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DIVISION OF COMMERCIAL FISHERIES MANAGEMENT AND DEVELOPMENT

ANNUAL MANAGEMENT REPORT

-1997-

BRISTOL BAY AREA

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PREFACE

The 1997 Bristol Bay Management Report is the thirty-eighth consecutive annual volume reporting on management activities of the Division of Commercial Fisheries Management and Development 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 1997. 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 Anchorage office, Attention: Editor.

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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 six major river systems: Naknek, Kvichak, Egegik, Ugashik, Nushagak, 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.

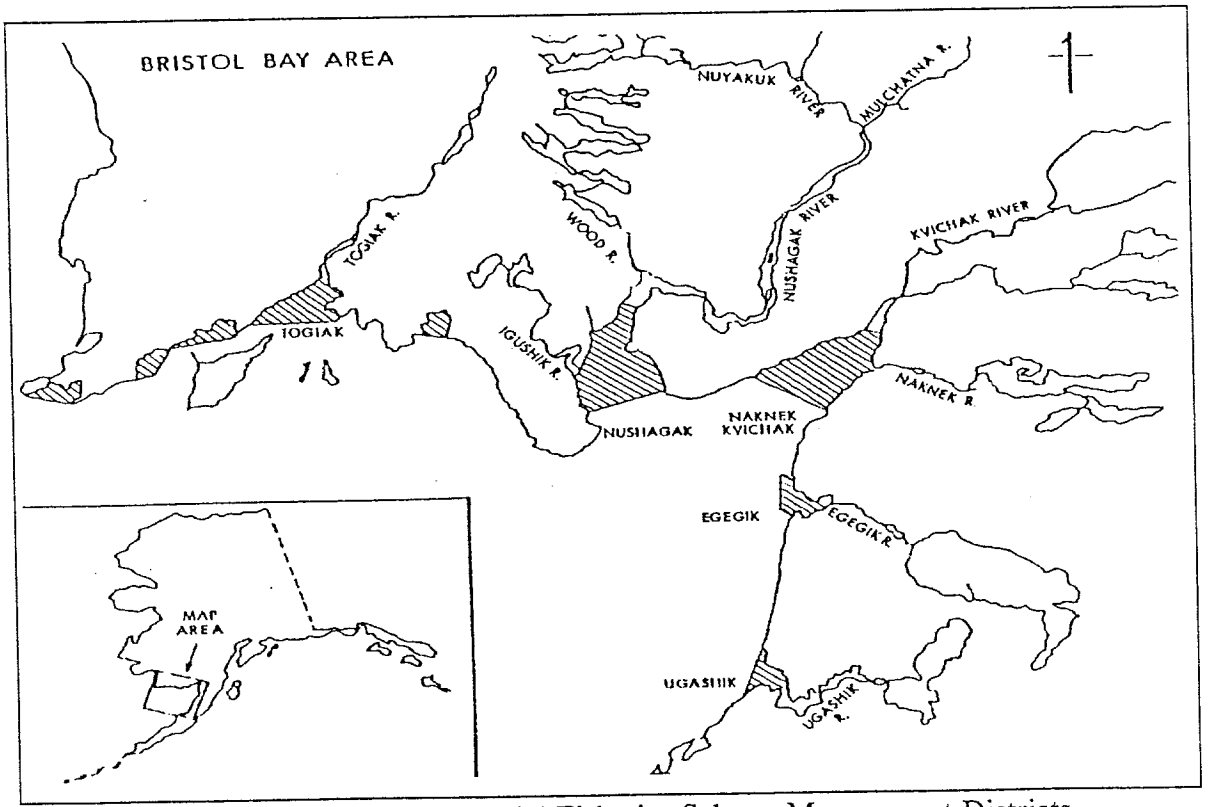

Figure 1. Bristol Bay Area Commercial Fisheries Salmon Management Districts.

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 (1977-1996) average 25.0 million sockeye salmon, 119 thousand chinook, 1.2 million chum, 208 thousand coho, and 1.6 million (even-years only) pink salmon (Appendix Tables 5-9). Since 1987, the value of the commercial salmon harvest in Bristol Bay has averaged $161 million, with sockeye salmon being the most valuable, worth an average $158 million (Appendix Table 29). Subsistence catches average approximately 168 thousand salmon and are also comprised primarily of sockeye salmon (Appendix Table 30). Sport fisheries harvest all species of salmon, with most effort directed toward chinook and coho stocks. Approximately 46,000 salmon are harvested annually by sportfishermen in Bristol Bay.

Management of the commercial fishery in Bristol Bay is focused on discrete stocks with 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 (150f) and set (50f) gillnets. Drift fishermen are the most numerous; 1,891 drift permits were registered in 1997. Setnet permits registered in 1997 totaled 1,017 (Appendix Table 3).

1997 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. Management success is easily measured each season by comparing actual escapements to the goals published for the individual river systems and species.

Preseason Forecasts

Total inshore sockeye salmon production for Bristol Bay in 1997 was forecasted to be 33.6 million fish (Table 1). The inshore sockeye harvest was predicted to reach approximately 24.8 million fish. Runs were expected to exceed spawning escapement goals for all river systems.

The 1997 forecast was based on spawner-return, sibling-return, and smolt-return relationships for each river where data were available. Return information prior to 1978 was omitted in calculations for east side river systems, but was included in calculations for west side river systems. Using recent years production data rather than all data reduced prediction errors for east side rivers during years tested (1984-1994). To further correct this tendency of under forecasting, the 1997 forecast for the Egegik River was increased by it's prediction errors for the years 1984-96.

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" has changed a great deal over the years, but presently it is set at 700,000 chums.

The sockeye harvest allocation for the South Peninsula June fishery this season was 2,246,000 (1,840,000 for South Unimak and 406,000 for the Shumagins), based on the 1997 projected harvest in Bristol Bay. Preliminary catch information indicates that the Shumagin Island fishery landed 449,000 sockeye, and the South Unimak fishery landed 1,179,179 sockeye. The total catch for the June fishery of 1,628,179 was 28% under the total allocation. Due to the low incidental harvest of chum salmon (322,000) in the directed sockeye fishery, the allowable cap of 700,000 was not exceeded.

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 fished specific loran stations on a transect line 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 influences 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. This was due 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 of 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 1997, the exvessel value of the commercial salmon inshore harvest was estimated at $61.7 million (Appendix Table 29), the lowest exvessel value since 1978. The 1977 to 1996 average exvessel value of Bristol Bay commercial salmon fisheries is about $131 million.

During the 1997 season, 7 companies canned, 33 companies froze and 4 companies cured salmon in Bristol Bay. In addition, 17 companies exported fresh fish by air, and 29 companies shipped salmon out by sea in refrigerated sea water (RSW) or brine (Table 33). A total of 35 processors/buyers reported catches from Bristol Bay in 1997.

Run and Harvest Performance by Species

The combined commercial salmon harvest in Bristol Bay totaled 12.7 million fish in 1997 . This was the smallest catch since 1977 (Appendix Table 10) for Bristol Bay.

Sockeye Salmon

The 1997 inshore sockeye return of 18.9 million fish was approximately 78% less than the preseason forecast of 33.5 million (Table 1). Actual runs to individual districts were: 222% less than the forecast for the Naknek/Kvichak District, 49% less than the forecast for the Egegik District, 88% less than the forecast for the Ugashik District, 23% less than the forecast for the Nushagak District, and 116% less than the forecast for the Togiak District (Table 1).

Sockeye salmon dominated the inshore commercial harvest, and totaled 12.3 million fish (Table 4). Sockeye escapement goals were met or exceeded in four of the eight river systems where spawning requirements have been defined. Point goals were achieved in Naknek, Egegik and Wood, and were not met in the Kvichak, Ugashik, Togiak, Igushik and Nushagak Rivers (Table 1).

Chinook Salmon

Chinook salmon harvests in 1997 were below the recent 20-year averages in all districts (Appendix Table 6). The 1997 bay-wide commercial harvest of 76,400 chinook was 36% below the 20-year average of 119,800

Chum Salmon

In 1997, the inshore commercial harvest of 307,100 chum salmon was the smallest since 1957 and well below the 20-year average of 1.2 million (Appendix Table 7).

Pink Salmon

Bristol Bay has a dominant even-year pink salmon cycle. The 1997 return only produced a harvest of only 118 fish.

Coho Salmon

The 1997 bay-wide commercial harvest of coho salmon totaled 50,000 fish, which was well below the recent 20-year average of 208,000 (Appendix Table 9). Coho catches were below average in all of the districts.

Season Summary By District

Naknek-Kvichak District

The total run of sockeye salmon to the Naknek-Kvichak District was projected at nearly 10.8 million fish (Table 1). Escapement goals were set at 4.0 million (range 4.0-8.0 million) for the Kvichak River and 1.0 million (range 0.8-1.4 million) for the Naknek River (App. Table 1). The district harvest forecast totaled 5.6 million sockeye. The actual run to the district totaled 3.4 million sockeye, and the actual harvest totaled 603,809.

Preseason management strategy for sockeye salmon called for some openings early in the season to monitor both run size and age composition in the District. Catches and age composition at False Pass and Port Moller were monitored for marked differences from the forecast. Commercial catches and age class in the Egegik and Ugashik Districts were also closely monitored. There was preseason concern over the strength of sockeye run to the Kvichak River, 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 a 500% increase in effort over the last twenty years observed during the pre-emergency order fishery and a 200% increase noted in the post-emergency order fishery, it was necessary to reduce the weekly fishing schedule from five to four days per week. In addition, on June 1, 1997 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.

The 1997 salmon season in the Naknek-Kvichak District started by regulation on June 2, but the first recorded commercial landings did not occur until June 9 and consisted of small catches of sockeye and chinook salmon (Table 13). The first significant catches of sockeye occurred on June 16 after the three-day weekend closure.

The weekly fishing schedule ended at 9:00 a.m. Friday, June 20 with the harvest totaling 20,433 sockeye and 1,117 chinook. The sockeye catch for the pre-emergency order period was 80 percent less than the 20 year average.

The emergency order period in the Naknek-Kvichak District started at 9:00 a.m. on June 23. The strategy early in the E.O. period was to exploit the Naknek bound fish at a high rate to try and keep the escapement low. With escapement being low as the season progressed more frequent closures could occur post July 1 when historically Kvichak stocks increase in abundance.

On June 22 the Naknek tower project started counting, the Kvichak tower began their counts on June 24 (Table 25). The Kvichak inside test fish project started drifting on June 23 (Table 27). In the evening of June 22 an announcement was made that the district was on short notice. The Naknek section would be the only area under consideration for a possible opening. Catches in the subsistence nets in the Naknek River had been increasing over the last few tides. A district test boat fished the Naknek Section on June 23, June 24 and June 25. On June 25 a build up of fish within the Naknek Section was noted, in the morning of June 26 a period was announced for the Naknek Section for eight hours in the evening of June 26. The catch for the period totaled 20,000 fish (Table 13).

Over the next six days, there were 5 periods ranging from 8 hours to 13.5 hours, the total catch of sockeye for these periods was 341,000 sockeye. Escapements into the Naknek and Kvichak rivers were lagging behind the rate which was needed to achieve the goals at the end of the season. The district closed on July 2 to allow additional fish into the escapements. Escapements did not improve through July 4, so an announcement was made on the night of July 4 that the district would close until further notice. The reasons for this decision were that the escapements into the Naknek and Kvichak rivers were both 5 days behind schedule and the department could not project that the minimum escapement goals would be met in either system. The department would continue to monitor the runs with the hope that additional fish will show so that the district may be reopened.

District test fish boats fished in the Naknek section and the Naknek river from July 5 until July 8. Each day of fishing showed an increase in the movement of fish into the Naknek river with fewer of the fish backing back out and milling. Tower counts on the Naknek river started to climb on July 6 when a total of 130,000 fished passed on that day. Through July 8 the Naknek tower totaled 631,000 with the Kvichak tower count standing at 637,000.

With the commercial district closed additional subsistence oppurtunity was needed other than the river fishery. Based on that need an E.O. was written that opened the Naknek-Kvichak commercial district to subsistence

fishing for the same two day a week periods that occur in the river fishery. The difference would be that 25 fathoms of gill net gear was allowed in the subsistence fishery within the district boundaries.

On the morning of July 9 the hourly tower count on the Naknek river jumped up to 8,000 fish an hour. At 12 noon on July 9 a fishing period was announced for both gear types in the Naknek River Special Harvest Area for 8 hours on July 9. That period produced a catch of 53,000 fish. On July 10 a 7 hour period was announced for the river fishery, a total of 24,000 fish were caught. Escapements past the Naknek tower through July 10 was 837,000, the Kvichak tower had a 949,000 total with an additional 350,000 fish in the river.

Several days were needed to gain additional escapement into the Naknek river, the tower count through July 11 was 903,000 which was on schedule to reach the goal. The Kvichak escapement stood at 1.1 million with an additional 150,000 fish in the river. Projecting ahead the escapement into the Kvichak river would be 1.8 million fish short of reaching the minimum goal of 4 million. A seven hour period was announced for the Naknek river fishery on July 13, this period resulted in a catch of 30,000 fish. Three additional periods were given for the river fishery through July 17. On July 17 it was announced that the E.O. period would be extended in the Naknek-Kvichak District until July 25 to protect fish traveling to the Kvichak river. From July 18 until July 25 eight periods occurred with the last one lasting 9 hours on July 25 and yielding a catch of 1,513 fish. The district as of 9:00 a.m. July 28 resumed its normal four day a week fishery.

A total of 200,000 fish were caught in the river fishery which was 33% of the total catch for the season. The Naknek tower was pulled on July 18 with total escapement reaching 1,025,664 fish, 25,664 fish above the point goal of 1.0 million. The Kvichak tower finished counting on July 23 with a total escapement of 1,503,732 fish, which was 2.5 million fish short of the 4.0 million goal. This was the second lowest escapement into the Kvichak River since 1986 when the total reached only 1.2 million fish. Within the last twenty years, the 1997 escapement of 1.5 million fish was the fifth lowest; only in 1977, 1982, 1986 and 1996 was the overall escapement less.

The week of July 28 saw catches of sockeye salmon drop to a daily total of less than 400 fish. Coho catches were somewhat lower than normal, however historically, significant catches do not begin until the first week of August. Effort levels were low with combined gear deliveries averaging 150 a day. Only three buyers were buying during the last week of July.

The last deliveries in the district occurred on August 18. A total of 25 buyers purchased fish in the Naknek-Kvichak District in 1997. The sockeye salmon harvest totaled 603,000, the lowest catch since 1974. The chum salmon harvest totaled 8,719 fish, which is less than than 5% of the recent 20-year average of 273,000 (Appendix Table 7). The commercial harvest of 2,839 chinook was half the recent ten-year average catch of 5,500 chinook

(Appendix Table 6). Coho salmon harvest reached 678 fish, far below the 20-year average catch of 9,000. This was expected since there was only one delivery in the district after August 1. Subsistence catches are listed in Table 35; harvest levels are average.

Egegik District

The 1997 sockeye salmon run to the Egegik District of 8.6 million fish was the ninth largest run on record, but it was about 4.2 million less than the preseason forecast of 12.8 million sockeye. The harvest of 7.5 million was the ninth largest commercial harvest recorded over the 103-year history of the fishery. An escapement of approximately 1.1 million fish was achieved, which was slightly above the 1.0 million point goal, but well within the goal range of 800 thousand to 1.4 million (Table 1). Total Egegik District sockeye runs during the past four comparable cycle years dating back to 1977 have ranged from 2.5 to 17.6 million fish with an average of 7.6 million, so the 1997 run ranks as the second highest in recent years and it was about average for the recent cycle years (Appendix Table 15).

The 1997 ADF&G preseason Bristol Bay sockeye salmon forecast projected a total inshore run of 33.6 million fish, and a surplus of approximately 24.8 million fish. The projected Egegik District harvest of 11.8 million sockeye was 48% of the predicted bay-wide harvest. (Table 1).

Commercial salmon fishing was opened in the Egegik District on June 2 (Table 14). Effort was light, but sockeye catches per unit of setnet effort were better than average through June 13. A gillnet mesh restriction of no larger than five and on-half inches was invoked from the beginning of the season until July 1 to protect chinook salmon. By regulation, the district is managed by emergency order openings beginning at 9:00 a.m. on June 16.

Daily test fishing, which provides estimates of sockeye passage into the lower portions of Egegik River, began on June 15 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 above average and by June 16 catches indicated that approximately 62,000 sockeye salmon had passed the commercial fishing district and were safely making their way upriver. An aerial survey of Egegik River/Lagoon revealed an estimate of approximately 2,800 sockeye, which is an above average count for this date. With the large Egegik inshore forecast of 12.8 million sockeye salmon and a steady movement of fish inriver, the first fishing period of the emergency order period, an 8-hour period, was scheduled for 8:00 a.m. June 17.

Participation in the June 17 opening was moderate with approximately 266 driftnet and 103 setnet deliveries reported. The catch of approximately 48,000 sockeye (Table 14), was above average for this date. Sockeye catches per delivery were very good for setnetters averaging 162 fish per delivery compared to the 1960 to 1996 average for this date of 23 per delivery. Inriver test fishing results through June 17 suggested that about 113,000 sockeye salmon had entered the Egegik River system. With this estimate of escapement and some good strength in sockeye catches, another 8-hour commercial opening was scheduled for June 19.

The June 19 opening started at 9:30 a.m.. Catch success for setnetters was again very good with an average of slightly over 100 fish per delivery. Drift catches were modest and averaged about the same for 412 deliveries. The total period harvest was approximately 62,000 sockeye salmon bringing the district's cumulative harvest to about 117,000. The inriver test fishery was still showing a good movement of fish into the Egegik River and was now estimating approximately 200,000 sockeye salmon, or 20% of the escapement goal in the river (Table 28). Another 8-hour fishing period was scheduled for June 20.

The June 20 opening started at 10:30 a.m. and ended at 6:30 p.m.. A total of about 505 driftnet deliveries and 156 setnet deliveries were reported yielding a catch of approximately 102,000 sockeye salmon. This was the third largest sockeye catch ever reported for the district for June 20, and it brought the cumulative catch through June 20 to approximately 219,000 or about 2% of the expected surplus of 11.8 million fish. Inriver test fishing revealed about half the fish movement of the previous day and the fishery stayed closed until 12:30 a.m. June 22. As of June 21, the sockeye escapement count at the Egegik Towers was 54,300 or about three days ahead of schedule with normal run timing to reach the goal of 1 million fish.

The June 22 opening produced a sockeye harvest of 137,000 fish bringing the cumulative catch total to 356,000. This total harvest was about 21% below the 10-year average for this date of 450,000. The tower count increased throughout June 22 and another 8-hour fishing period was scheduled for 1:30 a.m. June 23. The tower count rose to 90,000 by 6:00 a.m. June 23 which was well ahead of schedule for this date and another 8-hour period was announced after a brief 4-hour closure. The total sockeye harvest for the 16 hours fished on June 23 was approximately 413,000 fish bringing the cumulative catch total to 769,000. The tower sockeye count through June 23 was 100,000 or 10% of the escapement goal. This was the second highest tower count for this date on record and this escapement was still about three days ahead of expected levels for this date with normal run timing. With this excellent movement of sockeye into the river and the harvest total to date of approximately 6% of the expected surplus another 8-hour fishing period was scheduled for 2:30 p.m. June 24.

The catch for June 24 was not indicative of the increased movement of sockeye salmon into the river and totaled only approximately 242,000 sockeye salmon bringing the cumulative harvest to 1 million. However, the tower count through 6:00 a.m. on June 25 was 106,000 and still ahead of schedule so another 8-hour period was announced for June 25, starting at 4:00 p.m..

The eight hour period produced a harvest of around 339,000 sockeye salmon for a cumulative catch of approximately 1.3 million or about 11% of the expected surplus. Inriver test fishing and tower counts had dropped off and the fishery remained closed until 5:00 a.m. June 27 when another 8-hour period was scheduled. This eight hour period produced a harvest of approximately 484,000 bringing the cumulative harvest to 1.8 million. The tower count through June 27 was approximately 145,000 or about half a day ahead of schedule, however; inriver test fishing was picking up and another 8-hour period was announced for 5:30 a.m. June 28.

This period produced a harvest of around 330,000 fish. The Egegik cumulative sockeye catch now totaled about 2.2 million fish. The recent 10-year average cumulative sockeye catch for this date is 1.9 million fish. Inriver test fishing was still showing good movement and another 8-hour period was scheduled for June 29 at 6:30 a.m..

The June 29 opening yielded a harvest of 187,000 sockeye salmon, bringing the cumulative catch to 2.4 million or 20% of the expected surplus. The tower count increase to 188,000 through June 28 or approximately 19% of the escapement goal and by 7:00 p.m. June 29 is was approximately 229,000. The push of fish into the escapement was fairly steady and was actually increasing each day for the last three days. Given this situation, the next fishing period scheduled for 7:00 a.m. June 30 was increased slightly to a 10-hour period.

This was the first 10-hour period of the season and produced a catch of approximately 363,000 and brought the cumulative harvest to 2.5 million. The tower count increased to 247,000 as of 11:00 a.m. June 30 and after a brief 4-hour closure the fishery reopened for an 8-hour period starting at 9:00 p.m.. Commercial fishers were told to standby at 7:00 a.m. July 1 for the next possible announcement and warned that the next fishing could occur as early as 8:00 a.m. July 1 . The tower count increased to 275,000 as of 6:00 a.m. July 1 and another 8-hour period was announced for 8:00 a.m.. The cumulative Egegik sockeye harvest through July 1 totaled almost 3 million fish and the escapement was close to 300,000 or still slightly ahead of the expected level in spite of fairly steady fishing. Fishing time was increased to 10-hour intervals for the next two periods after taking a tide off between periods. Tower counts slowed up and fishing time was reduced to eight hours following a one-tide closure. This schedule was maintained for the next two

days through July 5 when a longer three-tide closure was needed to augment the falling escapement. Meanwhile, the Kvichak and Naknek Rivers escapements had fallen four to five days behind expected levels and on July 4 it was announced that the Naknek/Kvichak District would be closed until further notice for conservation reasons. Consequently, per the Egegik River Sockeye Salmon Special Harvest Area Management Plan, Egegik fishers were given a 48-hour notice that they would be fishing in a reduced district with the western boundary at the Loran C Line 9990-Z-45110 line effective any period announced for after 8:00 p.m. July 6. The cumulative Egegik catch through July 5 was approximately 5 million sockeye salmon and the escapement tower count was 320,000 fish.

The three-tide closure proved to be the right amount of down time as inriver test fishing improved dramatically on July 6 and 7 averaging 1,351 and 3,853 index points or estimating an additional escapement of approximately 360,000 fish. With this improved estimated escapement an 8-hour period was scheduled for 2:00 p.m. July 7 . The July 7 harvest of 476,000 brought the cumulative harvest to 5.5 million or 46% of the expected surplus. Approximately 700 vessels participated in this fishery and only about 40 vessels left the district when the 45110 line was announced on July 4 (Table 12). The tower count had increased to approximately 503,000 with an estimate of an additional 230,000 fish inriver, but below the counting towers. The tower count for July 7 was about two days behind schedule, but with the inriver test fishing estimate, the total escapement picture was about where is should be with normal run timing. Therefore, another 8-hour period was scheduled for 2:30 p.m. July 8.

The July 8 opening produced a harvest of about 308,000 sockeye salmon and the cumulative district harvest now totaled approximately 5.8 million. By 6:00 a.m. July 9, the tower count increased to 637,000 fish and an additional 150,000 fish were estimated in the river. The next fishing period was announced at 9:00 a.m. and it was another 8-hour period scheduled to start at 3:00 p.m. that afternoon.

By this time, the drift effort in the Egegik District had dropped to 656 vessels as drifters thinking the Egegik run was about over began to leave. The July 9 catch of 391,000 brought the district's season total sockeye harvest to 6.2 million. Tower escapement counts had again slowed down and it was again clear that a longer closure would be necessary to get escapement levels back on track. The fishery stayed closed through July 10, but with much improved inriver test fishing indices it reopened at 4:00 a.m. July 11 for another 8-hour period.

The July 11 harvest was approximately 311,000 bringing the total harvest to about 6.6 million. Drift effort had declined to a little over 600 hundred vessels for this opening and catches averaged around 400 sockeye salmon per drifter. The tower count improved significantly throughout the day bringing the count up to

832,000 by 6:00 p.m. , and the next fishing period, starting at 4:30 a.m. July 12, was announced at 8:00 p.m..

The July 12 8-hour period was not as productive as the previous day and the harvest was only 168,000 fish. The tower count continued to improve as it reached 934,000 sockeye salmon by 6:00 p.m., and another 8-hour period was announced starting at 5:00 a.m. on July 13. This period produced a harvest of 123,000 and although drifters continued to have low catches, setnetters averaged 127 sockeye per delivery which was about average for this date. The escapement goal of one million was reached at 8:00 p.m. on July 13 and the 48-hour waiting period to transfer into the district was waived and in effect for the next opening which occurred at 5:30 a.m. on July 14.

The July 14 period was increased to ten hours and the resulting catch increased as well to 171,000 fish. The cumulative district harvest now totaled approximately 7.1 million. Commercial fishing was announced by emergency order over the next three days and although extended fishing time was allowed, catches dropped off to less than 100,000 for each day. By the end of the emergency order period, the district's cumulative sockeye catch totaled approximately 7.4 million fish, or 38% below the preseason forecast. At 9:00 a.m. Monday, July 21, the fishery reverted to its fall fishing schedule, 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 7,535,569 fish. The counting towers ceased operation on July 17 and the final count totaled 1,103,964. Peak passage occurred on July 7 and 11 when over 170,000 sockeye salmon passed the towers on each of these days. The escapement sex ratio was 42% males to 58% females.

The age composition of the 1997 Egegik District sockeye run was as follows:

Age Group	Catch	Escapement
1.2	6%	2%
2.2	50%	67%
1.3	13%	5%
2.3	30%	23%
Other	1%	3%

The sockeye run was comprised primarily (65%) of progeny from the 1992 escapement of 1.95 million fish (5-year olds) with the 1991 escapement of 2.79 million producing an additional 28% (6-year olds). An above average showing of age 2.1 jacks (2.7% of the escapement) from the 1993 escapement of 1.5 million

fish was evident, and indicates good survival of this year class and possibly a strong contributor to the 1998 return.

Egegik District fishermen harvested 87% of the Egegik inshore sockeye run, slightly above the recent 20-year average of 81%. Preliminary catch data indicates drift gillnets took 87% of the sockeye harvest while set gillnets took 13% which is equal to the recent 20-year average for the gear groups. The 6,556,000 sockeye salmon delivered by driftnet fishers was the ninth largest volume on record for that gear type, and the 980,000 sockeye delivered by setnet fishers was the sixth largest catch on record for that gear group. The peak day in the fishery based on volume landed (778,000 sockeye) was July 5, and the peak catch rate was 97,000 sockeye salmon per hour and occurred on that same day. During the emergency order period, June 16 to July 17, a total of 244 hours were fished in the district, or 33% of the 744 available hours. This total was an 18% decrease from the 296 hours fished in 1996.

The commercial harvest of other salmon species in the Egegik District totaled 91,000 fish, or 1% of the total harvest. The chinook harvest totaled approximately 2,050 fish, or 30% less than 1977 to 1996 (20-year) average of 2,900 (Appendix Table 6). The Egegik chinook run was strong in 1997 and escapement indices were above average. Part of the below average chinook harvest was due to prohibiting the use of gill nets with mesh sizes larger than 5.5 inches in the fishery from June 2 to July 1. The district chum harvest of approximately 53,000 fish was 49% below the recent 20-year average of 103,000 (Appendix Table 7). Essentially no pink salmon were harvested again this season, though odd-numbered-years are not considered pink salmon years. The district coho salmon harvest of 36,000 fish was about average (Appendix Table 9).

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 1,616 chinook, 1,723 chum, and 3,455 coho salmon. The chinook index was above average while the chum salmon index was below average. Though chum salmon aerial escapement indices were below average, a US Fish and Wildlife Service weir on Gertrude Creek counted over 11,000 chum salmon which was 22 times the aerial count of 500 on that system. Aerial index counts of chum salmon escapement on Gertrude Creek, and perhaps on many other systems, 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 is only about half of last year's index, but it is about equal to the totals for 1994 and 1995.

A total of 26 buyers operated in the district this season, which was the same number as last year (Table 33). Most of the harvest was taken aboard floating freezer processors or tendered to other districts for processing. Fish volume was never very high with most fishing period harvests less than 500,000 fish.

Consequently, there were no reports this season of individual buyers in the district reaching processing capacity limits leading to suspensions of buying, or of any processors placing commercial fishers on delivery limits of any kind.

In summary, the salmon season at Egegik was a productive one with the ninth largest harvest on record. A total of 21 out of 26 fishing periods during the emergency order (EO) period were 8-hours in length and no extensions to fishing time were issued until July 16. The drift fleet size was about the same as last year with a peak registration of 767 vessels (Table 12). Setnet catch performance as a whole was very good, with setnetters harvesting about 13% of the run. Escapement needs were slightly exceeded with the final sockeye escapement count of approximately 1.1 million.

Ugashik District

The 1997 Ugashik District total inshore sockeye salmon return was approximately two million fish, or 48% below the preseason forecast of 3.8 million (Table 1). The commercial sockeye harvest of approximately 1.4 million fish was the lowest catch since 1982. The sockeye escapement of approximately 618,000 fish was 12% under the point goal of 700,000. Comparable cycle-year sockeye returns over the last four cycles dating back to 1977 have ranged from 0.3 to 5.5 million fish with an average of 2.7 million, so the 1997 run was 26% below the cycle-year average.

With the preseason forecast for the Ugashik District suggesting a harvest of 3.1 million sockeye salmon, a more cautious approach, compared to the last couple of seasons when surpluses of five to six million were predicted, was warranted. The management approach was to identify strength of sockeye numbers within the escapement and within the district and based on that strength, allow some fishing time. The length of fishing periods would be significantly reduced compared to previous seasons to cycle more fish into the escapement and to distribute fish better within the district. Accordingly, commercial fishers were advised that short fishing periods in late June and early July would be possible with good indications of sockeye salmon abundance. Given the lower forecast and a more cautious management approach, less than 100 vessels elected to start their season in the Ugashik District (Table 12).

Initial landings occurred in the district June 10 (Table 15) with only a few sockeye and chinook salmon landed. Small catches were reported for the remainder of that week as only a few driftnet permits actually fished. During the week of June 16, effort and sockeye catches were increasing and by the onset of the emergency order period, at 9:00 a.m. June 23, the cumulative district harvest was approximately 55,000 sockeye, 755 chinook, and 731 chum salmon. The pre-emergency order period catches were slightly below the recent 10-year (1987 to 1996)

average of 57,000 for sockeye salmon and well below average for chinook and chum salmon. The district was allowed to close at the onset of the emergency order period and district test fishing was scheduled for June 23.

Inriver test fishing, operating about three miles upstream of Ugashik Village, started 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) and district test fishing (Table 9) also showed very few fish within the district. On June 30 district test fishing improved, and inriver test fishing showed the best increase of fish movement up the river to date. Given this information, a brief 8-hour period was announced for 7:00 a.m. July 1.

A total of 95 vessels were registered for the district and 37 setnet landings were made during the first emergency order opening of the season. The July 1 opening yielded a harvest of approximately 72,000 sockeye salmon. Though this catch was better than average for this date it was only about one third of the last year's harvest on this date. The fishery closed as schedule and another round of district test fishing was arranged for July 2. Inriver test fishing indicated that approximately 13,000 sockeye had entered the lower Ugashik River. The Ugashik River counting towers would begin operating the next day.

The July 2 tower count was very modest with the first day's total reaching only 276 sockeye salmon. District test fishing continued on July 3 and delivered the most promising index to date with 1,143 index points in a set made near the Smoky Point Bar (Table 9). Inriver test fishing results indicated a cumulative escapement of approximately 18,000, so the season's second emergency order fishing period, an 8-hour period, was announced for 10:00 a.m. July 4. The period produced a harvest of approximately 179,000 sockeye salmon. An estimated 103 vessels and 62 setnetters participated in this opening. Drift vessels averaged around 1,640 fish per delivery while setnetters averaged about 170 per delivery. Inriver test fishing was not showing much change (Table 29) and estimated a cumulative escapement of about 21,000 sockeye salmon. The fishery closed as scheduled and another round of district test fishing was scheduled for July 5.

Test fish catches at inner district stations and above the inner district boundary markers on the morning of July 6 indicated a fair number of fish within the district and a good push of fish into the river. With the district's total harvest around 306,000 sockeye salmon or 10% of the expected 3.1 million harvest, another opening was scheduled for 12:00 noon, July 6.

This was a 6-hour period and produced a harvest of 217,000 sockeye salmon. The average setnet catch was around 300 sockeye salmon per delivery, which was about average for this date. Driftnet vessels average about

1,700 sockeye salmon per delivery. The fishery closed as scheduled, but with improved tower counts and inriver test fishing results it would reopen the next day for brief 7-hour period.

The July 7 opening produced the biggest Ugashik District catch so far this season, and as it would turn out, it would be the biggest catch day of the season. Approximately 263,000 sockeye salmon were landed on July 7, bringing the season's total sockeye harvest to 786,000 fish. Compared to the last ten years, this cumulative catch through July 7 was 18% below the average of 961,000. The fishery closed as scheduled and another round of district test fishing was scheduled for July 8.

Inriver test fishing revealed strong pushes of fish into the Ugashik River through July 7 and 8 bringing the estimated escapement level up to 147,000. Allowing for a couple of days of travel time, this level of escapement at the counting towers would be about on schedule for meeting the point escapement goal of 700,000. The results of District test fishing were also encouraging with very good indices achieved above the inner district boundary markers (Table 9). With these results, the next fishing period was scheduled for 2:00 p.m. July 9.

This period was not as productive as the previous one with approximately 184,000 sockeye salmon landed. Setnetters averaged 382 sockeye per landing, while 169 drift vessels delivered 777 salmon for each fish ticket written. The district's total sockeye catch was now approximately 970,000 fish. The fishery closed as scheduled and district test fishing was again scheduled for the next day. The tower count through July 9 was 61,000 or about one day behind expected levels.

Inriver test fishing was still holding up and through July 10 it had accrued a cumulative total of 7,367 index points indicating that the escapement was now around 228,000 fish, or 33% of the goal. The Ugashik tower count was approximately 96,000 (Table 25) or still about a day behind the expected level. District test fishing again showed a good abundance of fish just above the markers but below the inriver test fishery. Commercial fishers were put on short notice to standby at 3:00 p.m. July 11 for a possible opening at 4:00 p.m.

The Ugashik River tower count improved to 135,000 by 2:00 p.m. July 11 with an hourly rate of 4,700 which would have produced a daily passage of over 90,000 fish and brought the cumulative escapement to over 180,000, or the expected level for this time. Therefore the next period, a 6-hour period, was announced to start at 4:00 p.m.

The July 11 opening produced a sockeye catch of about 185,000 bringing the cumulative harvest total to approximately 1.2 million fish. Driftnet and setnet catches averaged 547 and 313 sockeye salmon per delivery, respectively. The Ugashik counting tower count increased by 48,000 sockeye salmon and the cumulative tower count was 144,000. The fishery closed as scheduled and district test fishing continued the next day. Very few fish

were seen in the inner part of the district, however; good abundance was showing in the outer district. The tower escapement count increased by another 49,000 fish bringing the cumulative count through July 12 to approximately 193,000 sockeye salmon. Inriver test fishing estimated another 175 thousand fish in the river below the counting towers. District test fishing would continue the next morning and commercial fishers were told to standby at the regular announcement times for the next possible announcement.

District test fishing on the morning of July 13 recorded very good indexes above the inner district markers. The tower count stood at 205,000 through 10:00 a.m. and inriver test fishing results estimated another 200,000 fish in the river. Given these results, a 7-hour fishing period was announced at noon to start at 5:00 p.m. that evening.

The July 13 opening produced a harvest of only 135,000 to a fleet that had now grown to approximately 375 drift vessels. Drift fishers averaged 278 sockeye salmon per delivery while setnetters averaged 314. The cumulative harvest now totaled 1.3 million fish. The tower count through July 13 was 230,000 fish or still about a day behind expected levels for this date. The fishery closed as scheduled and would stay closed through July 14 pending additional escapement and a greater fish abundance within the district.

By 2:00 p.m. on July 15 things had improved. An aerial survey at noon revealed about 93,000 fish in the river just below the lagoon and the cumulative tower count at 2:00 p.m. was 305,000. Inriver test fishing indicated another 140,000 fish in the river. Given these positive signs, it looked like escapement levels were back on track with expectations. The next 6-hour fishing period was announced at 3:00 p.m. to start at 6:00 p.m. that evening.

The July 15 opening was disappointing with only about 74,000 sockeye salmon landed. Drifters averaged 188 fish per landing while setnetters averaged 189. The tower count was not up to expectations either. The daily passage of only 61,000 brought the cumulative count up to 334,000 or approximately half a day behind expected levels. Strong winds were believed to have been a factor in the lower than expected tower counts. District test fishing was again arranged for the next day but the results were not encouraging. At this point, it became apparent that a longer closure would be necessary to improve escapement levels. District test fishing continued through July 19 with some favorable results above the inner district markers, but tower counts did not improve enough to warrant fishing. Inriver test fishing and district test fishing were suspended after July 18 and 19 respectively. The estimated amount of the run remaining and needed escapement would not allow for much, if any, fishing without actual escapement tower counts. Indeed, the fishery remained closed from July 16 through July 27. The tower counting project was terminated on July 29 with a final count of 618,396. The fishery reopened Monday, July 28 under its fall fishing schedule of 9:00 a.m. Mondays to 9:00 a.m. Fridays. From July 28 to the end of August approximately 38,000 sockeye salmon were landed by a couple of dozen fishers that remained in the district. The district's total season sockeye harvest was approximately 1.4 million fish.

Approximately 10,600 sockeye salmon in Dog Salmon River, and 27,600 sockeye salmon in King Salmon River were later counted during an aerial survey on August 6, bringing the Ugashik drainage sockeye escapement total to 657,000. The peak sockeye count at the counting tower occurred July 15 when about 61,000 sockeye were tallied. The escapement was well distributed and represented throughout all segments of the run. The sockeye escapement sex ratio was 43% males to 57% females.

The age composition of the 1997 Ugashik District sockeye return was as follows:

Age Group	Catch	Escapement
1.2	8%	19%
2.2	44%	45%
1.3	29%	23%
2.3	17%	10%
Other	2%	3%

The commercial harvest of other salmon species totaled approximately 25,000 fish or 2% of the total district's harvest. The harvest of 1,084 chinook salmon was 73% below the 20-year (1977 to 1996) average of 3,950 (Appendix Table 6). Ugashik chinook escapement indices ranged from below to above average. The total drainage count of 4,166 was 118% below the 1980 to 1996 average of 4,696. The chum salmon harvest of approximately 16,400 fish was well below average, while the coho harvest of 7,700 fish was 72% below the recent 20-year average (Appendix Tables 7 and 9). Chum salmon escapement indices ranged from slightly below average to above average with a cumulative drainage count of 30,145. Pink salmon harvest in the Ugashik District was negligible in 1997 (Appendix Table 8).

The Ugashik District fishery harvested approximately 68% of the sockeye return in 1997 which was about average for the recent 20-year (1977-1996) removal rate. Peak catch per hour occurred July 7 when approximately 263,000 sockeye salmon were landed in seven hours, or 37,600 per hour. Peak catch per unit effort in the district occurred July 6 for drift gillnets with 1,771 sockeye salmon landed per permit. For set gillnets, peak catch occurred on July 9 with approximately 382 sockeye salmon landed per permit. Based on preliminary catch totals it appears drift gillnets took about 88% of the sockeye harvest while set gillnets caught 12%. The 20-year (1977 to 1996) average percentages of the sockeye harvest by gear type are 90% for drift and 10% for set gillnet. The fishery was open 55 hours or 9.5% of the 576 hours available during the emergency order period. This was the least amount of fishing time allowed during the EO period since 1978 when the EO period was not fished at all that year.

A total of 20 buyers operated in the district during the season (Table 33), two more than last year. Nearly all the catch was either frozen on floating processors or tendered to other districts for processing. There were no reported instances of lack of processing capacity during the sockeye season. The strategy of shorter fishing periods provided for some fishing time through the middle of the season and held the interest of both commercial fishers and processors. The quality of most of this year's harvest was again reported to be very good.

Nushagak District

In January 1996, the Board of Fisheries adopted the Nushagak Coho Salmon Management Plan (5 AAC 06.368), the Wood River Special Harvest Area Management Plan (5 AAC 06.358) and regulations concerning in season mesh size restrictions. No regulations that directly affect management of the Nushagak District were adopted or amended prior to the 1997 season.

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 (NCSMP) (5 AAC 06.361). The plan was adopted in 1992 and amended in 1995.

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. The 1997 season was the fifth year the department has managed under this plan.

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 results from size selective harvests. To address this concern in 1997, the department adopted a strategy of in the commercial fishery of fishing after inriver pulses of fish into the

Nushagak River. Allowing untargeted fish into the river was intended to lessen the effects of selectivity in the commercial fishery and allow fish with a desirable age distribution to enter the river.

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 in season 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 (June 8 to June 20) before the majority of fish discolor and become soft, and before many fish migrate inriver. 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 and the need to maintain quality and value.

The 1997 Nushagak District chinook salmon forecast was 156,000. About 69,000 chinook salmon were projected to be available for commercial harvest assuming in inriver passage of 75,000 fish and an average lower river subsistence harvest (12,000). Assuming an average harvest during the sockeye fishery of 20,000 to 25,000 chinook salmon left about 45,000 chinook available for a directed commercial harvest. A subsistence catch monitoring project was initiated at Lewis Point in 1997 to improve the ability to detect when chinook salmon move into the river (Browning *in prep*).

Harvest potential in the sport fishery, given an inriver abundance of 75,000 fish, was estimated to be 10,000 chinook salmon, or 50% greater than the guideline harvest level. On January 30, 1997, department staff issued a preseason emergency order reducing the bag and possession limit for Nushagak chinook from 3 per day, of which 2 may be over 28 inches, to 1, no size limit. The early restriction was intended to reduce the harvest potential in the sport fishery by 50% to limit the harvest to the guideline harvest level prescribed in the management plan. A fishery survey of the Nushagak and Mulchatna chinook salmon sport fishery was conducted in 1997 (Dunaway and Fleischman *in prep*).

Two directed commercial openings were allowed for a total of 16 hours (Table 11). These openings were based on the preseason forecast, in season escapement and subsistence harvest rates and age composition analysis that indicated actual run strength was at least as great as the forecasted run. Peak effort was 278 boats and 72 set nets fished. Commercial harvest during these directed periods accounted for 39,000 chinook salmon (Table 16). Another 25,300 were taken during the sockeye fishery. Commercial harvests for the season totaled 64,294 chinook salmon, or slightly less than the available commercial harvest, based on the preseason forecast.

By June 27, an inriver passage of less than 65,000 chinook salmon was projected for the season. The department announced a catch-and-release restriction for the Nushagak and Mulchatna Rivers effective June 30 and continuing through the remainder of the season.

Final sonar passage was estimated at about 41,000 chinook salmon (Table 26). In early August, escapement surveys of the majority of chinook salmon spawning areas were flown and escapement was estimated to be 82,000 spawners, or twice the estimated sonar passage. Significant chinook salmon were missed by the sonar and the estimate of spawning escapement was based on aerial surveys. Problems with the sonar are discussed below.

Biological samples collected at the sonar in 1997 indicated a dis-proportionately low number of large (age-5 through age-7) chinook salmon. However, reports from sport fishers conflict with the sampling results. Because an unusually large component of the run is believed to have migrated upstream offshore of the sonar beams and were not sampled, the age composition of the inriver passage was not estimated. The success of the management strategy of pulse fishing to allow fish with a desirable age distribution to enter the escapement remains unknown.

The 1997 chinook salmon run was approximately 164,000 fish, very close to forecast (Appendix Tables 2 and 21).

Sockeye

Unlike commercial fishing in other Bristol Bay districts, the sockeye fishery in Nushagak District is not regulated by a management plan. The Nushagak District sockeye fishery is managed to achieve biological escapement goals 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 Igushik River run can be managed independently 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 pre-season forecast for the sockeye run to the Nushagak District totaled 5.7 million salmon, the second largest projected run since 1982 (Table 1). Strength of the forecasted Wood River run was above average (1986-95), while the Nushagak run was expected to be average; the forecasted return to Igushik River (1.0 million) was about 20% less than average (1986-95). 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 timing and migratory routes overlap to a high degree. The Wood River Special Harvest Area Management Plan provides a stock specific

management tool to target Wood River sockeye salmon, but only as a means to conserve coho salmon. The plan does not allow 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 proportions in the district, and harvests are not selective, opening timing may be used in a limited manner to target or conserve the Wood or Nushagak stocks. However, without a stock-specific means to exploit sockeye, Wood River sockeye surplus cannot be fully harvested without sacrificing the Nushagak River escapement goal when the Wood River run is more than twice as large as the Nushagak River run.

From 1994 to 1996, Wood River runs were more than three times larger than Nushagak River runs due to high production in the Wood River and low production in the Nushagak River. In each of these years, sockeye escapement in the Wood River exceeded the upper range of the escapement goal, while escapement in the Nushagak River fell below the goal. Although the Wood River run was projected to be only about twice as large as the Nushagak River run in 1997 based on the forecast, recent production trends presented a concern that differences between the runs would be greater than forecasted. To conserve Nushagak stocks, the department would limit commercial fishing early in the sockeye run. Should Wood River escapement be more than twice the escapement in the Nushagak River, the department would also strive to balance shortfall in the Nushagak River with surplus in the Wood River.

To conserve Nushagak River sockeye stocks, commercial fishing was not permitted in the Nushagak Section until late June 30, after very large test fish catches above the district were obtained. From June 22 to June 30, increasing district test fish catches indicated an increase in sockeye abundance in and above the district (Table 10). Escapement estimates during this period were well above average levels in the Wood River, but Nushagak River escapements lagged behind expected levels. Early season fishing effort was large. By June 29, the drift gillnet fleet registered 430 vessels in the Nushagak District (Table 12). The large fishing effort and early indications of a large difference between the size of the Wood and Nushagak River runs heightened concern for achieving the Nushagak River escapement goal.

Through 2:00 p.m. June 30, Wood River escapement totaled 268,000 sockeye salmon, or 27% of the biological escapement goal (Tables 24 and 30). About 87,000 sockeye were estimated in the Nushagak River, which comprised only 16% of the Nushagak escapement goal (Table 26). Since commercial fishing remained closed prior to June 30, these escapement estimates provided the first substantial indication of an imbalance between the Wood and Nushagak runs of the season. With no lag included to accommodate any difference in run timing, the June 30 escapements indicated a Wood River run at least three times as large as the sockeye run to the Nushagak River. Test fish indices increased sharply on June 30 when one set totaled over 25,000 index points.

The first commercial opening was announced June 30 in response to the increase in test fish catch rates (Table 11). Duration was limited to six hours due to the large disparity between Wood and Nushagak River, the risk that fish caught in the district test sets may not continue into the rivers, and the large fleet size. Preliminary catch estimates (330,000 sockeye salmon) were above average for that date, but the catch rates were lower than average (Table 16).

Considering the low exploitation prior to July 1, early catch and escapement estimates indicated that the sockeye run was late and/or smaller than forecast. Following the first opening test fish success and escapement rates in the Wood and Nushagak River moderated, but remained steady. Test fish catches increased for the second time mid-afternoon July 2 and the second opening was announced shortly afterwards. From July 2 through July 8, fishing time was regulated in the Nushagak Section to balance escapement surplus in the Wood River with escapements less than levels required to achieve the escapement goal in the Nushagak River.

Through July 5, escapement estimates in the Nushagak River (180,000) lagged the level required to achieve escapement goal in the Nushagak by three days, and Wood River escapement (814,000) exceeded levels required to achieve that goal by five days. The difference in escapement between rivers indicated that, to achieve the lower escapement goal range in the Nushagak River, Wood River escapement would exceed the upper goal range without a stock specific management tool that could be used to target Wood River sockeye.

On July 6, department staff met to discuss the use of an Emergency Regulation to open a portion of the Wood River to commercial fishing. The Department found that an emergency existed and the facts constituting the emergency included:

- When the Wood River sockeye run is substantially stronger than the Nushagak River run, the commercial fishery is managed to achieve the minimum escapement goal of 340,000 in the Nushagak River, and an escapement not to exceed 1.2 million in the Wood River.
- At current escapement rates managing for the Nushagak River minimum escapement goal is expected to result in a Wood River escapement that will exceed 1.7 million sockeye. This is because: 1) the Wood River sockeye run is estimated to be more than five times as large as the Nushagak River run, 2) current daily escapement into Wood River is eight to ten times greater than daily escapement into Nushagak, 3) Nushagak sockeye are harvested at a greater rate in Nushagak District since Nushagak sockeye are larger than Wood River sockeye, and 4) run timing and spatial distribution of the two stocks within the District are very similar making it very difficult to institute stock specific harvest strategies.
- In Wood River, impacts from successive large escapements each year between 1994 and 1996 combined with extremely low water levels in 1997 may result in even lower production than that usually associated

with escapements greater than 1.7 million sockeye. Escapements of 1.7 million sockeye represent a foregone harvest of over 500,000 sockeye.

- Allowing additional harvest of Wood River sockeye within Wood River will provide a stock specific harvest area which will help reduce foregone harvest of Wood River sockeye and will also help reduce the harvest rate on Nushagak River sockeye and increase the likelihood of meeting the minimum escapement goal.
- While the Department has authority to allow fishing within Wood River, it cannot restrict gear length or repeal set net registration requirements. To open this area to commercial fishing without these regulatory controls would create an unmanageable and disorderly fishery due to congestion and gear conflicts. Using the existing legal limit of drift gear, one vessel can block almost the entire width of Wood River at some locations.

The commissioner and lieutenant governor signed an emergency regulation into effect on July 8, 1997 based on the findings above. The emergency regulation allowed the department to open and close, by emergency order, the fishing season in the Wood River with gear restrictions provided in the Wood River Special Harvest Area Management Plan. The emergency regulation gave the department this authority for the purpose of achieving the minimum escapement goal for sockeye salmon in the Nushagak River, while providing opportunities to harvest Wood River sockeye salmon in excess to spawning needs. At 8:00 p.m. July 8, waters of the Wood River Special Harvest Area were closed to subsistence fishing as directed under the plan in preparation to open the area to commercial fishing.

Through July 8, escapement in the Wood River (989,000) was slightly less than the escapement goal for that system, while the Nushagak River escapement (222,000) was comprised of only two-thirds of the minimum escapement goal range. Using a one-day lag for the Nushagak River timing, Wood River escapement through July 8 was over four times as large as the Nushagak escapement. If the Wood River run was four times larger than the Nushagak River run, achieving the minimum range in the Nushagak River would require over 1.3 million sockeye salmon in the Wood River without fishing in the Wood River. On July 9, commercial fishing was permitted for a 7-hour period, concurrently in both the Nushagak and Wood River Sections. Opening both areas provided fishers the opportunity to harvest surplus Wood River sockeye salmon while helping reduce the harvest rate on Nushagak stocks.

Escapement rates increased in the Wood River July 9. The daily escapement estimate (156,000) was the largest of the season and increased the total escapement to 1.145 million. By 12:00 noon July 10, the upper escapement goal range was expected to be achieved within 24 hours. Escapement rates in the Nushagak River had slowed to the point the minimum escapement goal for that system could not be projected to be met using

current escapement counts and late run timing estimates, without exceeding 1.7 million sockeye in the Wood River. Nushagak River sockeye escapement lagged levels required to achieve the minimum escapement goal by two days. Because even late run timing scenarios projected that the minimum escapement goal would not be achieved in the Nushagak River, the Wood River was opened exclusively for a 5-hour period beginning at 7:30 a.m. July 11.

The Wood River was opened to commercial fishing every tide from July 11 through July 13. On July 14, commercial fishing was permitted concurrently in the Wood River and the Nushagak Section again in response to an increase in Nushagak River escapement July 13. The July 13 escapement levels in the Nushagak River were projected to increase the cumulative sockeye escapement to levels required to achieve the minimum escapement goal.

From July 14 through July 23, concurrent openings were scheduled in the Nushagak Section and the Wood River to ensure that the minimum escapement goal in the Nushagak River was achieved. Throughout this period, the Wood River was opened during each tide to maximize opportunity to harvest surplus Wood River sockeye salmon.

The Nushagak River Coho Salmon Management 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 poor parental escapement in 1993 and poor recent production trends, the 1997 coho run was also expected to be poor (less than 100,000). 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 commercial fishery by July 23. Commercial fishing in the Nushagak Section closed for the season July 23 as directed by the Nushagak River Coho Salmon Management Plan.

The Wood River Special Harvest Area Management Plan allows commercial fishing in a portion of the Wood River when the Nushagak Section is closed for coho conservation reasons, and the sockeye escapement goal has been reached in the Wood River. The intent of the plan is to provide an opportunity to harvest sockeye salmon surplus to escapement requirements, while minimizing impact to Nushagak River sockeye after late-season district closures. The impetus for this plan stemmed from closures of the commercial sockeye fishery for the conservation of coho salmon during 1994-1995. In addition to establishing criteria that specify when the department may open the area, the plan defines area, gear specifications and distance requirements, and addresses potential conflicts between commercial and subsistence users. The department may open the WRSHA when the Wood River sockeye escapement goal is achieved and the Nushagak Section is closed for coho conservation, and only when

subsistence fishing in the area is closed. From July 24 through 16:30 July 29, commercial fishing was permitted each tide in the Wood River under direction from the Wood River Special Harvest Area Management Plan.

When salmon buyers notified the department that buying operations would cease in the Nushagak District July 29, staff announced that commercial fishing in the Nushagak District, including the Wood River, would remain closed after 4:30 p.m. July 29. Staff also announced that fishing would remain closed throughout the season unless the department could project that the inriver run goal of 100,000 coho salmon can be achieved and a harvestable surplus of coho salmon remained. Since further commercial fishing was not anticipated, waters of the Wood River Special Harvest Area were re-opened to normal subsistence fishing. No further commercial fishing occurred in 1997.

Wood River Section

Commercial fishing was permitted in Wood River in 1996 for the first time since the early part of the century. Commercial fishing was permitted in Wood River again in 1997. The river was opened to commercial fishing in both years to conserve Nushagak River coho salmon and provide an opportunity to harvest sockeye salmon during the late portion of the sockeye run

In 1997, commercial fishing in the Wood River from July 9 to July 23 was intended to provide opportunity to harvest Wood River sockeye salmon surplus to the upper escapement goal range and conserve Nushagak River sockeye salmon. By far, the majority of fishing effort and harvests in the Wood River occurred during this period; over 98% of the salmon harvested in the Wood River were taken prior to July 24. From July 24 to July 29, the Wood River was opened to commercial fishing to harvest surplus sockeye salmon and conserve Nushagak River coho salmon stocks. Commercial fishing during this time was managed as directed by the Wood River Special Harvest Area Management Plan.

Peak effort levels in Wood River occurred July 11, when 232 drift nets and 99 set nets were observed during an aerial survey. These levels represented about 51% and 43% of peak drift and setnet effort in the entire district at that time. Effort levels decline substantially throughout the season. Effort levels decreased during most openings after the first one to three hours due to reported declines in catch rates.

The Wood River was opened to commercial fishing 37 times between July 9 and July 29, for 217 hours. During seven of these openings, fishing was permitted concurrently in the Nushagak Section. Other openings included only the Wood River. Opening times and duration were scheduled to maximize exploitation of Wood River sockeye and distribute fish throughout the harvest area prior to each opening.

Fishing was generally opened once each tide for four to seven hours. The first two openings began two and one-half hours prior to high water (Nushagak book time), similar to timing used in the district. After much discussion with fishers, openings for the remainder of the season in the Wood River were scheduled one to one and one-half hour before high tide to improve distribution throughout the area prior to each opening. Based on comments from fishers, openings closer to high water improved fish distribution and reduced fleet congestion and gear conflicts near the downstream boundary.

Initial openings (July 11 - July 13) four or five hours in duration appeared to result in substantial numbers of sockeye migrating through the area during fishery closures. This was indicated by dramatic spikes in hourly counts at the Wood River counting tower that regularly followed fishery closures. Department staff responded July 12, again after much discussion with fishers, by relocating the upstream boundary from just downstream of the Muklung upstream to markers located approximately two miles downstream of Silver Salmon Creek. Opening duration was also increased to six hours beginning July 13 to reduce the duration of closures from seven or eight hours to six. Together, increasing fishing area and time appeared to increase exploitation. Hourly tower counts still pulsed at regular intervals, but the magnitude of pulses after July 13 was substantially less.

Exploitation of Wood River sockeye salmon during the period July 11 - July 22 was estimated at 60%. To estimate exploitation, Wood River sockeye harvests during this period were divided into the sum of the Wood River harvest and daily tower counts from July 12 through July 22. The method used to calculate exploitation was crude, and differences in fishing time and area undoubtedly contributed to variations in exploitation throughout this period, as did inriver abundance, weather and fishing effort levels and stock composition of the sockeye harvest. For these reasons, the 1997 exploitation estimate should be regarded as an approximation.

Commercial harvest in the Wood River totaled approximately 446,000 sockeye salmon (Table 18). Daily sockeye harvests peaked July 12 (84,572) and declined to less than 10,000 fish July 19. The majority (55%) of the sockeye harvest was landed by drift nets. However, setnet catch rates averaged higher than catch rates for drift nets every day fished; for the season, setnets averaged 132 fish per day and drift nets averaged 98. Based on observations during aerial surveys and reports from fishers, the majority of sockeye harvested by setnets were taken at or near the downstream boundary, in the first several sites on each bank.

When fishing closed for the season in the Nushagak Section (July 23), as directed by the Nushagak River Coho Salmon Management Plan, escapement levels totaled approximately 1.5 million in Wood River and 373,000 in Nushagak River. Commercial sockeye harvest in the Wood River through July 23 totaled 424,281. Without opening the Wood River to commercial fishing, an escapement of approximately 1,937,000 sockeye would have been required in the Wood River system to achieve the 1997 escapement level in the Nushagak River.

This notion assumes that the Wood River harvest was comprised predominantly of Wood River stocks and that effects of gear selectivity in the district are negligible.

Effects to species of salmon other than sockeye presented a concern in 1997 because little is understood of the chinook, chum and coho salmon stocks in the Wood River. Sockeye salmon represented 96.5% of the 1997 commercial harvest in the Wood River. Harvests of other species included nearly 2,500 chinook, 12,700 chum and over 500 coho salmon. Staff conducted aerial surveys of chinook spawners in the Muklung River and tributaries to the Wood River as a method to monitor effects of the fishery. The aerial count of 1,240 spawners in the Muklung River was the fourth largest since 1967, when surveys were first conducted on this river. Aerial counts of chinook in tributaries to the Wood River, including Ice and Sunshine Creeks, were higher than any previous counts known. For chum salmon, incidental tower counts for that species were much higher than average. Unfortunately, no indication is available for the magnitude of coho salmon escapement in the Wood River system. Based on the aerial survey results and incidental tower counts, chinook and chum returns to the Wood River were probably strong in 1997, and escapement of those species was above average in spite of the Wood River commercial fishing activity. Catch reporting problems apparent in 1996 did not appear to be a factor in 1997.

Igushik Section

The 1997 sockeye run forecasted for Igushik River was similar in size to recent actual runs, but less than forecasts in other recent years. Since Igushik River escapements from 1989 to 1996 exceeded biological escapement goal ranges in spite of extensive commercial fishing in the Igushik Section, management strategy remained aggressive in 1997. Managers advised fishermen to anticipate regular openings in Igushik Section in June as often as every two tides, once fish were documented in river. This strategy was applied to increase exploitation of Igushik River sockeye salmon over rates during recent years, to harvest sockeye surplus to the Igushik River escapement goal and to provide regular catch rate information to use as an indicator of abundance. By allowing regular early season openings, managers intended to avoid exceeding the escapement goal to the extent experienced in recent years (Appendix Table 1).

The first fish were detected in the Igushik River June 17, during the first test fishing of the season (Table 31). From June 17 through June 19, daily and cumulative test fish indices were the largest for that date since the project began in 1989. Through 12:00 noon July 19, over 6,000 sockeye were estimated past the inriver test fish site. In response to the strong initial test fish catches, the first commercial opening in the Igushik Section was scheduled for 8 hours, to begin at 12:00 noon June 20 (Table 11).

Two additional openings were scheduled in the Igushik Section. Openings on June 22 and June 25 were justified by continued record indices obtained by the inriver test fish project. However, sockeye harvests in Igushik Section were less than expected, given the inriver test fish results and large commercial fleet size (Table 16).

Through 12:00 noon June 24, 45,000 sockeye salmon were projected past the ADF&G test fish project. The Igushik River counting tower became operational June 23, and initial daily counts (June 23 through June 30) were average, in spite of continued record indices in the lower river test fish project. Because the actual escapement estimated at the counting tower was much less than projections based on the test fish results, and Igushik Section commercial harvests were lower than average, commercial fishing was not permitted again exclusively for Igushik Section.

Beginning June 29, cumulative escapement at the counting tower began to lag expected levels. However, test fish indices beginning June 29 increased to levels three to four times as large as indices previously observed. In response to the dramatic increase in test fish indices, commercial fishing was permitted in Igushik Section concurrently with the Nushagak Section, when the Nushagak Section was opened between July 1 and July 5.

Through 6:00 p.m. July 5, sockeye escapement in the Igushik River (18,600) lagged expected levels by five days, and passage estimated by the inriver test fish project (20,000) indicated escapement would continue to lag. On July 5, the minimum escapement goal range could not be projected to be achieved by the end of the season, using current escapement levels and late run scenarios, and fishermen were advised that Igushik Section would remain closed until further notice. The section did not re-open after the closure at 12:00 midnight July 5.

Commercial fishing time in Igushik Section totaled only 61 hours, excluding directed chinook openings. The Igushik Section closure during the sockeye season in 1997 was the first since 1987. Although drift harvests are not estimated for Igushik Section, Igushik Section setnet harvests totaled approximately 29,000 sockeye salmon (Table 17), which represents the lowest setnet harvest in that area since 1977. Sockeye salmon escapement in the Igushik River totaled 128,000, or 15% less than the lower escapement goal range.

Sockeye runs to Nushagak District systems totaled 4.6 million, 18% less than the forecasted runs and the smallest run since 1988 (Table 4, Appendix Table 18). Wood River sockeye comprised the majority (75%), followed by Nushagak (18%) and Igushik (6%). The Wood River run was the only run in Bristol Bay that exceeded the forecast. The Nushagak run was 45% less than forecast. The Igushik return of 293,000 fish represented only 29% of the forecast for that river system. The difference between the 1997 forecasted and actual returns for Igushik River was the second largest in Bristol Bay, exceeded only by the Kvichak River.

Sockeye escapement in the three major Nushagak District river systems was balanced (Appendix Tables 1 and 17). Escapement in the Wood River (1.51 million) exceeded the upper range of the Wood River goal by 26%. In the Nushagak River, the lower escapement goal range was achieved; the final escapement estimate (373,000) exceeded the lower range by nearly 10%, and was 32% shy of the point goal. Although the 1997 Nushagak River escapement was less than the 1996 estimate, escapement into Nuyakuk River (273,000) was larger than the 1996 escapement into that tributary. The lower escapement goal range for the Igushik River was not achieved; escapement in that system (128,000) was 15% below the range and 36% below the point goal.

The preliminary sockeye harvest estimate (2.6 million) for Nushagak District was 33% less than forecast and the smallest since 1988. Peak drift fishing effort (474 vessels) was the largest observed since 1983. Sockeye harvested by setnets comprised about 29% of the 1997 harvest, similar to the recent 10-year average.

Coho Salmon

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 poor parental escapement in 1993 and poor recent production trends, the 1997 coho run was also expected to be poor (less than 100,000). 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 commercial fishery by July 23. In 1997, commercial fishing in the Nushagak Section was closed for the season July 23 as directed by the Nushagak River Coho Salmon Management Plan. Approximately 2,800 coho salmon were harvested prior to the closure. 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 4, the estimated coho salmon escapement was less than 10,000, or less than half of the expected escapement for that date. Total escapement was projected, based on current escapement counts and average run timing, to be less than 60,000. Effective 12:01 a.m. August 7, the sport fishery in the Nushagak and Mulchatna drainages was closed to the taking of coho salmon, including catch and release fishing. Effective at 9:00 a.m. August 7, subsistence fishing in the Nushagak and Mulchatna drainages, including Nushagak Bay and District, was restricted to three days per week, with set gillnets restricted to 10 fathoms.

The management plan directs the department, when the spawning escapement is projected to be less than 50,000, to close all fisheries that target coho salmon, including the subsistence fishery. Through August 10, coho salmon escapement totaled 15,230, well below expected levels for that date. At that time, total escapement could not be projected to reach 50,000 spawners by the end of the season. Effective 9:00 a.m. August 13, the Nushagak and Mulchatna drainages, including Nushagak Bay and District, were closed to subsistence fishing.

In 1997, ADF&G experienced problems with the estimation of chinook and coho salmon escapement into the Nushagak River using sonar. We believe the counts of chinook and coho salmon past the sonar site were substantially lower than the actual number of spawners. The Department took steps within the season to evaluate the scope of this problem once it was detected.

We estimated that the biological escapement goal of 65,000 chinook salmon was achieved. Aerial surveyors observed 41,700 spawning chinook salmon in the Nushagak River drainage. This observation is greater than the sonar count and does not take into account portions of the river not surveyed, effects of spawner stream life and visibility of salmon to the aerial observer. Based on aerial survey results, we estimated the spawning escapement at 82,000 chinook salmon, or twice as large as the sonar count.

We estimated the coho salmon escapement to be at least 50,000 fish. In response to our belief that the sonar was undercounting chinook salmon and unprecedented low water conditions, we initiated a gill net test fishery to examine the lateral distribution of coho salmon in the Nushagak River at the sonar site. We found that the majority of the catch-per-unit-effort occurred offshore of the sonar beam and concluded that the sonar did not count a substantial portion of the coho salmon escapement.

Problems experienced with the sonar project severely impacted the sport fishery for chinook salmon, and also impacted the fall sport and subsistence fisheries. When results of the lateral distribution evaluation were complete, the subsistence fishery was re-opened to a limited, three day per week schedule. The subsistence fishery re-opened on the restricted schedule September 1.

We believe that extremely low water levels, slow water velocities and high temperatures observed in 1997 may have played a part in a larger proportion of chinook and coho salmon migrating offshore of the sonar. It is likely that these conditions combined to cause a much larger proportion of chinook salmon to swim offshore of the sonar beam than in other years. ADF&G Staff will research sources for water level, temperature and flow data with the intent of analyzing possible effects on inriver migration in 1997. However, offshore distribution is not well understood for other years, and needs further investigation.

In 1998 and following years, the department will continue to assess offshore distribution for all species of salmon as an integral part of the sonar project. The objective will be to estimate the proportion of chinook, coho and other salmon species that migrate offshore of the sonar beam and to define how variable the offshore component is between years. Results of this work will be used to determine whether the ADF&G sonar is a viable tool for counting chinook and coho salmon in the Nushagak River.

Togiak District

The 1997 inshore sockeye run to the Togiak River was forecasted to reach 483,000 sockeye salmon, of which 70% were projected to be 3-ocean fish and 30% 2-ocean fish (Table 2). With an escapement goal of 150,000 sockeye past the towers at Togiak Lake, and an additional 25,000 fish (20-year average) spawning in the tributaries below the towers, 308,000 sockeye would be potentially available as harvestable surplus in the Togiak River Section, if the run returned at forecast levels. Smaller sockeye runs to other drainages in the district (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 1997 in the Togiak Section was 22% below the long-term average (1977-1996) harvest of 369,000 fish (Appendix Table 19), therefore, a moderate management approach was planned.

No formal forecast is issued for chinook salmon runs in the Togiak River. Chinook run strength declined from 1984 through 1991; and chinook escapements in the Togiak River fell short of the goal (10,000) from 1985 through 1992. The chinook goal was reached in 1993 through 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. A reduced weekly schedule of approximately 48 hours per week in late June seems to be a sustainable amount of fishing time to achieve the escapement goal and harvest the chinook salmon surplus to spawning needs.

A 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 (1993) in the Togiak River was not available due to water and weather conditions. Commercial coho harvest during the parent year was well below average. No parent year escapement information and below average parent year harvest was the basis for a cautious management strategy for coho salmon in 1997.

The Alaska Board of Fisheries adopted the Togiak District Salmon Management Plan (TDSMP) in January, 1996. This plan set forth certain management guidelines for the Togiak District but the most important facet

of the plan was that it restricted transfer in and out of the Togiak District by prohibiting boats that had fished in any other district to fish in the Togiak District until July 24, and prohibiting boats that had fished in the Togiak District to fish in any other Bristol Bay district until the same date.

Togiak District is managed differently than other districts in Bristol Bay. The district uses a fixed fishing schedule of three days per week in the Kulukak Section, four days per week in Togiak River Section, and five days per week in the Osviak, Matogak, and Cape Pierce Sections. In addition to the restrictions mentioned above, the TDSMP added 36 hours to the 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.

At a public meeting on June 5 in Togiak, department staff discussed the concern for achieving the chinook escapement goal in the Togiak River. Staff announced that fishermen should again anticipate some reduction in the weekly fishing schedule during the last two weeks of June for all sections of the district to reduce the exploitation of chinook salmon, particularly since the new TDSMP would increase exploitation of this stock in early July with the increased fishing schedule. Staff also announced that management focus would shift to sockeye salmon during the first week in July. The extended fishing schedule would begin at that time for the Togiak River Section.

The first landings of the 1997 season occurred on June 10 (Table 20). By the close of fishing on June 14, the cumulative chinook catch in Togiak Section was less than 200 fish, well below the historical average for that date. Effort (number of deliveries) was below average levels, and catch rates (number of fish per delivery) were mixed with some days being below the average, and some above. No definitive indications of chinook run strength were apparent at this point in the season. The department announced via public radio on June 13 that commercial fishing would be allowed in all sections of the Togiak District from 9:00 a.m., Monday, June 16 until 9:00 a.m., Wednesday, June 18; a reduction of 48 hours from the normal weekly fishing schedule in the Togiak River Section.

Based on the 1996 chinook run to the Togiak River of approximately 18,000 fish which was a 20% reduction in run strength from 1995, staff expected a chinook run of similar size. Effort increased in the chinook fishery the third week in June to average levels, daily catch rates were also at average levels. The resulting chinook harvest reached 1,300 fish in the Togiak River Section for the 48-hour opening ending June 18.

Cumulative chinook harvest for Togiak District through June 20 was 1,400 fish, which was well below average for that date. The department announced another 48-hour opening for the week of June 23. Effort had increased to above average levels, and as the daily catches were reported , it became evident that the 1997

chinook run to the Togiak River was weaker than recent years. Togiak River Section chinook harvest from this opening was an additional 1,100 fish, bringing the cumulative harvest through June 25 to 2,500 fish or 40% of the average catch for that date. Discussions with Togiak residents and sportfishing lodge operators indicated that chinook abundance in the Togiak River was comparable to recent years.

Sockeye salmon management began June 30 along with the extended weekly fishing schedule implemented by the new TDSMP. Sockeye escapements exceeded the goal in the Togiak River from 1991-95, 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 in excess of the desired goal. The additional 36 hours added to the weekly schedule by management plan would do this before overall sockeye run strength could be assessed in season.

There was concern among staff preseason regarding the amount of effort that would remain in the Togiak District with the restrictions implemented by the TDSMP. On June 30, 31 drift fishing vessels, and 75 set net permits were registered for Togiak District. The setnet effort was similar to past years while the drift effort was slightly higher than normal for the first week of July, but far less than would normally be seen by mid-July. With the district registration restrictions of the TDSMP, both set and drift gillnet effort should remain stable through July 23, which was historically the 85% point in the sockeye harvest for Togiak District.

Department personnel set up camp and began operation of the counting towers at Togiak Lake on July 3. Although adult sockeye salmon were present when counting began, daily passage rates were below average, and cumulative sockeye escapement began diverging from expected levels.

Reported daily harvests during the first weekly sockeye period were well below average levels particularly in the Togiak River Section. Although effort was comparable to previous years, catch rates were 30-45% below average for the first week in July. In Kulukak Section, sockeye catches were reported to be at or above average levels. With the extended weekly fishing schedule invoked by the TDSMP ending July 5, and the relatively poor performance of the commercial sockeye fishery to date, staff announced at 8:00 p.m., July 5, that commercial fishing would reopen as scheduled at 9:00 a.m., Monday, July 7, but permit holders were advised to stand by at regular announcement times on Tuesday, July 8, for a possible adjustment to the weekly schedule.

The first sockeye aerial survey on the Togiak River was flown July 7 with good visibility. Less than 5,000 sockeye were observed in the Togiak River below the counting towers. This observation was within the range expected for this date, albeit at the low end.

When the Togiak District reopened on Monday, July 7, daily catches in the Togiak River Section again were below average. Catch rates in both Kulukak and Togiak River Sections on Monday were approximately half of the average. Daily sockeye escapement past the counting towers at Togiak Lake continued to fall below average levels. By July 8, only 1,000 sockeye had passed the towers, which put Togiak River escapement several days behind expected levels.

On July 8, staff announced that the commercial fishery would close in all sections of the Togiak District at 9:00 a.m., July 9 due to lagging escapements and poor catch rates. The second week of the extended weekly schedule had been shortened from 132 hours to 48 hours. Permit holders were advised to standby on July 11 for an update on the next weekly fishing schedule. Through July 9, with average run timing, approximately 40% of the sockeye harvest is normally taken. Cumulative sockeye harvest for the Togiak District was only 65,000 fish through this date. It was becoming apparent that the sockeye return was under forecast.

The second sockeye aerial survey of the season was conducted on July 9 after the closure under fair conditions. Fish were observed in all sections of the Togiak River; staff estimated approximately 8,500 fish in the mainstem below the counting towers.

Daily sockeye escapement past the counting towers, although increasing, continued to lag below expected levels. Through July 10, only 1,650 sockeye had been observed. Another aerial survey was flown on July 11 to see if sockeye abundance had increased in the Togiak River below the counting towers. Less than 10,000 sockeye were observed. Instream flows in 1997 were extremely low in most drainages of southwestern Alaska, and low stream flows are known to delay entry of salmon into natal streams. Even with the low water factor, concern regarding achievement of the sockeye escapement goal began to build.

On July 11, staff announced that commercial fishing would reopen in all sections of the Togiak District for a 24-hour period at 9:00 a.m., July 14. The performance of the commercial fishery on what should be the peak of the commercial harvest would tell if sockeye abundance had built up in the district since the last opening. The question of whether the sockeye run was late or weak should be answered with the 24-hour period.

Daily sockeye escapement at the counting towers increased slightly with the first daily count exceeding 1,000 fish occurring on July 13. The cumulative sockeye escapement through July 13 was 4,700 fish. Normally, 25% of the sockeye escapement has past the towers by this date with average run timing.

Another sockeye aerial survey was flown on Monday, July 14 when the Togiak District opened for the 24-hour commercial fishing period. Staff estimated approximately 19,000 sockeye in the mainstem Togiak River below the counting towers. Reported harvest from Monday, July 14 was about half of the average for that date. The fishery closed in all sections of the district at 9:00 a.m., July 15. The question of sockeye abundance in the district had been answered; conservation of sockeye salmon for spawning escapement became the department objective. By July 15, with normal run timing, 60% of the sockeye harvest has occurred and 35% of the escapement past the counting towers has occurred.

Daily escapement past the counting towers at Togiak Lake reached the 4,000-6,000 fish range during the week of July 14; the cumulative escapement was only 12,000 fish by this date, which was now tracking about 6 days behind expected levels.

Aerial surveys continued to document the increase of sockeye salmon escapement into the Togiak River. On July 18, staff estimated 25,000 sockeye in the river below the counting towers. On July 19, the department announced that no commercial fishing would be allowed during the following week beginning July 21

Another aerial survey on July 21 resulted in an estimate of 43,000 sockeye in the mainstem Togiak River below the counting towers. At this time the cumulative sockeye escapement had reached 40,000 fish, and based on normal run timing, this would be the 60% point of the escapement past the tower. There were no indications from aerial surveys or passage rates at the counting towers that the escapement goal would be achieved. Department staff requested a public meeting in Togiak to discuss the sockeye salmon return and the lack of escapement. A meeting was held on July 22 with over 80 permit holders present. Togiak fishers were advised at this time that the commercial fishery would not reopen for sockeye and that the next opening would likely be August 4 for coho salmon.

Sockeye escapement increased in the Togiak River with the peak daily escapement of 9,200 fish occurring on July 24. Daily escapements remained in the 4,000 - 8,000 fish range for the next 10 days and then declined quickly. The final sockeye escapement into Togiak Lake when counting ceased on August 9 was 132,000 fish or 12% below the escapement goal of 150,000 sockeye.

Staff announced on July 31 that all sections of the Togiak District would reopen at 9:00 a.m., August 4 for a 24-hour period instead of the normal weekly schedule primarily to assess coho abundance in the district. The expected harvest on that date would be predominantly sockeye in a normal year, however, due to the weak return of sockeye and the fact that by August 4, over 96% of the sockeye return on average has entered the river, a short commercial opening was thought to be a valuable data point.

The reported harvest from this first coho salmon period (August 4-5) was as expected. Over 5,000 sockeye were caught and less than 100 coho salmon. Staff announced on August 8, that the weekly fishing schedule beginning August 11 would also be reduced to 24 hours. This would allow a short commercial opening to assess coho abundance, yet it was early enough in the coho run to not harvest a large portion of the return. Harvest from the second 24-hour coho opening was low and still predominantly sockeye. These first two periods indicated that the 1997 coho salmon return to the Togiak River was not strong.

Aerial surveys are generally not productive to assess coho salmon abundance in the Togiak River until mid to late August, due to low numbers of coho and high numbers of other salmon species until that time. The commercial catch rates provide the only indication of coho run strength available in early August.

The next weekly commercial fishing period began on August 18. An announcement reducing the weekly schedule to 24 hours was made August 15 based on the previous two coho periods. The daily catches and catch-per-delivery were approximately 50% of the average, supporting the impression of a weak coho return.

Staff announced on August 22 that one more 24-hour opening would be allowed beginning 9:00 a.m., August 25. This opening would occur on what has been the historical peak of the coho harvest. The resulting daily coho catches and catch-per-delivery reported by the processors were approximately 60% of the average. After receiving catch information and reviewing the performance of the four coho salmon periods, department staff announced on August 29 that the Togiak District would remain closed to commercial fishing for the remainder of 1997. Cumulative coho harvest for the entire Togiak District was less than 3,000 fish through the close of fishing on August 26.

One of the most important regulatory changes implemented by the TDSMP was the restriction on district re-registration. The effect of this restriction was to hold both drift and set gillnet effort constant through July 24. By the last week in June, there were 33 drift gillnet vessels, and 66 setnet permits registered to fish in the Togiak District. These numbers were verified by aerial surveys several times between July 1 and July 24. On July 24, 86 drift vessels (62 in Togiak River Section, 24 in Kulukak Section) and 76 setnets (56 in Togiak River Section, 20 in Kulukak Section) were observed fishing in the district. This was the peak for both drift

and setnet effort in the Togiak District. One week later, effort had dropped to 60 drift gillnet vessels and 54 setnets. No fishing occurred in Kulukak Section after July 30. Beginning the second week in August, effort declined to much lower levels for the coho fishery; 6 drift gillnet vessels and 14 setnets were observed on August 22.

Enforcement coverage improved considerably over recent years with additional effort directed at Togiak District. This increased presence lead to increased compliance and fewer complaints inseason.

The preliminary district sockeye harvest totaled 144,100 fish (Table 19 and Appendix Table 20), 69% below the 1977-1996 average of 458,000 and the second lowest on record (Appendix Table 5). The Togiak River Section sockeye catch (91,847) was 77% below the 1977-1996 average, while the Kulukak sockeye catch (49,277) was 14% below the long-term (1977-1996) average for that section (Appendix Table 19). Matogak Section received commercial fishing effort on only 8 days throughout the 1997 season, producing a sockeye harvest of 2,083 fish (Table 22).

Escapement enumeration at Togiak Lake ended on August 9 when the tower project terminated. Togiak Lake sockeye salmon escapement was estimated at 131,682 fish, or 12% below the escapement goal (Table 33, Appendix Table 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 152,307 sockeye. Escapement plus the Togiak River Section catch yielded a total run to the Togiak River of 244,154 sockeye, 50% below the preseason forecast. Sockeye escapement into the Kulukak Section totaled 7,950 fish, 72% below the recent 10-year average, and the lowest since 1976.

The 1997 Togiak District harvest of 6,114 chinook was approximately 29% of the 1977-1996 average (Appendix Table 22). After failing to achieve the escapement goal in 1996, the chinook escapement in the Togiak River reached the desired goal (10,000) in 1997. The escapement estimate of 10,300 chinook was derived from aerial survey under fair visibility conditions. Commercial exploitation of the Togiak River chinook stock in 1997 was 34% (not counting sport and subsistence harvests), less than the average (1980-1996) of 57%. Postseason aerial escapement estimates of chinook salmon on the spawning grounds were much lower than average levels in most systems in the district. Escapement estimates totaled 775 for Kulukak River, with an additional 420 estimated in the Quigmy, Osviak, Matogak, Slug, and Negukthlik Rivers combined. The total district escapement of 11,495 chinook was 31% below the 20-year average of 16,651. The combined total run to Togiak District of 18,609 chinook salmon was 30% below the recent 5-year average, and showed a decrease in run strength for three consecutive years since 1994 (Appendix Table 22).

The 1997 Togiak District chum salmon harvest of 47,459 was 80% below the 1977-1996 average (Appendix Table 23). The commercial catch combined with the district-wide escapement estimate of 106,580 fish determined from aerial survey, produced a total run estimate of 154,039 chum salmon, approximately 31% of the 1977-1996 mean.

The 1997 pink salmon catch for Togiak District was 27 fish , typical for an odd year.

The 1997 commercial catch of coho salmon in the Togiak District (2,976 fish) was the third lowest since 1980, and 92% below of the 1980-1996 average. Post-season aerial survey estimates of spawning escapement were conducted successfully on most streams in the Togiak District in 1997. Coho salmon escapement in the Togiak River and tributaries was estimated to be 20,625 fish, which was 55% 1980-1996 average. District-wide coho escapement was only 39,474 fish with the Negukthlik River uncounted. Comparative counts from previous years are provided in Appendix Table 26.

1997 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 1997, only gillnets were recognized as legal subsistence gear, except that in the Togiak District, spear fishing was also allowed. Net 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.

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

Including all the districts of Bristol Bay, 17 emergency orders relating to subsistence fishing were issued. Descriptions of these emergency orders are located in Table 11 by drainage.

In the Nushagak District, 7 subsistence emergency orders were issued. Subsistence fishing was allowed from 9:00 a.m., June 1 to 9:00 a.m., June 06; from 9:00 p.m., June 06 to 9:00 p.m. June 08; from 3:00 p.m., June 12 to 3:00 a.m., June 14; from 3:00 p.m., June 14 to 3:00 p.m., June 15; from 12:00 noon, July 24 to midnight, September 30. The weekly subsistence fishing schedule and allowable gear was reduced from 9:00 a.m., August 07 to 12:00 midnight, September 30. This schedule opened subsistence fishing from 9:00 a.m. Monday to 9:00 a.m. Tuesday, 9:00 a.m. Wednesday to 9:00 a.m. Thursday and 9:00 a.m. Friday to 9:00 a.m. Saturday. In addition, set gillnets were restricted to 10 fathoms in length. Subsistence fishing area was reduced from 9:00 a.m. August 13 to 9:00 a.m. October 31. This emergency order closed the Nushagak commercial fishing district, the Nushagak River upstream of the Nushagak District upper boundary, and that portion of the Wood River down river of the dock at Dragnet Fisheries to subsistence salmon fishing.

In the Wood River Special Harvest Area there were 2 emergency orders issued. Subsistence fishing in the Wood River Special Harvest Area was closed from 8:00 a.m., July 09 to 6:00 a.m., July 30. Subsistence fishing was reopened 6:00 a.m., July 30 to 12:00 midnight, September 30.

In the Togiak District, 6 subsistence emergency orders were issued for 1997. Subsistence fishing was opened in all sections of the district during to following dated and times: 9:00 a.m., June 26 to 9:00 p.m., June 28; 9:00 a.m., July 10 to 9:00 p.m., July 12; 9:00 a.m., July 16 to 9:00 p.m., July 19; 9:00 a.m., July 24 to 9:00 p.m., July 26; 9:00 a.m., July 28 to 9:00 a.m., August 02; 9:00 a.m., August 06 to 9:00 a.m., August 09.

In the Naknek-Kvichak District the commercial fishing district was closed from July 3 until July 28 due to conservation concerns for the Kvichak river. Additional subsistence opportunity was needed for users in the

commercial district so an E.O. was issued that opened the commercial district to subsistence fishing with 25 fathoms during the two regular weekly 24 hour periods from July 8 until July 25.

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, 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 1997, a total of 1,166 permits were issued for Bristol Bay; the largest number were for the Nushagak and Naknek/Kvichak districts. For the Nushagak and Naknek/Kvichak districts, more permits were issued in 1997 than the average for the past 10 years, due in part to permits being available to all state residents. Fewer permits were issued for the other districts in 1997 than the average for the past 10 years. The number of permits returned in 1997 was 1,051, 90.1% of those issued.

Harvest

The estimated total Bristol Bay subsistence salmon harvest in 1997 was 145,992 fish (Table 35). This number is below both the 20-year average of 167,969 salmon and recent 10-year average of 161,514 salmon. Only the chinook harvest was above the recent 10-year average (Appendix Table 31).

In 1997 as over the last several decades, most of the subsistence harvest was taken in the Naknek/Kvichak (62%) and the Nushagak (32%) districts. The Naknek/Kvichak total harvest of 90,368 fish was slightly below the recent 10-year average of 93,815 (Appendix Table 31). Kvichak drainage communities harvested sockeye salmon at levels below their recent 10-year averages, except Igiugig and Nondalton. Kvichak drainage residents (and other permit holders fishing in the Kvichak drainage) harvested an estimated 59,508 sockeye salmon, compared to a recent 10-year average of 68,405 and 20-year average of 72,918 sockeye salmon. However, the 1997 sockeye harvest was slightly higher than that of 1995 and 1996 (Appendix Table 32).

In the Nushagak District the total estimated subsistence harvest in 1997 was 46,106 salmon. The recent 10-year average is 57,221. All species, except chinook, were harvested in the Nushagak District at levels below their recent 10-year averages, with the sockeye harvest of 25,080 slightly above the historical lows of about 23,000 sockeyes in 1995 and 1996 (Appendix Table 31). The Nushagak chinook harvest in 1997 of 15,318 is the third highest estimated harvest. The Nushagak chinook harvest historical high is 17,709 fish estimated for 1993.

Harvests of all species in the Togiak District in 1997, with the exception of chinook salmon, were below their recent 10-year averages, due in large part to the decreased number of permits obtained and returned by drainage residents. The estimated subsistence harvest in the Ugashik District in 1997 was 3,327. This is the highest estimate over the last 20 years, and is substantially above the recent 10-year average of 2,066. In the Egegik District the estimated subsistence salmon harvest of 3,304 was similar to the recent 10 year average. However the number of permits issued for this district has dropped notably since peaking at 80 in 1992; 34 permits were issued for 1997 (Appendix Table 31).

In 1997, the Bristol Bay subsistence salmon harvest was composed of 80.1% sockeye, 13.1% chinook, 2.0% chum, 4.2% coho, and 0.5% pink 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, 1997.[a]

District and River System	Inshore Run			Escapement				Inshore Catch		
	Forecast	Actual[1]	Percent Deviation[2]	Goal	Range	Actual[1]	Percent Deviation[2]	Projected Harvest	Actual[1]	Percent Deviation[2]
NAKNEK-KVICHAK DISTRICT										
Kvichak River	6,900	1,686	309%	4,000	6,000-10,000	1,504	166%	2,900	182	1493%
Branch River	578	245	136%	185	170-200	218	-15%	393	27	1356%
Naknek River	3,325	1,420	134%	1,000	800-1,400	1,026	-3%	2,325	395	489%
Total	10,803	3,351	222%	5,185	6,970-11,600	2,748	89%	5,618	604	830%
EGEGIK DISTRICT	12,831	8,640	49%	1,000	800-1,400	1,104	-9%	11,831	7,536	57%
UGASHIK DISTRICT	3,804	2,025	88%	700	500-1,200	618	13%	3,104	1,407	121%
NUSHAGAK DISTRICT										
Wood River	3,100	3,480	-11%	1,000	700-1,200	1,512	-34%	2,100	1,968	7%
Igushik River	1,011	293	245%	200	150-250	128	56%	811	165	392%
Nushagak-Mulchatna	1,563	858	82%	550	340-760	373	47%	1,013	485	109%
Total	5,674	4,631	23%	1,750	1,190-2,210	2,013	-13%	3,924	2,618	50%
TOGIAK DISTRICT	483	224	116%	150	140-250	152	-1%	333	92	262%
TOTAL BRISTOL BAY	33,595	18,871	78%	8,785	9,630-16,160	6,635	32%	24,810	12,257	102%

[1] Unless otherwise noted, inshore total runs and catches are preliminary, while escapement data is final.

[2] Percent deviation = (forecast - actual)/actual.

[3] These systems cannot be managed sep. from the major system in the district.

[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 systems 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, catch, escapement, and inshore run. Totals may not equal column sums due to rounding.

Table 2. Inshore forecast of sockeye salmon returns by age class, river system and district, in thousands of fish, Bristol Bay, 1997.

District and River System	2-Ocean			3-Ocean			Other	Total
	1.2 (1993)	2.2 (1992)	Total	1.3 (1992)	2.3 (1991)	Total		
NAKNEK-KVICHAK DISTRICT								
Kvichak River	3,192	1,938	5,130	1,199	571	1,770	-	6,900
Branch River	230	137	367	185	26	211	-	578
Naknek River	365	606	971	1,273	1,082	2,355	-	3,326
Total	3,787	2,681	6,468	2,657	1,679	4,336	-	10,804
EGEGIK DISTRICT	688	5,948	6,636	1,651	4,544	6,195	-	12,831
UGASHIK DISTRICT	1,009	1,579	2,588	735	481	1,216	-	3,804
NUSHAGAK DISTRICT								
Wood River	1,368	117	1,485	1,574	41	1,615	-	3,100
Igushik River	232	38	270	711	29	740	-	1,010
Nushagak River	124	7	131	870	8	878	554	1,563
Total	1,724	162	1,886	3,155	78	3,233	554	5,673
TOGIAK DISTRICT	119	26	145	305	33	338	-	483
TOTAL BRISTOL BAY[1]								
Number	7,327	10,396	17,723	8,503	6,815	15,318	554	33,595
Percent	22	31	53	25	20	46	2	100

[1] 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, 1997.[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	789	513	1,302	1	211	163	375	1,677
	Percent	47.0	30.6	77.6	0.1	12.6	9.7	22.4	100
Branch River									
	Number	118	59	177	0	68	0	68	245
	Percent	48.2	24.1	72.2	0.0	27.8	0.0	27.8	100
Naknek River									
	Number	274	228	502	1	516	328	845	1,347
	Percent	20.3	16.9	37.3	0.1	38.3	24.4	62.7	100
Total	Number	1,181	800	1,981	2	795	491	1,288	3,269
	Percent	36.1	24.5	60.6	0.1	24.3	15.0	39.4	100
EGEGIK DISTRICT									
	Number	461	4,490	4,951	8	1,039	2,483	3,530	8,481
	Percent	5.4	52.9	58.4	0.1	12.3	29.3	41.6	100
UGASHIK DISTRICT									
	Number	238	900	1,138	2	547	306	855	1,993
	Percent	11.9	45.2	57.1	0.1	27.4	15.4	42.9	100
NUSHAGAK DISTRICT									
Wood River									
	Number	1,660	90	1,750	2	1,585	70	1,657	3,407
	Percent	48.7	2.6	51.4	0.1	46.5	2.1	48.6	100
Igushik River									
	Number	124	8	132	1	137	20	158	290
	Percent	42.8	2.8	45.5	0.3	47.2	6.9	54.5	100
Nush-Mulchat. River									
	Number	60	9	69	34	599	18	651	720
	Percent	8.3	1.3	9.6	4.7	83.2	2.5	90.4	100
Total	Number	1,844	107	1,951	37	2,321	108	2,466	4,417
	Percent	41.7	2.4	44.2	0.8	52.5	2.4	55.8	100
TOGIAK DISTRICT[b]									
	Number	53	26	79	3	108	25	136	215
	Percent	24.7	12.1	36.7	1.4	50.2	11.6	63.3	100
TOTAL BRISTOL BAY[1]									
	Number	3,774	6,320	10,100	52	4,807	3,411	8,275	18,375
	Percent	20.5	34.4	55.0	0.3	26.2	18.6	45.0	100

[1] Approximately 510,463 additional sockeye salmon of several minor age classes, or returning to minor Bristol Bay drainages, in 1997 are not included in this total.

[a] The inshore run data does not include the 1997 False Pass/Alaska Peninsula catch of Bristol Bay sockeye or any high seas by-catch of immatures.

[b] Does not include rivers other than Togiak River.

Table 4. Inshore commercial catch and escapement of sockeye salmon, Bristol Bay, in numbers of fish, 1997[a]

District and River System	Catch	Escapement	Total Run
NAKNEK-KVICHAK DISTRICT			
Kvichak River	182,456	1,503,732	1,686,188
Branch River	26,775	218,116	244,891
Naknek River	394,578	1,025,664	1,420,242
Total	603,809	2,747,512	3,351,321
EGEGIK DISTRICT	7,535,569	1,103,964	8,639,533
UGASHIK DISTRICT	1,407,086	618,396	2,025,482
NUSHAGAK DISTRICT			
Wood River	1,967,967	1,512,396	3,480,363
Igushik River	164,861	127,704	292,565
Nushagak-Mulchatna	485,340	373,035	858,375
Total	2,618,168	2,013,135	4,631,303
TOGIAK DISTRICT[1]			
Togiak Lake	91,847	131,682	223,529
Togiak River/Tributaries		20,625	20,625
Kulukak System		7,950	7,950
Other Systems		11,116	2,137
Total	91,847	171,373	263,220
TOTAL BRISTOL BAY	12,256,479	6,654,380	18,910,859

[1] Catch includes Togiak River Section only, "Other Systems" escapement includes Nequkthlik, Ungalikthluk, Osviak, Matogak and Slug River systems.

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

[b] Includes Egegik River Tower count and peak aerial counts for King Salmon River Shosky Creek.

Table 5. Inshore commercial catch and escapement of pink salmon, in numbers of fish, Bristol Bay, 1997.[a]

District and River System	Catch	Escapement	Total Run
	(Insignificant catch in 1997)		

[a] Bristol Bay produces insignificant numbers of pink salmon in odd numbered years; only small numbers were taken incidental to other species in 1997.

Table 6. Offshore test fishing catch indices and estimated inshore daily passage rate of sockeye salmon, Port Moller, 1997.

Date	No. of Stations Fished	Sockeye Catch	Running Mean Length (mm)	Index[1] Daily	Index[1] Cum.
11-Jun	4	33	565	13	13
12-Jun	4	47	552	17	30
13-Jun	4	24	556	12	42
14-Jun	4	69	564	26	68
15-Jun	4	66	551	30	98
16-Jun	4	147	556	47	145
17-Jun	4	97	561	46	191
18-Jun	4	61	562	27	218
19-Jun	4	207	557	82	300
20-Jun	4	181	560	86	386
21-Jun	4	139	550	56	442
22-Jun	4	253	552	102	544
23-Jun	4	245	556	94	638
24-Jun	0	216	561	93	731
25-Jun	4	186	546	76	807
26-Jun	4	227	556	82	889
27-Jun	4	350	550	140	1,029
28-Jun	4	352	555	154	1,183
29-Jun	4	301	547	114	1,297
30-Jun	4	354	552	124	1,421
1-Jul	4	205	552	83	1,504
2-Jul	4	325	545	133	1,637
3-Jul	4	610	545	234	1,871
4-Jul	4	156	536	76	1,947
5-Jul	4	327	541	132	2,079
6-Jul	4	354	543	138	2,217
7-Jul	4	245	544	90	2,307
8-Jul	4	178	543	79	2,386

[1] Indices are based on fish/100 fathom-hours and include interpolations for missed days and stations (in parentheses).

Table 7. Summary of district sockeye salmon test fishing indices in the Naknek-Kvichak District, by index area and date, 1997.[a]

Date	Naknek R. Mouth	Pederson Point	Ships Anchorage	Middle Naknek	Johnson Hill	Division Buoy	Naknek River Inside Stations			
							Red Salmon Cannery	Peter Pan	Leader Creek	Morakas Point
06/23/97	920	53	5	14	177	376	282	274	129	
06/24/97	143		189		97	189	720	396	70	
06/25/97	112		347	103		18	260	476	83	
06/26/97							55	62	222	81
06/29/97							15	263	165	
07/03/97							198	720	376	261
07/04/97							553	297	699	887
07/05/97							882	724	324	197
07/06/97							688	1795	203	407
07/08/97							1329	430	631	1586

[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, 1997.[a]

Index Area	Date
	(No District Test Fishing was conducted in 1997.)

[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, 1997.[a]

Index Area	June							
	23	24	25	26	27	28	29	30
Cape Grieg		5		39		41[b]	14[b]	158[b]
Four Miles North of Smoky Point Nearshor	178		22[b]	18	279	5	64	134
Four Miles North of Smoky Point (Outer li	71	62	58	14	636	38	32	379
Two Miles North of Smoky Point (Outer line)		0	14[b]	90		40[b]	44[b]	88
Smoky Point Bar North Side Inshore				9		26[b]	9[b]	
Smoky Point Bar Offshore end			5	33				18
Smoky Point Entrance			0[b]	8	5	5	0	0
Mid Outer Line	194[b]	201	0[b]	18	0	8[b]	102[b]	333
Bell Buoy								
Four Miles North of Cape Menshikof	13	5	32[b]	14	4[b]	0[b]	36	89
Two Miles North of Cape Menshikof	13	30		5	8	22[b]	46[b]	41[b]
Three Miles South of South Spit (Nearshor	17	0						
South Spit		0	5		0	0[b]		
Dago Creek Mouth								
Pilot Point	0							
Between Pilot Point and Muddy Point		0						
Outer South Channel		0						0

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

[b] Average of two or more drifts.

(Continued)

Table 9. (page 2 of 2)

Index Area	July																
	2	3	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Cape Grieg	5																
Four Miles North of Smoky Point Nearsh		196															
Four Miles North of Smoky Point (Outer	367	248															
Two Miles North of Smoky Point (Outer line)																	
Smoky Point Bar North Side Inshore	463																
Smoky Point Bar Offshore end	204	1,143															
Smoky Point Entrance			223[b]	22													
Mid Outer Line	116[b]	122[b]															
Bell Buoy																	
Four Miles North of Cape Menshikof										696							
Two Miles North of Cape Menshikof	89																
Three Miles South of South Spit (Nearsh	132[b]									551							
South Spit		18[b]				379		301[b]	14	258[b]							
Dago Creek Mouth			154[b]	5	64	137		129									
Pilot Point			183[b]	22	68[b]	38[b]	27	94[b]	38	42[b]		29	14				
Between Pilot Point and Muddy Point		0	60	23	60	56	49	17		48[b]		111	48				
Outer South Channel						80				17							
Inner South Channel						60			5								
Above inner district boundary line west side						26[b]		65									
Above inner district boundary line east si	13	5	168	40	51	298[b]	32	72[b]	10	37	443	729	231[b]	78[b]	58[b]	222[b]	296[b]
Below inner districtboundary line east side			35														
Between Dog Salmon and King Salmon Rivers					86[b]	342[b]	173[b]	436[b]	366[b]	88[b]	068[b]	654[b]	945[b]	111[b]	218[b]	411[b]	522[b]

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

[b] Average of two or more drifts.

Table 10. Summary of district sockeye salmon test fishing indices in the Nushagak District, by index area and date, 1997. [a]

Date	Start Time	Hanson Point	Across anson Pt.	Tule Point	Across ule Point	Picnic Point	Grassy Island	Lower Grassy Is	Nushagak Point	Pile Driver	Queen Slough	Clark's Point	Libby Cabin	Upperline West	Ekuk Bluff	Peter Pan	Olsen Ville	Kanak-anak	Upper W. Marker
06/22/97		0	411	5,783		600		4,177									411		
		368		9,120		2,055													
06/23/97	06:45	968	1,382	4,714		2,807		4,554		438		441							
						2,081				1,304									
06/25/97	09:20	4,648	2,198	3,816	7,500	10,703		5,408		9,565	392								
06/25/97	21:38	4,878	750	5,574		12,093				1,786	566								
06/26/97	22:02	4,348	1,338	10,336		7,431		4,977		1,469		0							
06/27/97	10:36	3,415	5,393	10,887	4,385	1,040		5,529		4,981	0	0		0					202
06/28/97	11:18	4,041	4,506	9,000	3,367	0		2,007		7,755							242		
		4,286				1,706													
06/29/97	12:46	1,475	1,339	8,612		7,059		8,049		1,017		0	570		4,332				
06/30/97	00:27					6,083	6,667		2,412	741		6,244				2,521		543	
										952									
06/30/97	13:40	3,186	4,918	8,788		25,758		12,439		2,009									
07/01/97	14:42	1,765	3,939	5,825		12,281	1,475			559									
07/02/97	3:52	6,590	5,152	9,775		4,051		1,825										2,463	
07/02/97	14:53	1,593	9,323	9,711		8,715		7,883										1,513	
								25,806											
07/03/97	15:45	2,029	6,567	10,789		7,977	807												
07/04/97	05:52	8,000	5,246	8,298		0	0											1,662	
07/04/97	16:38						1,558			614		0						755	
07/10/97	10:00	4,242	3,251	8,955		3,529	0											3,348	

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

Table 11. Commercial Fishing Emergency Orders, by district, Bristol Bay, 1997.

Number[1]	Date and Time				Effective time
Naknek-Kvichak District					
AKN.02	June 2	9:00 a.m.	to July 17	9:00 a.m.	Restriction [2]
AKN.01	July 8	9:00 a.m.	to July 17	9:00 a.m.	Subsistence [5]
AKN.55	July 17	9:00 a.m.	to July 25	9:00 a.m.	Restriction [11]
AKN.02	July 17	9:00 a.m.	to July 25	9:00 a.m.	Subsistence [5]
Naknek Section					
AKN.11	June 26	5:30 p.m.	to June 27	1:30 a.m.	8 hrs. [3]
AKN.14	June 28	6:30 a.m.	to June 28	2:30 p.m.	8 hrs. [3]
AKN.17	June 29	8:30 p.m.	to June 30	4:30 a.m.	8 hrs. [3]
AKN.22	July 01	9:00 a.m.	to July 01	5:00 p.m.	8 hrs. [3]
AKN.25	July 02	10:00 a.m.	to July 02	6:00 p.m.	8 hrs. [3]
Kvichak Section					
AKN.15	June 28	6:30 p.m.	to June 29	2:30 a.m.	8 hrs. [9]
AKN.23	July 01	9:30 p.m.	to July 02	5:30 a.m.	8 hrs. [9]
Naknek River Special Harvest Area					
AKN.36	July 09	3:00 p.m.	to July 09	11:00 p.m.	8 hrs. [3]
AKN.38	July 10	4:30 p.m.	to July 10	11:30 p.m.	7 hrs. [3]
AKN.43	July 13	7:30 a.m.	to July 13	2:30 p.m.	7 hrs. [3]
AKN.47	July 14	8:00 a.m.	to July 14	3:00 p.m.	7 hrs [3]
AKN.49	July 16	9:30 a.m.	to July 16	5:30 p.m.	8 hrs. [3]
AKN.54	July 17	10:30 a.m.	to July 17	6:30 p.m.	8 hrs. [3]
AKN.56	July 18	11:00 a.m.	to July 18	7:00 p.m.	8 hrs. [3]
AKN.57	July 19	12:00 noon	to July 19	8:00 p.m.	8 hrs. [3]
AKN.58	July 20	1:00 p.m.	to July 20	9:00 p.m.	8 hrs. [3]
AKN.59	July 21	2:00 p.m.	to July 21	10:00 p.m.	8 hrs. [3]
AKN.60	July 22	3:00 p.m.	to July 22	11:00 p.m.	8 hrs. [3]
AKN.61	July 23	4:00 p.m.	to July 23	12:00 midnight	8 hrs. [3]
AKN.62	July 24	5:00 p.m.	to July 25	9:00 a.m.	16 hrs. [3]
Egegik District					
AKN.01	June 02	9:00 a.m.	to July 01	12:01 a.m.	Restriction [2]
AKN.03	June 17	8:00 a.m.	to June 17	4:00 p.m.	8 hrs. [3]
AKN.04	June 19	9:30 a.m.	to June 19	5:30 p.m.	8 hrs. [3]

(Continued)

Table 11. (Continued)

Number[1]	Date and Time				Effective time
AKN.05	June 20	10:30 a.m.	to June 20	6:30 p.m.	8 hrs. [3]
AKN.06	June 22	12:30 a.m.	to June 22	8:30 a.m.	8 hrs. [3]
AKN.07	June 23	1:30 a.m.	to June 23	9:30 a.m.	8 hrs. [3]
AKN.08	June 23	1:30 p.m.	to June 23	9:30 p.m.	8 hrs. [3]
AKN.09	June 24	2:30 p.m.	to June 24	10:30 p.m.	8 hrs. [3]
AKN.10	June 25	4:00 p.m.	to June 25	12:00 midnight	8 hrs. [3]
AKN.12	June 27	5:00 a.m.	to June 27	1:00 p.m.	8 hrs. [3]
AKN.13	June 28	5:30 a.m.	to June 28	1:30 p.m.	8 hrs. [3]
AKN.16	June 29	6:30 a.m.	to June 29	2:30 p.m.	8 hrs. [3]
AKN.18	June 30	7:00 a.m.	to June 30	5:00 p.m.	10 hrs. [3]
AKN.19	June 30	9:00 p.m.	to July 01	5:00 a.m.	8 hrs. [3]
AKN.21	July 01	8:00 a.m.	to July 01	4:00 p.m.	8 hrs. [3]
AKN.24	July 02	9:00 a.m.	to July 02	7:00 p.m.	10 hrs. [3]
AKN.26	July 03	10:00 a.m.	to July 03	8:00 p.m.	10 hrs. [3]
AKN.27	July 04	11:00 a.m.	to July 04	7:00 p.m.	8 hrs. [3]
AKN.29	July 05	12:00 noon	to July 05	8:00 p.m.	8 hrs. [3]
AKN.31	July 06	8:00 p.m.	to Sept. 30	11:59 p.m.	Restriction [10]
AKN.33	July 08	2:30 p.m.	to July 08	10:30 p.m.	8 hrs. [3]
AKN.34	July 09	3:00 p.m.	to July 09	11:00 p.m.	8 hrs. [3]
AKN.37	July 07	2:00 p.m.	to July 07	10:00 p.m.	8 hrs. [3]
AKN.39	July 11	4:00 a.m.	to July 11	12:00 noon	8 hrs. [3]
AKN.41	July 12	4:30 a.m.	to July 12	12:30 p.m.	8 hrs. [3]
AKN.42	July 13	5:00 a.m.	to July 13	1:00 p.m.	8 hrs. [3]
AKN.45	July 14	5:30 a.m.	to July 17	9:00 a.m.	Regulatory [10]
AKN.46	July 14	5:30 a.m.	to July 14	3:30 p.m.	10 hrs. [3]
AKN.48	July 15	6:30 a.m.	to July 15	4:30 p.m.	10 hrs. [3]
AKN.51	July 16	7:30 a.m.	to July 17	8:00 a.m.	24.5 hrs. [3]
AKN.52	July 17	8:00 a.m.	to July 17	9:00 a.m.	1 hr. [4]
Ugashik District					
AKN.20	July 01	7:00 a.m.	to July 01	3:00 p.m.	8 hrs. [3]
AKN.28	July 04	10:00 a.m.	to July 04	6:00 p.m.	8 hrs. [3]
AKN.30	July 06	12:00 noon	to July 06	6:00 p.m.	6 hrs. [3]
AKN.32	July 07	1:00 p.m.	to July 07	8:00 p.m.	7 hrs. [3]
AKN.35	July 09	2:00 p.m.	to July 09	9:00 p.m.	7 hrs. [3]
AKN.40	July 11	4:00 p.m.	to July 11	10:00 p.m.	6 hrs. [3]
AKN.44	July 13	5:00 p.m.	to July 13	12:00 midnight	7 hrs. [3]
AKN.50	July15	6:00 p.m.	to July 15	12:00 midnight	6 hrs. [3]
AKN.53	July 17	9:00 a.m.	to Sept. 30	12:00 midnight	Regulatory [11]
AKN.63	July 28	9:00 a.m.	to Sept. 30	12:00 midnight	Regulatory [13,16]

(Continued)

Table 11. (Continued)

Number[1]	Date and Time				Effective time
AKN.64	Aug. 25	9:00 a.m.	to Sept. 30	12:00 midnight	Regulatory [6]
AKN.65	Sept. 01	9:00 a.m.	to Sept. 30	12:00 midnight	Regulatory [16]
Nushagak District					
DLG.01	June 01	9:00 a.m.	to June 06	9:00 a.m.	Subsistence [5]
DLG.02	June 06	9:00 p.m.	to June 08	9:00 p.m.	Subsistence [5]
DLG.03	June 11	6:30 p.m.	to June 12	12:30 p.m.	6 hrs. [3]
DLG.04	June 12	3:00 p.m.	to June 14	3:00 a.m.	Subsistence [5]
DLG.06	June 14	3:00 p.m.	to June 15	3:00 p.m.	Subsistence [5]
DLG.07	June 17	10:00 a.m.	to June 17	8:00 p.m.	10 hrs. [3]
DLG.13	June 30	10:00 p.m.	to July 01	4:00 a.m.	6 hrs. [2,3]
DLG.14	July 02	12:00 midnight	to July 03	7:00 a.m.	7 hrs. [2,3]
DLG.15	July 03	12:00 noon	to July 03	10:00 p.m.	10 hrs. [2,3]
DLG.16	July 05	2:00 p.m.	to July 05	12:00 midnight	10 hrs. [2,3]
DLG.48	July 24	12:00 noon	to Sept. 30	12:00 midnight	Subsistence [5]
DLG.61	Aug. 07	9:00 a.m.	to Sept. 30	12:00 midnight	Subsistence [8]
DLG.63	Aug. 13	9:00 a.m.	to Oct. 31	9:00 a.m.	Subsistence [14]
Wood River Special Harvest Area					
DLG.22	July 09	8:00 a.m.	to Sept. 30	12:00 midnight	Subsistence [7]
DLG.24	July 09	5:00 p.m.	to July 09	12:00 midnight	7 hrs. [2,3]
DLG.25	July 11	7:30 a.m.	to July 11	12:30 p.m.	5 hrs. [2,3]
DLG.26	July 11	8:30 p.m.	to July 12	12:30 a.m.	4 hrs. [2,3]
DLG.27	July 12	8:30 a.m.	to July 12	1:30 p.m.	5 hrs. [2,3]
DLG.29	July 12	9:00 p.m.	to July 13	2:00 a.m.	5 hrs. [2,3]
DLG.30	July 13	9:00 a.m.	to July 13	2:00 p.m.	5 hrs. [2,3]
DLG.31	July 13	10:00 p.m.	to July 14	4:00 a.m.	6 hrs. [2,3]
DLG.32	July 14	9:30 a.m.	to July 14	3:30 p.m.	6 hrs. [2,3]
DLG.33	July 14	11:00 p.m.	to July 15	5:00 a.m.	6 hrs. [2,3]
DLG.34	July 15	10:00 a.m.	to July 15	4:00 p.m.	6 hrs. [2,3]
DLG.35	July 15	11:30 p.m.	to July 16	5:30 a.m.	6 hrs. [2,3]
DLG.36	July 16	11:00 a.m.	to July 16	5:00 p.m.	6 hrs. [2,3]
DLG.37	July 17	12:30 a.m.	to July 17	6:30 a.m.	6 hrs. [2,3]
DLG.38	July 17	12:00 noon	to July 17	6:00 p.m.	6 hrs. [2,3]
DLG.39	July 18	1:00 a.m.	to July 18	7:00 a.m.	6 hrs. [2,3]
DLG.40	July 18	12:00 noon	to July 18	6:00 p.m.	6 hrs. [2,3]
DLG.41	July 19	2:00 a.m.	to July 19	8:00 a.m.	6 hrs. [2,3]
DLG.41	July 19	1:00 p.m.	to July 19	7:00 p.m.	6 hrs. [2,3]
DLG.43	July 20	3:00 a.m.	to July 20	9:00 a.m.	6 hrs. [2,3]

(Continued)

Table 11. (Continued)

Number[1]	Date and Time				Effective time
DLG.43	July 20	2:00 p.m.	to July 20	8:00 p.m.	6 hrs. [2,3]
DLG.44	July 21	3:30 a.m.	to July 21	9:30 a.m.	6 hrs. [2,3]
DLG.44	July 21	3:00 p.m.	to July 21	9:00 p.m.	6 hrs. [2,3]
DLG.45	July 22	4:30 a.m.	to July 22	10:30 a.m.	6 hrs. [2,3]
DLG.45	July 22	4:00 p.m.	to July 22	10:00 p.m.	6 hrs. [2,3]
DLG.46	July 23	5:00 a.m.	to July 23	11:00 a.m.	6 hrs. [2,3]
DLG.46	July 23	5:30 p.m.	to July 23	11:30 p.m.	6 hrs. [2,3]
DLG.47	July 24	6:00 a.m.	to July 24	12:00 noon	6 hrs. [2,3]
DLG.47	July 24	6:00 p.m.	to July 24	12:00 midnight	6 hrs. [2,3]
DLG.51	July 25	7:00 a.m.	to July 25	1:00 p.m.	6 hrs. [3]
DLG.51	July 25	7:00 p.m.	to July 26	1:00 a.m.	6 hrs. [3]
DLG.52	July 26	7:30 a.m.	to July 26	1:30 p.m.	6 hrs. [4]
DLG.52	July 26	8:30 p.m.	to July 27	2:30 a.m.	6 hrs. [5]
DLG.55	July 27	8:30 a.m.	to July 27	2:30 p.m.	6 hrs. [6]
DLG.55	July 27	9:30 p.m.	to July 28	3:30 a.m.	6 hrs. [7]
DLG.56	July 28	9:30 a.m.	to July 28	3:30 p.m.	6 hrs. [8]
DLG.57	July 28	10:30 p.m.	to July 29	4:30 a.m.	6 hrs. [3]
DLG.57	July 29	10:30 a.m.	to July 29	4:30 p.m.	6 hrs. [3]
DLG.58	July 30	6:00 a.m.	to Sept. 30	12:00 midnight	Subsistence [5]
Nushagak Section					
DLG.17	July 05	12:00 midnight	to July 06	12:00 noon	12 hrs. [2,3]
DLG.18	July 06	12:00 noon	to July 06	11:00 p.m.	11 hrs. [2,4]
DLG.19	July 07	3:30 p.m.	to July 08	1:30 a.m.	10 hrs. [2,3]
DLG.20	July 08	4:30 p.m.	to July 09	2:30 a.m.	10 hrs. [2,3]
DLG.24	July 09	5:00 p.m.	to July 09	12:00 midnight	7 hrs. [2,3]
DLG.32	July 14	8:00 a.m.	to July 14	2:00 p.m.	6 hrs. [2,3]
DLG.40	July 18	11:00 a.m.	to July 18	9:00 p.m.	10 hrs. [2,3]
DLG.43	July 20	1:00 a.m.	to July 20	1:00 p.m.	12 hrs. [2,3]
DLG.44	July 21	1:30 p.m.	to July 22	1:30 a.m.	12 hrs. [2,3]
DLG.45	July 22	3:00 p.m.	to July 23	3:00 a.m.	12 hrs. [2,3]
DLG.46	July 23	4:00 p.m.	to July 23	12:00 midnight	8 hrs. [2,3]
Igushik Section					
DLG.08	June 20	12:00 noon	to June 20	8:00 p.m.	8 hrs. [3]
DLG.10	June 22	2:00 p.m.	to June 22	10:00 p.m.	8 hrs. [3]
DLG.11	June 25	5:00 p.m.	to June 26	5:00 a.m.	12 hrs. [2,3]

(Continued)

Table 11. (Continued)

Number[1]	Date and Time				Effective time
Togiak District					
DLG.05	June 18	9:00 a.m.	to June 21	9:00 a.m.	Restriction [6]
DLG.09	June 25	9:00 a.m.	to June 28	9:00 a.m.	Restriction [6]
DLG.12	June 26	9:00 a.m.	to June 28	9:00 p.m.	Subsistence [5]
DLG.21	July 09	9:00 a.m.	to July 12	9:00 p.m.	Restriction [6]
DLG.23	July 10	9:00 a.m.	to July 12	9:00 p.m.	Subsistence [5]
DLG.28	July 15	9:00 a.m.	to July 19	9:00 a.m.	Restriction [6]
DLG.42	July 21	9:00 a.m.	to July 26	9:00 a.m.	Restriction [15]
DLG.49	July 16	9:00 a.m.	to July 19	9:00 p.m.	Subsistence [5]
DLG.50	July 24	9:00 a.m.	to July 26	9:00 p.m.	Subsistence [5]
DLG.53	July 28	9:00 a.m.	to Aug. 02	9:00 a.m.	Restriction [15]
DLG.54	July 28	9:00 a.m.	to Aug. 02	9:00 a.m.	Subsistence [5]
DLG.59	Aug. 05	9:00 a.m.	to Aug. 09	9:00 a.m.	Restriction [6]
DLG.60	Aug. 06	9:00 a.m.	to Aug. 09	9:00 a.m.	Subsistence [5]
DLG.62	Aug. 12	9:00 a.m.	to Aug. 16	9:00 a.m.	Restriction [6]
DLG.64	Aug. 19	9:00 a.m.	to Aug. 23	9:00 a.m.	Restriction [6]
DLG.65	Aug. 26	9:00 a.m.	to Aug. 30	9:00 a.m.	Restriction [6]
DLG.66	Sept. 01	9:00 a.m.	to Sept. 30	12:00 midnight	Restriction [15]

01. Prefix code on emergency orders indicate where announcement originated. ("AKN" for King office and "DLG" for Dillingham field office.)
02. Prohibits the use of gillnet mesh larger than five and one half inches.
03. Opens area to commercial salmon fishing.
04. Extends area to commercial salmon fishing.
05. Opens area to Subsistence fishing.
06. Reduces the weekly commercial fishing schedule.
07. Closes area to Subsistence fishing.
08. Reduces the weekly Subsistence fishing schedule.
09. Opens area to commercial set gillnets only.
10. Moves the western boundary line of the Egegik District from 9990-z-451135 Loran C to the 9 Loran C until futher notice.
11. Extends the Emergency Order period.
12. Waives the 48 hour waiting period for relocating between districts and when changing gear ty
13. Rescinds extension of the Emergency Order period in Ugashik District.
14. Reduces the area of Subsistence fishing in the Nushagak District.
15. Closes the District to Commercial fishing.
16. Resumes normal fall fishing 9:00 a.m. Monday to 9:00 a.m. Friday.

Table 12. Daily district registration of drift gillnet permit holders by district, 1997.

Date	Nakek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total [a]
16-Jun	230	241	78	300	10	859
17-Jun	258	349	82	330	13	1032
18-Jun						0
19-Jun	287	427	85	324	15	1138
20-Jun	295	524	67	346	20	1252
21-Jun	298	613	46	346	21	1324
22-Jun	305	694	45	373	21	1438
23-Jun						0
24-Jun	365	721	53	374	25	1538
25-Jun	380	743	58	375	26	1582
26-Jun	394	752	66	420	27	1659
27-Jun	424	761	67	423	27	1702
28-Jun	435	767	67	430	28	1727
29-Jun						0
30-Jun	447	760	71	433	29	1740
1-Jul	458	752	95	475	29	1809
2-Jul	462	743	96	485	29	1815
3-Jul	466	741	97	490	30	1824
4-Jul	472	737	103	492	31	1835
5-Jul	470	732	108	489	31	1830
6-Jul	456	714	113	489	31	1803
7-Jul	455	692	122	491	31	1791
8-Jul	438	678	139	499	32	1786
9-Jul	419	656	169	487	32	1763
10-Jul	404	634	211	482	33	1764
11-Jul	382	617	255	457	33	1744
12-Jul	362	610	315	452	34	1773
13-Jul	350	602	375	425	34	1786
14-Jul	351	606	419	425	34	1835
15-Jul	352	604	419	423	34	1832
16-Jul	355	599	417	428	35	1834
Average	347	583	137	386	25	1478

[a] Number of drift gillnet permit holders registered to fish in Bristol Bay districts by day. 1,890 drift permits wereactive in 1997.

Table 13. Commercial salmon catch by date and species, in numbers of fish, Naknek-Kvichak District, 1997.

Date	Time	Sockeye	Chinook	Chum	Pink	Coho	Total
6/9	15 hrs.	2	0	0	0	0	2
6/10	24 hrs.	12	0	0	0	0	12
6/11	24 hrs.	42	0	0	0	0	42
6/12	24 hrs.	53	15	1	0	0	69
6/13	9 hrs.	20	0	0	0	0	20
6/16	15 hrs.	1,741	146	68	0	0	1,955
6/17	24 hrs.	2,471	142	55	0	0	2,668
6/18	24 hrs.	4,431	566	54	0	0	5,051
6/19	24 hrs.	6,667	237	91	0	0	6,995
6/20	9 hrs.	5,023	71	49	0	0	5,143
6/25[a]	0	690	0	3	0	0	693
6/26[b]	8 hrs.	20,043	44	28	0	0	20,115
6/28[b,c]	13.5 hrs.	70,799	80	478	0	0	71,357
6/29[b,c]	6 hrs.	7,571	122	4	0	0	7,697
6/30[b]	4.5 hrs.	98,480	32	798	0	0	99,310
7/ 1[b,c]	10.5 hrs.	81,220	76	400	0	0	81,696
7/ 2[b,c]	13.5 hrs.	83,191	289	440	0	0	83,920
7/3[a]	0	618	2	0	0	0	620
7/4[a]	0	1,565	7	0	0	0	1,572
7/5[a]	0	2,902	0	14	0	0	2,916
7/6[a]	0	1,881	0	0	0	0	1,881
7/7[a]	0	403	0	0	0	0	403
7/8[a]	0	1,910	7	0	0	0	1,917
7/ 9[d]	8 hrs.	53,347	103	488	0	0	53,938
7/10[d]	7 hrs.	23,777	83	195	0	0	24,055
7/11[a]	0	1,947	0	13	0	0	1,960
7/12[a]	0	113	0	0	0	0	113
7/13[d]	7 hrs.	29,730	79	263	0	0	30,072
7/14[d]	7 hrs.	27,945	72	284	0	0	28,301
7/16[d]	8 hrs.	13,257	41	266	0	2	13,566
7/17[d]	8 hrs.	12,340	36	249	2	0	12,627
7/18[d]	8 hrs.	7,789	44	15	0	1	7,849
7/19[d]	8 hrs.	11,879	60	63	3	0	12,005
7/20[d]	8 hrs.	8,110	48	71	1	5	8,235
7/21[d]	8 hrs.	6,998	66	44	7	5	7,120
7/22[d]	8 hrs.	3,059	40	32	0	3	3,134
7/23[d]	8 hrs.	2,336	75	57	2	5	2,475
7/24[d]	7 hrs.	1,640	42	69	0	4	1,755
7/25[d]	9 hrs.	1,513	58	80	3	6	1,660
7/28	15 hrs.	2,673	61	2,068	2	185	4,989
7/29	24 hrs.	1,972	49	1,394	15	232	3,662
7/30	24 hrs.	916	27	305	1	147	1,396
7/31	24 hrs.	482	14	243	1	68	808
8/1	9 hrs.	251	5	15	2	3	276
8/4	15 hrs.	0	0	21	0	0	21
8/18	24 hrs.	0	0	1	0	12	13
Total		603,809	2,839	8,719	39	678	616,084
% of District Catch		98.0	0.5	1.4	0.0	0.1	100

[a] Test fishing

[b] Naknek Section only.

[c] Kvichak setnets only.

[d] Naknek in-river fishery open to both gear groups, district closed.

Table 14. Commercial salmon catch by date and species, in numbers of fish, Egegik District, 1997.

Date	Hrs.	Effort[1]		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set						
2-Jun	15								0
3-Jun	24								0
4-Jun	24								0
5-Jun	24								0
6-Jun	9								0
9-Jun	15		13	383	60	1			444
10-Jun	24	2	18	1,146	69				1,215
11-Jun	24	4	23	2,385	92	2			2,479
12-Jun	24	4	21	3,207	94	11			3,312
13-Jun	9	1	6	503	19	2			524
17-Jun	8	266	103	47,793	146	607			48,546
19-Jun	8	412	148	61,985	131	701			62,817
20-Jun	8	505	156	101,574	96	993			102,663
22-Jun	8	590	182	136,783	57	1,659			138,499
23-Jun	16	1338	330	413,331	110	3,552			416,993
24-Jun	8	707	194	242,277	81	2,013			244,371
25-Jun	8	660	204	338,544	70	2,297			340,911
27-Jun	8	774	187	483,861	79	2,666			486,606
28-Jun	8	765	212	330,310	83	1,753			332,146
29-Jun	8	747	211	186,551	81	1,239			187,871
30-Jun	13	821	244	363,090	91	1,619			364,800
1-Jul	13	1418	320	450,897	125	1,975			452,997
2-Jul	10	212	786	335,020	77	1,954			337,051
3-Jul	10	784	208	379,235	85	1,837			381,157
4-Jul	8	803	221	522,740	89	3,134			525,963
5-Jul	8	840	262	778,319	72	3,314			781,705
7-Jul	8	700	280	476,131	72	2,633			478,836
8-Jul	8	683	245	307,936	27	1,467			309,430
9-Jul	8	688	226	390,678	37	1,947			392,662
11-Jul	8	639	230	310,883	21	1,493			312,397
12-Jul	8	590	202	168,161	19	1,237			169,417
13-Jul	8	536	173	122,807	16	1,243			124,066
14-Jul	10	554	198	171,541	15	1,261			172,817
15-Jul	10	473	182	85,876	7	1,133			87,016
16-Jul	16.5	350	154	67,979	4	887			68,870
17-Jul	24	367	215	89,652	4	1,482			91,138
18-Jul	9	132	83	23,682		446			24,128
21-Jul	15	251	125	40,376	4	1,183	1		41,564
22-Jul	24	281	109	32,783	2	1,087		4	33,876
23-Jul	24	151	99	25,225	3	251	1	4	25,484
24-Jul	24	102	94	15,923		288			16,211

Continued

Table 14. (Page 2 of 2)

Date	Hrs.	Effort[1] Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
25-Jul	9	59	25	4,522		61		4	4,587
28-Jul	15	53	49	6,341		124		121	6,586
29-Jul	24	34	33	3,966		118		133	4,217
30-Jul	24	18	38	2,321		105		127	2,553
31-Jul	24	14	36	1,187		381		163	1,731
1-Aug	9	0	4	51		205		21	277
4-Aug	15	6	34	2,013	2	299		489	2,803
5-Aug	24	5	22	852		282		482	1,616
6-Aug	24	6	34	1,115		449		1,032	2,596
7-Aug	24	5	32	888		514		1,003	2,405
8-Aug	9	4	8	80	1	101		98	280
11-Aug	15	6	17	234		186		839	1,259
12-Aug	24	7	33	547	4	451		2,570	3,572
13-Aug	24	6	32	280		283		1,693	2,256
14-Aug	24	8	33	532	1	128		2,330	2,991
15-Aug	9	3	13	106		20		419	545
18-Aug	15	11	29	296	1	52		3,253	3,602
19-Aug	24	14	23	244		32		3,501	3,777
20-Aug	24	7	25	115		43		2,579	2,737
21-Aug	24	7	23	60		20		2,018	2,098
22-Aug	9	0	7	41		1		334	376
25-Aug	15	10	13	33		10		2,179	2,222
26-Aug	24	13	19	76		4		2,911	2,991
27-Aug	24	10	16	70		6		2,828	2,904
28-Aug	24	10	11	32		7		1,622	1,661
29-Aug	9	1	1					26	26
1-Sep	15	3	5					590	590
2-Sep	24	5	7					983	983
3-Sep	24	3	8					940	940
4-Sep	24	6	5					700	700
5-Sep	9								
8-Sep	15								
9-Sep	24								
10-Sep	24								
11-Sep	24								
12-Sep	9								
Total	1,228	18,484	7,299	7,535,569	2,047	53,249	2	35,996	7,626,863
% of District Catch				99	0	1	0	0	100

[1] Estimated number of deliveries based on daily company reports. Preliminary.

Table 15. Commercial salmon catch by date and species, in numbers of fish, Ugashik District, 1997.

Date	Hrs.	Effort[1]		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set						
2-Jun	15.0								
3-Jun	24.0								
4-Jun	24.0								
5-Jun	24.0								
6-Jun	9.0								
9-Jun	15.0								
10-Jun	24.0	3		13	7	0			20
11-Jun	24.0	1		32	17				49
12-Jun	24.0								0
13-Jun	9.0	1		64		18			82
16-Jun	15.0	45	3	6,814	172	153			7,139
17-Jun	24.0	65	1	13,066	302	248			13,616
18-Jun	24.0	80	3	16,857	138	2			16,997
19-Jun	24.0	74	3	12,991	89	225			13,305
20-Jun	9.0	75	1	5,400	30	91			5,521
23-Jun	0.0	1		45	1	2			48
25-Jun	0.0	1		279	1	6			286
26-Jun	0.0	1		85		1			86
27-Jun	0.0	2		352					352
28-Jun	0.0	1		93		3			96
29-Jun	0.0	2		212		4			216
30-Jun	0.0	2		300	107	601			1,008
1-Jul	8.0	97	37	72,227	8	1,285			73,520
3-Jul	0.0	1		544					544
4-Jul	8.0	106	62	178,895	47	1,806			180,748
5-Jul	0.0	2		558	4				562
6-Jul	6.0	91	52	216,754	49	1,528			218,331
7-Jul	7.0	140	84	263,109	32	1,254			264,395
8-Jul	0.0	2		610	4				614
9-Jul	7.0	206	71	183,765	23	2,020	0	0	185,808
10-Jul	0.0						0	0	0
11-Jul	6.0	303	59	184,934	15	2,645	0	0	187,594
13-Jul	7.0	346	72	135,153	17	2,191	0	0	137,361
14-Jul	0.0						0	0	0
15-Jul	6.0	306	55	73,549	11	1,697	0	0	75,257
17-Jul	0.0	1		309	3	6	0	0	318
18-Jul	0.0	1		473		24	0	0	497
19-Jul	0.0	1		779	1	76	0	0	856
28-Jul	9.0	24	26	8,965		127			9,092
29-Jul	24.0	30	26	10,975		89			11,064

Continued

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Date	Hrs.	Effort[1] Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
30-Jul	24.0	22	14	5,483					5,483
31-Jul	24.0	18	18	4,232		54			4,286
1-Aug	9.0	2	6	949		0			949
4-Aug	15.0	11	17	2,851	2	72		42	2,967
5-Aug	24.0	4	16	1,857	1			61	1,919
6-Aug	24.0	4	17	1,255				12	1,267
7-Aug	24.0	4	5	413	1	27		73	514
8-Aug	9.0	1		129		35		54	218
11-Aug	15.0	5	3	484		16		225	725
12-Aug	24.0	3	4	201		71		175	447
13-Aug	24.0	3	1	172				190	362
14-Aug	24.0	7	5	508	1			560	1,069
15-Aug	9.0	1	1	140				33	173
18-Aug	15.0		2	0				187	187
19-Aug	24.0		2	27				167	194
20-Aug	24.0	1	2	1				232	233
21-Aug	24.0	5	3	97	1			644	742
22-Aug	9.0	3	3	37				378	415
27-Aug	15.0		2	6				465	471
28-Aug	24.0	12	2	36		2		1,745	1,783
29-Aug	9.0		2					775	775
1-Sep	15.0		2					218	218
2-Sep	24		2	6				339	345
3-Sep	24		3					343	343
4-Sep	24		2					140	140
5-Sep	9		1					357	357
8-Sep	15		2					121	121
9-Sep	24		1					40	40
10-Sep	24		1					42	42
11-Sep	24		1					33	33
Total	952	2,117	695	1,407,086	1,084	16,379	0	7,651	1,432,200
% of District Catch				98.2	0.1	1.1	0.0	0.5	100

[1] Estimated number of deliveries based on daily company oral reports. Preliminary.

Table 16. Commercial salmon fishing time, effort and harvest by date, Nushagak District, 1997.

Date	Time (*hrs*)				Effort[3]		Harvest[4]					
	District[1]	Nushagak[2]	Igushik[2]	WRSHA[2]	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
11-Jun	5.5				198	29	50	1,055	1	-	-	1,106
12-Jun	0.5						130	7,556	15	-	-	7,701
17-Jun	10.0				278	72	12,377	30,392	3,198	-	-	45,967
20-Jun			8.0				3,520	2,137	179	-	-	5,836
22-Jun			8.0		222	57	4,759	1,223	422	-	-	6,404
25-Jun [a]			7.0		337	62	7,470	251	807	-	-	8,528
26-Jun [a]			5.0				17,061	589	2,196	-	-	19,846
30-Jun [a]	2.0				401	279						
1-Jul [a]	4.0						292,619	5,502	35,517	-	-	333,638
3-Jul [a]	17.0				474	269	332,737	5,180	42,421	3	-	380,341
5-Jul [a]	10.0				340	269	297,280	1,525	19,014	-	-	317,819
6-Jul [a]		23.0				147	431,398	2,932	22,989	1	-	457,320
7-Jul [a]		8.5			438	213	113,768	843	5,179	1	-	119,791
8-Jul [a]		9.0				174	197,634	905	14,048	-	3	212,590
9-Jul [a]		9.5		7.0	453	216	304,953	1,163	12,751	-	2	318,869
11-Jul [a]				8.5	232	115	34,808	452	790	-	1	36,051
12-Jul [a]				8.5	188	81	70,322	509	1,556	-	-	72,387
13-Jul [a]				9.0			101,147	463	1,605	2	-	103,217
14-Jul [a]		6.0		11.0	378	233	142,226	485	9,669	5	5	152,390
15-Jul [a]				11.5			62,501	153	700	-	-	63,354
16-Jul [a]				11.5			28,686	175	1,001	-	6	29,868
17-Jul [a]				12.0			32,470	312	1,075	6	20	33,883
18-Jul [a]		10.0		12.0	218	172	44,164	159	1,258	4	36	45,621
19-Jul [a]				12.0			9,508	29	243	-	1	9,781
20-Jul [a]		12.0		12.0			27,397	59	1,037	24	60	28,577
21-Jul [a]		10.5		12.0	63	125	18,183	71	723	2	80	19,059
22-Jul [a]		10.5		12.0			12,480	60	1,416	2	431	14,389
23-Jul [a]		11.0		12.0			12,196	70	1,245	-	2,122	15,633
24-Jul				12.0			1,789	19	135	-	276	2,219
25-Jul				11.0			1,561	10	11	-	36	1,618
26-Jul				10.5			1,239	3	8	-	29	1,279
27-Jul				11.0			598	8	4	-	2	612
28-Jul				11.0			700	3	27	-	5	735
29-Jul				10.5			439	1	13	-	8	461
Total	49.0	110.0	28.0	217.0			2,618,170	64,294	181,253	50	3,123	2,866,890
% of District Catch							91.3%	2.2%	6.3%	0.0%	0.1%	100.0%

[1] Number of hours the Nushagak District was opened to commercial fishing. Includes Nushagak and Igushik Sections prior to 9:00 a.m. July 17, and Nushagak, Igushik and Snake River Sections after 9:00 a.m. July 17.

[2] Number of hours each section was opened to commercial fishing, in addition to commercial openings in the Nushagak District and other sections, unless otherwise noted. WRSHA; Wood River Special Harvest Area.

[3] Estimated fishing effort based on aerial survey counts.

[4] Numbers of fish.

[a] Mesh sizes exceeding five and one half inches prohibited for the protection of chinook salmon.

Table 17. Commercial sockeye salmon fishing time and setnet harvest by date and statistical area, Nushagak District, 1997.

Date	Time (hrs)				Harvest[3]							
	District[1]	Nushagak[2]	Igushik[2]	WRSHA[2]	Combine Flats[4]	Queen Slough[5]	Coffee Point[6]	Clark's Point[7]	Ekuk Beach[8]	Igushik Beach[9]	WRSHA[10]	Total
11-Jun	5.5				18	32						50
12-Jun	0.5				18				56	45		119
17-Jun	10.0				1,457	1,223	310	637	1,297	1,171		6,095
20-Jun			8.0							1,948		1,948
22-Jun			8.0							1,829		1,829
25-Jun [a]			7.0							2,421		2,421
26-Jun [a]			5.0							1,008		1,008
30-Jun [a]	2.0											-
1-Jul [a]	4.0				24,534	9,995	4,701	9,419	26,731	5,518		80,898
3-Jul [a]	17.0				29,001	10,473	10,461	7,461	31,916	8,686		97,998
5-Jul [a]	10.0				17,894	19,102	11,898	4,846	16,662	6,302		76,704
6-Jul [a]		23.0			8,976	2,638	9,945	964	23,461			45,984
7-Jul [a]		8.5			13,355	4,667	5,131	488	11,290			34,931
8-Jul [a]		9.0			3,458	1,193	7,804		13,667			26,122
9-Jul [a]		9.5		7.0	12,991	21,398	9,143	867	25,867		21,048	91,314
11-Jul [a]				8.5							18,136	18,136
12-Jul [a]				8.5							35,755	35,755
13-Jul [a]				9.0							35,425	35,425
14-Jul [a]		6.0		11.0	6,806	7,863	457	3,470	10,142		34,877	63,615
15-Jul [a]				11.5							23,902	23,902
16-Jul [a]				11.5							13,305	13,305
17-Jul [a]				12.0							15,146	15,146
18-Jul [a]		10.0		12.0	6,090	1,978		584	2,047		13,665	24,364
19-Jul [a]				12.0							4,596	4,596
20-Jul [a]		12.0		12.0	4,400		1,064	3,158	6,022		4,948	19,592
21-Jul [a]		10.5		12.0	2,795		708	4,977	2,652		2,652	13,784
22-Jul [a]		10.5		12.0	593		579	2,538	557		1,136	5,403
23-Jul [a]		11.0		12.0	391		688	2,941	71		2,448	6,539
24-Jul				12.0							766	766
25-Jul				11.0							800	800
26-Jul				10.5							934	934
27-Jul				11.0							454	454
28-Jul				11.0							490	490
29-Jul				10.5							333	333
Total	49.0	110.0	28.0	217.0	132,777	80,562	62,889	42,350	172,438	28,928	230,816	750,760
% of District Catch					17.7%	10.7%	8.4%	5.6%	23.0%	3.9%	30.7%	100.0%

[1] Number of hours the Nushagak District was opened to commercial fishing. Includes Nushagak and Igushik Sections prior to 9:00 a.m. July 17, and Nushagak, Igushik and Snake River Sections after 9:00 a.m. July 17.

[2] Number of hours each section was opened to commercial fishing, in addition to commercial openings in the Nushagak District and other sections, unless otherwise noted. WRSHA; Wood River Special Harvest Area.

[3] Numbers of fish.

[4] Sockeye salmon accounted for 96.0% of the total beach harvest. Other species landed included 2,356 chinook, 3,164 chum, 2 pink and 45 coho salmon.

[5] Sockeye salmon accounted for 97.6% of the total beach harvest. Other species landed included 530 chinook, 1,419 chum, 3 pink and 0 coho salmon.

[6] Sockeye salmon accounted for 96.5% of the total beach harvest. Other species landed included 713 chinook, 1,526 chum, 0 pink and 37 coho salmon.

[7] Sockeye salmon accounted for 93.7% of the total beach harvest. Other species landed included 167 chinook, 2,153 chum, 0 pink and 540 coho salmon.

[8] Sockeye salmon accounted for 97.8% of the total beach harvest. Other species landed included 507 chinook, 3,227 chum, 34 pink and 48 coho salmon.

[9] Sockeye salmon accounted for 94.0% of the total beach harvest. Other species landed included 1,780 chinook, 69 chum, 1 pink and 0 coho salmon.

[10] Sockeye salmon accounted for 97.7% of the total beach harvest. Other species landed included 1,489 chinook, 3,596 chum, 3 pink and 434 coho salmon.

[a] Mesh sizes exceeding five and one half inches prohibited for the protection of chinook salmon.

Table 18. Commercial salmon fishing time, effort and harvest by date, Wood River Special Harvest Area, 1997.

Date	Time (*hrs*)	Effort[1]		Harvest[2]					
		Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
9-Jul	7.0	42	38	30,644	496	964	0	0	32,104
11-Jul	8.5	232	99	39,343	449	1,369	1	1	41,163
12-Jul	8.5	188	81	84,572	417	1,889	0	0	86,878
13-Jul	9.0			72,543	283	2,418	0	0	75,244
14-Jul	11.0	110	55	64,397	171	1,661	0	0	66,229
15-Jul	11.5			45,352	68	1,385	0	0	46,805
16-Jul	11.5			31,005	220	732	0	14	31,971
17-Jul	12.0			23,058	214	767	0	10	24,049
18-Jul	12.0	57	28	11,955	42	546	1	2	12,546
19-Jul	12.0			7,495	27	448	0	3	7,973
20-Jul	12.0			6,737	13	204	0	0	6,954
21-Jul	12.0	21	22	4,032	18	114	0	0	4,164
22-Jul	12.0			1,017	3	12	0	0	1,032
23-Jul	12.0			2,131	32	108	0	234	2,505
24-Jul	12.0			1,289	16	56	0	179	1,540
25-Jul	11.0			1,828	11	11	0	36	1,886
26-Jul	10.5			1,239	3	8	0	29	1,279
27-Jul	11.0			598	8	4	0	2	612
28-Jul	11.0			700	2	26	0	3	731
29-Jul	10.5			439	1	11	0	8	459
Total	217.0			430,374	2,494	12,733	2	521	446,124
%				96.5%	0.6%	2.9%	0.0%	0.1%	100.0%

[1] Estimated fishing effort based on aerial survey counts.

[2] Numbers of fish.

Table 19. Commercial salmon catch by date and species, in numbers of fish, Togiak District, 1997.

Date[1]	Sockeye	Chinook	Chum	Pink	Coho	Total
6/10	19	53	0	0	0	72
6/11	12	39	1	0	0	52
6/12	11	56	1	0	0	68
6/13	8	35	3	0	0	46
6/16	202	446	127	0	0	775
6/17	403	616	203	0	0	1,222
6/18	234	309	128	0	0	671
6/23	2,609	386	1,390	0	0	4,385
6/24	4,268	594	2,291	0	0	7,153
6/25	2,087	153	599	0	0	2,839
6/30	7,369	435	3,903	1	0	11,708
7/01	10,448	589	4,965	0	0	16,002
7/02	9,748	481	4,163	1	0	14,393
7/03	8,485	446	3,440	0	0	12,371
7/04	9,266	319	3,010	0	0	12,595
7/05	10,319	246	2,286	3	0	12,854
7/07	15,531	260	3,813	2	0	19,606
7/08	16,375	262	4,789	8	0	21,434
7/09	7,593	103	1,718	2	0	9,416
7/14	17,988	153	4,784	6	0	22,931
7/15	13,521	95	3,235	4	0	16,855
8/04	2,580	8	1,058	0	31	3,677
8/05	2,458	8	1,125	0	23	3,614
8/11	803	5	199	0	120	1,127
8/12	455	1	40	0	45	541
8/18	464	3	48	0	319	834
8/19	497	6	83	0	799	1,385
8/25	250	5	46	0	1,384	1,685
8/26	97	2	11	0	255	365
Total	144,100	6,114	47,459	27	2,976	200,676
% of District Total	71.8%	3.0%	23.6%	0.0%	1.5%	100.0%

[1] 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, 1997.

Date[1]	Effort[2]		Sockeye	Chinook	Chum	Pink	Coho	Total
	Drift	Set						
6/10	4		19	53	0	0	0	72
6/11	1	5	12	39	1	0	0	52
6/12	2	3	11	56	1	0	0	68
6/13	2	2	8	35	3	0	0	46
6/16	10	18	124	420	72	0	0	616
6/17	14	41	231	581	142	0	0	954
6/18	7	19	118	285	91	0	0	494
6/23	12	53	1,107	315	732	0	0	2,154
6/24	37	72	1,651	530	1,552	0	0	3,733
6/25	5	31	872	116	392	0	0	1,380
6/30	24	71	4,574	369	2,428	1	0	7,372
7/01	38	80	4,948	499	3,495	0	0	8,942
7/02	32	85	4,216	384	2,892	0	0	7,492
7/03	33	101	5,743	418	2,907	0	0	9,068
7/04	39	107	8,125	298	2,456	0	0	10,879
7/05	22	106	9,817	232	2,106	2	0	12,157
7/07	29	90	9,774	214	3,054	1	0	13,043
7/08	42	98	8,694	221	3,139	6	0	12,060
7/09	9	42	3,654	85	987	0	0	4,726
7/14	13	85	11,948	125	3,605	1	0	15,679
7/15	39	97	8,778	70	2,557	2	0	11,407
8/04	23	56	2,580	8	1,058	0	31	3,677
8/05	29	52	2,458	8	1,125	0	23	3,614
8/11	18	23	803	5	199	0	120	1,127
8/12	0	17	455	1	40	0	45	541
8/18	9	10	308	1	27	0	278	614
8/19	24	23	497	6	83	0	799	1,385
8/25	25	16	228	5	37	0	1,272	1,542
8/26	4	8	94	2	11	0	214	321
Total			91,847	5,381	35,192	13	2,782	135,215
% of Section Total			67.9%	4.0%	26.0%	0.0%	2.1%	100.0%

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

[2] Effort is deliveries from processor catch reports by gear type.

Table 21. Commercial salmon catch by date and species, in numbers of fish, Kulukak Section, 1997.

Date[1]	Effort[2] Drift	Effort[2] Set	Sockeye	Chinook	Chum	Pink	Coho	Total
6/16		8	78	26	55	0	0	159
6/17		11	172	35	61	0	0	268
6/18		7	116	24	37	0	0	177
6/23	3	28	1,482	69	618	0	0	2,169
6/24	3	28	2,241	56	463	0	0	2,760
6/25		12	1,199	35	153	0	0	1,387
6/30	4	32	2,404	59	1,414	0	0	3,877
7/01	8	51	5,110	80	1,315	0	0	6,505
7/02	8	52	5,423	89	1,199	0	0	6,711
7/03	9	25	2,892	39	604	0	0	3,535
7/07	7	44	5,757	46	759	1	0	6,563
7/08	9	48	7,681	41	1,650	2	0	9,374
7/09	9	25	3,939	18	731	2	0	4,690
7/14	7	36	6,040	28	1,179	5	0	7,252
7/15	5	19	4,743	25	678	2	0	5,448
Total			49,277	670	10,916	12	0	60,875
% of Section Total			80.9%	1.1%	17.9%	0.0%	0.0%	100.0%

[1] Kulukak Section open three days per week. See Table 11 for inseason adjustments to the weekly fishing schedule.

[2] Effort is number of deliveries by gear type on processor reports.

Table 22. Commercial salmon catch by date and species, in numbers of fish, Matogak Section, 1997.

Date[1]	Sockeye	Chinook	Chum	Pink	Coho	Total
6/24	376	8	276	0	0	660
6/25	16	2	54	0	0	72
7/01	67	1	29	0	0	97
7/04	991	10	483	0	0	1,484
7/05	452	10	118	1	0	581
8/18	156	2	21	0	41	220
8/25	22	0	9	0	112	143
8/26	3	0	0	0	41	44
Total	2,083	33	990	1	194	3,301
% of Section Total	63.1%	1.0%	30.0%	0.0%	5.9%	100.0%

[1] Matogak and Osviak Sections open five days per week. See Table 11 for inseason adjustments to the weekly fishing schedule.

Table 23. Commercial salmon catch by date and species, in numbers if fish, Osviak Section, 1997.

Date	Sockeye	Chinook	Chum	Pink	Coho	Total
6/23	20	2	40	0	0	62
6/30	391	7	61	0	0	459
7/01	323	9	126	0	0	458
7/02	109	8	72	1	0	190
7/05	50	4	62	0	0	116
Total	893	30	361	1	0	1,285
% of Section Total	69.5%	2.3%	28.1%	0.1%	0.0%	100.0%

Table 24. Commercial salmon catch by district and species, in number of fish, Bristol Bay, 1997.[a]

District and River System	Sockeye	Chinook	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT						
Kvichak River	182,456					
Branch River	26,775					
Naknek River	394,578					
Total	603,809	2,839	8,719	39	678	616,084
EGEGIK DISTRICT	7,535,569	2,047	53,249	2	35,996	7,626,863
UGASHIK DISTRICT	1,407,086	1,084	16,379		7,651	1,432,200
NUSHAGAK DISTRICT						
Wood River	1,967,967					
Igushik River	164,861					
Nushagak-Mulchatna	485,340					
Total	2,618,168	64,294	181,253	50	3,123	2,866,888
TOGIAK DISTRICT						
Togiak Section	91,847	5,381	35,192	13	2,782	135,215
Kulukak Section	49,277	670	10,916	12	0	60,875
Matogak Section	2,083	33	990	1	194	3,301
Osviak Section	893	30	361	1	0	1,285
Total	144,100	6,114	47,459	27	2,976	200,676
TOTAL BRISTOL BAY	12,308,732	76,378	307,059	118	50,424	12,742,711
PERCENT	96.6%	0.6%	2.4%	0.0%	0.4%	100.0%

[a] Preliminary

Table 25. Daily sockeye salmon escapment tower counts by river system, Bristol Bay, 1997.

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.
6/19					14,610	14,610								
20					26,100	40,710								
21					13,566	54,276								
22			1,062	1,062	34,830	89,106			7,686	7,686				
23			2,220	3,282	10,572	99,678			8,904	16,590	474	474		
24	2,676	2,676	8,202	11,484	6,258	105,936			13,854	30,444	804	1,278		
25	3,624	6,300	13,044	24,528	6,324	112,260			27,798	58,242	972	2,250		
26	8,718	15,018	19,812	44,340	7,410	119,670			28,392	86,634	738	2,988		
27	26,742	41,760	6,996	51,336	25,164	144,834			30,618	117,252	1,872	4,860		
28	18,144	59,904	4,092	55,428	42,636	187,470			57,126	174,378	2,364	7,224		
29	6,732	66,636	3,384	58,812	44,034	231,504			52,632	227,010	2,640	9,864		
30	6,084	72,720	16,518	75,330	34,566	266,070			51,660	278,670	1,626	11,490		
7/1	3,174	75,894	33,990	109,320	16,296	282,366			50,526	329,196	1,044	12,534		
2	7,026	82,920	17,676	126,996	6,618	288,984	276	276	91,056	420,252	1,074	13,608		
3	33,054	115,974	25,482	152,478	13,560	302,544	1,290	1,566	127,134	547,386	1,062	14,670	54	54
4	42,012	157,986	70,116	222,594	7,914	310,458	1,476	3,042	127,086	674,472	2,094	16,764	342	396
5	48,054	206,040	75,858	298,452	9,114	319,572	1,704	4,746	68,826	743,298	2,694	19,458	264	660
6	93,486	299,526	129,936	428,388	18,252	337,824	2,370	7,116	101,616	844,914	4,638	24,096	354	1,014
7	139,878	439,404	90,582	518,970	170,358	508,182	9,288	16,404	71,502	916,416	2,622	26,718	30	1,044
8	197,742	637,146	112,380	631,350	127,806	635,988	13,500	29,904	73,014	989,430	3,132	29,850	54	1,098
9	159,678	796,824	152,988	784,338	39,228	675,216	31,380	61,284	156,120	1,145,550	5,220	35,070	186	1,284
10	152,742	949,566	52,878	837,216	12,252	687,468	34,230	95,514	35,268	1,180,818	6,954	42,024	366	1,650
11	103,224	1,052,790	9,210	846,426	181,302	868,770	48,090	143,604	66,618	1,247,436	8,706	50,730	906	2,556
12	87,138	1,139,928	57,078	903,504	81,300	950,070	49,056	192,660	66,366	1,313,802	8,346	59,076	750	3,306
13	60,432	1,200,360	54,066	957,570	68,130	1,018,200	37,080	229,740	60,072	1,373,874	7,158	66,234	1,386	4,692
14	90,690	1,291,050	15,468	973,038	37,842	1,056,042	43,572	273,312	30,630	1,404,504	6,786	73,020	6,906	11,598
15	57,654	1,348,704	28,632	1,001,670	42,498	1,098,540	60,876	334,188	29,136	1,433,640	7,428	80,448	4,866	16,464

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.
16	32,586	1,381,290	11,394	1,013,064	6,168	1,104,708	21,024	355,212	15,948	1,449,588	8,622	89,070	4,542	21,006
17	29,706	1,410,996	6,768	1,019,832	3,822	1,108,530	36,096	391,308	12,228	1,461,816	8,532	97,602	4,482	25,488
18	23,508	1,434,504	5,832	1,025,664			24,918	416,226	15,276	1,477,092	8,526	106,128	3,480	28,968
19	20,298	1,454,802					13,254	429,480	11,310	1,488,402	6,114	112,242	4,008	32,976
20	12,804	1,467,606					23,808	453,288	8,466	1,496,868	4,356	116,598	4,674	37,650
21	14,178	1,481,784					28,134	481,422	5,772	1,502,640	3,732	120,330	2,712	40,362
22	10,872	1,492,656					25,380	506,802	9,756	1,512,396	2,598	122,928	5,364	45,726
23	11,076	1,503,732					20,874	527,676			2,256	125,184	6,300	52,026
24							24,930	552,606			2,520	127,704	9,228	61,254
25							12,918	565,524					8,742	69,996
26							13,032	578,556					4,902	74,898
27							22,662	601,218					5,568	80,466
28							13,650	614,868					5,982	86,448
29							3,528	618,396					5,874	92,322
30													6,396	98,718
7/31													8,016	106,734
8/1													4,230	110,964
2													4,368	115,332
3													2,970	118,302
4													4,428	122,730
5													2,790	125,520
6													3,126	128,646
7													1,338	129,984
8													888	130,872
9													726	131,598
Total		1,503,732		1,025,664		1,108,530		618,396		1,512,396		127,704		131,598

Table 26. Final daily and cumulative escapement estimates by species, Nushagak River sonar project, 1997.

Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/09	395	395	111	111	68	68	0	0	0	0	574	574
6/10	440	835	160	271	74	142	0	0	0	0	674	1,248
6/11	319	1,154	62	333	45	187	0	0	0	0	426	1,674
6/12	278	1,432	57	390	39	226	0	0	0	0	374	2,048
6/13	516	1,948	74	464	74	300	0	0	0	0	664	2,712
6/14	521	2,469	137	601	88	388	0	0	0	0	746	3,458
6/15	589	3,058	2,034	2,635	412	800	0	0	0	0	3,035	6,493
6/16	1,384	4,442	5,023	7,658	1,034	1,834	0	0	0	0	7,441	13,934
6/17	1,300	5,742	2,140	9,798	587	2,421	0	0	0	0	4,027	17,961
6/18	910	6,652	1,735	11,533	426	2,847	0	0	0	0	3,071	21,032
6/19	1,866	8,518	1,893	13,426	609	3,456	0	0	0	0	4,368	25,400
6/20	1,962	10,480	2,367	15,793	713	4,169	0	0	0	0	5,042	30,442
6/21	1,001	11,481	520	16,313	222	4,391	0	0	0	0	1,743	32,185
6/22	2,631	14,112	709	17,022	597	4,988	0	0	0	0	3,937	36,122
6/23	2,645	16,757	565	17,587	501	5,489	0	0	0	0	3,711	39,833
6/24	3,759	20,516	490	18,077	508	5,997	0	0	0	0	4,757	44,590
6/25	7,204	27,720	1,633	19,710	1,401	7,398	0	0	0	0	10,238	54,828
6/26	16,643	44,363	3,545	23,255	3,059	10,457	0	0	0	0	23,247	78,075
6/27	16,883	61,246	1,604	24,859	2,381	12,838	0	0	0	0	20,868	98,943
6/28	8,316	69,562	770	25,629	1,335	14,173	0	0	0	0	10,421	109,364
6/29	10,127	79,689	615	26,244	1,254	15,427	0	0	0	0	11,996	121,360
6/30	13,695	93,384	1,091	27,335	4,876	20,303	0	0	0	0	19,662	141,022
7/01	25,312	118,696	1,732	29,067	10,755	31,058	0	0	0	0	37,799	178,821
7/02	24,776	143,472	1,642	30,709	8,532	39,590	125	125	0	0	35,075	213,896
7/03	13,902	157,374	1,230	31,939	3,064	42,654	0	125	0	0	18,196	232,092
7/04	17,175	174,549	630	32,569	1,249	43,903	0	125	0	0	19,054	251,146
7/05	6,006	180,555	258	32,827	413	44,316	0	125	0	0	6,677	257,823
7/06	14,090	194,645	364	33,191	1,084	45,400	0	125	0	0	15,538	273,361
7/07	14,301	208,946	387	33,578	642	46,042	0	125	0	0	15,330	288,691
7/08	12,874	221,820	285	33,863	201	46,243	0	125	0	0	13,360	302,051

Continued

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Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/09	14,221	236,041	630	34,493	1,336	47,579	0	125	0	0	16,187	318,238
7/10	12,039	248,080	526	35,019	665	48,244	0	125	0	0	13,230	331,468
7/11	6,161	254,241	226	35,245	308	48,552	0	125	0	0	6,695	338,163
7/12	20,575	274,816	462	35,707	1,207	49,759	0	125	42	42	22,286	360,449
7/13	26,312	301,128	921	36,628	3,580	53,339	0	125	52	94	30,865	391,314
7/14	15,542	316,670	1,099	37,727	2,042	55,381	0	125	420	514	19,103	410,417
7/15	9,620	326,290	629	38,356	1,204	56,585	0	125	269	783	11,722	422,139
7/16	4,630	330,920	260	38,616	611	57,196	0	125	159	942	5,660	427,799
7/17	9,264	340,184	606	39,222	1,321	58,517	0	125	317	1,259	11,508	439,307
7/18	6,472	346,656	413	39,635	748	59,265	0	125	282	1,541	7,915	447,222
7/19	4,085	350,741	197	39,832	376	59,641	0	125	212	1,753	4,870	452,092
7/20	2,419	353,160	126	39,958	228	59,869	0	125	117	1,870	2,890	454,982
7/21	2,515	355,675	124	40,082	230	60,099	0	125	125	1,995	2,994	457,976
7/22	2,303	357,978	98	40,180	179	60,278	0	125	115	2,110	2,695	460,671
7/23	4,245	362,223	148	40,328	330	60,608	0	125	210	2,320	4,933	465,604
7/24	3,084	365,307	135	40,463	291	60,899	0	125	150	2,470	3,660	469,264
7/25	1,861	367,168	56	40,519	140	61,039	0	125	87	2,557	2,144	471,408
7/26	1,895	369,063	67	40,586	156	61,195	0	125	96	2,653	2,214	473,622
7/27	1,157	370,220	31	40,617	76	61,271	0	125	49	2,702	1,313	474,935
7/28	1,340	371,560	46	40,663	95	61,366	0	125	72	2,774	1,553	476,488
7/29	1,126	372,686	42	40,705	90	61,456	0	125	58	2,832	1,316	477,804
7/30	4	372,690	0	40,705	0	61,456	0	125	818	3,650	822	478,626
7/31	6	372,696	0	40,705	0	61,456	0	125	869	4,519	875	479,501
8/01	5	372,701	0	40,705	0	61,456	0	125	673	5,192	678	480,179
8/02	4	372,705	0	40,705	0	61,456	0	125	769	5,961	773	480,952
8/03	10	372,715	0	40,705	0	61,456	0	125	1,100	7,061	1,110	482,062
8/04	8	372,723	0	40,705	0	61,456	0	125	1,844	8,905	1,852	483,914
8/05	4	372,727	0	40,705	0	61,456	0	125	955	9,860	959	484,873
8/06	5	372,732	0	40,705	0	61,456	0	125	683	10,543	688	485,561
8/07	5	372,737	0	40,705	0	61,456	0	125	645	11,188	650	486,211

Continued

Table 26. (page 3 of 4)

Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
8/08	6	372,743	0	40,705	0	61,456	0	125	752	11,940	758	486,969
8/09	9	372,752	0	40,705	0	61,456	0	125	943	12,883	952	487,921
8/10	25	372,777	0	40,705	0	61,456	0	125	3,185	16,068	3,210	491,131
8/11	30	372,807	0	40,705	0	61,456	0	125	3,192	19,260	3,222	494,353
8/12	20	372,827	0	40,705	0	61,456	0	125	6,408	25,668	6,428	500,781
8/13	19	372,846	0	40,705	0	61,456	0	125	3,067	28,735	3,086	503,867
8/14	20	372,866	0	40,705	0	61,456	0	125	2,100	30,835	2,120	505,987
8/15	9	372,875	0	40,705	0	61,456	0	125	1,220	32,055	1,229	507,216
8/16	4	372,879	0	40,705	0	61,456	0	125	528	32,583	532	507,748
8/17	6	372,885	0	40,705	0	61,456	0	125	1,030	33,613	1,036	508,784
8/18	4	372,889	0	40,705	0	61,456	0	125	709	34,322	713	509,497
8/19	5	372,894	0	40,705	0	61,456	0	125	1,029	35,351	1,034	510,531
8/20	7	372,901	0	40,705	0	61,456	0	125	1,061	36,412	1,068	511,599
8/21	10	372,911	0	40,705	0	61,456	0	125	1,422	37,834	1,432	513,031
8/22	33	372,944	0	40,705	0	61,456	0	125	2,460	40,294	2,493	515,524
8/23	14	372,958	0	40,705	0	61,456	0	125	1,402	41,696	1,416	516,940
8/24	7	372,965	0	40,705	0	61,456	0	125	895	42,591	902	517,842
8/25	9	372,974	0	40,705	0	61,456	0	125	778	43,369	787	518,629
8/26	5	372,979	0	40,705	0	61,456	0	125	587	43,956	592	519,221
8/27	3	372,982	0	40,705	0	61,456	0	125	755	44,711	758	519,979
8/28	5	372,987	0	40,705	0	61,456	0	125	632	45,343	637	520,616
8/29	4	372,991	0	40,705	0	61,456	0	125	500	45,843	504	521,120
8/30	6	372,997	0	40,705	0	61,456	0	125	763	46,606	769	521,889
8/31	24	373,021	0	40,705	0	61,456	0	125	1,170	47,776	1,194	523,083
9/01	14	373,035	0	40,705	0	61,456	0	125	967	48,743	981	524,064
9/02	0	373,035	0	40,705	0	61,456	0	125	649	49,392	649	524,713
9/03	0	373,035	0	40,705	0	61,456	0	125	800	50,192	800	525,513
9/04	0	373,035	0	40,705	0	61,456	0	125	781	50,973	781	526,294
9/05	0	373,035	0	40,705	0	61,456	0	125	704	51,677	704	526,998
9/06	0	373,035	0	40,705	0	61,456	0	125	734	52,411	734	527,732

Continued

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Date	Sockeye		Chinook		Chum		Pink		Coho		Total	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
9/07	0	373,035	0	40,705	0	61,456	0	125	754	53,165	754	528,486
9/08	0	373,035	0	40,705	0	61,456	0	125	795	53,960	795	529,281
9/09	0	373,035	0	40,705	0	61,456	0	125	705	54,665	705	529,986
9/10	0	373,035	0	40,705	0	61,456	0	125	678	55,343	678	530,664
9/11	0	373,035	0	40,705	0	61,456	0	125	659	56,002	659	531,323
9/12	0	373,035	0	40,705	0	61,456	0	125	608	56,610	608	531,931
9/13	0	373,035	0	40,705	0	61,456	0	125	486	57,096	486	532,417
Total	373,035		40,705		61,456		125		57,096		532,417 [a]	

[a] An additional 349 whitefish and 248 Arctic char were counted passing the sonar site in 1997.

Table 27. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey and river test fishing enumeration methods, in thousands of fish, Kvichak River, 1997.

	Tower Count		Aerial Survey	River Test Fishing			
				Fish per	Index Points		Cumulative
Date	Daily	Cum.	Total	Index Pt.[1]	Daily	Cum.	Escapement
6/23	0	0		84	10	20	1,680
6/24	2,676	2,676		84	19	39	3,276
6/25	3,624	6,300		84	32	71	5,964
6/26	8,718	15,018		84	23	94	7,896
6/27	26,742	41,760		84	33	127	10,668
6/28	18,144	59,904		84	15	142	11,928
6/29	6,732	66,636		84	37	179	15,036
6/30	6,084	72,720		84	73	252	21,168
7/1	3,174	75,894		84	111	363	30,492
7/2	7,026	82,920		84	739	1,102	92,568
7/3	33,054	115,974	85,000	84	1,004	2,106	176,904
7/4	42,012	157,986		109	1,304	3,410	371,690
7/5	48,054	206,040	150,000	79	1,913	5,323	420,517
7/6	93,486	299,526		61	4,213	9,536	581,696
7/7	139,878	439,404	130,000	64	3,587	13,123	839,872
7/8	197,742	637,146		67	2,324	15,447	1,034,949
7/9	159,678	796,824		66	2,933	18,380	1,213,080
7/10	152,742	949,566	65,000	59	1,677	20,057	1,183,363
7/11	103,224	1,052,790		57	903	20,960	1,194,720
7/12	87,138	1,139,928		56	1,056	22,016	1,232,896
7/13	60,432	1,200,360		57	869	22,885	1,304,445
7/14	90,690	1,291,050		58	600	23,485	1,362,130
7/15	57,654	1,348,704		58	1,024	24,509	1,421,522
7/16	32,586	1,381,290		58	730	25,239	1,463,862
7/17	29,706	1,410,996					
7/18	23,508	1,434,504					
7/19	20,298	1,454,802					
7/20	12,804	1,467,606					
7/21	14,178	1,481,784					
7/22	10,872	1,492,656					
7/23	11,076	1,503,732					
Total		1,497,432				17,821	1,425,680

[1] Fish per index point was based on lag time and/or catchability factors.

Table 28. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey, and river test fishing enumeration methods, in thousands of fish, Egegik River, 1997.

	Tower Count		Aerial Survey	River Test Fishing			
					Index Points		Estimated
Date	Daily	Cum.	Total	Fish per Index Pt.[1]	Daily	Cum.	Cumulative Escapement
6/15				80	279	279	22
6/16				80	498	777	62
6/17			2,800	80	640	1,417	113
6/18				80	742	2,159	173
6/19	14,610	14,610		80	634	2,793	223
6/20	26,100	40,710	13,800	80	350	3,143	251
6/21	13,566	54,276		80	652	3,795	304
6/22	34,830	89,106		80	363	4,158	333
6/23	10,572	99,678	15,000	31	260	4,418	137
6/24	6,258	105,936		27	183	4,601	124
6/25	6,324	112,260		26	165	4,766	124
6/26	7,410	119,670		27	171	4,937	133
6/27	25,164	144,834		31	452	5,389	167
6/28	42,636	187,470		40	422	5,811	232
6/29	44,034	231,504	10,800	42	649	6,460	271
6/30	34,566	266,070		42	514	6,974	293
7/1	16,296	282,366	6,100	45	103	7,077	318
7/2	6,618	288,984		43	775	7,852	338
7/3	13,614	302,598	1,100	42	454	8,306	349
7/4	7,956	310,554		40	378	8,684	347
7/5	9,252	319,806		38	875	9,559	363
7/6	18,252	338,058		38	1,351	10,910	415
7/7	170,664	508,722	33,300	49	3,853	14,763	723
7/8	127,806	636,528		49	968	15,731	771
7/9	39,228	675,756	1,400	43	921	16,652	716
7/10	12,252	688,008		43	1,299	17,951	772
7/11	176,196	864,204	44,500	50	1,486	19,437	972
7/12	81,300	945,504		52	699	20,136	1,047
7/13	68,130	1,013,634	5,100				
7/14	37,842	1,051,476					
7/15	42,498	1,093,974	5,500				
7/16	6,168	1,100,142					
7/17	3,822	1,103,964					
Total		1,103,964				20,136	

[1] The 1985-96 mean fish per index point relationship (80 fpi) was used until June 23 when lag-time relationships began to prove more accurate.

Table 29. Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey, and river test fishing enumeration methods, in thousands of fish, Ugashik River, 1997.

	Tower Count		Aerial Survey	River Test Fishing			
					Index Points		
Date	Daily	Cum.	Total	Fish per Index Pt.[1]	Daily	Cum.	Cumulative Escapement
6/22							
6/23			600				0
6/24				30	34	34	1
6/25				30	27	61	2
6/26				30	31	92	3
6/27				30	51	143	4
6/28				30	96	239	7
6/29			1,500	30	51	290	9
6/30				30	135	425	13
7/01			100	30	89	514	15
7/02	276	276		30	72	586	18
7/03	1,290	1,566		30	51	637	19
7/04	1,476	3,042		30	71	708	21
7/05	1,704	4,746		30	112	820	25
7/06	2,370	7,116		30	229	1,049	31
7/07	9,288	16,404	400	30	1,358	2,407	72
7/08	13,500	29,904		36	1,686	4,093	147
7/09	31,380	61,284	11,500	33	1,794	5,887	194
7/10	34,230	95,514		31	1,480	7,367	228
7/11	48,090	143,604	9,900	30	3,013	10,380	311
7/12	49,056	192,660		32	1,620	12,000	384
7/13	37,080	229,740	2,000	31	2,181	14,181	440
7/14	43,572	273,312		24	2,662	16,843	404
7/15	60,876	334,188	93,000	25	2,094	18,937	473
7/16	21,024	355,212		23	638	19,575	450
7/17	36,096	391,308	5,600	22	797	20,372	448
7/18	24,918	416,226	5,400	22	1,597	21,969	483
7/19	13,254	429,480	300				
7/20	23,808	453,288					
7/21	28,134	481,422	1,400				
7/22	25,380	506,802	700				
7/23	20,874	527,676					
7/24	24,930	552,606					
7/25	12,918	565,524					
7/26	13,032	578,556					
7/27	22,662	601,218					
7/28	13,650	614,868					
7/29	3,528	618,396					
Total		618,396				21,969	

[1] The 1985-96 mean fish per index point was 60 fpi.

Table 30. Daily sockeye salmon escapement estimates by tower and aerial survey enumeration methods, in thousands of fish, Wood River, 1997.

Date	Tower Count		Aerial Surveys[1]		
	Daily	Cum.	Number	Visibility	Comments
20-Jun					
21-Jun					
22-Jun	8	8			
23-Jun	9	17			
24-Jun	14	30	400	Fair	1 fish in lower river subsistence net
25-Jun	28	58	1,030	Poor	Groups of 40 to 50, lower river sign
26-Jun	28	87	1,900	Poor	Lower river sign
27-Jun	31	117	1,950	Poor	Lower river sign
28-Jun	57	174			
29-Jun	53	227			
30-Jun	52	279			
1-Jul	51	329			
2-Jul	91	420			
3-Jul	127	547			
4-Jul	127	674	14,600	Exc	Heavy sign below Muklung River
5-Jul	69	743			
6-Jul	102	845	7,500	Poor	One jumper observed above Muklung
7-Jul	72	916	5,500	Fair	
8-Jul	73	989			
9-Jul	156	1,146			
10-Jul	35	1,181			
11-Jul	67	1,247			
12-Jul	66	1,314			
13-Jul	60	1,374			
14-Jul	31	1,405			
15-Jul	29	1,434			
16-Jul	16	1,450			
17-Jul	12	1,462			
18-Jul	15	1,477			
19-Jul	11	1,488			
20-Jul	8	1,497			
21-Jul	6	1,503			
22-Jul	10	1,512			
Total		1,512			

[1] 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 enumeration methods, in thousands of fish, Igushik River, 1997.

	Tower Count		Aerial Surveys[1]					River Test Fishing			
Date	Daily	Cum.	Lower River	Upper Lagoon	Upper River	Total	Visibility	Fish pe Index Pt	Index Points Daily	Index Points Cum.	Cumulative scapement
17-Jun								86	37	37	2
18-Jun								86	19	56	5
19-Jun								86	49	105	9
20-Jun								86	55	160	14
21-Jun								86	150	310	27
22-Jun			0	0	0	0	Good	86	112	422	36
23-Jun	1	1						86	108	530	45
24-Jun	1	1	0					86	105	635	55
25-Jun	1	2						86	189	824	69
26-Jun	1	3	0	30	250	280	Poor	86	105	929	77
27-Jun	2	5						11	94	1,023	12
28-Jun	2	7						17	72	1,095	19
29-Jun	3	10						18	155	1,250	23
30-Jun	2	11						18	377	1,627	29
1-Jul	1	13						13	201	1,828	25
2-Jul	1	14						12	348	2,176	27
3-Jul	1	15						11	358	2,534	30
4-Jul	2	17		100	200	300	Excellent	10	465	2,999	31
5-Jul	3	19						11	273	3,272	39
6-Jul	5	24		300	600	900	Fair	14	441	3,713	55
7-Jul	3	27		200	600	800	Poor	14	543	4,256	62
8-Jul	3	30						13	759	5,015	69
9-Jul	5	35		100	850	950	Poor	13	677	5,692	79
10-Jul	7	42						14	1,051	6,743	94
11-Jul	9	51		550	750	1300		16	1,364	8,107	137
12-Jul	8	59						11	1,111	9,218	108
13-Jul	7	66						9	711	9,929	98
14-Jul	7	73						12	614	10,543	136
15-Jul	7	80									
16-Jul	9	89									
17-Jul	9	98									
18-Jul	9	106		250	1350	1600	Poor				
19-Jul	6	112									
20-Jul	4	117									
21-Jul	4	120									
22-Jul	3	123									
23-Jul	2	125									
24-Jul	3	128									
Total		401									

[a] The 1991-92, 1994-96 mean fish per index point relationship (86 fpi) was used until June 27 when lag-time relationships began to prove more accurate.

Table 32. Comparison of daily sockeye salmon escapement estimates by tower and aerial survey enumeration methods in thousands of fish, Togiak River, 1997.

Date	Tower Count		Aerial Surveys [1]					
	Daily	Cum.	Togiak to Gechiak	Gechiak to Ongivinuck	Ongivinuck to tower	Total	Visibilit	Comments
7/01								
7/02								
7/03								
7/04								
7/05		1						
7/06		1						
7/07		1	1950	2155	560	4665	Good	
7/08		1						
7/09		1	2050	4916	1440	8406	Fair	
7/10		2						
7/11	1	3	4275	4092	1085	9452	Good	
7/12	1	3						
7/13	1	5						
7/14	7	12	5550	8230	5100	18880	Good	
7/15	5	16						
7/16	5	21						
7/17	4	25						
7/18	3	29	6350	13690	4560	24600	Fair	Smoke reduced light
7/19	4	33						
7/20	5	38						
7/21	3	40	16100	20270	6720	43090	Good	
7/22	5	46						
7/23	6	52						
7/24	9	61						
7/25	9	70	5600	12370	6860	24830	Fair	
7/26	5	75						
7/27	6	80						
7/28	6	86						
7/29	6	92						
7/30	6	99						
7/31	8	107						
8/01	4	111						
8/02	4	115						
8/03	3	118						
8/04	4	123						
8/05	3	126						
8/06	3	129						
8/07	1	130						
8/08	1	131						
8/09	1	132						
Total		132						

[1] Unexpanded counts of fish in clear water index areas immediately below the counting tower at the time of the survey.

Table 33. Commercial salmon processors and buyers operating in Bristol Bay, 1997.[a]

Name of Operator/Buyer	Base of Operations	District[1]	Method[2]	Export
01. Alaska Pacific Products	Egegik, AK	E	F,S	AIR
02. American Seafoods Company	Naknek, AK	K,E,U,N	F	SEA
03. Capilano Pacific	Naknek, AK	K,E,U,N	C,F	SEA
04. Clarks Fish Company	Cathlamet, WA	E	F,EF	AIR, SEA
05. Clippers Seafoods, Ltd.	Seattle, WA	U	F	SEA
06. Dillingham Meat & Fish	Dillingham, AK	N	F,S,EF	AIR
07. Dragnet Fisheries Company	Anchorage, AK	N	F,EF	AIR,SEA
08. Friedman Family Fisheries	Baltimore, MD	N	F	SEA
09. Favco Inc.	Anchorage, AK	N	EF	AIR
10. Icicle Seafoods, Inc.	Seattle, AK	K,E,U,N	F,EF	SEA
11. Inlet Salmon	Kenai, AK	K,E,U,N	F,EF	AIR,SEA
12. International Seafoods of Alaska	Kodiak, AK	E	F	SEA
13. Kachemak Bay Seafoods	Homer, AK	E	F	SEA
14. Lady Marian Seafoods, Inc.	Anchorage, AK	K	F	AIR
15. Nelbro Packing Company	Kenmore, WA	K,E	C,F	SEA
16. New West Fisheriess	Bellingham, WA	K,E,U	F	SEA
17. North Alaska Fishereis Inc.	Anchorage, AK	T	EF	AIR
18. North Coast Seafood Products	Seattle, WA	K,E,U	F	SEA
19. Nor Quest Seafoods, Inc.	Seattle, WA	K,E	F	SEA
20. Ocean Beauty Seafoods, Inc.	Seattle, WA	K,E,U,N	F,EF	AIR,SEA
21. Pan Pacific Seafoods	Seattle, WA	K,E,U	F	SEA
22. Pederson Point	Seattle, WA	K,E	F	SEA
23. Peter Pan Seafoods, Inc.	Seattle, WA	N	C,EF,F,S	SEA
24. Silent Partner	Poulsbo, WA	N	F,EF	SEA
25. Snopak Products	Seattle, WA	K,E,U,N	F	SEA
26. Togiak Fisheries Inc.	Seattle, WA	T	F,EF	SEA
27. Trans Aqua International Inc.	Warden, WA	E	F	SEA
28. Trident Seafoods	Seattle, WA	K,E,U,N	C,EF,F	AIR,SEA
29. Unisea, Inc.	Redmond, WA	K,E,U,N	F,EF	AIR
30. Wards Cove Packing Ekuk	Seattle, WA	N	C,F	AIR
31. Wards Cove Packing Naknek	Seattle, WA	K,E,N	F	AIR
32. Wards Cove Packing Red Salmon	Seattle, WA	K,E,N	C,EF,F	SEA
33. Western Sea	Seattle, WA	E	F	SEA
34. Woodbine Alaska Fish Company	Rio Vista, CA	K,E,U,N	C,F	SEA
35. Yard Arm Knot	Seattle, WA	K,E	F	SEA

# of processors: Canning =7; Freezing =33; Fresh =14; Curing =3; Air Export =13; Sea Export =27

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

[1] K=Naknek-Kvichak; E=Egegik; U=Ugashik; N=Nushagak; T=Togiak.

[2] Type of processing: C=canned; EF=export fresh; F=frozen; S=cured; T=tendered.

Table 34. Mean round weight, price per pound, and total exvessel value of the commercial salmon catch, Bristol Bay, 1997.[a]

Species	Total Catch (lbs.)	Mean Weight (lbs.)	Mean Price ($/lb.)	Exvessel Value ($)
Sockeye	72,621,330	5.90	0.85	61,728,130
Chinook	1,252,960	16.40	0.55	689,128
Chum	1,995,500	6.50	0.10	199,550
Pink	340	3.40	0.05	20
Coho	332,640	6.60	0.45	149,688
Total	76,202,770			62,766,516

[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, 1997*

Area and River System	Permits Issued	Estimated Number of Salmon Harvested					
		Sockeye	Chinook	Chum	Pink	Coho	Total
NAKNEK-KVICHAK DISTRICT							
Naknek River[1]	338	27,244	2,264	422	209	1,391	31,530
Kvichak River/Iliamna Lake:							
Chekok	2	700	0	0	0	0	700
Igiugig	8	1,933	3	0	0	2	1,938
Iliamna Community	22	8,842	103	0	0	0	8,944
Iliamna Lake	10	1,212	0	0	0	0	1,212
Kokhanok	17	8,773	4	34	214	0	9,025
Kvichak River	11	1,400	19	2	0	11	1,432
Lake Clark - General	48	6,219	2	0	0	0	6,221
Levelock	6	1,290	12	0	0	15	1,317
Newhalen River	44	16,561	308	0	0	0	16,869
Nondalton	8	5,058	46	19	0	34	5,158
Pedro Bay	16	5,838	0	0	0	0	5,838
Subtotal, Kvichak	192	57,825	497	56	214	62	58,653
TOTAL NAKNEK/KVICHAK	533	85,248	2,764	478	422	1,457	90,368
EGEGIK DISTRICT[3]	34	2,438	101	21	5	740	3,304
UGASHIK DISTRICT[4]	28	2,785	169	39	23	311	3,327
NUSHAGAK DISTRICT							
Wood River[5]	114	3,814	3,254	343	12	905	8,328
Lower Nushagak River[6]	29	1,313	2,365	99	2	101	3,880
Upper Nushagak River[7]	68	4,396	2,981	676	54	325	8,432
Dillingham Beaches[8]	221	9,256	5,381	778	89	1,615	17,119
Nushagak Bay Commercial[9]	56	1,916	551	52	4	236	2,758
Igushik	31	3,428	612	34	45	156	4,277
Nushagak, Site Unspecified	19	957	174	74	12	95	1,312
TOTAL NUSHAGAK DISTR	538	25,080	15,318	2,056	218	3,433	46,106
TOGIAK DISTRICT[10]	31	1,440	667	380	0	260	2,747
TOTAL BRISTOL BAY[11]	1,166	116,991	19,159	2,974	668	6,201	145,992

* Harvests are extrapolated for all permits issued, based on those returned and on the area fished as first recorded on the permit. Of 1,166 permits issued for the management area, 1,051 were returned (90.1%).

[1] Includes Mile 5 North, Naknek River General, Powerline-North, North and South Savonoski, South Naknek Beach, and Telephone Point-North.

[2] Totals include 3 permits with unknown fishing site in the Naknek/Kvichak District

[3] Includes Egegik river and beach

[4] Includes Point Point and Ugashik

[5] Includes Dragnet, Aleknagik area, Muklung River, Red Bluff, and Upper and Lower Wood River General

[6] Includes Black Point, Grassy Island, and Lewis Point

[7] Includes Ekwok Area, Kokwok River, New Stuyahok Area, Koliganek Area, Mulchatna River, and Portage Creek

[8] Includes Icicle, Kanakanak, Scandinavia, Skinner, Snag Point, and Squaw Creek

[9] Includes Clark's Point, Ekuk, Etolin Point, Nushagak Point, Protection Point, and Queen's Slough.

[10] Includes Togiak village and Togiak River

[11] Includes 2 permits with site and district unknown, estimated harvest of 140 chinook.

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, 1977-97.

	Kvichak River					Naknek River				
	Point	Range			Percent	Point	Range			Percent
Year	Goal	Lower	Upper	Actual	Deviation [1]	Goal	Lower	Upper	Actual	Deviation
1977	2,000			1,341	(33)	800			1,086	36
1978	2,000			4,149	107	800			813	2
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	4000	6000	1,451	(63)	1,000			1,078	7
20 yr Ave	5,800			6,139	4	930			1,504	62
1977-86	5,500			6,455	15	860			1,438	67
1987-96	6,333	4,889	8,444	6,308	(1)	1,000	800	1,400	1,625	63
1997	4,000	4,000	6,000	1,504	(62)	1,000	800	1,400	1,026	3

	Egegik River					Ugashik River				
	Point	Range			Percent	Point	Range			Percent
Year	Goal	Lower	Upper	Actual	Deviation [1]	Goal	Lower	Upper	Actual	Deviation
1977	600			693	16	500			201	(60)
1978	600			896	49	500			70	(86)
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	1,613	61	700	500	900	643	(8)
1989	1,000	800	1,200	1,611	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	1,968	97	700	500	900	1,081	54
1995	1,000	800	1,400	1,283	28	700	500	1,200	1,321	89
1996	1,000	800	1400	1,076	8	700	500	1,200	668	(5)
20 yr Ave	853	800	1,217	1,358	58	626	500	925	1,272	108
1977-86	689	800	1,200	940	40	544	500	900	1,224	131
1987-96	1,000	800	1,220	1,734	73	700	500	930	1,315	88
1997	1,000	800	1,400	1,109	11	700	500	1,200	619	(12)

Continued

Appendix Table 1. (Page 2 of 2)

Year	Wood River					Igushik River				
	Point Goal	Range Lower	Range Upper	Actual	Percent Deviation [1]	Point Goal	Range Lower	Range Upper	Actual	Percent Deviation [1]
1977	800			562	(30)	150			96	(36)
1978	800			2,267	183	150			536	257
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	308	54
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
20 yr Ave.	950	723	1,200	1,326	43	185	148	250	467	171
1977-86	860			1,384	65	170			538	244
1987-96	1,022	733	1,200	1,225	20	200	148	250	395	97
1997	1000	700	1200	1,512	51	200	150	250	128	(36)

Year	Nushagak River [2]					Togiak River				
	Point Goal	Range Lower	Range Upper	Actual	Percent Deviation [1]	Point Goal	Range Lower	Range Upper	Actual	Percent Deviation [1]
1977	250			233	(7)	100			134	34
1978	250			577	131	100			274	174
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
20 yr Ave.	421			631	85	132			201	63
1977-86	311			754	179	111			213	105
1987-96	520	324	736	519	(0)	150	128	235	189	26
1997	550	340	760	373	(32)	150	140	250	132	(12)

[1] Percent deviation = (actual minus goal) / goal (multiplied by 100).

[2] Actual escapement from 1974-88 is based on the Nuyakuk River tower count, and from 1989-present is based on sonar count at Portage Creek.

Appendix Table 2. Forecast and inshore chinook salmon return, in thousands of fish, Bristol Bay, 1977-97.

Year	Forecast			Inshore Run[1]	Forecast Error (%)		
	Spawner Recuit	Mean Percent	Sibling		Spawner Recruit	Mean Percent	Sibling
1977	211	107	146	156	35	-31	-6
1978	254	105	111	256	-1	-59	-57
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 [a]	135			-11
1992			196 [a]	142			38
1993			139 [a]	175			-21
1994[b]			151 [a]	229			-34
1995[b]			177 [a]	178			-1
1996[b]			150 [a]	135			11
Mean Percent Error					47	42	-6
1997[b]			157 [a]	164 [c]			-4

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

[a] Adjusted (reduced) by the average forecast error from 1984 to the current year.

[b] Mean returns were used to predict age 1.1 and age 1.2, other year classes were forecast using sibling data.

[c] Preliminary

(Sources: 1, 5, 6, 7, and 16)

Appendix Table 3. Salmon entry permit registration by gear and residency, Bristol Bay, 1977-1997.[a]

Year	Drift Net[1]					Set Net[1]					Total
	Resident		Non-Resident		Total	Resident		Non-Resident		Total	
1977	1,001	(52)	726	(13)	1,727	684	(15)	156	(1)	840	2,567
1978	1,041	(66)	735	(11)	1,776	749	(16)	161	(3)	910	2,686
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[c]	1,044	(75)	793	(16)	1,837	736	(14)	224	(4)	960	2,797
1988[d]	1,033	(78)	806	(12)	1,839	731	(14)	227	(3)	958	2,797
1989[e]	1,036	(77)	831	(14)	1,867	784	(14)	240	(4)	1,024	2,891
1990[f]	1,038	(78)	840	(15)	1,878	784	(11)	243	(5)	1,027	2,905
1991[g]	1,019	(74)	862	(14)	1,881	771	(8)	253	(4)	1,024	2,905
1992[h]	998	(72)	886	(15)	1,884	774	(8)	251	(0)	1,025	2,909
1993[i]	984	(65)	902	(16)	1,886	764	(8)	259	(0)	1,023	2,909
1994[j]	971	(63)	916	(14)	1,887	761	(7)	259	(0)	1,020	2,907
1995[k]	969	(62)	919	(13)	1,888	762	(8)	257	(0)	1,019	2,907
1996[l]	967	(56)	924	(14)	1,891	759	(6)	258	(0)	1,017	2908
20 Year Ave	1,028		814		1,842	751		218		969	2,805
1977-86 Av	1,050		760		1,809	741		198		939	2,748
1987-96 Av	1,006		868		1,874	763		247		1,010	2,884
1997[m]	967	(56)	924	(14)	1,891	759	(6)	258	(0)	1,017	2,908

Allowable gear per license/permit is 150 fathoms for drift and 50 fathoms for set with the following exceptions: 1968 and 1975 75F. drift and 25 F. set; 1969 - 125 F. drift; and 1969 - 125 F. drift; 1973 - 25 F. drift and 12 1/2 F. set.

[1] Total license/permit registration; not all license/permittee's actually fished. Limited Entry went into effect in 1974. Figure in parenthesis are interim-use permits, and are included in the totals. Does not include 2 drift and 11 setnet permits available but not renewed.

[a] Does not include 1 drift and 8 setnet permits.

[b] Does not include 5 drift and 20 setnet permits.

[c] Does not include 3 drift and 14 setnet permits.

[d] Does not include 4 drift and 20 setnet permits.

[e] Does not include 4 drift and 14 setnet permits.

[f] Does not include 7 drift and 18 setnet permits.

[g] Does not include 7 drift and 15 setnet permits.

[h] Does not include 2 drift and 14 setnet permits.

[i] Does not include 7 drift and 18 setnet permits.

[j] Does not include 7 drift and 15 setnet permits.

[k] Does not include 2 drift and 14 setnet permits.

[l] Does not include 4 drift and 1 setnet permits.

[m] Does not include 7 drift and 20 setnet permits.

Appendix Table 4. Salmon fishing interim-use and permanent entry permits actually fished, by gear type, Bristol Bay, 1977-1997.

Year	Permits Issued			Permits Fished	
	Interim -Use	Permanent	Total	Number	Percent
		Drift Gill Net			
1977	65	1,662	1,727	1,359	79%
1978	77	1,699	1,776	1,575	89%
1979	83	1,716	1,799	1,714	95%
1980	110	1,716	1,826	1,764	97%
1981	107	1,719	1,826	1,785	98%
1982	100	1,724	1,824	1,792	98%
1983	95	1,727	1,822	1,797	99%
1984	91	1,729	1,820	1,804	99%
1985	96	1,738	1,834	1,815	99%
1986	95	1,743	1,838	1,823	99%
1987	91	1,746	1,837	1,824	99%
1988	90	1,749	1,839	1,837	100%
1989	91	1,776	1,867	1,855	99%
1990	93	1,785	1,878	1,869	100%
1991	88	1,793	1,881	1,873	100%
1992	87	1,797	1,884	1,879	100%
1993	81	1,805	1,886	1,875	99%
1994	77	1,810	1,887	1,865	99%
1995	75	1,813	1,888	1,882	100%
1996	70	1,821	1,891	1,884	100%
Average	88	1,753	1,842	1,794	97%
1997[a]	68	1,830	1,898		
		Set Gill Net			
1977	16	824	840	498	59%
1978	19	891	910	656	72%
1979	24	910	934	770	82%
1980	34	913	947	807	85%
1981	42	913	955	841	88%
1982	41	916	957	859	90%
1983	31	929	960	865	90%
1984	31	931	962	869	90%
1985	28	931	959	872	91%
1986	22	940	962	869	90%
1987	18	942	960	899	94%
1988	17	941	958	922	96%
1989	18	1,006	1,024	971	95%
1990	16	1,011	1,027	971	95%
1991	12	1,012	1,024	950	93%
1992	8	1,017	1,025	968	94%
1993	8	1,015	1,023	965	94%
1994	7	1,013	1,020	939	92%
1995	8	1,011	1,019	967	95%
1996	6	1,011	1,017	941	93%
Average	20	954	974	870	89%
1997[a]	7	1011	1,018		

[a] Preliminary
(Source: 14)

Appendix Table 5. Sockeye salmon commercial catch by district, in numbers of fish, Bristol Bay, 1977-97.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1977	2,167,214	1,780,567	92,623	619,025	218,451	4,877,880
1978	5,123,668	1,207,294	7,995	3,137,166	452,016	9,928,139
1979	14,991,826	2,257,332	391,118	3,327,346	460,984	21,428,606
1980	15,120,457	2,623,066	885,875	4,497,787	634,561	23,761,746
1981	10,992,809	4,361,406	2,116,066	7,493,093	639,707	25,603,081
1982	5,005,802	2,447,514	1,139,192	5,916,187	595,696	15,104,391
1983	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
1985	8,179,093	7,537,273	6,468,862	1,307,889	209,766	23,702,883
1986	2,892,171	4,852,935	5,002,949	2,719,313	308,688	15,776,056
1987	4,986,002	5,356,669	2,128,652	3,254,720	342,732	16,068,775
1988	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
1990	17,272,224	10,371,762	2,149,009	3,532,543	197,589	33,523,127
1991	10,475,206	6,797,166	2,945,742	5,053,845	549,221	25,821,180
1992	9,395,948	15,646,575	3,320,966	2,789,741	726,446	31,879,676
1993	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
1995	20,279,581	14,425,979	4,509,446	4,445,883	605,328	44,255,217
1996	8,211,983	10,809,115	4,411,055	5,693,523	462,621	29,588,297
20-Year Ave.	10,686,330	7,506,499	2,738,842	3,701,254	458,257	25,090,631
1977-86 Ave.	10,057,912	3,901,306	2,211,251	3,613,023	443,020	20,226,512
1987-96 Ave.	11,314,747	11,111,693	3,266,433	3,789,486	473,493	29,954,751
1997[a]	603,809	7,535,569	1,407,086	2,618,168	91,847	12,256,479

[a] Preliminary.

(Sources: 1 and 5)

Appendix Table 6. Chinook salmon commercial catch by district, in numbers of fish, Bristol Bay, 1977-97.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1977	4,373	3,694	2,167	85,074	35,218	130,526
1978	6,930	3,126	5,935	118,548	57,000	191,539
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	140,910
1996	4,195	980	588	72,011	8,602	99,318
20-Year Ave.	6,750	2,926	3,956	82,174	21,303	119,836
1977-86 Ave.	7,952	4,362	5,602	114,672	31,014	163,601
1987-96 Ave.	5,547	1,491	2,310	49,677	11,592	76,070
1997[a]	2,839	2,047	1,084	64,294	6,114	76,378

[a] Preliminary.

(Sources: 1 and 5)

Appendix Table 7. Chum salmon commercial catch by district, in numbers of fish, Bristol Bay, 1976-97.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1976	317,550	46,955	9,924	801,064	153,559	1,329,052
1977	340,228	83,121	4,465	899,701	270,649	1,598,164
1978	185,451	44,480	1,449	651,743	274,967	1,158,090
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
20-Year Ave.	273,100	103,405	71,194	523,233	250,140	1,221,071
1977-86 Ave.	275,261	94,306	70,238	636,390	257,884	1,334,079
1987-96Ave.	270,939	112,504	72,150	410,075	242,396	1,108,063
1997[a]	8,719	53,249	16,379	181,253	47,459	307,059

a Preliminary.

(Sources: 1 and 5)

Appendix Table 8. Pink salmon commercial catch by district, in numbers of fish, Bristol Bay, 1976-97.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1975	6	9	2	126	279	422
1976	264,631	4,121	116	739,590	28,085	1,036,543
1977	19	0	5	3,017	1,476	4,517
1978	734,880	11,430	530	4,348,336	57,524	5,152,700
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
20-Year Ave.[1]	302,968	4,545	448	1,252,069	45,330	1,605,370
1976-85 Ave.[1]	325,348	5,157	651	2,351,379	39,705	2,722,240
1986-95 Ave.[1]	280,589	3,933	245	152,760	50,955	488,499
1997[a]	39	2	0	50	27	118

[1] Includes even numbered years only.
[a] Preliminary.

(Sources: 1 and 5)

Appendix Table 9. Coho salmon commercial catch by district, in numbers of fish, Bristol Bay, 1977-97.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1977	2,883	2,685	3,884	52,562	45,201	107,215
1978	913	2,256	2,024	44,740	44,338	94,271
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
20-Year Ave.	9,245	36,363	27,405	82,586	52,874	208,472
1977-86 Ave.	6,256	30,919	28,709	137,504	79,162	282,550
1987-96 Ave.	12,234	41,808	26,100	27,668	26,585	134,395
1997[a]	678	35,996	7,651	3,123	2,976	50,424

[a] Preliminary.

(Sources: 1 and 5)

Appendix Table 10. Total salmon commercial catch by district, in numbers of fish, Bristol Bay, 1997.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1977	2,514,717	1,870,067	103,144	1,659,379	570,995	6,718,302
1978	6,051,842	1,268,586	17,933	8,300,533	885,845	16,524,739
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	10,933,424	4,530,995	6,111,030	724,023	30,621,784
20-Year Ave.	11,427,685	7,769,055	2,852,231	5,164,114	845,874	28,058,960
1977-86 Ave.	10,494,328	4,033,370	2,316,128	5,630,565	831,605	23,305,995
1987-96 Ave.	11,730,954	11,269,376	3,367,358	4,327,538	775,855	31,471,081
1997[a]	616,084	7,626,863	1,432,200	2,866,890	200,676	12,742,713

[a] Preliminary.

(Sources: 1 and 5)

Appendix Table 11. Commercial sockeye salmon catch, in percent, by gear type and district, Bristol Bay, 1977-97.

Year	Naknek-Kvichak		Egegik		Ugashik		Nushagak		Togiak		Total[b]	
	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set
1977	90	10	88	12	90	10	85	15	89	11	89	11
1978	91	9	84	16	88	12	85	15	84	16	88	12
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	45	55	86	14
20-Year Ave	87	13	87	13	91	9	76	24	69	31	87	13
1977-86 Ave	87	13	84	16	90	10	82	18	80	20	88	12
1987-96 Ave	87	13	91	9	91	9	71	29	58	42	87	13
1997[a]	73	27	87	13	90	10	71	29	35	65	83	17

[a] Preliminary data.

[b] Percentages based on total fish caught per gear group.

Appendix Table 12. Sockeye salmon escapement by district, in numbers of fish, Bristol Bay, 1977-97.

Year	Naknek-Kvichak[1]	Egegik[2]	Ugashik[3]	Nushagak[4]	Togiak[5]	Total
1977	2,527,000	692,514	201,520	1,220,056	202,634	4,843,724
1978	5,192,066	895,698	82,434	3,485,532	340,076	9,995,806
1979	12,437,996	1,032,042	1,706,904	3,073,571	224,838	18,475,351
1980	25,447,866	1,060,860	3,335,284	8,310,438	572,450	38,726,898
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	1,001,364	1,948,492	239,610	8,536,244
1984	11,948,514	1,165,345	1,270,318	1,814,686	200,778	16,399,641
1985	9,179,014	1,095,192	1,006,407	1,684,796	190,082	13,155,491
1986	3,387,147	1,151,750	1,015,582	2,133,398	271,184	7,959,061
1987	7,281,896	1,273,553	686,894	1,895,961	316,076	11,454,380
1988	5,297,708	1,612,745	654,412	1,524,752	340,712	9,430,329
1989	9,676,244	1,611,566	1,713,287	2,189,501	125,080	15,315,678
1990	9,231,358	2,191,582	749,478	2,144,450	278,202	14,595,070
1991	8,078,885	2,786,925	2,482,016	2,419,488	320,713	16,088,027
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	1,967,775	1,095,068	2,449,616	233,632	15,317,336
1995	11,365,573	1,282,508	1,321,108	2,254,231	240,266	16,463,686
1996	2,835,426	1,076,460	692,167	2,553,995[b]	212,524	4,816,577
20-Year Ave.	7,832,044	1,344,037	1,256,794	2,526,074	276,281	13,235,230
1977-86 Ave.	8,083,658	961,499	1,213,306	2,853,435	294,899	13,406,797
1987-96 Ave.	7,580,429	1,726,575	1,300,281	2,162,341	257,664	13,027,289
1997[a]	2,747,511	1,104,004	656,641	2,022,234	171,373	6,701,763

[1] Includes Kvichak, Branch and Naknek Rivers.

[2] Includes Egegik River. Also includes King Salmon River in 1986-95, and Shosky Creek in 1988-96.

[3] Includes Ugashik River. Also includes Mother Goose River system 1976-96 and Dog Salmon River system in 1984-96.

[4] Includes Wood, Igushik, Nuyakuk, Nushagak-Mulchatna and Snake Rivers.

[5] Includes Togiak River, Lake tributaries, Kulukak system and other misc. river systems.

[a] Preliminary.

[b] Snake River not surveyed due to lack of funding.

(Sources: 1, 7, and 12)

Appendix Table 13. Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak District by river system, in numbers of fish, 1977-97.

Year	Escapement					Total Run
	Catch	Kvichak[1]	Branch[2]	Naknek[1]	Total	
1977	2,167,214	1,341,144	100,000	1,085,856	2,527,000	4,694,214
1978	5,123,668	4,149,288	229,400	813,378	5,192,066	10,315,734
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
20 Year Ave.	10,686,330	6,138,696	211,622	1,481,726	7,832,044	18,518,373
1977-86 Ave.	10,057,912	6,455,435	190,281	1,437,942	8,083,658	18,141,570
1987-96 Ave.	11,314,747	5,821,957	232,963	1,525,509	7,580,429	18,895,176
1997[a]	603,809	1,503,732	218,115	1,025,664	2,747,511	3,351,320

[1] Tower count.

[2] Aerial survey estimates 1977-96.

[a] Preliminary apportionment.

(Sources: 1, 7, 13 and 15)

Appendix Table 14. Inshore sockeye salmon total run by river system Naknek-Kvichak District, in thousand of fish, 1977-97.

Year	Kvichak		Branch		Naknek		Total Run[1]
	Number	%	Number	%	Number	%	
1977	2,081	44	150	3	2,463	52	4,694
1978	7,965	77	455	4	1,896	18	10,316
1979	24,637	90	573	2	2,219	8	27,430
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	7,536
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	17,358
1986	1,966	31	399	6	3,913	62	6,279
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
1996	3,458	31	706	6	6,860	62	11,024
20 Year Ave.	13,646	67	510	3	4,361	30	18,517
1977-86 Ave.	13,839	66	460	4	3,842	31	18,142
1987-96 Ave.	13,452	68	561	3	4,881	29	18,893
1997[a]	1,686	50	245	7	1,420	42	3,351

[1] Due to rounding of river system total runs, the district total run may not equal the sum of the rows.

[a] Preliminary apportionment.

(Sources: 1 and 7)

Appendix Table 15. Inshore commercial catch and escapement of sockeye salmon in the Egegik District by river system, 1977-97.

Year	Catch	Escapement			Total Run
		Egegik[1]	Shosky Cr.[2]	King Salmon[2] River	
1977	1,780,567	692,514			2,473,081
1978	1,207,294	895,698			2,102,992
1979	2,257,332	1,032,042			3,289,374
1980	2,623,066	1,060,860			3,683,926
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	1,095,192			8,632,465
1986	4,852,935	1,151,750		430	6,005,115
1987	5,356,669	1,272,978		575	6,630,222
1988	6,456,598	1,612,680	65		8,069,343
1989	8,901,994	1,610,916	50	600	10,513,560
1990	10,371,762	2,191,362	0	220	12,563,344
1991	6,797,166	2,786,880	0	45	9,584,091
1992	15,646,575	1,945,332	0	300	17,592,207
1993	21,600,858	1,516,980	20		23,117,858
1994	10,750,213	1,967,730	15	30	12,717,988
1995	14,425,979	1,281,678	0	830	15,708,487
1996	10,842,251	1,076,460			11,918,711
20-Year Ave.	7,508,156	1,343,898			8,852,214
1977-86 Ave.	3,901,306	961,497			4,862,848
1987-96 Ave.	11,115,007	1,726,300	15	260	12,841,581
1997[a]	7,535,569	1,103,964	40		8,639,573

[1] Tower count.

[2] Aerial survey index count.

[a] Preliminary.

(Sources: 1 and 7)

Appendix Table 16. Inshore commercial catch and escapement of sockeye salmon in the Ugashik District by river system, 1977-97.

Year	Catch	Escapement			Total Run
		Ugashik[1] River	King Salmon[2] River	Dog Salmon[2] River	
1977	92,623	201,486	34		294,143
1978	7,995	70,434	12,000		90,429
1979	391,118	1,700,904	6,000		2,098,022
1980	885,875	3,321,384	13,900		4,221,159
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	1,000,614	750		4,350,815
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	1,681,302	25,480	6,505	4,859,526
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	4,410,073	667,518	7,230	17,419	5,102,240
20-Year Ave.	2,738,793	1,240,825	11,172	4,796	3,995,586
1977-86 Ave.	2,211,251	1,202,025	9,046	2,236	3,424,557
1987-96 Ave.	3,766,629	1,379,773	13,730	8,334	5,168,467
1997[a]	1,407,086	618,396	27,645	10,600	2,063,727

[1] Tower count.

[2] Aerial survey.

[a] Preliminary.

(Sources: 1 and 7)

Appendix Table 17. Inshore commercial catch and escapement of sockeye salmon in the Nushagak District by river system, in number of fish, 1977-97.

Year	Catch	Escapement							Total Run
		Wood [1]	Igushik [1]	Nuyakuk [1]	Nush/Mul [2]	Nushagak [3]	Snake [4]	Total	
1977	619,025	561,828	95,970	232,554	320,400		9,304	1,220,056	1,839,081
1978	3,137,166	2,267,238	536,154	576,666	87,400		18,074	3,485,532	6,622,698
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	180,438	318,606	85,400		3,080	1,948,492	7,068,236
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	212,454	429,162	69,300		34,880	1,684,796	2,992,685
1986	2,719,313	818,652	307,728	821,898	168,340		16,780	2,133,398	4,852,711
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	170,454	319,992	163,208		4,320	1,524,752	3,231,468
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	365,802			680,368	28,840	2,144,450	5,676,993
1991	5,053,845	1,159,920	756,126			492,522	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	22,480	2,449,616	5,842,759
1995	4,445,883	1,482,162	473,382	69,702	211,605	281,307	17,380	2,254,231	6,700,114
1996	5,693,523	1,649,598	400,746	250,692	252,959	503,651		2,553,995	8,247,518
20-year Ave.	3,701,254	1,326,070	466,669	600,973	169,609		17,684	2,527,470	6,228,725
1977-86 Ave.	3,712,324	1,446,334	563,543	754,260	150,376		18,925	2,933,439	6,645,763
1987-96 Ave.	3,789,486	1,268,575	395,376	200,847	213,201	548,850	16,217	2,201,506	5,990,992
1997	2,618,170 [a]	1,512,396	127,704	272,982	100,053	373,035	8,394	2,021,529	4,639,699

[1] Tower count.

[2] Aerial survey estimates 1977-83, 1985, and 1987. Escapement estimates for 1984, 1988, 1995, 1996 and 1997 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.

[3] Total escapements from 1989 on are determined for the entire Nushagak River drainage using Portage Creek sonar estimates.

[4] 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.

[a] Preliminary.

(Sources: 1, 7, and 13)

Appendix Table 18. Inshore sockeye salmon total run by river system, in thousands of fish and percent, Nushagak District, 1977-97.

Year	Wood		Igushik		Nuyakuk		Nush-Mul		Nushagak		Snake		Total Run[1]
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	
1977	834	45	146	8	358	19	488	27			12	1	1,838
1978	4,117	62	1,084	16	1,302	20	87	1			33	0	6,623
1979	3,638	57	1,842	29	764	12	138	2			18	0	6,400
1980	4,529	35	3,126	24	4,826	38	291	2			37	0	12,809
1981	4,568	44	2,229	22	3,319	32	177	2			52	1	10,345
1982	3,471	44	1,818	23	2,079	26	550	7			12	0	7,930
1983	4,272	60	813	12	1,379	20	601	9			3	0	7,068
1984	1,982	52	435	11	906	24	451	12			34	1	3,808
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	617	12	589	11	1,116	22			2	0	5,152
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	1,280	23					1,757	31	29	1	5,676
1991	3,303	44	2,424	32					1,736	23	11	0	7,474
1992	2,481	49	794	16					1,802	35			5,077
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[a]	5,030	61	1,502	18					1,771	21			8,303
20-Year A	3,100	50	1,292	19	1,553	23	413	9	1,601	25	23	0	6,232
1977-86 A	3,078	49	1,283	18	1,739	25	342	8			25	0	6,467
1987-96 A	3,122	52	1,302	21	619	16	770	17	1,601	25	19	0	5,997
1997[a]	3,480	75	293	6					858	18	8	0	4,639

[1] Due to rounding, the district total runs may not equal the sum of the rows.
[a] Preliminary harvest apportionment.

(Sources: 1 and 7)

Appendix Table 19. Inshore commercial catch and escapement of sockeye salmon in the Togiak District by river system, in numbers of fish, 1977-97.

	Catch				Escapement						
					Togiak						
Year	Togiak	Kulukak	Os/Mat[1]	Total	Lake[2]	River[3]	Tributaries[4]	Kulukak[5]	Other[6]	Total	Total Run
1974	110,886	13,615	14,840	139,341	82,992	12,000	8,600	4,900		108,492	247,833
1975	184,856	3,821	237	188,914	160,962	12,200	7,400	8,600		189,162	378,076
1976	293,016	4,822	4,045	301,883	158,190	15,000	16,200	11,200		200,590	502,473
1977	201,004	16,252	1,195	218,451	133,734	4,400	24,400	40,100		202,634	421,085
1978	422,100	29,668	248[a]	451,768	273,576	15,000	17,600	33,900		340,076	791,844
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	522090[b]	33425[b]	6437[b]	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
20-Year Ave.	368,929	55,617	6,109	458,116	198,309	12,618	21,585	34,973	21,990	276,281	734,397
1977-86 Ave.	387,733	48,576	6,687	442,996	208,510	13,273	29,216	41,400	25,000	294,899	737,894
1987-96 Ave.	350,126	62,658	5,530	473,237	188,109	11,962	13,954	28,546	21,560	257,664	730,901
1997[c]	91,847	49,277	2,976	144,100	131,682	12,300	8,325	7,950	6,370	166,627	310,727

[1] Catches in the Osviak and Matogak sections were combined.
[2] Tower count.
[3] Aerial survey estimate.
[4] Aerial survey estimate includes Gechiak, Pungokepuk, Kemuk, Nayorurum, and Ongivinuck River systems. Aerial survey estimates prior to 1986 also include Ungalikthluk, Negukthlik, Matogak, Osviak, and other miscellaneous river systems when surveyed.
[5] Aerial survey estimate includes Kulukak River and Lake and Tithe Creek ponds.
[6] 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.
[a] Includes 248 fish from Cape Pierce Section.
[b] Based on weekly processor reports. Fish tickets were not coded by section.
[c] Preliminary.

(Source: 1, 7, and 13)

Appendix Table 20. Inshore total run of sockeye by district, in numbers of fish, Bristol Bay, 1977-97.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1977	4,694,214	2,473,081	294,143	1,839,081	421,085	9,721,604
1978	10,315,734	2,102,992	90,429	6,622,698	792,092	19,923,945
1979	27,429,822	3,289,374	2,098,022	6,400,917	685,822	39,903,957
1980	40,568,323	3,683,926	4,221,159	12,808,225	1,207,011	62,488,644
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	4,350,815	7,068,236	827,818	45,908,275
1984	26,495,224	6,355,758	3,928,694	3,807,367	522,904	41,109,947
1985	17,358,107	8,632,465	7,475,269	2,992,685	399,848	36,858,374
1986	6,279,318	6,005,115	6,018,531	4,852,711	579,872	23,735,547
1987	12,267,898	6,630,222	2,815,546	5,150,681	658,808	27,523,155
1988	8,778,544	8,069,343	2,177,932	3,231,468	1,162,799	23,420,086
1989	23,486,200	10,513,560	4,859,526	4,977,686	214,012	44,050,984
1990	26,503,582	12,563,344	2,898,487	5,676,993	475,791	48,118,197
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	14,816,695	23,117,858	5,590,354	7,533,348	782,408	51,840,663
1994	25,899,103	12,717,988	5,447,865	5,842,759	633,671	50,541,386
1995	31,645,154	15,708,487	5,830,554	6,700,114	845,594	60,729,903
1996	11,047,409	11,885,575	5,103,222	8,247,518	675,145	36,958,869
20-Year Ave.	18,518,374	8,850,558	3,995,635	6,228,725	734,538	38,327,829
1977-86 Ave.	18,141,570	4,735,929	3,136,338	6,645,763	755,480	33,415,080
1987-96 Ave.	18,895,178	12,250,222	4,658,243	5,651,511	721,629	42,176,783
1997[a]	3,351,320	8,639,573	2,063,727	4,640,404	315,473	19,010,497

[a] Preliminary

(Sources: 1 and 7)

Appendix Table 21. Chinook salmon harvest, escapement and total runs in the Nushagak District, 1977-97.[a]

Year	Harvests by Fishery				Inriver Abundance[1]	Spawning Escapement[2]	Total Run
	Commercial	Sport	Subsistence	Total			
1977	85,074	923	5,200	91,197		65,000	156,197
1978	118,548	442	6,600	125,590		130,000	255,590
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
20-Year Mean	82,174	3,197	11,570	96,941		92,494	189,435
5-Year Mean	76,395	5,675	15,286	97,355	82,873	74,448	171,804
1997	64,294 [a]	2,500 [a]	15,000 [a]	81,794		82,000	163,794

[1] Inriver abundance estimated by sonar below the village of Portage Creek.

[2] 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 - Inriver abundance estimated by sonar minus inriver havests. Estimates for 1977-85 are are rounded to the nearest thousand fiish.

[a] Preliminary.

(Sources: 1, 5 and 13)

Appendix Table 22. Chinook salmon harvest, escapement and total runs in the Togiak District, 1977-97.[a]

Year	Harvests by Fishery				Spawning Escapement[1]	Total Run
	Commercial	Sport	Subsistence	Total		
1977	35,218	62	400	35,680	20,000	55,680
1978	57,000	35	300	57,335	40,000	97,335
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	303	9,307	11,476	20,783
20-Year Mean	21,303	334	582	22,185	16,651	38,836
5-Year Mean	10,912	428	760	12,100	14,743	26,843
1997	6,114 [a]	600 [a]	400 [a]	7,114 [a]	11,495	18,609

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

[a] Preliminary.

(Sources: 1, 5 and 13)

Appendix Table 23. Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak Districts, in numbers of fish, 1977-97.[a]

	Nushagak District			Togiak District		
Year	Catch	Escapement [1]	Total Run	Catch	Escapement [2]	Total Run
1977	899,701	609,000	1,508,701	270,649	496,000	766,649
1978	651,743	293,000	944,743	274,967	396,000	670,967
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	331,414	225,331	556,745	206,226	117,240	323,466
20-Year Ave.	523,590	305,875	820,636	250,096	239,489	489,585
1976-85 Ave.	636,390	345,228	981,618	257,884	292,800	550,684
1986-95 Ave.	410,791	266,522	659,655	242,309	186,178	428,487
1997[b]	181,253	61,456	242,709	47,459	106,580	154,039

[1] Escapements were estimated from the following:
1976-78 - aerial survey data;
1979-97 - adjusted sonar estimate from Portage Creek site.
Estimates for 1976-85 are rounded to the nearest thousand fish.

[2] 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.

[a] Escapement estimates supersede those previously reported.

[b] Preliminary.

(Sources: 1, 5 and 13)

Appendix Table 24. Inshore commercial catch and escapement of pink salmon in the Nushagak District by river system, in numbers of fish, 1958-97. [a]

Year	Catch	Escapement							Total Run
		Wood[1]	Igushik[2]	Nuyakuk[3]	Nush/Mul[4]	Nushagak[5]	Snake[6]	Total	
1958	1,113,794			4,000,000				4,000,000	5,113,794
1960	289,781			146,359				146,359	436,140
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					[b]			
1994	7,337					191,772		191,772	199,109
1996	2,681					821,312		821,312	823,993
Average[7]	1,062,279	55,875	7,419	1,859,390	132,848	476,263	2,217	1,578,928	2,687,111

[1] Aerial survey estimate 1962 and 1974-84; tower count 1964.

[2] Aerial survey estimate 1962-80; aerial survey estimates and tower count 1976 and 1982-84.

[3] Tower count 1960-84; aerial survey estimate 1958, and below counting tower 1962-64 and 1982-84.

[4] Aerial survey estimate.

[5] Sonar estimate from Portage Creek.

[6] Aerial survey estimate 1962-64, 1974-76 and 1980-84, and weir count 1978.

[7] Only years and systems with escapement data were included in averages.

[a] Includes even-years only.

[b] No escapement estimate. Sonar project terminated early due to budget constraints.

(Sources: 1, 5, 13, and 19)

Appendix Table 25. Coho salmon harvest, escapement and total runs in the Nushagak Drainage, 1977-97.

Year	Harvests by Fishery								Inriver Run[2]	Spawnin Escapement[3]	Total Run
	Commercial	Subsistence[1]			Sport			Total			
		Lower	Upper	Total	Lower	Upper	Total				
1977	52,562			3,500		248	248	56,310			
1978	44,740			1,802		516	516	47,058			
1979	129,607			4,676		212	212	134,495			
1980	146,354	3259	840	4,099		551	551	151,004	96,759	95,368	246,372
1981	219,310	4795	3,135	7,930		389	389	227,629	144,992	141,468	369,097
1982	345,903	4919	3,125	8,044		503	503	354,450	297,779	294,151	648,601
1983	66,109	4002	878	4,880		1,498	1,498	72,487	39,261	36,885	109,372
1984	257,649	5885	1,564	7,449		473	473	265,571	142,841	140,804	406,375
1985	20,230	4360	1,646	6,006		130	130	26,366	84,034	82,258	108,624
1986	68,568	6533	2,617	9,150		1,576	1,576	79,294	49,676	45,483	124,777
1987	13,263	4149	1,209	5,358		1,007	1,007	19,628	23,484	21,268	40,896
1988	53,125	3515	1,112	4,627		557	557	58,309	131,840	130,171	188,480
1989	77,073	6971	1,159	8,130		2,392	2,392	87,595	84,658	81,107	168,702
1990	7,447	4856	766	5,622		438	438	13,507	141,704	140,500	154,007
1991	5,399	8915	1,275	10,190		874	874	16,463	39,733	37,584	54,047
1992	84,898	4962	1,534	6,496		752	752	92,146			
1993	14,244	4463	387	4,850		194	194	19,288	42,742	42,161	61,449
1994	6,814	4302	406	4,708		1,143	1,143	12,665	82,019	80,470	93,135
1995	4,181	3233	478	3,711		725	725	8,617	46,340	45,137	53,754
1996	11,401	3603	1,080	4,683		3,713	3,713	19,797	187,028	182,235	202,032
1977-1996 Avg	81,213	4,945	1,383	5,651		746	746	87,573	96,524	94,321	188,513
1992-1996 Avg	23,107	5,175	816	5,991		738	738	29,836	52,709	51,338	65,596
1997	3,123 [b]			4,000 [b]			500 [b]				

[a] Minimum estimate.

[b] Preliminary.

[1] Subsistence harvest estimated by expanding fishing permit returns; excludes estimates for the communities of Manokotak and Wood River. Est. for 1976-86 were based on community where permit was issued; 1987 based on community where permit issued and Nushagak watershed fishing site; 1988-97 on community of residence and Nush. watershed fishing site.

[2] In river run estimated by sonar through Aug. 25 for 1982-96. 1980 and 1981 estimated by applying exploitation rates of .602 to commercial harvest. Sonar est. expanded for some years when the project terminated prior to August 25.

[3] Spawning escapement estimated by sonar minus sport and subsistence harvests upriver of Portage Creek sonar site.

Appendix Table 26. Coho salmon harvest by fishery, escapement and total runs for the Togiak River, 1980-1997

Year	Harvests by Fishery				Spawning	Total
	Commercial	Subsistence[1]	Sport	Total	Escapemen	Run
1980	111,829	1,200	258	113,287	65,130	178,417
1981	19,504	2,200	119	21,823	43,500	65,323
1982	108,000	1,300	524	109,824	69,900	179,724
1983	4,977	800	294	6,071		
1984	111,631	3,800	1,295	116,726	60,840	177,566
1985	35,765	1,500	342	37,607	33,210	70,817
1986	28,030	500	2,851	31,381	21,400	52,781
1987	1,284	1,600	409	3,293	16,000	19,293
1988	8,744	792	1,238	10,774	25,770	36,544
1989	35,814	976	1,976	38,766		
1990	2,296	1,111	367	3,774	21,390	25,164
1991	4,262	1,238	87	5,587	25,260	30,847
1992	3,918	1,231	251	5,400	80,100	85,500
1993	12,613	743	330	13,686		
1994	88,522	910	531	89,963		
1995	8,910	703	408	10,021		
1996	58,369	107	1,400	59,876	64,980	124,856
1980-1996 A	37,910	1,218	746	39,874	43,957	83,831
1992-1996 A	34,466	739	584	35,789	72,540	108,329
1997	2,976 [a]	700 [a]	600 [a]	4,276	20,625	24,901

[a] Preliminary.

[1] 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.

[2] Expanded estimates from aerial surveys.

Appendix Table 27. Average round weight (lbs.) of the commercial salmon catch by species, Bristol Bay, 1977-97.[a]

Year	Sockeye	Chinook	Chum	Pink	Coho
1977	6.7	22.9	7.4		7.8
1978	5.9	23.9	7.2	3.2	7.5
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
20-Year Ave	5.9	19.3	6.7	3.5	7.3
1977-86 Ave	6.0	20.5	6.8	3.4	7.3
1987-96 Ave	5.8	18.1	6.6	3.7	7.3
1997	5.9	16.4	6.5	3.4	6.6

[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 an 1996 data is extracted from the fish ticket system.

(Sources: 1, 4, and 9)

Appendix Table 28. Average price paid per pound for Bristol Bay salmon, 1978-1997.[a]

Year	Sockeye	Chinook	Chum	Pink	Coho
1978	$0.68	$0.70	$0.38	$0.33	$0.62
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[b]	$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
19-Year Ave.	$0.91	$0.89	$0.29	$0.19	$0.65
1978-86 Ave.	$0.81	$0.99	$0.34	$0.24	$0.69
1987-96 Ave.	$1.00	$0.80	$0.24	$0.15	$0.61
1997[c]	$0.85	$0.55	$0.10	$0.05	$0.46

[a] Data prior to 1978 is unavailable. Price information for those years is reported in Annual Management Reports separately for company and independent fishermen.

[b] Price paid in Nushagak District. Bristol Bay average unavailable.

[c] Based on 1997 Final Operations Reports.

(Sources: 1, 3, and 8)

Appendix Table 29. Estimated exvessel value of the commercial salmon catch by species, in thousands of dollars, Bristol Bay, 1977-97.[a]

Year	Sockeye	Chinook	Chum	Pink	Coho	Total
1977	$19,434	$1,940	$4,275		$445	$26,094
1978	$40,034	$3,206	$3,173	$5,424	$435	$52,272
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
20 Year Ave.	$125,410	$2,095	$2,438	$1,205 [b]	$1,045	$131,651
1977-86 Ave.	$92,928	$3,223	$3,091	$2,266 [b]	$1,448	$101,823
1987-96 Ave.	$157,892	$967	$1,785	$321 [b]	$643	$161,479
1997	$61,728	$689	$200		$150	$62,767

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

[b] Includes even-years only.

(Sources: 1, 5, 8, and 9)

Appendix Table 30. South Unimak and Shumigan Island preseason sockeye allocation, actual sockeye harvest, and chum harvest in thousands of fish, Alaska Peninsula, 1977-97.[a]

	South Unimak			Shumigan Island			Total		
	Sockeye			Sockeye			Sockeye		
Year	Actual	Quota[1]	Chum	Actual	Quota[1]	Chum	Actual	Quota[1]	Chum
1977	193	195	93	46	42	22	239	237	115
1978	419	428	105	68	94	18	487	522	123
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
20-yr Ave	1,194	1,539	378	342	340	104	1,536	1,878	482
77-86 Ave	1,166	1,220	361	286	269	88	1,452	1,489	449
87-96 Ave	1,222	1,858	395	399	410	120	1,620	2,268	511
1997	1,179	1,840	196	449	406	126	1,628	2,246	322

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

[1] 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: 11)

Appendix Table 31. Subsistence salmon harvest by district and species, Bristol Bay, 1977-97. [a] [b]

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
			NAKNEK KVICHAK DISTRICT				
1977	352	81,400	1,300	600	100	300	83,700
78	392	93,000	1,200	1,000	1,400	300	96,900
79	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
1982	350	71,400	1,100	600	900	1,000	75,000
83	385	107,900	1,000	400	300	900	110,500
84	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
1987	407	86,706	1,289	756	490	1,106	90,347
88	391	88,145	1,057	588	917	813	91,520
89	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
1992	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
94	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
20 Year Average	480	89,694	1,275	916	1,251 [c]	1,092	93,733
1977-1986 Average	465	90,203	1,167	664	1,541 [c]	795	93,652
1987-1996 Average	495	89,185	1,383	1,168	961 [c]	1,389	93,815
1997	533	85,248	2,764	478	422	1,457	90,368
			EGEGIK DISTRICT				
1977	20	100		100		200	400
78	13	200		100		200	500
79	8	300				100	400
80	3	100					100
81 [d]	4						
1982	19	2,400					2,400
83	14	700					700
84	24	500		100		300	900
85	23	582	14	21	1	203	821
86	41	1,052	69	58	21	319	1,519
1987	49	3,350	87	139	2	284	3,862
88	52	1,405	97	87	54	333	1,976
89	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
1992	80	3,322	124	270	51	729	4,496
93	69	3,633	128	148	15	905	4,829
94	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
20 Year Average	38	1,752	88	110	67 [c]	430	2,285
1977-1986 Average	17	659	42	76	21 [c]	220	860
1987-1996 Average	59	2,735	97	127	76 [c]	555	3,567
1997	34	2,438	101	21	5	740	3,304

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
			UGASHIK DISTRICT				
1977	19	1,000	100	300		500	1,900
78	8	500	100	100		900	1,600
79	8	200				100	300
80	10	200				200	400
81	12	600				200	800
1982	11	400				300	700
83	8	500				100	600
84	8	500				200	700
85	9	233	17	7		143	400
86	27	1,080	83	48	21	335	1,567
1987	22	892	104	51	29	272	1,348
88	23	1,400	84	55	35	330	1,904
89	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
1992	37	2,348	106	79	8	397	2,938
93	39	1,766	86	107	24	495	2,478
94	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
20 Year Average	21	1,013	80	84	38 [c]	337	1,481
1977-1986 Average	12	521	75	114	21 [c]	298	897
1987-1996 Average	30	1,504	82	72	42 [c]	377	2,066
1997	28	2,785	169	39	23	311	3,327
			NUSHAGAK DISTRICT				
1977	306	43,300	5,200	7,300	200	4,500	60,500
78	331	33,200	6,600	14,300	11,100	2,500	67,700
79	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
1982	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
84	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
1987	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
89	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
1992	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
94	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
20 Year Average	432	37,203	11,553	7,526	5,463 [c]	6,355	65,641
1977-1986 Average	385	44,140	9,820	9,520	7,600 [c]	6,370	74,060
1987-1996 Average	478	30,267	13,286	5,531	3,327 [c]	6,341	57,221
1997	538	25,080	15,318	2,056	218	3,433	46,106

	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
			TOGIAK DISTRICT				
1977	41	2,100	400	800		1,100	4,400
78	29	900	300	700	300	500	2,700
79	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
1982	50	1,900	400	300	400	1,300	4,300
83	38	1,900	700	900	200	800	4,500
84	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
1987	46	3,600	700	1,000		1,600	6,900
88	29	2,413	429	716	45	792	4,395
89	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
1992	40	3,716	1,361	626	135	1,231	7,069
93	38	2,139	784	571	8	743	4,245
94	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
20 Year Average	37	2,408	590	693	198 [c]	1,155	4,972
1977-1986 Average	40	2,250	520	760	320 [c]	1,360	5,090
1992-1996 Average	34	2,566	660	625	75 [c]	950	4,853
1997	31	1,440	667	380	0	260	2,747
			TOTAL BRISTOL BAY AREA				
1977	738	127,900	7,000	9,100	300	6,600	150,900
78	773	127,600	8,100	16,200	12,700	4,400	169,000
79	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
1982	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
84	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
1987	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
89	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
1992	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
94	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
20 Year Average	1,008	131,954	13,525	9,277	6,965 [c]	9,288	167,969
1977-1986 Average	919	137,647	11,546	11,037	9,450 [c]	8,965	174,423
1987-1996 Average	1,096	126,261	15,505	7,518	4,481 [c]	9,611	161,514
1997	1,166	116,991	19,159	2,974	668	6,201	145,992

[a] Harvests are extrapolated for all permits issued, based on those returned. Harvests prior to 1985 are rounded to the nearest hundred fish.

[b] Permit and harvest esimates 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.

[c] Includes even years only. [d] No permits returned.

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, 1977-97. [a] [b]

Year	Levelock	Igiugig	Pedro Bay	Kokhanok	Iliamna-Newhalen	Nondalton	Port Alsworth	Other [1]	Total
1977	2,600	6,000	5,600	14,300	11,400	27,200	4,900		72,000
78	8,900	8,800	11,200	23,700	11,000	17,300	3,000		83,900
79	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
1982	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
84	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
1987	5,700	[c]	7,300	16,500	27,500	11,800	3,200		72,000
88	3,500	[c]	5,500	14,400	29,800	20,700	3,200	[d]	77,100
89	5,100	1,200	6,700	13,000	24,700	18,500	2,200	[d]	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
1992	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
94	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
20 Year Average	4,767	3,498	7,801	17,128	19,318	16,085	3,825	2,412	72,918
1977-86 Average	5,990	5,140	8,770	19,460	15,730	17,690	4,650		77,430
1987-96 Average	3,545	1,447	6,832	14,797	22,907	14,481	2,999	2,412	68,405
1997	1,062	2,067	5,501	8,722	19,513	17,194	2,348	3,101	59,508

[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] No permits issued.

[d] No permits issued. Only residents of the Naknek Kvichak watershed could obtain subsistence permits.

[1] Subsistence harvests by non-watershed residents.

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

Appendix Table 33. Subsistence salmon harvest by community, Nushagak District, Bristol Bay, 1977-97. [a b]

Year	Dillingham [1]	Manokotak	Aleknagik	Ekwok	New Stuyahok	Koliganek	Other [2]	Total
1977	15,700	8,100	1,500	8,000	20,900	6,300		60,500
78	27,700	3,200	2,700	12,900	14,200	7,000		67,700
79	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
1982	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
84	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
1987	33,500	5,900	3,100	6,400	11,400	4,900		65,200
88	29,600 [d]	5,500	2,400	6,100	11,700	5,700	[c]	61,000
89	31,800 [d]	5,800	2,000	4,700	9,700	3,800	[c]	57,800
90	28,860 [d]	6,600	2,300	4,900	9,900	8,000	700	61,260
91	34,399 [d]	5,873	3,043	4,532	8,326	5,438	2,163	63,774
1992	31,702 [d]	4,317	2,184	5,971	11,325	3,708	2,635	61,842
93	25,315 [d]	3,048	2,593	2,936	12,169	4,180	2,538	52,779
94	30,145 [d]	3,491	2,289	4,343	8,056	4,513	2,322	55,159
95	24,998 [d]	2,453	1,468	2,046	6,911	2,983	2,406	43,265
96	27,161 [d]	3,883	1,733	2,866	8,892	3,319	2,113	49,967
20 Year Average	28,169	5,093	2,506	6,370	14,759	7,997	2,125	65,637
1977-86 Average	26,590	5,500	2,700	8,260	19,680	11,340		74,070
1987-96 Average	29,748	4,687	2,311	4,479	9,838	4,654	2,125	57,205
1997	23,255 [d]	3,988	1,989	1,797	6,427	4,179	4,598	46,233

[a] Harvests are extrapolated for all permits issued, based on those returned. Harvest estimates prior to 1991are 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] No permits issued. Only residents of the Nushagak watershed could obtain subsistence permits.

[d] Includes permits issued in Clarks Point and Ekuk.

[1] Includes the village of Portage Creek.

[2] Subsistence harvests by non-watershed residents.

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

BRISTOL BAY

HERRING

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INTRODUCTION

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: Bay District; including all waters east of the longitude of Cape Newenham, Togiak District; including all waters between the longitude of Cape Newenham and the longitude of Cape Constantine, and 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 pallasi*) 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 spp.)* 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 1978 to 1996, sac roe harvests averaged 19,000 tons, worth $8.6 million to fishers annually. Spawn-on-kelp harvests during this period averaged 362,000 lbs., worth about $271,000 to fishers. In 1997, poor market conditions led to low prices on the grounds; sac roe harvests brought only $4.3 million to fishers, representing the lowest annual value since 1981, and the spawn-on-kelp fishery remained closed due to a lack of product (Table 1).

This report summarizes the Togiak herring stock assessment program, provides an overview of the Togiak District herring fishery from 1978 through 1996 and summarizes the 1997 season.

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 Lebida 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 ft^2 of surface area is 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 (Table 2). Abundance was estimated to be high in the late 1970's, declined in the mid 1980's and remained relatively low and stable through 1991. Biomass levels from 1992 through 1994 increased to levels between 150,000 and 200,000 tons and estimates since 1995 range from 136,000 to 149,000 tons.

From 1983 to 1996, 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 May 20. Biomass increased rapidly and peaked within one to seven days of the first observation in all but two 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 two years, spawn was first observed any time within three days of the first herring observation. Similar to trends observed for biomass,

spawning in all but two years accelerated rapidly, peaked from one to four days after the first occurrence of spawn then rapidly subsided. Small "spot" spawns have been observed as last as June 7.

Herring ages- 2 through 20 have been observed in the Togiak biomass 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. More recently, the 1987 and 1988 year classes were detected in the fishery in 1992 and 1993, and appeared as age -9 and 10 herring during the 1997 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 (Table 4). Gillnet effort peaked in 1989 then declined to the lowest levels observed since 1978 in 1993. Since 1993, gillnet effort increased substantially; gillnet effort in 1996 (461 vessels) was the largest since the inception of the fishery. Purse seine effort increased steadily from 1978 through 1989, when 310 vessels were observed. Since 1990, the purse seine fleet has fluctuated between 200 and 300 vessels. Gillnet vessels comprised the majority of the sac roe effort from 1978 through 1990 and more recently in 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 to the current limit of 100 fathoms per permit holder, restricted the operation from one vessel to 100 fathoms, 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 and harvest capacity for both gear types.

The department first restricted herring gillnet length to 50 fathoms in 1992 to maintain an orderly fishery, help ensure roe quality and minimize potential waste. From 1994 through 1996, gear length was restricted to 50 fathoms during all gillnet openings. These restrictions appeared to control waste and preserve orderliness in the fishery without reducing harvesting capacity.

Industry participation in the fishery peaked between 1979 and 1982, when 33 processors participated in the herring fishery. Since 1987, 16 to 22 companies purchased herring or spawn on kelp each year in Togiak. Processing capacity since 1990 ranged from 3,100 to 4,850 tons per day, or approximately 11% to 25% of annual sac roe harvests.

Harvests 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 through 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 and 1996, but fell at or below the maximum of 20% for all other years since 1981 (Table 5). Annual exploitation ranged from 11% to 22% and averaged 17% 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 the gillnet and purse seine allocations, the department establishes guideline harvest levels (tons) each year by allocating 25% and 75% of the sac roe harvest allocation 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 1996, annual gillnet harvests were equally distributed above and below guideline allocations, and averaged 7% less than allocations (Table 6). 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 five of the nine years. Differences between actual and guideline purse seine harvests ranged from -38% to 25%, and averaged 12%. From 1988 to 1996, 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 intensive from 1982 through 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 to open an area. Since then, the department has opened to commercial fishing only areas that have documented high quality roe.

Development of test fishing procedures sped the availability of results, reduced time required between test fishing and opening an area to commercial fishing and helped ensure high mature roe percents in harvests. From 1981 through 1996, sac roe harvests averaged approximately 9.2% mature roe. Purse seine harvests for this period averaged 9.6% mature roe. Annual purse seine harvests did not vary by more than 1% above or below the average and show no distinct trend through time (Table 4). Gillnet harvest area was gradually reduced in the late 1980's and early 1990's due to lack of successful test fishing or poor quality results in some areas of the district. From 1994 through 1996, gillnet fishing was opened almost exclusively in the area between Right Hand Point and Kulukak Bay. This reduction in area heightened competition among the gillnet fleet, especially during 1996, when fishing effort was high.

Unlike purse seine harvest quality, mature roe percent in gillnet harvests increased substantially in 1993. Mature roe content in gillnet harvests from 1993 through 1996 averaged over 3% higher than harvests from 1981 to 1992, and ranged from 10 to 12%. 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 three 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 seven days and large-scale deterioration of flesh and roe quality in the 1992 harvest. Increasing market demands for high quality product and poor harvest quality compelled the department to recognize quality problems associated with holding times. Limiting individual harvests not to exceed processing capabilities became a management objective after 1992. 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 area to reduce holding times to three 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 announcements occurred with minimal (1 hour or less) notice. As an example, the duration of the final 1995 purse seine opening was shortened from one and one-half to one hour with no notice, at the beginning of the fishing period.

The impact of the reduced purse seine depth and fishing areas on product quality is difficult to measure. However, these two factors enabled managing individual harvests for an amount that will not exceed three days of production. 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 53 hours from 1993 to 1996. Area limitations also heightened competition within the purse seine fleet.

Spawn-on-Kelp Fishery

Similar 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 the direction of the Togiak District Herring Spawn on Kelp Management Plan (5 AAC 27.834)[1]. 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 on a two- to three-year basis (Figure 2), 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 (Table 7). 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 the function of assisting with transporting kelp after the period closure. By 1993, most permits issued for this fishery became permanent.

From 1984 to 1996, the fishery was opened for all years except 1985. Actual harvests exceeded the 350,000-lb. guideline harvest level by more than 10% in five years and fell short in three (Table 6). For the four other years in which a fishery occurred, actual harvests were within 10% of the guideline. The two- to three-year area rotation schedule 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 in 1986.

[1] The Board did not adopt this plan as regulation until 1988. From 1984 to 1987, the plan existed as an informal directive from the Board to the department.

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

1997 SEASON SUMMARY

The 1997 herring run was forecasted to be 125,000 tons. The peak biomass observed was 117,000 tons, and post-season age composition and survey analysis resulted in a final biomass estimate of 145,000 tons (Tables 2 and 8). Herring ages-3 to -20 were present in the 1997 return (Table 9). Older (age-9 and above) herring comprised 56% of the biomass. The 1987 and 1988 year classes (age-9 and -10) represented 37% of the biomass, and were followed in magnitude by the 1990 and 1991 (age-6 and -7) year classes (Table 3). The presence of age-4 and -5 herring (11%) indicated a small recruitment event, similar in magnitude to that of the 1987 and 1988 year classes recruited into the fishery in 1992. The condition of the Togiak herring biomass is considered stable.

The 1997 herring migration to the Togiak District appeared to be early and compressed. Herring were first observed April 27 and biomass peaked April 29, about 10 days earlier than normal. By April 30, biomass observed in offshore areas had declined substantially. Nearly 20 miles of spawn occurring the first day of spawning activity represented the largest initial spawn documented in any year. Subsequent spawning activity diminished and by May 5, less than one mile of milt was observed. An early appearance of younger age classes suggests that the 1997 run was more compressed in time, compared to other years.

Based on the forecast and allocation guidelines in the BBHMP, the projected harvest for each fishery was: sac roe purse seine; 16,391 tons, sac roe gillnet; 5,464 tons, spawn-on-kelp product; 350,000 lbs. (1,500 ton herring equivalent), and Dutch Harbor food and bait: 1,645 tons. To ensure a high quality sac roe harvest, staff planned to use test fisheries to estimate mature roe quality within areas of the district, and to open fishing areas only with high quality roe. We 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 harvests.

The early 1997 run surprised fishermen and the industry. Much of the processing, tender and purse seine fleet expected to participate in the Togiak fisheries remained in Cook Inlet for the Kamishak herring fisheries through April 28. Only four processing vessels, four purse seiners and one tender were observed during the April 27 survey, when the first herring were observed. From April 29 through May 2, eighteen companies registered to buy gillnet and purse seine sac roe herring (Tables 4 and 10). The 1997 processing capacity (4,200 tons per day) was similar to 1992 to 1996 levels.

Purse Seine Sac Roe

Early test fishing indicated presence of only poor quality herring. The first test samples were collected April 29 from Tongue Point and Togiak Bay and contained only immature roe. Immature roe dominated samples collected during two test fisheries April 30; morning and evening samples averaged 0.3 and 1.2% mature roe, and contained the first spawnouts. On May 1, test fishing was extended to include the area from Kulukak Bay to Estes Point, and the mature roe percent increased slightly to 2.1 and 2.7% in morning and evening samples. The highest quality test set prior to May 2 was reported at 7.6% mature roe.

Test fish quality improved substantially May 2, one day after the first spawn was observed. Samples collected between Estes Point and Right Hand Point early May 2 averaged 6.9% mature roe, and four of ten completed sets ranged from 8.3 to 12.3% mature roe.

The presence of marketable herring caused the department to announce, at 12:00 noon May 2, that an opening for purse seines was possible as early as 7:30 p.m. that evening. Managers limited consideration to the area from Anchor Point to Right Hand Point for two reasons. First, limited biomass in that area restricted the harvest potential to an amount that would not exceed processing capacities. Harvest potential on May 2 was estimated to be high based on a moderate to large purse seine fleet, large biomass and excellent spotting conditions, and several companies were not yet at full capacity. Secondly, test sets conducted east of Togiak Bay were more numerous and produced higher quality samples than test sets west of Togiak Bay.

During the announcement at 12:00 noon May 2, volunteer vessels were requested to re-test the area from Right Hand Point to Anchor Point to monitor quality, while the remainder of the fleet repositioned. After test fish results confirmed the presence of a large number of spawnouts in the offshore areas between Anchor and Right Hand Points, the first purse seine opening (15 minutes beginning at 7:30 p.m.) was announced at 6:30 p.m. (Table 11).

Fishers were advised that further adjustments to the opening time, duration and area may be announced prior to 7:30 p.m. and to remain standing by on VHF 07 and SSB .2509 until the opening while staff continued to re-evaluate harvest potential by aerial survey. Most noticeable during the survey was a large biomass west of Anchor Point, moving east toward Anchor Point and the area opened to fishing. At 7:10 p.m., the rapid speed of these fish toward the intended fishing area indicated that a large additional biomass would be present in the fishing area when it opened at 7:30 p.m. Although few vessels were at Anchor Point, about 80 purse seine vessels were observed in Rocky Bay and close enough to reach Anchor Point for the opening. Additionally, herring were becoming more visible in Rocky Bay. These changes prompted a decision reduce the area for the pending opening.

At 7:15 p.m., the 6:30 p.m. announcement was amended to include only the area from east Ungalikthluk Bay to Right Hand Point, and to delay the opening start time until 8:15 p.m. The opening was delayed to provide one hour after the second announcement to allow travel time for vessels in the Rocky and Anchor Point areas. Advance notice was limited to one hour to minimize any further change in the fleet's potential efficiency because biomass and spotting conditions can rapidly change. Approximately 2,400 tons were harvested during the first opening, with an average roe maturity of 9.9% (Table 12).

Seven purse seine periods occurred for a total of 6 hours and 25 minutes of fishing time. Following the first opening, the purse seine fishery was re-opened during six of the following seven tides without further test fishing. Harvests ranged from 300 to 4,500 tons per opening, and mature roe ranged from 9.2 to 10.2%. Area was restricted for four periods. Purse seine sac roe harvest, including 350 tons estimated as waste, totaled 18,649 tons and exceeded the maximum guideline harvest allocation by 14% (Tables 6 and 12). Purse seine harvests averaged 9.4% mature roe overall, similar to quality observed in annual purse seine harvests since 1981 (Table 4). Peak effort was observed May 4, when 231 seine vessels were counted during an aerial survey.

Each purse seine opening was intensively managed to ensure processing capacity was not exceeded. Fishing area was announced via radio four to eight hours in advance of each opening. Potential fleet efficiency and harvest was assessed by aerial surveys. One to two hours before each opening, herring abundance and distribution was estimated and spotting and fishing conditions were assessed. Period duration was based on the survey results and announced during or immediately following aerial surveys, generally with 1-hour notice. With each opening, fishing area and time generally increased as the fishable biomass and potential to exceed processing capacity decreased. The amount of herring harvested but not processed during the fishery was estimated to be equivalent to less than three days of processing for most companies.

Gillnet Sac Roe

Gillnet test fishing began May 1 in Nunavachak and Kulukak Bays. Early sets yielded high percentages of immature roe or spawnouts. On May 2, test fishing in the Kulukak Bay to Right Hand Point area averaged over 10% mature roe, but the area was not opened to fishing because samples averaged over 3% immature roe and few spawnouts were present. Early May 3, test fish samples in the same area averaged 11.6% mature roe and immature roe decreased to 1.4%. At 9:00 a.m. May 3, the first gillnet opening was announced to begin in the area between Right Hand Point and Kulukak Bay at 10:00 a.m., for a duration of four hours (Table 11).

Preliminary reports from companies the afternoon of May 3 estimated the gillnet harvest at 2,000 tons, and quality ranged from 9.9 to 13.3% mature roe (Table 12). Because quality was high, a large harvestable surplus remained and processing capacity was available, a second opening was announced for the same area the evening May 3. Four additional openings were held May 4 through May 6, without further test fishing. Openings May 5 and 6 were extended to take advantage of high quality herring, after companies reported high quality roe samples collected during the fishery. Openings May 5 and 6 followed purse seine openings in the same area by one hour.

The 1997 sac roe fishing effort was above average for both gear types, most notably for gillnet vessels (Table 4). Peak gillnet effort occurred May 4 with a count of 336 vessels. For the second consecutive year, gillnet effort exceeded purse seine effort, similar to levels observed from 1978 through 1990.

Six openings occurred throughout a 4-day period for a total of 24.0 hours of fishing time. Gillnet harvest totaled 5,165 tons, or 5% less than the maximum guideline harvest level (Tables 6 and 12). Overall, gillnet harvests averaged (unweighted) 11.8% mature roe. The quality observed in the 1997 gillnet harvest was similar to that observed from 1993 to 1996; 1997 was the fifth consecutive year during which gillnet roe quality exceeded 10% (Table 4).

Similar to 1994 to 1996, gillnet fishing was opened exclusively in the area between Right Hand Point and Kulukak Bay. To maintain an orderly fishery, help ensure roe quality and minimize potential waste, gear length was restricted to 50 fathoms during all gillnet openings in 1997. This provision was identical to the gear restrictions placed each year from 1994 through 1996.

Spawn-on-Kelp

In 1997, 295 people held permanent limited entry permits for the Togiak spawn-on-kelp fishery.

ADF&G staff collected kelp samples in areas K-4, K-5 and K-6 (Nunavachak Bay to Right Hand Point) on May 4 and 5. The area from Middle Bay to Rocky Point (K-8 and K-9) had been harvested in 1996 and, therefore, was not under consideration for a fishery in 1997. Heavy spawn deposition was observed from Middle Bay to Rocky Point and from Nunavachak Bay to Right Hand Point. Coverage was very light even on samples collected from these areas.

At a public meeting May 6, representatives of two companies registered to buy kelp stated that the samples displayed were not of marketable quality. After companies reassessed the spawn on kelp in areas K-4 and K-5 the next morning, company representatives reported insufficient product quality. Comments from the industry and the potential for waste due to rejected; low quality product justified the staff announcement that a spawn-on-kelp fishery would not occur in 1997.

Exploitation and Value

The 1997 herring fisheries were managed for a maximum exploitation rate of 20% of the forecasted biomass. Combining the sac roe harvest (23,813 tons) and the Dutch Harbor food and bait harvest (1,950 tons) resulted in a total harvest of 25,763 tons (Table 5). Based on the biomass estimate of 144,887 tons, the 1997 exploitation was 17.8%. Twenty two percent of the sac roe harvest was taken by gillnets and 78% by purse seines (Tables 4 and 6).

The ex-vessel value of the 1997 Togiak herring fishery was $4.3 million (Table 1). The value does not include any post-season adjustments to fishermen from processors and should therefore be considered a minimum estimate. The 1997 ex-vessel value was approximately 60% less than the average value from 1992-1996, and was the lowest since 1981. It includes only the sac roe fishery, since no spawn-on-kelp fishery took place. The loss to fishermen as a result of the spawn-on-kelp fishery can best be represented by the average (1992-1996) value of $332 thousand.

Prices paid for sac roe herring in 1997 were low relative to previous years; base prices ranged from $100 to $300 per ton for 10% mature roe. The 1997 base price, weighted by company, averaged $170 per ton for 10% mature roe.

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Table 1. Exvessel value of the commercial herring and spawn-on-kelp harvest, in thousands of dollars, Togiak District, 1978-1997.[a]

Year	Herring		Spawn-on-Kelp	Total
	Sac Roe	Food/Bait		
1978	2,635	0	120	2,755
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
1978-96 Avera	8,257	38	271	8,552
1992-96 Avera	10,068	9	332	10,409
1997	4,306	0	[b]	4,306

[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.

Table 2. Aerial survey estimates of herring biomass and spawn deposition, Togiak District, 1978-1997.

Year	Preseason Forecast[a]	Biomass Estimate	Spawn Estimates	
			Observations	iles
1978		190,292	70	41
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	70	59
1996	135,585	135,585	99	73
1978-96 Average	93,654	127,341	115	65
1992-96 Average	127,235	164,187	97	71
1997	125,000	144,887	79	59

[a] 1993-1997 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.

Table 3. Age composition of the inshore herring run, Togiak District, 1977-1997.

Year	Age Composition (%)[1] 3 [a]	4	5	6	7	8	9	Total [2] Run (tons)
1977	4	49	37	3	3	3	1	
1978		47	36	11	1	3	2	190,292
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 [b]
1991		7	1	1	16	18	57	83,329
1992		10	20	1	1	15	53	156,955 [c]
1993			6	23	1	1	67	193,847 [d]
1994			2	12	28	3	55	185,454 [d]
1995		1	4	7	24	30	35	[3]
1996		10	12	6	8	24	40	135,585 [4]
1997		7	5	12	11	10	55	144,887 [c]

[1] Age composition in 1978-92 is weighted by aerial survey data and weight at age; age composition for 1977 is not weighted is not by aerial survey data.

[2] Includes commercial catch, escapement, and documented waste.

[a] Includes age 1, 2 and 3 herring.

[b] Contributions of age groups 3, 4 and 5 are less than 5% each.

[c] Contribution of age 3 herring is less than 0.5%.

[d] Contribution of age 4 herring is less than 0.5%.

[3] 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.

[4] 1996 forecasted age composition and biomass.

Table 4. Sac roe herring industry participation, fishing effort and harvest, Togiak District, 1978-1997.

Year	ompanie	Daily Processing Capacity[a]	Fishery Dates	Gillnet					Purse Seine					Total Harvest
				Effort[b]	Duration	Harvest[c]	C.P.U.E	Roe%[d]	Effort[b]	Duration	Harvest[c]	C.P.U.E	Roe%[d]	
1978	16		5/11-6/1	40	528.0	683	0.0	8.2	25	528.0	7,069	0.5	8.2	7,752
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		4/25-5/1	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		5/14-5/2	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		5/18-5/2	300	35.0	4,934	0.5	8.4	196	11.0	14,485	6.7	10.2	19,419
1985	23		5/23-5/2	302	11.0	4,482	1.3	7.4	155	3.0	21,330	45.9	10.0	25,812
1986	23		5/14-5/1	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	5/10-5/1	170	14.0	3,182	1.3	8.5	200	3.0	11,788	19.6	10.0	14,970
1992	18	3,700	5/20-5/2	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	5/11-5/2	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
1978-9	22	3,593		239	124.3	4,333	0.8	8.8	187	97.0	14,658	30.0	9.5	18,991
1992-9	17	3,740		241	59.5	5,983	0.7	10.8	241	10.7	19,154	57.6	9.5	25,136
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

[a] Number of tons per day based on companies registered.

[b] Peak aerial survey count.

[c] Sourc 1988-97: Fish ticket data
1980-87: Sandone and Brannian, 1988.
1978-79: ADF&G, 1981 and 1982.

[d] Sourc 1989-97: Fish ticket data
1978-88: ADF&G, 1997.

[e] Fishery managed by emergency order from 1981 to present.

Table 5. Exploitation (tons) of Togiak herring, 1978-1997.

Year	Biomass Estimate	S-O-K Herring Equivalent	Dutch Harbor Food/Bait	Sac Roe			Total Harvest	Exploitation Rate
				Gillnet	Purse Seine	Total		
1978	190,292			683	7,069	7,752	7,752	4.1%
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%
1978-96 Average	134,303	1,424	2,145	4,333	14,658	18,991	20,981	17.3%
1992-96 Average	164,187	1,398	2,415	5,983	19,154	25,136	28,950	18.0%
1997	144,887	0	1,950	5,164	18,649	23,813	25,763	17.8%

Table 6. Guideline and actual harvests of sac roe herring (tons) and spawn-on-kelp (lbs), Togiak District, 1984-1997.

Year	Gillnet Sac Roe			Purse Seine Sac Roe			Spawn-on-Kelp		
	Guideline[a]	Actual	ifference[b]	Guideline[a]	Actual	ifference[b]	Guideline[a]	Actual	ifference[b]
1984							350,000	406,586	16%
1985							350,000	0	
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%
Average			-7%			0%			12%
1997	5,464	5,164	-5%	16,391	18,649	14%	350,000	0	

[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.

Table 7. Herring spawn-on-kelp industry participation, fishing effort, area and harvest, Togiak District, 1978-1997.

Year	Compan	Fishery Dates	Hours	Effort[a]	Area	Total Harvest	Herring Equivalent	openings	mean roe%
1978	11	5/13-6/3		160	Togiak District	329,858			8.2
1979	16	5/4-5/23		100	Togiak District	414,727			0.1
1980[b]	21	5/2-5/13		78	K 3 - K10	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	26.0	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
1978-96 Avera	8		15.3	245		361,666	1,542		
1992-96 Avera	4		8.9	230		358,480	1,398		
1997		no fishery							

[a] 1978 - 1989 and 1992 - 1997, 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.

Table 8. Daily observed estimates (tons) of herring by index area, Togiak District, 1997.

Date	Start Time	Surve Rating	iles of Spawn	Estimated Biomass by Index Area[b] NUS	KUK	MET	NVK	UGL	TOG	TNG	MTG	OSK	PYR	CN	HAG	WAL	Daily Total
18-Apr	8:25	2.8															
22-Apr	11:50	1.6															
24-Apr	12:35	4															
27-Apr	14:20	3													12		12
28-Apr	14:40	2	0	18		532	220	2,130	1,387	23,286	333	134			33,571	8,287	69,897
29-Apr	15:35	1.3	0	4,340	363	9,759	1,083	1,175	61,201	22,184	2,287				14,666		117,059
30-Apr	12:30	2.3	0	4,650	1,964			274	48,697	4,402	6,665	2,749	198	570	4,124		74,606
1-May	17:50	2.2	19.5	6,700	9,509	12,110	2,776	13,420		7,987	3,104	1,777	2,272		4,010		98,184
2-May	7:45	2.8	13.6														
3-May	7:35	2.5	15.5							17,117							17,117
4-May			3.9														
5-May		2.9	0.8		2,104	1,100	311	876	14,450	850	1,308	1,371	922		97		23,389
9-May	12:12	3		11	786	48	47	867	413	621	707	724	126		324		4,673
23-May	12:00	2.2	5		274	199	263	458		30	1,016	842			79		3,161
Total			58.3														

[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 - Tong MTG - Matogak; HAG Hagemeister; OSK - Osviak; PYT - Pyrite Point; CN - Cape Newenham

Table 9. Preliminary herring total run and commercial catch by year class, Togiak District, 1997.[a]

Year Class	Age	Total Run (tons)	Total Run %	Harvest (tons)	Harvest %	Escapement (tons)	Escapement %
1979	18	1,295	0.9%	124	0.5%	1,171	1.0%
1980	17	263	0.2%	133	0.6%	130	0.1%
1981	16	1,715	1.2%	220	0.9%	1,495	1.2%
1982	15	3,202	2.2%	482	2.0%	2,720	2.2%
1983	14	3,162	2.2%	863	3.6%	2,299	1.9%
1984	13	5,020	3.5%	826	3.5%	4,194	3.5%
1985	12	2,250	1.6%	726	3.0%	1,524	1.3%
1986	11	9,997	6.9%	1,773	7.4%	8,224	6.8%
1987	10	25,087	17.3%	4,247	17.8%	20,840	17.2%
1988	9	28,848	19.9%	4,778	20.1%	24,070	19.9%
1989	8	14,194	9.8%	2,051	8.6%	12,143	10.0%
1990	7	16,237	11.2%	2,777	11.7%	13,460	11.1%
1991	6	17,251	11.9%	2,609	11.0%	14,642	12.1%
1992	5	6,670	4.6%	1,108	4.7%	5,562	4.6%
1993	4	9,636	6.7%	1,089	4.6%	8,547	7.1%
1994	3	59	0.0%	8	0.0%	51	0.0%
1995	2	0	0.0%	0	0.0%	0	0.0%
Total		144,886	100%	23,814	100%	121,072	100%

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

Table 10. Commercial herring sac roe and spawn-on-kelp buyers in Togiak District, 1997.

	Operator/Buyer	Base of Operation	Product Purchased: Sac Roe: Purse Gillnet	Product Purchased: Sac Roe: Purse Seine	Product Purchased: Spawn-on-Kelp[b]
1	Capilano	F/V Pacific Sun	X	X	
2	Dragnet Fisheries, Inc.	F/V Jackie M	X	X	
3	Icicle Seafood, Inc.	P/B Berring Star	X	X	
4	Inlet Salmon	F/V Andronica	X		
5	Nelbro Packing	Naknek Plant	X	X	
6	New West Fisheries, Inc.	P/V New West	X	X	
7	Northcoast Seafoods	P/V Polar Queen	X	X	X
8	Norquest Seafoods, Inc.	M/V Pribilof	X	X	
9	Ocean Beauty Seafoods	P/V Ocean Pride	X	X	
10	Pan Pacific Seafoods	P/V Pacific Producer	X	X	
11	Peter Pan Seafoods, Inc.	P/V Blue Wave	X	X	
12	Snopac Products, Inc.	P/V Snowpac	X	X	
13	Togiak fisheries, Inc.	Togiak Plant	X	X	X
14	Trident Seafoods	P/B Neptune	X	X	
15	Unisea, Inc.	P/V Omnisea	X	X	
16	Wards Cove Packing	F/V Bulldog	X		
17	Woodbine Ak. Fish Co.	M/V Woodbine	X	X	
18	Y.A.K. Inc.	P/B Yard Arm Knot	X	X	

[a] Operators that registered in the Togiak Herring District.

[b] Companies registered for Spawn-on-kelp, no fishery occured.

Table 11. Emergency order commercial fishing periods for herring sac roe and spawn-on-kelp, Togiak District, 1997.

Emergency Order Number	Area[1]	Date and Time	Duration
Herring Sac Roe Gillnet			
DLG-	Right Hand Point to Kulukak Bluffs[2]	5/0 10:00 a.m. - 5/03 2:0	4 hrs.
DLG-	Right Hand Point to Kulukak Bluffs[2]	5/0 9:00 p.m. - 5/03 11:0	2 hrs.
DLG-	Right Hand Point to Kulukak Bluffs[2]	5/0 11:00 p.m. - 5/04 2:0	3 hrs.
DLG-	Right Hand Point to Kulukak Bluffs[2]	5/0 2:00 p.m. - 5/04 5:0	3 hrs.
DLG-	Right Hand Point to Kulukak Bluffs[2]	5/0 2:00 p.m. - 5/05 6:0	4 hrs.
DLG-	Right Hand Point to Kulukak Bluffs[2]	5/0 6:00 p.m. - 5/05 9:0	3 hrs.
DLG-	Togiak District except upper Togiak	5/0 12:00 noon - 5/06 3:0	3 hrs.
DLG-	Togiak District except upper Togiak	5/0 10:00 p.m. - 5/06 12:0	2 hrs.
Herring Sac Roe Purse Seine			
DLG-	Anchor Point to Right Hand Point	5/0 7:30 p.m. - 5/02 7:15	min.
DLG-	Ungalikthluk Bay to Right Hand Poin	5/0 8:15 p.m. - 5/02 8:15	min.
DLG-	Anchor Point to Right Hand Point	5/0 10:00 a.m. - 5/03 10: 30	min.
DLG-	Anchor Pt. to Right Hand Pt. and alo	5/0 9:00 p.m. - 5/03 9:10	min.
DLG-	Tongue Pt. to Right Hand Pt. except	5/0 11:00 p.m. - 5/04 12:	1 hr.
DLG-	Togiak District except upper Togiak	5/0 8:00 p.m. - 5/04 1:30	min.
DLG-	Togiak District except upper Togiak	5/0 10:00 a.m. - 5/05 1:	3 hr.
DLG-	Togiak District except upper Togiak	5/0 10:00 a.m. - 5/06 11:	1 hr.
Herring Spawn on Kelp			
	No Kelp Fishery this year.		

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

[2] Gillnet length reduced to 50 fathoms.

[3] Fishing period extended.

[4] Superseded DLG-01.

Table 12. Commercial herring harvest (tons) by fishing section and gear type, Togiak District, 1997. (roe percentages for each opening and section are noted within parentheses).

Date	Time (hours)	Periods	Kulukak	Nunavachak	Togiak	Hagemeister	Pyrite Poi	Cape Newenham	Total
					Purse Seine				
2-May	0.25	1		2,387 (9.9)					2,387 (9.9)
3-May	0.67	2,3		2,841 (9.3)	174 10.4)				3,015 (9.4)
4-May	1.50	4,5	700 9.2)	828 (9.5)	2,014 (9.7)	577 (9.7)	158 10.5)		4,277 (9.6)
5-May	3.00	6	1,698 8.8)	367 (9.8) [a]	459 (9.5)	1,895 (9.5)	266 9.4) [d,e]		4,685 (9.3)
6-May	1.00	7	2,001 9.0)	288 10.6) [b]	425 (8.8)	1,539 (9.6) [c]	32 8.7)		4,285 (9.2)
	6.42		4,399 9.0)	6,711 (9.6)	3,072 (9.6)	4,011 (9.6)	456 9.7)		18,649 (9.4)
					Gill Net				
3-May	6.00	1,2	2,819 11.9)						2,819 (11.9)
4-May	6.00	3	1,283 11.9)						1,283 (11.9)
5-May	7.00	4	760 11.4)						760 (11.4)
6-May	5.00	5,6	303 11.7)						303 (11.7)
	24.00		5,165 11.8)						5,165 (11.8)
					Total				
2-May	0.25			2,387 (9.9)					2,387 (9.8)
3-May	6.67		2,819 11.9)	2,841 (9.3)	174 10.4)				5,834 (10.6)
4-May	7.50		1,983 11.0)	828 (9.5)	2,014 (9.7)	577 9.7)	158 10.5)		5,560 (10.2)
5-May	10.00		2,458 (9.6)	367 (9.8)	459 (9.5)	1,895 9.5)	266 9.4) [d,e]		5,445 (9.6)
6-May	6.00		2,304 (9.3)	288 10.6)	425 (8.8)	1,539 9.6) [c]	32 8.7)		4,588 (9.4)
Total	30.42		9,564 10.5)	6,711 (9.6)	3,072 (9.6)	4,011 9.6)	456 9.7)		23,814 (10.0)

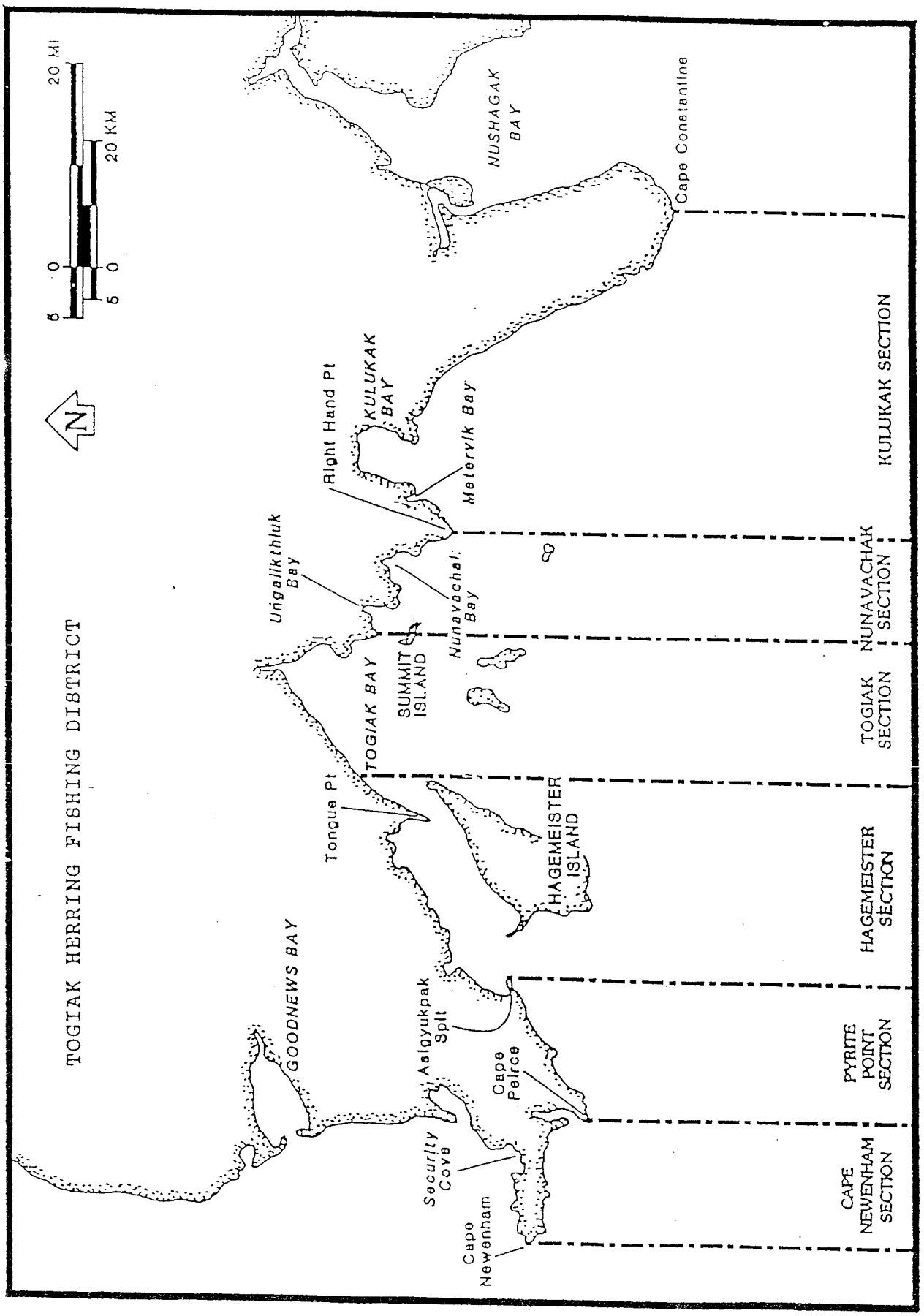
[a] Includes 200 tons deadloss

[b] Includes 150 tons deadloss

[c] Includes test fish harvest of 150 tons

[d] Includes test fish harvest of 10 tons

[e] Includes harvest for Cape Newenham for less than 3 fishermen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0
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6
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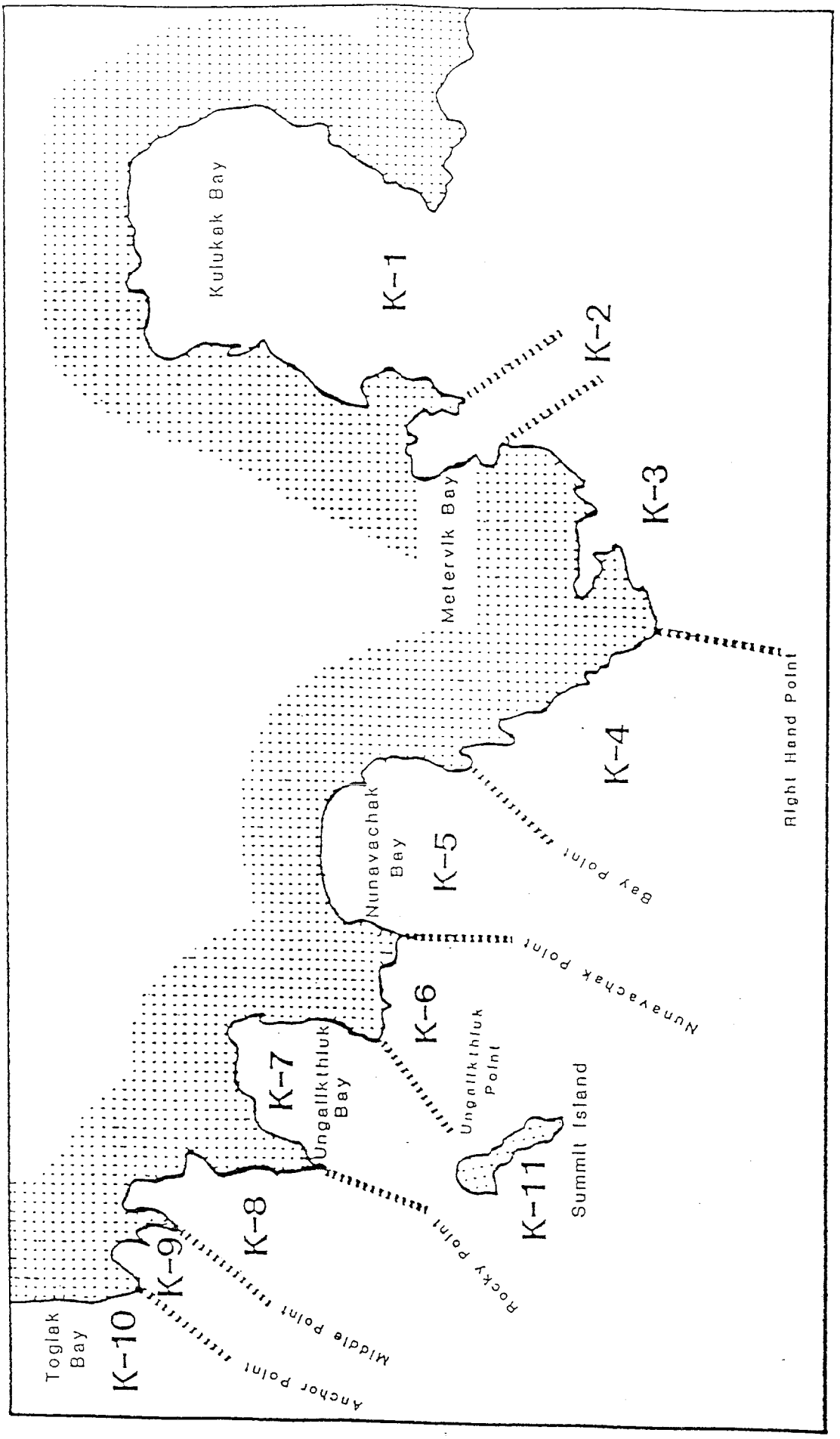
GOODNEWS BAY
Tongue Pt
TOGIAK BAY
Unigalikthluk Bay
SUMMIT ISLAND
Nunavachak Bay
Right Hand Pt
KULUKAK BAY
Metervik Bay
NUSHAGAK BAY
Cape Constantine
HAGEMEISTER ISLAND
Aslgyukpak Spit
Cape Peirce
Security Cove
Cape Newenham
CAPE NEWENHAM SECTION
PYRITE POINT SECTION
HAGEMEISTER SECTION
TOGIAK SECTION
NUNAVACHAK SECTION
KULUKAK SECTION



BRISTOL BAY TOGIAK DISTRICT SPAWN ON KELP MANAGEMENT AREAS (K-1 through K-11)