

PRINCE WILLIAM SOUND MANAGEMENT AREA
1993 ANNUAL FINFISH MANAGEMENT REPORT



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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). This area includes the Bering River, Copper River and all of Prince William Sound with a total adjacent land area of approximately 38,000 square miles.

The salmon management area is divided into eleven 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 escapement goals for the major species while allowing for the orderly harvest of all fish surplus to spawning requirements. In addition, the department follows regulatory plans to manage fisheries and assist private non-profit (PNP) hatcheries in achieving cost recovery and brood stock objectives.

Six hatcheries contribute to the area's fisheries. Five are operated by the regional aquaculture association, Prince William Sound Aquaculture Corporation (PWSAC). The Gulkana Hatchery in Paxson augments the production of sockeye salmon to the Copper River. The Cannery Creek Hatchery located on the north shore of the Sound, and the A.F. Koernig Hatchery in the southwestern Sound produce pink salmon, the Noerenberg Hatchery in the northwestern Sound produces pink, chum, coho and chinook salmon and the Main Bay Hatchery in the western Sound produces sockeye salmon. Valdez Fisheries Development Association (VFDA) operates the Solomon Gulch Hatchery in Port Valdez and produces pink, chum and coho salmon.

Gear for the salmon fishery includes purse seine, drift and set gillnet. Drift gillnet permits are the most numerous and are allowed in the Bering River, Copper River, Coghill, Unakwik and Eshamy districts. Set gillnet gear is allowed only in the Eshamy district. Purse seine gear is allowed in the Eastern, Northern, Unakwik, Coghill, Northwestern, Southwestern, Montague and Southeastern Districts.

As an avenue for the commercial fishing industry to formally provide management recommendations to the department, representatives from area processing, gear groups, and aquaculture associations sit on an advisory body known as the PWS Salmon Harvest Task Force (SHTF).

Five herring fisheries occur during the year. The management objective for herring is to target fisheries on a high quality segment of the biomass. All of the herring fisheries are managed for a guideline harvest level established by the Prince William Sound Herring Management Plan.

OVERVIEW OF AREA WIDE FISHERIES

The 1993 Prince William Sound Area commercial salmon harvest of 9.3 million fish is the smallest since 1978 (Appendix A.3). The harvest was comprised of 5.8 million pink, 1.9 million sockeye, 1.2 million chum, 400,000 coho, and 32,000 chinook salmon. The majority of the catch, 6.43 million, was common property fishery harvest and 2.84 million were sold for hatchery cost recovery and department test fisheries.

The estimated exvessel value of the commercial salmon harvest is \$24.7 million, including hatchery sales (Appendix A.5). During the 1993 season, 514 drift gillnet permit holders participated. The drift gillnet catch is valued at \$18.86 million, setting the average earnings of the 514 permits at \$36,688. The set gillnet catch is valued at \$0.67 million, setting the average earnings of the 30 permits holders this season at \$22,333. Only 144 seine permits were active this season, which is roughly half of the area's seine permits. The seine fishery was worth \$1.68 million for an average exvessel value of \$11,667 for the 144 permit holders. Revenue generated for hatchery operations through fish sales was approximately \$3.5 million.

The estimated exvessel value for all herring fisheries was \$2.8 million. The gillnet sac roe fishery harvested 1,029.9 tons valued at \$0.412 million, setting the average earnings for the 24 permit holders at \$17,165. The pound spawn-on-kelp fishery utilized 1,330.5 tons of herring valued at \$2.0 million, setting the average earnings for the 52 permit holders producing product at \$38,462. The wild spawn-on-kelp fishery utilized 1,300.7 tons of herring valued at \$0.18 million, setting the average earnings for the 83 permit holders at \$2,155. The food-and-bait fishery harvested 1,087 tons, valued at \$0.22 million, setting the average earnings of the 8 permit holders at \$27,175. There was no seine sac roe opening during 1993.

1993 SEASON SUMMARY BY DISTRICT

COPPER RIVER DISTRICT

PRESEASON OUTLOOK AND HARVEST STRATEGY

The 1993 harvest forecast for the Copper River District was 27,100 chinook, 920,000 sockeye, and 311,000 coho salmon. The Gulkana Hatchery located south of Summit Lake was expected to contribute 116,700 sockeye salmon to the commercial catch. Steelhead, chum and pink salmon are also present, but historically make up less than two percent of the catch.

The early season management strategy in the Copper River District is based on actual catch and effort compared to the anticipated catch. The weekly anticipated catch is a percentage of the forecasted harvest. The percentage is based on the average weekly catch from 1971 - 1992, including only those years that have similar fishing patterns (ie, nonstrike years). This allows the most reliable method of evaluating early run strength prior to the installation of inriver sonar to estimate escapement. Two evenly spaced

24-hour periods per week beginning 7:00 a.m. on Mondays and 7:00 p.m. on Thursdays are optimum; however, the fishing schedule is adjusted inseason as the situation dictates. 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 becomes the primary factor governing management of the fishery. The salmon escapement goal for the Upper Copper River is 516,000 salmon.

By mid-June aerial estimates of sockeye escapement in the Copper River Delta are evident and are also considered when scheduling periods. Due to many spawning systems in the lower Copper River Delta, an actual escapement enumeration is not obtained. An escapement index is estimated through weekly aerial surveys. The observed escapements are compared to the anticipated weekly escapement that is an average of past years' escapement observations. The escapement index goal for the Copper River Delta is 90,000 sockeye salmon.

Typically, the coho management strategy is implemented the second week of August. In the past, the strategy provided a single fishing period per week but of longer duration than is commonly used during the sockeye season. As in the sockeye salmon fishery, escapement estimates for the early portion of the coho salmon return are not immediately available. The fleet is managed using catch and effort as indicators of run strength. Effort and harvest techniques have increased over time that require adjustments in the management strategy. Reduction in the length of fishing periods has occurred thereby reducing the exploitation of coho salmon early in the season. The weekly fishing period was reduced from 72-hours to 48-hours in 1989, from 12:00 noon Monday to 12:00 noon Wednesday. In 1992, the early coho season weekly schedule was altered to two 24-hour periods per week. The department met with several gillnet representatives from the Salmon Harvest Task Force to discuss the option of two shorter periods each week during 1993. This strategy change was met with opposition. The department felt this bi-weekly fishing schedule allowed greater flexibility in responding to catch data early in the run. Modification of fishing times during the coho salmon season occur based on the commercial catch and escapement trends in the principal delta spawning streams. The escapement index goal for the Copper River Delta is 50,000 coho salmon.

SOCKEYE AND CHINOOK SALMON FISHERY

The sockeye salmon harvest within the Copper River District was 1,398,000, 52 percent above the projected 920,000 (Appendix B.1 and B.2). Escapement to the upper portion of the Copper River surpassed the minimum goal of 516,000 salmon for a total of 833,000 salmon. Escapement into the Copper River delta systems was 57,720, 64 percent of the index goal of 90,000. The harvest of 29,700 chinook salmon was slightly above the 27,000 projected harvest, but 25 percent below the 10-year average of 37,008 chinook salmon.

The 1993 commercial season began at 7:00 a.m. Monday, May 17 with a 24-hour period (Appendix B.3). Past practice announced the opening date for the Copper River District in the Commercial Salmon Management Outlook in late March. However, in 1993, the first commercial fishing period was not announced until May 10, when the water conditions on the Copper River could be evaluated. An aerial survey on May 8 observed small amounts of river ice below Childs Glacier; still, ice covered the river upstream of Childs Glacier and on into Miles Lake. With this information the first Copper River opening was scheduled for May 17, a 24-hour period.

Evaluation of the Copper River before announcing the first opening was in response to the 1992 season. In 1992, the first commercial fishing period was announced April 1 to begin at 7:00 a.m. Friday, May 15 for 12-hours. Cold weather conditions delayed the Copper River break up with ice remaining on the river until May 26. This late break-up and low water slowed the chinook and early run sockeye stocks from entering the river which resulted in a high commercial harvest and poor escapement for those stocks. A repeated poor escapement would be hazardous for both chinook and sockeye salmon stocks. To prevent this from occurring, the assessment of river conditions was conducted before the announcement of the first period.

The May 17 opening harvested 43,058 sockeye salmon, 25 percent below the 62,000 anticipated (Appendix B.2-B.4). The chinook salmon harvest of 6,380 was almost three times the anticipated 2,650 (Appendix B.5 and B.6). The next fishing period was scheduled for 7:00 a.m. Monday, May 24, a 24-hour period. The Thursday May 20 period was by-passed due to the poor escapement to the early run stocks of both sockeye and chinook salmon in 1992, and a below anticipated harvest for the opening period in 1993.

The Copper River Highway was cleared of snow by the Alaska Department of Transportation by the evening of May 18. ADF&G personnel operating the Miles Lake sonar were on site that evening. At that time it was observed that Miles Lake and the shoreline of the Copper River below Miles Lake were free of shore ice. The camp was set up quickly and the Miles Lake sonar was operational at 12:00 noon Thursday, May 20. Escapement of sockeye salmon was high with an estimated first day escapement of 9,503 salmon (Appendix B.7 and B.8). With this unusually high sonar count, an announcement Friday, May 21 at 12:00 noon notified the fleet of the high passage rate of salmon by Miles Lake sonar. They were also notified that if escapement continued at that rate throughout Friday and into early Saturday morning an opening for 7:00 a.m. Sunday was probable.

Escapement continued to increase throughout Friday and into Saturday morning. The daily escapement for Friday was 13,677 salmon versus an anticipated 1,657 salmon. The projected daily count for Saturday May 22 based on the first 6-hours passage rate was 14,828 salmon. The anticipated daily for Saturday May 22 was only 1,793 salmon. The noon announcement on Saturday declared a 36-hour period from 7:00 a.m. Sunday, May 23 to 7:00 p.m. Monday, May 24. The harvest from the 36-hour period was 124,400 sockeye and 8,000 chinook salmon. The anticipated harvest was 87,000 sockeye salmon and 3,200 chinook salmon.

Daily sockeye escapements continued to remain above the anticipated daily escapement through June 16 at which time the cumulative escapement was 521,991 salmon, more than twice the anticipated cumulative escapement of 231,409. Period harvest rates for sockeye salmon remained above the anticipated harvests until late July. Escapement past Miles Lake sonar remained strong, with occasional daily escapements dropping below the anticipated daily.

Escapement into the lower delta systems was above anticipated through mid-June (Appendix B.9). With escapement up to expectations and some fishing effort shifting to other gillnet districts in the Sound, the length of periods increased until August 9 when coho management began. Escapement goal performance did not continue into the lower delta systems. A larger portion of the commercial fleet remained fishing in the Copper River District due to the strong mid-summer run of sockeye salmon and the poor return of sockeye at the Main Bay Hatchery. Also, due to the poor predicted pink salmon return for 1993 several dual permit holders (gillnet/purse seine) continued to gillnet the entire season. With the

unusually high fishing effort the delta systems on the east side of the Copper River were below the desired escapement objective.

The Bendix side-scanning sonar at Miles Lake was deployed from May 20 until August 2. Sockeye salmon make up an estimated 95 percent of the total counts past the sonar, chinook salmon appear through late June and coho begin in late July. The migration time for salmon to travel from the Copper River District to the sonar site at Miles Lake is estimated at seven to nine days. The seasonal goal of 516,000 salmon past Miles Lake sonar was exceeded with 833,387 salmon migrating upriver. Escapement of sockeye salmon within the lower delta systems was 57,720, 64 percent of the season escapement index of 90,000 (Appendix B.10). Aerial surveys of sockeye salmon spawning systems above Miles Lake were not flown during 1993 due to budget shortfalls (Appendix B.11). However, the aerial survey program for chinook salmon occurred this season but at a reduced level (Appendix B.12).

The 1993 sockeye return to the Copper River District was the largest on record. The unseasonably warm weather in April and May created the early breakup conditions. The early breakup allowed sockeye and chinook salmon earlier entry to the Copper River. Besides the early migration up the Copper River, the early run sockeye stocks were stronger than anticipated allowing a larger escapement. The management of the Copper River before the installation of the Miles Lake sonar is based on past historic performances. The lag time between the fishery and the sonar is up to nine days, far too long for adequate management. To correct this, a test fishery is in the planning stage that may provide managers with more timely information before the deployment of the Miles Lake sonar.

COHO SALMON FISHERY

The coho salmon harvest within the Copper River District was 281,000, slightly less than the projected 310,000 (Appendix B.5). Escapement of coho salmon into the Copper River delta systems was 45,700 approximately 90 percent of the expected 50,000 coho salmon.

Coho management began August 9 with 2,100 coho salmon harvested during a 24-hour period. The projected harvest for the week was 22,000 coho salmon based on past fishing patterns (Appendix B.13). With a lower than expected harvest during the August 9 period, and a poor harvest of coho salmon during the last week of sockeye management, the next 24-hour period was scheduled for Monday, August 16. During the week of August 15, the harvest for two 24-hour periods was 14,000 coho salmon. The anticipated weekly harvest was 46,000 coho salmon.

An aerial survey during the week of August 15 was not possible due to poor weather but escapement was expected to be near the anticipated level of 5,000 coho salmon. With less than expected catch during the previous week the department delayed the next opening and scheduled a single 48-hour period on Thursday, August 26. The harvest of 55,000 coho salmon was slightly less than the projected 60,000. An aerial survey on August 24, estimated 1,480 coho salmon in the systems that were surveyable (Appendix B. 14). The anticipated for the surveyed systems was 12,500 coho salmon. Due to the low escapement index, only one period occurred that week and the next fishing period was set for Thursday, September 2, a 48-hour period.

The harvest for the September 2 period was 55,000 coho salmon, the anticipated, 68,000 coho salmon. An aerial survey on September 4 showed little change with only 3,300 coho salmon observed. With both catch and escapement below the projected levels, the next fishing period was 24-hours on September 9.

An aerial survey on September 9 observed 9,000 coho salmon and the following survey on September 13 observed 21,300 coho salmon. The anticipated escapement for the week ending September 18 was 25,000 coho salmon. With the increase in escapement, fishing time was expanded to 48-hours on September 13 and a 24-hour period on September 16. Beginning September 20 two 48-hour periods per week were allowed until October 9 when fishing closed for the 1993 season (Appendix B.15).

Weather conditions along the delta systems generally dictate the results of the aerial survey. During the 1993 season, weather conditions were anything but normal. The summer brought unseasonably warm temperatures and little precipitation, resulting in low water levels in most rivers and lakes. In the fall, heavy rains altered flows of glacial rivers into usually clear systems that did not clear-up through the remainder of the season. For systems that were affected, Eyak Lake and Ibek Creek, the anticipated season goal was assumed to have been achieved. Escapement of other systems west of the Copper River; Alaganik Slough and 27-Mile Creek were slightly above the anticipated.

BERING RIVER DISTRICT

PRESEASON OUTLOOK AND HARVEST STRATEGY

The 1993 harvest forecast for the Bering River District was 20,000 to 30,000 sockeye salmon and 124,000 coho salmon. Chinook salmon are present, but not in significant numbers. The Bering River District sockeye fishery begins in mid-June almost one month after the Copper River District opens. The sockeye run timing, which has a very short span, typically peaks during the third week of June. Commercial fishing periods in the Bering River District generally coincide with the Copper River District (Appendix B.25). However, if escapement trends fall below the anticipated, the fishing schedule will be modified. Due to the condensed run timing of the Bering River sockeye stock, evaluating escapement sometimes results in shortfalls or surpluses in any given year. The Bering River District escapement index goal is 32,000 sockeye salmon.

The Bering River District, unlike the Copper River District, does not have a long historical catch database for sockeye salmon. Before 1985, most of the sockeye salmon harvested were on the south side of Kayak Island and destined for other spawning systems. The Alaska Board of Fisheries (BOF) closed this area to commercial fishing in 1986. All catch information before 1986 includes those waters closed by the BOF. When a sufficient data base has been constructed with the post 1985 information, weekly anticipated catches for the Bering River District will be available.

The Bering River District's coho salmon fishery is also managed concurrent with the Copper River District whenever possible. However, unlike Bering River sockeye salmon, assessment of coho salmon run strength prior to when aerial survey information is available, is based on weekly anticipated catch information based on the past 13 years and then compared to the actual catch. The south side of Kayak Island was not fished during the coho season before 1986 so the influence observed in the sockeye fishery did not affect the coho fishery. The Bering River District escapement index goal is 23,000 coho salmon.

SOCKEYE SALMON FISHERY

The 1993 sockeye salmon harvest of 34,000 was slightly more than 10 percent above the preseason projection (Appendix B.19). The actual observed escapement index for the Bering River system was 28,000 slightly less than the anticipated index of 32,000 sockeye salmon.

The Bering River District opened June 6 for 24-hours, the earliest fishing period on record (Appendix B.20). Based on the salmon entry for the Copper River District, the Bering River District opened a week earlier than the June 14 date announced in the 1993 Commercial Salmon Management Outlook. Traditionally, the Bering River District opens in mid-June and periods open simultaneously with the Copper River District.

Typically, aerial surveys begin in mid-June; yet, in 1993 the first aerial survey was flown on May 31 with 500 sockeye salmon observed in the Bering River (Appendix B.21). Before the week beginning June 13, no anticipated escapement index is available. A minimum of three surveys are required from as many years to calculate an anticipated weekly escapement index. Surveys continued with 1,000 sockeye salmon observed on June 4 and 900 on June 10.

The harvest from the first period was 3,700 sockeye salmon harvested by 19 permit holders. The next scheduled period was on June 10 for 24-hours; five permit holders harvested 618 sockeye salmon. The 24-hour fishing period on June 14 harvested 2,500 sockeye salmon by 11 permit holders. On June 15, 4,530 sockeye salmon were observed during an aerial survey. The anticipated for that same week was 3,600 sockeye salmon. With escapement above the anticipated the next commercial period on June 17 was increased to 36-hours. The fishing effort increased to 73 permit holders for a combined harvest of 15,500 sockeye salmon, the largest period harvest since the 1985 closure of the area south of Kayak Island. Effort dropped after the June 17 period to 21 permit holders on June 21. Effort continued to decline to less than four permit holders throughout the sockeye season.

COHO SALMON FISHERY

The 1993 coho salmon harvest of 115,800 was slightly less than 10 percent below the preseason projection. The actual observed escapement index for the Bering River system was 29,500, 28 percent above the anticipated index of 23,000 coho salmon (Appendix B.22 and B.23).

Coho management began August 9, but no reported catch occurred during the 24-hour period. Due to the closure in the Copper River District, the Bering River District remained closed for the rest of the week. The 24-hour period on August 16 had a reported catch of 17 coho salmon, less than four permit holders fished. There was no reported catch on the August 29, 24-hour period. The projected harvest for the week of August 15 was 4,800 coho salmon. The next fishing period on August 26 was for 48-hours. Thirty-one permit holders harvested 7,400 coho salmon, almost 60 percent below the projected 19,000 coho salmon.

Coho salmon were observed during an aerial survey on August 4 in the Bering River and Katalla River systems. On August 10, a total of 200 coho salmon were observed, the anticipated was 700. An aerial survey was not possible during the week of August 15 due to poor weather but escapement was expected

to be near the anticipated level of 1,600 coho salmon. An aerial survey on August 24 estimated slightly less than 2,000 coho salmon, far below the 8,000 anticipated. On August 28, only 2,800 coho salmon were observed during the aerial survey, 35 percent of the anticipated. It was apparent from the below expected harvest and escapement, the run was not going to meet the projected level. A conservative approach followed with the next commercial fishing period on September 4, for 48-hours. The combined effort of 54 permit holders harvested 19,000 coho salmon, slightly more than half the projected 35,000. With both catch and escapement far below the anticipated, the September 9 fishing period was reduced to 24-hours. Escapement increased to 7,000 coho salmon for the systems surveyed on September 6; the anticipated escapement for those same systems was 8,000.

The harvest from the 24-hour period on September 9 was 14,500 coho salmon 60 percent below the anticipated 39,000 for the week. On September 8, a ground survey of Bering River and Lake by boat with commercial fisherman observed coho salmon. Due to the high muddy water, enumeration of coho salmon observed was not possible. It was apparent, however, that an increase in coho salmon had occurred after the September 6 aerial survey. Also, on September 8 an acoustic survey of the glacial waters of Controller Bay aboard a fishing vessel observed coho salmon. Escapement estimates of 20,800 on the September 9 aerial survey matched the anticipated of 20,800 coho salmon. With actual escapement at the predicted level a 48-hour fishing period occurred on September 13 with 83 permit holders harvesting 26,000 coho salmon. An additional 24-hour period on September 16 harvested 10,000 coho salmon. The cumulative coho salmon harvest for the week ending September 18 was 36,000; the projected, 20,000.

The harvest of coho salmon continued to remain above the anticipated until the end of the season. Escapement also continued to increase with a total escapement index of 29,450 surpassing the goal of 23,000. Commercial fishing periods were increased to two 48-hour periods per week from September 20 until the district closed due to lack of interest on October 9.

COGHILL DISTRICT (prior to July 21)

PRESEASON OUTLOOK AND HARVEST STRATEGY

Prior to July 21 drift gillnet is the only gear type in the Coghill District. The management strategy prior to July 21 is based primarily upon the return of sockeye salmon to Coghill Lake and the return of chum salmon to the Noerenberg Hatchery. Coghill sockeye are managed for an escapement goal of 25,000 whereas hatchery chum are managed to satisfy the allocation between the common property fishery and PWSAC's corporate escapement as determined by the Noerenberg Hatchery Annual Management Plan. A small run of hatchery chinook salmon is incidental to the hatchery chum run.

The Coghill Lake sockeye forecast was 116,600 fish. The forecast included 57,700 sockeye of wild stock origin and 58,900 from a remote release by PWSAC. The remote release sockeye (F_1 generation) were reared at the Main Bay hatchery and released as smolt in 1991 near the mouth of the Coghill River.

The Noerenberg Hatchery early chum forecast was 748,100 fish. PWSAC was slated to harvest 35 percent of the returning hatchery chum plus operating expense for the Gulkana Hatchery. Based on run

timing and the sockeye and chum salmon forecasts, the Esther Subdistrict of the Coghill District was scheduled to open June 14 for two 24-hour fishing periods per week. If Coghill sockeye were weak, harvest would be limited to the Esther Subdistrict. If hatchery chum were weak and Coghill sockeye were available for harvest, a fishery would occur in Port Wells. If both chum and sockeye were available for harvest the entire Coghill District may open, however during the middle stage of the Coghill sockeye run, protection would be provided to wild chum salmon in Port Wells. To alleviate congestion, openings would coincide with other drift gillnet districts.

SEASON SUMMARY

The commercial harvest of early chum salmon was 1.09 million fish, exceeding the forecast. The common property harvest was 623,000, and the hatchery sold 464,000 salmon. The hatchery brood stock goal of 114,000 chum salmon was achieved. Escapement at Coghill Lake was 9,232 whereas the goal was 25,000 sockeye. During the chum salmon fishery 48,000 sockeye were harvested in the Esther Subdistrict. The coded wire tag program estimates that 36 percent were wild stock sockeye (various origin). The chinook harvest by the common property fishery and PWSAC was 1,991. No directed management action was taken for chinook salmon, however the brood stock goal was achieved. All commercial harvests were confined to the Esther Subdistrict of the Coghill District.

The Esther Subdistrict opened on June 7 for 24-hours to target hatchery chum salmon. Hatchery run timing indicated salmon entry beginning on June 10, however by June 5 PWSAC had already collected 20,000 chum for corporate escapement. Lake and Quillian Bays were closed to commercial fishing to allow PWSAC to utilize this area to harvest salmon, however during the June 10 and 28 periods the Terminal Harvest Area of Quillian Bay was opened to the common property fishery for harvest of chum salmon in excess of corporate escapement needs. To help maintain quality, subdistrict markers at the south end of Esther Pass were temporarily moved north in Esther Pass to the vicinity of Shoestring Cove. The balance of the Coghill District remained closed to protect sockeye salmon returning to Coghill Lake. The harvest for the first period was 42,000 chum and 156 sockeye. A 36-hour period followed on June 10 and the harvest was 79,346 chum and 182 sockeye.

The fishing schedule of two periods per week in the Esther Subdistrict continued until early July. Due to the low escapement at Coghill Lake, shallow gillnet gear was retained by emergency order after the first Monday in July. On July 7, PWSAC asked the department to manage the Noerenberg Hatchery chum and the Main Bay Hatchery Coghill-stock sockeye runs in aggregate. Aggregate management was instituted primarily because of the lack of sockeye escapement at Coghill Lake. Under aggregate management the department had flexibility to allow the fleet to take a greater share of Main Bay Hatchery sockeye in the Eshamy District and a lesser share of the Noerenberg chum run in the Esther Subdistrict. The underlying principle was that Coghill Lake sockeye interception was greater in the Esther Subdistrict than the Eshamy District. Aggregate management directed the department to divide the combined value of the two hatchery runs between the common property fishery and the hatchery operator.

By early July sockeye escapement at Coghill Lake was less than 10 percent of anticipated. The period on July 9 was reduced to 12-hours and the periods on July 12 and 15 were confined to the Terminal Harvest Area of Quillian Bay to protect Coghill Lake sockeye. After the July 15 period the Esther Subdistrict was closed to protect Coghill sockeye and increase corporate escapement. Aggregate management continued until July 20. Due to low escapement of wild pink and chum stocks in the northwestern sound, the Coghill District remained closed until August 5. On August 5 the directed pink

salmon fishery began. Further discussion of this portion of the fishing season is provided in the section pertaining to the *General Purse Seine Districts*.

To help assess the sockeye return to Coghill Lake, the department utilized gillnet vessels to test fish in Port Wells from Esther Passage to Coghill Point. Testing occurred five times from June 28 until July 18. The Coghill weir was operational until August 6 when a late summer deluge of rain washed the weir out. As a result of the weak escapement, the PWSAC remote egg take at Coghill Lake was lowered from 1,500 adults to 429 adults.

UNAKWIK DISTRICT

PRESEASON OUTLOOK AND HARVEST STRATEGY

The Unakwik District is the smallest in the management area. The district encompasses the upper half of Unakwik Inlet and the Cannery Creek Hatchery, a major pink salmon facility, borders the district on the southern boundary. Both drift gillnet and purse seine are allowed during all fishing periods. This district was established for management of sockeye runs to Miners and Cowpen Lakes. These runs are relatively small and the department does not formally forecast these runs. Escapement enumeration into both lakes is via aerial survey, however water clarity is poor thus escapement indices are considered qualitative at best.

Historically this district was managed concurrently with the Coghill District, as the commercial catch from both areas cycled in a similar fashion. Since 1991 the department has managed the Unakwik District on a schedule of two 24-hour periods per week coinciding with other gillnet openings. Fishery performance, measured by catch/boat hour, was evaluated against historic catch and effort.

SEASON SUMMARY

The 1993 harvest was 14,770 sockeye, and 6,571 pink salmon with minor amounts of chum, coho, and chinook salmon. The sockeye harvest was slightly below the 10-year average of 17,600.

The Unakwik District opened on June 17 to a schedule of two 24-hours periods per week to target sockeye salmon. No changes were made to the fishing schedule throughout the season that extended until September 2. No landings from this district occurred after mid-August. Sockeye harvest peaked during the first week of July. The peak aerial survey estimate for Miners Lake was 4,600 sockeye and for Cowpen Lake 100 sockeye salmon.

ESHAMY DISTRICT

PRESEASON OUTLOOK AND HARVEST STRATEGY

Both set and drift gillnets are allowed in the Eshamy District. Beginning in mid-June the management strategy is based primarily upon the Coghill-stock sockeye salmon run to the Main Bay Hatchery. In July management focuses on the Eshamy-stock sockeye salmon run to the Main Bay Hatchery, and the Eshamy-stock sockeye salmon run to Eshamy Lake. The Eshamy Lake sockeye run included a remote release component from the Main Bay Hatchery and a wild stock sockeye salmon component.

The Eshamy Lake sockeye run is managed for an escapement goal of 35,000 plus additional sockeye to allow PWSAC to utilize the site for remote egg take. Wild sockeye and remote released sockeye were expected to contribute to escapement at Eshamy Lake. The Eshamy District also supports wild pink salmon.

The forecasted return for Main Bay Hatchery sockeye salmon was 519,700 fish composed of 79 percent Coghill-stock and 24 percent Eshamy-stock. The Eshamy Lake sockeye salmon forecast was 206,900 fish composed of 62 percent remote release sockeye from the Main Bay Hatchery and 38 percent wild stock sockeye. The remote release sockeye (F_1 generation) were reared at the Main Bay Hatchery and released as smolt in 1991 near the mouth of the Eshamy River.

Based on run timing information, the Eshamy District was scheduled to open June 17 for two 36-hour fishing periods per week coinciding with other gillnet districts. Adjustments to the weekly schedule would occur depending upon corporate escapement at the Main Bay Hatchery and consideration of wild stock escapement.

There is overlap in run timing between the Coghill and Eshamy-stock sockeye returns to the Main Bay Hatchery. Management for harvest allocation objectives of hatchery sockeye was scheduled to change from Coghill-stock to Eshamy-stock on July 21. Although the Coghill-stock is not complete, approximately 10 percent of the Eshamy-stock should have arrived by this date. Allocation objectives were determined by the Main Bay Hatchery Annual Management Plan. PWSAC was slated to harvest 35 percent of the hatchery produced Eshamy and Coghill stock sockeye runs. In addition, PWSAC would collect revenue for operating expense of the Gulkana Hatchery. Coghill-stock sockeye were returning to Coghill Lake (remote release) and the Main Bay Hatchery. Eshamy-stock sockeye were returning to Eshamy Lake (remote release) and to the Main Bay Hatchery. To distinguish wild from hatchery produced sockeye and provide PWSAC with the stated corporate escapement goal, inseason coded wire tag estimates of the commercial harvest would be used.

The Main Bay Hatchery Special Harvest Area (SHA) at the head of Main Bay could be utilized by the hatchery operator during closed periods and by the commercial fleet during open periods. The hatchery brood holding area in salt water was defined by a barrier seine. To provide protection to hatchery brood, the Alternating Gear Zone (AGZ) at the head of Main Bay was closed to fishing. In the Main Bay Subdistrict an emergency order was in effect through July 7 allowing commercial fishing within the two 500 yard anadromous stream closures.

SEASON SUMMARY

The commercial harvest of sockeye salmon was 290,000 which was well below forecast. The common property harvest was 183,000 and the hatchery sold 110,000. The hatchery brood stock goals of 4,600 for the Coghill-stock and 1,800 for the Eshamy-stock were achieved. Escapement at Eshamy Lake was 42,983 whereas the goal was 35 - 40,000 sockeye. Achievement of the goal allowed PWSAC to obtain the entire remote egg take for continued smolt stocking at Eshamy Lagoon. Over the course of the season 130,000 pink salmon and 47,000 chum salmon were harvested in the Eshamy District.

The district opened on June 17 for 24-hours. The harvest was 733 chum and 358 sockeye salmon. Based on the preseason forecast, PWSAC expected 3,000 sockeye to have returned to the SHA by this date, however collection had not begun. Twice weekly periods in the entire district continued through July 9, however the harvest of sockeye was only 30 percent of preseason expectations. On July 7, PWSAC asked the department to manage the Noerenberg Hatchery early chum run and the Main Bay Hatchery Coghill-stock sockeye run in aggregate. The intent of aggregate management was to protect Coghill Lake sockeye where escapement was low. Coded wire tag information of the commercial harvest in the Esther and Eshamy districts indicated a wild stock sockeye salmon component in both districts. Scale pattern analysis indicated that Coghill Lake sockeye were present in both districts. Shallow gear was retained by emergency order after the first Monday in July to reduce the interception of Coghill Lake sockeye salmon.

During the week of July 12, two periods occurred in the Main Bay Subdistrict and the remainder of the Eshamy District was closed to protect Coghill Lake and Eshamy Lake sockeye. After July 15 the Main Bay Subdistrict was closed to increase corporate escapement. On July 15 Eshamy Lake escapement was 455 sockeye and the anticipated escapement was 3,403.

Beginning July 21 management for corporate escapement of sockeye in the Eshamy District changed from the Main Bay Coghill-stock to the Main Bay Eshamy-stock. From July 21 through July 29 the Eshamy District was closed to common property fishing to allow PWSAC to collect corporate escapement for the Eshamy stock component.

The Main Bay Subdistrict opened on July 29 and remained open for two periods a week until August 26 when the Main Bay Subdistrict was closed to increase corporate escapement. A minimum mesh size of 5 1/4 inches was implemented on July 29 to help protect pink salmon. Both shallow gear and the minimum mesh size remained in effect until August 12 when gear restrictions were rescinded as the fleet was confined to the Main Bay Subdistrict. When the Crafton Island Subdistrict reopened on August 20 the shallow gear and minimum mesh size was again required to protect pink salmon until the end of the season.

Escapement at Eshamy weir on August 17 was 21,599 and the expected was 22,906 sockeye salmon. Between August 18 and August 21, 43 percent of the season's escapement occurred. Escapement on August 21 was 39,861. The Crafton Island Subdistrict opened on August 20 and remained open for two 12-hour periods a week until the end of the season. The waters of Eshamy Bay opened on August 20 for a scheduled 36-hour period. On August 21, the Eshamy Bay opening was extended in time to 132-hours and in area to include the waters of Eshamy Lagoon up to the mouth of the Eshamy River. On August 25 the opening in Eshamy Bay and Lagoon was extended until the end of the season. On September 2, to accommodate sport fish users, waters within 100 yards of the mouth of the Eshamy River were closed to commercial fishing.

On September 2 the Main Bay Subdistrict reopened to continuous fishing except that the AGZ was closed to protect hatchery brood stock. On September 14 with brood stock goals assured the AGZ was opened to continuous fishing.

During the season PWSAC received 41 percent of the aggregate value of the Noerenberg and Main Bay Coghill-stock sockeye runs. Corporate escapement for the Main Bay Eshamy-stock sockeye run was 32 percent. The entire Eshamy District closed for the season on October 8. The Eshamy weir was operational from June 28 until September 8.

From June 20 until July 18 the department conducted a sockeye stock composition study using scale pattern analysis. The department utilized commercial vessels during weekend test fisheries primarily in the Eshamy District and secondarily in the Esther Subdistrict. The intent of this project is to improve understanding of migration routes of sockeye salmon destined for Coghill Lake and the relative interception during the Eshamy sockeye and the Esther Subdistrict chum fisheries. The 1993 project completes a two year program that began in 1992.

The sockeye program at the Main Bay Hatchery has greatly increased effort in the Eshamy District over historic levels. In early July 1993 there were approximately 150 permits fishing the district and in 1992 approximately 350 permits. Due to this high number of vessels operating in a relatively small area, friction has developed between gear types in certain areas as they vie for preferred sets, especially at the beginning of fishing periods when sockeye are schooled near the beach. When sockeye are abundant, Fish & Wildlife Protection has to maintain law and order rather than ensuring that resources are protected in other areas of Prince William Sound.

GENERAL PURSE SEINE DISTRICTS

PRESEASON OUTLOOK AND HARVEST STRATEGY

The general purse seine districts include the Eastern, Northern, Unakwik, Coghill, Northwestern, Southwestern, Montague and Southeastern Districts. The Prince William Sound Management and Salmon Enhancement Allocation Plan closes the Southwestern District prior to July 18. The Management Plan also closes the Coghill District prior to July 21 for purse seine gear. Beginning July 21 both purse seine and drift gillnet are allowed. From August 25 through September 4, seine gear is restricted to the Noerenberg Hatchery Terminal Harvest Area of Lake and Quillian Bays. Beginning September 5 seine gear may only be operated in this area if the harvestable surplus is predominately pink salmon. Fishing is allowed in all other districts as established by emergency order.

The general purse seine districts are managed to achieve wild pink and chum salmon escapement goals by district and allow for the orderly harvest of surplus wild and hatchery stocks. Escapement of pink and chum salmon is tracked through the season by weekly aerial surveys of 209 index streams. Management to achieve hatchery corporate escapement goals is accomplished by opening and closing subdistricts near the hatcheries. Subdistricts near the hatcheries are also utilized to target the fleet on hatchery stocks when wild salmon escapement is weak.

Valdez Fisheries Development Association (VFDA) salmon returns consist of an early stock of pink salmon that peaks in early July, a small run of chum salmon in August and an incidental return of coho salmon beginning in mid-August. All VFDA returns are to the Solomon Gulch Hatchery in Port Valdez. Prince William Sound Aquaculture Corporation (PWSAC) has late returning pink salmon that peak in mid-August. PWSAC pink salmon return to the Cannery Creek Hatchery, the Noerenberg Hatchery and the A.F. Koernig Hatchery. A moderate run of coho salmon is incidental to the August pink salmon fishery at the Noerenberg Hatchery.

The outlook for the general purse seine fishery was a total return of 28.8 million pink salmon composed of 23.4 million hatchery produced (86% PWSAC, 14% VFDA) and 5.4 million wild stock pink salmon. The anticipated common property fishery harvest was 18 million. The remainder was slated for wild stock escapement and corporate escapement. The wild stock chum salmon forecast was weak with a projected run of only 201 thousand salmon which is less than the escapement goal of 225 thousand. The forecast for VFDA chum salmon was 54 thousand with a projected common property harvest of 30 thousand. The forecast for VFDA coho salmon was 88 thousand with a projected common property harvest of 58 thousand. There is overlap of the chum and coho salmon returns, and VFDA requested that the ADF&G manage for chum salmon and treat coho as incidental to the chum return in their Annual Management Plan.

The PWS Salmon Harvest Task Force (SHTF) met prior to the season. The management plan that was drafted did not receive official endorsement by task force members. The development of management recommendations for early-mid July were similar to the 1992 plan. One significant departure from the 1992 plan was the acknowledgement that although fishing may be allowed at the 80 percent escapement level for wild stocks, the department still expected to achieve the escapement goal. The 1993 plan also differed from the 1992 plan by not having a preseason fishing schedule for late July and early August when the PWSAC pink salmon run is building. Fishing periods would be allowed in areas that warrant harvest. If wild stocks are weak then harvest of hatchery fish would be confined to areas near the hatcheries to help reduce the wild stock harvest rate. The draft 1993 plan also established a task force subcommittee, whose purpose was to meet inseason with ADF&G to review and exchange information.

Task force approval was given, to a request by VFDA, to have their pink salmon return managed for a revenue goal of \$2.5 million. Based on average weight, expected marine survival and price/pound it was likely that the entire return would be needed for corporate escapement to achieve the revenue goal.

The PWSAC pink salmon return would be managed to provide 35 percent corporate escapement as stated in the PWSAC annual management plans. The hatchery pink salmon return would be managed collectively and site specific corporate escapement could fall above or below 35 percent at a site. To distinguish wild from hatchery pink salmon, inseason coded-wire tag estimates of the commercial harvest would be used.

SEASON SUMMARY

Aerial surveys to assess early chum and pink salmon in the Eastern and Northern Districts began in mid-June. In early July surveys started in the Coghill, Northwestern, and Southwestern areas and in mid-July the Montague and Southeastern areas. Although no directed fishery occurred on wild stocks during the season, all districts fell short of their escapement goal. Pink salmon escapement reached 95 percent of the season's goal in the Southeastern District; 75 percent in the Eastern District; 89 percent in the

Montague District; 75 percent in the Northern District; 85 percent in the Southwestern District; 55 percent in the Northwestern District; and 23 percent in the Coghill District.

Chum salmon escapement reached 85 percent of the goal in the Southeastern District, 83 percent in the Northwestern, 58 percent in the Northern; 51 percent in the Eastern District and 22 percent in the Coghill District.

VFDA began corporate harvests of pink salmon on June 20 at the Solomon Gulch Hatchery. The VFDA pink return peaked about July 7 as evidenced by 44 percent female salmon in the sales harvest. By this date only 617,000 fish were collected for corporate escapement. Based on ADF&G's forecast of 3.36 million, 1.7 million fish should have returned by July 7. The VFDA Special Harvest Area was defined as the eastern half of Port Valdez through July 7. Beginning July 8 the Special Harvest Area was confined to those waters within 1,000 yards of the Solomon Gulch Hatchery to afford more protection to wild stocks. Due to the weak return at the Solomon Gulch Hatchery, the pink salmon revenue goal was not obtained and there was no common property fishery. The VFDA pink salmon brood stock goal was attained.

PWSAC began collecting pink salmon for corporate escapement on July 19 at the Noerenberg Hatchery, July 23 at the A.F. Koernig Hatchery and August 2 at the Cannery Creek Hatchery.

Through July 31, 65,000 pink salmon were collected for corporate escapement, however based on the preseason forecast the expected run entry was 663,000 fish. Seine representatives on the Task Force Subcommittee met with department staff in late July to implement a test fish program to track fish entry into the Southwestern District. Test fishing began on July 27 and continued daily until August 4. The catch was converted to catch/boat hour and the average on July 27 was 390 pink salmon/boat hour. Up to three vessels were utilized per day for a total of nine test sets in key areas of the Southwestern District. The highest daily average occurred on August 1 when the index was 2,437 pink salmon/boat hour (812 pink salmon for a 20 minute set). Test fishing did not indicate a large volume of salmon entering the Sound. This was also confirmed by run entry into the hatchery special harvest areas.

The percent female from the hatchery special harvest areas on August 1 was 12 percent at Noerenberg Hatchery and 15 percent at the A.F. Koernig Hatchery. These percentages signalled that the PWSAC run was just beginning although total run entry was much less than expected. The sex ratio was too low to make an accurate run projection.

Through August 3 PWSAC had collected 144,000 pink salmon for corporate escapement, versus an anticipated 1 million. The percentage of female salmon in the hatchery sales harvest indicated that run entry was later than the odd-year average at both the Noerenberg and A.F. Koernig hatcheries. Although indicators of abundance were considerably less than expected for both hatchery and wild pink salmon, the department was obligated to allow the common property fishery the opportunity to harvest 65 percent of PWSAC produced pink salmon. A 24-hour period beginning on August 5 in the Port San Juan Subdistrict, near the A.F. Koernig Hatchery, yielded 145,000 pink salmon and 53,000 from the Esther Subdistrict near the Noerenberg Hatchery.

To help increase brood stock collection, hatchery sales harvests stopped on August 7 at the Cannery Creek Hatchery and on August 8 at the Noerenberg Hatchery. To continue harvesting towards the fleet's 65 percent share, a 48-hour period occurred on August 8-10 yielding 293,000 pink salmon from the Port San Juan Subdistrict and 46,000 from the Esther Subdistrict. After the 48-hour period, the Esther

Subdistrict was closed over concern for brood stock. Brood stock acquisition was also a concern at the Cannery Creek Hatchery even though no directed commercial fishery had occurred near that site. On August 12 the percent female still indicated that the run was later than average.

At this point in the run, the A. F. Koernig Hatchery was the only site that provided a harvestable surplus and the Port San Juan Subdistrict was opened for the remainder of the season. The A.F. Koernig Special Harvest Area and Sanctuary were periodically opened to allow the common property fishery to harvest salmon excess to corporate escapement needs.

Brood stock collection increased at the Noerenberg and Cannery Creek hatcheries as the run neared its peak. The common property fishery was opened on August 18 in the Esther Subdistrict and waters of Unakwik Inlet near the Cannery Creek Hatchery along with the hatchery special harvest areas and sanctuaries. This allowed the common property fleet to harvest salmon and allow brood stock collection to take arriving pink salmon so that all segments of the run would be represented.

The run peaked several days later than the odd-year average at each site. On August 20 the seine fleet left the fishing grounds for a blockade of Valdez Narrows to focus attention on the PWSAC ecosystem. The department opened fishing for the common property fleet and PWSAC resumed sales harvesting at the Noerenberg and Cannery Creek hatcheries.

Unakwik Inlet closed for the season on August 25 to allow for brood stock collection. The Esther Subdistrict became a drift gillnet area on August 25. Beginning August 25 seine gear was only permitted in the Noerenberg Hatchery Terminal Harvest Area. Beginning September 5 seines could be operated in the waters of Lake and Quillian Bays if there was a predominance of pink salmon. The Noerenberg Terminal Harvest Area (Quillian Bay) opened from September 2-4. During this period there was a predominance of pink salmon harvested. This area was closed to seining on September 5, however a 12-hour period was allowed for seines and gillnets on September 6. The harvest from this period indicated a predominance of coho salmon and the Noerenberg Terminal Harvest Area closed to seine gear for the season. The Esther Subdistrict remained open to gillnet gear until October 8.

The coho harvest from the Esther Subdistrict was 41,190 salmon (39,658 common property fishery and 1,532 hatchery sales). Gillnetters harvested approximately 94 percent of the coho return. The Noerenberg Hatchery collected 3,100 for corporate escapement. No directed management action was taken for coho salmon, however the brood stock goal was achieved.

PWSAC began their pink salmon egg take in late August. Fecundity information revealed a lower number of eggs/female than expected. This was attributed to the small average fish size. PWSAC's pink salmon historically average 3.3 pounds, however the 1993 return averaged 2.7 pounds. The 1993 average fecundity of 1,480 was less than the long term average of 1,600. The lower fecundity required an increase in the number of brood fish if the egg take goal was to be obtained.

In conjunction with low fecundity, there was a higher number of males in PWSAC's brood holding ponds thus requiring more total brood to assure enough females were available. The A.F.Koernig brood stock goal was revised inseason upwards by 47,000 salmon, Noerenberg by 58,000 salmon, and Cannery Creek by 69,000. The egg take fell short by 48 million at the Cannery Creek Hatchery and by 8 million at the Noerenberg Hatchery.

The department tracked the entry of VFDA chum salmon brood stock beginning in mid-August. Brood stock acquisition was approximately one-half of the anticipated and the fall chum egg-take goal was not achieved for the Solomon Gulch Hatchery. The VFDA coho salmon return that is managed incidentally to the chum return also performed poorly. The hatchery only collected 3,500 coho, however the brood stock goal was achieved.

The total pink salmon return including commercial harvest, hatchery brood and wild stock escapement is estimated at 8.0 million. The common property fishery harvested 3.5 million pink salmon for the entire season from all districts. Approximately 70 percent of the pink salmon harvest was taken in the Southwestern District along with 28,000 sockeye salmon. The average weight of pink salmon was approximately 2.7 pounds.

PWSAC harvested 1.8 million pink salmon for corporate escapement and VFDA harvested 1.65 million pink salmon for corporate escapement. Revenue from fish sales for both VFDA and PWSAC was substantially below preseason projections.

1993 PRINCE WILLIAM SOUND AND COPPER RIVER SUBSISTENCE FISHERIES

Subsistence and personal use harvests continue to be minor by comparison to the commercial salmon harvest in the Prince William Sound Management Area. The largest subsistence and personal use fisheries occur on the Upper Copper River, upstream of the regulatory markers above Haley Creek to Slana River. In Prince William Sound and the Copper River Delta commercial fishermen may withhold a portion of their commercial catch for home use. There is currently no mechanism to monitor this catch and it goes unreported. The only personal use fishery occurs on the upper Copper River in the Chitina Subdistrict. All remaining waters of the Prince William Sound Management Area are closed to the personal use taking of fish. Subsistence fishing permits are issued from the Cordova office for the Copper River Delta, Prince William Sound, Southwestern and Eastern areas. Harvests are provided for these areas in Appendix G.1.

PRINCE WILLIAM SOUND AREA SUBSISTENCE FISHERIES

PRINCE WILLIAM SOUND AND LOWER COPPER RIVER FISHERIES

Permits issued at the Cordova office allow subsistence users to fish open commercial periods in Prince William Sound and the Copper River Flats. In 1993, six permits were issued for Prince William Sound, however only four fished. The reported catch was 104 sockeye, 10 coho and 1 chinook salmon (Appendix G.2).

For the Copper River Flats 111 permits were issued. Of the permits returned only 50 fished. The reported catch was 120 chinook, 428 sockeye, 29 coho and 24 other species (Appendix G.3).

EASTERN AND SOUTHWESTERN PRINCE WILLIAM SOUND FISHERIES

The Southwestern and Eastern subsistence permit program began in 1988. Residents of both Chenega Bay and Tatitlek are eligible for subsistence use permits in their respective area. In 1991 a court ruling qualified all residents of Alaska for a subsistence permit in the Eastern or Southwestern areas. The permit holders are allowed to fish in their respective areas from May 15 until the commercial fishery opens in the permitted area and from the closure of the commercial fishery until September 30 in Southwestern and October 31 in the Eastern area 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, 22 permits were issued, mainly to residents of Chenega Bay village. This was an increase of 8 from 1992. Only 17 permits fished for a total catch of 835 sockeye salmon, 232 pink salmon, 124 chum salmon, 50 coho salmon and 2 chinook salmon (Appendix G.4).

In the Eastern area, 7 of the 18 permits issued actually fished in 1993. A total catch of 512 sockeye salmon, 305 coho salmon, 74 chum salmon, 144 pink salmon, 2 chinook salmon and 180 salmon reported with no species designation.

UPPER COPPER RIVER SUBSISTENCE AND PERSONAL USE FISHERIES

SUBSISTENCE FISHERY

The 1993 Copper River salmon return was anticipated to allow unrestricted fishing for the subsistence fish wheel and dip net fishery. During the 1991 Board of Fisheries meeting, subsistence harvest was increased from 25,000 to 35,000 salmon with the fish wheel and dip net fishery opening June 1 to seven day per week fishing. A total of 14 dip net and 759 fish wheel permits were issued for a total harvest of 49,960 salmon. The estimated total (reported and unreported) salmon harvest was 54,370 (Appendix G.5).

BATZULNETAS SUBSISTENCE FISHERY

In 1987 an interim subsistence fishery was provided for by emergency regulation at Batzulnetas to achieve settlement in the United States District Court case John v. Alaska. The fishery was conducted near the mouth of and within Tanada Creek near the historical village site of Batzulnetas. Eight permits were issued to individuals or family groups from Mentasta or Dot Lake and the fishery was conducted during July and early August. A total of 22 sockeye salmon was reported in 1987. The Board of Fisheries reviewed the fishery prior to the 1988 season and set seasons, eliminated the quota, and provided for additional gear types. No permits were issued between 1988 and 1992. In 1993, one permit was issued for a harvest of 160 sockeye salmon.

PERSONAL USE FISHERY

The personal use fishery in the Chitina Subdistrict opened June 4 for 54 hours during the first weekend of June and opened to continuous fishing June 21 until the season closed on September 30. The Personal Use fishery is restricted to a 60,000 seasonal salmon harvest, plus 25 percent of the escapement past Miles Lake sonar which exceed the 516,000 salmon objective. Fishing time may be reduced when actual harvest rates exceed the expected. 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 7,914 dip net permits were issued in 1993, representing an increase of over 1,500 permits issued in 1992. The reported harvest for the season was 89,629 sockeye, 2,729 chinook and 1,358 coho salmon. The estimated total (reported and unreported) salmon harvest was 97,500. The combined upper Copper River personal use and subsistence fisheries estimated catch of 151,870 salmon ranks as the largest harvest on record.

1993 PRINCE WILLIAM SOUND HERRING FISHERIES

PRESEASON OUTLOOK AND HARVEST STRATEGY

Five herring fisheries occur during the year. During the spring two fisheries target herring for sac roe using either seine or gillnet gear. Two spawn-on-kelp fisheries harvest either naturally occurring spawn on kelp or spawn on kelp produced by impounding herring and kelp. In the fall a food-and-bait fishery occurs. Of the five herring fisheries only the wild spawn on kelp and food-and-bait fishery are open entry.

For management purposes, all herring fisheries target on what is treated as a single major stock of herring that spawns during the mid-April to early May period. The Prince William Sound Herring Management Plan, 5 AAC 27.365, allocates the projected available surplus to the five fisheries based on a 0 to 20 percent harvest rate when stock size is between 8,400 and 42,500 tons, and the maximum harvest rate of 20 percent is applied when stock size is greater than 42,500 tons. The sac roe seine fishery is allocated 58.1 percent of the available surplus; the food-and-bait fishery 16.3 percent; the pound spawn-on-kelp fishery 14.2 percent; the wild spawn-on-kelp fishery 8.0 percent and the gillnet sac roe fishery 3.4 percent.

The 1993 spawning biomass was projected to be a record 134,133 tons and dominated by age-5 fish from the 1988 year class. The exploitation rate for the 1992-93 management year was set at 20 percent. Allocation by fishery was; seine sac roe 15,586 tons, gillnet sac roe 912 tons, 3,809 tons of pound spawn-on-kelp biomass, and 2,146 tons of wild spawn-on-kelp biomass.

The 1993 food-and-bait fishery was the first fishery of the 1993-94 herring management year. The guideline allocation of 978 tons was based on a 15 percent exploitation rate of the preliminary spawning biomass estimate of 40,000 tons.

A summary of the major spawning areas, timing of spawn, and areas utilized in the 1993 commercial fishery are shown in Appendix H.1. The 1993 herring fisheries utilized 4,748 tons of herring, the lowest since 1983.

SAC ROE SEINE FISHERY

There are 103 permanent and 4 interim purse seine permits in Prince William Sound. Purse seines can be 150 fathoms in length and 1,000 meshes deep. Mesh size is not regulated. The management goal is to provide high quality product to enhance value within the harvest guideline. Quality for PWS is roughly defined as average fish size of 120 grams or larger and a mature roe recovery of 10 percent or greater.

The department announced its intentions to conduct the fishery to enhance value in the preseason fishery outlook. After a record statewide harvest of sac roe in 1992 and a predicted record harvest in 1993 quality was paramount to conducting a successful fishery in 1993. Test fish samples identify a location with large average fish size. Sampling also estimates roe recovery and helps to identify when roe recovery is expected to be near optimum. Aerial and sonar surveys help control harvest within processing capacity. Due to limited processing capacity for the large seine harvest, the department notified the industry that an effort would be made to divide the harvest into several openings. Several seine openings would allow the catch to be quickly processed. Quick processing helps maintain the shape of the roe, and prevents dehydration and uneven curing.

Aerial survey biomass estimates and documentation of spawn activity began on April 1. The sac roe seine fleet was placed on the standard 48-hour advance notice. On April 3 one mile of spawn was seen at Port Gravina, a typical early spawning location, and 12,000 tons of herring, primarily at Montague Island. Sampling for size and roe maturity began on April 5 at Montague Island. The Montague Island samples averaged 114 grams, with 4% mature roe and 3% immature roe.

Spawning was minimal until April 7 when two and one half shoreline miles of spawn was sighted in the Northeast area and two shoreline miles at Montague Island. Samples on April 7 from Montague Island averaged 112 grams with 5.4 percent mature roe. The advance notice period for the seine fleet was reduced to 24-hours on April 7.

Fishing vessels and tenders stationed in Cordova or in the Northeast area of PWS where the fleet hoped to target on larger, higher quality fish. Montague Island has a reputation for having smaller fish of a given age than the Northeast area. The Montague area also tends to have more recruit fish (age-3 and 4) than other locations of the Sound. Herring in the Northeast area typically stage and spawn before the biomass at Montague Island. These factors directed the fleet away from Montague Island; however, the department requested that vessels base at Montague Island as there was no appreciable biomass elsewhere in the Sound.

On April 8 Montague Island samples averaged 107 grams with 7.3% mature roe and 2.3% immature roe. That same day spawn was beginning at the head of Rocky Bay on Montague Island. On April 10 sampling continued on the northwest shore of Montague Island, however all sets were extremely poor quality. Spawning continued along the outer coast between Montague Point and Graveyard Point and near the head of Rocky Bay.

Sampling effort increased on April 11 in hopes of isolating an area with high quality fish. On April 11 samples in the middle of Rocky Bay on Montague Island looked promising with an average weight of 114 grams with 9.3% mature roe and 1% immature roe, however another sample at Montague Point, taken in active spawn had an average size of 99 grams; with 3.0% mature roe and 2.5% immature roe.

Weather prevented test fishing and aerial surveys on April 12. The department contacted all processors stationed in Cordova and scheduled a meeting on April 12 to discuss the results to date. Considering the small biomass, timing and location of spawn, processors were advised that the biomass at Montague Island may provide the only opportunity to conduct a seine fishery in 1993. Processors were also notified that the department intended to conduct an open competitive fishery; however, if the industry wanted a cooperative style fishery, openings would be scheduled to suit this type of effort. Although interest in Montague Island fish was extremely low those fish presented the only opportunity for a harvest.

On April 13 sampling efforts focused on Rocky Bay at Montague Island. Samples averaged 107 grams with a range from 98 to 120 grams. Mature roe averaged 9.0% with a range of 4.4 to 13 percent and immature roe averaged 1.8%. On the outer coast of Montague Island between Montague Point and Graveyard Point, where active spawning was occurring, the average size was 106 grams with 2.5% mature roe and a significant number of spawnouts.

The advance notice period was reduced to 6-hours on April 13 and again to 2-hours effective 8:00 a.m. April 14. Although Rocky Bay had mixed quality it was hoped that continued sampling might identify an acceptable area. On April 14 results indicated an average size of 113 grams with a range of 103 to 118 grams. Mature roe averaged 8.9 percent with a range from 6.7 to 11.3 percent and spawnouts occurred in several of the test sets.

A meeting for processors was called at 10:30 a.m. on April 14 to discuss the sample results collected that morning in Rocky Bay. A vote among the seven processors attending (representing 91 percent of the fleet) resulted in an overwhelming majority deciding to forego the harvest opportunity. The department announced to the fleet that due to marginal roe recoveries and small fish size a harvest would not occur.

The seine fleet was placed on 6-hour advance notice and aerial surveys continued through April 23, however those surveys did not locate new fish of any significance. On April 23 the fleet was taken off advance notice status.

During the course of sampling at Montague Island abnormal behavior and surface hemorrhages on herring were noted. Pathology samples were taken at Montague Island and the Northeast area. Results indicate a viral infection, Viral Hemorrhagic Septicemia. It is unknown if the virus caused the poor quality herring this year.

The 1993 season can be characterized by an earlier than average spawning period, a biomass significantly less than the forecast, a lower than expected percentage of 5-year fish, low annual growth for all age classes, a tight market and low quality herring.

GILLNET SAC ROE FISHERY

There are 24 permanent gillnet permits in Prince William Sound. Gillnets are limited to 100 fathoms in aggregate length and 120 meshes in depth. Mesh size is regulated to a minimum of 2 1/8 to a maximum of 3 inches.

Quality is a primary consideration for the gillnet sac roe fishery. As in the seine fishery, test fishing occurs to identify an area with large average size and high mature roe content. Gillnets are selective for larger size fish than seine gear therefore targeting the fleet on quality herring is easier to achieve than in the seine sac roe fishery.

The gillnet sac roe herring fishery was placed on 48-hour advance notice on April 1 and reduced to 24-hours on April 7. Most of the biomass observed during aerial surveys was concentrated at Montague Island and on April 10, three and one-half miles of spawn were sighted in the northern Montague area. With increased spawning activity and an adequate herring biomass in the area, the advance notice period for the gillnet fleet was further reduced to 6-hours on April 14. Conditions in the northern Montague area appeared ideal for a gillnet fishery, however few fishing vessels were on the grounds. By April 15, all processors and fishing vessels were present on the grounds. Gillnet test fishing results from Rocky Bay yielded an average roe recovery of 9.75 percent. Samples obtained from the outside coast near Montague Point averaged 11.1 percent mature roe recovery and 151 grams. A 2-hour opening was announced, commencing at 4:00 p.m., April 15 on the outside coast of Montague Island from Graveyard Point to Middle Point, including Rocky Bay. The opening was extended until 9:00 p.m. after product quality was reported as acceptable, however the weather was poor with winds exceeding 40 knots in exposed areas and product quality deteriorated later during the period. The harvest from the April 15 opening was 132 tons, with an average roe recovery of 9.0 percent.

No new concentrations of herring had been observed by aerial survey flights, consequently, the fish at north Montague Island continued to provide the best opportunity for a gillnet harvest. Test fishing continued on April 17 with roe recoveries of 12.4% and average fish weight of 156 grams. A gillnet sac roe opening commenced at 12:00 noon that same day. The opening was initially 3-hours long but was extended to 9-hours after product quality was assessed and found to be good. This pattern was followed for all gillnet openings. The catch estimate for this open period was 430 tons.

Gillnet test fishing results from the morning of April 18 were again good. An aerial survey reported that all of the accessible biomass was in Rocky Bay. A test fish boat surveyed this area with sonar and confirmed the aerial observations. The third gillnet sac roe opening was confined to the waters of Rocky Bay and lasted 11-hours. The catch estimate for this opening was 283 tons with an average roe recovery of 11.65%.

After the third open period, the cumulative harvest was 846 tons, 66 tons less than the guideline of 912 tons. No new herring biomass had moved into any area of Prince William Sound, including the north Montague Island area. Fishing had been scratchy the day before, with catch rates of 0.5 ton per boat hour at the close of the period. At this rate it was expected the gillnet fleet could achieve the guideline in 9 hours. The final gillnet sac roe opening commenced at 11:00 a.m. in Rocky Bay and was extended until 10:00 p.m. that evening when it appeared catch rates were even lower than expected. However, the catch estimate for this opening was 185 tons, bringing the total catch to 1,029.9 tons, 117.9 tons greater than the guideline harvest level. This overage is attributed to increased catch rates in the last 2-

hours of the fishery. Roe recovery for the entire harvest averaged 11.0 percent. The exvessel value for the gillnet sac roe fishery is estimated at \$411,960.

SPAWN-ON-KELP IN POUNDS FISHERY

There are 128 permanent pound permits in Prince William Sound. Seine specifications are the same as in the seine sac roe fishery, however there are no specifications on pound size. In addition to the limited entry permit, a Commissioner's permit, issued by the Cordova office, is also required. The Commissioner's permit stipulates gear, method of operation, production limit, and harvest requirements. There were 124 Commissioner's permits issued for the 1993 season.

The pound spawn-on-kelp fishery is unique when compared to other herring fisheries. Participants import *Macrocystis* kelp from Southeast Alaska as a substrate for herring to spawn upon, although local kelp such as *Laminaria* is also authorized. The blades of kelp are individually hung on lines near the surface of the pound. Mature herring are captured by purse seine and transferred into the pound structure where they can be held for up to eight days. After herring and kelp are introduced spawning occurs and the spawn on kelp is harvested.

Beginning in 1991 the Board of Fisheries directed the department to limit the number of kelp blades that can be utilized by each permit holder. This action was taken to help control the utilization of herring. The Prince William Sound Herring Management Plan allocates herring for the pound fishery, however, in practice there is no definitive measure of assessing the actual biomass utilized by this fishery short of pumping each pound in operation. Allocation of the harvest guideline is based on the goal of one ton of spawn-on-kelp product for every 12.5 tons of herring allocated to this fishery. That harvest quota is then distributed to each individual permit holder by a specified number of kelp blades.

The pound spawn-on-kelp fishery is usually the first spring herring fishery to open. The opening occurs after an adequate biomass has been sighted and sample results indicate mature fish are available. The 1993 fishery occurred in the traditional location of Valdez Arm and Port Fidalgo. During the season some permit holders relocated their pound when the fishery was only opened in limited locations due to the small show of herring.

Aerial surveys in early April revealed a small biomass and minimal spawning activity in the traditional pounding location of northeast Prince William Sound. The pound fishery was placed on 24-hour advance notice on Wednesday, April 7.

The first test fish samples from the Northeast area were collected on April 7 from various locations around Port Fidalgo. Samples collected from Two Moon Bay had an overall average weight of 126 grams and an average mature roe of 7.0 percent. Samples from Snug Corner Cove averaged 129 grams and 5.5 percent mature roe. Landlocked Bay samples averaged 92 grams with 4.9 percent mature roe. Herring collected from two sets in Boulder Bay were small, averaging 92 and 97 grams with 1.3 and 3.2 percent mature roe recovery. The advance notice for the pound fishery was reduced to 4-hours effective 6:30 p.m. Thursday, April 8.

On April 9 sample results indicated mixed quality herring. One set averaged 127 grams with 8.8 percent mature roe, another set averaged 97 grams and one percent mature roe and yet another sample averaged 111 grams with 6.7 percent mature roe. Permit holders in the Landlocked Bay/Two Moon Bay area were

ready to fish on April 10. With several test sets indicating mature fish in Landlocked Bay and Two Moon Bay and permit holders with kelp hung in their pounds, the pound fishery opened for the seining of herring for introduction into pounds at 6:00 a.m. Saturday, April 10. The area open included only those waters of Port Fidalgo east of a line from Porcupine Point to Bidarka Point.

Test fishing continued on April 10 in the area that was not opened with mixed results. No fish were spotted in the Galena Bay area, however fish of acceptable quality were located in Tatitlek Narrows. With mature herring located in areas closed to the introduction to pounds and permit holders in those areas ready to fish, the waters open to the seining of herring for the introduction to pounds was expanded effective 3:00 p.m. April 10 to include those waters east of a line from Rocky Point to Porcupine Point.

The peak aerial biomass estimate for the Northeast area occurred on April 8 with 2,300 tons observed. From the peak estimate, biomass decreased due to natural spawning and utilization by the fishery. No new fish entered the Northeast area and no fish, of significance, were seen in Galena Bay where 69 permit holders waited for herring to show.

On April 20 the department announced its intentions to close the fishery if new fish were not observed on the next survey. This action was due to the paucity of the herring biomass in the Northeast area, no indication of fish moving into the area, and sets capturing spawnouts and juvenile herring. The department also wanted to inform permit holders of this closure because some permit holders were planning to import more *Macrocystis* kelp blades from Southeast Alaska. On April 21 the department announced that the seining of herring for introduction to pounds would close at noon on Thursday, April 22.

After the announcement, 19 permit holders from Galena Bay introduced herring into their pounds (from 1 to several dozen fish). After herring were introduced, permittees moved the pound structures and kelp to areas where fish were located such as Landlocked Bay or Two Moon Bay. Kelp was reintroduced and the web surrounding the pound was dropped to release the fish. By dropping their web, which is the accepted practice for releasing herring from the pound, herring in the area were able to swim into their pounds and add eggs to the suspended kelp. Although the department does not condone open pounding there is currently no regulation to prohibit a permit holder from dropping web after herring have been introduced. This was done by 31 permit holders of which 24 permit holders produced product.

The harvest of spawn on kelp began on April 19 and finished on April 28 with 106.4 tons of untrimmed product harvested short of the 305 tons of product allocated to the fishery. The quality of the product produced in 1993 was higher than 1992 with 61 % of the product grade three or higher as compared to 1992 when 54 % was grade three or higher. Only 40 percent of the permit holders produced product in 1993. The fleet received an average of \$10.00 per pound for processed product, placing the value of the fishery at about \$2.0 million.

WILD HARVEST SPAWN-ON-KELP FISHERY

The wild spawn-on-kelp fishery utilizing native Prince William Sound kelp occurs after a major spawning event on marketable species of kelp receiving adequate egg coverage. Wild spawn on kelp is taken by divers or by hand picking depending upon the type of kelp available for harvest and the market demand. Considerations for this fishery are to conduct the fishery in an area receiving adequate egg coverage and to ensure that harvesting does not denude an area of kelp.

The 1991 fishery was the first year *Fucus* kelp (popweed) was the species in demand in Prince William Sound. A survey of processors before the season indicated they had a market for both *Fucus* and ribbon kelp, but good quality product was important. *Fucus* kelp, a predominately intertidal species, doesn't always occur in harvestable quantities with the traditional subtidal kelp species (ribbon, sieve, and hair kelp). Given adequate spawning, openings in two different areas (to harvest both *Fucus* and the traditional species of kelp) were possible. This harvest strategy would satisfy the market demand for both types of kelp.

The fishery was placed on 48 hour advance notice on April 14 after five shoreline miles of spawn had been observed on Montague Island. As only seven miles of spawn had been observed in other areas of Prince William Sound, the northern Montague Island area was the only area under consideration for a wild spawn-on-kelp opening. Spawning was first observed in this area April 5 and continued to increase in distribution and intensity. Montague Island has a diverse composition of kelp species including most of the species found in other areas of Prince William Sound, however *Fucus* is the only marketable species found in any quantity in this area; very little of the traditional subtidal species, ribbon, hair, or sieve kelp occur here. Tatitlek Narrows is the historic area for harvesting the traditional species of wild spawn on kelp. A survey conducted by department personnel indicated that spawn deposition was spotty with some areas receiving marketable coverage. With this level of deposition, the department expected that the demand for quality product would be greater than the availability. The kelp was free of grit and sand. Processors examined samples of the available product and indicated that it was acceptable.

The first open period for the wild harvest fishery commenced at noon on April 19 and continued for 9 hours. The Montague Island area north of Graveyard Point to Middle Point, including Rocky Bay, was open. Five buyers had registered and an effort survey indicated 43 participants. The estimated harvest for the first period was 18 tons of spawn on kelp.

After two more openings, one on April 20 for 17 hours and another on April 21 for 18 hours, the cumulative harvest was 82 tons of product. This was less than the harvest level established for this fishery. Effort remained low and buyers were still receiving quality product. The next day, April 22 the open period was extended continuously until further notice. On April 23, four buyers notified the department that they were leaving the area and would no longer be accepting deliveries. The remaining buyer indicated he would leave the next day. The fishery closed at noon on April 24. The total wild harvest was 162.6 tons of product. All of the product harvested was *Fucus* kelp. The exvessel value for the wild harvest fishery is estimated to be \$178,860 and 83 permit holders participated.

Of concern to processors, fishermen and the department is the waste of harvested product. Waste occurs due to the large number of harvesters, the number of new participants, and harvest locations contribute to the difficulty of advising the fleet of processor requirements for good quality product. Some trimming is traditional to enhance product salability. In 1992 processors turned away skiff loads of spawn on kelp. These fishermen may have delivered to another processor or they may have dumped their catch overboard.

1993 FOOD-AND-BAIT FISHERY

The food-and-bait season may run from September 1 through January 31, however, industry concerns for product quality usually result in a delay of the season opening. The Prince William Sound food-and-bait herring season opened by emergency order at noon October 7, 1993. Participating processors and fishermen were canvassed and all wanted to postpone the September 1 opening. Current market demand is for crab and longline bait. The oil content and subsequent bait quality improves later in the fall and winter. Larger fish begin to show and become vulnerable to purse seine gear later in the fall as well. Quality longline bait is a larger sized herring with firm flesh and a high oil content. Several processors had stringent size requirements for specialized markets again this year and would have preferred an opening later than October 7, however the season opening was a compromise.

The open area included the Montague Herring District and the waters of the General Herring District west of 147°0.0' W. longitude. This is the fourth year the fleet has fished the Montague/Green Island area. By regulation, only the General Herring District is open to this fishery. The food-and-bait harvest has occurred in the Knowles Head area, however, opening the western portion of the General District and the Montague Herring District was justified, as the majority of older, larger herring have been found here recently and this area had the potential of producing a catch of the highest quality. The closure of the eastern portion of the General Herring District was necessary to protect a small sub-stock of young small herring.

The guideline harvest level (GHL) of 978 tons was based on the preliminary 1993 spring spawning biomass of 40,000 tons and a harvest rate of 15 percent. Competition for fish was expected to be intense; the GHL for the past few years had been approximately 4,000 tons and fishermen have developed markets for that amount. Department personnel were on the grounds to monitor the catch and collect biological samples. Although the fishery opened October 7 poor weather delayed any fishing until the next day. Approximately 750 tons of herring were reported taken before poor weather made fishing impossible. Fishing resumed early in the morning of October 10. Only small catches were made until just after daylight when three boats made sets and the catch was projected to exceed the GHL. The fishery was closed at 9:10 a.m., October 10 by field announcement.

Samples collected from the catch were approximately 65 percent five year old fish. Three year old fish comprised approximately 14 percent of the samples. The overall average fish weight ranged from 138 to 144 grams. Processors were pleased with the fish size and the quality of the catch.

The final catch, as reported on fish tickets was 1,087 tons. Five processors purchased herring and eight fishermen made deliveries this year; all used purse seine gear. The estimated exvessel value of the harvest is \$217,400 with an average price of \$200 per ton.

1993 STOCK ASSESSMENT

The 1993 spring spawning biomass of herring was dramatically lower than forecast. Possible causes include high over-winter mortality, unusually low spawning recruitment, or extensive spawning in locations not observed in aerial surveys. The herring spawning population was dominated by the 1988 year class, as expected, which returned as five year olds. Five year olds represented about 65% of the spawning population samples. All age classes showed low annual growth.

The aerial survey program was conducted from early April through late April. Herring biomass and spawning activity was documented throughout the season. The peak aerial biomass estimate was 20,375 tons, the lowest since 1986. Approximately 70 percent of the peak aerial estimate was sighted at Montague Island. The total spawning biomass as estimated from age structured analysis is 30,004 short tons.

The spawning season was earlier than average. The total linear miles of shoreline spawn was 20.4, the lowest ever recorded and the total mile-days of spawn was 40.8 the third lowest on record. A total of 13.2 miles of spawn occurred in the Montague area; 5.5 miles of spawn in the Northeast area; and 1.7 miles of spawn in the Southeast area. The Montague Island area accounted for approximately 65 percent of the shoreline spawning. There was no spawning activity on the North Shore or at Naked Island.

1993-94 HERRING SEASON OUTLOOK

The management year for herring is from July 1 through June 30. In regulation, the guideline harvest level for all fisheries is established before the fall food-and-bait season, based upon the final biomass spawning estimate from the previous spring, cohort analysis, and projected recruitment. In practice the department has not been able to produce a final spring biomass estimate prior to the fall food-and-bait fishery. During the past several years the fall food-and-bait fishery guideline harvest level was set based on a preliminary biomass estimate. The guideline harvest for the spring fisheries has been set in early winter after a final analysis is complete.

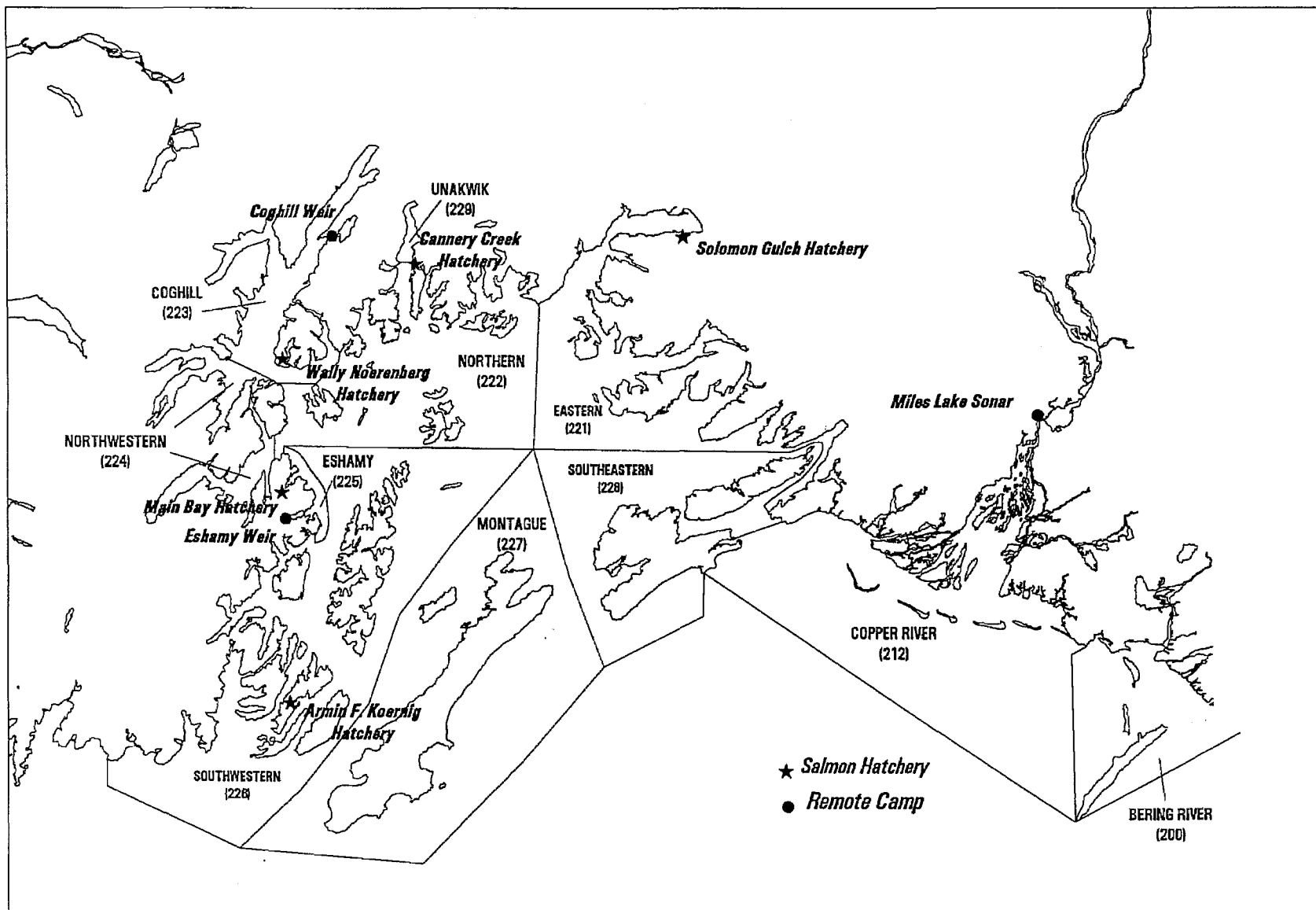
The preliminary 1993 food-and-bait fishery harvest guideline was set at 978 tons. The guideline was established in August based on an assessment of the 1993 spawning stock of 40,000 tons. At the given stock size the harvest rate was set at 15 percent.

Due to the loss of the spawn deposition survey after the 1992 spawning season, the forecast method changed to an Age Structured Analysis model. The model incorporates previous spawn survey egg deposition estimates, miles of spawn, growth, and age compositions from the spawning stock, gillnet and seine sac roe fisheries. Natural mortality is estimated by the ASA model whereas in prior years natural mortality was taken from the literature. The model hindcasted the 1993 spawning biomass at 30,004 tons. Accounting for growth and mortality the ASA model projects the 1994 spawning stock to be 29,786 tons. The spawning biomass should be dominated by age-6 herring.

At the given stock size a harvest rate of 15 percent will be allowed and the following allocations have been made to the five herring fisheries for the 1993-94 management year: 733 tons for the 1993 food-and-bait fishery; 360 tons of wild spawn-on-kelp biomass or 45 tons of spawn on kelp to be harvested, 639 tons of pound spawn-on-kelp biomass or 51 tons of pound spawn on kelp to be harvested, 2,615 tons of herring to be harvested by the sac roe seine fishery, and 153 tons to be harvested by the sac roe gillnet fishery. The total guideline harvest allocation for the 1993-1994 management year is 4,500 tons of herring.

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, 1993.

District	Effort	Chinook	Sockeye	Coho	Pink	Chum	Total
Northern	45	1	154	18	406,737	2,154	409,064
Unakwik	6	0	79	0	3,233	67	3,379
Coghill	72	46	6,250	1,760	352,468	3,645	364,169
Southwestern	133	11	28,092	3,659	2,475,798	3,592	2,511,152
Purse Seine	144	58	34,575	5,437	3,238,236	9,458	3,287,764
Bering River	153	130	33,951	115,833	82	22	150,018
Copper River	508	29,727	1,398,234	281,469	9,579	13,002	1,732,011
Unakwik	33	5	14,691	4	3,338	978	19,016
Coghill	369	576	66,532	37,898	141,279	635,208	881,493
Eshamy	200	8	80,807	673	45,974	27,045	154,507
Drift Gillnet	514	30,446	1,594,215	435,877	200,252	676,255	2,937,045
Eshamy	30	55	101,717	832	84,568	20,369	207,541
Set Gillnet	30	55	101,717	832	84,568	20,369	207,541
Solomon Gulch	1	5	73	1,727	1,326,463	9,101	1,337,369
Cannery Creek	1	0	37	0	172,824	688	173,549
Wally Noerenberg	1	1,432	2,011	1,532	276,642	463,591	745,208
Main Bay	1	0	109,921	0	79,416	1,763	191,100
Armin F. Koernig	1	0	1,696	0	357,058	5	358,759
Hatchery ^a	5	1,437	113,738	3,259	2,212,403	475,148	2,805,985
Donated Fish ^b	1	0	0	0	500	0	500
ADF&G Test Fish	2	8	6,795	172	25,138	5,021	37,134
Confiscated Fish	11	1	93	35	0	114	243
Total	14	9	6,888	207	25,638	5,135	37,877
<hr/>							
Prince William Sound							
Total		32,005	1,851,133	445,612	5,761,097	1,186,365	9,276,212

^a Hatchery sales for hatchery operating costs.

^b These fish were landed on a PWSAC hatchery permit and donated to Alaska Seafood Marketing Institute.

Appendix A.3. Commercial salmon harvest by species from all gear types,
Prince William Sound, 1971 – 1993. ^a

Year	Catch by Species					Total
	Chinook	Sockeye	Coho	Pink	Chum	
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
1990 ^b	22,163	911,607	524,274	44,165,077	967,384	46,590,505
1991 ^c	35,355	1,734,544	641,854	37,135,561	352,321	39,899,635
1992 ^d	41,306	1,771,612	619,460	8,637,116	334,376	11,403,870
1993 ^e	32,005	1,851,133	445,612	5,761,097	1,186,365	9,276,212
<hr/>						
Ten Year						
Average	38,405	1,306,392	528,984	22,563,430	1,171,899	25,609,110
(1983–92)						

^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.

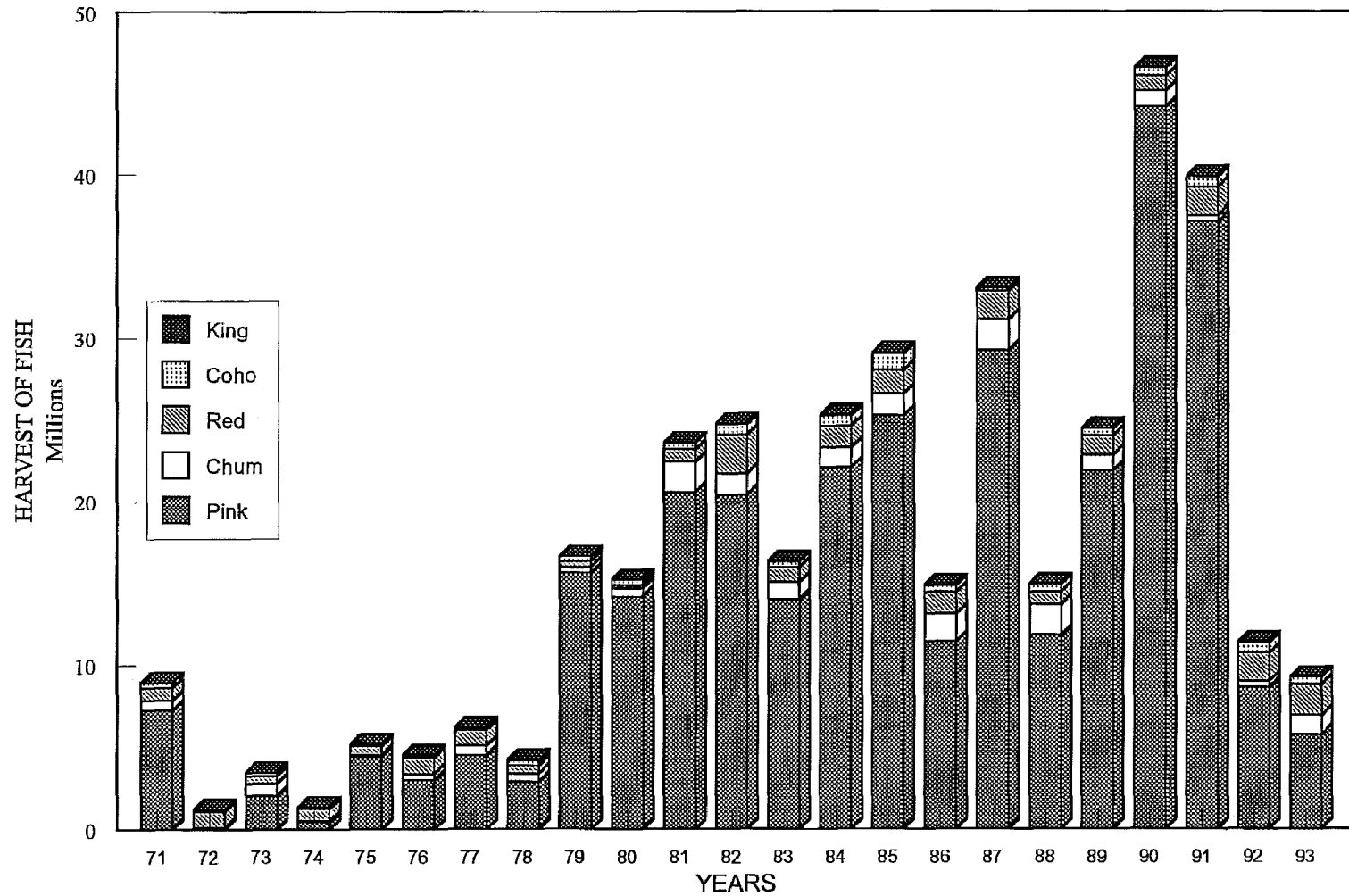
^b Includes confiscated and educational special use permits. Also includes hatchery sales harvests and carcass sales.

^c Includes confiscated and educational special use permits, hatchery sales harvests, and donated and discarded catches.

^d Includes catches from confiscated and educational special use permits, hatchery sales harvests and test fisheries.

^e Includes catches from confiscated permits, hatchery sales harvests, donated fish harvest and test fisheries.

**ALL SPECIES SALMON CATCH
PRINCE WILLIAM SOUND**



Appendix A.4. Commercial salmon harvest by species for all gear types combined, Prince William Sound. 1971 - 1993.

Appendix A.5. Mean price and estimated exvessel value of the total commercial salmon harvest by gear type, Prince William Sound, 1993. ^a

PURSE SEINE

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	58	601	10.36	0.63	378.63
Sockeye	34,575	203,899	5.90	0.83	169,236.17
Coho	5,437	39,423	7.25	0.54	21,288.42
Pink	3,238,236	9,184,567	2.84	0.16	1,469,530.72
Chum	9,458	62,068	6.56	0.36	22,344.48
	3,287,764	9,490,558			\$1,682,778.42

DRIFT GILLNET

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	30,446	652,145	21.42	1.81	1,180,382.45
Sockeye	1,594,215	9,266,000	5.81	1.27	11,767,820.00
Coho	435,877	3,378,749	7.75	0.80	2,702,999.20
Pink	200,252	676,704	3.38	0.17	115,039.68
Chum	676,255	4,546,487	6.72	0.68	3,091,611.16
	2,937,045	18,520,085			\$18,857,852.49

SET GILLNET

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	55	874	15.89	0.97	847.78
Sockeye	101,717	594,462	5.84	0.87	517,181.94
Coho	832	6,580	7.91	0.66	4,342.80
Pink	84,568	285,987	3.38	0.17	48,617.79
Chum	20,369	137,903	6.77	0.71	97,911.13
	207,541	1,025,806			\$668,901.44

HATCHERY SALES ^b

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	1,437	21,394	14.89	1.25	26,736.41
Sockeye	113,738	485,221	4.27	0.77	371,621.49
Coho	3,259	20,315	6.23	0.58	11,712.40
Pink	2,212,403	6,262,951	2.83	0.24	1,472,127.70
Chum	475,148	2,685,793	5.65	0.59	1,576,882.33
	2,805,985	9,475,674			\$3,459,080.33

OTHER GEAR ^c

Species	Number	Pounds	Avg. Wt.	Price	Value
Chinook	9	151	16.78	1.02	154.02
Sockeye	6,888	40,521	5.88	1.29	52,272.09
Coho	207	1,532	7.40	0.49	750.68
Pink	25,638	69,877	2.72	0.13	9,084.01
Chum	37,377	32,132	6.26	0.50	16,066.00
	70,119	144,213			\$78,326.80

Gear Type	Value of Catch	No. of Permits	Average Earnings
Purse Seine	1,682,778.42	144	\$11,685.96
Drift Gillnet	18,857,852.49	514	\$36,688.43
Set Gillnet	668,901.44	30	\$22,296.71
Subtotal—			
Value of CPF Catch	\$21,209,532.35		
Hatchery	\$3,459,080.33		
Other Gear	\$78,326.80		
GRAND TOTAL	\$24,746,939.48		

^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 Prices are an average of sales harvest prices.

^c Includes the confiscated fish sales, donated catch and ADF&G test fish.

Appendix A.6. Total commercial salmon harvest and estimated value by gear type and district, Prince William Sound, 1993.

District	Numbers of Fish							Total	Estimated Value ^a
	Permits	Landings	Chinook	Sockeye	Coho	Pink	Chum		
222 Northern	45	79	1	154	18	406,737	2,154	409,064	185,800
229 Unakwik	6	9	0	79	0	3,233	67	3,379	1,860
223 Coghill	72	146	46	6,250	1,760	352,468	3,645	364,169	201,750
226 Southwestern	133	845	11	28,092	3,659	2,475,798	3,592	2,511,152	1,293,368
PURSE SEINE TOTAL	144	1,079	58	34,575	5,437	3,238,236	9,458	3,287,764	\$1,682,778
200 Bering River	153	1,268	130	33,951	115,833	82	22	150,018	963,171
212 Copper River	508	14,758	29,727	1,398,234	281,469	9,579	13,002	1,732,011	13,266,084
229 Unakwik	33	110	5	14,691	4	3,338	978	19,016	121,319
223 Coghill	369	5,490	576	66,532	37,898	141,279	635,208	881,493	3,738,567
225 Eshamy	200	1,130	8	80,807	673	45,974	27,045	154,507	768,711
DRIFT GILLNET TOTAL	514	22,756	30,446	1,594,215	435,877	200,252	676,255	2,937,045	\$18,857,852
225 Eshamy	30	1,081	55	101,717	832	84,568	20,369	207,541	668,901
SET GILLNET TOTAL	30	1,081	55	101,717	832	84,568	20,369	207,541	\$668,901
221 Solomon Gulch	2	63	5	73	1,727	1,326,463	9,101	1,337,369	1,094,178
222 Cannery Creek	1	8	0	37	0	172,824	688	173,549	63,520
223 Wally Noerenberg	1	94	1,432	2,011	1,532	276,642	463,591	745,208	1,730,047
225 Main Bay	1	27	0	109,921	0	79,416	1,763	191,100	388,366
226 Armin F. Koernig	2	25	0	1,696	0	357,058	5	358,759	182,969
HATCHERY SALES TOTAL	7	217	1,437	113,738	3,259	2,212,403	475,148	2,805,985	\$3,459,080 ^b
Donated Fish	1	1	0	0	0	500	0	500	0
ADF&G Test Fish	2	49	8	6,795	172	25,138	5,021	37,134	76,878
Confiscated	11	11	1	93	35	0	114	243	1,449
MISC. TOTAL	14	61	9	6,888	207	25,638	5,135	37,877	\$78,327
PRINCE WILLIAM SOUND									
GRAND TOTAL			32,005	1,851,133	445,612	5,761,097	1,186,365	9,276,212	\$24,746,940

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

Appendix A.7. Average price paid to fishermen for salmon, Prince William Sound, 1984–1993.^a

Species	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
King Salmon	1.30	1.65	1.45	1.75	2.23	2.25	2.24			
Copper/Bering Districts								1.65	2.50	1.82
Prince William Sound								1.00	1.55	1.07
Sockeye Salmon	1.15	1.50								
Copper River	1.00	1.55	1.65	1.90	3.20	2.30	2.13	1.28	2.50	1.32
Bering River	0.95	1.10	1.65	1.90	3.00	2.30	2.13	1.28	2.50	1.40
Coghill/Unakwik Districts	0.90	1.20	1.37	1.75	2.68	2.00	1.50	1.28	1.55	0.93
Eshamy	0.85	1.10	1.34	1.60	2.77		1.45	1.28	1.55	0.86
General Purse Seine			1.35	1.45	2.68	2.00	1.50	1.00	1.55	0.83
Coho Salmon										
Copper/Bering Districts	1.10	0.85	0.94	0.93	2.35	0.60	0.97	0.65	0.90	0.80
Prince William Sound	1.10	0.40	0.46	0.55	1.86	0.70	0.97	0.45	0.90	0.77
Pink Salmon	0.26	0.22	0.23	0.40	0.79	0.35	0.30	0.12	0.18	0.16
Chum Salmon	0.26	0.29	0.33	0.39	0.73	0.35	0.70	0.40	0.55	0.68

^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 1993 commercial salmon fishery by district and species,
Prince William Sound. ^a

COMMERCIAL HARVEST (1,000's of fish)										
District	Chinook		Sockeye		Coho		Pink		Chum	
	Point Estimate	Range	Point Estimate	Range	Point Estimate	Range	Point Estimate	Range	Point Estimate	Range
Copper River ^b	27.0	21.0-34.0	787.0	696.0-878.0	311.0	139.0-437.0				
Bering River ^c					124.0	0-234.0				
Coghill ^d			32.7	0.01-142.6						
Eshamy ^e			38.3	0.00-107.5						
General P.W.S. Districts			12.9	0.00- 27.6	11.9	0.0- 29.5	4,060.0	0.0-15.3	0.0	0.0-225.6
Total Wild Stock	27.0	21.0-34.0	870.9		446.9		4,060.0	0 - 4,660	0.0	0.0-225.6
Solomon Gulch					58.1	40.1- 76.0	1,680.0	600-2,720	29.7	17.6- 41.8
Armin F. Koemig							3,930.0	3,100-4,760		
Wally Noerenberg	1.3	0.0- 4.3			159.7	107.8-212.6	5,880.0	2,820-8,940	523.7	218.3-829.0
Cannery Creek							4,180.0	680-7,680		
Main Bay			493.7							
Gulkana			133.0	106.0-159.0						
Total Hatchery	1.3		626.7		217.8		15,670.0		553.4	
Total Hatchery and Wild	28.3	21.0- 40.0	1,497.6	1,056-2,444	664.6		19,730.0	7,660-39,410	553.4	

^a Formal forecast procedures are used for estimating wild stock returns for pink and chum salmon in Prince William Sound. Hatchery contributions are based on known fry releases and average marine survival rates. General P.W.S. sockeye production is based upon average harvest. Harvest estimates are only made for those species which constitute a significant portion of the catch. The harvest projections do not include 6.01 million pinks, 105,430 chum, and 163,090 sockeye, projected for harvest by hatcheries for cost recovery.

^b Formalized forecast procedures are used for Copper River chinook and sockeye returns. Copper River coho catches are based on mean annual harvest.

^c Bering River coho harvest estimates are based on mean annual harvest.

^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 is included in the "General PWS Districts" projection.

^e No formal forecast exists for Eshamy sockeye production. The pink and chum harvest is included in the "General PWS Districts" projection.

Appendix A.9. A listing of finfish processors, their location of operation, and type of product processed, Prince William Sound, 1993.

Executive Names, Address Location of Operations	Processor Code	Type of Product	Executive Names, Address Location of Operations	Processor Code	Type of Product
A Taste of Seafood 115 W. Dayton St. Edmonds, WA 98020 Bill Hjort	F1677	Salmon	New West Fisheries 601 W. Chestnut St. Bellingham, WA 98225 Jerry Thon	F0602	Herring
Cannery Row, Inc. P.O. Box 120 Cordova, AK 99574 Greg Meyer	F1673	Herring Salmon	North Coast Seafood Proc., Inc. P.O. Box 70668 Seattle, WA 98107 Bruce Wood	F0084	Herring
Cook Inlet Processing P.O. Box 8163 Nikiski, AK 99635 Pat Hardina	F0186	Herring Salmon	North Pacific Processors, Inc. P.O. Box 1040 Cordova, AK 99574 Ken or Don Roemhildt	F0232	Herring Salmon
Eyak Packing Company P.O. Box 1131 Cordova, AK 99574 Gerald Masolini	F1515	Herring Salmon	Peter Pan Seafoods, Inc. P.O. Box 1027 Valdez, AK 99686 Jim Poor/Bill Chord	F0142 F1041	Herring Salmon
Golden Age Fisheries 18 W. Mercer, Suite 400 Seattle, WA 98119 Jim Harmon/John Henderschedt	F1405	Salmon	Prime & America, Inc. P.O. Box 104533 Anchorage, AK 99510 Laurie K. Yi	F1586	Salmon
Great Pacific Seafoods, Inc. P.O. Box 81165 Seattle, WA 98108 Linda Bartram	F1267	Salmon	St. Elias Ocean Products, Inc. P.O. Box 548 Cordova, AK 99574 Bill Terhar	F1455	Herring Salmon
Inlet Fisheries, Inc. P.O. Box 530 Kenai, AK 99611 Sally Waechtler	F1039 F1231	Herring Salmon	Sagaya Corporation 3700 Old Seward Hwy. Anchorage, AK 99503 Paul Reid	F0803	Herring
J.D. Ventures H.C. 30 Box 5428 Wasilla, AK 99687 Jack Schultheis	10788	Herring	Sahalee of Alaska P.O. Box 104174 Anchorage, AK 99510 Dan Field/Elizabeth Basila	F1485	Salmon
Keener Packing Company, Inc. P.O. Box 890 Kenai, AK 99611 Michael Sawinski	F0394	Salmon	Sea Hawk Seafoods, Inc. P.O. Box 151 Valdez, AK 99686 Raymond Cesarini	F0223	Salmon
Lafayette Fisheries 4259 22nd Ave. West Seattle, WA 98199 John Garner	F0073 F1482 F1483	Herring	Seward Fisheries P.O. Box 8 Seward, AK 99664 Jeff A. Poole	F0133 F0138 F0135 F1142 F0137	Salmon
Nautilus Marine, Inc. P.O. Box 1615 Valdez, AK 99686 James A. Van Stone	F0815	Salmon	Silver Lining Seafoods P.O. Box 260 Cordova, AK 99574 Larry Cragun	F1486	Herring Salmon

- Continued -

Appendix A.9. (page 2 of 2)

Executive Names, Address Location of Operations	Processor Code	Type of Product	Executive Names, Address Location of Operations	Processor Code	Type of Product
Virgin Bay Kelp Co. P.O. Box 1724 Cordova, AK 99574 Steve Smith/Jeannine Buller	F1261	Herring			
Whitney Foods P.O. Box 190429 Anchorage, AK 99519 Bruce Mitchell	F0827	Salmon			

Appendix A.10. Map of the Prince William Sound area showing commercial fishing districts and statistical reporting areas, 1993.

APPENDIX B

COPPER AND BERING RIVER DISTRICTS

Appendix B.1. Commercial salmon catch by species in the Copper River District,
1973 - 1993.

Year	Catch by Species					Total
	Chinook	Sockeye	Coho	Pink	Chum	
1973	19,915	332,816	132,272	8,964	10,173	504,140
1974	18,980	607,766	46,625	9,839	664	683,874
1975	19,644	335,384	53,805	236	807	409,876
1976	31,479	865,195	111,900	3,392	178	1,012,144
1977	21,722	602,737	131,356	23,185	335	779,335
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	52,500	626,735	234,243	7,345	2,217	923,040
1984	38,957	900,043	382,432	32,194	6,935	1,360,561
1985	42,214	927,553	587,990	19,061	5,966	1,582,784
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
1990	21,702	844,778	246,797	1,596	7,545	1,122,418
1991	34,787	1,206,811	385,086	1,246	20,220	1,648,150
1992	39,810	970,938	291,627	1,664	5,807	1,309,846
1993	29,727	1,398,234	281,469	9,579	13,002	1,732,011
<hr/>						
Ten Year Average (1983-92)	37,325	904,132	304,578	12,641	9,797	1,268,472

Appendix B.2. Anticipated and actual weekly catch and escapement of sockeye salmon in the Copper River District drift gillnet fishery, 1993.

Semi-Weekly Date	Fishing Time (Hrs.)	Actual Catch	Anticipated Catch ^a	Anticipated Cumulative Escapement ^b	Actual Cumulative Escapement ^c
May 19	24	43,058	61,891	2,346	
May 22	0		87,000	7,310	45,886
May 26	36	124,368	104,846	23,531	168,519
May 29 ^d	48	136,702	83,216	44,016	212,036
June 02	24	93,367	80,192	77,742	276,504
June 05	24	99,355	53,409	110,028	334,459
June 09	48	110,515	57,248	158,247	423,929
June 12	48	94,659	50,817	193,152	473,164
June 16	48	67,420	54,415	231,409	521,991
June 19	60	62,847	37,548	254,734	540,857
June 23	60	66,440	43,946	280,091	557,226
June 26	36	39,412	23,941	299,006	570,336
June 30	48	48,316	22,449	322,333	591,427
July 03	36	42,200	20,494	338,161	609,931
July 07	48	65,851	19,500	359,392	637,457
July 10	36	49,641	18,596	373,653	668,514
July 14	36	69,283	15,249	394,828	695,985
July 17	36	49,060	14,918	411,680	714,152
July 21	48	50,255	12,548	443,394	741,593
July 24	36	28,021	8,085	462,049	777,569
July 28	48	23,873	6,988	484,223	806,460
July 31	36	8,391	4,809	494,445	824,618
Aug 04	48	8,969	3,359	500,942	833,387 ^e
Oct 09 ^f	588	16,231	5,537		
Season Total	1,500	1,398,234	891,001	516,000	833,387

^a Based on average historic catches for comparable dates (1969–1992).

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

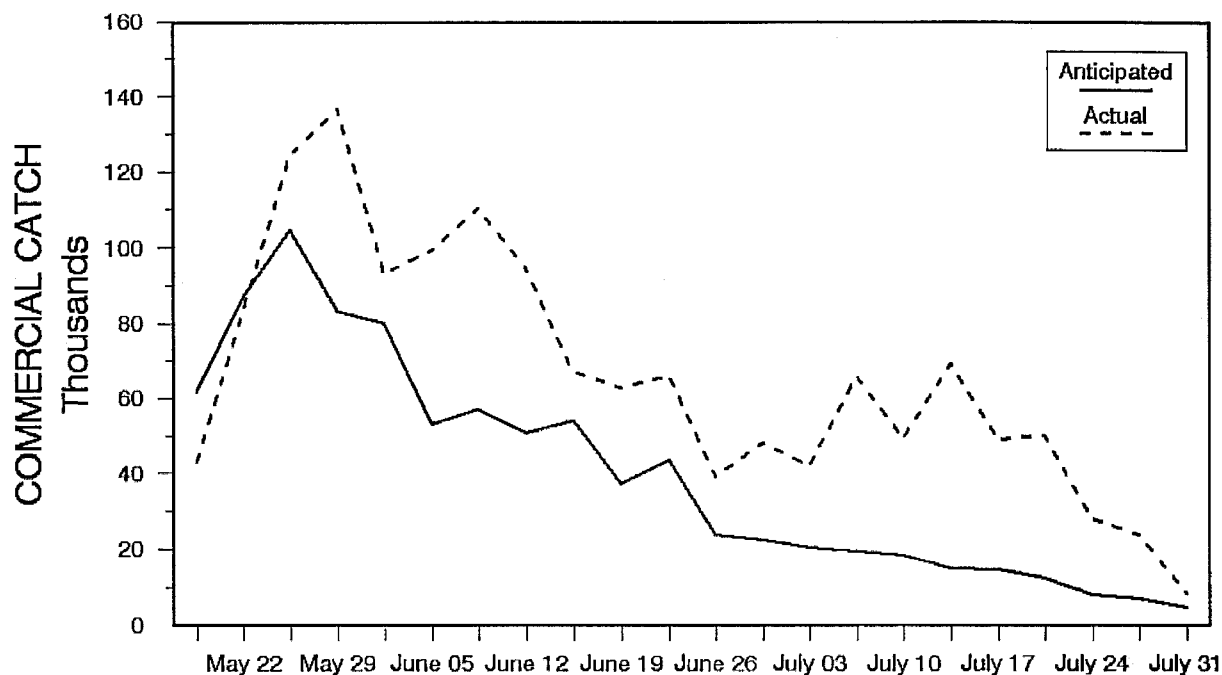
^c Escapement estimate from sonar counters at Miles Lake.

^d Includes catches from a 36-hour period and a 12-hour period.

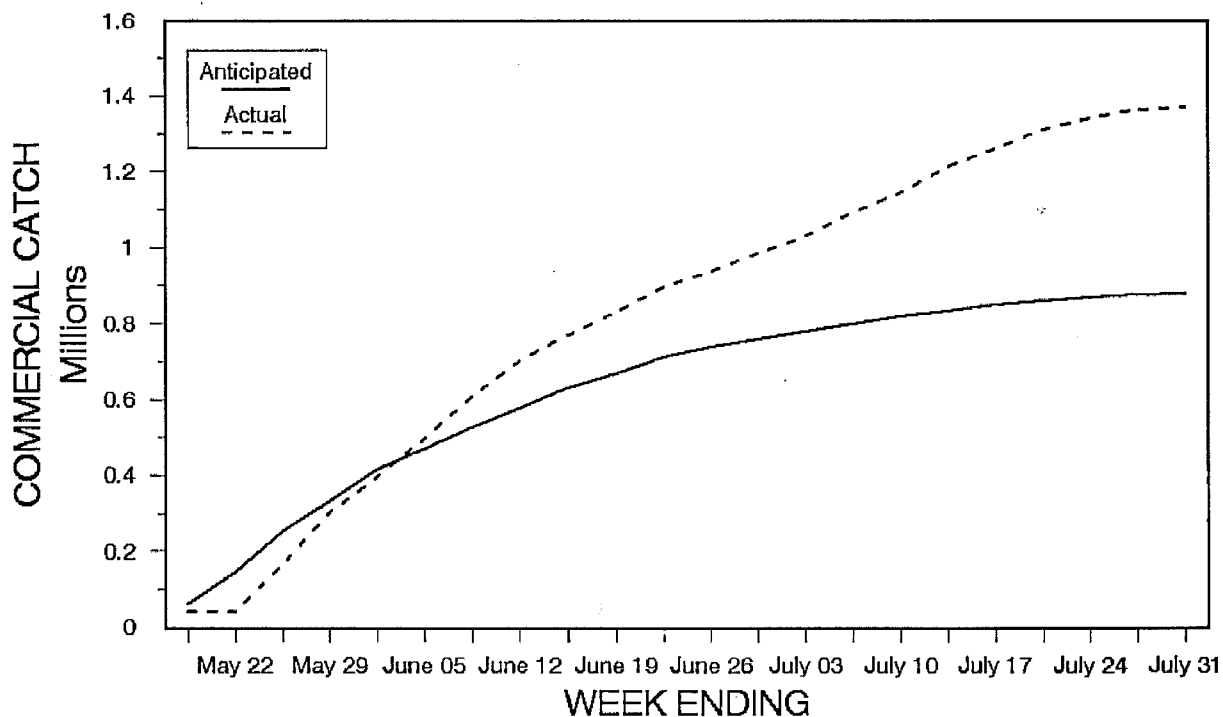
^e Miles Lake sonar operation ended August 2.

^f Combines all periods from August 7 to October 9; the end of the season.

COPPER RIVER COMMERCIAL SOCKEYE CATCH WEEKLY



CUMULATIVE



Appendix B.3. Anticipated and actual weekly and cumulative catches of sockeye salmon in the Copper River District gillnet fishery, 1993.

Appendix B.4. Commercial salmon harvest by period in the Copper River District drift gillnet fishery, 1993.

Period	Date ^{a b}	Hours	Permits	Landings	Chinook		Sockeye		Coho		Pink		Chum	
					Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
01	5/17	24	461	633	6,375	134,769	43,058	247,451	0	0	0	0	5,443	36,298
02	5/23	36	488	923	7,998	167,331	124,368	708,088	3	24	0	0	1,106	6,493
03	5/26	36	481	761	3,688	77,547	91,714	519,679	18	95	0	0	1,675	10,480
04	5/29	12	451	470	1,103	24,216	44,988	255,990	1	7	0	0	129	840
05	5/31	24	481	752	2,830	59,289	93,367	531,581	5	40	0	0	438	2,756
06	6/03	24	491	712	2,124	47,041	99,355	560,213	5	37	0	0	203	1,292
07	6/06	48	301	597	2,187	51,623	110,515	611,579	113	817	0	0	253	1,680
08	6/10	48	327	746	1,312	29,704	94,659	548,444	74	520	2	10	79	515
09	6/14	48	316	640	857	20,400	67,420	389,679	378	2,749	1	3	295	1,968
10	6/17	60	274	587	527	12,273	62,847	370,388	622	4,508	1	3	180	1,333
11	6/21	60	277	634	435	10,244	66,440	392,399	887	6,447	28	145	78	536
12	6/24	36	194	324	99	2,237	39,412	233,687	340	2,478	23	85	38	272
13	6/28	48	158	369	74	1,520	48,316	286,077	547	3,982	40	178	40	289
14	7/01	36	157	262	26	475	42,200	247,423	203	1,462	28	100	1	6
15	7/05	48	176	417	21	390	65,851	386,491	442	3,243	101	385	39	255
16	7/08	36	245	400	6	60	49,641	289,149	1,397	10,324	377	1,548	91	602
17	7/12	36	260	491	13	187	69,283	404,935	2,395	17,442	1,566	5,310	149	1,008
18	7/15	36	272	435	13	158	49,060	291,321	1,990	14,057	1,741	6,540	416	2,711
19	7/19	48	268	485	10	93	50,255	299,963	2,110	14,818	1,214	4,362	572	3,659
20	7/22	36	239	329	9	79	28,021	168,534	1,872	12,987	864	3,058	314	2,054
21	7/26	48	165	273	4	34	23,873	142,911	779	5,252	828	2,814	473	3,010
22	7/29	36	132	167	2	22	8,391	50,620	635	4,404	537	1,899	292	1,859
23	8/02	48	82	129	1	31	8,969	53,437	641	4,318	531	2,019	168	1,044
24	8/05	36	74	95	0	0	6,193	37,027	863	5,949	582	1,899	226	1,392
25	8/09	24	109	140	0	0	6,335	37,789	2,112	14,627	926	3,230	238	1,495
26	8/16	24	181	221	5	75	1,415	8,968	8,585	62,985	120	386	34	208
27	8/19	24	79	90	0	0	302	1,819	5,306	37,077	5	24	3	19
28	8/26	48	290	599	7	114	1,427	9,121	54,639	412,297	49	154	22	134
29	9/02	48	285	576	1	20	484	3,166	54,139	424,559	8	28	7	41
30	9/09	24	225	299	0	0	45	285	31,496	247,054	0	0	0	0
31	9/13	48	235	465	0	0	27	175	47,677	390,361	5	20	0	0
32	9/16	24	85	92	0	0	0	0	7,163	59,963	0	0	0	0
33	9/20	48	150	267	0	0	1	7	26,078	213,696	2	6	0	0
34	9/23	48	142	185	0	0	2	12	14,236	122,976	0	0	0	0
35	9/27	48	92	112	0	0	0	0	7,124	59,634	0	0	0	0
36	9/30	48	29	34	0	0	0	0	3,095	25,952	0	0	0	0
37	10/04	48	37	45	0	0	0	0	3,413	27,673	0	0	0	0
38	10/07	48	NA	NA	0	0	0	0	86	717	0	0	0	0
Total		1,500	508	14,756	29,727	639,932	1,398,234	8,088,408	281,469	2,215,531	9,579	34,206	13,002	84,249
Average Weight						21.53		5.78		7.87		3.57		6.48

^a Starting date of period.

^b From 5/15– 8/07 all 24–hour Monday openers started at 7:00 a.m. and Thursday openers started at 7:00 p.m. All 12–hour periods started at 7:00 a.m.; after August 7, all periods began at 12:00 noon.

Appendix B.5. Anticipated and actual weekly catch of chinook and coho salmon in the Copper River District drift gillnet fishery, 1993.

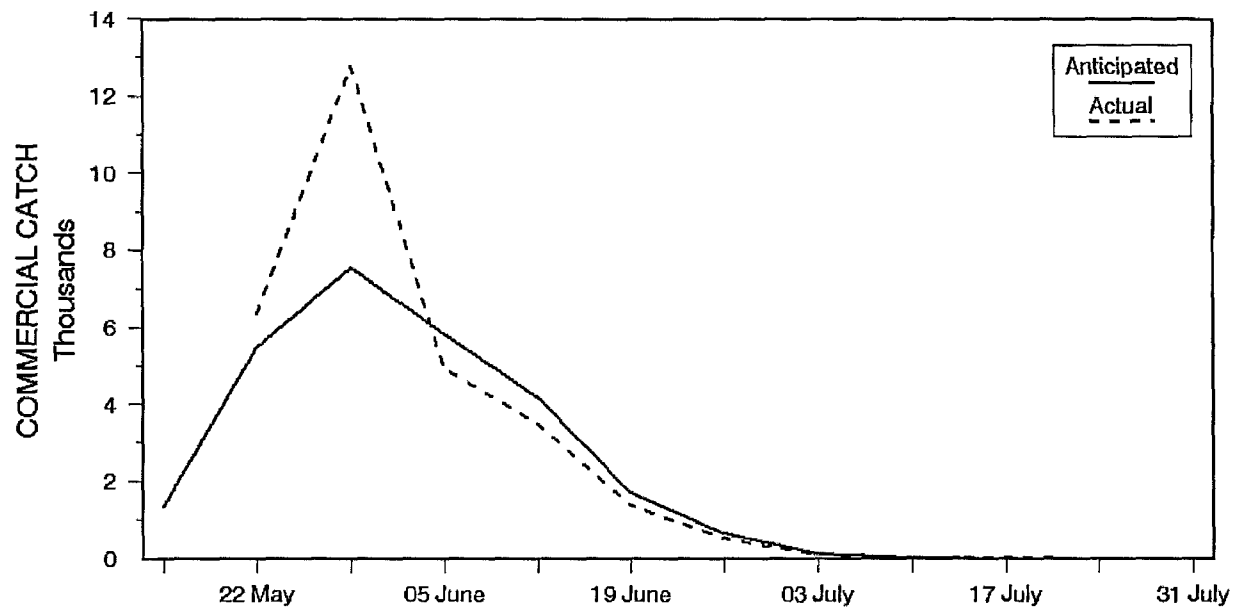
Week Ending Date	Length of Fishing Periods (Hrs)	Chinook		Coho	
		Actual Catch	Anticipated Catch ^a	Actual Catch	Anticipated Catch ^a
May 15			1,346		
May 22	24	6,375	5,488	0	
May 29	36,36 and 12	12,789	7,554	22	
June 05	24 and 24	4,954	5,849	10	
June 12	48 and 48	3,499	4,199	187	
June 19	48 and 60	1,384	1,736	1,000	
June 26	60 and 36	534	682	1,227	
July 03	48 and 36	100	147	750	
July 10	48 and 36	27	44	1,839	
July 17	36 and 36	26	19	4,385	1,211 ^b
July 24	48 and 36	19	12	3,982	1,026
July 31	48 and 36	6	7	1,414	2,679
Aug 07	48 and 36	1		1,504	9,848
Aug 14	24	0		2,112	21,912
Aug 21	24 and 24	5		13,891	46,026
Aug 28	48	7		54,639	60,955
Sept 04	48	1		54,139	67,550
Sept 11	24	0		31,496	59,614
Sept 18	48 and 24	0		54,840	25,900
Sept 25	48 and 48	0		40,314	10,876
Oct 02	48 and 48	0		10,219	2,181
Oct 09	48 and 48	0		3,499	722
Season Total		29,727	27,083	281,469	310,500

^a Based on average historic catches for comparable dates (1969 – 1991).

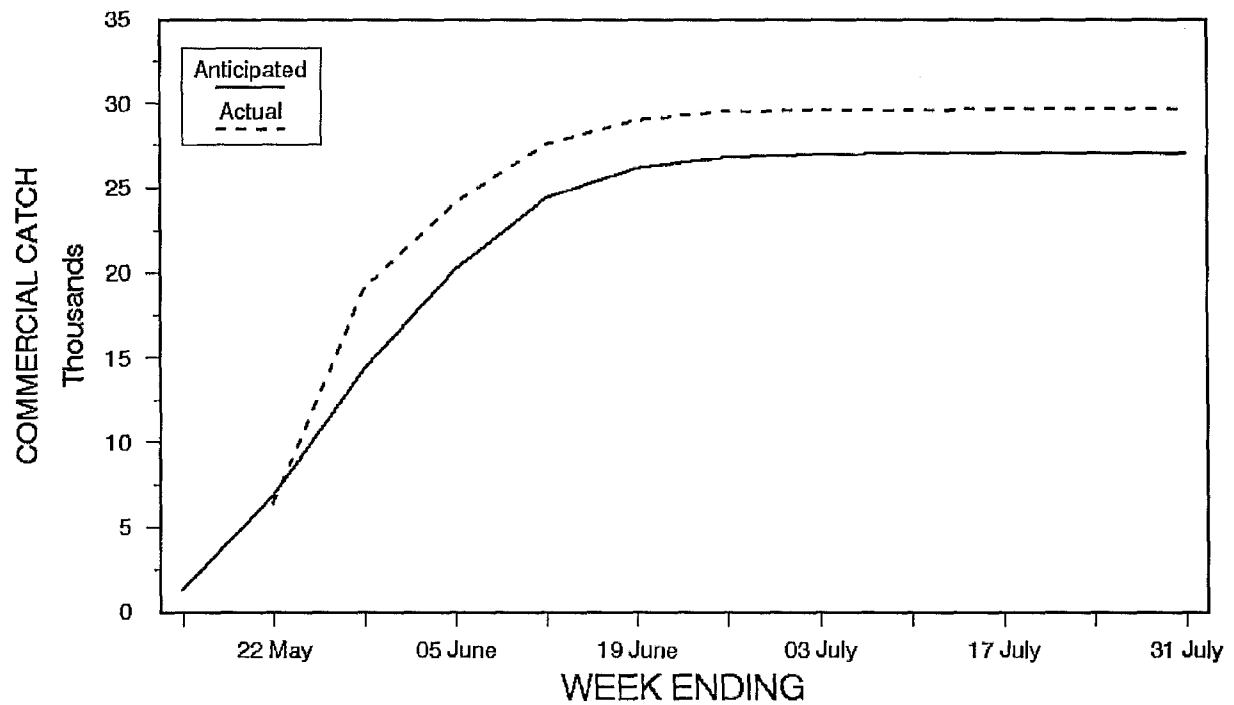
^b The anticipated cumulative harvest through July 17.

COPPER RIVER COMMERCIAL CHINOOK CATCH

WEEKLY



CUMULATIVE



Appendix B.6. Anticipated and actual weekly and cumulative catches of chinook salmon in the Copper River drift gillnet fishery, 1993.

Appendix. B.7. Daily sockeye salmon escapement estimates at Miles Lake sonar, 1993.

Date	Water Level ^a	North Bank	Estimate		Daily	Cumulative	Escapement Objective		Anticipated	
			South Bank				Daily	Cumulative	0600	Daily
18-May										
19-May							1,307	2,346		
20-May	41.12	65	9,438 ^b	9,503	9,503	9,503	1,514	3,860		
21-May	41.26	85	13,592	13,677	23,180	23,180	1,657	5,517	2,439	9,756
22-May	41.40	269	22,437	22,706	45,886	45,886	1,793	7,310	3,707	14,828
23-May	41.39	251	28,174	28,425	74,311	74,311	2,740	10,050	7,224	28,896
24-May	41.38	1,077	30,903	31,980	106,291	106,291	3,513	13,563	7,196	28,784
25-May	41.54	1,379	37,202	38,581	144,872	144,872	4,825	18,388	11,029	44,116
26-May	41.68	1,254	22,393	23,647	168,519	168,519	5,143	23,531	7,300	29,200
27-May	41.67	530	12,355	12,885	181,404	181,404	5,363	28,894	3,232	12,928
28-May	41.65	457	17,019	17,476	198,880	198,880	6,663	35,557	3,334	13,336
29-May	41.77	218	12,938	13,156	212,036	212,036	8,459	44,016	4,901	19,604
30-May	41.93	214	8,264	8,478	220,514	220,514	6,784	50,800	2,383	9,532
31-May	42.11	180	16,506	16,686	237,200	237,200	7,660	58,460	4,670	18,680
01-Jun	42.35	120	16,353	16,473	253,673	253,673	9,490	67,950	3,560	14,240
02-Jun	42.37	240	22,591	22,831	276,504	276,504	9,792	77,742	6,778	27,112
03-Jun	42.40	260	14,331	14,591	291,095	291,095	10,515	88,257	4,280	17,120
04-Jun	42.49	268	17,317	17,585	308,680	308,680	10,265	98,522	3,154	12,616
05-Jun	42.53	552	25,227	25,779	334,459	334,459	11,506	110,028	4,928	19,712
06-Jun	42.60	477	25,166	25,643	360,102	360,102	12,718	122,746	8,113	32,452
07-Jun	42.74	391	17,677	18,068	378,170	378,170	11,591	134,337	5,538	22,152
08-Jun	42.68	1,277	19,485	20,762	398,932	398,932	11,208	145,545	4,478	17,912
09-Jun	42.35	506	24,491	24,997	423,929	423,929	12,702	158,247	4,433	17,732
10-Jun	42.03	758	19,036	19,794	443,723	443,723	11,963	170,210	4,316	17,264
11-Jun	41.84	218	10,901	11,119	454,842	454,842	11,666	181,876	2,808	11,232
12-Jun	41.84	179	18,143	18,322	473,164	473,164	11,276	193,152	3,565	14,260
13-Jun	41.86	250	12,622	12,872	486,036	486,036	10,601	203,753	4,035	16,140
14-Jun	41.94	120	8,237	8,357	494,393	494,393	9,464	213,217	2,406	9,624
15-Jun	42.08	336	13,015	13,351	507,744	507,744	8,915	222,132	2,295	9,180
16-Jun	42.35	545	13,702	14,247	521,991	521,991	9,277	231,409	3,675	14,700
17-Jun	42.58	124	7,497	7,621	529,612	529,612	8,171	239,580	2,565	10,260
18-Jun	42.61	99	4,822	4,921	534,533	534,533	8,094	247,674	1,018	4,072
19-Jun	42.57	71	6,253	6,324	540,857	540,857	7,060	254,734	1,413	5,652
20-Jun	42.60	159	4,741	4,900	545,757	545,757	6,480	261,214	1,373	5,492
21-Jun	42.46	168	3,368	3,536	549,293	549,293	6,597	267,811	805	3,220
22-Jun	42.50	225	2,639	2,864	552,157	552,157	6,151	273,962	843	3,372
23-Jun	42.52	292	4,777	5,069	557,226	557,226	6,129	280,091	1,337	5,348
24-Jun	42.58	186	5,885	6,071	563,297	563,297	6,354	286,445	1,554	6,216
25-Jun	42.64	223	4,098	4,321	567,618	567,618	6,249	292,694	1,211	4,844
26-Jun	43.00	103	2,615	2,718	570,336	570,336	6,312	299,006	538	2,152
27-Jun	42.75	145	3,225	3,370	573,706	573,706	5,894	304,900	695	2,780
28-Jun	42.61	117	4,244	4,361	578,067	578,067	5,847	310,747	1,030	4,120
29-Jun	42.57	486	4,490	4,976	583,043	583,043	5,769	316,516	977	3,908
30-Jun	42.60	308	8,076	8,384	591,427	591,427	5,817	322,333	1,708	6,832

—Continued—

Appendix B.7. (page 2 of 2)

Date	Water Level ^a	Estimate		Escapement Objective				Anticipated	
		North Bank	South Bank	Daily	Cumulative	Daily	Cumulative	0600	Daily
01-Jul	42.65	358	7,281	7,639	599,066	5,337	327,670	1,821	7,284
02-Jul	42.61	212	5,508	5,720	604,786	5,231	332,900	1,608	6,432
03-Jul	42.62	109	5,036	5,145	609,931	5,261	338,161	1,258	5,032
04-Jul	42.55	151	5,376	5,527	615,458	5,452	343,613	1,378	5,512
05-Jul	42.63	227	6,112	6,339	621,797	5,545	349,158	1,436	5,744
06-Jul	42.59	226	6,205	6,431	628,228	5,296	354,454	1,789	7,156
07-Jul	42.53	393	8,836	9,229	637,457	4,938	359,392	1,634	6,536
08-Jul	42.34	320	10,066	10,386	647,843	4,598	363,990	2,343	9,372
09-Jul	42.08	271	10,834	11,105	658,948	4,705	368,695	2,180	8,720
10-Jul	42.50	277	9,289	9,566	668,514	4,958	373,653	2,890	11,560
11-Jul	42.82	404	6,960	7,364	675,878	5,659	379,312	1,449	5,796
12-Jul	43.07	409	6,410	6,819	682,697	5,082	384,394	1,671	6,684
13-Jul	43.16	311	5,304	5,615	688,312	5,351	389,745	1,049	4,196
14-Jul	43.45	186	7,487	7,673	695,985	5,083	394,828	2,009	8,036
15-Jul	43.61	394	5,718	6,112	702,097	5,689	400,517	1,159	4,636
16-Jul	43.76	181	6,699	6,880	708,977	5,568	406,085	1,645	6,580
17-Jul	44.04	227	4,948	5,175	714,152	5,595	411,680	1,404	5,616
18-Jul	44.14	282	5,116	5,398	719,550	6,445	418,125	893	3,572
19-Jul	44.07	217 ^c	6,565	6,782	726,332	7,938	426,063	1,423	5,692
20-Jul	43.82	237	7,180	7,417	733,749	8,125	434,188	1,230	4,920
21-Jul	43.85	251	7,593	7,844	741,593	9,206	443,394	2,406	9,624
22-Jul	43.87	295	8,946	9,241	750,834	8,240	451,634	1,064	4,256
23-Jul	43.44	448	13,564	14,012	764,846	6,029	457,663	2,437	9,748
24-Jul	43.29	406	12,317	12,723	777,569	4,386	462,049	2,926	11,704
25-Jul	43.19	289	8,759	9,048	786,617	6,372	468,421	1,517	6,068
26-Jul	43.21	205	6,201	6,406	793,023	5,464	473,885	1,796	7,184
27-Jul	43.29	238	7,227	7,465	800,488	5,110	478,995	1,696	6,784
28-Jul	43.33	191	5,781	5,972	806,460	5,228	484,223	1,763	7,052
29-Jul	43.43	195	5,921	6,116	812,576	5,329	489,552	1,070	4,280
30-Jul	43.49	208	6,295	6,503	819,079	2,763	492,315	1,383	5,532
31-Jul	43.53	177	5,362	5,539	824,618	2,130	494,445	1,345	5,380
01-Aug	43.60	146	4,414	4,560	829,178	1,863	496,308	1,358	5,432
02-Aug	43.40	134	4,075	4,209	833,387	1,631	497,939	934	3,736
Total		23,757	809,630	833,387					

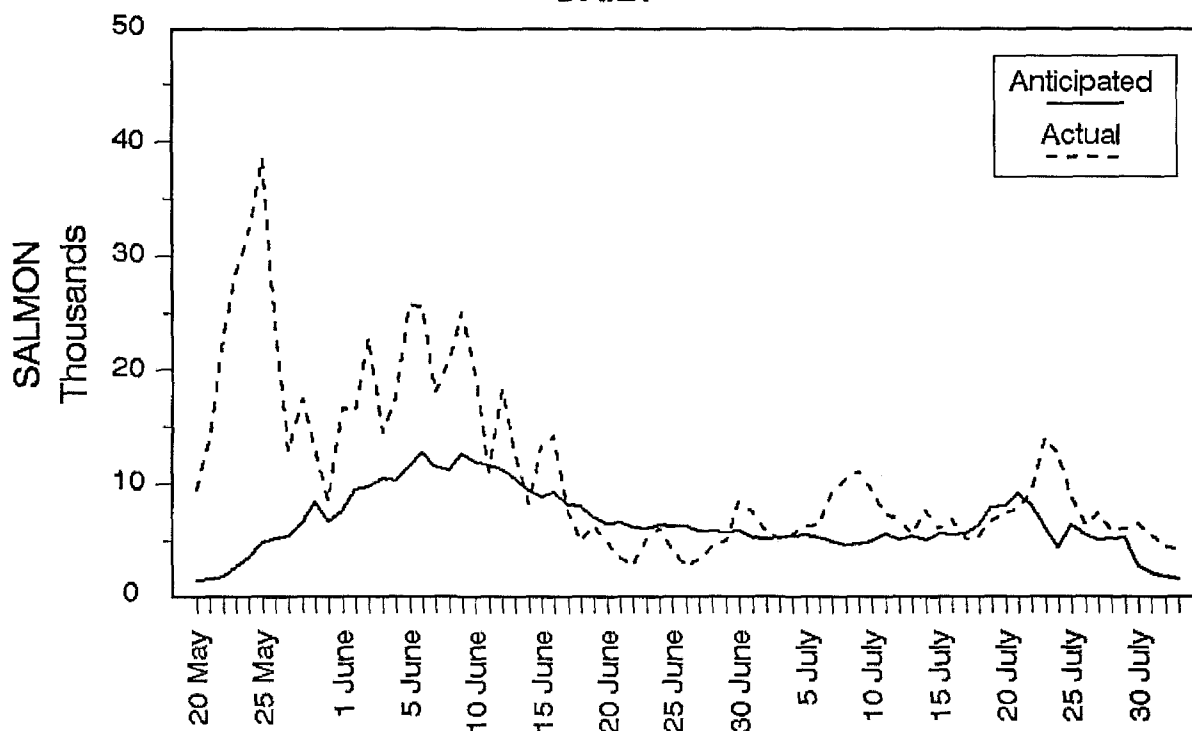
^a Meters above mean sea level.

^b Went to permanent substrate.

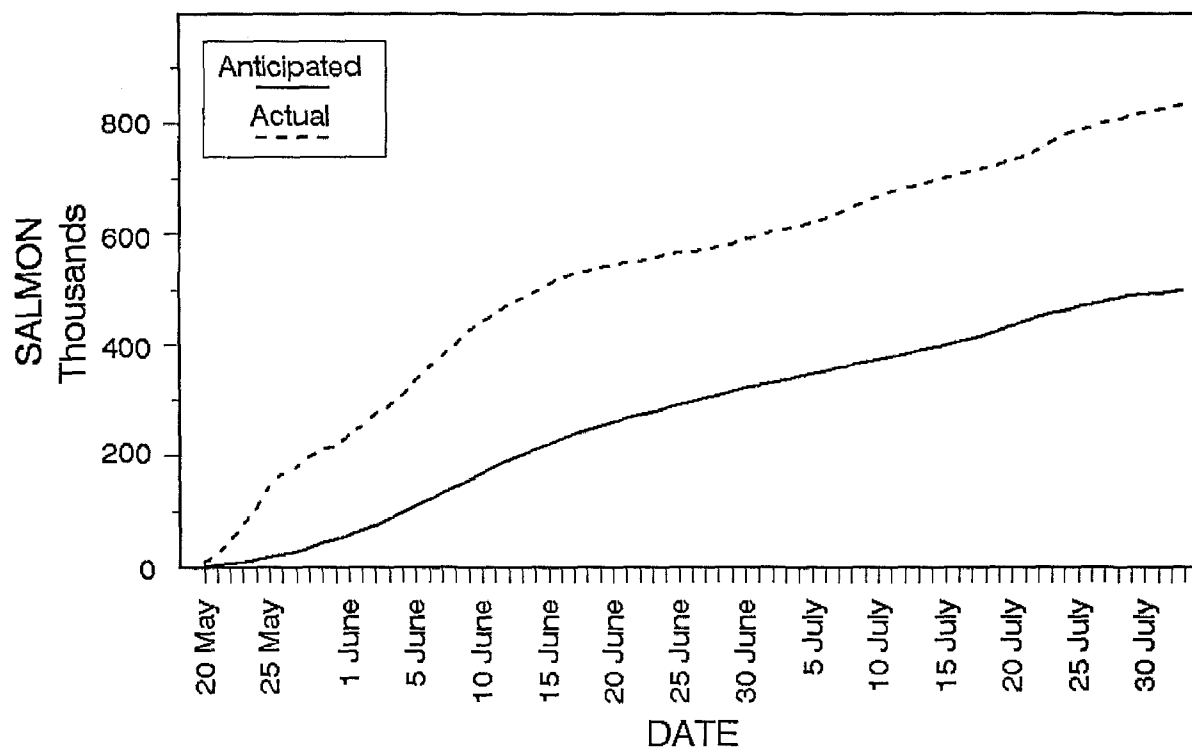
^c North bank pulled on July 18 and all counts after are interpolated. North bank counts are derived from the average percent of North versus south bank counts of 3.3 percent.

1993 MILES LAKE SONAR COUNT

DAILY



CUMULATIVE



Appendix B.8 Anticipated and actual daily and cumulative salmon escapement estimates, Miles Lake sonar, 1993.

Appendix B.9. Aerial escapement indices by date and location for sockeye salmon returning to the Copper River Delta, 1993.

Copper River Delta *		Aerial Escapement Indices by Survey Date						
System and Drainage	Survey System	31 May	4 June	10 June	15 June	22 June	29 June	7 July
Eyak River	Eyak River	200 +	NC	NC	NS	NS	NS	NS
	West Shore Beaches	150	120	270	200	600	1,600	6,300
	East Shore Beaches	0	0	210	1,300	150	1,100	2,800
	Middle Arm Beaches ^b	1,030	1,400 *	1,370	1,460	1,700	1,360	900
	North Shore Beaches	NS	NS	0	2,500	3,800	2,900	200
	Hatchery Creek Delta	NS	NS	0	300	350	350	700
	Hatchery Creek	NS	NS	0	0	0	300	275
	Power Creek Delta	NS	NS	0	0	300	600	200
	Power Creek	NS	NS	NS	NS	NS	NS	NS
Ibek Creek	Ibek Creek	NS	NS	NS	NS	NS	NS	NS
Alganik Slough	Alganik Slough	0	NC	NS	NS	NS	NS	NS
	McKinley Lake	0	0	0	0	0	1,400	2,200
	Salmon Creek West Fork	NS	NS	NS	NS	0	0	0
	Salmon Creek East Fork	NS	NS	NS	NS	NS	NS	20
26/27 Mile Creek	26/27 Mile Creek	0	0	0	150	200	600	900
39 Mile Creek	39 Mile Creek	NS	NS	0	0	0	0	1
Goat Mountain Creek	Goat Mountain Creek	NS	NS	NC	NC	NC	NC	0
Pleasant Creek	Pleasant Creek ^b	NS	NS	64	250	770	1,520 ^c	1,600
Martin River	Martin River – Lower	745	725	465	1,250	680	495	250
	Ragged Point River	NS	NS	NS	NS	NS	0	450
	Ragged Point Lake Outlet	NS	NS	NS	NS	NS	NS	0
	Ragged Point Lake	NS	NS	NS	NS	NS	NS	0
	Martin River – Upper ^b	0	250	200	250	1,300	880	300
	Martin Lake Outlet	0	100	100	650	100	420	0
	Martin Lake	0	650	800	3,700	3,800	5,200	4,000
	Martin Lake Feeders	NS	NS	0	0	0	200	680
	Pothole River	NS	NS	NS	NS	NS	85	240
	Pothole Lake	NS	NS	NS	NS	NS	0	0
	Little Martin Lake Outlet	NS	NS	NS	NS	NS	NS	NS
	Little Martin Lake	NS	NS	NS	NS	NS	NS	NS
	Tokun Springs	NS	200	150	1,200 *	600	920	1,600
	Tokun River	NS	250	100	300 *	400	100	170
	Tokun Lake Outlet	NS	0	0	400 *	150	0	0
	Tokun Lake	NS	150	200	1,500 *	1,300	1,200	1,150
Martin River Slough	Martin River Slough	0	0	140	350	3,400	3,000	5,400 *
Copper River Aerial Survey Daily Total		2,125	3,845	4,069	15,760	19,600	24,230	30,336
Anticipated Escapement		NA	NA	2,833	4,968	18,780	26,529	40,466

-Continued-

Appendix B.9. (page 2 of 4).

Copper River Delta ^a		Aerial Escapement Indices by Survey Date						
System and Drainage	Survey System	13 July	20 July	29 July	4 August	10 August	24 August	28 August
Eyak River	Eyak River	NS	NS	NS	0 *	50	NC	NC
	West Shore Beaches	2,800	2,600	2,900	2,500 *	1,100	NC	1,300
	East Shore Beaches	460	750	1,400	2,200 *	2,260	NC	NC
	Middle Arm Beaches ^b	1,850	2,800	3,000	3,300 *	4,000	5,000	6,000
	North Shore Beaches	NC	7,500	7,000	7,000 *	6,500	NC	1,620
	Hatchery Creek Delta	NC	600	NC	1,000 *	500	700	900
	Hatchery Creek	NC	130	NC	100 *	60	800	1,200
	Power Creek Delta	NC	NC	NC	700 *	NC	NC	3,000
	Power Creek	NS	NS	NS	NS	NS	NS	350
Ibek Creek	Ibek Creek	NS	NS	NS	NC	NS	NC	NC
Alganik Slough	Alganik Slough	NS	NS	NS	NS	NS	NC	NC
	McKinley Lake	7,000	10,200	7,700 *	6,300	4,300	800	800
	Salmon Creek West Fork	250	400	3,000 *	2,700	4,500	4,700	5,000
	Salmon Creek East Fork	0	0	0 *	100	1,100	600	1,100
26/27 Mile Creek	26/27 Mile Creek	1,625 *	1,000	1,300	1,050	1,000	900	500
39 Mile Creek	39 Mile Creek	1,000	3,000	3,050	3,700	4,000 *	3,040	4,000
Goat Mountain Creek	Goat Mountain Creek	NC	NC	NC	NC	NC	NC	NC
Pleasant Creek	Pleasant Creek ^b	1,850 *	NS	NS	NS	NS	NS	NS
Martin River	Martin River – Lower	230	425	350	300	400 *	80	0
	Ragged Point River	1,030	300	750	400	775 *	600	600
	Ragged Point Lake Outlet	10	50	200	200	100 *	300	300
	Ragged Point Lake	20	400	200	300	450 *	1,300	1,200
	Martin River – Upper ^b	575	1,100	850	620	1,100 *	300	450
	Martin Lake Outlet	1,100	300	300	400	500 *	20	200
	Martin Lake	3,000	1,800	1,300	450	3,700 *	40	400
	Martin Lake Feeders	2,875	3,000	3,600	2,200	2,500 *	0	0
	Pothole River	425	600	50	100	700 *	120	0
	Pothole Lake	0	100	300	100	0 *	150	200
	Little Martin River	10	0	0	50	25	0	0
	Little Martin Lake	800	1,100	1,900 *	1,300	1,000	1,500	1,300
	Tok un Springs	1,600	600	300	600	NC	400	100
	Tok un River	365	125	550	325	175	20	100
	Tok un Lake Outlet	0	0	0	0	0	0	0
	Tok un Lake	1,200	1,400	2,350	2,000	1,700	1,600	2,020
Martin River Slough	Martin River Slough	2,800	2,735	1,550	1,220	900	450	125
Copper River Aerial Survey Daily Total		32,875	43,015	43,900	41,215	43,395	23,420	32,765
Anticipated Escapement		44,802	46,632	52,233	55,347	37,869	44,625	44,625

--Continued--

Appendix B.9. (page 3 of 4).

Copper River Delta ^a		Aerial Escapement Indices by Survey Date				Estimated Escapement		
System and Drainage	Survey System	4 Sept.	9 Sept.	13 Sept.	24 Sept.	Site ^d	system ^e	anticipated
Eyak River	Eyak River	NS	NS	NS	NS	0	18,200	13,977
	West Shore Beaches	NS	NS	NC	NC	2,500		
	East Shore Beaches	NS	NC	NC	NC	2,200		
	Middle Arm Beaches ^b	NS	NS	3,500	1,600	4,700		
	North Shore Beaches	NS	NS	NC	NC	7,000		
	Hatchery Creek Delta	NS	NC	200	0	1,000		
	Hatchery Creek	NS	NC	200	300	100		
	Power Creek Delta	NS	NC	200	0	700		
	Power Creek	NS	NC	500	400	NS		
Ibek Creek	Ibek Creek	NC	NC	NC	NC			
Alganik Slough	Alganik Slough	NS	NS	0	NC		10,700	13,998
	McKinley Lake	NS	1,000	800	800	7,700		
	Salmon Creek West Fork	NS	2,200	1,800	700	3,000		
	Salmon Creek East Fork	NS	200	110	75	0		
26/27 Mile Creek	26/27 Mile Creek	550	450	400	200	1,625	1,625	3,748
39 Mile Creek	39 Mile Creek	1,800	2,000	1,100	400	4,000	4,000	9,599
Goat Mountain Creek	Goat Mountain Creek	NC	NC	NC	0	NC	NC	(1,048) ^f
Pleasant Creek	Pleasant Creek ^b	NS	NS	NS	NS	2,270	2,270	920
Martin River	Martin River – Lower	0	0	0	NS	400	12,125	30,224
	Ragged Point River	600	500	100	150	775		
	Ragged Point Lake Outlet	600	100	200	100	100		
	Ragged Point Lake	1,100	1,260	1,000	900	450		
	Martin River – Upper ^b	450	600	600	NC	1,100		
	Martin Lake Outlet	0	NC	50	NC	500		
	Martin Lake	0	475	660	NC(1,600)	3,700		
	Martin Lake Feeders	NS	0	0	NS	2,500		
	Pothole River	30	NC	100	NC	700		
	Pothole Lake	300	600	2,140	NC(800)	0		
	Little Martin Lake Outlet	0	0	100	0	0		
	Little Martin Lake	400	520	600	NC	1,900		
	Tok un Springs	0	40	200	50	1,200	3,400	9,403
	Tok un River	200	200	70	50	300		
	Tok un Lake Outlet	30	0	0	0	400		
	Tok un Lake	1,900	1,140	1,400	500	1,500		
	Martin River Slough	0	0	0	50	5,400	5,400	6,699
	Copper River Aerial Survey Daily Total	7,960	11,285	16,030	6,275		57,720	
	Anticipated Escapement Index	19,581	21,386	16,792	5,704			87,520

–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 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 meaning: NS = no survey, NC = surveyed but no count due to poor conditions. The + sign after some counts indicates that the count is the minimum estimate seen in less than 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 sites. Aerial counts from more than one day may be restricted and used in the escapement estimate if the surveyor indicates that these counts represented different fish.
- ^c A peak count of 420 sockeye were observed in Pleasant Creek 2 on June 29.
- ^d The escapement estimates for each site is in the restricted 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.
- ^e The sum of the estimates by site within a system.
- ^f Due to glacial overflow into spawning area, no counts were available. The seasons anticipated is not calculated into the cumulative.

Appendix B.10. Copper River and Bering River area sockeye salmon escapement estimates, 1985 – 1993.^a

Stream/Lake ^b	1985	1986	1987	1988	1989	1990	1991	1992	1993
Eyak Lake	11,025	2,960	7,420	6,775	4,110	8,270	20,640	21,470	16,400
Hatchery Creek	850	650	1,975	1,225	1,150	2,800	5,100	2,200	1,100
Power Creek	glacial	0	0	350	0	205	1,870	1,420	700
Ibek Creek	25	0	0	0	120	160	120	40	glacial
McKinley Lake	19,000	12,000	10,300	9,700	6,300	1,400	2,000	10,300	7,700
Salmon Creek	8,000	900	2	100	630	2,000	3,330	25	3,000
26/27 Mile Creek	6,500	2,030	4,100	2,105	3,020	3,360	3,900	1,420	1,625
39 Mile Creek	27,000	9,500	6,100	3,620	7,420	5,000	5,340	4,500	4,000
Goat Mountain	150	600	1,000	220	3,150	420	20	620	NC
Pleasant Creek	2,500	1,000	1	460	990	3,190	1,495	1,567	2,270
Martin River	0	2,875	1,480	0	0	350	2,045	1,400	1,500
Ragged Pt. R./Lake	18,500	3,900	4,100	2,060	4,420	8,950	5,900	2,600	1,325
Martin Lake	20,500	11,200	6,010	6,440	7,850	11,250	10,700	14,000	6,700
Pothole Lake	1,500	2,200	910	2,785	1,550	2,190	5,200	1,300	700
L. Martin Lake	11,000	1,500	3,320	2,200	3,030	5,700	11,700	1,780	1,900
Tokun Lake/River ^c	7,400	16,000	8,080	12,160	4,950	4,200	5,960	8,230	3,400
Martin River Slough	8,100	7,980	5,900	3,115	3,010	13,900	5,180	3,955	5,400
Copper Delta Total	142,050	75,295	60,698	53,315	51,700	73,345	90,500	76,827	57,720
Upper Copper R. ^d	436,313	509,275	483,478	488,398	607,869	581,859	579,412	601,952	833,387
Copper R. Dist. Tot.	578,363	584,570	544,176	541,713	659,569	655,204	669,912	678,779	891,107
Bering River/Lake	15,700	13,200	19,200	11,450	14,330	16,325	26,480	54,180	23,120
Shepherd Creek	8,000	3,600	4,100	950	340	1,260	3,400	1,200	3,100
Stillwater Cr.	100	1,350	2,000	100	250	700	1,200	150	500
Kushtaka Lake	500	825	1,225	480	1,530	256	880	100	205
Katalla River				350	6,850	1,200	260	265	800
Bering R. Area Tot.	24,300	18,975	26,525	13,330	23,300	19,741	32,220	55,895	27,725
Copper/Bering Total	602,663	603,545	570,701	555,043	682,869	674,945	702,132	734,674	918,832

^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 estimates across years, however in years prior to 1984, different methodology was used and discrepancies may be found when cross references 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 Tokun Lake for 1985 is 10,993.

^d Upriver escapement estimate from Miles Lake sonar counts.

Appendix B.11. Aerial survey indices of sockeye salmon escapement to the Upper Copper River drainage, 1983 – 1993. ^a

Location	Yearly Survey Indices										10 Year Average	
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993 ^c	1983–92
Fish Lake	5,500	10,950	3,750	8,750	9,530	6,800	6,700	3,600	4,350	4,250		6,418
Bad Crossing #1&2	2,000	760	1,125	5,300	2,575	2,075	3,025	6,050	2,625	500		2,604
Suslota Lake	5,600	700	2,200	1,300	970	550	525	750	210	1,350		1,416
Dickey Lake	135	105	290	43	360	57	28	28	56	46		115
Keg Creek	620	2,505	825	200	400	360	1,450	160	95	630		725
Mahlo Creek	2,400	4,300	575	1,750	2,350	3,900	4,600	2,600	3,750	250		2,648
St. Anne Creek	9,700	10,300	1,250	4,600	6,980	6,100	3,100	1,700	4,700	450		4,888
Fish Cr. – Mentasta	900	900	1,800	1,100	250	650	1,500	1,000	1,050	480		963
Swede Lake	550	2,400	250	385	113	230	275	120	110	875		531
Tana River	2,485	3,665	1,145	1,825	472	2,034	245	89	750	740		1,345
Mentasta Lake	6,800	4,850	3,850	2,850	1,800	4,300	3,270	2,900	1,550	600		3,277
Tanada Lake	4,300	9,100	5,900	3,960	4,950	2,100	2,550	1,650	1,725	2,250		3,849
Salmon Creek	1,550	1,350	575	300	1,150	700	425	350	350	1,500		825
Paxson Inlt – Mud Cr	7,500	15,700	7,500	7,000	4,250	6,350	3,200	2,850	4,800	6,450		6,560
Mud Creek and Lake	470	270	200	70	0	150	0	35	100	425		172
Mendeltna Creek	2,850	1,900	2,300	3,325	2,275	1,550	2,000	3,700	3,050	1,750		2,470
Paxson Lake Outlet	3,300	4,100	3,600	1,810	5,100	3,200	900	1,350	2,300	950		2,661
Mud Cr. – Summit L.	5,700	9,600	8,150	3,375	9,050	15,400	6,800	2,950	9,625	3,800		7,445
Long Lake	5,600	1,360	590	1,300	1,225	1,125	1,225	1,950	1,919 ^b	1,050		1,577
Tonsina Lake	2,850	975	290	350	740	650	2,450	1,450	770 ^b	1,350		1,080
Totals	70,810	85,790	46,165	49,593	54,540	58,281	44,268	35,282	43,885	29,696		51,831

^a The escapement figures in this table are based on peak aerial survey estimates and weir counts from a majority 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 prevent surveys for that given year.

^b No survey flown, counts are the historical average.

^c No surveys were flown during 1993.

Appendix B.12. Aerial survey indices of chinook salmon escapement to the upper Copper River, 1983 – 1993. ^a

Location	Yearly Survey Indices											10 Year Average 1983 – 1992
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992 ^c	1993	
East Fork Chistochina	575	577	360	618	764	684	740	615	865	88	^d	589
Gulkana River	931	2,189	321	3,182	1,228	967	1,993	1,356	1,303	656	1,156	1,413
Mendeltna Creek	12	26	26	76	10	17	185	320	305	83	126	106
Kiana Creek	166	382	91	328	80	249	344	411	520	79	65	265
St. Anne Creek	87	89	15	182	192	62	90	42	115	12	^d	89
Manker Creek	141	264	22	251	141	115	165	41	101	14	^d	126
Grayling Creek	287	279	58	224	112	161	72	49	151	17	^d	141
Little Tonsina River	330	568	203	424	247	75	65	57	54	107	^d	213
Indian River	41	17	14	29 ^b	33	0	3	15	18	1	^d	16
Total Survey Index	2,570	4,391	1,110	5,314	2,807	2,330	3,657	2,906	3,432	1,057	1,347	2,957

^a The escapement figures in this table are based on peak aerial survey estimates and weir counts from a majority of the known 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.

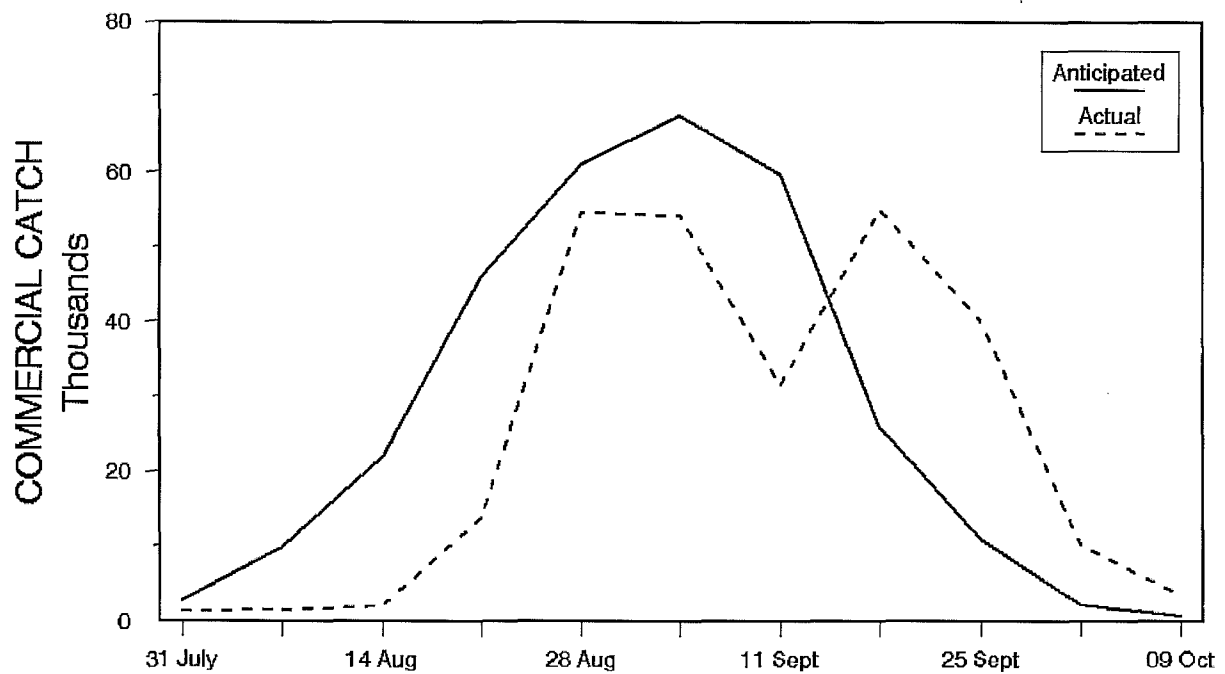
^b Interpolated counts.

^c Due to poor weather conditions surveys were late for 1992; live and carcass counts were used.

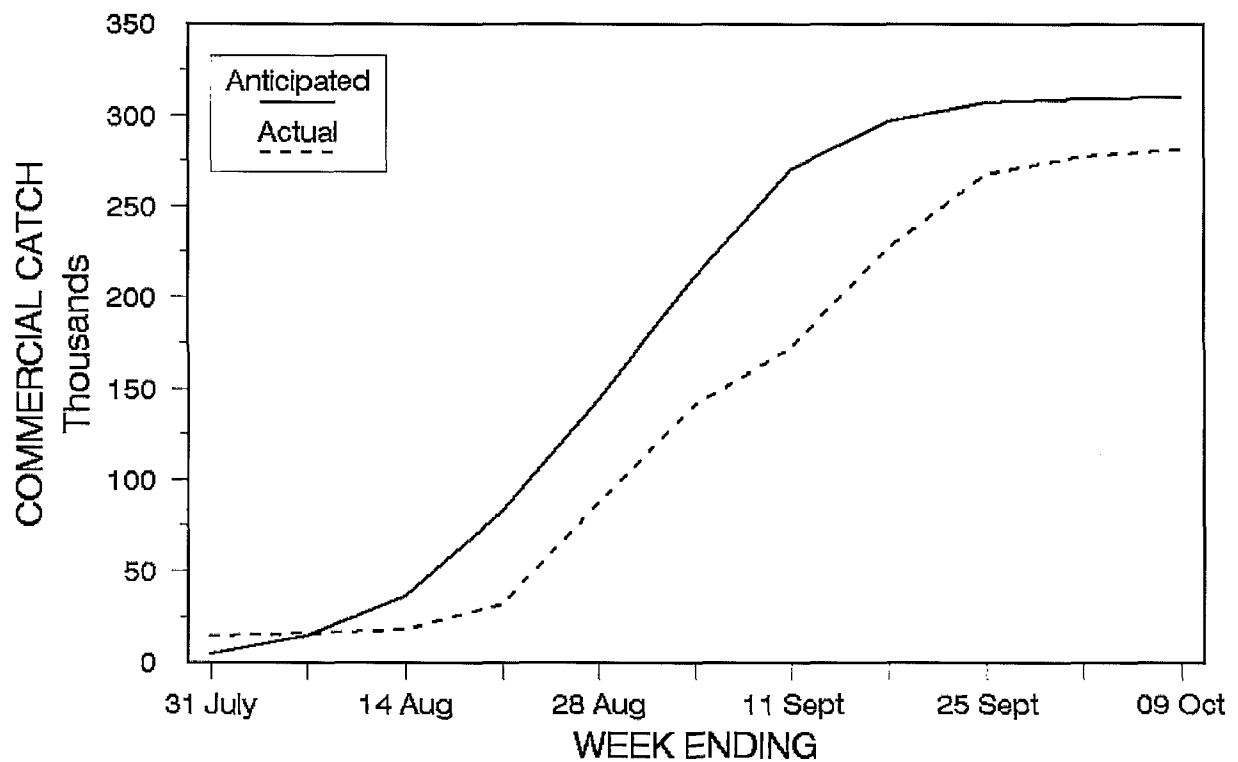
^d No aerial surveys conducted in 1993.

COPPER RIVER COMMERCIAL COHO CATCH

WEEKLY



CUMULATIVE



Appendix B.13. Anticipated and actual weekly and cumulative catches of coho salmon in the Copper River District drift gillnet fishery, 1993.

Appendix B.14. Aerial escapement indices by date and location for coho salmon returning to the Copper River Delta, 1993.

Copper River Delta *		Aerial Escapement Indices by Survey Date ^b							
System and Drainage	Survey System	4 August	10 August	24 August	28 August	4 Sept.	9 Sept.	13 Sept.	24 Sept.
Eyak River	Eyak River	100	50	NC	NC	NS	NS	NS	NS
	East Shore Beaches	0	0	NC	NC	NS	NS	NC	NC
	West Shore Beaches	0	0	NC	0	NS	NS	NC	NC
	Middle Arm Beaches	0	0	0	0	NS	NS	0	0
	North Shore Beaches	0	0	NC	0	NS	NS	NC	NC
	Hatchery Creek Delta	0	0	0	0	NS	NS	NC	0
	Hatchery Creek	0	0	0	0	NS	NS	NC	500
	Power Creek Delta	0	0	NC	0	NS	NS	NC	600
	Power Creek	0	0	NS	0	NS	NS	NC	800
Ibek Creek	Ibek Creek	NC	NS	NC (20)	NC (110)	NC	NC (230)	NC (350)	NC (1,300)
Scott River	Scott River	NS	NS	0	0	NS	NC	80 *	350
	Elsner Lake	NS	NS	0	0	NS	0	0 *	0
	Scott Lake	NS	NS	0	0	NS	1,200	1,500 *	400
Alganik Slough	Alganik Slough	NS	NS	NC	NC	NS	300 +	150	NC
	18/20 Mile Creek	NS	NC	10	130	360	875	1,750 *	1,550
	McKinley Lake	0	0	0	0	NS	NC	450	700 *
	Salmon Creek West Fork	0	0	0	0	NS	0	200	400 *
	Salmon Creek East Fork	0	0	0	0	NS	0	60	1,000 *
26/27 Mile Creek	26/27 Mile Creek	0	0	0	0	130	300	500	1,500 *
39 Mile Creek	39 Mile Creek	0	0	0	0	600	1,400	1,500	1,600 *
Goat Mountain Cr.	Goat Mountain Creek	NC	NC	0	0	50	220	220	650 *
Pleasant Creek	Pleasant Creek	NS	NS	NS	NS	NS	NS	NS	NS
Martin River	Martin River ~ Lower	0	120	110	785	700	2,200	1,040 *	NS
	Ragged Point River	0	0	0	0	75	100	150	100
	Ragged Point Lake Outlet	0	0	0	0	0	0	0	0
	Ragged Point Lake	0	0	0	0	0	0	0	0
	Martin River ~ Upper	150	150	150	630	1,900	2,700	3,500 *	NC
	Martin Lake Outlet	0	0	0	0	150	0	0	NC
	Martin Lake	0	0	0	0	0	NC	NC	NC
	Martin Lake Feeders	0	0	0	0	0	0	0	NS
	Pothole River	0	20	0	80	0	NC	50	NC(200)
	Pothole Lake Outlet	0	0	0	0	0	NC	NC	NC
	Pothole Lake	0	0	0	0	0	0	0	0
	Little Martin River	0	0	550	350	1,300	2,700	3,900	6,100 *
	Little Martin Lake	0	0	0	300	300	300	200	NC
	Tokun Springs	0	NC	0	40	20	200	100	550 *
	Tokun River	0	25	0	60	200	130	60	400 *
	Tokun Lake Outlet	0	0	0	0	0	0	0	0
	Tokun Lake	0	0	0	0	0	0	0	0
Martin River Slough	Martin River Slough	300	250	660	950	3,300	8,700	9,450	11,200 *
Copper River Aerial Survey Daily Total		550	615	1,480	3,325	9,085	21,325	24,860	28,400
Anticipated Escapement ^b		105	1,723	12,565	12,565	17,241	25,145	29,838	20,815

--Continued--

Appendix B.14. (page 2 of 3)

Copper River Delta ^a			Estimated Escapement		
System and Drainage	Survey System	21 Oct	Site ^c	System ^d	Anticipated
Eyak River	Eyak River	NS	NC	7,198	7,198
	East Shore Beaches	NC			
	West Shore Beaches	NC			
	Middle Arm Beaches	NC			
	North Shore Beaches	NC			
	Hatchery Creek Delta	0			
	Hatchery Creek	210			
	Power Creek Delta	130			
	Power Creek	230			
Ibek Creek	Ibek Creek	1,720	NC	6,672	6,672
Scott River	Scott River	NC	80		
	Elsner Lake	120	0		
	Scott Lake	NC	1,500		
Alganik Slough	Alganik Slough	100			
	18/20 Mile Creek	200	1,750	1,750	898
	McKinley Lake	50	700	2,100	3,671
	Salmon Creek West Fork	220	400		
	Salmon Creek East Fork	2,020	1,000		
26/27 Mile Creek	26/27 Mile Creek	550	1,500	1,500	405
39 Mile Creek	39 Mile Creek	NC	1,600	1,600	3,990
Goat Mountain Cr.	Goat Mountain Creek	NS	650	650	1,065
Pleasant Creek	Pleasant Creek	NS			
Martin River	Martin River – Lower	10	1,040	4,540	6,060
	Ragged Point River	200 *	300	300	1,197
	Ragged Point Lake Outlet	20			
	Ragged Point Lake	100 *			
	Martin River – Upper	415	3,500		
	Martin Lake Outlet	20	150	150	2,872
	Martin Lake	0			
	Martin Lake Feeders	70			
	Pothole River	130 *	730	730	2,736
	Pothole Lake	600 *			
	Little Martin Lake Outlet	400	6,100	6,400	5,054
	Little Martin Lake	0	300		
	Tokun Springs	450	550	950	1,288
	Tokun River	250	400		
	Tokun Lake Outlet	0			
	Tokun Lake	0			
Martin River Slough	Martin River Slough	2,940	11,200	11,200	10,681
Copper River Aerial Survey Total		11,155		45,740	53,787
Anticipated Escapement ^b		16,266			

–Continued–

- ^a The survey sites represent most of the known coho 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 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 meaning: NS = no survey, NC = surveyed but no count due to poor conditions. The + sign after some counts indicates that the count is the minimum estimate seen in less than 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 For systems not flown on any given survey the expected for that system was subtracted from the total anticipated for that survey.
- ^c 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.
- ^d The sum of the estimates by site within a system

Appendix B.15. Copper River Delta and Bering River coho salmon escapement estimates, 1985 – 1993. ^a

Stream/Lake ^b	1985	1986	1987	1988	1989	1990	1991	1992	1993
Eyak Lake	1,400	2,550	2,800	3,250	1,925	5,775	7,170	5,710	NC ^c
Hatchery Creek	7,010	400	850	100	400	1,940	0	1,100	NC ^c
Power Creek	1,800	0	4,800	350	0	650	0	1,000	NC ^c
Ibek Creek	8,500	4,200	3,100	2,400	4,330	3,950	13,540	9,600	NC ^c
Scott River				1,060	510	1,105	700	550	1,580
Alganik Slough				1,075	1,000	630	4,200	915	1,750
McKinley Lake	4,300	1,600	10	170	800	375	100	800	700
Salmon Creek	7,000	200	0	1,925	1,990	1,970	1,770	0	1,400
26/27 Mile	300	60	350	105	810	860	300	475	1,500
39 Mile	8,000	5,800	2,800	1,390	2,150	2,230	2,100	1,900	1,600
Goat Mountain	4,000	100	520	1,500	2,500	1,340	1,900	480	650
Pleasant Cr.	1,500	0	250	110	961	1	6	8	NS
Martin River	11,500	4,820	3,060	3,400	470	400	1,600	1,900	4,540
Ragged Pt. River/Lk.	1,500	30	3,330	1,080	3,600	820	450	310	300
Martin Lake	9,100	275	70	145	590	320	1,500	65	150
Pothole Lake	8,500	640	70	350	1,300	2,670	6,000	300	730
Little Martin Lake	4,100	275	560	4,500	7,200	7,400	11,360	10,800	6,400
Tokun River/Lake	1,900	490	495	600	2,870	2,250	2,800	510	950
Martin River Slough	26,000	4,350	3,400	4,110	7,960	7,700	8,860	8,140	11,200
Copper Delta Total	106,410	25,790	26,465	27,620	41,366	42,386	64,356	44,563	33,450

Katalla R.	14,000	1,800	1,600	560	1,220	2,960	4,000	2,760	4,400
Bering Lake	18,000	1,350	900	2,350	1,000	2,040	12,300	3,540	5,900
Dick Creek	5,000	350	50	105	570	1,500	1,220	1,250	200
Shepard Cr.	1,500	10	45	70	70	100	NS	NS	600
Nichawak R.	3,500	1,700	250	3,670	2,550	2,900	2,560	1,970	4,100
Gandil R.	4,500				1,410	910	1,460	600	1,250
Controller Bay	34,000	4,210	2,740	4,660	9,000	14,390	9,760	6,180	13,600
Bering Area Total	80,500	9,420	5,585	11,415	15,820	24,800	31,300	16,300	30,050
Copper/Bering Total	186,910	35,210	32,050	39,035	57,186	67,186	95,656	60,863	63,500

^a The escapement figures in this table are based on peak aerial survey estimates 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 estimates 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 prevent 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.

^c Due to glacial water conditions these systems are listed as "NC" no count. See Appendix B.14. for weekly observations.

Appendix B.16. Estimated age and sex composition of sockeye salmon harvested in the Copper River District drift gillnet fishery, 1993.

		Brood Year and Age Group										
		1990	1989		1988			1987		1986		
		0.2	0.3	1.2	0.4	1.3	2.2	1.4	2.3	2.4	3.3	Total
<hr/>												
Strata Combined:	05/17 – 09/24											
Sampling dates:	05/18 – 07/27											
Sample size:	4,940											
Female	Percent of sample	0.1	6.2	6.2	0.1	33.2	0.4	0.2	4.2	0.0	0.0	50.5
	Number in catch	728	87,239	86,416	1,015	463,682	4,974	2,565	58,507	386	374	705,887
Male	Percent of sample	0.2	4.9	8.4	0.0	31.9	0.4	0.4	3.4	0.0	0.0	49.5
	Number in catch	2,568	68,307	116,857	287	445,908	5,017	4,925	48,104	374	0	692,347
Total	Percent of sample	0.2	11.1	14.5	0.1	65.1	0.7	0.5	7.6	0.1	0.0	100.0
	Number in catch	3,296	155,546	203,273	1,303	909,590	9,991	7,490	106,611	761	374	1,398,234
	Standard error	1,054	6,474	6,973	658	9,739	1,693	1,446	5,338	463	374	

Appendix B.17 Estimated age and sex composition of the chinook salmon harvest in the Copper River District drift gillnet fishery, 1993.

		Brood Year and Age Group												
		1990		1989		1988			1987			1986		
		0.2	1.1	0.3	1.2	0.4	1.3	2.2	0.5	1.4	2.3	1.5	2.4	Total
<hr/>														
Strata Combined:	05/16 – 09/03													
Sampling dates:	05/18 – 06/16													
Sample size:	2,043													
Female	Percent of sample	0.1	0.0	0.0	1.9	0.1	37.7	0.2	0.0	13.4	1.3	0.6	0.5	55.9
	Number in catch	36	0	0	576	18	11,221	45	9	3,990	380	179	163	16,616
Male	Percent of sample	0.2	0.2	0.0	4.6	0.1	24.9	0.0	0.0	11.2	0.5	0.7	0.5	43.0
	Number in catch	71	45	12	1,356	18	7,412	12	0	3,334	160	200	161	12,782
Total	Percent of sample	0.4	0.2	0.0	6.6	0.1	63.3	0.2	0.0	25.0	1.8	1.3	1.1	100.0
	Number in catch	106	45	12	1,963	35	18,820	57	9	7,417	540	397	324	29,727
	Standard error	48	27	12	180	22	337	30	9	300	93	81	80	

Appendix B.18. Estimated age and sex composition of the coho salmon commercial harvest in the Copper River District commercial drift gillnet fishery, 1993.

		Brood Year and Age Group							Total
		1991	1990		1989	1988		1987	
		1.0	1.1	2.0	2.1	2.2	3.1	3.2	
Strata Combined: 05/23 - 10/08									
Sampling dates: 08/20 - 09/22									
Sample size: 1,196									
Female	Percent of sample	0.0	16.9	0.0	37.2	0.1	1.5	0.0	55.6
	Number in catch	73	47,461	0	104,681	316	4,104	0	156,634
Male	Percent of sample	0.1	12.8	0.1	29.5	0.1	1.3	0.1	44.1
	Number in catch	311	36,116	311	83,162	316	3,535	316	124,067
Total	Percent of sample	0.1	29.7	0.1	67.0	0.2	2.7	0.1	100.0
	Number in catch	384	83,649	311	188,537	632	7,639	316	281,469
	Standard error	320	4,029	311	4,195	446	1,515	316	

Appendix B.19. Commercial salmon catch by species in the Bering River District,
1973–1993.

Year	Catch by Species					Total
	Chinook	Sockeye	Coho	Pink	Chum	
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
1990	14	8,332	42,952	2	1	51,301
1991	28	19,181	110,951	4	195	130,359
1992	21	19,721	125,616	4	1	145,363
1993	130	33,951	115,833	82	22	150,018
Ten Year Average (1983–92)	143	39,719	127,626	148	3,530	171,166

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

Appendix B.20. Commercial salmon harvest by period in the Bering River District drift gillnet fishery, 1993.

Period	Date ^{a,b}	Hours	Permits	Landings	Chinook		Sockeye		Coho		Pink		Chum	
					Number	Pound	Number	Pound	Number	Pound	Number	Pound	Number	Pound
1	6/06	24	19	28	33	740	3,726	20,882	0	0	0	0	0	0
2	6/10	24	5	5	3	66	618	3,583	0	0	0	0	0	0
3	6/14	24	11	13	21	400	2,524	15,014	0	0	0	0	0	0
4	6/17	36	73	115	54	1,102	15,559	93,821	22	175	1	3	18	111
5	6/21	36	21	28	5	132	2,021	12,182	0	0	0	0	0	0
6	6/24	36	8	18	7	146	1,596	9,352	0	0	1	6	1	6
7	6/28	48	6	19	4	65	3,017	16,590	0	0	10	33	1	7
8	7/01	36	6	11	2	36	1,708	9,073	0	0	30	112	0	0
9	7/05	48	4	6	0	0	1,066	5,685	0	0	3	12	0	0
10	7/08	36	NA ^c	NA	0	0	250	1,325	0	0	0	0	0	0
11	7/12	36	NA	NA	0	0	743	3,948	0	0	30	120	0	0
12	7/15	36	NA	NA	0	0	262	1,390	0	0	0	0	0	0
13	7/19	48	NA	NA	0	0	242	1,285	0	0	0	0	0	0
14	7/22	36	NA	NA	0	0	200	1,077	0	0	0	0	0	0
15	7/26	48	NA	NA	0	0	172	968	0	0	0	0	0	0
16	7/29	36	NA	NA	0	0	18	101	0	0	0	0	0	0
17	8/02	48	0	0	0	0	0	0	0	0	0	0	0	0
18	8/05	36	NA	NA	0	0	53	299	0	0	0	0	0	0
19	8/09	24	0	0	0	0	0	0	0	0	0	0	0	0
20	8/16	24	NA	NA	0	0	9	50	17	100	2	7	0	0
21	8/19	24	0	0	0	0	0	0	0	0	0	0	0	0
22	8/26	48	31	80	1	12	135	848	7,417	52,599	3	11	2	10
23	9/02	48	54	154	0	0	19	124	18,947	137,110	0	0	0	0
24	9/09	24	68	101	0	0	4	25	14,459	108,044	1	4	0	0
25	9/13	48	83	213	0	0	9	62	25,911	197,389	0	0	0	0
26	9/16	24	50	89	0	0	0	0	10,222	79,967	1	3	0	0
27	9/20	48	63	167	0	0	0	0	17,722	141,595	0	0	0	0
28	9/23	48	38	93	0	0	0	0	9,803	78,142	0	0	0	0
29	9/27	48	32	66	0	0	0	0	6,340	49,443	0	0	0	0
30	9/30	48	27	39	0	0	0	0	3,841	30,436	0	0	0	0
31	10/04	48	5	10	0	0	0	0	1,132	8,854	0	0	0	0
32	10/07	48	0	0	0	0	0	0	0	0	0	0	0	0
Total		1,224	153		130	2,699	33,951	197,684	115,833	883,854	82	311	22	134
Average Weight (lbs)						20.76		5.82		7.63		3.79		6.09

^a For starting times of specific openings refer to Appendix B.26

^b Starting date of period.

^c Less than the required 3 permits fishing in that area.

Appendix B.21. Aerial escapement indices by date and location for sockeye salmon returning to the Bering River Delta, 1993.

Bering River Delta ^a		Aerial Escapement Indices by Survey Date						
System and Drainage	Survey System	31 May	4 June	10 June	15 June	22 June	29 June	4 July
Bering River	Bering River	500	350	800	700	2,500	500	360
	Bering Lake	0	700	0	3,800	4,800	8,200	19,000
	Dick Creek	NS	0	0	0	0	0	800
	Shepherd Creek -- Lagoon	NS	NS	0	0	1,000	500 +	200
	Shepherd Creek	NS	NS	NS	NS	NS	NC	NS
	Carbon Creek	NS	NS	NS	NS	NS	NC	NS
	Trout Creek	NS	NS	NS	NS	NS	NS	NS
	Clear Creek	NS	NS	NS	NS	NS	NS	NS
	Kushtaka Lake	NS	NS	NS	NS	NS	NS	NS
	Shockum Creek	NS	NS	NS	NS	NS	NS	NS
Kattalla River	Kattalla River	0	NS	70	30	120	200	200
Bering River Aerial Survey Daily Index		500	1,050	870	4,530	8,420	9,400	20,560
Anticipated Escapement Index		NA	NA	1,684	3,639	7,535	13,972	24,491

Bering River Delta ^a		Aerial Escapement Indices by Survey Date						
System and Drainage	Survey System	13 July	20 July	29 July	4 August	10 August	24 August	28 August
Bering River	Bering River	25	400 *	30	100	20	200	0
	Bering Lake	17,750	17,620 *	2,200	3,100	3,175	640	500
	Dick Creek	1,525	5,100 *	11,700	11,680	11,400	1,920	3,500
	Shepherd Creek -- Lagoon	0	500	0	NS	NC	NS	NS
	Shepherd Creek	NS	1,200	3,000 *	NS	NS	NS	NS
	Carbon Creek	NS	NS	100 *	NS	NS	NS	NS
	Trout Creek	0	NS	NS	NS	0	NS	NS
	Clear Creek	500	800	600	800	500 *	NS	NS
	Kushtaka Lake	0	0	0	30	105 *	NS	NS
	Shockum Creek	0	0	0	30	100 *	NS	NS
Kattalla River	Kattalla River	800 *	650	250	200	100	650	300
Bering River Aerial Survey Daily Index		20,600	26,270	17,880	15,940	15,400	3,410	4,300
Anticipated Escapement Index		26,142	24,625	20,696	19,842	7,723	2,056	2,056

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Bering River Delta ^a		Aerial Escapement Indices by Survey Date				Estimated Escapement		
System and Drainage	Survey System	4 Sept	9 Sept	13 Sept	24 Sept	Site ^b	System ^c	Anticipate
Bering River	Bering River	NC	50	0	220	400	23,120	23,514
	Bering Lake	280	320	370	200	17,620		
	Dick Creek	NS	1,800	700	750	5,100		
	Shepherd Creek – Lagoon	NC	0	0	NS		3,100	6,084
	Shepherd Creek	NC	NS	NS	NS	3,000		
	Carbon Creek	450	NS	NS	NS	100		
	Trout Creek	NS	NS	NS	NS	0		
	Clear Creek	NS	NS	NS	NS	500	500	1,533
	Kushtaka Lake	NS	NS	NS	NS	105	205	1,657
	Shockum Creek	NS	NS	NS	NS	100		
Kattalla River	Kattalla River	NS	0	0	0	800	800	
Bering River Aerial Survey Daily Index		730	2,170	1,070	1,170		27,725	32,788
Anticipated Escapement Index								

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 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 meaning: NS = no survey, NC = surveyed but no count due to poor conditions. The + sign after some counts indicates that the count is the minimum estimate seen in less than 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 restricted 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.22. Anticipated and actual weekly catch and escapement of coho salmon in the Bering River District drift gillnet fishery, 1993.

Week Ending Date	Fishing Time (Hrs.)	Coho		Coho Escapement	
		Actual Catch	Anticipated Catch ^a	Peak Aerial Index	Anticipated Peak Index ^b
Prior to July 31		22	421		
July 31	48 and 36	0	15		
Aug 07	48 and 36	0	181	250	
Aug 14	24	0	106	200	700
Aug 21	24 and 24	17	4,837	NS	1,600
Aug 28	48	7,417	19,186	2,811	8,000
Sept 04	48	18,947	35,287	6,965	8,000
Sept 11	24	14,459	38,361	20,760	20,800
Sept 18	48 and 24	36,133	20,249	15,200	18,000
Sept 25	48 and 48	27,525	4,931	28,900	18,000
Oct 02	48 and 48	10,181	395		16,400
Oct 09	48 and 48	1,132	31		
Season Total		115,833	124,000	28,900	21,600

^a Based on average historic catches for comparable dates (1969–1992).

^b Based on average historic aerial escapement surveys for comparable dates (1980 – 1992).

Appendix B.23. Aerial escapement indices by date and location for coho salmon returning to the Bering River Delta, 1993.

Bering River Delta ^a System and Drainage	Survey System	Aerial Escapement Indices by Survey Date						
		4 August	10 August	24 August	28 August	4 Sept.	9 Sept.	13 Sept.
Bering River	Bering River ^b	100	50	1,000	1,000	2,540	3,650 *	3,000 +
	Bering Lake	0	0	200	260	450	2,250 *	2,070
	Dick Creek	0	0	0	400	NS	200 *	100
	Shepherd Creek – Lagoon	NS	NC	NS	NS	NC	600	400
	Shepherd Creek	NS	NS	NS	NS	NC	NS	NS
	Carbon Creek	NS	NS	NS	NS	0	NS	NS
Katalla River	Katalla River	150	150	350	500	NS	4,000	2,800
Lower Bering River	Gandil River	NS	NS	0	1	275	560	670
	Nichawak River	NS	NS	4	0	1,000	2,500	NC
Controller Bay	Campbell River	NS	NS	4	0	0	0	0
	Edwards River	NS	NS	0	250	1,000	2,500	1,000
	Okalee River	NS	NS	320	400	1,600	4,400	5,000
	Other Clear Streams	NS	NS	0	0	100	100	160
Bering River Aerial Survey Daily Index		250	200	1,878	2,811	6,965	20,760	15,200
Anticipated Escapement Index		NA	721	8,000	8,000	8,088	20,818	18,096

Bering River Delta ^a System and Drainage	Survey System	Aerial Escapement Indices by Survey Date		Estimated Escapement		
		24 Sept	21 Oct	Site ^c	System ^d	Anticipated
Bering River	Bering River ^b	1,000	NS	3,650	6,100	5,988
	Bering Lake	4,100	560	2,250		
	Dick Creek	450	920	200		
	Shepherd Creek – Lagoon	NS	NS	600		
	Shepherd Creek	NS	NS	NS		
	Carbon Creek	NS	NS	0		
Katalla River	Katalla River	4400 *	340	4,400	4,400	5,037
Lower Bering River	Gandil River	1,250 *	NS	1,250	5,350	2,531
	Nichawak River	4,100 *	NS	4,100		
Controller Bay	Campbell River	0 *	NS	0	13,600	7,992
	Edwards River	5,200 *	NS	5,200		
	Okalee River	7,400 *	NS	7,400		
	Other Clear Streams	1,000 *	NS	1,000		
Bering River Aerial Survey Total		28,900	1,820		29,450	21,548
Anticipated Escapement Index		18,000	2,028			

^a The survey sites represent most of the unknown coho 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 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 meaning: NS = no survey, NC = surveyed but no count due to poor conditions. The + sign after some counts indicates that the count is the minimum estimate seen in less than 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 Bering River counts include coho observed in the Don Miller Hill tributaries.

^c The escapement estimates for each site is in the restricted 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 withing a system.

Appendix B.24. Estimated age and sex composition of coho salmon harvested in the Bering River District commercial drift gillnet fishery, 1993.

		Brood Year and Age Group				
		1990	1989		1988	
		1.1	1.2	2.1	3.1	Total
<hr/>						
Strata Combined:	06/18 - 10/06					
Sampling dates:	09/05 - 09/23					
Sample size:	827					
<hr/>						
Female	Percent of sample	10.0	0.0	34.3	0.7	45.0
	Number in catch	11,613	0	39,750	759	52,122
Male	Percent of sample	11.5	0.1	38.7	1.0	51.3
	Number in catch	13,364	107	44,798	1,133	59,402
Total	Percent of sample	21.8	0.1	76.1	2.1	100.0
	Number in catch	25,222	107	88,120	2,384	115,833
	Standard error	1,661	107	1,733	632	

Appendix B.25. Summary of periods, dates, hours fished, and emergency orders issued for the commercial salmon gillnet fisheries in the Bering River and Copper River District, 1993.

Bering River District (200)			Copper River District (212)			Emergency Orders Issued
Periods	Dates	Hours Fished	Periods	Dates	Hours Fished	
			1	5/17 - 5/18	24	2-F-E-22-93 ^a
						2-F-E-23-93
			2	5/23 - 5/24	36	2-F-E-24-93 ^b
			3	5/26 - 5/27	36	2-F-E-25-93
			4	5/29 - 5/29	12	2-F-E-27-93
			5	5/31 - 6/01	24	
			6	6/03 - 6/04	24	2-F-E-28-93 ^c
1	6/07 - 6/08	24	7	6/06 - 6/08	48	2-F-E-29-93
2	6/10 - 6/11	24	8	6/10 - 6/12	48	2-F-E-31-93
3	6/14 - 6/15	24	9	6/14 - 6/16	48	2-F-E-35-93
4	6/17 - 6/18	36	10	6/17 - 6/19	60	2-F-E-36-93
5	6/21 - 6/22	36	11	6/21 - 6/23	60	
6	6/24 - 6/26	36	12	6/24 - 6/26	36	2-F-E-40-93
7	6/28 - 6/30	48	13	6/28 - 6/30	48	2-F-E-42-93
8	7/01 - 7/03	36	14	7/01 - 7/03	36	2-F-E-43-93 ^d
9	7/05 - 7/07	48	15	7/05 - 7/07	48	
10	7/08 - 7/10	36	16	7/08 - 7/10	36	
11	7/12 - 7/13	36	17	7/12 - 7/13	36	2-F-E-49-93 ^e
12	7/15 - 7/17	36	18	7/15 - 7/17	36	2-F-E-53-93 ^d
13	7/19 - 7/21	48	19	7/19 - 7/21	48	
14	7/22 - 7/24	36	20	7/22 - 7/24	36	
15	7/26 - 7/28	48	21	7/26 - 7/28	48	
16	7/29 - 7/31	36	22	7/29 - 7/31	36	
17	8/02 - 8/04	48	23	8/02 - 8/04	48	
18	8/05 - 8/07	36	24	8/05 - 8/07	36	
19	8/09 - 8/10	24	25	8/09 - 8/10	24	2-F-E-59-93 ^f
20	8/16 - 8/17	24	26	8/16 - 8/17	24	2-F-E-60-93
21	8/19 - 8/20	24	27	8/19 - 8/20	24	2-F-E-65-93
22	8/26 - 8/28	48	28	8/26 - 8/28	48	2-F-E-73-93
23	9/02 - 9/04	48	29	9/02 - 9/04	48	2-F-E-82-93
24	9/09 - 9/10	24	30	9/09 - 9/10	24	2-F-E-86-93
25	9/13 - 9/15	48	31	9/13 - 9/15	48	2-F-E-87-93
26	9/16 - 9/17	24	32	9/16 - 9/17	24	2-F-E-89-93
27	9/20 - 9/22	48	33	9/20 - 9/22	48	
28	9/23 - 9/25	48	34	9/23 - 9/25	48	2-F-E-91-93
29	9/27 - 9/29	48	35	9/27 - 9/29	48	
30	9/30 - 10/02	48	36	9/30 - 10/02	48	2-F-E-93-93 ^g
31	10/04 - 10/06	48	37	10/04 - 10/06	48	
32	10/07 - 10/09	48	38	10/07 - 10/09	48	2-F-E-94-93 ^h

^a The Copper River District's fishing season is officially open for a 24-hour period from 7:00 a.m. Monday May 17. The Copper River schedule is typically two 24-hour periods per week; the first is from 7:00 a.m. Monday to 7:00 a.m. Tuesday and from 7:00 p.m. Thursday to 7:00 p.m. Friday. All 12-hour periods will begin at 7:00 a.m.

^b Emergency Order (E.O.) 2-E-F-24-93 supersedes E.O. 2-E-F-23-93.

^c The Bering River District's 1993 season will begin at 7:00 a.m. Monday June 7.

^d Until further notice, the Copper and Bering River Districts are on a schedule of one 36-hour period and one 48-hour period per week, from 7:00 p.m. Thursday to 7:00 a.m. Saturday and from 7:00 a.m. Monday to 7:00 a.m. Wednesday.

^e Emergency Order 2-F-E-49-93 recinds the fishing schedule set by "E.O." 2-F-E-43-93.

^f All fishing periods on or after August 7 in the Copper and Bering River Districts will begin at 12:00 noon.

^g Until further notice, the Copper and Bering River Districts are on a schedule of two 48-hour periods per week, from 12:00 noon Thursday to 12:00 noon Saturday and from 12:00 noon Monday to 12:00 noon Wednesday.

^h The Copper and Bering River Districts closed for the 1993 season.

APPENDIX C

COGHILL AND UNAKWIK DISTRICTS

Appendix C.1. Commercial salmon harvest by statistical week in the Coghill District commercial drift gillnet and purse seine fisheries, P.W.S., 1993. The statistical weeks listed are those with active fishing participation.

Date ^a	Stat Week	Chinook				Sockeye		Coho		Pink		Chum	
		Permits	Landings	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
GEAR: DRIFT GILLNET													
06/12	24 ^{b,c}	164	680	262	4,449	338	2,070	0	0	1	3	121,376	868,478
06/19	25 ^{b,d}	205	672	126	2,053	1,096	6,938	1	9	24	99	84,207	608,756
06/26	26 ^d	264	943	71	1,187	2,985	18,433	6	35	128	476	151,074	1,017,952
07/03	27 ^{b,d,e}	317	1,040	62	932	18,438	111,951	30	228	1,625	5,732	156,726	1,012,557
07/10	28 ^{b,c,d}	246	619	20	265	15,613	92,708	72	463	1,773	6,213	76,649	488,248
07/17	29 ^d	91	294	18	263	9,546	60,046	91	680	1,046	3,866	32,849	198,921
08/07	32 ^{g,h}	38	60	3	23	4,022	25,140	292	2,130	6,032	21,469	1,934	12,702
08/14	33 ^h	80	197	9	91	8,355	52,036	982	7,851	11,547	40,770	5,188	33,699
08/21	34 ^{h,j}	72	138	2	13	1,905	11,708	406	3,160	49,091	160,648	2,801	17,123
08/28	35 ^j	52	182	0	0	1,718	10,131	2,284	17,012	50,065	170,493	1,682	9,789
09/04	36 ^k	54	208	2	24	2,060	12,554	7,519	56,510	17,922	59,020	651	4,106
09/11	37	51	232	1	16	297	1,805	10,536	78,028	2,000	6,627	64	383
09/18	38	31	131	0	0	154	979	9,319	65,435	24	72	6	41
09/25	39	21	90	0	0	5	32	5,876	39,003	1	3	1	5
10/02	40 ^l	4	4	0	0	0	0	484	3,332	0	0	0	0
Total		369	5,490	576	9,316	66,532	406,531	37,898	273,876	141,279	475,491	635,208	4,272,760
Average Weight					16.17		6.11		7.23		3.37		6.73
GEAR: PURSE SEINE													
08/07	32 ^h	52	54	14	138	3,511	20,648	312	2,254	52,773	146,160	1,930	12,044
08/14	33	38	47	31	290	1,956	11,867	212	1,630	26,785	77,174	1,137	7,368
08/21	34 ⁱ	15	17	1	5	437	2,498	35	246	139,049	369,529	362	1,790
08/28	35	16	23	0	0	306	1,930	321	2,322	114,181	325,253	216	1,526
09/04	36 ⁱ	4	5	0	0	40	246	880	6,176	19,680	54,439	0	0
Total		72	146	46	433	6,250	37,189	1,760	12,628	352,468	972,555	3,645	22,728
Average Weight					9.41		5.95		7.18		2.76		6.24
Combined Total		441	5,636	622	9,749	72,782	443,720	39,658	286,504	493,747	1,448,046	638,853	4,295,488
Average Weight					15.67		6.10		7.22		2.93		6.72

^a Statistical week ending date.

^b The boundary in Esther Passage was temporarily moved north to the vicinity of Shoestring Cove. The temporary boundary was designated by shore markers at approximately 60° 50.75' N. Lat. The Noerenberg Hatchery Special Harvest Area and Terminal Harvest Area were closed to fishing.

^c The waters of Lake and Quillian Bays, excluding the Special Harvest Area in Lake Bay were open to fishing. Effective 8:00 p.m. Thursday, June 10, the Special Harvest Area was reduced in size confining the area to those waters of Lake Bay north of shoreline markers at approximately 60° 47.36' N. Lat.

^d The waters of Lake and Quillian Bays inside of a line from Esther Light to Hodgkin Pt. were not open.

^e The Noerenberg Hatchery Terminal Harvest Area (Sanctuary) was open for the first 12 hours.

^f Only the waters of the Terminal Harvest Area of Quillian Bay, those waters inside of a line from Esther Light to Hodgkin Point, except for the Special Harvest Area of Lake Bay, were open to fishing.

- Continued -

- g The 60 mesh depth gear restriction for drift gillnets was rescinded effective 8:00 p.m. Thursday, August 5.
- h Waters of the Noerenberg Special Harvest Area and Sanctuary were not open. The Esther Subdistrict boundary in Esther Passage was moved to the normal subdistrict boundary at 60° 49.33' N. Lat.
- i The Noerenberg Hatchery Terminal Harvest Area and Special Harvest Areas of Lake and Quillian Bays opened for 12 hours. Waters within 100 ft. of the hatchery barrier seine were closed.
- j The Noerenberg Hatchery Terminal Harvest Area and Special Harvest Areas opened for 12 hours from 8:00 a.m. to 8:00 p.m. Sunday, August 22 and then was extended until 8:00 p.m. Tuesday, August 24. Waters within 100 ft. of the hatchery barrier seine were closed.
- k Effective 8:00 a.m. September 4, the Esther Subdistrict and the Noerenberg Hatchery Terminal Harvest Area of Quillian Bay and the outer portion of Lake Bay were opened until further notice.
- l The Coghill District officially closed to purse seines on Monday, September 6. The Coghill District closed to drift gillnets on Friday, October 8.

Appendix C.2. Commercial salmon catch by species in the Coghill District, Prince William Sound, 1975 - 1993.

CATCH BY SPECIES						
Year	Chinook	Sockeye	Coho	Pink	Chum	Total
GEAR: DRIFT GILLNET						
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
1990	126	11,988	128,605	1,907,510	301,209	2,349,438
1991	92	3,888	78,363	231,501	34,223	348,067
1992	242	57,919	86,782	167,384	182,433	494,760
1993	576	66,532	37,898	141,279	635,208	881,493
Ten Year Average (1983-92)	341	149,375	43,269	661,605	234,237	1,088,827
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
1990	2	286	11,819	785,278	10,951	808,336
1991	11	1,562	621	1,980,074	11,519	1,993,787
1992	6	765	27,382	196,503	1,603	226,259
1993	46	6,250	1,760	352,468	3,645	364,169
Ten Year Average (1983-92)	47	7,463	9,728	899,188	27,521	944,047
COMBINED GEARS						
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
1990	128	12,274	140,424	2,692,788	312,160	3,157,774
1991	103	5,450	78,984	2,211,575	45,742	2,341,854
1992	248	58,684	114,164	363,887	184,036	721,019
1993	622	72,782	39,658	493,747	638,853	1,245,662
Ten Year Average (1983-92)	388	156,838	52,996	1,560,793	261,859	2,032,874

Appendix C.3. Daily salmon escapement through the Coghill River weir, Prince William Sound, 1993.

Date	Sockeye ^a		Pink ^b		Chum		Coho		Chinook	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
06/04	0	0	0	0	0	0	0	0	0	0
06/05	0	0	0	0	0	0	0	0	0	0
06/06	0	0	0	0	0	0	0	0	0	0
06/07	0	0	0	0	0	0	0	0	0	0
06/08	0	0	0	0	0	0	0	0	0	0
06/09	0	0	0	0	0	0	0	0	0	0
06/10	8	8	0	0	0	0	0	0	0	0
06/11	0	8	0	0	0	0	0	0	0	0
06/12	1	9	0	0	0	0	0	0	0	0
06/13	2	11	0	0	0	0	0	0	0	0
06/14	9	20	0	0	0	0	0	0	0	0
06/15	1	21	0	0	0	0	0	0	0	0
06/16	1	22	0	0	0	0	0	0	0	0
06/17	10	32	0	0	0	0	0	0	0	0
06/18	3	35	0	0	0	0	0	0	0	0
06/19	6	41	0	0	0	0	0	0	0	0
06/20	17	58	0	0	0	0	0	0	0	0
06/21	4	62	0	0	0	0	0	0	0	0
06/22	16	78	0	0	0	0	0	0	0	0
06/23	19	97	0	0	0	0	0	0	0	0
06/24	10	107	0	0	0	0	0	0	0	0
06/25	21	128	0	0	0	0	0	0	0	0
06/26	38	166	0	0	0	0	0	0	0	0
06/27	17	183	0	0	0	0	0	0	0	0
06/28	27	210	0	0	0	0	0	0	0	0
06/29	38	248	0	0	0	0	0	0	0	0
06/30	62	310	1	1	0	0	0	0	0	0
07/01	57	367	0	1	0	0	0	0	0	0
07/02	88	455	3	4	0	0	0	0	0	0
07/03	119	574	1	5	1	1	0	0	0	0
07/04	55	629	0	5	0	1	0	0	0	0
07/05	51	680	0	5	0	1	0	0	0	0
07/06	37	717	0	5	0	1	0	0	0	0
07/07	42	759	0	5	0	1	0	0	0	0
07/08	133	892	3	8	0	1	0	0	0	0
07/09	62	954	2	10	0	1	0	0	1	1
07/10	389	1343	16	26	0	1	0	0	0	1
07/11	883	2226	55	81	0	1	0	0	0	1
07/12	715	2941	90	171	0	1	0	0	1	2
07/13	314	3255	65	236	0	1	0	0	0	2
07/14	345	3600	103	339	2	3	0	0	0	2
07/15	404	4004	107	446	0	3	0	0	2	4
07/16	152	4156	48	494	0	3	0	0	0	4
07/17	259	4415	199	693	0	3	0	0	0	4
07/18	352	4767	258	951	6	9	0	0	0	4
07/19	270	5037	183	1134	3	12	0	0	2	6
07/20	182	5219	131	1265	0	12	0	0	0	6
07/21	183	5402	85	1350	0	12	0	0	3	9
07/22	119	5521	53	1403	0	12	0	0	1	10
07/23	155	5676	70	1473	0	12	0	0	0	10
07/24	343	6019	461	1934	4	16	0	0	0	10
07/25	299	6318	206	2140	6	22	1	1	1	11
07/26	296	6614	232	2372	1	23	0	1	1	12
07/27	242	6856	149	2521	1	24	0	1	0	12

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Appendix C.3. (page 2 of 2)

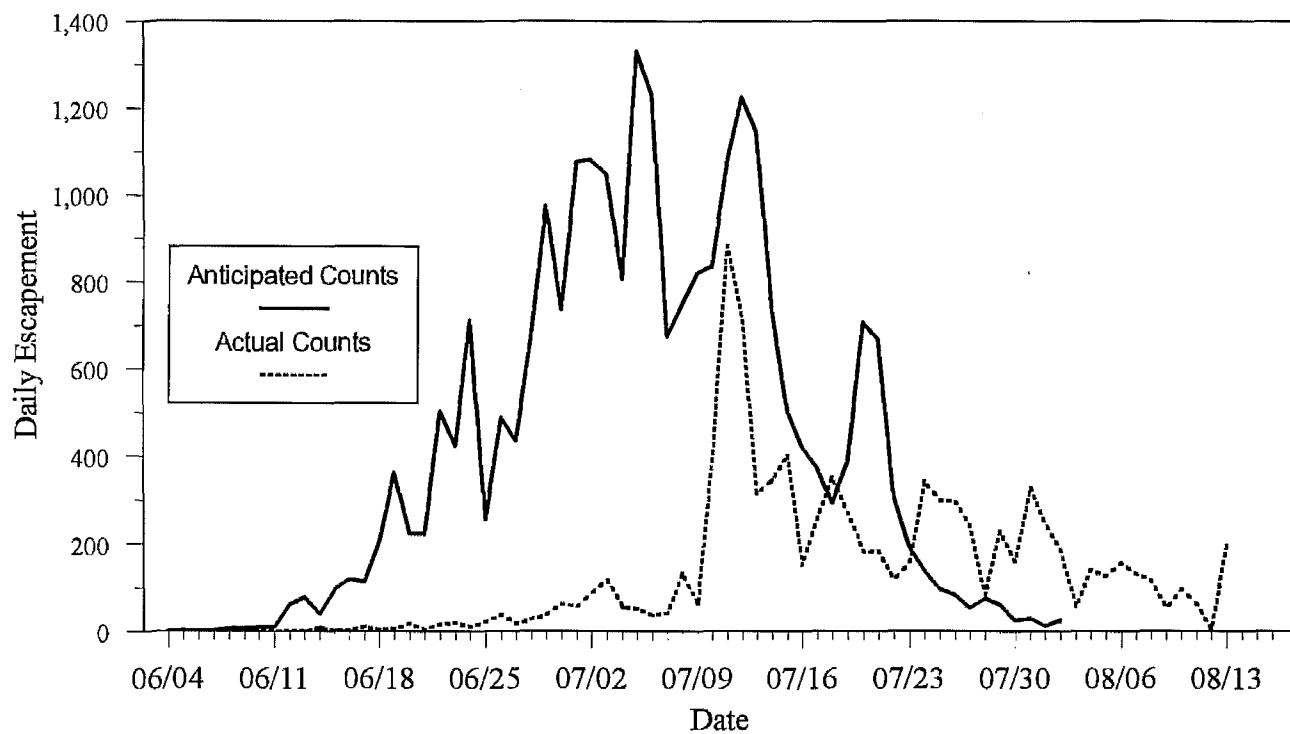
Date	Sockeye ^a		Pink ^b		Chum		Coho		Chinook	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
07/28	84	6940	172	2693	1	25	0	1	2	14
07/29	229	7169	316	3009	1	26	0	1	1	15
07/30	160	7329	270	3279	1	27	0	1	0	15
07/31	329	7658	683	3962	1	28	1	2	1	16
08/01	248	7906	380	4342	1	29	3	5	1	17
08/02	188	8094	402	4744	1	30	4	9	1	18
08/03	57	8151	159	4903	1	31	1	10	0	18
08/04	140	8291	266	5169	3	34	3	13	0	18
08/05	126	8417	265	5434	2	36	3	16	1	19
08/06	157	8574	436	5870	2	38	2	18	1	20
08/07	132	8706	329	6199	1	39	0	18	0	20
08/08	116	8822	505	6704	1	40	0	18	1	21
08/09	53	8875	345	7049	0	40	1	19	1	22
08/10	96	8971	351	7400	1	41	1	20	1	23
08/11	61	9032	265	7665	0	41	0	20	1	24
08/12	4	9036	162	7827	0	41	0	20	0	24
08/13	196	9232	233	8060	1	42	1	21	1	25
Total	9232		8060		42		21		25	

^aCount includes 49 jacks.

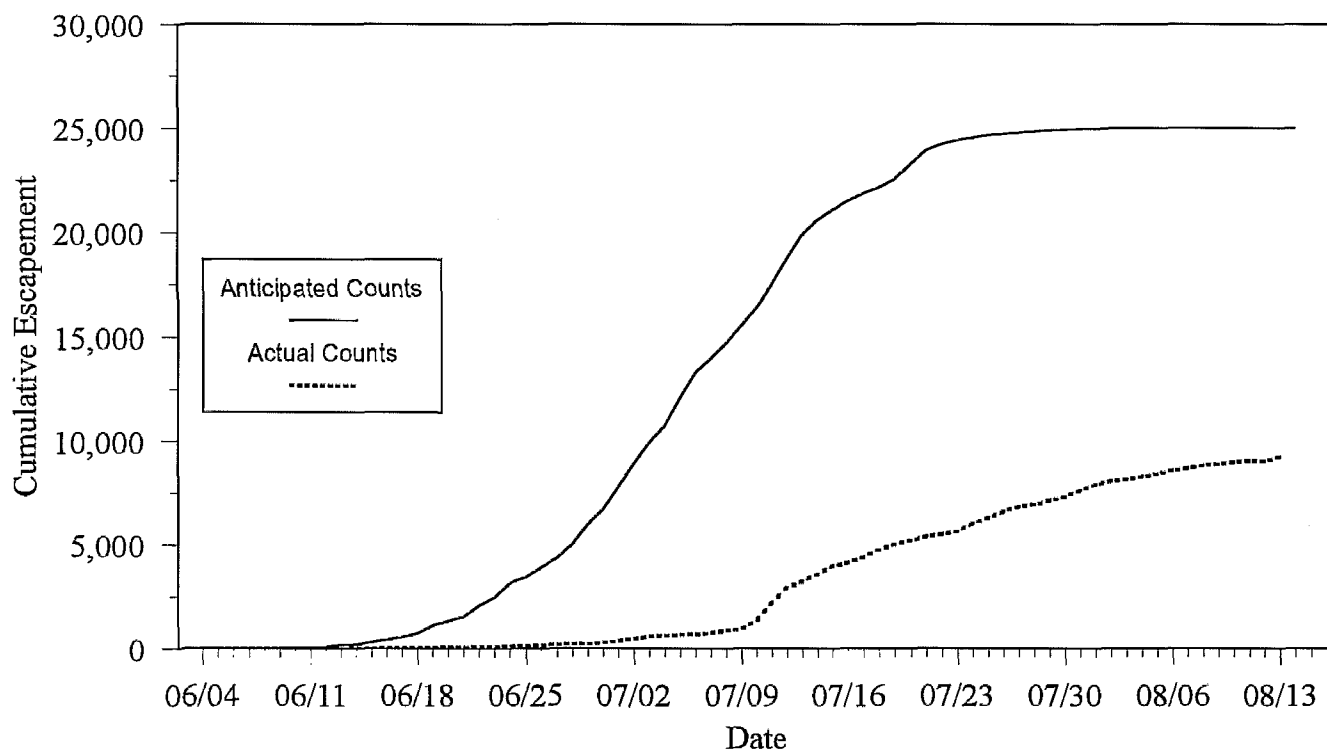
^bCount may be incomplete. The Coghill weir is designed to prohibit the passage of sockeye salmon and because of their smaller size some pink salmon are able to pass uncounted.

1993 COGHILL SOCKEYE SALMON ESCAPEMENT

Daily vs. Anticipated Escapement (25,000 Goal)



Cumulative Escapement



Appendix C.4. Anticipated, actual daily, and cumulative sockeye salmon escapement past the Coghill River weir, Prince William Sound, 1993.

Appendix C.5. Salmon escapement by species in the Coghill District, Prince William Sound, 1969 - 1993.

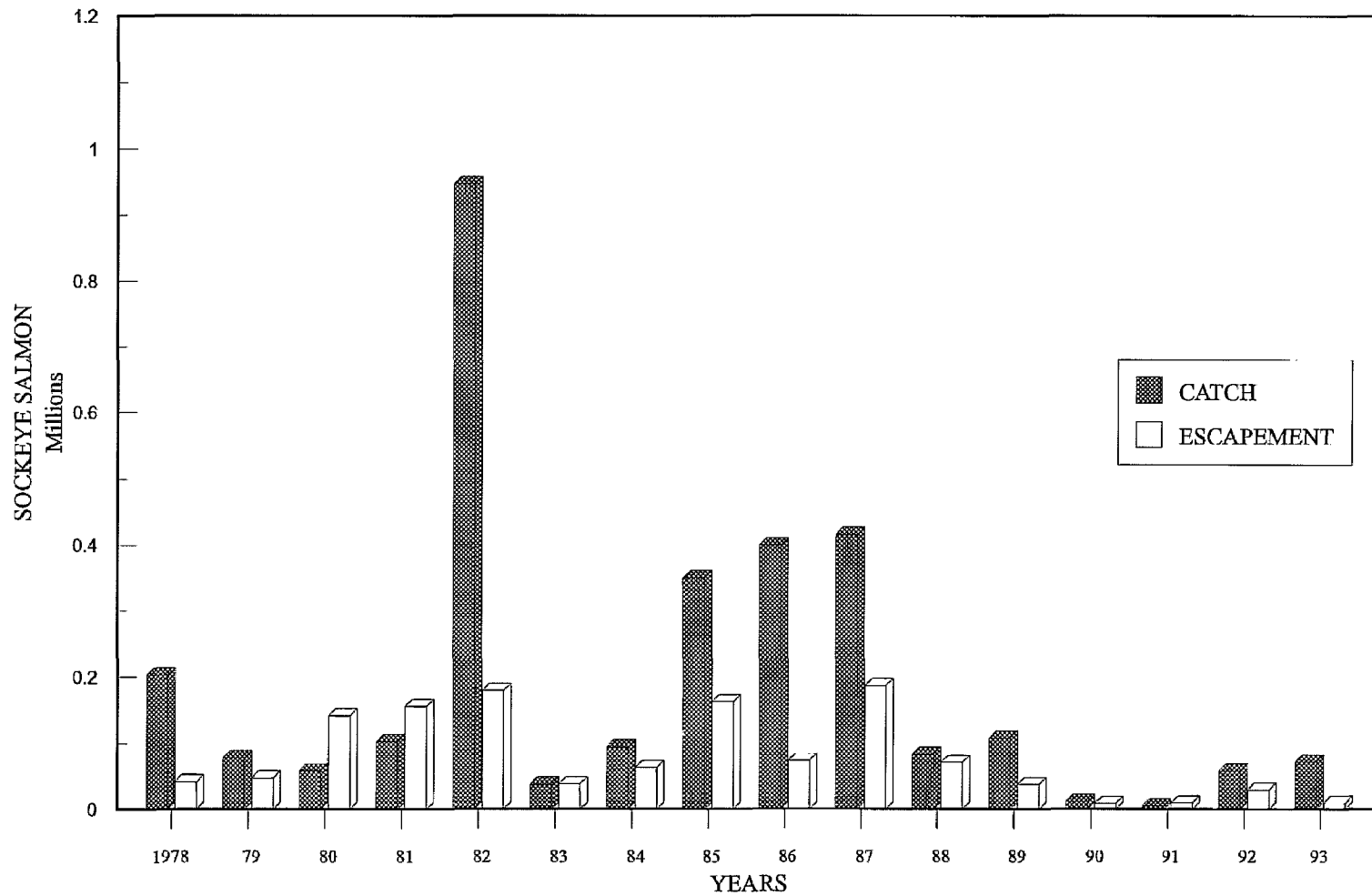
Year	Sockeyea	Pink ^b	Chum ^b
1969	81,000	39,020	8,410
1970	35,200	95,170	11,880
1971	15,000	62,160	6,600
1972	51,000	30,960	28,160
1973	55,000	493,780	72,610
1974	22,333	56,940	29,280
1975	34,855	452,430	3,640
1976	9,056	57,090	25,670
1977	31,562	130,510	43,940
1978	42,284	85,450	18,160
1979	48,281	70,980	6,330
1980	142,253	214,930	23,340
1981	156,112	106,450	2,050
1982	180,314	368,380	22,130
1983	38,783	310,330	61,410
1984	63,622	429,450	19,690
1985	163,311	296,970	22,140
1986	71,095	101,600	13,140
1987	187,263	147,060	24,510
1988	72,052	37,070	39,240
1989	37,751	45,510	22,680
1990	8,949	49,110	26,020
1991	9,752	98,580	6,070
1992	29,642	23,611	10,003
1993	9,232	41,666	7,404
<hr/>			
20 Year			
Average	70,214	178,812	24,603
(1973-1992)			

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

^b Pink and chum escapements estimated for streams in district by aerial surveys. Historical data revised in 1990.

SOCKEYE SALMON CATCH and ESCAPEMENT

COGHILL DISTRICT



Appendix C.6. Sockeye salmon catch and escapement in the Coghill District, Prince William Sound, 1978 - 1993.

Appendix C.7 Estimated age and sex composition of the sockeye salmon escapement through the Coghill weir and of the commercial drift gillnet sockeye catch from the Coghill District, 1993.

COMMERCIAL DRIFT GILLNET FISHERY

		Brood Year and Age Group									
		1990	1989			1988		1987			
		1.1	0.3	1.2	2.1	1.3	2.2	1.4	2.3	3.2	Total
<hr/>											
Strata Combined:	06/07 - 09/25										
Sampling dates:	06/22 - 08/07										
Sample size:	1,451										
Female	Percent of sample	0.0	0.0	26.0	0.0	16.0	2.4	0.1	1.7	0.1	46.3
	Number in catch	0	0	17,327	0	10,620	1,612	96	1,116	46	30,816
Male	Percent of sample	0.3	0.0	30.6	0.1	14.5	4.2	0.0	1.4	0.0	51.2
	Number in catch	207	20	20,368	88	9,653	2,795	20	928	0	34,078
Total	Percent of sample	0.3	0.0	57.5	0.1	31.8	6.8	0.2	3.3	0.1	100.0
	Number in catch	207	20	38,241	88	21,131	4,510	115	2,174	46	66,532
	Standard error	107	20	912	62	866	476	60	319	33	

COGHILL LAKE ESCAPEMENT

		Brood Year and Age Group									
		1990	1989		1988		1987			1986	
		0.2	0.3	1.2	1.3	2.2	1.4	2.3	3.2	3.3	Total
<hr/>											
Strata Combined:	06/10 - 08/13										
Sampling dates:	06/27 - 08/06										
Sample size:	1,661										
Female	Percent of sample	0.3	0.1	2.7	29.4	0.8	0.6	1.8	0.1	0.1	35.9
	Number in catch	29	12	252	2,713	71	53	167	5	9	3,311
Male	Percent of sample	0.3	0.1	2.5	54.4	1.6	2.2	3.0	0.1	0.1	64.1
	Number in catch	26	6	229	5,023	148	199	272	7	10	5,921
Total	Percent of sample	0.6	0.2	5.2	83.8	2.4	2.7	4.8	0.1	0.2	100.0
	Number in catch	54	18	482	7,736	219	252	439	12	19	9,232
	Standard error	14	7	43	87	34	45	55	8	13	

Appendix C.8. Commercial salmon harvest by statistical week in the Unakwik District drift gillnet and purse seine fisheries, P.W.S., 1993. The statistical weeks listed are for those that registered active fishing participation. For a listing of all fishing periods see Appendix C.10. ^a

Stat		Chinook				Sockeye		Coho		Pink		Chum	
Date ^b	Week	Permits	Landings	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
GEAR: DRIFT GILLNET													
06/19	25	1	1	0	0	156	936	0	0	0	0	0	0
06/26	26	13	27	1	11	4,175	27,088	0	0	0	0	0	0
07/03	27	8	14	2	51	3,809	23,168	0	0	1	4	117	793
07/10	28	17	25	1	20	4,009	24,119	0	0	7	24	134	979
07/17	29	9	15	0	0	1,456	8,907	0	0	12	41	82	635
07/24	30	6	8	1	14	458	2,897	4	23	8	25	220	1,224
07/31	31	4	4	0	0	109	770	0	0	20	80	70	443
08/07	32 ^c	2	4	0	0	338	2,185	0	0	137	554	39	247
08/14	33	5	7	0	0	136	703	0	0	2,172	5,983	155	761
08/21	34 ^d	5	5	0	0	45	224	0	0	981	2,655	161	754
Total		33	110	5	96	14,691	90,997	4	23	3,338	9,366	978	5,836
Average Weight					19.20		6.19		5.75		2.81		5.97
GEAR: PURSE SEINE													
08/14	33	5	6	0	0	78	404	0	0	2,725	7,332	47	253
08/21	34 ^d	3	3	0	0	1	5	0	0	508	1,366	20	106
Total		6	9	0	0	79	409	0	0	3,233	8,698	67	359
Average Weight							5.18				2.69		5.36
Combined Total													
Combined Total		39	119	5	96	14,770	91,406	4	23	6,571	18,064	1,045	6,195
Average Weight					19.20		6.19		5.75		2.75		5.93

^a The Unakwik District was opened on June 17 to two 24-hour periods per week. The weekly schedule was 8:00 a.m. Monday until 8:00 a.m. Tuesday and from 8:00 p.m. Thursday until 8:00 p.m. Friday.

^b Statistical week ending date.

^c The 60 mesh depth restriction for drift gillnets was rescinded at 8:00 p.m. Thursday, August 5.

^d Effective 8:00 p.m. Friday, September 24, the Unakwik District was closed for the season.

Appendix C.9. Commercial salmon catch by species in the
Unakwik District, Prince William Sound,
1975 - 1993.

CATCH BY SPECIES						
Year	Chinook	Sockeye	Coho	Pink	Chum	Total
GEAR : DRIFT GILLNET						
1975	4	11,522	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
1990	3	247	127	9,986	23	10,386
1991	13	4,482	11	12,299	118	16,923
1992	3	2,224	13	3,972	94	6,306
1993	5	14,691	4	3,338	978	19,016
Ten Year Average (1983-92)	10	12,788	20	11,365	1,846	26,029
GEAR: 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						
1990 a						
1991	0	819	3	121,068	79	121,969
1992	0	42	2	13,264	119	13,427
1993	0	79	0	3,233	67	3,379
Ten Year Average (1983-92)	0	271	2	59,457	5,732	65,461
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	21,412	27	41,820	404	63,694
1990	3	247	127	9,986	23	10,386
1991	13	5,301	14	133,367	197	138,892
1992	3	2,266	15	17,236	213	19,733
1993	5	14,770	4	6,571	1,045	22,395
Ten Year Average (1983-92)	10	12,977	21	52,985	5,858	71,851

a No catch recorded.

Appendix C.10. Summary of periods, dates, hours open, and emergency orders issued for the commercial salmon fisheries in the Coghill and Unakwik Districts, Prince William Sound, 1993.

Unakwik (229)		Coghill (223)		Emergency Orders Issued
Dates	Hours Open	Dates	Hours Open	
		6/07 - 6/08	24	2-F-E-30-93 ^a
		6/10 - 6/12	36	2-F-E-31-93
				2-F-E-33-93 ^b
				2-F-E-34-93
		6/14 - 6/15	24	2-F-E-35-93 ^c
6/17 - 6/18	24	6/17 - 6/18	24	2-F-E-37-93 ^{a,d}
6/21 - 6/22	24	6/21 - 6/22	24	2-F-E-39-93 ^a
6/24 - 6/25	24	6/24 - 6/25	24	2-F-E-41-93
6/28 - 6/29	24	6/28 - 6/29	24	2-F-E-42-93 ^c
7/01 - 7/02	24	7/01 - 7/02	24	2-F-E-44-93 ^a
7/05 - 7/06	24	7/05 - 7/06	24	2-F-E-45-93
7/09 - 7/10	24	7/09	12	2-F-E-48-93 ^{f,g}
7/12 - 7/13	24	7/12 - 7/13	36	2-F-E-50-93 ^h
7/15 - 7/16	24	7/15 - 7/17	36	2-F-E-51-93
7/19 - 7/20	24			
7/22 - 7/23	24			
7/26 - 7/27	24			
7/29 - 7/30	24			
8/02 - 8/03	24			
8/05 - 8/06	24	8/05 - 8/06	24	2-F-E-57-93 ⁱ
8/09 - 8/10	24	8/08 - 8/10	48	2-F-E-58-93 ^a
8/12 - 8/13	24			
8/16 - 8/17	24	8/18 - 8/19	24	2-F-E-64-93 ^j
8/19 - 8/20	24	8/20 - 8/21	40	2-F-E-70-93 ^a
				2-F-E-71-93
8/23 - 8/24	24	8/22 - 8/25	72	2-F-E-74-93 ^k
				2-F-E-76-93 ^l
				2-F-E-77-93 ^m
8/26 - 8/27	24	8/26 - 8/28	72	
8/30 - 8/31	24	8/29 - 9/04	168	2-F-E-84-93 ⁿ
8/31 - 9/01	24			2-F-E-85-93 ^o
9/02 - 9/03	24			
		9/05 - 9/11	168	
		9/12 - 9/18	168	
		9/19 - 9/25	168	
		9/26 - 10/2	168	
		10/3 - 10/8	144	2-F-E-92-93 ^p

^a The Esther Subdistrict, excluding the Esther Hatchery Special Harvest Area of Lake and Quillian Bays, was opened to fishing.

^b This emergency order modified the domain of the Noerenberg Hatchery Special Harvest Area as those waters of Lake Bay north of shore markers at approximately 60° 47' 36" N. latitude. The emergency order also opened the Noerenberg Hatchery Sanctuary (Terminal Harvest Area) of Quillian Bay and the outer portion of Lake Bay.

^c Effective 8:00 a.m. Monday, June 14, the Noerenberg Special Harvest Area was defined as those waters inside of a line from Esther Light to Hodgkin Point. This emergency order also reestablished Lake and Quillian Bays as closed waters effective 8:00 a.m. Monday, June 14.

-Continued-

- d The Unakwik District opened to a weekly fishing schedule of two 24-hour fishing periods per week. The weekly schedule was from 8:00 p.m. Thursday until 8:00 p.m. Friday and from 8:00 a.m. Monday until 8:00 a.m. Tuesday.
- e The Esther Subdistrict opened for a 24 hour fishing period. The Noerenberg Hatchery Terminal Harvest Area (Sanctuary) was open for the first 12 hours.
- f The Esther Subdistrict, including the Terminal Harvest Area (Sanctuary) of Quillian Bay was opened to fishing.
- g The Unakwik District was scheduled to open on Thursday, July 8, however, the period was postponed to Friday, July 9 to coincide with other gillnet openings in Prince William Sound.
- h The Noerenberg Hatchery Terminal Harvest Area (Sanctuary) of Quillian Bay of the Esther Subdistrict opened to fishing.
- i The 60 mesh depth restriction was rescinded effective 8:00 p.m. Thursday, August 5. The Esther Subdistrict was open to fishing.
- j The Esther Subdistrict was open for 24 hours starting 8:00 a.m. Wednesday, August 18. The Esther Subdistrict boundary was the normal subdistrict boundary at 60° 49.55'. The Noerenberg Hatchery Sanctuary and Special Harvest Area of Lake and Quillian Bays opened for 12 hours.
- k The Noerenberg Hatchery Special Harvest Area open for 12 hours starting at 8:00 a.m. Sunday, August 22. The Esther Subdistrict opening was extended another 24 hours.
- l This emergency order extended the current openings of the Esther Subdistrict and the Noerenberg Hatchery Special Harvest Area and Sanctuary until further notice.
- m The Noerenberg Hatchery Special Harvest Area and Sanctuary were closed effective 8:00 p.m. Tuesday, August 24.
- n The Noerenberg Hatchery Terminal Harvest Area (Sanctuary) was opened at 8:00 a.m. Thursday, September 2 until further notice.
- o The Noerenberg Hatchery Special Harvest Area was opened at 8:00 a.m. Saturday, September 4 until further notice. An opening for purse seine gear was established for 12 hours beginning at 8:00 a.m. Monday, September 6.
- p The Coghill District was officially closed at 8:00 p.m. Friday, October 8.

APPENDIX D

ESHAMY DISTRICT

Appendix D.1. Commercial salmon harvest by statistical week in the Eshamy District commercial drift gillnet and set gillnet fisheries, P.W.S., 1993. The statistical weeks listed are those with active fishing participation.

Date	Stat		Chinook		Sockeye		Coho		Pink		Chum		
	Week	Permits	Landings	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
GEAR: DRIFT GILLNET													
06/19b	25	5	7	0	0	17	106	0	0	0	0	151	1,060
06/26c	26	3	7	0	0	136	767	0	0	0	0	370	2,384
07/03	27	126	267	5	63	11,405	69,773	20	162	1,385	5,021	18,499	128,149
07/10	28	86	172	1	17	11,173	65,065	64	463	1,693	6,309	5,542	36,430
07/17d	29	49	80	0	0	3,816	22,259	4	35	381	1,350	467	2,933
07/31	31	36	55	0	0	4,650	26,623	4	35	653	2,545	294	1,781
08/07de	32	54	126	0	0	5,627	33,007	20	181	2,346	8,333	523	3,247
08/14d,f	33	33	78	0	0	4,584	26,647	95	745	5,000	18,211	504	3,172
08/21g	34	62	136	1	12	22,012	134,375	48	401	11,523	39,685	250	1,555
08/28hi	35	50	183	1	10	16,494	98,928	341	2,870	20,931	69,974	431	2,719
09/04jk	36	9	17	0	0	879	4,753	56	421	2,052	5,875	14	78
09/11i	37	2	2	0	0	14	77	21	152	10	27	0	0
Total		200	1,130	8	102	80,807	482,380	673	5,465	45,974	157,330	27,045	183,508
Average Weight					12.75		5.97		8.12		3.42		6.79
GEAR: SET GILLNET													
06/19b	25	21	40	15	295	341	2,228	0	0	1	4	582	4,394
06/26c	26	29	119	16	289	2,954	18,646	0	0	74	298	4,243	28,793
07/03	27	29	162	8	83	13,669	83,156	4	32	660	2,469	8,585	59,814
07/10	28	30	100	7	133	14,213	85,021	17	109	1,375	4,932	3,495	24,043
07/17d	29	19	70	2	16	5,460	31,136	8	59	411	1,490	629	3,749
07/31	31	20	30	0	0	5,760	32,535	3	22	492	1,820	301	1,861
08/07de	32	22	76	0	0	10,718	60,577	9	85	1,801	6,635	964	5,949
08/14d,f	33	21	57	0	0	6,557	36,931	39	323	5,052	18,413	561	3,386
08/21g	34	25	83	2	22	14,356	84,542	69	581	20,969	69,008	263	1,560
08/28hi	35	26	177	0	0	17,412	101,104	293	2,517	37,174	125,899	663	3,849
09/04jk	36	16	118	5	36	7,838	44,573	244	1,888	14,659	49,138	74	456
09/11i	37	8	42	0	0	2,071	11,873	126	823	1,884	5,840	9	49
09/18l	38	3	6	0	0	333	1,990	20	141	16	41	0	0
09/25	39	1	1	0	0	25	150	0	0	0	0	0	0
Total		30	1,081	55	874	101,717	594,462	832	6,580	84,568	285,987	20,369	137,903
Average Weight					15.89		5.84		7.91		3.38		6.77
Combined Total		230	2,211	63	976	182,524	1,076,842	1,505	12,045	130,542	443,317	47,414	321,411
Average Weight					15.49		5.90		8.00		3.40		6.78

- Statistical week ending date.
- The Alternating Gear Zone (AGZ) was closed and remained closed until September 14.
- In the Main Bay Subdistrict the 500 yard anadromous stream closures will not take effect until 12:01 a.m. July 8.
- Only waters of the Main Bay Subdistrict were open.
- A 5 1/4" minimum mesh size and a 60 mesh depth restriction was put into effect until further notice.
- Effective 8:00 p.m. Thursday, August 12 the 5 1/4" minimum mesh size and the 60 mesh depth restriction was rescinded.
- The Crafton Island Subdistrict was open for 12 hours starting at 8:00 a.m. Friday August 20. The Main Bay Subdistrict and waters of Eshamy Bay west of a line from a point on the south shore at 60° 28.0' N. Lat., 147° 57.5' W. Long., to a point on the north shore at 60° 29.0' N. Lat., 147° 58.1' W. Long. was open for 36 hours. The minimum mesh size and depth restriction was put back into effect. Effective 12:00 noon Saturday, August 21, the waters of Eshamy Bay were enlarged to include Eshamy Lagoon. Effective 12:00 noon August 21, the opening in Eshamy Lagoon was extended to the mouth of Eshamy River. The waters of Eshamy Bay and Lagoon were open until 8:00 p.m. Wednesday, August 25.
- The Crafton Island Subdistrict was open for 12 hours starting at 8:00 a.m. Monday, August 23. The Main Bay Subdistrict was open for 36 hours effective 8:00 a.m. Monday, August 23. The waters of Eshamy Bay and Lagoon were also open.
- The Crafton Island Subdistrict and the Main Bay Subdistrict were open for 12 hours starting 8:00 a.m. Thursday, August 26. The opening in Eshamy Bay and Lagoon was extended until further notice.
- The Crafton Island Subdistrict was open for 12 hours from 8:00 a.m. Monday, August 30, until 8:00 p.m. Monday, August 30. The waters of Eshamy Bay and Lagoon remained open to continuous fishing until further notice.
- Effective 8:00 a.m. Thursday, September 2, the Crafton Island Subdistrict excluding the waters of Eshamy Bay and Lagoon were placed on a weekly fishing schedule of two 12-hour periods per week. The schedule was 8:00 a.m. to 8:00 p.m. Thursday and from 8:00 a.m. to 8:00 p.m. Monday. The Main Bay Subdistrict excluding the AGZ was opened at 8:00 a.m. Thursday, September 2, until further notice.
- Effective 8:00 a.m. Tuesday, September 14, the AGZ at the head of Main Bay was opened to continuous fishing. The season officially closed Friday, October 8.

Appendix D.2. Commercial salmon catch by species in the
Eshamy District, Prince William Sound,
1977 - 1993.

CATCH BY SPECIES						
Year ^a	Chinook	Sockeye	Coho	Pink	Chum	Total
GEAR: DRIFT GILLNET						
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						
1990	110	12,967	574	165,362	264,772	443,785
1991	107	296,234	468	44,516	202,183	543,508
1992	158	373,596	1,017	153,018	50,974	578,763
1993	8	80,807	673	45,974	27,045	154,507
Ten Year Average (1983-92)	53	84,377	350	127,855	83,446	296,081
GEAR: SET GILLNET						
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						
1990	56	10,204	532	369,589	94,494	474,875
1991	76	184,028	504	20,075	49,394	254,077
1992	101	144,568	1,242	390,097	4,695	540,703
1993	55	101,717	832	84,568	20,369	207,541
Ten Year Average (1983-92)	42	43,505	352	174,269	33,531	251,699
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						
1990	166	23,171	1,106	534,951	359,266	918,660
1991	183	480,262	972	64,591	251,577	797,585
1992	259	518,164	2,259	543,115	55,669	1,119,466
1993	63	182,524	1,505	130,542	47,414	362,048
Ten Year Average (1983-92)	96	127,882	701	302,124	116,977	547,780

^a Fishing was closed during the following years: 1975, 1976, 1978, 1979, 1981 and 1982.

^b Fishing was closed due to oil contamination on the beaches.

Appendix D.3. Daily salmon escapement through the Eshamy weir, Prince William Sound, 1993.

Date	Sockeye		Pink		Chum		Coho		Chinook	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
06/28	33	33	0	0	0	0	0	0	0	0
06/29	2	35	0	0	0	0	0	0	0	0
06/30	9	44	0	0	0	0	0	0	0	0
07/01	6	50	0	0	0	0	0	0	0	0
07/02	67	117	0	0	0	0	0	0	0	0
07/03	2	119	0	0	0	0	0	0	0	0
07/04	0	119	0	0	0	0	0	0	0	0
07/05	0	119	0	0	0	0	0	0	0	0
07/06	0	119	0	0	0	0	0	0	0	0
07/07	6	125	0	0	0	0	0	0	0	0
07/08	0	125	0	0	0	0	0	0	0	0
07/09	0	125	0	0	0	0	0	0	0	0
07/10	7	132	0	0	0	0	0	0	0	0
07/11	181	313	0	0	0	0	0	0	0	0
07/12	117	430	0	0	0	0	0	0	0	0
07/13	1	431	0	0	0	0	0	0	0	0
07/14	1	432	0	0	0	0	0	0	0	0
07/15	23	455	0	0	0	0	0	0	0	0
07/16	4	459	0	0	0	0	0	0	0	0
07/17	6	465	0	0	0	0	0	0	0	0
07/18	0	465	0	0	0	0	0	0	0	0
07/19	0	465	0	0	0	0	0	0	0	0
07/20	0	465	0	0	0	0	0	0	0	0
07/21	0	465	0	0	0	0	0	0	0	0
07/22	1	466	0	0	0	0	0	0	0	0
07/23	240	706	0	0	0	0	0	0	0	0
07/24	225	931	1	1	0	0	0	0	0	0
07/25	381	1,312	1	2	0	0	0	0	0	0
07/26	826	2,138	1	3	2	2	0	0	0	0
07/27	147	2,285	2	5	1	3	0	0	0	0
07/28	287	2,572	1	6	0	3	0	0	0	0
07/29	42	2,614	0	6	0	3	0	0	0	0
07/30	710	3,324	1	7	0	3	0	0	0	0
07/31	120	3,444	1	8	0	3	0	0	0	0
08/01	37	3,481	0	8	0	3	0	0	0	0
08/02	407	3,888	1	9	1	4	0	0	0	0
08/03	75	3,963	1	10	0	4	1	1	0	0
08/04	188	4,151	4	14	1	5	0	1	0	0
08/05	85	4,236	5	19	0	5	0	1	0	0
08/06	85	4,321	2	21	1	6	0	1	0	0
08/07	289	4,610	2	23	0	6	0	1	0	0
08/08	146	4,756	5	28	0	6	0	1	0	0
08/09	254	5,010	7	35	0	6	0	1	0	0
08/10	658	5,668	30	65	0	6	0	1	0	0
08/11	640	6,308	52	117	0	6	0	1	0	0
08/12	253	6,561	35	152	0	6	0	1	0	0
08/13	430	6,991	22	174	0	6	0	1	0	0
08/14	2977	9,968	270	444	0	6	3	4	0	0
08/15	3019	12,987	95	539	0	6	8	12	0	0
08/16	3714	16,701	101	640	1	7	2	14	1	1
08/17	4898	21,599	164	804	0	7	15	29	0	1
08/18	3008	24,607	156	960	0	7	9	38	0	1
08/19	3557	28,164	161	1,121	2	9	11	49	0	1
08/20	4401	32,565	203	1,324	0	9	16	65	0	1
08/21	7296	39,861	267	1,591	0	9	14	79	0	1
08/22	943	40,804	208	1,799	0	9	0	79	0	1
08/23	437	41,241	170	1,969	0	9	1	80	0	1
08/24	168	41,409	86	2,055	0	9	0	80	0	1

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Appendix D.3. (page 2 of 2)

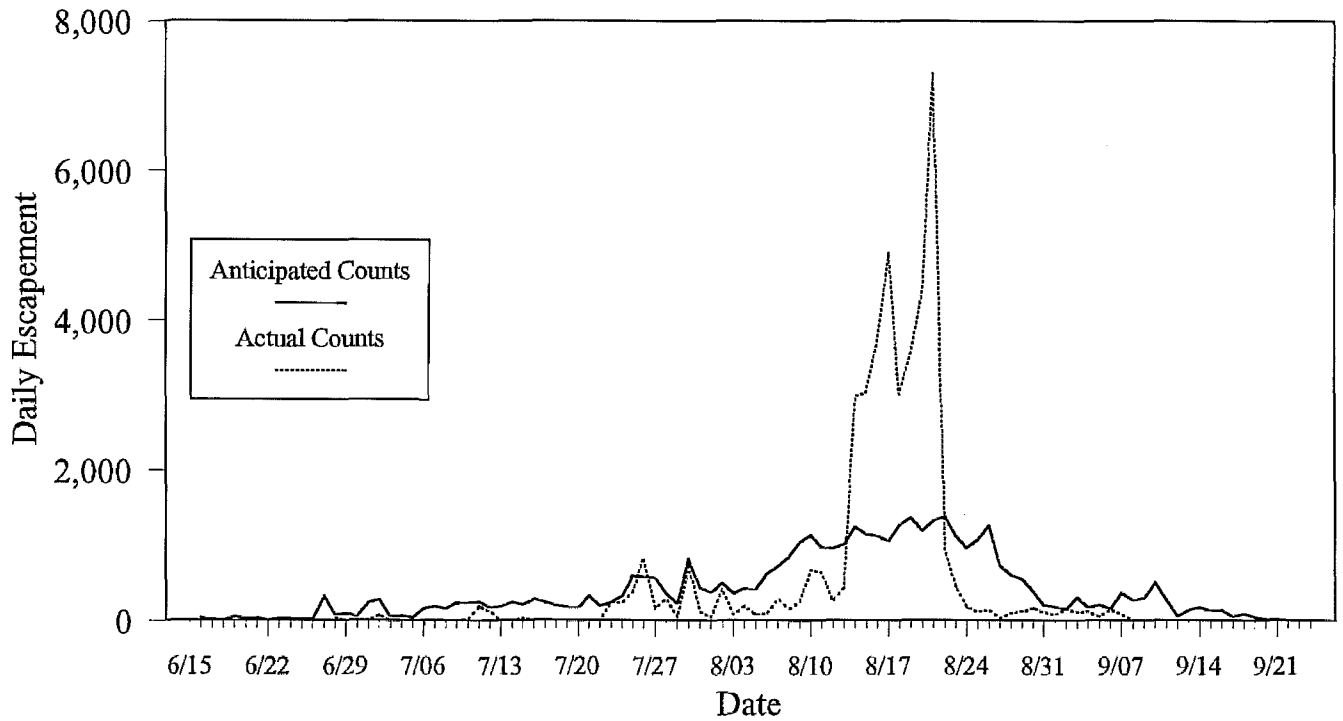
Date	Sockeyea ^a		Pink ^b		Chum		Coho		Chinook	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
08/25	112	41,521	74	2,129	0	9	0	80	0	1
08/26	138	41,659	56	2,185	0	9	2	82	0	1
08/27	20	41,679	43	2,228	0	9	0	82	0	1
08/28	89	41,768	85	2,313	0	9	0	82	0	1
08/29	119	41,887	322	2,635	0	9	1	83	0	1
08/30	162	42,049	193	2,828	0	9	3	86	0	1
08/31	107	42,156	90	2,918	0	9	0	86	0	1
09/01	73	42,229	80	2,998	0	9	0	86	0	1
09/02	163	42,392	129	3,127	0	9	3	89	0	1
09/03	111	42,503	140	3,267	0	9	2	91	0	1
09/04	113	42,616	50	3,317	0	9	0	91	0	1
09/05	51	42,667	44	3,361	0	9	0	91	0	1
09/06	141	42,808	45	3,406	0	9	1	92	0	1
09/07	71	42,879	29	3,435	0	9	0	92	0	1
09/08	14	42,893	0	3,435	0	9	0	92	0	1
Totals	42893		3435		9		92		1	

a Count includes 94 sockeye jacks.

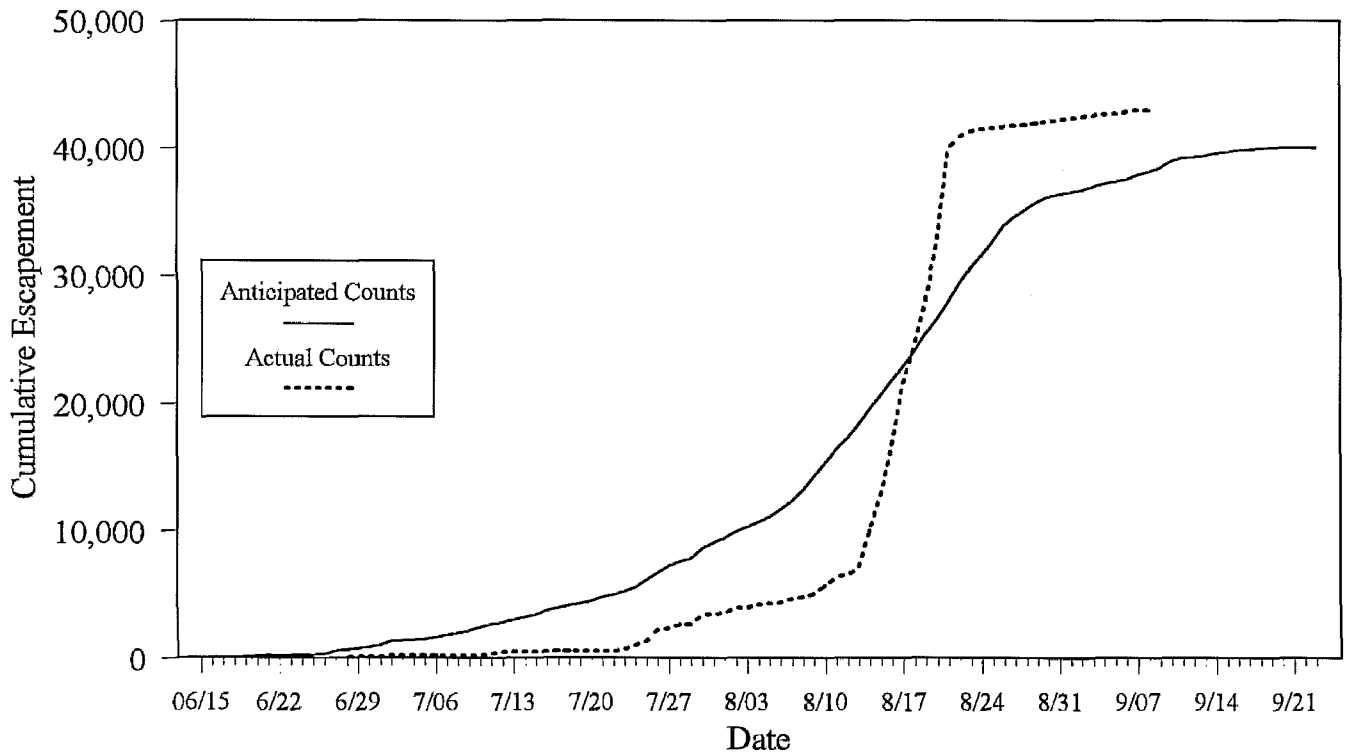
b Count may be incomplete. The Eshamy weir is designed to prohibit the passage of sockeye salmon and some pink salmon are able to pass uncounted because of their smaller size.

1993 ESHAMY LAKE SOCKEYE SALMON ESCAPEMENT

Daily vs. Anticipated Escapement (40,000 Goal)



Cumulative Escapement



Appendix D.4. Anticipated, actual, and cumulative sockeye salmon escapement past the Eshamy weir, Prince William Sound, 1993.

Appendix D.5. Salmon escapement by species at the Eshamy weir, Prince William Sound, 1967 - 1993.

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	1	57,106 ^g	0	6,283	210	63,600
1990	0	14,191 ^h	43	2,209	5	16,448
1991	2	46,229 ⁱ	907	31,241	17	78,396
1992	1	36,237 ^j	52	3,004	5	39,299
1993	1	42,893 ^k	92	3,435	9	46,430
20 Year Average (1973-1992)	1	21,454	190	6,762	23	27,328

^aIncidental passage of salmon other than sockeye were not recorded for each year.

^bProbably inaccurate because of holes in weir. Actual escapement is estimated to be at least 3,000.

^cAssuming the run was 90 percent complete, an additional 2,600 sockeye are estimated to have escaped following weir removal.

^dAn estimated 270 sockeye below the weir when pulled is included in the total count.

^eAn estimated 25 sockeye below the weir at removal are included in the total count.

^fThe Eshamy weir was not in operation during 1987.

^gTotal does not include 126 jacks counted through.

^hTotal does not include 286 sockeye jacks counted through.

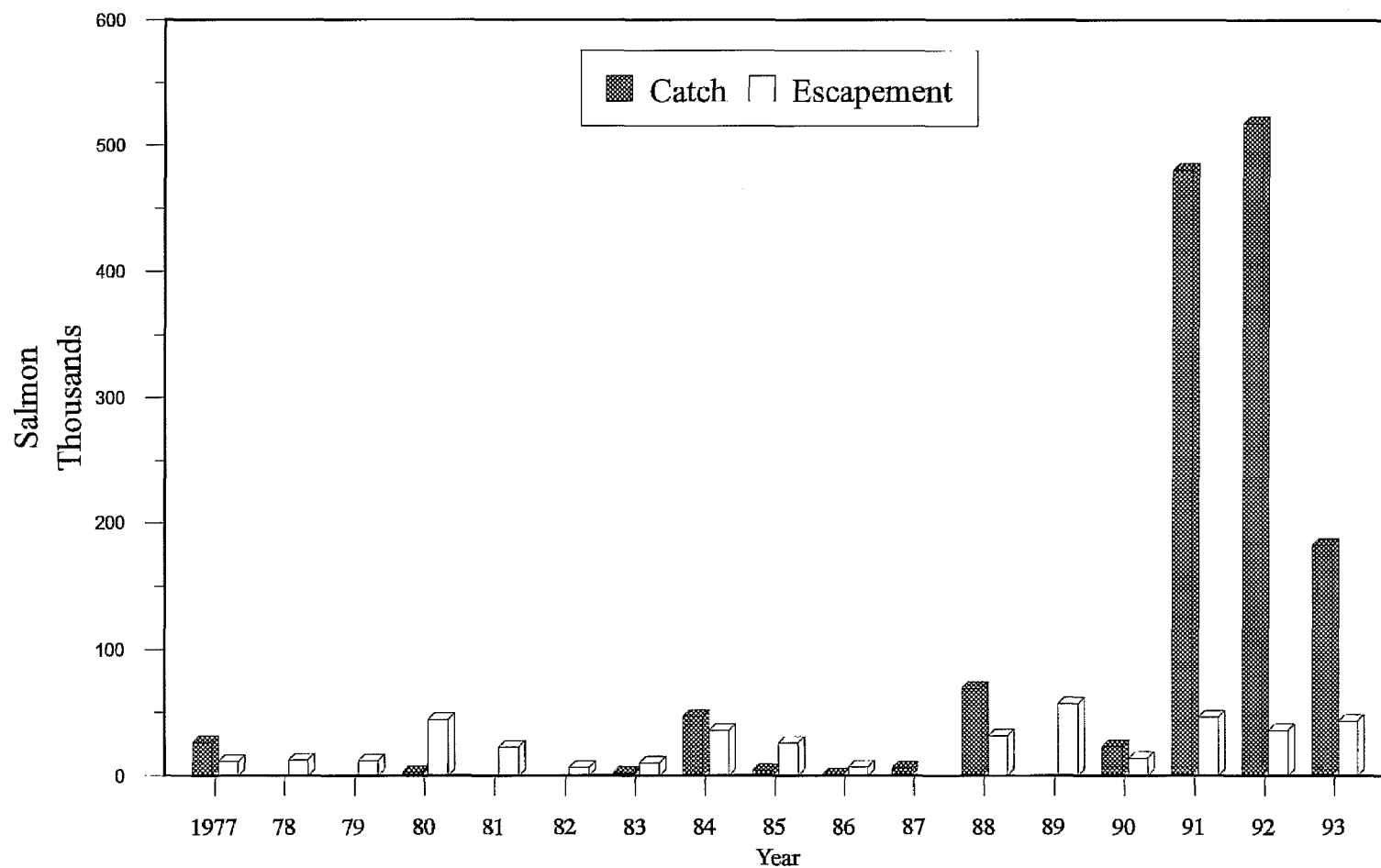
ⁱCount includes 681 jacks.

^jCount includes 350 jacks.

^kCount includes 94 jacks.

SOCKEYE SALMON CATCH AND ESCAPEMENT

ESHAMY DISTRICT



Appendix D.6. Sockeye salmon catch and escapement, Eshamy District, Prince William Sound, 1977 -1993.

Appendix D.7. Temporally stratified age and sex composition of sockeye salmon in the Eshamy District commercial common property gillnet fishery, 1993.

		Brood Year and Age Group						
		1990	1989	1988		1987		
		1.1	1.2	1.3	2.2	1.4	2.3	Total
Stratum dates: 06/17 - 06/25								
Sampling dates: 06/22								
Sample size: 290								
Female	Percent of sample	0.0	4.1	51.7	1.4	0.3	2.8	60.3
	Number in catch	0	143	1,789	48	12	95	2,087
Male	Percent of sample	0.0	5.9	31.0	0.7	0.3	1.7	39.7
	Number in catch	0	203	1,073	24	12	60	1,371
Total	Percent of sample	0.0	10.0	82.8	2.1	0.7	4.5	100.0
	Number in catch	0	346	2,862	72	24	155	3,458
	Standard error	0	61	77	29	17	42	
Stratum dates: 06/28 - 07/01								
Sampling dates: 06/28								
Sample size: 922								
Female	Percent of sample	0.0	16.7	35.7	3.4	0.0	2.0	57.7
	Number in catch	0	2,674	5,714	538	0	313	9,239
Male	Percent of sample	0.1	20.4	18.3	2.3	0.1	1.1	42.3
	Number in catch	17	3,265	2,935	365	17	174	6,773
Total	Percent of sample	0.1	37.1	54.0	5.6	0.1	3.0	100.0
	Number in catch	17	5,939	8,649	903	17	486	16,012
	Standard error	17	255	263	122	17	91	
Stratum dates: 07/02 - 07/06								
Sampling dates: 07/05								
Sample size: 855								
Female	Percent of sample	0.0	28.1	26.5	1.2	0.0	2.7	58.5
	Number in catch	0	6,024	5,698	251	0	577	12,550
Male	Percent of sample	0.0	25.0	14.2	0.9	0.0	1.4	41.5
	Number in catch	0	5,371	3,037	201	0	301	8,910
Total	Percent of sample	0.0	53.1	40.7	2.1	0.0	4.1	100.0
	Number in catch	0	11,395	8,735	452	0	878	21,460
	Standard error	0	366	361	105	0	146	
Stratum dates: 07/09 - 07/30								
Sampling dates: 07/12								
Sample size: 324								
Female	Percent of sample	0.0	34.6	16.0	1.2	0.0	0.0	51.9
	Number in catch	0	11,295	5,244	403	0	0	16,942
Male	Percent of sample	1.2	29.9	14.5	1.9	0.3	0.3	48.1
	Number in catch	403	9,782	4,740	605	101	101	15,732
Total	Percent of sample	1.2	64.5	30.6	3.1	0.3	0.3	100.0
	Number in catch	403	21,077	9,984	1,008	101	101	32,674
	Standard error	201	870	837	314	101	101	

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		Brood Year and Age Group						
		1990	1989	1988		1987		
		1.1	1.2	1.3	2.2	1.4	2.3	Total
<hr/>								
Stratum dates:	08/02 - 08/17							
Sampling dates:	08/15							
Sample size:	384							
Female	Percent of sample	1.3	37.2	3.6	1.0	0.0	0.0	43.2
	Number in catch	463	13,256	1,298	371	0	0	15,388
Male	Percent of sample	2.1	48.7	3.4	1.3	0.0	1.3	56.8
	Number in catch	742	17,335	1,205	463	0	463	20,208
Total	Percent of sample	3.4	85.9	7.0	2.3	0.0	1.3	100.0
	Number in catch	1,205	30,590	2,503	834	0	463	35,596
	Standard error	329	632	465	275	0	206	
<hr/>								
Stratum dates:	08/21 - 09/08							
Sampling dates:	08/25							
Sample size:	348							
Female	Percent of sample	0.0	32.8	2.0	4.6	0.0	0.3	39.7
	Number in catch	0	24,020	1,475	3,371	0	211	29,077
Male	Percent of sample	1.4	51.7	0.6	6.0	0.0	0.6	60.3
	Number in catch	1,054	37,926	421	4,425	0	421	44,247
Total	Percent of sample	1.4	84.5	2.6	10.6	0.0	0.9	100.0
	Number in catch	1,054	61,946	1,896	7,796	0	632	73,324
	Standard error	468	1,425	625	1,213	0	364	
<hr/>								
Strata Combined:	06/17 - 09/08							
Sampling dates:	06/22 - 08/25							
Sample size:	3,123							
Female	Percent of sample	0.3	31.5	11.6	2.7	0.0	0.7	46.7
	Number in catch	463	57,412	21,216	4,982	12	1,196	85,282
Male	Percent of sample	1.2	40.5	7.3	3.3	0.1	0.8	53.3
	Number in catch	2,216	73,882	13,411	6,083	130	1,520	97,242
Total	Percent of sample	1.5	71.9	19.0	6.1	0.1	1.5	100.0
	Number in catch	2,679	131,294	34,628	11,065	142	2,716	182,524
	Standard error	607	1,841	1,230	1,294	104	465	

Appendix D.8 Temporally stratified age and sex composition of sockeye salmon escapement through the weir at the head of Eshamy Lagoon, 1993.

		Brood Year and Age Group						
		1990		1989	1988		1987	
		0.2	1.1	1.2	1.3	2.2	2.3	Total
Stratum dates: 06/28 - 08/08 Sampling dates: 07/23 - 07/25 Sample size: 433								
Female	Percent of sample	0.0	0.0	20.8	18.0	15.9	0.9	55.7
	Number in catch	0	0	989	857	758	44	2,647
Male	Percent of sample	0.0	0.0	20.8	13.6	9.5	0.5	44.3
	Number in catch	0	0	989	648	450	22	2,109
Total	Percent of sample	0.0	0.0	41.6	31.6	25.4	1.4	100.0
	Number in catch	0	0	1,977	1,505	1,208	66	4,756
	Standard error	0	0	113	106	100	27	
Stratum dates: 08/09 - 08/18 Sampling dates: 08/12 - 08/13 Sample size: 402								
Female	Percent of sample	0.2	0.0	28.9	6.5	15.9	0.5	52.0
	Number in catch	49	0	5,728	1,284	3,160	99	10,321
Male	Percent of sample	0.0	0.0	22.1	7.2	18.2	0.5	48.0
	Number in catch	0	0	4,395	1,432	3,605	99	9,530
Total	Percent of sample	0.2	0.0	51.0	13.7	34.1	1.0	100.0
	Number in catch	49	0	10,123	2,716	6,765	198	19,851
	Standard error	49	0	496	341	470	98	
Stratum dates: 08/19 - 09/08 Sampling dates: 08/24 - 08/29 Sample size: 443								
Female	Percent of sample	0.9	0.0	70.4	1.4	11.1	0.2	84.0
	Number in catch	165	0	12,879	248	2,023	41	15,355
Male	Percent of sample	0.5	0.5	11.1	0.5	3.6	0.0	16.0
	Number in catch	83	83	2,023	83	660	0	2,931
Total	Percent of sample	1.4	0.5	81.5	1.8	14.7	0.2	100.0
	Number in catch	248	83	14,901	330	2,683	41	18,286
	Standard error	101	58	338	116	308	41	
Strata Combined: 06/28 - 09/08 Sampling dates: 07/23 - 08/29 Sample size: 1,278								
Female	Percent of sample	0.5	0.0	45.7	5.6	13.9	0.4	66.0
	Number in catch	214	0	19,595	2,388	5,941	184	28,323
Male	Percent of sample	0.2	0.2	17.3	5.0	11.0	0.3	34.0
	Number in catch	83	83	7,406	2,163	4,716	121	14,570
Total	Percent of sample	0.7	0.2	63.0	10.6	24.8	0.7	100.0
	Number in catch	297	83	27,001	4,551	10,656	305	42,893
	Standard error	112	58	610	375	570	110	

Appendix D.9. Summary of periods, dates, hours open, and emergency orders issued for the commercial salmon fisheries in the Eshamy District, Prince William Sound, 1993.

Main Bay Subdistrict (225-21)			Crafton Island Subdistrict (225-10, 20, 30)			Emergency Orders Issued
Periods	Dates	Hours Open	Periods	Dates	Hours Open	
1	6/17 - 6/18	24	1	6/17 - 6/18	24	2-F-E-37-93 ^a 2-F-E-38-93 ^b
2	6/21 - 6/22	24	2	6/21 - 6/22	24	2-F-E-39-93 ^a
3	6/24 - 6/25	24	3	6/24 - 6/25	24	2-F-E-41-93
4	6/28 - 6/29	36	4	6/28 - 6/29	36	2-F-E-42-93
5	7/01 - 7/03	36	5	7/01 - 7/03	36	2-F-E-44-93
6	7/05 - 7/06	24	6	7/05 - 7/06	24	2-F-E-45-93
7	7/09	12	7	7/09	12	2-F-E-48-93
8	7/12 - 7/13	36				2-F-E-50-93 ^c
9	7/15 - 7/17	36				2-F-E-51-93
10	7/29 - 7/30	24				2-F-E-55-93 ^d
11	8/02 - 8/03	24				2-F-E-56-93
12	8/05 - 8/07	36				2-F-E-57-93
13	8/09 - 8/10	36				2-F-E-58-93
14	8/12 - 8/14	36				2-F-E-61-93 ^e
15	8/16 - 8/17	36				2-F-E-67-93
16	8/20 - 8/21	36	16	8/20 - 8/21	40	2-F-E-68-93 ^f 2-F-E-69-93 ^g 2-F-E-72-93 ^h
17	8/23 - 8/24	36	17	8/22 - 8/25	96	2-F-E-75-93 ⁱ
18	8/26	12	18	8/26 - 8/28	72	2-F-E-79-93 ^j
			19	8/29 - 9/01	96	2-F-E-80-93 ^k
20	9/02 - 9/04	64	20	9/02 - 9/04	72	2-F-E-84-93 ^l
21	9/05 - 9/08	96	21	9/05 - 9/08	96	
22	9/09 - 9/11	72	22	9/09 - 9/11	72	
23	9/12 - 9/15	96	23	9/12 - 9/15	96	2-F-E-88-93 ^m
24	9/16 - 9/18	72	24	9/16 - 9/18	72	
25	9/19 - 9/22	96	25	9/19 - 9/22	96	
26	9/23 - 9/25	72	26	9/23 - 9/25	72	
27	9/26 - 9/29	96	27	9/26 - 9/29	96	
28	9/30 - 10/2	72	28	9/30 - 10/2	72	
29	10/3 - 10/6	96	29	10/3 - 10/6	96	
30	10/7 - 10/8	48	30	10/7 - 10/8	48	2-F-E-92-93 ⁿ

^a The Eshamy District, excluding the Alternating Gear Zone of the Main Bay Subdistrict was open to fishing.

^b Commercial fishing within the 500 yard anadromous stream closures in the Main Bay Subdistrict was open from 8:00 p.m. June 17 through July 7, 1993.

^c The Main Bay Subdistrict, excluding the Alternating Gear Zone, was open to fishing.

^d The Main Bay Subdistrict, excluding the Alternating Gear Zone, was open. Gillnet mesh size was restricted to a minimum of 5 and 1/4 inches until further notice.

- e The Main Bay Subdistrict, excluding the Alternating Gear Zone, was open. The 60 mesh depth restriction and the 5 and 1/4 inch minimum mesh size for gillnets was rescinded effective 8:00 p.m. August 12.
- f The Main Bay Subdistrict, excluding the Alternating Gear Zone was open. A 12 hour period was established in the Crafton Island Subdistrict which began at 8:00 a.m. Friday, August 20. The 60 mesh depth restriction and the 5 1/4 inch minimum mesh size for gillnets was reinstated.
- g This emergency order extended the time period open to fishing in the Main Bay Subdistrict, excluding the Alternating Gear Zone, and the waters of Eshamy Bay in the Crafton Island Subdistrict west of a line from a point on the south shore at 60° 29.0' N. lat., 147° 57.7' W. long., to a point on the north shore at 60° 29.0' N. lat., 147° 58.1' W. long.
- h This emergency order enlarged the area and extended the time period for the waters of Eshamy Bay, including Eshamy Lagoon, in the Crafton Island Subdistrict west of a line from a point on the south shore at 60° 28.0' N. lat., 147° 57.5' W. long., to a point on the north shore at 60° 29.0' N. lat., 147° 58.1' W. long.
- i The Main Bay Subdistrict, excluding the Alternating Gear Zone, was open for 36 hours. The Crafton Island Subdistrict was open for 12 hours. The 500 yard stream closure at the mouth of the Eshamy River was rescinded.
- j The Main Bay Subdistrict, excluding the Alternating Gear Zone, and the Crafton Island Subdistrict were open for 12 hours. The described waters of Eshamy Bay and Lagoon were opened until further notice.
- k The Crafton Island Subdistrict was open for 12 hours from 8:00 a.m. to 8:00 p.m. Monday, August 30.
- l A weekly fishing schedule was established beginning on Thursday, September 2 at 8:00 a.m.. The schedule was for two 12 hour periods per week for the Crafton Island Subdistrict, excluding the waters of Eshamy Bay and Eshamy Lagoon. Fishing periods started on Monday at 8:00 a.m. and on Thursday at 8:00 p.m. until further notice. The Main Bay Subdistrict, excluding the Alternating Gear Zone, was opened until further notice effective 8:00 a.m. September 2.
- m The Alternating Gear Zone was opened at 8:00 a.m. Tuesday, September 14, until further notice.
- n The Eshamy District was closed for the season at 8:00 p.m. Friday, October 8.

APPENDIX E

PRINCE WILLIAM SOUND

PURSE SEINE DISTRICTS

Table E.1. Prince William Sound commercial purse seine salmon harvest by day, 1993. Includes the common property catch from all districts open to purse seines: Northern, Coghill, Unakwik and Southwestern.

Catch Date	Chinook				Sockeye		Coho		Pink		Chum	
	Permits	Landings	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds	Numbers	Pounds
08/05 ^a	7	7	0	0	206	1,067	76	467	8,617	20,143	50	368
08/06	115	117	16	162	6,492	38,238	764	5,518	187,957	518,907	2,377	14,754
08/08	10	10	2	23	247	1,531	39	296	16,088	43,640	86	620
08/09 ^b	52	55	12	133	1,508	9,022	219	1,558	79,745	216,707	554	3,226
08/10	118	120	19	170	4,206	25,380	902	6,844	233,258	659,030	1,151	7,705
08/12	1	1	0	0	5	30	0	0	145	424	0	0
08/13	60	61	4	32	1,535	9,196	188	1,358	91,288	261,148	154	930
08/14	71	71	0	0	1,894	11,355	223	1,819	89,144	242,641	269	1,645
08/15 ^c	53	53	1	38	1,018	5,724	121	880	120,050	329,578	147	905
08/16	83	83	0	0	2,816	16,159	378	2,838	227,787	654,385	381	2,509
08/17	81	82	1	18	3,379	19,463	361	2,499	202,409	571,592	419	2,726
08/18 ^{d,e}	73	79	0	0	1,964	11,908	173	1,255	423,481	1,181,827	1,700	12,364
08/19 ^f	73	74	1	5	2,168	12,784	177	1,285	268,603	775,170	852	5,579
08/21 ^g	5	7	0	0	453	2,787	47	299	50,732	145,126	59	347
08/22	10	12	0	0	783	4,337	76	531	122,069	333,556	82	602
08/23	51	53	0	0	928	5,679	192	1,388	337,113	986,955	369	2,392
08/24 ^h	50	56	1	16	1,379	8,045	344	2,483	264,795	753,831	355	2,543
08/25 ⁱ	40	42	1	4	1,497	8,784	98	749	174,436	502,982	271	1,831
08/26	20	20	0	0	442	2,679	41	298	58,174	166,636	69	433
08/27	26	30	0	0	950	5,444	63	406	100,556	283,042	83	418
08/28	10	11	0	0	183	1,128	23	150	35,258	104,606	14	77
08/29	6	6	0	0	198	1,162	15	89	16,261	46,184	3	19
08/30	10	14	0	0	229	1,406	29	194	39,580	118,985	11	65
08/31	5	5	0	0	53	330	8	43	22,428	67,284	2	10
09/02	4	4	0	0	2	15	151	1,063	30,196	89,990	0	0
09/03	1	1	0	0	0	0	48	341	893	2,681	0	0
09/04	2	2	0	0	40	246	681	4,772	16,023	44,064	0	0
09/05 ^j	3	3	0	0	0	0	0	0	21,150	63,453	0	0
Total	144	1,079	58	601	34,575	203,899	5,437	39,423	3,238,236	9,184,567	9,458	62,068
Average Weight				10.36		5.90		7.25		2.84		6.56

- ^a Open waters included the Esther Subdistrict, excluding the W.N.H. Special Harvest Area and Sanctuary and the Port San Juan Subdistrict, excluding the A.F.K. Special Harvest Area.
- ^b The Unakwik District, waters north of the reef in Unakwik Inlet, was opened June 17 to two 24-hour periods per week. The weekly schedule was 8:00 a.m. Monday until 8:00 a.m. Tuesday and from 8:00 p.m. Thursday until 8:00 p.m. Friday. The first delivery was August 9.
- ^c The Port San Juan Subdistrict, excluding the A.F.K. Special Harvest Area and Sanctuary, opened for 60 hours beginning at 8:00 a.m. Sunday, August 15 and then was extended another 48 hours and closed at 8:00 p.m. Thursday, August 19.
- ^d In the Esther Subdistrict, the Noerenberg Hatchery Terminal Harvest Area and Special Harvest Areas of Lake and Quillan Bays were open for 12 hours. Waters within 100 ft. of the hatchery barrier seine were closed.
In the Northern District, open waters included all waters north of 60° 55.6' N. Lat., excluding the waters of Siwash Bay west of a line from a point on the north shore at approximately 60° 58.3' N. Lat., 147° 37.2' W. Long. to a point on the south shore at approximately 60° 57.0' N. Lat., 147° 35.9' W. Long. and excluding the waters of Jonah Bay west of a line from a point on the north shore at approximately 61° 01.1' N. Lat., 147° 35.2' W. Long. to a point on the south shore at approximately 61° 04' N. Lat., 147° 36.0' W. Long.

- Continued -

- e The Cannery Creek Hatchery Special Harvest Area and Sanctuary defined by shoreline markers at 61° 01.0' N. Lat., 147° 31.5' W. Long., westward to a point on the Unakwik District boundary at 61° 01.0' N. Lat., 147° 33.0' W. Long., and southward to a point on the south shore of the old cannery site located at 60° 59.5' N. Lat., 147° 32.0' W. Long. opened for a 6-hour period starting at 8:00 a.m. Wednesday, August 18. Waters within 100 feet of the hatchery barrier seine were closed. This area was then extended for an additional 6 hours.
- f The Port San Juan Subdistrict was extended another 48 hours and was to close at 8:00 p.m. Saturday, August 21. The Port San Juan Subdistrict was extended again for 36 more hours and was to close at 8:00 a.m. Monday, August 23. The A.F.K. Special Harvest Area and Sanctuary opened another 12 hours starting at 8:00 a.m. Sunday, August 22. Effective 12:00 noon, Sunday, August 22, the Port San Juan Subdistrict including the SHA and Sanctuary were opened to continuous fishing until further notice. The A.F.K. Special Harvest Area and Sanctuary opened for 12 hours beginning at 8:00 a.m. Thursday, August 19.
- g Effective 8:00 a.m. Tuesday, August 21, the A.F.K. Special Harvest Area and Sanctuary were opened to fishing until further notice.
- h The A.F.K. Special Harvest Area and Sanctuary closed 8:00 p.m. Tuesday, August 24, to allow for the collection of brood stock.
- i The Northern District officially closed at 8:00 p.m. August 25. In the Esther Subdistrict, purse seines, by regulation, are restricted to the Special Harvest Area and Sanctuary effective August 25.
- j The Southwestern and Unakwik districts officially closed at 8:00 p.m. Friday, September 24.

Appendix E.2. Commercial salmon harvest by species, all gear and districts combined,
Prince William Sound, 1971 - 1993.^a

CATCH BY SPECIES						
Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1971	3,551	88,368	30,551	7,310,964	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	13,909,755
1989	1,113	140,090	203,574	21,860,582	995,962	23,201,321
1990	447	58,497	234,525	44,163,479	959,838	45,416,786
1991	445	507,815	145,311	37,134,311	331,906	38,119,788
1992	1,475	780,932	202,311	8,635,448	328,568	9,948,734
1993	2,148	418,948	48,310	5,461,097	1,186,365	7,116,868
Ten Year Average (1983-92)	936	359,707	96,413	22,539,919	1,155,918	24,152,892

^a Includes purse seine, drift gillnet and set gillnet catches from all P.W.S. fishing districts; Eastern, Northern, Unakwik, Coghill, Northwestern, Eshamy, Southwestern, Montague and Southeastern. Also includes hatchery sales harvests, confiscated fish, donated and discarded fish catch, the surimi study fish, and the educational special use permit catches.

Appendix E.3. Commercial pink salmon harvest for all gear types, by district, Prince William Sound, 1969-1993. Includes purse seine, drift gillnet and set gillnet catches from all Prince William Sound districts; Unakwik catches are included in the Northern District. Does not include hatchery cost recovery, discarded, donated, educational, confiscated and test fish harvests.

Year	DISTRICT								Total
	Eastern	Northern	Coghill	Northwestern	Eshamy	Southwestern	Montague	Southeastern	
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	6,964,549	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	^c	^c	^c	73,177	13,795,415
1990	7,970,364	5,482,585	2,692,788	891,444	534,951	17,811,479	10,658	12,325	35,406,594
1991	2,617,222	4,150,612	2,211,575	0	64,591	17,849,425	0	0	26,893,425
1992	489,228	1,142,061	363,887		543,115	3,039,775			5,578,066
1993		413,308	493,747		130,542	2,475,798			3,513,395
10 year Average (1983-92)	3,783,256	2,510,969	1,571,236	530,143	267,468	9,082,675	248,615	739,017	18,505,131

^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. Aerial escapement indices for pink and chum salmon by district
Prince William Sound, 1993.

PINK SALMON (ODD CYCLE)						
District	Escapement Goal	Odd Cycle Escapement Range		1965-91 Mean Index	Observed Escapement Index ^a	Deviation From Goal
Eastern	422,000	380,000	- 465,000	425,839	314,727	-25.4%
Northern/Unakwik	128,000	115,000	- 141,000	131,060	95,491	-25.4%
Coghill	178,000	160,000	- 196,000	172,186	41,666	-76.6%
Northwestern	83,000	75,000	- 92,000	84,659	45,847	-44.8%
Eshamy	5,700	5,100	- 6,200	6,589	9,348	64.0%
Southwestern	116,000	105,000	- 128,000	121,954	98,573	-15.0%
Montague	162,000	146,000	- 179,000	168,527	144,784	-10.6%
Southeastern	333,000	300,000	- 366,000	347,403	315,093	-5.4%
Total	1,427,700			1,458,217	1,065,529	-25.4%
CHUM SALMON						
District	Escapement Goal	Desired Escapement Range		1965-92 Mean Index	Observed Escapement Index ^a	Deviation From Goal
Eastern	98,100	87,200	- 109,000	92,727	49,904	-49.1%
Northern/Unakwik	33,075	29,400	- 36,750	41,791	19,265	-41.8%
Coghill	33,325	29,600	- 37,050	21,237	7,404	-77.8%
Northwestern	21,350	19,000	- 23,700	13,631	17,692	-17.1%
Eshamy	0	0	- 0	38	0	
Southwestern	3,825	3,400	- 4,250	1,876	1,250	-67.3%
Montague	12,825	11,400	- 14,250	2,671	30	-99.8%
Southeastern	22,500	20,000	- 25,000	15,623	19,173	-14.8%
Total	225,000			189,594	114,718	-58.2%

^a 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 brood stock, Prince William Sound, 1965 - 1993.
Historical data revised in 1989.

Year	PINK SALMON ESCAPEMENTS ^a									Hatchery		Common Property Catch ^b	Total Run ^c
	Eastern	Northern	Coghill	Northwest	Eshamy	Southwest	Montague	Southeastern	Total	Sales	Brood		
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	153,930	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			4,452,805	5,718,365
76	472,080	139,600	57,090	68,150	5,840	52,120	13,790	117,590	925,260			3,018,995	3,945,255
77	390,930	69,980	130,510	80,890	16,450	178,670	152,960	277,780	1,298,170	7,745	16,112	4,514,431	5,844,258
78	279,120	163,010	85,450	132,300	5,430	258,980	56,690	164,030	1,145,010	114,188	40,432	2,780,073	4,079,703
79	642,220	200,730	70,980	124,020	0	231,300	219,400	728,630	2,217,280	223,748	54,207	15,393,223	17,888,458
1980	535,960	189,140	214,930	159,260	13,100	133,470	118,400	307,680	1,671,940	346,728	145,061	13,434,024	15,597,753
81	599,340	243,170	106,450	51,210	3,990	93,630	255,420	359,870	1,713,080	707,037	268,501	19,286,542	21,975,160
82	573,070	332,560	368,380	174,290	15,080	195,950	132,380	482,860	2,274,570	1,354,732	239,945	18,858,647	22,727,894
83	481,950	168,410	310,330	196,630	12,610	161,290	230,200	601,680	2,163,100	686,963	258,062	13,309,461	16,347,586
84	1,209,740	593,310	429,450	452,370	16,860	345,760	191,810	792,560	4,031,860	415,393	341,259	21,683,076	26,471,588
1985	750,530	214,210	296,970	199,190	1,410	181,270	332,240	645,510	2,621,330	1,209,960	640,340	23,959,698	28,431,328
86	356,380	141,420	101,600	81,490	3,840	74,980	44,680	155,830	960,220	905,464	466,471	10,498,052	12,830,207
87	514,570	132,960	147,060	75,390	3,450	112,920	149,260	330,630	1,466,240	2,691,190	1,158,908	26,125,769	31,442,107
88	362,370	143,850	37,070	73,780	490	126,440	67,990	152,540	964,530	1,632,701	824,302	9,650,406	13,071,939
89	359,730	106,530	45,510	68,540	19,470	176,230	181,760	315,000	1,272,770	5,737,911	856,927	13,854,209	23,796,279
1990	443,660	131,580	49,110	115,870	17,870	150,100	113,572	304,090	1,325,852	6,691,160	749,910	35,430,821	46,239,241
91	474,380	165,930	98,580	101,320	18,800	197,095	247,890	533,170	1,837,165	5,201,860	1,324,255	31,178,750	40,295,731
92	204,383	72,915	23,611	42,308	2,709	66,953	47,156	95,070	555,105	2,626,248	802,117	5,578,099	9,984,715
93	314,727	95,491	41,666	45,847	9,348	98,573	144,784	315,093	1,065,529	2,212,403	893,462	3,548,694	7,720,088
EVEN CYCLE AVG. (1966-92)													
AVG.	452,508	197,373	128,087	127,344	8,476	139,314	71,415	233,594	1,358,111	1,760,827	451,187	9,242,667	12,040,831
ODD CYCLE AVG. (1965-93)													
AVG.	418,431	128,689	163,485	82,072	6,773	120,395	166,944	345,249	1,432,038	2,075,424	607,864	11,660,454	14,886,863

^aCoghill and Northwestern escapement figures correspond to current district boundaries.

^bIncludes the common property harvest of both wild and hatchery stocks. Does not include hatchery sales harvests.

^cRepresents 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, 1993.

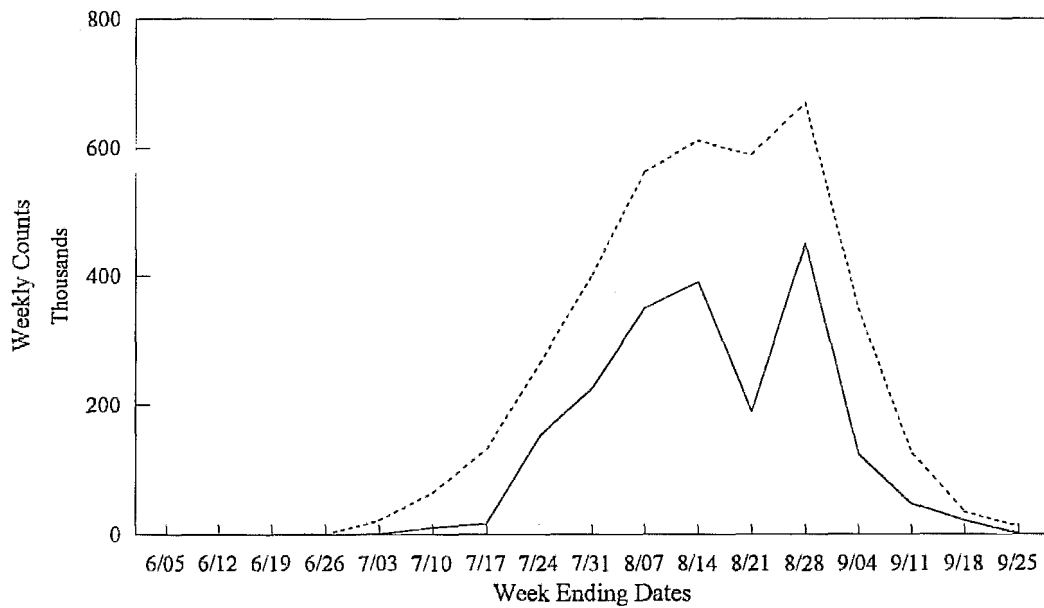
Survey Location		Week Ending Dates ^a																Adjusted	
		6/05	6/12	6/19	6/26	7/03	7/10	7/17	7/24	7/31	8/07	8/14	8/21	8/28	9/04	9/11	9/18	9/25	Total ^b
Orca Inlet	221-10	NS	NS	NS	NS	0	40	875	1,300	3,950	0	2,800	NS	3,250	1,125	NS	30	NS	8,638
Simpson/Sheep	221-20	0	0	0	0	400	3,490	500	13,602	18,060	27,475	33,140	13,200	29,000	18,450	NS	5,275	600	74,691
Port Gravina	221-30	0	0	0	0	25	1,760	3,355	24,325	27,887	51,200	36,300	19,525	44,500	16,050	NS	635	50	98,299
Port Fidalgo	221-40	0	0	0	0	100	1,730	2,689	17,250	14,600	29,960	15,840	3,420	13,900	7,280	NS	1,225	0	49,179
Valdez Arm	221-50	0	0	0	0	205	2,730	3,224	19,117	18,810	36,850	30,443	3,400	18,300	10,900	NS	230	NS	75,965
Port Valdez	221-60	NS	NS	NS	NS	NS	100	200	0	1,550	NS	NS	NS	NS	NS	NS	NS	NS	7,955
Eastern District Total		0	0	0	0	730	9,850	10,843	75,594	84,857	145,485	118,523	39,545	108,950	53,805	NS	7,395	650	314,727
Columbia/Long	222-10	0	0	0	0	0	100	247	1,662	9,424	8,450	10,110	0	17,000	10,600	NS	170	NS	29,214
Wells/Unakwik	222-20	0	0	0	0	0	500	3,875	7,750	12,860	16,172	16,025	15,225	15,850	10,050	NS	5,655	140	56,416
Eaglek	222-30	NS	NS	NS	NS	NS	0	3	75	500	1,445	1,000	4,000	NS	6,800	NS	560	5	9,861
Northern District Total		0	0	0	0	0	600	4,125	9,487	22,784	26,067	27,135	19,225	32,850	27,450	NS	6,385	145	95,491
Unakwik District (229) Total		NS	NS	NS	NS	0	0	0	NS	0	0	0	0	NS	100	NS	50	NS	111
W. Port Wells	223-10	NS	NS	NS	NS	NS	2	0	125	700	16,175	10,325	NS	2,200	1,925	NS	1,130	20	26,744
Esther Passage	223-20	NS	NS	NS	NS	NS	0	0	0	62	200	NS	NS	150	600	NS	NS	NS	709
E. Port Wells	223-30	NS	NS	NS	NS	NS	0	150	75	200	0	12,000	NS	NS	50	NS	NS	NS	14,213
Coghill District Total		NS	NS	NS	NS	NS	2	150	200	900	16,237	22,525	0	2,350	2,575	NS	1,130	20	41,666
Passage/Cochrane	224-10	NS	NS	NS	NS	NS	0	0	350	500	7,040	4,025	NS	NS	4,150	NS	601	75	17,909
Culross Pass	224-30	NS	NS	NS	NS	NS	0	50	0	50	1,600	2,300	NS	NS	1,730	NS	30	NS	5,391
Nellie Juan	224-40	NS	NS	NS	NS	NS	0	0	400	5,050	8,675	4,960	NS	11,925	2,900	NS	65	NS	22,547
Northwestern District Total		NS	NS	NS	NS	NS	0	50	750	5,600	17,315	11,285	NS	11,925	8,780	NS	696	75	45,847
Crafton/Eshamy	225-30	NS	NS	NS	NS	NS	0	0	80	0	150	505	5,000	4,450	3,650	NS	350	45	9,348
Eshamy District Total		NS	NS	NS	NS	NS	0	0	80	0	150	505	5,000	4,450	3,650	NS	350	45	9,348
Chenega	226-20	NS	NS	NS	NS	NS	0	400	2,010	10,805	13,650	22,750	34,700	34,550	13,140	NS	641	20	60,986
W. Knight Island	226-30	NS	NS	NS	NS	NS	0	0	0	2,000	1,300	3,250	4,300	3,500	4,500	NS	250	0	9,454
Bainbridge/Latouche	226-40	NS	NS	NS	NS	NS	15	0	0	285	905	4,142	4,840	8,530	7,250	NS	1,315	0	14,733
Port Bainbridge	226-50	NS	NS	NS	NS	NS	0	0	600	6,000	3,900	6,200	7,300	5,700	2,000	NS	350	90	13,400
Southwestern District Total		NS	NS	NS	NS	NS	15	400	2,610	19,090	19,755	36,342	51,140	52,280	26,890	NS	2,556	110	98,573
S. Montague	227-10	NS	NS	NS	NS	NS	NS	NS	3,050	12,345	11,860	38,412	52,050	51,000	NS	10,660	1,403	120	92,546
N. Montague	227-20	NS	NS	NS	NS	NS	0	0	120	685	4,585	10,344	22,000	44,000	400	7,755	196	NS	52,238
Montague District Total		NS	NS	NS	NS	NS	0	0	3,170	13,030	16,445	48,756	74,050	95,000	400	18,415	1,599	120	144,784
S. Hawkins	228-10	NS	NS	NS	NS	NS	NS	0	2,200	2,400	1,500	200	NS	1,400	NS	300	0	NS	3,963
Hawkins Cutoff	228-20	NS	NS	NS	NS	NS	100	525	3,800	NS	13,800	19,900	NS	17,700	NS	755	20	NS	43,453
N. Hawkins	228-30	NS	NS	NS	NS	NS	NS	410	3,125	7,420	9,200	7,800	NS	19,400	NS	3,500	0	NS	39,100
Double Bay	228-40	NS	NS	NS	NS	NS	NS	0	960	6,600	12,800	16,500	NS	18,800	NS	3,400	10	NS	34,280
Johnstone	228-50	NS	NS	NS	NS	NS	NS	500	8,300	12,200	11,600	13,100	NS	21,000	NS	5,200	220	NS	39,049
Port Etches	228-60	NS	NS	NS	NS	NS	NS	200	41,200	50,800	59,202	68,395	NS	64,125	NS	15,525	1,257	50	155,248
Southeastern District Total		NS	NS	NS	NS	NS	100	1,635	59,585	79,420	108,102	125,895	NS	142,425	NS	28,680	1,507	50	315,093
TOTAL OF 9 DISTRICTS		0	0	0	0	730	10,567	17,203	151,476	225,681	349,556	390,966	188,960	450,230	123,650	47,095	21,668	1,215	1,065,640

^a There are a total of 209 streams included in the systematic aerial survey program. The survey program commences in the Eastern District where the earliest escapements in the Sound occur. Weather and conditions permitting, each stream is flown weekly. Failure to fly a survey due to run timing or bad survey conditions is denoted by NS (no survey). A notation of NC (no count) occurs when a stream is flown but no count is possible because of survey conditions (i.e. water clarity). During the peak of the pink salmon run many streams are flown twice weekly to provide fisheries managers with more timely escapement data. In cases where more than one survey per week was flown the weekly observation shown in this table is the average of the two counts if observing conditions during both surveys were good or, the maximum of the two counts if conditions during the minimum count were poor.

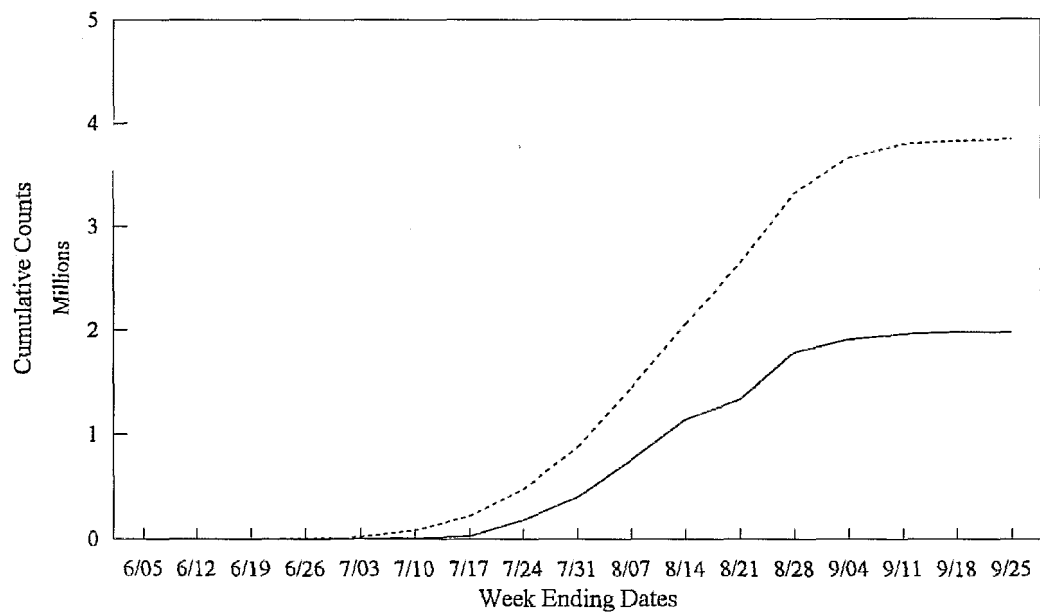
^b The adjusted total is an escapement estimate based a geometric method used since the inception of the systematic survey program in the early 1960's. In this method, aerial observers are assumed to count without error or bias. Linear interpolations between observations are used to estimate numbers of fish in the stream on days when no surveys are flown. All daily observations and interpolations are summed across the season. Because fish seen on day $i+1$ may include fish seen on day i , the sum of all daily observations and interpolations must be divided by some residence time for fish in the streams to account for duplicate observations. The residence time of 17.5 days which has historically been used in this calculation is from tagging data completed by National Marine Fisheries Service on Olseu Creek pink salmon in the early 1960's. Since observer bias and stream life are stream specific, adjusted totals in this table may be used for interannual comparisons but should not be interpreted as the true escapement.

PWS PINK STREAM COUNTS - ALL DISTRICTS

CURRENT YEAR VS. HISTORICAL AVERAGE



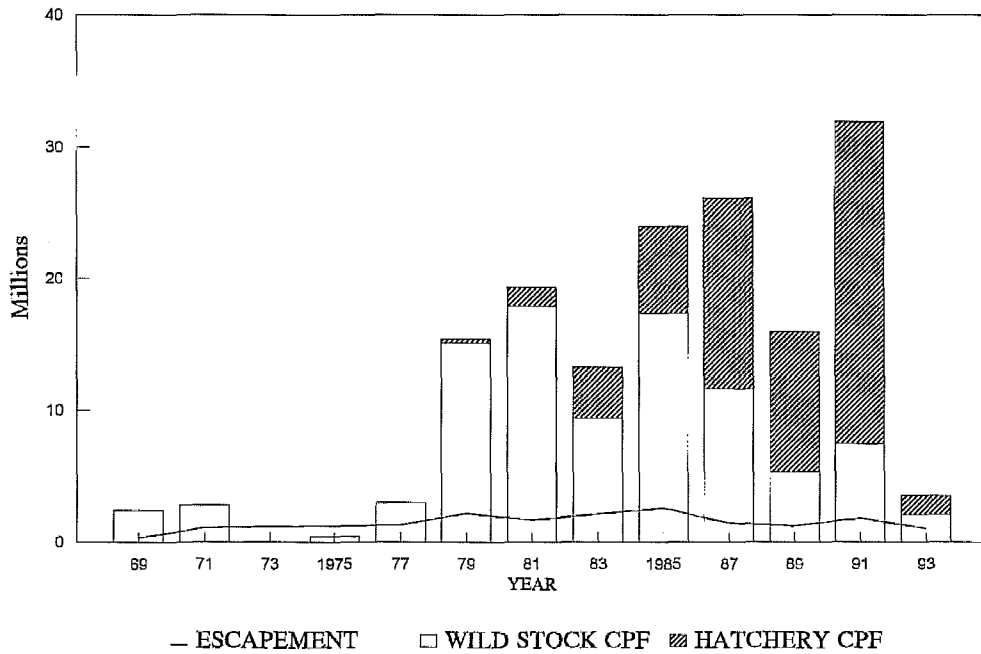
CUMULATIVE



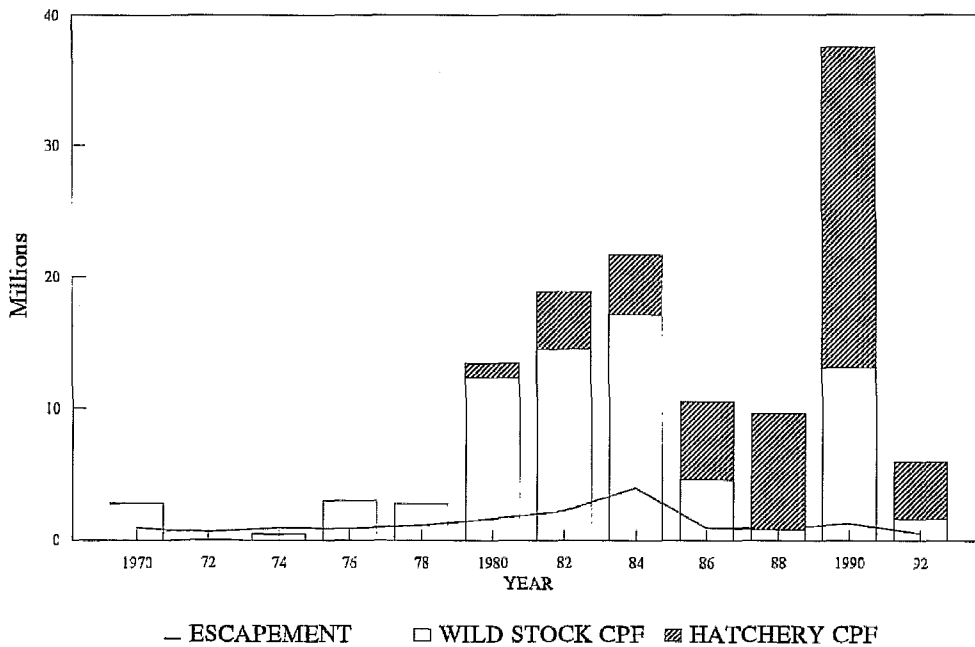
— Current Year --- Historical Average

Appendix E.7. Current year and historical weekly pink salmon escapement performance from index spawning streams, Prince William Sound, 1993.

PINK SALMON ODD YEAR CATCH AND ESCAPEMENT PRINCE WILLIAM SOUND



PINK SALMON EVEN YEAR CATCH AND ESCAPEMENT PRINCE WILLIAM SOUND



Appendix E.8. Pink salmon catch and escapement, odd years (1969-1993) and even years (1970-1992), Prince William Sound.

Appendix E.9. Chum salmon harvests and escapement indices, including hatchery sales harvests and brood stock, Prince William Sound, 1965 - 1993.

Year	CHUM SALMON ESCAPEMENTS ^a									Hatchery		Common Property Catch ^b	Total Run ^c
	Eastern	Northern	Coghill	Northwestern	Eshamy	Southwestern	Montague	Southeastern	Total	Sales	Brood		
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	24,370	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
1990	115,100	112,480	26,020	37,020	0	80	1,050	7,275	299,025	24,554	107,284	935,284	1,366,147
91	86,360	19,080	6,070	8,960	0	2,800	925	9,203	133,398	13,471	114,814	318,435	580,118
92	48,804	12,903	10,003	11,072	300	2,940	783	3,881	90,686	57,392	183,940	271,176	603,194
93	49,904	19,265	7,404	17,692	0	1,250	30	19,173	114,718	475,143	140,330	711,222	1,441,413
1965-92 AVG	92,727	41,791	21,237	13,631	38	1,876	2,671	15,623	189,593	23,057	68,193	709,235	936,323

^aCoghill and Northwestern escapement figures correspond to current district boundaries.

^bIncludes the common property harvest of both wild and hatchery stocks. Does not include hatchery sales harvests.

^cRepresents 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, 1993.

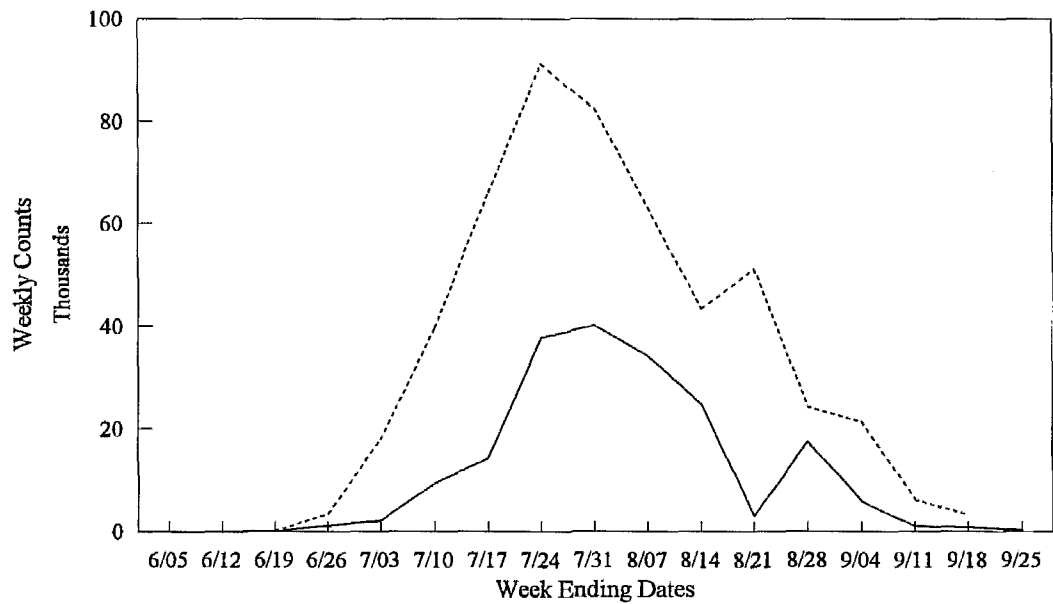
Survey Location		Week Ending Dates ^a																	Adjusted Total ^b
		6/05	6/12	6/19	6/26	7/03	7/10	7/17	7/24	7/31	8/07	8/14	8/21	8/28	9/04	9/11	9/18	9/25	
Orea Inlet	221-10	NS	NS	NS	NS	0	0	0	0	800	0	0	NS	150	50	NS	0	NS	984
Simpson/Sheep	221-20	0	0	0	400	50	1,720	580	1,075	2,200	875	1,800	1,000	3,000	500	NS	0	0	7,066
Port Gravina	221-30	0	0	52	730	825	4,100	5,500	5,950	4,600	4,350	3,000	200	1,000	400	NS	10	0	13,137
Port Fidalgo	221-40	0	0	0	10	80	180	442	2,200	3,475	1,300	1,100	900	2,100	400	NS	650	225	6,651
Valdez Arm	221-50	0	0	8	50	885	970	2,835	6,225	5,600	6,325	2,798	0	1,300	0	NS	130	NS	17,089
Port Valdez	221-60	NS	NS	NS	NS	NS	370	0	210	500	NS	NS	NS	NS	NS	NS	NS	NS	4,977
Eastern District Total		0	0	60	1,190	1,840	7,340	9,357	15,660	17,175	12,850	8,698	2,100	7,550	1,350	NS	790	225	49,904
Columbia/Long	222-10	0	0	0	0	133	660	875	5,050	2,550	2,950	2,800	0	400	500	NS	0	NS	7,050
Wells/Unakwik	222-20	0	0	15	20	210	1,500	1,500	6,850	2,755	3,349	2,700	725	500	1,600	NS	0	0	11,137
Eaglek	222-30	NS	NS	NS	NS	NS	0	0	0	75	287	0	100	NS	900	NS	0	0	1,078
Northern District Total		0	0	15	20	343	2,160	2,375	11,900	5,380	6,586	5,500	825	900	3,000	NS	0	0	19,265
Unakwik District (229) Total		NS	NS	NS	NS	NS	0	0	NS	0	0	0	0	NS	0	NS	0	NS	0
W. Port Wells	223-10	NS	NS	NS	NS	NS	0	16	800	310	1,225	2,750	NS	0	1,300	NS	45	100	4,747
Esther Passage	223-20	NS	NS	NS	NS	NS	0	0	0	0	0	0	NS	0	0	NS	0	NS	0
E. Port Wells	223-30	NS	NS	NS	NS	NS	0	0	0	500	0	2,500	NS	NS	0	NS	NS	NS	2,657
Coghill District Total		NS	NS	NS	NS	NS	0	16	800	810	1,225	5,250	0	0	1,300	NS	45	100	7,404
Passage/Cochrane	224-10	NS	NS	NS	NS	NS	0	30	2,250	0	9,247	2,450	NS	NS	200	NS	0	0	10,242
Culross Pass	224-30	NS	NS	NS	NS	NS	0	0	0	0	0	0	NS	NS	0	NS	0	NS	0
Nellis Juan	224-40	NS	NS	NS	NS	NS	0	150	1,330	7,300	2,325	0	NS	0	0	NS	0	NS	7,450
Northwestern District Total		NS	NS	NS	NS	NS	0	180	3,580	7,300	11,572	2,450	NS	0	200	NS	0	0	17,692
Crafton/Eshamy	225-30	NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	NS	0	0	0
Eshamy District Total		NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	NS	0	0	0
Chenega	226-20	NS	NS	NS	NS	NS	0	0	0	1,000	100	50	100	0	0	NS	0	0	1,250
W. Knight Island	226-30	NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	NS	0	0	0
Bainbridge/Latouche	226-40	NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	NS	0	0	0
Port Bainbridge	226-50	NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	NS	0	0	0
Southwestern District Total		NS	NS	NS	NS	NS	0	0	0	1,000	100	50	100	0	0	NS	0	0	1,250
S. Montague	227-10	NS	NS	NS	NS	NS	NS	NS	0	0	0	0	0	0	NS	0	0	20	20
N. Montague	227-20	NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	0	10	NS	10
Montague District Total		NS	NS	NS	NS	NS	0	0	0	0	0	0	0	0	0	0	10	20	30
S. Hawkins	228-10	NS	NS	NS	NS	NS	NS	0	0	0	0	0	NS	0	NS	0	0	NS	0
Hawkins Cutoff	228-20	NS	NS	NS	NS	NS	0	0	0	NS	0	0	NS	0	NS	0	0	NS	0
N. Hawkins	228-30	NS	NS	NS	NS	NS	NS	20	0	0	0	0	NS	0	NS	0	0	NS	20
Double Bay	228-40	NS	NS	NS	NS	NS	NS	6	0	2,500	0	0	NS	0	NS	0	0	NS	2,500
Johnstone	228-50	NS	NS	NS	NS	NS	NS	35	950	1,500	0	0	NS	0	NS	0	0	NS	1,550
Port Etches	228-60	NS	NS	NS	NS	NS	NS	2,300	5,000	4,500	2,000	3,000	NS	9,100	NS	1,100	0	0	15,103
Southeastern District Total		NS	NS	NS	NS	NS	0	2,361	5,950	8,500	2,000	3,000	NS	9,100	0	1,100	0	0	19,173
TOTAL OF 9 DISTRICTS		0	0	75	1,210	2,183	9,500	14,289	37,890	40,165	34,333	24,948	3,025	17,550	5,850	1,100	845	345	114,718

^a There are a total of 209 streams included in the systematic aerial survey program. The survey program commences in the Eastern District where the earliest escapements in the Sound occur. Weather and conditions permitting, each stream is flown weekly. Failure to fly a survey due to run timing or bad survey conditions is denoted by NS (no survey). A notation of NC (no count) occurs when a stream is flown but no count is possible because of survey conditions (ie. water clarity). During the peak of the pink salmon run many streams are flown twice weekly to provide fisheries managers with more timely escapement data. In cases where more than one survey per week was flown the weekly observation shown in this table is the average of the two counts if observing conditions during both surveys were good or, the maximum of the two counts if conditions during the minimum count were poor.

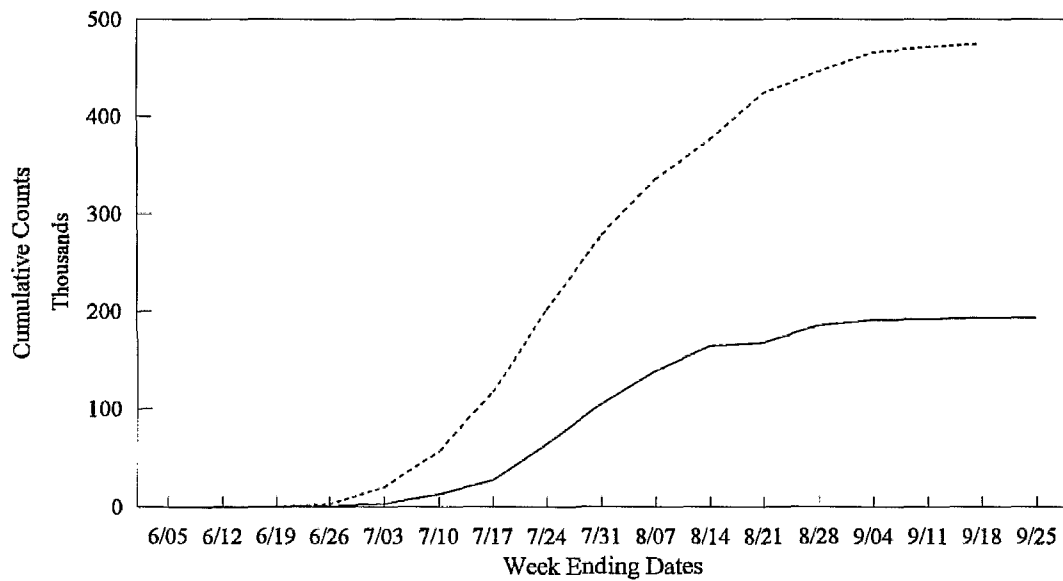
^b The adjusted total is an escapement estimate based a geometric method used since the inception of the systematic survey program in the early 1960's. In this method, aerial observers are assumed to count without error or bias. Linear interpolations between observations are used to estimate numbers of fish in the stream on days when no surveys are flown. All daily observations and interpolations are summed across the season. Because fish seen on day $i+1$ may include fish seen on day i , the sum of all daily observations and interpolations must be divided by some residence time for fish in the streams to account for duplicate observations. The residence time of 17.5 days which has historically been used in this calculation is from tagging data completed by National Marine Fisheries Service on Olsen Creek pink salmon in the early 1960's. Since observer bias does occur and since both observer bias and stream life are stream specific, adjusted totals in this table may be used for interannual comparisons but should not be interpreted as the true escapement.

PWS CHUM STREAM COUNTS - ALL DISTRICTS

CURRENT YEAR VS. HISTORICAL AVERAGE



CUMULATIVE

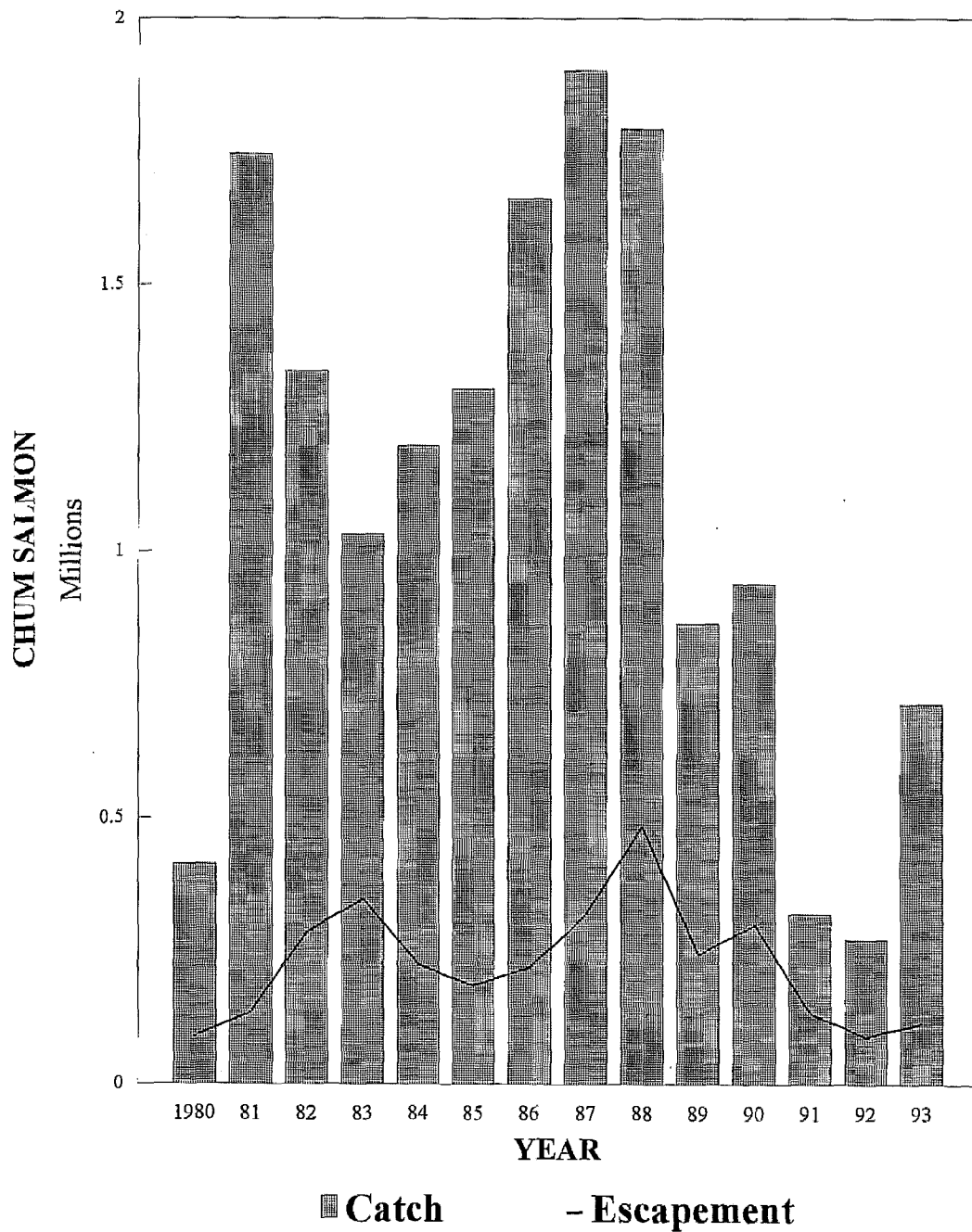


— Current Year --- 1980-92 Average

Appendix E.11. Current year and historical weekly chum salmon escapement performance from index spawning streams, Prince William Sound, 1993.

CHUM SALMON CATCH AND ESCAPEMENT

PRINCE WILLIAM SOUND



Appendix E.12. Chum salmon catch and escapement, Prince William Sound, 1980-1993.

Appendix E.13. Sockeye salmon escapement counts from selected systems, Prince William Sound, 1993.^a

Stream Name	Stream Number	Weekly Count (week ending dates)												
		7/03	7/10	7/17	7/24	7/31	8/07	8/14	8/21	8/28	9/04	9/11	9/18	9/25
Robe River	138	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Billy's Hole	218	250	0	400	700	2,600	210	1,340	100	50	3	NS	0	NS
Cowpen Lake	242	NS	0	25	0	0	0	100	50	NS	0	NS	0	NS
Miners Lake	244	NS	75	1,800	NS	2,300	4,600	2,300	175	NS	400	NS	30	NS
Red Lake	300	NS	0	0	0	0	30	0	0	0	0	NS	0	NS
Golden Lagoon ^b	310	NS	0	0	0	0	0	0	0	NS	0	NS	0	NS
Halferty Creek	454	NS	0	0	0	0	125	0	0	0	50	NS	6	0
Cochrane Creek	461	NS	0	0	0	0	4	0	20	20	20	NS	10	NS
Shrode Lake	476	NS	95	550	50	1,375	775	0	800	NS	220	NS	140	NS
Culross Creek	479	NS	0	0	0	0	0	0	0	NS	0	NS	0	NS
Jackpot Lakes	608	NS	680	2,120	1,200	720	600	2,000	3,500	745	800	NS	70	NS
Bainbridge	630	NS	120	25	800	300	200	1,500	600	NS	200	NS	25	5
Point Creek	702	NS	0	0	0	0	0	0	0	0	NS	0	0	NS
Cabin Creek	747	NS			0	0	0	10	0	1	NS	0	10	NS
Total		250	970	4,920	2,750	7,295	6,544	7,250	5,245	816	1,693	0	291	5

^aCounts 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.

^bBelieved to be returns from hatchery sockeye released into Davis Lake.

Appendix E.14 Estimated age and sex composition of Prince William Sound commercial chum salmon catches by district, 1993.

		Brood Year and Age Group				
		1990	1989	1988	1987	Total
		0.2	0.3	0.4	0.5	
Coghill District						
Strata Combined: 06/07 - 09/19						
Sampling dates: 06/08 - 07/12						
Sample size: 1,938						
Female	Percent of sample	0.0	28.4	29.6	0.1	58.2
	Number in catch	311	180,690	188,190	429	369,619
Male	Percent of sample	0.2	19.8	21.7	0.2	41.8
	Number in catch	1,064	125,556	137,597	1,083	265,300
Total	Percent of sample	0.2	48.2	51.3	0.2	100.0
	Number in catch	1,375	306,246	326,061	1,512	635,194
	Standard error	1,109	7,021	6,968	675	
Eshamy District						
Strata Combined: 06/17 - 09/20						
Sampling dates: 06/21 - 07/05						
Sample size: 899						
Female	Percent of sample	0.0	62.5	17.8	0.1	80.4
	Number in catch	0	29,646	8,424	50	38,120
Male	Percent of sample	0.0	14.3	5.1	0.3	19.6
	Number in catch	0	6,769	2,399	126	9,294
Total	Percent of sample	0.0	76.8	22.8	0.4	100.0
	Number in catch	0	36,415	10,824	176	47,414
	Standard error	0	697	693	101	
Southwestern District						
Stratum dates: 08/05 - 08/31						
Sampling dates: 08/20						
Sample size: 29						
Female	Percent of sample	3.4	69.0	17.2	0.0	89.7
	Number in catch	124	2,477	619	0	3,220
Male	Percent of sample	0.0	10.3	0.0	0.0	10.3
	Number in catch	0	372	0	0	372
Total	Percent of sample	3.4	79.3	17.2	0.0	100.0
	Number in catch	124	2,849	619	0	3,592
	Standard error	124	275	256	0	
All Districts Combined						
Strata Combined: 06/06 - 08/21						
Sampling dates: 06/08 - 08/20						
Sample size: 2,866						
Female	Percent of sample	0.1	31.0	28.7	0.1	59.9
	Number in catch	435	212,813	197,233	479	410,960
Male	Percent of sample	0.2	19.3	20.4	0.2	40.1
	Number in catch	1,064	132,696	139,996	1,209	274,966
Total	Percent of sample	0.2	50.4	49.2	0.2	100.0
	Number in catch	1,499	345,510	337,504	1,688	686,200
	Standard error	1,315	7,060	6,974	675	

Appendix E.15. Summary of periods, dates, hours open, and emergency orders issued by district, for the commercial purse seine salmon fishery, Prince William Sound, 1993. The Eastern, Northwestern, Montague, and Southeastern districts were closed the entire season. See Appendix C.12. for Unakwik District openings.

Northern (222)		Coghill (223)		Southwestern (226)		Emergency Orders Issued
Dates	Hours Open	Dates	Hours Open	Dates	Hours Open	
		08/05 - 08/06	24 ^a	08/05 - 08/06	24 ^a	2-F-E-57-93
		08/08 - 08/10	48	08/08 - 08/10	48	2-F-E-58-93
				08/13 - 08/14	24	2-F-E-62-93
				08/15 - 08/19	112 ^e	2-F-E-63-93
08/18 - 08/19	24 ^{b,c}	08/18 - 08/19	24 ^d			2-F-E-64-93
08/20 - 08/25	132 ^{b,f}	08/20 - 08/24	108	08/20 - 08/28	216 ^{h,i,j}	2-F-E-66-93
						2-F-E-70-93
						2-F-E-71-93
						2-F-E-74-93
						2-F-E-76-93
						2-F-E-77-93
		09/02 - 09/04	64 ^g	08/29 - 09/04	168	2-F-E-78-93
						2-F-E-83-93
						2-F-E-84-93
						2-F-E-85-93
				09/05 - 09/11	168 ^k	2-F-E-90-93

- ^a Waters of the Noerenberg Special Harvest Area and Sanctuary were not open. The Esther Subdistrict boundary in Esther Passage was the normal subdistrict boundary at 60° 49.33' N. Lat. Only the Port San Juan Subdistrict, excluding the A.F.K. Special Harvest Area, was open to fishing.
- ^b Open waters include all waters of the Northern District north of 60° 55.6' N. Lat., excluding the waters of Siwash Bay west of a line from a point on the north shore at approximately 60° 58.3' N. Lat., 147° 37.2' W. Long. to a point on the south shore at approximately 60° 57.0' N. Lat., 147° 35.9' W. Long. and excluding the waters of Jonah Bay west of a line from a point on the north shore at approximately 61° 01.1' N. Lat., 147° 35.2' W. Long. to a point on the south shore at approximately 61° 0.4' N. Lat., 147° 36.0' W. Long.
- ^c The Cannery Creek Hatchery Special Harvest Area and Sanctuary defined by shoreline markers at 61° 01.0' N. Lat., 147° 31.5' W. Long., westward to a point on the Unakwik District boundary at 61° 01.0' N. Lat., 147° 33.0' W. Long., and southward to a point on shore south of the old cannery site located at 60° 59.5' N. Lat., 147° 32.0' W. Long. opened for a 6-hour period starting at 8:00 a.m. Wednesday, August 18. Waters within 100 feet of the hatchery barrier seine were closed. This area was then extended for an additional 6 hours.
- ^d The Noerenberg Hatchery Terminal Harvest Area and Special Harvest Areas of Lake and Quillian Bays opened for 12 hours. Waters within 100 ft. of the hatchery barrier seine were closed.
- ^e The Port San Juan Subdistrict excluding the A.F.K. Special Harvest Area and Sanctuary, opened for 60 hours starting 8:00 a.m. Sunday, August 15 and then was extended another 48 hours and closed at 8:00 p.m. Thursday, August 19. The A.F.K. Special Harvest Area and Sanctuary opened for 12 hours starting 8:00 a.m. Thursday, August 19.
- ^f The Northern District closed 8:00 p.m., August 25.
- ^g By regulation purse seines may only operate in the Special Harvest Area and Sanctuary effective August 25.
- ^h The Port San Juan Subdistrict was extended another 48 hours and was to close at 8:00 p.m. Saturday, August 21. The Port San Juan Subdistrict was extended again for 36 more hours and was to close at 8:00 a.m. Monday, August 23. The A.F.K. Special Harvest Area and Sanctuary opened another 12 hours starting at 8:00 a.m. Sunday, August 22. Effective 12:00 noon, Sunday, August 22, the Port San Juan Subdistrict including the SHA and Sanctuary were opened to continuous fishing until further notice.
- ⁱ Effective 8:00 a.m. Tuesday, August 21 the A.F.K. Special Harvest Area and Sanctuary were opened to fishing until further notice.
- ^j The A.F.K. Special Harvest Area and Sanctuary closed 8:00 p.m. Tuesday, August 24 to allow for the collection of brood stock.
- ^k The season officially closed at 8:00 p.m. Friday, September 24

APPENDIX F

HATCHERY RETURNS

Appendix F.1. Daily salmon sales harvests and sex ratios at the Wally Noerenberg Hatchery, 1993. Brood stock and sex ratio data provided by the Prince William Sound Aquaculture Corporation.

HATCHERY SALES HARVESTS IN NUMBERS OF FISH						Pink Salmon % Female
Date	Pinks	Chinook	Chum	Coho	Sockeye	
05/29	0	36	4,348	0	0	
06/01	0	53	1,829	0	0	
06/02	0	20	1,272	0	0	
06/03	0	68	4,943	0	0	
06/04	0	44	4,544	0	0	
06/05	0	76	3,382	0	0	
06/07	0	128	5,983	0	0	
06/08	0	18	854	0	0	
06/09	0	45	5,424	0	0	
06/10	0	162	15,365	0	0	
06/13	0	101	910	0	0	
06/15	0	107	3,036	0	0	
06/16	0	72	3,143	0	0	
06/17	0	121	5,142	0	0	
06/18	0	0	4,255	0	0	
06/20	0	120	8,386	0	0	
06/21	0	33	12,108	0	0	
06/22	0	111	11,252	0	0	
06/23	0	26	11,234	0	0	
06/24	0	16	15,913	0	0	
06/25	6	0	4,869	0	0	
06/26	0	55	4,760	0	0	
06/27	0	0	18,174	0	0	
06/28	0	0	6,758	0	0	
06/29	10	0	7,275	0	0	
06/30	0	0	5,724	0	16	
07/01	0	0	17,887	0	0	
07/02	0	0	5,331	0	0	
07/03	0	0	15,078	0	0	
07/04	0	0	12,660	0	0	
07/05	15	0	17,529	0	0	
07/06	0	0	15,792	0	0	
07/07	0	0	11,436	0	0	
07/08	0	0	5,802	0	0	
07/09	0	0	18,201	0	0	
07/11	0	0	16,167	0	0	
07/12	0	0	5,539	0	0	
07/13	0	0	5,552	0	0	
07/14	69	0	13,274	0	0	
07/15	232	20	11,533	0	0	
07/16	10	0	1,779	0	0	
07/18	72	0	7,756	0	0	
07/20	457	0	15,042	0	0	
07/21	0	0	13,719	0	0	
07/22	374	0	3,525	0	79	
07/23	765	0	7,917	0	159	
07/24	698	0	25,941	0	0	

-continued-

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HATCHERY SALES HARVESTS IN NUMBERS OF FISH						Pink Salmon %
Date	Pinks	Chinook	Chum	Coho	Sockeye	Female
07/26	1,542	0	9,893	0	206	24.2%
07/28	4,120	0	2,764	0	61	16.1%
07/29	2,529	0	15,266	0	160	17.3%
07/30	5,085	0	5,437	0	169	12.9%
08/01	5,968	0	6,528	0	206	12.5%
08/03	7,866	0	1,706	0	247	15.4%
08/04	2,946	0	155	0	24	20.4%
08/05	13,649	0	1,961	0	188	13.2%
08/08	14,634	0	1,249	0	309	23.1%
08/09	2,819	0	222	0	54	22.6%
08/10	0	0	0	0	0	23.2%
08/13	0	0	0	0	0	28.7%
08/15	0	0	0	0	0	36.9%
08/17	0	0	0	0	0	32.7%
08/19	0	0	0	0	0	41.5%
08/20	58,135	0	0	0	0	46.5%
08/21	62,063	0	0	0	0	41.4%
08/22	77,132	0	0	0	0	51.4%
08/25	0	0	0	0	0	55.5%
08/27	15,415	0	0	193	0	66.6%
08/29	0	0	0	0	0	66.7%
08/31	0	0	0	500	25	76.0%
09/01	0	0	0	209	0	
09/03	0	0	0	630	0	
Totals	276,611	1,432	463,524	1,532	1,903	
Pounds						
Sold	738,637	21,317	2,611,752	7,897	9,964	
	Pink	Chinook	Chum	Coho	Sockeye	
Average Weights:	2.67	14.89	5.63	5.15	5.24	
Average Price/Lb:	\$0.190	\$1.220	\$0.640	\$0.730	\$0.870	

BROOD STOCK SUMMARY:

	PINK	CHINOOK	EARLY CHUM
Fish spawned at hatchery	198,702	378	85,762
Green/bad/excessed	129,606	195	14,484
Eggtake mortality	9,250	0	3,154
Total available brood stock	337,558	573	103,400
Fish estimated remaining in brood pond	1,000	5	1,500
Fish estimated remaining in bay	500	0	0
Estimated unseen mortality	42,800	20	6,029
Mortalities prior to eggtake	0	328	0
Estimated creek spawners	0	0	0
Estimated total return to hatchery (not sold)	381,858	598	110,929
			0

Appendix F.2. Daily salmon sales harvests and sex ratios
at the Armin F. Koernig Hatchery, 1993.
Brood stock and sex ratio data provided
by the Prince William Sound Aquaculture
Corporation.

HATCHERY HARVESTS IN NUMBERS OF FISH			Pink Salmon %
Date	Pinks	Sockeye	Female
07/28	1,523	0	16.0%
07/29	22,336	405	8.5%
07/30	13,652	190	12.0%
07/31	13,475	97	9.8%
08/01	10,672	131	15.6%
08/02	4,659	105	13.0%
08/03	20,562	338	18.6%
08/04	5,700	103	20.0%
08/05	6,178	42	14.1%
08/06	14,395	86	12.6%
08/07	4,811	38	21.2%
08/08	33,827	63	25.3%
08/09	13,411	0	27.4%
08/10	5,421	0	27.1%
08/11	5,322	0	31.0%
08/12	18,753	98	32.0%
08/13	18,618	0	33.6%
08/14	0	0	34.3%
08/15	0	0	34.3%
08/16	13,231	0	41.0%
08/17	0	0	47.2%
08/18	0	0	47.8%
08/19	0	0	53.4%
08/20	0	0	53.4%
08/21	67,628	0	54.7%
08/22	63,384	0	
08/23	0	0	
08/24	0	0	55.7%
08/25	0	0	
08/26	0	0	61.8%
08/27	0	0	
08/28	0	0	65.1%
Totals	357,558	1,696	
Pounds Sold	936,976	8,546	
Average Weight:	2.62 lbs.	5.04 lbs.	
Average Price/Lb.:	\$0.160	\$0.350	

PINK BROOD STOCK SUMMARY:

Spawned at hatchery	142,555
Excessed	54,727
Green/overripe	12,217
Fishway/system mortality	1,758
Total available brood stock	211,257
Estimated diversion channel mortality	35,000
Estimated unseen mortality	15,000
Fish estimated remaining in bay	500
Fish estimated remaining behind barrier seine	2,000
Estimated total return to hatchery (not sold)	263,757

Appendix F.3. Daily pink salmon sales harvests and sex ratios at the Solomon Gulch Hatchery, 1993. Sex ratios and brood stock data provided by Valdez Fisheries Development Association, Inc.

Date	FISH SALES						
	Pinks		% Female	Coho		Chum	
	Daily	Cumulative		Daily	Cumulative	Daily	Cumulative
06/20	126	126		0	0	10	10
06/21	0	126		0	0	0	10
06/22	2,251	2,377	12.0%	0	0	220	230
06/23	1,581	3,958	10.5%	0	0	177	407
06/24	0		14.6%	0	0	0	0
06/25	7,416	11,374	17.9%	0	0	685	1,092
06/26	24,870	36,244	17.2%	0	0	1,197	2,289
06/27	46,209	82,453	19.8%	0	0	1,026	3,315
06/28	31,047	113,500	20.2%	0	0	566	3,881
06/29	57,509	171,009	23.3%	0	0	153	4,034
06/30	45,790	216,799	26.0%	0	0	1,407	5,441
07/01	130,698	347,497	23.5%	0	0	732	6,173
07/02	51,359	398,856	32.0%	0	0	512	6,685
07/03	0	0		0	0	0	0
07/04	80,352	479,208	33.0%	0	0	1,001	7,686
07/05	40,242	519,450		0	0	1,074	8,760
07/06	90,599	610,049		0	0	42	8,802
07/07	0	0	44.4%	0	0	0	0
07/08	0	0	31.7%	0	0	0	0
07/09	268,739	878,788		0	0	4	8,806
07/10	117,890	996,678	36.0%	0	0	39	8,845
07/11	0	0	45.7%	0	0	0	0
07/12	132,589	1,129,267	48.0%	0	0	37	8,882
07/13	62,801	1,192,068	47.1%	0	0	47	8,929
07/14	15,465	1,207,533	49.2%	0	0	34	8,963
07/15	61,830	1,269,363	53.0%	0	0	84	9,047
07/16	37,724	1,307,087	53.3%	0	0	54	9,101
07/17	19,376	1,326,463	54.6%	0	0	0	9,101
09/14	0	0		532	532	0	9,101
09/16	0	0		771	1,303	0	9,101
09/17a	0	0		424	1,727	0	9,101
Totals	1,326,463			1,727		9,101	
Total Pounds	3,904,670			12,418		61,150	

a VFDA sold 4,591.65 lbs. of pink salmon roe, 23.75 lbs. of chum salmon roe, and 152.25 lbs of coho salmon roe.

PINK BROOD STOCK SUMMARY:

Spawned at hatchery	202,343
Green/overripe	32,330
System mortalities/excessed	127,117
Total available brood stock	361,790
Estimated creek spawners	30,044
Fish estimated remaining above weir	4,546
Estimated total return to hatchery	396,380

CHUM BROOD STOCK SUMMARY:

Spawned at hatchery	4,111
Green/overripe	1,237
System mortalities/excessed	3,685
Total available brood stock	9,033
Estimated creek/bay spawners	1,149
Estimated total return to hatchery	10,182

COHO BROOD STOCK SUMMARY:

Spawned at hatchery	687
Green/overripe	123
System mortalities/excessed	879
Total available brood stock	1,689
Estimated creek/bay spawners	84
Estimated total return to hatchery	1,773

Average Pink Weight: 2.94 pounds
Average Coho Weight: 7.19 pounds

Average price/pound for pinks = \$0.28
Average price/pound for coho = \$0.48

Appendix F.4. Daily salmon sales harvests and sex ratios at the Cannery
Creek Hatchery, 1993. Brood stock and sex ratio data
provided by the Prince William Sound Aquaculture Corporation.
Corporation.

Date	HATCHERY HARVEST IN NUMBERS OF FISH		Pink Salmon % Female
	Pinks	Pounds Sold	
08/04	6,266	16,917	12.2%
08/05	7,152	17,879	20.4%
08/06	8,490	22,074	18.4%
08/07	6,914	17,977	19.5%
08/08	0	0	
08/09	0	0	23.0%
08/10	0	0	
08/11	0	0	26.1%
08/12	0	0	
08/13	0	0	23.8%
08/14	0	0	
08/15	0	0	30.1%
08/16	0	0	47.5%
08/17	0	0	31.3%
08/18	0	0	
08/19	49,014	127,437	39.2%
08/20	39,904	103,750	44.0%
08/21	13,507	35,119	52.2%
08/22	41,577	112,258	53.0%
08/23	0	0	
08/24	0	0	
08/25	0	0	51.2%
08/26	0	0	
08/27	0	0	41.1%
08/28	0	0	67.2%
08/31	0	0	74.2%
Totals	172,824	453,411	

Average Weight: 2.62 lbs.

Average Price/Lb.: \$0.140

BROOD STOCK SUMMARY:

Spawned at hatchery	110,446
Excessed	101,697
Green/bad mortality	14,700
Eggtake mortality	38,035
Total available broodstock	264,878
Estimated stream spawners	42,600
Estimated total return to hatchery (not sold)	307,478

Appendix F.5. Daily salmon sales harvests at the Main Bay Hatchery, 1993.
 Brood stock data provided by the Prince William Sound
 Aquaculture Corporation.

HATCHERY SALES HARVESTS IN NUMBERS OF FISH						
Date	Sockeye		Pink		Chum	
	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative
06/24	1,104	1,104	13	13	27	27
06/28	1,237	2,341	37	50	50	77
07/01	3,126	5,467	14	64	34	111
07/05	4,699	10,166	24	88	72	183
07/07	5,261	15,427	31	119	30	213
07/09	2,864	18,291	94	213	111	324
07/11	5,019	23,310	483	696	69	393
07/12	2,804	26,114	38	734	0	393
07/15	2,075	28,189	229	963	10	403
07/19	4,833	33,022	356	1,319	91	494
07/20	2,217	35,239	121	1,440	12	506
07/21	6,827	42,066	522	1,962	143	649
07/22	4,362	46,428	306	2,268	177	826
07/24	4,393	50,821	614	2,882	64	890
07/26	4,206	55,027	545	3,427	138	1,028
07/27	7,282	62,309	433	3,860	93	1,121
07/29	11,328	73,637	976	4,836	152	1,273
08/01	10,516	84,153	2,198	7,034	112	1,385
08/04	4,433	88,586	1,185	8,219	121	1,506
08/05	5,801	94,387	3,681	11,900	106	1,612
08/08	3,918	98,305	5,410	17,310	78	1,690
08/12	2,911	101,216	6,149	23,459	38	1,728
08/17	1,923	103,139	4,433	27,892	35	1,763
08/21	1932	105,071	5038	32,930	0	1,763
08/22	2326	107,397	14438	47,368	0	1,763
08/28	1668	109,065	17697	65,065	0	1,763
09/02	856	109,921	14351	79,416	0	1,763
Totals	109,921		79,416		1,763	
Pounds						
Sold	465,564		230,769		8,419	

Average Sockeye Weight: 4.24 pounds Average Pink Weight: 2.91 pounds
 Average price/pound for sockeye = \$0.810 Average price/pound for pink = \$0.150

COGHILL STOCK SOCKEYE BROOD STOCK SUMMARY:

Coghill Stock		Eshamy Stock	
Spawned at hatchery	2,320	Spawned at hatchery	652
Green and bad	147	Green and bad	114
Mortalities	171	Mortalities	1,339
Excessed	3,132	Excessed	145
Total available brood stock	5,770	Total available brood stock	2,250
Fish remaining in bay	0	Fish remaining in bay	0
Total	5,770	Total	2,250

SOCKEYE REMOTE EGGTAKES:

Eyak Lake		Coghill Lake	
Good	57	Good	223
Green/overripe	5	Green/overripe	11
System mortalities/excessed/bad	6	System mortalities/excessed/bad	7
Total	68	Total	241
Eshamy Lake			
Good	614		
Green/overripe	10		
System mortalities/excessed/bad	37		
Total	661		

Appendix F.6. Sales harvests of salmon by species from private nonprofit hatcheries as reported on fish tickets, Prince William Sound, 1977 - 1993.^a

Year	Hatchery ^b	Catch by Species				Total
		Sockeye	Coho	Pink	Chum	
1977	AFK			15,545		15,545
1978	AFK			114,188		114,188
1979	AFK			223,748		223,748
1980	AFK, N			346,728	6	346,734
1981	AFK			707,037	118	707,155
1982	AFK			1,354,732		1,354,732
1983	AFK			616,963		616,963
1984	AFK, SG			415,393	4,886	420,279
1985	AFK, SG			1,209,960	3,840	1,213,800
1986	AFK, SG		2,156	905,464	20,683	928,303
1987 ^c	AFK, SG, E, CC		7,015	2,691,190	2,549	2,700,754
1988	AFK, SG, E		6,110	1,632,701	42,694	1,681,505
1989 ^d	AFK, SG, WNH, CC, MB		52,307	7,812,373	131,362	7,996,042
1990	AFK, SG, WNH, CC		14,199	8,732,658	24,554	8,771,411
1991	AFK, SG, WNH, CC		52,625	5,955,561	13,471	6,021,657
1992	AFK, SG, WNH, CC, MB	163,086	73,530	3,049,394	57,392	3,343,402
1993	AFK, SG, WNH, CC, MB	113,738	3,259	2,212,403	475,148	2,804,548
TOTAL		276,824	211,201	37,996,038	776,703	39,260,766

^aIncludes salmon harvested by private nonprofit hatcheries in Prince William Sound to generate revenues to offset operational costs. Does not include carcass sales.

^bHatcheries: AFK = Armin F. Koernig (PWSAC) (formerly Port San Juan Hatchery)
E = Esther Hatchery (PWSAC), renamed WNH in 1989
SG = Solomon Gulch Hatchery (VFDA)
N = NERKA Inc.
CC = Cannery Creek (PWSAC)
WNH = Wally Noerenberg Hatchery (PWSAC) (formerly Esther Hatchery)
MB = Main Bay (PWSAC) (formerly operated by ADF&G)

^cPWSAC 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.

^dPWSAC 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 property fishery.

Appendix F.7. Summary of pink and chum salmon returns to Prince William Sound hatcheries, 1993.

Pink salmon returns to P.W.S. hatcheries.^a

Hatchery	1992 Fry Release (millions)	1993 Forecast Return	Estimated Total Return	Marine Survival	Estimated C.P.F. Contribution	Estimated Sales Harvest Contributions ^b	Escmt. and Broode	Eggs Taken (millions)
Solomon Gulch	86.9	3,360,000	1,112,314	1.3%	572	942,993	168,749	230.0
A. F. Koernig	112.8	5,630,000	1,528,425	1.4%	1,095,084	239,178	183,646	125.9
Wally Noerenberg	163.8	8,410,000	1,429,039	0.9%	860,291	270,105	357,510	180.6
Cannery Creek	132.2	5,970,000	712,223	0.5%	436,215	92,451	183,557	105.3
Total Pink	495.7	23,370,000	4,782,001		2,392,162	1,544,727	893,462	641.8

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

Hatchery	1993 Forecast Return	Estimated Total Return	Estimated C.P.F. Comm Catch	Sales Harvest ^b	Escmt. and Broode	Eggs Taken (millions)
Solomon Gulch	53,840	NO ESTIMATE MADE.		9,101	9,033	7.0
A. F. Koernig	0	0		0	0	0
Wally Noerenberg ^c	748,100	NO ESTIMATE MADE.		463,524	103,400	111.2
Cannery Creek	0	0		0	0	0
Total Chum	801,940			0	472,625	112,433

^aContribution estimates of pink and chum salmon from PWS hatcheries are based on analysis of CWT recoveries and location of catch as reported on fish tickets. Age five chums were not tagged with CWT's. No CWT based estimates for hatchery chum returns.

^bDoes not include carcass sales which are part of the brood stock.

^cIncludes brood stock, overmature/green fish, holding mortalities and excess fish. Does not include watershed spawners, unseen mortalities or fish remaining in bay. These data used in the analysis of CWT recoveries.

^dIncludes both early and late chum returns.

Appendix F.8. Historical catch contributions, coded wire tag (CWT) releases, and total returns of pink salmon to Armin F. Koernig Hatchery, Prince William Sound, 1977 - 1993.

Brood Year	Return Year	Fry Release ^a	CWT Applied to Fry Release ^b	Brood Stock ^a	Total Cost Recovery Harvest ^c	Hatchery Contribution to CR Harvest ^b	Hatchery Contribution to Other Harvest ^d	Hatchery Contribution to the CPF ^a	Total Hatchery Return	Estimated Marine Survival
1975	1977	1,000,000	0	16,112	15,545	7,745	0	4,000	27,857	2.79%
1976	1978	11,010,577	0	40,432	114,188	114,188	0	0	154,620	1.40%
1977	1979	16,950,784	0	54,207	223,748	223,748	0	275,000	552,955	3.26%
1978	1980	22,774,739	0	108,061	346,728	346,728	0	1,038,700	1,493,489	6.56%
1979	1981	21,500,000	0	198,901	707,037	707,037	0	1,358,907	2,264,845	10.53%
1980	1982	69,787,000	0	164,545	1,354,732	1,354,732	0	3,615,086	5,134,363	7.36%
1981	1983	70,118,000	0	124,278	608,002	608,002	0	2,990,225	3,722,505	5.31%
1982	1984	87,384,533	0	186,431	387,146	387,146	0	2,226,423	2,800,000	3.20%
1983	1985	76,746,000	0	271,513	986,141	986,141	0	3,772,962	5,030,616	6.55%
1984	1986	103,531,000	0	277,706	814,072	814,072	0	3,872,222	4,964,000	4.79%
1985	1987	111,266,808	207,756	389,610	1,237,332	1,237,332	0	5,986,219 ^e	7,613,161	6.84%
1986	1988	116,117,645	0	281,660	646,833	646,833	0	5,148,000	6,076,493	5.23%
1987	1989	110,036,728	209,063	124,045	3,715,739	2,474,884	0	29,698	2,628,627	2.39%
1988	1990	160,486,843	323,030	123,021	2,669,519	1,297,941	0	5,388,128	6,809,090	4.24%
1989	1991	113,843,914	202,265	244,589	1,089,168	650,686	339,236	3,883,058	5,117,569	4.50%
1990	1992	115,762,047	201,835	151,923	822,411	637,090	11,209	1,602,127	2,402,349	2.08%
1991	1993	112,830,588	202,421	211,257	357,058	239,178	10,516	1,095,084	1,556,035	1.38%
1992	1994	113,337,345	197,729							

^a Data for BY 1985 and 1987 - 1991 provided by the ADF&G CWT project. PWSAC provided data for all other years.

^b Data for all years provided by the ADF&G CWT project.

^c Data for all years from ADF&G fishticket information.

^d Includes fish donated and/or discarded in 1991. Data provided by the ADF&G CWT project.

^e Contribution estimate from Geiger, 1990.

Appendix F.9. Historical catch contributions, coded wire tag (CWT) releases, and total returns of pink salmon to Cannery Creek Hatchery, Prince William Sound, 1977 - 1993.

Brood Year	Return Year	Fry Release ^a	CWT Applied to Fry Release ^b	Brood Stock ^a	Total Cost Recovery Harvest ^c	Hatchery Contribution to CR Harvest ^b	Hatchery Contribution to Other Harvest ^d	Hatchery Contribution to the CPF ^a	Total Hatchery Return	Estimated Marine Survival
1975	1977	0	0	0	0	0	0	0	0	0.00%
1976	1978	0	0	0	0	0	0	0	0	0.00%
1977	1979	0	0	0	0	0	0	0	0	0.00%
1978	1980	2,826,000	0	37,000	0	0	0	53,348	90,348	3.20%
1979	1981	2,694,000	0	69,600	0	0	0	71,840	141,440	5.25%
1980	1982	21,289,000	0	75,400	0	0	0	688,814	764,214	3.59%
1981	1983	13,933,000	0	121,300	0	0	0	348,141	469,441	3.37%
1982	1984	22,123,000	0	77,000	0	0	0	1,062,000	1,139,000	5.15%
1983	1985	31,200,000	0	172,000	0	0	0	2,422,000	2,594,000	8.31%
1984	1986	36,500,000	0	71,100	0	0	0	781,900	853,000	2.34%
1985	1987	31,115,388	218,436	308,940	41,002	41,002	0	1,781,784 ^e	2,131,726	6.85%
1986	1988	42,600,000	0	127,688	0	0	0	100,000	227,688	0.53%
1987	1989	95,571,232	172,591	127,764	631,284	500,726	0	4,912,175	5,540,665	5.80%
1988	1990	58,969,539	125,869	190,255	552,498	489,983	0	1,854,059	2,534,297	4.30%
1989	1991	143,662,511	248,193	348,539	765,430	686,043	755,077	6,711,637	8,501,296	5.92%
1990	1992	141,519,850	244,204	168,864	363,667	306,132	3,347	1,041,373	1,519,716	1.07%
1991	1993	132,166,231	160,733	264,878	172,824	92,451	0	436,215	793,544	0.60%
1992	1994	140,030,396	232,526							

^a Data for BY 1985 and 1987 - 1991 provided by the ADF&G CWT project. PWSAC provided data for all other years.

^b Data for all years provided by the ADF&G CWT project.

^c Data for all years from ADF&G fishticket information.

^d Includes donated and discarded fish. Data provided by the ADF&G CWT project.

^e Contribution estimate from Geiger, 1990.

Appendix F.10. Historical catch contributions, coded wire tag (CWT) releases, and total returns of pink salmon to Wally Noerenberg Hatchery, Prince William Sound, 1977 - 1993.

Brood Year	Return Year	Fry Release ^a	CWT Applied to Fry Release ^b	Brood Stock ^a	Total Cost Recovery Harvest ^c	Hatchery Contribution to CR Harvest ^b	Hatchery Contribution to Other Harvest ^a	Hatchery Contribution to the CPF ^a	Total Hatchery Return	Estimated Marine Survival
1975	1977	0	0	0	0	0	0	0	0	0.00%
1976	1978	0	0	0	0	0	0	0	0	0.00%
1977	1979	0	0	0	0	0	0	0	0	0.00%
1978	1980	0	0	0	0	0	0	0	0	0.00%
1979	1981	0	0	0	0	0	0	0	0	0.00%
1980	1982	0	0	0	0	0	0	0	0	0.00%
1981	1983	0	0	0	0	0	0	0	0	0.00%
1982	1984	0	0	0	0	0	0	0	0	0.00%
1983	1985	0	0	0	0	0	0	0	0	0.00%
1984	1986	0	0	0	0	0	0	0	0	0.00%
1985	1987	34,525,575	220,369	276,947	305,946	305,946	0	2,429,062 ^c	3,011,955	8.72%
1986	1988	75932715	0	222,790	443,828	443,828	0	3,200,000	3,866,618	5.09%
1987	1989	195,607,739	280,479	390,227	2,786,348	2,121,349	0	3,207,218	5,718,794	2.92%
1988	1990	159,713,663	313,004	282,022	3,364,172	2,991,569	0	10,280,000	13,553,591	8.49%
1989	1991	235,378,496	467,587	456,061	1,044,093 ^f	964,618	2,479,492	7,790,063	11,690,234	4.97%
1990	1992	214,941,068	395,313	230,590	518,652	442,702	10,781	1,322,054	2,006,127	0.93%
1991	1993	163,802,656	299,241	337,558	276,642	270,105	4,132	860,291	1,472,086	0.90%
1992	1994	172,087,494	284,957							

^a Data for BY 1985 and 1987 - 1991 provided by the ADF&G CWT project. PWSAC provided data for all other years.

^b Data for all years provided by the ADF&G CWT project.

^c Data for all years from ADF&G fishticket information.

^d Includes donated and discarded fish. Data provided by the ADF&G CWT project.

^e Contribution estimate from Geiger, 1990.

^f Includes 163,583 fish made into surimi on a trial basis.

Appendix F.11. Historical catch contributions, coded wire tag (CWT) releases, and total returns of pink salmon to Solomon Gulch Hatchery, Prince William Sound, 1977 - 1993.

Brood Year	Return Year	Fry Release ^a	CWT Applied to Fry Release ^b	Brood Stock ^a	Total Cost Recovery Harvest ^c	Hatchery Contribution to CR Harvest ^b	Hatchery Contribution to Other Harvest ^d	Hatchery Contribution to the CPF ^a	Total Hatchery Return	Estimated Marine Survival
1975	1977	0	0	0	0	0	0	0	0	0.00%
1976	1978	0	0	0	0	0	0	0	0	0.00%
1977	1979	0	0	0	0	0	0	0	0	0.00%
1978	1980	0	0	0	0	0	0	0	0	0.00%
1979	1981	0	0	0	0	0	0	0	0	0.00%
1980	1982	0	0	0	0	0	0	0	0	0.00%
1981	1983	7,900,000	0	12,484	78,961	78,961	0	no estimate	91,445	1.16%
1982	1984	5,600,000	0	77,828	28,247	28,247	0	25,000	131,075	2.34%
1983	1985	8,390,000	0	196,827	223,819	223,819	0	64,961	485,607	5.79%
1984	1986	51,275,265	0	117,665	91,392	91,392	0	1,008,193	1,217,250	2.37%
1985	1987	54,630,942	0	183,411	1,106,910	1,106,910	0	4,000,000 ^e	5,290,321	9.68%
1986	1988	59,830,980	178,461	192,164	542,040	542,040	0	300,000 ^e	1,034,204	1.73%
1987	1989	130,830,267	277,365	214,891	720,048	670,952	0	2,412,008	3,297,851	2.52%
1988	1990	128,518,252	312,196	154,612	2,146,469	1,911,667	0	6,857,288	8,923,567	6.94%
1989	1991	122,255,027	210,854	275,066	3,220,450	2,900,513	0	2,515,597	5,691,176	4.66%
1990	1992	131,296,671	250,051	238,503	1,344,664	1,240,324	4,953	380,251	1,864,031	1.42%
1991	1993	86,900,725	160,733	361,790	1,326,463	942,993	0	572	1,305,355	1.50%
1992	1994	141,865,235	235,764							

^a Data for BY 1985 and 1987 - 1991 provided by the ADF&G CWT project. VFDA provided data for all other years.

^b Data for all years provided by the ADF&G CWT project.

^c Data for all years from ADF&G fishticket information.

^d Includes donated and discarded fish. Data provided by the ADF&G CWT project.

^e Contribution estimate from Geiger, 1990.

Appendix F.12. Estimated total hatchery and wild stock production of pink salmon, Prince William Sound, 1977 to 1993.^a

Year	Total Return by Hatchery ^b					Total Hatchery Production	Total Wild Stock Component ^c
	Solomon Gulch (VFDA)	Armin F Koernig (PWSAC)	Wally Noerenberg (PWSAC)	Main Bay (ADF&G - PWSAC)	Cannery Cr. (ADF&G - PWSAC)		
1977		27,857				27,857	5,816,401
1978		154,620				154,620	3,925,083
1979		552,955				552,955	17,335,503
1980		1,493,489			90,348	1,583,837	14,013,916
1981		2,264,854			141,440	2,406,294	19,568,866
1982		5,134,363		35,000	764,214	5,933,577	16,794,317
1983	91,445	3,722,502		496,850	469,441	4,780,238	11,567,348
1984	131,075	2,800,000		1,200,000	1,139,000	5,270,075	21,201,513
1985	485,607	5,030,616		383,000	2,594,000	8,493,223	19,938,105
1986	1,217,250	4,964,000		232,000	853,000	7,266,250	5,563,957
1987	5,290,321	7,613,161	3,011,955	328,000	2,131,726	18,375,163	13,066,944
1988	1,034,204	6,076,493	3,866,618	100,000	227,688	11,305,003	1,766,936
1989	3,297,851	2,628,627	5,718,794	0	5,540,665	17,185,937	6,610,342
1990	8,923,567	6,809,090	13,553,591	^d	2,534,297	31,820,545	14,418,696
1991	5,691,176	5,117,569	11,690,234	0	8,501,296	31,000,275	9,295,456
1992	1,859,078	2,391,140	1,995,346	0	1,516,369	7,761,933	2,222,782
1993	1,112,314	1,528,425	1,492,039	0	712,223	4,845,001	3,158,118

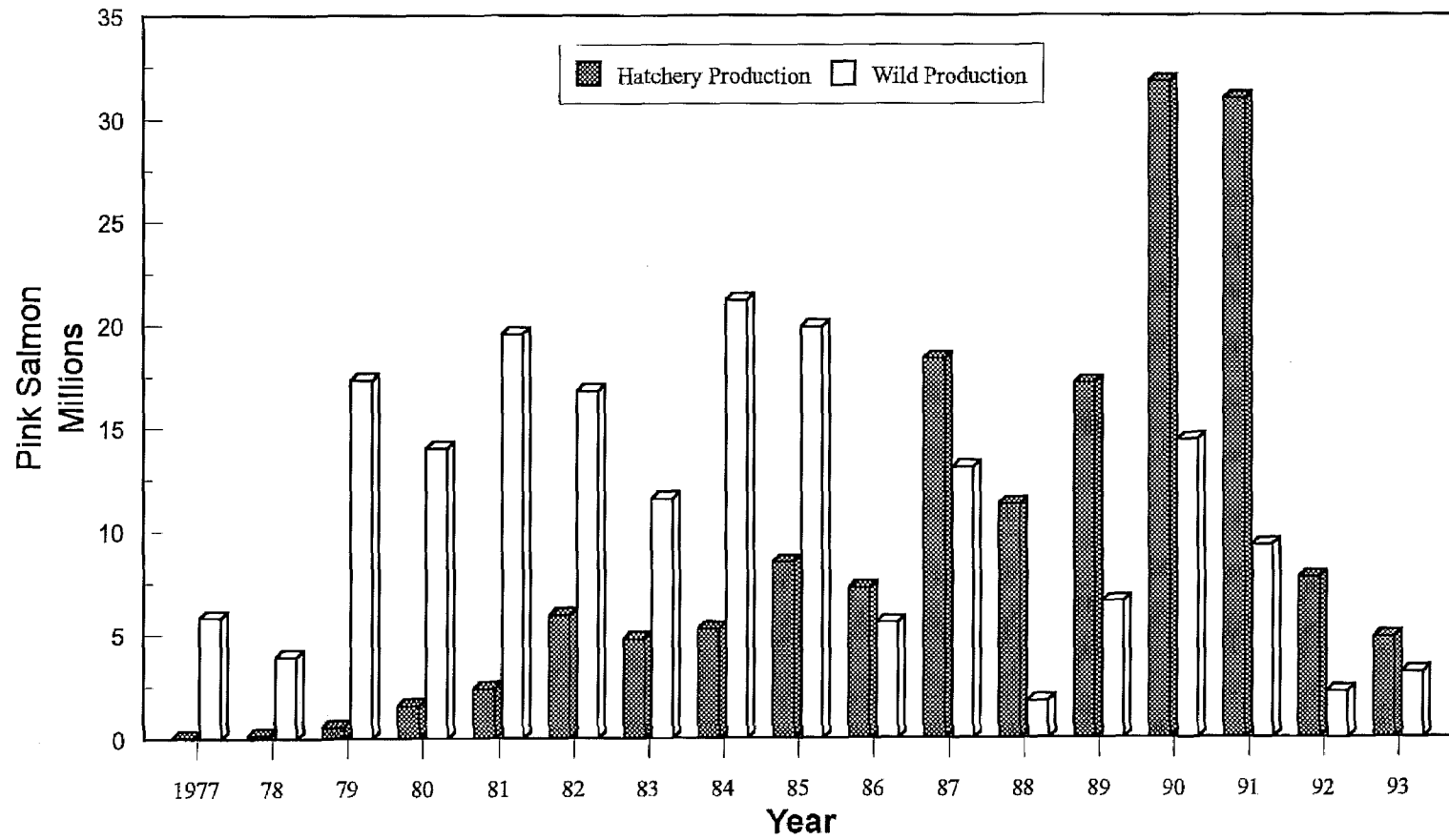
^aPrior to 1987, there was no definitive or statistically valid method of separating hatchery and wild stock composition in the commercial catch. The above estimates are based on presumed wild stock exploitation rates which in turn are determined by the wild stock escapement estimate. The wild stock 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 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).

^bHatchery totals include cost recovery harvests, brood stock collection and escapement, and estimated common property fishery interception.

^cTotal wild stock return represents the estimated wild stock catch plus the aerial escapement index. 1993 wild stock component = 2,081,918 catch plus 1,070,381 escapement index.

^d Not available.

Hatchery and Wild Stock Pink Returns Prince William Sound



Appendix F.13. Estimated total pink salmon returns to hatcheries and wild stock systems, Prince William Sound, 1977 - 1993.

Appendix F.14. Historical catch contributions, coded wire tag (CWT) releases, and total returns of pink salmon to all hatcheries combined, Prince William Sound, 1977 - 1993.

Brood Year	Return Year	Fry Release ^a	CWT Applied to Fry Release ^b	Brood Stock ^a	Total Cost Recovery Harvest ^c	Hatchery Contribution to CR Harvest ^b	Hatchery Contribution to Other Harvest ^a	Hatchery Contribution to the CPF ^a	Total Hatchery Return	Estimated Marine Survival
1975	1977	1,000,000	0	16,112	15,545	7,745	0	4,000	27,857	2.79%
1976	1978	11,010,577	0	40,432	114,188	114,188	0	0	154,620	1.40%
1977	1979	16,950,784	0	54,207	223,748	223,748	0	275,000	552,955	3.26%
1978	1980	25,600,739	0	145,061	346,728	346,728	0	1,092,048	1,583,837	6.19%
1979	1981	24,194,000	0	268,501	707,037	707,037	0	1,430,747	2,406,285	9.95%
1980	1982	91,076,000	0	239,945	1,354,732	1,354,732	0	4,303,900	5,898,577	6.48%
1981	1983	91,951,000	0	258,062	686,963	686,963	0	3,338,366	4,283,391	4.66%
1982	1984	115,107,533	0	341,259	415,393	415,393	0	3,313,423	4,070,075	3.54%
1983	1985	116,336,000	0	640,340	1,209,960	1,209,960	0	6,259,923	8,110,223	6.97%
1984	1986	191,306,265	0	466,471	905,464	905,464	0	5,662,315	7,034,250	3.68%
1985	1987	231,538,713	646,561	1,158,908	2,691,190	2,691,190	0	14,197,065	18,047,163	7.79%
1986	1988	218,830,647	568,688	824,302	1,632,701	1,632,701	0	8,748,000	11,205,003	5.12%
1987	1989	532,045,966	939,498	856,927	7,853,419	5,767,911	0	10,561,099	17,185,937	3.23%
1988	1990	507,688,297	1,074,099	749,910	8,732,658	6,691,160	0	24,379,475	31,820,545	6.27%
1989	1991	615,139,948	1,128,899	1,324,255	6,119,141	5,201,860	3,573,805	20,900,355	31,000,275	5.04%
1990	1992	603,519,636	1,091,403	789,880	3,049,394	2,626,248	30,290	4,345,805	7,792,223	1.29%
1991	1993	495,700,200	823,128	1,175,483	2,212,403	1,544,727	14,648	2,392,162	5,127,020	1.03%
1992	1994									

^a Data for BY 1985 and 1987 - 1991 provided by the ADF&G CWT project. VFDA and PWSAC provided data for all other years.

^b Data for all years provided by the ADF&G CWT project.

^c Data for all years from ADF&G fishticket information.

^d Includes donated and discarded fish. Data provided by the ADF&G CWT project.

APPENDIX G

SUBSISTENCE AND PERSONAL USE FISHERIES

Appendix G.1. Subsistence salmon harvest by species and gear type, Prince William Sound and upper Copper River, 1993.

Area	Permits Issued	Permits Fished	Gear ^a Type	Chinook	Sockeye	Coho	Pink	Chum	Other ^b	Total
Prince William Sound	4	3	D.G.N.	1	81	3			0	85
	0	0	P.S.	0	0	0			0	0
	2	1	S.N.	0	23	7			0	30
P.W.S. TOTAL	6	4		1	104	10			0	115
Copper River Flats	111	50	D.G.N.	120	428	29			24	601
Upper Copper River	14	12	D.N.	18	214	20			0	252
	759	654	F.W.	1,290	48,368	50			84	49,708
Eastern	18	7	MX.	2	512	305	144	74	180	1,217
Southwestern	22	17	MX.	2	835	50	232	124	0	1,243
Batzulnetas	1	1	F.W.	0	160	0	0	0	0	160
Total	931	745		1,433	50,621	464	376	198	288	53,296

^aD.G.N. = Drift gillnet; P.S. = Purse seine; S.N. = Setnet; MX. = Combination of gear (drift gillnet and dip net); D.N. = Dip Net; F.W. = Fish Wheel

^bIncludes cutthroat and Dolly Varden as well as misc. salmon species.

Appendix G.2. Salmon catch and effort in the Prince William Sound subsistence fishery,
1960 - 1993.

Year	Permits		Catch						Total
	Issued	Returned	Chinook	Sockeye	Coho	Pink	Chum	Unknown	
1960	50		1	139	505	1,292	75	150	2,162
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
1990	8	8	0	0	7	4	0	0	11
1991	9	5	0	2	0	0	0	0	2
1992	10	6	0	20	0	0	0	0	20
1993	6	6	1	104	10	0	0	0	115

Includes catches from Prince William Sound proper, does not include Copper River Flats.

Appendix G.3. Salmon catch and effort in the Copper River District subsistence gillnet fishery 1965 – 1993.

Year	Total Issued	Permits Issued			Catch			Total
		Fished ^b	Not Fished	Not returned	Chinook	Sockeye	Coho	
1965	31	15	5	11	12	459	85	556
1966	45	21	10	14	47	175		222
1967	61	37	19	5	83	153		236
1968	17	7	8	2	11	36		47
1969	49	20	13	16	16	63	85	164
1970	32	24	3	5	66	179		245
1971	29	17	9	3	10	32	4	46
1972	104	75	5	24	149	569	53	771
1973	94	89	N/A	5	153	326	180	659
1974	9	3	2	4	5	4	2	11
1975	2	2	N/A	0	0	5	0	5
1976	27	14	N/A	13	1	10	0	11
1977	23	22	N/A	1	10	71	0	81
1978	34	9	19	6	37	18	12	67
1979	49	21	20	8	45	26	17	88
1980	39	18	17	4	19	27	17	63
1981	72	30	21	21	48	145	104	297
1982	108	48	42	18	60	634	106	802 ^a
1983	87	31	42	14	79	107	57	254 ^a
1984	118	57	47	14	68	324	135	549 ^a
1985	94	67	27	0	88	261	83	433 ^a
1986	88	57	28	3	86	348	47	481 ^a
1987	95	39	50	6	49	359	14	510 ^a
1988	114	57	40	17	59	226	42	440 ^a
1989	75	32	32	11	56	339	51	454 ^a
1990	88	38	38	12	60	469	82	611 ^a
1991	129	72	43	14	136	830	38	1,009 ^a
1992	126	67	46	13	142	785	42	999 ^a
1993	111	50	43	18	120	428	29	601 ^a

^a Total also includes pink salmon, chum salmon, whitefish, dolly varden and cutthroat.

^b Fished includes those permittees that were successful and those that were unsuccessful.

Appendix G.4. Salmon catch and effort in the Eastern (Tatitlek) and Southwestern (Chenega) subsistence fishery, Prince William Sound, 1988 - 1993.

Year	Permits		Catch						
	Issued	Fished	Chinook	Sockeye	Coho	Pink	Chum	Unknown	Total
EASTERN									
1988	17	9	2	210	249	143	297	0	901
1989	14	7	1	107	653	28	43	0	832
1990	13	8	0	5	241	10	4	0	260
1991	19	7	0	107	984	320	28	0	1,439
1992	15	5	2	441	369	30	49	0	891
1993	18	7	2	512	305	144	74	180	1,217
SOUTHWESTERN									
1988	10	5	1	50	8	251	294	0	604
1989	8	7	0	322	0	554	180	0	1,056
1990	7	2	1	36	5	20	2	0	64
1991	12	4	3	345	42	195	53	0	638
1992	14	8	1	526	23	313	99	0	962
1993	22	17	2	835	50	232	124	0	1,243

Appendix G.5. Salmon catch by species and numbers of permits by gear type for the Upper Copper River subsistence and personal use fisheries, 1981 - 1993.

Year	Permits Issued			Reported Catch ^a			Reported Catch by Species			Total Catch	
	Fish			Fish			Chinook	Sockeye	Coho	Reported	Estimated
	Dip Net	Wheel	Total	Dip Net	Wheel	Total					
1981	3,555	523	4,078	28,872	26,924	55,796	1,913	53,008	849	55,770	68,654
1982 ^b	5,475	615	6,090	62,614	38,120	100,734	2,532	96,799	1,246	100,577	109,557
1983	6,911	630	7,541	72,257	35,971	108,228	5,421	100,995	1,690	108,106	118,599
1984 ^s	104	458	562	1,288	20,374	21,662	415	20,999	237	21,651	28,617
^p	5,311	17	5,328	46,018	223	46,241	1,592	44,079	552	46,223	50,714
^{s&p}	5,415	475	5,890	47,306	20,597	67,903	2,007	65,078	789	67,874	79,331
1985	4,153	533	5,686	29,856	22,877	52,733	1,673	50,488	544	52,705	64,164
1986 ^{sc}	39	366	405	645	25,136	25,781	622	24,890	264	25,776	28,417
^p	3,966	65	4,031	41,641	1,054	42,695	2,294	39,794	521	42,609	43,959
^{s&p}	4,005	431	4,436	42,286	26,190	68,476	2,916	64,684	785	68,385	72,376
1987 ^{sc}	59	372	431	1,114	24,157	25,271	531	21,615	105	22,251	34,080
^p	4,186	73	4,259	42,842	567	43,409	2,749	40,285	393	43,427	46,884
^{s&p}	4,245	445	4,690	43,956	24,724	68,680	3,280	61,900	498	65,678	80,964
1988 ^s	70	339	409	1,860	18,955	20,815	672	19,761	245	20,678	30,313
^p	4,205	46	4,251	40,492	1,238	41,730	2,723	38,533	450	41,706	45,895
^{s&p}	4,275	385	4,660	42,352	20,193	62,545	3,395	58,294	695	62,384	76,203
1989 ^s	78	308	386	2,235	25,377	27,612	744	26,716	65	27,525	29,225
^p	4,447	137	4,584	53,321	3,223	56,544	2,160	53,505	825	56,490	58,858
^{s&p}	4,525	445	4,970	55,556	28,600	84,156	2,904	80,221	890	84,015	88,083
1990 ^s	95	311	406	2,703	27,942	30,645	604	29,947	87	30,638	32,283
^p	5,631	58	5,689	67,241	747	67,988	2,594	63,793	1,446	67,833	70,317
^{s&p}	5,726	369	6,095	69,944	28,689	98,633	3,198	93,740	1,533	98,471	102,600
1991 ^s	293	418	711	6,127	31,634	37,761	1,217	36,289	213	37,719	40,070
^p	6,222	NA	6,222	82,767	NA	82,767	3,947	75,499	3,264	82,710	84,622
^{s&p}	6,515	418	6,933	88,894	31,634	120,528	5,164	111,788	3,477	120,429	124,692
1992 ^s	151	504	655	4,250	40,198	44,448	1,368	42,689	330	44,387	46,395
^p	6,387	NA	6,387	89,840	NA	89,840	3,337	84,981	1,487	89,805	91,400
^{s&p}	6,538	504	7,042	94,090	40,198	134,288	4,705	127,670	1,817	134,192	137,795
1993 ^s	14	759	773	252	49,792	50,044	1,308	48,582	70	49,960	54,370
^p	7,914	NA	7,914	93,747	NA	93,747	2,729	89,629	1,358	93,716	97,500
^{s&p}	7,928	759	8,687	93,999	49,792	143,791	4,037	138,211	1,428	143,676	151,870

^a Includes all reported species

^b Return requirement enforced

^c Subsistence dip net catch estimated

^s = subs tence

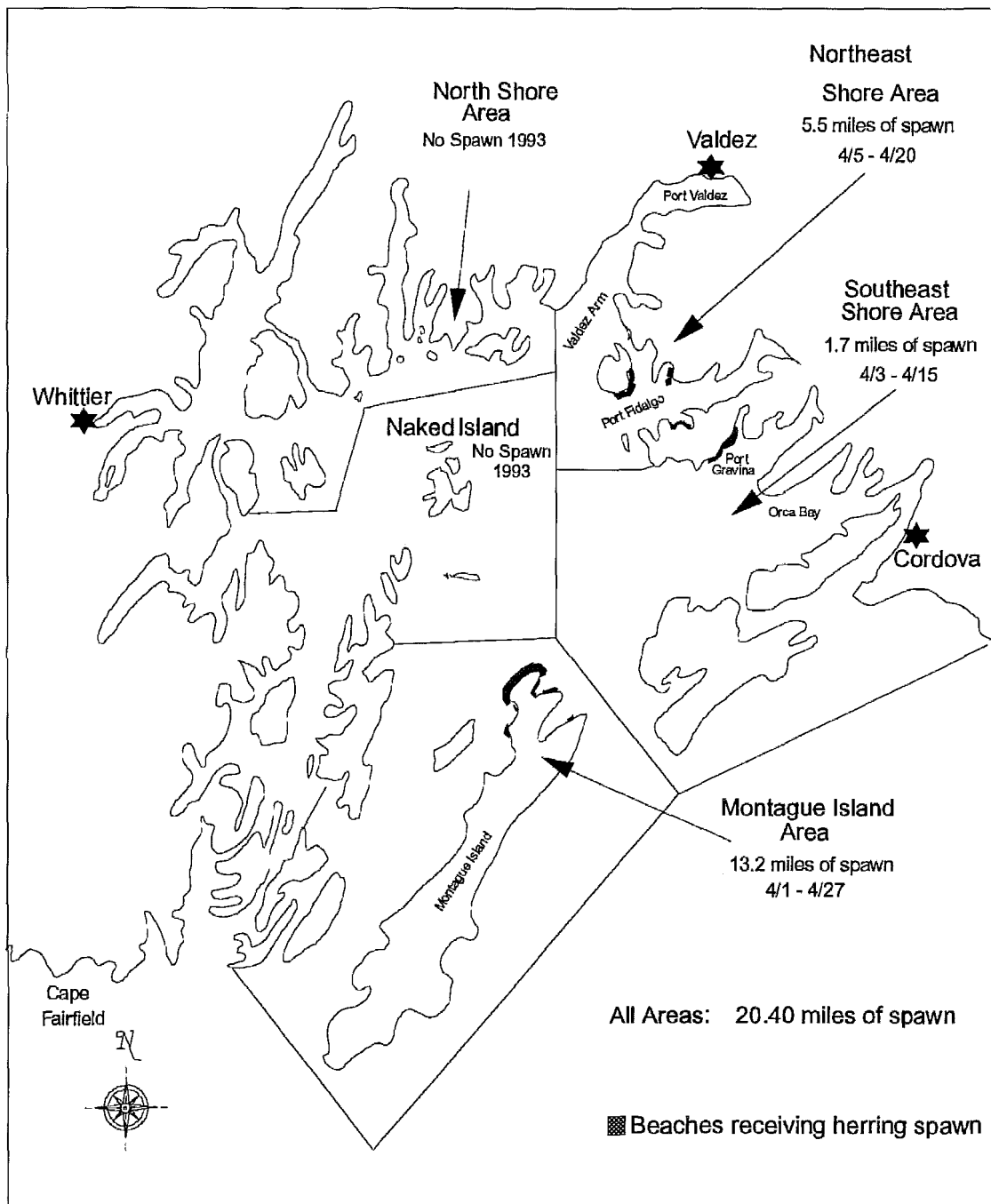
^p = personal use

^{s&p} = total catch

APPENDIX H

HERRING FISHERIES

1993 Prince William Sound Herring Spawning



Appendix 1. Prince William Sound herring spawn, shoreline mileage, and dates mapped during aerial surveys, 1993.

Appendix H.2. Prince William Sound commercial Pacific herring harvest summary with fishing location and effort by gear type for calendar year 1993.

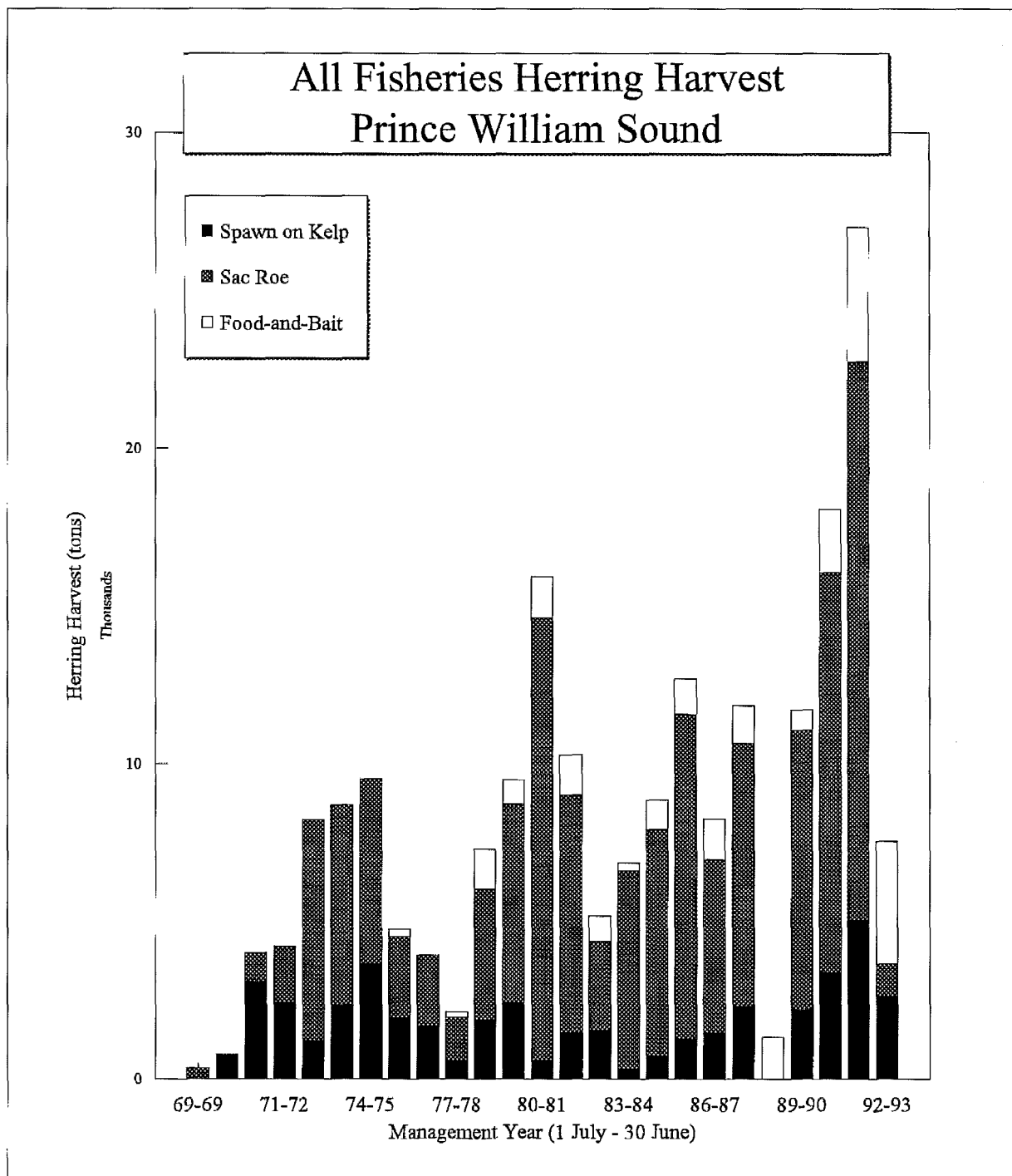
Fishery	Fishing Information				Harvest (tons)	
	Area	Date	Duration	Effort	Spawn on Kelp	Pacific Herring
Sac Roe Purse Seine	NO OPENINGS					
	Total				0.0	
Sac Roe Gillnet	Montague I.	15 April	5.0 h	23 permits	132.4	
	Montague I.	17 April	9.0 h	24 permits	429.8	
	Montague I.	18 April	11.0 h	24 permits	283.3	
	Montague I.	19 April	11.0 h	24 permits	184.5	
	Total			36.0 h	24 permits	1,029.9
Wild Spawn-on-Kelp ^a	Montague I.	19 April	9.0 h	19 permits	17.8	142.3
	Montague I.	20 April	17.0 h	22 permits	23.3	186.1
	Montague I.	21 April	18.0 h	35 permits	40.8	326.4
	Montague I.	22 April	24.0 h	51 permits	50.2	401.3
	Montague I.	23 April	24.0 h	36 permits	27.3	218.6
	Montague I.	24 April	12.0 h	4 permits	3.3	26.1
	Total			114.0 h	83 permits	162.6
Pound Spawn-on-Kelp ^c	Northeast	10-22 April		52 permits	106.4	1,330.5
	Total				106.4	1,330.5 ^d
Food-and-Bait Fishery	Montague I.	7-10 October	69.3 h	8 permits	1,087.0	
	Total				1,087.0	
<u>Harvest and Use - Total</u>					269.0	4,748.1

^a The harvest of naturally occurring herring spawn on native kelp species in Prince William Sound.

^b The equivalent harvest of herring due to the removal of reproductive capacity from the population based on the assumption that the average herring spawn recovery is 10%, and 80% of the spawn on kelp harvest weight consists of eggs.

^c The harvest of herring spawn-on-kelp produced in net pens or pounds.

^d The equivalent harvest of herring due to stress mortality and the removal of reproductive capacity of the population based on the assumption that 12.5 tons of herring are used to produce one ton of spawn on kelp.



Appendix H.3. Prince William Sound commercial herring harvest by management year and fishery.

Appendix H.4. Pacific herring sac roe seine and gillnet fishery effort, anticipated and actual harvest, Prince William Sound, 1969 - 1993.

Calendar Year	Seine Fishery							Gillnet Fishery							Total Harvest (tons)
	Opening Dates	Hours	Effort (Boats)	Guideline Harvest ^a	Harvest (tons)	CPUE (tons/Boat Hr)	Estimated Roe %	Opening Dates	Hours	Effort (Boats)	Guideline Harvest ^a	Harvest (tons)	CPUE (tons/Boat Hr)	Estimated Roe %	
1969	3/01 - 6/30		5		325.4										355.7
1970	3/01 - 6/30														
1971	3/01 - 6/30		12		919.2										919.2
1972	3/01 - 6/30		18		1,777.2										1,777.2
1973	4/23 - 5/09		31		6,991.9										6,991.9
1974	4/10 - 4/17		72		6,371.0			4/10 - 04/17		3		3.8			6,374.8
1975	4/15 - 4/22	14	76		5,853.8	5.50			14						5,853.8
1976	5/08 & 6/01	13	66		2,584.2	3.01			13						2,584.2
1977	4/09 - 4/10	38	58		2,265.6	1.03		4/09 - 04/10	38	1		1.6	0.04		2,267.1
1978	4/17 - 4/21 ^b	106	75	5,000	1,329.5	0.17		4/17 - 04/21	106	38		61.7	0.02		1,391.2
1979	4/07 - 4/19	215.5	89	5,000	4,138.0	0.22		CLOSED ^c							4,138.0
1980	4/01 - 4/09	162	76	5,000	6,042.2	0.49		4/17 - 5/05		16		264.4			6,306.7
1981	4/01 - 4/09	60	106	5,000	13,768.2	2.16		4/16 - 4/18	53	18		234.5	0.25		14,002.8
1982	4/23	2	95	5,000	7,148.3	37.62	10-14%	4/24 - 4/26	54	18		393.9	0.41	12-15%	7,542.2
1983	4/13	1	103 ^d	5,000	2,728.5	26.49	11.0%	4/21 - 4/22	24	22		105.4	0.20	11.0%	2,833.9
1984	4/14	3	105 ^e	5,000	5,946.1	18.88	10-11%	4/18 - 4/22	59	23	250	342.7	0.25	8-14%	6,288.8
1985	4/28 - 4/29	4	103 ^f	5,000	6,764.1	16.42	10-12%	4/29 - 5/01	34	21	250	413.3	0.58	10-12%	7,177.4
1986	4/17	3	106	5-7,000	9,828.1	30.91	11.0%	4/24 - 4/28	90	24	3-400	448.6	0.21	11.4%	10,276.7
1987	4/08 - 4/09	1.5	96	3-5,000	4,982.2	34.60	10.0%	4/10 - 4/11	24	24	2-300	533.3	0.93	9.5%	5,515.5
1988	4/21 - 4/22	2	105	4-5,000	7,977.3	37.99	10.5%	4/23	5.5	24	275	353.0	2.67	10.0%	8,330.3
1989 ^g	Season Closed			6,400							375				0.0
1990	04/12	0.3	96	6,038	8,362.1	290.35	10.0%	04/13	4	24	353	505.4	5.26	10.6%	8,867.5
1991	4/09, 4/10, & 4/19	1.3	104	11,232.6	11,923.0 ^h	85.32	10.5%	04/18	10.5	24	657.3	742.0	2.94	11.06%	12,665.1
1992	4/13, 4/17, & 4/21	2.0	104	14,100.0	16,784.2 ⁱ	80.25	10.0%	4/23 - 4/24	11	24	825	940.6	3.56	10.8%	17,724.8
1993	No Harvest			15,586.0				4/15, 4/17-4/19	36	24	912	1,029.9	1.19	11.01%	1,029.9

^a Guideline harvest based on pre-season harvest projections beginning in 1986.

^b An additional opening on 6/14 for 6 hours resulted in no harvest.

^c Gillnet fishery closed by Board of Fisheries action.

^d Out of 103 boats participating, 72 actually made deliveries.

^e Out of 105 boats participating, 101 actually made deliveries.

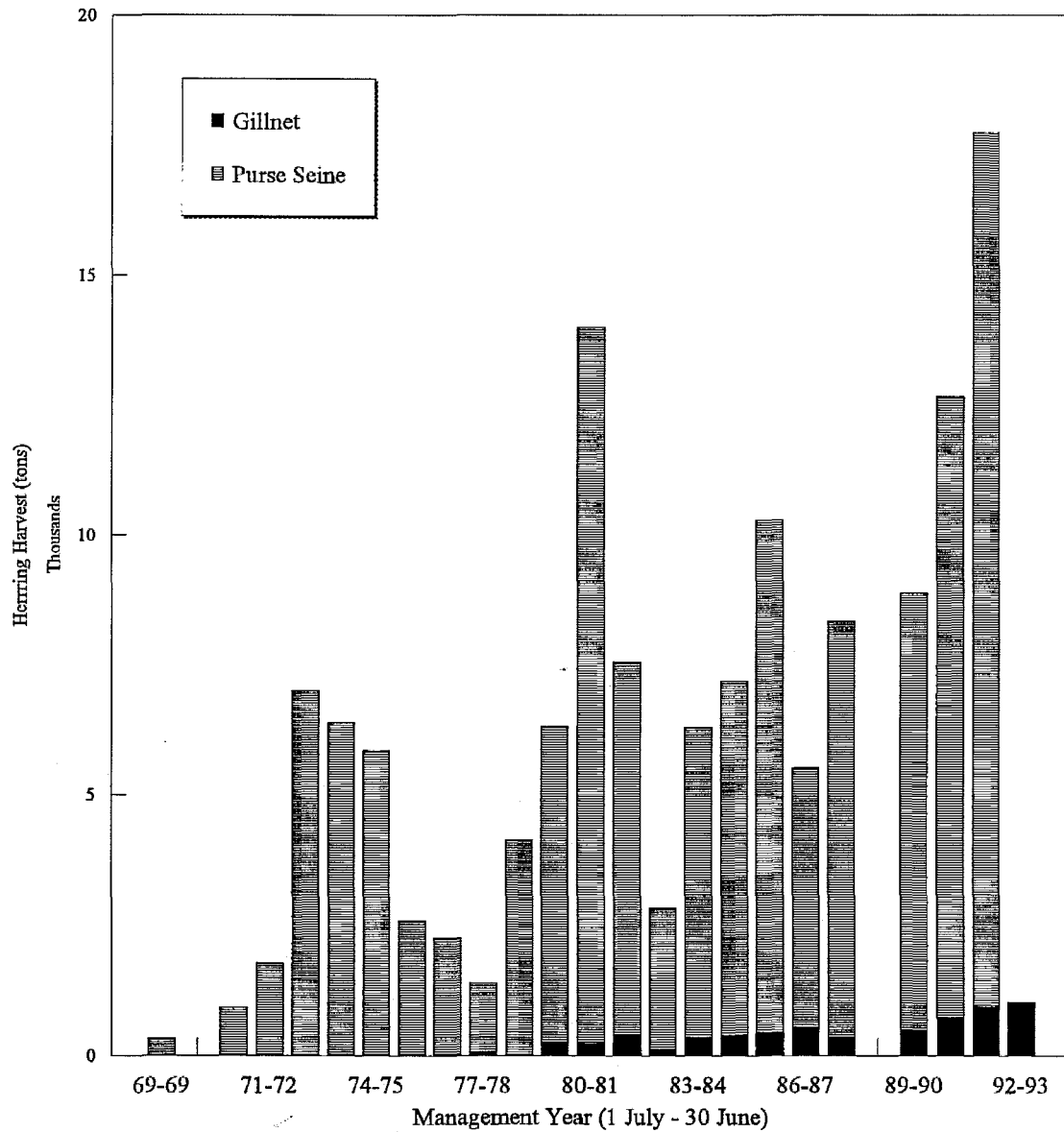
^f Out of 103 boats participating, 62 made deliveries at Montague Island and 90 made deliveries in the north-shore area.

^g All Pacific herring commercial sac roe and spawn-on-kelp fisheries in Prince William Sound were closed during the spring of 1989 due to the potential for contamination of catches from the *TV Exxon Valdez* oil spill.

^h Total for 1991 includes a 92.2 ton test fishing set made by ADF&G for aerial survey calibration.

ⁱ Total for 1992 includes a 192.5 ton test fishing catch made by ADF&G for aerial survey calibration.

Sac Roe Herring Harvest by Fishery Prince William Sound



Appendix H.5.

Prince William Sound commercial herring sac roe purse seine and gillnet harvest by management year, 1969-1993.

Appendix H.6.

Pacific herring spawn-on-kelp harvests from natural spawning, Prince William Sound, 1969 - 1993.

Calendar Year	Fishery Dates	Hours	Effort (Divers)	Guideline Harvest (tons)	Harvest by Kelp Species and Grounds Price (\$/lb)								Spawn-on-Kelp Harvest		Herring Utilized ^a (tons)
					Ribbon		Sieve		Fucus		Other		(lb)	(tons)	
					Percent	Price	Percent	Price	Percent	Price	Percent	Price			
1969	5/18-5/31		3										5,424	2.7	21.7
1970	4/19-6/06		34										190,374	95.2	761.5
1971	4/18-5/15		159										769,481	384.7	3,077.9
1972	4/30-5/20		397										600,453	300.2	2,401.8
1973	4/23-5/26		176										306,358	153.2	1,225.4
1974	4/22-5/04		143		Mostly Ribbon - Some Sieve and Hair				\$0.60-0.75				580,588	290.3	2,322.4
1975	4/25-5/10		328										916,919	458.5	3,667.7
1976	4/21- ?		279										485,043	242.5	1,940.2
1977	4/27-12/31		104										417,000	208.5	1,668.0
1978	4/20-4/30		66	165	23%		50%				27% ^b		141,268	70.6	565.1
1979	4/25-5/03		97	200									474,242	237.1	1,897.0
1980	4/23-4/30	10	458	200	60%	\$1.25	40%	\$0.85					603,880	301.9	2,415.5
1981	4/25	12	196	200	38%	\$1.25	60%	\$0.85			2% ^b	\$0.60	122,532	61.3	490.1
1982	5/05-5/08	73	152	187	83%	\$1.42	11%	\$0.95			6% ^b	\$0.74	291,430	145.7	1,165.7
1983	4/27	12	185	187	51%	\$2.00-2.45	35%	\$1.50-1.70			14% ^c		298,362	149.2	1,193.4
1984	Season Closed ^d		225 ^e	187											
1985	5/06 & 5/08	20	106	169	51%	\$1.25	49%	\$0.50					60,832	30.4	243.3
1986	4/30-5/03	86	29	142	97%	\$1.75		\$0.80			^b	\$0.80	95,205	47.6	380.8
1987	4/15-4/17	44	59	103	90%	\$1.70		\$0.85			^b	\$0.80	176,485	88.2	705.9
1988	4/29 & 4/30	12	159	103	64%	\$1.50	24%	\$0.75-1.00			12% ^b	\$0.75-1.00	194,762	97.4	779.0
1989	Season Closed ^d			110											
1990	4/21-4/22	16	134	104	37%	\$0.99	6%	\$0.52			57% ^b	\$0.88	237,575	118.8	950.3
1991	5/11-5/17	95	48	195					100%	\$0.75-0.85			215,147	107.6	860.8
1992	4/24-4/30	101	217	243	21%	\$0.70			76%	\$0.40	3%		504,663	252.3	2,018.7
1993	4/19-4/24	114	83	268					100%	\$0.55			325,181	162.6	1,300.7

^a 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.

^b Hair kelp.

^c Mostly *Macrocystis* spp. Some hair kelp.

^d Season remained closed due to lack of suitable spawn.

^e Permits issued.

^f All Pacific herring commercial sac roe and spawn-on-kelp fisheries in Prince William Sound were closed during the spring of 1989 due to the potential for contamination of catches from the T/V Exxon Valdez oil spill.

Appendix H.7. Pacific herring spawn-on-kelp harvest produced in pounds, Prince William Sound, 1979 - 1993.

Year	Fishery Dates ^a	Effort			Guideline Harvest (tons)	Blades Per Permit Holder	Spawn-on-Kelp Harvest ^b (tons)			Herring Utilized (tons) ^e
		Permits Issued ^b	Pounds Built ^c	Producing Pounds ^d			Ribbon	Macrocystis	Total	
1979		2	0							
1980	4/14	14	4	2	8		0.9	0.4	1.3	16.6
1981	4/14	18	18	7	16		8.6	1.1	9.7	120.7
1982	4/29-5/10	25	20	18	26		25.1	0.5	25.5	319.2
1983	4/30-5/04	47	38	26	26		17.7	10.1	27.9	348.8
1984	4/24-5/08	65	45	37	26		6.4	18.8	25.8	322.8
1985	4/25-5/07	81	59	50	40		12.1	28.1	40.2	502.1
1986	4/21-4/28	104	82	81	60		0	72.2	72.2	903.0
1987	4/10-4/21	111	111	108	85		0	61.2	61.2	765.1
1988	4/12-4/23	122	122	119	85		0	123.2	123.2	1,540.5
1989 Season Closed ^f										
1990	4/11-4/26	128	128	122	118		0	98.8	98.8	1,235.3
1991	4/07-4/20	126	126	119	220	1,200	0	202.4	202.4	2,530.5
1992	4/07-4/24	127	127	127	276	1,770	0	242.2	242.2	3,027.7
1993	4/10-4/22	128	124	52	305	1,950	0	106.4	106.4	1,330.5

a Dates that the fishery was opened to seines for the capture and placement of Pacific herring into pounds.

b Commssioner's permits issued to applicants on register prior to the March 1 deadline.

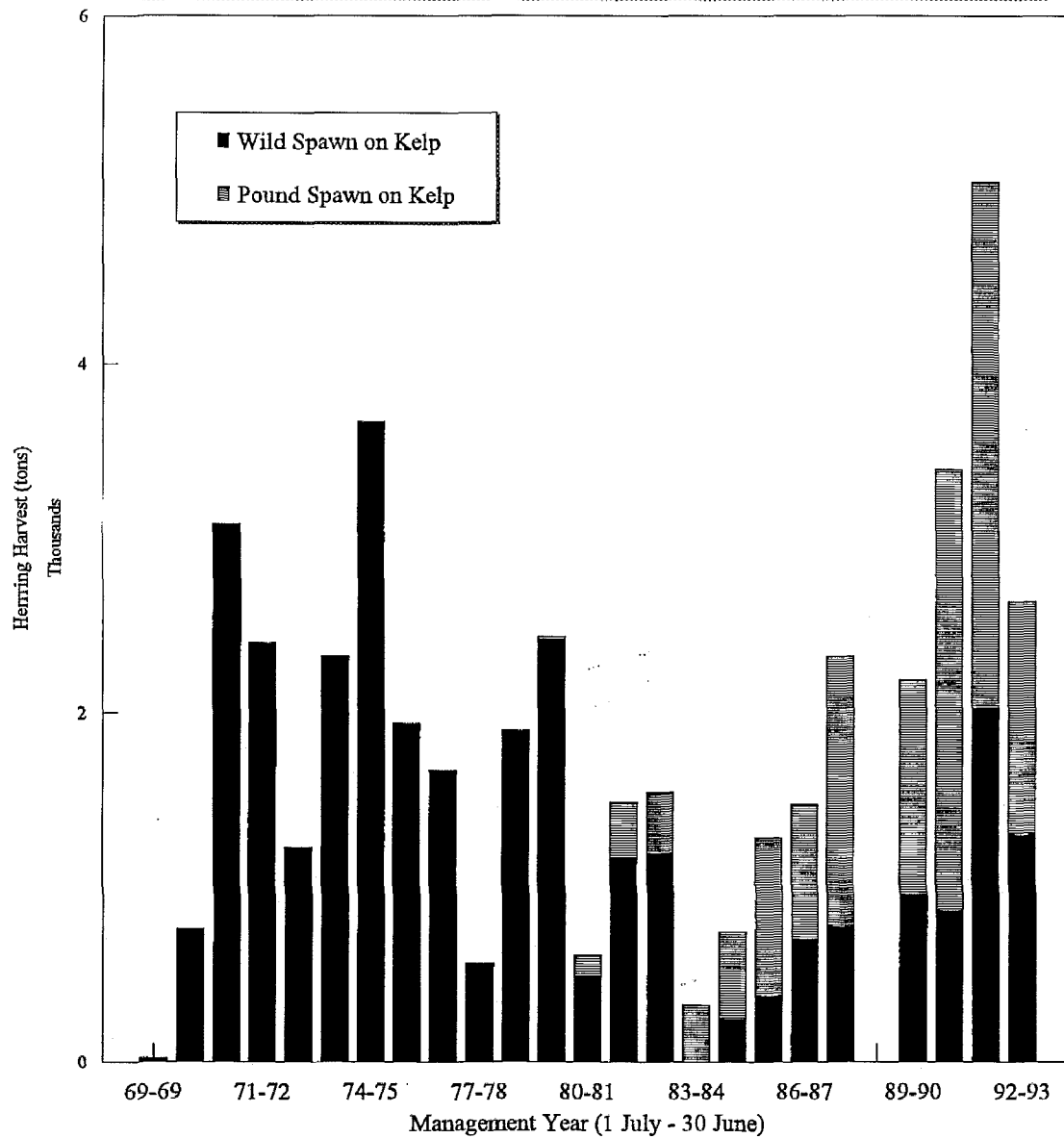
c Number of individual pounds constructed by the April 1 deadline, and consequently the number of individuals receiving an equal allocation of the guideline harvest.

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

e The equivalent harvest of Pacific herring due to stress mortality and the removal of reproductive capacity of the population based on the assumption that 12.5 tons of Pacific herring are used to produce 1 ton of spawn-on-kelp product.

f All Pacific herring commercial sac roe and spawn-on-kelp fisheries in Prince William Sound were closed during the spring of 1989 due to the potential for contamination of catches from the T/V Exxon Valdez oil spill.

Spawn on Kelp Herring Usage Prince William Sound



Appendix H.8.

Prince William Sound commercial spawn-on-kelp herring usage by management year, 1969-1993.

Appendix H.9. Prince William Sound commercial Pacific herring food/bait fishery effort and harvests, 1970-1993.

Management	Fishing		Guideline	Purse Seine		Pair Trawl		Mid-Water Trawl		Otter Trawl		Total	
	Dates			Effort (Boats)	Harvest (tons)	Effort (Boats)	Harvest (tons)	Effort (Boats)	Harvest (tons)	Effort (Boats)	Harvest (tons)	Harvest (tons)	
	Year	Opened											Closed
1969-1970	10/01/69	- 06/30/70	a	-	14.0							14.0	
1970-1971	10/01/70	- 06/30/71	a									0.0	
1971-1972	10/01/71	- 06/30/72	a	-	20.0							20.0	
1972-1973	10/01/72	- 05/09/73	a	-	9.0							9.0	
1973-1974	08/27/73	- 04/17/74	a	b	-	8.5						8.5	
1974-1975	07/15/74	- 03/10/75		b								0.0	
1975-1976	06/01/75	- 06/25/75	c	b	4	226.7						226.7	
1976-1977	02/01/77	- 03/09/77		b								0.0	
1977-1978	10/01/77	- 02/28/78		b	-	17.0	-	145.3				162.3	
1978-1979	10/16/78	- ?	d	b	-	195.4	7	988.7	-	9.4	-	81.0	1,274.4
1979-1980	09/16/79	- 02/28/80	e	1,400	-	510.8	4	145.1	-	103.2	-	2.6	761.7
1980-1981	09/15/80	- 11/07/80		1,400	-	1,030.4	6	275.7					1,306.1
1980-1982	09/15/81	- 09/30/81		1,400	7	1,189.4	-	73.1					1,262.5
1982-1983	09/15/82	- 01/31/83		1,400	6	797.3							797.3
1983-1984	09/15/83	- 01/31/84		1,400	-	257.6							257.6
1984-1985	09/15/84	- 01/31/85		1,400	-	936.2							936.2
1985-1986	09/01/85	- 02/15/86		1,400	6	1,118.1							1,118.1
1986-1987	09/01/86	- 10/24/86		1,400	6	1,276.2							1,276.2
1987-1988	09/02/87	- 11/12/87	f	1,400	7	1,189.4							1,189.4
1988-1989	11/01/88	- 11/05/88		1,400	8	1,335.3							1,335.3
1989-1990	11/01/89	- 01/31/90		1,694	-	646.1							646.1
1990-1991	09/21/90	- 11/24/90	g	3,151	5	1,955.0			-	60.8			2,015.9
1991-1992	10/01/91	- 10/14/91		3,956	14	4,258.5							4,258.5
1992-1993	10/01/92	- 10/22/92		3,416	h	17	3,900.3						3,900.3
1993-1994	10/07/93	- 10/10/93		978	i	8	1,087.0						1,087.0

^a Openings set by regulation. Ending date coincides with regulatory ending of sac roe season.

^b No Official quota, but unofficial goal was 1,500 tons.

^c Harvest from special June food-and-bait fishery opening. Although this harvest actually occurred at the end of the 1975 management year, it is included in the 1976 harvest management year to be consistent with other food-and-bait harvests which occur after spring sac roe fisheries.

^d Fishery closed from 1 January to 6 January 1979.

^e Fishery closed from 1 January to 15 February 1980.

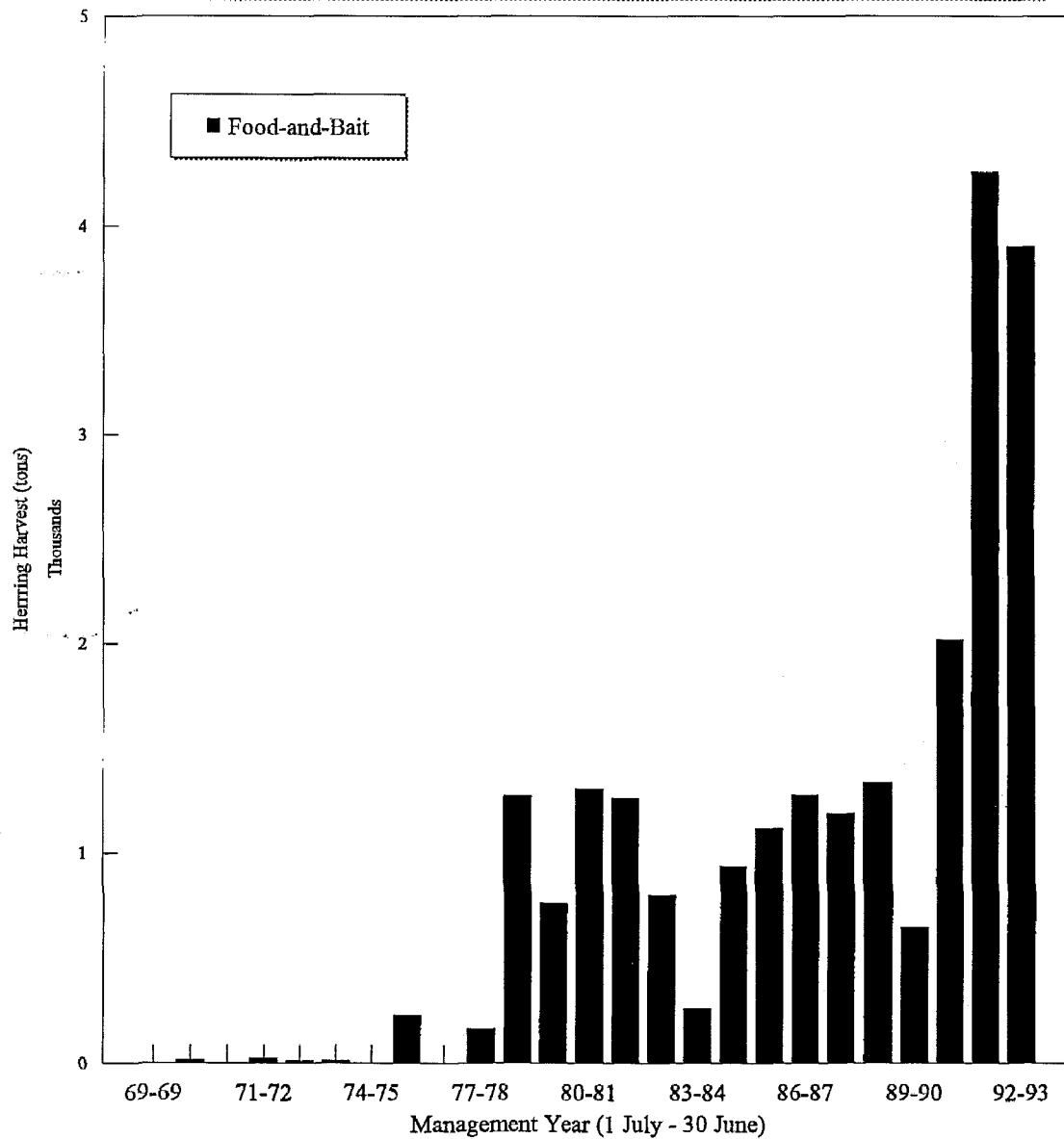
^f Fishing season opened by regulation on September 1, 1987 in the General District. The north-shore and east-shore Pacific herring districts opened on September 23. The season was closed by emergency order on October 6 for a period of five weeks, reopened on November 9, and closed for the duration of the 1987-88 season on November 12, 1987.

^g Fishery open from September 21 until November 24. The Montague Island area was open from September 24 until November 24.

^h Preseason guideline harvest level based on spawn deposition biomass estimate. Final guideline harvest based on age-structured analysis was issued in January 1993 and was 4,373 tons.

ⁱ Preseason guideline harvest level based on preliminary aerial survey biomass estimate of 40,000 tons.

Food-and-Bait Herring Harvest Prince William Sound



Appendix H.10. Prince William Sound commercial food-and-bait herring harvest, 1969-1993.

Appendix H.11.

Annual Pacific herring biomass indices, Prince William Sound, 1974-1993.

Management Year	Total Sac Roe Harvest ^a (tons)	Aerial Survey Estimates				Unexploited Escapement Biomass		Pre-Fishery Run Biomass
		Peak Biomass Estimate ^b (tons)	Maximum Possible Observed Biomass ^c	Miles of Spawn ^d	Mile Days of Spawn ^e	Spawn Deposition Surveys ^f (tons)	Age Structured Analysis (tons)	Age Structured Analysis (tons)
1973-1974	6,374.8	41,080	107,290	38.5	75.2		34,743.7	41,068.8
1974-1975	5,853.8			34.2	42.4		31,592.2	37,772.9
1975-1976	2,584.2	7,330	25,247	32.8	33.7		27,491.6	30,486.6
1976-1977	2,267.1	16,830	17,460	39.3	73.5		25,703.7	27,986.5
1977-1978	1,391.2	13,410	36,540	28.7	36.3		22,037.4	23,423.0
1978-1979	4,138.0	42,100	107,390	54.5	73.2		32,899.5	37,044.2
1979-1980	6,306.7	62,110	122,050	50.5	73.9		51,253.0	56,139.5
1980-1981	14,002.8	77,810	161,690	85.4	140.1		51,707.2	65,446.3
1980-1982	7,542.2	68,790	97,620	49.0	65.1		46,853.7	53,884.2
1982-1983	2,833.9	41,850	107,710	67.4	99.8	22,000 ^g	59,080.5	61,862.7
1983-1984	6,288.8	58,870	158,760	60.1	86.8	58,089	71,114.4	76,138.8
1984-1985	7,177.4	20,830	60,954	101.2	149.5		85,809.3	93,275.3
1985-1986	10,276.7	15,180	54,820	72.4	152.3		69,704.6	79,621.0
1986-1987	5,515.5	26,580	52,192	65.3	155.9		80,886.4	86,166.5
1987-1988	8,330.3	34,270	67,175	166.3	236.9	53,785	123,253.7	131,454.9
1988-1989	^h	56,915	186,708	98.4	185.8	49,914	133,235.1	133,235.1
1989-1990	8,867.5	57,900	145,013	94.1	144.4	127,478	100,564.8	110,606.9
1990-1991	12,665.1	42,765	141,375	58.0	64.8	140,964	74,319.9	88,976.3
1991-1992	17,724.8	53,835	130,569	74.7	99.5	128,263	74,234.0	91,791.6
1992-1993	1,029.9	20,725	109,865	20.4	40.8		30,004.9	32,048.6
1993-1994 ⁱ		20,000				15000		29,786.6
1994-1995								
1995-1996								

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

^b Largest single day aerial estimate of Pacific herring biomass in short tons.

^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 Pacific herring spawn.

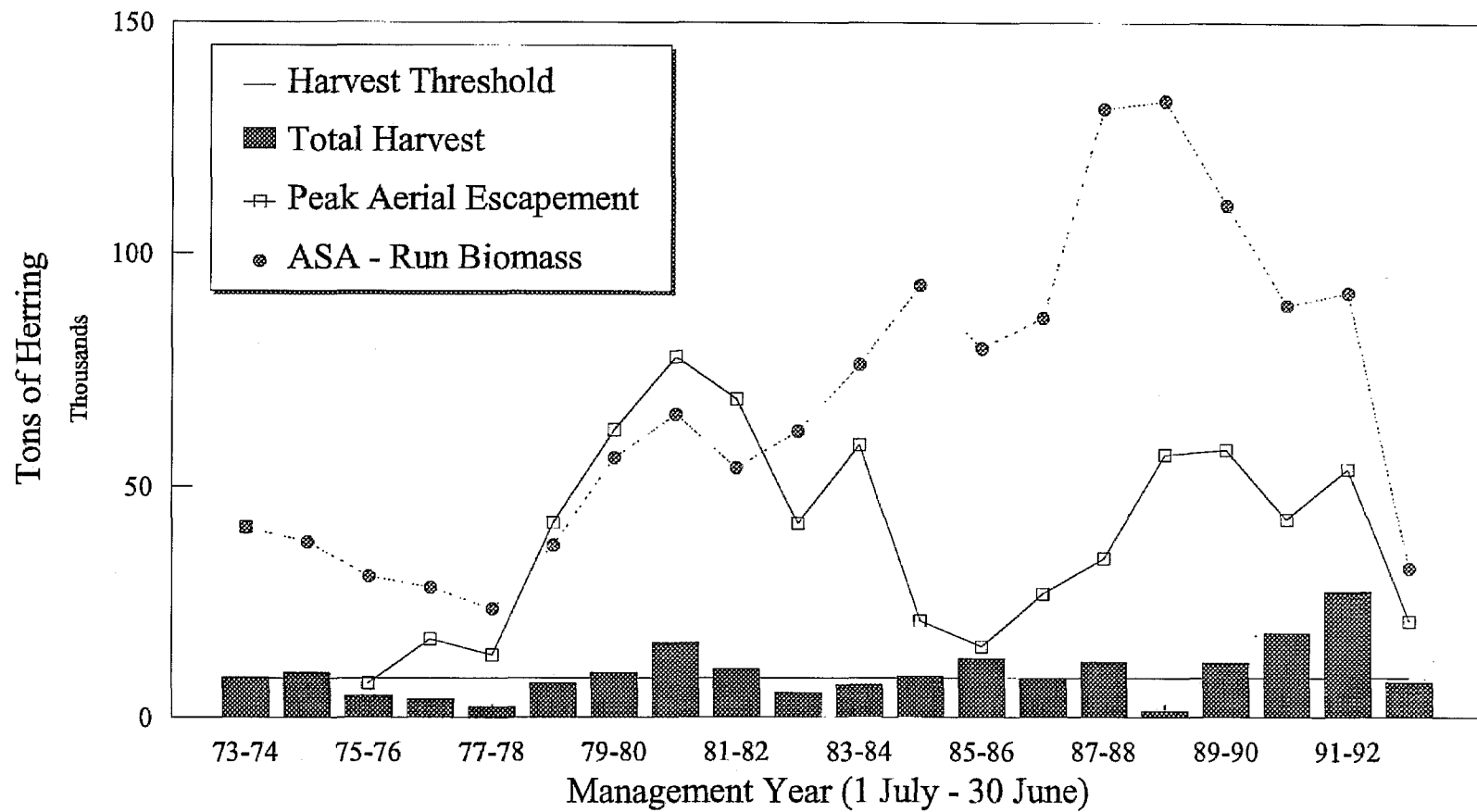
^f Estimates are made from underwater surveys of spawn deposition.

^g Partial estimate of spawning biomass from feasibility study.

^h All Pacific herring commercial sac roe and spawn-on-kelp fisheries in Prince William Sound were closed during the spring of 1989 due to the potential for contamination of catches from the T/V Exxon Valdez oil spill.

ⁱ Projected run biomass estimate from age structured analysis, December 1993.

PWS Herring Biomass Estimates



Appendix H.12. Prince William Sound annual herring biomass indices, harvest, and harvest threshold by management year, 1974-1993.

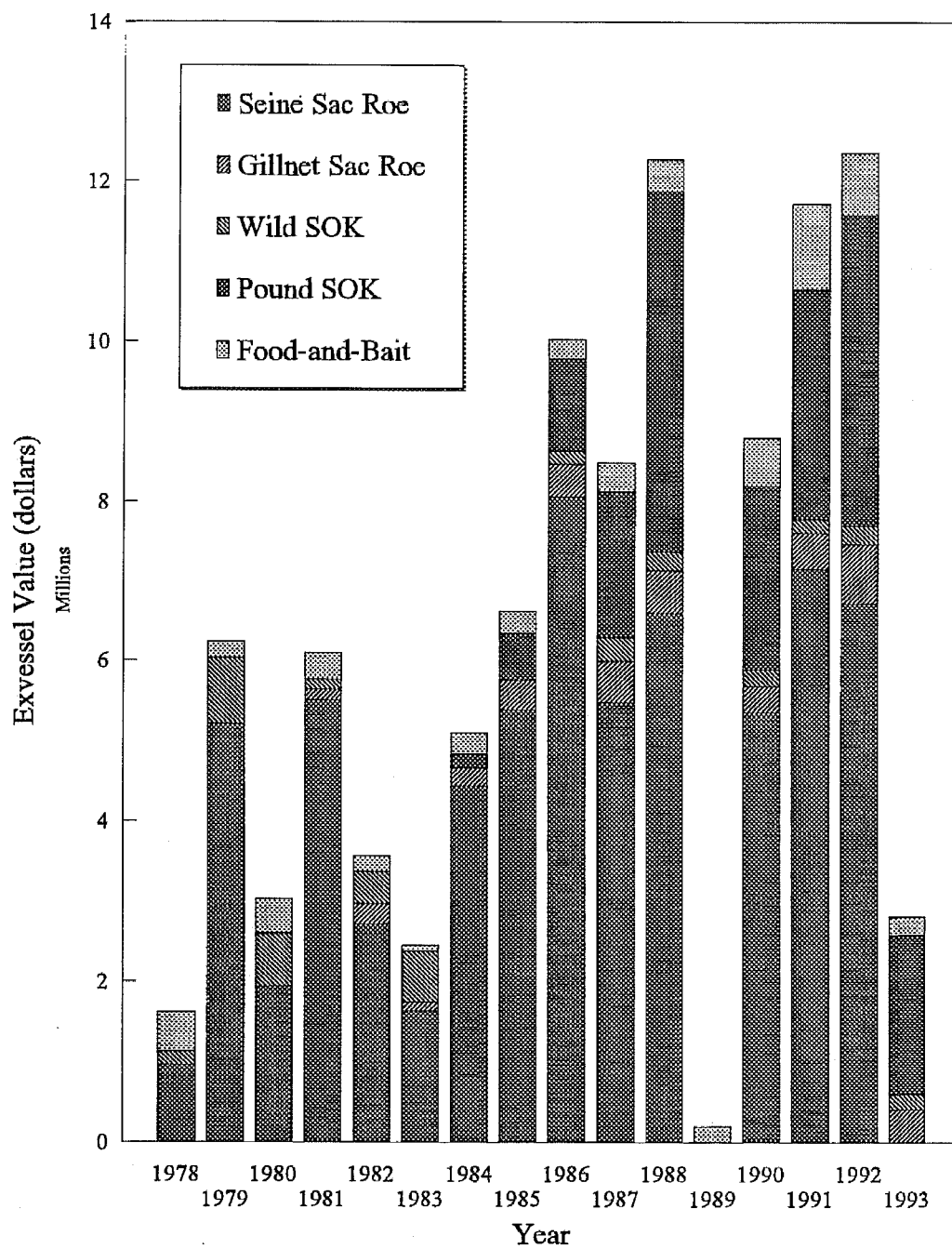
Appendix H.13. Mean price and estimated exvessel value of the commercial Pacific herring harvest by gear type based on verbal post season estimates from processors and fishermen, Prince William Sound, 1978-1993.

Calendar Year	Sac Roe Fisheries				Spawn on Kelp Fisheries				Food-and-Bait Fishery		
	Purse Seine		Gillnet		Wild Spawn on Kelp		Pounds		Mixed Gear		
	Price per ton	Total Value	Price per ton	Total Value	Price per lb	Total Value	Price per lb ^a	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	NO HARVEST		\$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	SEASON CLOSED		SEASON CLOSED		SEASON CLOSED		SEASON CLOSED		\$300	\$193,830	\$193,830
1990	\$640	\$5,351,744	\$640	\$323,456	\$0.90	\$213,840	\$11.40	\$2,305,080	\$300	\$605,130	\$8,799,250
1991	\$600	\$7,153,800	\$600	\$445,200	\$0.80	\$172,160	\$9.00	\$2,880,000	\$250	\$1,064,625	\$11,715,785
1992	\$400	\$6,713,680	\$800	\$752,480	\$0.46	\$232,116	\$8.00	\$3,875,200	\$200	\$780,060	\$12,353,536
1993	No Harvest		\$400	\$411,960	\$0.55	\$178,860	\$10.00	\$2,000,000	\$200	\$217,400	\$2,808,220

^a The price per pound for spawn on kelp in pounds is based on the final product weight, not harvest weight.

Exvessel Value of Herring Fisheries

Prince William Sound



Appendix H.14.

Average annual exvessel value of commercial herring fisheries, Prince William Sound, 1978-1993.

Appendix H.15.

Preliminary age and sex composition, mean weight-at-age, and mean length-at-age of herring sampled from the commercial gillnet sac roe fishery at Rocky Bay and Graveyard Point, Montague Island area, Prince William Sound, Alaska, 15-18 April 1993.

Year Class	Age Class	Age and Sex Composition						Weight (g)						Standard Length (mm)					
		Male		Female		Combined ¹		Male		Female		Combined		Male		Female		Combined	
		Number	Percent	Number	Percent	Number	Percent	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1992	1	0	0.0	0	0.0	0	0.0												
1991	2	0	0.0	0	0.0	0	0.0												
1990	3	0	0.0	0	0.0	0	0.0												
1989	4	0	0.0	2	0.3	2	0.3			100	37	100	37			193	18	193	18
1988	5	30	3.9	103	13.5	134	17.6	130	17	131	15	131	16	216	10	217	8	216	8
1987	6	2	0.3	6	0.8	8	1.1	162	1	143	10	148	12	230	1	228	5	228	4
1986	7	24	3.2	37	4.9	61	8.0	145	13	146	12	146	12	225	9	228	7	227	8
1985	8	91	12.0	102	13.4	193	25.4	147	15	150	16	148	16	229	8	230	9	229	8
1984	9	169	22.2	170	22.3	339	44.5	147	13	153	18	150	16	229	8	231	9	230	9
1983	10	9	1.2	10	1.3	19	2.5	155	21	154	19	154	19	232	13	233	11	232	12
1982	11	1	0.1	1	0.1	2	0.3	181		149		165	23	247		239		243	6
1981	12	1	0.1	0	0.0	1	0.1	155				155		244				244	
1980	13	0	0.0	0	0.0	0	0.0												
Total		328	43.1	432	56.8	761	100.0	146	16	146	19	146	17	228	10	227	11	227	10
Unaged		31	48.4	32	50.0	64	100.0	145	12	146	18	146	15	228	8	226	11	227	10

¹ Sample size for sexes combined may be greater than the sum of males and females due to immature fish for which sex could not be determined.

Appendix H.16. Preliminary age and sex composition, mean weight-at-age, and mean length-at-age of herring sampled from commercial purse seine pound and test fish purse seine catches at Two Moon Bay, Picnic Cove, and Landlocked Bay, northeast-shore area, Prince William Sound, Alaska, 7-10 April 1993.

Sample	Year Class	Age Class	Age and Sex Composition						Weight (g)						Standard Length (mm)					
			Male		Female		Combined		Male		Female		Combined		Male		Female		Combined	
			Number	Percent	Number	Percent	Number	Percent	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Two Moon Bay 7-18 April 93	1991	2	0	0.0	0	0.0	0	0.0												
	1990	3	7	1.6	4	0.9	12	1.0	72.9	12	67	12	69	13	179	9	176	8	177	10
	1989	4	9	2.0	6	1.3	15	1.3	97	11	103	13	99	12	198	7	203	13	200	10
	1988	5	390	87.6	341	76.6	736	64.3	110	14	115	15	112	15	207	8	209	8	208	8
	1987	6	15	3.4	9	2.0	24	2.1	120	25	116	13	118	21	213	14	215	10	214	13
	1986	7	12	2.7	13	2.9	26	2.3	134	17	142	26	140	24	226	7	226	14	227	11
	1985	8	47	10.6	47	10.6	95	8.3	148	18	148	19	148	18	227	9	229	10	228	10
	1984	9	95	21.3	126	28.3	221	19.3	155	19	159	19	158	19	231	10	233	8	232	9
	1983	10	4	0.9	7	1.6	11	1.0	161	37	174	27	169	30	230	15	245	11	235	14
	1982	11	0	0.0	2	0.4	2	0.2			173	9	173	9			242	4	242	4
	1981	12	0	0.0	2	0.4	2	0.2			192	1	192	1			255	5	255	5
	1980	13	0	0.0	0	0.0	0	0.0												
	Total		579	130.1	557	125.2	1,144	100.0	121	25	129	27	125	27	213	14	217	15	215	15
	Unaged		17	340.0	13	260.0	30	100.0	126	31	125	22	125	27	215	14	215	14	215	14
Picnic Cove Landlocked Bay 10 April 93	1992	1	0	0.0	0	0.0	0	0.0												
	1991	2	0	0.0	0	0.0	0	0.0												
	1990	3	6	1.3	3	0.6	10	2.1	66	12	80	14	68	14	177	13	185	11	179	12
	1989	4	3	0.6	9	1.9	13	2.8	87	25	100	28	94	27	195	10	201	21	198	18
	1988	5	160	33.9	128	27.1	291	61.7	104	14	111	15	107	15	205	8	207	8	206	8
	1987	6	6	1.3	6	1.3	12	2.5	110	10	119	18	115	15	209	6	215	9	212	8
	1986	7	6	1.3	9	1.9	16	3.4	126	14	129	21	130	19	221	8	219	11	221	10
	1985	8	28	5.9	27	5.7	55	11.7	141	18	152	15	146	17	225	9	232	7	228	9
	1984	9	33	7.0	36	7.6	69	14.6	151	20	152	18	152	19	232	11	231	10	232	10
	1983	10	0	0.0	1	0.2	1	0.2			187		187				257		257	
	1982	11	1	0.2	3	0.6	4	0.8	199		169	18	176	21	252		240	2	243	6
	1981	12	1	0.2	0	0.0	1	0.2	159				159		228				228	
	1980	13	0	0.0	0	0.0	0	0.0												
	Total		244	51.7	222	47.0	472	100.0	115	26	124	26	119	27	211	15	215	15	212	15
	Unaged		5	62.5	3	37.5	8	100.0	116	19	128	30	120	22	212	19	214	20	213	18

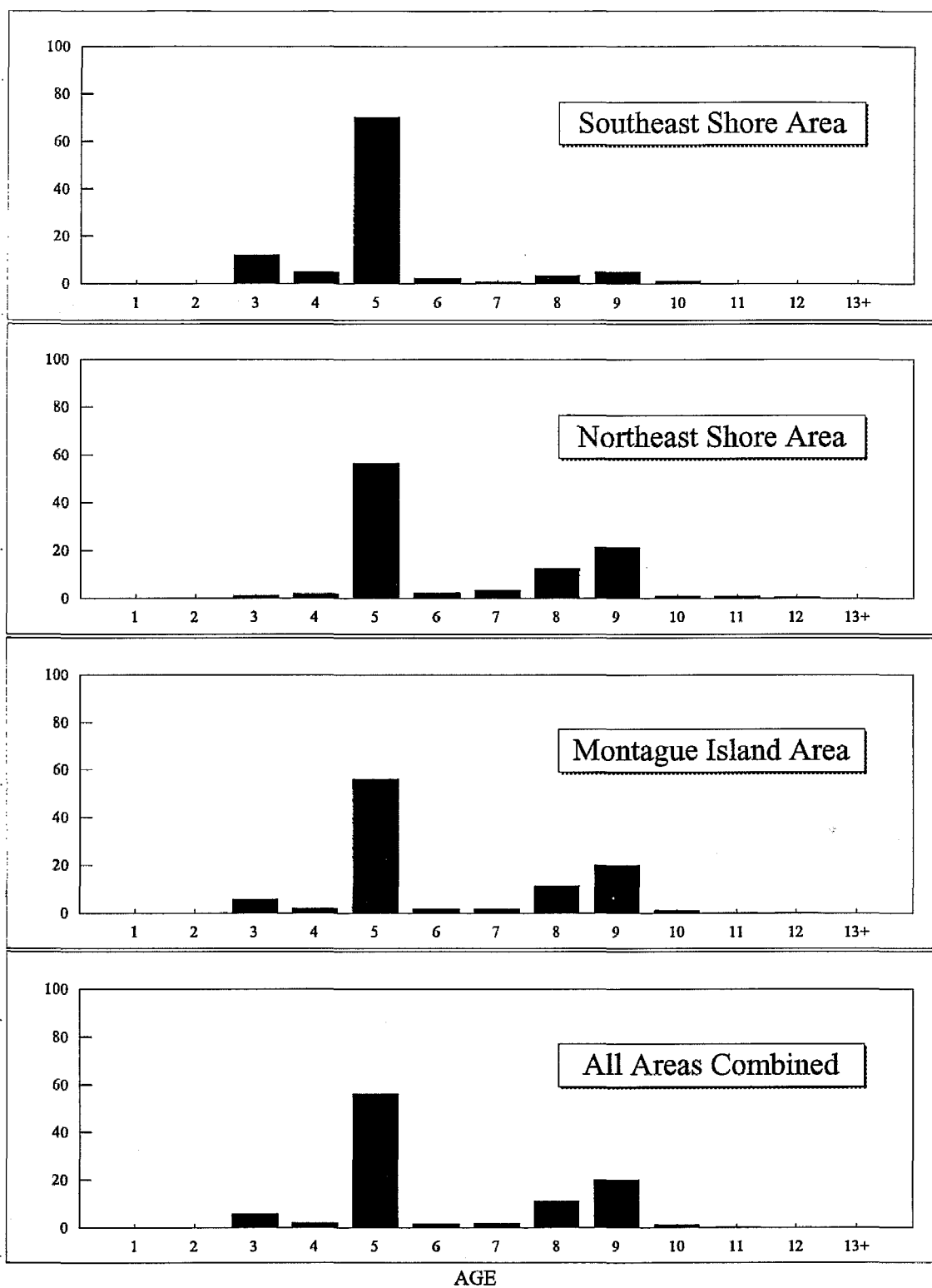
Appendix H.17.

Preliminary age, sex, and size composition of Pacific herring sampled from commercial food-and-bait fishery purse seine catches at Green Island, Prince William Sound, 7-10 October 1993.

Year Class	Age Class	Age and Sex Composition						Weight (g)						Standard Length (mm)					
		Male		Female		Combined		Male		Female		Combined		Male		Female		Combined	
		Number	Percent	Number	Percent	Number	Percent	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1991	2	5	0.4	3	0.3	9	1.1	76	9	91	30	80	19	176	6	183	16	178	10
1990	3	63	5.5	58	5.1	121	14.3	107	17	103	15	105	16	196	10	196	8	196	9
1989	4	34	3.0	23	2.0	57	6.7	128	21	132	23	129	22	208	10	210	10	209	10
1988	5	295	25.8	248	21.7	544	64.2	144	19	143	19	144	19	214	9	216	9	215	9
1987	6	11	1.0	10	0.9	21	2.5	168	17	162	21	165	19	227	10	225	6	226	8
1986	7	10	0.9	2	0.2	13	1.5	171	28	174	35	171	26	229	9	222	7	229	9
1985	8	30	2.6	25	2.2	55	6.5	178	21	180	18	179	19	231	9	233	8	232	9
1984	9	17	1.5	9	0.8	26	3.1	186	20	184	21	185	20	234	9	234	8	234	9
1983	10	0	0.0	0	0.0	0	0.0												
1982	11	0	0.0	1	0.1	1	0.1			194		194				259		259	
1981	12	0	0.0	0	0.0	0	0.0												
1980	13	0	0.0	0	0.0	0	0.0												
Total		465	40.6	379	33.1	847	100.0	142	28	140	28	141	28	213	14	214	13	214	13
Unaged		6	20.0	6	20.0	12	100.0	122	29	179	31	150	41	206	15	231	13	218	19

Prince William Sound Herring Spawning Biomass Age Composition

Percent Contribution by Weight



Appendix H.18. Percent contribution by age class in the herring spawning biomass, Prince William Sound, 1993

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