0	0	3,715,739	8,910	3,724,649
Main Bay	1	0	13	0	0	102,811	102,824
Hatchery [b]		9	24	52,307	8,006,373	129,551	8,188,238
Ed. Permit [c]	6	11	2,322	1,044	46,331	989	50,697
Confiscated	1	0	140	0	192	162	494
Test Fish	2	19	170	9	3,090	1,932	5,220
Oil Contaminated	15	0	57	22	9,181	777	10,037
Misc. Gear		30	2,689	1,075	58,794	3,860	66,448
Prince William Sound Total		32,006	1,175,238	424,980	21,886,466	1,001,809	24,520,473

[a] These districts were closed due to oil contamination on beaches.

[b] Hatchery sales for hatchery operating costs. Solomon Gulch includes hatchery carcass sales of 1 chinook at 10 pounds and 152,954 pinks at 546,623 pounds.

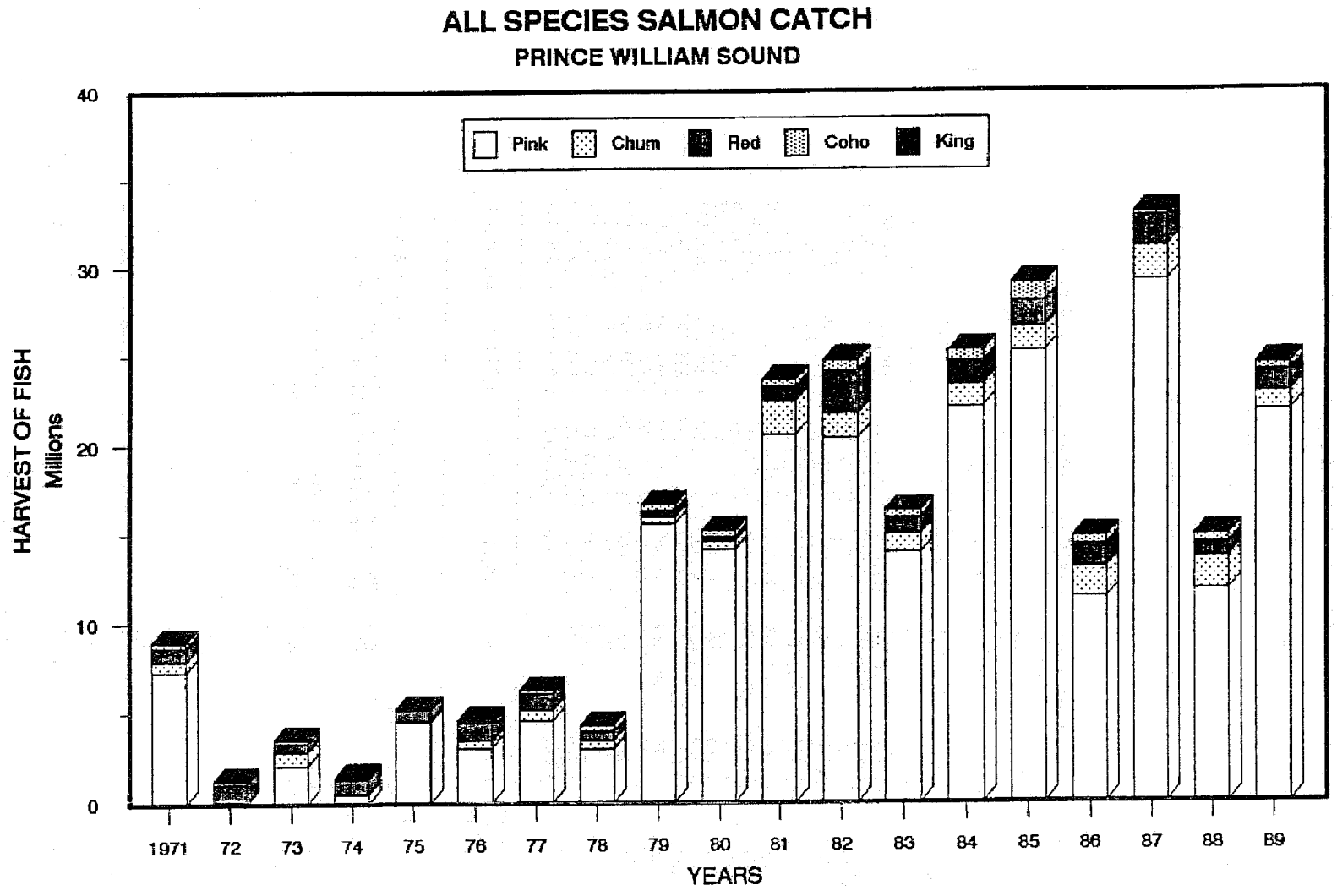
[c] Cordova High School educational special permits.

Appendix A.3. Commercial salmon harvest by species from all gear types, Prince William Sound, 1971 - 1989. [a]

Year	Catch by Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
1971	20,142	741,945	327,697	7,312,730	579,552	8,982,066
1972	23,003	976,115	124,670	57,090	46,088	1,226,966
1973	22,638	473,044	199,019	2,065,844	740,017	3,500,562
1974	20,602	741,340	76,041	458,619	89,210	1,385,812
1975	22,325	546,634	84,109	4,453,041	101,286	5,207,395
1976	32,751	1,008,912	160,494	3,022,426	370,657	4,595,240
1977	22,864	943,943	179,417	4,536,459	573,166	6,255,849
1978	30,435	505,509	312,930	2,917,499	489,771	4,256,144
1979	20,078	369,583	315,774	15,615,810	349,615	16,670,860
1980	8,643	208,724	337,123	14,161,023	482,214	15,197,727
1981	20,782	784,469	396,163	20,558,304	1,888,822	23,648,540
1982	47,871	2,362,328	623,877	20,403,423	1,336,878	24,774,377
1983	53,879	908,469	365,469	13,977,116	1,048,737	16,353,670
1984	39,774	1,303,515	609,484	22,119,309	1,229,185	25,301,267
1985	43,735	1,464,563	1,025,046	25,252,924	1,321,538	29,107,806
1986	42,128	1,288,712	426,240	11,410,302	1,700,906	14,868,288
1987	41,909	1,737,989	175,214	29,230,303	1,919,415	33,104,830
1988 [b]	31,797	767,674	477,816	11,820,121	1,843,317	14,940,725
1989 [b]	32,006	1,175,238	424,980	21,886,466	1,001,809	24,520,499
Ten Year Average (1979-88)	35,060	1,119,603	475,221	18,454,864	1,312,063	21,396,809

[a] Includes catches by all gear types and hatchery sales from the Eastern, Northern, Coghill, Unakwik, Northwestern, Eshamy, Southwestern, Montague, Southeastern, Copper River and Bering River Districts.

[b] Includes confiscated and educational special use permits. Also includes hatchery sales harvests and carcass sales.



Appendix A.4. Commercial salmon harvest by species for all gear types combined, Prince William Sound 1971 - 1989.

Appendix A.5. Mean price and estimated exvessel value of the commercial salmon harvest by gear type, Prince William Sound, 1989. [a]

PURSE SEINE

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	679	10,547	15.5	2.25	23,730.75
Sockeye	9,851	64,383	6.5	2.00	128,766.00
Coho	69,428	555,892	8.0	0.70	389,124.40
Pink	13,125,073	45,621,298	3.5	0.35	15,967,454.30
Chum	667,563	5,803,873	8.7	0.35	2,031,355.55
	13,872,594	52,055,993			$18,540,431.00

DRIFT GILL NET

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	31,288	829,589	26.5	2.25	1,866,575.25
Sockeye	1,162,674	7,882,969	6.8	2.26	17,853,841.10
Coho	302,170	2,469,732	8.2	0.62	1,533,703.60
Pink	696,226	2,516,050	3.6	0.35	880,617.50
Chum	200,835	1,764,114	8.8	0.35	617,439.90
	2,393,193	15,462,454			$22,752,177.35

SET GILL NET

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	0	0			0.00
Sockeye	0	0			0.00
Coho	0	0			0.00
Pink	0	0			0.00
Chum	0	0			0.00
	0	0			$0.00

HATCHERY SALES [b]

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	0	0			0.00
Sockeye [c]	13	417			
Coho	52,307	347,118	6.6	0.41	141,632.00
Pink	7,795,713	26,085,622	3.3	0.62	16,119,012.00
Chum	131,232	1,231,688	9.4	0.45	552,999.00
	7,979,265	27,664,845			$16,813,643.00

OTHER GEAR [d]

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	30	586	19.5	2.25	1,318.50
Sockeye	2,689	17,939	6.7	2.26	40,471.30
Coho	1,075	9,048	8.4	0.61	5,505.60
Pink	58,794	210,501	3.6	0.35	73,675.35
Chum	3,860	33,970	8.8	0.35	11,889.50
	66,448	272,044			$132,860.25

Gear Type	Value of Catch	No. of Permits	Average Earnings
Purse Seine	18,540,431.00	243	$76,298.07
Drift Gill Net	22,752,177.35	488	46,623.31
Set Gill Net	0.00	0	0.00
Subtotal- Value of CPF Catch	$41,292,608.35		
Hatchery	$16,813,643.00		
Other Gear	$132,860.25		
GRAND TOTAL	$58,239,111.60		

a Mean prices are estimated at the end of the season based on the average of cash buyers and the advance prices paid by the canneries on the grounds. They do not reflect the spring adjustments paid by some companies.

b Includes carcass sales. Prices are an average of sales harvest prices and carcass sale prices.

c Incidental catch - value included in pink total.

d Includes the Cordova High School special educational permit, confiscated fish sales, ADF&G test fish and oil contaminated fish.

Appendix A.6. Commercial salmon harvest and estimated value by gear type and district, Prince William Sound, 1989.

District	Permits	Landings	Numbers of Fish Chinook	Sockeye	Coho	Pink	Chum	Total	Estimated Value [a]
221 Eastern	225	1,017	528	3,135	20,894	3,151,096	341,142	3,516,795	5,048,509
222 Northern	231	1,451	83	4,134	7,044	6,422,270	193,155	6,626,686	8,499,611
229 Unakwik	0	0	0	0	0	0	0	0	0
223 Coghill	185	872	61	2,030	39,484	3,296,965	124,639	3,463,179	4,644,027
224 Northwestern	28	49	2	406	1,684	181,565	7,862	191,519	253,652
226 Southwestern	0	0	0	0	0	0	0	0	0
227 Montague	0	0	0	0	0	0	0	0	0
228 Southeastern	28	44	5	146	322	73,177	765	74,415	94,632
PURSE SEINE TOTAL	243	3,433	679	9,851	69,428	13,125,073	667,563	13,872,594	$18,540,431 [b]
200 Bering River	40	191	30	9,225	26,952	7	2	36,216	280,946
212 Copper River	476	9,018	30,863	1,025,923	194,454	25,877	5,845	1,282,962	18,801,276 [c]
229 Unakwik	98	245	31	21,412	27	41,820	404	63,694	364,472
223 Coghill	353	4,274	364	106,114	80,737	628,522	194,584	1,010,321	3,305,483
225 Eshamy	0	0	0	0	0	0	0	0	0
DRIFT GILL NET TOTAL	488	13,728	31,288	1,162,674	302,170	696,226	200,835	2,393,193	$22,752,177
225 Eshamy	0	0	0	0	0	0	0	0	0
SET GILL NET TOTAL	0	0	0	0	0	0	0	0	$0
221 Solomon Gulch	2	94	0	0	52,307	667,814	1,658	721,779	1,888,171
222 Cannery Creek	2	29	0	0	0	633,150	0	633,150	1,465,684
223 Wally Noerenberg	3	71	0	0	0	2,778,696	17,429	2,796,125	5,059,789
226 Armin F. Koernig	1	83	0	0	0	3,716,053	9,334	3,725,387	7,991,671
225 Main Bay	1	31	0	13	0	0	102,811	102,824	408,328
HATCHERY SALES TOTAL	5	308	0	13	52,307	7,795,713	131,232	7,979,265	$16,813,643 [d]
200/212 Copper/Bering	5	38	10	2262	960	252	49	3,533	41,233
221 Eastern	1	13	1	60	5	29,732	554	30,352	39,891 [b]
223 Coghill	1	8	0	0	79	16,347	386	16,812	21,362 [b]
Educational Permit [e]	6	59	11	2,322	1,044	46,331	989	50,697	$102,485
Oil Contaminated	7	7	0	57	22	9,181	777	10,037	15,214 [c]
ADF&G Test Fish	2	16	19	170	9	3090	1932	5,220	12,424 [c]
Confiscated	1	9	0	140	0	192	162	494	2,737 [c]
OTHER GEAR TOTAL	16	91	30	2,689	1,075	58,794	3,860	66,448	$132,860
PRINCE WILLIAM SOUND GRAND TOTAL		17,560	31,997	1,175,227	424,980	21,675,806	1,003,490	24,311,500	$58,239,112

a (Reported number of pounds delivered by species) x (estimated average price per pound for that species and district) = Estimated Value. Actual value may vary.

b Used the general purse seine disrict average price paid by species in estimating value.

c Used the Coghill District drift gill net average price paid by species in estimating value.

d Hatchery sales for hatchery operating costs. Does not include hatchery carcass sales.

e Cordova High School educational special permit.

Appendix A.7. Average price paid to fishermen for salmon, Prince William Sound, 1979-1989. [a]

Species	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
King Salmon	1.40	1.65	1.40	1.05	1.30	1.65	1.45	1.75	2.23	2.25
Sockeye Salmon	0.85	1.40	1.01	0.95	1.15	1.50				
Copper River			0.80	0.95	1.00	1.55	1.65	1.90	3.20	2.30
Bering River			0.80	0.85	0.95	1.10	1.65	1.90	3.00	2.30
Coghill/Unakwik districts					0.90	1.20	1.37	1.75	2.68	2.00
Eshamy					0.85	1.10	1.34	1.60	2.77	--
General Purse Seine							1.35	1.45	2.68	2.00
Coho Salmon										
Copper/Bering rivers	0.95	0.95	0.86	0.75	1.10	0.85	0.94	0.93	2.35	0.60
Prince William Sound	0.39	0.39	0.40	0.30	1.10	0.40	0.46	0.55	1.86	0.70
Pink Salmon	0.42	0.44	0.23	0.24	0.26	0.22	0.23	0.40	0.79	0.35
Chum Salmon	0.50	0.50	0.38	0.24	0.26	0.29	0.33	0.39	0.73	0.35

[a] Based on processor reports, fish tickets and other sources. Prices are monitored throughout the season and a weighted average is generally used. Prices generally do not reflect post season adjustments. Prices are an estimate only; Caution should be used if using these prices to estimate value.

Appendix A.8. Harvest projections for the 1989 commercial salmon fishery by district and species, Prince William Sound. [a]

District	COMMERCIAL HARVEST (1,000's of fish)				
	King	Sockeye	Coho	Pink	Chum
Copper River [b]	25 - 44	598 - 804	135 -429		
Bering River [c]		20 - 30	0 -237		
Coghill-Unakwik [d]		123 - 573			
Eshamy [e]		0 - 5			
General P.W.S. Districts [f]				10,750 -32,050	0 -1,177
Total Wild	25 - 44	741 -1,412	135 -666	10,750 -32,050	0 -1,177
Solomon Gulch				4,270 - 6,890	27 - 36
Armin F. Koernig				3,120 - 5,350	72 - 88
Esther Island				6,610 -10,380	194 - 259
Cannery Creek				3,130 - 5,020	-
Main Bay					220 - 269
Total Hatchery				17,130 -27,640	513 - 652
Total Hatchery and Wild	25 - 44	741 -1,412	135 -666	27,880 -59,690	513 -1,829

[a] Harvest estimates are only made for those species which constitute a significant portion of the catch. The pink salmon harvest projection does not include 4.86 million fish projected for harvest by hatcheries for cost recovery.

[b] Formalized forecast procedures are used for Copper River king and sockeye returns. Copper River coho catches are based on mean fishery performance adjusted by escapement levels and environmental conditions.

[c] Bering River sockeye and coho harvest estimates are based on mean fishery performance adjusted by escapement levels and environmental conditions.

[d] Coghill sockeye returns are formally forecast using a sibling relationship model for the major age class and spawner recruit relationships for other age classes. The pink and chum harvest represents a projection of harvest component inside the Coghill district for the area production.

[e] No formal forecast exists for Eshamy sockeye production. The chum production is based on anticipated returns to the Main Bay hatchery.

[f] Formal forecast procedures are used for estimating wildstock returns for pink and chum salmon in Prince William Sound. Hatchery contributions are based on known fry releases and assumed marine survival rates. Sockeye production is based upon mean fishery performance.

Appendix A.9. A listing of finfish processors, Location of operation, type of product processed, 1989.

Executive Names, Address Location of Operations	Processor Code	Type of Product
Alaska Pacific Seafoods P.O. Box 31179 Seattle, WA. 98103 or P.O. Box 1126 Kodiak, AK. 99615 James J. Kudwa	F0210	Salmon
Anderson Seafoods P.O. Box 87 Seward, AK. 99664 Margaret Anderson	F0082	Salmon Bait Herring
Bristol Monarch 7814 8th Ave S Seattle, WA. 98108 Bob Morton	F0942 F0944 F0079	Salmon
Chugach Fisheries Inc. P.O. Box 120 Cordova, AK. 99574 Steve Meuter	F0830 F0213	Salmon
Copper River Fishermen's Coop P.O. Box 90 Cordova, AK. 99574 Mike Schomer/Leslie Justice	F0146	Salmon
Exxon, USA P.O. Box 670 Valdez, AK. 99686 A.D. Carpenter	F1198	Salmon
Eyak Packing P.O. Box 1131 Cordova, AK. 99574 Gerald Masolini	F0224	Salmon
Icicle Seafoods, Inc. P.O. Box 8 Seward, AK. 99664 Jeff Poole/John Woodruff	F0133 F0135 F0138 F0137	Salmon
Inlet Salmon P.O. Box 530 Kenai, AK. 99611 Steve Sather/Ellie Tikka or Vince Goddard	F1039	Salmon

Appendix A.9. (page 2 of 2)

Executive Names, Address Location of Operations	Processor Code	Type of Product
John Cabot Company 1200 E. 70th Anchorage, AK. 99518 Roy Jones/Bill Billingsley	F0932	Salmon
Josef Kopecky 7865 Moose Run Circle Anchorage, AK. 99507	F1191	Salmon
Nautilus Marine P.O. Box 727 Valdez, AK. 99686 Tom Waterer/Gloria Madsen	F0815	Salmon
Nizina Fish Company Glennallen, AK. 99588 Al Gagnon	F1057	Salmon
North Pacific Processors P.O. Box 1040 Cordova, AK. 99574 Ken Roemhildt	F0232	Salmon
Peter Pan Seafoods, Inc. P.O. Box 1027 Valdez, AK. 99686 Jim Poor	F1041	Salmon Bait Herring
Phoenix Seafoods, Inc. P.O. Box 710 Whittier, AK. 99603 Joe Hale	F1184	Salmon
Sea Hawk Seafoods, Inc. P.O. Box 151 Valdez, AK. 99686 Karen Johnson	F0223	Salmon
St. Elias Ocean Products, Inc. P.O. Box 548 Cordova, AK. 99574 Virgil Siers	F0120	Salmon Bait Herring
Wards Cove Packing Company P.O. Box 1589 Kenai, AK. 99611 William E. Brindle	F0270	Salmon

Appendix A.10. The 1989 Memorandum of understanding between the Alaska Dept. of Fish and Game and the Alaska Dept. of Environmental Conservation.

MEMORANDUM OF UNDERSTANDING
1989 COMMERCIAL FISHERY SEASON

ALASKA DEPARTMENT OF FISH AND GAME
AND
ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

I. PREAMBLE

On March 24, 1989, the oil tanker EXXON VALDEZ ran aground, spilling more than 10,500,000 gallons of crude oil into the waters of Prince William Sound. The spilled oil has spread and continues to spread from Prince William Sound through the western Gulf of Alaska. The spilled oil has polluted and contaminated and continues to pollute and contaminate state waters and shoreline. The affected waters support productive fisheries which are of immense economic and social value to the State of Alaska and its citizens.

The State of Alaska, through the Department of Fish and Game, is charged with managing fishery resources and fisheries. Management directives and goals include: 1) to protect, maintain, improve and extend fishery resources; 2) to avoid depletion or waste of fishery resources; 3) to conduct fishing in state waters in an orderly fashion which promotes conservation, development, and utilization of fishery resources; and 4) to preserve the economic stability of the state's fishing industry.

The State of Alaska, through the Department of Environmental Conservation, is charged with protecting the environment and the health, safety, welfare, and economic and social well-being of the public. Public protection directives and goals include: 1) to conserve, improve, and protect natural resources from oil pollution; and 2) to ensure that fish marketed from state waters are pure, safe, wholesome, unadulterated, and free from any taint of oil contamination.

Oil pollution (as defined in AS 46.03.900(19)) in waters or on shorelines in or adjacent to an area where a fishery is conducted poses a risk of adulterating

fisheries resources and spreading oil pollution. Oil contamination also poses a risk of disruption of fisheries, including alteration of traditional fishing patterns and Board of Fisheries adopted fisheries management plans, by causing fouling of fishing gear, by causing loss of fishing time, by causing strains on the ability of industry to supply sufficient amounts of uncontaminated gear to vessels, by causing fishermen who are unable to acquire uncontaminated gear or vessels to forego their livelihoods, and by causing water of fishery resources that have become adulterated by oil pollution in the water or by contact with oil contaminated gear or vessels.

If oil adulterated fish are introduced into fish processing facilities, it could cause disruption of fisheries and waste of fish product because processing activities would have to be suspended while oil contaminated processing equipment was cleaned, maintained, and inspected. Additional waste and adulteration of fish product could occur if uncontaminated fish were exposed to oil contaminated fish or equipment.

Therefore, in order to carry out the management and public protection directives and goals with which the Department of Fish and Game and the Department of Environmental Conservation are charged, the respective departments agree to conduct the following activities during the 1989 commercial fishing season.

II. ALASKA DEPARTMENT OF FISH AND GAME

The Alaska Department of Fish and Game (ADF&G) will undertake the following activities in areas which have been polluted by oil:

A. ADF&G will conduct and document the results of aerial surveys or beach surveys in potential fishing districts, sections, subareas, or other areas as defined by ADF&G (hereinafter "areas") before the initial fishery opening in an area in order to ascertain whether oil pollution is present and to document the character and general location of the oil. ADF&G will provide the Department

of Environmental Conservation (DEC) with the results of the surveys.

B. ADF&G will monitor oil contamination in potential fishing areas using oil spill tracking maps provided by DEC and survey information developed by ADF&G.

C. ADF&G will conduct test fisheries before the initial fishery opening in potential fishing areas which have been polluted by oil, even if there is no current discernible presence of oil, and will provide samples of test fishery catches to DEC for evaluation.

1. If requested, ADF&G will assist in providing transportation for DEC inspectors to and from test fishing vessels.

2. Test fishing will be conducted according to the test fishery sampling plans developed in individual fishery management areas.

3. ADF&G may conduct additional test fishing in a previously tested or previously fished area if there is reason to believe that weather or other variables may have resulted in oil or an oil sheen entering the area.

III. ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

The Alaska Department of Environmental Conservation (DEC) will undertake the following activities:

A. DEC will evaluate commercial fishery catches to ensure that seafood safety and product wholesomeness is maintained. In order to accomplish this, DEC will undertake an intensive inspection program which will have requirements for fishing

vessels, tender vessels, buying stations and processing facilities.

B. DEC will enforce the emergency regulations, 18 AAC 34.500 et seq., which establish emergency requirements for fishing vessels, tender vessels, buying stations, and processing facilities in order to prevent adulteration of product and contamination of equipment by oil. DEC will review the records of tender vessels and processing facilities in order to assure compliance with the regulations.

C. DEC will train state personnel in the technique of organoleptic evaluation of fish for safety and wholesomeness. DEC-trained personnel will evaluate samples of catches from test fisheries provided by ADF&G to determine whether a safe and wholesome product will result from commercial openings in the areas where test fisheries were conducted. DEC will determine the appropriate methods of evaluation of particular samples. DEC will provide the results of organoleptic examination of test fish catches to ADF&G managers within 12 hours after the fish are made available to DEC. DEC will provide the results of laboratory evaluations, if any, of test fish catches to ADF&G managers within 24 hours after the fish are made available to DEC. DEC will provide inspectors for test fishing vessels when ADF&G requires an immediate evaluation of fish catch safety and wholesomeness for fisheries management purposes.

D. DEC will attempt to work with Exxon Shipping Company (Exxon) and encourage Exxon to establish boat cleaning stations and receiving stations for oil adulterated fish and oil contaminated gear. DEC will attempt to work with Exxon to develop recordkeeping procedures and oil contaminated material disposal procedures.

IV. OPENING OF FISHERY AREAS

ADF&G will decide whether to open particular areas for fishing based upon information acquired from the activities described above. The general principles by which ADF&G will make opening determinations are as follows:

A. A fishing area will remain closed if there is an indication of oil in any quantity in the area or the proximity of the area (including beaches), such that there is an appreciable likelihood that gear will be fouled, fish harvest adulterated, or such that the conduct of an orderly fishery could not take place. If weather conditions prohibit ADF&G from evaluating a potential fishing area through surveys or test fishing as set out above, the area will remain closed until the survey or test fishery can be conducted if DEC oil pollution tracking maps, or other reliable information, indicate the presence of oil pollution in the vicinity.

B. A fishing area will remain closed if test fishing has demonstrated that oil contamination of fishing gear or oil adulteration of product is likely to occur.

C. After fishing areas are opened for commercial fishing, if DEC inspection or evaluation of fishing vessels, tender vessels, buying stations, or processing facilities indicates oil adulteration of a harvest, designated representatives of DEC and ADF&G will consult to determine whether a recurring contamination problem has developed. If so, ADF&G will close fishing in the area where the oil contamination occurred.

V. AGENCY STAFF

Each agency will designate key contact people to implement this Memorandum of Understanding (MOU) and to facilitate the decision making process during the 1989 commercial fishery season. The following are specific agency representatives for all purposes under this MOU:

ADF&G designates:

_____ (NAME)

_____ (TITLE)

_____ (PHONE)

DEC designates:

Manny Soares
_____ (NAME)

Environmental Conservation Manager
_____ (TITLE)

(907) 563-0318
_____ (PHONE)

Because it may be necessary to make emergency closure decisions, in the event that either designated representative is unavailable, the alternative designated persons are:

ADF&G designates:

Prince William Sound Region:

James Brady/Dennis Haanpaa
_____ (NAME)

_____ (TITLE)

_____ (PHONE)

Cook Inlet Region:

Schroeder and Ken Florey
_____ (NAME)

_____ (TITLE)

_____ (PHONE)

Westward Region: Larry Nicholson designates

_____ (NAME)

_____ (TITLE)

_____ (PHONE)

DEC Designates: _____ (NAME)

_____ (TITLE)

_____ (PHONE)

Agency staff will, to the maximum extent possible, coordinate and channel all respective efforts through the designated staff member.

_____ _____

Dated Don W. Collinsworth, Commissioner
Alaska Department of Fish and Game

_____ _____

Dated Dennis D. Kelso, Commissioner
Department of Environmental Conservation

APPENDIX B

COPPER AND BERING RIVER DISTRICTS

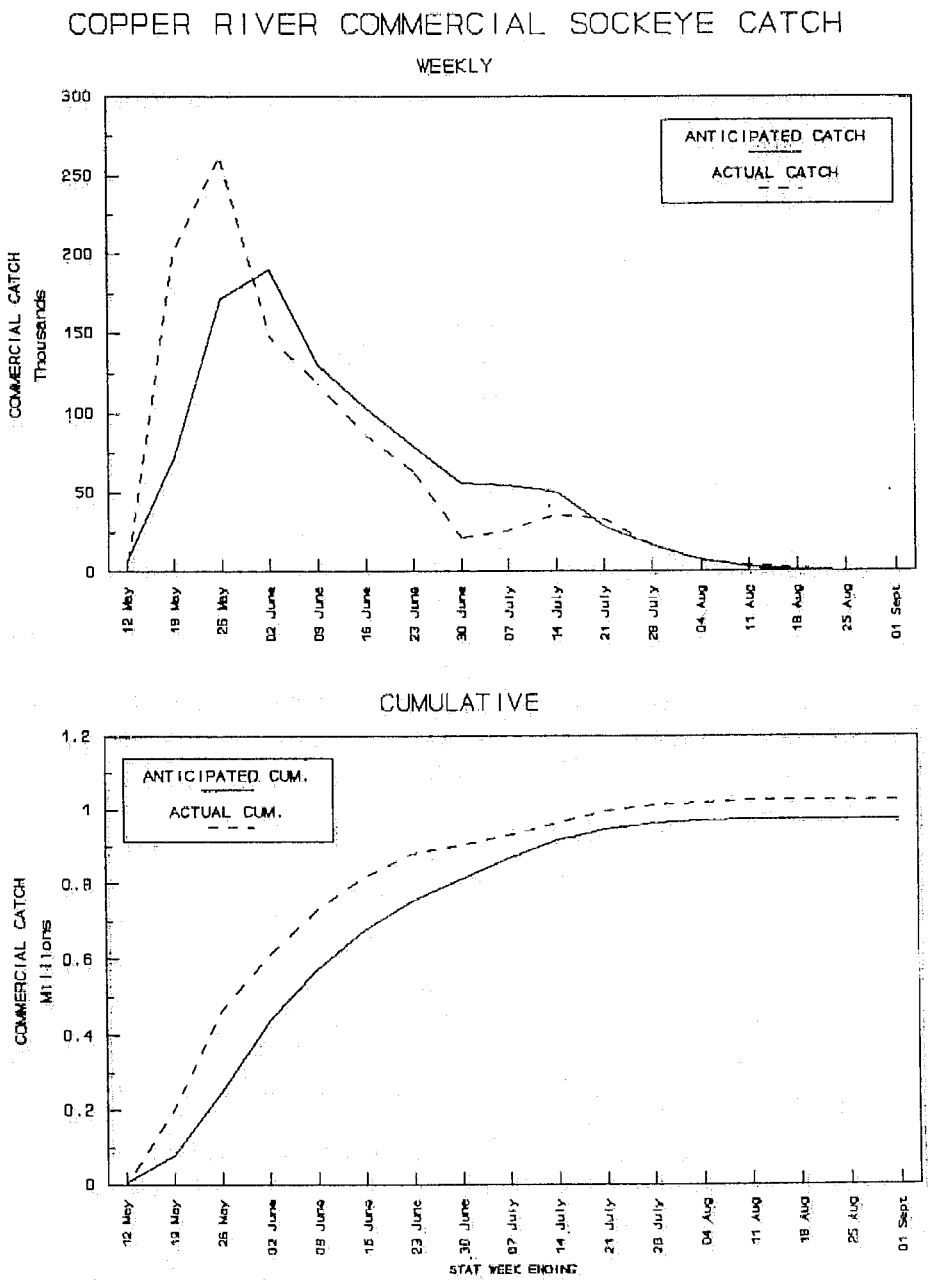
Appendix B.1. Anticipated and actual weekly catch and escapement of sockeye salmon in the Copper River District drift gill net fishery, 1989.

Date	Stat. Week	Fishing Time (Hrs.)	Actual Catch	Anticipated Catch [a]	Anticipated Cumulative Escapement [b]	Actual Cumulative Escapement [c]
May 7-13	20	0	0	6,536	3,166	0
May 14-20	21	48	201,000	72,641	27,674	17,915
May 21-27	22	60	262,304	171,798	93,832	66,818
May 28-June 3	23	60	147,437	190,450	192,475	123,208
June 4-10	24	48	119,492	130,797	258,537	195,818
June 11-17	25	48	86,675	103,748	302,280	266,742
June 18-24	26	48	63,763	79,537	336,924	319,607
June 25-Jul 1	27	24	21,528	56,208	371,144	357,345
July 2-8	28	24	25,525	54,122	409,504	417,098
July 9-15	29	24	35,830	50,840	453,141	489,653
July 16-22	30	24	32,801	28,361	473,097	559,547
July 23-29	31	48	16,213	16,257	482,646	599,684
Jul 30-Aug 5	32	48	6,613	6,973	485,456	607,797
Aug 6-12	33	48	4,630	2,700	485,634	
Aug 13-19	34	48	1,616	845	0	
Aug 20-26	35	48	440	0	0	
Aug 27-Sept 2	36	48	42	0	0	
Sept 3-9	37	48	12	0	0	
Sept 10-16	38	48	2	0	0	
Sept 17-22	39	48				
Season Total		840	1,025,923	971,813	485,634	607,797

a Based on average historic catches for comparable dates(1969-1988).

b Based on historical escapements at Miles Lake sonar, includes upriver chinook escapement component and sockeye broodstock for the Gulkana hatchery. Does not include sockeye escapements for the Copper/Bering delta streams.

c Escapement estimate from sonar counters at Miles Lake.



Appendix B.2. Anticipated and actual weekly and cumulative catches of sockeye salmon in the Copper River District drift gill net fishery, 1989.

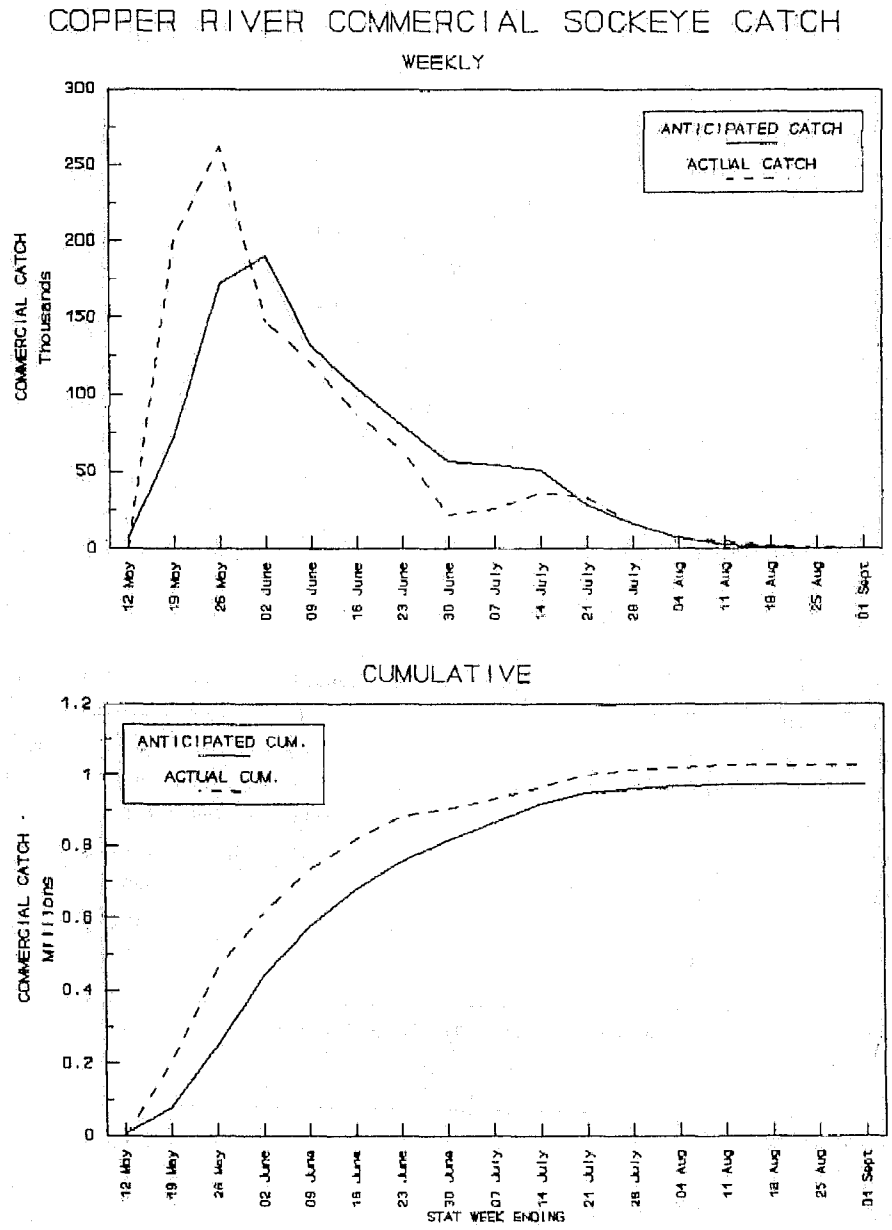
Appendix B.3. Commercial salmon harvest by period in the Copper River District drift gill net fishery, 1989.

Period	Date[a]	Hours[b]	Permits	Landings	Chinook		Sockeye		Coho		Pink		Chum	
					Numbers	Pound	Number	Pound	Number	Pound	Number	Pound	Number	Pound
01	5/15	24	301	465	4,132	106,632	48,157	332,716	0	0	0	0	47	391
02[c]	5/18	24	358	642	2,893	76,172	152,843	1,073,491	0	0	0	0	211	1,741
03	5/22	24	392	680	2,852	73,540	110,911	758,988	0	0	0	0	165	1,398
04	5/25	36	408	831	4,976	128,823	151,393	1,028,178	0	0	0	0	251	2,193
05	5/29	36	406	712	5,100	136,198	108,891	736,092	0	0	0	0	473	3,625
06	6/01	24	333	441	2,329	63,552	38,546	256,281	0	0	0	0	170	1,156
07	6/05	24	395	602	3,029	80,556	89,062	584,371	0	0	0	0	380	3,093
08	6/08	24	370	442	1,650	46,442	30,430	198,842	1	7	0	0	59	468
09	6/12	24	336	480	1,697	48,289	49,086	318,816	33	206	50	181	644	4,792
10	6/15	24	246	304	1,061	30,935	37,589	241,529	65	436	97	327	1,144	8,902
11	6/19	24	171	238	569	16,651	34,228	221,395	106	750	346	1,367	187	1,472
12	6/22	24	209	246	246	7,102	29,535	191,367	97	672	4,766	19,098	580	5,337
13	6/26	24	102	147	150	4,393	21,528	139,287	52	397	1,059	4,275	130	1,089
14	7/03	24	124	176	37	854	25,525	167,734	26	189	234	959	30	253
15	7/10	24	228	280	52	882	35,830	237,135	822	6,442	8,897	36,436	754	5,812
16	7/17	24	223	312	68	858	32,801	217,888	984	7,725	6,043	24,295	347	2,776
17	7/24	48	163	203	7	174	16,213	108,091	445	3,660	1,437	5,875	29	263
18	7/31	48	89	125	1	50	6,613	44,133	2,313	18,786	1,124	4,071	118	912
19	8/07	48	182	280	9	127	4,630	30,020	11,227	86,390	1,429	5,551	6	57
20	8/14	48	143	279	3	67	1,616	10,898	23,614	197,165	311	1,126	16	108
21	8/21	48	165	321	2	29	440	3,135	28,756	241,621	28	105	1	8
22	8/31	48	132	271			42	275	42,357	374,191	47	412	3	25
23	9/11	48	134	353			12	81	59,290	538,761	9	32		
24	9/21	48	78	146			2	11	19,350	186,889				
25	9/28	48	45	62					4,916	47,072				
Total		840	476	9,018	30,863	822,326	1,025,923	6,900,754	194,454	1,711,359	25,877	104,110	5,845	45,871
Average Weight						26.64		6.73		8.80		4.02		7.85

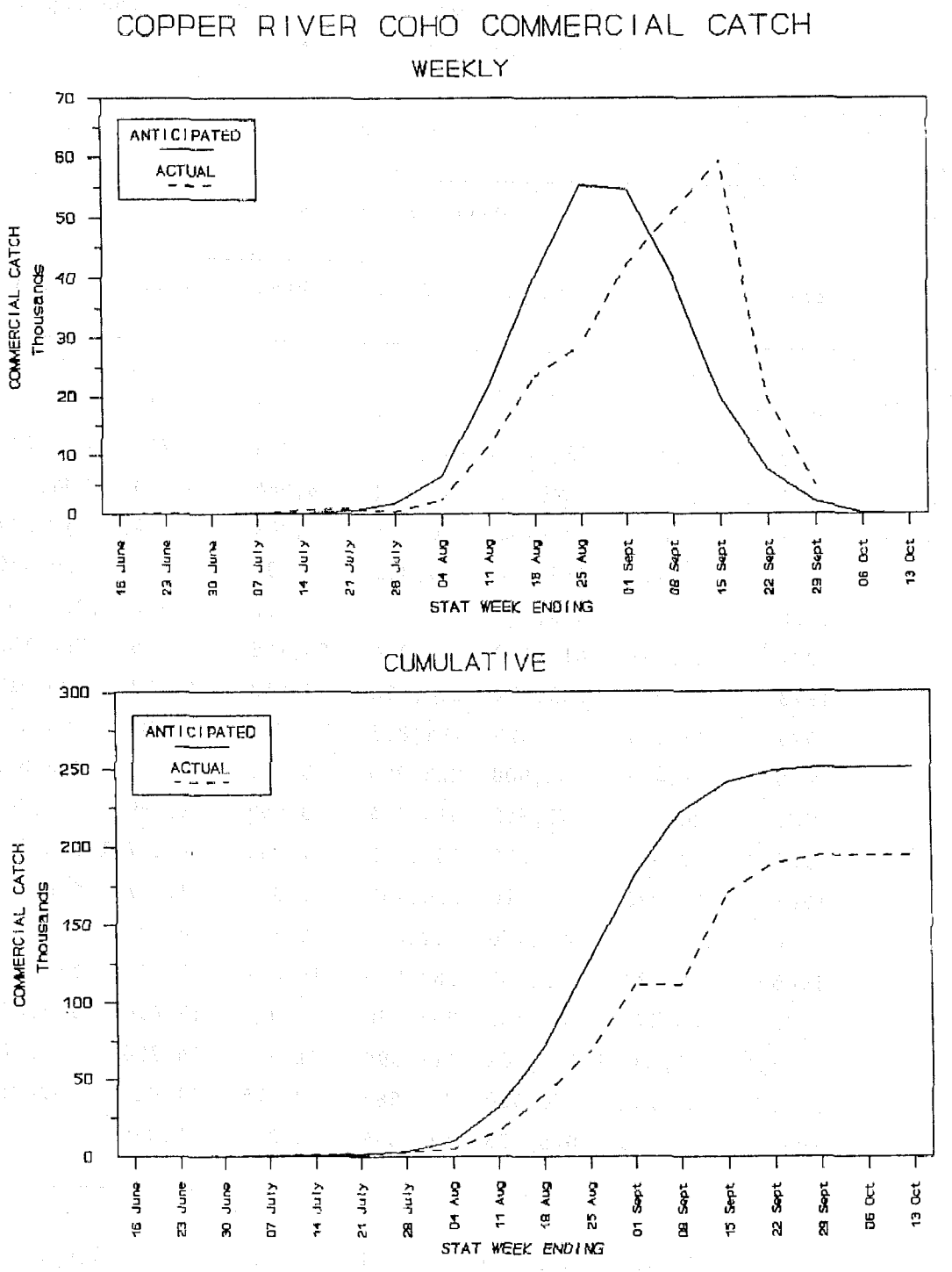
a Starting date of period.

b From 5/15 - 8/09 all Monday openers started at 7:00 AM and Thursday openers started at 7:00 PM. Starting on 8/14, all openers started at 12:00 Noon.

c From 0700 May 18 until 0001 August 01 only mesh size smaller than six inches was allowed.



Appendix B.4. Anticipated and actual weekly and cumulative catches of chinook salmon in the Copper River District drift gill net fishery, 1989.



Appendix B.5. Anticipated and actual weekly and cumulative catches of coho salmon in the Copper River District drift gill net fishery, 1989.

Appendix B.6. Commercial salmon catch by species in the Copper River District, 1971 - 1989.

	Catch by Species					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1971	16,486	616,801	208,915	1,762	5,287	849,251
1972	22,349	727,144	103,211	2,304	717	855,725
1973	19,948	332,816	132,272	8,964	10,173	504,173
1974	18,890	607,766	46,625	9,839	664	683,784
1975	19,644	335,384	53,805	236	807	409,876
1976	31,483	865,254	111,900	3,392	178	1,012,207
1977	22,089	619,140	131,356	23,185	335	796,105
1978	29,062	249,872	220,338	3,512	2,233	505,017
1979	17,678	80,528	194,885	1,295	107	294,493
1980	8,454	18,908	225,299	3,966	198	256,825
1981	20,178	477,662	310,154	23,952	1,799	833,745
1982	47,362	1,177,632	454,763	7,154	1,177	1,688,088
1983	50,022	633,010	234,243	7,345	2,217	926,837
1984	38,955	899,776	382,432	32,194	6,935	1,360,292
1985	42,333	931,132	587,990	19,061	5,966	1,586,482
1986	40,670	780,808	295,980	3,016	17,614	1,138,088
1987	41,001	1,180,782	111,599	31,635	14,796	1,379,813
1988	30,741	576,950	315,568	2,775	11,022	937,056
1989	30,863	1,025,923	194,454	25,877	5,845	1,282,962
Ten Year Average (1979-88)	33,739	675,719	311,291	13,239	6,183	1,040,172

Appendix B.7. Daily sockeye salmon escapement estimates at Miles Lake sonar, 1989.

Date	Water Level	Estimated				Escapement Objective	
		North Bank	South Bank	Daily	Cumulative	Daily	Cumulative
15-May	131.41						
16-May	131.35						
17-May	131.27		732 [a]	732	732	325	325
18-May	131.27		3,660 [b]	3,660	4,392	662	987
19-May	131.44		6,588 [c]	6,588	10,980	1,467	2,454
20-May	131.46	880 [d]	6,055 [e]	6,935	17,915	1,918	4,372
21-May	131.30	500	4,334	4,834	22,749	2,476	6,848
22-May	131.70	1,004	3,026	4,030	26,779	2,726	9,574
23-May	131.98	793	5,679	6,472	33,251	3,523	13,097
24-May	132.11	983	6,465	7,448	40,699	4,944	18,041
25-May	131.75	783	3,875	4,658	45,357	5,164	23,205
26-May	131.78	1,363	6,955	8,318	53,675	5,522	28,727
27-May	132.12	2,770	10,373	13,143	66,818	7,373	36,100
28-May	132.62	1,529	12,351	13,880	80,698	9,551	45,650
29-May	133.20	879	9,798	10,677	91,375	7,252	52,903
30-May	134.50	547	4,828	5,375	96,750	8,330	61,233
31-May	136.13	383	6,933 [f]	7,316	104,066	9,997	71,230
01-Jun	137.20	361	6,680	7,041	111,107	10,306	81,536
02-Jun	137.37	376	4,858	5,234	116,341	12,004	93,540
03-Jun	136.80	350	6,517	6,867	123,208	12,203	105,742
04-Jun	136.82	564	7,991	8,555	131,763	13,639	119,382
05-Jun	137.85	392	7,120	7,512	139,275	15,032	134,413
06-Jun	138.15	445	7,274	7,719	146,994	13,554	147,967
07-Jun	138.00	533	12,160	12,693	159,687	12,799	160,766
08-Jun	137.80	540	14,025	14,565	174,252	14,173	174,938
09-Jun	137.45	846	8,594	9,440	183,692	13,986	188,924
10-Jun	137.52	1,058	11,068	12,126	195,818	12,750	201,674
11-Jun	137.13	1,065	8,598	9,663	205,481	11,879	213,553
12-Jun	136.64	804	7,452	8,256	213,737	10,226	223,780
13-Jun	136.92	726	9,900	10,626	224,363	8,606	232,385
14-Jun	137.07	631	12,917	13,548	237,911	8,201	240,587
15-Jun	137.88	519	9,403	9,922	247,833	8,541	249,128
16-Jun	138.21	445	8,444	8,889	256,722	8,253	257,381
17-Jun	137.85	151	9,869	10,020	266,742	8,187	265,569
18-Jun	137.59	511	10,620	11,131	277,873	6,612	272,180
19-Jun	137.86	264	8,081	8,345	286,218	5,647	277,827
20-Jun	138.08	171	7,404	7,575	293,793	5,823	283,650
21-Jun	138.29	544	6,625	7,169	300,962	5,419	289,069
22-Jun	138.53	296	8,572	8,868	309,830	5,787	294,856
23-Jun	138.91	258	5,592	5,850	315,680	6,573	301,429
24-Jun	139.36	104	3,823	3,927	319,607	6,435	307,864
25-Jun	140.54	197	2,799	2,996	322,603	5,786	313,650
26-Jun	141.51	139	3,287	3,426	326,029	4,953	318,603
27-Jun	141.43	157	3,083	3,240	329,269	4,730	323,332
28-Jun	141.10	133	6,169	6,302	335,571	4,370	327,703
29-Jun	141.00	518	5,972	6,490	342,061	4,581	332,284
30-Jun	141.18	492	6,862	7,354	349,415	4,819	337,103
01-Jul	141.40	250	7,680	7,930	357,345	4,718	341,820
02-Jul	142.08	158	5,138	5,296	362,641	5,074	346,895
03-Jul	142.70	149	4,827	4,976	367,617	5,078	351,973

-Continued-

Date	Water Level	Estimated North Bank	Estimated South Bank	Estimated Daily	Estimated Cumulative	Escapement Objective Daily	Escapement Objective Cumulative
04-Jul	142.43	207	7,162	7,369	374,986	5,384	357,357
05-Jul	142.48	370	10,369	10,739	385,755	4,513	361,869
06-Jul	142.31	355	9,669	10,024	395,749	4,530	366,399
07-Jul	142.44	304	9,932	10,236	405,985	4,153	370,552
08-Jul	142.48	385	10,728	11,113	417,098	4,654	375,206
09-Jul	142.72	508	10,253	10,761	427,859	4,931	380,137
10-Jul	143.13	465	9,041	9,506	437,365	5,806	385,943
11-Jul	143.50	290	8,163	8,453	445,818	5,179	391,122
12-Jul	144.19	367	11,586	11,953	457,771	5,374	396,497
13-Jul	144.60	245	9,084	9,329	467,100	4,884	401,380
14-Jul	144.46	395	9,875	10,270	477,370	4,842	406,222
15-Jul	143.78	125	12,158	12,283	489,653	5,493	411,715
16-Jul	142.74	220	10,677	10,897	500,550	5,053	417,768
17-Jul	141.72	224	8,679	8,903	509,453	5,448	423,217
18-Jul	141.52	401	11,410	11,811	521,264	6,534	429,751
19-Jul	142.06	725	9,842	10,567	531,831	7,222	436,973
20-Jul	142.62	501	9,668	10,169	542,000	6,649	443,622
21-Jul	142.97	596	8,043	8,639	550,639	5,098	448,720
22-Jul	142.13		8,908	8,908	559,547	4,706	453,426
23-Jul	141.54		8,103	8,103	567,650	3,646	457,072
24-Jul	141.08		6,250	6,250	573,900	3,332	460,404
25-Jul	140.78		5,303	5,303	579,203	3,354	463,758
26-Jul	140.61		5,706	5,706	584,909	2,838	466,596
27-Jul	140.44		5,699	5,699	590,608	2,010	468,606
28-Jul	140.27		4,926	4,926	595,534	2,168	470,774
29-Jul	140.64		4,150	4,150	599,684	2,101	472,874
30-Jul	140.96		2,519	2,519	602,203	1,899	474,773
31-Jul	141.51		1,551	1,551	603,754	1,664	476,437
01-Aug	142.03		2,299	2,299	606,053	1,645	478,082
02-Aug	142.30		1,744	1,744	607,797	1,341	479,423
Total		33,244	574,553	607,797			

a 4 hours operational off tripod, expanded to daily estimate.

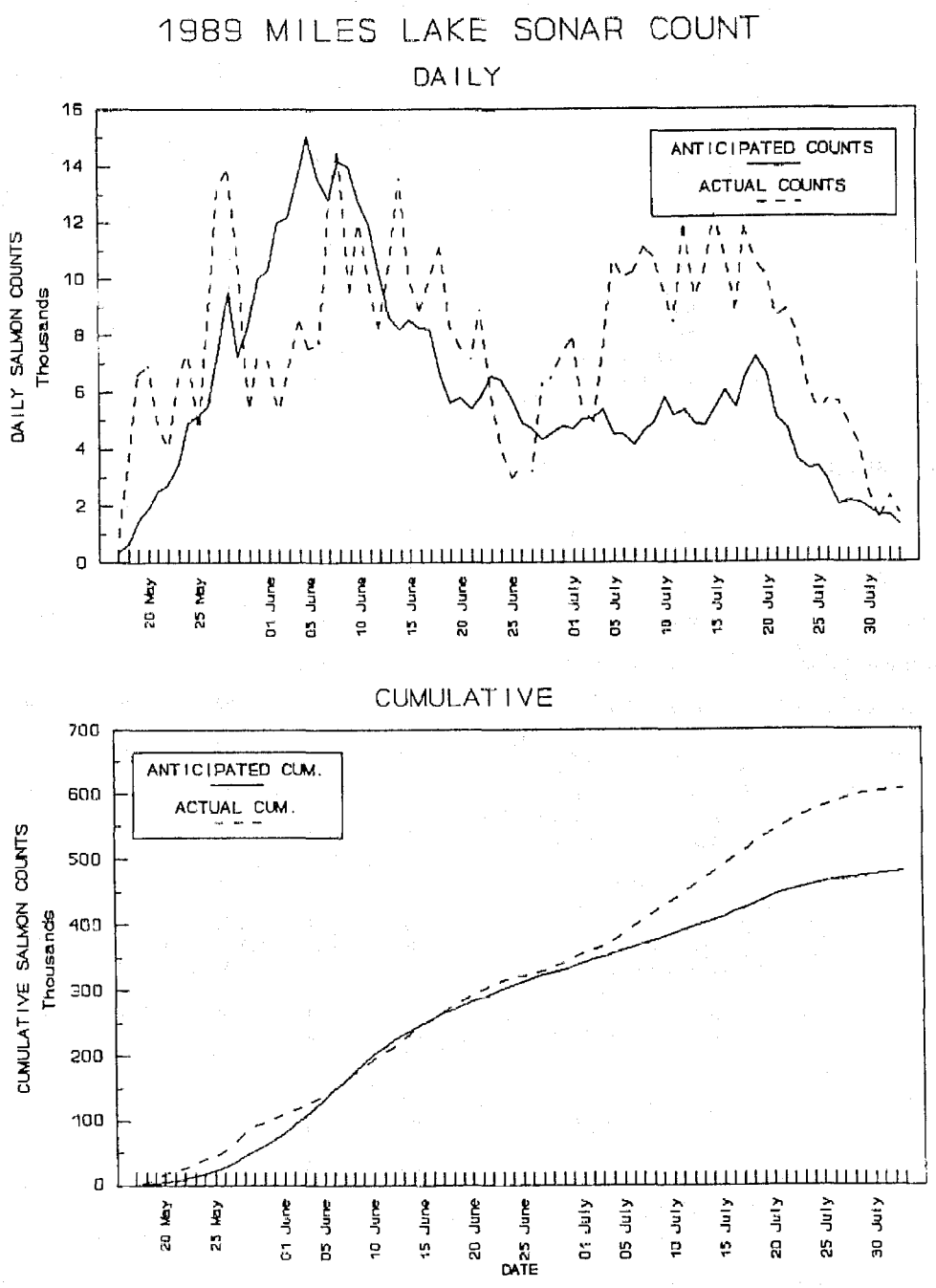
b Average of previous and following daily estimates.

c 12 hours operational off artificial substrate, expanded to daily estimate.

d 14 hours operational off tripod, expanded to daily estimate.

e South bank substrate knocked out by ice at 11:05,
17 hours operational off artificial substrate, expanded to daily estimate/m.

f Operational off of permanent substrate at 03:00.



Appendix B8. Anticipated and actual daily and cumulative sockeye salmon escapement estimates at Miles Lake sonar, 1989.

Appendix B.9. Aerial escapement indices by date and location for sockeye salmon returning to the Copper River Delta, 1989.

Copper River Delta [a] System and Drainage	Survey System	Aerial Escapement Indices by Survey Date							
		08 Jun	17 Jun	27 Jun	04 Jul	11 Jul	18 Jul	27 Jul	09 Aug
Eyak River	Eyak River	NS	0	0	NC	NC	0	NS	NS
	West Shore Beaches	0	35+	100+	210	190	440	940	1,420
	Middle Arm Beaches [b]	30	40	70	120	140	500	430	2,000
	North Shore Beaches	0	0	NC	NC	20	80+	10	20
	Hatchery Creek Delta [b]	0	25	150	330 *	50	0	0	0
	Hatchery Creek [b]	0	0	135	220 *	290	420	300	90
	Power Creek Delta	NS	NS	NS	NS	NS	NS	0	NS
	Power Creek	NS	NS	NS	NS	NS	NS	10	NS
Ibek Creek	Ibek Creek	NS	NS	NS	NS	NS	NS	NS	0
Alganik Slough	Alganik Slough	NS	NS	NS	NS	NS	NS	NS	NS
	McKinley Lake	0	0	0	300	3,000	3,600	4,700	6,300 *
	Salmon Creek West Fork	NS	NS	0	0	0	0	150	600 *
	Salmon Creek East Fork	NS	NS	0	0	0	0	80	30 *
26/27 Mile Creek	26/27 Mile Creek	0	0	480	900	3,020 *	1,050	1,640	2,100
39 Mile Creek	39 Mile Creek	NS	NS	120	0	1,970	5,140	5,200+	6,730+
Goat Mountain Creek	Goat Mountain Creek	NS	NS	0	0	50	NC	1,400	2,200
Pleasent Creek	Pleasent Creek	NS	855	850	450	990+*	450+	20	20
Martin River	Martin River- Lower	0	12	0	100	170	180	93	60
	Ragged Point River	NS	NS	130	950	2,320	950	400	820
	Ragged Point Lake Outlet	NS	NS	0	0	30	150	1,300	300
	Ragged Point Lake	NS	NS	NS	0	0	1,000	100	3,300
	Martin River- Upper	0	85	90	680	750	420	932	360
	Martin Lake Outlet	0	170	70	200	150	170	400	2,400
	Martin Lake [b]	0	340	1,770	3,400	1,975	2,800 *	750	1,130
	Martin Lake Feeders	0	0	260	1,200	2,400	2,650 *	1,030	490
	Pothole River	NS	0	30	350	250	350	210	100
	Pothole Lake Outlet	NS	0	0	0	0	120	500	0
	Pothole Lake	NS	0	0	0	0	0	100	1,200
	Little Martin Lake Outlet	0	0	0	0	25	30	10	0
	Little Martin Lake	NS	0	350	100+	700	1,040	2,340	3,030
	Tokun Springs	NS	0	60	0	115	250	400	420
	Tokun River [b]	0	60	240	300	380	290	2,000 *	1,420
	Tokun Lake Outlet [b]	0	0	250	50+	0	0	300 *	500
	Tokun Lake [b]	0	70	200	500+	550	600	2,200 *	1,500
Martin River Slough	Martin River Slough	0	0	2,250	1,740	1,900	910	3,010 *	2,430
Copper River Aerial Survey Daily Totals		30	1,692	7,605	12,100	21,435	23,590	30,955	40,970

-Continued-

Copper River Delta [a] System and Drainage	Survey System	Aerial Escapement Indices by Survey Date							
		14 Aug	21 Aug	03 Sep	08 Sep	16 Sep	30 Sep	09 Oct	20 Oct
Eyak River	Eyak River	0	NS	NS	NS	NS	NS	NS	NS
	West Shore Beaches	1,430 *	520+	70+	30	500	0	0	0
	Middle Arm Beaches [b]	2,500 *	1,900	2,200	2,500	1,100	NC	0	0
	North Shore Beaches	10	NS	NC	NS	180 *	NC	65	0
	Hatchery Creek Delta [b]	90	0	NC	300	200 *	0	0	0
	Hatchery Creek [b]	50	80	50+	150	400 *	200	0	0
	Power Creek Delta	NS	NS	NS	NS	NC	NS	NS	NS
	Power Creek	NS	NS	NS	NS	NC	NS	NS	NS
Ibek Creek	Ibek Creek	120 *	80	0	40	0	50	0	0
Alganik Slough	Alganik Slough	NS	0	NS	0	NC	NS	0	NS
	McKinley Lake	3,510	100	50	130	0	100	0	0
	Salmon Creek West Fork	1,050	400+	160+	230	100	0	0	0
	Salmon Creek East Fork	160	0	NC	70	0	0	0	0
26/27 Mile Creek	26/27 Mile Creek	930	360	370	0	125	100	0	0
39 Mile Creek	39 Mile Creek	7,420+*	2,900+	430+	1,800	0	0	0	NS
Goat Mountain Creek	Goat Mountain Creek	3,150 *	NS	NS	540	0	0	0	NS
Pleasent Creek	Pleasent Creek	0	0	NC	0	0	0	0	NS
Martin River	Martin River- Lower	33	0	0	0	0 *	NC	NS	NS
	Ragged Point River	690	10	0	100	0	0	0	0
	Ragged Point Lake Outlet	400	300	400	400	20	0	0	0
	Ragged Point Lake	2,400	3,000	3,000	2,400	1,500	3,000	250	0
	Martin River- Upper	805	411	100	300	0 *	NC	NS	NC
	Martin Lake Outlet	300	700	NC	0	200	NC	NC	NC
	Martin Lake [b]	2,800	600	NC	140	350	240	255	80
	Martin Lake Feeders	70	0	0	50	0	NC	NC	NC
	Pothole River	200	200	NC	50	0 *	0	0	0
	Pothole Lake Outlet	0	0	NC	50	50 *	0	0	0
	Pothole Lake	20	650	400+	360	1,500 *	300	300	0
	Little Martin Lake Outlet	0	0	0	0	0	0	0	0
	Little Martin Lake	920	2,200	300+	1,400	900	0	NC	0
	Tokun Springs	350	450 *	0	0	0	0	0	0
	Tokun River [b]	510	490	100	0	0	0	0	0
	Tokun Lake Outlet [b]	0	0	150	0	0	0	0	0
	Tokun Lake [b]	130	2,000	600	1,500	3,400	500	0	0 +
Martin River Slough	Martin River Slough	810	140	200	0	0	0	0	0
Copper River Aerial Survey Daily Totals		30,858	17,491	8,580	12,540	10,525	4,490	870	80

-Continued-

Copper River Delta [a] System and Drainage	Survey System	Aerial Escapement Indices by Survey Date: 30 Oct	Estimated Escape: Site [c]	Estimated Escape: System
Eyak River	Eyak River	NS	0	5,26
	West Shore Beaches	0	1,430	
	Middle Arm Beaches [b]	0	2,500	
	North Shore Beaches	0	180	
	Hatchery Creek Delta [b]	0	530	
	Hatchery Creek [b]	0	620	
	Power Creek Delta	NS	0	
	Power Creek	NS	0	
Ibek Creek	Ibek Creek	0	120	1
Alganik Slough	Alganik Slough	NS	0	6,9
	McKinley Lake	0	6,300	
	Salmon Creek West Fork	0	600	
	Salmon Creek East Fork	0	30	
26/27 Mile Creek	26/27 Mile Creek	0	3,020	3,0
39 Mile Creek	39 Mile Creek	0	7,420	7,4
Goat Mountain Creek	Goat Mountain Creek	100	3,150	3,1
Pleasent Creek	Pleasent Creek	0	990	9
Martin River	Martin River- Lower	0	0	
	Ragged Point River	0	820	4,4
	Ragged Point Lake Outlet	0	300	
	Ragged Point Lake	0	3,300	
	Martin River- Upper	0	0	
	Martin Lake Outlet	0	2,400	7,8
	Martin Lake [b]	140	2,800	
	Martin Lake Feeders	0	2,650	
	Pothole River	0	0	1,1
	Pothole Lake Outlet	0	50	
	Pothole Lake	500	1,500	
	Little Martin Lake Outlet	0	0	3,0
	Little Martin Lake	0	3,030	
	Tokun Springs	0	450	4,9
	Tokun River [b]	0	2,000	
	Tokun Lake Outlet [b]	0	300	
	Tokun Lake [b]	0	2,200	
Martin River Slough	Martin River Slough	0	3,010	3,
Copper River Aerial Survey Daily Totals		740		51

-Continued-

a The survey sites represent most of the known sockeye salmon spawning locations in the Copper River Delta drainage. Weather permitting, the sites are surveyed weekly. The surveys provide information about the relative strength of escapement among years and within a year, time for spawning sites and the relative escapement strength among sites. The indices are not intended to provide an actual estimate of escapement for coastal stocks but they have been for the purpose in the absence of any other escapement estimating method. The abbreviations used in the following table have the following meanings: NS= no survey, NC= surveyed but no count due to poor conditions. The + sign after some counts indicate that the count is the minimum estimate of seen in less then ideal conditions. The * symbol indicates that this survey count was used as the peak survey for the site without duplication of counts for survey sites along migratory corridors (see footnote b).

b The sites typically have very protracted run timing or two temporally segregated spawning populations at the same site. Aerial counts from more then one day may be asterisked and used in the escapement estimate if the surveyor indicates that these counts represented different fish.

c The escapement estimates for each site is in the asterisked survey estimate. Where the survey site is a terminal spawning area the peak count is used however, if the site is a schooling area for migratory fish bound for sites further upstream the count which minimizes possible duplication counts across dates selected.

d The sum of the estimates by site within a system.

Appendix B.10. Copper River and Bering River area sockeye salmon escapement estimates, 1980 - 1989.[a]

Stream/Lake [b]	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Eyak Lake	22,500	11,300	11,700	8,900	11,690	11,025	2,960	7,420	6,775	4,110
Hatchery Creek	700	4,750	1,800	2,000	3,700	850	650	1,975	1,225	1,150
Power Creek	4,500	1,100	300	200	500	muddy	0	0	350	0
Ibek Creek	0	0	0	0	0	25	0	0	0	120
McKinley Lake	27,500	10,000	9,500	12,000	15,000	19,000	12,000	10,300	9,700	6,300
Salmon Creek	5,000	10,800	13,500	8,500	11,000	8,000	900	2	100	630
26/27 Mile Creek	7,500	9,500	5,500	8,000	7,500	6,500	2,030	4,100	2,105	3,020
39 Mile Creek	18,000	11,000	13,000	13,000	17,000	27,000	9,500	6,100	3,620	7,420
Goat Mountain	150	muddy	3,000	100	1,500	150	600	1,000	220	3,150
Pleasant Creek	250	muddy	NS muddy	NS muddy	7,400	2,500	1,000	1	460	990
Martin River	3,500	5,350	1,000	3,650	5,000	0	2,875	1,480	0	0
Ragged Pt. R./Lake	18,000	9,500	13,500	10,000	8,950	18,500	3,900	4,100	2,060	4,420
Martin Lake	27,650	41,050	14,820	17,600	35,350	20,500	11,200	6,010	6,440	7,850
Pothole Lake	2,200	8,000	1,230	6,500	6,000	1,500	2,200	910	2,785	1,550
L. Martin Lake	8,000	2,500	6,020	6,400	10,500	11,000	1,500	3,320	2,200	3,030
Tokun Lake/River [c]	1,500	1,700	450	500	27,553	11,393	16,000	8,080	12,160	4,950
Martin River Slough	10,000	15,000	9,500	11,000	14,500	8,100	7,980	5,900	3,115	3,010
Copper Delta Total	156,950	141,550	104,820	108,350	183,143	146,043	75,295	60,698	53,315	51,700
Upper Copper R. [d]	276,538	535,263	467,306	545,724	536,806	436,313	509,275	483,478	488,398	607,869
Copper R. Dist. Tot	433,488	676,813	572,126	654,074	719,949	582,356	584,570	544,176	541,713	659,529
Bering River/Lake					29,000	15,700	13,200	19,200	11,450	14,330
Shepherd Creek					14,500	8,000	3,600	4,100	950	340
Clear Creek					3,500	100	1,350	2,000	100	250
Kushtaka Lake					1,500	500	825	1,225	480	1,530
Katalla River									350	6,850
Bering R. Area Tot.					48,500	24,300	18,975	26,525	13,330	23,300
Copper/Bering Total					768,449	606,656	603,545	570,701	555,043	682,829

a The escapement figures in this table are based on peak aerial survey estimates, sonar and weir counts from a majority of the known salmon spawning areas in the Copper and Bering River delta. These indices are not intended to provide a true estimate of total escapement for the coastal stocks, but a comparable index based upon the best data currently available. An effort has been made to standardize the estimate across years, however in years prior to 1984, different methodology was used and discrepancies may be found when cross referenced to the primary data.

b The areas in this table represent combined survey sites corresponding to the "system" designations for the current year survey results presented elsewhere in this report.

c Weir counts at Tokon Lake included in estimates for 1983, 1984 and 1985.

d Upriver escapement estimate from Miles Lake sonar counts.

Appendix B.11. Aerial escapement indices by date and location for coho salmon returning to the Copper River Delta, 1989.

Copper River Delta System and Drainage	Survey System	Aerial Escapement Indices by Survey Date							
		09 Aug	14 Aug	21 Aug	03 Sep	08 Sep	16 Sep	30 Sep	09 Oct
Eyak River	Eyak River	NS	0	NS	NS	NS	NS	NS	NS
	West Shore Beaches	0	0	0	30+	0	1,025 *	400	0
	Middle Arm Beaches	0	0	0	0	0	900 *	NC	0
	North Shore Beaches	0	0	NS	NC	NS	0 *	NC	0
	Hatchery Creek Delta	0	0	0	NC	0	200	0 *	0
	Hatchery Creek	0	0	0	0	0	0	400 *	50
	Power Creek Delta	NS	NS	NS	NS	NS	NC	NS	NS
	Power Creek	NS	NS	NS	NS	NS	NC	NS	NS
Ibek Creek	Ibek Creek	NS	0	50	100+	350	3,080	3,090	2,911
Scott River	Scott River	NS	0	0	NS	0	0	0	0
	Elsner River	NS	0	0	NS	0	0	0	35
	Scott Lake	NS	0	0	NS	0	150+	200 *	125
Alganik Slough	Alganik Slough	NS	NS	0	NC	0	NC	NS	0
	18/20 Mile Creek	30	0	50	50+	50	630+	1,000 *	375
	McKinley Lake	0	0	0	0	0	200	800 *[b]	30
	Salmon Creek West Fork	0	0	0	10+	0	0	940	60
	Salmon Creek East Fork	0	0	0	NC	0	160	0	530 *
26/27 Mile Creek	26/27 Mile Creek	0	150	150	100	60	190	810	260
39 Mile Creek	39 Mile Creek	0	0	300	400	1,800	2,150 *	860	360
Goat Mountain Creek	Goat Mountain Creek	0	0	NS	NS	0	240	2,500 *	900
Pleasant Creek	Pleasant Creek	0	0	0	NC	961 *	0	0	25
Martin River	Martin River- Lower	0	40	206	220	260	2,900	NC	NS
	Ragged Point River	0	0	120	10	0	80	450	575
	Ragged Point Lake Outlet	0	0	0	0	0	0	100 *	0
	Ragged Point Lake	0	0	0	0	0	500	1,000 *	0
	Martin River- Upper	0	0	15	1,920	700	2,200	NC	NS
	Martin Lake Outlet	0	0	0	NC	0	300 *	NC	NC
	Martin Lake	0	0	0	50+	0	180 *	NC	NC
	Martin Lake Feeders	0	0	0	NC	0	110 *	NC	NC
	Pothole River	0	0	0	NC	0	1,300 *	60	0
	Pothole Lake Outlet	0	0	0	NC	0	0 *	0	0
	Pothole Lake	0	0	0	0	200	0 *	0	45
	Little Martin Lake Outlet	0	0	0	1,260	500	1,400	7,000 *	5,300
	Little Martin Lake	0	0	0	140+	200	0	200 *	NC
	Tokun Springs	0	0	0	100+	200	90	200	75
	Tokun River	0	0	0	120	40	90	700	1,700
	Tokun Lake Outlet	0	0	0	100	0	0	0	0 *
	Tokun Lake	0	0	0	0	0	0	0	120 *
Martin River Slough	Martin River Slough	0	0	10	1,460+	4,690	3,640	7,960 *	1,805
Copper River Aerial Survey Daily Totals		30	190	901	6,070	10,011	21,715	28,670	15,281

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Copper River Delta [a] System and Drainage	Survey System	Aerial Escapement Indices by Survey Date 20 Oct	30 Oct	Estimated Escape Site [c]	Syste
Eyak River	Eyak River	NS	NS	0	2,325
	West Shore Beaches	10	40	1,025	
	Middle Arm Beaches	0	0	900	
	North Shore Beaches	0	0	0	
	Hatchery Creek Delta	0	0	0	
	Hatchery Creek	85	50	400	
	Power Creek Delta	NS	NS	NS	
	Power Creek	NS	NS	NS	
Ibek Creek	Ibek Creek	4,330 *	2,980	4,330	4,330
Scott River	Scott River	NS	120 *	120	510
	Elsner Lake	190 *	180	190	
	Scott Lake	NS	0	200	
Alganik Slough	Alganik Slough	NS	NS	0	3,790
	18/20 Mile Creek	590	825	1,000	
	McKinley Lake	151	0	800	
	Salmon Creek West Fork	170	1,460 *	1,460	
	Salmon Creek East Fork	50	300	530	
26/27 Mile Creek	26/27 Mile Creek	NC	535	810	810
39 Mile Creek	39 Mile Creek	NS	20	2,150	2,150
Goat Mountain Creek	Goat Mountain Creek	NS	1,400	2,500	2,500
Pleasant Creek	Pleasant Creek	NS	0	961	961
Martin River	Martin River- Lower	NS	40 *	40	40
	Ragged Point River	1,155	2,500 *	2,500	3,600
	Ragged Point Lake Outlet	0	0	100	
	Ragged Point Lake	200+	0	1,000	
	Martin River- Upper	NS	430 *	430	430
	Martin Lake Outlet	NC	0	300	590
	Martin Lake	NC	0	180	
	Martin Lake Feeders	NC	60	110	
	Pothole River	30	180	1,300	1,300
	Pothole Lake Outlet	0	0	0	
	Pothole Lake	200+	0	0	
	Little Martin Lake Outlet	3,030	2,130	7,000	7,200
	Little Martin Lake	0	0	200	
	Tokun Springs	20	600 *	600	2,870
	Tokun River	930	2,150 *	2,150	
	Tokun Lake Outlet	0	0	0	
	Tokun Lake	20	0	120	
Martin River Slough	Martin River Slough	6,364	3,030	7,960	7,960
Copper River Aerial Survey Daily Totals		17,525	19,030		41,366

-Continued-

a The survey sites represent most of the known sockeye salmon spawning locations in the Copper River Delta drainage. Weather permitting, the sites are surveyed weekly. The surveys provide information about the relative strength of escapement among years and within a year, time for spawning sites and the relative escapement strength among sites. The indices are not intended to provide an actual estimate of escapement for coastal stocks but they have been for the purpose in the absence of any other escapement estimating method. The abbreviations used in the following table have the following meanings: NS= no survey, NC= surveyed but no count due to poor conditions. The + sign after some counts indicate that the count is the minimum estimate of seen in less then ideal conditions. The * symbol indicates that this survey count was used as the peak survey for the site without duplication of counts for survey sites along migratory corridors (see footnote c).

b The 800 fish shown for McKinley Lake on 30 September are spawning fish in the N.E. corner of the lake. Counts at later dates in Salmon Creek are not duplicates of migratory fish seen 30 September in the lake.

c The escapement estimates for each site is in the asterisked survey estimate. Where the survey site is a terminal spawning area the peak count is used however, if the site is a schooling area for migratory fish bound for sites further upstream the count which minimizes possible duplication counts across dates selected.

d The sum of the estimates by site within a system.

Appendix B.12. Copper River delta and Bering River coho salmon escapement estimates, 1980 - 1989. [a]

Stream/Lake [b]	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Eyak Lake	9,200	2,750	7,000	14,600	6,500	1,400	2,550	2,800	3,250	1,925
Hatchery Creek		2,500	125	1,000	1,750	7,010	400	850	100	400
Power Creek		800	1,500	1,000	1,900	1,800	0	4,800	350	0
Ibek Creek	12,110	10,000	1,100	4,200	9,700	8,500	4,200	3,100	2,400	4,330
McKinley Lake	2,500		500	5,000	500	4,300	1,600	10	170	800
Salmon Creek	2,000	1,700	4,650	6,500	850	7,000	200	0	1,925	1,990
26/27 Mile		250	50	0	350	300	60	350	105	810
39 Mile	7,100	1,900	2,000	6,500	8,000	8,000	5,800	2,800	1,390	2,150
Goat Mountain	800	500	50		600	4,000	100	520	1,500	2,500
Pleasant Cr.	500		400	350	1,100	1,500	0	250	110	961
Martin River	12,855	4,000	7,500	3,100	4,000	11,500	4,820	3,060	3,400	470
Ragged Pt. River/Lake		1,200	2,550	525	650	1,500	30	3,330	1,080	3,600
Martin Lake	4,500		9,000	6,100	4,700	9,100	275	70	145	590
Pothole Lake					900	8,500	540	70	350	1,300
Little Martin Lake	1,500	6,000	150	1,125	7,000	4,100	275	560	4,500	7,200
Tokun River/Lake	4,200	800	2,400	350	525	1,900	490	495	600	2,870
Martin River Slough	22,000	10,900	1,350	9,700	15,500	26,000	4,350	3,400	4,110	7,960
Copper Delta Total	79,265	43,300	40,325	60,050	64,525	106,410	25,790	26,465	27,930	41,366
Katalla R.	8,000	3,000	11,500	4,800	7,000	14,000	1,800	1,600	560	1,220
Bering Lake	700	0	8,000	4,000	2,000	18,000	1,350	900	2,350	1,000
Dick Creek	1,625	0	5,500	7,100	5,500	5,000	350	50	105	570
Shepard Cr.	0	600				1,500	10	45	70	70
Nichawak R.	250		5,000	800	1,000	3,500	1,700	250	3,670	2,550
Gandil R.	600					4,500				1,410
Controller Bay					4,500	34,000	4,210	2,740	4,660	9,000
Bering Area Total	11,175	3,600	30,000	16,700	20,000	80,500	9,420	5,585	11,415	15,835
Copper/Bering Total	90,440	46,900	70,325	76,750	84,525	186,910	35,210	32,050	39,345	57,201

a The escapement figures in this table are based on peak aerial survey estimates and weir counts from a majority of the known salmon spawning areas in the Copper and Bering River delta. These indices are not intended to provide a true estimate of total escapement for the coastal stocks, but a comparable index based upon the best data currently available. An effort has been made to standardize the estimate across years, however counts were obtained only as environmental conditions allow and may not necessarily correspond to periods of peak abundance. Missing counts are generally a result of bad weather, high water, turbulence or other factors that prevented surveys for that given year.

b The areas in this table represent combined survey sites corresponding to the "system" designations for the current year survey results presented elsewhere in this report.

Appendix B.13. Aerial survey indices of sockeye salmon escapement to the Upper Copper River drainage, 1979 to 1989. [a]

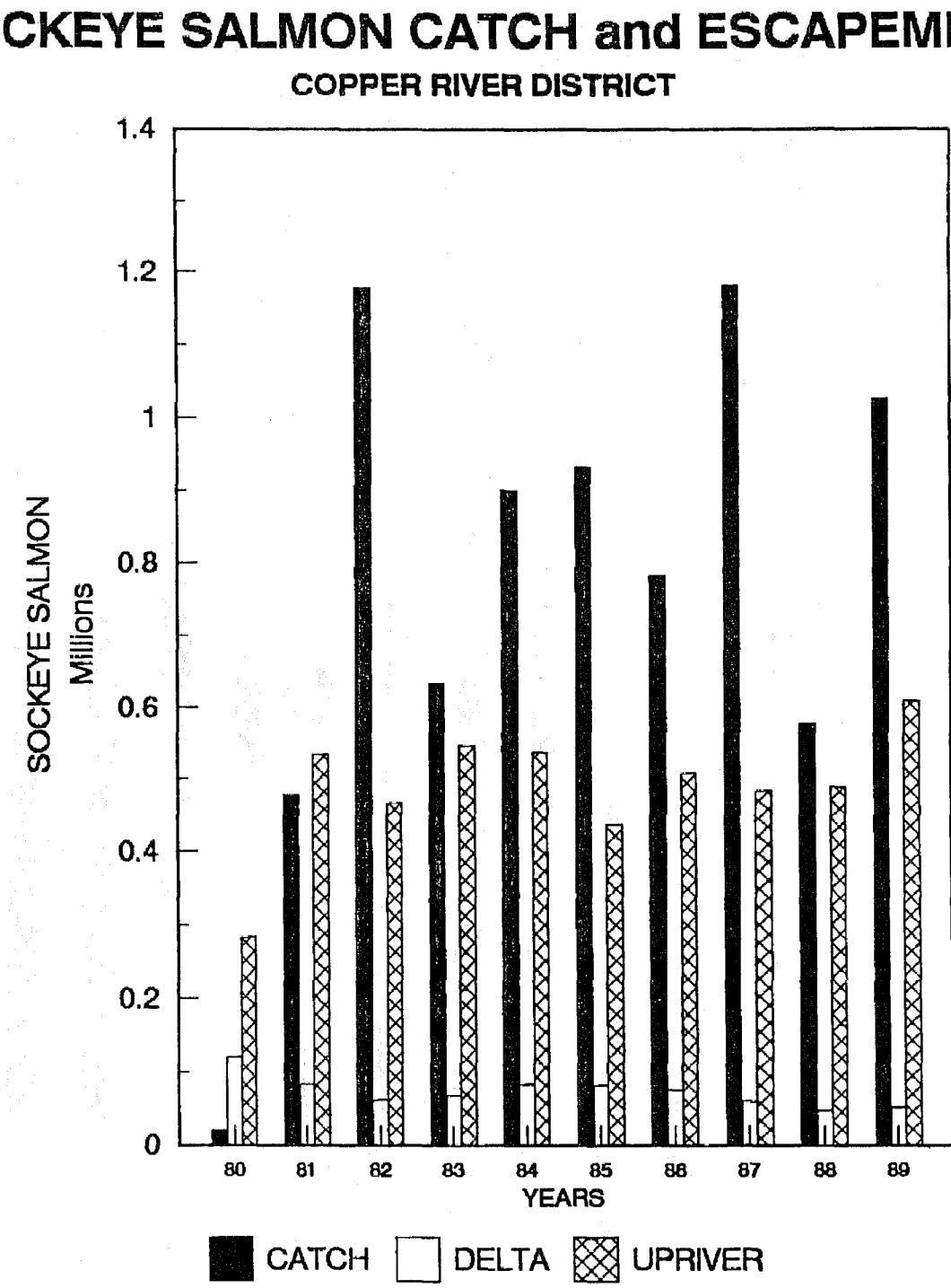
Location	Yearly Survey Indices											10 Year Average
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
Fish Lake	1,700	3,175	8,800	22,560	5,500	10,950	3,750	8,750	9,530	6,800	6,700	8,152
Bad Crossing #1&2	650	75	15,000	4,550	2,000	760	1,125	5,300	2,575	2,075	3,025	3,411
Suslota Lake	1,000	1,700	300	1,800	5,600	700	2,200	1,300	970	550	525	1,512
Dickey Lake	13	250	20	410	135	105	290	43	360	57	28	168
Keg Creek	1,300	2,335	320	495	620	2,505	825	200	400	360	1,450	936
Mahlo Creek	450	1,000	1,800	3,300	2,400	4,300	575	1,750	2,350	3,900	4,600	2,183
St. Anne Creek	730	5,000	4,700	8,800	9,700	10,300	1,250	4,600	6,980	6,100	3,100	5,816
Fish Cr.-Mentasta	350	900	10,500	1,700	900	900	1,800	1,100	250	650	1,500	1,905
Swede Lake	155	400	450	1,400	550	2,400	250	385	113	230	275	633
Tana River	465	2,130	290	1,100	2,485	3,665	1,145	1,825	472	2,034	245	1,561
Mentasta Lake	2,500	3,200	7,400	3,250	6,800	4,850	3,850	2,850	1,800	4,300	3,270	4,080
Tanada Lake	3,375	4,200	5,300	3,880	4,300	9,100	5,900	3,960	4,950	2,100	2,550	4,707
Salmon Creek	450	1,500	250	850	1,550	1,350	575	300	1,150	700	425	868
Paxson Inlt-Mud Cr	5,400	8,200	2,200	1,150	7,500	15,700	7,500	7,000	4,250	6,350	3,200	6,525
Mud Creek and Lake	460	740	810	1,900	470	270	200	70	0	150	0	507
Mendeltna Creek	350	1,125	4,830	400	2,850	1,900	2,300	3,325	2,275	1,550	2,000	2,091
Paxson Lake Outlet	1,900	3,800	1,500	3,800	3,300	4,100	3,600	1,810	5,100	3,200	900	3,211
Mud Cr.- Summit L.	2,600	3,075	3,400	17,400	5,700	9,600	8,150	3,375	9,050	15,400	6,800	7,775
Long Lake	3,100	2,550	1,325	1,700	5,600	1,360	590	1,300	1,225	1,125	1,225	1,998
Tonsina Lake	775	650	1,725	1,700	2,850	975	290	350	740	650	2,450	1,071
Totals	27,723	46,105	70,920	82,145	70,810	85,790	46,165	49,593	54,540	58,281	44,268	59,207

a The escapement figures in this table are based on peak aerial survey estimates and weir counts from a majority of the known salmon spawning areas in the upper Copper River drainage. These indices are not intended to provide a true estimate of total escapement for these stocks, but a comparable index based upon the best data currently available. An effort has been made to standardize the estimate across years, however counts were obtained only as environmental conditions allow and may not necessarily corresponed to periods of peak abundance. Missing counts are generally a result of bad weather, high water, turbulence or other factors that prevent surveys for that given year.

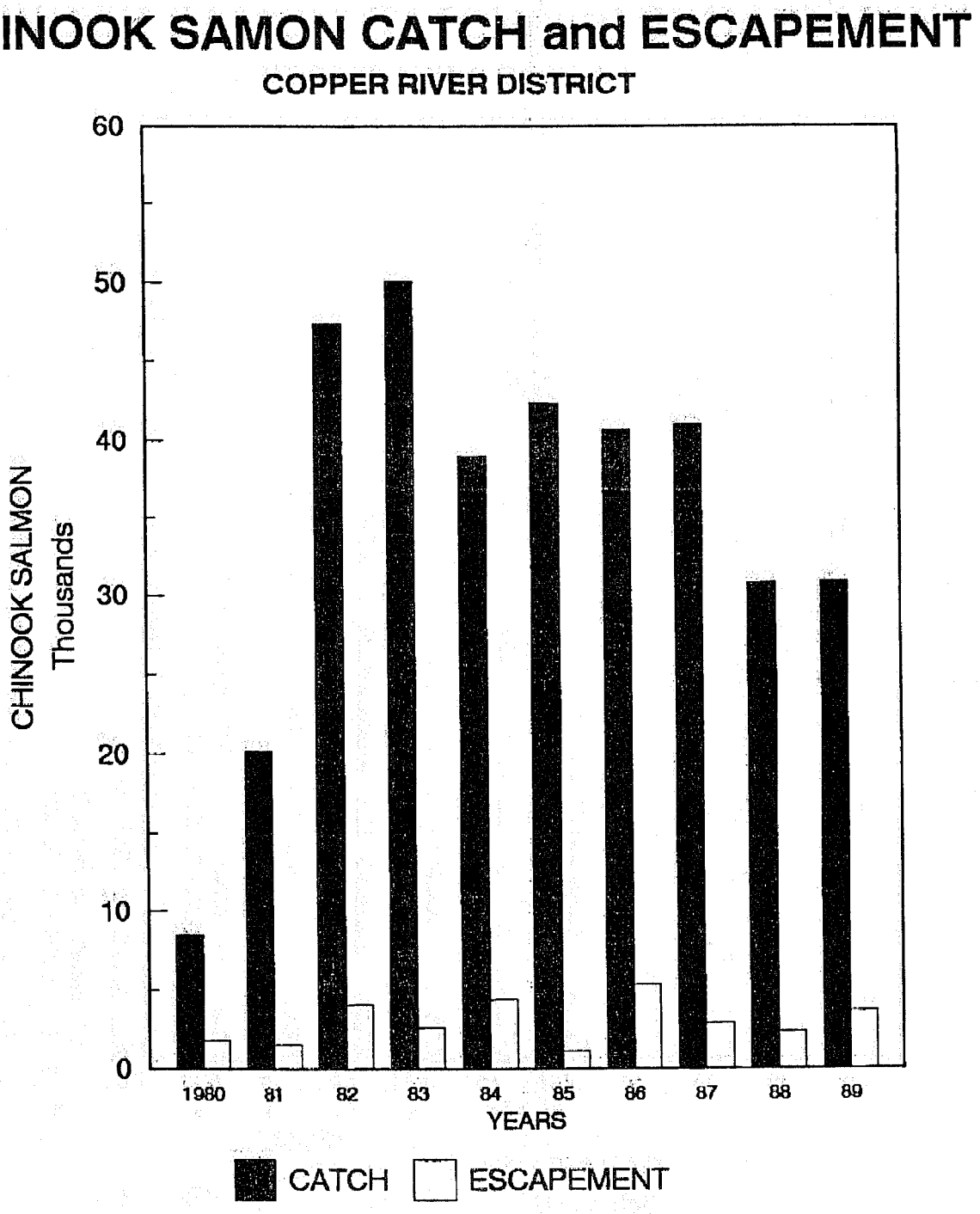
Appendix B.14. Aerial survey indices of chinook salmon escapement to the Copper River drainage, 1979 - 1989. [a]

	Yearly Survey Indices											10 Year Average
Location	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1978 - 1987
East Fork Chistochina	810	575	120	1,260	575	577	360	618	764	684	740	634
Gulkana River	1,380	718	754	1,656	931	2,189	321	3,182	1,228	967	1,993	1,333
Mendeltna Creek	5	3	51	70	12	26	26	76	10	17	185	30
Kiana Creek	279	247	191	200	166	382	91	328	80	249	344	221
St. Anne Creek	16	8	19	35	87	89	15	182	192	62	90	71
Manker Creek	16	35	23	49	141	264	22	251	141	115	165	106
Grayling Creek	153	66	107	127	287	279	58	224	112	161	72	157
Little Tonsina River	285	70	191	440	330	568	203	424	247	75	65	283
Indian River	29	24	20	179	41	17	14	29	33	0	3	39
Total without interpolated counts	2,973	1,746	712	4,016	2,570	4,391	1,110	5,285	2,807	2,330	3,657	2,794
Counts Missing			2					1				
Total with interpolated counts	2,973	1,746	1,476	4,016	2,570	4,391	1,110	5,314	2,807	2,330	3,657	2,873

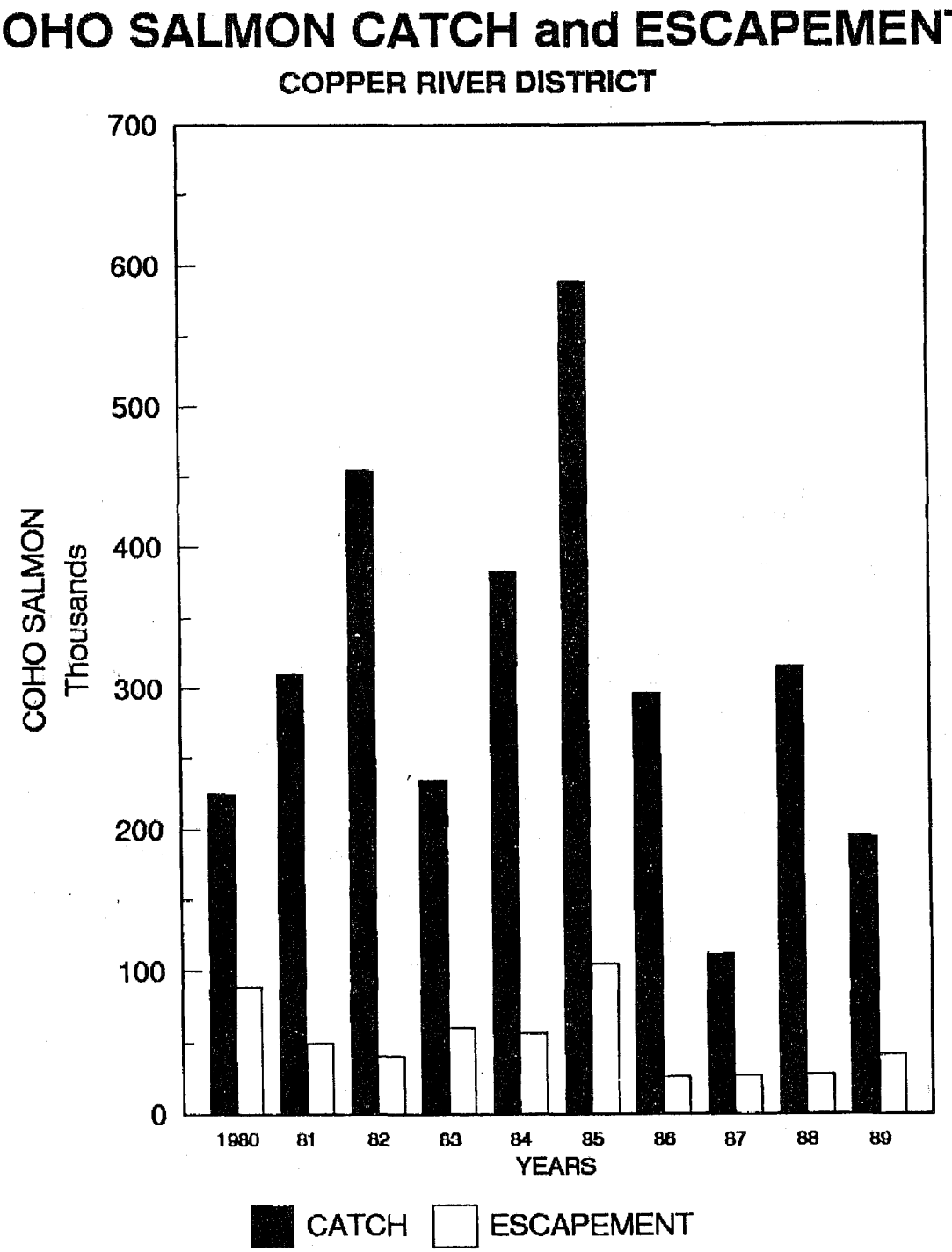
a The escapement figures in this table are based on peak aerial survey estimates and weir counts from a majority of the known salmon spawning areas in the upper Copper River drainage. These indices are not intended to provide a true estimate of total escapement for these stocks, but a comparable index based upon the best data currently available. An effort has been made to standardize the estimate across years, however counts were obtained only as environmental conditions allow and may not necessarily correspond to periods of peak abundance. Missing counts are generally a result of bad weather, high water, turbulence or other factors that prevented surveys for that given year.



Appendix B.15 Sockeye salmon catch and escapement in the Copper River District, 1980 - 1989.



Appendix B.16. Chinook salmon catch and escapement in the Copper River District, 1980 - 1989.



Appendix B.17. Coho salmon catch and escapement in the Copper River District, 1980 - 1989.

Appendix B.18. Estimated age and sex composition of sockeye salmon harvested in the Copper River District commercial drift gill net fishery, 1989.

		Brood Year and Age Group										
		1986		1985		1984			1983		1982	
		0.2	1.1	0.3	1.2	0.4	1.3	2.2	1.4	2.3	2.4	Total
Strata Combined:	5/15-9/23											
Sampling Dates:	5/16-7/25											
Sample Size:	4,684											
Female	Percent of Sample	0.2	0.0	2.6	1.8	0.0	38.4	0.4	0.1	6.5	0.0	50.2
	Number in Catch	1,807	0	27,034	18,587	0	394,437	4,547	1,337	66,753	195	514,698
Male	Percent of Sample	0.4	0.1	2.0	3.7	0.1	37.3	0.4	0.1	5.6	0.1	49.8
	Number in Catch	4,335	606	20,850	37,799	731	382,622	4,425	821	57,590	804	510,583
Total	Percent of Sample	0.6	0.1	4.7	5.5	0.1	75.8	0.9	0.2	12.1	0.1	100.0
	Number in Catch	6,142	606	47,884	56,386	731	777,324	8,972	2,424	124,454	999	1,025,923
	Standard Error	1,168	273	3,950	3,152	536	7,135	1,162	767	5,549	514	

Appendix B.19. Estimated age and sex composition of the chinook salmon catch in the Copper River District commercial drift gill net fishery, 1989.

		Brood Year and Age Group											
		1986	1985		1984			1983		1982		1981	
		1.1	1.2	2.1	0.4	1.3	2.2	1.4	2.3	1.5	2.4	2.5	Total
Strata Combined: 5/15-8/23 Sampling Dates: 5/16-6/10 Sample Size: 1,557													
Female	Percent of Sample	0.0	0.7	0.0	0.0	10.5	0.0	22.3	3.8	0.3	7.9	0.2	45.8
	Number in Catch	0	208	0	14	3,234	0	6,887	1,180	106	2,445	62	14,135
Male	Percent of Sample	0.1	1.8	0.2	0.0	10.1	0.3	28.8	2.3	1.7	8.5	0.2	54.0
	Number in Catch	45	550	62	0	3,121	84	8,882	708	536	2,625	59	16,672
Total	Percent of Sample	0.1	2.5	0.2	0.0	20.6	0.3	51.2	6.1	2.1	16.5	0.4	100.0
	Number in Catch	45	758	62	14	6,354	84	15,797	1,888	642	5,098	120	30,863
	Standard Error	33	134	37	14	335	49	407	196	113	286	47	

Appendix B.20. Estimated age and sex composition of coho salmon harvested in the Copper River District commercial drift gill net fishery, 1989.

		Brood Year and Age Group 1986	1985	1984	
		1.1	2.1	3.1	Total
Strata Combined:	6/08-9/30				
Sampling Dates:	8/06-9/12				
Sample Size:	1,205				
Female	Percent of Sample	19.9	19.1	0.3	39.3
	Number in Catch	38,740	37,056	630	76,426
Male	Percent of Sample	31.9	28.5	0.3	60.7
	Number in Catch	62,016	55,341	671	118,028
Total	Percent of Sample	51.8	47.5	0.7	100.0
	Number in Catch	100,756	92,397	1,301	194,454
	Standard Error	2,928	2,928	421	

Appendix B.21 Commercial salmon harvest by period in the Bering River District drift gill net fishery, 1989.

Period	Date [a]	Hours	Permits	Landings	Chinook		Sockeye		Coho		Pink		Chum	
					Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
01[b]	6/19	24	14	33	29	671	7,479	47,930	0	0	0	0	0	0
02	6/22	24	13	18	1	28	1,708	10,748	0	0	1	3	2	14
03	6/26	24	0	0	0	0	0	0	0	0	0	0	0	0
04	7/03	24	0	0	0	0	0	0	0	0	0	0	0	0
05	7/10	24	0	0	0	0	0	0	0	0	0	0	0	0
06	7/17	24	0	0	0	0	0	0	0	0	0	0	0	0
07	7/24	48	0	0	0	0	0	0	0	0	0	0	0	0
08	7/31	48	0	0	0	0	0	0	0	0	0	0	0	0
09	8/07	48	2	3	0	0	9	63	17	139	5	16	0	0
10	8/14	48	3	4	0	0	2	15	67	552	0	0	0	0
11	8/21	48	10	27	0	0	17	107	2,728	21,832	1	3	0	0
12	8/31	48	10	26	0	0	10	60	5,540	46,464	0	0	0	0
13	9/11	48	15	57	0	0	0	0	14,082	126,814	0	0	0	0
14	9/21	48	8	20	0	0	0	0	4,224	40,903	0	0	0	0
15	9/28	48	2	3	0	0	0	0	294	3,025	0	0	0	0
Total		576	40	191	30	699	9,225	58,923	26,952	239,729	7	22	2	14
Average Weight						23.30		6.39		8.89		3.14		7.00

a Starting times for specific openings refer to Appendix B.29

b From 1900 May 18 until 0001 August 01 only drift gill nets with a mesh size smaller than six inches was allowed.

Appendix B.22. Aerial escapement indices by date and location for sockeye salmon returning to the Bering River Delta, 1989.

Bering River Delta System and Drainage	Survey System	Aerial Escapement Indices by Survey Date							
		08 Jun	17 Jun	27 Jun	04 Jul	11 Jul	18 Jul	27 Jul	09 Aug
Bering River	Bering River	0	NC	0	50	30	40	350	800
	Bering Lake	0	580	2,490	13,500 *	9,650	5,430	3,740	590
	Dick Creek	0	NS	15	30 *	800	4,000+	6,000	8,030
	Shepherd Creek - Lagoon	0	180+	210	0	50+	0	0	NC
	Shepherd Creek	NS	NS	0	0	0	60	50	90+
	Carbon Creek	NS	NS	0	0	0	20	30	250
	Maxwell Creek	NS	NS	NS	0	0	0	0	0
	Trout Creek	NS	NS	NS	0	0	0	0	0
	Clear Creek	NS	NS	NS	0	50	220	250 *	200
	Kushtaka Lake	NS	NS	NS	0	0	0	75	320
	Shockum Creek	NS	NS	NS	0	0	0	15	500
Katalla River	Katalla River	0	0	0	220	330	800	3,320	6,850
Bering River Total		0	760	2,715	13,800	10,910	10,570	13,830	17,63

Bering River Delta System and Drainage	Survey System	Aerial Escapement Indices by Survey Date							
		14 Aug	21 Aug	03 Sep	08 Sep	16 Sep	30 Sep	09 Oct	20 Oct
Bering River	Bering River	100	50	NC	0	0	NC	NS	NS
	Bering Lake	260	90	20+	100	0	0	0	0
	Dick Creek	2,760	990	30	30	0	0	0	0
	Shepherd Creek - Lagoon	0	0	NC	0	NS	NS	NC	NS
	Shepherd Creek	100	40+	NS	0	NS	NS	55	NS
	Carbon Creek	50	50	NS	NS	NS	NS	0	NS
	Maxwell Creek	0	0	NS	NS	NS	NS	0	NS
	Trout Creek	0	0	0	0	NS	NS	0	NS
	Clear Creek	60	0	0	0	NS	NS	0	NS
	Kushtaka Lake	730 *	80	0	0	NS	NS	0	N
	Shockum Creek	800 *	150	20	15	NS	NS	0	N
Katalla River	Katalla River	3,450 SP	200	NC	40	0	0	0	
Bering River Total		8,310	1,650	70	185	0	0	55	

-Continued-

Bering River Delta [a] System and Drainage	Survey System	Aerial Escapement Indices by Survey Date: 30 Oct	Estimated Escapement: Site [b]	Estimated Escapement: System [c]
Bering River	Bering River	NS	800	14,330
	Bering Lake	0	13,500	
	Dick Creek	0	30	
	Shepherd Creek - Lagoon	NS	0	340
	Shepherd Creek	NS	90	
	Carbon Creek	NS	250	
	Maxwell Creek	NS	0	
	Trout Creek	NS	0	0
	Clear Creek	NS	250	250
	Kushtaka Lake	NS	730	1,530
	Shockum Creek	NS	800	
Katalla River	Katalla River	0	6,850	6,850
Bering River Total		0		23,300

a The survey sites represent most of the known sockeye salmon spawning locations in the Bering River drainage. Weather permitting, the sites are surveyed weekly. The surveys provide information about the relative strength of escapement among years and within a year, time for spawning sites and the relative escapement strength among sites. The indices are not intended to provide an actual estimate of escapement for coastal stocks but they have been for the purpose in the absence of any other escapement estimating method. The abbreviations used in the following table have the following meanings: NS= no survey, NC= surveyed but no count due to poor conditions. The + sign after some counts indicate that the count is the minimum estimate of seen in less then ideal conditions. The * symbol indicates that this survey count was used as the peak survey for the site without duplication of counts for survey sites along migratory corridors (see footnote b).

b The escapement estimates for each site is in the astricted survey estimate. Where the survey site is a terminal spawning area the peak count is used however, if the site is a schooling area for migratory fish bound for sites further upstream the count which minimizes possible duplication counts across dates selected.

c The sum of the estimates by site within a system.

Appendix B.23. Commercial salmon catch by species in the Bering River District, 1971-1989.

Year	Catch by Species					Total
	Chinook	Sockeye	Coho	Pink	Chum	
1971	105	36,776	88,231	4	0	125,116
1972	107	51,445	19,825	3	1	71,381
1973	285	15,426	65,348	2	5	81,066
1974	32	4,208	28,615	7	2	32,864
1975	162	21,637	24,162	0	0	45,961
1976	228	30,908	42,423	43	1	73,603
1977	127	14,445	47,218	192	221	62,203
1978	331	33,554	91,097	266	2,391	127,639
1979	385	139,015	114,046	6,895	23,094	283,435
1980 [a]	0	0	108,872	0	0	108,872
1981	200	55,585	82,626	9,882	8,307	156,600
1982	254	129,667	144,752	47	333	275,053
1983	610	179,273	117,669	851	4,615	303,018
1984	330	91,784	214,632	309	20,408	327,463
1985	215	26,561	419,276	214	9,642	455,908
1986	128	19,038	115,809	15	243	135,233
1987	34	16,926	15,864	54	7	32,885
1988	19	7,152	86,539	23	181	93,914
1989	30	9,225	26,952	7	2	36,216
Ten Year Average (1979-88)	218	66,500	142,009	1,829	6,683	217,238

a In 1980 no fishing was allowed prior to August 11.

Appendix B.24. Aerial escapement indices by date and location for coho salmon returning to the Bering River Delta, 1989.

Bering River Delta [a] System and Drainage	Survey System	Aerial Escapement Indices by Survey Date							
		21 Aug	03 Sep	08 Sep	16 Sep	30 Sep	09 Oct	20 Oct	30 Oct
Bering River	Bering River	0	NC	0	360	NC	NS	NS	NS
	Bering Lake	0	0	0	280	1,000+*	550	NC	20+
	Dick Creek	0	110+	470	260	570 *	70	525	750
	Shepherd Creek - Lagoon	0	NC	0	NS	NS	NC	NS	NS
	Shepherd Creek	0	NS	70 *	NS	NS	NC	NS	NS
	Carbon Creek	0	NS	NS	NS	NS	65	NS	NS
	Maxwell Creek	0	NS	NS	NS	NS	0	NS	NS
	Trout Creek	0	0	0	NS	NS	0	NS	NS
	Clear Creek	0	0	0	NS	NS	0	NS	NS
	Kushtaka Lake	0	0	0	NS	NS	15 *	NS	NS
	Shockum Creek	0	0	0	NS	NS	0	NS	NS
Katalla River	Katalla River	0	NC	700	1,200 *	690	252	100	140
Gandil River	Gandil River	0	NC	1,320	520	1,410 *	1,110	140+	220
Nichawek River	Nichawak River	110	NC	500	1,200	460	125	10	2,550 *
Controller Bay Strms.	Campbell River	NS	NS	0	300 *	0	60	0	22
	Edwards River	NS	NS	NS	8,070 *	7,250	5,620	5,500	5,570
	Okalee River	NS	NS	NS	630 *	NC	150	80	425
	Other Clear Streams	NS	NS	NS	0 *	0	NS	NS	NS
Bering River Total		110	110	3,060	12,840	11,380	8,017	775	3,702

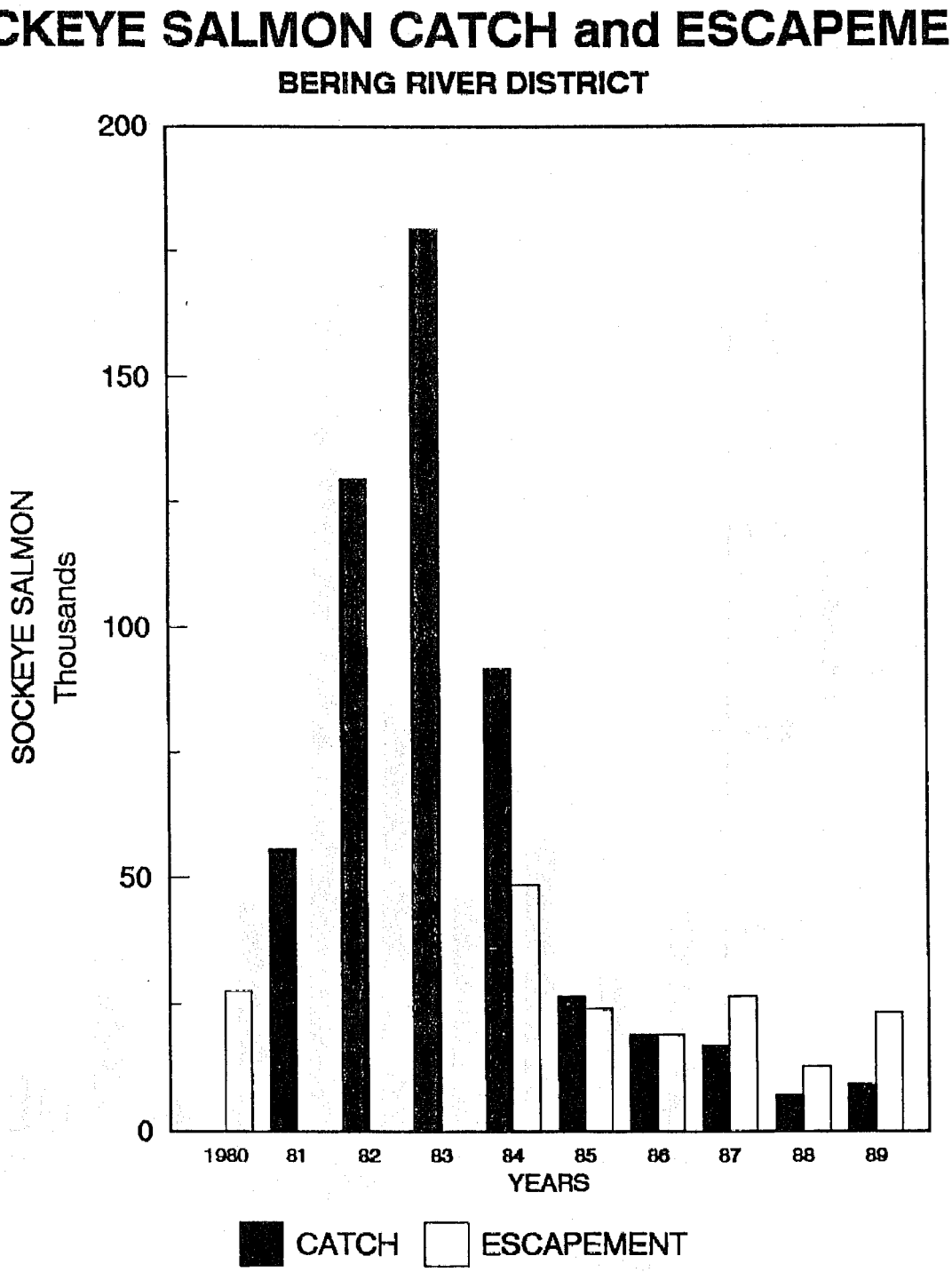
Bering River Delta [a] System and Drainage	Survey System	Estimated Escapment	
		Site [b]	System [c]
Bering River	Bering River	0	1,570
	Bering Lake	1,000	
	Dick Creek	570	
	Shepherd Creek - Lagoon	0	70
	Shepherd Creek	70	
	Carbon Creek	0	
	Maxwell Creek	0	
	Trout Creek	0	0
	Clear Creek	0	0
	Kushtaka Lake	15	15
	Shockum Creek	0	0
Katalla River	Katalla River	1,220	1,220
Gandil River	Gandil River	1,410	3,960
Nichawak River	Nichawak River	2,550	
Controller Bay Strms.	Campbell River	300	9,000
	Edwards River	8,070	
	Okalee River	630	
	Other Clear Streams	0	
Bering River Total			15,835

-Continued-

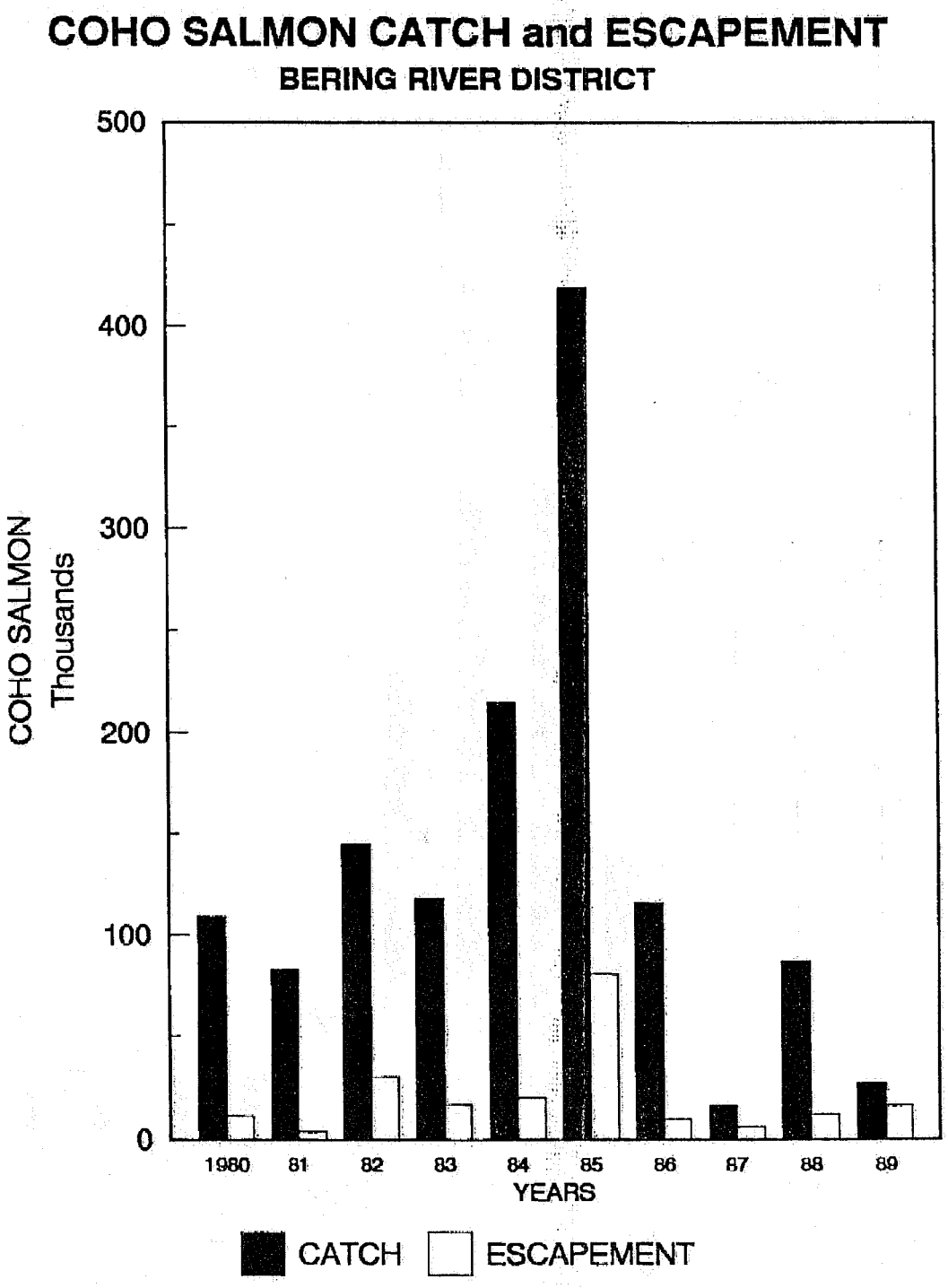
a The survey sites represent most of the known sockeye salmon spawning locations in the Bering River drainage. Weather permitting, the sites are surveyed weekly. The surveys provide information about the relative strength of escapement among years and within a year, time for spawning sites and the relative escapement strength among sites. The indices are not intended to provide an actual estimate of escapement for coastal stocks, but they have been for the purpose in the absence of any other escapement estimating method. The abbreviations used in the following table have the following meanings: NS= no survey, NC= surveyed but no count due to poor conditions. The + sign after some counts indicate that the count is the minimum estimate of seen in less then ideal conditions. The * symbol indicates that this survey count was used as the peak survey for the site without duplication of counts for survey sites along migratory corridors (see footnote b).

b The escapement estimates for each site is in the estricted survey estimate. Where the survey site is a terminal spawning area the peak count is used however, if the site is a schooling area for migratory fish bound for sites further upstream the count which minimizes possible duplication counts across dates selected.

c The sum of the estimates by site within a system.



Appendix B.25. Sockeye salmon catch and escapement in the Bering River District, 1980 - 1989.



Appendix B.26. Coho salmon catch and escapement in the Bering River District, 1980 - 1989.

Appendix B.27. Estimated age and sex composition of sockeye salmon harvested in the Bering River District commercial drift gill net fishery, 1989.

		Brood Year and Age Group							
		1986		1985		1984		1983	
		0.2	1.1	0.3	1.2	1.3	2.2	2.3	Total
Stratum Dates:	6/19-9/02								
Sampling Dates:	6/20								
Sample Size:	593								
Female	Percent of Sample	1.0	0.0	0.3	6.1	30.0	0.0	4.4	41.8
	Number in Catch	93	0	31	560	2,769	0	404	3,858
Male	Percent of Sample	1.7	0.5	0.3	11.1	38.8	1.0	4.7	58.2
	Number in Catch	156	47	31	1,027	3,578	93	436	5,367
Total	Percent of Sample	2.7	0.5	0.7	17.2	68.8	1.0	9.1	100.0
	Number in Catch	249	47	62	1,587	6,347	93	840	9,225
	Standard Error	61	27	31	143	176	38	109	

Appendix B.28. Estimated age and sex composition of coho salmon harvested in the Bering River District commercial drift gill net fishery, 1989.

		Brood Year and Age Group				
		1986	1985	1984		
		1.1	2.1	2.2	3.1	Total
Stratum Dates:	6/19-9/30					
Sampling Dates:	8/24,9/14					
Sample Size:	722					
Female	Percent of Sample	16.9	28.9	0.0	0.5	46.3
	Number in Catch	4,550	7,791	0	124	12,466
Male	Percent of Sample	22.5	30.8	0.1	0.3	53.7
	Number in Catch	6,061	8,307	24	71	14,462
Total	Percent of Sample	39.4	59.8	0.1	0.7	100.0
	Number in Catch	10,611	16,122	24	195	26,952
	Standard Error	521	522	24	85	

Appendix B.29. Summary of periods, dates, hours fished, and emergency orders issued for the commercial salmon gill net fisheries in the Bering River and Copper River districts, 1989.

Bering River (200)			Copper River (212)			
Periods	Dates	Hours Fished	Periods	Dates	Hours Fished	Emergency Orders Issued
			1	5/15 - 5/16	24	a 2-F-E-03-89
			2	5/18 - 5/19	24	b 2-F-E-04-89
			3	5/22 - 5/23	24	2-F-E-05-89
			4	5/25 - 5/27	36	2-F-E-06-89
			5	5/29 - 5/30	36	2-F-E-07-89
			6	6/01 - 6/02	24	2-F-E-08-89
			7	6/05 - 6/06	24	2-F-E-09-89
			8	6/08 - 6/09	24	2-F-E-11-89
			9	6/12 - 6/13	24	2-F-E-12-89
			10	6/15 - 6/16	24	2-F-E-14-89
1	6/19 - 6/20	24	11	6/19 - 6/20	24	
2	6/22 - 6/23	24	12	6/22 - 6/23	24	c 2-F-E-17-89
3	6/26 - 6/27	24	13	6/26 - 6/27	24	
4	7/03 - 7/04	24	14	7/03 - 7/04	24	2-F-E-19-89
5	7/10 - 7/11	24	15	7/10 - 7/11	24	2-F-E-21-89
6	7/17 - 7/18	24	16	7/17 - 7/18	24	2-F-E-24-89
7	7/24 - 7/26	48	17	7/24 - 7/26	48	d 2-F-E-26-89
8	7/31 - 8/02	48	18	7/31 - 8/02	48	
9	8/07 - 8/09	48	19	8/07 - 8/09	48	
10	8/14 - 8/16	48	20	8/14 - 8/16	48	e 2-F-E-33.5-89
11	8/21 - 8/23	48	21	8/21 - 8/23	48	
12	8/31 - 9/02	48	22	8/31 - 9/02	48	2-F-E-46-89
13	9/11 - 9/13	48	23	9/11 - 9/13	48	2-F-E-53-89
14	9/21 - 9/23	48	24	9/21 - 9/23	48	2-F-E-54-89
15	9/28 - 9/30	48	25	9/28 - 9/30	48	f 2-F-E-55-89

a The Copper River and Bering River districts fishing season is officially opened for a first period of 24 hrs. beginning Monday at 7 a.m.

b Only gill nets with a mesh size of six inches or smallerwill be allowed from 7:00 p.m. May 18 to August 1 12:00 a.m.

c Until further notice, the Copper River and Bering River districts will be open for 2 - 24 hr. fishing periods per week from 7 a.m. Monday until 7 a.m. Tues and from 7 p.m. Thrusday until 7 p.m. Friday.

d Until further notice, the Copper River and Bering River districts will be open for one 48 hr. fishing period per week from 7 a.m. Monday, July 24 until 7 a.m. Wednesday.

e Until further notice, the Copper River and Bering River districts will be open for one 48 hr. fishing period per week from 12 noon Monday, August 14 until noon Wednesday.

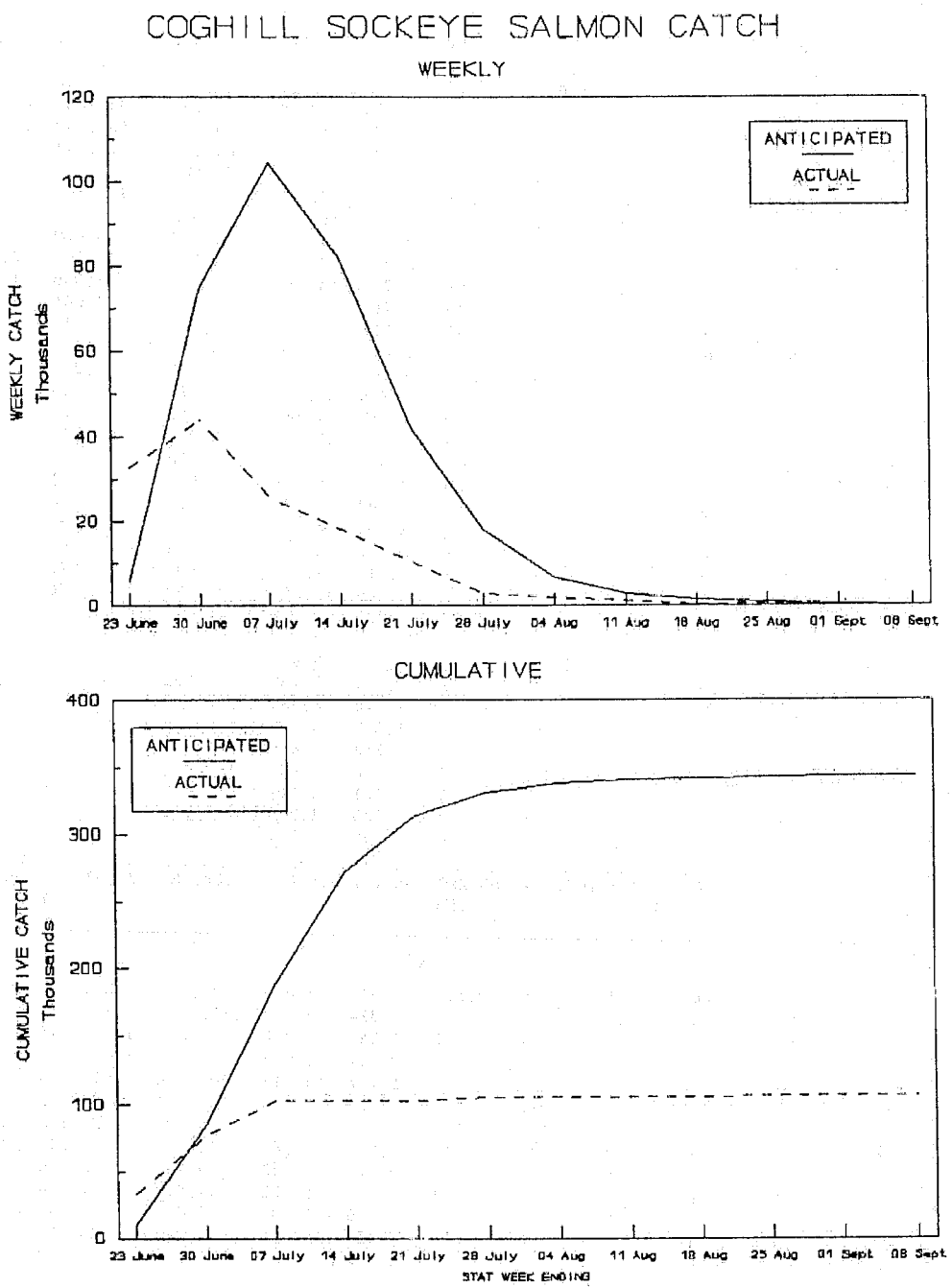
f This announcement offically closes the 1989 Copper and Bering River districts seasons.

APPENDIX C

COGHILL AND UNAKWIK DISTRICTS

Appendix C.1. Commercial salmon harvest by period in the Coghill District commercial drift gill net and purse seine fisheries, Prince William Sound, 1989. The periods listed are for those that registered active fishing participation. For a listing of all fishing periods see Appendix C.12.

Period			Chinook		Sockeye		Coho		Pink		Chum	
Date	Hour	Permits	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
DRIFT GILL NET												
6/19-21	60	193	173	2,898	32,845	244,875	15	101	31	121	46,704	458,323
6/26-28	60	272	145	2,356	43,741	315,114	6	44	529	2,086	40,837	373,537
7/03	12	207	25	352	25,637	183,035	183	1,398	1,001	3,844	6,040	55,961
7/26-29	76	206	20	395	2,803	18,932	1,862	13,978	219,551	834,620	43,211	350,085
8/14	12	133	0	0	160	1,233	1,067	7,832	118,406	436,649	18,815	158,492
8/18	12	106	0	0	200	1,351	4,209	31,579	64,224	225,337	8,680	73,009
8/21	12	79	0	0	140	923	5,123	35,483	46,536	159,678	6,968	55,596
8/22	12	91	0	0	164	1,103	4,302	27,372	51,755	174,666	5,583	45,356
8/23	12	101	0	0	122	845	2,535	16,165	27,915	94,664	2,269	18,308
8/24	12	88	0	0	104	691	3,269	21,444	20,819	70,879	2,340	18,926
8/26	11	56	0	0	47	332	2,723	19,230	11,265	38,494	2,381	20,003
8/27	11	58	1	22	21	141	1,702	12,881	9,175	31,869	1,529	12,886
8/28	11	55	0		21	136	1,781	12,742	7,525	26,084	902	7,450
8/29	11	47	0		10	61	2,915	19,554	7,787	24,316	897	7,175
8/30	12	39	0		7	51	3,614	22,166	6,062	19,904	619	5,038
8/31	12	27	0		0	0	1,586	12,913	2,874	9,806	469	3,783
9/01	12	25	0		4	26	4,288	24,706	4,876	14,635	746	6,065
9/02	12	28	0		10	69	3,583	20,841	2,948	9,691	584	4,710
9/03	12	33	0		9	69	3,779	25,523	3,844	12,517	762	5,946
9/04	12	38	0		7	44	2,936	19,518	4,140	13,521	743	5,979
9/05	12	35	0		3	20	3,782	25,238	3,971	12,825	494	3,952
9/06	12	34	0		9	61	3,808	24,826	3,881	12,806	593	4,719
9/07	12	30	0		8	40	2,593	18,713	2,251	7,553	504	4,027
9/08	12	28	0		9	67	2,945	18,527	1,354	4,266	537	4,120
9/09	12	20	0		0	0	1,915	11,107	993	3,025	309	2,237
9/10	12	15	0		1	8	2,469	13,053	1,587	4,780	202	1,582
9/11	12	17	0		4	23	2,375	12,623	1,636	4,923	175	1,478
9/12	12	18	0		4	23	2,355	12,308	840	2,523	148	1,232
9/13	12	23	0		0	0	2,080	10,478	515	1,557	158	1,315
9/14	12	14	0		1	5	1,550	7,766	231	697	121	980
9/15	12	12	0		0	0	1,359	6,936	0	0	95	782
9/16	12	13	0		3	19	1,236	6,201	0	0	88	762
9/17	12	6	0		0	0	288	1,450	0	0	31	253
9/18	12	2	0		0	0	98	492	0	0	19	74
9/19	12	2	0		0	0	151	1,247	0	0	11	88
9/20	12	1	0		0	0	155	1,238	0	0	19	122
9/25	12	1	0		0	0	100	751	0	0	0	0
Total		353	364	6,023	106,114	769,297	80,737	518,424	628,522	2,258,336	194,584	1,714,351
Average Weight				16.55		7.25		6.42		3.59		8.81
PURSE SEINE												
7/26-28	60	76	44	415	1,358	9,188	613	4,659	336,344	1,219,617	23,396	198,241
8/14	12	136	5	33	152	940	874	6,520	1,353,776	4,727,665	53,983	451,916
8/18	12	98	6	38	134	797	4,345	30,084	313,922	1,085,746	17,643	150,926
8/21	12	76	0	0	51	331	9,767	71,920	514,790	1,807,450	11,105	93,245
8/22	12	99	4	45	119	765	5,737	46,115	307,996	1,047,678	8,054	66,075
8/23	12	77	0	0	67	436	2,126	17,976	197,502	689,542	3,991	33,766
8/24	12	74	0	0	138	786	3,851	29,660	115,490	396,693	2,837	23,017
8/26	11	30	0	0	7	47	3,903	30,744	71,684	242,534	2,349	18,704
8/27	11	25	1	5	2	10	2,171	19,457	29,215	102,966	564	4,491
8/28	11	17	1	5	2	11	767	5,372	11,988	41,234	187	1,533
8/29	11	6	0	0	0	0	826	6,098	5,094	17,846	60	472
8/30	12	1	0	0	0	0	1,056	10,564	7,286	25,500	43	365
8/31	12	3	0	0	0	0	1,033	10,323	6,018	21,062	57	478
9/01	12	1	0	0	0	0	130	1,290	907	3,176	20	170
9/02	12	2	0	0	0	0	865	8,650	5,762	20,169	46	389
9/03	12	1	0	0	0	0	340	3,400	6,175	21,612	106	898
9/04	12	1	0	0	0	0	460	4,605	4,941	17,295	73	260
9/05	12	1	0	0	0	0	460	3,730	5,485	18,649	103	933
9/06	12	1	0	0	0	0	160	1,602	2,590	9,065	22	191
Total		185	61	541	2,030	13,311	39,484	312,769	3,296,965	11,517,499	124,639	1,046,070
Average Weight				8.87		6.56		7.92		3.49		8.39
Combined Total		425	6,564	108,144	782,608	120,221	831,193	3,925,487	13,775,835	319,223	2,760,421	
Average Weight				15.44		7.24		6.91		3.51		8.65



Appendix C.2. Anticipated and actual weekly and cumulative catches of sockeye salmon in the Coghill District based on a projected harvest of 343,500 fish.

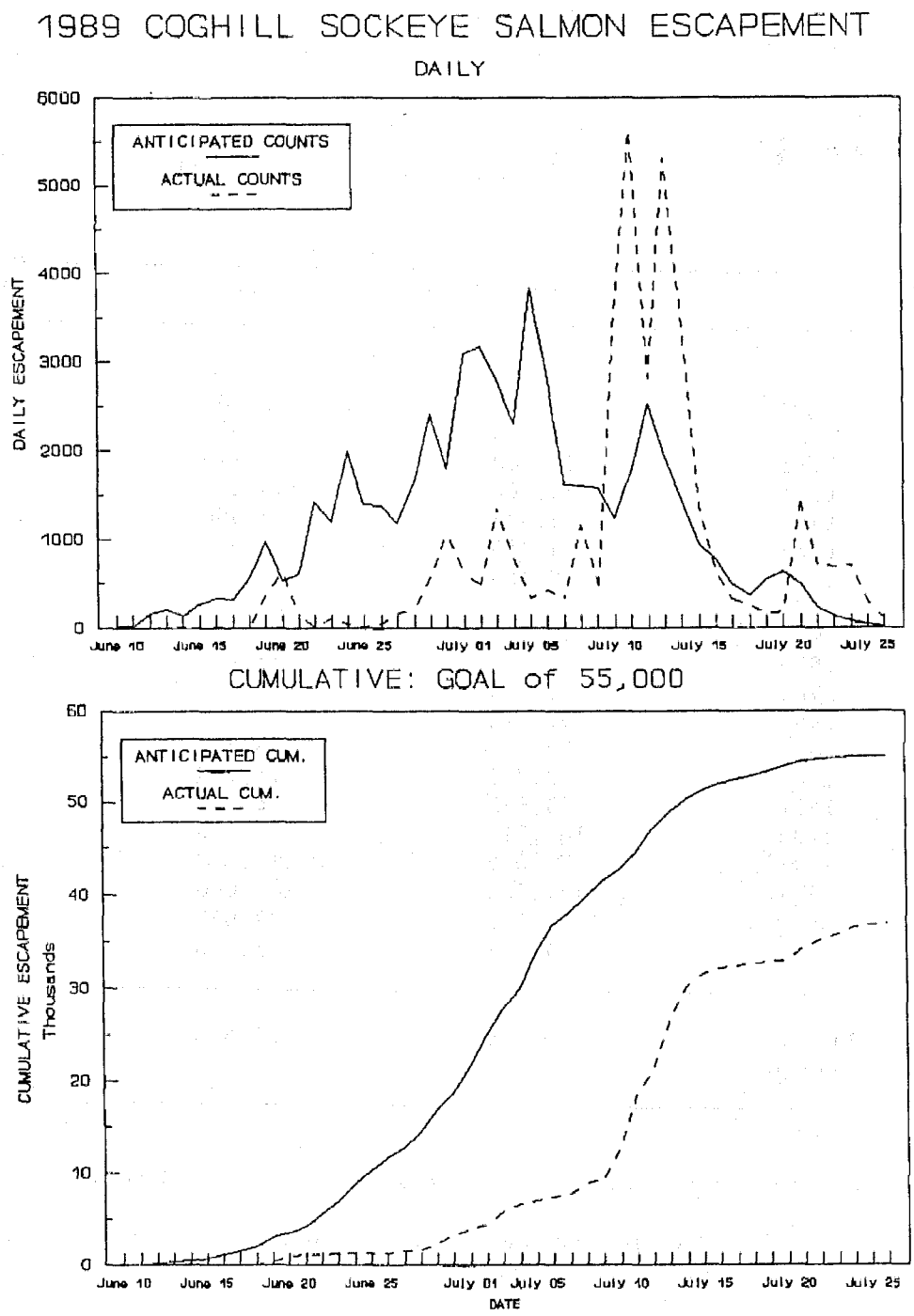
Appendix C.3. Commercial salmon catch by species in the Coghill District, Prince William Sound, 1975 - 1989.

Year	Catch by Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
Gear: Drift Gill Net						
1975	525	142,864	357	99,492	32,438	275,676
1976	102	54,334	72	53,219	89,170	196,897
1977	124	154,342	49	332,859	127,476	614,850
1978	469	193,899	64	49,527	110,679	354,638
1979	543	75,753	1,837	259,372	56,916	394,421
1980	107	56,957	1,053	355,684	68,071	481,872
1981	152	101,058	1,008	526,739	131,399	760,356
1982	127	929,965	213	181,925	252,077	1,364,307
1983	340	38,273	1,013	233,263	234,022	506,911
1984	396	94,956	563	897,496	264,878	1,258,289
1985	380	339,296	1,131	454,531	246,824	1,042,162
1986	617	381,565	789	68,887	218,971	670,829
1987	352	377,454	13,396	712,897	318,842	1,422,941
1988	501	82,294	41,307	1,314,061	346,388	1,784,551
1989	364	106,114	80,737	628,522	194,584	1,010,321
Ten Year Average (1979-88)	352	247,757	6,231	500,486	213,839	968,664
Gear: Purse Seine						
1975	246	4,985	30	145,155	2,561	152,977
1976	83	6,159	29	56,967	30,328	93,566
1977	40	16,436	50	230,215	37,102	283,843
1978	206	9,623	34	13,059	14,007	36,929
1979	692	3,047	55	38,560	5,709	48,063
1980	0	2,159	0	134,876	4,702	141,737
1981	1	1,997	0	34,083	23,378	59,459
1982	23	17,466	29	1,006,579	135,553	1,159,650
1983	0	175	16	41,048	8,958	50,197
1984	0	21	0	10,911	1,126	12,058
1985	85	10,757	112	69,242	19,330	99,526
1986	186	18,514	98	145,706	27,078	191,582
1987	58	38,899	1,956	865,671	59,252	965,836
1988	63	1,623	15,787	1,600,481	11,755	1,629,709
1989	61	2,030	39,484	3,296,965	124,639	3,463,179
Ten Year Average (1979-88)	111	9,466	1,805	394,716	29,684	435,782
Gear: Combined Gear						
1975	771	147,849	389	244,647	34,999	428,655
1976	185	60,493	101	110,186	119,498	290,463
1977	164	170,778	99	563,074	164,578	898,693
1978	675	203,522	98	62,586	124,686	391,567
1979	1,235	78,800	1,892	297,932	62,625	442,484
1980	107	59,116	1,053	490,560	72,773	623,609
1981	153	103,055	1,008	560,822	154,777	819,815
1982	150	947,431	242	1,188,504	387,630	2,523,957
1983	340	38,448	1,029	274,311	242,980	557,108
1984	396	94,977	563	908,407	266,004	1,270,347
1985	465	350,053	1,243	523,773	266,154	1,141,688
1986	803	400,079	887	214,593	246,049	862,411
1987	410	416,353	15,352	1,578,568	378,094	2,388,777
1988	564	83,917	57,094	2,914,542	358,143	3,414,260
1989	425	108,144	120,221	3,925,487	319,223	4,473,500
Ten Year Average (1979-88)	459	243,670	18,235	1,170,682	250,405	1,683,451

Appendix C.4. Daily salmon escapement at the Coghill River weir, Prince William Sound, 1989.

	Sockeye [a]		Pink		Chum		Chinook	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
06/09								
06/10								
06/11								
06/12	4	4						
06/13	0	4						
06/14	4	8						
06/15	1	9						
06/16	4	13						
06/17	2	15						
06/18	7	22						
06/19	361	383						
06/20	639	1,022	1	1				
06/21	141	1,163	2	3				
06/22	6	1,169		3				
06/23	119	1,288		3	4	4		
06/24	32	1,320		3	1	5		
06/25	13	1,333		3		5		
06/26	51	1,384		3	1	6		
06/27	168	1,552		3		6		
06/28	199	1,751		3		6		
06/29	571	2,321		3		6	1	1
06/30	1,082	3,404		3		6		1
07/01	602	4,006		3		6		1
07/02	501	4,507	4	7		6		1
07/03	1,346	5,853		7	2	8		1
07/04	761	6,614	2	9		8	1	2
07/05	339	6,953		9		8		2
07/06	422	7,375	10	19	1	9	1	3
07/07	339	7,714	27	46	1	10	0	3
07/08	1,168	8,882	44	90	3	13		3
07/09	486	9,368	29	119	1	14	2	5
07/10	3,683	13,051	372	491	16	30	1	6
07/11	5,783	18,834	1,692	2,183	18	48	4	10
07/12	2,900	21,734	757	2,940	11	59	1	11
07/13	5,534	27,268	3,272	6,212	19	78	0	11
07/14	3,580	30,848	3,847	10,059	41	119	3	14
07/15	1,388	32,236	1,345	11,404	37	156	4	18
07/16	641	32,877	458	11,862	13	169	1	19
07/17	325	33,202	768	12,630	7	176	1	20
07/18	246	33,448	1,571	14,201	8	184	1	21
07/19	155	33,603	1,777	15,978	16	200	0	21
07/20	182	33,785	1,075	17,053	23	223	0	21
07/21	1,432	35,217	1,477	18,530	27	250	3	24
07/22	726	35,943	3,089	21,619	35	285	1	25
07/23	692	36,635	3,825	25,444	47	332	1	26
07/24	713	37,348	5,526	30,970	49	381	1	27
07/25	308	37,656	2,868	33,838	32	413	5	32
07/26	95	37,751	1,195	35,033	13	426	2	34
Total	37,751		35,033		426		34	

a Sockeye count includes 870 jack salmon.



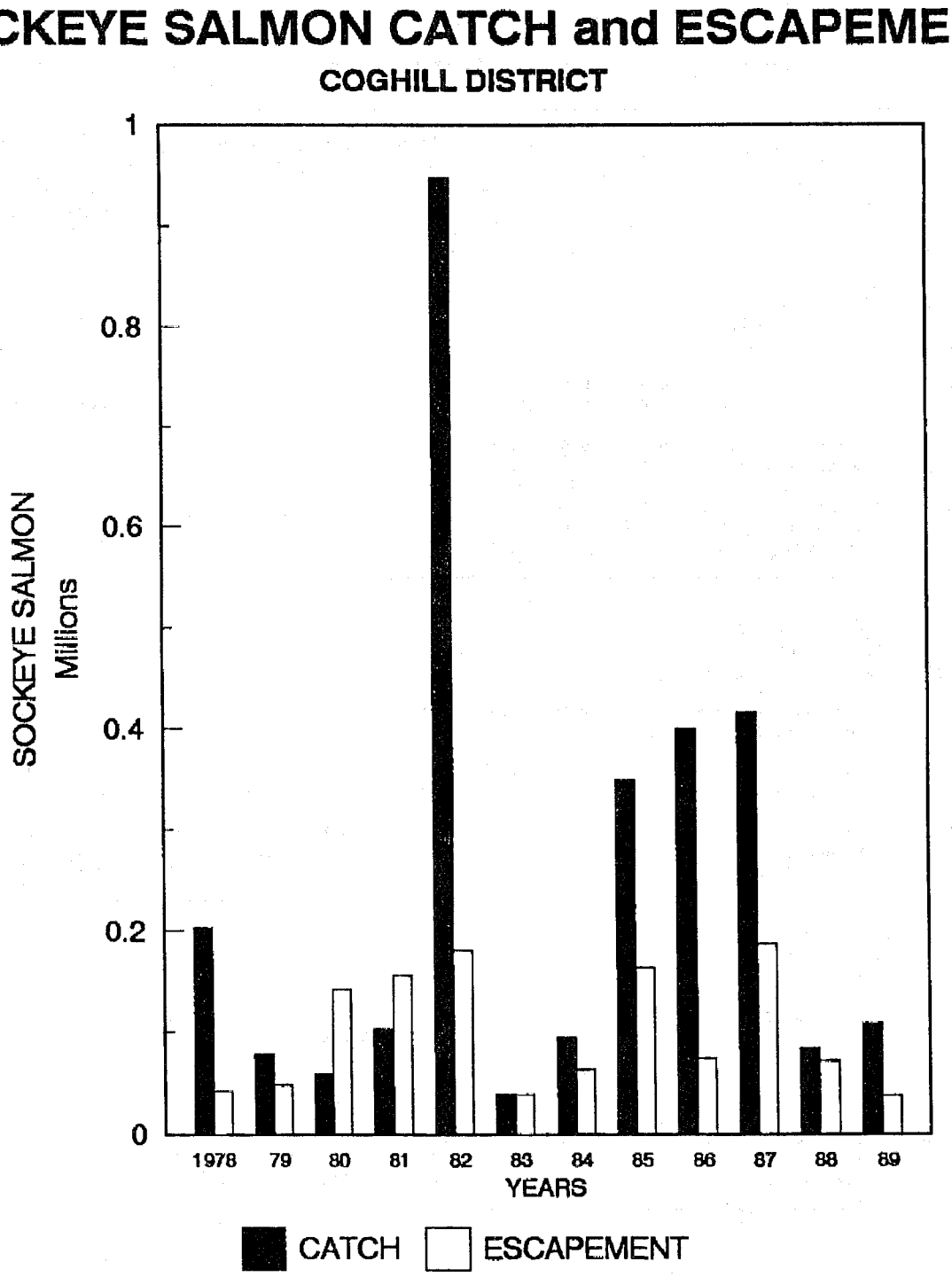
Appendix C.5. Anticipated and actual daily and cumulative sockeye salmon escapement at the Coghill weir, Prince William Sound, 1989.

Appendix C.6. Salmon escapement by species in the Coghill District, Prince William Sound, 1969 - 1989.

Year	Sockeye [a]	Pink [b]	Chum [b]
1969	81,000	72,000	34,600
1970	35,200	18,580	3,080
1971	15,000	500,000	10,200
1972	51,000	7,770	11,700
1973	55,000	543,150	73,600
1974	22,333	42,660	39,700
1975	34,855	570,950	7,100
1976	9,056	50,930	35,750
1977	31,562	338,750	41,640
1978	42,284	75,270	13,550
1979	48,281	66,230	13,150
1980	142,253	182,430	12,610
1981	156,112	444,700	30,740
1982	180,314	264,420	24,150
1983	38,783	311,200	62,800
1984	63,622	468,040	24,460
1985	163,311	299,350	23,290
1986	71,095	115,800	19,320
1987	187,263	147,060	24,510
1988	72,052	37,070	39,240
1989	37,751	45,510	35,783
20 Year Average	75,019	227,818	27,260

a Escapement count of sockeye salmon past the Coghill River weir.

b Pink and Chum escapements estimated for streams in district by aerial surveys. These are preliminary estimates.



Appendix C.7. Sockeye salmon catch and escapement in the Coghill District, Prince William Sound, 1978 - 1989.

Appendix C.8. Estimated age and sex composition of sockeye salmon harvested in the Coghill District commercial drift gill net fishery, and sockeye salmon escapement to Coghill Lake, Prince William Sound, 1989. Commercial samples include both drift gill net and purse seine catches.

		Brood Year and Age Group									
		1986	1985			1984		1983		1982	
		1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	2.4	Total
COMMERCIAL CATCH											
Stratum Dates:	6/19-9/15										
Sampling Dates:	6/24,7/04										
Sample Size:	1,127										
Female	Percent of Sample	0.0	0.0	0.6	0.0	47.2	0.3	0.3	1.8	0.0	50.2
	Number in Catch	0	0	609	0	51,027	342	324	1,961	0	54,263
Male	Percent of Sample	0.0	0.0	0.3	0.0	47.6	0.3	0.2	1.4	0.0	49.8
	Number in Catch	0	0	305	0	51,460	362	267	1,488	0	53,881
Total	Percent of Sample	0.0	0.0	0.8	0.0	94.8	0.7	0.5	3.2	0.0	100.0
	Number in Catch	0	0	914	0	102,487	703	592	3,449	0	108,144
	Standard Error	0	0	287	0	735	223	273	592	0	
ESCAPEMENT											
Strata Combined:	6/10-7/27										
Sampling Dates:	6/22-7/18										
Sample Size:	1,808										
Female	Percent of Sample	0.1	0.0	0.8	0.1	51.3	1.5	0.3	5.7	0.3	59.8
	Number in Catch	28	0	232	28	18,915	552	104	2,088	110	22,057
Male	Percent of Sample	0.0	0.1	1.5	0.4	31.1	2.2	0.2	4.4	0.4	40.2
	Number in Catch	0	28	539	142	11,461	815	77	1,625	138	14,824
Total	Percent of Sample	0.1	0.1	2.1	0.5	82.4	3.7	0.5	10.1	0.7	100.0
	Number in Catch	28	28	771	170	30,376	1,368	181	3,713	247	36,881
	Standard Error	28	28	120	67	352	166	68	282	78	
CATCH AND ESCAPEMENT COMBINED											
Sampling Dates:	6/22-7/18										
Sample Size:	2,935										
Female	Percent of Sample		0.0	0.6	0.0	48.2	0.6	0.3	2.8	0.1	52.6
	Number in Catch		0	841	28	69,942	894	429	4,049	110	76,320
Male	Percent of Sample		0.0	0.6	0.1	43.4	0.8	0.2	2.1	0.1	47.4
	Number in Catch		28	844	142	62,921	1,177	344	3,113	138	68,705
Total	Percent of Sample		0.0	1.2	0.1	91.6	1.4	0.5	4.9	0.2	100.0
	Number in Catch		28	1,684	170	132,863	2,071	773	7,162	247	145,025
	Standard Error		28	311	67	815	278	281	655	78	0

Appendix C.9. Commercial salmon harvest by period in the Unakwik District drift gill net and purse seine fisheries, Prince William Sound, 1989. The periods listed are for those that registered active fishing participation. For a listing of all fishing periods see Appendix C.12.[a]

Period	Date	Hours	Permits	Chinook Numbers	Chinook Pounds	Sockeye Number	Sockeye Pounds	Coho Number	Coho Pounds	Pink Number	Pink Pounds	Chum Number	Chum Pounds
Gear: Drift Gill Net													
01	6/19-21	60	8	20	332	7,212	53,779	0	0	0	0	64	704
02	6/26-28	60	18	9	182	10,785	77,240	0	0	2	9	205	2,076
03	7/03	12	66	1	12	3,370	22,692	7	57	29,951	111,519	67	603
04	8/10	12	4	0	0	13	81	17	135	1,526	5,609	37	253
05	8/14	12	1	0	0	0	0	0	0	79	300	0	0
06	8/16	12	47	1	15	32	203	3	28	10,262	36,145	31	242
Total			98	31	541	21,412	153,995	27	220	41,820	153,582	404	3,878
Average Weight					17.45		7.19		8.15		3.67		9.60

a Purse seine fishery did not occur in 1989.

Appendix C.10. Commercial salmon catch by species in the Unakwik District, Prince William Sound, 1975 - 1989.

	Catch by Species					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total
DRIFT GILL NET						
1975	4	11,922	0	84	70	12,080
1976	4	8,421	0	2,744	331	11,500
1977	3	7,912	2	257	141	8,315
1978	24	9,116	0	2,082	597	11,819
1979	11	9,250	9	2,359	289	11,918
1980	0	1,547	6	4,815	727	7,095
1981	0	2,445	0	4,152	1,330	7,927
1982	1	48,947	0	335	598	49,881
1983	3	13,215	0	1,515	1,426	16,159
1984	2	18,522	0	27,742	7,125	53,391
1985	26	27,532	22	9,191	3,942	40,713
1986	5	25,759	1	1,973	2,463	30,201
1987	2	5,894	1	4,871	1,356	12,124
1988	15	8,589	0	281	1,504	10,389
1989	31	21,412	27	41,820	404	63,694
Ten Year Average (1979-88)	7	16,170	4	5,723	2,076	23,980
PURSE SEINE						
1975 [a]						
1976	0	7	0	8,526	225	8,758
1977 [a]						0
1978	3	268	5	55,115	5,025	60,416
1979 [a]						
1980	0	6	0	9,113	355	9,474
1981	0	108	0	71,624	17,650	89,382
1982	0	2	4	89,137	517	89,660
1983	0	6	0	3,344	716	4,066
1984 [a]						
1985	0	138	0	28,210	4,123	32,471
1986	0	76	0	4,718	4,675	9,469
1987	0	146	0	187,752	6,549	194,447
1988	0	667	7	57,844	23,860	82,378
1989 [a]						
Ten Year Average (1979-88)	0	144	1	56,468	7,306	63,918
COMBINED GEARS						
1975	4	11,922	0	84	70	12,080
1976	4	8,428	0	11,270	556	20,258
1977	3	7,912	2	257	141	8,315
1978	27	9,384	5	57,197	5,622	72,235
1979	11	9,250	9	2,359	289	11,918
1980	0	1,553	6	13,928	1,082	16,569
1981	0	2,553	0	75,776	18,980	97,309
1982	1	48,949	4	89,472	1,115	139,541
1983	3	13,221	0	4,859	2,142	20,225
1984	2	18,522	0	27,742	7,125	53,391
1985	26	27,670	22	37,401	8,065	73,184
1986	5	25,835	1	6,691	7,138	39,670
1987	2	6,040	1	192,623	7,905	206,571
1988	15	9,256	7	58,125	25,364	92,767
1989	31	21412	27	41820	404	63694
Ten Year Average (1979-88)	7	16,285	5	50,898	7,921	75,115

a Fishing was closed.

Appendix C.11. Estimated age and sex composition of sockeye salmon harvested in the Unakwik District commercial drift gill net fishery, 1989.

		Brood Year and Age Group						
		1985	1984		1983		1982	
		1.2	1.3	2.2	1.4	2.3	2.4	Total
Stratum Dates:	6/19-8/16							
Sampling Dates:	6/29							
Sample Size:	427							
Female	Percent of Sample	0.5	50.1	0.5	0.7	4.2	0.0	56.0
	Number in Catch	100	10,731	100	150	903	0	11,985
Male	Percent of Sample	0.2	40.5	0.5	0.0	2.1	0.2	43.6
	Number in Catch	50	8,675	100	0	451	50	9,327
Total	Percent of Sample	0.7	91.1	0.9	0.7	6.3	0.2	100.0
	Number in Catch	150	19,506	201	150	1,354	50	21,412
	Standard Error	87	295	100	87	252	50	

Appendix C.12. Summary of periods, dates, hours fished, and emergency orders issued for the commercial salmon fisheries in the Coghill and Unakwik districts, Prince William Sound, 1989.

Unakwik (229)			Coghill (223)			
Periods	Dates	Hours Fished	Periods	Dates	Hours Fished	Emergency Orders Issued
1	6/19 - 6/21	60	1	6/19 - 6/21	60	2-F-E-15-89[a]
2	6/26 - 6/28	60	2	6/26 - 6/28	60	2-F-E-18-89[b]
3	7/03	12	3	7/03	12	2-F-E-20-89[b]
				7/26 - 7/29	76	2-F-E-27-89[c]
						2-F-E-30-89
			4	7/27 - 7/28	36	2-F-E-28-89[d]
4	8/10	12				2-F-E-34-89[e]
5	8/14	12	5	8/14	12	2-F-E-37-89
6	8/16	12				2-F-E-38-89[f]
7	8/18	12	6	8/18	12	2-F-E-39-89[g]
8	8/21	12	7	8/21	12	2-F-E-40-89[g]
9	8/22	12	8	8/22	12	2-F-E-41-89[h]
10	8/23	12	9	8/23	12	2-F-E-44-89[i]
11	8/24	12	10	8/24	12	2-F-E-45-89[h]
			11	8/26	11	2-F-E-47-89[j]
			12	8/27	11	2-F-E-48-89[k]
						2-F-E-49-89
			13	8/28	11	2-F-E-50-89[j]
			14	8/29	11	2-F-E-51-89[j]
			15 - 41	8/30 - 9/30	375	2-F-E-52-89[l]
						2-F-E-55-89

a The season was officially open beginning 8:00 A.M. on Monday, June 19 with a 60 hour period in Coghill and Unakwik. The Esther subdistrict and the Coghill District south of a line from Pt. Pigot to Esther Rocks remains closed.

b The Esther Subdistrict and all waters of the Coghill District south of a line extending from Esther Rocks to Point Pigot will remain closed.

c Only the Esther Subdistrict and the terminal harvest area of WNH (Lake and Quillion bays) will be open.

d A 36 hour period from 8:00 a.m. Thursday to 8:00 p.m. Friday in the Esther Subdistrict and the waters south of a line from Esther Rocks to Point Pigot.

e A 12 hour period from 9 a.m. Thursday to 9:00 p.m. in the waters of Unakwik Inlet.

f A 12 hour period from 9:00 a.m. to 9:00 p.m. for the Unakwik District.

g A 12 hour period from 9:00 a.m. to 9:00 p.m. for the entire Unakwik and Coghill District, including Lake and Quillion bays.

h A 12 hour period from 9:00 a.m. to 9:00 p.m. in the Esther Subdistrict and the waters of Wells Passage south of a line from Esther Rocks to Point Pigot, and the Unakwik District

i A 12 hour period from 9:00 a.m. to 9:00 p.m. in the Esther Subdistrict and the waters of Wells Passage south of a line from Esther Rocks to Point Pigot, and the Unakwik District. Esther and Quillion bays are closed.

j A 11 hour period from 10:00 a.m. to 9:00 p.m. in the Esther Subdistrict.

k That portion of the Esther Subdistrict south of a line extending from the district marker sign on the point west of Culross Light to Egg Rocks, to the marker on the west island of the Bald Head Chris Islands, will be open for 11 hours from 10:00 a.m. to 9:00 p.m.

l The Esther Subdistrict is open to 12 hours per day fishing from 9:00 a.m. to 9:00 p.m., August 30 to September 30. The season closed at 12 noon, September 30.

APPENDIX D

ESHAMY DISTRICT

Appendix D.1. Commercial salmon catch by species in the Eshamy District, Prince William Sound, 1977 - 1989.

Year [a]	Catch by Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
DRIFT GILL NET						
1977	22	16,916	49	63,036	8,344	88,367
1980	0	684	25	3,235	130	4,074
1983	1	924	8	162,541	3,427	166,901
1984	7	23,490	282	247,326	15,451	286,556
1985	1	667	0	24,899	1,021	26,588
1986	0	4	1	938	65	1,008
1987	2	642	3	3,225	7,060	10,932
1988	94	50,868	794	348,873	206,060	606,689
1989 [b]						
Ten Year Average (1979-88)	15	11,040	159	113,005	33,316	157,535
SET GILL NET						
1977	9	9,889	2	24,743	4,218	38,861
1980	0	2,000	38	2,471	134	4,643
1983	1	1,328	10	167,942	4,463	173,744
1984	5	23,226	98	278,176	3,000	304,505
1985	1	3,439	74	33,284	1,295	38,093
1986	9	1,043	86	42,123	5,764	49,025
1987	31	5,387	336	86,677	45,099	137,530
1988	100	18,321	283	180,456	93,577	292,737
1989 [b]						
Ten Year Average (1979-88)	21	7,821	132	113,018	21,905	142,897
COMBINED GEAR						
1977	31	26,805	51	87,779	12,562	127,228
1980	0	2,684	63	5,706	264	8,717
1983	2	2,252	18	330,483	7,890	340,645
1984	12	46,716	380	525,502	18,451	591,061
1985	2	4,106	74	58,183	2,316	64,681
1986	9	1,047	87	43,061	5,829	50,033
1987	33	6,029	339	89,902	52,159	148,462
1988	194	69,189	1,077	529,329	299,637	899,426
1989 [b]						
Ten Year Average (1979-88)	36	18,860	291	226,024	55,221	300,432

a Fishing was closed for years 1975, 1976, 1978, 1979, 1981, and 1982.

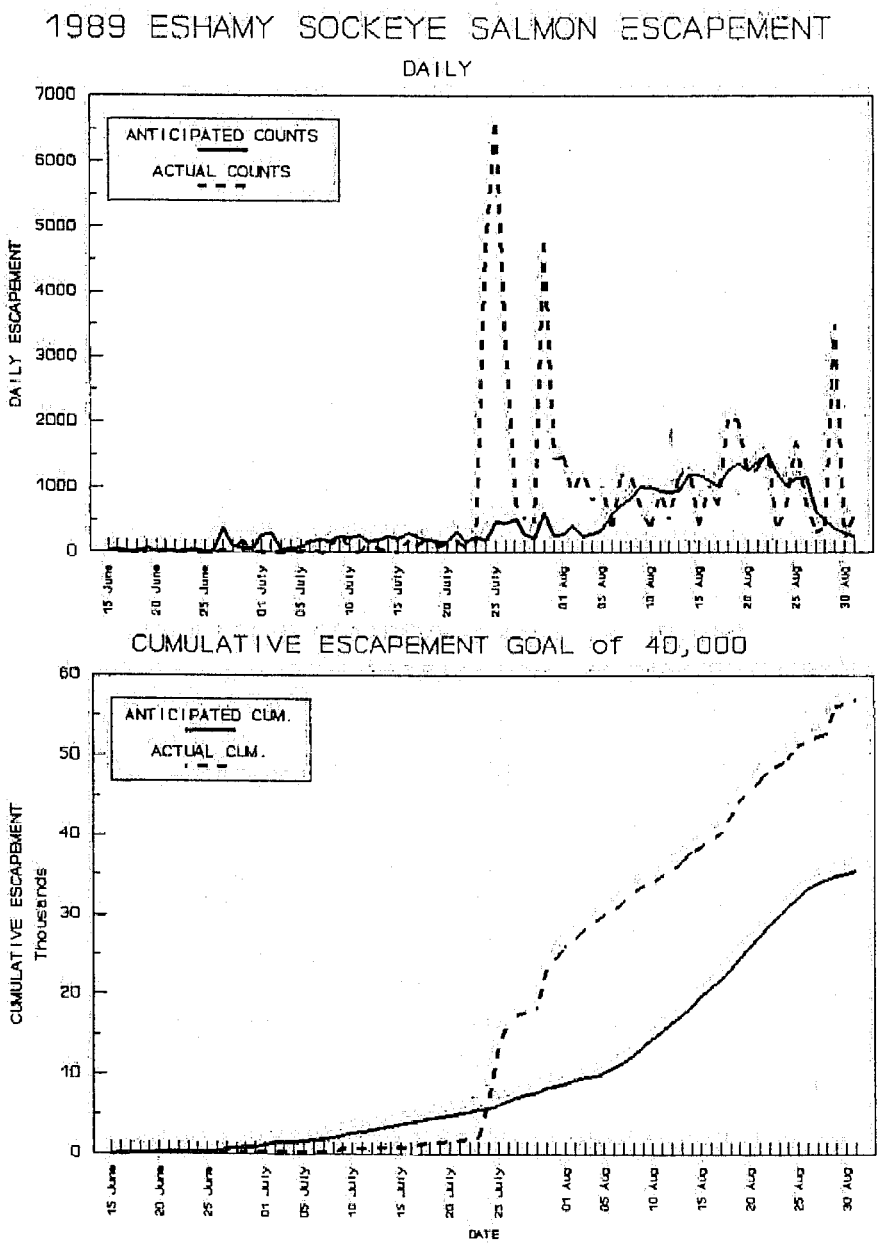
b Closed due to oil contamination on beaches.

Appendix D.2. Daily salmon escapement at the Eshamy Lake weir, Prince William Sound, 1990.

	Sockeye		Sockeye Jacks		Pink		Chum		Chinook	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
06/15										
06/16										
06/17										
06/18	23	23								
06/19	2	25								
06/20	8	33								
06/21		33								
06/22	1	34								
06/23	1	35								
06/24	2	37								
06/25		37								
06/26		37								
06/27	25	62								
06/28	22	84								
06/29	185	269								
06/30	9	278								
07/01		278								
07/02		278								
07/03		278								
07/04		278								
07/05		278								
07/06	50	328						2		2
07/07	3	331								2
07/08		331								2
07/09	369	700	3	3						2
07/10	7	707		3						2
07/11	11	718		3						2
07/12	127	845		3				2		4
07/13	63	908		3				3		7
07/14	3	911		3						7
07/15		911		3						7
07/16	173	1,084	2	5				4		11
07/17	86	1,170	2	7						11
07/18	338	1,508	3	10				6		17
07/19	102	1,610		10				2		19
07/20	149	1,759	1	11				11		30
07/21	190	1,949		11				38		68
07/22	79	2,028	1	12				18		86
07/23	162	2,190	1	13	2	2		15		101
07/24	4,672	6,862	8	21	6	8		32		133
07/25	6,657	13,519	3	24	65	73		23		156
07/26	3,179	16,698		24	23	96		5		161
07/27	739	17,437	3	27	4	100		5		166
07/28	557	17,994		27	6	106		5		171
07/29	470	18,464		27	3	109		3		174
07/30	4,793	23,257	7	34	76	185		14		188
07/31	1,445	24,702	8	42	16	201		3		191
08/01	1,461	26,163	13	55	9	210		3		194
08/02	883	27,046		55	3	213				194
08/03	1,299	28,345	5	60	12	225		4		198
08/04	808	29,153	4	64	31	256				198

-continued-

	Sockeye		Sockeye Jacks		Pink		Chum		Chinook	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
08/05	1,026	30,179	2	66	16	272	1	199		
08/06	352	30,531		66	2	274		199		
08/07	1,207	31,738		66	26	300	2	201		
08/08	1,213	32,951	3	69	58	358		201	1	1
08/09	708	33,659	3	72	42	400		201		1
08/10	399	34,058		72	64	464		201		1
08/11	952	35,010	5	77	78	542		201		1
08/12	521	35,531	4	81	23	565		201		1
08/13	1,189	36,720		81	124	689		201		1
08/14	1,317	38,037	6	87	122	811		201		1
08/15	443	38,480	5	92	96	907		201		1
08/16	1,037	39,517	3	95	140	1,047	1	202		1
08/17	740	40,257	3	98	147	1,194		202		1
08/18	2,036	42,293	2	100	874	2,068		202		1
08/19	2,040	44,333	10	110	560	2,628		202		1
08/20	1,200	45,533	6	116	272	2,900		202		1
08/21	1,299	46,832	2	118	620	3,520		202		1
08/22	1,609	48,441		118	712	4,232		202		1
08/23	359	48,800	3	121	131	4,363		202		1
08/24	741	49,541	5	126	269	4,632		202		1
08/25	1,706	51,247		126	666	5,298		202		1
08/26	759	52,006		126	188	5,486	1	203		1
08/27	315	52,321		126	77	5,563	3	206		1
08/28	385	52,706		126	58	5,621	1	207		1
08/29	3,500	56,206		126	450	6,071		207		1
08/30	254	56,460		126	68	6,139	1	208		1
08/31	597	57,057		126	144	6,283	2	210		1
09/01	238	57,295		126	58	6,341		210		1
09/02	150	57,445		126	54	6,395		210		1
09/03	58	57,503		126	136	6,531		210		1
09/04	122	57,625		126	297	6,828		210		1
09/05	99	57,724		126	233	7,061		210		1
09/06	46	57,770		126	124	7,185		210		1
09/07	81	57,851		126	97	7,282		210		1
09/08	150	58,001		126	500	7,782		210		1
Totals	58,001		126		7,782		210		1	

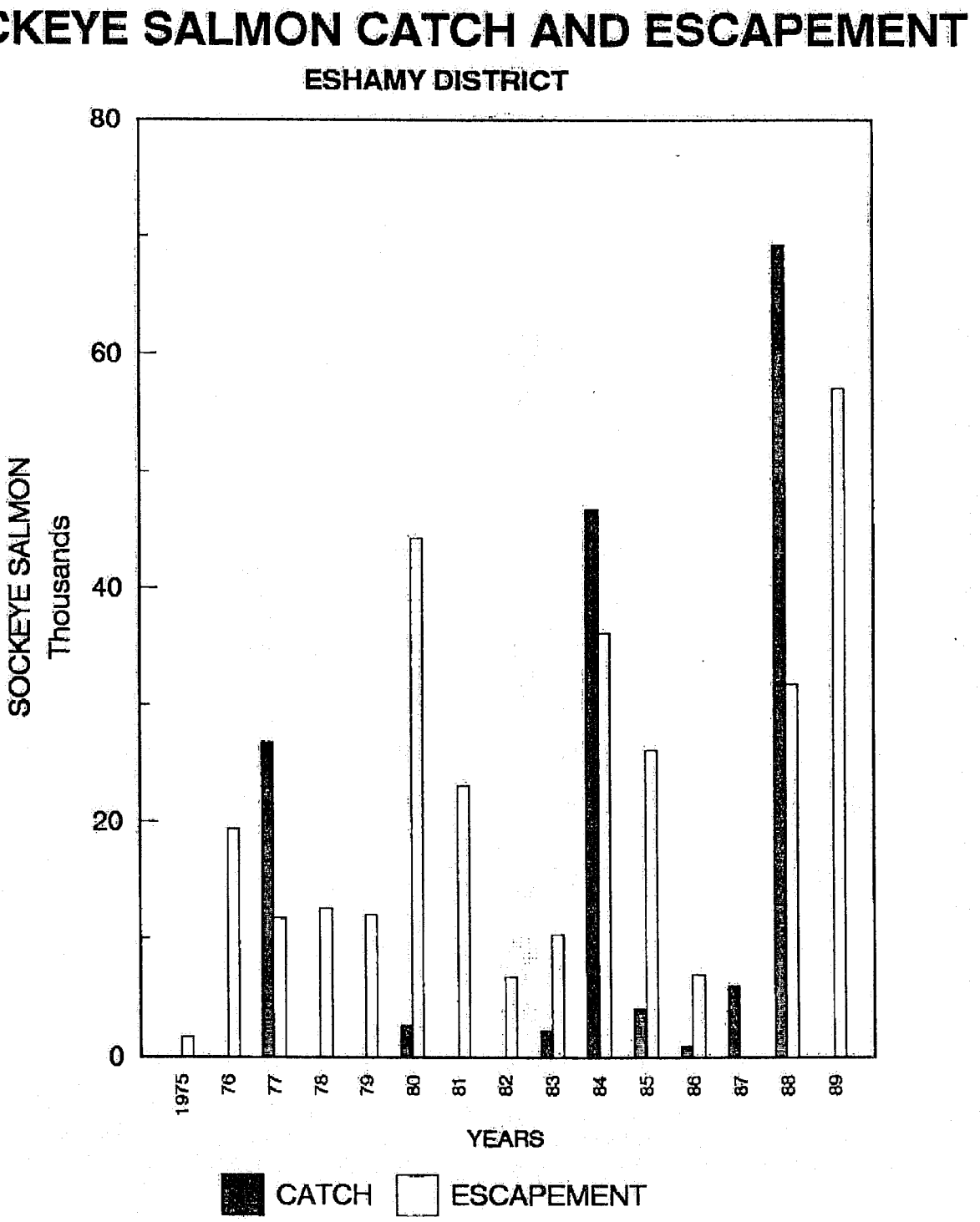


Appendix D.3. Anticipated and actual daily and cumulative sockeye salmon escapement at the Eschamy weir, Prince William Sound, 1989.

Appendix D.4. Salmon escapement by species at the Eshamy weir, Prince William Sound, 1967 - 1989.

Year	Escapement by Species [a]					Total
	Chinook	Sockeye	Coho	Pink	Chum	
1967	0	10,821	192	10,433	1	21,447
1968	1	68,048	450	919	1	69,419
1969	0	61,196	96	3,095	2	64,389
1970	0	11,460	25	387	0	11,872
1971	0	954 [b]	97	3,179	0	4,230
1972		28,683				28,683
1973	0	10,202	205	1,698	0	12,105
1974		633				633
1975		1,724				1,724
1976		19,367				19,367
1977	0	11,746	230	32,080	0	44,056
1978	0	12,580	20	552	0	13,152
1979	0	12,169	5	3,654	1	15,829
1980	5	44,263	128	963	2	45,361
1981	1	23,048 [c]	249	5,956	13	29,267
1982	0	6,782 [d]	79	1,056	79	7,996
1983	0	10,348	40	7,047	4	17,439
1984	2	36,121 [e]	881	3,970	0	40,974
1985	0	26,178	96	6,271	0	32,545
1986	2	6,949	55	1,004	31	8,041
1987 [f]						
1988	2	31,747	48	1,205	1	33,003
1989 [g]	1	57,106	0	6,283	210	63,600
20 Year Average	1	20,663	141	4,900	21	24,713

a Incidental passage of salmon other than sockeye were not recorded for each year.
b Probably inaccurate because of holes in weir. Actual escapement is estimated to be at least 3,000.
c Assuming the run was 90 percent complete, an additional 2,600 sockeye are estimated to have escaped following weir removal.
d An estimated 270 sockeye below the weir when pulled is included in the total count.
e An estimated 25 sockeye below the weir at removal are included in the total count.
f The Eshamy weir was not in operation during 1987.
g Total does not include 126 jacks counted through.



Appendix D.5. Sockeye salmon catch and escapement, Eshamy District, Prince William Sound, 1975 - 1989.

Appendix D.6. Estimated age and sex composition of the sockeye salmon escapement through the weir at the head of Eshamy Lagoon, 1989.

		Brood Year and Age Group					
		1986	1985	1984		1983	
		1.1	1.2	1.3	2.2	2.3	Total
Escapement Dates:	6/18-9/08 [a]						
Sampling Dates:	7/13-8/29						
Sample Size:	1,706						
Female	Percent of Sample	0.5	44.3	3.7	6.9	0.6	55.9
	Number in Catch	278	25,678	2,143	3,980	324	32,403
Male	Percent of Sample	0.5	34.5	2.8	6.0	0.4	44.1
	Number in Catch	297	20,025	1,600	3,451	224	25,598
Total	Percent of Sample	1.0	78.8	6.5	12.8	0.9	100.0
	Number in Catch	575	45,703	3,743	7,431	549	58,001
	Standard Error	101	619	382	517	157	

a Counts from 6/18-7/05 are from a smolt weir operation by FRED Division.

APPENDIX E

PRINCE WILLIAM SOUND

PURSE SEINE DISTRICT

Appendix E.1. Commercial purse seine catch of salmon by species, by day, Prince William Sound, 1989. Includes the common property commercial catch of salmon from all districts open to purse seines: Eastern, Northern, Coghill, Northwestern, Southwestern and Southeastern districts. Districts referenced as open may have been partially closed. See appendices C.12. and E.16. for more detailed closure information.

Catch Date	Hours	Permits	Chinook		Sockeye		Coho		Pink		Chum	
			Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
06/28 [a]	12	155	247	4,253	1,278	8,737	17	118	461,034	1,592,139	102,042	909,897
07/05 [a]	12	188	146	2,358	1,321	8,541	88	553	472,995	1,636,712	32,251	295,808
07/12 [b]	12	204	126	2,071	948	6,163	35	252	1,369,779	4,707,348	20,006	174,497
07/15 [c]	6	146	20	293	129	866	7	26	392,143	1,375,860	553	4,960
07/26 [d]	16	158	17	251	632	4,117	145	1,073	476,683	1,687,301	12,828	109,725
07/27 [e]	24	170	37	340	1,541	10,777	389	2,893	666,442	2,358,527	32,982	277,753
07/28	24	173	31	386	1,775	11,323	587	4,587	662,306	2,362,693	25,907	227,252
07/29 [f]	24	90	3	32	290	1,790	82	569	148,580	539,717	4,076	35,573
07/30 [g]	13	83	3	47	158	1,006	15	118	120,093	422,611	1,452	12,659
08/10 [h]	15	205	6	59	218	1,373	193	1,410	2,196,678	7,600,433	4,622	38,597
08/11	21	162	14	201	93	568	2,818	23,470	345,835	1,197,288	94,761	825,175
08/14	12	212	6	45	314	2,002	1,918	15,015	2,353,302	8,201,182	73,651	619,106
08/16	12	204	9	89	238	1,491	3,190	25,631	667,955	2,306,643	73,578	630,962
08/18	12	212	7	58	290	1,772	10,431	83,289	931,463	3,211,937	61,731	540,058
08/21 [i]	12	174	1	9	147	921	15,321	116,139	834,620	2,910,038	50,415	435,108
08/22	12	133	4	45	160	1,019	6,127	49,459	406,510	1,374,406	9,462	78,743
08/23	12	120	0	0	114	726	3,039	24,068	308,543	1,069,357	5,964	50,577
08/24	12	97	0	0	193	1,112	4,177	32,038	149,249	516,383	3,488	28,333
08/26	11	53	0	0	8	58	12,481	99,366	73,921	250,439	43,199	380,649
08/27	11	25	1	5	2	10	2,171	19,457	29,215	102,966	564	4,491
08/28	11	28	1	5	2	11	855	6,004	12,449	42,872	6,571	57,388
08/29	11	11	0	0	0	0	837	6,193	5,114	17,918	6,990	62,878
08/30 [j]	12	-	0	0	0	0	1,056	10,564	7,286	25,500	43	365
08/31	12	-	0	0	0	0	1,033	10,323	6,018	21,062	57	478
09/01	12	-	0	0	0	0	130	1,290	907	3,176	20	170
09/02	12	-	0	0	0	0	865	8,650	5,762	20,169	46	389
09/03	12	-	0	0	0	0	340	3,400	6,175	21,612	106	898
09/04	12	-	0	0	0	0	460	4,605	4,941	17,295	73	260
09/05	12	-	0	0	0	0	460	3,730	5,485	18,649	103	933
09/06	12	-	0	0	0	0	160	1,602	2,590	9,065	22	191
Total		243	679	10,547	9,851	64,383	69,428	555,892	13,125,073	45,621,298	667,563	5,803,873
Average Weight				15.53		6.54		8.01		3.48		8.69

a The Eastern and Northern districts open for 12 hours. Valdez Arm closed north of latitude of Rockey Point except Galena, Jack and Sawmill bays.

b The Eastern and Northern districts open for 12 hours on July 12. All waters of Valdez Port and Arm open except the Solomon Gulch SHA.

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c Solomon Gulch SHA open for 6 hours.

d The Esther Subdistrict and the Cannery Creek Hatchery areas open to continuous fishing until further notice.

e The Southeastern, Coghill and portions of the Northern and Northwestern districts open for 36 hours from 8:00 a.m. July 27 until 8:00 p.m.

f The Esther Subdistrict closed until further notice, due to oil, effective 12:00 noon July 29.

g Cannery Creek Area 3 closed until further notice effective 1:00 p.m. July 30, due to reports of oil encounters by fishing boats.

h Field announced openings were conducted in the Esther Subdistrict, Unakwik Inlet and adjacent waters. Boundaries varied dependent upon occurance of oil sheens in the area.

i Field announced openings continued on a daily basis in the Esther Subdistrict, Unakwik Inlet and adjacent waters.

j Scheduled 12 hour openings in the Esther Subdistrict only for balance of season.

Appendix E.2. Commercial salmon harvest by all gear types, by species, Prince William Sound, 1971 - 1989. [a]

Year	Catch by Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
1971	3,551	88,368	30,551	7,310,984	574,265	8,007,699
1972 [b]	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 [b]	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	1,042	222,083	1,495	2,913,721	485,147	3,623,488
1979	2,015	150,040	6,843	15,607,620	326,414	16,092,932
1980	189	189,816	2,952	14,157,057	482,016	14,832,030
1981	404	251,222	4,383	20,524,470	1,878,716	22,659,195
1982	255	1,055,099	24,362	20,396,222	1,335,368	22,811,306
1983	1,048	92,111	10,496	14,038,796	1,041,309	15,183,760
1984	489	311,955	12,420	22,086,806	1,201,842	23,613,512
1985	1,104	493,278	19,753	25,056,663	1,280,093	26,850,891
1986	1,330	488,715	12,277	11,407,271	1,683,049	13,592,642
1987	874	540,109	47,751	29,198,507	1,904,494	31,691,735
1988	1,037	183,572	75,709	11,817,323	1,832,114	13,846,584
1989	1,113	140,090	203,574	21,860,582	995,962	23,201,321
Ten Year Average (1979-88)	875	375,592	21,695	18,429,074	1,296,542	20,117,459

[a] Includes purse seine, drift gill net and set gill net catches from all Prince William Sound fishing districts; Eastern, Northern, Unakwik, Coghill, Northwestern, Eshamy, Southwestern, Montague and Southeastern. Also includes hatchery sales salmon harvest to offset operational costs for hatcheries, confiscated salmon and educational special use permits.

[b] General purse seine season closed.

Appendix E.3. Commercial pink salmon harvest for all gear types, by district, Prince William Sound, 1969–1989. Includes purse seine, drift gill net and set gill net catches from all Prince William Sound districts; Unakwik catches are included in the Northern District. Does not include hatchery cost recovery harvests.

Year	District								
	Eastern	Northern	Coghill	Northwestern	Eshamy	Southwestern	Montague	Southeastern	Total
1969	963,583	262,403	43,134	268,240	0	2,565,737		696,182	4,799,279
1970	358,326	308,797	100,338	371,528	0	1,518,700		90,438	2,748,127
1971 [a]	1,974,605	666,308	323,841	163,401		3,901,939		276,605	7,306,699
1972 [b]			9,408		54,781				64,189
1973	327,453	183,467	95,793	127,197	0	407,388	146,778	657,429	1,945,505
1974 [b]			163,328		285,441				448,769
1975	712,328	171,657	303,597	420,891		1,673,887	118,467	875,456	4,276,283
1976	1,380,943	384,267	217,696	207,190		589,458		82,366	2,861,920
1977	1,673,044	147,964	230,215	208,727	0	930,469	77,104	824,374	4,091,897
1978	1,516,076	933,013	13,059					216,696	2,678,844
1979	4,500,032	115,886	38,560	59,423		5,111,073	1,347,413	4,160,925	15,333,312
1980	3,140,134	1,271,177	134,876	306,109	0	7,507,776	950	1,271,389	13,632,411
1981	4,797,583	1,194,621	34,155	46,874		10,371,220	278,879	3,221,268	19,944,600
1982	2,959,601	2,331,903	1,000,524	520,972	3,997	10,801,771	6,444	747,116	18,372,328
1983	2,430,063	1,021,345	273,131	714,522		5,957,068	158,241	1,482,013	12,036,383
1984	4,525,029	2,194,904	996,483	1,412,822	544,082	10,197,349	11,587	1,245,042	21,127,298
1985	6,715,143	1,002,872	523,773	527,132	58,183	10,843,752	1,448,809	2,733,562	23,853,226
1986	2,488,540	944,871	214,593	285,184	43,061	6,374,535		147,268	10,498,052
1987	6,954,549	2,419,611	1,578,568	750,877	89,902	13,341,940	111,011	955,988	26,212,446
1988	481,324	286,743	2,932,072	7,738	529,329	5,411,424		1,776	9,650,406
1989	3,151,096	6,464,090	3,925,487	181,565	0 [c]	0 [c]	0 [c]	73,177	13,795,415
10 year Average	3,900,200	1,278,393	772,674	463,165	181,222	8,591,791	420,417	1,596,635	17,066,046

a The Eshamy District was closed to fishing.

b The general purse seine district was closed to fishing.

c These districts were closed due to the Exxon Valdez oil spill.

Appendix E.4. Commercial catch and aerial escapement indices for pink and chum salmon by district, Prince William Sound, 1989.

PINK SALMON

District	Commercial Catch [a]	Desired Escapement Range	Escapement Index [b]	Min. Est. Total Run
Eastern	3,151,096	400,000 - 480,000	359,730	3,510,826
Northern/Unakwik	6,464,090	140,000 - 170,000	106,530	6,570,620
Coghill	3,925,487	125,000 - 175,000	45,510	3,970,997
Northwestern	181,565	104,000 - 172,000	68,540	250,105
Eshamy	0	9,000 - 12,000	19,470	19,470
Southwestern	0	69,000 - 115,000	180,610	180,610
Montague	0	106,000 - 128,000	181,760	181,760
Southeastern	73,177	225,000 - 270,000	315,000	388,177
Total	13,795,415	1,178,000 - 1,522,000	1,277,150	15,072,565

CHUM SALMON

District	Commercial Catch [a]	Desired Escapement Range	Escapement Index [b]	Min. Est. Total Run
Eastern	341,142	87,000 - 110,000	112,080	453,222
Northern/Unakwik	193,559	29,000 - 37,000	46,470	240,029
Coghill	319,223	49,000 - 61,000	22,680	341,903
Northwestern	7,862	3,000 - 4,000	27,430	35,292
Eshamy	0		320	320
Southwestern	0	3,000 - 4,000	11,690	11,690
Montague	0	11,000 - 14,000	0	0
Southeastern	765	20,000 - 25,000	22,640	23,405
Total	862,551	202,000 - 255,000	243,310	1,105,861

[a] Commercial catch does not include hatchery sales harvests.

[b] Based on weekly aerial survey counts of 209 index spawning streams in Prince William Sound. This does not represent the total spawning escapement but rather a comparable annual index.

Appendix E.5. Pink salmon harvests and escapement indices, including hatchery sales harvests and broodstock, Prince William Sound, 1965 - 1989. Historical data revised in 1989.

	PINK SALMON ESCAPEMENTS [a]									Hatchery		Common Property	
Year	Eastern	Northern	Coghill	Northwest	Eshamy	Southwest	Montague	Southeastern	Total	Sales	Brood	Catch [b]	Total Run [c]
1965	257,853	59,820	91,584	159,011	9,340	65,380	77,042	255,926	975,956			2,460,471	3,436,427
66	544,980	288,710	135,440	79,960	11,720	115,570	42,220	204,570	1,423,170			2,699,418	4,122,588
67	255,240	144,200	65,240	82,980	5,020	42,950	10,020	236,610	842,260			2,626,340	3,468,600
68	364,930	151,120	108,020	117,430	10,770	172,770	52,350	179,120	1,156,510			2,452,168	3,608,678
69	160,600	94,770	39,020	23,830	0	57,890	1,550	26,910	404,570			4,828,579	5,233,149
1970	387,090	125,360	95,170	82,660	7,610	66,790	73,880	140,660	979,220			2,809,996	3,789,216
71	352,800	126,210	62,160	14,320	1,710	79,140	296,730	179,480	1,112,550			7,310,964	8,423,514
72	344,470	83,900	30,960	39,020	1,100	29,530	33,140	79,060	641,180			54,783	695,963
73	309,040	69,660	493,780	2,910	0	52,320	119,520	177,780	1,225,010			2,056,878	3,281,888
74	256,880	206,750	56,940	163,930	6,240	160,980	11,750	94,650	958,120			448,773	1,406,893
1975	412,560	38,260	452,430	4,990	0	77,270	85,380	194,670	1,265,560		15,155	4,452,805	5,733,520
76	472,080	139,600	57,090	68,150	5,840	52,120	13,790	117,590	926,260		40,432	3,018,995	3,985,687
77	390,930	69,980	130,510	80,890	16,450	178,670	152,960	277,780	1,298,170		54,207	4,514,431	5,866,808
78	279,120	163,010	85,450	132,300	5,430	258,980	56,690	164,030	1,145,010	133,648	145,061	2,780,073	4,203,792
79	642,220	200,730	70,980	124,020	0	231,300	219,400	728,630	2,217,280	223,761	211,801	15,393,223	18,046,065
1980	535,960	189,140	214,930	159,260	13,100	133,470	118,400	307,680	1,671,940	346,928	270,745	13,434,024	15,723,637
81	599,340	243,170	106,450	51,210	3,990	93,630	255,420	359,870	1,713,080	707,037	379,178	19,286,542	22,085,837
82	573,070	332,560	368,380	174,290	15,080	195,950	132,380	482,860	2,274,570	1,355,315	563,431	18,858,647	23,051,963
83	481,950	168,410	310,330	196,630	12,610	161,290	230,200	601,680	2,163,100	765,924	458,513	13,309,461	16,696,998
84	1,209,740	593,310	429,450	452,370	16,860	345,760	191,810	792,560	4,031,860	402,825	358,806	21,683,076	26,476,567
1985	750,530	214,210	296,970	199,190	1,410	181,270	332,240	645,510	2,621,330	1,273,951	399,610	23,959,698	28,254,589
86	356,380	141,420	101,600	81,490	3,840	74,980	44,680	155,830	960,220	909,219	404,038	10,498,052	12,771,529
87	514,570	132,960	147,060	75,390	3,450	112,920	149,260	330,630	1,466,240	2,986,061	966,557	26,125,769	31,544,627
88	362,370	143,850	37,070	73,780	490	126,440	67,990	152,540	964,530	1,667,238	844,302	9,650,406	13,126,476
89	359,730	106,530	45,510	68,540	19,470	180,610	181,760	315,000	1,277,150	7,795,713	1,230,077	13,854,209	24,157,149
EVEN CYCLE AVG. (1966-88)													
AVG.	473,923	213,228	143,375	135,387	8,173	144,445	69,923	239,263	1,427,716	802,529	375,259	7,365,701	9,413,582
ODD CYCLE AVG. (1965-87)													
Avg.	422,105	128,378	177,848	83,378	5,650	116,511	162,422	333,114	1,429,404	2,292,075	464,387	10,783,028	13,556,090

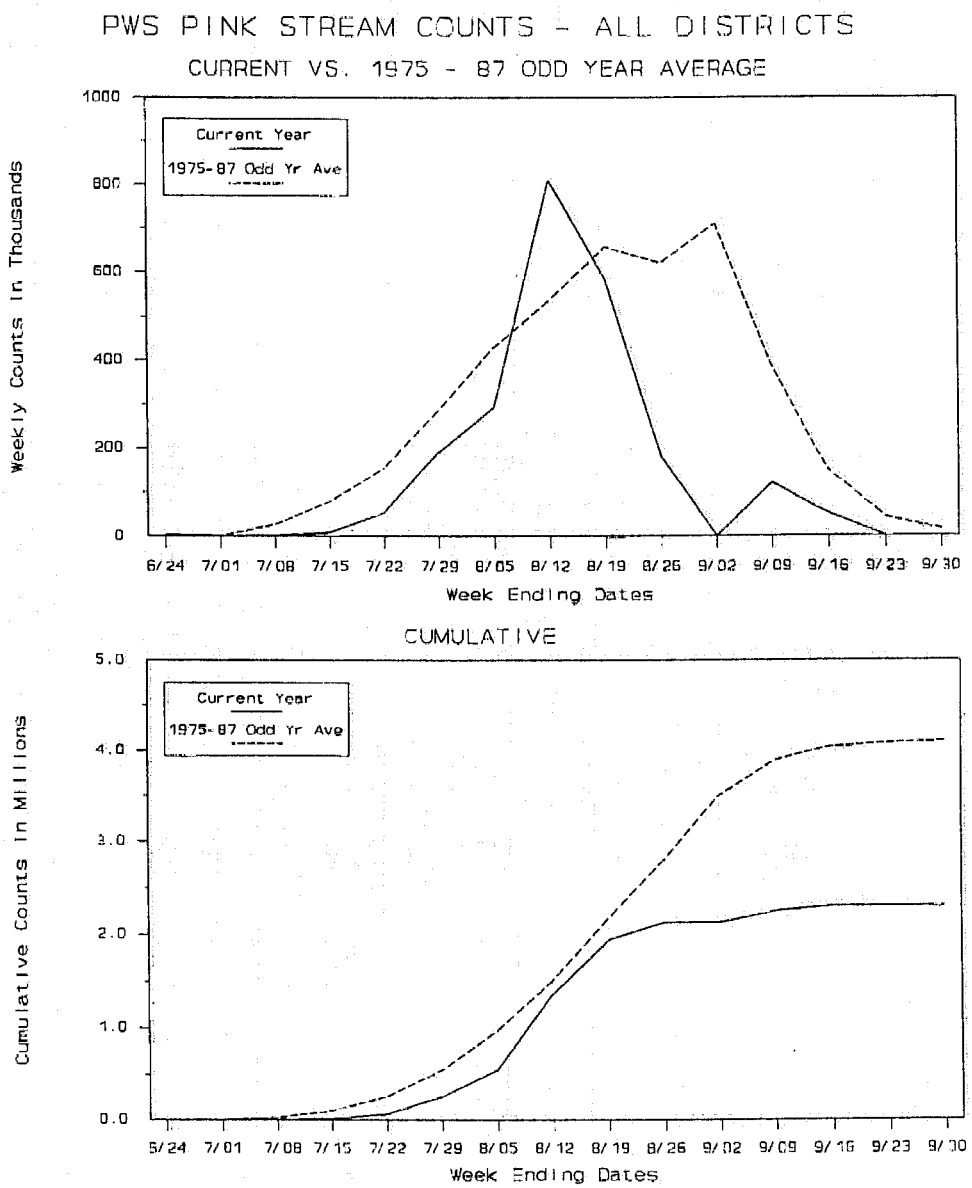
[a] Coghill and Northwestern escapement figures correspond to current district boundries.

[b] Includes the common property harvest of both wild and hatchery stocks. Does not include hatchery sales harvests.

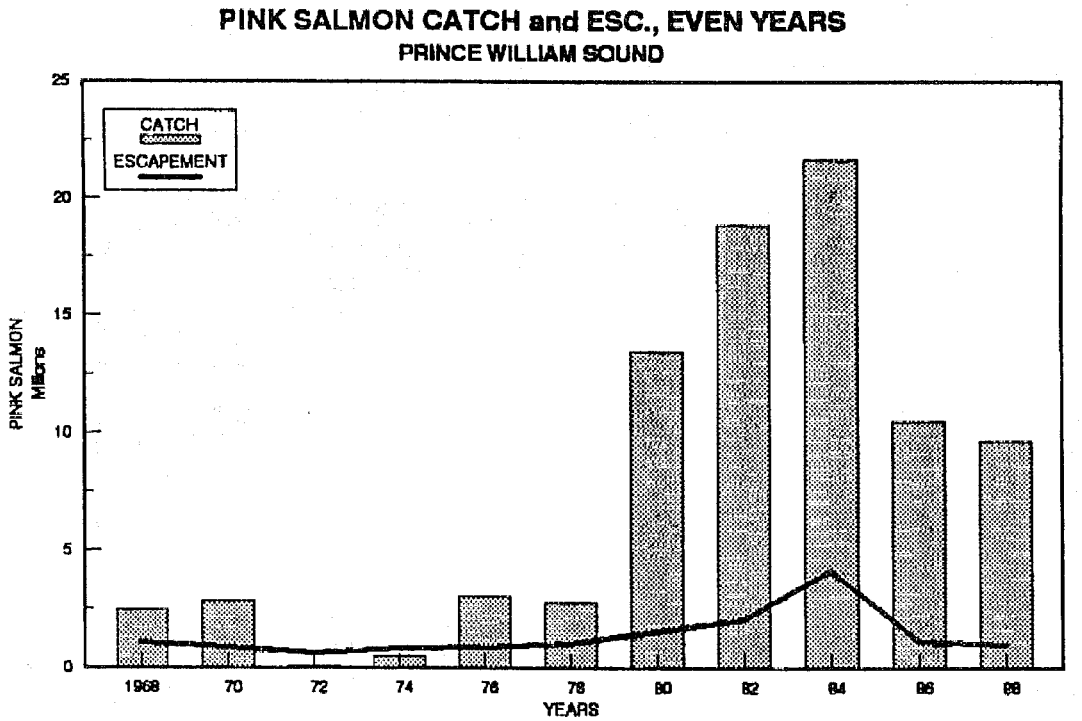
[c] Represents the sum of the commercial catch, hatchery sales and brood, plus the escapement index. Does not account for wild stock escapement into non-index streams.

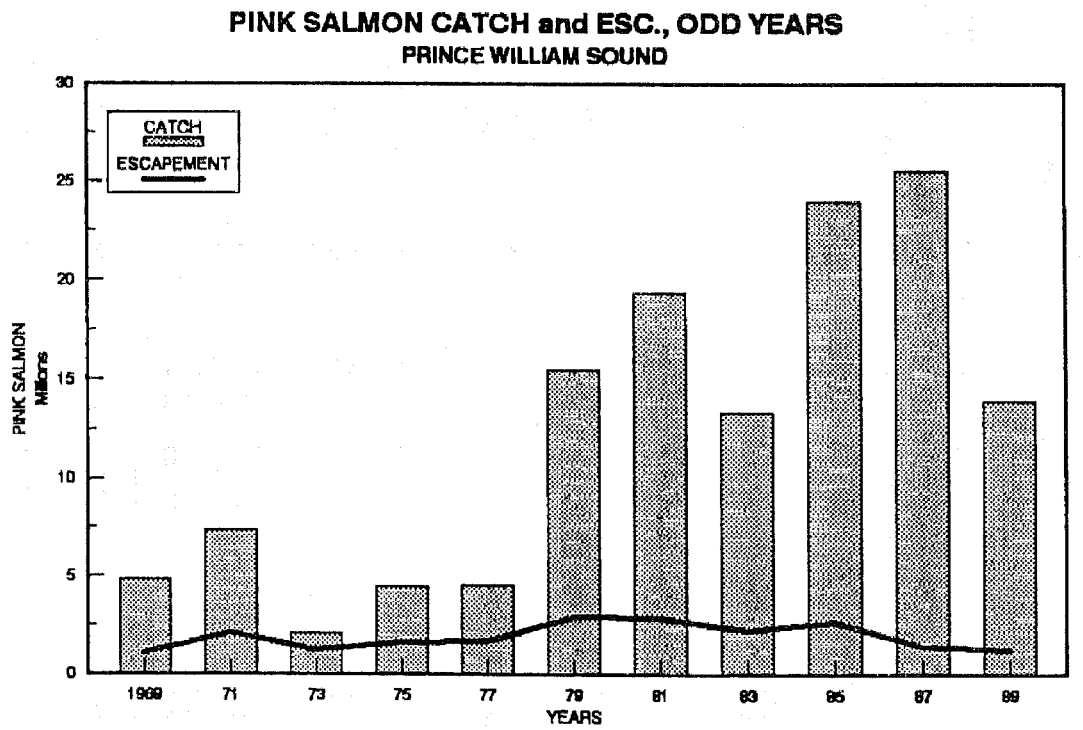
Appendix E.6. Weekly aerial estimates of pink salmon escapement by statistical area, Prince William Sound, 1989.

Survey Location	Subdistrict	Week Ending Date 6/24	7/01	7/08	7/15	7/22	7/29	8/05	8/12	8/19	8/26	9/02	9/09	9/16	9/23	9/30	TOTAL	ADJ.STREAM TOTAL
Orca Inlet	221-10	0	0	0	60	950	2,300	5,300	6,530	5,370	1,800	0	0	100	0	0	22,410	9,790
Simpson/Sheep	221-20	0	0	0	900	3,000	4,220	11,500	23,200	18,300	19,360	0	0	5,920	0	0	86,400	45,150
Gravina	221-30	0	0	100	700	650	13,170	38,700	50,300	52,300	46,100	0	0	7,940	0	0	209,960	106,900
Fidalgo	221-40	0	0	152	500	2,150	6,750	22,300	37,815	26,500	20,700	0	0	3,960	0	0	120,827	59,890
Valdez Arm	221-50	0	10	820	260	1,700	8,950	49,600	43,500	46,100	43,300	0	0	31,580	0	0	225,820	124,750
Port Valdez	221-60	0	30	1,500	350	820	2,680	7,500	8,000	1,600	600	0	0	0	0	0	23,080	13,250
Eastern District TOTAL		0	40	2,572	2,770	9,270	38,070	134,900	169,345	150,170	131,860	0	0	49,500	0	0	688,497	359,730
Columbia/Long	222-10	0	0	0	0	200	800	14,500	11,520	10,070	5,600	0	0	0	0	0	42,690	19,300
Wells/Unakwik	222-20	0	0	200	10	6,250	20,250	24,440	50,795	22,500	17,270	0	0	10	0	0	141,725	66,180
Eaglek	222-30	0	0	0	0	520	960	5,650	11,100	16,200	13,920	0	0	0	0	0	48,350	21,050
Northern District TOTAL		0	0	200	10	6,970	22,010	44,590	73,415	48,770	36,790	0	0	10	0	0	232,765	106,530
Unakwik District (229) TOTAL		NOT SURVEYED															0	0
W. Port Wells	223-10	0	0	0	0	300	1,750	0	16,170	13,450	0	0	0	0	0	0	31,670	19,470
Esther Passage	223-20	0	0	0	0	0	0	0	1,100	1,150	1,200	0	0	0	0	0	3,450	2,040
E. Port Wells	223-30	0	0	0	0	2,000	1,500	0	16,000	24,000	0	0	0	0	0	0	43,500	24,000
Coghill District TOTAL		0	0	0	0	2,300	3,250	0	33,270	38,600	1,200	0	0	0	0	0	78,620	45,510
Passage/Cochrane	224-10	0	0	0	330	1,000	2,150	0	8,620	11,000	0	0	0	0	0	0	23,100	15,500
Culross Pass	224-30	0	0	0	20	1,300	2,200	0	32,300	26,600	0	0	0	0	0	0	62,420	33,280
Nellie Juan	224-40	0	0	0	2,812	1,010	2,300	0	14,600	11,750	0	0	0	5	0	0	32,477	19,760
Northwestern District TOTAL		0	0	0	3,162	3,310	6,650	0	55,520	49,350	0	0	0	5	0	0	117,997	68,540
Eshamy	225-30	0	0	0	0	50	0	1,400	7,600	7,400	6,200	0	13,500	54	0	0	36,204	19,470
Eshamy District TOTAL		0	0	0	0	50	0	1,400	7,600	7,400	6,200	0	13,500	54	0	0	36,204	19,470
Chenega	226-20	0	0	0	500	7,320	13,985	34,244	103,950	45,350	1,300	0	24,650	57	0	0	231,356	127,770
Knight Island	226-30	0	0	0	0	0	0	200	3,500	3,000	0	0	4,000	0	0	0	10,700	11,580
Bainbridge/Latouche	226-40	0	0	0	0	300	200	2,374	6,097	4,310	0	0	30,700	300	0	0	44,281	33,850
Port Bainbridge	226-50	0	0	0	0	0	400	5,400	4,300	2,500	0	0	1,400	30	0	0	14,030	7,410
Southwestern District TOTAL		0	0	0	500	7,620	14,585	42,218	117,847	55,160	1,300	0	60,750	387	0	0	300,367	180,610
S. Montague	227-10	0	0	0	0	200	3,450	26,400	20,280	27,430	0	0	14,460	0	0	0	92,220	68,420
N. Montague	227-20	0	0	0	0	1,150	8,020	44,350	72,440	37,440	1,600	0	32,570	750	0	0	198,320	113,340
Montague District TOTAL		0	0	0	0	1,350	11,470	70,750	92,720	64,870	1,600	0	47,030	750	0	0	290,540	181,760
S. Hawkins	228-10	0	0	0	0	300	700	0	500	300	0	0	0	0	0	0	1,800	1,140
Cutoff	228-20	0	0	0	1,200	8,300	24,800	0	66,660	37,460	0	0	0	0	0	0	138,420	76,300
N. Hawkins	228-30	0	0	0	75	1,800	13,400	0	43,000	29,500	0	0	0	0	0	0	87,775	58,270
Double Bay	228-40	0	0	0	0	200	11,200	0	43,800	26,900	0	0	0	0	0	0	82,100	48,470
Johnstone	228-50	0	0	10	400	2,600	14,900	0	30,500	16,400	0	0	0	0	0	0	64,810	35,190
Etches	228-60	0	0	100	300	9,850	29,230	0	74,570	58,850	0	0	0	0	0	0	172,900	95,530
Southeastern District TOTAL		0	0	110	1,975	23,050	94,230	0	259,030	169,410	0	0	0	0	0	0	547,805	315,000
TOTAL OF 8 DISTRICTS		0	40	2,882	8,417	53,920	190,265	293,858	808,747	583,730	178,950	0	121,280	50,706	0	0	2,292,795	1,277,150



Appendix E.7. Current year and historical weekly pink salmon escapement performance from index spawning streams, Prince William Sound, 1989.





Appendix E.8. Pink Salmon Catch and escapement, even years (1968 - 1988) and odd years (1969 - 1989), Prince William Sound.

Appendix E.9. Chum salmon harvests and escapement indices, including hatchery sales harvests and broodstock, Prince William Sound, 1965 - 1989. Historical data revised in 1989.

	CHUM SALMON ESCAPEMENTS [a]									Hatchery		Common Property	
Year	Eastern	Northern	Coghill	Northwest	Eshamy	Southwest	Montague	Southeast	Total	Sales	Brood	Catch [b]	Total Run [c]
1965	69,180	20,980	20,768	18,907	0	1,829	17,500	46,480	195,644			201,043	396,687
66	75,690	24,870	10,540	5,770	0	2,180	14,100	9,410	142,560			426,628	569,188
67	74,570	23,270	7,450	1,670	0	6,200	4,980	9,070	127,210			274,234	401,444
68	48,960	10,620	8,780	800	0	580	220	4,610	74,570			342,939	417,509
69	58,690	17,340	8,410	780	0	0	0	6,320	91,540			320,977	412,517
1970	34,430	4,020	11,880	2,720	0	550	0	7,950	61,550			230,661	292,211
71	49,730	11,870	6,600	5,600	100	1,430	27,990	6,450	109,770			574,265	684,035
72	112,950	70,760	28,160	22,980	0	4,010	3,340	26,990	269,190			45,370	314,560
73	213,170	140,030	72,610	13,250	0	1,020	3,110	48,080	491,270			729,839	1,221,109
74	72,010	55,510	29,280	6,580	0	240	80	3,200	166,900			88,544	255,444
1975	30,040	8,910	3,640	430	0	1,280	140	2,850	47,290			100,479	147,769
76	16,260	29,430	25,670	8,300	0	90	0	770	80,520			370,478	450,998
77	47,880	48,600	43,940	10,090	0	700	0	8,280	159,490			575,839	735,329
78	90,250	27,480	18,160	12,940	0	790	0	6,550	156,170			485,147	641,317
79	42,630	17,320	6,330	8,770	0	90	0	5,140	80,280			324,040	404,320
1980	26,720	27,880	23,340	3,060	0	2,040	70	6,710	89,820	6		412,948	502,774
81	71,560	28,670	2,050	15,130	0	710	0	16,010	134,130	118		1,745,869	1,880,117
82	146,120	68,580	22,130	21,880	0	1,530	0	25,260	285,500	0	86,200	1,335,368	1,707,068
83	143,800	85,720	61,410	31,660	340	3,170	0	21,410	347,510	0	44,000	1,030,546	1,422,056
84	129,190	59,080	19,690	7,920	0	20	0	8,650	224,550	4,886	3,000	1,196,785	1,429,221
1985	111,310	33,410	22,140	13,290	0	620	0	4,470	185,240	3,840	0	1,302,090	1,491,170
86	126,690	50,740	13,140	17,420	0	1,890	0	8,830	218,710	20,683	12,523	1,662,366	1,914,282
87	183,620	38,700	24,510	26,460	0	1,690	0	44,020	319,000	2,549	15,574	1,902,063	2,239,186
88	258,560	75,420	39,240	40,780	0	2,350	500	66,930	483,780	42,694	108,271	1,792,616	2,427,361
89	112,080	46,470	22,680	27,430	320	11,690	0	22,640	243,310	129,551	74,513	862,551	1,309,925
1965-88 AVG	93,084	40,800	22,078	12,383	18	1,459	3,001	16,435	189,258	8,308	38,510	727,964	931,570

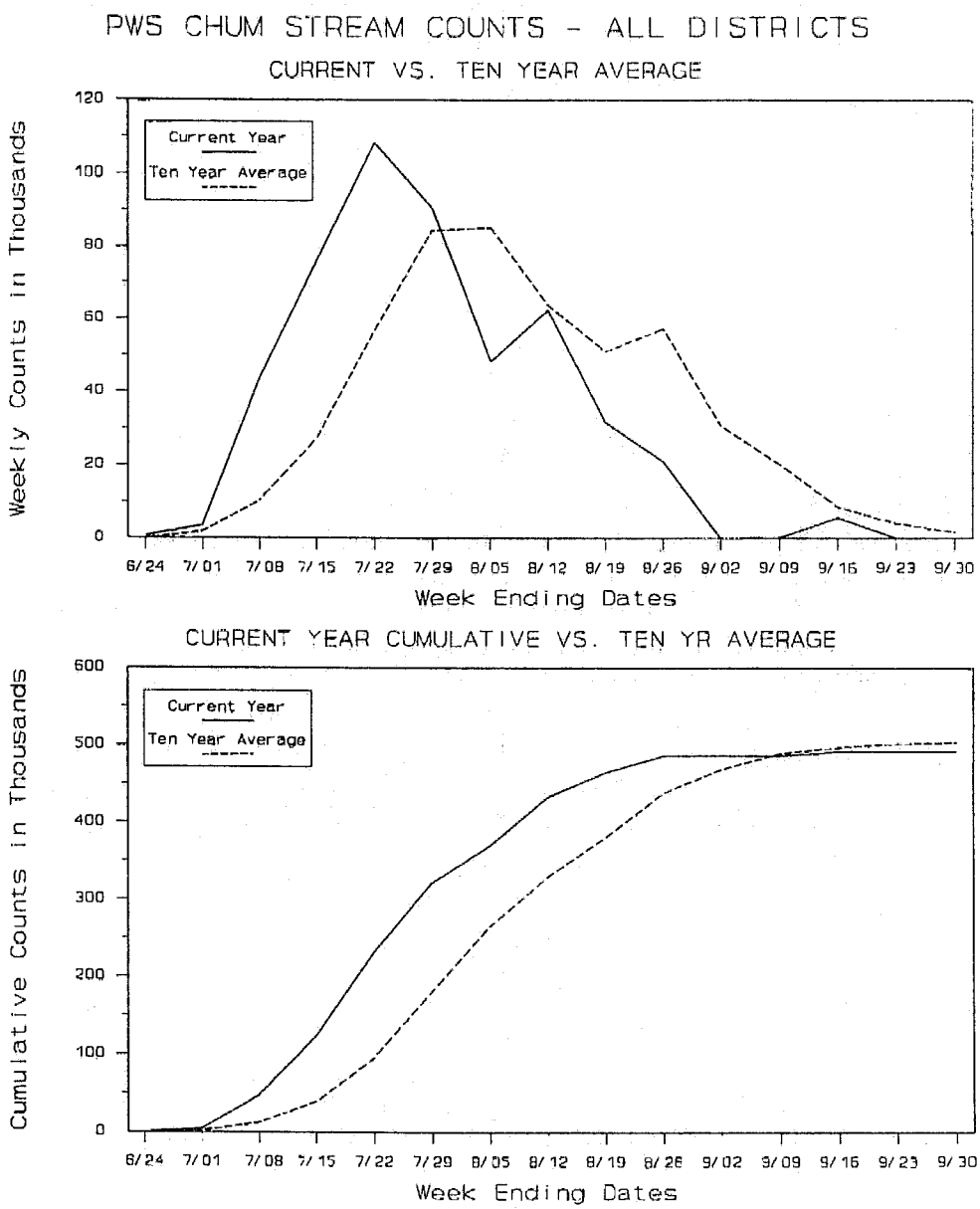
[a] Coghill and Northwestern escapement figures correspond to current district boundaries.

[b] Includes the common property harvest of both wild and hatchery stocks. Does not include hatchery sales harvests.

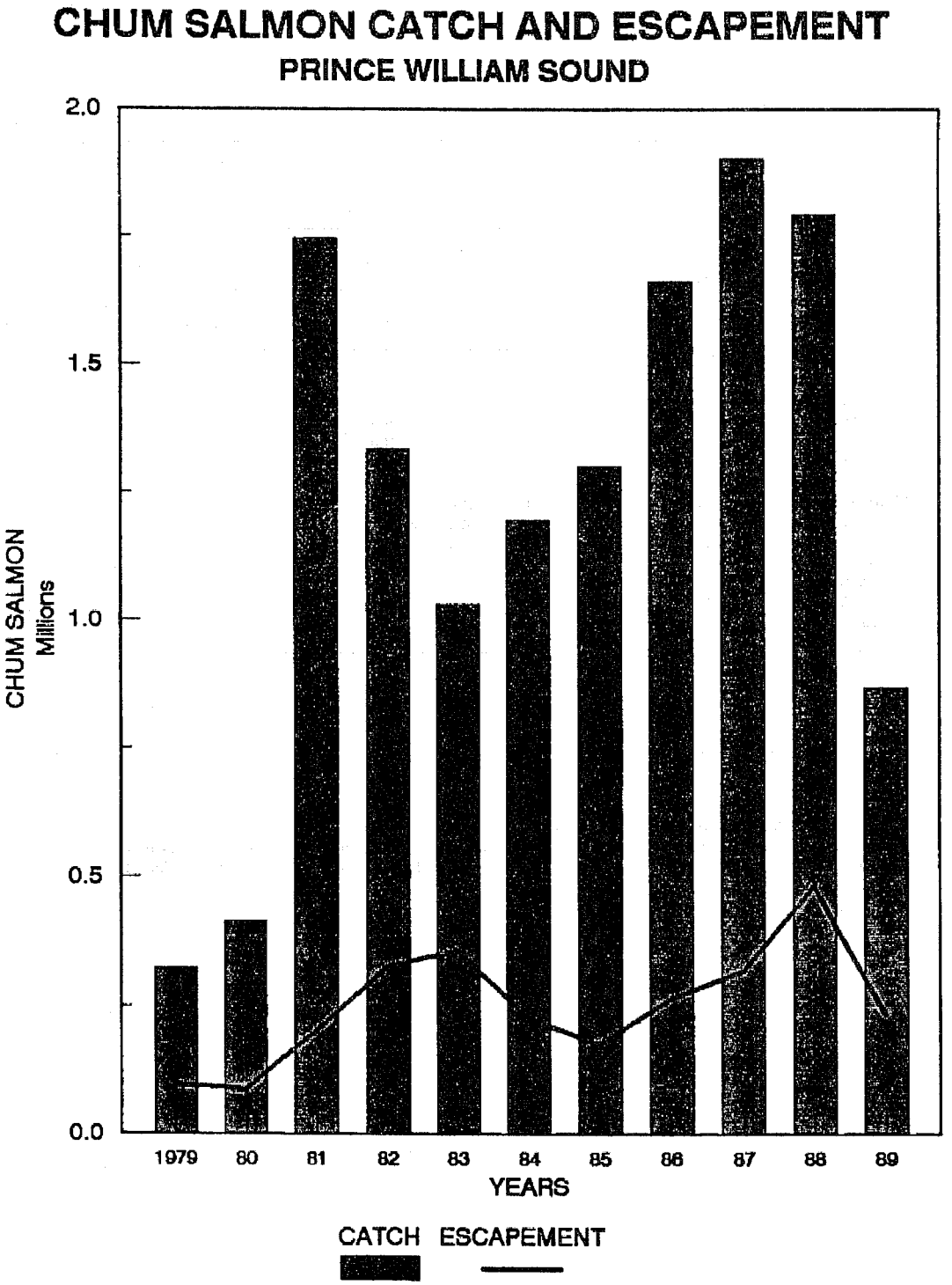
[c] Represents the sum of the common property catch, hatchery sales and brood, plus the escapement index. Does not account for wild stock escapement into non-index streams.

Appendix E.10. Weekly aerial estimates of chum salmon escapement by statistical area, Prince William Sound, 1989.

Survey Location	Subdistrict	Week Ending Date 6/24	7/01	7/08	7/15	7/22	7/29	8/05	8/12	8/19	8/26	9/02	9/09	9/16	9/23	9/30	TOTAL	ADJ. STREAM TOTAL
Orca Inlet	221-10	0	0	0	140	350	0	1,100	800	200	0	0	0	0	0	0	2,590	1,120
Simpson/Sheep	221-20	0	60	2,650	5,800	11,700	6,300	8,200	7,600	2,500	1,400	0	0	150	0	0	46,360	18,740
Gravina	221-30	550	2,300	16,300	16,910	24,000	12,050	12,000	2,020	0	1,000	0	0	0	0	0	87,130	36,420
Fidalgo	221-40	0	10	700	3,100	4,500	11,200	500	1,521	3,300	11,710	0	0	1,200	0	0	37,741	23,700
Valdez Arm	221-50	150	480	9,630	7,640	9,800	10,100	5,600	2,050	4,500	1,100	0	0	450	0	0	51,500	22,080
Port Valdez	221-60	0	80	1,100	1,560	1,740	1,950	0	0	3,000	3,580	0	0	3,930	0	0	16,940	10,020
Eastern District TOTAL		700	2,930	30,380	35,150	52,090	41,600	27,400	13,991	13,500	18,790	0	0	5,730	0	0	242,261	112,080
Columbia/Long	222-10	0	0	3,950	5,600	8,600	9,250	1,000	0	100	0	0	0	0	0	0	28,500	13,770
Wells/Unakwik	222-20	100	600	7,500	15,050	9,250	9,250	6,500	5,210	1,110	0	0	0	0	0	0	54,570	22,460
Eaglek	222-30	0	0	150	50	80	600	8,500	5,700	3,010	2,300	0	0	0	0	0	20,390	10,240
Northern District TOTAL		100	600	11,600	20,700	17,930	19,100	16,000	10,910	4,220	2,300	0	0	0	0	0	103,460	46,470
Unakwik District (229) TOTAL		NOT SURVEYED															0	0
W. Port Wells	223-10	0	3	0	240	820	1,750	0	16,510	4,860	0	0	0	0	0	0	24,183	16,560
Esther Passage	223-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. Port Wells	223-30	0	0	0	300	1,800	1,500	0	5,000	3,000	0	0	0	0	0	0	11,600	6,120
Coghill District TOTAL		0	3	0	540	2,620	3,250	0	21,510	7,860	0	0	0	0	0	0	35,783	22,680
Passage/Cochrane	224-10	0	0	550	4,110	5,630	5,500	0	6,500	1,000	0	0	0	0	0	0	23,290	13,280
Culross Pass	224-30	0	0	0	10	1,300	800	0	0	0	0	0	0	0	0	0	2,110	1,300
Nellie Juan	224-40	0	0	100	5,592	4,600	5,300	0	5,300	1,000	0	0	0	0	0	0	21,892	12,950
Northwestern District TOTAL		0	0	650	9,712	11,530	11,600	0	11,800	2,000	0	0	0	0	0	0	47,292	27,430
Eshamy	225-30	0	0	0	0	0	250	100	0	0	0	0	0	0	0	0	350	320
Eshamy District TOTAL		0	0	0	0	0	250	100	0	0	0	0	0	0	0	0	350	320
Chenega	226-20	0	0	600	2,000	7,150	6,578	4,877	3,010	100	0	0	200	0	0	0	24,515	11,420
Bainbridge/Latouche	226-40	0	0	0	0	200	150	0	0	0	0	0	0	10	0	0	360	270
Southwestern District TOTAL		0	0	600	2,000	7,350	6,728	4,877	3,010	100	0	0	200	10	0	0	24,875	11,690
S. Montague	227-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N. Montague	227-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montague District TOTAL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawkins Cutoff	228-20	0	0	0	7	400	0	0	0	0	0	0	0	0	0	0	407	410
N. Hawkins	228-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Double Bay	228-40	0	0	0	3,500	5,000	900	0	0	4,100	0	0	0	0	0	0	13,500	9,680
Johnstone	228-50	0	0	60	850	2,250	1,200	0	300	0	0	0	0	0	0	0	4,560	2,400
Port Etches	228-60	0	0	300	3,110	9,200	6,000	0	1,000	0	0	0	0	0	0	0	19,610	10,150
Southeastern District TOTAL		0	0	360	7,467	16,850	8,100	0	1,300	4,100	0	0	0	0	0	0	38,177	22,640
TOTAL OF 8 DISTRICTS		800	3,533	43,590	75,569	108,370	90,628	48,377	62,521	31,780	21,090	0	200	5,740	0	0	492,198	243,310



Appendix E.11. Current Year and historical weekly chum salmon escapement performance from index spawning streams, Prince William Sound, 1989.



Appendix E.12. Chum salmon catch and escapement, Prince William Sound, 1979 - 1989.

Appendix E.13. Sockeye salmon escapement counts from selected systems, Prince William Sound, 1989.[a]

Stream Name	Stream Number	Weekly Count (week ending dates)								
		08-Jul	15-Jul	22-Jul	29-Jul	05-Aug	12-Aug	19-Aug	26-Aug	16-Sep
Robe River [b]	137									
Billy's Hole	218		200	400	2,500		600	80	50	
Red Lake	300				1,000		400	200	100	
Halferty Creek	454							120		
Cochrane Creek	461						70			
Shrode Lake	476		40	200	200		1,070	280		
Jackpot Lakes	608	1,500		1,900	3,000	2,200	200	50		
Bainbridge	630	70		300	1,600	800	300	50		5
Point Creek [b]	702									
Cabin Creek [b]	747									
Udall Creek [b]	770									
Pautzke Creek [b]	775									
Total		1,570	240	2,800	8,300	3,000	2,640	780	150	5

[a] Counts contained in this table are obtained in conjunction with the regular pink and chum aerial survey program. Many of these sockeye systems are difficult to survey by air and thus the counts do not necessarily represent total live abundance at a particular time.

[b] No sockeye counts obtained in 1989.

Appendix E.14. Estimated age and sex composition of chum salmon harvested in the Prince William Sound commercial purse seine fishery, 1989.

		Brood Year and Age Group					
		1986	1985	1984	1983	1982	
		0.2	0.3	0.4	0.5	0.6	Total
EASTERN DISTRICT PURSE SEINE							
Strata Combined:	6/28-8/29						
Sampling Dates:	6/28-8/12						
Sample Size:	1,240						
Female	Percent of Sample	0.4	48.8	6.0	1.1	0	56.3
	Number in Catch	1,447	166,365	20,570	3,757	0	192,139
Male	Percent of Sample	0.0	36.6	5.4	1.6	0	43.7
	Number in Catch	98	124,826	18,515	5,564	0	149,003
Total	Percent of Sample	0.5	85.4	11.5	2.7	0	100.0
	Number in Catch	1,546	291,191	39,085	9,321	0	341,142
	Standard Error	981	3,882	3,688	1,064	0	
NORTHERN DISTRICT PURSE SEINE							
Stratum Dates:	6/28-8/24						
Sampling Dates:	6/28-8/11						
Sample Size:	1,194						
Female	Percent of Sample	0.8	42.7	10.9	1.7	0.1	56.3
	Number in Catch	1,452	82,562	21,150	3,327	193	108,683
Male	Percent of Sample	0.2	31.3	9.4	2.7	0.1	43.7
	Number in Catch	465	60,514	18,156	5,201	136	84,472
Total	Percent of Sample	1.0	74.1	20.3	4.4	0.2	100.0
	Number in Catch	1,916	143,076	39,306	8,528	329	193,155
	Standard Error	532	2,341	2,207	1,196	236	
COGHILL DISTRICT PURSE SEINE AND GILL NET							
Stratum Dates:	6/19-9/06						
Sampling Dates:	6/20-7/28						
Sample Size:	779						
Female	Percent of Sample	1.1	52.8	9.9	1.4	0	65.2
	Number in Catch	3,480	168,429	31,676	4,559	0	208,144
Male	Percent of Sample	0.2	26.2	7.2	1.3	0	34.8
	Number in Catch	480	83,503	23,017	4,079	0	111,079
Total	Percent of Sample	1.2	78.9	17.1	2.7	0	100.0
	Number in Catch	3,960	251,932	54,692	8,638	0	319,223
	Standard Error	1,452	3,664	3,420	1,373	0	
SOUTHEASTERN DISTRICT PURSE SEINE							
Stratum Dates:	7/12-8/11						
Sampling Dates:	7/28						
Sample Size:	136						
Female	Percent of Sample	2.2	52.2	6.6	2.2	0	63.2
	Number in Catch	17	399	51	17	0	484
Male	Percent of Sample	0.0	30.9	5.1	0.7	0	36.8
	Number in Catch	0	236	39	6	0	281
Total	Percent of Sample	2.2	83.1	11.8	2.9	0	100.0
	Number in Catch	17	636	90	23	0	765
	Standard Error	10	25	21	11	0	

Appendix E.15. Summary of dates, hours fished, and emergency orders issued by district, for the commercial purse seine fishery, Prince William Sound, 1989. Includes openings in hatchery harvest areas.

Eastern (221)		Northern (222)		Coghill (223)		Unakwik (229)		Northwestern (224)		Southeastern (228)		Emergency Orders Issued
Dates	Hours Fished	Dates	Hours Fished	Dates	Hours Fished	Dates	Hours Fished	Dates	Hours Fished	Dates	Hours Fished	
6/28	12 [a]	6/28	12 [a]									2-F-E-18-89
7/05	12 [a]	7/05	12 [a]									2-F-E-20-89
7/12	12 [b]	7/12	12 [b]					7/12	12 [b]	7/12	12	2-F-E-22-89
												2-F-E-23-89
7/15	6 [c]											2-F-E-25-89
		7/25 - 7/30	101 [d]	7/26 - 7/29	76 [d]							2-F-E-27-89
												2-F-E-30-89
												2-F-E-31-89
		7/27 - 7/28	36 [e]	7/27 - 7/28	36 [e]			7/27 - 7/28	36 [e]	7/27 - 7/28	36	2-F-E-28-89
8/10 - 8/11	36 [f]	8/10	12 [f]			8/10	12			8/10 - 8/11	36	2-F-E-34-89
												2-F-E-35-89
												2-F-E-36-89
		8/14	12 [g]	8/14	12	8/14	12	8/14	12 [g]			2-F-E-37-89
8/16	12	8/16	12 [h]			8/16	12			8/16	12	2-F-E-38-89
8/18	12	8/18	12 [i]	8/18	12	8/18	12	8/18	12 [i]	8/18	12	2-F-E-39-89
8/21	12	8/21	12 [j]	8/21	12	8/21	12	8/21	12 [j]	8/21	12	2-F-E-40-89
		8/22	12 [j]	8/22	12 [k]	8/22	12	8/22	12 [j]			2-F-E-41-89
		8/23	12 [j]	8/23	12 [k]	8/23	12	8/23	12 [j]			2-F-E-44-89
		8/24	12 [j]	8/24	12 [k]	8/24	12	8/24	12 [j]			2-F-E-45-89
				8/26	11 [l]							2-F-E-47-89
8/26	11			8/27	11 [m]							2-F-E-48-89
												2-F-E-49-89
				8/28	11 [l]							2-F-E-50-89
8/28	11 [n]			8/29	11 [l]							2-F-E-51-89
8/29	11 [n]			8/30 - 9/30	375 [o]							2-F-E-52-89

a The season was officially open for a 12 hour period beginning at 8 a.m., Wednesday, June 28. In the Eastern District all waters of Valdez Arm and Port north of a line from the Rocky Pt. Coast Guard marker to the Sisters Buoy were closed. Galena, Jack and Sawmill bays were open. All waters of the Northern District south of the west island of the Bald Head Chris Is. were closed.

b A 12 hour opening commencing at 8:00 a.m., Wednesday. Only the Whittier Subdistrict of the Northwestern District was open. All waters south of the Bald Head Chris Is. were closed. A portion of the Solomon Gulch SHA was open.

c Only the Solomon Gulch SHA and the waters east of 146 30.5' W. long in the Port of Valdez were open.

d Only the Esther Subdistrict and Lake and Quillion bays were open in the Coghill District. Only the Cannery Creek Hatchery Area 3 was open in the Northern District.

-continued-

e In the Northern District only the waters north of Bald Head Chris Is. and northern Perry Pass were open. West Twin Bay was closed. In the Coghill District the Esther Subdistrict and the waters south of a line from Esther Rocks to Pt. Pigot were open. In the Northwestern District the Whttier Subdistrict, northern Culross and Perry passes, and Port Nellie Juan were open.

f The waters of the Eastern District south of 60 57.0' N. lat. were open. All waters of the Eastern District were open for the last 8 hours of the opening. In the Northern District, Unakwik Inlet, Wells Bay, Granite and Cedar bays north of a line from Fairmont Point to Olsen Is. to Mueller Cove were open

g Waters opened included the following areas: the Whittier Subdistrict, Culross Passage north of 60 43.8' N. lat., Culross Bay, and the Northern District north of 60 47.0' N. lat.

h All waters of the Northern District north of 60 47.0' N. lat. were open.

i Waters opened included the following areas: the Whittier Subdistrict, Culross Pass north of 60 43.8' N. lat., Culross Bay and the Northern District north of a line from Pt. Perry to Axel Lind Is. to Granite Pt. to Glacier Is. to Pt. Freemantle.

j Waters opened included the following areas: the Whittier Subdistrict in the Northwestern District, Culross Passage north of 60 43.8' N. lat., Culross Bay, northern Perry Passage, West Twin Bay, and the Northern District north of 60 47.0 N. lat.

k In the Coghill District, only the Esther Subdistrict and the waters of Wells Passage south of a line from Esther Rocks to Pt. Pigot were open.

l Only the Esther Subdistrict was open.

m Only the portion of the Esther Subdistrict north of a line from the point west of Culross light to Egg Rocks to Bald Head Chris Is. was open.

n Only the Fidalgo Subdistrict was open.

o Only the Esther Subdistrict was open 12 hours per day, 9 a.m. to 9 p.m. The season closed at 12 noon September 30.

APPENDIX F

HATCHERY RETURNS

Appendix F.1. Daily pink salmon sales harvests, sex ratios, revenue and brood stock collection at the Wally Norenberg Hatchery, 1989. Data provided by Prince William Sound Aquaculture Corporation.

Date	Fish Sales (numbers)		Pounds Sold	Average Fish Wt	Price/ Pound	Revenue		Brood Stock[a]		% Female
	Daily	Cumulative				Daily	Cumulative	Fish/Day	Cumulative	
07/20								271	271	
07/21								437	708	
07/22								197	905	
07/23								240	1,145	
07/24								120	1,265	
07/25								4,820	6,085	
07/26	630	630	2,176	3.45	$0.350	$762	$762	400	6,485	12.2
07/27	0	630	0				$762	0	6,485	
07/28	641	1,271	2,328	3.63	$0.350	$815	$1,577	0	6,485	18.9
07/29	0	1,271	0				$1,577	0	6,485	
07/30	41,655	42,926	149,960	3.60	$0.594	$89,042	$90,619	0	6,485	17.5
07/31	0	42,926	0				$90,619	0	6,485	17.5
08/01	140,043	182,969	504,150	3.60	$0.720	$362,938	$453,557	0	6,485	25.9
08/02	0	182,969	0				$453,557	0	6,485	
08/03	129,076	312,045	472,797	3.66	$0.750	$354,551	$808,108	0	6,485	29.6
08/04	51,622	363,667	185,839	3.60	$0.740	$137,521	$945,629	29,850	36,335	28.0
08/05	109,382	473,049	391,103	3.58	$0.575	$224,703	$1,170,332	10,250	46,585	30.0
08/06	49,744	522,793	184,054	3.70	$0.468	$86,137	$1,256,469	42,000	88,585	30.0
08/07	145,250	668,043	522,905	3.60	$0.640	$334,654	$1,591,123	11,600	100,185	31.1
08/08	174,455	842,498	637,273	3.65	$0.545	$347,074	$1,938,197	34,825	135,010	32.5
08/09	384,788	1,227,286	1,367,222	3.55	$0.584	$797,993	$2,736,190	12,100	147,110	32.9
08/10	242,599	1,469,885	824,844	3.40	$0.460	$379,557	$3,115,747	0	147,110	34.8
08/11	73,641	1,543,526	254,707	3.46	$0.471	$119,863	$3,235,610	19,100	166,210	43.1
08/12	386,222	1,929,748	1,308,201	3.39	$0.409	$534,691	$3,770,301	7,500	173,710	43.0
08/13	92,862	2,022,610	306,444	3.30	$0.422	$129,171	$3,899,472	0	173,710	43.0
08/14	693	2,023,303	2,431	3.51	$0.350	$851	$3,900,323	11,400	185,110	40.2
08/15	0	2,023,303	0				$3,900,323	33,100	218,210	40.2
08/16	64,083	2,087,386	224,292	3.50	$0.414	$92,857	$3,993,180	0	218,210	47.2
08/17	115,218	2,202,604	403,266	3.50	$0.408	$164,476	$4,157,656	0	218,210	45.4
08/18	124,442	2,327,046	398,213	3.20	$0.440	$175,174	$4,332,830	8,000	226,210	49.5
08/19	259,809	2,586,855	831,391	3.20	$0.432	$358,999	$4,691,829	0	226,210	53.6
08/20	120,232	2,707,087	387,297	3.22	$0.461	$178,507	$4,870,336	(36,210)	190,000	53.9
08/21	0	2,707,087	0				$4,870,336	34,850	224,850	53.9
08/22	48,857	2,755,944	170,999	3.50	$0.440	$75,222	$4,945,558	41,700	266,550	61.3
08/23	22,752	2,778,696	79,632	3.50	$0.440	$35,030	$4,980,588	72,115	338,665	58.2
08/24		2,778,696						12,850	351,515	58.2
Totals	2,778,696		8,611,524	3.46	$0.518	$4,980,588		$351,515		

[a] Inseason estimates. May include overmaure or green fish, holding mortalities and fish excess to spawning needs. Actual number of adults spawned as broodstock in 1989 was 249,914 pink salmon.

Appendix F.2. Daily pink salmon sales harvests, sex ratios, revenue and brood stock collection at the Armin F. Koernig Hatchery, 1989. Data provided by Prince William Sound Aquaculture Corporation.

Date	Fish Sales (numbers)		Pounds Sold	Average Fish Wt	Price/ Pound	Revenue		Brood Stock[a]		% Female
	Daily	Cumulative				Daily	Cumulative	Fish/Day	Cumulative	
07/24	23,792	23,792	78,512	3.30	$0.760	$59,668	$59,668			7.6
07/25	47,596	71,388	161,826	3.40	$0.820	$132,696	$192,364			10.5
07/26	28,538	99,926	94,177	3.30	$0.841	$79,213	$271,577			13.1
07/27	48,574	148,500	155,436	3.20	$0.722	$112,256	$383,833			13.8
07/28	102,501	251,001	327,201	3.19	$0.710	$232,162	$615,995			15.7
07/29	75,039	326,040	240,126	3.20	$0.723	$173,635	$789,630			18.9
07/30	74,762	400,802	236,202	3.16	$0.676	$159,725	$949,355			18.9
07/31	103,063	503,865	329,800	3.20	$0.697	$229,940	$1,179,295			23.2
08/01	77,574	581,439	255,990	3.30	$0.743	$190,200	$1,369,495			30.5
08/02	125,696	707,135	403,489	3.21	$0.753	$303,989	$1,673,484	12,100	12,100	28.2
08/03	162,176	869,311	512,525	3.16	$0.800	$409,969	$2,083,453	0	12,100	30.2
08/04	152,617	1,021,928	462,789	3.03	$0.820	$379,441	$2,462,894	5,900	18,000	32.7
08/05	192,599	1,214,527	594,792	3.09	$0.745	$443,017	$2,905,911	13,950	31,950	36.4
08/06	0	1,214,527	0				$2,905,911	18,000	49,950	37.4
08/07	276,218	1,490,745	856,273	3.10	$0.754	$645,521	$3,551,432	0	49,950	39.7
08/08	230,497	1,721,242	714,543	3.10	$0.724	$517,243	$4,068,675	2,600	52,550	45.8
08/09	97,317	1,818,559	301,682	3.10	$0.695	$209,730	$4,278,405	3,000	55,550	45.8
08/10	209,484	2,028,043	666,824	3.18	$0.712	$475,045	$4,753,450	12,175	67,725	49.0
08/11	123,432	2,151,475	372,005	3.01	$0.693	$257,623	$5,011,073	0	67,725	47.7
08/12	217,015	2,368,490	663,157	3.06	$0.495	$327,964	$5,339,037	0	67,725	51.2
08/13	122,158	2,490,648	378,692	3.10	$0.400	$151,552	$5,490,589	0	67,725	53.7
08/14	199,276	2,689,924	617,754	3.10	$0.712	$440,088	$5,930,677	0	67,725	56.7
08/15	99,222	2,789,146	307,587	3.10	$0.712	$219,125	$6,149,802	40,150	107,875	57.4
08/16	210,089	2,999,235	650,276	3.10	$0.549	$357,179	$6,506,981	0	107,875	59.0
08/17	170,738	3,169,973	529,290	3.10	$0.583	$308,695	$6,815,676	0	107,875	58.1
08/18	120,055	3,290,028	362,223	3.02	$0.664	$240,668	$7,056,344	6,350	114,225	59.0
08/19	161,654	3,451,682	501,127	3.10	$0.602	$301,615	$7,357,959	0	114,225	62.2
08/20	101,602	3,553,284	315,247	3.10	$0.712	$224,582	$7,582,541	(24,225)	90,000	61.0
08/21	76,744	3,630,028	237,906	3.10	$0.712	$169,484	$7,752,025	5,300	95,300	60.8
08/22	48,548	3,678,576	155,352	3.20	$0.712	$110,673	$7,862,698	27,700	123,000	61.3
08/23	20,019	3,698,595	62,059	3.10	$0.432	$26,816	$7,889,514	47,825	170,825	61.0
08/24	0	3,698,595	0				$7,889,514	29,350	200,175	61.0
08/25	17,458	3,716,053	54,119	3.10	$0.712	$38,554	$7,928,068	13,000	213,175	65.1
08/26		3,716,053					$7,928,068		213,175	
08/27		3,716,053					$7,928,068		213,175	
08/28		3,716,053					$7,928,068		213,175	
08/29		3,716,053					$7,928,068		213,175	
08/30		3,716,053					$7,928,068		213,175	
08/31		3,716,053					$7,928,068		213,175	
09/01		3,716,053					$7,928,068		213,175	
09/02		3,716,053					$7,928,068		213,175	
09/03		3,716,053					$7,928,068		213,175	
09/04		3,716,053					$7,928,068		213,175	
Totals	3,716,053		11,598,981	3.12	$0.684	$7,928,068		213,175		

[a] Inseason estimates. May include overmature/green fish, holding mortalities and fish excess to spawning needs. Actual number of adults spawned as broodstock in 1989 was 106,654 pink salmon.

Appendix F.3. Daily pink salmon sales harvests, sex ratios, revenue and brood stock collection at the Solomon Gulch Hatchery, 1989. Data provided by Valdez Fisheries Development Association.

Date	Fish Sales[a] Daily	Fish Sales[a] Cumulative	Pounds Sold	Price/ Pound	Revenue Daily	Revenue Cumulative	Brood Stock[b] Fish/Day	Brood Stock[b] Cumulative	% Female
06/18	246	246	901	$0.500	$450.50	$451			
06/19	588	834	1,992	$0.500	$996.00	$1,447			
06/20	0	834	0		$0.00	$1,447			
06/21	0	834	0		$0.00	$1,447			18.0
06/22	0	834	0		$0.00	$1,447			20.0
06/23	16,851	17,685	136,390	$0.536	$73,132.32	$74,579			17.3
06/24	20,664	38,349	0		$0.00	$74,579			23.0
06/25	16,879	55,228	152,080	$0.538	$81,819.04	$156,398			23.0
06/26	25,702	80,930	0		$0.00	$156,398			29.0
06/27	25,791	106,721	98,156	$0.558	$54,790.67	$211,189			26.2
06/28	0	106,721	0		$0.00	$211,189		0	23.8
06/29	0	106,721	0		$0.00	$211,189		0	25.0
06/30	50,753	157,474	84,898	$0.587	$49,835.13	$261,024		0	34.4
07/01	133,703	291,177	637,758	$0.599	$381,896.34	$642,920		0	31.3
07/02	14,299	305,476	202,184	$0.646	$130,651.30	$773,571		0	40.6
07/03	36,247	341,723	0		$0.00	$773,571		0	42.7
07/04	55,350	397,073	221,405	$0.646	$143,071.91	$916,643		0	36.7
07/05	71,238	468,311	204,501	$0.677	$138,422.64	$1,055,066	100	100	36.0
07/06	44,780	513,091	302,057	$0.705	$212,953.41	$1,268,019	500	600	37.8
07/07	67,227	580,318	273,613	$0.657	$179,803.00	$1,447,822	1,000	1,600	38.6
07/08	39,343	619,661	167,220	$0.850	$142,120.28	$1,589,943	2,000	3,600	46.6
07/09	6,081	625,742	19,285	$0.850	$16,390.32	$1,606,333	3,500	7,100	
07/10	0	625,742	6,600	$0.850	$5,609.34	$1,611,942	5,900	13,000	
07/11	0	625,742	0		$0.00	$1,611,942	6,700	19,700	
07/12	0	625,742	0		$0.00	$1,611,942	8,000	27,700	
07/13	0	625,742	0		$0.00	$1,611,942	8,500	36,200	
07/14	42,072	667,814	168,288	$0.800	$134,596.74	$1,746,539	8,500	44,700	
07/15							8,500	53,200	
07/16							8,500	61,700	
07/17							8,500	70,200	
07/18							8,500	78,700	
07/19							8,500	87,200	
07/20							8,500	95,700	
07/21							8,500	104,200	
07/22							9,000	113,200	
07/23							9,000	122,200	
07/24							9,000	131,200	
07/25							9,000	140,200	
07/26							8,500	148,700	
07/27							8,500	157,200	
07/28							8,500	165,700	
07/29							8,500	174,200	
07/30							7,000	181,200	
07/31							7,000	188,200	
08/01							6,500	194,700	
08/02							5,000	199,700	
08/03							4,000	203,700	
08/04							4,000	207,700	
08/05							3,000	210,700	
08/06							2,000	212,700	
08/07							1,000	213,700	
08/08							500	214,200	
08/09							500	214,700	
Totals	667,814		2,676,427	$0.652	$1,746,088		214,700		

Average Weight: 4.01 pounds

[a] Does not include carcass sales.

[b] May include overmature/green fish, holding mortalities and fish excess to spawning needs. Actual number of adults spawned as broodstock in 1989 was 114,846 pink salmon.

Appendix F.4. Daily pink salmon sales harvests, sex ratios, revenue and brood stock collection at the Cannery Creek Hatchery, 1989. Data provided by Prince William Sound Aquaculture Corporation.

Date	Fish Sales (numbers)		Pounds Sold	Average Fish Wt	Price/ Pound	Revenue		Brood Stock[a]		% Female
	Daily	Cumulative				Daily	Cumulative	Fish/Day	Cumulative	
07/27	849	849	3,142	3.70	$0.350	$1,100	$1,100	3,000	3,000	5.0
07/28		849					$1,100	380	3,380	5.0
07/29		849					$1,100	340	3,720	5.0
07/30		849					$1,100	0	3,720	5.0
07/31		849					$1,100	17,599	21,319	39.7
08/01		849					$1,100	15,383	36,702	39.7
08/02	141,731	142,580	500,877	3.53	$0.730	$365,590	$366,690	16,300	53,002	40.2
08/03		142,580					$366,690	20,482	73,484	40.2
08/04	143,837	286,417	489,048	3.40	$0.610	$298,319	$665,009	22,850	96,334	49.0
08/05	92,271	378,688	325,228	3.52	$0.555	$180,360	$845,369	9,950	106,284	47.2
08/06	63,960	442,648	229,685	3.59	$0.719	$165,075	$1,010,444	1,567	107,851	47.2
08/07	145,899	588,547	502,340	3.44	$0.728	$365,493	$1,375,936	10,159	118,010	47.6
08/08	43,969	632,516	145,098	3.30	$0.615	$89,235	$1,465,172	10,433	128,443	47.6
08/09		632,516					$1,465,172	30,557	159,000	49.5
08/10		632,516					$1,465,172	7,016	166,016	51.4
08/11		632,516					$1,465,172	5,009	171,025	53.3
08/12		632,516					$1,465,172	910	171,935	55.2
08/13		632,516					$1,465,172	174	172,109	57.1
08/14	300	632,816	1,000	3.33	$0.350	$350	$1,465,522	945	173,054	59.0
08/15		632,816					$1,465,522	13,626	186,680	59.0
08/16	334	633,150	1,080	3.23	$0.150	$162	$1,465,684	(42,680)	144,000	62.0
08/17		633,150					$1,465,684	8,443	152,443	62.0
08/18								12,310	164,753	62.0
08/19								16,475	181,228	62.0
08/20								(18,228)	163,000	62.0
08/21								12,383	175,383	68.0
08/22								0	175,383	69.0
08/23								7,384	182,767	69.0
08/24								5,132	187,899	69.0
08/25								0	187,899	69.0
Totals	633,150		2,197,498	3.47	$0.667	$1,465,684		187,899		

[a] May include overmature or green fish, holding mortalities and fish excess to spawning needs. Actual number of adults spawned as broodstock in 1989 was 138,199 pink salmon.

Appendix F.5. Daily chum salmon sales harvests, sex ratios, and revenue collection at the Main Bay Hatchery, 1989. Data provided by Prince William Sound Aquaculture Corporation.

Date	Fish Sales (numbers)		Pounds Sold	Average Fish Wt	Price/ Pound	Revenue[a]	
	Daily	Cumulative				Daily	Cumulative
06/14	3,460	3,460	42,900	12.40	$0.564	$24,204	$24,204
06/15		3,460					$24,204
06/16	2118	5,578	26,471	12.50	$0.473	$12,527	$36,732
06/17	9639	15,217	113,745	11.80	$0.496	$56,418	$93,149
06/18		15,217					$93,149
06/19	1,482	16,699	18,669	12.60	$0.470	$8,774	$101,924
06/20	2,325	19,024	25,576	11.00	$0.480	$12,270	$114,194
06/21		19,024					$114,194
06/22	1,532	20,556	16,861	11.01	$0.441	$7,431	$121,625
06/23	1,689	22,245	18,243	10.80	$0.450	$8,218	$129,844
06/24	1,963	24,208	20,218	10.30	$0.451	$9,108	$138,952
06/25	2,828	27,036	28,002	9.90	$0.509	$14,253	$153,205
06/26	1,809	28,845	17,914	9.90	$0.460	$8,245	$161,450
06/27	2828	31,673	28,847	10.20	$0.441	$12,714	$174,164
06/28	7586	39,259	75,097	9.90	$0.386	$28,950	$203,114
06/29	5,701	44,960	56,680	9.94	$0.345	$19,583	$222,696
06/30	3,960	48,920	37,228	9.40	$0.379	$14,109	$236,806
07/01	4,755	53,675	45,173	9.50	$0.373	$16,827	$253,633
07/02		53,675					$253,633
07/03	4831	58,506	45,413	9.40	$0.359	$16,326	$269,959
07/04	1,959	60,465	17,631	9.00	$0.386	$6,797	$276,756
07/05	8,703	69,168	79,133	9.09	$0.360	$28,464	$305,220
07/06	7,016	76,184	61,745	8.80	$0.373	$23,000	$328,220
07/07	4,443	80,627	38,125	8.58	$0.399	$15,193	$343,413
07/08	2,584	83,211	22,735	8.80	$0.379	$8,617	$352,029
07/09		83,211					$352,029
07/10	2,624	85,835	22,300	8.50	$0.425	$9,466	$361,496
07/11	1,223	87,058	10,888	8.90	$0.337	$3,667	$365,162
07/12		87,058					$365,162
07/13	4,582	91,640	39,408	8.60	$0.337	$13,271	$378,433
07/14	2,092	93,732	17,572	8.40	$0.347	$6,089	$384,522
07/15		93,732					$384,522
07/16	3958	97,690	31,272	7.90	$0.353	$11,039	$395,561
07/19	3718	101,408	30,628	8.24	$0.297	$9,082	$404,643
07/21	972	102,380	7,390	7.60	$0.308	$2,272	$406,916
07/22	561	102,941	4,150	7.40	$0.340	$1,411	$408,327
Totals	102,941		1,000,014	9.71	$0.408	$408,327	

[a] Due to the Exxon Valdez oil spill the Eshamy District was closed to commercial fishing in 1989. As a result, there was a surplus of chum salmon returning to the Main Bay Hatchery. These were harvested and sold by PWSAC.

Appendix F.6. Sales harvests of salmon by species from private nonprofit hatcheries, Prince William Sound, 1978 - 1989. Data provided by PWSAC and VFDA.[a]

Year	Hatchery[b]	Catch by Species			
		Coho	Pink	Chum	Total
1978	AFK		133,648		133,648
1979	AFK		223,761		223,761
1980	AFK, N		346,928	6	346,934
1981	AFK		707,037	118	707,155
1982	AFK		1,355,315		1,355,315
1983	AFK		765,924		765,924
1984	AFK, SG		402,825	4,886	407,711
1985	AFK, SG		1,273,951	3,840	1,277,791
1986	AFK, SG	2,156	909,219	20,683	932,058
1987[c]	AFK, SG, E, CC	7,015	2,986,061	2,549	2,995,625
1988	AFK, SG, E	6,110	1,667,238	42,694	1,716,042
1989[d]	AFK, SG, WNH, CC, MB	52,307	7,795,713	131,362	7,979,382
TOTAL		67,588	18,567,620	206,138	18,841,346

[a] Includes salmon harvested by private nonprofit hatcheries in Prince William Sound to generate revenues to offset operational costs. Does not include carcass sales.

[b] Hatchery codes: AFK = Armin F. Koernig Hatchery (PWSAC)
E = Esther Hatchery (PWSAC), renamed WNH in 1989
SG = Solomon Gulch Hatchery (VFDA)
N = NERKA Inc.
CC = Cannery Creek (PWSAC)
WHN = Wally Noerenberg Hatchery (PWSAC)
MB = Main Bay (ADF&G)

[c] PWSAC administered a sales harvest at the state owned Cannery Creek hatchery. A majority of the coho salmon sold were carcasses and surplus brood fish from the Solomon Gulch hatchery.

[d] PWSAC administered a sales harvest at the state owned Main Bay Hatchery to harvest a surplus of chum salmon due to the closure of the common propery fishery.

Appendix F.7. Summary of pink and chum salmon returns to Prince William Sound hatcheries, 1989.

Pink salmon returns to P.W.S. hatcheries.[a]

Hatchery	1988 Fry Release (millions)	1989 Forecast Return	Estimated Total Return	Marine Survival	Estimated C.P.F. Comm Catch[b]	Sales Harvest[c]	Escmt. and Brood[d]	Eggs Taken (millions)
Solomon Gulch	130.9	6,940,000	3,378,761	2.6%	2,500,000	667,814	210,947	142.8
A. F. Koernig	110.9	5,910,000	3,937,926	3.6%	0	3,716,053	221,873	126.9
Wally Noerenberg	195.3	10,220,000	7,130,475	3.7%	3,854,052	2,778,696	497,727	269.6
Cannery Creek	95.4	5,030,000	6,946,635	7.3%	6,013,955	633,150	299,530	161.1
Main Bay		0	0	0	0	0	0	0
Total Pink	532.5	28,100,000	21,393,797		12,368,007	7,795,713	1,230,077	700.4

Chum salmon returns to P.W.S. hatcheries.

Hatchery	1989 Forecast Return	Estimated Total Return	Estimated C.P.F. Comm Catch	Sales Harvestc	Escmt. and Broodd	Eggs Taken (millions)
Solomon Gulch	46,500	34,658	25,000	1,658	8,000	6.0
A. F. Koernig	80,300	10,899	0	9,334	1,565	0.2
Wally Noerenberg	326,500	241,988	159,611	17,429	64,948	54.1
Cannery Creek	0	0	0	0	0	0
Main Bay	224,800	117,941	15,000	102,941	0	0
Total Chum	878,100	405,486	199,611	131,362	74,513	60.3

[a] Estimates of the common property catch of pink salmon from the Sound's hatcheries are based on timing and location of catch as reported on fish tickets.

[b] Preliminary data - will change when 1989 CWT analysis is released.

[c] Data provided by PWSAC and VFDA. Does not include carcass sales.

[d] May include broodstock, overmature/green fish, holding mortalities and excess fish.

Appendix F.8. Estimated total hatchery and wild stock production of pink salmon, Prince William Sound, 1978 to 1989. Sales harvest data provided by PWSAC and VFDA.[a]

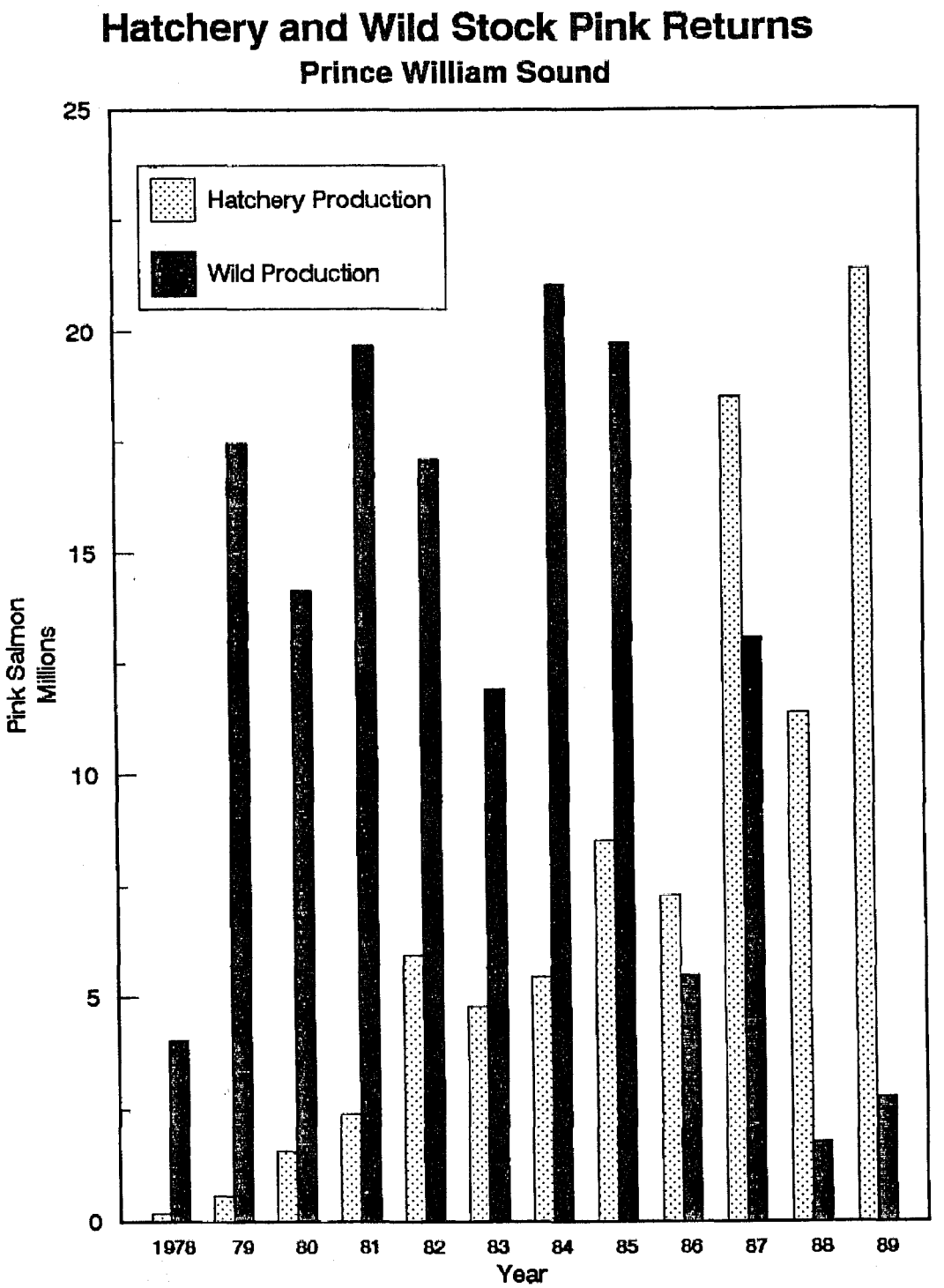
	Total Return by Hatchery[b]						
Year	Solomon Gulch (VFDA)	Armin F Koernig (PWSAC)	Wally Noerenberg (PWSAC)	Main Bay (ADF&G)	Cannery Cr. (ADF&G - PWSAC)	Total Hatchery	Total Wild Stock Component[c]
1978		154,620				154,620	4,049,172
1979		552,955				552,955	17,493,110
1980		1,493,489			90,348	1,583,837	14,139,800
1981		2,264,854			141,328	2,406,182	19,679,655
1982		5,134,363		35,000	760,389	5,929,752	17,122,211
1983	92,000	3,722,502		496,850	469,436	4,780,788	11,916,210
1984	200,000	2,900,000		1,200,000	1,139,000	5,439,000	21,037,567
1985	421,000	5,030,000		383,000	2,686,000	8,520,000	19,734,589
1986	1,240,000	4,964,000		232,000	853,000	7,289,000	5,482,529
1987	5,406,153	7,613,551	3,032,443	328,000	2,122,786	18,502,933	13,041,094
1988	1,057,996	6,108,238	3,866,618	100,000	227,688	11,360,540	1,765,936
1989	3,378,761	3,937,926	7,130,475	0	6,946,635	21,393,797	2,763,352[d]

[a] Prior to 1987, there was no definitive or statistically valid method of separating hatchery and wild stock composition in the commercial catch. The above estimates are based on presumed wildstock exploitation rates which in turn are determined by the wild stock escapement estimate. The wild stock escapement index is only a minimum estimate. The true wild stock escapement is not known. Consequently estimates prior to 1987 may exaggerate hatchery contributions somewhat. In 1987 returning adults from the Cannery Creek, Armin F. Koernig and and Esther hatcheries were marked with half length coded wire tags. In a jointly funded program conducted by ADF&G and PWSAC, these marked fish were recovered and analyzed to estimate hatchery contributions to the fishery (Geiger,1990).

[b] Hatchery totals include terminal harvests, brood stock collection, escapement and estimated common property fishery interception.

[c] Total wild stock return represents the estimated wild stock catch plus the aerial escapement index.

[d] Preliminary figures - will change when CWT analysis is released. 1989 wildstock component = 1,486,202 catch plus 1,277,150 escapement index.



Appendix F.9. Estimated total pink salmon returns to hatcheries and wildstock systems, Prince William Sound, 1978 - 1989.

APPENDIX G

SUBSISTENCE AND PERSONAL USE FISHERIES

Appendix G.1. Subsistence salmon harvest by species and gear type, Prince William Sound, 1989.

Area	Permits Issued	Permits Fished	Gear a Type	KING	SOCKEYE	COHO	OTHER b	TOTALS
PRINCE WILLIAM	11	1	D.G.N.	0	0	0	3	3
SOUND	0	0	P.S.	0	0	0	0	0
	0	0	S.N.	0	0	0	0	0
P.W.S. TOTAL	11	1		0	0	0	3	3
COPPER RIVER FLATS	75	32	D.G.N.	56	339	51	8	454
UPPER COPPER	78	78	D.N.	744	26716	65	0	27525
RIVER	308	308	F.W.	2160	53505	825	0	56490
TATITLEK c	14	5	MX.	0	107	628	31	766
SOUTHWESTERN c	8	7	MX.	0	322	0	734	1056
AREA TOTAL	494	431		2960	80989	1569	776	86,294

a D.G.N. = Drift gill net; P.S. = Purse seine; S.N. = Set net; MX. = Combination of gear (drift gill net and dip net); D.N. = Dip Net; F.W. = Fish Wheel

b Includes cutthroat and Dolly Varden as well as misc. salmon species.

c The "other" species catch column is composed of approximate 50/50 pink and chum salmon. This is the second year using these special subsistence permits.

Appendix G.2. Salmon catch and effort in the Copper River District subsistence gill net fishery, 1960 – 1989.

Year	Total Issued	Permits Returned				Catch				
		Unused	Unsuccessful	Successful	Total	Chinook	Sockeye	Coho	Total	
1960	13	No Record	No Record	Unknown	No Record			158	158	
1961	14	"	"	"	14	60	137	99	296	
1962	14	"	"	"	No Record	44	135	3	182	
1963	8	0	2	6	8	3	13	157	173	
1964	5	2			3	14			14	
1965	31	5	2	13	20	12	459	85	556	
1966	45	10	2	19	31	47	175		222	
1967	61	19	9	28	56	83	153		236	
1968	17	8	1	6	15	11	36		47	
1969	49	13	7	13	33	16	63	85	164	
1970	32	3	1	23	27	66	179		245	
1971	29	9	12	5	26	10	32	4	46	
1972	104	5		75	80	149	569	53	771	
1973	94			89	89	153	326	180	659	
1974	9	2	2	1	5	5	4	2	11	
1975	2			2	2	0	5	0	5	
1976	27			14	14	1	10	0	11	
1977	23			22	22	10	71	0	81	
1978	34	19		9	28	37	18	12	67	
1979	49	20	4	17	41	45	26	17	88	
1980	39	17	6	12	35	19	27	17	63	
1981	72	21	4	26	51	48	145	104	297	
1982	108	42	3	45	90	60	634	106	802	a
1983	87	42	4	27	73	79	107	57	254	b
1984	118	47	14	43	104	68	324	135	549	c
1985	94	27	9	58	94	88	261	83	433	d
1986	88	28	9	48	85	86	348	47	481	e
1987	95	50	5	34	89	49	359	14	510	f
1988	114	40	17	40	97	59	226	42	440	g
1989	75	32	2	30	64	56	339	51	454	h

a Includes 1 pink and 1 chum.
b Includes 11 pinks.
c Includes 22 pinks.
d Includes 1 chum.
e Includes 23 Dolly Varden.
f Includes 73 Dolly Varden, 6 Whitefish and 9 Cutthroat
g Includes 4 chum, 87 Dolly Varden, 15 Whitefish and 7 Cutthroat
h Includes 3 chum, 2 Dolly Varden, and 3 Whitefish

Appendix G.3. Salmon catch and effort in the Prince William Sound subsistence fishery, 1960 - 1989. a

	Permits		Catch						
Year	Issued	Returned	Chinook	Sockeye	Coho	Pink	Chum	Unknown	Total
1960	50		1	139	505	1282	75	150	2162
1961	12		3	41	123	732	3		902
1962	9				119	214	142		475
1963	9				406	298	24		728
1964	15			11		900			911
1965	22	16				179	25		204
1966	3	3		3	19	20	50		92
1967	4	3			4	4			8
1968	4	3			20	156		22	198
1969	7	3			16				16
1970	1	1							0
1971	3	2				46			46
1972	0								0
1973	19	16			289				289
1974	3	1							0
1975	2	0							0
1976	0								0
1977	4	4							0
1978	3	2							0
1979	15	2							0
1980	26	15		7	6				13
1981	12	8		3	29		2		34
1982	35	27		84	4	31	24		143
1983	26	21		22	36	9	79		146
1984	8	8		10		11	2		23
1985	22	16	1	27	16	14	26		84
1986	25	14		5	15				20
1987	18	17	5	31	6		16		58
1988	7	7	2	51	7	10	9		79
1989	11	7	0	0	0	0	3	0	3

a Includes only catches from Prince William Sound proper.

Appendix G.4. Salmon catch by species and numbers of permits by gear type for the Upper Copper River subsistence and personal use fisheries, 1965 - 1989.

		Permits Issued			Reported Catch			Reported Catch by Species			Total Catch	
Year		Dip Net	Fish Wheel	Total	Dip Net	Fish Wheel	Total	Chinook	Sockeye	Coho	Reported	Estimated
1965		982	143	1,125	7,215	5,813	13,028	664	12,760	52	13,476	16,818
1966		1,132	138	1,270	7,452	9,188	16,640	555	16,718		17,273	21,896
1967		1,166	154	1,320	6,146	8,360	14,506	419	14,457		14,876	19,007
1968		1,235	143	1,378	8,040	6,071	14,111	644	14,819	233	15,696	20,383
1969		1,415	167	1,582	18,054	6,220	24,274	719	27,604	224	28,547	29,266
1970		3,220	267	3,487	22,700	9,886	32,586	427	36,500	554	37,481	42,757
1971	(a)	4,168	374	4,542	28,115	9,370	37,485	1,363	37,517	363	39,243	48,449
1972	(b)	3,485	205	3,690	18,996	7,854	26,850	1,501	26,850	248 2	28,599	32,468
1973	(c)	3,840	305	4,145	16,407	10,943	27,350	1,846	27,350	51 3	29,247	29,248
1974	(d)	3,305	288	3,593	15,143	7,657	22,800	1,141	22,800	163 4	24,104	26,001
1975		2,452	350	2,802	7,694	5,626	13,320	1,705	13,320		15,025	15,357
1976		2,512	451	2,963	12,130	8,321	20,451	2,017	20,451	17	22,485	23,623
1977		3,526	540	4,066	22,612	12,751	35,363	2,171	35,363	454	37,988	41,815
1978		3,313	392	3,705	12,569	6,638	19,207	2,050	19,207	633	21,890	22,029
1979		2,730	470	3,200	11,887	10,251	22,138	2,372	22,138	705	25,215	30,963
1980		2,804	399	3,203	14,650	9,805	24,455	2,256	21,437	639	24,332	35,081
1981		3,555	523	4,078	28,872	26,924	55,796	1,913	53,008	849	55,770	68,746
1982	(e)	5,475	615	6,090	62,614	38,120	100,734	2,532	96,799	1,246	100,577	110,006
1983		6,911	630	7,541	72,257	35,791	108,228	5,421	100,995	1,690	108,106	118,728
1984	s	104	458	562	1,288	20,374	21,662	415	20,999	237	21,651	23,093
	p	5,311	17	5,328	46,018	223	46,241	1,592	44,079	552	46,223	49,940
	s&p	5,415	475	5,890	47,306	20,597	67,903	2,007	65,078	789	67,874	73,033
1985		4,153	533	5,686	29,856	22,877	52,733	1,673	50,488	544	52,705	64,200
1986	s(f)	39	366	405	645	25,136	25,781	622	24,890	264	25,776	28,423
	p	3,966	65	4,031	41,641	1,054	42,695	2,294	39,794	521	42,609	44,047
	s&p	4,005	431	4,436	42,286	26,190	68,476	2,916	64,684	785	68,385	72,470
1987	s(f)	59	372	431	1,148	21,821	22,969	541	22,286	100	22,969	35,035
	p	4,186	73	4,259	42,301	470	42,771	2,739	39,614	398	42,771	46,115
	s&p	4,245	445	4,690	43,449	22,291	65,740	3,280	61,900	498	65,740	81,150
1988	s	70	339	409	1,860	18,955	20,815	672	19,761	245	20,678	30,514
	p	4,205	46	4,251	40,492	1,238	41,730	2,723	38,533	450	41,730	45,921
	s&p	4,275	385	4,660	42,352	20,193	62,545	3,395	58,294	695	62,545	76,435
1989	s	78	309	386	2,235	25,377	27,612	744	26,716	65	27,525	29,317
	p	4,447	137	4,584	53,321	3,223	56,544	2,160	53,505	825	56,490	58,914
	s&p	4,525	446	4,970	55,556	28,600	84,156	2,904	80,221	890	84,015	88,231

(a) Last use of Dip Net/Fishwheel combination permits.

(b) First issue of permits at Chitina

(c) Last "Blacklist" used

(d) Issue of permits at Chitina and Glennallen only.

(e) Return requirement enforced.

(f) Subsistence dip net catch estimated.

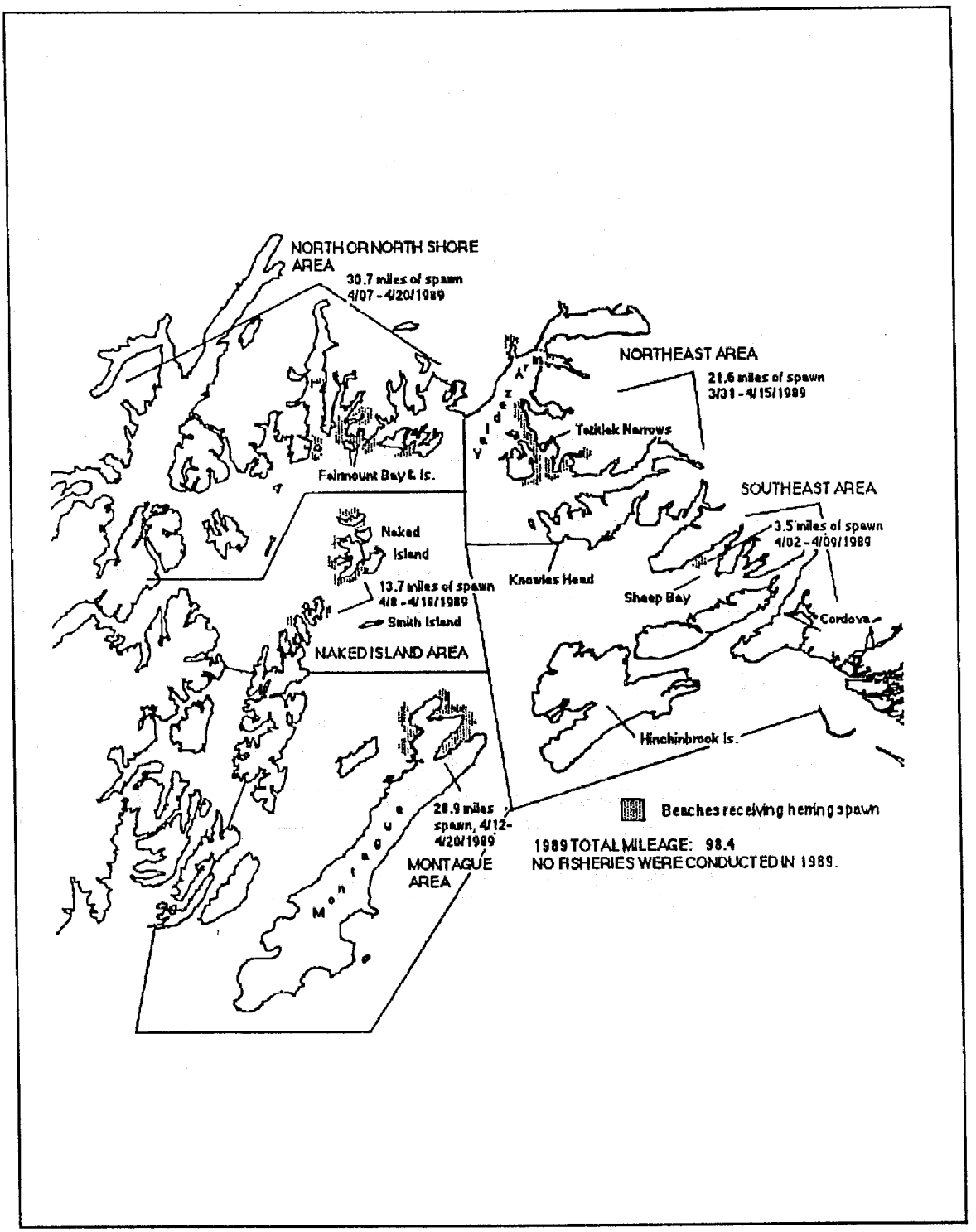
s = subsistence

p = personal use

s&p = total catch (1984,1986,1987, and 1988)

APPENDIX H

HERRING

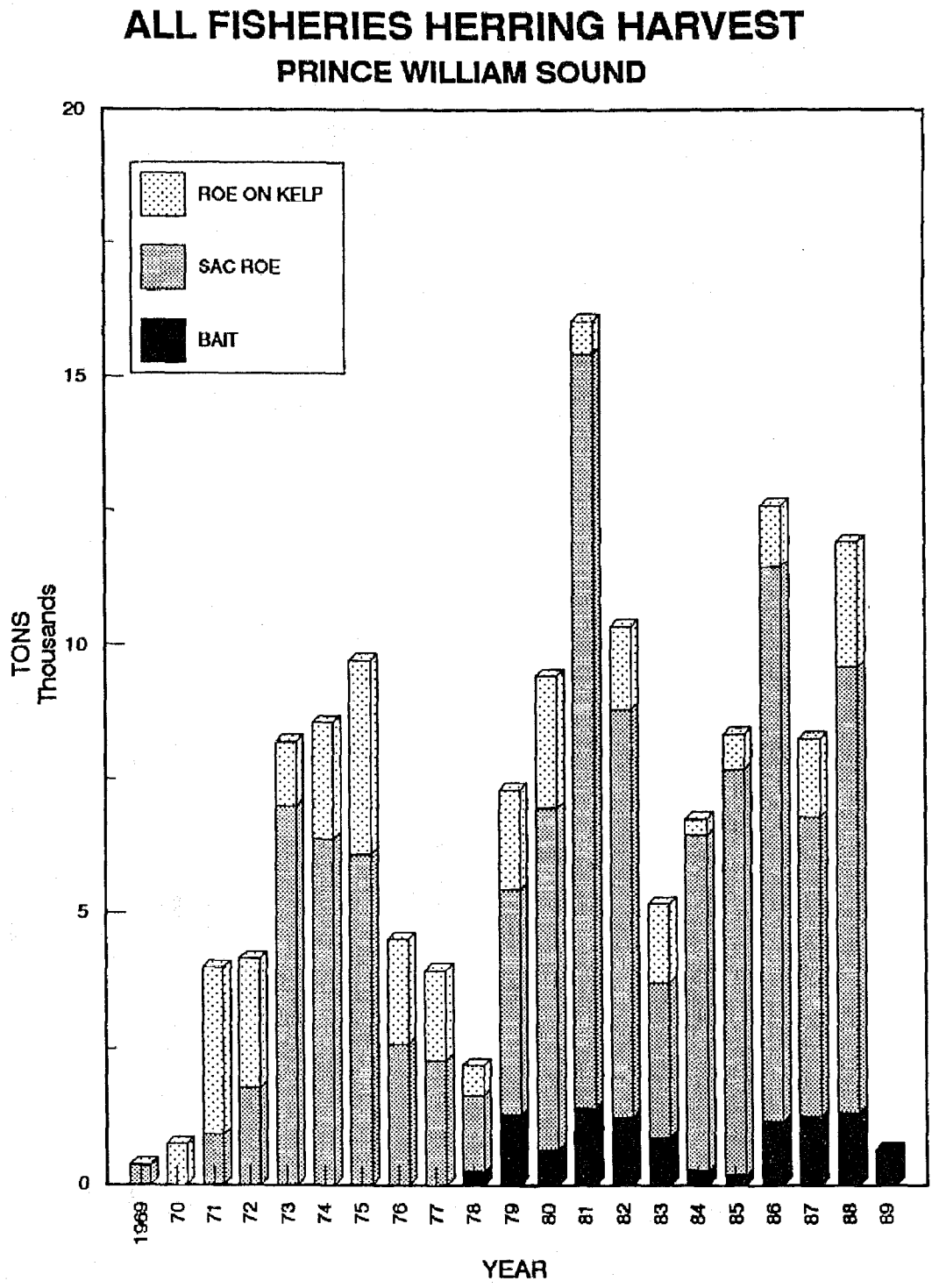


Appendix H.1. Miles & dates of herring spawn, PWS, 1989, delineated by aerial & skiff surveys in the 5 major spawning areas used in the spawn deposition biomass estimate.

Appendix H.2. Commercial herring harvest summary with fishing locations and effort by gear type, Prince William Sound, 1989.

			Fishing		Harvest (short tons)		
Fishery	Area	Date(s)	Duration	Effort	Roe on Kelp	Herring	
Sac Roe Seine	Total		0 hrs.	0		0.0	a
Sac Roe Gillnet	Total		0 hrs.	0		0.0	a
Spawn on Kelp	Total		0 hrs.	0	0.0	0.0	a
Pound Kelp	Total			0	0.0	0.0	a
Bait/Food	General	11/01-1/31/90		3		646.1	
	Total Equivalent harvest of herring					646.1	

a The spring herring sac roe, spawn on kelp, and pound fisheries were closed in 1989 due to risk of contamination of product with oil.



Appendix H.3 Commercial herring harvest by fishery, Prince William Sound, 1969-1989.

Appendix H.4. Herring sac roe seine and gill net fishery effort, anticipated and actual harvest, and peak aerial estimate, Prince William Sound, 1969 - 1989.

	Seine Fishery						Gillnet Fishery				Combined Fisheries	
Year	Seine Fishery Opening Dates	Effort Hours	Effort (Boats)		Antcipated Harvest a	Harvest (Tons)	Gillnet Fishery Opening Dates	Effort Hours	Effort (Boats)	Antcipated Harvest a	Harvest (Tons)	Peak Aerial Est.(Tons)	Harvest (Tons)
1969	3/01 - 6/30		6			355.7							355.7
1970	3/01 - 6/30		1										
1971	3/01 - 6/30		14			919.3							919.3
1972	3/01 - 6/30		15			1,772.6							1,772.6
1973	4/23 - 5/09		28			6,984.4							6,984.4
1974	4/10 - 4/17		72			6,368.2			3		3.8		6,372.0
1975	4/15 - 4/22	14	76			6,081.5		14				1,323.0	6,081.5
1976	5/08 & 6/01	13	66			2,584.5		13				8,809.0	2,584.5
1977	4/09 - 4/10	38	60			2,282.9		38	1		1.6	18,643.0	2,284.5
1978	4/17 - 4/21	b 106	75			1,329.6			38		61.7	9,228.0	1,391.3
1979	4/07 - 4/19		89			4,138.6						31,631.0	4,138.6
1980	4/01 - 4/09		74			6,043.2	4/17 - 5/05		16		264.5	49,844.0	6,307.7
1981	4/01 - 4/09	60	101			13,770.6	4/16 - 4/18	53	18		234.6	51,090.0	14,005.2
1982	4/23	2	104			7,148.3	4/24 - 4/26	54	18		393.9	34,861.0	7,542.2
1983	4/13	1	103	c		2,724.2	4/21 - 4/22	24	22		105.4	33,803.0	2,829.6
1984	4/14	3	105	d	5,000	5,836.9	4/18 - 4/22	59	24	250	342.9	45,655.0	6,179.8
1985	4/28 - 4/29	4	103	e	5,000	6,924.8	4/29 - 5/01	34	21	250	413.3	26,162.0	7,338.1
1986	4/17	3	105		5-7,000	9,828.1	4/24 - 4/28	90	25	3-400	448.6	15,150.0	10,276.7
1987	4/08 - 4/09	1.5	96		3-5,000	4,982.2	4/10 - 4/11	24	25	2-300	533.3	24,090.0	5,515.5
1988	4/21 - 4/22	2	105		4-5,000	7,895.9	4/23	5.5	24	275	358.1	34,270.0	8,254.0
1989	None				6,400	0.0	None	0	0	375	0	56,915.0	0.0

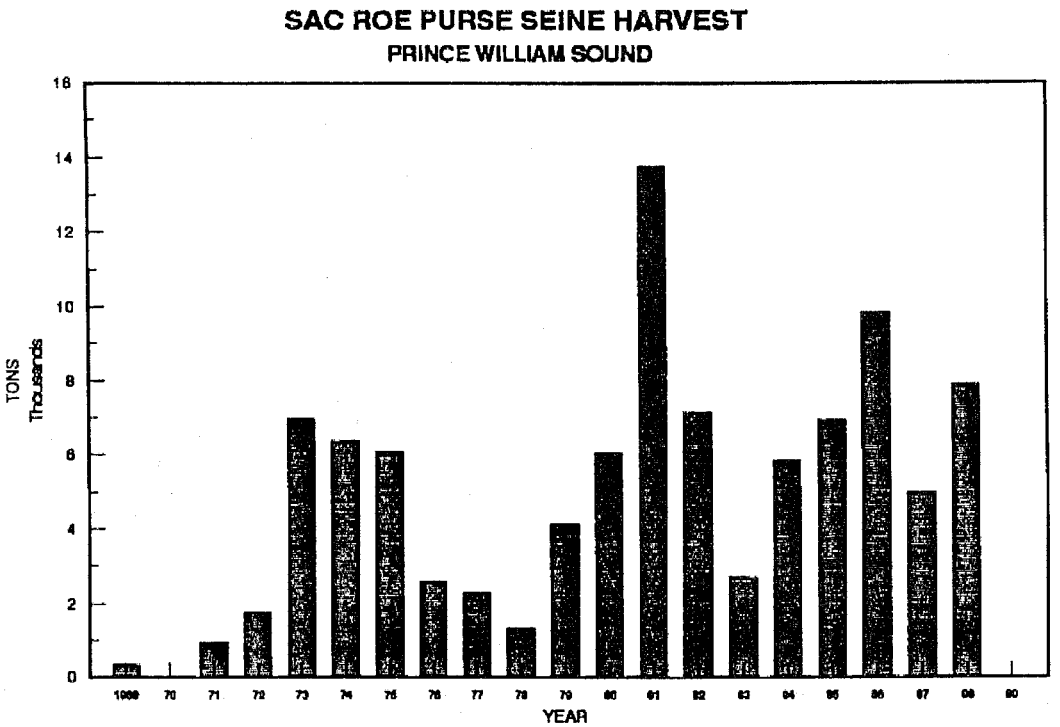
a Anticpated harvest figures based on pre season harvest outlook projections.

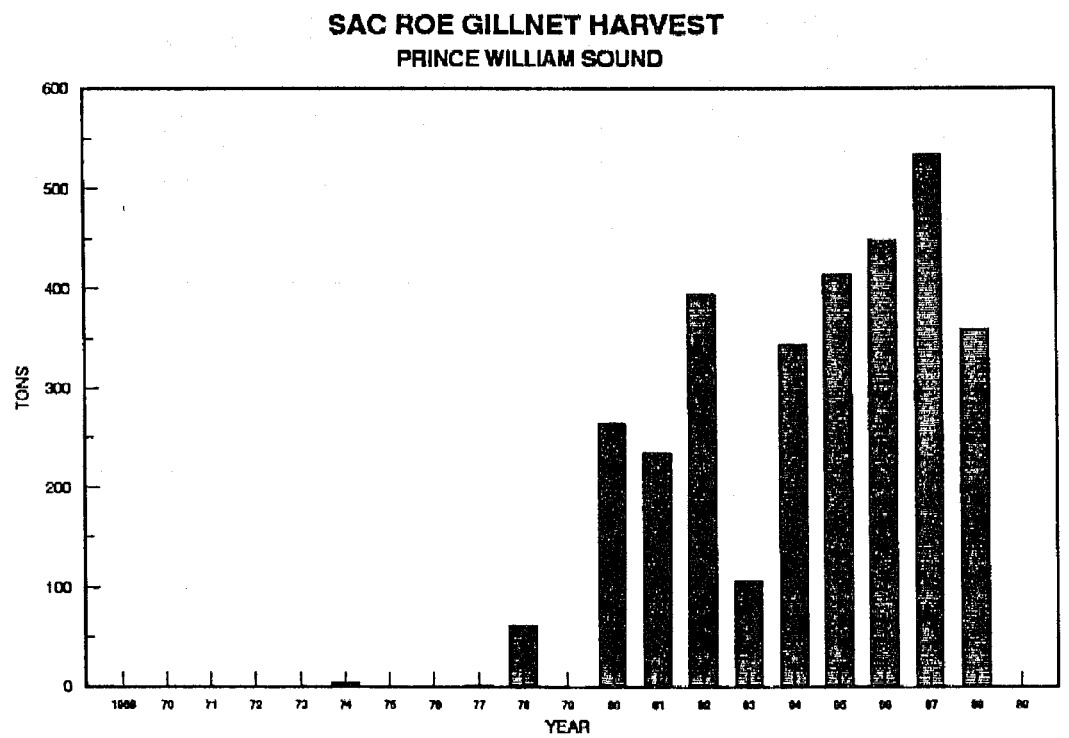
b An addition opening was scheduled on 5/14 for 6 hours, but resulted in no harvest.

c 103 boats participating but only 72 actually made deliveries.

d 105 boats participating but only 101 actually made deliveries.

e 103 boats participating; 62 made deliveries at Montague and 90 made deliveries in the Northern District.





Appendix H.5. Herring sac roe purse seine and gill net harvests, Prince William Sound, 1969 - 1989.

Appendix H.6. Herring eggs on kelp harvests from natural spawning, Prince William Sound, 1969 - 1989.

Year	Fishery Dates	Hours	Effort (Divers)	Harvest Pounds a	Harvest Tons	Herring Utilized b Tons
1969	5/18-5/31		3	5,300	2.7	21.2
1970	4/19-6/06		29	190,300	95.2	761.2
1971	4/18-5/15		34	769,300	384.7	3,077.2
1972	4/30-5/20		397	599,300	299.7	2,397.2
1973	4/23-5/26		176	306,300	153.2	1,225.2
1974	4/22-5/04		166	552,100	276.1	2,208.4
1975	4/25-5/10		437	917,100	458.6	3,668.4
1976	4/21- ?		357	484,900	242.5	1,939.6
1977	4/27-12/31		164	417,000	208.5	1,668.0
1978	4/20-4/30		66	140,900	70.5	563.6
1979	4/25-5/03		198	473,200	236.6	1,892.8
1980	4/23-4/30	10	469	612,300	306.2	2,449.2
1981	4/25	12	214	122,400	61.2	489.6
1982	5/05-5/08	73	151	309,600	154.8	1,238.4
1983	4/27	12	186	303,200	151.6	1,212.8
1984	SEASON CLOSED		225 c			0.0
1985	5/06&5/08	20	95	41,300	20.7	165.2
1986	4/30-5/03	86	29	95,200	47.6	380.8
1987	4/15-4/17	44	60	176,400	88.2	705.6
1988	4/29&4/30	12	158	193,200	96.6	772.8
1989	SEASON CLOSED				0	

a Rounded to nearest 100 pounds.

b Indicates the annual removal of reproductive capacity from the population based on the assumption that average fish roe recovery is 10% and 80% of spawn on kelp harvest weight consists of eggs.

c Permits issued.

Appendix H.7. Herring eggs on kelp produced in pounds, Prince William Sound, 1979 - 1989.

Year	a Fishery Dates	b Permits Issued	c Pounds Constructed	d Producing Pounds	Herring e Utilized (Tons)	Ribbon lbs.	Ribbon Tons	Macrocystis lbs.	Macrocystis Tons	Total f lbs.	Total f Tons
1979		2	0								
1980	4/14	14	4	2	27 - 44	1,771	0.9	880	0.4	2,651	1.3
1981	4/14	18	18	7	193 - 322	17,217	8.6	2,100	1.1	19,317	9.7
1982	4/29-5/10	25	20	18	511 - 851	50,165	25.1	900	0.5	51,065	25.5
1983	4/30-5/04	47	38	26	555 - 924	35,364	17.7	20,100	10.1	55,464	27.7
1984	4/24-5/08	65	45	37	504 - 840	12,839	6.4	37,572	18.8	50,411	25.2
1985	4/25-5/07	81	59	50	803 - 1,338	24,199	12.1	56,131	28.1	80,262	40.1
1986	4/21-4/28	104	82	81	1,444 - 2,407	0	0	144,400	72.2	144,400	72.2
1987	4/10-4/21	111	111	108	1,224 - 2,040	0	0	122,400	61.2	122,400	61.2
1988	4/12-4/23	122	122	119	2,480 - 4,133	0	0	248,000	124.0	248,000	124.0
1989	SEASON CLOSED				0						

a Dates that the fishery was opened to seine herring for placement into pounds.

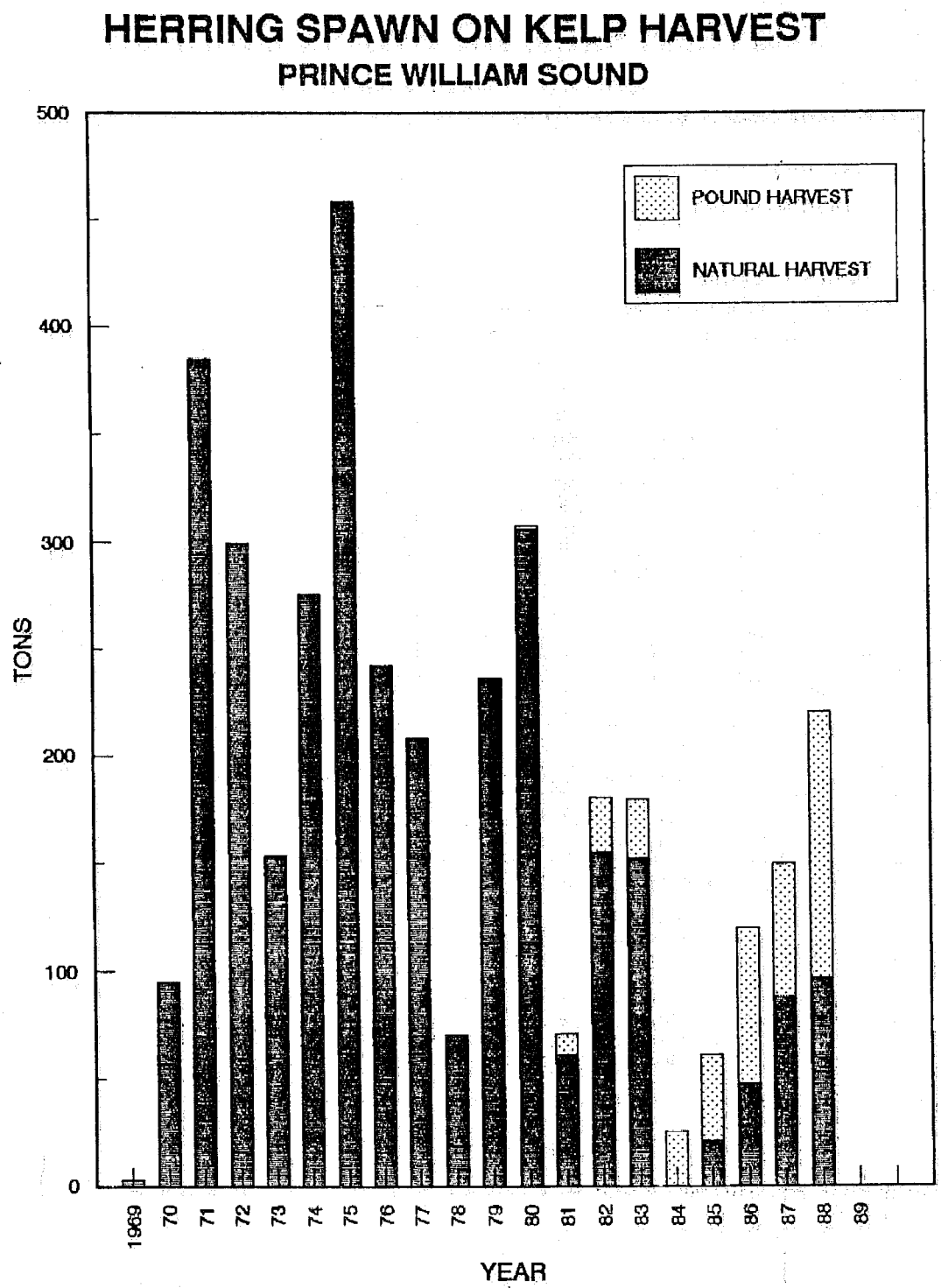
b Permits issued to applicants on register prior to the March 1 deadline.

c Number of individual pounds constructed by the April 1 deadline, and consequently the number of individuals receiving an equal allocation of the guideline harvest.

d Number of pounds that were successful in producing roe on kelp product. Due to the group cooperation in this fishery production is frequently reported for a few individuals whose pounds did not produce roe on kelp product.

e Minimum tonnage based on the following assumptions: 100% of the harvest is roe; equal amounts of roe on web as on the kelp; 10% herring with 100% spawning success.
Maximum tonnage based on the following assumptions: 100% of the harvest is roe; equal amounts of roe on web as on the kelp; 10% herring with 60% spawning success.

f Production figures represent processed weights as reported on fish tickets.



Appendix H.8. Herring spawn on kelp harvest, Prince William Sound, 1969 - 1989.

Appendix H.9. Daily commercial herring food and bait harvest as reported on fish tickets, Prince William Sound, 1989.

Year	Date	Effort	Harvest a		Cumulative Harvest	
			lbs.	Tons	lbs.	Tons
1989	11/02	–	177,000	88.5	177,000	88.5
"	11/03	–	214,800	107.4	391,800	195.9
"	11/04	–	85,600	42.8	477,400	238.7
"	11/05	–	299,400	149.7	776,800	388.4
"	11/06	–	68,600	34.3	845,400	422.7
"	11/08	–	175,200	87.6	1,020,600	510.3
"	11/12	–	271,400	135.7	1,292,000	646.1
Totals		–	1,292,000	646.1		

a All harvests from the General District. Effort was concentrated in the vicinity of Knowles Head.

Appendix H.10. Commercial herring bait and food harvests in short tons, Prince William Sound, 1970 - 1989. a

	Seine		Pair Trawl		Mid-Water Trawl		Otter Trawl		
Year a	Effort	Harvest Tons	Effort	Harvest Tons	Effort	Harvest Tons	Effort	Harvest Tons	Total Tons
1970	1	10.0							10.0
1971	2	20.0							20.0
1972	1	4.9							4.9
1973	1	8.5							8.5
1977-78 b	2	17.0	2	145.3	1	90.4			252.7
1978-79 c	2	195.4	2	988.8	1	103.2	1	2.5	1,289.9
1979-80 d	1	510.9	2	145.1					656.0
1980-81 e	3	1,030.5	3	386.0					1,416.5
1981-82 f	6	1,189.5	2	73.1					1,262.6
1982-83	5	883.2							883.2
1983-84	2	273.6							273.6
1984-85	2	1,021.7							1,021.7
1985-86 g	5	1,118.1							1,118.1
1986-87 h	5	1,276.2							1,276.2
1987-88 i	7	1,189.4							1,189.4
1988-89 j	7	1,335.3							1,335.3
1989-90 k	3	646.1							646.1

a -No harvest in years not listed.

b -Starting 1977 bait herring season includes portions of two calendar years, unless closed by E.O.

c -Fishery opened by emergency order on October 16,1979 and extended on January 7, 1980. Deliveries made through March 2.

d -Fishery season opened by emergency order September 15,1979, closed Dec. 31, 1979, and reopened by emergency order from Feb. 16 - 28, 1980.

e -Fishing season opened by regulation on September 15,1980 and closed by emergency order on November 7,1980.

f -Fishing season opened by regulation on September 15,1981 and closed by emergency order on September 30,1981.

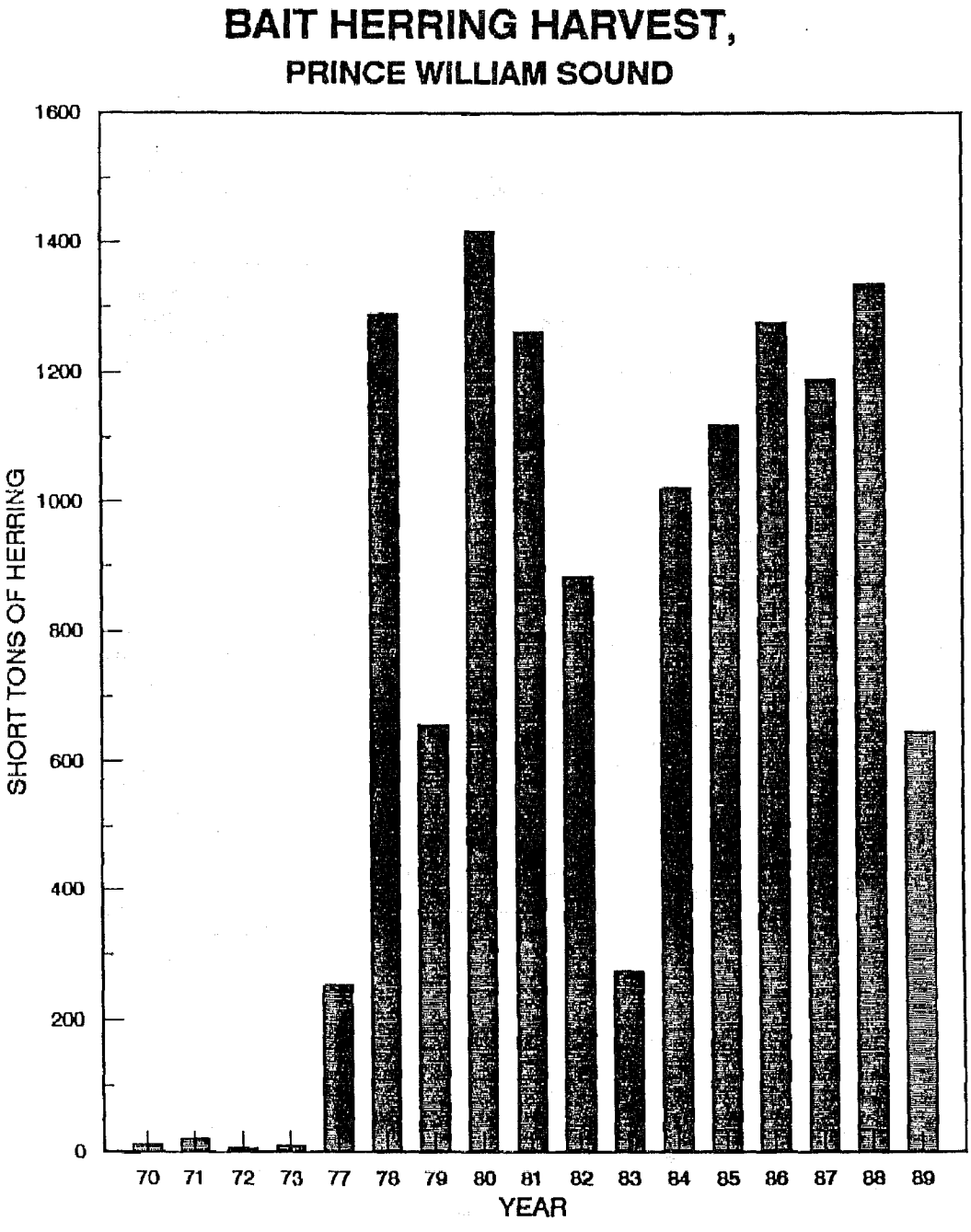
g -Fishing season opened by regulation on September 1,1985 and closed by emergency order on February 15,1986.

h -Fishing season opened by regulation on September 1,1986 and closed by emergency order on October 24,1986.

i -Fishing season opened by regulation on September 1, 1987 in the General District. The Northern and Eastern Herring Districts opened on September 23. The season was then closed by emergency order on October 6 for a period of five weeks, reopened on November 9, and closed for the duration of the 1987-88 season on November 12, 1987.

j -Fishery open from November 1 until November 5.

k -Fishery opened by regulation from November 1, 1989 and closed by emergency order on January 31, 1990.



Appendix H.11. Food and bait herring harvests, Prince William Sound, 1970 - 1989.

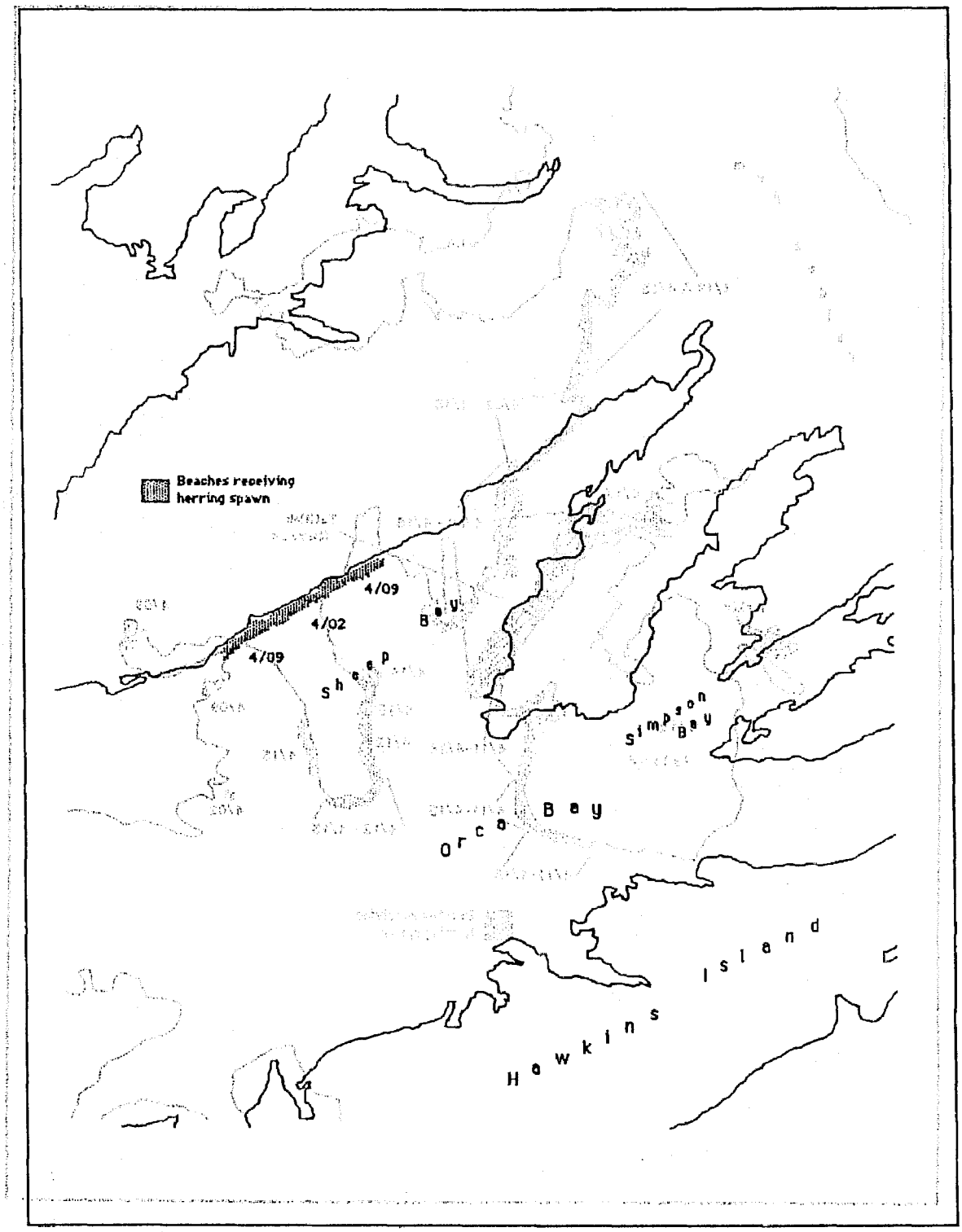
Appendix H.12. Peak aerial survey herring biomass and miles of spawn by area, Prince William Sound, 1989.

Survey Area	Peak Aerial Survey Date a	Peak Aerial Biomass Est.(tons)		Spawn Deposition Biomass Est.(tons) b	Total Miles of Spawn
SOUTHEAST AREA					
Simpson Bay		0			
Sheep Bay	4/07	10			
Hinchinbrook	4/18	70			
Port Gravina	4/05 & 4/17	90	c		
AREA TOTAL		170		45	3.5
NORTHEAST AREA					
Port Fidalgo	4/05 & 4/12	3,700	c		
Tatitlek Area	4/06 & 4/11	1,250	c		
Valdez Arm	4/08	5,510			
AREA TOTAL		10,460		7,880	21.6
NORTH SHORE					
Pt.Free.-Granite Pt.	4/07	4,110			
Granite Pt.-Esther Pass	4/07	9,680			
AREA TOTAL		13,790		20,020	30.7
NAKED ISLAND AREA					
Perry Island		0			
Naked Island Group	4/12	4,785			
Knight Island Area	4/15	210			
AREA TOTAL		4,995		11,183	13.7
MONTAGUE AREA					
Montague Island	4/12	27,500			
Green Island		0			
AREA TOTAL		27,500		18,452	28.9
ALL AREAS TOTAL		56,915		57,580	98.4

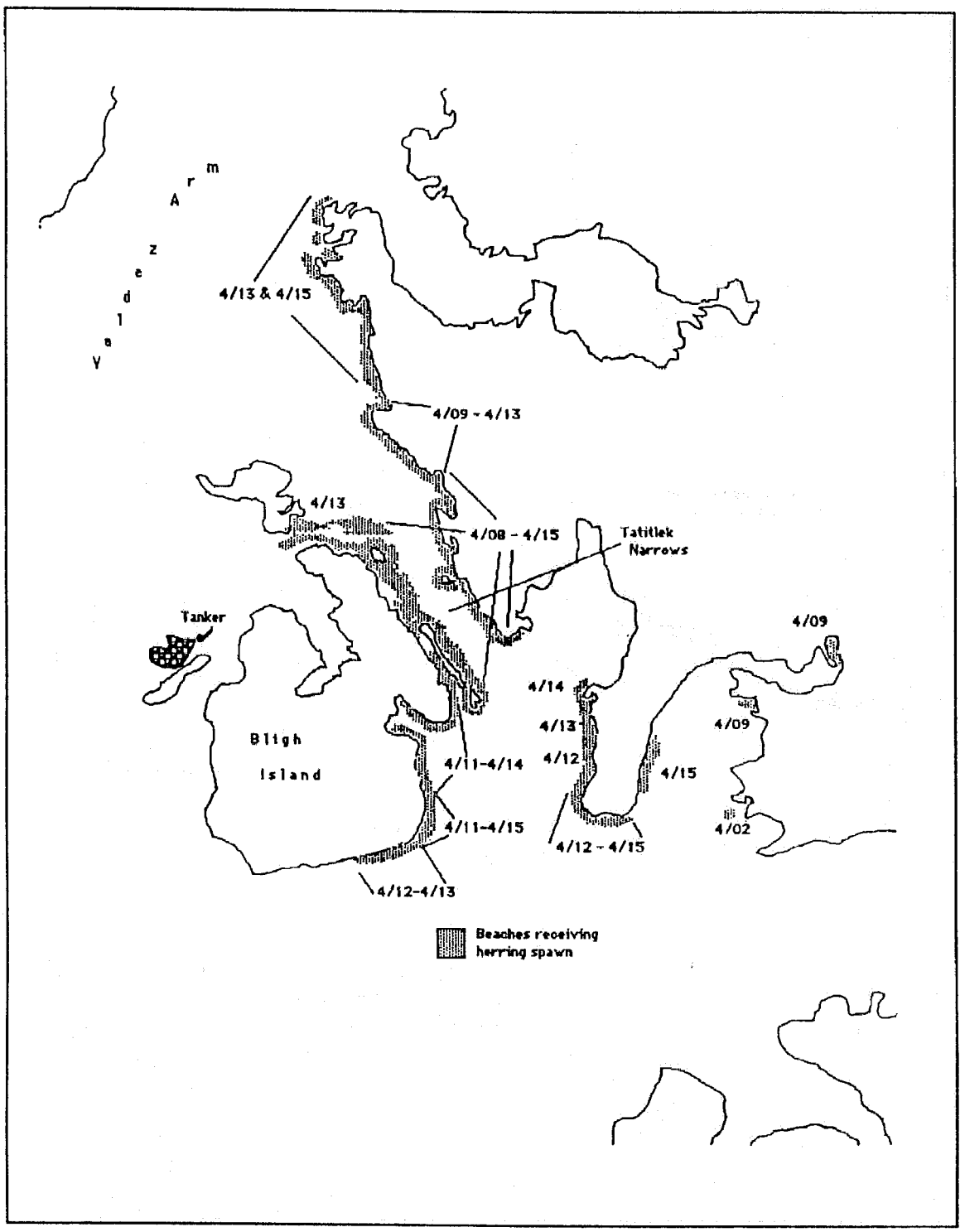
a Date or dates that the peak biomass observations were made.

b Herring spawner biomass estimates based on dive surveys. This estimate does not include the commercial catch.

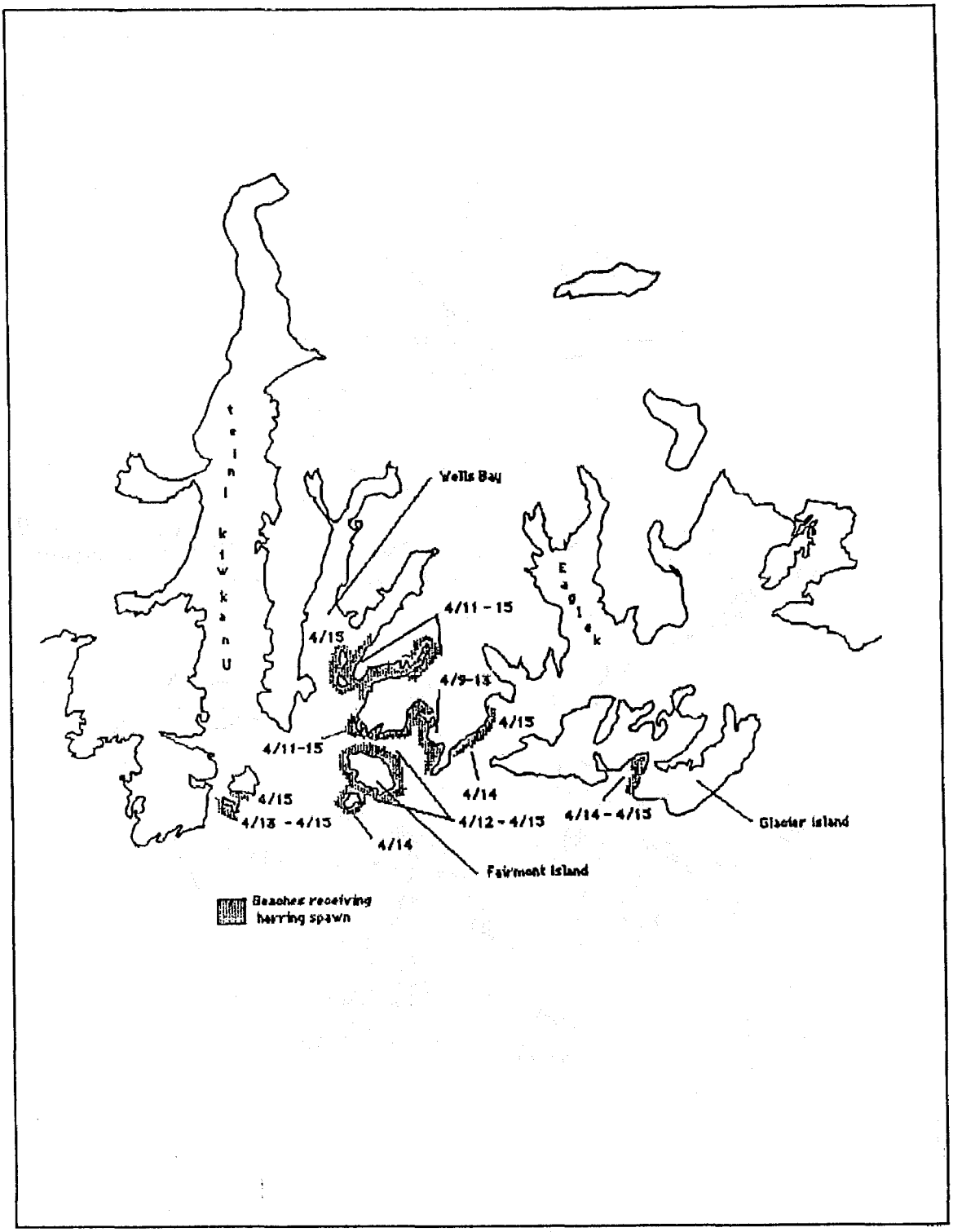
c Aerial estimates that are based on more than one peak or date.



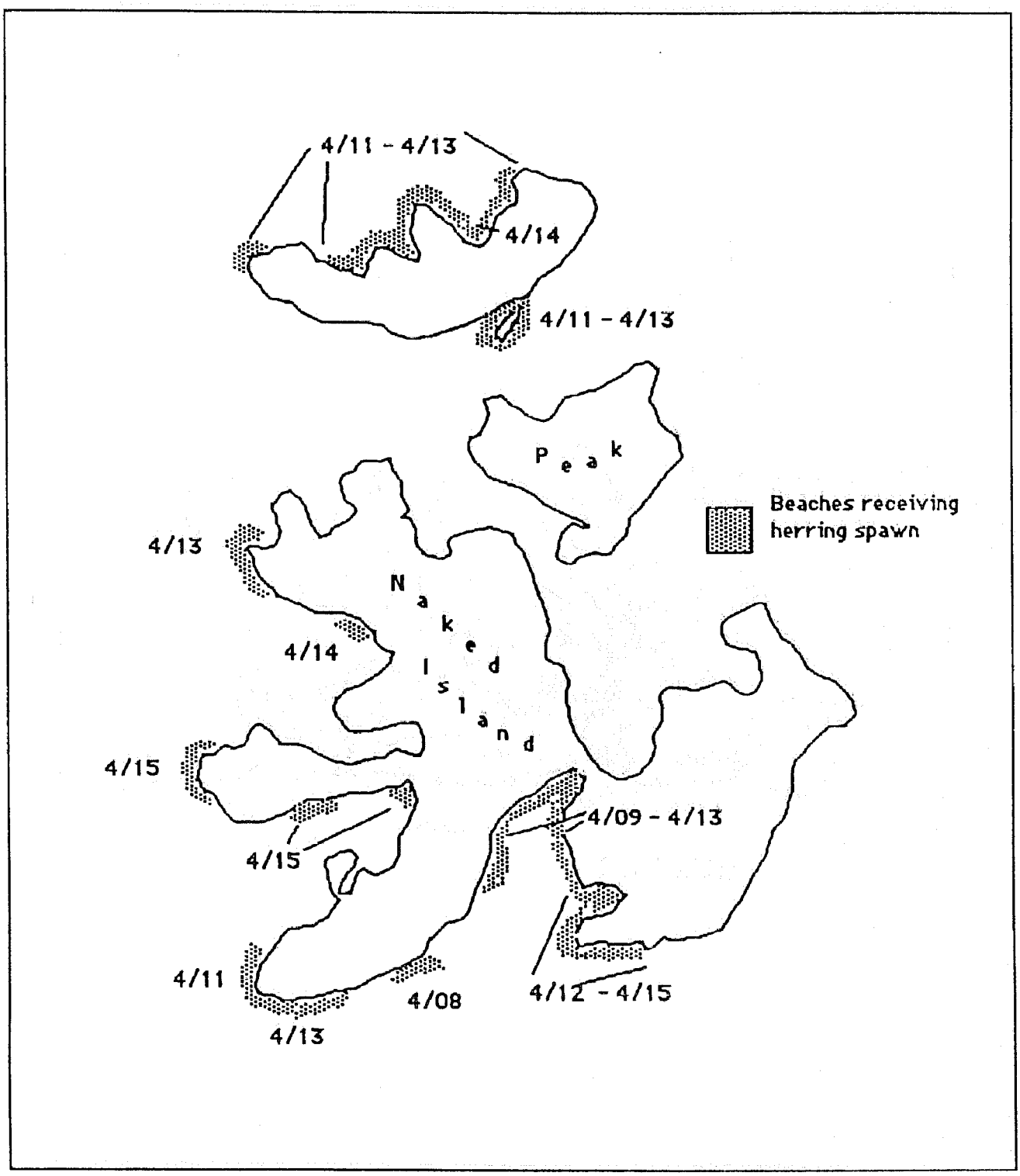
Appendix H.13. Beaches receiving herring spawn and dates of spawning in the Sheep Bay (Southeast) area, Prince William Sound, 1989.



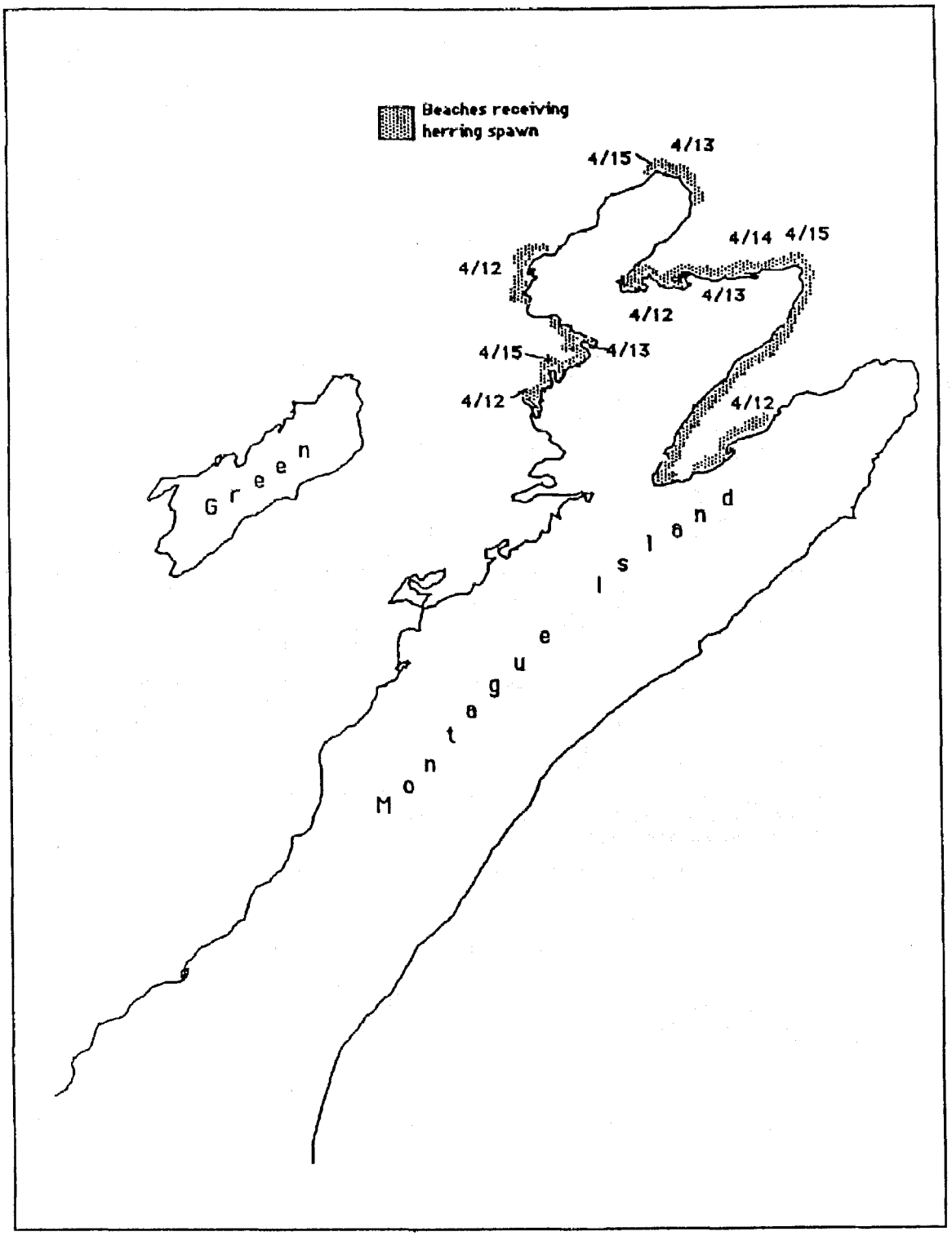
Appendix H.14. Beaches receiving herring spawn and dates of spawning in the Tatitlek Narrows, Bligh Isand (Northeast) area, Prince William Sound, 1989.



Appendix H.15. Beach areas receiving spawn and dates of spawning in the North (Shore) Area, Prince William Sound, 1989.



Appendix H.16. Beaches receiving herring spawn and dates of spawning in the Naked Island area, Prince William Sound, 1989.



Appendix H.17. Beaches receiving herring spawn and dates of spawning in the Northern Montague area, Prince William Sound, 1989.

Appendix H.18. Annual herring biomass indices, Prince William Sound, 1978 - 1989.

Year	Total Sac Roe Harvest a	Peak Aerial Estimate b	Maximum Possible Observed Biomass c	Miles of Spawn d	Mile Days of Spawn e	Est. Biomass from Spawn Surveys f
1978	1,391	9,228	36,060	47.4	36.3	
1979	4,139	31,631	107,390	67.1	72.2	
1980	6,308	49,844	122,020	53.3	73.9	
1981	14,005	51,090	161,690	99.7	140.1	
1982	7,542	34,861	97,620	59.1	65.1	
1983	2,830	33,803	107,710	49.7	99.7	22,000
1984	6,180	45,655	158,760	65.8	86.8	79,710
1985	7,484	26,162	60,784	83.2	149.5	
1986	10,277	15,150	54,820	78.6	152.3	
1987	5,516	24,090	52,192	72.8	155.9	
1988	8,254	34,270	67,175	166.3	236.9	43,581
1989	0	56,915	186,708	98.4	183.7	57,580

a Represents the combined seine and gillnet sac roe harvest in short tons.

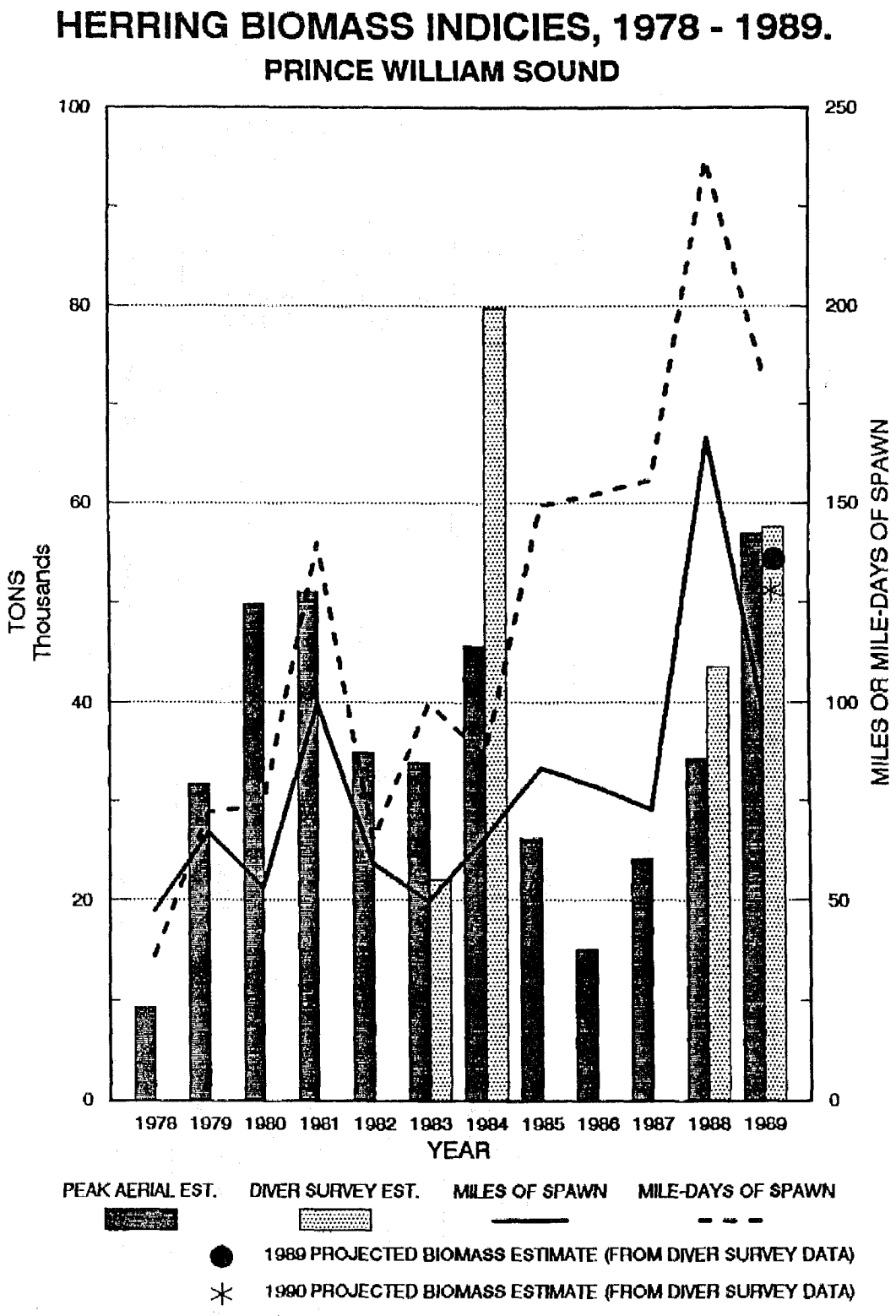
b Largest single day aerial estimate of herring biomass in short tons. Peak estimates for different areas (ie. Valdez Arm vs. Montague) may occur on different days.

c The sum of all daily aerial biomass estimates for a given year.

d Total linear miles of spawn.

e The sum of the daily observed linear miles of herring spawn.

f Estimates are made from underwater surveys of spawn deposition; 1983 is a partial estimate of the spawning biomass, while 1984 and 1988 estimates are of the entire spawning biomass.

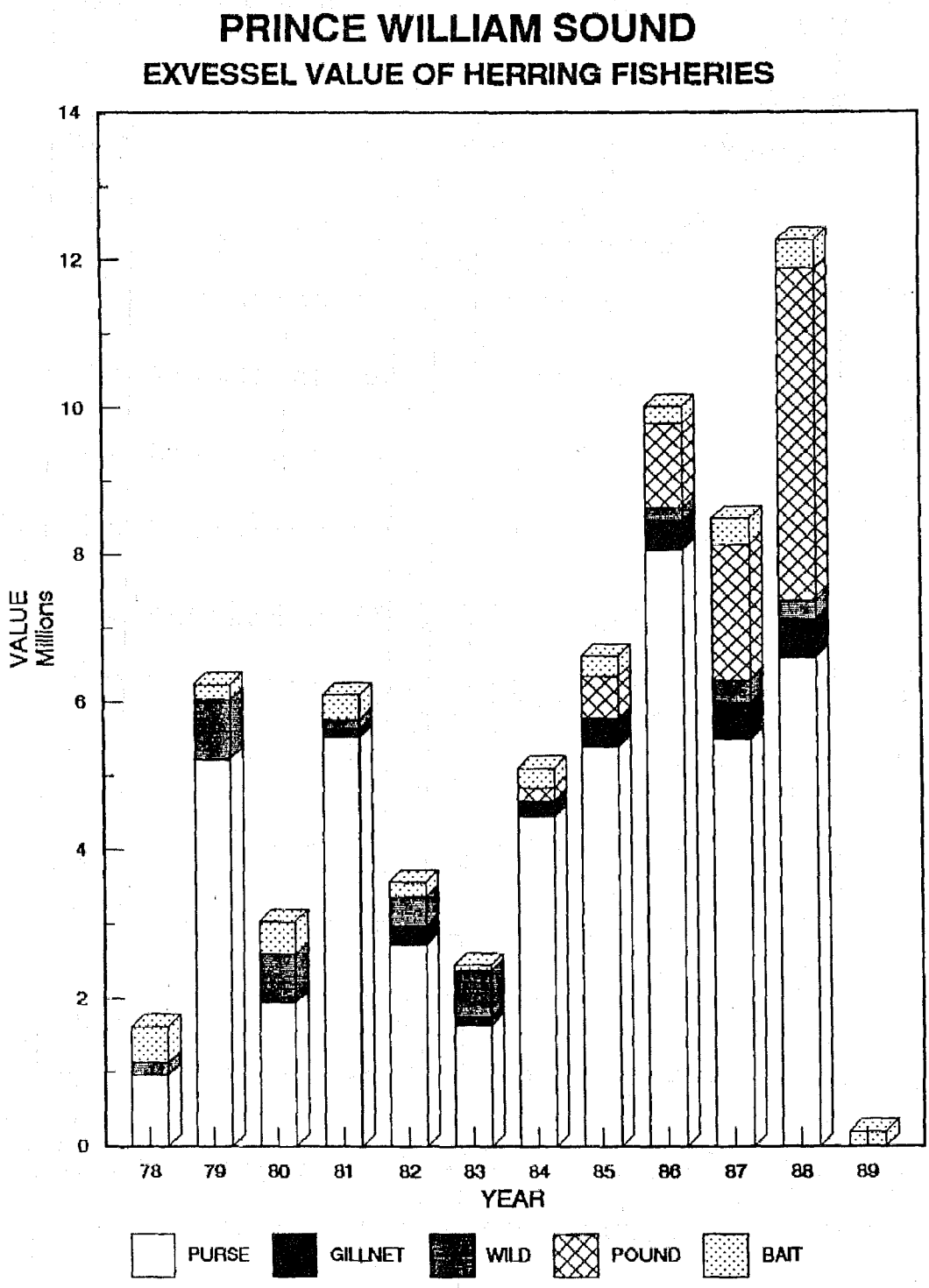


Appendix H.19. Annual herring biomass indices, Prince William Sound, 1978 - 1989.

Appendix H.20. Mean price and estimated exvessel value of the commercial herring harvest by gear type, Prince William Sound, 1978 – 1989. a

	Sac Roe Fisheries				Roe on Kelp Fisheries				Food and Bait Fishery		
	Purse Seine		Gillnet		Wild Harvest		Pounding		Mixed Gear		
Year	Price per ton	Total Value	Price per ton	Total Value	Price per pound	Total Value	Price per pound	Total Value	Price per ton	Total Value	TOTAL VALUE
1978	$720	$956,800		$0	$1.25	$175,000		$0	$380	$489,820	$1,621,700
1979	$1,260	$5,213,880		$0	$1.74	$821,280		$0	$300	$196,800	$6,231,960
1980	$320	$1,933,760		$0	$1.09	$667,080		$0	$300	$424,800	$3,025,640
1981	$400	$5,508,000	$580	$135,720	$1.00	$122,000		$0	$260	$328,120	$6,093,840
1982	$380	$2,716,240	$640	$251,520	$1.29	$397,320		$0	$220	$194,260	$3,559,340
1983	$600	$1,634,400	$1,040	$109,200	$2.10	$634,200		$0	$260	$70,980	$2,448,780
1984	$760	$4,435,360	$640	$218,880		$0	$3.50	$176,439	$260	$265,460	$5,096,139
1985	$760	$5,380,800	$900	$371,700	$0.48	$19,200	$7.09	$569,058	$250	$279,500	$6,620,258
1986	$820	$8,058,960	$920	$412,160	$1.70	$159,800	$8.00	$1,155,200	$180	$229,680	$10,015,800
1987	$1,100	$5,480,200	$960	$511,680	$1.70	$299,200	$15.00	$1,836,000	$300	$356,700	$8,483,780
1988	$840	$6,600,000	$1,400	$537,000	$1.20	$232,000	$18.00	$4,500,000	$300	$400,590	$12,236,500
1989	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	$300	$193,830	$193,830

a Value of harvest and price per ton are estimates based on verbal reports from processors and fishermen obtained post season.



Appendix H.21. Annual exvessel value of commercial herring fisheries, Prince William Sound, 1978 - 1989.

Appendix H.22. Age, sex and size composition of Pacific herring from the spring test purse seine samples, Prince William Sound, 1989.

		MALES						FEMALES						SEXES COMBINED					
				LENGTH		WEIGHT				LENGTH		WEIGHT				LENGTH		WEIGHT	
	AGE	NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	0	0.0	NA	NA	NA	NA	1	0.1	188	NA	86	NA	1	0.1	188	NA	86	NA
	4	16	2.0	192	7	89	12	19	2.3	197	8	100	15	35	4.3	195	8	95	14
Unakwik Inlet	5	248	30.4	206	9	116	16	278	34.0	208	10	123	17	528	64.6	207	10	120	17
& Olsen Island	6	22	2.7	219	11	140	16	37	4.5	216	10	141	21	59	7.2	217	10	140	19
4 April, 1989	7	29	3.5	227	7	157	19	15	1.8	227	7	165	22	44	5.4	227	7	159	20
	8	28	3.4	231	9	171	26	48	5.9	234	9	178	22	76	9.3	233	9	176	24
	9	30	3.7	236	10	184	26	28	3.4	239	6	194	16	58	7.1	237	8	189	22
	10	4	0.5	245	6	197	16	4	0.5	248	5	215	12	8	1.0	247	5	206	16
	11	4	0.5	240	9	189	42	2	0.2	237	13	179	25	6	0.7	239	10	185	35
	12	0	0.0	NA	NA	NA	NA	2	0.2	248	1	212	6	2	0.2	248	1	212	6
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	381	46.6	213	15	130	32	434	53.1	215	15	137	32	817	100.0	214	15	134	32
	UNAGED	39	43.8	208	15	120	29	50	56.2	209	26	131	35	89	100.0	209	21	126	33
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	2	0.4	171	1	67	7	2	0.4	182	3	78	13	4	0.8	177	7	72	11
	4	17	3.2	189	15	89	25	17	3.2	195	9	97	13	34	6.4	192	13	93	20
Port Fidalgo,	5	144	27.3	206	10	115	16	204	38.6	210	8	125	16	348	65.9	209	9	120	17
Two Moon Bay	6	21	4.0	211	17	121	27	23	4.4	216	12	139	24	45	8.5	214	15	130	27
5 April, 1989	7	18	3.4	219	11	140	21	10	1.9	228	10	163	26	28	5.3	222	11	148	25
	8	22	4.2	230	9	163	22	22	4.2	231	8	176	20	45	8.5	231	8	169	22
	9	6	1.1	239	9	179	19	11	2.1	230	10	167	18	17	3.2	233	11	171	19
	10	0	0.0	NA	NA	NA	NA	4	0.8	246	8	201	22	4	0.8	246	8	201	22
	11	1	0.2	243	NA	183	NA	0	0.0	NA	NA	NA	NA	1	0.2	243	NA	183	NA
	12	2	0.4	242	18	192	10	0	0.0	NA	NA	NA	NA	2	0.4	242	18	192	10
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	233	44.1	210	16	122	28	293	55.5	213	13	132	27	528	100.0	212	14	127	28
	UNAGED	15	53.6	213	23	134	44	13	46.4	207	17	121	28	28	100.0	210	20	128	37

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SAMPLE LOCATION AND DATE	AGE	MALES						FEMALES						SEXES COMBINED					
				LENGTH		WEIGHT				LENGTH		WEIGHT				LENGTH		WEIGHT	
		NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
Outside Bay,	4	16	3.8	192	8	89	13	14	3.3	195	12	97	17	30	7.2	193	10	92	15
Naked Island	5	172	41.1	205	8	109	15	162	38.7	206	8	117	15	335	80.0	206	8	113	16
11 April, 1989	6	13	3.1	217	7	130	11	5	1.2	216	16	137	31	18	4.3	217	10	132	18
	7	6	1.4	225	8	151	14	7	1.7	230	9	159	21	13	3.1	228	9	156	18
	8	10	2.4	232	11	168	26	3	0.7	244	7	198	6	13	3.1	235	11	175	26
	9	3	0.7	232	3	167	15	2	0.5	239	21	195	52	5	1.2	235	11	190	29
	10	1	0.2	226	NA	159	NA	1	0.2	248	NA	193	NA	2	0.5	237	16	176	24
	11	1	0.2	254	NA	229	NA	0	0.0	NA	NA	NA	NA	1	0.2	254	NA	229	NA
	12	0	0.0	NA	NA	NA	NA	2	0.5	257	6	223	18	2	0.5	257	6	223	18
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	222	53.0	207	12	114	25	196	46.8	208	13	121	26	419	100.0	208	13	117	26
	UNAGED	12	38.7	206	12	108	22	19	61.3	210	12	127	28	31	100.0	209	12	120	27
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	1	0.2	181	NA	76	NA	0	0.0	NA	NA	NA	NA	1	0.2	181	NA	76	NA
Cedar Bay,	4	14	3.3	190	6	88	9	9	2.1	187	10	88	12	23	5.4	189	8	88	10
North Shore	5	193	45.3	202	8	108	15	141	33.1	206	8	122	16	338	79.3	203	8	114	17
13 April, 1989	6	14	3.3	215	8	130	24	13	3.1	217	7	145	16	27	6.3	216	8	137	22
	7	9	2.1	226	9	154	14	7	1.6	227	6	163	9	16	3.8	227	7	158	13
	8	8	1.9	226	12	154	21	7	1.6	230	10	167	16	15	3.5	228	11	160	19
	9	1	0.2	228	NA	161	NA	2	0.5	223	21	148	48	3	0.7	225	15	153	36
	10	1	0.2	253	NA	209	NA	1	0.2	247	NA	202	NA	2	0.5	250	4	206	5
	11	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	12	0	0.0	NA	NA	NA	NA	1	0.2	258	NA	252	NA	1	0.2	258	NA	252	NA
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	241	56.6	204	12	112	22	181	42.5	208	12	127	24	426	100.0	206	12	118	24
	UNAGED	14	58.3	206	15	118	29	10	41.7	205	7	118	18	24	100.0	206	12	118	25

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Appendix H.22. (page 3 of 5)

SAMPLE LOCATION AND DATE	AGE	MALES						FEMALES						SEXES COMBINED					
				LENGTH		WEIGHT				LENGTH		WEIGHT				LENGTH		WEIGHT	
		NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	1	0.4	174	NA	61	NA	1	0.4	179	NA	68	NA	2	0.8	177	4	65	5
	4	8	3.2	196	7	93	10	8	3.2	195	6	92	10	17	6.8	195	6	92	9
Galena Bay,	5	109	43.4	205	9	109	15	96	38.2	207	8	116	14	205	81.7	206	8	112	15
Valdez Arm	6	9	3.6	215	10	122	19	7	2.8	215	9	134	13	16	6.4	215	9	127	17
12 April, 1989	7	2	0.8	216	3	137	8	0	0.0	NA	NA	NA	NA	2	0.8	216	3	137	8
	8	3	1.2	231	4	163	28	2	0.8	237	3	185	9	5	2.0	234	4	171	24
	9	3	1.2	232	1	175	14	0	0.0	NA	NA	NA	NA	3	1.2	232	1	175	14
	10	0	0.0	NA	NA	NA	NA	1	0.4	252	NA	218	NA	1	0.4	252	NA	218	NA
	11	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	12	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	135	53.8	206	11	112	21	115	45.8	207	10	117	21	251	100.0	207	11	114	21
	UNAGED	8	42.1	208	9	111	19	9	47.4	206	12	117	22	19	100.0	206	10	111	21
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	2	1.1	176	7	64	4	0	0.0	NA	NA	NA	NA	2	1.1	176	7	64	4
	4	10	5.5	187	6	81	8	10	5.5	188	5	84	6	20	11.0	187	5	83	7
Johnson Cove	5	74	40.7	202	8	102	14	66	36.3	203	7	111	14	141	77.5	202	8	106	14
Valdez Arm	6	8	4.4	212	6	118	9	3	1.6	218	3	139	12	11	6.0	214	6	124	14
12 April, 1989	7	0	0.0	NA	NA	NA	NA	3	1.6	226	7	151	16	3	1.6	226	7	151	16
	8	1	0.5	218	NA	136	NA	3	1.6	221	14	148	34	4	2.2	221	12	145	28
	9	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	10	1	0.5	236	NA	165	NA	0	0.0	NA	NA	NA	NA	1	0.5	236	NA	165	NA
	11	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	12	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	96	52.7	201	11	102	18	85	46.7	203	11	112	20	182	100.0	202	11	106	19
	UNAGED	7	36.8	207	15	110	24	12	63.2	203	10	108	19	19	100.0	205	12	109	20

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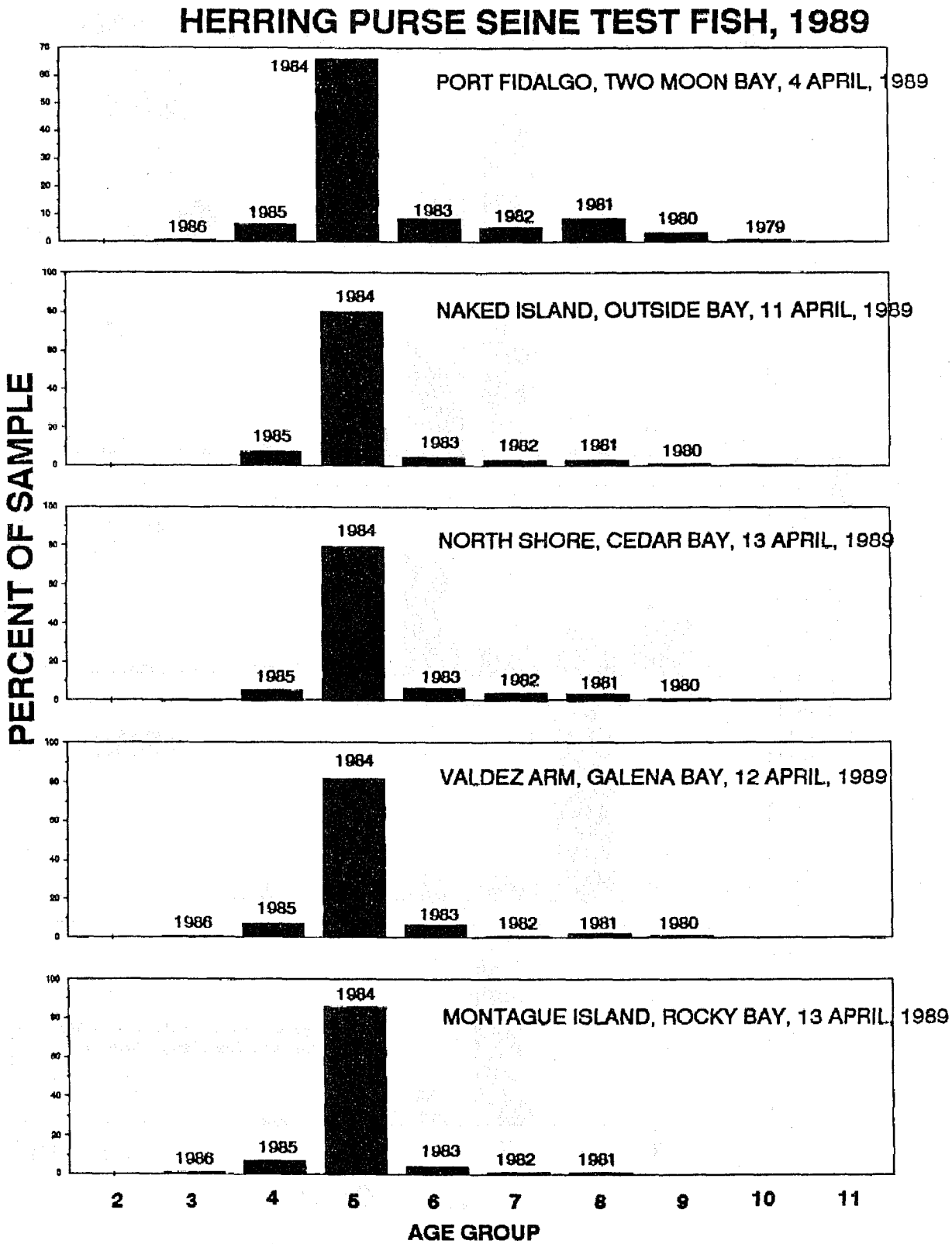
Appendix H.22. (page 4 of 5)

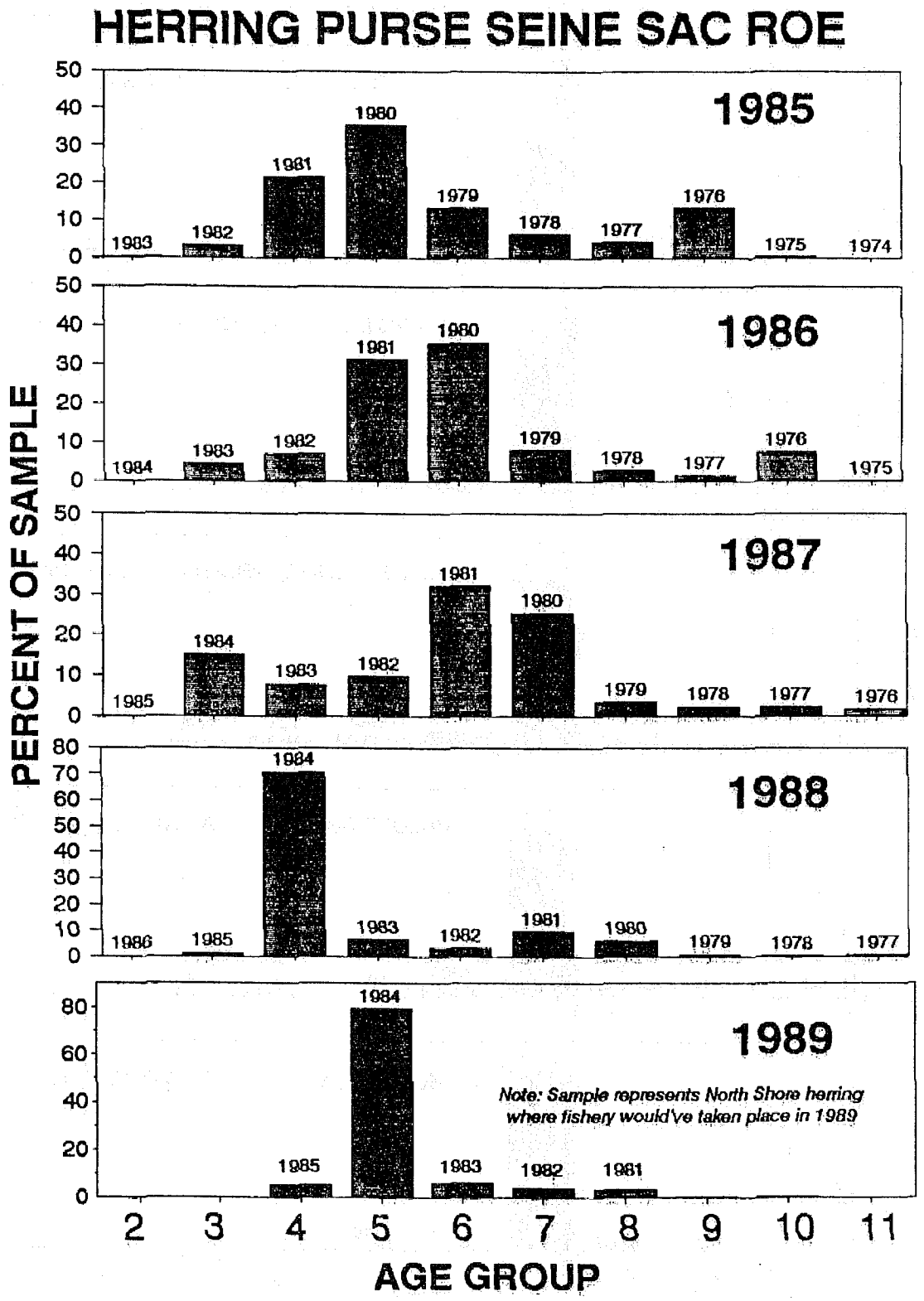
SAMPLE LOCATION AND DATE	AGE	MALES						FEMALES						SEXES COMBINED					
				LENGTH		WEIGHT				LENGTH		WEIGHT				LENGTH		WEIGHT	
		NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD	NUMBER	PERCENT	MEAN	STD	MEAN	STD
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	2	0.5	192	4	84	4	2	0.5	187	13	84	21	4	0.9	189	8	84	12
	4	19	4.3	190	10	83	16	12	2.7	195	13	91	16	31	7.0	192	11	86	16
Rocky Bay	5	205	46.3	204	9	105	15	174	39.3	205	11	113	18	380	85.8	204	10	109	17
Montague Is.	6	11	2.5	210	10	114	18	7	1.6	214	10	131	20	18	4.1	212	10	121	20
13 April, 1989	7	4	0.9	225	11	140	18	1	0.2	237	NA	145	NA	5	1.1	227	11	141	16
	8	3	0.7	219	10	126	8	1	0.2	241	NA	194	NA	4	0.9	224	14	143	35
	9	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	10	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	11	1	0.2	244	NA	186	NA	0	0.0	NA	NA	NA	NA	1	0.2	244	NA	186	NA
	12	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	245	55.3	204	11	105	18	197	44.5	205	12	113	20	443	100.0	204	11	108	19
	UNAGED	1	14.3	216	NA	125	NA	6	85.7	202	12	106	24	7	100.0	204	12	109	23
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	1	0.2	183	NA	76	NA	0	0.0	NA	NA	NA	NA	1	0.2	183	NA	76	NA
	4	23	5.3	186	6	80	8	9	2.1	189	4	89	8	32	7.3	187	6	82	9
Zaikof Bay	5	242	55.4	200	8	101	16	138	31.6	203	9	111	18	385	88.1	201	9	105	17
Montague Is.	6	6	1.4	199	11	104	14	3	0.7	203	3	111	10	9	2.1	201	9	106	13
17 April, 1989	7	2	0.5	224	23	158	69	2	0.5	213	1	136	6	4	0.9	219	15	147	42
	8	1	0.2	207	NA	109	NA	2	0.5	217	8	137	2	4	0.9	220	14	138	25
	9	1	0.2	238	NA	178	NA	1	0.2	237	NA	177	NA	2	0.5	238	1	178	1
	10	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	11	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	12	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	276	63.2	199	10	100	18	155	35.5	202	10	111	19	437	100.0	201	10	104	19
	UNAGED	10	76.9	204	16	106	27	3	23.1	214	5	136	22	13	100.0	206	15	113	28

-Continued-

SAMPLE LOCATION AND DATE	AGE	MALES NUMBER	MALES PERCENT	MALES LENGTH MEAN	MALES LENGTH STD	MALES WEIGHT MEAN	MALES WEIGHT STD	FEMALES NUMBER	FEMALES PERCENT	FEMALES LENGTH MEAN	FEMALES LENGTH STD	FEMALES WEIGHT MEAN	FEMALES WEIGHT STD	SEXES COMBINED NUMBER	SEXES COMBINED PERCENT	SEXES COMBINED LENGTH MEAN	SEXES COMBINED LENGTH STD	SEXES COMBINED WEIGHT MEAN	SEXES COMBINED WEIGHT STD
	2	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	3	3	0.7	167	3	58	6	3	0.7	171	4	70	7	6	1.4	169	4	64	9
	4	34	8.0	182	9	81	12	15	3.5	181	6	83	9	49	11.6	182	8	82	11
Stockdale Hbr.	5	176	41.6	194	11	101	15	162	38.3	197	9	110	17	338	79.8	195	10	105	16
Montague Is.	6	5	1.2	200	12	109	22	4	0.9	214	9	152	17	9	2.1	206	12	128	29
18 April, 1989	7	1	0.2	226	NA	162	NA	1	0.2	213	NA	139	NA	2	0.5	220	9	151	16
	8	6	1.4	217	10	146	20	2	0.5	234	5	186	47	8	1.9	221	11	156	31
	9	5	1.2	228	8	158	14	3	0.7	214	13	141	29	8	1.9	223	11	151	20
	10	0	0.0	NA	NA	NA	NA	2	0.5	245	10	201	19	2	0.5	245	10	201	19
	11	1	0.2	235	NA	185	NA	0	0.0	NA	NA	NA	NA	1	0.2	235	NA	185	NA
	12	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	13	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA	0	0.0	NA	NA	NA	NA
	TOTAL	231	54.6	194	14	101	21	192	45.4	197	13	110	24	423	100.0	195	13	105	23
	UNAGED	11	40.7	195	9	98	14	16	59.3	197	14	110	22	27	100.0	196	12	105	20



Appendix H.23. Percent contribution by age class in the herring test fishery, Prince William Sound, 1989.



Appendix H.24. Percent contribution by age class in the purse seine herring sac roe fishery, Prince William Sound, 1985 - 1989.

EEO STATEMENT

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