

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

-1999-

BRISTOL BAY AREA



Regional Information Report¹ No. 2A00 - 20

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March, 2000

¹Contribution 2000-xx from the Anchorage Regional office. The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate needs for up-to-date information reports in this series may contain preliminary data.

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PREFACE

The 1999 Bristol Bay Management Report is the fortieth consecutive annual volume reporting on management activities of the Division of Commercial Fisheries staff in Bristol Bay. The report emphasizes a descriptive account of the information, decisions, and rationale used to manage the Bristol Bay commercial salmon and herring fisheries, and outlines basic management objectives and procedures. We have included all information deemed necessary to fully explain the rationale behind management decisions formulated in 1999. All narrative and data tabulations in this volume are combined under separate SALMON and HERRING sections to aid in the use of this document as a reference source.

The extensive set of tables has been updated to record previously unlisted data for easy reference. Fisheries data in this report supersedes information in previous reports. Corrections or comments should be directed to the Dillingham office. Attention: Editor.

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ACKNOWLEDGEMENTS

The authors gratefully acknowledge the Commercial and Subsistence Fisheries staff of the Dillingham, King Salmon and Anchorage offices of the Alaska Department of Fish and Game for their contributions to this report. These Divisions employed 15 permanent employees and 70 seasonal employees in Bristol Bay during the 1999 season, each of which participated in various area management and research programs. In addition, Bristol Bay Economic Development Corporation provided two seasonal interns. Thanks are extended to all personnel for a successful season.

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ACKNOWLEDGEMENTS (Continued)

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ACKNOWLEDGEMENTS (Continued)

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BRISTOL BAY

SALMON

FISHERY

INTRODUCTION

Management Area Description

The Bristol Bay management area includes all coastal waters and inland waters east of a line from Cape Newenham to Cape Menshikof (Figure 1). The area includes eight major river systems: Naknek, Kvichak, Egegik, Ugashik, Wood, Nushagak, Igushik and Togiak. Collectively, these rivers are home to the largest commercial sockeye salmon fishery in the world. Sockeye salmon are by far the most abundant salmon species that return to Bristol Bay each year, but chinook, chum, coho, and (in even-years) pink salmon returns are important to the fisheries as well.

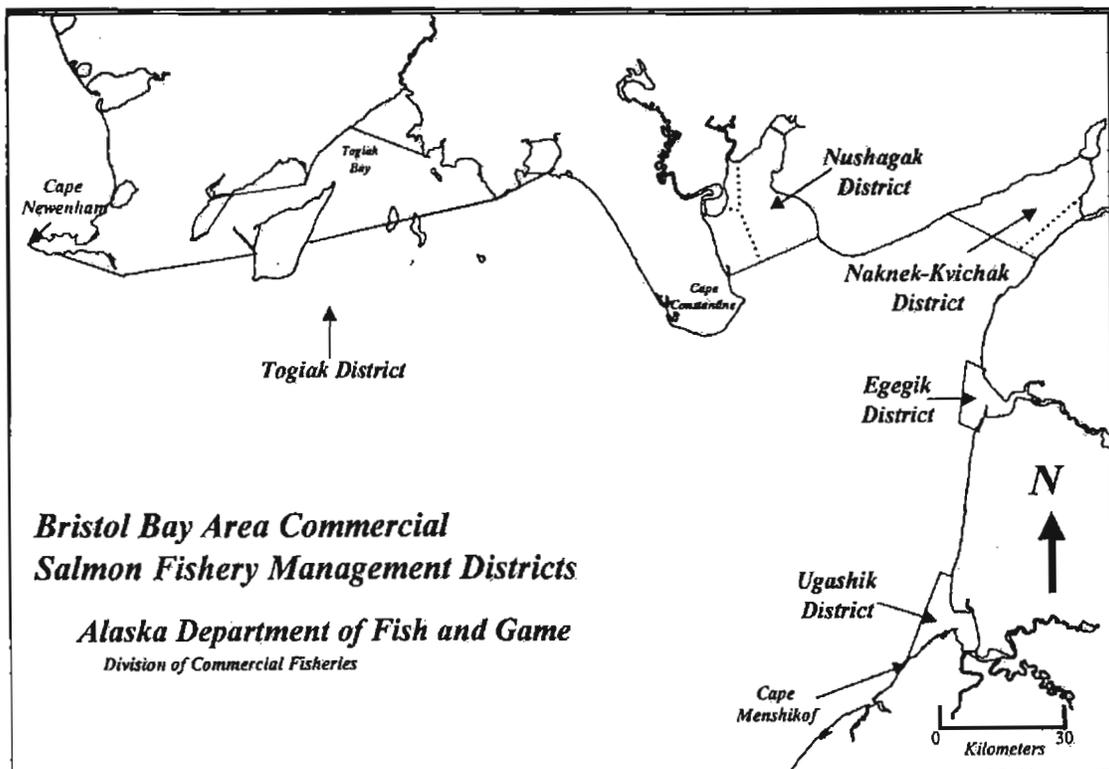


Figure 1.

The Bristol Bay area is divided into five management districts (Naknek-Kvichak, Egegik, Ugashik, Nushagak, and Togiak) that correspond to the major river drainages. The management objective for each river is to achieve desired escapement goals for the major salmon species while harvesting all fish in excess of the escapement requirement through orderly fisheries. In addition, regulatory management plans have been adopted for individual species in certain districts.

Overview of the Bristol Bay Salmon Fisheries

The five species of pacific salmon found in Bristol Bay are the focus of major commercial, subsistence and sport fisheries. Annual commercial catches (1979-1998) average 25.5 million sockeye salmon, 112 thousand chinook, 1.1 million chum, 207 thousand coho, and 1.0 million (even-years only) pink salmon (Appendix Tables 5-9). Since 1989, the value of the commercial salmon harvest in Bristol Bay has averaged \$143 million, with sockeye salmon being the most valuable, worth an average \$140 million (Appendix Table 29). Subsistence catches average approximately 143 thousand salmon and are also comprised primarily of sockeye salmon (Appendix Table 31). Sport fisheries harvest all species of salmon, with most effort directed toward chinook and coho stocks. Approximately 45,000 salmon are harvested annually by sportfishermen in Bristol Bay.

Management of the commercial fishery in Bristol Bay is focused on discrete stocks with harvests directed at terminal areas around the mouths of major river systems. Each stock is managed to achieve a spawning escapement goal based on maximum sustained yield. Escapement goals are achieved by regulating fishing time and area by emergency order and/or adjusting weekly fishing schedules. Legal gear for the commercial salmon fishery includes both drift (150 fathoms) and set (50 fathoms) gillnets. Drift gillnet permits are the most numerous at 1,906 in Area T, of those 1,898 registered in 1999. Setnet permits registered in 1999 totaled 1,014 (Appendix Table 3 and 4).

1999 COMMERCIAL SALMON FISHERY

Run Strength Indicators

Fishery managers in Bristol Bay have several early indicators of sockeye run size, including: the preseason forecast, the False Pass fishery, the Port Moller test boat, the district test program, and the early performance of the commercial fishery. Evaluated individually, each of these pieces of information may not give a correct assessment of run size. Collectively they form patterns such as missing year classes, discrepancies with the forecast, or differences in run timing that can be important to the successful management of the commercial fishery.

Preseason Forecasts

Total inshore sockeye salmon production for Bristol Bay in 1999 was forecasted to be 24.9 million fish (Table 1). The inshore sockeye harvest was predicted to reach approximately 14.1 million fish. Runs were expected to exceed spawning escapement goals for all river systems.

The 1999 forecast was based on three separate time series of data using spawner-return, sibling-return, and smolt-return relationships for each river where data were available. Time series utilizing "old" data was from 1956-1977, data from 1956-1998 is referred to as "all" data; and 1978-1998 referred to as "new" data. The time series used was based on hindcasting the 1994-1998 sockeye salmon returns. The predictions used for 1999 utilizing the old data series were Egegik, Ugashik and Togiak, the all data series were Kvichak, Branch, Naknek, Igushik and Nushagak and the new data series Wood River.

South Unimak/Shumagin Island Fishery

The inseason development of the South Unimak/Shumagin Island intercept sockeye fishery is closely monitored by Bristol Bay fishery managers for indications of migration timing, relative abundance, age composition and fish size in the incoming Bristol Bay run. Indications from these fisheries give the terminal fisheries managers notice of what to expect, and provides advanced warning of any potential differences that may exist between actual and forecasted run statistics. However, data obtained from these two fisheries have not always given an accurate picture of the Bristol Bay run size. Onshore winds tend to move the fish into areas more accessible to the fleet, resulting in a higher catch per unit of effort, and high winds affect the fleet's ability to harvest their quota. Those variables in addition to unusual fish size or run timing can make the information difficult to interpret.

These fisheries are managed under a guideline harvest (quota) specified in 5 AAC 09.365, the South Unimak/Shumagin Islands June Fishery Management Plan initially adopted in 1974 by the Alaska Board of Fisheries. The original intent of the Alaska Board of Fisheries was to prevent over harvest of sockeye runs bound for individual river systems in Bristol Bay.

The management plan was brought before the Board for review in February 1988. At that time the Board elected to maintain a traditional harvest pattern, and set maximum allowable harvest levels at 6.8% of the forecasted inshore harvest for Bristol Bay for the South Unimak fishery, and 1.5% of the forecasted harvest for the Shumagin Island fishery. In addition the Board set a maximum allowable catch of chums that could occur during the South Unimak/Shumagin Islands June Fishery. The "chum cap" often changes, recently, it was lowered from 700,000 to a floating cap that can range from 350,000 to 650,000 fish depending on a Arctic-Yukon-Kuskokwim (A-Y-K) harvest projection based on the previous year's harvest of summer chum salmon in A-Y-K. For 1999 the chum cap was 350,000 to 400,000.

The sockeye harvest allocation for the South Peninsula June fishery this season was 1,250,000 (1,024,000 for South Unimak and 226,000 for the Shumagins), based on the 1999 projected harvest in Bristol Bay (Appendix Table 30). Preliminary catch information indicates that the Shumagin Island fishery landed 269,200 sockeye, and the South Unimak fishery landed 1,106,200 sockeye. The total catch for the June fishery of 1,375,400 was slightly more than 7% above the allocation. Due to the low incidental harvest of chum salmon (245,000) in the directed sockeye fishery, the allowable floating cap was not breached.

Port Moller Test Fishery

For many years the Department of Fish and Game ran a test fish program out of the community of Port Moller. A large vessel would fish specific loran stations on transect lines across the migration path of sockeye on route to Bristol Bay. Data collected was used to estimate run strength, timing, age, and size composition. Though the performance was not always good, the project was very popular with salmon processors as it gave an additional indication of run size, which influenced production capacity and the price paid to fishermen.

Through voluntary funding from the industry, the Port Moller test fish project was resumed and has been operated by staff from the Fisheries Research Institute (FRI), University of Washington since 1987. When the project changed leadership a newer more modern type of gear was employed, and a different method of fishing was used. Though the program is still plagued with gaps in the data due to unfishable weather and equipment breakdowns, recent data collected has provided a more accurate assessment of run size. Information concerning the project is shared with the department on a daily basis inseason and analyzed extensively by the Commercial Fisheries research staff in King Salmon.

Economics and Market Production

Until 1991, price disputes had not been a factor in the Bristol Bay salmon fishery for many years – attributable to the large increase in the number of floating fish processors and the establishment of individual market agreements with small groups of fishermen. However, a large expected reduction in the sockeye price in 1991 resulted in a major price dispute between fishermen and processors. A settlement was achieved and the fishery harvested approximately 25.8 million sockeye salmon (Appendix Table 5) from a total run of 41.9 million (Appendix Table 20). There have been no price disputes since 1991.

In 1999, the exvessel value of the commercial salmon inshore harvest was estimated at \$110.2 million (Appendix Table 29). The 1979 to 1998 average exvessel value of Bristol Bay commercial salmon fisheries is about \$134 million.

During the 1999 season, 8 companies canned, 26 companies froze and 5 companies cured salmon in Bristol Bay. In addition, 4 companies exported fresh fish by air, and 4 companies shipped salmon out by sea in refrigerated seawater (RSW) or brine (Table 33). A total of 29 processors/buyers reported catches from Bristol Bay in 1999.

Run and Harvest Performance by Species

The combined commercial salmon harvest in Bristol Bay totaled 26.5 million fish in 1999. This was still less than the 20-year average of 27.4 million salmon (Appendix Table 10) for Bristol Bay.

Sockeye Salmon

The 1999 inshore sockeye return of 40.0 million fish was approximately 38% above the preseason forecast of 25.4 million (Table 1). Actual runs to all districts were above forecast: for the Naknek/Kvichak District 17%, 61% for the Egegik District, 64% for the Ugashik District, 43% for the Nushagak District, and 51% for the Togiak District (Table 1).

Sockeye salmon dominated the inshore commercial harvest, and totaled 25.8 million fish (Tables 1 and 4). Sockeye escapement goals were met or exceeded in all of the eight river systems where spawning requirements have been defined (Table 1).

Chinook Salmon

Chinook salmon harvests in 1999 were below the recent 20-year averages in all districts (Appendix Table 6). The 1999 bay-wide commercial harvest of 26,077 chinook was the smallest since 1944 and well below the 20-year average of 111,600.

Chum Salmon

In 1999, the inshore commercial harvest of 654,338 chum salmon was the third lowest in the last 20-years and well below the 20-year average of 1.1 million (Appendix Table 7). Chum salmon catches were below average in all districts except in the Naknek/Kvichak District.

Pink Salmon

Bristol Bay has a dominant even-year pink salmon cycle. The 1999 return produced a harvest of only 77 fish (Appendix Table 8).

Coho Salmon

The 1999 bay-wide commercial harvest of coho salmon totaled 19,831 fish, which was well below the recent 20-year average of 207,200 (Appendix Table 9). Coho catches were below average in all the districts.

SEASON SUMMARY BY DISTRICT

Naknek/Kvichak District

The preseason projection of sockeye salmon to the Naknek/Kvichak District was approximately 14.7 million (Table 1). Escapement goals were set at 6.0 million (6.0-10.0 million range) for the Kvichak River and 1.1 million (0.8-1.4 million range) for the Naknek River (Appendix Table 1). The forecasted harvest for the district was 7.4 million sockeye. The forecast predicted a strong 2-ocean component for 1999 with age-2.2 the strongest (Table 2 and 3). The actual run to the district was 17.8 million sockeye, age-2.1 the dominant year class and the total catch was slightly above 9.4 million sockeye (Table 4).

The preseason management strategy for sockeye salmon called for some early fishing periods to monitor both run size and age composition in the district. Catch and age composition at False Pass and Port Moller were monitored for marked differences from the forecast. Commercial catch and age compositions were also monitored in the Egegik and Ugashik Districts for comparison. There was a slight concern over the strength of sockeye run to the Kvichak River based on the past three years performances. Indications of run strength would be closely watched as the season progressed.

No forecast is made for chinook salmon in the Naknek/Kvichak District. Chinook catches have been declining in the district in recent years, though effort levels have increased (Appendix Table 6). Due to the increase in effort level, it has been necessary to reduce the weekly fishing schedule from five to four days per week. In addition, on June 1, 1999 an emergency order went into effect that prohibited the use of gillnet mesh larger than 5.5 inches until July 17 to afford additional protection to the chinook salmon stocks (Table 11).

The 1999 salmon season in the Naknek/Kvichak District started by regulation on June 1, but the first recorded commercial landings did not occur until June 14 and consisted of small catches of sockeye and chinook salmon (Table 13). The actively managed (tide by tide) fishery in the Naknek/Kvichak District started on June 23. The strategy was to exploit the Naknek bound fish at a high rate to minimize early escapement. With escapement being low, as the season progressed more frequent closures would be necessary in early July when historically Kvichak stocks increase in abundance.

On June 23, the Naknek tower became operational; the Kvichak tower began counting on June 24 (Table 25). The Kvichak inside test fish project started drifting on June 21 (Table 27). The commercial catch through June 23 was only 34,600 sockeye. The district closed at 9:00 a.m. Wednesday, June 23, with a relatively low harvest. On June 25, the district test boat fished the Naknek Section for the first time, making seven drifts for a total harvest of 14 sockeye, all from a single set at the Johnston Hill Line (Table 7). The result from the June 26 test fishing was a total of 95 sockeye; the largest index, 222, was near the mouth of the Naknek River. On June 27, the district test boat fished the a.m. flood and part of the ebb in the Naknek Section; 11 sets harvested a total 348 sockeye. Nearly 70% of the sockeye were caught in two sets near the mouth of the Naknek River. The largest set had an index of 512 during the afternoon ebb, and it was reported that those fish were backing out. The 6:00 p.m. announcement on June 27 informed the commercial fleet that the earliest a potential fishery could occur would be 12:30 p.m. Tuesday, June 29.

Escapement past the Naknek tower through June 27 was a cumulative of 8,700; the projected count through June 27, based on a 1.1 million-escapement goal curve, was 95,600 sockeye. On June 28, district test fish indices increased

with a catch of 898 sockeye from 11 drifts. The largest index, 1,915, came from the Johnston Hill line area. Two test boats were utilized on June 29: one fished the lower district line, the other monitored fish abundance near the mouth of the Naknek River. Test fishing began on the morning ebb and went through the flood. Test fish information from the lower district line indicated fish were moving out of the district, while the fish near Naknek River were committing to the river. Indices were consistently higher than the preceding day in the upper district, which was not the case along the lower district boundary. Escapement past Naknek tower improved only moderately on June 28. Escapement began to pickup on June 29 with a count from midnight to 2:00 p.m. of 44,300 sockeye. An aerial survey of the lower Naknek River and the Naknek Section observed a substantial movement of fish inriver, and fish were visibly active in the commercial district. It was announced at 6:00 p.m. June 29 that the Naknek Section would open to both drift and set gillnet gear for a 8-hour period beginning at 1:30 a.m. Wednesday, June 30.

The harvest from the 8-hour period on June 30 was 240,000 sockeye salmon. During the afternoon tide on June 30, the districts test boat fished from Pedersen Point to the mouth of Kvichak River. Results varied with low indices in Ships Anchorage and at the mouth of Kvichak River, but very high indices at Graveyard and moderate indices near Pedersen Point. Escapement past Naknek tower continued with strength. The daily for June 29 was 104,800 and the midnight to 2:00 p.m. on June 30 was 80,500, projecting a total well over 100,000 for the day. The projected cumulative through June 30, based on the 1.1 million escapement goal curve, was 263,000. It was expected that by midnight June 30 the actual escapement would be within the projected range. With escapement well within the projected range for the Naknek River, a Naknek Section only fishery was announced to begin at 2:30 a.m. July 1. To aid in balancing the allocation between drift and set gillnet gear, the drift fleet fished for 8-hours and the set gillnet users fished for 11.5 hours.

The Kvichak inriver test fish project began on June 21 and catches remained low through June 28, with a cumulative index of only 55 (Table 27). However, on the morning of June 29 catch rates climbed and the average daily index jumped to 1,322. This projected the inriver escapement of 150,000 sockeye for the day. Sockeye continued to move into Kvichak River for the next several days, with a daily inriver index of 4,944 on June 30 and 11,383 on July 1. This projected a combined inriver estimate of 1.5-million sockeye. The first aerial survey of the Kvichak River was conducted on June 30 and estimated 235,000 sockeye inriver. With strong inriver indices on June 30 and the morning of July 1, it was expected that this would continue for another two tides. With apparently well over 1.5 million fish already in the Kvichak River, it was warranted to open the Naknek/Kvichak District to commercial fishing. At 9:00 a.m. July 1, it was announced that the Naknek/Kvichak District would open to both set and drift gillnet gear for an 8-hour period beginning at 2:00 p.m. July 1.

An aerial survey of the Kvichak River was conducted on July 1 during the afternoon flood, estimating 1.2-million sockeye inriver. Tower counts remained below expectation; however, it was expected to pick-up in short order. In the meantime escapement into the Naknek River remained strong and continued to exceed the daily projected. A survey of the commercial fishery in progress observed strong catches throughout the district. With escapement ahead of schedule in the Naknek River and escapement to the Kvichak River increasing, the July 1 period was extended an additional 17-hours for both drift and set gillnet gear closing at 3:00 p.m. Friday, July 2. The harvest for July 1 in the Naknek/Kvichak District was 1.2 million sockeye. The cumulative bay-wide harvest for July 1 was 3.0 million sockeye. There was some discussion among processors that they may fall behind schedule with processing if the harvest continued at that rate. Escapements into the Naknek and Kvichak Rivers continued and the period was again extended, this time an additional 9-hours closing at 12:00 midnight, July 2. In addition, the announcement suggested that permit holders contact their processors before fishing to confirm they had markets for the period.

With catch in the Naknek/Kvichak District above expectations and escapement into both systems ahead of schedule, the next fishing period was scheduled for both drift and set gillnets at 4:00 p.m. Saturday, July 3 for 8-hours. Again, the industry was hit with a large volume of fish on July 2; 2.2 million fish were caught in the Naknek/Kvichak District alone. Bay-wide, the harvest for July 2 was nearly 3.5 million, bringing the 2-day total to a bay wide record harvest of 7.3 million sockeye. The industry was backlogged and would not be able to take additional fish for at least 24-hours. With most of the industry unable to take on additional product, the department cancelled the scheduled period

on July 3 in the Naknek/Kvichak District. The department canceled the July 3, 8-hour period for the following reasons: 1) to minimize the amount of fish harvested and not sold (it was reported that in the Naknek/Kvichak District several loads of fish were dumped because no buyer would purchase these fish, but could not be substantiated), in the Egegik District several thousands of pounds of fish were buried on the beach, and 2) product quality: with processors backlogged for several days, the quality of the pack would deteriorate if continued fishing occurred.

The escapement through 6:00 a.m. July 4 at the Naknek River tower was 9,000 sockeye for a cumulative of 635,000. The projected escapement through July 4, based on the 1.1-million escapement goal curve, was 587,000. Escapement past the Kvichak tower through 6:00 a.m. was 125,000 for a cumulative of 875,000, only 50% of the projected. The Kvichak inriver test fish indices projected an inriver escapement of 2.0 million sockeye; the aerial survey estimated 650,000 sockeye. With the Naknek/Kvichak District closed for the past 40-hours, a projected total return larger than the pre-season forecast and cumulative catch to date of nearly 3.5 million sockeye, the district opened to commercial fishing on July 4. However, the industry was still backlogged, so the strategy was to open with short multiple fishing periods. The Naknek/Kvichak District opened to drift gillnet gear for two 4-hour periods and 18-hours for set gillnet gear beginning at 5:00 p.m. Due to the allocation disparity between gear groups, additional time was allowed for set gillnet gear. The next announcement was scheduled for 9:00 a.m. July 5.

Escapement past the Naknek tower continued to climb and by 6:00 a.m. Monday, July 5 the cumulative count was 745,000; the projected through July 5 was 645,000. The 06:00 count past the Kvichak tower showed signs of improvement, bringing the cumulative to 1.24 million sockeye. The projected escapement through July 5, based on a 6.0 million-escapement goal curve, was 2.1 million. The Naknek/Kvichak District opened for two 6-hour periods for drift gillnet gear and a 20-hour period for set gillnet gear. Again the difference in time was due to the disparity in allocation. The next announcement was scheduled for 10:00 a.m. Tuesday, July 6.

The July 5 escapement estimate for the Naknek River was 205,400 for a cumulative of 925,000 sockeye, five days ahead of the projected. With escapement of this magnitude, the 1.1 million goal would likely be met within the next few days. Escapement into the Kvichak system continued at a less than desirable pace; the daily escapement for July 5 was 437,100 sockeye for a cumulative total of 1,523,500. The inriver test fish indices dropped from 11,440 on July 4 to 6,091 on July 5, estimating a cumulative inriver escapement to date of 3.8 million sockeye. The July 6, 06:00 count at the Kvichak tower was 55,100 sockeye, which was down from the previous day. The projected escapement through July 6, based on the 6.0-million escapement goal, was 2.5 million. However, run strength indicators continued to project a strong Kvichak return, i.e., continued strength in the Port Moller index that was projecting a return of better than 40 million to the Bay and a strong one ocean component in the Port Moller catch. Based on the information, the Naknek Section was open to continuous fishing for drift and set gillnet gear, while in the Kvichak section was open for two 8-hour periods for drift gillnet gear and continuous fishing for set gillnet gear. Following the announcement stating the Naknek Section would open to continuous fishing, a processor meeting was called to identify the best approach to handle the larger than projected run to Bristol Bay while maintaining product quality and prevent the harvest of salmon that could not be sold.

Representatives from nearly all processors attended the meeting in King Salmon. The discussion centered on the continuous fishing schedule in the Naknek Section and the potential schedules for the Egegik and Nushagak Districts. Escapements into those systems had been met or would be in the near term. The department asked how the industry would like to see the fishery managed when escapement goals for those systems are met. The department's first priority is meeting the escapement goal for the systems, followed by managing for an orderly fishery where quality is maintained and all fish harvested are sold. Based on the guiding principles outlined by the Board of Fisheries under the "Bristol Bay Commercial Set and Drift Gillnet Sockeye Salmon Fisheries Management and Allocation Plan", the following goals were used to manage the return. A) salmon will be harvested in an orderly manner; B) salmon will be harvested consistent with specific regulatory management plans for each district; and C) salmon will be harvested in a way to improve product quality. All processors agreed that the use of shorter pulse type periods would be in the best interest of all. With that, the current continuous fishing schedule for drift gillnet gear in the Naknek section was reduced to two 6-hour periods in both the Naknek and Kvichak Sections.

The escapement goal for the Kvichak River for a pre-peak year is 6.0 to 10.0 million sockeye, with the mid-point set at 50% of the run when the run is between 12.0 and 20 million. The projected run to the Kvichak River was 12.0 million sockeye; thereby, the 1999 escapement goal was set at 6.0 million preseason. The goal, however, is adjusted in season when the actual run can be determined. Typically, by July 8, 50% of the run is complete. In 1999, based on current catch and escapement, it was projected that the run would come in at near preseason expectations. The escapement goal for the Kvichak River remained at 6.0 million.

Escapement into the Kvichak systems continued to fall further behind and by July 8, the cumulative count was approximately 2.8 million sockeye; the projected for this time, based on the 6.0 million goal, was 3.3 million. In addition, the inriver test fish indices dropped to less than 1,000 index points a day and the aerial estimate for July 8 was only 600,000 sockeye. With the decline in strength, the Kvichak Section remained closed to commercial fishing following the 12:30 closure on July 7 until escapement improved. On the morning of July 8, the department sent out the district test boat to evaluate strength in the Kvichak Section. Test fishing was poor in the upper section from Graveyard to Ships Anchorage, and on the south line two sets had indices over 400; all others were below 100 index points. In the Naknek River, escapement past the tower had dropped significantly since the inception of two fishing periods per day. On July 7, daily escapement dropped to 26,800 and on July 8 the daily was 10,700. However, the cumulative escapement through July 8 was 1.06 million; the projected through July 8 was 833,000. The Naknek drainage is a complex multi-stock system and escapement is necessary throughout the entire run. Typically, the daily escapement for this time period is 50,000 to 80,000 sockeye. To maintain the late-run escapement component, the Naknek Section closed at 3:00 p.m. on July 9. However, due to the disparity in allocation between gear types, the Naknek Section remained open to set gillnet gear until further notice.

District test fishing resumed in both the Naknek and Kvichak Sections on the morning of July 10. Indices around the mouth of the Naknek River remained low but improved near the south line. In the Kvichak Section, the only area showing any volume of fish was along the gravel spit on the west shore; two sets were above 2,000 points. Based on the district test fish information, a small isolated pocket of fish along the west shore was all that was located. With improved indices in the Naknek Section on the south line, it was announced that the Naknek Section would open to drift gillnet gear for 5-hours beginning at 10:30 a.m. July 11. The allocation between gear groups through July 8 was 87% drift gear, 6% Naknek Section set gear and 6% Kvichak set. With Naknek set gillnet remaining behind in the gear allocation, the Naknek Section remained on a continuous fishing schedule. To balance the gear allocation for the Kvichak section set gillnet gear, the Kvichak Section was opened for a 13.5-hour period beginning at 10:00 a.m. July 11 for set gillnet gear only. In addition to the announced fishing period, the drift gillnet fleet was provided a 48-hour advanced notice of a potential Naknek River Special Harvest Area (NRSHA) opening as early as 12:00 noon, Monday, July 12.

The district test boat fished the Kvichak Section on July 11 with marginal results. The average index was 403 per set. Escapement past the Kvichak tower remained more than two days behind. With Kvichak more than two days behind schedule and marginal test fish indices both inriver and out in the district, the Naknek River Special Harvest Area (NRSHA) opened for a 4-hour period beginning at 12:00 noon Monday, July 12. The Naknek/Kvichak District closed at 11:30 p.m. July 11 to set gillnet gear. Any further fishing periods in the Naknek/Kvichak District for set gillnet gear would be restricted to 25-fathoms while the drift gillnet fleet remained in the NRSHA.

The July 12 Kvichak inriver test fish results estimated 650,000 inriver fish, while the daily escapement through 6:00 p.m. Monday, July 12 was 173,000 for a cumulative count of slightly more than 4.0 million. The projected cumulative escapement, based on the 6.0 million-goal curve, was 4.9 million. The harvest from the first period in the Naknek River Special Harvest Area was only 28,000 sockeye.

District test fishing continued for the next several days with varying degrees of activity. The average index point per set on July 12 was 180 and on July 13 indices rose slightly to 238. Inriver test fishing remained slow with an average daily index of 4,751 on July 12 and 2,141 on July 13. Aerial surveys of the Kvichak River were mimicking the

inriver test fish data; July 12 estimated 338,000 sockeye and on the 13th 875,000. On July 14, district test fishing increased substantially; the nine sets averaged 1,040 index points. This was a substantial increase over the past several days; the largest indices were collected on the west side. The cumulative escapement past the Kvichak tower through July 13 was 4.3 million, 1.7 million short of the goal. The projected escapement, based on the 6.0 million curve, was 5.2 million. To sanction a commercial fishery, test fish indices would need to be in the 3,000 to 4,000 range consistently for the escapement goal of 6.0 million to be met and have a commercial fishery this late in the run. The NRSHA opened each day during the afternoon flood with a harvest of marginal proportions.

The current allocation between gear groups through July 13 stood at 86% drift, 7% Naknek Section set and 7% Kvichak Section set gillnet. To adjust the allocation disparity, the Naknek/Kvichak District was opened to set gillnet gear for a 5.5 hour period beginning at 2:30 p.m. Thursday, July 15. The 25-fathom gear restriction was still in effect due to the drift fleet remaining inside the Naknek River Special Harvest Area. District test fishing on the 15th did not maintain the strength observed on the 14th. However, inriver test fish indices climbed during the afternoon tide and it was expected to continue through the next several tide series. An aerial survey of the set gillnet fishery observed heavy catches in both the Naknek and Kvichak sections.

The morning of the 16th showed good strength in the Kvichak inriver test fish and, based on this, it was felt the 6.0 million-escapement goal would be met and exceeded without a commercial fishery. With the escapement into the Kvichak expected to be met, the Naknek/Kvichak District was opened to both drift and set gillnet gear for a 20.5-hour period beginning at 3:30 p.m. July 16. In addition, the emergency order period was extended in the Naknek-Kvichak District from 9:00 a.m. July 17 until 9:00 a.m. July 19. This was done to allow for additional fishing time since both escapement goals would be reached. As of 9:00 a.m. July 19 the district went to its fall fishing schedule of 4 days a week, 9:00 a.m. Mondays until 9:00 a.m. Fridays.

The Naknek tower was pulled on July 19 with total escapement reaching 1,625,142 sockeye, 525,142 above the midpoint of 1.1 million. The Kvichak tower finished counting on July 23 with a total escapement of 6,197,988 fish, 197,988 above the point goal of 6.0 million.

The week of July 19-23 saw catches of sockeye salmon higher than normal with a weekly catch of over 550,000. Effort levels were above average with combined gear deliveries averaging 440 a day. Effort dropped dramatically the last week of July with an average of 78 deliveries per day and 142 sockeye per delivery. Coho catches were practically nonexistent during the week. Historically, significant catches do not begin until the first week of August. There were no reported harvests during the first two weeks of August. During the week of August 16, 5 deliveries for 77 coho were reported. The total reported coho harvest for the season was 298, the lowest harvest since 1975. Only one small catcher/processor operated in the district during the week; they made their last delivery on August 19.

A total of 21 buyers purchased fish in the Naknek-Kvichak District in 1999 (Table 33). The sockeye salmon harvest totaled 8.9 million, significantly higher than the 1998 catch of 2.6 million (Appendix Table 5). The chum salmon harvest totaled 247,000 fish, which is above the recent 10-year average of 200,000 (Appendix Table 7). The reported commercial harvest of 557 chinook was only 11% of the recent 10-year average catch of 4,900 chinook. The coho salmon harvest reached 200 fish, far below the 10-year average catch of 9,000 (Appendix Table 9). Subsistence catches are listed in Table 35; harvest levels are average.

Egegik District

The 1999 sockeye salmon run to the Egegik District of 9.2 million fish was the ninth largest run on record, and it was 5.6 million more than the preseason forecast of 3.6 million sockeye. The harvest of 7.4 million was the tenth largest commercial harvest on record in the 103-year history of the fishery. An escapement of approximately 1.7 million fish was achieved, which was 57% over the midpoint objective of 1.1 million. The escapement was approximately 327,000 fish over the upper end of the Biological Escapement Goal (BEG) range

of 1.4 million (Table 1). Total Egegik District sockeye runs, during the past four comparable cycle years dating back to 1979, have ranged from 3.3 to 12.7 million fish with an average of 8.2 million. The 1999 run was 12% above the average for the recent cycle years (Appendix Table 15).

The 1999 ADF&G pre-season Bristol Bay sockeye salmon forecast projected a total inshore run of 24.9 million fish, and a surplus of approximately 13.8 million fish. The projected Egegik District harvest of 2.5 million sockeye was only 18% of the predicted Bay-wide harvest (Table 1). Therefore, effort levels were less than usual at the beginning of the season.

Commercial salmon fishing was opened in the Egegik District on June 1 (Table 14), but no landings occurred until June 14. Sockeye catches per unit of set gillnet effort were slower than they were in recent years but about average for the last 20 years through June 16. The fishery was allowed to close as scheduled on June 16.

Daily test fishing, which provides estimates of sockeye passage into the lower portions of Egegik River, began on June 14 at the usual sites just upstream of Wolverine Creek (Table 28). The Egegik River salmon counting towers, which provide daily estimates of sockeye passage into Becharof Lake, began operation on June 19 (Table 25).

Initial inriver test fishing sockeye catches were slow, but by June 19 catches indicated that approximately 73,000 sockeye salmon had passed the commercial fishing district and were making their way up river (Table 28). An aerial survey of Egegik Lagoon on June 20 revealed an estimate of approximately 14,500 sockeye salmon. With the small Egegik inshore forecast of only 3.6 million sockeye salmon and with no fish counted past the counting towers yet, commercial fishing would be delayed until signs of fish abundance improved.

June 20 and 21 inriver test fishing revealed increasing passage of sockeye salmon into the Egegik River and the cumulative index points indicated that approximately 120,000 were in the river (Table 28). An aerial survey on June 21 indicated about 28,000 fish holding in the Egegik Lagoon. Given this information, a brief 6-hour period was announced and scheduled to start at 6:30 a.m. on June 22.

Participation in the June 22 opening was fair with approximately 316 drift vessels (Table 12) and 126 setnetters making deliveries. The catch of approximately 24,000 sockeye (Table 14), was disappointing and well below the average of 150,000 for this date. Sockeye catches per delivery were below average for both set and drift gillnet fishers at 56 and 52 fish per delivery, respectively. Inriver test fishing results through June 22 suggested that about 134,000 sockeye salmon had entered the Egegik River system. However, with the poor commercial harvest on June 22 and with only 48 fish counted past the towers, the fishery would stay closed pending better indications of greater abundance.

Aerial surveys conducted on June 22 and 23 (Table 28) revealed that sockeye salmon numbers were continuing to build in the lower western-half of the Lagoon, but fish were not showing any inclination to move into Becharof Lake. Lake water was particularly cold at 4 degrees centigrade and salmon seemed satisfied to hold in the warmer, 9 degrees centigrade, river water. Inriver test fishing picked up on June 23 and 24 and supported an estimate of approximately 200,000 fish in the Egegik River. Given these results, another brief 7-hour period was scheduled for June 25 to start at 8:30 a.m..

The June 25 opening was also disappointing when only about 28,000 sockeye salmon were harvested. This was well below the average catch for this date of approximately 355,000 fish. Catch successes for setnetters and drift gillnet fishers were again below their 10-year averages and people were beginning to wonder if this was going to be a worse season than last year. The inriver test fishery slowed down considerably and indices dropped to an average of 29 index points on June 26. The next day, however, inriver test fishing picked up and averaged 802 index points. Tower counts were still sluggish with less than 1,000 fish counted. It was decided

that a test fishing boat would be sent out on the morning of June 28 to test for fish abundance in the district. This was the first time since 1988 that test fishing would be conducted in the Egegik District.

District test fishing results are listed in Table 8 and revealed good numbers of fish in the middle of the district, but in other areas abundance was light. An aerial survey at 1:00 p.m. revealed approximately 206,000 fish in the lower section of the lagoon, but still there was no significant movement past the counting towers. Inriver test fishing results were the strongest so far this season with an average of 1,600 index points. Given this information, it was decided that waiting one more tide to fish would not be prudent, so an 8-hour period was scheduled to start at 11:30 p.m. that evening.

Though some of the fishing fleet were grumbling about fishing into the night, it turned out to be the right thing to do as approximately 470,000 fish were harvested during the 8-hour period. The district's season total sockeye harvest now totaled approximately 530,000 fish, or one fifth of the forecasted harvest. The harvest of 470,000 was slightly above the recent 10-year (1989 to 1998) average for June 29 of 430,000. Though the set gillnet harvest per delivery of 356 fish was 126% above the recent 10-year average, the drift gillnet catch of 604 sockeye salmon per delivery was 28% below their 10-year average. Inriver test fishing continued to hold up on June 29 with an average of 1,167 index points and the estimated fish in the river was approximately 350,000 (Table 28). Another 8-hour period was scheduled to start at 12:30 a.m. June 30.

The June 30 opening proved also to be a productive one with approximately 827,000 sockeye salmon harvested (Table 14). This was well above the 10-year average of 450,000, and both set and drift gillnet harvests per delivery were well above average. Inriver test fishing continued to show good numbers of fish moving into the Egegik River in spite of the large harvests during the last 48 hours. An aerial survey confirmed a large number of sockeye salmon in the river and holding in the lagoon (Table 28). The next fishing periods were scheduled to start at 1:00 a.m. on July 1. In order to provide for: 1) the distribution of fish within the Egegik District, 2) an orderly fishery, 3) improved product quality, and 4) the minimizing of ebb fishing by the drift gillnet fleet, two separate fishing periods for drift gillnet fishers were scheduled through the next two tides. Setnetters were scheduled to fish a 17.5-hour period.

July 1 fishing was very productive with approximately 1.4 million sockeye salmon harvested, bringing the season's total catch to 2.7 million fish or 10% above the forecasted harvest of 2.5 million. The 1.4 million catch was the largest on record for the district for July 1, and it was a definite sign that this year's Egegik run had the potential for being much larger than predicted. Drift and set gillnet catches per delivery were above their 10-year averages for this date. Inriver test fishing results were indicating the largest push of fish up the river so far this season, and the next fishing periods were set for July 2. Drift gillnet fishers were scheduled to fish eight hours on each of the next two tides, and set gillnet fishers extended until 10:00 p.m..

The July 2 harvest was also very good with approximately 1.2 million sockeye salmon landed. This was the fourth largest catch for the Egegik District for this date. The Naknek/Kvichak and Nushagak Districts were also experiencing excellent catches and the Bay's total harvest for July 1 and 2, of approximately 7.3 million fish, was a new record for a two-day period in the Bay. In just two days, over half the Bay's preseason predicted harvest was taken. Because almost all of the processors had reduced their processing capabilities for this season, this amount of harvest had brought most of them to their capacities. In fact, two Egegik processors had suspended buying on July 2 in order to catch up with the fish they took on July 1. Talking with all the processors that could be reached and that would talk to the department, it was estimated that the ability to take fish was down to about 10% or less of the Bay-wide preseason indicated capacities. If fishing continued on July 3, there would be too great a risk that many commercial fishers would fish without confirming with their markets. Most processors indicated that it would be 24 to 36 hours before they would be able to take fish again. In fact, on the morning of July 3, Fish and Wildlife Protection were investigating reports of fish being wasted and there was an instance of thousands of pounds being buried on a beach in the Egegik District. The department would not prosecute a fishery

if this kind of waste was a potential outcome. Naknek/Kvichak and Egegik Districts stayed closed on July 3, but would reopened on July 4.

Sockeye escapement to Becharof Lake increased dramatically on July 3 when approximately 212,000 fish migrated past the counting towers bringing the cumulative escapement up to 338,000 fish. The cumulative escapement went from several days behind the expected level on July 2 to one day behind expected level on July 3. An additional 700,000 fish were estimated in the river. Fishing periods were announced for July 4 and 5 that started at 4:00 p.m. on the 4th. The July 4 opening produced a sockeye harvest of approximately 400,000 fish or only about one fourth of the July 2 harvest. This was below the recent 10-year average of 680,000 for this date, but it was slightly below the 20-year average of 440,000. Drift gillnet catches per landing were below the 10-year average, but set gillnet catches were about average. An aerial survey at 5:00 p.m. on July 4 revealed approximately 552,000 in the Egegik Lagoon which was one of the largest counts on record for sockeye salmon in Egegik Lagoon. With the aerial survey numbers, the sockeye escapement level was approximately 1,040,000 fish, or almost the midpoint of the BEG range. The July 5 production was approximately 460,000 sockeye salmon, bringing the total harvest to about 4.8 million or almost twice the preseason expectation. Drift and set gillnet catches were about at their allocations of 86% and 14%, respectively.

Sockeye escapement tower counts were very strong from July 6 through July 10 with over 100,000 fish estimated past the towers on each of those days. The peak count day was July 7 when approximately 263,000 sockeye were estimated past the counting towers (Table 25). The midpoint of the escapement BEG range, 1.1 million fish, was reached at 6:00 p.m. on July 8 and the 48-hour waiting period to transfer into the Egegik District was waived and in effect at the 8:00 p.m. announcement time.

With the escapement assured, there would be steady fishing time to curtail as much as possible the remaining segments of the run, but other objectives like genetic diversity, providing for an orderly fishery, allocation between gear groups and improving catch quality would also be considered. From July 6 until the end of the emergency order period on July 18, drift gillnet fishers fished a part of every tide except three, and setnetters were kept in the water almost continuously. Setnetters were pulled out of the water at 8:00 p.m. on July 15 until 3:30 p.m. on July 17 in order to gain some ground on the drift gillnet catch allocation which had slipped to 84%. Through July 17, the proportion of harvest was 85% for drift gillnet fishers and 15% for setnetters. Commercial harvests between July 6 and July 18 ranged from 60,000 to 444,000 sockeye salmon per day and averaged approximately 173,000 fish (Table 14). A total of approximately 2.5 million sockeye salmon were landed from July 6 to July 18, bringing the season's cumulative harvest up to approximately 7.3 million fish or almost three times the preseason forecast. At 9:00 a.m. Monday, July 19, the fishery reverted to its fall fishing schedule of 9:00 a.m. Mondays until 9:00 a.m. Fridays.

Sockeye landings in the district continued throughout July and August (Table 14), reaching a preliminary seasonal cumulative total of about 7,422,700 fish. The counting towers ceased operation on July 17 and the final escapement count totaled 1,727,772 sockeye salmon. This was approximately 23% over the upper end of the BEG range. The escapement sex ratio was 53% males to 47% females.

The age composition of the 1999 Egegik District sockeye run was as follows:

<u>Age Group</u>	<u>Catch</u>	<u>Escapement</u>
1.2	35%	27%
2.2	42%	57%
1.3	11%	6%
2.3	11%	9%
Other	1%	1%
Totals	100%	100%

Most of the sockeye run (55%) were age 2.2 and 1.3 fish and came from the 1994 escapement of 1.97 million fish. The second largest component (33%) were age 1.2 fish and came from the 1995 brood year which had an escapement of 1.28 million. Egegik District commercial fishers harvested 81% of the Egegik inshore sockeye run, slightly below the recent 20-year average of 82%. The 6.3 million sockeye salmon delivered by district drift gillnet fishers was the tenth largest volume on record for that gear type, and the 1.2 million sockeye delivered by set gillnet fishers was the fourth largest catch on record for that gear group. The peak day in the fishery based on volume landed (1.4 million sockeye) was July 1. The peak catch rate for drift gillnet fishers was 113,000 sockeye salmon per hour on July 1, and for set gillnet fishers it was 13,400 sockeye salmon per hour on June 30. During the emergency order period, June 16 to July 17, a total of 196 hours were fished in the district by drift gillnet fishers or 26% of the 744 available hours. For set gillnet fishers, 318 hours or 43% of the available time was fished. This compares to 124 hours for drift gillnet fishers and 142 hours for set gillnet fishers fished in 1998. Peak drift gillnet effort was about 600 vessels from June 25 to July 3 (Table 12).

The commercial harvest of other salmon species in the Egegik District totaled 87,000 fish, or 1% of the total harvest. The chinook harvest totaled approximately 578 fish, or 79% less than 1979 to 1998 (20-year) average of 2,726 (Appendix Table 6). The district chum harvest of approximately 75,000 fish was 26% below the recent 20-year average of 101,000 (Appendix Table 7). No pink salmon were reported harvested this season. The district coho salmon harvest of 11,600 fish was well below the recent 20-year average of 39,000 (Appendix Table 9). However, coho run strength indicators throughout the Bay showed signs of weakness and the Egegik run also proved to be slim. On August 23, the scheduled weekly fishing period of four days was reduced to two days and the only buyer in the district stopped purchasing salmon after August 25.

Aerial surveys were conducted in the Egegik and King Salmon River systems to provide escapement indices for chinook, chum, and coho salmon. The resulting indices totaled 567 chinook, 1,431 chum, and 4,060 coho salmon. Chinook escapement indices were below average in all but one index stream. The chinook index was 51% below the 20-year average while the chum salmon index was 81% below average. Though chum salmon aerial escapement indices were below average in all index systems, a U.S. Fish and Wildlife Service weir on Gertrude Creek counted over 16,000 chum salmon which was 66 times the aerial count of 243 for that system. Egegik aerial index counts of chum salmon escapements are, at best, a very marginal indicator of true chum salmon escapements. The coho index represents the total count for several tributary streams of Becharof Lake and it was 5% below the 1997 and 1998 average count of 4,300.

A total of 21 buyers operated in the district this season (Table 33). Sockeye salmon production was particularly high on June 30, July 1, and July 2, when a total of 3.4 million fish were landed in the Egegik District. Consequently, there were problems in keeping up with the production, and processors were voicing their capacity problems to the department and some of them suspended buying on July 2. Eastside districts were closed on July 3, and when fishing resumed on July 4 there were several companies that put delivery limits on their commercial fishers.

In summary, the salmon season at Egegik was very productive with the tenth largest harvest on record. For set gillnet fishers it was their fourth largest harvest on record. Drift gillnet fishing time between June 23 and July 17 was about average for the last ten years, but set gillnet fishing time was 36% above average and the most time given since 1983. This year's run was a particularly difficult one to manage for several reasons: 1) the run that was 154% greater than the forecast, 2) the movement of fish into the districts was very compressed with over a third of the season's harvest occurring in a three day period, 3) the processing capacity problem that occurred during the first two days of July, 4) the lack of fish movement past the counting towers with tower counts lagging behind expected levels until July 6, and the problem of fish milling in the Lagoon and Egegik River, and 5) the much larger than expected component of age 1.2 fish in the run, and perhaps their reduced catch-ability because of their smaller size.

Ugashik District

The 1999 Ugashik District total inshore sockeye salmon return was approximately 3.9 million fish, or 179% above the preseason forecast of 1.4 million (Table 1). It was the second highest underestimated return for Ugashik on record, only exceeded by the under-predicted run of 1980 that was 186% above the preseason forecast. The commercial sockeye harvest of approximately 2.3 million fish was the twelfth largest on record. The sockeye escapement to Ugashik River was approximately 1.6 million and was 33% over the upper end of the BEG range. Comparable cycle-year sockeye returns, over the last four cycles dating back to 1979, have ranged from 2.1 to 5.4 million fish with an average of 4 million, making the 1999 run of approximately 3.9 million about average for the last four cycle years.

The preseason forecast for the Ugashik District suggested a harvest of 600,000 sockeye salmon which would have been the lowest harvest in 20 years. With the lowest smolt count on record taken in 1996, there was a fair amount of concern about this year's run and a more cautious management approach would be warranted. Accordingly, commercial fishers were advised that fishing after June 23 and perhaps well into July was highly unlikely. The possibility also existed that very little, if any, commercial fishing time for the entire season might be allowed. Given these possibilities, only 9 drift vessels decided to start their season on June 25 in the Ugashik District (Table 12).

Initial landings occurred in the district June 14 (Table 15) with a few sockeye and chinook salmon landed. During the week of June 21, effort and sockeye catches increased, and by 9:00 a.m. June 23, the cumulative district harvest was approximately 75,000 sockeye, and 1,350 chinook salmon. There were also about 1,600 chum salmon taken. The 1999 sockeye harvest through June 23 was 44% above the recent 10-year (1989 to 1998) average of 52,000. However, given the forecast, the district closed as scheduled on June 23.

Inriver test fishing, operating about three miles upstream of Ugashik Village, started on June 24 and provided a daily estimate of sockeye passage into the lower part of the Ugashik River. Over the next several days, inriver test fishing documented few fish entering the Ugashik River (Table 29). On July 1, the first round of district test fishing was scheduled (Table 9). Results were not encouraging, but additional test fishing became impossible when no outlet for harvested fish was found. Neither a buyer nor local residents were interested in taking test fish, so district test fishing was suspended until the department could find an outlet for the catch and not waste fish.

Inriver test fishing picked up on July 2 (Table 29) and an estimated 80,000 fish had now entered the river above Ugashik Village. Inriver test fishing dropped off on July 3 to 573 index points bringing the cumulative index point total to 2,793. The estimated number of fish in the river was approximately 100,000. An aerial survey on July 4 revealed approximately 65,000 fish in the lower part of the lagoon, but no sockeye counts at the towers had yet occurred. Possibly, Ugashik sockeye were up against a similar water thermal barrier that Egegik sockeye salmon were experiencing, though Lower Ugashik Lake effluent was two degrees warmer than the water emanating from Becharof Lake. The estimated river fish (ERF) increased to 200,000 on the July 4 and a 4-hour drift gillnet period and an 8-hour set gillnet period were scheduled for July 5.

Additional fishing time was allowed for the setnetters because their proportion of the harvest, through July 4, was approximately 1% and the Ugashik District's Allocation Plan calls for 10% of the harvest to be allocated to setnetters. Approximately 16 vessels (Table 12) and 45 setnetters participated in this opening and produced a sockeye harvest of approximately 72,000 fish. This harvest was below the average harvest for this date, but the catch was likely influenced by the low amount of effort. Sockeye harvests per landing were about average of drift gillnet fishers and over twice the average for set gillnet fishers. Setnetters took about 78% of the catch. The fishery closed as scheduled, but test fishing picked up on July 5 and approximately 350,000 fish were estimated to be in the river. The next commercial fishing periods were scheduled to start on the afternoon of July 6.

Setnetters were scheduled for a 21.5-hour period and driftnetters were scheduled for two 7-hour periods with a 4.5-hour break in between them. Catches for July 6 totaled approximately 38,000, and on July 7 approximately 87,000

sockeye were landed (Table 15). Again setnetters harvested the majority of fish taking 64% and 58% of the harvest on the July 6 and July 7, respectively.

By July 7, approximately 500,000 sockeye salmon were estimated in the river though the tower counts still showed no passage and totaled only 6 fish through July 7. Based on the estimated river fish, commercial fishing was extended for setnetters from 2:00 p.m. on July 7 until 3:00 p.m. on July 8. For drift gillnet fishers, two 8-hour periods were scheduled through 3:00 p.m., July 8. An aerial survey flown after these fishing times were announced, revealed approximately 212,000 sockeye salmon in the river under good to excellent survey conditions (Table 29). Good signs of fish were also seen in the vicinity of the Ugashik River Special Harvest Area (URSHA) and commercial fishers were advised that evening to stand by at 9:00 a.m. on July 8 for a possible announcement that could open the URSHA as early as 10:30 a.m. that morning. A considerable amount of time, effort, and money was spent to deploy markers that would delineate the setnet and driftnet areas of the URSHA. The next morning a brief 1.5-hour fishery was announced for this area that started at 11:00 a.m..

Only three drift vessels and four set gillnet fishers fished in the URSHA during the opening and catches were light. Most drift and set gillnet fishers preferred to stay in the areas where they had been fishing. Harvest for the entire district for July 8 totaled approximately 92,000 sockeye salmon and again this was below average for the date. However, sockeye harvests per landing were about average for drift gillnet and set gillnet fishers. The set gillnet proportion of the harvest for the period was approximately 29% and they were losing ground on their season's allocation. It was anticipated that the set gillnet proportion of the harvest would continue to erode away as more drifters transferred into the district and as more fishing time was warranted. With this scenario projected, it was decided to keep the set gillnet fishers fishing even though they were ahead on their harvest allocation. Fishing was extended for set gillnet fishers until 4:00 p.m., July 9. Two 10-hour periods for drift gillnet fishers were scheduled through 6:00 p.m. on July 9.

Inriver test fishing was slowing down but still indicated that at least the lower end of the BEG range, 500,000 fish, was in the river and that maybe even the midpoint of the BEG, 850,000 fish, might be above the district as well. Without tower counts, it is difficult to accurately interpret inriver test fishing results. The first significant tower count of 33,000 finally occurred on July 8, but it takes several daily counts to more accurately estimate river fish. An aerial survey on the afternoon of July 8, revealed good numbers of fish in the river with a count of approximately 221,000 (Table 29).

Approximately 85 drift vessels were legal to fish on July 9, and the total harvest jumped up to approximately 290,000 sockeye salmon or about 80,000 fish above the average for this date. Set gillnet harvest fell off sharply during this opening to only about 4% of the catch, but for the year setnetters still accounted for approximately about 24% of the total harvest. Tower counts increased dramatically on July 9 when over 200,000 sockeye salmon moved into Lower Ugashik Lake (Table 25). Escapement counts went from two days behind the expected level for July 8, to two days ahead of the expected level for July 9. Commercial fishing for set gillnet fishers was extended to 5:00 p.m. July 10, and for drift gillnet fishers an 8-hour period and a 7-hour period were scheduled to run through 4:30 p.m. July 10.

The July 10 catches were again good with approximately 224,000 sockeye salmon harvested. This was above the average harvest for this date and again most of the harvest was taken by the drift gillnet fleet which had now grown to 172 vessels (Table 12). Sockeye salmon were continuing to pass the counting towers at a good rate bringing the season's cumulative count to 290,000 at 10:00 a.m. on July 10 and still about two days ahead of expected escapement levels. An additional 450,000 sockeye salmon were estimated in the river. Given this information, the next fishing periods were announced at 3:00 p.m.. Setnetters were extended until 6:00 p.m. Sunday July 11, and drift gillnet fishers were scheduled for an 8-hour period to begin at 9:00 a.m. on Sunday, July 11.

A total of 248 vessels and 50 setnetters harvested approximately 160,000 sockeye salmon. This was 27% below the average harvest for July 11. The total sockeye catch for the district was approximately 1 million fish which was about 32% below the recent 20-year average harvest of 1.5 million through July 11. The age 1.2 sockeye salmon were

dominating in the catch and escapement with proportions of 67% and 70%, respectively. The preseason forecast had predicted only 13% of the run, or 200,000 fish, would be age 1.2 and the run was already at approximately 1.1 million age 1.2 fish. Tower escapement counts increased to a total of 500,000 sockeye salmon at 10:00 a.m. on July 11 or four days ahead of expected levels. An additional 250,000 fish were estimated in the river. The next fishing period was announced at 3:00 p.m.. Set gillnet fishers were continuing to slip in their overall proportion of the harvest and they now possessed approximately 18% of the catch. Set gillnet fishers were extended until 7:00 p.m., Monday, July 12, and drift gillnet fishers were scheduled for a 10-hour period to begin at 9:30 a.m. on July 12.

Harvest for July 12 was approximately 207,000 sockeye salmon which was twice the average for that date, and brought the season cumulative sockeye harvest up to about 1.2 million fish, or twice the harvest that was predicted. Inriver test fishing was still slowing down with only 353 index points for July 11 and 239 index points for July 12 (Table 29). Tower counts, however; were picking up and by 10:00 a.m., on July 12, approximately 660,000 sockeye salmon had past the Ugashik counting towers. An additional 150,000 fish were estimated in the river and the next fishing periods were announced at 3:00 p.m. Setnetters were extended until 8:00 p.m. on July 13 and drift gillnet fishers were scheduled for an 8-hour period to begin at 11:00 a.m. on July 13.

Approximately 300 drift vessels and 50 setnetters participated in the July 13 opening and harvested approximately 120,000 sockeye salmon. Escapement had jumped up considerably during the evening of July 12 and continued at that pace into the morning of July 13. By 10:00 a.m. on July 13, the tower count was slightly over 1 million and not slowing down much. Based on the results of inriver test fishing and aerial surveys, it is believed that most of these fish had entered the Ugashik River several days earlier and had been holding up in the river. Inriver test fishing had been slowing down since July 9, and with steady fishing and a fair fleet size since July 9, there should have been enough harvesting potential to keep excess escapement in check. However, another factor to consider was the large number of the smaller sized age-1.2 fish in the run. Based on their proportions in the harvest and escapement, it is plausible that a fair amount of these small fish were getting through the fishing gear.

Set gillnet catches continued to be very slow and the department was hearing from several fishers, that no fish were getting to the beaches. Because drift gillnet fishing had been occurring predominantly on the outside part of the district and because of the declining inriver test fishing indices over the past few days and complaints of set gillnet fishers, staff was inclined to believe that few fish were getting inside. If this pattern continued, set gillnet fishers would fall far enough behind in their allocation that set gillnet only fishing might have to occur. Set gillnet only fishing could possibly risk a greater underutilization of surplus sockeye salmon. In an attempt to get more fish to the inside of the district and not add too many more fish to the escapement, the next fishing period for drift gillnet fishers was scheduled to start about ½ hour before high slack water. Set gillnet fishers were extended until 9:00 a.m., Monday, July 19.

By starting drift gillnet fishing farther into the flood, it was planned that drift gillnet fishers would start fishing farther into the district and hopefully some fish would become available to set gillnet gear in the inner part of the district. This attempt failed in that most drifters still stayed on the outside part of the district, and there was really no significant increase in harvest by set gillnet fishers nor by the few drift gillnet fishers that had move further into the district. The second drift fishing period for July 14, was to have opened at 3:00 p.m., but because of the failure to achieve the objectives during the first period scheduled for that day, and not wanting to risk getting more escapement, the second period was rescheduled to open at 1:00 p.m.

July 14 fishing harvested approximately 162,000 sockeye salmon bringing the seasons total harvest to 1.53 million fish. As of 2:00 p.m. on July 14 the tower count was 1.26 million and though test fishing had dropped off again to less than 100 index points, the escapement had already exceeded the upper range of the BEG. The proportion of set gillnet harvest had been falling off steadily since July 8, with set gillnet fishers averaging only about 3% of the daily harvest since that date. The set gillnet harvest through the July 13 slipped to about 12% of the total harvest. From the small set gillnet harvests over the last few days, it seemed that most of the escapement counted between July 9 and 13

had probably entered the river prior to July 9. Though again, the preponderance of the smaller sized age-1.2 fish may have resulted in a fair number of these fish getting through the fishing gear.

Regular fishing periods for drift gillnet fishers were scheduled over the next four days and at least a part of every tide through July 18 was fished. The emergency order period was extended through the weekend of July 17 so that fishing periods could be scheduled. The fall fishing schedule of 9:00 a.m. Mondays to 9:00 a.m. Fridays started at 9:00 a.m. on Monday, July 19.

The final Ugashik River sockeye escapement estimate was 1.647 million fish or 37% over the upper end of BEG range. The fact that most of the escapement (89%) was the smaller sized 2-ocean fish, there were probably fewer eggs seeded on the spawning grounds than would have been deposited by larger 3-ocean fish. Smaller sized fish may also not have the spawning success of larger fish (Forbes and Peterman, 1994). The harvest of 2.3 million sockeye salmon was 18% below the recent 20-year(1979 to 1998) average catch of 2.8 million.

The harvest between the gear groups from June 1 through July 18 was 10.89% for setnetters and 89.11% for drift fishers, or about 1% more for set gillnet fishers and 1% less for drift gillnet fishers than their allocations. Even though set gillnet fishers were ahead of their allocation during almost all of the season, they were allowed almost continuous fishing because of the projected surplus of fish. Between 3:30 p.m. July 5, and 9:00 a.m. July 17, setnetters fished a total of 264.5 hours or 94% of the available 282.5 hours. Drift gillnet fishers fished a total of 135.5 hours or about 48% of the available time. For setnetters, this was the second largest amount of fishing time allowed during this period in the last ten years. For drift gillnet fishers, it was the fifth largest amount of fishing time allowed in the last ten years.

Sockeye escapements to the Dog Salmon and King Salmon Rivers were not as large this year as they were in 1997 and in 1998. An aerial survey on August 9 revealed 6,350 sockeye in the King Salmon River drainage and 4,120 sockeye in the Dog Salmon River drainage, bringing the Ugashik drainage sockeye escapement total to 1,657,000 (Appendix Table 16). The peak count at the counting tower occurred July 13 when 354,000 sockeye salmon were tallied. Approximately 76% of the total escapement count occurred July 9 to 13. The sockeye escapement sex ratio was 57% males to 43% females.

The age composition of the 1999 Ugashik District sockeye run was as follows:

<u>Age Group</u>	<u>Catch</u>	<u>Escapement</u>
1.2	63%	78%
2.2	22%	11%
1.3	9%	7%
2.3	6%	4%
Other	0%	0%
Totals	100%	100%

The commercial harvest of other salmon species totaled approximately 75,200 fish or 3% of the total district's harvest. The harvest of 1,680 chinook salmon was 54% below the 20-year (1979 to 1998) average of 3,620 (Appendix Table 6). Ugashik chinook escapement indices ranged from below average to above average. An aerial survey count of 1,455 was 69% below the 1980 to 1998 average of 4,670. The chum salmon harvest of approximately 71,000 fish was about average, while the coho harvest of 2,480 fish was about one-tenth the recent 10-year average. Coho runs proved to be weak Bay-wide and coho harvest rates in the Ugashik District were not only below average but the worst observed in ten years. Subsequently, the coho fishery was reduced to 48 hours per week from August 23 until the end of the season, September 30 (Appendix Tables 7 and 9). Coho escapement index counts in Upper and Lower Ugashik Lakes were 14% below the 1998 and 1997 counts. Chum salmon escapement indices were below average with a cumulative drainage count of 5,040. Pink salmon harvest in the Ugashik District was reported at only two fish.

The Ugashik District fishery harvested approximately 58% of the sockeye return in 1999 which was slightly below the 20-year (1979 to 1998) average removal rate of 65%. Peak catch per hour occurred July 11 when approximately 160,000 sockeye salmon were landed in eight hours, or 20,000 per hour. This compares to a peak harvest rate of 71,000 fish per hour last year on July 11. Peak catch per landing in the district occurred on July 9 for drift gillnet fishers when approximately 1,650 sockeye salmon per delivery were taken. For set gillnet fishers, the peak catch per landing occurred on July 5 when 840 sockeye per delivery were taken.

A total of 17 buyers operated in the district during the season (Table 33), three more than last year. Nearly all of the catch was tendered to other districts for processing, but some was frozen on floating processors. There were several reported instances of lack of processing capacity during the sockeye season and some commercial fishers were placed on delivery limits. Processors had geared down for what was projected to be the lowest production for Ugashik in 20 years.

Nushagak District

In March 1999, the Alaska Board of Fisheries adopted two agenda change requests implementing regulatory changes affecting the Nushagak District for the 1999 season. The Board modified the opening criteria for the Wood River Special Harvest Area (WRSHA) Management Plan to include an optimum escapement goal of 235,000 sockeye for the Nushagak River when the ratio of Wood River to Nushagak River sockeye salmon exceeded 3:1. This optimum escapement goal adopted by the Board was discussed as "economic relief" to the commercial users in the Nushagak District for a period of two years. It was below the biological escapement goal range derived from a thirty-year data set that had been the management objective since 1990. The new goal will be in effect through the 2000 season and will be reviewed by the Board and the Department at the 2000/2001 Board cycle. The Board also reinstated the statistical area registration and the 48-hour transfer requirements for setnets moving between statistical areas in the Nushagak District.

Chinook

Peak chinook salmon production in the early 1980's resulted in record commercial harvests and development of a growing sport fishery. Declining run sizes and the question of how to share the burden of conservation among users precipitated the development of a management plan for Nushagak chinook salmon. Since 1992, management of the Nushagak chinook salmon fisheries has been governed by the Nushagak-Mulchatna Chinook Salmon Management Plan (NMCSMP) (5 AAC 06.361). The plan was adopted in 1992 and amended twice in 1995 and 1997.

The purpose of this management plan is to ensure an adequate spawning escapement of chinook salmon into the Nushagak River system. The plan directs the Department to manage the commercial fishery for an inriver goal of 75,000 chinook salmon past the sonar site at Portage Creek. The inriver goal provides: (1) a biological escapement goal of 65,000 spawners, (2) a reasonable opportunity for inriver subsistence harvest and (3) a sport guideline harvest of 5,000 fish. The plan addresses poor run scenarios by specifying management actions to be taken in subsistence, commercial and sport fisheries depending on the severity of the conservation concern. Management decisions are heavily dependent upon the cumulative estimates of inriver passage by the sonar.

Trends in age composition of chinook spawning escapements in 1995 and 1996 raised concerns about the quality of chinook escapements in the Nushagak River. The proportion of large (age-5 through age-7) fish was less than desired, and the age composition of the escapement from the first half of the run differed substantially from the escapement from the second half of the run. Differences in age composition between escapement and total run and between early and late season escapement result from size selective harvests. To address this concern, the Department adopted a strategy of allowing detectable pulses of chinook into the Nushagak River before opening a commercial period. Allowing untargeted fish into the river was intended to lessen the effects of selectivity in the

commercial fishery and allow fish with a natural age distribution to enter the river. In November 1997, additional language directing the Department to allow pulses of chinook salmon into the Nushagak River that were not exposed to commercial fishing gear was added to the NMCSMP.

The Department adjusts commercial fishing time and area in an attempt to harvest chinook salmon surplus to the inriver goal. Management decisions are based on the preseason forecast and inseason indicators of run strength, including commercial harvest performance, subsistence harvest rates and inriver passage by the sonar. To maintain quality and value, chinook salmon are commercially harvested early in the run before the majority of fish discolor and become soft, and before many fish migrate into the mainstem of the Nushagak River. Chinook escapement typically peaks 10 days after commercial harvests; only 15% of the escapement is counted past the sonar when commercial harvests peak. This difference in run timing prohibits reliable estimates of run size until after the peak of the fishery. Early commercial openings are justified on forecasted surplus, quality concerns and in accordance with the added language in the NMCSMP.

The 1999 Nushagak District chinook salmon forecast was 214,000 fish. Approximately 127,000 chinook salmon were projected to be available for commercial harvest, assuming an inriver goal of 75,000 fish and an average lower river subsistence harvest (12,000). Assuming an average incidental harvest during the sockeye fishery of 20,000 chinook salmon left about 107,000 chinook available for a directed commercial harvest. A subsistence catch monitoring project was operated at Lewis Point for the third year in 1999 to improve the ability to detect when pulses of chinook salmon were moving into the river.

Unrestricted harvest potential in the sport fishery, given an inriver abundance of 75,000 fish, has been demonstrated to be over 10,000 chinook salmon, or 100% greater than the guideline harvest level of 5,000 chinook. Included in the Alaska Board of Fisheries November, 1997 amendments to the NMCSMP were restrictions on the sport fishery to reduce the sport harvest potential. These restrictions were intended to reduce the harvest in the sport fishery to the guideline harvest level prescribed in the management plan.

One directed commercial chinook salmon opening, 6 hours in duration, was allowed on June 16 (Table 11). This opening was based on the preseason forecast and subsistence monitoring at Lewis Point. Inseason cumulative chinook escapement past the Portage Creek sonar counters through June 15 was behind expected levels but subsistence catches downriver at Lewis Point indicated a considerable movement of fish into the lower river. No indications of weak chinook run strength was apparent when the June 16 opening was announced. Effort observed during this opening was 279 boats and 59 set nets. The commercial harvest of 563 chinook salmon during this directed period was far below expected levels (Table 16). Low abundance of chinook in the district as illustrated by the results of the commercial opening coupled with low daily passages of chinook at Portage Creek sonar, began to raise concerns about the strength of the Nushagak chinook salmon run relative to the 1999 forecast. As the cumulative escapement continued to diverge from the level needed to achieve the 75,000 fish inriver goal, it became evident that no further directed commercial openings for chinook salmon would occur. Another 10,500 chinook were taken incidentally during the sockeye fishery. Commercial harvest for the season totaled 11,008 chinook salmon, or 8% of the projected commercial harvest, based on the forecast.

On July 1st, based on the Nushagak-Mulchatna Chinook Salmon Management Plan, the department announced restrictions on subsistence fishing for chinook salmon in the Nushagak River drainage. Effective 9:00 a.m., July 2nd, subsistence fishing was allowed only three 24-hour periods per week due to projections of spawning escapement falling below 40,000 chinook salmon. On July 5th, approximately 5,000 chinook salmon past the sonar counters at Portage Creek, based on the increased chinook escapement the 3 day per week restrictions on the subsistence chinook fishery for the local beaches and the Nushagak drainage ceased on July 6. The subsistence fishery returned to 7 days per week.

Final sonar escapement estimate was 62,331 chinook salmon (Table 26). In early August, aerial surveys of the majority of chinook salmon spawning areas were conducted with good counting conditions. Chinook spawning

escapement was estimated at between 58,000 – 68,000 fish, which was commensurate with the sonar estimate. The 1999 inshore chinook salmon run to the Nushagak River was approximately 78,300 fish, or 37% of the preseason forecast (Appendix Tables 2 and 21).

Sockeye

The 1999 Nushagak District total inshore sockeye salmon run was approximately 8.5 million fish, or 74% over the preseason forecast of 4.9 million (Table 1). Commercial sockeye harvest reached 6.3 million; 82% over the preseason projected harvest of 3.47 million sockeye, and was the second largest catch in the history of the Bristol Bay fishery. Total sockeye escapement in the district's three major river systems totaled 2.26 million (1,512,426 Wood River, 445,536 Igushik River and 311,899 Nushagak River) or 38% over the combined escapement goal of 1.63 million. Exvessel value of the sockeye fishery in the Nushagak District exceeded \$25 million for 1999.

The Nushagak District sockeye fishery in the past has been managed to achieve a biological escapement goal of 550,000 (range 340-760 thousand) spawners in the Nushagak River and 1 million (range 700 thousand to 1.2 million) spawners in the Wood River. The Alaska Board of Fisheries modified the Wood River Special Harvest Area Management Plan in March of 1999 to include language that directed the Department to manage the Nushagak River for an optimum escapement goal (OEG) of no less than 235,000 sockeye when the ratio of Wood River to Nushagak River sockeye was projected to be greater than 3:1. This OEG was adopted in order to give economic relief to the Nushagak District permit holders according to the Board. Since the preseason forecast for the two rivers exceeded the 3:1 ratio, the management objective for the Nushagak River in 1999 was to achieve sockeye escapement of at least 235,000 fish. The Igushik River run can be managed independently to a large degree by opening and closing the Igushik Section of the Nushagak District to harvest or conserve that stock. Sockeye returning to the Igushik River are managed for a biological escapement goal of 200,000 fish (range 150,000 to 250,000).

The preseason forecast for the inshore sockeye run to the Nushagak District totaled 4.9 million salmon, which was slightly below the 20-year average of 5.1 million sockeye. Strength of the forecasted Wood River run (3.3 million) was 2% above the 1979-98 average actual return, while the Nushagak River sockeye run (.9 million) was expected to be 38% below the recent 10-year average actual return of 1.45 million. The forecasted return to Igushik River (.7 million) was about 46% below the 1989-98 average (Appendix Table 18). Management of the Igushik and Nushagak Sections are discussed separately below.

Nushagak Section

Few tools exist to manage Nushagak and Wood River stocks independently because run timing and migratory routes overlap to a high degree. The Wood River Special Harvest Area Management Plan was adopted in 1996 as a means to conserve coho salmon in the district while continuing to harvest surplus sockeye salmon in the Wood River. The framework of the WRSMA plan was used by the Department in an emergency regulation during the 1997 season for sockeye management due to a large disparity in run strengths between Wood and Nushagak River stocks. The plan was then formally modified by the Board in November 1997 to provide a stock specific management tool to target Wood River sockeye salmon. The plan allows opening the Wood River for the conservation of Nushagak River sockeye salmon. Nushagak River sockeye escapement peaks slightly earlier than escapement in Wood River. If stock proportions in the escapement represent stock abundance in the district, and harvests are not stock selective, delaying the sockeye openings should help to conserve the Nushagak stocks. However, without an additional stock-specific means to exploit Wood River sockeye, surplus Wood River sockeye cannot be harvested without sacrificing the Nushagak River escapement goal particularly when the Wood River run is on the order of three times as large (or greater) than the Nushagak River run.

For at least the last sockeye life cycle, Wood River runs have been more than three times larger than Nushagak River runs due to high production in the Wood River system and decreased production in the Nushagak River system. In

each of these years, the Department has attempted unsuccessfully to keep sockeye escapement in the Wood River from exceeding the upper end of the escapement goal range, while simultaneously attempting to achieve at least the lower end of the BEG range in the Nushagak River. A similar ratio of Wood River to Nushagak River sockeye was forecast for 1999. To conserve Nushagak stocks, the department would limit commercial fishing time early in the sockeye run. The department would make every effort to achieve the new OEG minimum of 235,000 sockeye in the Nushagak River while attempting to harvest surplus Wood River sockeye in both the district and the Wood River Special Harvest Area.

Commercial fishing had not been permitted in the Nushagak Section since the June 16th period for chinook salmon. Beginning June 21st, testfishing was conducted in the upper portion of the district on almost every tide. High individual indices were observed off Pile Driver beach below Nushagak Point beginning on the evening tide of June 28th, but no other test fish stations above the district indicated a strong presence of sockeye including those in the lower Wood River (Table 10). Based on these first elevated indices, the drift fleet was put on short notice effective 8:00 p.m., June 28th. Sockeye escapement in the Wood River was building slowly commensurate with the point goal curve (1.0 million); Igushik River sockeye had not shown up at the counting towers but the test fish project in the lower Igushik River had begun to catch substantial numbers of sockeye yielding an inriver estimate inline with the point goal curve of 200 thousand fish. Nushagak River sockeye had fallen several days behind the 235,000 minimum curve.

Testfish indices in the upper portion of the district and between the district and the Wood River continued to increase through June 29th and the morning tide on the June 30th. A volunteer test fishery was also conducted with 4 vessels in the commercial fishing district in conjunction with the contracted test fish vessel. Two drift vessels fished the main channels down to the southern portion of the district on the evening tide of June 29 and the morning tide of June 30. This additional test fishing activity indicated an increasing abundance of sockeye throughout the commercial district. Through 12:00 midnight June 29, Wood River escapement totaled 45,000 sockeye salmon (Table 25), while just over 12,000 sockeye were estimated in the Nushagak River (Table 26). Igushik River had an estimated 35,000 sockeye inriver, based on the test fish project (Table 31).

Drift effort early in the season was above average. By June 30, the drift gillnet fleet registered 383 vessels in the Nushagak District (Table 12). Late afternoon on June 30th, the testfish vessel, "Ms. Mindy", reported test fish indices of 24,000 at Pile Driver Creek and 16,000 at Nushagak Point. The indices from the lower Wood River had also increased to the 4-5 thousand range. Sockeye salmon were beginning to push above the district and into the Wood River. The daily count at Wood River tower was 13,000 through 5:00 p.m., June 30th bringing the cumulative to 59,000 and the passage rate was increasing. At 6:00 p.m., an 8-hour opening in the Wood River Special Harvest Area was announced to begin at 10:00 p.m. that evening for both drift and set gillnets. The criteria for opening the WRSWA, projections of exceeding 700 thousand sockeye in the Wood River while projecting less than 340 thousand sockeye in the Nushagak River. Subsistence fishing in the WRSWA was closed until further notice effective 9:00 p.m., June 30th as specified in the WRSWA management plan. After the announcement, reports of large sockeye catches in subsistence nets on Kakanak and Scandinavian Beaches supported the testfish information that sockeye movement was occurring

Early reports the morning of July 1st indicated that harvest from the commercial opening in the WRSWA was very heavy. Wood River sockeye escapement rate continued to increase with a daily count of 8,000 fish for a cumulative of 74,000 by 6:00 a.m., July 1st. Nushagak River cumulative sockeye count of 14,700 had fallen to 5 days and 32,000 fish below the 235 thousand minimum curve. In order to maintain control over the movement of sockeye into the Wood River, another 8-hour opening was announced at 9:00 a.m. beginning at 12:00 noon for both gear types.

Department staff flew an aerial survey of the upper district, the lower Nushagak, Wood and Igushik Rivers in the afternoon. A strong movement of sockeye was observed in both the Wood and lower Nushagak Rivers. The Igushik River also showed a visible increase in sockeye abundance in the upper reaches below the counting towers; staff estimated 4-5 thousand sockeye between the lagoon and the towers. With the amount of fish observed between Lewis

Point and the sonar counters at Portage Creek on the Nushagak River, a substantial increase in sockeye escapement rate was expected in the next 12 to 24 hours. This was expected to bring the cumulative escapement in the Nushagak River above the 235,000 minimum curve. The sockeye observed in the Igushik River combined with the inriver estimates being generated by the Igushik testfish project indicated that sockeye escapement in that river was also proceeding at or above the entry curve to the 200 thousand escapement goal. At 6:00 p.m., July 1, a short commercial opening was announced for the entire Nushagak District beginning 4:00 a.m., July 2. Four hours was announced for the drift fleet, while six hours was allowed for set gillnets due to tide height at the closure. The duration was kept short to test abundance in the district while not harvesting the majority of all sockeye present. An 11.5-hour extension was included for Igushik Section set gillnets because of the continued high indices from the test fish project in the lower river indicating strong passage of sockeye into the Igushik River. Two additional 8-hour openings on July 2 in the WRSHA for both gear types were included in the announcement as a result of the aerial survey. The openings in both the Nushagak District and the WRSHA were restricted to mesh sizes of 5 ½ inches or smaller for the conservation of chinook salmon.

Escapement rates in the Wood River were kept under control by the commercial openings in the WRSHA and the cumulative escapement of 91,000 through midnight July 1 was between the 700 thousand curve and the point goal curve to 1.0 million sockeye. Passage rate at the sonar counters in the Nushagak River increased substantially the evening of July 1st, bringing the cumulative sockeye escapement to over 25,000 through midnight July 1st. The elevated rate continued on July 2nd with over 88,000 unapportioned counts through 2:00 p.m. Testfishing information at Portage Creek indicated the majority of the counts were sockeye salmon. This rate would put the Nushagak River above the 235 thousand curve by the end of the day. Igushik River tower had a cumulative escapement of 7,000 sockeye through July 1st, and the passage rate was increasing substantially through July 2. This increased rate would also put the Igushik escapement above the point goal curve to 200,000 within the next 24 hours. Escapement information continued to appear positive in all three river systems. At 5:00 p.m., July 2nd staff announced a 17-hour opening in the entire Nushagak District from 7:00 p.m. that evening until 12:00 noon, July 3rd with both gear types including drift gillnets in the previously announced Igushik Section set gillnet opening.

By the afternoon of July 2nd, news of extremely large catches in the eastside districts (Naknek/Kvichak and Egegik) began to be discussed along with the issue of maximum processing capacity being exceeded by some processors. There were reports of waste occurring in those districts. No word of processing capacity being a problem in the Nushagak District had surfaced through July 2.

On the morning of July 3rd, with commercial fishing in the district having begun in earnest at 7:00 p.m. the previous evening, news that most of the processors had ceased buying operations in the Nushagak District came as an unwelcome shock to management staff. A poll of the processors conducted that morning indicated all but 2 had ceased buying; the other two processors said that they would suspend buying if the current opening in the Nushagak District was extended beyond 12:00 noon, July 3rd. The bay-wide sockeye harvest for July 1st and 2nd totaled almost 7 million fish or 35-40 million pounds! This was a new record for a 48-hour period in Bristol Bay and it was understandable that industry was unable to keep up with the sheer volume of fish.

The sockeye escapement in all three rivers had progressed towards their respective escapement goal curves. The Wood River had a cumulative escapement of 178,000 sockeye through July 2, which was above the point goal curve. The Nushagak River with a cumulative sockeye escapement of over 66,000 and an increasing passage rate was within a few thousand fish of the 235 thousand OEG minimum curve for 1999. The Igushik River towers had counted over 31,000 sockeye through July 2nd, which was just over the point goal curve for that system. Commercial fishing needed to resume in the district and the WRSHA soon to control sockeye escapement in all three river systems.

At 12:00 noon, July 3rd, the staff made an announcement that their intention was to have a WRSHA opening that afternoon, resume fishing in the Nushagak District at 5:00 a.m. the next morning after a two-tide break, and

extend Igushik Section set gillnets through the district opening tomorrow. However, with virtually all the companies suspending buying operations for the next 24-36 hours, the department was forced to adjust the intended fishing schedule accordingly. Igushik would close as scheduled at 12:00 noon, July 3rd, the WRSMA opening would be delayed until the next morning (July 4th) and the Nushagak District opening would be delayed until the evening tide of July 4th.

Requests from the processors were for short (6-8-hour) separate openings as opposed to long (12+ hours) openings. Industry representatives maintained that these "pulse" type openings maximized harvest and processing capacity because the companies kept more accurate account of the amount of fish purchased so they didn't exceed their capacity and get backlogged. WRSMA had been closed since 9:00 p.m., July 2nd, while Igushik and Nushagak Sections had closed at 12:00 noon, July 3rd. No additional commercial openings occurred the rest of the day in any area of the Nushagak.

As expected, the Wood River sockeye escapement rate started to increase dramatically with a daily count of 200,000 through 6:00 p.m., July 3rd, bringing the cumulative count to 380,000 sockeye, well above the upper end of the escapement goal curve. The Igushik River counting towers also saw an increase in passage rate with a daily count of 24,000 through 6:00 p.m., July 3rd taking that river well above the point goal curve. The sonar counters at Portage Creek on the Nushagak River had registered 35,000 unapportioned counts through 6:00 p.m. with the majority of those expected to be sockeye salmon. This brought the cumulative sockeye escapement in the Nushagak River to just above the 235 thousand OEG curve. All river systems were at or above their escapement goal curves by the evening of July 3rd.

Discussions amongst the Department's Bristol Bay management staff and with industry representatives centered on a strategy of having short openings on each tide with the processing companies putting their fishermen on poundage "limits" each opening and requiring delivery at each closure. This strategy seemed to work well in the eastside districts. However, in the Nushagak District, with both district openings and WRSMA openings producing large volumes of fish, and the limited processing capacity provided by companies in the district, this strategy broke down. Companies in the Nushagak could not handle the amount of fish coming out of the WRSMA and the district with both areas open every tide. The management staff in the Nushagak was told by industry representatives that the combined processing capacity in the Nushagak could handle openings in one area every tide and openings in the other area every other tide. Since sockeye escapement was exceeding the upper end of the escapement goal range on the Wood River and just exceeding a minimum management objective in the Nushagak River, the priority was clear. Openings were scheduled to cover every tide in the WRSMA and every other tide in the Nushagak District.

On July 4th, a 6-hour opening in the entire Nushagak District was announced from 5:30 p.m. until 11:30 p.m. for both drift and set gillnets. Also an 8-hour opening for drift gillnets and a 15.5-hour opening for set gillnets was scheduled for the WRSMA beginning at 1:00 a.m. The noon announcement on July 4 summed up the situation: "Due to limited market and processing capacity, we are forced to consider alternating openings between the Wood River Special Harvest Area and the Nushagak District including the Igushik Section. We need to have commercial openings in all locations to control sockeye escapement levels, but must schedule these openings according to processing capacity and available market in order to avoid unintentional waste. For any opening scheduled, some companies will have filled their capacity from a previous opening and may not be buying. Permit holders must contact their company to confirm market prior to participating in a scheduled commercial opening."

Through midnight, July 4th, sockeye escapement was as follows: Wood River – 740,000 (with a daily count on July 3rd of 347,000 as a result of the two tide closure); Igushik River – 95,000 which was double the number needed to achieve the point goal; and the Nushagak River – 144,000 which was 30,000 fish above the 235 thousand curve mandated by the WRSMA management plan. Nushagak District sockeye salmon harvest had surpassed 2 million.

At noon on July 5, staff announced a 6-hour period in the Nushagak District on the evening tide for both gear types beginning at 6:30 p.m.; because of market availability for the Igushik Section, permit holders were reminded to check with their market before participating in the opening. The WRSWA was opened to drift gillnets for an 8-hour period beginning at 3:00 p.m., while set gillnets were extended for 25 hours. At this point in the season, all permit holders were impacted by the processing capacity limitation and were on strict poundage limits imposed by their company.

A morning teleconference with ADF&G management staff in King Salmon and Dillingham was held on July 6 to discuss the current fishing pattern dictated by processors versus an "open until further notice" strategy. The two major concerns and management mandates for department staff were to: 1) Provide an orderly fishery; and 2) Minimize waste. These two concerns were the basis for delaying, shortening and rescheduling commercial openings at the request of processors beginning on July 2 when the large processing glut occurred. However, by July 6, several factors were different. Orderliness had been restored in the fishery with the poundage limits invoked by the processors with their fishermen, and the threat of large-scale waste was greatly diminished because the daily bay-wide harvest was much less. Additionally, whereas sockeye escapements were all increasing toward their respective escapement goals on July 2, by this time escapement levels in several river systems across Bristol Bay were exceeding their established goals. These factors led to department staff agreeing that "continuous fishing" with the processors controlling their own fishermen with limits and delivery requirements would lead to maximizing the harvest and processing potential. At the end of the teleconference, the plan for all districts except Togiak was to open commercial fishing until further notice. A meeting with industry representatives was planned that afternoon at 3:00 p.m. to discuss the department's strategy. In the noon announcement on July 6, staff opened commercial fishing in the Nushagak District and in the WRSWA until further notice.

At the 3:00 p.m. meeting in King Salmon, representatives from all processing companies buying salmon in Bristol Bay except one requested the department to continue "pulse" type openings (short duration openings on each tide with closed periods in between) instead of going to continuous fishing as planned. Department staff questioned industry's input on the two issues concerning managers; maximizing harvest potential and minimizing the potential for waste. Company representatives advised the department that "pulse" type openings did indeed maximize harvest potential and minimize waste. At the end of the meeting, the department agreed to continue the pulse fishing.

Nushagak management staff then rescinded the 12:00 noon announcement allowing fishing until further notice in both the district and the WRSWA, and returned to the short openings requested by industry. An 8:00 p.m., July 6th announcement allowed a 6-hour period on each high tide in the Nushagak District with both gear types and opened the WRSWA to drift gillnets for two 8-hour periods around low water while allowing set gillnets to continue fishing around the clock. In the Igushik Section, set gillnets were allowed to fish continuously while drift gillnets were allowed to fish when the rest of the district was open. The differential fishing time was to attempt to achieve the allocation percentages prescribed in the allocation plan for each gear type. Nushagak District commercial sockeye harvest reached approximately 3 million fish through July 6.

This general pattern of fishing continued for the Nushagak District through July 26 and the WRSWA through July 27. Periods increased in duration in the district to two 8-hour and then 10-hour openings around each high tide for drift gillnets. Period duration and frequency was adjusted for set gillnets in the Nushagak Section of the Nushagak District to attempt to achieve the allocation percentages prescribed in the Nushagak District allocation plan.

Commercial fishing in the Nushagak District closed at 6:30 p.m., July 26 under the Nushagak River Coho Salmon Management Plan because the Department could not project achieving the specified 100,000 coho salmon inriver goal.

The Nushagak District Commercial Set and Drift Gillnet Sockeye Salmon Fisheries Management and Allocation Plan adopted by the Alaska Board of Fisheries in November 1997 was in effect for the second season in 1999.

The plan specified a target sockeye allocation by gear type of 74% by drift gillnets and 26% by set gillnets. The 26% allocation for set gillnets was further subdivided into 20% for Nushagak Section set gillnets, and 6% for Igushik Section set gillnets. Differential fishing time for the two gear types was invoked on several occasions in order to achieve the specified harvest percentages. Beginning on July 7, with the sockeye harvest percentages calculated at 67% to drift gillnets, 33% to set gillnets, drift gillnets were allowed to fish longer than set gillnets in the commercial openings to increase their percentage of the harvest. From July 9 until July 13, set gillnets in the Nushagak Section were allowed only one 6-hour opening per day while drift gillnets were allowed two 10-hour periods. This disparity in fishing time did increase the percentage of sockeye harvest taken by drift gillnets the first few days. However, no noticeable shift in percentage between gear types occurred with this management action after July 12, so on July 13, the set gillnet fishery returned to a two 6-hour periods per day fishing schedule with drift gillnets continuing with two 10-hour openings. The final sockeye allocation percentages calculated for the Nushagak District were: 69.5% by drift gillnets, 24% by Nushagak Section set gillnets, and 6.5% by Igushik Section set gillnets.

Wood River Special Harvest Area

Commercial fishing was permitted in Wood River in 1996 for the first time since the early part of the century. In January 1996, the Alaska Board of Fisheries adopted the Wood River Sockeye Salmon Special Harvest Area Management Plan to conserve Nushagak River coho salmon while providing an opportunity to harvest surplus Wood River sockeye during the late portion of the run. It was under this management plan that the fishery was conducted in 1996. In 1997, the commercial fishing occurred in the Wood River under an emergency regulation that used the WRSHA predominantly for sockeye management. After the 1997 season, the Board modified the WRSHA Management Plan to include provisions and criteria for sockeye salmon management, specifically to harvest surplus Wood River sockeye while conserving Nushagak River bound sockeye salmon. The plan was modified again in March of 1999 to eliminate the concurrent district opening language and include an OEG of no less than 235,000 sockeye in the Nushagak River when the projected ratio of Wood to Nushagak River sockeye exceeded 3:1.

Peak effort levels in Wood River occurred July 1, when the Wood River was open without a concurrent district opening. Over 250 drift gillnet vessels and 78 set nets were observed fishing on an aerial survey during what was actually the second opening of the season. Effort levels were substantially less after July 3rd when the Nushagak District began regular openings.

The Wood River was opened to commercial fishing 51 times between June 30 and July 27; fishing time was 396 hours for drift gillnets and 589 hours for set gillnets. In all but the first three and last opening, fishing was permitted concurrently in the Nushagak Section. Opening times and duration were changed as the season progressed to maximize exploitation of Wood River sockeye and distribute fish throughout the harvest area prior to each opening. Based on the experience with opening times during the 1997 and 1998 Wood River fisheries, openings around low water improved efficiency of both gear types. Overall exploitation of Wood River sockeye salmon in the WRSHA in 1999 was estimated at 56%. Early periods prior to opening the Nushagak District showed greater efficiency with exploitation rates of 90-95% when drift and set gillnet effort levels were high.

The sockeye salmon allocation plan that went into effect in 1998 for the Nushagak District also applied to the WRSHA. The plan called for a target allocation percentage of 74% to drift gillnets and 26% to set gillnets in the Wood River fishery. During the first few periods in 1999, beginning on June 30, drift and set gillnets were allowed to fish eight hours. After seeing the extremely high percentage of the sockeye harvest and large volume of fish taken by drift gillnets in these early periods, beginning on July 4 openings were announced with set gillnets fishing longer periods. On July 6, with the WRSHA sockeye harvest calculated at 86% taken by drift gillnets, 14% by set gillnets; periods were announced with set gillnets fishing 24 hours per day while drift gillnets were allowed to fish two 8-hour periods. Final sockeye harvest by gear type in the WRSHA was calculated at 78% by drift nets and 22% by set gillnets.

Commercial harvest in the Wood River totaled approximately 1.8 million sockeye salmon (Table 18) in 1999. Daily sockeye harvests peaked July 1 (491,000 fish) when WRSHA was the only section open, and declined to less than 100,000 fish on July 8. This was the first season that the Wood River fishery performed up to expectations of the management staff and showed a level of efficiency that could control the sockeye escapement when needed. Impacts to other species of salmon and resident species in the Wood River are always a concern with an inriver fishery. There is little data on the size of chinook, chum and coho salmon stocks in the Wood River and less data available on resident species populations. Sockeye salmon represented 99.6% of the 1999 commercial harvest in the Wood River. Harvests of other species included approximately 500 chinook, 6,600 chum and less than 50 coho salmon. Staff conducted aerial surveys of chinook spawning escapement in the Muklung River in an effort to monitor effects of the fishery. The aerial count of 100 chinook salmon in the Muklung River was one of the lowest since 1967, when surveys were first conducted on this river. However, the low commercial harvest of this species in the fishery was an indication that overall run strength was down and that exploitation of Muklung chinook was not above normal levels.

Igushik Section

The 1999 sockeye run forecasted for Igushik River was approximately 25% smaller than recent years at 700 thousand fish. Sockeye salmon escapements in the Igushik River from 1989 to 1996 exceeded the biological escapement goal range (150 – 250 thousand) in spite of extensive commercial fishing in the Igushik Section (Appendix Table 1). In 1997, the Igushik sockeye run failed, as did most other river systems in Bristol Bay, with less than 300 thousand fish in the total inshore return. This failure in 1997 set the stage for a conservative management strategy in the following years.

The first sockeye were detected in the Igushik River June 26, after ten days of test fishing with minimal daily catches (Table 31). Through 12:00 noon June 27, the Igushik test fish project was yielding an estimate of 5,000 sockeye past the test fish site in the lower Igushik River. However, the inriver estimate rose to 15 and then 25 thousand over the next two days with large daily test fish catches and resulting indices. There were only 6 sockeye past the Igushik counting towers on the upper Igushik River before June 30. On July 1, after an aerial survey estimate of 5,000 sockeye in the upper Igushik river and an inriver estimate from the test fish project of 60,000 fish, indications were that sockeye escapement into the Igushik was at the level needed to achieve the 200 thousand point goal.

After a substantial increase in sockeye escapement rate at Igushik towers July 1, the first commercial opening was announced for 4:00 a.m., July 2 in the entire Nushagak District with an 11.5-hour extension for set gillnets in the Igushik Section. Sockeye escapement rates at Igushik towers began to increase on July 2 bringing the cumulative total of 31,000 fish up to the point goal curve. Another commercial opening, 17 hours in duration was announced beginning the evening of July 2. Then, on the morning of July 3rd, the processing company that was the major buyer in the Igushik Section suspended buying. Commercial fishing closed in the Igushik Section at 12:00 noon, July 3 due to lack of a viable market. The Igushik Section was then reopened for a 6-hour opening at 5:30 p.m., July 4 but with poundage limits imposed by the processor. After one opening, the company again suspended buying for another 24-36 hours. These closures occurred during the peak of sockeye migration into the Igushik River and at a critical time for controlling escapement. In each announcement for the Igushik Section, permit holders were advised to check with their market before participating in the opening. Processing capacity allowed only one 6-hour period per day through July 5, then period duration was increased as capacity allowed until by July 8, continuous fishing with set gillnets in the Igushik Section was allowed until July 26 when the district closed.

Commercial fishing time in Igushik Section totaled 522 hours. Although drift harvests are not estimated for Igushik Section, Igushik Section setnet harvests totaled approximately 287,000 sockeye salmon (Table 17), which is above the recent 10-year (1989-1998) average. Sockeye salmon escapement in the Igushik River totaled 445,000 fish, or 123% over the escapement goal. The 1999 Igushik River sockeye return estimated at 1.63 million came in at 133% above the preseason forecast.

The new sockeye allocation plan specified a target of 6% of the sockeye harvest of the Nushagak District to be taken by Igushik Section setnets. Management actions directed at achieving this target consisted of trying to maximize fishing time for set gillnets. When the entire Nushagak District was open, drifting was allowed in the Igushik Section, when the district was closed, set gillnets were allowed to continue fishing in Igushik Section when processing capacity allowed. The final sockeye harvest percentage for Igushik Section set gillnets was 6.5%.

Sockeye runs to Nushagak District systems totaled 8.5 million, 74% above the 1999 forecast and well above the recent 10-year average (Table 4, Appendix Table 18). Wood River comprised the majority (69%) of the sockeye return, followed by Igushik (19%) and Nushagak (12%).

The preliminary sockeye harvest estimate (6.2 million) for Nushagak District was 100% above the forecast and approximately 68% above the 1979-1998 average of 3.7 million. It was the second largest harvest on record for the Nushagak District; second only to 1981. Sockeye escapement in the three major Nushagak District river systems reflected the disparity in run strengths (Appendix Tables 1 and 17). Escapement in the Wood River (1.51 million) exceeded the upper range of the Wood River goal by 25%. In the Nushagak River, the management objective or OEG minimum of 235,000 fish for 1999 was exceeded; the final escapement estimate (312,000) fell between the OEG minimum and the low end of the BEG range (340,000). Although the 1999 Nushagak River escapement was within the desired range, sockeye escapement into Nuyakuk River (81,000) was much less than the 1998 escapement into that tributary and far below the desired range. The escapement goal for the Igushik River was more than doubled; escapement in that system (445,000) was 123% above the point goal.

Coho

The Nushagak Coho Salmon Management Plan established spawning and inriver escapement goals and provides guidance to the department in managing sport, subsistence and commercial fisheries that harvest coho salmon.

The plan directs the department to manage the commercial fishery in the Nushagak District to achieve an inriver run goal of 100,000 coho salmon in the Nushagak River. The inriver run goal provides for a biological escapement goal of 90,000 spawners and upriver sport and subsistence harvests. Based on parent year escapement of approximately 45,000 coho in 1995 and poor recent production trends, the 1999 coho return was not expected to be strong. The coho plan directs the department, when the total inriver run in the Nushagak River is projected to be less than 100,000 but at least 60,000, to close "the directed coho salmon commercial fishery" by July 23. In 1999, commercial fishing in the Nushagak District continued through July 26 due to sockeye being the predominant species in the harvest, thus not being considered as a "directed" coho fishery. Through July 26, the cumulative coho salmon escapement past the Portage Creek sonar project was less than 3,000 fish, which was several days behind the level needed to achieve the inriver goal. Approximately 2,700 coho salmon were reported in the commercial catch prior to the closure; reporting problems relating to coho salmon identification in the commercial harvest would indicate that the actual catch was greater than reported catch. Subsistence and sport fishing would be permitted to continue normally, unless in river run strength was projected to fall below 60,000 coho during the season.

Directives in the Nushagak River Coho Salmon Management Plan call for a closure of the sport fishery, and restrictions in the subsistence fishery, when the inriver run is projected to be less than 60,000. Through August 8, the estimated coho salmon escapement was 19,600, or 40% of the expected escapement for that date. Total escapement was projected, based on current escapement counts and average run timing, to end up between 41,000 and 64,000. Due to the weak parent-year escapement and recent production trends, a conservative approach was taken and an emergency order restricting the subsistence coho salmon fishery on Dillingham beaches and the Nushagak drainage to three 24-hour periods per week was announced on August 9. On August 12, after a closure of the sport fishery and with cumulative coho salmon escapement estimated at 25,000 through August 11, and projections for total coho escapement to fall short of 40,000 fish; a closure of the subsistence coho fishery was announced effective 9:00 a.m., August 13. No further commercial, sport or subsistence harvest of coho salmon occurred for the 1999 season.

Final reported commercial harvest of coho salmon was approximately 2,819 fish (Table 16, Appendix Table 25). Final coho salmon escapement into the Nushagak River was estimated to be 34,853 fish for 1999.

Togiak District

The 1999 Togiak District inshore sockeye run was approximately 540,800 fish or 80% above the preseason forecast. District sockeye harvest was 383,900 fish; 13% below the 20-year average of 441,300 and the highest catch since 1996. Sockeye escapement into Togiak Lake reached 155,898 fish or 4% over the escapement goal of 150,000 sockeye. Combining the final tower escapement with the escapement estimate for the tributaries and mainstem resulted in a Togiak River drainage escapement of 196,100 sockeye.

Forecast

Sockeye

The 1999 inshore sockeye run to the Togiak River was forecasted at 300,000 sockeye salmon, of which 67% were projected to be 3-ocean fish and 33% 2-ocean fish (Table 2). With an escapement goal of 150,000 sockeye for Togiak Lake, and an additional 25,000 fish (20-year average) spawning in the tributaries below, approximately 125,000 sockeye would be available as harvestable surplus in the Togiak River Section. This was expected to be one of the lowest harvests in the last 20 years. Smaller sockeye runs to other drainages in the district (primarily Kulukak Section) occur, but these are not included in the forecast because age composition and escapement data are not complete. The projected sockeye harvest for 1999 in the Togiak River Section was 64% below the 20-year (1979-1998) average actual harvest of 348,000 fish (Appendix Table 19). Therefore, a conservative management approach was planned.

Chinook

No formal forecast is issued for chinook salmon runs in the Togiak River. Recently, chinook run strengths have declined from a high of almost 48,000 in 1983 to a low of less than 16,000 in 1991; and chinook escapements fell short of the regulatory escapement goal (10,000) from 1986 through 1992. The chinook goal was reached from 1993 to 1995, with extensive commercial closures and mesh size restrictions. In 1996, with only minor reductions in the weekly fishing schedule, chinook escapement again fell short of the goal. The chinook escapement goal in the Togiak River has been achieved regularly since that time. Reducing the weekly schedule to approximately 48 hours per week in late June seems to provide a sustainable amount of fishing time while achieving the escapement goal and harvesting the surplus chinook salmon (Appendix Table 22).

Coho

A formal forecast is not produced for coho salmon in the Togiak District. Parent-year escapement estimates from aerial surveys of spawning coho are the only preseason indicator of run strength available. Coho salmon escapement for the parent-year (1995) in the Togiak River was not available due to water and weather conditions. Togiak District's commercial coho harvest in 1995 was 8,910 fish. The 1995 commercial harvest was approximately 75% below the 18-year average harvest. Lacking parent-year escapement information and with the commercial harvest indicating weak coho run strength for the parent-year, a cautious management approach based on catch performance was planned.

Togiak District is managed differently than other districts in Bristol Bay. This district uses a fixed fishing schedule of 3 days per week in the Kulukak Section, 4 days per week in Togiak River Section, and 5 days per week in the Osviak, Matogak and Cape Pierce Sections. The Togiak District Salmon Management Plan (TDSMP)

adopted by the Alaska Board of Fisheries in January 1996 adds 36 hours to the weekly schedule for the Togiak River Section between July 1 and July 16. This schedule is adjusted by emergency order, as necessary to achieve desired escapement objectives. In addition, the TDSMP restricts the transfer in and out of the Togiak District by prohibiting boats that fished in any other district to fish in the Togiak District until July 24. It also prohibits boats that had fished in the Togiak District to fish in any other Bristol Bay district until the same date.

Season Summary

Chinook

The management's strategy for the last 3 years has been to reduce the weekly fishing schedule during the last 2 weeks of June for all sections of the district to reduce the exploitation of chinook salmon. Staff expected that management focus would shift to sockeye salmon with the weekly fishing schedule beginning July 5. In early July, the TDSMP would increase exploitation of this stock with the increased fishing schedule. A public announcement, June 11, initiated a weekly fishing schedule reduction beginning June 14, allowing a 48-hour period for the week.

Commercial fishing opened in the district with a regular weekly schedule on June 1. The first landings of the 1999 season occurred during the week beginning June 14 (Table 19). By the close of fishing on June 16, the cumulative chinook catch in the Togiak River Section was 17 fish, far below the historical average of approximately 1,400 fish. Effort (number of deliveries) was below average, and catch rates (number of fish per delivery) were also significantly below average.

By June 18, 15 drift and 25 setnet permit holders were registered to fish in the Togiak District. The department announced that commercial fishing would again be restricted to 48 hours in all sections of the Togiak District from 9:00 a.m., Monday, June 21 until 9:00 a.m., Wednesday, June 23. This reduction of 48 hours from the normal weekly fishing schedule in the Togiak River Section was for the conservation of chinook salmon. During this commercial opening, effort increased in the Togiak River Section chinook fishery, but was still below normal levels for that date. Daily catch rates increased to above average levels. The resulting chinook harvest reached 1,194 fish in the Togiak River Section for the 48-hour opening. Following this opening, subsistence fishing was allowed in the commercial district for 48 hours.

The final week of June began a transition between chinook management and sockeye management. Commercial fishing was again reduced to 48 hours, beginning June 28. Effort levels increased, but were still below average. Daily catch rates slowed after the initial 24 hours of fishing, coinciding with average run timing. Peak chinook harvest occurred on June 28th with 1,600 fish harvested (Table 20). The week's harvest was 3,840 fish, bringing the cumulative chinook harvest for Togiak District through June 30 to 5,600 (Table 19), which was just over half of the historical average for this time, but near 1999 expectations. The Kulukak Section, where effort was high, contributed 550 chinook to the district's cumulative total. Overall, effort for June was 40% below average.

Catch per delivery numbers remained near average levels during July. Concurrently, Togiak residents and sportfishing lodge operators indicated that chinook abundance in the Togiak River was comparable to recent years. Total season commercial chinook harvest for the Togiak River Section was 10,700 fish (Table 20). The escapement goal of 10,000 for the Togiak River was essentially achieved with 9,500 chinook, estimated from aerial surveys. Commercial exploitation of the Togiak River chinook stock was 53% (not counting sport and subsistence harvests), just under the average (1980-1998) of 56%. District-wide, 11,500 chinook were harvested, approximately 65% of the 20-year average (Appendix Table 22). The District's 5-year average catch is 10,200, while the 20-year mean is 17,700 fish. Escapement estimates totaled 600 for Kulukak River, with an additional escapement of 2,140 estimated in the Quigmy, Osviak, Matogak, Slug, Negukthlik and Ungalikthluk Rivers combined. The total district escapement of 12,300 chinook was 17% below the 20-year average of 14,800. The

combined total chinook run to Togiak District was 25,200 chinook and was 2% lower than the recent 5-year average.

Sockeye

Sockeye salmon management began June 28 in the Kulukak Section. Due to very high effort levels in that section, the weekly schedule was reduced to 24 hours for the conservation of Kulukak River sockeye stocks. Escapement levels into the Kulukak River have been below average since 1993.

In the other sections, sockeye salmon management began July 5 along with the extended weekly fishing schedule implemented by the TDSMP. In some years sockeye escapements have exceeded the goal (Appendix Table 19) in the Togiak River when restrictions were implemented in late June for the conservation of chinook salmon. Limited efficiency of the small gillnet fleet, and extended lag time from the district to the counting tower, necessitated increasing fishing exploitation early in the sockeye run to control escapement excesses. The 36 hours that were added to the weekly schedule by the management plan would accomplish this before overall sockeye run strength could be assessed in season. However, in 1999, in recognition of the very low pre-season forecast, a reduction in the weekly schedule was likely for early July until run strength could be assessed. With the district registration restrictions of the TDSMP, both set and drift gillnet effort was expected to remain stable through July 23, which has historically been the 85% point in the sockeye harvest for Togiak District.

Department personnel set up camp and began construction of the counting towers at Togiak Lake on July 1. Adult sockeye salmon were not present until July 5. Daily passage rates remained relatively low, and cumulative sockeye escapement slowly diverged from expected levels, until July 27, when three days of record-level escapement brought the total closer to the goal. Historically, 99% of the escapement has occurred by July 26.

The first aerial survey of the Togiak River to assess sockeye escapement was conducted June 28; it included the lower index area, and few sockeye were present. On July 5, a complete aerial survey of Togiak River estimated 8,000 sockeye. Two additional aerial surveys were conducted on July 7 and 9 with fair conditions on July 7 observing 11,900 sockeye and poor conditions on July 9,000 estimating 7,300 sockeye. Sockeye were distributed evenly throughout the river, but the abundance present did not indicate escapement rates that would achieve the escapement goal (Table 32). Also on July 7, an aerial survey of Kulukak River and lake resulted in an estimated escapement in that system of 6,850 sockeye.

Beginning July 5, when the TDSMP would normally increase the weekly fishing schedule to 132 hours, an emergency order reduced the weekly commercial fishing schedule to 72 hours in the district, except Kulukak Section, which was reduced to 48 hours. By July 5, 40 drift fishing vessels and 65 set net permits were registered for Togiak District. In 1999, due to the processing capacity being exceeded in other districts, permit holders were obligated to deliver catches to available tenders, which moved in and out of Togiak Bay periodically. During the week of July 5 tender availability was limited and buyers suspended purchasing salmon the afternoon of July 7. Processing Togiak District salmon was primarily conducted in other Bristol Bay facilities since the local Togiak processing plant was closed for the 1999 season. However, due to high volumes of salmon being harvested in other Bristol Bay districts at the time, the processing industry faced potential waste and quality issues, processors gave permit holders advance notice of their intentions and suspended buying in Togiak District. Therefore, actual fishing time was only 48 hours, instead of 72. Concerning this matter, department announcements warned permit holders to confirm market availability before participating in scheduled commercial openings.

While the number of registered permit holders were at average levels during the week of July 5, distribution was unusual. Effort was low in the Togiak River Section, but high in the Kulukak Section, indicating an effort shift. Cumulative sockeye harvests reached 46,700 fish for the Togiak River Section, and 19,500 fish in Kulukak Section through July 5. Kulukak Section's weekly schedule had been reduced to 51 hours from 9:00 a.m., Monday, July 5 through 12:00 p.m., Wednesday, July 7 in order to conserve the small Kulukak River sockeye stock.

Since the sockeye catch had been good in the Togiak River Section during the week of July 5, the tower counts were on the escapement curve, and sockeye abundance in the Togiak River appeared steady, the full weekly schedule as prescribed in the TDSMP was permitted everywhere in the district except Kulukak Section during the week of July 12. Kulukak Section's weekly schedule was again reduced to 48 hours. Processors reported that they were ready for a complete week of fishing and district registration had increased to 42 drift and 66 setnet permit holders. When the Togiak District reopened on Monday, July 12, daily catches in the Togiak River Section were average. By Thursday, the daily catch was 54% above average and peaked for the season at 27,000 sockeye (Table 20). Effort had increased to slightly above average, and the cumulative harvest was 62% above the expected level in the Togiak River Section. Kulukak Section's 48-hour opening resulted in a harvest of over 18,000 sockeye, which was above average for that date. Effort in Kulukak remained twice the standard, while catches per delivery were still average. The peak daily catch for Kulukak Section occurred July 13, with 8,200 sockeye being harvested for a cumulative harvest of 37,600, 20% above average.

Throughout the week, aerial surveys were not providing completely adequate information. During an aerial survey conducted on July 12 with fair survey conditions, staff observed 7,700 fish in the lower Togiak River, steady influxes of sockeye, but no significant push forthcoming. Aerial surveys July 15 and July 20, were unreliable due to poor survey conditions. The Kulukak River was also surveyed July 15, very poor conditions limited the survey to the lower river; 1,200 sockeye were observed, low numbers given the date.

Harvest data, contributed better information, through July 17, with average run timing, approximately 66% of the sockeye harvest is normally taken. The cumulative harvest in Togiak River Section was 162,000 sockeye; 37,000 fish above the preseason forecast by July 17. Cumulative tower counts for sockeye was 47,000 fish (Table 25), 2 days behind the level required to make the escapement goal of 150,000 fish. Normally, 42% of the sockeye escapement has past the towers by July 17. Cumulative sockeye harvest for the Togiak District was 199,600 through this date. Considering cumulative harvest and escapement, the 1999 sockeye run appeared to be above forecast.

Accordingly, since the performance of the Togiak River Section's commercial harvest was good, the full weekly schedule was allowed for the week of July 19. The Kulukak Section was again reduced to a 48-hour opening to conserve Kulukak River sockeye. Throughout the week catch rates remained above normal in Togiak River Section, while effort was average. The second highest catch of the season for Togiak River Section occurred July 22 when 26,400 sockeye were harvested. The week yielded 96,200 sockeye from the Togiak River Section, bringing the cumulative catch to 258,200. This catch was 133,200 fish, or 106% above forecasted harvest. Effort in Kulukak Section dropped 60% in comparison to previous periods, catch rates dropped approximately 50% and the harvest for the week of July 19 was 1,670 sockeye. Even though Kulukak Section would open the following week for commercial fishing, harvesting of sockeye ceased July 21.

Meanwhile, escapement into the Togiak Lake remained steady; however, daily counts were approximately half of what was expected. Consequently, the cumulative tower counts lagged 4 days behind expected levels by the end of the week. With escapement falling further behind the escapement goal curve a reduction in fishing time was necessary. The fishing schedule for all of Togiak District was reduced to 48 hours during the July 26 week.

Because of the considerable lag time (10 – 13 days) between the commercial fishing district and the counting towers below Togiak Lake, aerial surveys play an important role in managing the Togiak salmon fishery. The aerial survey on July 27 resulted in a critical management decision. With fair survey conditions, approximately 25,700 sockeye were observed migrating, primarily through the upper Togiak River (Table 32). Even though tower counts were lagging behind the escapement curve, enough sockeye were observed in the river to assure the 150,000 fish goal. With the escapement goal for the Togiak River system assured, commercial fishing in all waters of the Togiak District excluding Kulukak Section, was extended through Friday, July 30. Sockeye escapement increased into Togiak Lake with the peak daily escapement of 19,400 fish occurring on July 28.

Following this, commercial fishing was again extended through 9:00 p.m., Saturday, July 31. The week of July 26 yielded 67,500 sockeye from the Togiak River Section, bringing the cumulative catch to 326,000. Daily catches, deliveries and catch per delivery were above average.

Daily escapement past the towers remained high for two more days, then, diminished to 500 by August 4. Normally, daily escapement would have declined steadily after July 24, but the late run brought the cumulative escapement up to the expected level. The counting tower operated through August 4, and when counting ceased, final escapement was 155,898 fish or 4% over the escapement goal of 150,000 sockeye (Table 25, Appendix Tables 1 and 19). Combining the final tower escapement into the lake with the escapement estimate for the tributaries and mainstem resulted in a Togiak River drainage escapement of 196,100 Sockeye. Sockeye escapement into the Kulukak Section totaled 12,300, 45% below the recent 10-year average.

Management focused on sockeye until August 13, since few coho were being observed in the commercial fishery and a harvestable surplus of sockeye remained in the district. An additional 19,000 sockeye were harvested during August and throughout the coho fishery bringing the preliminary total Togiak River Section harvest to 344,700 sockeye (Table 20). This was 1% below the 1979-1998 average (Appendix Table 19). Escapement plus the Togiak River Section catch yielded a total run to the Togiak River of 540,800 sockeye, 80% above the preseason forecast.

Kulukak Section sockeye harvest was 39,200 fish, while no commercial fishing occurred in Matogak, Osviak and Cape Pierce Sections (Tables 21, 22 & 23). Combined district sockeye harvest was 383,900, 13% below the 20-year average of 441,300 and the highest catch since 1996 (Appendix Tables 5, 19).

The 1999 Togiak District chum salmon harvest of 109,200 was 52% below the 1979-1998 mean (Appendix Table 23). The commercial catch combined with the district-wide escapement estimate of 116,200 fish determined from aerial survey, produced a total run estimate of 225,400 chum salmon, approximately 52% of the 1979-1998 mean.

Coho

Aerial surveys are generally not productive in assessing coho salmon abundance in the Togiak River until mid to late August. The commercial catch rates provide the only indication of coho run strength available in early August. Typically, Togiak sockeye runs diminish during the first week of August and coho abundance begins to build; management emphasis usually turns to coho salmon at that time.

Given the late sockeye run into the Togiak River and with no indications of run strength available for coho, commercial fishing for coho salmon was initiated in the district with a 48-hour period beginning August 9. This was to allow harvest of surplus sockeye and to provide indications of coho abundance. After the first day, 700 sockeye and only eight coho were harvested. With the abundant sockeye and few coho present, the department extended the fishery to Friday, August 13 in order to harvest surplus sockeye. The reported harvest from this first "coho" week was 6,000 sockeye and 250 coho. Coho catch rates were very low, while effort was normal for this occasion. It was still too early in the coho run to accurately assess run strength. The next weekly fishing schedule in the district was reduced to a 48-hour period, beginning Monday, August 16.

The catch for the August 16, 48-hour period was 660 coho, bringing the cumulative coho harvest for the Togiak River Section to 917. This was 88% below average. The resultant daily catches and catches per delivery in the Togiak River Section were still well below average. Based on this catch rate, another 48-hour opening was scheduled for August 23.

The week of August 23 is usually the peak of the commercial coho salmon harvest. Throughout the 48-hour opening the catch rate remained below average. Fishing effort decreased 55% below normal and the cumulative coho harvest in the Togiak River Section reached 2,660 fish, 84% below average. Very few coho salmon were observed entering the Togiak River during an aerial survey flown August 24. All available indications pointed to a

very weak coho run. With the fishery's performance, further commercial fishing was unwarranted. It was announced August 24 that coho fishing would close as scheduled August 25, and it was unlikely that later openings would occur in an attempt to achieve the 50,000 coho escapement goal.

The 1999 commercial catch of coho salmon in the Togiak River Section (2,660 fish) was the lowest since 1990 and 93% below the 1980-1998 average (Appendix Table 26). Postseason aerial survey estimates of spawning escapement were conducted on all streams in the Togiak District in 1999. Coho salmon escapement in the Togiak River and tributaries was estimated to be 3,860 fish, which was 91% below the 1980-1998 average of 40,960 and missed the escapement goal of 50,000. District-wide, 2,660 coho were harvested and total district escapement was 8,600 fish.

Subsistence Fishing

On four occasions during the season, emergency orders were written to allow subsistence fishing in the commercial fishing district in Togiak. Subsistence fishing is allowed during all open commercial periods in the commercial fishing district, and outside the district including in the Togiak River, subsistence fishing is allowed seven days per week. These additional emergency order subsistence openings were given to allow subsistence fishing opportunity in the commercial fishing area in front of the village of Togiak during times when commercial fishing was closed.

1999 SUBSISTENCE SALMON FISHERY

In spite of numerous social, economic, and technological changes, Bristol Bay residents continue to depend on salmon and other fish species as an important source of food. Residents have relied on fish to provide nourishment and sustenance for thousands of years. Subsistence harvests still provide important nutritional, economic, social, and cultural benefits to most Bristol Bay households. All five species of salmon are utilized for subsistence purposes in Bristol Bay, but the most popular are sockeye, chinook, and coho. Many residents continue to preserve large quantities of fish through traditional methods such as drying and smoking, and fish are also frozen, canned, salted, pickled, fermented, and eaten fresh. In some communities, significant numbers of fish are put up for dog teams as well.

Regulations

Permits are required to harvest salmon for subsistence purposes in Bristol Bay. Since 1990, all Alaska state residents have been eligible to participate in subsistence salmon fishing in all Bristol Bay drainages. In 1999, with two exceptions, only gillnets were recognized as legal subsistence gear. In the Togiak District, spear fishing was also allowed. In 1998, the Board of Fisheries adopted new regulations for the taking of "redfish" (spawned sockeye salmon) in portions of the Naknek District. Gillnets, spears, and dipnets may be used along a 100 yard length of the west shore of Naknek Lake near the outlet to the Naknek River from August 20 through September 30; at Johnny's Lake from August 15 through September 25; and at the mouth of the Brooks River from October 1 through November 15. In the Bristol Bay Area in 1999, gillnet lengths were limited to 10 fathoms in the Naknek, Egegik, and Ugashik rivers, Dillingham beaches, and within the Nushagak commercial district during emergency openings. Up to 25 fathoms could be used in the remaining areas, except that nets were limited to 5 fathoms in the special "redfish" harvest areas in the Naknek District.

In Dillingham and the Naknek, Egegik, and Ugashik rivers, subsistence fishing was limited to several fishing periods per week during the peak of the sockeye run. All commercial districts were open for subsistence fishing

during commercial openings. In addition, all commercial districts were open for subsistence fishing in May and September, from Monday to Friday. In recent years, declining chinook and coho stocks resulted in longer commercial closures and some residents had an increasingly difficult time obtaining fish for home use. The Nushagak commercial district, starting in 1988, has been opened for subsistence fishing by emergency order during extended commercial closures.

Inseason Management

Permit System

A permit system was gradually introduced throughout the region in the late 1960s to document the harvest of salmon for subsistence. Much of the increase in the number of permits issued during these years reflects: 1) a greater compliance with the permitting and reporting requirements, 2) an increased level of effort expended by the department in making permits available (including a local system of vendors), contacting individuals, and reminding them to return the harvest forms, and 3) a growing regional population. Most fishermen are obtaining permits and reporting their catches, and overall permit returns have averaged between 85% and 90%. However, fish removed for home use from commercial catches are not included in most reported subsistence harvest totals. Also, fish caught later in the season, such as coho and spawning salmon are probably not documented as consistently as chinook and sockeye.

In 1999, a total of 1,219 permits were issued for the Bristol Bay Management Area, and of these, 1,157 (94.9 percent) were returned to the Department with harvest data. The largest number of permits were issued for the Nushagak (548 permits) and Naknek/Kvichak (528 permits) districts. For the Nushagak and Naknek/Kvichak districts, more permits were issued in 1999 than the long-term 20-year average, due in part to permits being available to all state residents since 1990. Fewer permits were issued for the Egegik and Ugashik districts in 1999 than the average for the past 10 years. The number of permits issued for the Togiak District (76) was the highest on record, reflecting a more complete involvement by local subsistence fishers in the harvest reporting program for that district than has been the case in the past. Of all permits, 1,013 (83.1 percent) were issued to residents of Bristol Bay communities, and 206 (16.9 percent) were issued to other Alaska residents.

Harvest

The estimated total Bristol Bay subsistence salmon harvest in 1999 was 145,506 fish (Table 35). This number is below both the 20-year average of 166,441 salmon and recent 10-year average of 157,589 salmon (Appendix Table 31). The area-wide chinook harvest was the lowest since 1989, while the area-wide harvest of sockeyes was the highest since 1993. Of the entire Area harvest, 135,422 salmon (93.1%) were harvested by residents of Bristol Bay communities, and 10,084 salmon (6.9%) were harvested by other Alaska residents.

In 1999 as over the last several decades, most of the subsistence harvest was taken in the Naknek/Kvichak (61%) and the Nushagak (32%) districts. The Naknek/Kvichak total harvest of 88,674 fish was below the recent 10-year average of 93,561. In 1999, Kvichak drainage residents, and other permit holders fishing in the Kvichak drainage, harvested an estimated 57,723 sockeye salmon, compared to a recent 10-year average of 64,812 and a 20-year average of 70,781 sockeye salmon. However, the 1999 sockeye salmon harvest in the Kvichak system was the second highest over the last five years. Of Kvichak drainage communities, estimated sockeye harvests were up at Nondalton, Port Alsworth, and Igiugig compared to 10-year averages, but were lower than 10-year averages in Levelock, Pedro Bay, Kokhanok, and Iliamna/Newhalen (Appendix Table 32).

In the Nushagak District, the total estimated subsistence harvest in 1999 was 45,969 salmon. The recent 10-year average is 53,823. All species except sockeyes were harvested in the Nushagak District at levels below their recent 10-year averages. The sockeye harvest of 29,387 was slightly above the 10-year average and the highest

estimate since 1992 (Appendix Table 33). The Nushagak chinook harvest in 1999 of 10,057 was the lowest since 1989, and was down notably from the 15,318 chinook estimated for 1997 and the 12,258 harvested in 1998.

Harvests of all species except cohos in the Togiak District in 1999 were up from the year before, due in large part to the notable increase in the number of permits obtained and returned by drainage residents. The estimated total subsistence salmon harvest for the Togiak District in 1999 of 5,804 exceeds both the recent 10-year and 20-year averages and is the highest estimate since 1992. The estimated subsistence harvest in the Ugashik District in 1999 was 1,675, below the 10-year average of 2,268. In the Egegik District the estimated subsistence salmon harvest of 3,384 was slightly below the recent 10-year average. However, the number of permits issued for this district has dropped notably since peaking at 80 in 1992; 42 permits were issued for 1999.

In 1999, the Bristol Bay subsistence salmon harvest was composed of 84.0% sockeye, 8.9% chinook, 2.5% chum, 0.3% pink, and 4.2 percent coho salmon.

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Table 1. Comparison of inshore sockeye salmon forecast versus actual run, escapement goals versus actual escapements, and projected versus actual commercial catch, by river system and district, in thousands of fish, Bristol Bay, 1999.^a

District and River System	Inshore Run			Escapement				Inshore Catch		
	Forecast	Actual ^b	Percent Deviation ^c	Goal	Range	Actual ^b	Percent Deviation ^c	Projected Harvest	Actual ^b	Percent Deviation ^c
NAKNEK-KVICHAK DISTRICT										
Kvichak River	11,500	12,978	-11%	6,000	2,000-10,000	6,197	-3%	5,500	6,781	-19%
Branch River	400	1,070	-63%	185	170-200	482	-62%	200	588	-66%
Naknek River	2,800	3,740	-25%	1,100	800-1,400	1,625	-32%	1,700	2,115	-20%
Total	14,700	17,788	-17%	7,285	6,970-11,600	8,304	-12%	7,400	9,484	-22%
EGEGIK DISTRICT										
	3,600	9,150	-61%	1,100	800-1,400	1,728	-36%	2,500	7,422	-66%
UGASHIK DISTRICT										
	1,400	3,922	-64%	1,000	500-1,200	1,652	-39%	600	2,270	-74%
NUSHAGAK DISTRICT										
Wood River	3,300	5,923	-44%	1,000	700-1,200	1,512	-34%	2,300	4,411	-48%
Igushik River	700	1,627	-57%	200	150-250	446	-55%	500	1,181	-58%
Nushagak-Mulchatna	900	983	-8%	235	340-760	312	-25%	665	671	-1%
Total	4,900	8,533	-43%	1,435	1,190-2,210	2,270	-37%	3,465	6,263	-45%
TOGLAK DISTRICT										
	300	615	-51%	150	100-200	231	-35%	150	384	-61%
TOTAL BRISTOL BAY										
	24,900	40,008	-38%	10,970	9,560-16,610	14,185	-23%	14,115	25,823	-45%

^a The Bristol Bay inshore forecast does not include several minor river systems, including the Snake River drainage in Nushagak District, and the Kulukak, Osviak, Matogak and Slug River system in Togiak District. Catches, escapements, and total runs for these smaller systems are not included in this table for the sake of comparison. Therefore, actual District totals reported here may represent only a portion of the District, and actual Bristol Bay totals reported here include only a portion of the District, and actual Bristol Bay totals reported here include only a portion of the Bristol Bay catch, escapement and inshore run. Totals may not equal column sums due to rounding.

^b Unless otherwise noted, inshore total runs and catches are preliminary, while escapement data is final.

^c Percent deviation = (forecast - actual)/actual.

Table 2. Inshore forecast of sockeye salmon returns by age class, river system and district, in thousands of fish, Bristol Bay, 1999.

District and River System	2-Ocean		Total	3-Ocean		Other	Total
	1.2 (1999)	2.2 (1992)		1.3 (1992)	2.3 (1991)		
<u>NAKNEK-KVICHAK DISTRICT</u>							
Kvichak River	3,400	6,000	9,400	1,600	500	-	11,500
Branch River	200	100	300	100	-	-	400
Naknek River	550	650	1,200	900	700	-	2,800
Total	4,150	6,750	10,900	2,600	1,200	-	14,700
<u>ELEGIK DISTRICT</u>							
	300	2,400	2,700	400	700	-	3,800
<u>UGASHIK DISTRICT</u>							
	200	800	1,000	400	100	-	1,500
<u>NUSHAGAK DISTRICT</u>							
Wood River	1,500	200	1,700	1,700	100	-	3,500
Ignushik River	100	-	100	600	-	-	700
Nushagak River	100	-	100	700	-	200	1,000
Total	1,700	200	1,900	3,000	100	200	5,200
<u>TOGIK DISTRICT</u>							
	100	-	100	200	-	-	300
<u>TOTAL BRISTOL BAY^a</u>							
Number	6,450	10,150	16,600	6,600	2,100	200	25,500
Percent	25	40	65	26	8	1	100

^a Sockeye salmon of several minor age classes are expected to contribute an additional 1-2% to the total return.

Table 3. Inshore run of sockeye salmon by age class, river system and district, in thousands of fish, Bristol Bay, 1999.^a

District and River System	1.2	2.2	2-Ocean	0.3	1.3	2.3	3-Ocean	Total
NAKNEK-KVICHAK DISTRICT								
Kvichak River								
Number	7,525	3,700	11,225	0	1,166	569	1,735	12,960
Percent	58.1	28.5	86.6	0.0	9.0	4.4	13.4	100
Branch River								
Number	693	39	732	0	265	49	314	1,046
Percent	66.3	3.7	70.0	0.0	25.3	4.7	30.0	100
Naknek River								
Number	1,960	513	2,473	0	593	649	1,242	3,715
Percent	52.8	13.8	66.6	0.0	16.0	17.5	33.4	100
Total								
Number	10,178	4,252	14,430	0	2,024	1,267	3,291	17,721
Percent	57.4	24.0	81.4	0.0	11.4	7.1	18.6	100
EGEGIK DISTRICT								
Number	3,053	4,127	7,180	0	943	977	1,920	9,100
Percent	33.5	45.4	78.9	0.0	10.4	10.7	21.1	100
UGASHIK DISTRICT								
Number	2,710	673	3,383	5	314	195	514	3,897
Percent	69.5	17.3	86.8	0.1	8.1	5.0	13.2	100
NUSHAGAK DISTRICT								
Wood River								
Number	3,367	433	3,800	0	1,929	190	2,119	5,919
Percent	56.9	7.3	64.2	0.0	32.6	3.2	35.8	100
Igusbik River								
Number	651	93	744	0	837	36	873	1,617
Percent	40.3	5.8	46.0	0.0	51.8	2.2	54.0	100
Nush-Mulchat. River								
Number	142	6	148	6	658	51	715	863
Percent	16.5	0.7	17.1	0.7	76.2	5.9	82.9	100
Total								
Number	4,160	532	4,692	6	3,424	277	3,707	8,399
Percent	49.5	6.3	55.9	0.1	40.8	3.3	44.1	100
TOGIAK DISTRICT^b								
Number	328	30	358	4	159	15	178	536
Percent	61.2	5.6	66.8	0.7	29.7	2.8	33.2	100
TOTAL BRISTOL BAY^c								
Number	6,196	2,336	30,043	51	5,262	4,113	9,610	39,653
Percent	15.6	5.9	75.8	0.1	13.3	10.4	24.2	100

^a The inshore run data does not include the 1999 False Pass/Ak. Peninsula catch of Bristol Bay sockeye or any high seas by-catch of immatures.

^b Does not include rivers other than Togiak River.

^c Approximately 257,000 additional sockeye salmon of several minor age classes, as well as fish returning to minor Bristol Bay drainages in 1999 that are not included in this total.

Table 4. Inshore commercial catch and escapement of sockeye salmon, Bristol Bay, in numbers of fish, 1999 ^a.

District and River System	Catch	Escapement	Total Run
<u>NAKNEK-KVICHAK DISTRICT</u>			
Kvichak River	6,781,260	6,196,914	12,978,174
Branch River	588,025	481,600	1,069,625
Naknek River	2,114,994	1,625,364	3,740,358
Total	9,484,279	8,303,878	17,788,157
<u>EGEGIK DISTRICT</u>			
	7,422,700	1,727,772 ^b	9,150,472
<u>UGASHIK DISTRICT</u>			
	2,269,708	1,662,042 ^c	3,931,750
<u>NUSHAGAK DISTRICT</u>			
Wood River	4,411,203	1,512,426	5,923,629
Igushik River	1,181,401	445,536	1,626,937
Nushagak-Mulchatna	671,077	311,899	982,976
Total	6,263,681	2,269,861	8,533,542
<u>TOGIK DISTRICT^d</u>			
Togiak Lake	344,692	155,898	500,590
Togiak River/Tributaries	0	40,238	40,238
Kulukak System	39,226	12,300	51,526
Other Systems	0	22,760	22,760
Total	383,918	231,196	615,114
TOTAL BRISTOL BAY	25,824,286	14,194,749	40,019,035

^a Catch apportionment by river system is preliminary until catch and escapements are final.

^b Includes only Egegik River Tower counts.

^c Includes Ugahik River Tower and aerial survey estimates from King Salmon and Dog Salmon rivers.

^d Catch includes Togiak River Section only, "Other Systems" escapement includes Negukthlik, Ungalikthluk, Osviak, Matogak and Slug River systems.

Table 5. Inshore commercial catch and escapement of pink salmon, in numbers of fish, Bristol Bay, 1999.

District and River System	Catch ^a	Escapement ^b	Total Run
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(insignificant catch in 1999)

^a Bristol Bay produces insignificant numbers of pink salmon in odd numbered years; only small numbers were taken incidental to other species in 1999.

^b Estimated by aerial surveys unless otherwise noted.

Table 6. Offshore test fishing catch indices of sockeye salmon, Port Moller, Bristol Bay, 1999.

Date	No. of Stations Fished	Sockeye Catch	Running Mean		Index ^a	
			Length (mm)	Daily	Cum.	
6/11	4	25	543	16	16	
6/12	4	44	537	17	33	
6/13	4	32	549	13	46	
6/14	4	9	534	7	53	
6/15	4	30	527	14	67	
6/16	4	41	530	16	83	
6/17	4	19	513	8	91	
6/18	4	69	522	25	116	
6/19	4	169	519	68	184	
6/20	4	141	522	73	257	
6/21	4	164	520	64	321	
6/22	4	117	526	43	364	
6/23	4	175	522	92	456	
6/24	4	350	524	162	618	
6/25	4	244	523	112	730	
6/26	4	173	518	97	827	
6/27	4	151	523	60	887	
6/28	4	323	526	164	1,051	
6/29	4	196	523	81	1,132	
6/30	4	330	527	126	1,258	
7/01	4	317	524	124	1,382	
7/02	4	286	523	132	1,514	
7/03	4	316	522	157	1,671	
7/04	4	275	523	118	1,789	
7/05	4	254	536	121	1,910	
7/06	4	447	536	188	2,098	
7/07	4	312	534	142	2,240	
7/08	4	207	536	101	2,341	

^a Indices are based on fish/100 fathom-hours.

Table 7. Summary of district sockeye salmon test fishing indices in the Naknek-Kvichak District, by index area and date, Bristol Bay, 1999.^a

Date	Naknek R. Mouth	Pederson Point	Cutbank & Graveyard	Kvichak R. Mouth	Gravel Spit	Ships Anchorage	Half Moon Bay	Middle Naknek	Johnston Hill	Division Buoy	Deadman Sands	Low Point	Clark's Point
6/25	0							0	65	0			
6/26	77							38	9	13			
6/27	214					72		49	53	49			
6/28	184							138	671	232			
6/29	441	1,707				10		74	239	75			
6/30		1,047	5,151	10		0							
7/08		0			3			9		164			
7/09				9	233	367				0	550		
7/10	141	81			1,763			530	522	18	29		
7/11				1,867	382	134				340	196		
7/12	53	180		42	425					92	70		
7/13	14				441	258				49	26		
7/14		157			2,849		1,045			128	2,041		
7/15		153	208	757	448	164	78			9	25		

^a All indices expressed in numbers of fish/100 fathoms-hour to the nearest whole index point.

Table 8. Summary of district sockeye salmon test fishing in the Egegik District, by index area and date, 1999.^a

Index Area	Date
	June 28
Ward's Cove near King Salmon River	1,213
Red Bluff	2,756
Outer Entrance Channel (Inside the District)	88
Outer Entrance Channel (Outside the District)	397
South Line (Outside the District)	67
South Line (Inside the District)	103
Halfway Between Big Creek and Bishop Creek (Nearshore)	285
North Line (Outside the District)	62
Outer Entrance Channel (Inside the District)	305
Bishop Creek	107

^a All indices expressed in number of fish /100 fathom hours to the the nearest full index point.

Table 9. Summary of district sockeye salmon test fishing in the Ugashik District, by index area and date, 1999.^a

Index Area	Date
	July 1
Smoky Point Entrance	263
Three Miles South of South Spit (Nearshore)	808
South Spit	21
Dago Creek Mouth	42
Pilot Point	109
Between Pilot Point and Muddy Point	292
Below inner district boundary line, eastside	150

^a All indices expressed in number of fish /100 fathom hours to the the nearest full index point.

Table 10. Summary of district sockeye salmon test fishing indices in the Nushagak District, by index area and date, 1999. *

Date	Hanson Point	Across Hanson Pt.	Tule Point	Sheep Island	Picnic Point	Grassy Island	Lower Grassy Is.	Nushagak Point	Combine Flats	Pile Driver	Clark's Point	Ekuk Bluff	Upper W. Marker
6/21	0	230	0	0	0		0						0
6/22	0	0	0	0	0		0	0					0
6/23	0	471	219 229	486	0		233	0 234					0
6/24	0	1,190	0 444	0	0		217 456	0		1,641 1,385			0
6/25	231	221	226	0	229		0 0	11077 2781		0 0			0
6/26	233	0	478		0 1,163		448 232	0 231	2,290	0	3,256 2,186		0
6/27	923	1,860	448 490	2,077	3,571		458 0	0	458	429 1,846	2,500		229
6/27	0	1,647	225	1,860	941		233	0	1,163	1,825	3,969		945
6/28	243	486	1,825		934	0	0	0	480	5,647	706	1,161	0
6/28	842	873	1,358		4,219		458	235	2,126	8,571	2,134		232
6/29	1,634 0	4,651	222 2,264		476 700		238	0	0	0 0	2,348	9,723	0
6/29	916	916	0		949		1,660	12,580	14,456	22,320	1,846	10,909	0
6/30	471	923 4,743	3,059	3,529	5,714		6,667	16,260	15,285	24,000	9,208	10,688	1,163
6/30	5,476	7,404	2,943 4,122		15,875		21,635	3,250	7,619	12,000	3,471	9,105	1,860 3,333
7/01	2,588	5,455	7,200		13,810		3,210 7,250	21,628	9,412	22,963		9,919	7,984
7/01			3,664		14,651		28,653	700		13,177			5,081
7/03	11,221	4,113 6,353	6,353		6,122								1,452
7/03	2,619 1,167	968	1,660		12,140		11,755	0		17,067			5,432
7/04			12,692		17,312 13,846		26,033 30,817	10,000		13,846			7,765
7/05			5,455		3,320		7,826 19,294	456		4,580			7,200 3,184
7/06			4,384 6,190	3,502 3,918	17,510 12,607								

* All indices expressed in number of fish/100 fathoms-hours to the nearest full index point.

Table 11. Commercial Fishing Emergency Orders, by district and stat area Bristol Bay, 1999.

Number ^a	Date and Time				Effective time
<u>Naknek-Kvichak District</u>					
Drift net					
AKN.01	June 01	9:00 a.m.	to	June 23	9:00 a.m. weekly schedule ^{b,c}
AKN.11	July 01	2:00 p.m.	to	July 01	10:00 p.m. 8-hours
AKN.13	July 01	10:00 p.m.	to	July 02	3:00 p.m. 17-hours ^d
AKN.19	July 02	3:00 p.m.	to	July 02	12:00 a.m. 9-hours ^d
AKN.16	July 04	5:00 p.m.	to	July 04	9:00 p.m. 4-hours
AKN.16	July 05	5:00 a.m.	to	July 05	9:00 a.m. 4-hours
AKN.20	July 05	6:00 p.m.	to	July 05	12:00 a.m. 6-hours
AKN.20	July 06	12:00 p.m.	to	July 06	6:00 p.m. 6-hours
AKN.24	July 07	6:30 a.m.	to	July 07	12:30 p.m. 6-hours
AKN.57	July 16	3:30 p.m.	to	July 17	12:00 p.m. 20.5-hours
AKN.60	July 17	4:30 p.m.	to	July 19	9:00 a.m. 40.5-hours
Set net					
AKN.01	June 01	9:00 a.m.	to	June 23	9:00 a.m. weekly schedule ^b
AKN.11	July 01	2:00 p.m.	to	July 01	10:00 p.m. 8-hours
AKN.13	July 01	10:00 p.m.	to	July 02	3:00 p.m. 17-hours
AKN.19	July 02	3:00 p.m.	to	July 02	12:00 a.m. 9-hours
AKN.16	July 04	5:00 p.m.	to	July 05	11:00 a.m. 18-hours
AKN.20	July 05	11:00 a.m.	to	July 05	1:00 p.m. 2-hours ^d
AKN.20	July 05	6:00 p.m.	to	July 06	2:00 p.m. 20-hours
AKN.44	July 13	12:00 p.m.	to	July 13	7:00 p.m. 7-hours ^f
AKN.52	July 15	2:30 p.m.	to	July 15	9:00 p.m. 6.5-hours ^f
AKN.57	July 16	3:30 p.m.	to	July 17	12:00 p.m. 20.5-hours
AKN.60	July 17	4:30 p.m.	to	July 19	9:00 a.m. 40.5-hours
<u>Naknek Section</u>					
Drift net					
AKN.08	June 30	1:30 a.m.	to	June 30	9:30 a.m. 8-hours
AKN.09	July 1	2:30 a.m.	to	July 01	10:30 a.m. 8-hours
AKN.23	July 06	12:00 p.m.			^e
AKN.24				July 07	3:00 a.m. 15-hours
AKN.27	July 07	9:00 p.m.	to	July 08	3:00 a.m. 6-hours
AKN.27	July 08	7:00 a.m.	to	July 08	1:00 p.m. 6-hours
AKN.28	July 08	10:00 p.m.	to	July 09	4:00 a.m. 6-hours
AKN.28	July 09	9:00 a.m.	to	July 09	3:00 p.m. 6-hours
AKN.35	July 11	10:30 a.m.	to	July 11	3:30 p.m. 5-hours
AKN.39	July 11	3:30 p.m.	to	July 11	5:00 p.m. 1.5-hours ^d

(Continued)

Table 11. (Page 2 of 10)

Number ^a	Date and Time				Effective Time	
Set net						
AKN.08	June 30	1:30 a.m.	to	June 30	9:30 a.m.	8-hours
AKN.09	July 01	2:30 a.m.	to	July 01	2:00 p.m.	11.5-hours
AKN.23	July 06	12:00 p.m.				^c
AKN.37				July 11	11:30 p.m.	131.5-hours
<u>Kvichak Section</u>						
Drift net						
AKN.23	July 06	7:00 p.m.	to	July 07	3:00 a.m.	8-hours
AKN.23	July 07	6:30 a.m.	to	July 07	2:30 p.m.	8-hours [§]
Set net						
AKN.23	July 06	2:00 p.m.				^c
AKN.27				July 07	8:00 p.m.	30-hours
AKN.35	July 11	10:00 a.m.	to	July 11	11:30 p.m.	13.5-hours
<u>Naknek River Special Harvest Area Drift net only</u>						
AKN.43	July 12	12:00 p.m.	to	July 12	4:00 p.m.	4-hours
AKN.44	July 13	2:00 p.m.	to	July 13	5:00 p.m.	3-hours
AKN.48	July 14	2:30 p.m.	to	July 14	7:00 p.m.	4.5-hours
AKN.53	July 15	4:00 p.m.	to	July 15	7:30 p.m.	3.5-hours
AKN.54	July 16	5:00 a.m.	to	July 16	10:00 a.m.	5-hours
<u>Egegik District</u>						
Drift net						
AKN.02	June 01	9:00 a.m.	to	July 16	9:00 a.m.	weekly schedule ^h
AKN.04	June 22	6:30 a.m.	to	June 22	12:30 p.m.	6-hours
AKN.05	June 25	8:30 a.m.	to	June 25	3:30 p.m.	7-hours
AKN.06	June 28	11:30 p.m.	to	June 29	7:30 a.m.	8-hours
AKN.07	June 30	12:30 a.m.	to	June 30	8:30 a.m.	8-hours
AKN.10	July 01	1:00 a.m.	to	July 01	7:00 a.m.	6-hours
AKN.10	July 01	1:30 p.m.	to	July 01	6:30 p.m.	5-hours
AKN.12	July 02	1:30 a.m.	to	July 02	9:30 a.m.	8-hours
AKN.14	July 02	2:00 p.m.	to	July 02	10:00 p.m.	8-hours
AKN.15	July 04	4:00 p.m.	to	July 04	9:00 p.m.	5-hours
AKN.15	July 05	4:00 a.m.	to	July 05	10:30 a.m.	6.5-hours
AKN.18	July 06	5:00 a.m.	to	July 06	1:00 p.m.	8-hours

(Continued)

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Number ^a	Date and Time				Effective Time	
AKN.21	July 06	5:30 p.m.	to	July 07	1:30 a.m.	8-hours
AKN.21	July 07	5:00 a.m.	to	July 07	1:00 p.m.	8-hours
AKN.25	July 07	6:30 p.m.	to	July 08	1:30 a.m.	7-hours
AKN.25	July 08	6:00 a.m.	to	July 08	1:00 p.m.	7-hours
AKN.30	July 08	7:30 p.m.	to	July 09	1:30 a.m.	6-hours
AKN.30	July 09	7:00 a.m.	to	July 09	1:00 p.m.	6-hours
AKN.32	July 09	10:00 p.m.	to	July 10	3:30 a.m.	5.5-hours
AKN.32	July 10	10:30 p.m.	to	July 11	4:00 a.m.	5.5-hours
AKN.38	July 11	10:00 a.m.	to	July 11	3:00 p.m.	5-hours
AKN.38	July 12	10:00 a.m.	to	July 12	4:00 p.m.	6-hours
AKN.41	July 13	10:30 a.m.	to	July 13	5:30 p.m.	7-hours
AKN.46	July 14	12:00 a.m.	to	July 14	5:30 a.m.	5.5-hours
Egegik District						
Drift net						
AKN.46	July 14	11:30 a.m.	to	July 14	6:30 p.m.	7-hours
AKN.50	July 15	1:00 a.m.	to	July 15	7:30 a.m.	6.5-hours
AKN.50	July 15	12:00 p.m.	to	July 15	6:30 p.m.	6.5-hours
AKN.55	July 16	1:00 a.m.	to	July 16	9:00 a.m.	8-hours
AKN.55	July 16	1:00 p.m.	to	July 16	9:00 p.m.	8-hours
AKN.58	July 17	2:30 a.m.	to	July 17	10:30 a.m.	8-hours
AKN.58	July 17	3:30 p.m.	to	July 17	11:00 p.m.	7.5-hours
AKN.61	July 18	3:30 a.m.	to	July 18	11:30 a.m.	8-hours
AKN.61	July 18	4:30 p.m.	to	July 18	11:00 p.m.	6.5-hours
Set net						
AKN.02	June 01	9:00 a.m.	to	July 16	9:00 a.m.	weekly schedule
AKN.04	June 22	6:30 a.m.	to	June 22	12:30 p.m.	6-hours
AKN.05	June 25	8:30 a.m.	to	June 25	3:30 p.m.	7-hours
AKN.06	June 28	11:30 p.m.	to	June 29	7:30 a.m.	8-hours
AKN.07	June 30	12:30 a.m.	to	June 30	8:30 a.m.	8-hours
AKN.10	July 01	1:00 a.m.	to	July 01	6:30 p.m.	17.5-hours
AKN.12	July 01	6:30 p.m.	to	July 02	10:00 a.m.	15.5-hours ^d
AKN.14	July 02	10:00 a.m.	to	July 02	10:00 p.m.	12-hours ^d
AKN.15	July 04	4:00 p.m.	to	July 05	10:30 p.m.	20.5-hours
AKN.18	July 06	5:00 a.m.	to	July 06	3:00 p.m.	10-hours
AKN.21	July 06	3:00 p.m.	to	July 07	2:00 p.m.	23-hours ^d
AKN.25	July 07	2:00 p.m.	to	July 08	2:00 p.m.	24-hours ^d
AKN.30	July 08	2:00 p.m.	to	July 09	3:00 p.m.	25-hours ^d

(Continued)

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Number ^a	Date and Time				Effective Time	
AKN.32	July 09	3:00 p.m.	to	July 11	5:00 p.m.	50-hours ^d
AKN.38	July 11	5:00 p.m.	to	July 13	6:00 p.m.	49-hours ^d
AKN.46	July 13	6:00 p.m.	to	July 14	8:00 p.m.	26-hours ^d
AKN.50	July 14	8:00 p.m.	to	July 15	8:00 p.m.	24-hours ^d
AKN.58	July 17	3:30 p.m.	to	July 17	11:00 p.m.	7.5-hours
AKN.61	July 18	3:30 a.m.	to	July 18	11:30 a.m.	8-hours
AKN.61	July 18	4:30 p.m.	to	July 18	11:00 p.m.	6.5-hours
<u>Ugashik District</u>						
Drift net						
AKN.03	June 01	9:00 a.m.	to	June 23	9:00 a.m.	weekly schedule
AKN.17	July 05	6:30 p.m.	to	July 05	10:30 p.m.	4-hours
AKN.22	July 06	7:30 p.m.	to	July 07	2:30 a.m.	7-hours
AKN.22	July 07	7:00 a.m.	to	July 07	2:00 p.m.	7-hours
AKN.26	July 07	7:30 p.m.	to	July 08	3:30 a.m.	8-hours
AKN.26	July 08	7:00 a.m.	to	July 08	3:00 p.m.	8-hours
AKN.31	July 08	8:30 p.m.	to	July 09	6:30 a.m.	10-hours
AKN.31	July 09	8:00 a.m.	to	July 09	6:00 p.m.	10-hours
<u>Ugashik District</u>						
Drift net						
AKN.33	July 09	10:00 p.m.	to	July 10	6:00 a.m.	8-hours
AKN.33	July 10	9:30 a.m.	to	July 10	4:30 p.m.	7-hours
AKN.36	July 11	9:00 a.m.	to	July 11	5:00 p.m.	8-hours
AKN.40	July 12	9:30 a.m.	to	July 12	7:30 p.m.	10-hours
AKN.42	July 13	11:00 a.m.	to	July 13	7:00 p.m.	8-hours
AKN.45	extends emergency order authority though 9:00 a.m. Monday July 19.					
AKN.47	July 14	3:00 a.m.	to	July 14	8:00 a.m.	5-hours
AKN.47	July 14	3:00 p.m.	to	July 14	9:00 p.m.	6-hours
AKN.49	July 14	1:00 p.m.	to	July 14	9:00 p.m.	8-hours ¹
AKN.51	July 15	3:00 a.m.	to	July 15	8:30 a.m.	5.5-hours
AKN.51	July 15	2:00 p.m.	to	July 15	8:00 p.m.	6-hours
AKN.56	July 16	2:00 a.m.	to	July 16	10:00 a.m.	8-hours
AKN.56	July 16	1:00 p.m.	to	July 16	9:00 p.m.	8-hours
AKN.59	July 17	11:00 a.m.	to	July 17	11:00 p.m.	12-hours
AKN.62	July 18	10:00 a.m.	to	July 18	11:00 p.m.	13-hours

(Continued)

Table 11. (Page 5 of 10)

Number ^a	Date and Time				Effective Time	
Set net						
AKN.03	June 01	9:00 a.m.	to	June 23	9:00 a.m.	weekly schedule
AKN.17	July 05	3:30 p.m.	to	July 05	11:30 p.m.	8-hours
AKN.22	July 06	4:30 p.m.	to	July 07	2:00 p.m.	21.5-hours
AKN.26	July 07	2:00 p.m.	to	July 08	3:00 p.m.	25-hours ^d
AKN.31	July 08	3:00 p.m.	to	July 09	4:00 p.m.	25-hours ^d
AKN.33	July 09	4:00 p.m.	to	July 10	5:00 p.m.	25-hours ^d
AKN.36	July 10	5:00 p.m.	to	July 11	6:00 p.m.	25-hours ^d
AKN.40	July 11	6:00 p.m.	to	July 12	7:00 p.m.	25-hours ^d
AKN.42	July 12	7:00 p.m.	to	July 13	8:00 p.m.	25-hours ^d
AKN.45	extends emergency order authority though 9:00 a.m. Monday July 19.					
AKN.47	July 13	8:00 p.m.	to	July 19	9:00 a.m.	133-hours ^d
<u>Ugashik River Special Harvest Area</u>						
AKN.29	July 08	11:00 a.m.	to	July 08	12:30 p.m.	1.5 hours
<u>Nushagak District</u>						
Drift net						
DLG.05	June 16	3:30 p.m.	to	June 16	9:30 p.m.	6-hours ^j
DLG.23	July 02	4:00 a.m.	to	July 02	8:00 a.m.	4-hours ^c
DLG.26	July 02	7:00 p.m.	to	July 03	12:00 p.m.	17-hours
DLG.28	July 04	5:30 p.m.	to	July 04	11:30 p.m.	6-hours
DLG.29	July 05	6:30 p.m.	to	July 06	12:30 a.m.	6-hours
DLG.31	July 06	12:00 p.m.	to			^e
DLG.32	July 06	8:00 p.m.	to	July 07	3:30 a.m.	7.5 -hours ^{c,k}
DLG.32	July 07	7:00 a.m.	to	July 07	3:00 p.m.	8-hours ^{c,k}
DLG.33	July 07	8:30 p.m.	to	July 08	4:30 a.m.	8-hours ^c
DLG.33	July 08	8:00 a.m.	to	July 08	4:00 p.m.	8-hours ^c
DLG.34	July 08	9:00 p.m.	to	July 09	7:00 a.m.	10-hours ^c
DLG.34	July 09	9:00 a.m.	to	July 09	7:00 p.m.	10-hours ^c
DLG.36	July 09	10:00 p.m.	to	July 10	8:00 a.m.	10-hours ^c
DLG.36	July 10	9:30 a.m.	to	July 10	7:30 p.m.	10-hours ^c
DLG.38	July 10	11:00 p.m.	to	July 11	9:00 a.m.	10-hours ^c
DLG.38	July 11	10:30 a.m.	to	July 11	8:30 p.m.	10-hours ^c
DLG.39	July 12	12:00 a.m.	to	July 12	10:00 a.m.	10-hours ^c
DLG.39	July 12	12:00 p.m.	to	July 12	10:00 p.m.	10-hours ^c
DLG.40	July 13	1:00 a.m.	to	July 13	11:00 a.m.	10-hours ^c
DLG.40	July 13	1:00 p.m.	to	July 13	11:00 p.m.	10-hours ^c

(Continued)

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Number ^a	Date and Time				Effective Time	
DLG.41	July 14	1:30 a.m.	to	July 14	11:30 a.m.	10-hours ^c
DLG.41	July 14	2:00 p.m.	to	July 15	12:00 a.m.	10-hours ^c
DLG.42	July 15	2:30 a.m.	to	July 15	12:30 p.m.	10-hours ^c
DLG.42	July 15	3:00 p.m.	to	July 16	1:00 a.m.	10-hours ^c
DLG.43	July 16	3:00 a.m.	to	July 16	1:00 p.m.	10-hours ^c
DLG.43	July 16	4:00 p.m.	to	July 17	2:00 a.m.	10-hours ^c
DLG.44	July 17	4:00 a.m.	to	July 17	2:00 p.m.	10-hours ^c
DLG.44	July 17	5:00 p.m.	to	July 18	3:00 a.m.	10-hours ^c
DLG.46	July 18	5:00 a.m.	to	July 18	3:00 p.m.	10-hours ^c
DLG.46	July 18	7:00 p.m.	to	July 19	5:00 a.m.	10-hours ^c
DLG.47	July 19	5:00 a.m.	to			^{c,e}
DLG.55	July 26	6:30 p.m.	to			ⁱ
Set net						
DLG.05	June 16	3:30 p.m.	to	June 16	9:30 p.m.	6-hours ^j
DLG.23	July 02	4:00 a.m.	to	July 02	10:00 a.m.	6-hours ^c
DLG.26	July 02	7:00 p.m.	to	July 03	12:00 p.m.	17-hours
DLG.28	July 04	5:30 p.m.	to	July 04	11:30 p.m.	6-hours
DLG.29	July 05	6:30 p.m.	to	July 06	12:30 a.m.	6-hours
DLG.31	July 06	12:00 p.m.	to			^e
DLG.32	July 06	8:00 p.m.	to	July 07	3:30 a.m.	7.5-hours ^{c,k}
DLG.32	July 07	7:00 a.m.	to	July 07	3:00 p.m.	8-hours ^{c,k}
DLG.33	July 07	8:30 p.m.	to	July 08	2:30 a.m.	6-hours ^c
DLG.33	July 08	8:00 a.m.	to	July 08	2:00 p.m.	6-hours ^c
Nushagak Section						
Set net only						
DLG.34	July 08	9:00 p.m.	to	July 09	3:00 a.m.	6-hours ^c
DLG.34	July 09	9:00 a.m.	to	July 09	3:00 p.m.	6-hours ^c
DLG.36	July 10	9:30 a.m.	to	July 10	3:30 p.m.	6-hours ^c
DLG.38	July 11	10:30 a.m.	to	July 11	4:30 p.m.	6-hours ^c
DLG.39	July 12	12:00 p.m.	to	July 12	6:00 p.m.	6-hours ^c
DLG.40	July 13	1:00 a.m.	to	July 13	7:00 a.m.	6-hours ^c
DLG.40	July 13	1:00 p.m.	to	July 13	7:00 p.m.	6-hours ^c
DLG.41	July 14	1:30 a.m.	to	July 14	8:30 a.m.	7-hours ^c
DLG.41	July 14	2:00 p.m.	to	July 14	8:00 p.m.	6-hours ^c
DLG.42	July 15	2:30 a.m.	to	July 15	9:30 a.m.	7-hours ^c
DLG.42	July 15	3:00 p.m.	to	July 15	9:00 p.m.	6-hours ^c
DLG.43	July 16	3:00 a.m.	to	July 16	10:00 a.m.	7-hours ^c

(Continued)

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Number ^a		Date and Time				Effective Time
DLG.43	July 16	4:00 p.m.	to	July 16	10:00 p.m.	6-hours ^c
DLG.44	July 17	4:00 a.m.	to	July 17	11:00 a.m.	7-hours ^c
DLG.44	July 17	5:00 p.m.	to	July 17	11:00 p.m.	6-hours ^c
DLG.46	July 18	5:00 a.m.	to	July 18	12:00 p.m.	7-hours ^c
DLG.46	July 18	7:00 p.m.	to	July 19	1:00 a.m.	6-hours ^c
DLG.47	July 19	6:00 a.m.	to	July 19	1:00 p.m.	7-hours ^c
DLG.47	July 19	7:00 p.m.	to	July 20	1:00 a.m.	6-hours ^c
DLG.48	July 20	7:00 a.m.	to	July 20	1:00 p.m.	6-hours ^c
DLG.48	July 20	8:00 p.m.	to	July 21	2:00 a.m.	6-hours ^c
DLG.49	July 21	7:30 a.m.	to	July 21	1:30 p.m.	6-hours ^c
DLG.49	July 21	9:00 p.m.	to	July 22	3:00 a.m.	6-hours ^c
DLG.50	July 22	9:00 a.m.	to	July 22	3:00 p.m.	6-hours ^c
DLG.50	July 22	10:00 p.m.	to	July 23	4:00 a.m.	6-hours ^c
DLG.51	July 23	9:30 a.m.	to	July 23	3:30 p.m.	6-hours
DLG.51	July 23	11:00 p.m.	to	July 24	5:00 a.m.	6-hours
DLG.53	July 24	10:00 a.m.	to	July 24	4:00 p.m.	6-hours
DLG.53	July 24	11:00 p.m.	to	July 25	6:00 a.m.	7-hours
DLG.54	July 25	11:00 a.m.	to	July 25	5:00 p.m.	6-hours
DLG.54	July 26	12:00 a.m.	to	July 26	7:00 a.m.	7-hours
DLG.55	July 26	11:30 a.m.	to	July 26	6:30 p.m.	7-hours
DLG.55	July 26	6:30 p.m.	to			1
Igushik Section						
Set net only						
DLG.23	July 02	10:00 a.m.	to	July 02	9:30 p.m.	11.5-hours ^{c,d}
DLG.34	July 08	2:00 p.m.	to	July 09	3:00 p.m.	25-hours ^c
DLG.36	July 09	3:00 p.m.	to	July 10	4:00 p.m.	25-hours ^{c,d}
DLG.38	July 10	4:00 p.m.	to	July 11	5:00 p.m.	25-hours ^{c,d}
DLG.39	July 11	5:00 p.m.	to	July 12	6:00 p.m.	25-hours ^{c,d}
DLG.40	July 12	6:00 p.m.	to	July 13	7:00 p.m.	25-hours ^{c,d}
DLG.41	July 13	7:00 p.m.	to	July 14	8:00 p.m.	25-hours ^{c,d}
DLG.42	July 14	8:00 p.m.	to	July 15	9:00 p.m.	25-hours ^{c,d}
DLG.43	July 15	9:00 p.m.	to	July 16	10:00 p.m.	25-hours ^{c,d}
DLG.44	July 16	10:00 p.m.	to	July 17	11:00 p.m.	25-hours ^{c,d}
DLG.46	July 17	11:00 p.m.	to	July 19	12:00 a.m.	25-hours ^{c,d}
DLG.47	July 19	12:00 a.m.	to			c,d,e
DLG.55	July 26	6:30 p.m.	to			1

(Continued)

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Number ^a	Date and Time				Effective Time	
<u>Wood River Special Harvest Area</u>						
Drift net						
DLG.20	June 30	10:00 p.m.	to	July 01	6:00 a.m.	8-hours
DLG.21	July 01	12:00 p.m.	to	July 01	8:00 p.m.	8-hours ^c
DLG.23	July 02	12:00 a.m.	to	July 02	8:00 a.m.	8-hours ^c
DLG.23	July 02	1:00 p.m.	to	July 02	9:00 p.m.	8-hours ^c
DLG.27	July 04	1:00 a.m.	to	July 04	9:00 a.m.	8-hours
DLG.28	July 05	2:00 a.m.	to	July 05	10:00 a.m.	8-hours
DLG.29	July 05	3:00 p.m.	to	July 05	11:00 p.m.	8-hours
DLG.30	July 06	1:30 a.m.	to	July 06	9:30 a.m.	8-hours
DLG.31	July 06	12:00 p.m.	to			^c
DLG.32	July 06	8:00 p.m.	to	July 07	1:00 a.m.	5-hours ^{c,k}
DLG.32	July 07	4:00 a.m.	to	July 07	12:00 p.m.	8-hours ^{c,k}
DLG.32	July 07	4:00 p.m.	to	July 08	12:00 a.m.	8-hours ^{c,k}
DLG.33	July 08	4:30 a.m.	to	July 08	12:30 p.m.	8-hours ^c
DLG.33	July 08	5:00 p.m.	to	July 09	1:00 a.m.	8-hours ^c
DLG.34	July 09	5:30 a.m.	to	July 09	1:30 p.m.	8-hours ^c
DLG.34	July 09	5:30 p.m.	to	July 10	1:30 a.m.	8-hours ^c
DLG.36	July 10	6:30 a.m.	to	July 10	2:30 p.m.	8-hours ^c
DLG.36	July 10	6:30 p.m.	to	July 11	2:30 a.m.	8-hours ^c
DLG.38	July 11	7:30 a.m.	to	July 11	3:30 p.m.	8-hours ^c
DLG.38	July 11	7:30 p.m.	to	July 12	3:30 a.m.	8-hours ^c
DLG.39	July 12	8:30 a.m.	to	July 12	4:30 p.m.	8-hours ^c
DLG.39	July 12	8:30 p.m.	to	July 13	4:30 a.m.	8-hours ^c
DLG.40	July 13	9:30 a.m.	to	July 13	5:30 p.m.	8-hours ^c
DLG.40	July 13	9:30 p.m.	to	July 14	5:30 a.m.	8-hours ^c
DLG.41	July 14	10:30 a.m.	to	July 14	6:30 p.m.	8-hours ^c
DLG.41	July 14	10:30 p.m.	to	July 15	6:30 a.m.	8-hours ^c
DLG.42	July 15	12:00 p.m.	to	July 15	8:00 p.m.	8-hours ^c
DLG.42	July 16	12:00 a.m.	to	July 16	8:00 a.m.	8-hours ^c
DLG.43	July 16	1:00 p.m.	to	July 16	9:00 p.m.	8-hours ^c
DLG.43	July 17	1:00 a.m.	to	July 17	9:00 a.m.	8-hours ^c
DLG.44	July 17	2:00 p.m.	to	July 17	10:00 p.m.	8-hours ^c
DLG.44	July 18	2:00 a.m.	to	July 18	10:00 a.m.	8-hours ^c
DLG.46	July 18	2:00 p.m.	to	July 18	10:00 p.m.	8-hours ^c
DLG.46	July 19	2:00 a.m.	to	July 19	10:00 a.m.	8-hours ^c
DLG.47	July 19	3:00 p.m.	to	July 19	11:00 p.m.	8-hours ^c
DLG.47	July 20	3:00 a.m.	to	July 20	11:00 a.m.	8-hours ^c
DLG.48	July 20	4:00 p.m.	to	July 21	12:00 a.m.	8-hours ^c

(Continued)

Table 11. (Page 9 of 10)

Number ^a		Date and Time				Effective Time
DLG.48	July 21	4:30 a.m.	to	July 21	12:30 p.m.	8-hours ^c
DLG.49	July 21	5:00 p.m.	to	July 22	1:00 a.m.	8-hours ^c
DLG.49	July 22	5:00 a.m.	to	July 22	1:00 p.m.	8-hours ^c
DLG.50	July 22	6:00 p.m.	to	July 23	2:00 a.m.	8-hours ^c
DLG.50	July 23	6:00 a.m.	to	July 23	2:00 p.m.	8-hours ^c
DLG.51	July 23	6:30 p.m.	to	July 24	2:30 a.m.	8-hours
DLG.51	July 24	7:00 a.m.	to	July 24	3:00 p.m.	8-hours
DLG.53	July 24	7:30 p.m.	to	July 25	3:30 a.m.	8-hours
DLG.53	July 25	8:00 a.m.	to	July 25	4:00 p.m.	8-hours
DLG.54	July 25	8:00 p.m.	to	July 26	4:00 a.m.	8-hours
DLG.54	July 26	9:00 a.m.	to	July 26	5:00 p.m.	8-hours
DLG.55	July 26	9:00 p.m.	to	July 27	5:00 a.m.	8-hours
DLG.55	July 27	10:00 a.m.	to	July 27	6:00 p.m.	8-hours
DLG.55	July 27	6:00 p.m.	to			1
Set net						
DLG.20	June 30	10:00 p.m.	to	July 01	6:00 a.m.	8-hours
DLG.21	July 01	12:00 p.m.	to	July 01	8:00 p.m.	8-hours ^c
DLG.23	July 02	12:00 a.m.	to	July 02	8:00 a.m.	8-hours ^c
DLG.23	July 02	1:00 p.m.	to	July 02	9:00 p.m.	8-hours ^c
DLG.27	July 04	1:00 a.m.	to	July 04	4:30 p.m.	15.5-hours
DLG.28	July 05	2:00 a.m.	to	July 05	5:30 p.m.	15.5-hours
DLG.29	July 05	5:30 p.m.	to	July 06	6:30 p.m.	25-hours ^d
DLG.31	July 06	12:00 p.m.	to			^c
DLG.32	July 06	8:00 p.m.	to	July 07	11:30 p.m.	3.5-hours ^{c,k}
DLG.33	July 07	11:30 p.m.	to	July 09	12:30 a.m.	25-hours ^{c,d}
DLG.34	July 09	12:30 a.m.	to	July 10	1:30 a.m.	25-hours ^{c,d}
DLG.36	July 10	1:30 a.m.	to	July 11	2:30 a.m.	25-hours ^{c,d}
DLG.38	July 11	2:30 a.m.	to	July 12	3:30 a.m.	25-hours ^{c,d}
DLG.39	July 12	3:30 a.m.	to	July 13	4:30 a.m.	25-hours ^{c,d}
DLG.40	July 13	4:30 a.m.	to	July 14	5:30 a.m.	25-hours ^{c,d}
DLG.41	July 14	5:30 a.m.	to	July 15	6:30 a.m.	25-hours ^{c,d}
DLG.42	July 15	6:30 a.m.	to	July 16	7:30 a.m.	25-hours ^{c,d}
DLG.43	July 16	7:30 a.m.	to	July 17	8:30 a.m.	25-hours ^{c,d}
DLG.44	July 17	8:30 a.m.	to	July 18	9:30 a.m.	25-hours ^{c,d}
DLG.46	July 18	9:30 a.m.	to	July 19	10:30 a.m.	25-hours ^{c,d}
DLG.47	July 19	10:30 a.m.	to			^{c,d,c}
DLG.55	July 27	6:00 p.m.	to			1

(Continued)

Table 11. (Page 10 of 10)

Number ^a	Date and Time				Effective Time
<u>Togiak District</u>					
Drift and Set					
DLG.03	June 16	9:00 a.m.	to	June 19	9:00 a.m. weekly schedule ^m
DLG.08	June 23	9:00 a.m.	to	June 26	9:00 a.m. weekly schedule ^m
DLG.15	June 29	9:00 a.m.	to	July 01	9:00 a.m. weekly schedule ^m
DLG.15	June 30	9:00 a.m.	to	July 03	9:00 a.m. weekly schedule ^m
DLG.25	July 07	12:00 p.m.	to	July 08	9:00 a.m. weekly schedule ^m
DLG.25	July 08	9:00 a.m.	to	July 10	9:00 a.m. weekly schedule ^m
DLG.35	July 14	9:00 a.m.	to	July 17	9:00 a.m. weekly schedule ^m
DLG.45	July 21	9:00 a.m.	to	July 22	9:00 a.m. weekly schedule ^m
DLG.52	July 28	9:00 a.m.	to	July 30	9:00 a.m. weekly schedule ^m
DLG.56	July 28	9:00 a.m.	to	July 29	9:00 a.m. weekly schedule ^{k,m}
DLG.56	July 30	9:00 a.m.	to	July 31	9:00 a.m. weekly schedule ^{k,m}
DLG.58	July 30	9:00 a.m.	to	July 31	9:00 p.m. weekly schedule ^d
DLG.58	Aug. 04	9:00 a.m.	to	Aug. 05	9:00 a.m. weekly schedule ^m
DLG.59	Aug. 11	9:00 a.m.	to	Aug. 14	9:00 a.m. weekly schedule ^m
DLG.61	Aug. 11	9:00 a.m.	to	Aug. 12	9:00 a.m. weekly schedule ^{k,m}
DLG.61	Aug. 13	9:00 a.m.	to	Aug. 14	9:00 a.m. weekly schedule ^{k,m}
DLG.63	Aug. 18	9:00 a.m.	to	Aug. 21	9:00 a.m. weekly schedule ^m
DLG.64	Aug. 25	9:00 a.m.	to	Aug. 28	9:00 a.m. weekly schedule ^m
DLG.65	Aug. 30	9:00 a.m.	to		^l

^a Prefix code on emergency orders indicate where announcement originated. ("AKN" for King Salmon field office and "DLG" for Dillingham field office.)

^b Weekly schedule: 9:00 a.m. Monday until 9:00 a.m. Friday.

^c Restricts mesh size to five and one-half inches or less through July 17.

^d Extends current fishing period.

^e Opens commercial fishing until further notice.

^f Reduces set gillnets to 25-fathoms in length.

^g Period was reduced to 6-hours and closed at 12:30 p.m. Wednesday, July 7.

^h Weekly schedule: 9:00 a.m. Monday until 9:00 a.m. Wednesday and from 9:00 a.m. Thursday until 9:00 a.m. Friday.

ⁱ The period opened 2-hours earlier than previously announced.

^j Restrict mesh size to seven and one-half inches or larger.

^k This emergency order supersedes and rescinds a previous emergency order.

^l Closes commercial fishing until further notice.

^m Reduces the weekly fishing schedule in specific sections of the District.

Table 12. Daily district registration of drift gillnet permit holders by district, 1999.

Date	Nakek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total *
6/19	108	115	23	366	27	639
6/20	113	125	27	350	27	642
6/21	163	147	49	354	28	741
6/22	238	316	95	339	32	1020
6/23	248	422	65	334	34	1103
6/24	259	471	14	344	36	1124
6/25	293	585	9	353	36	1276
6/26	300	596	10	366	40	1312
6/27	303	605	10	363	40	1321
6/28	321	607	8	364	33	1333
6/29	340	588	7	373	33	1341
6/30	436	594	7	383	33	1453
7/01	587	593	8	372	35	1595
7/02	664	589	9	360	38	1660
7/03	664	589	9	360	38	1660
7/04	785	465	9	347	38	1644
7/05	846	458	16	347	38	1705
7/06	908	453	25	350	38	1774
7/07	895	433	28	347	39	1742
7/08	814	406	32	349	40	1641
7/09	770	354	85	362	41	1612
7/10	728	315	172	368	41	1624
7/11	718	306	248	379	41	1692
Average	500	441	42	358	36	500

* Number of drift gillnet permit holders registered to fish in Bristol Bay districts by day. 1,898 drift permits were active in 1999.

Table 13. Commercial salmon catch by date and species, in numbers of fish, Naknek-Kvichak District, 1999.

Date	Time	Sockeye	Chinook	Chum	Pink	Coho	Total
6/14	15-hours	13	3	2	0	0	18
6/15	24-hours	48	1	1	0	0	50
6/16	24-hours	151	7	2	0	0	160
6/17	24-hours	646	24	47	0	0	717
6/18	9-hours	443	3	26	0	0	472
6/21	15-hours	14,052	62	364	0	0	14,478
6/22	24-hours	11,549	64	242	0	0	11,855
6/23 ^a	9-hours	7,674	45	191	0	0	7,910
6/24 ^a	0	568	0	0	0	0	568
6/25 ^a	0	283	0	0	0	0	283
6/26 ^a	0	2,363	1	5	0	0	2,369
6/27 ^a	0	7,211	3	1	0	0	7,215
6/28 ^a	0	2,738	0	1	0	0	2,739
6/29 ^a	0	1,691	2	1	0	0	1,694
6/30 ^{a,b}	8-hours	240,190	18	1,383	0	0	241,591
7/01 ^a	18-hours	1,223,464	63	4,752	0	0	1,228,279
7/02	24-hours	2,187,908	129	10,332	0	0	2,198,369
7/04	6-hours	565,656	12	4,888	0	0	570,556
7/05	19-hours	1,050,691	73	8,295	0	0	1,059,059
7/06	24-hours	1,073,984	51	10,319	0	0	1,084,354
7/07	24-hours	339,235	61	4,869	0	0	344,165
7/08 ^{a,b}	24-hours	298,453	31	2,966	1	0	301,451
7/09 ^{a,c}	24-hours	249,378	25	2,417	0	0	251,820
7/10 ^{a,c}	24-hours	35,130	16	225	1	0	35,372
7/11 ^a	23.5 hours	732,966	75	4,104	0	0	737,145
7/12 ^{a,d}	4-hours	37,969	23	535	0	0	38,527
7/13 ^{a,d,e}	7-hours	54,072	51	465	0	0	54,588
7/14 ^{a,d}	4.5-hours	55,171	2	1,599	0	0	56,772
7/15 ^{a,d,e}	6.5-hours	138,180	24	5,642	0	1	143,847
7/16 ^a	13.5-hours	147,468	43	32,253	0	2	179,766
7/17	19.5-hours	139,119	82	23,593	0	0	162,794
7/18	24-hours	294,366	37	45,961	2	0	340,366
7/19	24-hours	126,755	67	24,054	1	2	150,879
7/20	24-hours	226,900	56	27,512	2	0	254,470
7/21	24-hours	157,524	28	24,534	0	0	182,086
7/22	24-hours	37,421	43	12,385	3	2	49,854
7/23	9-hours	5,619	14	1,358	0	0	6,991
7/26	15-hours	7,460	26	7,460	1	29	14,976
7/27	24-hours	5,520	38	5,520	0	101	11,179
7/28	24-hours	2,006	31	2,006	1	19	4,063
7/29	24-hours	2,072	20	2,072	1	63	4,228
7/30	24-hours	165	1	165	0	2	333
8/16	15-hours	0	0	1	0	3	4
8/18	24-hours	0	0	1	0	9	10
8/19	24-hours	7	0	0	0	65	72
Total		9,484,279	1,355	272,549	13	298	9,758,494
% of District Catch		97.2	0.0	2.8	0.0	0.0	100

^a District test fishing and cost recovery.

^b Naknek Section.

^c Naknek Set net.

^d Naknek River Special Harvest Area; drift net.

^e Naknek/Kvichak set net.

Table 14. Commercial salmon catch by date and species, in numbers of fish, Egegik District, Bristol Bay, 1999.

Date	Hours ^b	Effort ^a		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set						
6/01	15								
6/02	9								
6/03	15								
6/04	9								
6/07	15								
6/08	24								
6/09	9								
6/10	15								
6/11	9								
6/14	15	8	10	1,029	5				1,034
6/15	24	14	27	2,387	26				2,413
6/16	9	8	8	1,128	5				1,133
6/22	6	338	126	24,185	22	606			24,813
6/25	7	483	160	28,145	44	1,052			29,241
6/28	0.5	1 ^c		1,215		7			1,222
6/29	7.5	643	238	471,478	46	2,147			473,671
6/30	8	638	237	826,917	32	2,530			829,479
7/01	11/23	1257	380	1,403,028	47	7,239			1,410,314
7/02	16/22	1103	270	1,216,463	67	7,753			1,224,283
7/04	5/8	440	215	398,825	9	1,991			400,825
7/05	6.5/12.5	500	221	460,633	23	1,834			462,490
7/06	14.5/19	740	389	444,150	22	2,217			446,389
7/07	15/24	669	253	213,832	31	1,334			215,197
7/08	14/24	553	207	154,832	15	1,559			156,406
7/09	9.5/24	565	149	235,050	16	1,923			236,989
7/10	5/24	335	361	202,769	27	1,195			203,991
7/11	9/24	583	391	346,699	40	4,122		2	350,863
7/12	6/24	299	282	206,331	34	3,850			210,215
7/13	7/24	357	253	141,503	16	4,204			145,723
7/14	12.5/24	592	284	211,506	6	5,368			216,880
7/15	13/20	476	292	119,460	11	5,001			124,472
7/16	16/0	406		68,757	8	3,595		1	72,361
7/17	15.5/7.5	256	97	57,054	9	5,040			62,103
7/18	14.5	213	128	64,944	7	4,115			69,066
7/19	15	121	76	36,823		3,510			40,333
7/20	24	72	83	30,869	1	439			31,309
7/21	24	42	67	16,816		362			17,178
7/22	24	51	46	14,643	1	483		2	15,129
7/23	9	17	21	5,538	2	289		2	5,831
7/26	15	30	30	6,557	1	182		13	6,753
7/27	24	9	33	2,548	2	81		27	2,658
7/28	24	12	25	2,422	1	225		38	2,686
7/29	24	12	16	1,830		134		54	2,018

continued

Table 14. (Page 2 of 2).

Date	Hours ^b	Effort ^a		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set						
7/30	9	4	6	296		6		9	311
8/02	15	6	10	512		194		186	892
8/03 ^d	24		1						
8/04	24	2	2	261		47		100	408
8/05	24	4	5	214	1	61		193	469
8/06	9	1	5	29		23		135	187
8/09	15	4	10	107	1	30		666	804
8/10	24	6	14	216		44		1,093	1,353
8/11	24	3	8	55		17		481	553
8/12	24	3	10	164		45		826	1,035
8/13 ^d	9		3						
8/16	15	8	9	96		10		1,188	1,294
8/17	24	3	11	49		13		799	861
8/18	24	9	12	127		33		1,475	1,635
8/19	24	1	7	14		5		446	465
8/20 ^d	9		2						
8/23	15	11	8	65		18		1,299	1,382
8/24	24	9	8	56		15		1,745	1,816
8/25	9	2	2	10		6		569	585
8/30	15								
8/31	24								
9/01	9								
9/06	15								
9/07	24								
9/08	9								
9/13	15								
9/14	24								
9/15	9								
9/20	15								
9/21	24								
9/22	9								
9/27	15								
9/28	24								
9/29	9								
Total		11,918	5,508	7,422,700	578	74,959		11,576	7,509,813
% of District Catch				99	0	1		0	100

^a Estimated number of deliveries based on weekly and daily company reports. Preliminary.

^b First number is drift gillnet hours fished , second number is set gillnet hours fished.

^c District Test Fishing catch.

^d Less than four landings, so catch data is confidential.

Table 15. Commercial salmon catch by date and species, in numbers of fish, Ugashik District, Bristol Bay, 1999.

Date	Hours ^b	Effort ^a		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set						
6/01	15								
6/02	24								
6/03	24								
6/04	9								
6/07	15								
6/08	24								
6/09	24								
6/10	24								
6/11	9								
6/14	15	12		303	182	74			559
6/15	24	18		1,519	353	289			2,161
6/16	24	20		2,065	206	284			2,555
6/17	24	20		2,204	217	237			2,658
6/18	9	11	1	923	124	155			1,202
6/21	15	94	1	21,586	51	223			21,860
6/22	24	110	3	18,947	179	140			19,266
6/23	9	68	1	27,298	43	175			27,516
7/01	0	1 ^c		517	2	6			525
7/05	4/8	13	67	71,933	1	224			72,158
7/06	4.5/7.5	9	42	37,754	7	129			37,890
7/07	14/24	45	97	86,722	16	638			87,376
7/08	15/24	55	79	91,721	59	1,217			92,997
7/09	18.5/24	172	68	290,464	29	5,415			295,908
7/10	13/24	321	69	224,403	31	4,524			228,958
7/11	8/24	293	51	159,904	23	4,277			164,204
7/12	10/24	305	65	207,254	29	6,325			213,608
7/13	8/24	311	32	119,880	15	5,559			125,454
7/14	13/24	398	42	161,974	25	6,116			168,115
7/15	11.5/24	394	37	117,371	13	5,490			122,874
7/16	16/24	372	38	72,060	14	4,574			76,648
7/17	12/24	221	36	87,404	14	5,726			93,144
7/18	13/24	137	37	59,625	7	3,460			63,092
7/19	15/24	221	52	181,319	10	8,720			190,049
7/20	24	150	49	96,952	8	4,910			101,870
7/21	24	131	45	64,820	3	522		4	65,349
7/22	24	89	51	27,537	8	339			27,884
7/23	9	18	23	5,982	3	72			6,057
7/26	15	52	32	17,576	3	669		1	18,249
7/27	24	20	32	6,766	4	374	2	1	7,147
7/28	24	9	20	2,679	1	131			2,811
7/29	24	3	9	801		33			834

continued

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Date	Hours ^b	Effort ^a		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set						
7/30	9	1	3	297		6			303
8/02	15	4	5	676		49		7	732
8/03	24	1	3	173		7		2	182
8/04	24	1	3	75		3		4	82
8/05	24	1	3	130	1	9		15	155
8/06 ^d	9		3						
8/09 ^d	15		3						
8/10 ^d	24		3						
8/11 ^d	24		3						
8/12	24	5	3	35		9		92	136
8/13 ^d	9		3						
8/16 ^d	15		3						
8/17	24	1	3	7				102	109
8/18 ^d	24		3						
8/19	24	2	3	10				106	116
8/20 ^d	9		3						
8/23	15	1	3	2				93	95
8/24	24	1	3					273	273
8/25 ^d	9		3						
8/30	15	1	3					154	154
8/31	24	1	3					154	154
9/01 ^d	9		3						
9/06	15	1	3					318	318
9/07	24	1	3					368	368
9/08 ^d	9		3						
9/13 ^d	15		3						
9/14 ^d	24		3						
9/15 ^d	9		3						
9/20 ^d	15		1						
9/21 ^d	24		1						
9/22 ^d	9		1						
9/27	15								
9/28	24								
9/29	9								
Total		4,114	1,162	2,269,708	1,681	71,108	2	2,481	2,344,980
% of District Catch				97	0	3	0	0	100

^a Estimated number of deliveries based on weekly company reports. Preliminary.

^b First number is drift gillnet hours fished , second number is set gillnet hours fished.

^c District Test Fishing catch.

^d Less than four landings, so catch data is confidential.

Table 16. Commercial salmon fishing time, effort and harvest by date, Nushagak District, 1999.

Date	Length of period (hrs)				Effort			Harvest				Total
	District ^a	Nushagak	Igushik	WRSHA ^b	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	
6/16	^c 6.0	6.0	6.0		125	23	125	563	123			811
6/30				2.0	1	5	1,192		2			1,194
7/01				14.0	603	216	528,013	103	3,163			531,279
7/02	9.0	11.0	20.0	16.0	562	538	781,782	2,336	18,446			802,564
7/03	12.0	12.0	12.0		352	217	483,787	1,265	12,793			497,845
7/04	6.0	6.0	6.0	13.5	278	336	282,532	115	3,705			286,352
7/05	6.0	6.0	6.0	22.0	403	264	410,174	200	4,090			414,464
7/06	12.5	12.5	12.5	24.0	510	409	496,300	276	5,199			501,775
7/07	15.0	15.0	15.0	24.0	520	437	308,459	405	5,856	2		314,722
7/08	15.5	11.5	18.5	24.0	558	496	240,527	762	8,315	4		249,608
7/09	19.0	9.0	24.0	24.0	593	424	224,274	813	8,774			233,861
7/10	19.0	6.0	24.0	24.0	577	299	465,099	610	12,381	2		478,092
7/11	19.0	6.0	24.0	24.0	579	400	298,050	620	5,696	3	1	304,370
7/12	20.0	6.0	24.0	24.0	556	377	237,552	687	7,658	3		245,900
7/13	20.0	12.0	24.0	24.0	601	445	613,904	729	12,393			627,026
7/14	20.0	13.0	24.0	24.0	582	502	345,667	696	4,792	1	1	351,157
7/15	19.0	13.0	24.0	24.0	407	397	112,318	204	1,951	2	1	114,476
7/16	19.0	13.0	24.0	24.0	318	337	68,933	112	2,049	3	9	71,106
7/17	19.0	13.0	24.0	24.0	175	209	34,802	94	1,191	7	8	36,102
7/18	18.0	12.0	24.0	24.0	156	199	104,992	92	2,368	3	60	107,515
7/19	24.0	13.0	24.0	24.0	214	206	70,218	101	1,551	7	75	71,952
7/20	24.0	11.0	24.0	24.0	106	135	62,056	64	1,260	3	82	63,465
7/21	24.0	11.0	24.0	24.0	102	143	45,310	90	898	6	166	46,470
7/22	24.0	11.0	24.0	24.0	82	75	22,206	22	652	2	37	22,919
7/23	24.0	11.0	24.0	24.0	62	47	11,121	10	247	5	101	11,484
7/24	24.0	12.0	24.0	24.0	33	12	6,174	15	403	7	530	7,129
7/25	24.0	12.0	24.0	24.0	25	15	4,789	20	432	2	1,429	6,672
7/26	18.5	14.0	18.5	24.0	18	9	2,967	4	97		302	3,370
7/27				18.0	1	1	358		9		17	384
Total	460.5	278.0	522.5	589.5			6,263,681	11,008	126,494	62	2,819	6,404,064
% of District Catch							97.8%	0.2%	2.0%	0.0%	0.0%	100.0%

^a Number of hours the Nushagak District was opened to commercial fishing. Includes Nushagak and Igushik Sections.

^b WRSHA = Wood River Special Harvest Area.

^c Mesh sizes less than seven and one half inches prohibited for the protection of sockeye salmon.

Table 17. Commercial sockeye salmon fishing time and setnet harvest by date and statistical area, Nushagak District, 1999.

Date	Length of period (hrs)				Harvest							
	District ^a	Nushagak	Igushik	WRSHA ^b	Combine Flats	Queen Slough	Coffee Point	Clark's Point	Ekuk Beach	Igushik Beach	WRSHA	Total
6/16	6.0	6.0	6.0		2			9	38	33		82
6/30				2.0							1,025	1,025
7/01				14.0							78,544	78,544
7/02	9.0	11.0	20.0	16.0	63,061	20,718	24,500	16,562	32,614	42,158	36,746	236,359
7/03	12.0	12.0	12.0		34,697	5,189	18,752	4,867	371	27,817	4,535	96,228
7/04	6.0	6.0	6.0	13.5	19,928	7,880	5,645	5,623	6,427	16,285	38,082	99,870
7/05	6.0	6.0	6.0	22.0	27,871	12,127	11,022	2,921	29,940	412	30,618	114,911
7/06	12.5	12.5	12.5	24.0	36,867	15,889	7,441	7,117	56,036	34,164	34,211	191,725
7/07	15.0	15.0	15.0	24.0	12,290	3,664	2,405	6,109	28,403	13,716	13,224	79,811
7/08	15.5	11.5	18.5	24.0	16,150	4,168	3,506	8,518	39,968	7,219	7,860	87,389
7/09	19.0	9.0	24.0	24.0	4,055	2,196	437	1,203	6,854	24,758	3,915	43,418
7/10	19.0	6.0	24.0	24.0	1,877	4,288	679	4,705	18,288	22,602	2,250	54,689
7/11	19.0	6.0	24.0	24.0	12,882	10,225	3,951	2,362	4,793	13,915	24,804	72,932
7/12	20.0	6.0	24.0	24.0	4,093	2,696	744	3,162	13,474	18,166	15,156	57,491
7/13	20.0	12.0	24.0	24.0	15,854	10,256	9,681	10,852	69,606	26,269	10,226	152,744
7/14	20.0	13.0	24.0	24.0	20,555	7,715	10,135	6,969	53,281	9,540	32,906	141,101
7/15	19.0	13.0	24.0	24.0	6,499	1,898	5,975	1,657	12,154	5,219	18,207	51,609
7/16	19.0	13.0	24.0	24.0	2,791	1,366	1,629	2,212	6,868	3,172	13,303	31,341
7/17	19.0	13.0	24.0	24.0	779	103	377	2,278	7,517	7,660	3,734	22,448
7/18	18.0	12.0	24.0	24.0	2,633	2,783	806	3,459	28,784	7,648	5,927	52,040
7/19	24.0	13.0	24.0	24.0	3,849	3,616	3,087	1,255	5,743	2,907	4,401	24,858
7/20	24.0	11.0	24.0	24.0	1,180	4,305	1,538	266	11,074	3,343	5,532	27,238
7/21	24.0	11.0	24.0	24.0	215	1,225	1,683	438	7,900		4,665	16,126
7/22	24.0	11.0	24.0	24.0	188	554	177	472	5,136		2,070	8,597
7/23	24.0	11.0	24.0	24.0	108		43	759	3,623		513	5,046
7/24	24.0	12.0	24.0	24.0				457	2,587		112	3,156
7/25	24.0	12.0	24.0	24.0				317	1,038		389	1,744
7/26	18.5	14.0	18.5	24.0	59			163	878		202	1,302
7/27				18.0	241							241
Total	460.5	278.0	522.5	589.5	288,724	122,861	114,213	94,712	453,395	287,003	393,157	1,754,065
% of District Catch					16.5%	7.0%	6.5%	5.4%	25.8%	16.4%	22.4%	100.0%

^a Number of hours the Nushagak District Drift gillnet was opened to commercial fishing .

^b WRSHA = Wood River Special Harvest Area.

Table 18. Commercial salmon fishing time, effort and harvest by date, Wood River Special Harvest Area, 1999.

Date	Time (hrs)		Effort		Harvest					Total
	Drift	Set	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	
6/30	2.0	2.0	1	5	1,192	0	2	0	0	1,194
7/01	14.0	14.0	555	216	491,395	54	1,604	0	0	493,053
7/02	16.0	16.0	236	71	283,503	54	1,400	0	0	284,957
7/03			15	6	24,347	3	108	0	0	24,458
7/04	8.0	13.5	126	111	126,126	24	441	0	0	126,591
7/05	16.0	22.0	267	75	245,808	21	1,073	0	0	246,902
7/06	20.0	24.0	288	97	235,195	52	435	0	0	235,682
7/07	17.0	24.0	238	42	109,585	24	351	0	0	109,960
7/08	15.0	24.0	75	48	28,219	23	78	0	0	28,320
7/09	15.5	24.0	40	44	11,610	24	45	0	0	11,679
7/10	14.5	24.0	24	14	6,694	6	10	0	0	6,710
7/11	15.0	24.0	19	64	32,253	26	160	0	0	32,439
7/12	15.0	24.0	43	79	33,225	8	148	0	0	33,381
7/13	15.0	24.0	39	48	20,580	14	130	0	0	20,724
7/14	15.0	24.0	54	77	55,362	94	43	0	0	55,499
7/15	14.5	24.0	66	63	32,695	36	110	0	0	32,841
7/16	16.0	24.0	58	68	23,185	5	9	0	0	23,199
7/17	16.0	24.0	35	33	6,418	8	70	3	0	6,499
7/18	16.0	24.0	29	21	9,829	16	34	0	5	9,884
7/19	16.0	24.0	40	26	8,808	11	95	0	4	8,918
7/20	16.0	24.0	25	20	10,655	10	65	2	2	10,734
7/21	15.0	24.0	23	26	8,600	4	75	4	1	8,684
7/22	15.0	24.0	33	19	6,498	2	91	1	0	6,592
7/23	15.5	24.0	16	9	1,587	0	18	2	3	1,610
7/24	15.0	24.0	3	5	196	0	2	0	0	198
7/25	15.5	24.0	1	5	416	0	3	2	19	440
7/26	15.0	24.0	4	3	405	1	6	0	1	413
7/27	13.0	18.0			0	0	0	0	0	0
Total	396.5	589.5	2,353	1,295	1,814,386	520	6,606	14	35	1,821,561
%					99.6%	0.0%	0.4%	0.0%	0.0%	100.0%

Table 19. Commercial salmon catch by date and species, in numbers of fish, Togiak District, 1999.

Date ^a	Sockeye	Chinook	Chum	Pink	Coho	Total
6/15	49	17	13	0	0	79
6/16	70	1	1	0	0	72
6/21	788	399	792	0	0	1,979
6/22	1,561	871	1,339	0	0	3,771
6/23	613	136	321	0	0	1,070
6/28	5,718	1,821	4,305	0	0	11,844
6/29	6,602	1,512	5,123	0	0	13,237
6/30	3,447	847	2,677	0	0	6,971
7/05	16,939	1,203	4,979	0	0	23,121
7/06	21,418	1,014	8,444	0	0	30,876
7/07	9,006	277	2,971	0	0	12,254
7/12	20,991	497	9,445	0	0	30,933
7/13	24,085	474	7,725	0	0	32,284
7/14	22,594	533	12,508	0	0	35,635
7/15	27,014	263	6,555	0	0	33,832
7/16	20,479	199	3,984	0	0	24,662
7/17	18,247	210	4,956	0	0	23,413
7/19	13,788	164	2,490	0	0	16,442
7/20	21,475	86	3,219	0	0	24,780
7/21	25,744	108	4,901	0	0	30,753
7/22	26,403	153	3,664	0	0	30,220
7/23	10,438	66	1,380	0	0	11,884
7/26	15,331	64	2,843	0	0	18,238
7/27	17,701	98	3,180	0	0	20,979
7/28	13,942	71	3,922	0	0	17,935
7/29	8,689	99	2,040	0	0	10,828
7/30	7,575	50	1,871	0	0	9,496
7/31	4,231	52	939	0	0	5,222
8/01	167	0	0	0	0	167
8/02	5,302	61	1,059	0	2	6,424
8/03	932	3	155	0	0	1,090
8/04	755	1	35	0	0	791
8/05	3,398	19	350	0	3	3,770
8/06	667	10	99	0	2	778
8/09	710	4	129	0	8	851
8/10	2,707	19	345	0	59	3,130
8/11	1,450	20	170	0	104	1,744
8/12	891	12	105	0	77	1,085
8/13	236	1	9	0	6	252
8/16	486	1	57	0	208	752
8/17	576	4	67	0	333	980
8/18	234	4	14	0	115	367
8/23	112	4	0	0	306	422
8/24	186	3	34	0	865	1,088
8/25	171	4	13	0	569	757
Total	383,918	11,455	109,228	0	2,657	507,258
% of District Total	75.7%	2.3%	21.5%	0.0%	0.5%	100.0%

^a See table 11 for inseason adjustments to the regular weekly fishing schedule.

Table 20. Commercial salmon catch by date and species, in numbers of fish, Togiak Section, 1999.

Date ^a	Effort		Sockeye	Chinook	Chum	Pink	Coho	Total
	Drift	Set						
6/15	3		44	17	9	0	0	70
6/21	8	10	429	315	472	0	0	1,216
6/22	17	23	850	769	815	0	0	2,434
6/23	2	9	260	110	157	0	0	527
6/28	25	34	3,985	1,605	3,103	0	0	8,693
6/29	41	52	4,363	1,389	4,053	0	0	9,805
6/30	23	43	3,447	847	2,677	0	0	6,971
7/05	23	36	10,105	1,099	3,141	0	0	14,345
7/06	50	78	17,072	963	7,117	0	0	25,152
7/07	30	33	6,129	277	2,971	0	0	9,377
7/12	35	71	13,895	459	6,015	0	0	20,369
7/13	41	71	15,874	459	5,147	0	0	21,480
7/14	61	90	19,867	527	12,191	0	0	32,585
7/15	58	115	27,014	263	6,555	0	0	33,832
7/16	40	112	20,479	199	3,984	0	0	24,662
7/17	46	80	18,247	210	4,956	0	0	23,413
7/19	39	40	12,990	155	2,418	0	0	15,563
7/20	35	102	20,825	75	3,155	0	0	24,055
7/21	48	97	25,527	107	4,865	0	0	30,499
7/22	51	103	26,403	153	3,664	0	0	30,220
7/23	27	51	10,438	66	1,380	0	0	11,884
7/26	48	49	15,331	64	2,843	0	0	18,238
7/27	77	50	17,701	98	3,180	0	0	20,979
7/28	87	60	13,942	71	3,922	0	0	17,935
7/29	57	54	8,689	99	2,040	0	0	10,828
7/30	42	43	7,575	50	1,871	0	0	9,496
7/31	24	19	4,231	52	939	0	0	5,222
8/01		1	167	0	0	0	0	167
8/02	64	44	5,302	61	1,059	0	2	6,424
8/03	6	16	932	3	155	0	0	1,090
8/04	2	18	755	1	35	0	0	791
8/05	32	45	3,398	19	350	0	3	3,770
8/06	7	14	667	10	99	0	2	778
8/09	7	16	710	4	129	0	8	851
8/10	29	33	2,707	19	345	0	59	3,130
8/11	16	21	1,450	20	170	0	104	1,744
8/12	9	21	891	12	105	0	77	1,085
8/13	2	5	236	1	9	0	6	252
8/16	11	14	486	1	57	0	208	752
8/17	8	26	576	4	67	0	333	980
8/18	3	9	234	4	14	0	115	367
8/23	4	3	112	4	0	0	306	422
8/24	15	9	186	3	34	0	865	1,088
8/25	11	7	171	4	13	0	569	757
Total	1,264	1,827	344,692	10,668	96,281	0	2,657	454,298
% of Section								
Total			75.9%	2.3%	21.2%	0.0%	0.6%	100.0%

^a Togiak River Section is open five and one-half days per week from July 1 thru July 15 per TDSMP. See Table 11 for inseason adjustments to the weekly fishing schedule.

Table 21. Commercial salmon catch by date and species, in numbers of fish, Kulukak Section, 1999.

Date ^a	Effort		Sockeye	Chinook	Chum	Pink	Coho	Total
	Drift	Set						
6/15		1	5	0	4	0	0	9
6/16		2	70	1	1	0	0	72
6/21	4	22	359	84	320	0	0	763
6/22	9	26	711	102	524	0	0	1,337
6/23	1	14	353	26	164	0	0	543
6/28	6	21	1,733	216	1,202	0	0	3,151
6/29	6	22	2,239	123	1,070	0	0	3,432
7/05	7	54	6,834	104	1,838	0	0	8,776
7/06	7	31	4,346	51	1,327	0	0	5,724
7/07		4	2,877	0	0	0	0	2,877
7/12	14	47	7,096	38	3,430	0	0	10,564
7/13	11	35	8,211	15	2,578	0	0	10,804
7/14	1	16	2,727	6	317	0	0	3,050
7/19		14	798	9	72	0	0	879
7/20		13	650	11	64	0	0	725
7/21		6	217	1	36	0	0	254
Total			39,226	787	12,947	0	0	52,960
% of Section								
Total			74.1%	1.5%	24.4%	0.0%	0.0%	100.0%

^a Kulukak Section open three days per week. See Table 11 for inseason adjustments to the weekly fishing schedule.

Table 22. Commercial salmon catch by date and species, in numbers of fish, Matogak Section, 1999.

Date ^a	Sockeye	Chinook	Chum	Pink	Coho	Total
						0
No Commercial Fishing Effort Occurred						
Total	0	0	0	0	0	0
% of Section Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

^a Matogak Section open five days per week, unless adjustment by emergency order.

Table 23. Commercial salmon catch by date and species, in numbers of fish, Osviak Section, 1999.

Date ^a	Sockeye	Chinook	Chum	Pink	Coho	Total
						0
No Commercial Fishing Effort Occurred						
Total	0	0	0	0	0	0
% of Section Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

^a Osviak Section open five days per week, unless adjustment by emergency order.

Table 24. Commercial salmon catch by district and species, in number of fish, Bristol Bay, 1999.^a

District and River System	Sockeye	Chinook	Chum	Pink	Coho	Total
<u>NAKNEK-KVICHAK DISTRICT</u>						
Kvichak River	6,781,260					
Branch River	588,025					
Naknek River	2,114,994					
Total	9,484,279	1,355	272,549	13	298	9,758,494
<u>EGEGIK DISTRICT</u>						
	7,422,700	578	74,959	0	11,576	7,509,813
<u>UGASHIK DISTRICT</u>						
	2,269,708	1,681	71,108	2	2,481	2,344,980
<u>NUSHAGAK DISTRICT</u>						
Wood River	4,411,203					
Igushik River	1,181,401					
Nushagak-Mulchatna	671,077					
Total	6,263,681	11,008	126,494	62	2,819	6,404,064
<u>TOGIK DISTRICT</u>						
Togiak Section	344,692	10,668	96,281	0	2,657	454,298
Kulukak Section	39,226	787	12,947	0	0	52,960
Matogak Section	0	0	0	0	0	0
Osviak Section	0	0	0	0	0	0
Total	383,918	11,455	109,228	0	2,657	507,258
TOTAL BRISTOL BAY	25,824,286	26,077	654,338	77	19,831	26,524,609
PERCENT	97.4%	0.1%	2.5%	0.0%	0.1%	100.0%

^a Preliminary

Table 25. Daily sockeye salmon escapement tower counts by river system, Bristol Bay, 1999.

Date	Kvichak River		Naknek River		Egegik River		Ugashik River		Wood River		Igushik River		Togiak River	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/18														
6/19					0	0								
6/20					0	0								
6/21					24	24								
6/22					24	48								
6/23			0	0	66	114			186	186				
6/24	0	0	2,724	2,724	30	144			5,442	5,628				
6/25	54	54	1,374	4,098	18	162			2,676	8,304	6	6		
6/26	36	90	564	4,662	78	240			1,860	10,164	0	6		
6/27	90	180	4,122	8,784	450	690			10,086	20,250	0	6		
6/28	24	204	4,836	13,620	60	750			15,180	35,430	0	6	0	0
6/29	234	438	104,754	118,374	2,970	3,720			10,218	45,648	0	6	0	0
6/30	16,962	17,400	147,564	265,938	5,598	9,318			27,972	73,620	2,958	2,964	0	0
7/01	87,450	104,850	92,658	358,596	56,400	65,718			17,592	91,212	4,632	7,596	0	0
7/02	232,242	337,092	118,254	476,850	61,002	126,720			87,390	178,602	23,532	31,128	0	0
7/03	411,228	748,320	71,046	547,896	211,962	338,682	0	0	347,124	525,726	30,342	61,470	0	0
7/04	338,088	1,086,408	172,548	720,444	98,436	437,118	0	0	214,188	739,914	34,410	95,880	0	0
7/05	437,124	1,523,532	205,380	925,824	99,642	536,760	0	0	234,300	974,214	49,140	145,020	36	36
7/06	304,272	1,827,804	96,000	1,021,824	173,484	710,244	0	0	107,280	1,081,494	42,168	187,188	1,746	1,782
7/07	428,358	2,256,162	26,982	1,048,806	262,872	973,116	6	6	78,492	1,159,986	45,486	232,674	6,246	8,028
7/08	532,554	2,788,716	10,686	1,059,492	163,278	1,136,394	33,180	33,186	47,634	1,207,620	39,072	271,746	4,782	12,810
7/09	403,932	3,192,648	19,968	1,079,460	194,010	1,330,404	203,940	237,126	28,314	1,235,934	41,340	313,086	3,222	16,032
7/10	395,958	3,588,606	38,598	1,118,058	141,978	1,472,382	189,654	426,780	23,130	1,259,064	23,874	336,960	3,108	19,140
7/11	215,850	3,804,456	71,718	1,189,776	90,372	1,562,754	183,408	610,188	96,810	1,355,874	12,258	349,218	4,740	23,880
7/12	228,000	4,032,456	114,390	1,304,166	85,824	1,648,578	328,740	938,928	33,366	1,389,240	8,124	357,342	5,040	28,920
7/13	299,562	4,332,018	52,980	1,357,146	23,178	1,671,756	354,384	1,293,312	22,950	1,412,190	8,694	366,036	4,602	33,522
7/14	317,820	4,649,838	41,568	1,398,714	16,860	1,688,616	78,528	1,371,840	30,810	1,443,000	7,536	373,572	3,762	37,284
7/15	298,842	4,948,680	107,958	1,506,672	19,572	1,708,188	88,260	1,460,100	11,034	1,454,034	5,850	379,422	2,550	39,834

(Continued)

Table 25. (Page 2 of 2)

Date	Kvichak River		Naknek River		Egegik River		Ugashik River		Wood River		Igushik River		Togiak River	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/16	162,348	5,111,028	80,106	1,586,778	7,812	1,716,000	45,846	1,505,946	14,550	1,468,584	10,968	390,390	2,598	42,432
7/17	310,638	5,421,666	15,726	1,602,504	11,772	1,727,772	21,462	1,527,408	10,410	1,478,994	13,176	403,566	4,362	46,794
7/18	428,550	5,850,216	8,682	1,611,186			10,548	1,537,956	8,016	1,487,010	14,490	418,056	3,750	50,544
7/19	189,006	6,039,222	14,178	1,625,364			3,048	1,541,004	4,008	1,491,018	8,796	426,852	2,910	53,454
7/20	70,278	6,109,500					6,348	1,547,352	6,264	1,497,282	6,036	432,888	3,054	56,508
7/21	41,988	6,151,488					8,688	1,556,040	5,748	1,503,030	6,600	439,488	3,030	59,538
7/22	24,882	6,176,370					24,810	1,580,850	6,348	1,509,378	6,048	445,536	9,192	68,730
7/23	20,544	6,196,914					25,434	1,606,284	3,048	1,512,426			6,864	75,594
7/24							22,674	1,628,958					2,856	78,450
7/25							12,528	1,641,486					4,098	82,548
7/26							10,086	1,651,572					6,012	88,560
7/27													18,354	106,914
7/28													19,374	126,288
7/29													13,122	139,410
7/30													6,174	145,584
7/31													3,378	148,962
8/01													3,402	152,364
8/02													1,848	154,212
8/03													1,182	155,394
8/04													504	155,898

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Table 26. Final daily and cumulative escapement estimates by species, Nushagak River sonar project, 1999.

Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/09	5	5	8	8	29	29	0	0	0	0	42	42
6/10	8	13	14	22	61	90	0	0	0	0	83	125
6/11	19	32	48	70	177	267	0	0	0	0	244	369
6/12	17	49	30	100	139	406	0	0	0	0	186	555
6/13	20	69	43	143	136	542	0	0	0	0	199	754
6/14	14	83	33	176	91	633	0	0	0	0	138	892
6/15	29	112	72	248	217	850	0	0	0	0	318	1,210
6/16	268	380	720	968	1,876	2,726	0	0	0	0	2,864	4,074
6/17	221	601	496	1,464	1,642	4,368	0	0	0	0	2,359	6,433
6/18	110	711	227	1,691	838	5,206	0	0	0	0	1,175	7,608
6/19	45	756	131	1,822	314	5,520	0	0	0	0	490	8,098
6/20	32	788	103	1,925	200	5,720	0	0	0	0	335	8,433
6/21	35	823	75	2,000	243	5,963	0	0	0	0	353	8,786
6/22	33	856	74	2,074	221	6,184	0	0	0	0	328	9,114
6/23	43	899	214	2,288	279	6,463	0	0	0	0	536	9,650
6/24	2,405	3,304	8,063	10,351	14,887	21,350	0	0	0	0	25,355	35,005
6/25	2,431	5,735	3,384	13,735	7,766	29,116	0	0	0	0	13,581	48,586
6/26	666	6,401	1,383	15,118	2,396	31,512	0	0	0	0	4,445	53,031
6/27	539	6,940	1,065	16,183	2,154	33,666	0	0	0	0	3,758	56,789
6/28	3,309	10,249	896	17,079	7,766	41,432	0	0	0	0	11,971	68,760
6/29	2,233	12,482	425	17,504	3,275	44,707	0	0	0	0	5,933	74,693
6/30	4,014	16,496	507	18,011	5,508	50,215	0	0	0	0	10,029	84,722
7/01	9,217	25,713	2,251	20,262	29,784	79,999	0	0	0	0	41,252	125,974
7/02	42,891	68,604	10,203	30,465	58,420	138,419	0	0	0	0	111,514	237,488
7/03	44,770	113,374	2,137	32,602	10,626	149,045	0	0	0	0	57,533	295,021
7/04	33,122	146,496	2,689	35,291	16,369	165,414	0	0	0	0	52,180	347,201
7/05	35,790	182,286	4,344	39,635	25,340	190,754	0	0	0	0	65,474	412,675
7/06	29,267	211,553	3,161	42,796	11,083	201,837	0	0	0	0	43,511	456,186
7/07	24,132	235,685	2,663	45,459	8,004	209,841	0	0	0	0	34,799	490,985
7/08	9,572	245,257	1,304	46,763	3,437	213,278	0	0	0	0	14,313	505,298
7/09	6,973	252,230	1,252	48,015	2,541	215,819	0	0	0	0	10,766	516,064
7/10	5,081	257,311	948	48,963	2,244	218,063	0	0	10	10	8,283	524,347
7/11	5,816	263,127	992	49,955	2,437	220,500	0	0	10	20	9,255	533,602

(Continued)

Table 26. (page 2 of 3).

Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/12	4,873	268,000	818	50,773	2,084	222,584	0	0	291	311	8,066	541,668
7/13	2,011	270,011	675	51,448	969	223,553	0	0	101	412	3,756	545,424
7/14	2,914	272,925	713	52,161	1,247	224,800	0	0	138	550	5,012	550,436
7/15	5,174	278,099	903	53,064	1,892	226,692	0	0	209	759	8,178	558,614
7/16	3,622	281,721	818	53,882	1,483	228,175	0	0	165	924	6,088	564,702
7/17	2,784	284,505	719	54,601	1,157	229,332	0	0	118	1,042	4,778	569,480
7/18	3,367	287,872	1,051	55,652	1,609	230,941	0	0	171	1,213	6,198	575,678
7/19	2,449	290,321	767	56,419	1,181	232,122	0	0	128	1,341	4,525	580,203
7/20	2,437	292,758	853	57,272	1,270	233,392	0	0	141	1,482	4,701	584,904
7/21	2,770	295,528	956	58,228	1,483	234,875	0	0	169	1,651	5,378	590,282
7/22	3,193	298,721	823	59,051	1,270	236,145	0	0	120	1,771	5,406	595,688
7/23	2,540	301,261	606	59,657	1,039	237,184	0	0	109	1,880	4,294	599,982
7/24	2,033	303,294	591	60,248	1,010	238,194	0	0	120	2,000	3,754	603,736
7/25	1,574	304,868	395	60,643	730	238,924	0	0	88	2,088	2,787	606,523
7/26	1,933	306,801	561	61,204	1,011	239,935	0	0	659	2,747	4,164	610,687
7/27	1,183	307,984	236	61,440	579	240,514	0	0	561	3,308	2,559	613,246
7/28	864	308,848	237	61,677	454	240,968	0	0	452	3,760	2,007	615,253
7/29	343	309,191	127	61,804	200	241,168	0	0	326	4,086	996	616,249
7/30	260	309,451	76	61,880	145	241,313	0	0	373	4,459	854	617,103
7/31	270	309,721	57	61,937	154	241,467	0	0	814	5,273	1,295	618,398
8/01	187	309,908	62	61,999	110	241,577	0	0	3,108	8,381	3,467	621,865
8/02	34	309,942	16	62,015	26	241,603	0	0	679	9,060	755	622,620
8/03	26	309,968	25	62,040	24	241,627	0	0	697	9,757	772	623,392
8/04	212	310,180	80	62,120	114	241,741	0	0	3,626	13,383	4,032	627,424
8/05	328	310,508	84	62,204	152	241,893	0	0	4,945	18,328	5,509	632,933
8/06	170	310,678	23	62,227	59	241,952	0	0	2,176	20,504	2,428	635,361
8/07	70	310,748	8	62,235	23	241,975	0	0	866	21,370	967	636,328
8/08	42	310,790	5	62,240	15	241,990	0	0	534	21,904	596	636,924
8/09	22	310,812	4	62,244	10	242,000	0	0	310	22,214	346	637,270
8/10	30	310,842	7	62,251	13	242,013	0	0	423	22,637	473	637,743
8/11	147	310,989	15	62,266	46	242,059	0	0	1,773	24,410	1,981	639,724
8/12	99	311,088	7	62,273	28	242,087	0	0	1,141	25,551	1,275	640,999
8/13	30	311,118	8	62,281	16	242,103	0	0	487	26,038	541	641,540

(Continued)

Table 26. (page 3 of 3).

Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
8/14	21	311,139	6	62,287	10	242,113	0	0	317	26,355	354	641,894
8/15	30	311,169	3	62,290	9	242,122	0	0	354	26,709	396	642,290
8/16	22	311,191	6	62,296	8	242,130	0	0	318	27,027	354	642,644
8/17	15	311,206	4	62,300	6	242,136	0	0	207	27,234	232	642,876
8/18	23	311,229	5	62,305	9	242,145	0	0	318	27,552	355	643,231
8/19	48	311,277	4	62,309	16	242,161	0	0	592	28,144	660	643,891
8/20	222	311,499	4	62,313	51	242,212	0	0	2,326	30,470	2,603	646,494
8/21	206	311,705	3	62,316	47	242,259	0	0	2,151	32,621	2,407	648,901
8/22	74	311,779	4	62,320	19	242,278	0	0	823	33,444	920	649,821
8/23	56	311,835	6	62,326	17	242,295	0	0	677	34,121	756	650,577
8/24	49	311,884	4	62,330	13	242,308	0	0	560	34,681	626	651,203
8/25	15	311,899	1	62,331	4	242,312	0	0	172	34,853	192	651,395

Table 27. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey and river test fishing enumeration methods, Kvichak River, Bristol Bay, 1999.

Date	Tower Count		Aerial Survey Total	Fish per Index Pt. ^a	River Test Fishing Index Points		Cumulative Escapement	Estimated River Fish ^b
	Daily	Cum.			Daily	Cum.		
6/21				106	0			
6/22				106	0			
6/23				106	0			
6/24	0	0		106	42	42	4,452	4,000
6/25	54	54		106	6	48	5,088	5,000
6/26	36	90		106	0	48	5,088	5,000
6/27	90	180		106	4	52	5,512	5,000
6/28	24	204		106	0	52	5,512	5,000
6/29	234	438		106	1,322	1,374	145,644	150,000
6/30	16,962	17,400	235,000	106	4,944	6,318	669,708	700,000
7/01	87,450	104,850	1,185,000	106	11,383	17,701	1,876,306	1,800,000
7/02	232,242	337,092	1,035,000	106	4,095	21,796	2,310,376	2,000,000
7/03	411,228	748,320	648,000	106	6,631	28,427	3,013,262	2,100,000
7/04	338,088	1,086,408		106	11,439	39,866	4,225,796	3,000,000
7/05	437,124	1,523,532	2,400,000	106	6,091	45,957	4,871,442	3,000,000
7/06	304,272	1,827,804	1,376,000	83	2,348	48,305	4,009,315	2,000,000
7/07	428,358	2,256,162	741,000	79	648	48,953	3,867,287	1,500,000
7/08	532,554	2,788,716	603,000	69	945	49,898	3,442,962	700,000
7/09	403,932	3,192,648		69	438	50,336	3,473,184	350,000
7/10	395,958	3,588,606		74	298	50,634	3,746,916	300,000
7/11	215,850	3,804,456		77	2,553	53,187	4,095,399	400,000
7/12	228,000	4,032,456	338,000	80	4,751	57,938	4,635,040	650,000
7/13	299,562	4,332,018	873,000	86	2,141	60,079	5,166,794	850,000
7/14	317,820	4,649,838	566,000	86	1,522	61,601	5,297,686	650,000
7/15	298,842	4,948,680	363,600	85	6,034	67,635	5,748,975	800,000
7/16	162,348	5,111,028	932,000	88	9,121	76,756	6,754,528	1,100,000
7/17	310,638	5,421,666						
7/18	428,550	5,850,216						
7/19	189,006	6,039,222						
7/20	70,278	6,109,500						
7/21	41,988	6,151,488						
7/22	24,882	6,176,370						
7/23	20,544	6,196,914						

^a Fish per index point was based on historical average (106), estimates of fpi using early tower counts and aerial surveys (6/6 - 6/9), or by fitting test fish run timing to tower count timing (6/10 - 6/16).

^b Estimated river fish (ERF) was based on the river test fish cumulative escapement estimate less the cumulative tower count. On occasion, staff adjusted the ERF based on aerial surveys, catchability, etc.

Table 28. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey, and river test fishing enumeration methods, Egegik River, 1999.

Date	Tower Count		Aerial Survey	Fish per Index Pt. ^a	River Test Fishing		Estimated Cumulative Escapement	Estimated River Fish ^b
	Daily	Cum.	Total		Daily	Cum.		
6/14				62	41	41	2,542	
6/15				62	42	83	5,146	
6/16				62	31	114	7,068	
6/17				62	199	313	19,406	
6/18				62	574	887	54,994	55,000
6/19				62	285	1,172	72,664	72,000
6/20			14,550	62	512	1,684	104,408	100,000
6/21	24	24	27,800	62	339	2,023	125,426	120,000
6/22	24	48	29,700	62	146	2,169	134,478	130,000
6/23	66	114	32,650	62	486	2,655	164,610	165,000
6/24	30	144		62	652	3,307	205,034	200,000
6/25	18	162	15,800	62	312	3,619	224,378	200,000
6/26	78	240	26,400	62	29	3,648	226,176	200,000
6/27	450	690		62	802	4,450	275,900	150,000
6/28	60	750	206,600	62	1,636	6,086	377,332	250,000
6/29	2,970	3,720		62	1,167	7,253	449,686	350,000
6/30	5,598	9,318	190,200 ^c	62	1,627	8,880	550,560	450,000
7/01	56,400	65,718		62	2,624	11,504	713,248	575,000
7/02	61,002	126,720	130,000	62	1,790	13,294	824,228	650,000
7/03	211,962	338,682		62	2,891	16,185	1,003,470	700,000
7/04	98,436	437,118	605,000 ^d	62	2,230	18,415	1,141,730	750,000
7/05	99,642	536,760		62	480	18,895	1,171,490	650,000
7/06	173,484	710,244		62	916	19,811	1,228,282	500,000
7/07	262,872	973,116	334,000	73	97	19,908	1,453,284	500,000
7/08	163,278	1,136,394	93,000	75	33	19,941	1,495,575	350,000
7/09	194,010	1,330,404		73	38	19,979	1,458,467	150,000
7/10	141,978	1,472,382		-	-	19,979	-	-
7/11	90,372	1,562,754		82	109	20,088	1,647,216	100,000
7/12	85,824	1,648,578		83	214	20,302	1,685,066	50,000
7/13	23,178	1,671,756		82	266	20,568	1,686,576	35,000
7/14	16,860	1,688,616						
7/15	19,572	1,708,188						
7/16	7,812	1,716,000						
7/17	11,772	1,727,772						
7/18		1,727,772						
7/19		1,727,772						
7/20		1,727,772						

^a Fish per index point was based on historical average (62), estimates of fpi using early tower counts and aerial surveys (7/7 - 7/12), or by fitting test fish run timing to tower count timing (7/13).

^b Estimated river fish (ERF) was based on the river test fish cumulative escapement estimate, less the cumulative tower count. On occasion, staff may adjust the ERF based on aerial surveys, test fishing catchability factors such as low or high water, etc.

^c Count includes 118,000 estimated in the Egegik River from only one side of the river.

^d Count includes 53,000 estimated in the Egegik River from only one side of the river.

Table 29. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey, and river test fishing enumeration methods, Ugashik River, 1999.

Date	Tower Count		Aerial Survey	Fish per Index Pt. ^a	River Test Fishing		Estimated Cumulative Escapement	Estimated River Fish ^b
	Daily	Cum.	Total		Index Points Daily	Cum.		
6/24				54	0	0	0	
6/25				54	15	15	810	800
6/26				54	27	42	2,268	2,000
6/27				54	53	95	5,130	5,000
6/28				54	50	145	7,830	7,000
6/29				54	108	253	13,662	10,000
6/30				54	360	613	33,102	30,000
7/01				54	459	1,072	57,888	50,000
7/02				54	1,148	2,220	119,880	80,000
7/03				54	573	2,793	150,822	100,000
7/04			65,000	54	1,792	4,585	247,590	200,000
7/05			31,400	54	2,779	7,364	397,656	350,000
7/06				54	4,732	12,096	653,184	500,000
7/07	6	6	212,000 ^d	54	2,727	14,823	800,442	500,000
7/08	33,180	33,186	221,300 ^e	54	1,437	16,260	878,040	600,000
7/09	203,940	237,126		54	263	16,523	892,242	450,000
7/10	189,654	426,780		54		16,523	892,242	
7/11	183,408	610,188	175,100 ^f	54	353	16,876	911,304	150,000
7/12	328,740	938,928		54	239	17,115	924,210	150,000
7/13	354,342	1,293,270	38,000	57	44	17,159	978,063	No Estimate ^g
7/14	78,528	1,371,798	410	74	82	17,241	1,275,834	No Estimate ^g
7/15	88,260	1,460,058	34,600	77	86	17,327	1,334,179	No Estimate ^g
7/16	45,846	1,505,904		81	66	17,393	1,408,833	No Estimate ^g
7/17	21,462	1,527,366		83	87	17,480	1,450,840	20,000
7/18	10,548	1,537,914		84	69	17,549	1,474,116	20,000
7/19	3,048	1,540,962						
7/20	6,348	1,547,310						
7/21	8,688	1,555,998						
7/22	24,810	1,580,808						
7/23	25,434	1,606,242						
7/24	22,674	1,628,916						
7/25	12,528	1,641,444						
7/26	5,592	1,647,036						

^a Fish per index point was based on historical average (54), estimates of fpi using early tower counts and aerial surveys (7/13 - 7/16), or by fitting test fish run timing to tower count timing (7/17 - 7/18).

^b Estimated river fish (ERF) was based on the river test fish cumulative escapement estimate, less the cumulative tower count. On occasion, staff may adjust the ERF based on aerial surveys, test fishing catchability factors such as low or high water, etc.

^c No estimate because based on fitting test fish run timing to tower counts the estimate would have been zero.

^d Count includes 174,000 estimated in the Ugashik River from only one side of the river.

^e Count includes 164,000 estimated in the Ugashik River from only one side of the river.

^f Count includes 145,000 estimated in the Ugashik River from only one side of the river.

Table 30. Daily sockeye salmon escapement estimates by tower and aerial survey enumeration methods, Wood River, 1999.

Date	Tower Count		Aerial Surveys ^a		
	Daily	Cum.	Number	Visibility	Comments
6/22					
6/23	186	186			
6/24	5,442	5,628			
6/25	2,676	8,304			
6/26	1,860	10,164			
6/27	10,086	20,250			
6/28	15,180	35,430			
6/29	10,218	45,648	3,600	fair	Muddy in the lower river below Muklung
6/30	27,972	73,620			
7/01	17,592	91,212			
7/02	87,390	178,602			
7/03	347,124	525,726			
7/04	214,188	739,914			
7/05	234,300	974,214			
7/06	107,280	1,081,494			
7/07	78,492	1,159,986			
7/08	47,634	1,207,620			
7/09	28,314	1,235,934			
7/10	23,130	1,259,064			
7/11	96,810	1,355,874			
7/12	33,366	1,389,240			
7/13	22,950	1,412,190			
7/14	30,810	1,443,000			
7/15	11,034	1,454,034			
7/16	14,550	1,468,584			
7/17	10,410	1,478,994			
7/18	8,016	1,487,010			
7/19	4,008	1,491,018			
7/20	6,264	1,497,282			
7/21	5,748	1,503,030			
7/22	6,348	1,509,378			
7/23	3,048	1,512,426			

^a Estimated number of fish in clear water below the counting tower at the time of the survey.

Table 31. Daily sockeye salmon escapement estimates by tower, aerial survey, and river test fishing enumeration methods, Igushik River, Bristol Bay, 1999.

Date	Tower Count		Aerial Surveys ^a				Fish per Index Pt. ^b	River Test Fishing				
	Daily	Cum.	Lower River	Lagoon	Upper River	Total Visibility		Index Points Daily	Cum.	Estimated Escapement	Estimated River Fish ^c	
6/16							57	0	0	0		
6/17							57	0	0	0	0	
6/18							57	0	0	0	0	
6/19							57	0	0	0	0	
6/20							57	0	0	0	0	
6/21							57	0	0	0	0	
6/22							57	2	2	111	100	
6/23							57	0	2	0	100	
6/24							57	21	23	1,292	1,300	
6/25	6	6					57	5	28	1,555	1,500	
6/26	0	6					57	126	154	8,778	5,000	
6/27	0	6					57	363	517	29,422	15,000	
6/28	0	6					57	323	840	47,849	25,000	
6/29	0	6					57	445	1,285	73,190	35,000	
6/30	2,958	2,964					57	886	2,171	123,672	60,000	
7/01	4,632	7,596					57	685	2,856	162,704	60,000	
7/02	23,532	31,128	700	2,500	2,000	5,200	Good	56	977	3,833	217,848	110,000
7/03	30,342	61,470						27	2,661	6,494	176,076	150,000
7/04	34,410	95,880						32	1,823	8,317	198,484	140,000
7/05	49,140	145,020						21	2,032	10,349	221,813	85,000
7/06	42,168	187,188						21	3,400	13,749	292,961	115,000
7/07	45,486	232,674						21	1,923	15,672	338,881	115,000
7/08	39,072	271,746						19	1,322	16,994	324,884	60,000
7/09	41,340	313,086										
7/10	23,874	336,960										
7/11	12,258	349,218										
7/12	8,124	357,342										
7/13	8,694	366,036										
7/14	7,536	373,572										
7/15	5,850	379,422										
7/16	10,968	390,390										
7/17	13,176	403,566										
7/18	14,490	418,056										
7/19	8,796	426,852										
7/20	6,036	432,888										
7/21	6,600	439,488										
7/22	6,048	445,536										
7/23												
7/24												

^a Estimated number of fish in clear water below the counting tower at the time of the survey.

^b The historic mean fish per index (57) was used until July 2 when lag-time relationships began to prove more accurate.

^c Estimated river fish (ERF) was based on the river test fish cumulative escapement estimate, less the cumulative tower count. On occasion, staff may adjust the ERF based on aerial surveys, test fishing catchability factors such as low or high water, etc.

Table 32. Comparison of daily sockeye salmon escapement estimates by tower and aerial survey enumeration methods, Togiak River, 1999.

Date	Tower Count		Aerial Surveys ^a			Total	Visibility	Comments
	Daily	Cum.	Togiak to Gechiak	Gechiak to Ongivinuck	Ongivinuck to tower			
7/01								
7/02								
7/03	0	0						
7/04	0	0						
7/05	36	36	3,400	3,600	1,000	8,000	fair	
7/06	1,746	1,782						
7/07	6,246	8,028	1,600	3,800	6,500	11,900	fair	
7/08	4,782	12,810						
7/09	3,222	16,032	2,400	3,300	1,600	7,300	poor	
7/10	3,108	19,140						
7/11	4,740	23,880						
7/12	5,040	28,920	2,000	5,700	NS	7,700	fair	good light, lower river
7/13	4,602	33,522						
7/14	3,762	37,284						
7/15	2,550	39,834	1,600	4,400	NS	6,000	poor	low ceiling, mist
7/16	2,598	42,432						
7/17	4,362	46,794						
7/18	3,750	50,544						
7/19	2,910	53,454						
7/20	3,054	56,508	1,000	2,500	2,600	6,100	poor	wind, ripples, glare
7/21	3,030	59,538						
7/22	9,192	68,730						
7/23	6,864	75,594						
7/24	2,856	78,450						
7/25	4,098	82,548						
7/26	6,012	88,560						
7/27	18,354	106,914	1,200	12,300	12,200	25,700	fair	
7/28	19,374	126,288						
7/29	13,122	139,410						
7/30	6,174	145,584						
7/31	3,378	148,962						
8/01	3,402	152,364						
8/02	1,848	154,212						
8/03	1,182	155,394						
8/04	504	155,898						

^a Unexpanded counts of fish in clear water index areas immediately below the counting tower at the time of the survey. No survey is represented by NS.

Table 33. Commercial salmon processors and buyers operating in Bristol Bay, 1999.^a

Name of Operator/Buyer	Base of Operations	District ^b	Method ^c	Export
01. Alaska General Seafoods	Kenmore, WA	K, E	C,F	SEA
02. American Seafoods Company	Seattle, WA	K,E,U,N	S	SEA
03. Aurora Salmon	Anchorage, AK	E,U	F	SEA
04. Big Creek	Warden, WA	E	F	AIR
05. Clarks Fish Company	Cathlamet, WA	E	F	SEA
06. Crystal Alaska Seafoods	Tacoma, WA	K,U	F	SEA
07. Cherrier Fisheries Inc.	Anchorage, AK	K,E,U,N	F,EF	SEA
08. Friedman Family Fisheries	Baltimore, MD	N	F	SEA
09. Icicle Seafoods, Inc.	Seattle, WA	K,E,U,N	F,C	SEA
10. Inlet Salmon	Kenai, AK	K,E,U,N	F	SEA
11. International Seafoods of Alaska	Seattle, WA	E	F	SEA
12. Lady Marian Seafoods, Inc.	Anchorage, AK	K,N	EF,F	AIR
13. New West Fisheries	Bellingham, WA	K,E,U	F	SEA
14. NorQuest Seafoods, Inc.	Seattle, WA	K,E	F	SEA
15. North Alaska Fisheries	Anchorage, AK	T	F	AIR
16. Ocean Beauty Seafoods, Inc.	Seattle, WA	K,E,U,N	F,EF,S	SEA,AIR
17. Pacman Fisheries	Naknek, AK	K	S	AIR
18. Pan Pacific	Woodinville, WA	K,E,U,N	F	SEA
19. Pederson Point	Seattle, WA	K,E,U	F	SEA
20. Peter Pan Seafoods, Inc.	Seattle, WA	K,E,U,N	C,EF,F,S	SEA
21. Snopac Products	Seattle, WA	K,E,U,N	C,F	SEA
22. Togiak Fisheries	Seattle, WA	T	F	SEA
23. Trident Seafoods	Seattle, WA	K,E,U,N	C,EF,F	SEA
24. Ugashik Wild Salmon	Ugashik, AK	U	C,EF	N/A
25. Unisea, Inc.	Redmond, WA	K,E,U,N	F	SEA
26. Wards Cove Packing Ekuk	Seattle, WA	N	F	AIR
27. Wards Cove Packing Naknek	Seattle, WA	K	F	SEA
28. Wards Cove Packing Red Salmon	Seattle, WA	K,E,N	C,F,S	SEA
29. Woodbine Alaska Fish Company	Rio Vista, CA	K,E,U,T	C,F	SEA
30. Yard Arm Knot	Seattle, WA	K,E,U,N	F	SEA

Number of processors: 30; Canning= 8; Freezing= 26; Fresh=7 ; Curing= 5; Air Export=6; Sea Export=24

^a Indicates operators with a processing facility in a district or operators from other areas buying fish and/or providing support service for fishers in districts away from the facility.

^b K=Naknek-Kvichak; E=Egegik; U=Ugashik; N=Nushagak; T=Togiak.

^c Type of processing: C=canned; EF=export fresh; F=frozen; S=cured.

Table 34. Mean round weight, price per pound, and total exvessel value of the commercial salmon catch, Bristol Bay, 1999.^a

Species	Total Catch (lbs.)	Mean Weight (lbs.)	Mean Price (\$/lb.)	Exvessel Value (\$)
Sockeye	136,868,716	5.30	0.80	109,494,973
Chinook	372,901	14.30	0.50	186,451
Chum	4,384,065	6.70	0.10	438,407
Pink	246	3.20	0.05	12
Coho	126,918	6.40	0.30	38,075
Total	141,752,846			110,157,918

^a Data is preliminary and is extracted from "Bristol Bay Final Operations Reports" (BB-CF/303). Price information reflects on-ground values; price changes and bonuses may occur later.

Table 35. Subsistence salmon harvest by species, in numbers of fish, by district and location fished, Bristol Bay, 1999^a

Area and River System	Permits Issued	Estimated Number of Salmon Harvested					
		Sockeye	Chinook	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT							
Naknek River ^b	312	27,592	568	528	159	701	29,548
Kvichak River/Iliamna Lake:							
Alagnak River	1	65	0	0	0	0	65
Chekok	1	250	0	0	0	0	250
Igiugig	2	110	0	10	0	0	120
Iliamna Lake	23	3,528	108	1	0	30	3,667
Kokhanok	22	12,324	55	4	0	0	12,383
Kvichak River	21	3,328	403	23	15	65	3,834
Lake Clark	69	11,287	0	0	0	0	11,287
Levelock	3	527	8	40	4	55	634
Newhalen River	43	10,933	425	118	32	5	11,513
Nondalton Village	2	580	0	0	0	0	580
Pedro Bay	16	5,692	0	1	0	0	5,693
Six Mile Lake	13	9,099	0	0	0	0	9,099
Subtotal, Kvichak	216	57,723	999	197	51	155	59,125
TOTAL NAKNEK/KVICHAK	528	85,315	1,567	725	210	856	88,673
EGEGIK DISTRICT^c	42	2,434	106	35	2	806	3,383
UGASHIK DISTRICT^d	25	1,365	35	5	0	271	1,676
NUSHAGAK DISTRICT							
Wood River ^e	115	4,820	1,768	269	7	660	7,524
Lower Nushagak River ^f	33	1,381	1,747	160	4	55	3,347
Upper Nushagak River ^g	44	2,556	2,477	665	22	244	5,964
Dillingham Beaches ^h	258	14,031	2,416	1,038	36	2,062	19,583
Nushagak Bay Commercial ⁱ	75	3,579	927	253	41	937	5,737
Igushik/Snake River	22	3,020	721	23	13	34	3,811
Nushagak, Site Unspecified	1	0	0	0	0	0	0
TOTAL NUSHAGAK DISTRICT	548	29,387	10,056	2,408	123	3,992	45,966
TOGIAK DISTRICT^j	76	3,780	1,244	479	84	217	5,804
TOTAL BRISTOL BAY	1,219	122,281	13,008	3,652	419	6,142	145,502

^a Harvests are extrapolated for all permits issued, based on those returned and on the area fished as first recorded on the permit. Of 1,219 permits issued for the management area, 1,155 were returned (93.6%).

^b Includes Mile 5 North, Naknek River General, Powerline-North, North and South Savonoski, South Naknek Beach, and Telephone Point-North.

^c Includes Egegik river and beach.

^d Includes Point Point and Ugashik.

^e Includes Dagnet, Aleknagik area, Muklung River, Red Bluff, and Upper and Lower Wood River General.

^f Includes Black Point, Grassy Island, and Lewis Point

^g Includes Ekwook Area, Kokwook River, New Stuyahok Area, Koliganek Area, Mulchatna River, and Portage Creek.

^h Includes Bradford Point, City Dock, Kanakanak, Scandinavia, Skinner, Snag Point, and Squaw Creek.

ⁱ Includes Clark's Point, Ekuk, Etolin Point, Nushagak Point, Protection Point, and Queen's Slough.

^j Includes Togiak village and Togiak River.

Source: Bristol Bay Subsistence Permit Data Base, ADF&G

Appendix Table 1. Escapement goals and actual counts of sockeye salmon by river system, Bristol Bay, 1979-99.

Year	Kvichak River				Naknek River					
	Point Goal	Range		Actual	Percent Deviation ¹	Point Goal	Range		Actual	Percent Deviation ¹
		Lower	Upper				Lower	Upper		
1979	6,000			11,218	87	800			925	16
1980	14,000			22,505	61	800			2,645	231
1981	2,000			1,754	(12)	800			1,796	125
1982	2,000			1,135	(43)	800			1,156	45
1983	2,000			3,570	79	800			888	11
1984	10,000	8,000	12,000	10,491	5	1,000	800	1,400	1,242	24
1985	10,000	8,000	12,000	7,211	(28)	1,000	800	1,400	1,850	85
1986	5,000	4,000	6,000	1,179	(76)	1,000	800	1,400	1,978	98
1987	5,000	4,000	6,000	6,066	21	1,000	800	1,400	1,062	6
1988	5,000	4,000	6,000	4,065	(19)	1,000	800	1,400	1,038	4
1989	8,000	6,000	10,000	8,318	4	1,000	800	1,400	1,612	61
1990	6,000	6,000	10,000	6,970	16	1,000	800	1,400	2,093	109
1991	4,000	4,000	8,000	4,223	6	1,000	800	1,400	3,579	258
1992	6,000	4,000	8,000	4,726	(21)	1,000	800	1,400	1,607	61
1993	5,000	4,000	8,000	4,025	(20)	1,000	800	1,400	1,536	54
1994	8,000	6,000	10,000	8,338	4	1,000	800	1,400	991	(1)
1995	10,000	6,000	10,000	10,039	0	1,000	800	1,400	1,111	11
1996	4,000	4,000	6,000	1,451	(64)	1,000			1,078	8
1997	4,000	4,000	6,000	1,504	(62)	1,000	800	1,400	1,026	3
1998	2,000	2,000	10,000	2,296	15	1,100	800	1,400	1,202	9
20 yr Ave.	5,900			6,054	(2)	955			1,521	61
1979-88	6,100			6,919	7	900			1,458	64
1989-98	5,700	4,600	8,600	5,189	(12)	1,010	800	1,400	1,584	57
1999	6,000	6,000	10,000	6,197	3	1,100	800	1,400	1,625	48

Year	Egegik River				Ugashik River					
	Point Goal	Range		Actual	Percent Deviation ¹	Point Goal	Range		Actual	Percent Deviation ¹
		Lower	Upper				Lower	Upper		
1979	600			1,032	72	500			1,701	240
1980	600			1,061	77	500			3,321	564
1981	600			695	16	500			1,327	165
1982	600			1,035	73	500			1,158	132
1983	600			792	32	500			1,001	100
1984	1,000	800	1,200	1,165	17	700	500	900	1,241	77
1985	1,000	800	1,200	1,095	10	700	500	900	998	43
1986	1,000	800	1,200	1,151	15	700	500	900	1,001	43
1987	1,000	800	1,200	1,273	27	700	500	900	669	(4)
1988	1,000	800	1,200	1,599	60	700	500	900	643	(8)
1989	1,000	800	1,200	1,610	61	700	500	900	1,681	140
1990	1,000	800	1,200	2,191	119	700	500	900	730	4
1991	1,000	800	1,200	2,787	179	700	500	900	2,457	251
1992	1,000	800	1,200	1,945	95	700	500	900	2,174	211
1993	1,000	800	1,200	1,517	52	700	500	900	1,390	99
1994	1,000	800	1,200	1,897	90	700	500	900	1,081	54
1995	1,000	800	1,400	1,282	28	700	500	1,200	1,304	86
1996	1,000	800	1,400	1,076	8	700	500	1,200	668	(5)
1997	1,000	800	1,400	1,104	10	700	500	1,200	619	(12)
1998	1,100	800	1,400	1,111	1	850	500	1,200	891	5
20 yr Ave.	905	800	1,253	1,371	52	658	500	980	1,303	109
1979-88	800	800	1,200	1,090	40	600	500	900	1,306	135
1989-98	1,010	800	1,280	1,652	64	715	500	1,020	1,300	83
1999	1,100	800	1,400	1,728	57	850	500	1,200	1,647	94

Continued

Appendix Table 1. (Page 2 of 2)

Year	Wood River					Igushik River				
	Point Goal	Range		Actual	Percent Deviation ^a	Point Goal	Range		Actual	Percent Deviation ^a
		Lower	Upper				Lower	Upper		
1979	800			1,706	113	150			860	473
1980	800			2,969	271	150			1,988	1,225
1981	800			1,233	54	150			591	294
1982	800			976	22	150			424	183
1983	1,000			1,361	36	200			180	(10)
1984	1,000	700	1,200	1,003	0	200	150	250	185	(8)
1985	1,000	700	1,200	939	(6)	200	150	250	212	6
1986	800	700	1,200	819	2	200	150	250	309	55
1987	1,200	800	1,200	1,337	11	200	140	250	169	(16)
1988	800	800	1,200	867	8	200	140	250	170	(15)
1989	1,000	800	1,200	1,186	19	200	150	250	462	131
1990	1,000	700	1,200	1,069	7	200	150	250	366	83
1991	1,000	700	1,200	1,160	16	200	150	250	756	278
1992	1,000	700	1,200	1,286	29	200	150	250	305	53
1993	1,000	700	1,200	1,176	18	200	150	250	406	103
1994	1,000	700	1,200	1,472	47	200	150	250	446	123
1995	1,200	700	1,200	1,475	23	200	150	250	473	137
1996	1,200	700	1,200	1,650	38	200	150	250	401	101
1997	1,000	700	1,200	1,512	51	200	150	250	128	(36)
1998	1,000	700	1,200	1,756	75.6	200	150	250	216	8
20 yr Ave.	968	721	1,200	1,326	42	190	149	250	465	166
1979-88	900			1,321	51	180			546	245
1989-98	1,022	722	1,200	1,260	32	200	149	250	421	110
1999	1,000	700	1,200	1,512	51	200	150	250	446	123

Year	Nushagak River ^b					Togiak River				
	Point Goal	Range		Actual	Percent Deviation ^a	Point Goal	Range		Actual	Percent Deviation ^a
		Lower ^c	Upper				Lower	Upper		
1979	250			360	44	100			171	71
1980	250			3,027	1,111	100			462	362
1981	250			834	234	100			208	108
1982	250			538	115	100			245	145
1983	300			319	6	100			192	92
1984	500	300	700	473	(5)	150	140	250	95	(37)
1985	500	300	700	429	(14)	150	140	250	137	(9)
1986	500	300	700	822	64	150	140	250	168	12
1987	500	300	700	163	(67)	150	100	200	250	67
1988	500	300	700	320	(36)	150	100	200	277	85
1989	500	300	700	513	3	150	100	200	84	(44)
1990	500	340	760	680	36	150	140	250	142	(5)
1991	500	340	760	493	(1)	150	140	250	255	70
1992	550	340	760	695	26	150	140	250	199	33
1993	550	340	760	715	30	150	140	250	177	18
1994	550	340	760	509	(7)	150	140	250	155	3
1995	550	340	760	281	(49)	150	140	250	186	24
1996	550	340	760	525	(5)	150	140	250	157	5
1997	550	340	760	373	(32)	150	100	200	132	(12)
1998	550	340	760	459	(17)	150	100	200	154	3
20 yr Ave.	458			626	72	138			192	50
1979-88	380			729	145	125			221	90
1989-98	535	336	754	524	(2)	150	128	235	164	9
1999	550	235	760	312	(43)	150	100	200	156	4

^a Percent deviation = (actual minus goal) / goal (multiplied by 100).

^b Actual escapement from 1974-88 is based on the Nuyakuk River tower count, and from 1989-present is based on souar count at Portage Creek.

Appendix Table 2. Forecast and inshore chinook salmon return, in thousands of fish, Nushagak District, 1979-99.

Year	Forecast			Inshore Run ^a	Forecast Error (%)		
	Spawner Recruit	Mean Percent	Sibling		Spawner Recruit	Mean Percent	Sibling
1979	348	147	182	262	33	-44	-31
1980	329	206	162	219	50	-6	-26
1981	339	230	198	356	-5	-35	-44
1982	319	256	213	356	-10	-28	-40
1983	322	266	224	313	3	-15	-28
1984	236	319	165	154	53	107	7
1985	308	434	162	193	60	125	-16
1986	299	543	168	119	151	356	41
1987	353	366	125	140	152	161	-11
1988			139	80			74
1989			129	102			26
1990			116	88			32
1991			120 ^b	135			-11
1992			196 ^b	142			38
1993			139 ^b	175			-21
1994 ^c			151 ^b	229			-34
1995 ^c			177 ^b	178			-1
1996 ^c			150 ^b	135			11
1997 ^c			157 ^b	226			-31
1998 ^c			159 ^b	237 ^c			-33
Mean Percent Error					49	56	-6
1999 ^c			214 ^b	79 ^d			171

^a Inshore Nushagak River run includes commercial, subsistence and sport harvests below the sonar, and in river run estimated by sonar at Portage Creek.

^b Adjusted (reduced) by the average forecast error from 1984 to the current year.

^c Mean returns were used to predict age 1.1 and age 1.2, other year classes were forecast using sibling data.

^d Preliminary

(Sources: 1, 4, 5, 6, and 14)

Appendix Table 3. Salmon entry permit registration by gear and residency, Bristol Bay, 1979-1999.^{a,b}

Year	Drift Net ^c			Set Net ^c			Total
	Resident	Non-Resident	Drift Total	Resident	Non-Resident	Set Total	
1979	1,046 (73)	753 (10)	1,799	764 (19)	170 (5)	934	2,733
1980	1,061 (92)	765 (18)	1,826	758 (29)	189 (5)	947	2,773
1981	1,056 (98)	770 (18)	1,826	751 (37)	204 (5)	955	2,781
1982	1,048 (84)	776 (16)	1,824	741 (36)	216 (5)	957	2,781
1983	1,072 (79)	750 (16)	1,822	741 (33)	219 (3)	960	2,782
1984	1,049 (73)	771 (16)	1,820	743 (28)	219 (3)	962	2,782
1985	1,062 (83)	772 (13)	1,834	741 (24)	218 (4)	959	2,793
1986	1,060 (78)	778 (17)	1,838	739 (18)	223 (4)	962	2,800
1987	1,044 (75)	793 (16)	1,837	736 (14)	224 (4)	960	2,797
1988	1,033 (78)	806 (12)	1,839	731 (14)	227 (3)	958	2,797
1989	1,036 (77)	831 (14)	1,867	785 (14)	240 (4)	1,025	2,892
1990	1,039 (78)	839 (15)	1,878	783 (11)	243 (5)	1,026	2,904
1991	1,020 (74)	861 (14)	1,881	771 (8)	253 (4)	1,024	2,905
1992	998 (72)	885 (15)	1,883	774 (8)	251 (0)	1,025	2,908
1993	984 (65)	902 (16)	1,886	763 (8)	259 (0)	1,022	2,908
1994	972 (63)	915 (14)	1,887	760 (7)	259 (0)	1,019	2,906
1995	969 (62)	919 (13)	1,888	762 (8)	257 (0)	1,019	2,907
1996	966 (56)	925 (14)	1,891	760 (6)	257 (0)	1,017	2,908
1997	959 (56)	940 (14)	1,899	757 (6)	262 (0)	1,019	2,918
1998	955 (43)	944 (12)	1,899	756 (6)	259 (0)	1,015	2,914
20 Year Average	1,021	835	1,856	756	232	988	2,844
1979-88 Average	1,053	773	1,827	745	211	955	2,782
1989-98 Average	990	896	1,886	767	254	1,021	2,907
1999	937 (37)	961 (11)	1,898	750 (5)	264 (1)	1,014	2,912

^a Total license/permit registration, however, not all permit's fished.

^b Limited Entry went into effect in 1974. Figure in parenthesis are interim-use permits, and are included in the totals.

^c Allowable gear per license/permit is measured in fathoms, 150 for drift and 50 for set with the following exceptions: 1968 and 1975 drift was 75 and setnet 25; 1969 drift was 125, no change for setnet; 1973 drift 25 and 12.5 for set.

(Source: 12)

Appendix Table 4. Salmon fishing interim-use and permanent entry permits actually fished, by gear type, Bristol Bay, 1979-1999.

Year	Permits Issued			Permits Fished	
	Interim -Use	Permanent	Total	Number	Percent
Drift Gill Net					
1979	83	1,718	1,801	1,714	95%
1980	110	1,719	1,829	1,764	96%
1981	107	1,722	1,829	1,785	98%
1982	100	1,726	1,826	1,792	98%
1983	94	1,729	1,823	1,797	99%
1984	89	1,731	1,820	1,804	99%
1985	96	1,740	1,836	1,815	99%
1986	95	1,745	1,840	1,823	99%
1987	91	1,748	1,839	1,824	99%
1988	90	1,751	1,841	1,837	100%
1989	91	1,778	1,869	1,855	99%
1990	93	1,787	1,880	1,869	99%
1991	88	1,795	1,883	1,873	99%
1992	87	1,799	1,886	1,879	100%
1993	81	1,807	1,888	1,875	99%
1994	77	1,813	1,890	1,865	99%
1995	75	1,816	1,891	1,882	100%
1996	70	1,824	1,894	1,884	99%
1997	68	1,835	1,903	1,875	99%
1998	55	1,847	1,902		
Average	87	1,772	1,859	1,832	99%
1999 ^a	52	1,854	1,906		
Set Gill Net					
1979	24	912	936	770	82%
1980	34	915	949	807	85%
1981	42	916	958	841	88%
1982	41	918	959	859	90%
1983	31	931	962	865	90%
1984	31	933	964	869	90%
1985	28	935	963	872	91%
1986	22	944	966	869	90%
1987	18	949	967	899	93%
1988	17	949	966	922	95%
1989	18	1,017	1,035	971	94%
1990	16	1,023	1,039	971	93%
1991	12	1,024	1,036	950	92%
1992	8	1,031	1,039	968	93%
1993	8	1,032	1,040	965	93%
1994	7	1,032	1,039	939	90%
1995	8	1,033	1,041	967	93%
1996	6	1,034	1,040	941	90%
1997	7	1,035	1,042	921	88%
1998	6	1,035	1,041		
Average	19	980	999	903	90%
1999 ^a	6	1,035	1,041		

^a Preliminary

(Source: 12)

Appendix Table 5. Sockeye salmon commercial catch by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	14,991,826	2,257,332	391,118	3,327,346	460,984	21,428,606
80	15,120,457	2,623,066	885,875	4,497,787	634,561	23,761,746
81	10,992,809	4,361,406	2,116,066	7,493,093	639,707	25,603,081
82	5,005,802	2,447,514	1,139,192	5,916,187	595,696	15,104,391
83	21,559,372	6,755,256	3,349,451	5,119,744	588,208	37,372,031
1984	14,546,710	5,190,413	2,658,376	1,992,681	322,126	24,710,306
85	8,179,093	7,537,273	6,468,862	1,307,889	209,766	23,702,883
86	2,892,171	4,852,935	5,002,949	2,719,313	308,688	15,776,056
87	4,986,002	5,356,669	2,128,652	3,254,720	342,732	16,068,775
88	3,480,836	6,456,598	1,523,520	1,706,716	822,087	13,989,757
1989	13,809,956	8,901,994	3,146,239	2,788,185	88,932	28,735,306
90	17,272,224	10,371,762	2,149,009	3,532,543	197,589	33,523,127
91	10,475,206	6,797,166	2,945,742	5,053,845	549,221	25,821,180
92	9,395,948	15,646,575	3,320,966	2,789,741	726,446	31,879,676
93	8,907,876	21,600,858	4,176,900	5,236,557	539,933	40,462,124
1994	16,327,858	10,750,213	4,352,797	3,393,143	400,039	35,224,050
95	20,279,581	14,425,979	4,509,446	4,445,883	605,328	44,266,217
96	8,211,983	10,809,115	4,411,055	5,693,523	462,621	29,588,297
97	589,311	7,517,389	1,402,690	2,506,818	142,569	12,158,777
98	2,595,439	3,528,845	730,247	2,990,597	190,446	10,035,574
20-Year Average	10,481,023	7,909,418	2,840,458	3,788,316	441,384	25,460,598
1979-88 Average	10,175,508	4,783,846	2,566,406	3,733,548	492,456	21,751,763
1989-98 Average	10,786,538	11,034,990	3,114,509	3,843,084	390,312	29,169,433
1999 ^a	9,484,279	7,422,700	2,269,708	6,263,681	383,918	25,824,286

^a Preliminary.

(Sources: 1 and 4)

Appendix Table 6. Chinook salmon commercial catch by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	10,415	5,547	9,568	157,321	30,022	212,873
1980	7,517	5,610	4,900	64,958	12,543	95,528
1981	11,048	5,468	3,416	193,461	23,911	237,304
1982	12,425	4,834	7,170	195,287	33,786	253,502
1983	8,955	4,758	9,276	137,123	38,497	198,609
1984	8,972	4,680	4,767	61,378	22,179	101,976
1985	5,697	4,015	5,840	67,783	37,106	120,441
1986	3,188	1,883	2,982	65,783	19,880	93,716
1987	5,175	2,959	4,065	45,983	17,217	75,399
1988	6,538	3,103	3,444	16,648	15,606	45,339
1989	6,611	2,034	2,112	17,637	11,366	39,760
1990	5,068	1,146	1,840	14,812	11,130	33,996
1991	3,584	510	589	19,718	6,039	30,440
1992	5,724	694	2,146	47,563	12,640	68,767
1993	7,477	1,478	3,075	62,976	10,851	85,857
1994	6,016	1,243	3,685	119,480	10,486	140,910
1995	5,084	760	1,551	79,942	11,981	99,318
1996	4,195	980	588	72,011	8,602	86,376
1997	2,839	2,047	1,084	64,294	6,114	76,378
1998	2,444	760	346	108,486	14,131	126,167
20-Year Average	6,449	2,725	3,622	80,632	17,704	111,133
1979-88 Average	7,993	4,286	5,543	100,573	25,075	143,469
1989-98 Average	4,904	1,165	1,702	60,692	10,334	78,797
1999 ^a	1,355	578	1,681	11,008	11,455	26,077

^a Preliminary.

(Sources: 1 and 4)

Appendix Table 7. Chum salmon commercial catch by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	196,398	38,004	12,174	440,279	219,942	906,797
1980	204,515	78,556	36,343	681,930	299,682	1,301,026
1981	355,943	87,581	36,275	795,143	229,886	1,504,828
1982	198,019	84,329	53,204	434,817	151,000	921,369
1983	351,769	127,490	105,171	725,060	322,691	1,632,181
1984	447,259	178,096	210,611	850,114	336,660	2,022,740
1985	210,107	126,736	131,576	396,740	203,302	1,068,461
1986	262,925	94,666	111,112	488,375	270,057	1,227,135
1987	446,908	145,259	101,074	416,476	419,425	1,529,142
1988	295,571	237,888	94,545	371,196	470,132	1,469,332
1989	310,869	136,185	84,673	523,903	203,178	1,258,808
1990	422,276	123,087	32,013	378,223	102,861	1,058,460
1991	443,189	75,892	60,299	463,780	246,589	1,289,749
1992	167,168	121,472	57,170	398,691	176,123	920,624
1993	43,684	70,628	73,402	505,799	144,869	838,382
1994	219,118	62,961	52,127	328,267	232,559	895,032
1995	236,472	68,325	62,801	390,158	221,126	978,882
1996	124,137	83,339	103,392	324,261	207,094	842,223
1997	8,719	53,249	16,379	181,253	47,459	307,059
1998	82,281	29,405	8,088	208,551	67,595	395,920
20-Year Average	251,366	101,157	72,121	465,151	228,612	1,118,408
1979-88 Average	296,941	119,861	89,209	560,013	292,278	1,358,301
1989-98 Average	205,791	82,454	55,034	370,289	164,945	878,514
1999*	272,549	74,959	71,108	119,888	109,228	647,732

* Preliminary.

(Sources: 1 and 4)

Appendix Table 8. Pink salmon commercial catch by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	134	6	9	1,787	1,913	3,849
1980	288,363	2,476	51	2,202,545	70,033	2,563,468
1981	194	222	29	345	6,490	7,280
1982	127,560	1,997	170	1,339,272	23,417	1,492,416
1983	51	92	0	137	204	484
1984	211,306	5,759	2,387	3,127,153	19,468	3,366,073
1985	39	51	3	48	316	457
1986	106,919	2,749	98	267,117	24,404	401,287
1987	5	0	30	2	20	57
1988	648,569	4,485	218	243,890	58,084	955,246
1989	75	6	29	156	172	438
1990	421,690	11,593	361	54,127	8,746	496,517
1991	102	15	2	69	117	305
1992	214,228	694	525	190,102	93,989	499,538
1993	86	2	2	83	240	413
1994	11,537	145	21	8,562	69,552	89,907
1995	55	1	1	120	294	471
1996	4,590	22	21	2,681	30,308	37,622
1997	39	2	0	50	27	118
1998	11,317	674	247	6,787	6,406	25,431
20-Year Average ^a	204,608	3,059	410	744,224	40,441	992,751
1979-88 Average ^a	276,543	3,493	585	1,435,995	39,081	1,755,698
1989-98 Average ^a	132,672	2,626	235	52,452	41,800	229,803
1999 ^b	13	0	2	62	0	77

^a Includes even numbered years only.

^b Preliminary.

(Sources: 1 and 4)

Appendix Table 9. Coho salmon commercial catch by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	12,355	15,148	17,886	129,607	119,403	294,399
1980	7,802	22,537	19,419	147,726	151,000	348,484
1981	1,229	32,759	30,220	220,290	29,207	313,705
1982	10,586	74,989	50,803	349,669	133,765	619,812
1983	7,282	25,954	7,816	81,338	5,711	128,101
1984	3,209	66,589	68,451	260,310	176,053	574,612
1985	10,474	32,667	60,815	20,230	38,636	162,822
1986	5,824	33,607	25,770	68,568	48,306	182,075
1987	5,274	30,789	14,785	13,263	1,292	65,403
1988	29,988	48,981	52,355	52,698	18,468	202,490
1989	22,668	49,175	33,942	77,077	56,972	239,834
1990	16,091	43,897	32,906	7,733	2,690	103,317
1991	17,527	47,486	42,622	5,574	4,531	117,740
1992	18,553	47,780	35,794	84,077	5,328	191,532
1993	1,779	41,603	2,387	14,345	12,615	72,729
1994	5,877	48,436	19,250	5,615	96,062	175,240
1995	981	21,772	13,800	4,896	8,917	50,366
1996	3,601	38,156	13,163	11,401	58,978	125,299
1997	718	35,470	7,156	4,110	2,970	50,424
1998	1,587	29,856	13,007	22,703	52,630	119,783
20-Year Average	9,170	39,383	28,117	79,062	51,177	206,908
1979-88 Average	9,402	38,402	34,832	134,370	72,184	289,190
1989-98 Average	8,938	40,363	21,403	23,753	30,169	124,626
1999 ^a	298	11,576	2,481	2,819	2,657	19,831

^a Preliminary.

(Sources: 1 and 4)

Appendix Table 10. Total salmon commercial catch by district, in numbers of fish, Bristol Bay, 1979-1999.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	15,211,128	2,316,037	430,755	4,056,340	832,264	22,846,524
1980	15,628,654	2,732,245	946,588	7,594,946	1,167,819	28,070,252
1981	11,361,223	4,487,436	2,186,006	8,702,332	929,201	27,666,198
1982	5,354,392	2,613,663	1,250,539	8,235,232	937,664	18,391,490
1983	21,927,429	6,913,550	3,471,714	6,063,402	955,311	39,331,406
1984	15,217,456	5,445,537	2,944,592	6,291,636	876,486	30,775,707
1985	8,405,410	7,700,742	6,667,096	1,792,690	489,126	25,055,064
1986	3,271,027	4,985,840	5,142,911	3,609,156	671,335	17,680,269
1987	5,443,364	5,535,676	2,248,606	3,730,444	780,686	17,738,776
1988	4,461,502	6,751,055	1,674,082	2,391,148	1,384,377	16,662,164
1989	14,150,179	9,089,394	3,266,995	3,406,958	360,620	30,274,146
1990	18,137,349	10,551,485	2,216,129	3,987,438	323,016	35,215,417
1991	10,939,608	6,921,069	3,049,254	5,542,986	806,497	27,259,414
1992	9,801,621	15,817,215	3,416,601	3,510,174	1,014,526	33,560,137
1993	8,960,902	21,714,569	4,255,766	5,819,760	708,508	41,459,505
1994	16,570,406	10,862,998	4,427,880	3,855,157	808,698	36,525,139
1995	20,522,297	14,516,875	4,587,276	4,920,284	847,600	45,394,332
1996	8,322,312	10,900,288	4,530,995	6,111,030	724,023	30,588,648
1997	616,084	7,626,863	1,432,200	2,866,890	200,676	12,742,713
1998	2,693,068	3,589,540	751,962	3,345,717	336,995	10,717,282
20-Year Average	10,849,771	8,053,604	2,944,897	4,791,686	757,771	27,397,729
1979-88 Average	10,628,159	4,948,178	2,696,289	5,246,733	902,427	24,421,785
1989-98 Average	11,071,383	11,159,030	3,193,506	4,336,639	613,116	30,373,673
1999 ^a	9,758,494	7,509,813	2,344,980	6,404,064	507,258	26,524,609

^a Preliminary.

(Sources: 1 and 4)

Appendix Table 11. Commercial sockeye salmon catch, in percent, by gear type and district, Bristol Bay, 1979-99.

Year	Naknek-Kvichak			Egegik		Ugashik		Nushagak			WRSHA ^a		Togiak		Total ^b	
	Drift	Setnet	Section Naknek Kvichak	Drift	Set	Drift	Set	Drift	Setnet	Section Nushagak Igushik	Drift	Set	Drift	Set	Drift	Set
1979	90	10		78	22	84	16	82	18				82	18	88	12
1980	88	12		69	31	87	13	85	15				83	17	86	14
1981	86	14		77	23	89	11	81	19				79	21	86	14
1982	87	13		83	17	87	13	90	10				84	16	87	13
1983	92	8		86	14	93	7	86	14				80	20	90	10
1984	89	11		92	8	92	8	83	17				77	23	90	10
1985	87	13		93	7	96	4	65	35				75	25	90	10
1986	70	30		89	11	94	6	76	24				68	32	85	15
1987	86	14		91	9	93	7	80	20				66	34	87	13
1988	86	14		90	10	91	9	75	25				64	36	86	14
1989	89	11		90	10	87	13	58	42				55	45	86	14
1990	88	12		91	9	91	9	67	33				67	33	87	13
1991	89	11		91	9	89	11	76	24				64	36	86	14
1992	89	11		91	9	90	10	65	35				62	38	88	12
1993	84	16		93	7	90	10	72	28				54	46	87	13
1994	90	10		92	8	94	6	68	32				52	48	88	12
1995	89	11		90	10	95	5	68	32				52	48	87	13
1996	83	17		90	10	95	5	81	19				52	55	86	14
1997	73	27		87	13	88	12	70	30				37	63	82	18
1998	84	8	8	86	14	85	15	72	24	4	76	24	43	57	80	20
20-Year Average	86	14		87	13	91	10	75	25				66	36	87	13
1979-88 Average	86	14		85	15	91	9	80	20				76	24	88	13
1989-98 Average	86	13		90	10	90	10	70	30				54	47	86	14
1999 ^c	85	8	7	85	15	89	11	70	24	6	78	22	53	47	81	19
Allocation ^d	84	8	8	86	14	90	10	74	20	6	74	26	n.a.	n.a.	n.a.	n.a.

^a Wood River Special Harvest Area (WRSHA), Nushagak District.^b Percentages based on total fish caught per gear group.^c Preliminary data.^d BOF inacted current allocation plan in 1998.

Appendix Table 12. Sockeye salmon escapement by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek-Kvichak ^a	Egegik ^b	Ugashik ^c	Nushagak ^d	Togiak ^e	Total
1979	12,437,996	1,032,042	1,706,904	3,073,571	224,838	18,475,351
1980	25,447,866	1,060,920	3,335,254	8,310,438	572,450	38,726,928
1981	3,632,788	694,680	1,327,699	2,850,637	365,910	8,871,714
1982	2,529,692	1,034,628	1,185,551	2,012,742	341,424	7,104,037
1983	4,554,496	792,282	1,001,358	1,948,474	239,610	8,536,220
1984	11,948,514	1,165,345	1,270,318	1,814,686	200,778	16,399,641
1985	9,179,014	1,095,204	1,006,407	1,684,760	190,082	13,155,467
1986	3,387,147	1,151,750	1,015,582	2,134,490	271,184	7,960,153
1987	7,281,896	1,273,553	686,894	1,895,961	316,076	11,454,380
1988	5,297,708	1,599,161	654,412	1,524,704	340,712	9,416,697
1989	9,676,244	1,611,566	1,713,281	2,189,501	125,080	15,315,672
1990	9,231,358	2,191,582	749,478	2,144,444	278,202	14,595,064
1991	8,078,885	2,786,925	2,482,001	2,419,488	320,713	16,088,012
1992	6,557,157	1,945,632	2,194,927	2,286,278	266,956	13,250,950
1993	5,908,799	1,517,000	1,413,454	2,296,789	242,475	11,378,517
1994	9,571,245	1,894,977	1,095,068	2,449,616	233,632	15,244,538
1995	11,365,573	1,282,508	1,321,108	2,254,231	240,266	16,463,686
1996	2,835,426	1,075,596	692,167	2,553,995 ^f	212,524	7,369,708
1997	2,747,511	1,104,004	656,641	2,021,529	171,373	6,701,058
1998	3,750,246	1,110,932	924,853	2,441,666	214,626	8,442,323
20-Year Average	7,770,978	1,371,014	1,321,668	2,515,400	268,446	13,247,506
1979-88 Average	8,569,712	1,089,957	1,319,038	2,725,046	306,306	14,010,059
1989-98 Average	6,972,244	1,652,072	1,324,298	2,305,754	230,585	12,484,953
1999 ^g	8,303,878	1,727,772	1,662,042	2,269,861 ^f	231,196	14,194,749

^a Includes Kvichak, Branch and Naknek Rivers.

^b Includes Egegik River. Also includes King Salmon River in 1986-95, and Shosky Creek in 1988-96.

^c Includes Ugashik River. Also includes Mother Goose River system 1976-96 and Dog Salmon River system in 1984-96.

^d Includes Wood, Igushik, Nuyakuk, Nushagak-Mulchatna and Snake Rivers.

^e Includes Togiak River, Lake tributaries, Kulukak system and other miscellaneous river systems.

^f Snake River not surveyed.

^g Preliminary.

(Sources: 1, 6, and 10)

Appendix Table 13. Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak District by river system, in numbers of fish, Bristol Bay, 1979-99.

Year	Catch	Escapement			Total	Total Run
		Kvichak ^a	Branch ^b	Naknek ^a		
1979	14,991,826	11,218,434	294,200	925,362	12,437,996	27,429,822
1980	15,120,457	22,505,268	297,900	2,644,698	25,447,866	40,568,323
1981	10,992,809	1,754,358	82,210	1,796,220	3,632,788	14,625,597
1982	5,005,802	1,134,840	239,300	1,155,552	2,529,692	7,535,494
1983	21,559,372	3,569,982	96,220	888,294	4,554,496	26,113,868
1984	14,546,710	10,490,670	215,370	1,242,474	11,948,514	26,495,224
1985	8,179,093	7,211,046	118,030	1,849,938	9,179,014	17,358,107
1986	2,892,171	1,179,322	230,180	1,977,645	3,387,147	6,279,318
1987	4,986,002	6,065,880	154,210	1,061,806	7,281,896	12,267,898
1988	3,480,836	4,065,216	194,630	1,037,862	5,297,708	8,778,544
1989	13,809,956	8,317,500	196,760	1,161,984	9,676,244	23,486,200
1990	17,272,224	6,970,020	168,760	2,092,578	9,231,358	26,503,582
1991	10,475,206	4,222,788	277,589	3,578,508	8,078,885	18,554,091
1992	9,395,948	4,725,864	224,643	1,606,650	6,557,157	15,953,105
1993	8,907,876	4,025,166	347,975	1,535,658	5,908,799	14,816,675
1994	16,327,858	8,337,840	242,595	990,810	9,571,245	25,899,103
1995	20,279,581	10,038,720	215,713	1,111,140	11,365,573	31,645,154
1996	8,211,983	1,450,578	306,750	1,078,098	2,835,426	11,047,409
1997	589,311	1,503,732	218,115	1,025,664	2,747,511	3,336,822
1998	2,595,439	2,296,074	252,200	1,202,172	3,750,446	6,345,885
20 Year Average	10,481,023	6,054,165	218,668	1,498,156	7,770,988	18,252,011
1979-88 Average	10,175,508	6,919,502	192,225	1,457,985	8,569,712	18,745,220
1989-98 Average	10,786,538	5,188,828	245,110	1,538,326	6,972,264	17,758,803
1999 ^c	9,484,279	6,196,914	481,600	1,625,364	8,303,878	17,788,157

^a Tower count

^b Aerial survey estimates

^c Preliminary apportionment

(Sources: 1, 6, 10, 11 and 13)

Appendix Table 14. Inshore sockeye salmon total run by river system Naknek-Kvichak District, in thousands of fish, Bristol Bay, 1979-99.

Year	Kvichak		Branch		Naknek		Total Run ^a
	Number	%	Number	%	Number	%	
1979	24,637	90	573	2	2,219	8	27,429
1980	35,248	87	561	1	4,759	12	40,568
1981	6,989	48	311	2	7,326	50	14,626
1982	2,993	40	772	10	3,770	50	7,535
1983	20,105	77	557	2	5,452	21	26,114
1984	23,014	87	555	2	2,926	11	26,495
1985	13,394	77	264	2	3,699	21	17,357
1986	1,966	31	399	6	3,913	62	6,278
1987	9,593	78	297	2	2,378	19	12,268
1988	6,720	77	320	4	1,739	20	8,779
1989	19,774	84	534	2	3,179	14	23,487
1990	17,521	66	555	2	8,427	32	26,503
1991	8,032	43	604	3	9,918	53	18,554
1992	10,445	65	487	3	5,021	31	15,953
1993	9,313	63	817	6	4,687	32	14,817
1994	22,232	86	634	2	3,033	12	25,899
1995	27,431	87	651	2	3,564	11	31,646
1995	3,458	31	706	6	6,860	62	11,024
1997	1,683	50	244	7	1,409	42	3,336
1998	3,412	54	388	6	2,546	40	6,346
20 Year Average	13,398	66	511	4	4,341	30	18,251
1979-88 Average	14,466	69	461	3	3,818	27	18,745
1989-98 Average	12,330	63	562	4	4,864	33	17,757
1999 ^b	12,978	73	1,070	6	3,740	21	17,788

^a Due to rounding of river system total runs, the district total run may not equal the sum of the rows.

^b Preliminary apportionment.

(Sources: 1 and 6)

Appendix Table 15. Inshore commercial catch and escapement of sockeye salmon in the Egegik District by river system, 1979-99.

Year	Catch	Escapement			Total Run
		Egegik ^a	Shosky Cr. ^b	King Salmon ^b River	
1979	2,257,332	1,032,042			3,289,374
1980	2,623,066	1,060,920			3,683,986
1981	4,361,406	694,680			5,056,086
1982	2,447,514	1,034,628			3,482,142
1983	6,755,256	792,282			7,547,538
1984	5,190,413	1,165,320		25	6,355,758
1985	7,537,273	1,095,204			8,632,477
1986	4,852,935	1,151,320		430	6,004,685
1987	5,356,669	1,272,978		575	6,630,222
1988	6,456,598	1,599,096	65		8,055,759
1989	8,901,994	1,610,916	50	600	10,513,560
1990	10,371,762	2,191,362		220	12,563,344
1991	6,797,166	2,786,880		45	9,584,091
1992	15,646,575	1,945,332		300	17,592,207
1993	21,600,858	1,516,980	20		23,117,858
1994	10,750,213	1,894,932	15	30	12,645,190
1995	14,425,979	1,281,678		830	15,708,487
1996	10,809,115	1,075,596			11,884,711
1997	7,517,389	1,103,964	40		8,621,393
1998	3,528,845	1,110,882	50		4,639,777
20-Year Ave.	7,909,418	1,370,850	40	339	9,280,432
1979-88 Ave.	4,783,846	1,089,847	65	343	5,873,803
1989-98 Ave.	11,034,990	1,651,852	35	338	12,687,062
1999 ^c	7,422,700	1,727,772			9,150,472

^a Tower count.

^b Aerial survey index count.

^c Preliminary.

(Sources: 1 and 6)

Appendix Table 16. Inshore commercial catch and escapement of sockeye salmon in the Ugashik District by river system, 1979-99.

Year	Catch	Escapement			Total Run
		Ugashik ^a River	King Salmon ^b River	Dog Salmon ^b River	
1979	391,118	1,700,904	6,000		2,098,022
1980	885,875	3,321,354	13,900		4,221,129
1981	2,116,066	1,326,762	937		3,443,765
1982	1,139,192	1,157,526	28,025		2,324,743
1983	3,349,451	1,000,608	750		4,350,809
1984	2,658,376	1,241,418	17,100	11,800	3,928,694
1985	6,468,862	998,232	7,400	775	7,475,269
1986	5,002,949	1,001,492	4,310	9,780	6,018,531
1987	2,128,652	668,964	15,855	2,075	2,815,546
1988	1,523,520	642,972	8,360	3,080	2,177,932
1989	3,146,239	1,681,296	25,480	6,505	4,859,520
1990	2,149,009	730,038	11,340	8,100	2,898,487
1991	2,945,742	2,457,306	12,195	12,500	5,427,743
1992	3,320,966	2,173,692	13,425	7,810	5,515,893
1993	4,176,900	1,389,534	22,570	1,350	5,590,354
1994	4,352,797	1,080,858	8,885	5,325	5,447,865
1995	4,509,446	1,304,058	7,650	9,400	5,830,554
1996	4,411,055	667,518	7,230	17,419	5,103,222
1997	1,402,690	618,396	27,645	10,600	2,059,331
1998	730,274	890,508	27,425	6,920	1,655,127
20-Year Ave.	2,840,459	1,302,672	13,324	7,563	4,162,127
1979-88 Ave.	2,566,406	1,306,023	10,264	5,502	3,885,444
1989-98 Ave.	3,114,512	1,299,320	16,385	8,593	4,438,810
1999 ^c	2,269,708	1,651,572	6,350	4,120	3,931,750

^a Tower count.

^b Aerial survey.

^c Preliminary.

(Sources: 1, 6 and 10)

Appendix Table 17. Inshore commercial catch and escapement of sockeye salmon in the Nushagak District by river system, in number of fish, 1979-99.

Year	Escapement								Total	Total Run
	Catch	Wood ^a	Igushik ^a	Nuyakuk ^a	Nush/Mul ^b	Nushagak ^c	Snake ^d	Total		
1979	3,327,346	1,706,352	859,560	360,120	139,100		8,439	3,073,571	6,400,917	
1980	4,497,787	2,969,040	1,987,530	3,026,568	290,800		36,500	8,310,438	12,808,225	
1981	7,493,093	1,233,318	591,144	834,204	177,400		14,571	2,850,637	10,343,730	
1982	5,916,187	976,470	423,768	537,864	63,000		11,640	2,012,742	7,928,929	
1983	5,119,744	1,360,968	180,420	318,606	85,400		3,080	1,948,474	7,068,218	
1984	1,992,681	1,002,792	184,872	472,596	120,586		33,840	1,814,686	3,807,367	
1985	1,307,889	939,000	212,418	429,162	69,300		34,880	1,684,760	2,992,649	
1986	2,719,313	818,652	308,820	821,898	168,340		16,780	2,134,490	4,853,803	
1987	3,254,720	1,337,172	169,236	163,000	225,033		1,520	1,895,961	5,150,681	
1988	1,706,716	866,778	170,406	319,992	163,208		4,320	1,524,704	3,231,420	
1989	2,788,185	1,186,410	461,610			513,421	28,060	2,189,501	4,977,686	
1990	3,532,543	1,069,440	365,796			680,368	28,840	2,144,444	5,676,987	
1991	5,053,845	1,159,920	756,126			492,322	10,920	2,419,488	7,473,333	
1992	2,789,741	1,286,250	304,920			695,108		2,286,278	5,076,019	
1993	5,236,557	1,176,126	405,564			715,099		2,296,789	7,533,346	
1994	3,393,143	1,471,890	445,920			509,326		2,449,616	5,842,759	
1995	4,445,883	1,482,162	473,382			281,307		2,254,231	6,700,114	
1996	5,693,523	1,649,598	400,746			503,651		2,553,995	8,247,518	
1997	2,618,170	1,512,396	127,704			373,035		2,021,529	4,639,699	
1998	2,961,200	1,755,768	215,904			458,874		2,441,666	5,402,866	
20-year Ave.	3,792,413	1,348,025	452,292			169,958		2,515,400	6,307,813	
1979-88 Ave.	3,733,548	1,321,054	508,817			150,217		2,725,046	6,458,594	
1989-98 Ave.	3,851,279	1,374,996	395,767			219,310		2,305,754	6,157,033	
1999 ^e	6,263,681	1,512,426	445,536	81,006	230,893	311,899	^f	2,269,861	8,533,542	

^a Tower count.

^b Aerial survey estimates 1977-83, 1985, and 1987. Escapement estimates for 1984, 1988, and 1995-99, were derived from the difference between lower river sonar estimates and Nuyakuk Tower counts. Escapement estimates for 1976 and 1986 based on the average ratio of Nuyakuk/Mushagak-Mulchatna river system in years when data was available.

^c Total escapements from 1989 on are determined for the entire Nushagak River drainage using Portage Creek sonar estimates.

^d Aerial survey estimate 1980, 1982-91, 1994-95 and 1997; weir count 1975-79 and 1981, not surveyed in 1992, 1993 or 1996 due to lack of funding.

^e Preliminary.

^f Snake River escapement is not included this year because staff was unable to conduct aerial surveys.

(Sources: 1, 6, 10 and 11)

Appendix Table 18. Inshore sockeye salmon total run by river system, in thousands of fish and percent, Nushagak District, 1979-99.

Year	Wood		Igushik		Nuyakuk		Nush-Mul		Nushagak		Snake		Total Run ^a
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	
1979	3,638	57	1,843	29	764	12	138	2			18	0	6,401
1980	4,529	35	3,125	24	4,826	38	291	2			37	0	12,808
1981	4,568	44	2,228	22	3,319	32	177	2			52	1	10,344
1982	3,471	44	1,817	23	2,079	26	550	7			12	0	7,929
1983	4,272	60	813	12	1,379	20	601	9			3	0	7,068
1984	1,982	52	434	11	906	24	451	12			34	1	3,807
1985	1,593	53	460	15	697	23	208	7			35	1	2,993
1986	1,772	37	877	18	1,762	36	425	9			17	0	4,853
1987	2,828	55	616	12	589	11	1,116	22			2	0	5,151
1988	1,749	54	406	13	649	20	424	13			4	0	3,232
1989	2,519	51	1,214	24					1,217	24	28	1	4,978
1990	2,610	46	1,281	23					1,757	31	29	1	5,677
1991	3,303	44	2,424	32					1,736	23	11	0	7,474
1992	2,481	49	793	16					1,802	36			5,076
1993	3,725	49	1,580	21					2,228	30			7,533
1994	2,957	51	1,300	22					1,543	26	42	1	5,842
1995	4,022	60	1,902	28					756	11	20	0	6,700
1996	5,030	61	1,447	18					1,771	21			8,248
1997	3,480	75	293	6					858	18	8	0	4,639
1998	3,949	73	585	11					869	16			5,403
20-Year Ave.	3,224	53	1,272	19	1,697	24	438	8	1,454	24	22	0	6,308
1979-88 Ave.	3,040	49	1,262	18	1,697	24	438	8			21	0	6,459
1989-98 Ave.	3,408	56	1,282	20					1,454	24	23	0	6,157
1999 ^b	5,924	69	1,627	19					983	12	^c		8,534

^a Due to rounding, the district total runs may not equal the sum of the rows.

^b Preliminary harvest apportionment.

^c No aerial survey was conducted.

(Sources: 1 and 6)

Appendix Table 19. Inshore commercial catch and escapement of sockeye salmon in the Togiak District by river system, in numbers of fish, 1979-99.

Year	Catch				Escapement						Total Run
	Togiak	Kulukak ^c	Os/Mat ^a	Total	Togiak			Kulukak ^c	Other ^f	Total	
					Lake ^b	River ^e	Tributaries ^d				
1979	393,337	66,629	1,018	460,984	171,138	14,200	12,900	26,600		224,838	685,822
1980	591,470	42,811	280	634,561	461,850	27,900	37,000	45,700		572,450	1,207,011
1981	620,288	19,246	173	639,707	208,080	21,150	77,900	58,780		365,910	1,005,617
1982	581,718	13,952	26	595,696	244,824	3,450	40,400	52,750		341,424	937,120
1983	529,775	55,906	2,527	588,208	191,520	7,200	13,920	26,970		239,610	827,818
1984	213,213	96,709	12,204	322,126	95,448	15,830	39,700	49,800		200,778	522,904
1985	133,263	44,120	32,383	209,766	136,542	3,600	13,340	36,600		190,082	399,848
1986	191,158	100,466	17,064	308,688	168,384	20,000	15,000	42,800	25,000	271,184	579,872
1987	274,613	45,401	22,718	342,732	249,676	10,400	18,200	37,800		316,076	658,808
1988	673,408	143,112	5,567	822,087	276,612	18,800	13,600	31,700		340,712	1,162,799
1989	68,375	14,116	6,441	88,932	84,480	15,200	4,560	20,840		125,080	214,012
1990	168,688	27,311	1,590	197,589	141,977	17,540	29,605	49,600	39,480	278,202	475,791
1991	522,090 ^g	33,425 ^g	6,437 ^g	549,221	254,683	15,980	7,740	23,940	18,370	320,713	869,934
1992	610,575	108,358	7,513	726,446	199,056	6,060	10,400	26,440	25,000	266,956	993,402
1993	475,799	58,616	5,518	539,933	177,185	4,600	11,330	31,800	17,560	242,475	782,408
1994	321,121	76,781	2,137	400,039	154,752	6,200	13,220	29,740	29,720	233,632	633,671
1995	527,143	76,056	2,129	605,328	185,718	6,520	18,988	14,620	14,420	240,266	845,594
1996	381,539	76,833	1,691	460,063	156,954	18,320	11,900	18,980	6,370	212,524	672,587
1997	91,847	49,277	2,976	144,100	131,682	12,300	8,325	7,950	6,370	166,627	310,727
1998	112,718	76,332	1,375	190,425	153,576	9,780	12,120	12,950	26,200	214,626	405,051
20-Year Ave.	374,107	61,273	6,588	441,332	192,207	12,752	20,507	32,318	20,849	268,208	709,540
1979-88 Ave.	420,224	62,835	9,396	492,456	220,407	14,253	28,196	40,950	25,000	306,306	798,762
1989-98 Ave.	327,990	59,711	3,781	390,208	164,006	11,250	12,819	23,686	20,388	230,110	620,318
1999 ^h	344,692	39,226	0 ⁱ	383,918	155,898	10,800	29,438	12,300	22,760	231,196	615,114

^a Catches in the Osviak and Matogak sections were combined.

^b Tower count.

^c Aerial survey estimate.

^d Aerial survey estimate includes Gechiak, Pungokepuk, Kemuk, Nayorurun, and Ongivinuck River systems. Aerial survey estimates prior to 1986 also include Ungalikthluk, Negukthlik, Matogak, Osviak, and other miscellaneous river systems when surveyed.

^e Aerial survey estimate includes Kulukak River and Lake and Tithe Creek ponds.

^f Aerial survey estimate includes Matogak, Osviak, Slug, Negukthlik, and Ungalikthluk and Quigmy Rivers. Prior to 1986 estimates for these systems were included under tributaries when surveyed.

^g Based on weekly processor reports. Fish tickets were not coded by section.

^h Preliminary.

ⁱ No catch reported in the Osviak or Matogak section of the Togiak District.

(Source: 1, 6, and 10)

Appendix Table 20. Inshore total run of sockeye by district, in numbers of fish, Bristol Bay, 1979-99.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1979	27,429,822	3,289,374	2,098,022	6,400,917	685,822	39,903,957
1980	40,568,323	3,683,986	4,221,129	12,808,225	1,207,011	62,488,674
1981	14,625,597	5,056,086	3,443,765	10,343,730	1,005,617	34,474,795
1982	7,535,494	3,482,142	2,324,743	7,928,929	937,120	22,208,428
1983	26,113,868	7,547,538	4,350,809	7,068,218	827,818	45,908,251
1984	26,495,224	6,355,758	3,928,694	3,807,367	522,904	41,109,947
1985	17,358,107	8,632,477	7,475,269	2,992,649	399,848	36,858,350
1986	6,279,318	6,004,685	6,018,531	4,853,803	579,872	23,736,209
1987	12,267,898	6,630,222	2,815,546	5,150,681	658,808	27,523,155
1988	8,778,544	8,055,759	2,177,932	3,231,420	1,162,799	23,406,454
1989	23,486,200	10,513,560	4,859,520	4,977,686	214,012	44,050,978
1990	26,503,582	12,563,344	2,898,487	5,676,987	475,791	48,118,191
1991	18,554,091	9,584,091	5,427,743	7,473,333	869,934	41,909,192
1992	15,953,105	17,592,207	5,515,893	5,076,019	993,402	45,130,626
1993	14,816,675	23,117,858	5,590,354	7,533,346	782,408	51,840,641
1994	25,899,103	12,645,190	5,447,865	5,842,759	633,671	50,468,588
1995	31,645,154	15,708,487	5,830,554	6,700,114	845,594	60,729,903
1996	11,047,409	11,884,711	5,103,222	8,247,518	672,587	36,955,447
1997	3,336,822	8,621,393	2,059,331	4,639,699	310,727	18,967,972
1998	6,345,885	4,639,777	1,655,127	5,402,866	405,051	18,448,706
20-Year Average	18,252,011	9,280,432	4,162,127	6,307,813	709,540	38,711,923
1979-88 Average	18,745,220	5,873,803	3,885,444	6,458,594	798,762	35,761,822
1989-98 Average	17,758,803	12,687,062	4,438,810	6,157,033	620,318	41,662,024
1999 ^a	17,788,157	9,150,472	3,931,750	8,533,542	615,114	40,019,035

^a Preliminary

(Sources: 1 and 6)

Appendix Table 21. Chinook salmon harvest, escapement and total runs in the Nushagak District, 1979-99.

Year	Harvests by Fishery			Total	Inriver Abundance ^a	Spawning Escapement ^b	Total Run
	Commercial	Sport	Subsistence				
1979	157,321	654	8,900	166,875		95,000	261,875
1980	64,958	757	11,800	77,515		141,000	218,515
1981	193,461	1,220	11,500	206,181		150,000	356,181
1982	195,287	1,803	12,100	209,190		147,000	356,190
1983	137,123	2,003	11,800	150,926		161,730	312,656
1984	61,378	2,320	9,800	73,498		80,940	154,438
1985	67,783	1,809	7,900	77,492		115,720	193,212
1986	65,783	5,314	12,600	83,697	43,434	35,200	118,897
1987	45,983	3,258	12,428	61,669	84,309	78,217	139,886
1988	16,648	2,817	10,187	29,652	56,905	50,803	80,455
1989	17,637	3,613	8,122	29,372	78,302	73,095	102,467
1990	14,812	3,083	12,407	30,302	63,955	57,549	87,851
1991	19,718	5,551	13,627	38,896	104,351	96,378	135,274
1992	47,563	4,755	13,588	65,906	82,848	76,334	142,240
1993	62,976	5,899	17,709	86,584	97,812	88,568	175,152
1994	119,480	10,626	15,490	145,596	95,954	83,328	228,924
1995	79,943	4,951	13,701	98,595	85,622	79,147	177,742
1996	72,011	2,144	15,941	90,096	52,127	44,864	134,960
1997	64,294	2,538	15,318	82,150		82,000	164,150
1998	108,486	5,000	12,258	125,744	117,495	100,237	225,981
20-Yr Mean	80,632	3,506	12,359	96,497	80,260	91,856	188,352
5-Yr Mean	88,843	5,052	14,542	108,436	87,800	77,915	186,351
1999 ^c	11,008	5,000	3,000	19,008	62,331	59,331	78,339

^a Inriver abundance estimated by sonar below the village of Portage Creek.

^b Spawning escapement estimated from the following: 1977-81, 97 - comprehensive aerial surveys. 1982-85 - correlation between index counts and total escapement estimates when aerial surveys were complete. 1986-96,98,99 - Inriver abundance estimated by sonar minus inriver harvests. Estimates for 1977-85 are rounded to the nearest thousand fish.

^c Preliminary.

(Sources: 1, 4 and 10)

Appendix Table 22. Chinook salmon harvest, escapement and total runs in the Togiak District, 1979-99.

Year	Harvests by Fishery			Total	Spawning Escapement ^a	Total Run
	Commercial	Sport	Subsistence			
1979	30,022	78	200	30,300	20,000	50,300
1980	12,543	34	900	13,477	12,000	25,477
1981	23,911		400	24,311	27,000	51,311
1982	33,786	231	400	34,417	17,000	51,417
1983	38,497	535	700	39,732	22,000	61,732
1984	22,179	46	600	22,825	26,000	48,825
1985	37,106	925	600	38,631	14,000	52,631
1986	19,880	618	700	21,198	8,000	29,198
1987	17,217	338	700	18,255	11,000	29,255
1988	15,606		429	16,035	10,000	26,035
1989	11,366	234	551	12,151	10,540	22,691
1990	11,130	445	480	12,055	9,107	21,162
1991	6,039	284	470	6,793	12,667	19,460
1992	12,640	271	1,361	14,272	10,413	24,685
1993	10,851	225	784	11,860	16,035	27,895
1994	10,486	663	904	12,053	19,353	31,406
1995	11,981	581	448	13,010	16,438	29,448
1996	8,602	402	471	9,475	11,476	20,951
1997	6,114	1,163	667	7,944	11,495	18,609
1998	14,131	845	782	15,758	11,666	27,424
20-Yr Mean	17,704	440	627	18,728	14,810	33,496
5-Yr Mean	10,263	731	654	11,648	14,086	25,568
1999 ^b	11,455	750	700	12,905	12,263	25,168

^a Spawning escapement estimated from comprehensive aerial surveys. Estimates for 1976-88 are rounded to the nearest thousand fish.

^b Preliminary.

(Sources: 1, 4 and 10)

Appendix Table 23. Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak Districts, in numbers of fish, 1979-99.^c

Year	Nushagak District			Togiak District		
	Catch	Escapement ^a	Total Run	Catch	Escapement ^b	Total Run
1979	440,279	166,000	606,279	219,942	293,000	512,942
1980	681,930	969,000	1,650,930	299,682	415,000	714,682
1981	795,143	177,000	972,143	229,886	331,000	560,886
1982	434,817	256,000	690,817	151,000	86,000	237,000
1983	725,060	164,000	889,060	322,691	165,000	487,691
1984	850,114	362,000	1,212,114	336,660	204,000	540,660
1985	396,740	288,000	684,740	203,302	212,000	415,302
1986	488,375	168,275	656,650	270,057	330,000	600,057
1987	416,476	147,433	563,909	419,425	361,000	780,425
1988	371,196	186,418	557,614	470,132	412,000	882,132
1989	523,903	377,512	901,415	203,178	143,890	347,068
1990	378,223	329,793	708,016	102,861	67,460	170,321
1991	463,780	287,280	751,060	246,589	149,210	395,799
1992	398,691	302,678	615,712	176,123	120,000	296,123
1993	505,799	217,230	632,109	144,869	98,470	243,339
1994	328,267	378,928	707,195	232,559	229,470	462,029
1995	390,158	212,612	602,770	221,126	163,040	384,166
1996	324,261	225,331	549,592	207,094	117,240	324,334
1997	181,253	61,456	242,709	47,459	106,580	154,039
1998	208,551	299,443	507,994	67,595	102,455	170,050
20-Year Avt	465,151	278,819	735,141	228,612	205,341	433,952
1979-88 Avt	560,013	288,413	848,426	292,278	280,900	573,178
1989-98 Avt	370,289	269,226	621,857	164,945	129,782	294,727
1999 ^d	119,888	242,312	362,200	109,228	116,183	225,411

^a Escapements were estimated from the following: 1976-78 - aerial survey data; 1979-98 - adjusted sonar estimate from Portage Creek site. Estimates for 1976-85 are rounded to the nearest thousand fish.

^b Escapement estimates based on aerial surveys; however, surveys were not conducted in 1986 due to budget constraints. Estimate based on catch/escapement proportion using most recent 10-year average data. Estimates for 1976-88 rounded to the nearest thousand fish.

^c Escapement estimates supersede those previously reported.

^d Preliminary.

(Sources: 1, 4 and 10)

Appendix Table 24. Inshore commercial catch and escapement of pink salmon in the Nushagak District by river system, in numbers of fish in even years, 1961-98.

Year	Catch	Escapement						Total	Total Run
		Wood ^a	Igushik ^b	Nuyakuk ^c	Nush/Mul ^d	Nushagak ^e	Snake ^f		
1962	880,424	25,000	12,000	493,914	6,100		6,000	543,014	1,423,438
1964	1,497,817	1,560	450	883,500	25,000		50	910,560	2,408,377
1966	2,337,066			1,442,424				1,442,424	3,779,490
1968	1,705,150			2,161,116				2,161,116	3,866,266
1970	417,834			152,580				152,580	570,414
1972	67,953			58,536				58,536	126,489
1974	413,613	44,800	7,500	529,216	3,100		900	585,516	999,129
1976	739,590	21,986	5,070	794,478	41,800		100	863,434	1,603,024
1978	4,348,336	205,000	16,210	8,390,184	771,600		3,483	9,386,477	13,734,813
1980	2,202,545	31,150	3,500	2,626,746	123,000		800	2,785,196	4,987,741
1982	1,339,272	36,100	8,430	1,592,096	19,130		900	1,656,656	2,995,928
1984	3,127,153	81,400	6,190	2,760,312	73,050		5,500	2,926,452	6,053,605
1986	267,117					72,189		72,189	339,306
1988	243,890					494,610		494,610	738,500
1990	54,127					801,430		801,430	855,557
1992	190,102								
1994	7,337					191,772		191,772	199,109
1996	2,681					821,312		821,312	823,993
1998	6,808	942				132,402		133,344	140,152
Average ^g	1,044,674	49,771	7,419	1,823,759	132,848	418,953	2,217	1,443,701	2,687,111

^a Aerial survey estimate 1962 and 1974-84; tower count 1964.

^b Aerial survey estimate 1962-80; aerial survey estimates and tower count 1976 and 1982-84.

^c Tower count 1960-84; aerial survey estimate 1958, and below counting tower 1962-64 and 1982-84.

^d Aerial survey estimate.

^e Sonar estimate from Portage Creek.

^f Aerial survey estimate 1962-64, 1974-76 and 1980-84, and weir count 1978.

^g No escapement estimate. Sonar project terminated early due to budget constraints.

^h Only years and systems with escapement data were included in averages.

(Sources: 1, 4, 10, and 16)

Appendix Table 25. Coho salmon harvest, escapement and total runs in the Nushagak Drainage, 1979-99.

Year	Harvests by Fishery							Inriver Run ^b	Spawning Escapement ^c	Total Run
	Commercial	Subsistence ^a		Total	Sport		Total			
		Lower	Upper		Lower	Upper				
1979	129,607			4,676		212	212	134,495		
1980	147,726	3259	840	4,099		551	551	152,376	96,759	95,368
1981	220,290	4795	3,135	7,930		389	389	228,609	144,992	141,468
1982	349,669	4919	3,125	8,044		503	503	358,216	297,779	294,151
1983	81,338	4002	878	4,880		1,498	1,498	87,716	39,261	36,885
1984	260,310	5885	1,564	7,449		473	473	268,232	142,841	140,804
1985	20,230	4360	1,646	6,006		130	130	26,366	84,034	82,258
1986	68,568	6533	2,617	9,150		1,576	1,576	79,294	49,676	45,483
1987	13,263	4149	1,209	5,358		1,007	1,007	19,628	23,484	21,268
1988	52,698	3515	1,112	4,627		557	557	57,882	131,840	130,171
1989	77,077	6971	1,159	8,130		2,392	2,392	87,599	84,658	81,107
1990	7,733	4856	766	5,622		438	438	13,793	141,704	140,500
1991	5,574	8915	1,275	10,190		874	874	16,638	39,733	37,584
1992	84,077	4962	1,534	6,496		752	752	91,325		
1993	14,345	4463	387	4,850		194	194	19,389	42,742	42,161
1994	5,615	4302	406	4,708		1,143	1,143	11,466	82,019	80,470
1995	4,896	3233	478	3,711		725	725	9,332	46,340	45,137
1996	11,401	3603	1,080	4,683		3,713	3,713	19,797	187,028	182,235
1997	4,110			3,433		531	531	8,074	57,096	56,565
1998	22,703	201	254	455		1,500	1,500	24,082	104,948	103,194
1979-1998 Avg	79,062	4,607	1,304	5,725		958	958	85,715	99,830	97,601
1994-1998 Avg	9,745	2,835	555	3,398		1,522	1,522	14,550	95,486	93,520
1999	2,819 ^d	1,000	250	1,250 ^d				4,069	34,853	34,603

^a Subsistence harvest estimated by expanding fishing permit returns; excludes estimates for the communities of Manokotak and Wood River. Estimates for 1976-1986 were based on community where permit was issued; 1987 based on community where permit issued and Nushagak watershed fishing site; 1988- present on community of residence and Nushagak watershed fishing site.

^b In river run estimated by sonar through August 25 for 1982-1999. 1980 and 1981 estimated by applying exploitation rates of .602 to commercial harvest. Sonar estimates expanded for some years when the project terminated prior to August 25.

^c Spawning escapement estimated by sonar minus sport and subsistence harvests upriver of Portage Creek sonar site.

^d Preliminary estimates.

^e No estimate available at this time by Sport fish.

Appendix Table 26. Coho salmon harvest by fishery, escapement and total runs for the Togiak River, 1980-99.

Year	Harvests by Fishery				Spawning Escapement ^c	Total Run
	Commercial	Subsistence ^b	Sport	Total		
1980	151,000	1,200	258	152,458	65,130	217,588
1981	29,207	2,200	119	31,526	43,500	75,026
1982	133,765	1,300	524	135,589	69,900	205,489
1983	5,711	800	294	6,805		
1984	176,053	3,800	1,295	181,148	60,840	241,988
1985	38,636	1,500	342	40,478	33,210	73,688
1986	48,306	500	2,851	51,657	21,400	73,057
1987	1,292	1,600	409	3,301	16,000	19,301
1988	18,468	792	1,238	20,498	25,770	46,268
1989	56,972	976	1,976	59,924		
1990	2,690	1,111	367	4,168	21,390	25,558
1991	4,531	1,238	500	6,269	25,260	31,529
1992	5,328	1,231	251	6,810	80,100	86,910
1993	12,615	743	330	13,688		
1994	96,062	910	531	97,503		
1995	8,917	703	408	10,028		
1996	58,978	199	1,400	60,577	64,980	125,557
1997	2,970	260	746	3,976	20,625	24,901
1998	52,630	310	700	53,640	25,335	78,975
<hr/>						
1980-1998 Avg.	47,586	1,125	765	49,476	40,960	90,436
1994-1998 Avg.	43,911	476	757	45,145	36,980	82,125
<hr/>						
1999	2,657 ^a	500 ^a	^d	3,157	3,855	7,012

^a Preliminary.

^b Subsistence harvest estimated by expanding fishing permit returns; Estimates for 1976-1987 were based on community where permit was issued; 1988 - present on community of residence.

^c Expanded estimates from aerial surveys.

^d No estimate available at this time by Sport Fish.

(Sources: 1, 4, and 10)

Appendix Table 27. Average round weight (lbs.) of the commercial salmon catch by species, Bristol Bay, 1979-99.^a

Year	Sockeye	Chinook	Chum	Pink	Coho
1979	5.9	21.3	6.8		7.8
1980	5.6	19.7	6.2	3.4	7.0
1981	6.2	19.0	6.7		6.4
1982	6.4	19.6	6.7	3.5	7.3
1983	5.7	20.9	6.6		6.6
1984	5.6	20.5	6.8	3.2	7.5
1985	5.8	17.9	6.8		8.0
1986	6.0	18.8	6.7	3.5	6.7
1987	6.0	20.5	6.5		7.0
1988	6.2	18.7	7.0	3.6	7.8
1989	5.6	19.1	6.3		7.4
1990	5.7	16.9	6.3	3.8	7.5
1991	5.7	15.9	6.4		7.3
1992	5.7	16.8	6.4	3.7	7.0
1993	6.0	17.4	6.5		6.8
1994	5.5	18.0	6.5	3.7	8.2
1995	5.5	19.8	6.3	3.6	6.7
1996	6.3	18.0	7.3	3.5	6.8
1997	6.0	16.4	7.3	3.4	6.3
1998	5.7	17.7	6.4	3.3	8.4
20-Year Average	5.9	18.6	6.6	3.5	7.2
1979-88 Average	5.9	19.7	6.7	3.4	7.2
1989-98 Average	5.8	17.6	6.6	3.6	7.2
1999	5.3	14.3	6.7	3.2	6.4

^a Prior to 1991 and after 1992, averages are weighted by the number of fish reported by each buyer on Bristol Bay Final Operations Report BB-CF/303. 1991, 1992, 1995 and 1996 data is extracted from the fish ticket system.

(Sources: 1, 3, and 8)

Appendix Table 28. Average price paid per pound for Bristol Bay salmon, 1979-1999.

Year	Sockeye	Chinook	Chum	Pink	Coho
1979	\$1.03	\$1.00	\$0.41	\$0.33	\$1.05
1980	\$0.57	\$1.00	\$0.34	\$0.25	\$0.57
1981	\$0.76	\$1.23	\$0.41	\$0.29	\$0.73
1982	\$0.70	\$1.23	\$0.35	\$0.22	\$0.71
1983	\$0.61	\$0.69	\$0.30	\$0.16	\$0.40
1984	\$0.69	\$1.03	\$0.30	\$0.22	\$0.71
1985	\$0.85	\$1.02	\$0.31	\$0.20	\$0.71
1986	\$1.42	\$1.03	\$0.31	\$0.15	\$0.68
1987	\$1.35	\$1.24	\$0.26		\$0.69
1988	\$1.93	\$1.05	\$0.43	\$0.34	\$1.14
1989	\$1.07	\$0.80	\$0.26	\$0.17	\$0.67
1990 ^a	\$1.04	\$0.91	\$0.26	\$0.27	\$0.74
1991	\$0.70	\$0.68	\$0.22	\$0.11	\$0.58
1992	\$1.04	\$0.89	\$0.24	\$0.12	\$0.58
1993	\$0.62	\$0.76	\$0.21	\$0.11	\$0.52
1994	\$0.70	\$0.47	\$0.22	\$0.04	\$0.45
1995	\$0.75	\$0.65	\$0.20	\$0.11	\$0.43
1996	\$0.75	\$0.50	\$0.10	\$0.05	\$0.30
1997	\$0.85	\$0.55	\$0.10	\$0.05	\$0.46
1998	\$1.10	\$0.50	\$0.10	\$0.10	\$0.50
20-Year Average	\$0.93	\$0.86	\$0.27	\$0.17	\$0.63
1979-88 Average	\$0.99	\$1.05	\$0.34	\$0.24	\$0.74
1989-98 Average	\$0.86	\$0.67	\$0.19	\$0.11	\$0.52
1999 ^b	\$0.80	\$0.50	\$0.10	\$0.05	\$0.30

^a Price paid in Nushagak District. Bristol Bay average unavailable.

^b Based on 1999 Final Operations Reports.

(Sources: 1, 2, and 7)

Appendix Table 29. Estimated exvessel value of the commercial salmon catch by species, in thousands of dollars, Bristol Bay, 1979-99.^a

Year	Sockeye	Chinook	Chum	Pink	Coho	Total
1979	\$128,992	\$4,541	\$2,480		\$2,387	\$138,400
1980	\$76,118	\$1,881	\$2,738	\$2,173	\$1,392	\$84,302
1981	\$120,907	\$5,557	\$4,106		\$1,461	\$132,031
1982	\$68,122	\$6,088	\$2,145	\$1,111	\$3,199	\$80,665
1983	\$129,900	\$2,853	\$3,216		\$337	\$136,306
1984	\$94,681	\$2,158	\$4,040	\$2,414	\$3,072	\$106,365
1985	\$115,402	\$2,188	\$2,218		\$923	\$120,731
1986	\$135,689	\$1,819	\$2,522	\$207	\$826	\$141,063
1987	\$130,847	\$1,912	\$2,594		\$314	\$135,667
1988	\$168,586	\$891	\$4,418	\$1,171	\$1,792	\$176,858
1989	\$173,963	\$609	\$2,029		\$1,186	\$177,787
1990	\$198,897	\$520	\$1,752	\$508	\$582	\$202,259
1991	\$103,750	\$328	\$1,807		\$499	\$106,384
1992	\$190,368	\$1,029	\$1,359	\$222	\$767	\$193,745
1993	\$152,034	\$1,131	\$989		\$257	\$154,411
1994	\$138,007	\$1,190	\$1,043	\$15	\$650	\$140,905
1995	\$183,262	\$1,272	\$1,240		\$129	\$185,903
1996	\$139,208	\$788	\$615	\$7	\$254	\$140,872
1997	\$61,728	\$689	\$200		\$150	\$62,767
1998	\$62,948	\$1,116	\$294	\$8	\$521	\$64,887
20 Year Average	\$128,670	\$1,928	\$2,090	\$712 ^b	\$1,035	\$134,115
1979-88 Average	\$116,924	\$2,989	\$3,048	\$1,415 ^b	\$1,570	\$125,239
1989-98 Average	\$140,417	\$867	\$1,133	\$127 ^b	\$500	\$142,992
1999	\$109,495	\$186	\$438		\$38	\$110,157

^a Value paid to fishermen. Derived from price per fish or pound times commercial catch.

^b Includes even-years only.

(Sources: 1, 4, 7, and 8)

Appendix Table 30. South Unimak and Shumigan Island preseason sockeye allocation, actual sockeye harvest, and chum harvest in thousands of fish, Alaska Peninsula, 1979-99.^a

Year	South Unimak			Shumigan Island			Total		
	Sockeye			Sockeye			Sockeye		
	Actual	Quota ^b	Chum	Actual	Quota ^b	Chum	Actual	Quota ^b	Chum
1979	683	900	64	179	200	41	862	1,100	105
1980	2,731	2,513	457	572	555	71	3,303	3,068	528
1981	1,474	1,442	521	351	318	54	1,825	1,760	575
1982	1,670	1,850	934	451	408	160	2,121	2,258	1,094
1983	1,545	1,469	615	416	324	169	1,961	1,793	784
1984	1,131	1,111	228	257	245	109	1,388	1,356	337
1985	1,495	1,380	345	367	305	134	1,862	1,685	479
1986	314	907	252	156	200	99	470	1,107	351
1987	652	635	406	141	140	37	793	775	443
1988	474	1,263	465	282	279	62	756	1,542	527
1989	1,348	1,199	408	397	264	48	1,745	1,463	456
1990	1,091	1,087	455	256	240	64	1,347	1,327	519
1991	1,216	1,573	669	333	347	102	1,549	1,920	771
1992	2,047	1,959	324	410	432	102	2,457	2,391	426
1993	2,365	2,375	382	607	524	150	2,972	2,899	532
1994	1,001	2,938	374	460	648	208	1,461	3,586	582
1995	1,451	2,987	342	653	659	195	2,105	3,646	537
1996	572	2,564	129	446	566	228	1,018	3,130	357
1997	1,179	1,840	196	449	406	126	1,628	2,246	322
1998	975	1,529	195	314	336	50	1,289	1,865	245
20-yr Average	1,271	1,676	388	375	370	110	1,646	2,046	512
79-88 Average	1,217	1,347	429	317	297	94	1,534	1,644	522
89-98 Average	1,325	2,005	347	433	442	127	1,757	2,447	475
1999	1,106	1,024	187	269	226	58	1,375	1,250	245

^a South Unimak includes statistical area 284 in June and July, while Shumigan Islands includes includes statistical area 282 in June only.

^b The sockeye quota management system was initiated in 1974, and is based on 8.3 % of the Bristol Bay projected inshore harvest and traditional harvest patterns.

(Source: 9)

Appendix Table 31. Subsistence salmon harvest by district and species, Bristol Bay, 1979-99.^{a,b}

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
<u>NAKNEK/KVICHAK DISTRICT</u>							
1979	424	75,000	1,200	600		1,200	78,000
80	759	88,200	1,500	1,200	2,100	800	93,800
81	649	85,100	1,000	400	100	1,100	87,700
82	350	71,400	1,100	600	900	1,000	75,000
83	385	107,900	1,000	400	300	900	110,500
1984	382	115,200	900	600	1,300	600	118,600
85	544	107,543	1,179	540	27	1,103	110,392
86	412	77,283	1,295	695	2,007	650	81,930
87	407	86,706	1,289	756	490	1,106	90,347
88	391	88,145	1,057	588	917	813	91,520
1989	411	87,103	970	693	277	1,927	90,970
90	466	92,326	985	861	1,032	726	95,930
91	518	97,101	1,152	1,105	191	1,056	100,605
92	571	94,304	1,444	2,721	1,601	1,152	101,222
93	560	101,555	2,080	2,476	762	2,025	108,898
1994	555	87,662	1,843	503	460	1,807	92,275
95	533	75,644	1,431	1,159	383	1,791	80,407
96	540	81,305	1,574	816	794	1,482	85,971
97	533	85,248	2,764	478	422	1,457	90,368
98	567	83,095	2,433	784	1,063	1,592	88,967
20 Year Average	498	89,391	1,410	899	796	1,214	93,670
1979-1988 Average	470	90,248	1,152	638	905	927	93,779
1989-1998 Average	525	88,534	1,668	1,160	699	1,502	93,561
1999	528	85,315	1,567	725	210	856	88,674
<u>EGEGIK DISTRICT</u>							
1979	8	300				100	400
80	3	100					100
81	4	no permits returned					
82	19	2,400					2,400
83	14	700					700
1984	24	500		100		300	900
85	23	582	14	21	1	203	821
86	41	1,052	69	58	21	319	1,519
87	49	3,350	87	139	2	284	3,862
88	52	1,405	97	87	54	333	1,976
1989	50	1,636	50	33	1	414	2,134
90	61	1,105	53	85	39	331	1,613
91	70	4,549	82	141	32	430	5,234
92	80	3,322	124	270	51	729	4,496
93	69	3,633	128	148	15	905	4,829
1994	59	3,208	166	84	153	857	4,468
95	60	2,818	86	192	100	690	3,886
96	44	2,321	99	89	85	579	3,173
97	34	2,438	101	21	5	740	3,304
98	36	1,795	44	33	52	389	2,314
20 Year Average	40	1,959	86	100	44	475	2,533
1979-1988 Average	24	1,154	67	81	20	257	1,409
1989-1998 Average	56	2,683	93	110	53	606	3,545
1999	42	2,434	106	35	2	806	3,384

-continued-

Appendix Table 31. (page 2 of 3).

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
<u>UGASHIK DISTRICT</u>							
1979	8	200				100	300
80	10	200				200	400
81	12	600				200	800
82	11	400				300	700
83	8	500				100	600
1984	8	500				200	700
85	9	233	17	7		143	400
86	27	1,080	83	48	21	335	1,567
87	22	892	104	51	29	272	1,348
88	23	1,400	84	55	35	330	1,904
1989	22	1,309	32	35	2	214	1,592
90	37	1,578	51	143	120	280	2,172
91	38	1,403	121	168	42	614	2,348
92	37	2,348	106	79	8	397	2,938
93	39	1,766	86	107	24	495	2,478
1994	31	1,587	126	42	38	579	2,372
95	20	1,513	56	18	6	290	1,883
96	26	1,247	50	21	7	298	1,623
97	28	2,785	169	39	23	311	3,327
98	27	1,241	59	75	82	485	1,942
20 Year Average	22	1,139	82	63	34	307	1,570
1979-1988 Average	14	601	72	40	28	218	872
1989-1998 Average	31	1,678	86	73	35	396	2,268
1999	25	1,365	35	5	0	271	1,675
<u>NUSHAGAK DISTRICT</u>							
1979	364	40,200	8,900	6,800	500	5,200	61,600
80	425	76,800	11,800	11,700	7,600	5,100	113,000
81	395	44,600	11,500	10,200	2,300	8,700	77,300
82	376	34,700	12,100	11,400	7,300	8,900	74,400
83	389	38,400	11,800	9,200	500	5,200	65,100
1984	438	43,200	9,800	10,300	6,600	8,100	78,000
85	406	38,000	7,900	4,000	600	6,100	56,600
86	424	49,000	12,600	10,000	5,400	9,400	86,400
87	474	40,900	12,200	6,000	200	6,200	65,500
88	441	31,086	10,079	8,234	6,316	5,223	60,938
1989	432	34,535	8,122	5,704	407	8,679	57,447
90	441	33,003	12,407	7,808	3,183	5,919	62,320
91	528	33,161	13,627	4,688	292	10,784	62,552
92	476	30,640	13,588	7,076	3,519	7,103	61,926
93	500	27,114	17,709	3,257	240	5,038	53,358
1994	523	26,501	15,490	5,055	2,042	5,338	54,426
95	484	22,793	13,701	2,786	188	3,905	43,373
96	481	22,935	15,941	4,704	1,573	5,217	50,370
97	538	25,080	15,318	2,056	218	3,433	46,106
98	562	25,217	12,258	2,487	1,076	5,316	46,355
20 Year Average	455	35,893	12,342	6,673	2,503	6,443	63,854
1979-1988 Average	413	43,689	10,868	8,783	3,732	6,812	73,884
1989-1998 Average	497	28,098	13,816	4,562	1,274	6,073	53,823
1999	548	29,387	10,057	2,409	124	3,993	45,969

-continued-

Appendix Table 31. (page 3 of 3).

	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
TOGIAC DISTRICT							
1979	25	800	200	300		700	2,000
80	46	3,600	900	300	300	1,200	6,300
81	52	1,900	400	800	100	2,200	5,400
82	50	1,900	400	300	400	1,300	4,300
83	38	1,900	700	900	200	800	4,500
1984	41	3,600	600	1,700	500	3,800	10,200
85	51	3,400	600	1,000	100	1,500	6,600
86	29	2,400	700	800	100	500	4,500
87	46	3,600	700	1,000		1,600	6,900
88	29	2,413	429	716	45	792	4,395
1989	40	2,825	551	891	112	976	5,355
90	37	3,689	480	786	60	1,111	6,126
91	43	3,517	470	553	27	1,238	5,805
92	40	3,716	1,361	626	135	1,231	7,069
93	38	2,139	784	571	8	743	4,245
1994	25	1,777	904	398	77	910	4,066
95	22	1,318	448	425	0	703	2,894
96	19	662	471	285	59	199	1,676
97	31	1,440	667	380	0	260	2,747
98	42	2,211	782	412	76	310	3,791
20 Year Average	37	2,440	627	657	128	1,104	4,943
1979-1988 Average	41	2,551	563	782	218	1,439	5,510
1989-1998 Average	34	2,329	692	533	55	768	4,377
1999	76	3,780	1,244	479	84	217	5,804
TOTAL BRISTOL BAY AREA							
1979	829	116,500	10,300	7,700	500	7,300	142,300
80	1,243	168,600	14,100	13,100	10,000	7,300	213,100
81	1,112	132,100	13,000	11,500	2,600	12,200	171,400
82	806	110,800	13,700	12,400	8,600	11,500	157,000
83	834	149,400	13,500	10,500	900	7,100	181,400
1984	893	163,000	11,300	12,700	8,400	13,000	208,400
85	1,033	149,758	9,710	5,568	728	9,049	174,813
86	933	130,815	14,747	11,601	7,549	11,204	175,916
87	998	135,493	14,356	7,895	689	9,453	167,886
88	936	124,449	11,746	9,680	7,367	7,491	160,733
1989	955	127,408	9,725	7,356	799	12,210	157,498
90	1,042	131,701	13,976	9,683	4,434	8,367	168,161
91	1,197	139,731	15,452	6,655	584	14,122	176,544
92	1,204	134,330	16,623	10,772	5,314	10,612	177,651
93	1,206	136,207	20,787	6,559	1,049	9,206	173,808
1994	1,193	120,735	18,529	6,082	2,770	9,491	157,607
95	1,119	104,086	15,722	4,580	677	7,378	132,443
96	1,110	108,470	18,136	5,915	2,518	7,775	142,813
97	1,166	116,991	19,159	2,974	668	6,201	145,992
98	1,234	113,560	15,576	3,792	2,349	8,093	143,368
20 Year Average	1,052	130,707	14,507	8,351	3,425	9,453	166,442
1979-1988 Average	962	138,092	12,646	10,264	4,733	9,560	175,295
1989-1998 Average	1,143	123,322	16,369	6,437	2,116	9,346	157,589
1999	1,219	122,281	13,009	3,653	420	6,143	145,506

^a Harvests are extrapolated for all permits issued, based on returns. Average harvest of pink salmon are for even years only.

^b Permit and harvest estimates prior to 1989 are based on the community where the permit was issued; estimates from 1989 to the present are based on the area fished, as first recorded on the permit.

Source: Bristol Bay Subsistence Permit Data Base, ADF&G.

Appendix Table 32. Subsistence harvest of sockeye salmon by community, in numbers of fish, Kvichak River drainage, Bristol Bay, 1979-99. ^{a,b}

Year	Levelock	Igiugig	Pedro Bay	Kokhanok	Iliamna- Newhalen	Nondalton	Port Alsworth	Other ^c	Total
1979	4,400	6,600	3,500	16,200	15,900	14,700	4,200		65,500
80	6,100	8,100	7,400	22,600	11,100	11,300	6,000		72,600
81	6,600	5,400	9,700	16,500	15,400	15,200	6,800		75,600
82	5,400	1,900	8,200	16,600	13,500	11,200	4,500		61,300
83	4,800	3,300	10,400	20,100	23,800	29,400	4,700		96,500
1984	8,100	6,300	12,100	24,400	15,900	29,100	4,600		100,500
85	6,600	3,400	12,900	21,900	22,300	14,900	4,500		86,500
86	6,400	1,600	6,700	18,300	17,000	6,600	3,300		59,900
87	5,700	^d	7,300	16,500	27,500	11,800	3,200		72,000
88	3,500	^d	5,500	14,400	29,800	20,700	3,200	^e	77,100
1989	5,100	1,200	6,700	13,000	24,700	18,500	2,200	^e	71,400
90	4,700	2,200	6,600	12,400	18,800	27,300	3,200	1,400	76,600
91	1,029	1,712	9,739	17,184	29,094	4,163	2,755	1,110	66,786
92	4,374	1,056	6,932	11,477	29,633	13,163	2,954	2,559	72,148
93	4,699	1,397	6,226	18,810	19,067	17,890	3,254	2,780	74,123
1994	1,467	1,201	8,747	15,771	15,553	15,246	3,074	3,284	64,343
95	3,756	497	5,359	14,412	20,134	4,188	2,892	3,441	54,679
96	1,120	2,309	5,219	14,011	14,787	11,856	3,263	2,307	54,872
97	1,062	2,067	5,501	8,722	19,513	17,194	2,348	3,101	59,508
98	2,454	1,659	3,511	10,418	16,165	13,136	2,678	3,635	53,656
20 Year Average	4,368	2,883	7,412	16,185	19,982	15,377	3,681	2,624	70,781
1979-88 Average	5,760	4,575	8,370	18,750	19,220	16,490	4,500		76,750
1989-98 Average	3,024	1,530	6,367	13,691	21,568	14,849	2,893	2,624	65,929
1999	1,276	1,608	5,005	10,725	14,129	17,864	4,282	2,834	57,723

^a Harvests are extrapolated for all permits issued, based on those returned. Harvest estimates from 1991 are rounded to the nearest hundred fish.

^b Harvest estimates prior to 1990 are based on the community where the permit was issued; estimates from 1990 to the present are based on community of residence and include fish caught only in the Kvichak District.

^c Subsistence harvests by non-watershed residents.

^d No permits issued.

^e No permits issued. Only residents of the Naknek/Kvichak watershed could obtain subsistence permits.

Source: Bristol Bay Subsistence Permit Data Base, ADF&G

Appendix Table 33. Subsistence salmon harvest by community, Nushagak District, Bristol Bay, 1978-98. ^{a,b}

Year	Dillingham ^c	Manokotak	Aleknagik	Ekwok	New Stuyahok	Koliganek	Other ^d	Total
1979	20,600	7,400	1,000	7,200	17,200	8,200		61,600
80	47,900	8,200	3,500	10,400	22,200	20,800		113,000
81	23,900	6,700	2,900	8,800	23,600	11,400		77,300
82	24,700	2,900	2,400	7,500	22,600	14,300		74,400
83	20,100	5,300	1,900	5,800	18,700	13,300		65,100
1984	30,500	4,100	2,600	7,200	16,500	17,100		78,000
85	22,900	3,600	1,600	7,000	14,500	6,800		56,400
86	31,900	5,500	6,900	7,800	26,400	8,200		86,700
87	33,500	5,900	3,100	6,400	11,400	4,900		65,200
88	29,600 ^f	5,500	2,400	6,100	11,700	5,700	^e	61,000
1989	31,800 ^f	5,800	2,000	4,700	9,700	3,800	^e	57,800
90	28,860 ^f	6,600	2,300	4,900	9,900	8,000	700	61,260
91	34,399 ^f	5,873	3,043	4,532	8,326	5,438	2,163	63,774
92	31,702 ^f	4,317	2,184	5,971	11,325	3,708	2,635	61,842
93	25,315 ^f	3,048	2,593	2,936	12,169	4,180	2,538	52,779
1994	30,145 ^f	3,491	2,289	4,343	8,056	4,513	2,322	55,159
95	24,998 ^f	2,453	1,468	2,046	6,911	2,983	2,406	43,265
96	27,161 ^f	3,883	1,733	2,866	8,892	3,319	2,113	49,967
97	23,255 ^f	3,988	1,989	1,797	6,427	4,179	4,598	46,233
98	24,072 ^f	4,069	1,112	3,555	5,419	3,166	4,958	46,351
20 Year Average	28,365	4,931	2,451	5,592	13,596	7,699	2,715	63,857
1979-88 Average	28,560	5,510	2,830	7,420	18,480	11,070		73,870
1989-98 Average	28,171	4,352	2,071	3,765	8,713	4,329	2,715	53,843
1999	26,502 ^f	3,413	1,532	1,805	4,556	2,772	5,389	45,969

^a Harvests are extrapolated for all permits issued, based on those returned. Harvest estimates prior to 1991 are rounded to the nearest hundred fish.

^b Harvest estimates prior to 1990 are based on the community where the permit was issued; estimates from 1990 to the present are based on community of residence and include fish caught only in the Nushagak District.

^c Includes the village of Portage Creek.

^d Subsistence harvests by non-watershed residents.

^e No permits issued, only residents of the Nushagak watershed could obtain subsistence permits.

^f Includes permits issued in Clarks Point and Ekuk.

Source: Bristol Bay Subsistence Permit Data Base, ADF&G

BRISTOL BAY

HERRING

FISHERY

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INTRODUCTION

This report reviews stock assessment activities, provides an overview of the Togiak District herring fishery from 1978 to 1998 and summarizes the 1999 season.

The Bristol Bay area includes all waters south of a line, extending west from Cape Newenham, east of the International Date Line in the Bering Sea and north of a line extending west from Cape Menshikof. The Bristol Bay area is divided into three herring fishing districts. The Bay District; including all waters east of the longitude of Cape Newenham, the Togiak District; including all waters between the longitude of Cape Newenham and the longitude of Cape Constantine, and the General District; including all waters west of the longitude of Cape Newenham. Togiak District spans approximately 192 km (Figure 1). Togiak village lies at the center of the district, 108 km west of Dillingham.

Pacific herring (*Clupea harengus pallasii*) have been documented throughout Bristol Bay, but the major concentration returns to the Togiak area each spring as the focus of herring sac roe and spawn-on-kelp fisheries. In Togiak District, herring are commercially harvested for sac roe using gillnets and purse seines while herring spawn on rockweed kelp (*Fucus distichus*) is harvested by hand.

The herring sac roe fishery began in Togiak District in 1967, followed by the first fishery for spawn on kelp in 1968. Effort and harvest levels remained low for the first 10 years of the fishery. Increased interest, favorable market conditions and additional incentives provided by the Fishery Conservation and Management Act of 1976 (the 200-mile limit) resulted in a rapid expansion of the Togiak herring fishery in 1977.

The Togiak herring fishery is the largest in Alaska. From 1979 to 1998, sac roe harvests averaged 19,000 tons, worth an annual average of over \$8 million. Spawn-on-kelp harvests in the most recent 10 years have averaged 391,000 lbs., worth about \$282,000 to fishers. In 1999, sac roe harvests brought \$6.2 million to fishers, which was an increase in value of the fishery over the past two years. The spawn-on-kelp fishery was valued at \$315,000, which was slightly below the recent 5-year average. The kelp fishery had not been held during the previous two years due to a lack of quality product and industry interest (Appendix Table 6).

Capelin (*Mallotus villosus*), like herring, return to coastal waters near Togiak to spawn each spring. Commercial harvests of capelin, documented as early as the 1960's, have been small and sporadic. The largest harvest was taken in 1984 and the most recent harvest occurred in 1995.

STOCK ASSESSMENT

Methods

Since 1978, the department has conducted aerial surveys throughout the herring spawning season to estimate abundance, timing and distribution of pacific herring in the Togiak District. Surveys are conducted regularly from approximately April 20 until May 25 each year. Once herring are observed, surveys are conducted daily, weather permitting, until biomass declines and spawning activity subsides.

Aerial survey techniques used in Togiak have remained largely unchanged since 1978 and are described in Lebeda and Whitmore (1985). Herring school surface area is estimated through a handheld tube with a measured grid and a known focal length from a known altitude. Standard conversion factors of 1.52 tons (water depths of 16 ft or

less), 2.58 tons (water depths between 16 and 26 ft) and 2.83 tons (water depths greater than 26 ft) per 538 ft² of surface area are applied to herring school surface areas to estimate the total biomass observed during each flight.

Volunteer test fisheries, originally implemented by the department to estimate roe quality, provide samples for age, size and sex composition analysis. Samples are also collected from commercial harvest for age composition and size analysis. After the season, results are used to revise biomass estimates.

Spawning Population

Status of the Togiak herring population is considered to be stable. Annual biomass estimates range from 69,000 tons observed in 1980 to 239,000 tons documented in 1979 (Appendix Table 5). Abundance was estimated to be high in the late 1970's, declined in mid 1980's and remained relatively low and stable through 1991. Biomass levels from 1992 to 1994 increased to levels between 150,000 and 200,000 tons and estimates since 1995 range from 121,000 to 156,000 tons documented during the 1999 season.

From 1983 to 1999, herring were generally first observed in the district in early May, but were observed entering near shore areas as early as April 22 and as late as June 3. Biomass increased rapidly and peaked within 1 to 7 days of the first observation in all but 2 years. In recent years, biomass declined rapidly following the peak observation, but herring continued to enter and exit the district for several weeks. Except for 2 years, spawn was first observed any time within 3 days of the first herring observation. Similar to trends observed for biomass, spawning in all but 2 years accelerated rapidly, peaked from 1 to 4 days after the first occurrence of spawn then rapidly subsided. Small "spot" spawns have been observed as late as June 7.

Herring ages- 2 through 20 have been observed in the Togiak District but herring generally recruit into the fishery at age-5. Herring abundance is related to year class survival. Two major recruitment events have occurred since the State began monitoring the biomass in 1978. The 1977 and 1978 year classes recruited into the fishery in 1982 and 1983 and comprised a substantial component of the biomass until the early 1990's. Other lesser recruitment events have occurred since that time with the most recent being in 1993 appearing as age-6 herring in the 1999 season.

FISHERY OVERVIEW

Sac Roe Herring Fishery

Fishing and Industry Participation

Unlike most herring fisheries in Alaska, the Togiak sac roe fishery is not a limited entry fishery. Gillnets, purse seines and hand purse seines are legal gear. Since fishing effort is not limited, effort levels can vary substantially each year. Herring market conditions are one of the leading factors influencing effort, but other factors also affect fleet size. Salmon and other markets indirectly affect effort in the herring fishery because the majority of herring fishers in Togiak participate in the Bristol Bay salmon and other fisheries. Herring prices paid to fishers the prior year and run timing also influence effort.

Fishing effort in the sac roe fishery increased through the late 1980's (Appendix Table 1). Gillnet effort rose to over 300 vessels in 1989 then declined to the lowest levels observed since the inception of the fishery in 1993. With roe quality and marketability increasing, gillnet effort increased substantially to a peak gillnet effort of 461

vessels in 1996. Purse seine effort increased steadily from 1978 through 1989, when 310 vessels were observed. Since 1990, the purse seine fleet has fluctuated between 120 and 300 vessels. Gillnet vessels comprised the majority of the sac roe effort from 1978 to 1990 and more recently since 1996.

The Alaska Board of Fisheries reduced gear to limit harvesting capacity and control problems with waste. Prior to 1989, gillnet length was restricted to 150 fathoms. Permit holders were restricted to the use of one legal limit of gear, but up to 300 fathoms could be operated from a fishing vessel. Under these allowances, lost and abandoned nets accounted for substantial waste during some years. In 1989, the Board reduced gillnet length limit to 100 fathoms per permit holder, restricted the operation of no more than 100 fathoms from one vessel, and granted the department the authority to reduce length to 50 fathoms inseason. Gillnet depth remains unrestricted. In October 1989, the Board reduced purse seine length to 100 fathoms. In 1995, the Board restricted purse seine depth to 625 meshes, of which 600 could be no larger than one and one-half inches. These gear restrictions have helped reduce waste, control harvest and improve product quality for both gear types.

The department first restricted herring gillnet length to 50 fathoms by emergency order in 1992 to maintain an orderly fishery, help ensure roe quality and minimize potential waste. From 1994 to 1997, gear length was restricted to 50 fathoms by emergency order during all gillnet openings. These restrictions appeared to control waste and preserve orderliness in the fishery without reducing harvesting capacity. In the fall of 1997, the Board restricted the length of a single herring gillnet and/or aggregate length of herring gillnets operated by a permit holder to 50 fathoms. However, through emergency order, the department may allow use of 100 fathom gillnets.

Industry participation in the fishery peaked between 1979 and 1982, when 33 processors participated in the herring fishery. Since 1987, 15 to 22 companies purchase herring or spawn on kelp each year in Togiak. Processing capacity since 1990 ranged from 2,400 to 4,850 tons per day, or approximately 11% to 25% of annual sac roe harvests (Appendix Table 1).

Harvest and Management Performance

The commercial sac roe and spawn-on-kelp harvests in the Togiak District have been regulated by emergency order since 1981. From 1981 to 1987, informal policies directed the department to ensure that minimum threshold biomass levels were observed before opening the herring fishery, and to manage the fishery so that exploitation did not exceed 20%. In 1988, the Board incorporated the threshold and exploitation rate policies into the Bering Sea Herring Fishery Management Plan (5 AAC 27.060) for Togiak and other Bering Sea fisheries. Herring biomass in Togiak has been estimated at levels well above threshold requirements since 1981.

Management of the Togiak fisheries has successfully limited overall exploitation to 20% of the estimated biomass or less. Annual exploitation rates slightly exceeded 20% in 1982, 1991, 1996 and 1998, but fell at or below the maximum of 20% for all other years since 1981 (Appendix Table 2). Annual exploitation ranged from 11% to 22% and averaged 18% for the same period. Although the sac roe, spawn-on-kelp and Dutch Harbor food and bait fisheries take Togiak herring, only the sac roe harvests were used in calculating exploitation rates from 1981 to 1983. Estimates of herring biomass equivalent to spawn-on-kelp harvests and harvests in the Dutch Harbor fishery were not included when calculating exploitation rates until 1984 and 1988.

Herring purse seine and gillnet sac roe harvests are managed for allocation guidelines set forth in the Bristol Bay Herring Management Plan (BBHMP) (5 AAC 27.865). This plan states that, before opening the sac roe fishery, 1,500 short tons must be set aside for the spawn-on-kelp fishery, and 7% of the remaining available harvest is allocated to the Dutch Harbor food and bait fishery. After the spawn-on-kelp and the Dutch Harbor harvests are subtracted, the remaining harvestable surplus is allocated to the Togiak sac roe fishery: 25% to the gillnet fleet, and 75% to the purse seine fleet. The Board adopted these guidelines in 1988. To achieve gillnet and purse seine

allocations, the department establishes guideline harvest levels (tons) each year to each respective gear. The department then regulates fishing time and area to achieve each guideline harvest level.

This method has generally been successful in achieving sac roe harvest allocations. From 1988 to 1998, annual gillnet harvests were distributed above and below guideline allocations, and averaged 5% less than allocations (Appendix Table 7). Annual harvests exceeded guideline harvest levels by as much as 19% and fell short by as much as 46%. For the same period, purse seine harvests exceeded guideline harvests in seven of the 11 years. Differences between actual and guideline purse seine harvests ranged from -38% to 25%, and averaged 1%. From 1988 to 1998, 24% of all sac roe harvest was taken by gillnets and 76% by purse seines.

The Board of Fisheries and the industry have directed the department to give product quality and fishery value an equal priority with exploitation objectives. Management Guidelines for Commercial Herring Sac Roe Fisheries (5 AAC 27.059) state the department may manage sac roe fisheries to enhance product value by opening areas in which sampling has demonstrated high herring roe content and large herring size, and to minimize harvest of recruit size herring. The BBHMP also states that the primary objective in the sac roe fishery is to prosecute an orderly, manageable fishery while striving for the highest level of product quality and a minimum of waste. Given these regulations and comments from industry, the department considers maximizing quality and value a primary objective in the Togiak fishery.

The department has used volunteer test fishing as a means to maximize harvest roe quality since 1982. Test fishing procedures developed and became more organized and systematic from 1982 to 1989. By 1990, the department had established standard test fishing areas and sample sizes, coordinated test fishing start times between areas, coordinated and assisted in transporting samples to roe technicians and established criteria required for opening an area. Since then, the department has opened to commercial fishing only areas that have documented high quality roe.

Standardizing and streamlining test fishing procedures resulted in reduced turnaround time for sample results, reduced time required between test fishing and opening an area to commercial fishing and helped ensure high mature roe percentages in harvests. From 1979 to 1998, gillnet harvests averaged approximately 9.1% mature roe. Purse seine harvests for this period averaged 9.5% mature roe (Appendix Table 1). Overall gillnet harvest area has gradually been reduced since the late 1980's and early 1990's due to lack of complete test fishing coverage or poor quality results in some areas of the district. From 1994 to 1997, gillnet fishing was opened almost exclusively in the area between Right Hand Point and Kulukak Bay. This reduction in area increases competition among the gillnet fleet, especially when fishing effort is high.

Unlike purse seine harvest quality, mature roe percent in gillnet harvests increased substantially in 1993. Mature roe content in gillnet harvests from 1993 to 1997 averaged over 3% higher than harvests from 1981 to 1992, and ranged from 10 to 12.5%. This difference may partially be attributed to management efforts, but is primarily due to an apparent shift to larger gillnet mesh sizes. Prior to 1993, gillnets with mesh sizes smaller than 3 inches (stretched) were common. Gillnets with 3-inch mesh and larger have since become standard gear. This shift to larger mesh appears to have increased the percentage of female herring caught by herring gillnets from 44% (1982-1992) to 57% (1993-1996).

In 1992, over 20,000 tons of herring were harvested by purse seines in one 20-minute period. This magnitude combined with a limited processing capacity resulted in holding times up to 7 days and large-scale deterioration of flesh and roe quality in the 1992 harvest. Increasing demand for high quality product and recognition by the Department and industry of the deterioration in quality associated with extended holding times led to the Department adding holding time to quality criteria for management purposes. Limiting individual harvests not to exceed 3 days of processing capacity became a management objective since 1993. The Board addressed this issue in 1995 by reducing the allowable depth of purse seine gear.

Since 1993, the department has limited the purse seine fishing time and area to reduce holding times to 3 days or less. To provide harvest opportunity, yet control purse seine harvest rates, requires intensive management by the Department to account for rapid changes in biomass distribution and other factors that effect harvest capacity. Since 1995, the Department initially limited the area considered for an opening using test fish results. Aerial surveys were then conducted over a limited area immediately prior to scheduled announcement times, to assess the harvesting capacity of the fleet. Management decisions for time and area were primarily based on aerial survey assessment. Fishing duration announcements occurred with minimal (1 hour or less) notice. As an example, the duration of the final 1995 purse seine opening was shortened from 1.5 hours to 1 hour with no notice, at the beginning of the fishing period.

The impact of the reducing purse seine depth and fishing areas on product quality is difficult to measure. However, these two factors have controlled individual period harvests to a level that has not exceeded 3 days of production capacity. Industry comments suggest that the gear and area limitations strongly contributed to higher product quality and value. Limiting harvests during individual fishing periods resulted in a larger number of openings over a longer time period. Purse seine fishing time from 1988 to 1992 totaled less than 10 hours. Fishing time totaled 75.5 hours from 1993 to 1998. Area limitations also heightened competition within the purse seine fleet.

Spawn-on-Kelp Fishery

Similar to the sac roe fishery, the spawn-on-kelp harvest in the Togiak District has been regulated by emergency order since 1981. Since 1984, the spawn-on-kelp fishery was managed under guidelines provided in the Togiak District Herring Spawn on Kelp Management Plan (5 AAC 27.834). The plan essentially provides for an allocation of 350,000 lbs. of product, equivalent to 1,500 tons of herring, to this fishery. The plan also directs the department to 1) rotate harvest areas (Figure 2) on a 2 to 3 year basis; 2) ensure product quality; and 3) include the herring equivalent to the spawn-on-kelp harvest when calculating exploitation.

Fishing effort in the spawn-on-kelp fishery increased steadily since its inception, and peaked at 532 participants in 1991 (Appendix Table 4). The fishery became limited to interim use and permanent permit holders in 1990. Following the 1991 season, the Board limited the role of non-permit holders in the spawn-on-kelp fishery to assisting with transporting kelp after the period closure. By 1993, most permits issued for this fishery became permanent, stabilizing the number of permits at approximately 300.

From 1984 to 1998, the fishery was opened for all years except 1985, 1997 and 1998. Actual harvests exceeded the 350,000-lb. guideline harvest level by more than 10% in six years and fell short in three (Appendix Table 7). For the four other years in which a fishery occurred, actual harvests were within 10% of the guideline. The 2 to 3 year rotation schedule for kelp harvest areas was adhered to in all years except 1987. In 1987, area K 9 was opened after harvest in area K 10 fell short of the harvest guideline. The western half of area K 9 was opened the previous year.

To ensure product quality the department, industry representatives and fishers collect spawn-on-kelp samples to display at a public meeting each season, usually after the peak of herring spawning has occurred. Management decisions are based on comments from industry and users regarding sample quality.

1999 SEASON SUMMARY

For 1999, the pre-season forecasted biomass to the Togiak District was 90,000 tons. Based on the maximum exploitation of 20% and allocation guidelines in the Bristol Bay Herring Management Plan (5AAC 27.865) the

projected harvest by fishery was: purse seine sac roe; 11,509 tons, gillnet sac roe ; 3,836 tons, spawn-on-kelp product; 350,000 lbs. (1,500 ton herring equivalent), and Dutch Harbor food and bait: 1,155 tons. The department adequately assessed the biomass to be 156,183 tons inseason, therefore, the harvestable surplus for each fishery was adjusted accordingly: purse seine sac roe; 20,741 tons, gillnet sac roe; 6,914 tons, spawn-on-kelp product; 350,000 lbs. (1,500 ton herring equivalent), and Dutch Harbor food and bait; 2,082 tons.

The Bristol Bay Herring Management Plan and other regulations direct the department to conduct an orderly, manageable fishery and strive for the highest level of product quality with a minimum of waste. Industry representatives have stated that holding unprocessed fish more than three days results in a significant decline in product quality. To ensure a high quality sac roe harvest, we planned to use test fisheries to estimate mature roe percent within areas of the district, and open to fishing only areas with high quality roe. The department also intended to limit the amount of herring held on tenders or processing vessels to a level that could be processed in less than 3 days, by managing time and area for multiple openings, each with limited individual period harvests.

The late 1999 run concerned fishermen and industry. Much of the processing, tender and fishing fleet expected to participate in the Togiak fisheries were delayed by ice pack movement along the usual corridor of travel to Bristol Bay. Ice was present in the Bay during the fishery and did cause some problems to the fleet. Nine processing vessels, 12 purse seiners, 13 gillnetters and 38 tenders were counted during a May 15 survey, when department personnel observed the first herring. By May 18, based on peak aerial counts, fleet size increased to 96 purse seiners and 171 gillnetters.

Company registration for processors intending to buy herring and spawn-on-kelp product in the Togiak District began May 15, after Department staff moved to the field office. From May 15 through May 18, twelve companies registered to buy gillnet and purse seine sac roe herring, one of which also registered to buy spawn-on-kelp product (Table 5). Based on information supplied by companies upon registration in Togiak, on-grounds processing capacity was approximately 2,400 tons of sac roe herring per day. Processing capacity in 1999 was the lowest level recorded since the department began monitoring capacity in 1990. This became a factor in failing to achieve the harvest guidelines for each gear type with the Department having to take 24 hour breaks from harvesting to keep from exceeding the three day holding time criteria for quality. Since the run was late and compressed, this made it impossible to harvest the surplus biomass. The most difficult task managers faced in the 1999 season, was keeping the quality high and keeping the allocation between gear groups balanced.

Sac Roe Fishery

The National Weather Service ice maps in early spring indicated unusually late breakup of the ice pack in Bristol Bay. All indications from weather patterns were that spring would arrive late. Biologists expected that the arrival of the herring biomass into Togiak Bay would also be later than normal. Aerial surveys of the Togiak District began April 19, 1999. Surveys from April 19 to April 28 indicated that significant ice pack still remained in Togiak Bay. The 1999 climate and ice conditions were similar to 1985 when herring arrived in late May. Department staff first observed herring on May 15, when 5,000 tons were documented between Picnic Beach and Summit Island. Survey conditions were excellent and herring were observed in small dense schools approximately 2 miles offshore. Vessels on the grounds reported water temperature to be 2-3 degrees centigrade. At the time of this survey shorefast ice was present behind Tongue Point, Asigyukpak Spit and Hagemeister Spit. Aerial survey conditions continued to be excellent and staff estimated that the biomass had increased to an estimated 21,500 tons on May 16. A morning survey on May 17th documented 81,000 tons. The late evening tide on May 17th brought the majority of the biomass into the Togiak District. Department staff observed a peak biomass of 156,200 tons on May 17th on the evening tide. This survey was flown under excellent conditions until light became a limiting factor at sunset. A major concentration of herring was moving in large schools heading up the Nushagak Peninsula and into the Togiak District. Herring biomass declined rapidly after May 21, and by May 23 only 32,000 tons of herring were estimated in the district. Throughout May substantial biomass was observed moving

northwest along the Nushagak Peninsula, apparently entering the district from the east. Good aerial survey conditions occurred for most of the biomass surveys.

Spawn was first observed May 17 in the Anchor Point, Ungalikthluk and a small spot spawn on the North side of Hagemeister Island. A total of eight miles of spawn were documented on the May 17th. The largest amount of spawn observed during any single day in 1999 was 11.2 miles on May 19. Subsequent spawning diminished and by May 23, less than one mile was observed. Spawning continued through June 3 when the last aerial survey was conducted, reaching a total of 55.7 linear miles of spawn for the season. Of the 55.7 linear miles, 41% (23 linear miles) were documented in Ungalikthluk Bay.

The 1999 herring migration to the Togiak District appeared late and compressed. Based on survey observations, herring biomass peaked May 17, about a week later than normal.

Approximately 6,000 scales were collected for age, weight and length analysis. These samples were collected and delivered to the ADF&G field office by permit holders and processing companies. Age composition analysis indicates that the majority of the biomass (66%) consists of herring age-9 and older. Younger age classes showing strongly in the biomass are age-8 (12%) and age-6 (12%) herring. The average weight of herring caught in the purse seine fishery was 292 g. and in the gill net fishery, 370g.

Purse Seine

The first purse seine test fishing was conducted on May 15 offshore from Eagle Bay. Samples contained all immature roe. Testfishing continued on May 16, but test fishing samples from Anchor Point area yielded less than 3% mature roe. Water temperatures reported by the fleet were still quite cold and aerial surveyors reported shorefast ice lingering behind sheltered areas. Testfishing was expanded early May 17 to include Anchor Point, Togiak Reef, Quigmy River and Matogak River areas. Samples collected during these test fisheries contained mostly immature roe with mature roe percentages of less than 3.5%.

At the same time, large schools of herring were entering the district. With good aerial survey conditions throughout most of the season, department staff documented an estimated 22,000 tons of herring on May 16; and on a late evening flight on May 17, staff observed the peak biomass of 156,000 tons in the district. More than half of the observed biomass was observed between Kikertalik Lake on the Nushagak Peninsula and Metervik Bay. In addition, eight miles of spawn were observed May 17 throughout the district. Roe maturity improved for samples collected during the evening test fishery on May 17; mature roe percentages ranged between 3% and 12%, with the highest percentages on samples from Nunavachuk Bay. With the presence of marketable herring, the department announced at 8:30 p.m. on May 17, that an opening for purse seines was being considered for as early as 10:00 a.m. the next morning. On May 18, at 8:30 a.m., the department announced that a purse seine opening would occur between the western entrance to Nunavachuk Bay (the Pinnacle) and the westernmost point of Right Hand Point, within one nautical mile of shore. The duration of 10 minutes was given at 9:30 a.m. During the first opening, the fleet of 96 purse seine boats harvested 1,907 tons with an average roe maturity of 9.5%.

Managers only considered the area from Nunavachuk to Right Hand Point in order to limit the harvest potential to an amount that would not exceed processing capacity. At this point in the season, several major companies were not yet at full capacity. At the time of the opening, spotting conditions were excellent and adjacent areas held large schools of immature fish.

During the 5:00 p.m. announcement on May 18, the department conveyed the message that it was considering another purse seine opening as early as 9:00 p.m. in the same area as the first opening. However, a series of events caused the cancellation of the 9:00 p.m. opening. First, the biomass survey of the previous night estimated 156,000 tons of herring, far exceeding the pre-season forecast of 90,000 tons. This increased the allowable harvest for purse seine gear to 20,741 tons and 6,914 tons for gillnet gear. Second, with the small processing capacity

available for the 1999 season, the department met with processing company representatives to discuss the increased biomass and their ability to process the allowable harvest within a short time. A primary objective of the Bristol Bay Herring Management Plan is to maintain product quality. Third, an ongoing gillnet fishery south of Metervik Bay was producing a large catch, which, when combined with the earlier purse seine catch, would approach the three day limit for processing capacity. The department cancelled the proposed 9:00 p.m. purse seine opening at 8:45 p.m. In addition, it was announced that given allowable harvest, combined with a late, compressed run, that it was unlikely that the respective gear types would fully realize their allowable harvests before the herring departed the area.

When processing capacity for the purse seine harvest became available, volunteer test fish vessels were requested to test the area from Right Hand Point to Anchor Point and from Metervik Bay to the east entrance of Kulukak Bay, starting at 10:00 a.m., May 19. Test fish results from northeast Nunavachuk, indicated an average roe percentage of 12.5%, and the department announced a possible opening between Ungalikthluk Point and the westernmost point of Right Hand Point. At 5:45 p.m., the location was verified and the duration was given as 10 minutes. The intent was to have a purse seine opening at 6:00 p.m. in an area with a small, controlled harvest so that processing capacity wouldn't be exceeded. A lower harvest than expected transpired as biomass moved out of the open area just prior to the opening. The harvest was only 309 tons and average roe maturity was 8.6%.

On the morning of May 20, purse seine testfishing was expanded to include the area between Right Hand Point and Asigyukpak Spit. Marketable herring had dispersed throughout the district and by 10:00 a.m., the department was considering an opening at 1:00 p.m. in two different areas. The first area was between Asigyukpak Spit and Tongue Point, the second between Anchor Point and the western most point of Right Hand Point. The duration of the period was announced for one hour. This strategy was successful; 4,634 tons were harvested, averaging 9.4% mature roe. During the same day, the gillnet fishery harvested 2,600 tons. The combined harvests (7,200 tons) reached the three-day processing limit and both gear groups were told to stand down until further notice.

Following the opening on May 20, purse seine harvests totaled 61% of the combined sac roe cumulative harvest. The Bristol Bay Herring Management Plan (5 AAC 27.865) specifies that the fishery be managed for a removal of 75% of the allowable harvest by purse seines, and 25% by gillnets. Although, there isn't a lot of ambiguity in the above wording, a good deal of discourse occurred on the radio regarding allowing the gillnet gear type to continue to fish until they had harvested their guideline harvest of 6,900 tons. Management staff felt that this would result in a skewed harvest allocation favoring gillnets if the entire purse seine harvest guideline wasn't subsequently taken. With the compressed run timing being observed, it was unlikely that the entire sac roe harvest guideline for either gear type would be taken. In order to stay with the intent of the management plan, management action was directed at bringing the ratio of purse seine harvest to gillnet harvest closer to 75/25 before allowing more gillnet harvest to occur. Six more purse seine openings occurred between May 22 and May 25 so that the final harvest allocation for both gear groups would be balanced. Eventually, marketable herring left the district and purse seine harvests were ceased before the total allowable harvest was achieved.

A total of nine purse seine periods occurred totaling 4 hours and 40 minutes of fishing time. Harvests ranged from 400 to 5,200 tons per opening, and mature roe percentages ranged from 8.2% to 9.9%. Purse seine sac roe harvest, including an estimated 221 tons of waste, totaled 15,020 tons (Table 3) and fell short of the guideline harvest allocation by 5,721 tons, or 27.6%. The purse seine harvest accounted for 75.5% of the total sac roe harvest. Purse seine harvests averaged 9.1% mature roe; similar to average quality experienced between 1978 and 1998 (9.5%).

Each purse seine opening was managed to ensure processing capacity was not exceeded. The area being considered for opening was announced via radio four or more hours in advance of each opening. Potential harvest and fleet distribution was assessed by aerial surveys one to two hours before each opening. At the same time, herring abundance and distribution was estimated and spotting and fishing conditions were assessed. Fishing duration, based on the survey results, was announced during or immediately following aerial surveys, generally

from 15 to 60 minutes prior to the opening. With each of the later openings, fishing area generally increased as the fishable biomass and potential to exceed processing capacity decreased. The department estimated unprocessed herring harvested during the fishery to be equivalent to or less than three days of processing at any time during the season.

Following the purse seine fishery, an ADF&G point estimate test fishery occurred May 26 at Nunavachuk Bay and Quigmy River. Harvest was 191 tons.

Gillnet

Gillnet test fishing began on May 17 on the morning tide in order to begin to collect information on roe quality in the eastern portion of the district. At this time, the biomass was documented at 40,000 tons, which exceeds the 35,000 ton threshold required for a fishery. Volunteer gillnet vessels brought samples from the Kulukak Point, Kulukak Bluffs, and Barge Beach but they were less than 5% mature roe. The next test fishery was announced for the evening tide. By mid-afternoon, aerial surveys documented 2.5 miles of fresh spawn in the Middle Bay/Rocky Bay area with a spot spawn at Gravel Beach and the Pinnacle. This information made the evening test fishery look more promising for finding higher quality roe within the areas tested.

The test fishery on the evening of May 17 resulted in herring samples that were of mixed maturity. Samples ranged from 0 to 8% mature roe. The highest roe percentages were from samples east of Eagle Bay while green samples came from the Kulukak Bluffs area. Samples from Anchor Point and Middle Point were 4-5% mature roe. Therefore, another test fishery was setup to begin at 7:30 a.m. on May 18. The test fishing area was narrowed from Right Hand Point east to Kulukak Point.

On the early flood tide of May 18, samples brought in from Eagle Bay and east of Right Hand Point ranged from 7.5% to 13.25% with an average of 10% mature roe. Sets made in the Kulukak Bluff area resulted in low quality and test fishermen reported low volume of herring in that area. Only a few spawn outs were present in the samples from the test fishery. The first gillnet opening was announced for four hours beginning at 2:00 p.m. in the area between Right Hand Point and the marker at the southwest entrance to Metervik Bay. By regulation 50 fathoms of gillnet gear was allowed during the period. There were 12 companies registered to buy gillnet herring. A survey flown during the opening indicated good volume and processors reported mid-period that roe quality was high. Based on this information, the opening was extended for another 4 hours. This extension allowed the gillnet fleet to catch a good portion of the 3,800 ton harvest guideline. There were approximately 119 gillnetters on the grounds for the first opening.

As the extension on the opening of May 18th progressed, reports came in that fishing was very successful. Gillnet permit holders harvested 1,900 tons at 11.5% mature roe (Table 3). During the evening announcement on May 18 the results of the aerial survey that documented 156,000 tons of herring was given to the fleet. As a result of this survey, the gillnet allocation was increased to 6,900 tons. More of the local boats from Dillingham began to arrive and department staff reported 171 gillnet vessels on the grounds. With limited processing capacity, a short 4 hour opening for the gillnet fleet was announced for May 19 beginning at 6:00 a.m. At the time of the opening announcement, the fleet was notified that there would not be any extension to the second gillnet period.

The second opening was light and gillnet fleet only harvested 58 tons from 45 deliveries. The fish appeared to have moved out of the open area and few fishermen had any volume of fish to deliver. Another volunteer test fishery began on May 20 during the early tide, in the area from Right Hand Point to Kulukak Bluffs. Volunteer test boats were able to catch some high quality samples. Samples reported were as follows: Kulukak Bluffs 10.5% average, Right Hand Point to Eagle Bay 18.7% and 15.0%, and Metervik Bay averaged 12.5%. A 4-hour opening was announced at 10:00 a.m. to begin at 11:00 a.m. from Right Hand Point to the west shore of Kulukak Bay and within one nautical mile of the shoreline. An aerial survey prior to the opening indicated a substantial volume of fish available for harvest in the open area.

As the third opening progressed, samples from industry technicians reported an overall roe maturity of 11.0%. All areas reported good quality fish, and since volume was holding up, the period was extended for another 4 hours. As reports of heavy catches called in during the opening were added to a recent large harvest by the purse seine fleet, it became apparent that the three-day processing capacity was being approached. On May 21, in the 9:00 a.m. announcement, the department informed both gear types to stand down for the next 24 hours to allow the industry to process the herring being held on board tenders. The total gillnet harvest through May 21, based on processor verbals, was approximately 4,250 tons. This was approximately 40% of the total harvest, well over the 25% portion specified for gillnet gear type in the Bristol Bay Herring Management Plan.

At this point in the run, with 52 miles of spawn documented and the biomass decreasing rapidly, management needed to bring the allocation between gear groups closer to the 75/25 ratio specified in the management plan. Therefore, the gillnet fleet would have to stand down until the purse seine catch allocation was closer to their 75% portion. With over 6,000 tons of harvest needed by the purse seine fleet to balance the allocation, and the likelihood that the gillnet fleet would be on hold for several days, a portion of the gillnet fleet began to depart the district for Security Cove.

As it became more difficult for the purse seine fleet to find marketable fish, the waiting period for another gillnet opening lengthened. At the 9:00 p.m. announcement on May 23, the gillnet fleet was informed that with the current harvest percentage for each gear type, the earliest the gillnet fleet would have an opening would be May 24th on the evening tide. However, the purse seine openings resulted in relatively small harvests each period and as a result, this schedule was delayed. The gillnet fleet remained on the beach for several days and continued to decrease in number of vessels.

On May 25, volunteers signed up to begin testfishing for samples in the area from Right Hand Point to Kulukak Bluffs beginning on the evening flood. Resulting samples showed a mixture of spawn-outs and mature roe; some samples with high male count but overall mostly mature samples of acceptable quality. With the allocation being close to the 75/25 ratio, a short opening of 4 hours was announced to begin at 11:00 p.m.

During the fourth gillnet period on May 25 a small harvest of 197 tons was delivered with an average of 12.4% mature roe. At the 9:00 a.m. announcement on May 26, gillnetters were given another 4-hour opening beginning at 10:00 a.m. With the majority of the fleet departing the district, only 13 deliveries were made during this opening for a harvest of only 5 tons of herring with 13.0% mature roe. This brought the gillnet gear group harvest to a total of 4,858 tons of herring averaging 11.5% mature roe (Table 3). Without any further indication of movement of new fish available for harvest, the department announced that the district would close to commercial herring fishing for the 1999 season.

The gillnet harvest for 1999 season was 4,858 tons and averaged 11.5% mature roe. Five gillnet openings occurred, with 2 extensions. Herring gillnets fished a total of 28 hours. Gear was restricted to 50 fathoms due to small area and fleet size. The 1999 harvest of 4,858 tons was below the recent 5-year average of 6,487 tons and accounted for 24.4% of the total sac roe harvest.

Spawn on kelp

Spawning was first observed May 17, and by May 20, 42 linear miles of spawn had been documented. On May 20, representatives from the only spawn-on-kelp buyer collected kelp samples in areas K 3, K 5, K 8 and K 9 (Metervik Bay to Right Hand Point; Nunavachuk Bay; and Rocky Point to Anchor Point). ADF&G staff collected kelp samples from area K 9 on May 22. Within the traditional kelping areas, the heaviest spawn deposition occurred from Middle Bay to Anchor Point and from Metervik Bay to Right Hand Point. Samples were collected from areas where repeated spawning had occurred over several days and spawn coverage was good. Samples from each area were examined for egg coverage and silt. Samples from area K 9 and K 3 were of marketable

quality. The buyer indicated preference for the spawn-on-kelp product from K 9 due to excellent roe coverage and fully mature kelp fronds.

The Togiak District Herring Spawn On Kelp Management Plan (5 AAC 27.834) specifies a two to three year rotation for kelp harvest areas. Since the last fishery occurred in the area from Middle Bay to Rocky Point (K 8 and K 9) in 1996, all spawn-on-kelp areas were under consideration for a fishery in 1999. Plant coverage in area K 9 appeared to be dense, well distributed, and of sufficient quantity to allow the entire 350,000 lb. quota to be taken from this single area. Area K-9 was open for commercial harvest of spawn-on-kelp for a 5-hour period beginning at 2:00 a.m. Sunday, May 23. Weather conditions were good and the tide stage was adequate for harvesters to selectively pick 297,626 pounds of quality product. There were approximately 130 permit holders observed participating in the fishery and 152 deliveries were made. This was the lowest effort observed since 1983.

A 3-hour opening was announced for 4:00 p.m., May 23 to harvest the remainder of the 350,000 pound guideline from area K 9. Weather conditions and the tide level remained favorable. Harvest from the second kelp opening brought the total harvest to 419,563 lbs. or 19.9% over the harvest guideline. The spawn-on-kelp harvest was converted to an equivalent amount of herring, incorporating the overall average roe recovery percentage of 9.8%, and resulted in 1,605 tons.

Exploitation

The Togiak herring fisheries were managed for a maximum exploitation of 20% based on the peak biomass documented on the grounds. Combining the sac roe harvest (19,878 tons), the spawn on kelp (1,605) and the Dutch Harbor food and bait fishery harvest (2,398 tons) resulted in a total harvest exploitation of 23,881 tons (Appendix Table 2). The exploitation rate based on the peak biomass (156,183 tons) was calculated at 15.3% for the 1999 season. Of the sac roe harvest, 24.4% was taken by gillnets and 75.6% by purse seines (Appendix Table 2).

Exvessel value

The exvessel value of the 1999 Togiak sac roe herring fishery to fishermen was \$6.5 million (Appendix Table 6). Exvessel value of gillnet harvest was \$ 1.5 million and the purse seine harvest was \$4.6 million. The 1999 exvessel value was higher than the last 2 years but 34% less than the average value from 1994 to 1998. These estimates do not include any postseason adjustments to fishermen from processors and should therefore be treated as minimum estimates.

The exvessel value includes the sac roe fishery and the spawn-on-kelp fishery which was worth \$315,000 to permit holders. Base prices paid for sac roe herring in 1999 ranged from \$200 to \$500 per ton for 10% mature roe. This base price, weighted by company averaged \$316 per ton for 10% mature roe.

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Table 1. Daily observed estimates (tons) of herring by index area, Togiak District, 1999.

Date	Start Time	Survey Rating ^a	Miles of Spawna	Estimated Biomass by Index Area ^b													Daily Total	
				NUS	KUK	MET	NVK	UGL	TOG	TNG	MTG	OSK	PYR	CN	HAG	WAL		
4/19	10:50	3.0																
4/27	14:55	2.3																
5/03	12:30	4.0																
5/06	13:45	2.9																
5/11	13:15	4.0																
5/13	9:10	1.7																
5/15	10:15	1.1			1,894	2,165		398										4,457
5/16	19:55	2.0								5,123					10,117			21,495
5/17	11:15	1.0	2.3	18,265	29,730	1,652	1,317	6,332	5,815	4,142					14,161			81,414
5/17	19:50	2.9	7.9	50,501	31,065	9,727	2,801	432	4,448	15,728	25,825	2,457			13,199			156,183
5/18	13:00	2.0	5.1						107	1,510	7,241	3,205			1,043			13,105
5/19	10:02	4.4	2.4				1,381	1,017	88									2,486
5/19	13:40	1.7	7.4															
5/19	20:15	2.9	11.2	13,394		5,127	5,507	2,255	718	2,609	8,470	56			122			38,256
5/20	10:30	2.0	5.7															
5/20	16:00	1.0	6.7															
5/21	13:20	2.3	3.6	32,351	37,981	1,556	14,981	3,954	7,372	2,123	1,120	186	225	463	3,680			105,992
5/22	9:15	2.7	1.8															
5/23	17:00	2.1	0.8	1,523	11,995	7,258	2,626	1,771		3,900	2,592	416						32,080
6/03	9:00	2.9	0.8		18		262					3						283
Total			55.7														PEAK	156,183

^a 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Unsatisfactory

^b Index areas: NUS - Nushagak Peninsula; KUK - Kulukak; MET - Metervik; NUK - Nunavachak; UGL - Ungalikthluk/Togiak; TOG - Togiak; TNG - Tongue Pt; MTG - Matogak; HAG Hagemeister; OSK - Osviak; PYT - Pyrite Point; CN - Cape Newenham.

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Table 2. Emergency order commercial fishing periods for herring sac roe and spawn-on-kelp, Togiak District, 1999.

Emergency Order Number	Area ¹		Date and Time		Duration	
Herring Sac Roe Gillnet						
DLG-2/3	Right Hand Point to SW Metervik	Extended Period	5/18	2:00 p.m. to 5/18	10:00 p.m.	8 hrs.
DLG-4	Right Hand Point to SW Metervik		5/19	6:00 a.m. to 5/19	10:00 a.m.	4 hrs.
DLG-6/8	Right Hand Point to Kulukak Pt.	Extended Period	5/20	11:00 p.m. to 5/20	7:00 p.m.	8 hrs.
DLG-17	Right Hand Point to Kulukak Bluffs		5/25	11:00 p.m. to 5/26	3:00 a.m.	4 hrs.
DLG-18	Right Hand Point to Kulukak Bluffs		5/26	10:00 a.m. to 5/26	14:00 p.m.	4 hrs.
Herring Sac Roe Purse Seine						
DLG-1	Pinnacle to Right Hand Point		5/18	10:00 a.m. to 5/18	10:10 a.m.	10 min.
DLG-5	Ungalikthluk Pt. To Right Hand Point		5/19	6:00 p.m. to 5/19	6:10 p.m.	10 min.
DLG-7	Oosik to Tongue Pt./Anchor to RHP		5/20	1:00 p.m. to 5/20	2:00 p.m.	60 min.
DLG-10	Cape Newenham to Tongue&Pinnacle to Right Hand Point		5/22	5:00 p.m. to 5/22	5:30 p.m.	30 min.
DLG-11	Cape Newenham to Kulukuk Pt.		5/22	11:30 p.m. to 5/22	12:00 mid	30 min.
DLG-13	Cape Newenham to Kulukuk Pt.		5/23	12:00 noon to 5/23	1:00 p.m.	60 min.
DLG-14	Newenham to latitude of NW Metervik		5/24	11:00 a.m. to 5/24	11:30 a.m.	30 min.
DLG-15	Cape Newenham to Kulukuk Pt.		5/24	6:30 p.m. to 5/24	6:50 p.m.	20 min.
DLG-16	Cape Newenham to Kulukuk Pt.		5/25	7:00 a.m. to 5/25	7:30 a.m.	30 min.
Herring Spawn on Kelp						
DLG-9	Area K 9		5/23	2:00 a.m. to 5/23	7:00 a.m.	5 hrs.
DLG-12	Area K 9		5/23	4:00 p.m. to 5/23	7:00 p.m.	3 hrs.

¹ Area descriptions are approximate. Precise boundaries are described in Emergency Orders.

Table 3. Commercial herring harvest (tons) by fishing section and gear type, Togiak District
Bristol Bay, 1999 (roe percentages for each opening and section are noted within parentheses).

Date	Time (hours)	Periods	Kulukak	Nunavachak	Togiak	Hagemeister	Pyrite Point	Cape Newenham	Total
Purse Seine									
18-May	0.17	1		2,003 (9.4) ^e					2,003 (9.4)
19-May	0.17	2		411 (8.5) ^f					411 (8.5)
20-May	1.00	3		2,672 (9.5)		2,512 (9.3)			5,184 (9.4)
22-May	0.50	4		42 (8.9)		696 (8.3)			738 (8.7)
22-May	0.50	5	655 (8.6)			95 (8.7) ^a	536 (9.4) ^b		1,285 (8.7)
23-May	1.00	6	993 (8.5)		48 (8.1)	588 (8.4) ^a	244 (6.7)		1,872 (8.2)
24-May	0.50	7	1,295 (9.2)			172 (9.2)	38 (9.6)		1,505 (9.2)
24-May	0.33	8	751 (9.4) ^c			47 (9.3)			797 (9.4)
25-May	0.50	9	309 (10.0)	657 (10.0)		68 (9.4)			1,034 (9.9)
26-May				191 (8.4) ^d					191 (8.4)
	4.67		4,003 (9.0)	5,976 (9.4)	48 (8.1)	4,177 (9.0)	817 (8.5)		15,020 (9.1)
Gill Net									
18-May	8.00	1	1,900 (11.5)						1,900 (11.5)
19-May	4.00	2	56 (11.4)						56 (11.4)
20-May	8.00	3	2,691 (11.4)						2,691 (11.4)
25-May	4.00	4	206 (12.6)						206 (12.6)
26-May	4.00	5	5 (13.0)						5 (13.3)
	28.00		4,858 (11.5)						4,858 (11.5)
Total									
	8.17	1	1,900 (11.5)	2,003 (9.4) ^e					3,903 (10.5)
	4.17	2	56 (11.4)	411 (8.5) ^f					467 (9.0)
	9.00	3	2,691 (11.4)	2,672 (9.4)		2,512 (9.3)			7,874 (10.1)
	4.50	4	206 (12.6)	42 (8.9)		696 (8.3)			944 (9.4)
	4.50	5	660 (8.6)			95 (8.9)	536 (9.0) ^b		1,290 (8.7)
	1.00	6	993 (8.5)		48 (8.1)	588 (8.4) ^a	244 (6.7)		1,872 (8.2)
	0.50	7	1,295 (9.2)			172 (9.2)	38 (9.6)		1,505 (9.7)
	0.33	8	751 (9.4) ^c			47 (9.3)			797 (9.4)
	0.50	9	309 (10.0)	657 (10.0)		68 (9.4)			1,034 (9.9)
				191 (8.4) ^d					191 (8.4)
Total			8,861 (10.4)	5,976 (9.4)	48 (8.1)	4,177 (9.0)	817 (8.5)		19,878 (9.7)

^a Combined harvest for Togiak and Hagemeister fishing sections for period 5 (22 May) for confidentiality purposes

^b Combined harvest for fishing periods 4 and 5, both occurring on May 22, in the Pyrite Point fishing section for confidentiality purposes.

^c Combined harvest for fishing Kulukak and Nunavachak fishing sections for period 8 (24 May) confidentiality purposes.

^d Test Fish Harvest.

^e Includes deadloss of 105 tons

^f Includes deadloss of 103 tons

^a Includes deadloss of 13 tons

Table 4. Preliminary herring total run and commercial catch by year class, Togiak District, 1999.^a

Year Class	Age	Total Run		Harvest		Escapement	
		(tons)	%	(tons)	%	(tons)	%
1981	18	0	0.0%	0	0.0%	0	0.0%
1982	17	534	0.3%	42	0.2%	491	0.3%
1983	16	3,478	1.8%	138	0.7%	3,340	2.0%
1984	15	3,849	2.0%	200	1.0%	3,649	2.2%
1985	14	3,667	1.9%	474	2.4%	3,193	1.9%
1986	13	18,314	9.7%	1,286	6.5%	17,027	10.1%
1987	12	27,334	14.5%	2,202	11.1%	25,132	14.9%
1988	11	31,605	16.8%	3,059	15.4%	28,546	17.0%
1989	10	15,160	8.1%	1,449	7.3%	13,711	8.1%
1990	9	20,041	10.6%	1,993	10.0%	18,049	10.7%
1991	8	22,694	12.1%	2,822	14.2%	19,872	11.8%
1992	7	16,315	8.7%	1,929	9.7%	14,386	8.5%
1993	6	23,198	12.3%	3,927	19.8%	19,271	11.4%
1994	5	1,643	0.9%	274	1.4%	1,369	0.8%
1995	4	415	0.2%	80	0.4%	335	0.2%
1996	3	16	0.0%	5	0.0%	12	0.0%
1997	2	0	0.0%	0	0.0%	0	0.0%
Total		188,263	100%	19,880	100%	168,383	100%

^a Does not include harvest in the Dutch Harbor food and bait fishery.

Table 5. Commercial herring sac roe and spawn-on-kelp buyers in Togiak District, 1999.^a

Operator/Buyer	Base of Operation	Product Purchased		
		Gillnet	Purse Seine	Spawn-on-Kelp
1	Capilano	F/V Aquilla	X	
2	Icicle Seafood, Inc.	P/B Bering Star	X	X
3	New West Fisheries, Inc.	P/V New West	X	X
4	Norquest Seafoods, Inc.	M/V Pribilof	X	X
5	Ocean Beauty Seafoods	P/V Dorothea	X	X
6	Peter Pan Seafoods, Inc.	P/V Steller Sea	X	X
7	Snopac Products, Inc.	P/V Snowpac	X	X
8	Trident Seafoods	P/V Alaska Packer	X	X
9	Unisea, Inc.	P/V Omnisea	X	X
10	Wards Cove Packing	P/V Omnisea	X	
11	Woodbine	P/V Woodbine	X	X
12	Y.A.K. Inc.	P/V Yard Arm Knot	X	X

^a Operators that registered in the Togiak District.

Appendix Table 1. Sac roe herring industry participation, fishing effort and harvest, Togiak District, 1979-1999.

Year	Companies	Daily Processing Capacity ^a	Fishery Dates	Effort ^b	Gillnet			Purse Seine			Total Harvest			
					Duration (hrs.)	Harvest ^c	C.P.U.E. Roe% ^d	Duration (hrs.)	Harvest ^c	C.P.U.E. Roe% ^d				
1979	33		5/1-6/1	350	768.0	4,459	0.0	8.6	175	696.0	6,667	0.1	8.6	11,126
1980	27		4/25-5/16	363	384.0	4,150	0.0	8.0-11.0	140	384.0	20,366	0.4	8.0-11.0	24,516
1981 ^e	28		5/2-5/16	106	101.0	2,338	0.2	6.7	83	101.0	10,151	1.2	10.1	12,489
1982	33		5/14-5/24	200	60.0	7,105	0.6	7.4	135	36.0	14,716	3.0	9.5	21,821
1983	23		5/3-5/11	250	42.0	5,344	0.5	6.9	150	14.0	21,442	10.2	9.3	26,786
1984	25		5/18-5/21	300	35.0	4,934	0.5	8.4	196	11.0	14,485	6.7	10.2	19,419
1985	23		5/23-5/25	302	11.0	4,482	1.3	7.4	155	3.0	21,330	45.9	10.0	25,812
1986	23		5/14-5/15	209	10.0	3,448	1.6	8.8	209	1.0	12,828	61.4	9.9	16,276
1987	18		4/27-5/6	148	36.0	2,685	0.5	8.6	111	5.5	12,845	21.0	8.9	15,530
1988	22		5/17	300	4.0	3,695	3.1	8.3	239	0.5	10,472	87.6	10.9	14,167
1989	19		5/9-5/14	320	5.0	2,844	1.8	7.8	310	3.0	9,415	10.1	8.5	12,259
1990	16	3,100	5/8-5/20	277	66.0	3,072	0.2	9.0	221	3.0	9,158	13.8	9.7	12,230
1991	16	3,350	5/10-5/17	170	14.0	3,182	1.3	8.5	200	3.0	11,788	19.6	10.0	14,970
1992	18	3,700	5/20-5/27	274	25.5	5,030	0.7	8.8	301	0.3	20,778	230.1	9.2	25,808
1993	12	2,500	4/27-5/9	75	144.5	3,564	0.3	10.1	140	33.8	14,392	3.0	9.6	17,956
1994	16	3,300	5/11-5/20	146	76.0	7,462	0.7	12.0	240	4.6	22,853	20.7	9.4	30,315
1995	22	4,350	5/7-5/15	250	33.5	6,995	0.8	12.0	254	12.2	19,737	6.4	10.1	26,732
1996	19	4,850	5/3-5/8	461	18.0	6,863	0.8	11.1	268	2.4	18,008	27.8	9.0	24,871
1997	18	4,200	5/2-5/6	336	24.0	5,164	0.6	11.8	231	6.4	18,649	12.6	9.4	23,813
1998	15	2,475	4/29-5/10	152	46.0	5,952	0.9	12.5	123	16.5	16,824	8.3	9.6	22,776
1979-98 Ave.	21	3,536		249	95	4,638	1	9.1	194	67	15,345	29	9.5	19,232
1994-98 Ave.	18	3,835		269	39.5	6,487	1	11.9	223	8	19,214	15	10	25,701
1999	12	2,400	5/18-5/26	171	28	4,858	1	11.5	96	4.7	15,020	32.9	9.1	19,878

^a Number of tons per day based on companies registered.

^b Peak aerial survey count.

^c Sources: 1988-98: Fish ticket data

1980-87: Sandone and Bramman, 1988.

1978-79: ADF&G, 1981 and 1982.

^d Source: 1989-98: Fish ticket data

1978-88: ADF&G, 1997.

^e Fishery managed by emergency order from 1981 to present.

Appendix Table 2. Exploitation of Togiak herring stock, 1979-1999.

Year	Biomass Estimate (short ton)	S-O-K Herring Equivalent	Dutch Harbor Food/Bait	Gillnet	Sac Roe		Total Harvest	Exploitation Rate
					Purse Seine	Total		
1979	239,022			4,459	6,667	11,126	11,126	4.7%
1980	68,686			4,150	20,366	24,516	24,516	35.7%
1981	158,650			2,338	10,151	12,489	12,489	7.9%
1982	97,902			7,105	14,716	21,821	21,821	22.3%
1983	141,782			5,344	21,442	26,786	26,786	18.9%
1984	114,880	1,552		4,934	14,485	19,419	20,971	18.3%
1985	131,400	0		4,482	21,330	25,812	25,812	19.6%
1986	94,700	1,446		3,448	12,828	16,276	17,722	18.7%
1987	88,400	1,309		2,685	12,845	15,530	16,839	19.0%
1988	134,717	1,782	2,004	3,695	10,472	14,167	17,953	13.3%
1989	98,965	2,499	3,081	2,844	9,415	12,259	17,839	18.0%
1990	88,105	1,617	820	3,072	9,158	12,230	14,667	16.6%
1991	83,329	1,310	1,325	3,182	11,788	14,970	17,605	21.1%
1992	156,955	1,482	1,949	5,030	20,778	25,808	29,239	18.6%
1993	193,847	1,481	2,790	3,564	14,392	17,956	22,227	11.5%
1994	185,454	1,134	3,349	7,462	22,853	30,315	34,798	18.8%
1995	149,093	996	1,748	6,995	19,737	26,732	29,476	19.8%
1996	135,585	1,899	2,239	6,863	18,008	24,871	29,009	21.4%
1997	144,887	0	1,950	5,164	18,649	23,813	25,763	17.8%
1998	121,000	0	1,994	5,952	16,824	22,776	24,770	20.5%
1979-98 Ave.	131,368	1,234	2,114	4,638	15,345	19,984	23,331	18.1%
1994-98 Ave.	147,204	806	2,256	6,487	19,214	25,701	28,763	17.8%
1999	156,183	1,605	2,398	4,858	15,020	19,878	23,881	15.3%

^a 1999 includes testfish harvest of 191 tons

Appendix Table 3. Age composition of the inshore herring, Togiak District, 1979-1999.

Year	Age Composition (%) ^a							Total ^b Run (tons)
	3 ^c	4	5	6	7	8	9 +	
1979	1	4	48	31	13	1	2	239,022
1980	8	5	1	37	35	12	2	68,686
1981	1	50	7	1	22	14	5	158,650
1982		16	51	3	1	17	12	97,902
1983		5	37	45	2	2	9	141,782
1984		2	2	28	42	4	24	114,880
1985		1	1	8	35	42	13	131,400
1986			1	2	15	44	38	94,770
1987				8	10	28	54	88,400
1988		2	5	1	13	5	74	134,717
1989			5	11	4	15	65	98,965
1990				6	11	3	80	88,105 ^d
1991		7	1	1	16	18	57	83,329
1992		10	20	1	1	15	53	156,955 ^e
1993			6	23	1	1	67	193,847 ^f
1994			2	12	28	3	55	185,454 ^f
1995		1	4	7	24	30	35	^g
1996		'	3	5	7	21	64	^g
1997		7	5	12	11	10	55	144,887 ^e
1998		'	4	5	10	11	70	^g
1999	^c	'	1	12	9	12	66	188,264

^a Age composition in 1979-92 is weighted by aerial survey data and weight at age.

^b Includes commercial catch, escapement, and documented waste.

^c Includes age 1, 2 and 3 herring.

^d Contributions of age groups 3, 4 and 5 are less than 5% each.

^e Contribution of age 3 herring is less than 0.5%.

^f Contribution of age 4 herring is less than 0.5%.

^g Age contribution of the commercial purse seine harvest was used to represent the total run for the 1995 season. Aerial surveys to determine abundance were hampered by poor weather conditions, preventing calculation of a final season biomass estimate.

Appendix Table 4. Herring spawn-on-kelp industry participation, fishing effort, area and harvest, Togiak District, 1979-99.

Year	Companies	Fishery Dates	Hours	Effort ^a	Area	Total Harvest in pounds	Herring Equivalent (in tons)	Openings	Average roe %
1979	16	5/4-5/23		100	Togiak District	414,727			0.1
1980 ^b	21	5/2-5/13		78	K 3 - K 10	189,662			9.2
1981	7	5/5-5/13		108	K 3 - K 9	378,207			9.1
1982	8	5/21-5/23	39.0	214	K 3 - K 9	234,924		2	8.8
1983	4	5/5-5/7	52.0	125	K 3 - K 9	270,866		3	8.9
1984 ^c	6	5/21-5/24	16.0	330	K 4, K 9	406,586	1,552	3	9.8
1985		no fishery							9.6
1986	6	5/18-5/21	21.0	204	K 7, K 8, K 9	374,142	1,446	4	9.7
1987	5	4/29-5/4	6.6	187	K 9, K 10	307,307	1,309	5	8.8
1988	10	5/20	6.0	259	K 4, K 8	489,320	1,782	1	10.3
1989	11	5/14	4.0	487	K 9	559,780	2,499	1	8.3
1990	7	5/11	3.0	481	K 8	413,844	1,617	1	9.5
1991	7	5/13	2.5	532	K 4	348,357	1,310	1	9.7
1992	5	5/23	3.3	386	K 9	363,600	1,482	2	9.1
1993	2	5/1-5/2	7.0	173	K 8	383,000	1,481	2	9.7
1994	3	5/13-5/14	7.5	204	K 5	308,400	1,134	2	10.0
1995	5	5/11-5/14	14.5	188	K 2, K 3	281,600	996	3	10.6
1996	3	5/9-5/10	12.0	200	K 8, K 9	455,800	1,899	2	9.6
1997		no fishery							
1998		no fishery							
1989-98 Ave.	5		6.7	331		389,298	1,552	2	9.6
1994-98 Ave.	4		11.3	197		348,600	1,343	2	10.1
1999	1	5/23	8.0	130	K 9	419,563	1,605	2	9.8

^a 1978 - 1989 and 1992 - 1996, number of permits fished based on fish tickets. 1990 and 1991, peak aerial survey count.

^b Management plan adopted by Board of Fisheries in December, 1979 designating 10 kelp areas, and requiring emergency order closure when 10% of the standing biomass of kelp was harvested.

^c Management plan adopted by Board of Fisheries setting 350,000 lb. harvest guideline, specifying 2 to 3 year rotation, and including spawn-on-kelp herring equivalent in exploitation rate.

Appendix Table 5. Aerial survey estimates of herring biomass and spawn deposition, Togiak District, 1979-1999.

Year	Preseason Forecast ^a	Biomass Estimate	Spawn Estimates	
			Observations	Miles
1979		239,022	52	22
1980		68,686	64	24
1981		158,650	106	40
1982		97,902	103	39
1983		141,782	189	60
1984	106,422	114,880	171	61
1985	81,899	131,400	141	43
1986	86,310	94,700	182	67
1987	61,100	88,400	160	76
1988	54,500	134,717	107	61
1989	80,100	98,965	69	53
1990	56,000	88,105	94	66
1991	55,000	83,329	90	70
1992	60,214	156,955	160	97
1993	148,786	193,847	76	53
1994	142,497	185,454	80	72
1995	149,093	149,093 ^b	70	59
1996	135,585	135,585 ^b	99	73
1997	125,000	144,887	79	59
1998	121,000	121,000 ^b	42	33
<hr/>				
1979-98 Average	97,567	131,368	107	56
1994-98 Average	134,635	147,204	74	59
<hr/>				
1999	90,000	156,183	33	56

^a 1993-1999 forecasts based on Age Structured Analysis. Previous years based on age composition, abundance, average growth and mortality rates. Forecasts for Togiak herring not provided prior to 1984.

^b Biomass estimate precluded by weather conditions. Inseason management used preseason forecast.

Appendix Table 6. Exvessel value of the commercial herring and spawn-on-kelp harvest, in thousands of dollars, Togiak District, 1979-1999.^a

Year	Herring		Spawn-on-Kelp	Total
	Sac Roe	Food/Bait		
1979	6,561	180	249	6,990
1980	3,055	150	95	3,300
1981	3,988	1	250	4,239
1982	6,070	105	176	6,351
1983	10,450	67	284	10,801
1984	7,178	33	203	7,414
1985	13,696	41	^b	13,737
1986	8,648	12	187	8,847
1987	8,614	49	166	8,829
1988	14,103	3	346	14,452
1989	4,983	19	448	5,450
1990	6,494	9	360	6,863
1991	6,173	21	383	6,577
1992	8,818	26	254	9,098
1993	5,218	3	268	5,489
1994	9,090	0	212	9,302
1995	16,713	0	362	17,075
1996	14,395	5	510	14,910
1997	4,306	0	^b	4,306
1998	3,986	0 ^c	^b	3,986
<hr/>				
1979-98 Average	8,127	38	280	8,401
1994-98 Average	9,698	1	361	9,916
<hr/>				
1999	6,211	0 ^d	315	6,526

^a Exvessel value (value paid to the fisherman) is derived by multiplying price/ton by the commercial harvest. These estimates do not include any postseason adjustments to fishermen from processors and should therefore be treated as minimum estimates.

^b Fishery not conducted.

^c 400 ton dead loss reported, no commercial value.

^d 221 ton dead loss reported, no commercial value.

Appendix Table 7. Guideline and actual harvests of sac roe herring (tons) and spawn-on-kelp (lbs), Togiak District, 1984-1999.

Year	Gillnet Sac Roe			Purse Seine Sac Roe			Spawn-on-Kelp		
	Guideline ^a	Actual	Difference ^b	Guideline ^a	Actual	Difference ^b	Guideline ^a	Actual	Difference ^b
1984							350,000	406,586	16%
1985							350,000	^c	
1986							350,000	374,142	7%
1987							350,000	307,307	-12%
1988	5,647	3,695	-35%	16,943	10,472	-38%	350,000	489,320	40%
1989	3,376	2,844	-16%	10,128	9,415	-7%	350,000	559,780	60%
1990	2,993	3,072	3%	8,980	9,158	2%	350,000	413,844	18%
1991	3,143	3,182	1%	9,429	11,788	25%	350,000	348,357	0%
1992	5,662	5,030	-11%	16,985	20,778	22%	350,000	363,600	4%
1993	6,570	3,564	-46%	19,709	14,392	-27%	350,000	383,000	9%
1994	6,277	7,462	19%	18,832	22,853	21%	350,000	308,400	-12%
1995	6,582	6,995	6%	19,747	19,737	0%	350,000	281,600	-20%
1996	5,956	6,863	15%	17,868	18,008	1%	350,000	455,800	30%
1997	5,464	5,164	-5%	16,391	18,649	14%	350,000	^c	
1998	5,280	5,952	13%	15,840	16,824	6%	350,000	^c	
Average	5,177	4,893	-5%	15,532	15,643	1%	350,000	390,978	12%
1999	6,914	4,858	-30%	20,741	15,020	-28%	350,000	419,563	20%

^a Harvest guideline derived from inseason biomass estimate when available, or preseason forecast when weather precluded an inseason estimate.

^b Actual minus guideline divided by guideline.

^c No fishery conducted

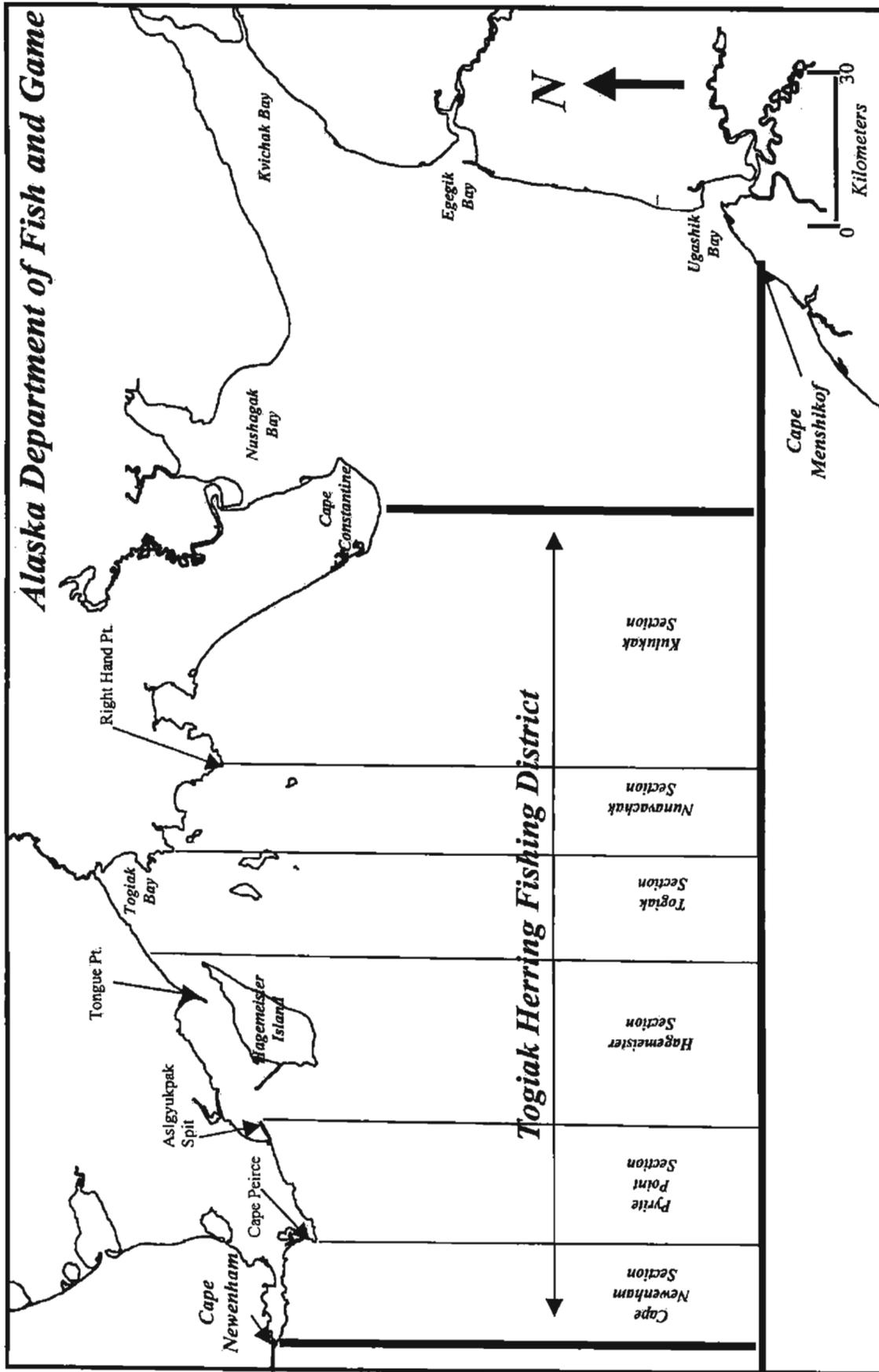
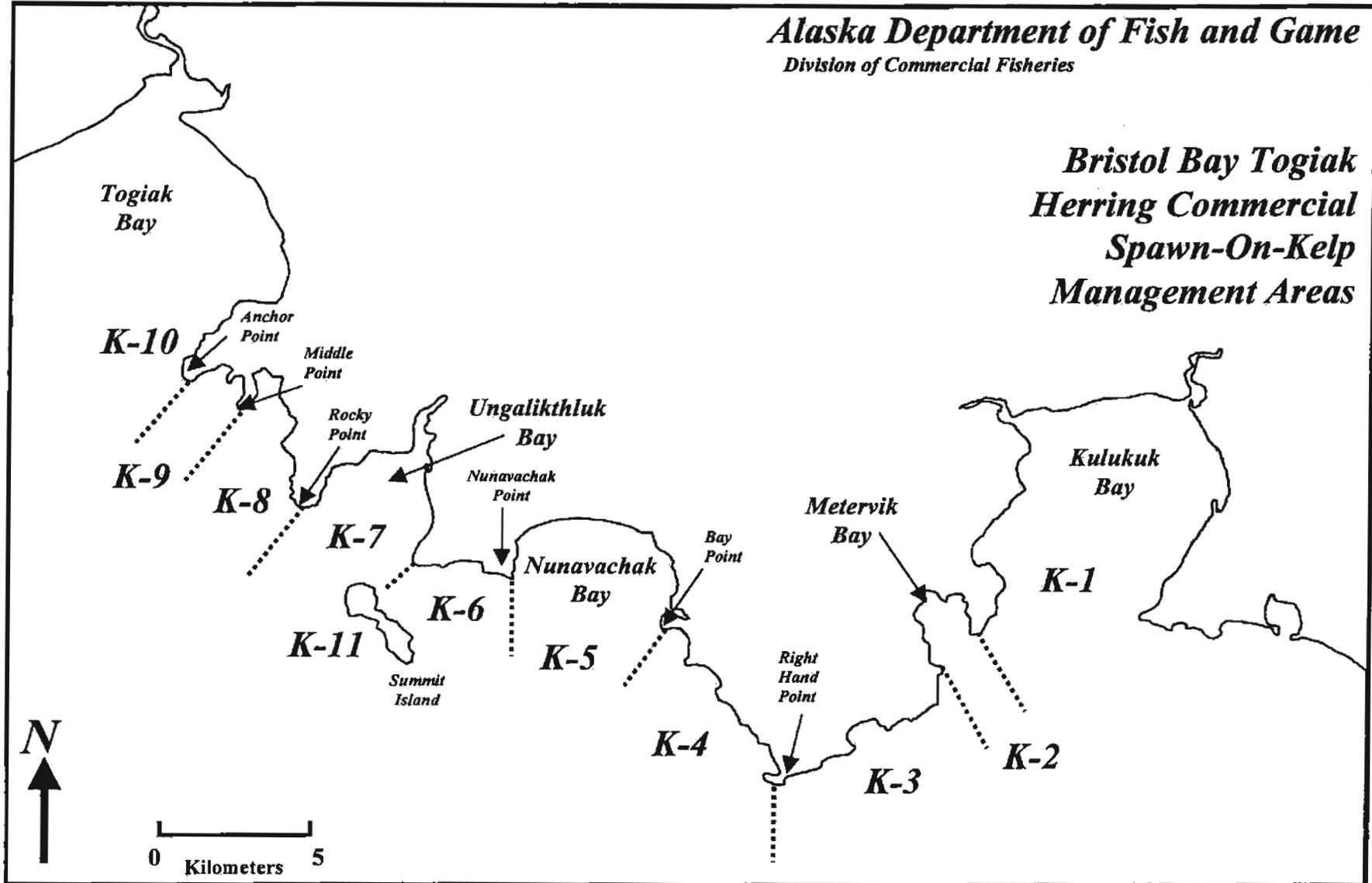


Figure 1

*Alaska Department of Fish and Game
Division of Commercial Fisheries*

*Bristol Bay Togiak
Herring Commercial
Spawn-On-Kelp
Management Areas*



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Figure 2