

MEMORANDUM

State of Alaska

TO: Report Recipients

DATE: April 23, 1982

FILE NO:

TELEPHONE NO:

FROM: Michael L. Nelson *MJM*
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SUBJECT: 1981 Bristol Bay Annual
Management Report

The attached report represents our continuing and most recent efforts to up-date and up-grade fishery statistics useful in describing the Bristol Bay fishery.

Many of the new data tables first included in 1975 have been continued, and a major reorganization of fishery statistics has been accomplished with this edition of the Bristol Bay annual management report. I believe this new revised edition of our annual management report series will be most useful in explaining and describing management rationale, as well as a better source for compiled catch, escapement and production information on all species of fish harvested in Bristol Bay.

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ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT

-1981-

BRISTOL BAY AREA

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April, 1982

PREFACE

The 1981 Bristol Bay Management Report is the twenty-second consecutive annual volume reporting on and detailing management activities of the Division of Commercial Fisheries staff in Bristol Bay. This review emphasizes a descriptive account of the administration of the Bristol Bay commercial fishery resources, as well as outlining management objectives and procedures. Our basic objective in producing this document is to assist in creating a better understanding of the commercial fisheries management program in Bristol Bay.

Extensive reorganization of the documentation in this review, which was begun in 1975, represents our continued efforts to update and evaluate all information deemed necessary to fully explain the rationale behind management decisions formulated in 1981. The extensive set of tables and appendix tables represents our efforts to update past information and to record material previously unlisted that may be useful and informative. 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.

Fishery data contained in this report supercedes information in previous reports. All 1980-81 catch data are preliminary pending receipt of final computer listings of fish ticket catches.

Data tabulation has been divided between current year TABLES (1981) and comparative APPENDIX TABLES (1962-1981) in an effort to increase the ease with which this report may be used for reference purposes. Data reference sources on all appendix tables are numbered to correspond with document numbers in the Literature Cited section. Appendix tables generally include data over a 20 year time span (1962-1981), except where information is not available. This report is considered to be "FOR INTER-DEPARTMENTAL USE ONLY".

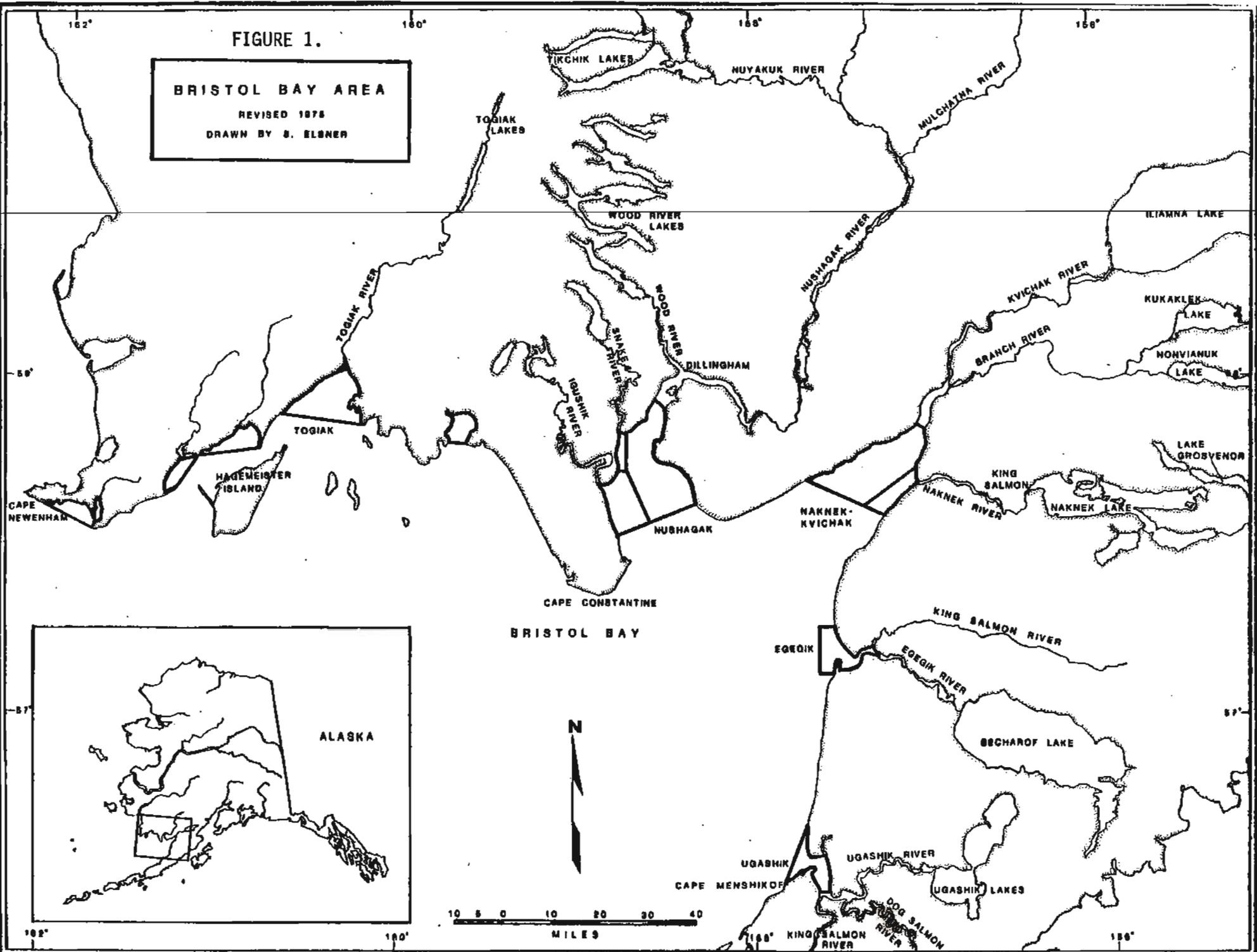
Corrections or comments on the contents of this report should be directed to the area office at Dillingham, Attention: Editor.

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FIGURE 1.

BRISTOL BAY AREA

REVISED 1978
DRAWN BY S. ELSNER



BRISTOL BAY

ALASKA



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MILES

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ANNUAL MANAGEMENT REPORT
BRISTOL BAY SALMON FISHERY
1981

INTRODUCTION

The Bristol Bay area includes all coastal waters and inland drainages east of a line from Cape Menshikof to Cape Newenham (Figure 1). Bristol Bay is the largest sockeye salmon producing region in the world, and also sustains substantial commercial fisheries on other salmon species, herring and herring spawn on kelp.

The 1981 sockeye salmon forecast anticipated substantial numbers of harvestable fish in all of the five major districts and totaled 21.2 million from a total run forecast of 26.7 million fish (Table 1). The management strategy called for early and frequent fishing periods in order to harvest those fish in excess of escapement requirements and to gauge run strength to individual districts (Appendix A).

The total salmon harvest of 27.7 million was second in size only to the 1980 harvest of 28.2 million, accounted for 25% of the entire statewide catch, and was highlighted by all time catch records of 239,000 king salmon and 25.7 million sockeye salmon. Sockeye escapement goals were achieved in all major river systems with the exception of Kvichak River (Table 1).

The entire salmon harvest in 1981 was worth nearly \$133 million to the fishermen with sockeye contributing \$121 million towards this total (Table 31). The herring and spawn on kelp fisheries contributed an additional \$4 million.

The exceptional inshore returns of salmon the past four years have been a result of (1) favorable freshwater and marine survival conditions, (2) adequate parental escapements, and (3) reduced interception rate of high seas fisheries on Western Alaska salmon stocks.

Fishery Economics

Salmon price negotiations between the industry and the two active fishermen associations in Bristol Bay were concluded early in the season and little fishing time was lost. Western Alaska Cooperative Marketing Association (WACMA) settled prices in late May, while the Alaska Independent Fishermen's Marketing Association (AIFMA) settled in late June. Fishermen in the Naknek-Kvichak district lost less than 12 hours fishing time prior to June 24 due to unresolved fish prices; and fishermen in other major districts were not affected. Final fish prices in 1981 showed a significant increase over prices in 1980, especially for sockeye salmon which rose to 65¢ per pound for canned and 75¢ for fresh-frozen compared with 57¢ paid in 1980 for both categories (Appendix Table 40).

Exvessel value (or value to the fishermen) is a function of price paid to the fishermen and numbers caught. From 1962-68, when fish were purchased on a per fish basis, the price for sockeye averaged \$1.11 per fish and only varied from \$1.04 to \$1.19 per fish for independent fishermen. Commencing in 1969, fish were purchased on a price per pound basis. Prices remained fairly stable until 1973 and reached a peak in 1979 of 80¢ per pound for canned sockeye and \$1.25 per pound for fresh-frozen sockeye (Appendix Table 40). This also marked the first time that a canned/fresh-frozen price differential was established. This price coupled with an exceptionally strong sockeye run and resultant catch, plus record king and coho catches as well as one of the larger chum catches in history, produced a fishery worth \$138 million to the fishermen in 1979, five times the average value. The two-tiered price structure returned in 1981 and along with the significant price increases and large catches of all species, the exvessel value amounted to \$132 million (Appendix Table 41).

From 1962-81, the average annual value was \$30 million to the fishermen, and has ranged from a low of \$3 million in 1973 to the 1979 high of \$138 million (Appendix Table 41). During this period sockeye have accounted for 89% of the value; king and chum salmon 4% each; pink salmon 2% and coho salmon 1%.

Japanese High Seas Fishery

Since 1974 the Japanese high seas mothership gillnet fishery has seen a decreased high seas exploitation rate of Bristol Bay sockeye, brought on by bilateral negotiations between Japan and the United States and through renegotiation of the INPFC treaty. The mothership fleet was restricted in 1981 by area and time restraints, which drastically altered past fishing patterns, and reduced significantly the interception rate of Bristol Bay sockeye.

Total Japanese high seas harvest by the mothership fleet from the 1981 Bristol Bay sockeye run included 681,000 fish caught as immatures in 1980, and 137,000 fish harvested as matures in 1981, or 818,000 fish and 2% of the total Bay run (Appendix Tables 3 and 4). This level of interception is well below the 20 year average of 7% and 1.5 million fish. In addition, the continuing relatively low level of sockeye catches first established in 1979, by the Japanese land-based gillnet fleet was also due, in part, to a series of reductions in this fishery brought about through the renegotiation of the INPFC treaty (Appendix Table 2).

Of particular concern to inshore domestic fishery managers in 1980 was the drastic increase seen in the interception of king salmon by the high seas mothership fleet. From 1962-79 the average king harvest was only 234,000 fish, but this interception rate increased three-fold in 1980 to 704,000 kings, the highest since the inception of the mothership fishery in 1952.

Over 54% of the total king harvest (or 380,000) were estimated to be of Western Alaska origin (Appendix Table 5). In response to concerns by the U. S., Japan voluntarily agreed to limit king salmon harvests by the mother-ship fishery by agreeing to self-regulatory measures for a three year period (1981-83), which restricts the king harvest to 110,000 fish per year during this period.

The Fisheries Agency of Japan also provided CPUE data from their high seas research vessels on immature sockeye salmon in waters south of the Aleutian Islands from which a comparative forecast of Bristol Bay run size was made. This forecast totaled 26.8 million, and was identical to the ADF&G forecast of 26.7 million. The age composition estimated from the Japanese data was 77% 2-ocean, and 23% 3-ocean, compared with the Department forecast of 48% 2-ocean and 52% 3-ocean (Table 2). Even though there was some disparity between the ocean age forecasts, the two total run predictions, which resulted from entirely separate data basis were identical.

South Unimak/Shumagin Fishery

The inseason development of the Unimak/Shumagin June cape intercept fishery is closely monitored by Bristol Bay fishery managers because this fishery can be helpful in showing migration timing, relative abundance, age composition and fish size of the incoming Bristol Bay run. These intercept fisheries were again managed under a guideline quota harvest policy originally adopted in 1974 by the Alaska Board of Fisheries to prevent over harvest of sockeye runs to individual river systems in Bristol Bay.

The South Unimak quota was 1.4 million sockeye and the Shumagin quota was 318,000 (Appendix Table 48). The June quotas were further broken down into weekly time period quotas so that the catch would spread out over the entire month. The actual catches were 1.5 million and 351,000 for the South

Unimak and Shumagin Islands fisheries respectively (Appendix Table 48).

Neither fishery commenced until June 11 due to a delay in a price settlement.

The Shumagin Islands June quota was surpassed by June 22. Consequently that fishery was closed from June 23 until July 7 when the entire area was opened on a local stock basis. Daily sockeye catches at South Unimak began to accelerate on June 11, and peaked on June 19-21 when 202,000, 226,000 and 219,000 sockeye were caught, respectively. Daily sockeye catches rarely exceed 200,000 fish per day at South Unimak, and the peak catches of over 647,000 fish for the three day period were identical to the long-term average run timing at Unimak. Sockeye catches of this magnitude generally indicate that a strong run is in progress, and that contrary to other entry timing data received in 1981, that the run was showing normal run timing. Chum salmon catches at South Unimak were also strong, indicating a significant run was passing the Unimak area (Appendix Table 48).

Port Moller Test Fishery

The Department's Port Moller test boat fishery provides information on sockeye and chum salmon run timing and magnitude and age and size composition of the incoming run one week in advance of the inshore fishery.

Test fishing catches indicated that sockeye run timing was normal, and age composition was nearly identical to that expected. However, run size or magnitude was inconclusive and the test boat catch results tended to underestimate run strength throughout most of the season. Part of the problem may have been caused by the atypical shoreward migration path followed by the 1981 sockeye run. Up to three additional inshore stations were fished in order to help assess sockeye run strength. This inshore migration pattern was also prevalent in all major commercial fishing districts in Bristol Bay.

The earliest inseason forecast of total sockeye abundance on June 15 was 29 million, about 16% below the actual return of 34.6 million. This forecast was based upon the mean length of all sockeye caught during the first five days of sampling at Port Moller.

Mean weight was not used to generate adjusted return per index values in 1981 because of the high degree of variability associated with weight-adjusted indices in the past. By July 1 it was apparent that the actual inshore return per index point was nearly twice that indicated by the length-catchability relationship. Therefore, it became necessary to rely solely upon the actual inshore return per index point method of estimating daily passage rates.

The inseason forecast of total sockeye abundance based upon entry pattern analysis at Port Moller on June 26 was 12.4 million, not quite one-third of the actual return. The final forecast of total sockeye abundance based upon 30,200 inshore fish per index point was 31.7 million, about 8% below the actual return.

Peak sockeye catches at Port Moller occurred on June 24 predicting peak abundance inshore on July 2 based on a five day lag time between the two areas (Table 5). The actual peak of abundance inshore was July 4. While comparison of peak dates at the test fishery and inshore suggested a ten day lag time between the two, curve matching accumulative entry data indicated that an eight-day lag was more appropriate. Analysis of May Adak/Cold Bay mean air temperatures by scientists from the Fisheries Research Institute of the University of Washington suggested that the median date of the sockeye run would be about June 29-30.

Surface water temperatures were taken at nearly every station fished and the seasonal mean surface water temperature in 1981 was 50.4° F. Available

Port Moller water temperatures are listed by year below for comparison:

1976 - 41.0⁰ F
77 - 44.6⁰ F
78 - 45.0⁰ F
80 - 42.6⁰ F
81 - 50.4⁰ F

In 1981, 392 chum salmon were caught during sampling at Port Moller, generating 218 total indices including values interpolated for missed fishing (Table 6). The seasonal chum salmon forecast based upon the historic mean of 10,400 inshore fish per index point was 2.3 million, roughly 13% above the actual run of 2.0 million (Appendix Table 6). No catchability adjustments have been used to describe any variability about the historic mean return per index value because of the relative stability in Bristol Bay chum salmon mean weight.

1981 COMMERCIAL SALMON FISHERY

Fishing Effort

Commercial fishing effort in 1981 was expected to be near peak record levels in recognition of the large forecast return. Nearly 2,800 units of gill net gear registered, although not all of this effort actually participated in the fishery (Appendix Table 7). Estimates of peak fishery effort on June 30-July 4 showed that actual drift effort was 95% of that registered, and set net effort was 87% of available registered gear. Overall, approximately 92% of preseason registered effort participated in the fishery in 1981. Participation in the fishery in both total numbers and percent of total has been increasing in recent years, and is no doubt due to both the high exvessel value of the product as well as the need of fishermen to make good on recently purchased entry permits and new fishing vessels.

District preseason fishing effort registration was heavily directed toward Naknek-Kvichak and Nushagak districts with over 78% of fishermen intending to begin fishing operations in these two areas (Table 9). Registration by residency continued to show an overall resident/non-resident ratio of 2 to 1, with the usual district ratios: Naknek-Kvichak and Egegik districts with equal numbers of resident and non-resident fishermen, while the remaining district fishermen were primarily residents (Table 9).

Industry Harvest Potential

The preseason sockeye forecast and other specie catch trends indicated a potential salmon harvest of over 23 million fish, with sockeye expected to contribute nearly 92% of the total:

<u>Species</u>	<u>Harvest in 1,000's of Fish</u>	
	<u>Potential</u>	<u>Actual</u>
Sockeye-----	21,200	25,713
King-----	150	239
Chum-----	1,500	1,475
Pink-----	-	8
Coho-----	250	313
Total	23,100	27,748

The actual total harvest of over 27.7 million salmon was the result of larger than forecasted sockeye runs, very little fishing time lost due to price disputes and processor imposed limits, and to increased production capacity in Bristol Bay, particularly in the frozen and export categories.

The large potential harvest prompted the salmon canning industry to make operational all of the Bay's available canning lines, which numbered 17 1-lb. talls, 19 ½-lb. flats, and 3 ¼-lb. flats in 12 operational plants (Table 28). In addition to the landbased canning operations, 78 additional companies operated in the Bristol Bay area in 1981 in the fresh export, brine export, frozen and cured salmon marketing areas (Table 28). A total of 90 processors/buyers reported catches in Bristol Bay in 1981.

Post season analysis shows that the daily sustained processing capacity in 1981 amounted to 1.620 million fish from June 30-July 11, compared with 1.970 million in 1980 (Table 17). The daily sustained capacity in 1981 was enhanced by the early season startup which allowed processors a break in period for more efficient operations.

Domestic processors handled less sockeye on a daily sustained basis in 1981, but the larger average size of the fish (6.2 lbs. in 1981 vs. 5.6 lbs. in 1980) produced 159 million pounds of sockeye compared with 133 million pounds in 1980 (Appendix Table 47).

Market Production

The increasing trend of salmon production in the fresh export and frozen/cured processing categories continued in 1981. Frozen and cured salmon production in Bristol Bay totaled 59.8 million pounds of all species in 1981, up significantly from 1979-80 when 46.7 and 42.9 million pounds were processed in this manner (Table 29 and Appendix Table 44). The significant shift in market

emphasis from canned to frozen salmon that began in 1978 shows no signs of reversing itself in the near future. In addition, a dramatic increase in fresh export (those fish exported from the Bay by air transportation) that began in 1976 with 1.3 million pounds, increased to over 28.8 million pounds in 1981 (Table 29 and Appendix Table 45).

Brine or chilled sea water exportation of fish out of Bristol Bay for canning amounted to 3.3 million fish (20.5 million pounds), second to the record set in 1980 of 5.0 million fish and 27.8 million pounds (Table 29 and Appendix Table 46).

The rapid shift in emphasis from canning to frozen and fresh markets since 1978 is shown below by comparing the percent of total Bristol Bay production by product type:

<u>Type Production</u>	<u>Percent of Total Production</u>			
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
Canned-----	63	36	34	38
Frozen/Cured-----	12	32	27	34
Fresh Export-----	9	18	18	16
Brine/Export-----	16	14	21	12

Assuming that all brine-chilled sea water export fish are canned, and that varying percents of fresh export fish are also canned, it is still evident that well over half of Bristol Bay's total production continues to be processed as a canned product.

Analysis of Department records indicate that an average of 92% of all sockeye salmon harvested from 1962-71 were processed as a canned product, compared with 48% from 1972-81 (Appendix Table 47). The more recent shift to frozen and export production of sockeye salmon is shown on Appendix Table 47. Excluding peak production years of 1965 and 1970, canned sockeye production has remained fairly stable over the past 20 years, while virtually all increased production capacity has taken place in the frozen and export categories.

Sockeye Salmon

The large expected sockeye run destined for Bristol Bay in 1981 was forecast at 26.7 million fish, with a probable harvest of 21.2 million after escapement requirements (Table 1). The actual inshore run totaled 34.6 million and was one of the largest ever recorded, well above the 20 year average of 20.6 million (Appendix Table 23). The 1981 sockeye harvest was over 25.7 million, breaking all time catch records in the Egegik, Ugashik, Nushagak and Togiak districts:

<u>District</u>	<u>Sockeye Catch (in 1,000's of Fish)</u>	
	<u>1981 Catch</u>	<u>Historical Record (Year)</u>
Naknek-Kvichak-----	10,949	20,968 (1938)
Egegik-----	4,481	3,180 (1965)
Ugashik-----	1,950	1,879 (1922)
Nushagak-----	7,713	7,388 (1905)
Togiak-----	621	608 (1980)
Total Bristol Bay	25,714	24,700 (1938)

Sockeye escapement goals were achieved for the eighth consecutive year in all major river systems with the exception of Kvichak River where the escapement of 1.8 million was 200,000 below the goal of 2.0 million, but within the management range of 1.5 - 2.5 million (Table 1).

Although the Bristol Bay salmon fishery began in 1884, it was nearly 20 years before catches reached levels that represented the actual potential for sockeye production in the area. This was a reflection of the industry establishing itself in this then remote area of Alaska.

A critical and comprehensive analysis of the historical production is hindered by the passage of time, and the subsequent lack of knowledge of the variables that may have affected production during certain periods of time. Nevertheless, certain patterns are exhibited in the historical catch records. The first most notable is that there was a sustained high catch averaging 13 million for 10 consecutive years (from 1901 through 1910) that varied only

6.2 million at the extreme. The pattern after this period was one of continuing high production overall, averaging 17.5 million sockeye, but the sustained periods became shorter, finally dropping to four year sequences (1923-24, 1926-29, 1931-34, 1936-39) with the intervening years production becoming smaller. The production pattern from 1940 to 1960 changed dramatically. Not only did the overall production decrease 54% during this 20 year period, but the production sequence changed significantly. Peak years shifted to a four year rather than a five year cycle, related primarily to the Kvichak River cycle, and adjacent years production dropped drastically. The lowest period occurred from 1953 through 1959 when production dropped to an average annual catch of only 5.4 million sockeye.

Commencing in 1960, production, especially for the important Kvichak River system, increased significantly. However, overall production, particularly for years adjacent to the peak year were still well below historic levels. Unfortunately, both the 1969 and the 1970 peak escapements suffered decreased production due to natural mortality as a result of the extremely cold 1970-1971 winters. Consequently, fishing time was severely restricted in both 1974 and 1975 in order to secure escapement goals for these two critical years. Catches during the 1972 to 1977 rebuilding period dropped to an all time low of only 3.3 million sockeye per year. The restraints imposed on the fishery during 1974 and 1975, and the sacrifices borne by the fishermen and industry, began to pay off in 1978 and are expected to continue. Unusually good survival rates also aided in boosting production throughout Bristol Bay. The 1981 sockeye catch of 25.7 million broke the record year of 1938 when 24.7 million were caught. The most significant factor however, has been the 1978-81 production plus the outlook for 1982. The overlapping production from these adjacent strong years is and will be highly significant to future

production. If the 1982 projected run and harvest materializes as expected, the average production in terms of catch for the five years, 1978-82, will be 21.6 million sockeye per year, or higher than any five year period in the history of the fishery.

In summary, the overall outlook for Bristol Bay sockeye production is encouraging. Although it is apparent that exceptional survival conditions have greatly aided in boosting production, the variable cycle year escapement strategy for the Kvichak River system has paid off in terms of greater production spread over more years. Barring any severe natural set backs, as experienced in the early 1970's, the decade of the 1980's should be a highly productive and significant period for the Bristol Bay sockeye salmon fishery.

King Salmon

The 239,000 king salmon harvested in Bristol Bay in 1981 broke the historical catch record of 202,000 set in 1919, and was over twice the long-term average catch of 104,000. The Nushagak district, which normally produces over 75% of the Bristol Bay catch, produced a catch of 195,000 and escapement of 150,000, both all time record highs, while the Togiak district produced a catch of 24,000 and escapement of 27,000 (Appendix Table 35).

Increased king salmon fishing effort experienced in recent years in all districts of Bristol Bay is the result of more fishermen and processors remaining in the Bay after the earlier herring season, higher prices and a larger demand for kings, as well as the prospects for a good production resulting from strong escapements in recent years.

Although escapement estimates are not available for the smaller king salmon producing districts in the Bay, it is reasonable to project that total runs have averaged over 300,000 kings in recent years (1976-81) throughout Bristol Bay. The outlook for the next several years is promising due to very good escapements in recent years.

Chum Salmon

The 1981 chum salmon harvest in Bristol Bay was 1.5 million, and was the third largest harvest in the history of the fishery and was highlighted by large catches in the Naknek-Kvichak (346,000), Nushagak (773,000), and Togiak (236,000) districts (Table 18). Escapements in the Nushagak (177,000) and Togiak (331,000) districts were within minimal escapement requirements (Appendix Table 36).

Total chum salmon run size in 1981 was 2.0 million fish, excluding escapements into the Naknek-Kvichak, Egegik and Ugashik district watersheds where escapements are not evaluated. Chum escapement in these areas might add another 200-300,000 fish to the total run, bringing the run size to 2.2 to 2.3 million fish in 1981.

The current status of the Bristol Bay chum salmon resource is well above average, in terms of catch, escapement and total estimated run size. The returns for the past six years have been extraordinary relative to comparable years since 1966 and 1967 for the Nushagak and Togiak districts, where such comparative data is available. Overall production, catch plus escapement for the six years (1976-81) have averaged 1.8 million fish for these two districts compared to the previous nine year average of 742,000 (Appendix Table 36).

Pink Salmon

Bristol Bay produces insignificant runs of this species during odd years and 1981 was no exception with a total commercial harvest of less than 8,000 fish (Table 18). A majority of these fish were caught in the Togiak district and were taken incidental to the harvests of the other species.

Coho Salmon

The harvest of 313,000 cohos in 1981 was the second highest ever achieved with only the 335,000 catch in 1980 showing a larger harvest. The Egegik district catch of 31,000 was the highest ever achieved and the Nushagak district

catch of 225,000 was second only to 293,000 harvested in 1916. The Togiak district coho salmon run did not materialize as expected, and this district was closed to fishing on August 31 to obtain additional escapement. The district did not reopen to fishing, as intensified aerial surveillance failed to detect adequate coho run strength. The eventual district coho escapement amounted to 41,000 with a commercial harvest of 30,000.

Catches of coho salmon have risen dramatically in the last three years (1979-81), and is reflected in all districts (Appendix Table 14). Escapement enumeration is too recent to fully assess the current and any long-term biological status. However, it is reasonable to conclude that the current status is probably high, and this species is in a mode of good production at present as are other salmon species in Bristol Bay. Past performance, or catch data, is difficult to evaluate since cohos have not been targeted upon until recently. It is believed that the recent high catches in the Togiak district probably cannot be sustained, and the 1981 run bears this out, but that Nushagak district stocks probably have the potential for a significantly higher sustained production comparable to the 1979-81 levels.

1981 DISTRICT MANAGEMENT SUMMARIES

Naknek-Kvichak District

The 1981 sockeye salmon forecast to the Naknek-Kvichak district was 14.1 million of which 11.1 million were potentially available for harvest (Table 1). The Kvichak River escapement goal was set at 2.0 million as in the past for the three years following the peak year of the five year cycle. The actual inshore run to the district amounted to 14.6 million including 10.9 million in the commercial harvest (Table 1). The four remaining species of salmon produce minor harvests in this district and the 1981 combined harvest of 357,000 fish represented 3% of the district's salmon harvest (Table 18).

A preseason survey of processors indicated at least 900 drift net fishermen and 250 set net fishermen planned to participate in the fishery. The actual number of participants was difficult to determine because some fishermen sold to more than one processor and some set net fishermen divide their legal gear into two separate units. Aerial surveys and processor reports indicate that peak effort occurred on July 1-2 when 935 drift units and 394 separate set net units were fishing (Table 11). Very little fishing time was lost in 1981 due to price disputes and processor limits and suspensions.

The preseason management strategy called for early and frequent fishing periods to assess run strength, allow processors to break in canning and freezing equipment and to harvest those fish in excess of escapement needs. The Port Moller test fishery began on June 10 and immediately began catching small numbers of sockeye and chum salmon (Tables 5 and 6). A price dispute between processors and fishermen in the South Unimak area lasted until June 11. Catches in the South Unimak area climbed to 144,000 on June 13 and then dropped to 21,000 on June 16 when the second period of fishing closed.

The Unimak fishery reopened for the third fishing period on June 19 and catches of over 200,000 sockeye were made on each of the following three days.

Normally the lag time between South Unimak and Bristol Bay is 13-14 days. Distribution of fish in the South Unimak area in 1981 was unusual in that the fish were scattered and tended to range offshore compared with recent years. The Shumigan area, an additional 4 days away, were still showing strong catches through June 22. Run timing as shown by Shumagin/South Unimak sockeye catches appeared to be normal, indicating a July 3-5 peak into Bristol Bay.

The Naknek-Kvichak district sockeye catch through June 20 was 60,000, while the Kvichak River inside test fish program projected a 14,000 sockeye escapement through June 21 (Table 22), and Naknek River escapement was estimated at 1,000 through the same period (Table 19). Port Moller test catches rose dramatically beginning June 20, indicating that the main body of the inshore sockeye run would probably begin entering the Bay around June 26-29 (Table 5). In addition, it was discovered that most of the fish passing Port Moller were caught on the inside stations; therefore, several additional inside stations were fished beginning June 21 in order to more accurately monitor the incoming sockeye run.

Contrary to Shumagin/South Unimak catches, it appeared that the sockeye run was developing slightly earlier than normal. The emergency regulatory period was to begin on June 23 but the large forecast prompted a 24 hour extension until June 24 (Table 10). A survey of Kvichak River on June 22 revealed only 3,000 fish in the river, while the inside test fish indices indicated a low, but consistent number of fish were entering the river. The Naknek River escapement had reached 12,000 by June 22, considerably above the long-term average for this date. Meanwhile, the estimated total run past Port Moller through June 22 was over 11.6 million sockeye, however, this estimate could not be verified until enough data on the inshore catch and escapement

was available so that it could be lagged back 6 to 9 days to the Port Moller results (Table 5). An additional extension of 31 hours of fishing time was allowed to help assess run strength and timing.

Commercial sockeye catches rose from 88,000 on June 23 to 139,000 on June 24, while Port Moller test indices indicated that 20 million sockeye had passed Port Moller headed for Bristol Bay (Table 5). A district survey was flown on June 24, and most of the drift effort was concentrated in the eastern half of the district, while set net catches were fair on the east beaches and poor on the west side. Sockeye escapements past the Kvichak and Naknek towers through June 24 were 29,000 and 30,000 respectively, and were above the long-term averages for this date. With the foregoing information, an additional 24 hour fishing period extension was announced (Table 10).

The commercial catch on June 25 totaled 200,000 sockeye, while escapements past Kvichak and Naknek towers totaled 33,000 and 34,000 respectively. The fishery was allowed to close to improve the rate of escapement into Kvichak and Naknek Rivers. Aerial surveys of both the district and the Kvichak River were flown the morning of June 26 prior to the closure. Fishing effort was still concentrated near the eastern shore with the best catches being made right at the southern boundary (Johnson Hill line). Kvichak River was essentially empty with a total of only 3,000 fish estimated in the river (Table 22). It was clear that the fish were migrating in a fairly discreet band along the eastern shore and that the fishing fleet was able to harvest nearly all as soon as they entered the district. A 24 hour fishing period was announced for June 27-28, and was prompted by the continued strong sockeye catches at Port Moller and the need to achieve a high exploitation rate to harvest all fish in excess of escapement requirements.

Commercial sockeye catches continued to climb and totaled over 800,000 through June 27 (Table 11). A fishing district survey on June 27 showed that although most of the effort was still in the eastern half of the district, some good catches were being made by west side set nets and drift boats fishing the western half of the district. Set net catches from midway on the southern east beach north to the inside boundary line were heavy. Kvichak River inside test fish indices totaled 185 on June 27 and was the first day that good catches were made. A decision was needed by noon on June 28 if an extension of fishing time would be announced. A district survey at 11:20 a.m. that day showed that sockeye catches were very light in all areas of the district and indicated that the fleet had removed any buildup of fish from the previous closure. The Kvichak River inside test drifts on the first tide were again strong but were a result of fish that were in the upper district from the previous closure (Table 22). The Kvichak River tower escapement was less than 36,000 through noon on June 28, and effects of the closure would not be seen until the fish began entering clear water above Levelock. Meanwhile, the Naknek River sockeye escapement began to rise dramatically on June 28 (Figure 2) and the escapement by 10:00 a.m. totaled 96,000, over 12% of the escapement goal (Table 19). Normally the Naknek sockeye run is slightly earlier than the Kvichak run. A total district closure was allowed to occur the evening of June 28 in order to assess escapements, commercial catch, age class compositions, test fishery and aerial survey results.

The Port Moller test fishery was again curtailed due to weather conditions and was unable to fish on June 28 and 29 (Table 5). Kvichak River inside test fish indices had dropped off sharply on the second tide of June 28 but rose again on the first tide of June 29 (Table 22). Fifty four of the 55 fish caught by the test boat on June 29 were on the east side drift, again indicating

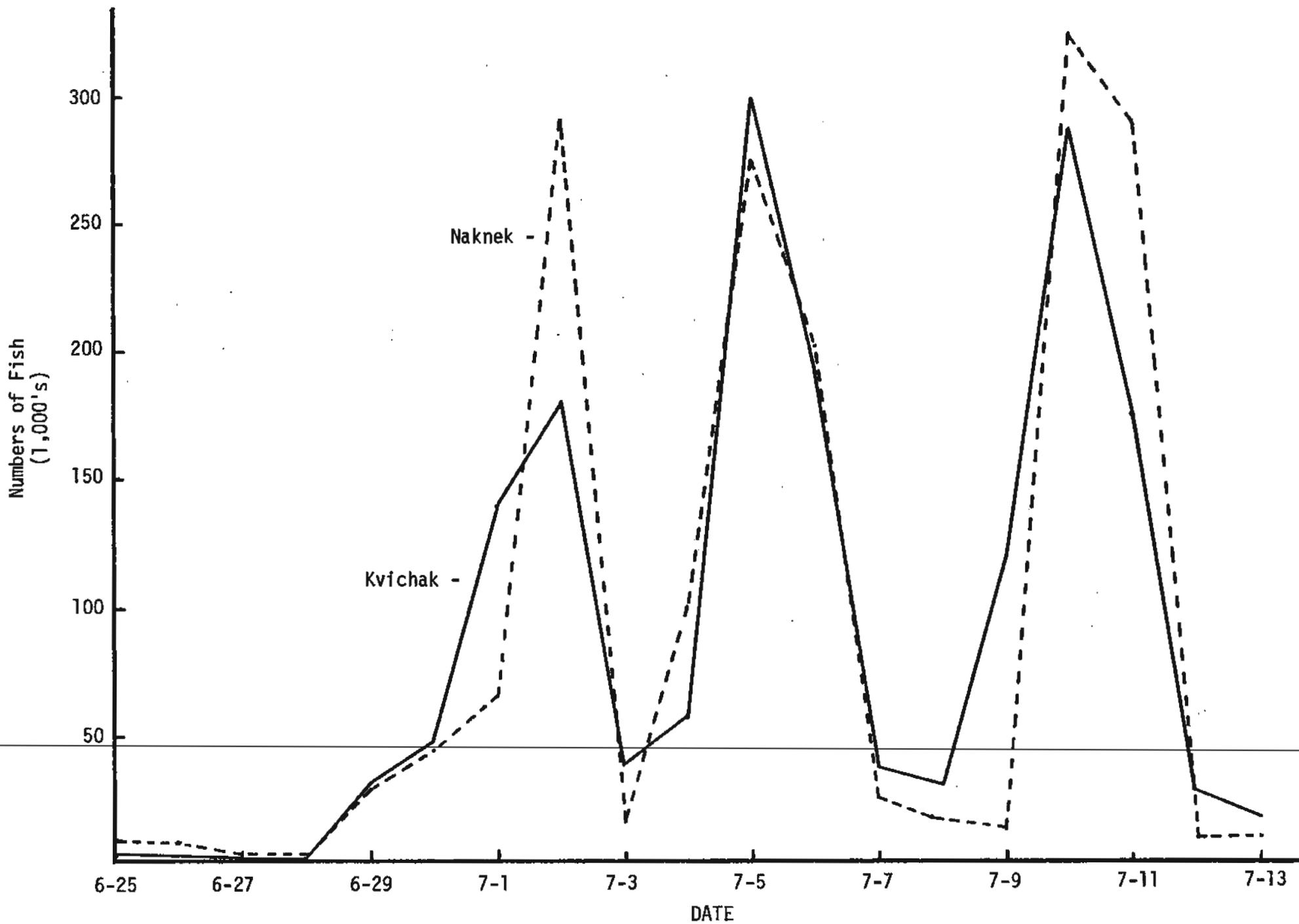


Figure 2. Kvichak and Naknek daily sockeye salmon tower escapement (2 day lag), 1981.

that the fish were almost all on the eastern shore. The estimated escapement past the inside test fish station at Naknek was 138,000 for the early morning tide, with large numbers of sockeye continuing to escape into the river (Table 22). The Naknek River escapement had reached 123,000 through midday of June 29 and represented 15% of the goal. The large sockeye catches made at Port Moller beginning on June 22 should be arriving in the Bay about this time, assuming a 7-8 day lag time. With the increasing escapement trend, a 12 hour fishing period was announced for June 30 after a 38 hour closure (Table 10).

The Port Moller test boat was able to fish on June 30 and catch indices indicated to date that 18.9 million sockeye had moved past Moller (Table 5). Good catches continued to be made by the inside Kvichak River test boat and through June 29 a total of 466,000 sockeye were estimated to have escaped into the river (Table 22). Counts through midday on June 30 at Kvichak and Naknek River towers totaled 80,000 and 218,000 respectively. With the improving escapement trends (Figure 2) a 12 hour fishing period extension was announced, while assessment of the escapement from the past 38 hour closure continued.

An aerial survey of Kvichak River on June 30 resulted in a minimum estimate of 461,000 sockeye present in the river (Table 22). Total escapements past Kvichak and Naknek River towers through June 30 totaled 116,000 (6% of the goal) and 467,000 (58% of the goal), respectively (Table 19). Port Moller passage rates were still above 1 million sockeye per day and depending on lag time and catchability factors total run magnitude ranged between 8 and 20 million fish. Additional fishing time was allowed after a 11 hour closure to help provide inshore return information to aid in evaluating run strength and timing.

The commercial sockeye catch through the last open fishing period on June 28 totaled 1.1 million (Table 11). Sockeye commercial catch age composition by day through July 1 had shown a gradual change from age 5₂ to age 5₃, an indication that a shift to Kvichak fish in the district was occurring. Port Moller test catches peaked on June 24, which indicated an estimated inshore

peak on July 2-3 if normal timing was assumed (Table 5). The estimated sockeye escapement into Kvichak River through July 1 ranged from 330,000 to 724,000 including 257,000 past the counting tower (Table 22). The Naknek River escapement by July 1 was 483,000, or 60% of the escapement goal (Table 19). A lengthy closure at this time could produce sockeye escapements in excess of requirements, therefore another 12 hour period was announced for July 3 (Table 10).

The commercial sockeye catch through July 2 totaled nearly 3.4 million with an estimated catch of 1.1 million made during the last 12 hour opening (Table 11). A fishing district survey shortly after the period opened on July 3 showed good catches all along the east side of the district. West side set nets were doing somewhat better, but still far below what they would have been in a year of normal migration patterns. An aerial survey of Kvichak River on July 3 was aborted due to high winds and poor visibility, while the inside test fish program estimated 705,000 fish past the site through July 2 (Table 22). With the improving escapement rates and strong catches, a fishing period extension of 12 hours was announced at 6:00 p.m. to allow fishing until noon, July 4 (Table 10).

Total run magnitude estimated past the Port Moller site was 23 million sockeye through July 3, while the inshore run estimates through July 3 totaled 11 million fish. Through July 3 the escapement past Kvichak River tower had reached 477,000 with an additional 203,000 estimated in the river, and the inside test fish indices showed the largest increase on July 3 of any previous day (Table 22). The Naknek River sockeye escapement through July 3 rose to 862,000, and with the improving trend in the Kvichak River escapement rate (Figure 2), another 12 hour fishing period extension was announced (Table 10).

The commercial sockeye catch had now reached 4.2 million through July 3 and was averaging about 1 million fish per day (Table 11). Escapements past the towers as of 2:00 p.m., July 4, were 489,000 at Kvichak and 1.1 million at

Naknek. Even though the inside test fish catches in Kvichak River dropped on the evening tide of July 3 and the morning tide of July 4, an aerial survey of Kvichak River produced an estimate of 1.3 million fish in the river (Table 22). With the Kvichak system pushing 1.8 million fish (tower plus river), and the Naknek River escapement goal of 800,000 already met, a 24 hour fishing period extension was announced (Table 10).

Kvichak River inside test fish catches picked up slightly on the evening tide of July 4 and the morning tide of July 5, and estimates of fish past the site through July 4 ranged from 627,000 to 1.2 million. Another aerial survey on July 5 produced a minimum estimate of 539,000 sockeye in the river, and with the 701,000 fish already past the counting tower, a total escapement of 1.2 million was assured (Table 22). An announcement was made to extend fishing time another 24 hours due to the continued strong run passing Port Moller, attainment of the Naknek River escapement goal, and the strong continuing commercial catches of over 1 million fish per day.

Caution was in order due to the wide range of the estimated sockeye escapement in Kvichak River as shown by aerial surveys on July 4 (1.3 million) and July 5 (539,000)(Table 22). Age class breakdown indicated that roughly 50% of the commercial catch were Naknek fish. Three aerial surveys of the fishing district were flown on July 6 and it was apparent that effort and good catches were still concentrated on the east side, with very little fishing success on the west side of the district. If a closure was necessary to protect Kvichak fish a difficult decision to close the whole district or just the Kvichak section would be necessary. Age class composition analysis of the sockeye catch was inconclusive although the age seemed to shift from age 5₂ to age 5₃ on June 28, as the age 5₃ Kvichak fish began to move into the district (Table 2). Escapements from the last two closures indicated a

shift from a majority of Naknek fish to a majority of Kvichak fish (Figure 2). Normally the Naknek run is slightly earlier than the Kvichak run, which would indicate that Naknek should be past peak and dropping off. These factors, in addition to the east shore migratory pattern, were influential in the decision to allow the entire district to close for protection of Kvichak sockeye stocks.

Port Moller sockeye catch indices dropped significantly on July 5-6, and the total estimated run magnitude past Port Moller was 28 million fish when the project was terminated on July 6 (Table 5). The inshore sockeye run was just over 21 million, leaving about 7 million fish to be accounted for inshore, if Port Moller estimates were anywhere near accurate. The Kvichak River inside test fish project was estimating between 1.2 and 1.8 million in the escapement through July 8 (Table 22). The first tide on July 8 produced a test catch of over 3,000 index points and an estimated 800,000 sockeye, while the tower count as of 2:00 p.m. on July 8 was 1.1 million (Table 22). A 24 hour fishing period for July 8-9 was announced based on the strong show of fish in lower Kvichak River.

An aerial survey of Kvichak River the afternoon of July 8 produced an estimated 246,000 fish in the river, and even though survey conditions were poor, many fish were observed entering clear water in the lower river (Table 22). The afternoon tide on July 8 produced inside test fish indices in excess of 8,000. The commercial catch through July 8 was 7.9 million and drift fishing effort was beginning to leave the district bound mainly for the Nushagak and Ugashik districts. With the lower end of the escapement management range met, the district was extended until 9:00 a.m., July 18, and a Commissioner's announcement was also issued waiving the 48 hour waiting period for district reregistration and gear movement into and within the Naknek-Kvichak district (Table 10).

Throughout the season numerous complaints were received by the Department's of Fish and Game and Fish and Wildlife Protection, that many fishermen were operating well below the Johnson Hill boundary line. A general announcement was finally issued on July 23 that stated that the entire district would be closed to drift fishing if violations did not stop. Violations diminished thereafter and no closure was necessary.

The final district sockeye catch was 10.9 million (99% of forecast), and was twice the average for the peak +1 year of the five year cycle. The district total run of sockeye was 14.6 million (103% of forecast), with the Kvichak River catch apportionment amounting to 5.2 million and representing 48% of the harvest (Table 1). The total sockeye run to the Kvichak River of 7.0 million was 67% of that forecasted. In contrast to the weaker than forecast Kvichak run, the Naknek River run was exceptionally strong, with an allocated catch of 5.5 million (216% of forecast) and the escapement of 1.8 million, which produced a total run of 7.3 million (218% of forecast)(Table 1). The Branch (Alagnak) River system cannot be managed separately and was allocated 237,000 in the catch with an additional 82,000 escapement enumerated post-season by aerial survey for a total run of 319,000 (Table 1).

The king salmon catch of 10,000 was equal to the recent 10 year average, while escapements which are monitored post-season by aerial survey, amounted to 18,000 fish (Table 21 and Appendix Table 11). The chum harvest of 346,000 was the second largest (1939-387,000) in the history of the fishery. No in-depth escapement estimates are made for this species. Pink salmon do not return in substantial numbers to Bristol Bay in odd numbered years, while the coho salmon catch of 800 was the lowest since 1975 and was due mainly to a lack of processors remaining in the area.

A total of 63 operators reported catches of salmon from this district in 1981 compared to 59 in 1980 (Table 28). No new canning operations were implemented in 1981, and all additional processors were either freezing or fresh airlift operations. Very little fishing time or production was lost in this district due to price disputes or processor imposed limits and suspensions. Enough processors were available to handle fish even though a few major companies did limit their fishermen with daily production limits.

Egegik District

The total sockeye salmon run to the Egegik district in 1981 totaled 5.2 million fish, 63% larger than the preseason forecast of 3.2 million (Table 1). The sockeye harvest of 4.5 million fish broke the previous single season record of 3.2 million set in 1965 and exceeded the preseason prediction by 1.9 million fish. An escapement of 695,000 sockeye was achieved, which was 16% above the management goal of 600,000, but 18% below the 20 year mean escapement of 844,000 (Appendix Table 20). Overall, the total sockeye run to the district in 1981 was the largest in the history of the fishery since catch and escapement records have been maintained. It exceeded 1965 (the previous record year) by over 1/2 million fish (Appendix Table 20).

The season's first commercial sockeye landings occurred during the week of June 1-6 when a few early fish were taken in set nets along the north Egegik beach (Table 12). Egegik River inside test fishing began on June 14, and initial catch indices (during a weekend commercial closure) indicated small numbers of sockeye were entering the river; the low passage rate was further confirmed on a June 15 aerial survey of Egegik Lagoon when 2,000 fish were observed in the lagoon (Table 23). This is the earliest date in the historical record that sockeye have been recorded at the tower site.

A survey to assess fishing effort and fleet distribution in the district was conducted June 15. This date marked the first time the drift fleet went out in numbers to test their gear and 121 boats were observed, along with 85 set nets (Table 12). Drift effort was greatest along the south Egegik outside line.

Average daily inside test fish indices dropped on June 16 and remained low through June 20 as the commercial fishery during this weekly open period intercepted most of the fish entering the district (Figure 3 and Table 23). Commercial fishing effort at Egegik increased to 168 drift boats and 160 set nets by June 19 (Table 12). With the possibility of prolonged fish price negotiations foremost in the minds of both fishermen and processors each group appeared anxious to get some early fish delivered.

A normal weekend closure was in effect on June 20-21. Prior to this closure the commercial catch totaled 135,000 sockeye and the escapement past the tower was 8,000. Catch reports from South Unimak and the Port Moller test fishery indicated a strong run was passing both locations. With large runs to all districts predicted these indicators reinforced a management strategy of allocating fish liberally to the commercial harvest.

Fishing reopened on June 22 with members of the AIFMA association officially involved in a "price dispute" throughout Bristol Bay. A noon aerial survey of the Egegik district indicated very few fishermen were honoring the price dispute as 133 drift boats and 132 set nets were observed fishing. Additionally, 9% of the fleet (12 drift boats) were also not honoring the established fishing district boundaries. Average inside test fish indices dropped significantly following the June 22 opening indicating the fleet was efficiently cleaning the district of incoming fish (Figure 3).

The price dispute ended on June 23 and the fishery entered the period of emergency regulatory management. By this date historically, approximately 10%

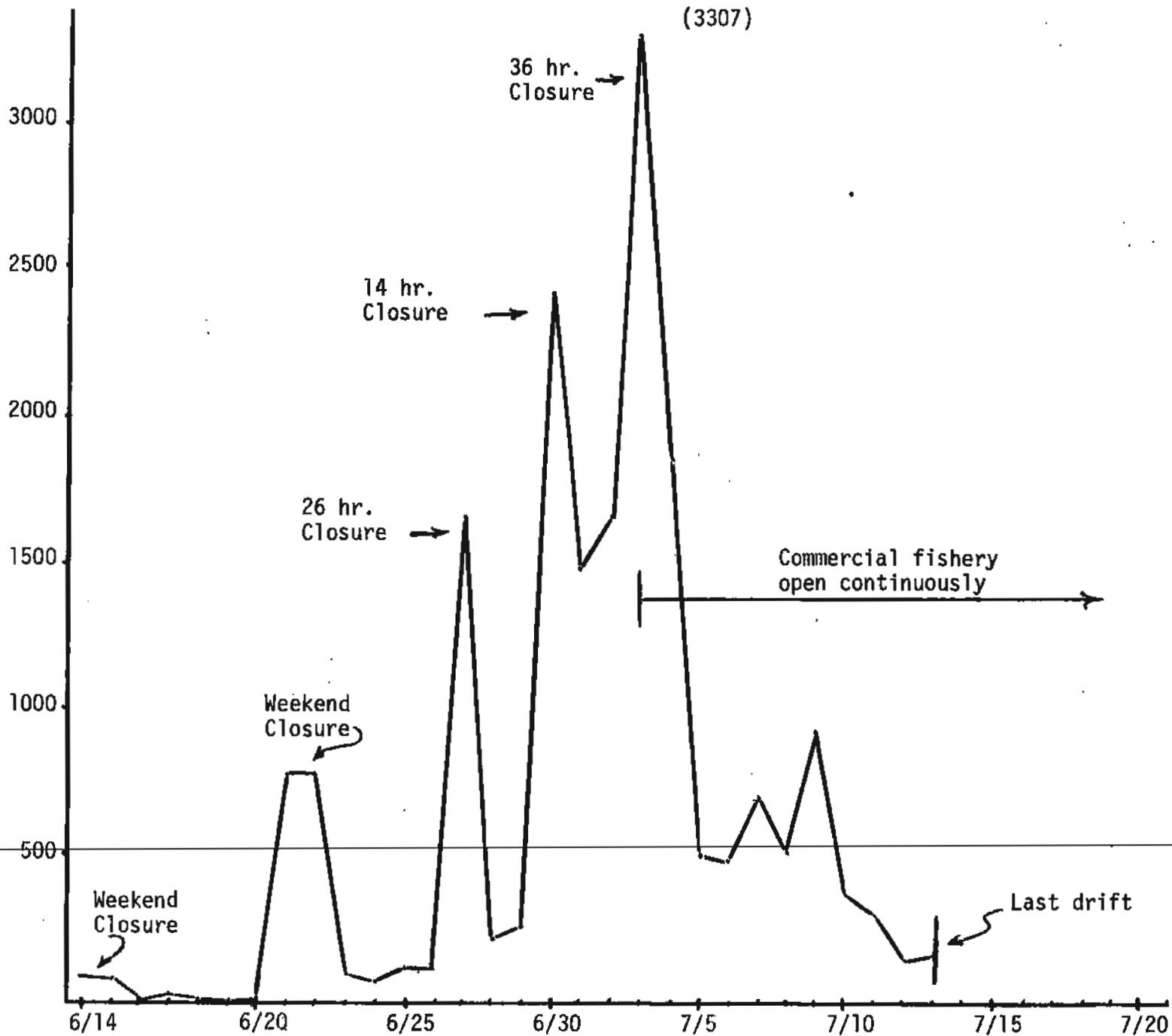


Figure 3. Average daily Egegik inside test fish indices, 1981.

of the Egegik commercial sockeye harvest has been achieved. A catch of 175,000 or 7% of the preseason forecast was obtained before the emergency regulatory period (Table 12). The fishery was opened by emergency order beginning on June 23 and it remained open for the next 79 hours until June 26 when it was allowed to close (Table 10). During this three day time period 507,000 sockeye were harvested bringing the accumulative catch to 682,000 (27% of forecast). Escapement proceeded slowly, reaching 51,000 (9% of goal) through June 25 (Table 23).

Increased inside test fish indices following the June 26 closure were encouraging and the fishery was reopened on June 27 (Figure 3). The fishery remained open for 48 hours during which time 376,000 sockeye were harvested bringing the accumulative catch to 1.1 million and 41% of forecast (Table 12). Escapement rates past the tower increased somewhat during this time period with a total passage through June 28 of 104,000 (17% of goal).

A lull in fish movement was experienced on June 29. Strong NW winds put down most outer district fishing activity and commercial catches, inside test fish indices, and tower counts all were low (Figure 3). Considering the adverse weather and the need for additional fish in the escapement, the fishery was allowed to close (Table 10).

The fishery was reopened for 12 hours on June 30 with the season's peak effort (346 units of gear) participating. An aerial survey of Egegik Lagoon indicated very few fish (approximately 2,400) were present in visible areas below the counting tower and only small numbers had passed the tower during the previous 24 hours so the fishery was allowed to close once again (Table 23). The season's peak commercial catch rate occurred during the 12 hour opening on June 30 with 480,000 sockeye taken (Table 12). This catch indicated the peak of the run was near or at hand and escapement was still far below the desired

goal, so additional closures to enhance escapement totals were necessary. A 12 hour closure beginning on June 30 followed by a 36 hour closure beginning on July 1 were the measures utilized to insure that adequate escapement was obtained. A 12 hour opening sandwiched between these closed periods was utilized as a test fishery and it produced only half (269,000) the catch that the earlier 12 hour opening had on June 30 (Table 12).

Sockeye escapement past the counting tower through July 2 totaled 140,000, while average inside test fish indices remained high on July 2 and increased sharply upwards on July 3 (Figure 3 and Table 23). Through July 2 inside test fish data indicated an estimated 395,000 fish total had passed the lower river test fish site; however, adverse weather on July 3 prevented aerial surveys to visually assess this escapement estimate (Table 23).

During previous seasons at Egegik the commercial fishery was unable to "cork off" the surge of fish passing through the district at the peak of the run. Large segments of previous years' escapements were obtained even when the fishery was in full operation. This fact was very much in the mind of the Egegik area management biologist on July 3. In consideration of this aspect and bearing in mind the greatly increased inside test fish indices (Figure 3), the fishery was reopened for 12 hours on July 3 and was consequently not closed again through the remainder of the emergency regulatory period (Table 10).

Aerial surveys on July 4-6 confirmed first that the lower range of the desired escapement goal was in the river and later that the goal of 600,000 sockeye would be achieved (Table 23). Inside test fish data through July 3 indicated an estimated 626,000 fish had passed the lower river test fish sites and this estimate increased to 719,000 sockeye through July 5 (Table 23). A series of announcements extending the fishery day by day through July 6 was employed to allow continued fishing while escapement monitoring continued to

insure that fish above the fishery did not suddenly drop back downstream and reenter the catch rather than escapement (Table 10).

With 532,000 sockeye (tower plus lagoon) visually assured in the escapement and more fish present in the muddy river areas below Egegik Lagoon, the commercial fishery was opened until further notice at midnight July 6, and the 48 hour waiting period for transfers into the district was also waived (Table 10).

Escapement passage rates peaked at the counting tower on July 7 when 102,000 sockeye were counted and the escapement goal of 600,000 was reached at the tower on July 8 (Table 23). Passage rates dropped quickly thereafter and a final count of 695,000 sockeye was achieved through July 18 when the counting program was terminated. Commercial catches and effort remained high in the district until July 11, and then tailed off during late July and early August. The sockeye season catch totaled 4.5 million fish (Table 12).

During the 1981 season there were no instances at Egegik of the catch exceeding processing capability, and fishermen were not put on limits by processors. There were instances of shore-based operators cutting off services to fishermen who sold fish to "cash buyers", indicating there was processor competition for the available catch.

In spite of an almost continuous onshore wind throughout most of the peak of the season which limited fleet efficiency, the fishery pretty well cleaned up the district during open fishing periods. This may have been greatly influenced by the migration route selected by the incoming sockeye. The fish this year, for the most part, migrated close to shore where they were very susceptible to capture by set gill nets. Those that made it to protected waters inside Egegik Bay were mopped up by drifters who were frequently concentrated inside due to rough water in outside district areas. In retrospect, considering the overall harvest efficiency, it is improbable that the escapement goal would have been achieved without the fishing closures that were employed.

There has been considerable post-season discussion of the Kvichak district sockeye short fall and the possibility that the missing fish were harvested by the Egegik fleet. It is certainly possible for this to have happened, but only if large numbers of Kvichak fish migrated very close inshore at Egegik as offshore fleet efficiency was hampered by rough waters for considerable periods of time.

The commercial catch of other salmon species in the Egegik district totaled 124,000 fish, 3% of the total district salmon harvest (Table 12). With the exception of pink salmon (always a minor catch component at Egegik) each species returned in record or near record numbers in 1981. The king salmon catch of 6,000 was the second largest in the history of the fishery, exceeded only by a catch of 10,000 in 1954. The chum salmon catch totaled 87,000 and broke the previous all time record of 83,000 set in 1977. Both the king and chum harvests were greater than twice the long-term averages (Appendix Tables 11 and 12). The harvest of 31,000 coho salmon is another all time record for the district and is nearly six times the long-term average (Appendix Table 14). Strong returns of these other salmon species continues a trend observed in recent years. Processing interest in these species, especially late season cohos, continues to increase and along with recent mild winters, and decreased interception rate on the high seas are partially responsible for the increased harvests.

A total of 29 processors and buyers operated in the Egegik district during 1981, and this represents a 53% increase over 1980 (Table 28). As the shore-based processors were able to keep up with daily harvests, considerable competition for available fish occurred, especially among "cash buyers". This increased competition for available fish was evident in all districts of Bristol Bay in 1981.

Ugashik District

The total sockeye salmon run to the Ugashik district in 1981 totaled 3.3 million fish, 8% greater than the preseason forecast of 3.0 million (Table 1). The sockeye harvest of 2.0 million fish broke the previous single season record of 1.9 set in 1922 but fell approximately 23% below the preseason predicted harvest goal (Table 1). The harvest in 1981 exceeded the 20 year average of 375,000 sockeye by a factor of five (Appendix Table 20). An escapement of 1.3 million sockeye was achieved exceeding both the goal and the 20 year average escapement (Appendix Table 20). Overall, the total sockeye return to the district in 1981 was the second largest since accurate catch and escapement records have been maintained (exceeded only by the 1980 return of 4.3 million fish).

The district was managed similar to the Egegik district, but due to a smaller escapement goal (500,000) and a much smaller initial fishing effort, a slightly more liberal approach to the harvest was maintained throughout the season. Three short fishing closures were instituted early in the season to put some early run fish into the escapement (Figure 4). The fishery was open continuously from July 1 through July 25 providing a maximum opportunity to harvest fish in excess of escapement needs.

Both an inside test fish program and a counting tower were operated to assess escapement magnitude and timing. The inside test fishery was begun June 17 and small initial catches indicated a few fish were already entering the escapement (Table 24). Commercial sockeye catches were generally small from the inception of the sockeye fishery until the end of June (Table 13). The commercial drift fleet (41 boats) during this early phase of the fishery was about double the 1980 fleet present during the same period, and this was due to the large forecast return to the district and an increased processing presence.

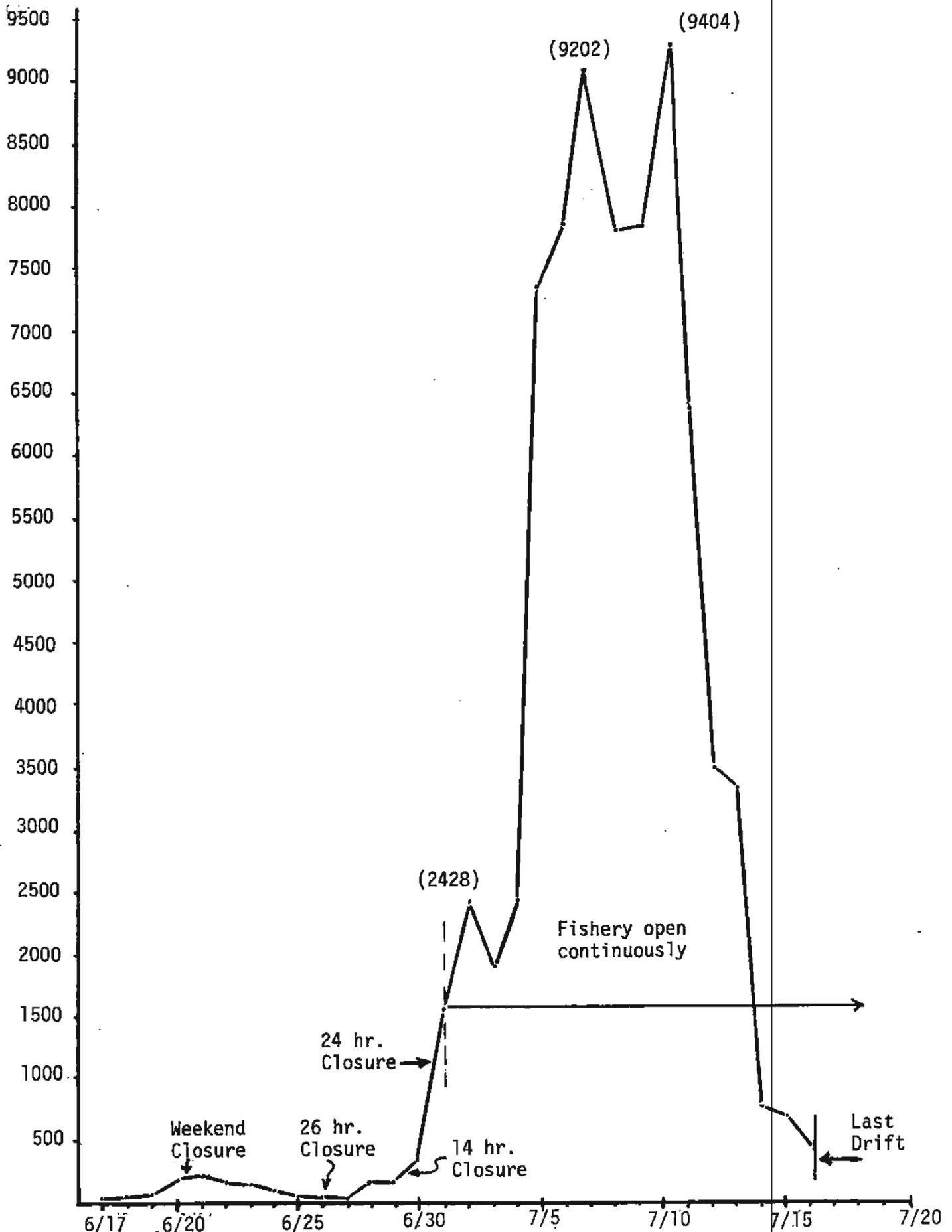


Figure 4. Average daily inside test fish indices, Ugashik River, 1981.

By the beginning of the emergency regulatory period on June 23, the commercial sockeye harvest had reached 25,000 fish, while the inside test fish catch data indicated an estimated 16,000 sockeye above the fishery (Table 24). With a large run predicted the fishery was opened by emergency order and remained open until June 26 when it was allowed to close for 26 hours to insure some early escapement (Table 10).

The fishery reopened on June 27 and remained open 48 hours, and by the end of this open period the catch had reached 119,000 sockeye (5% of forecast) and escapement past the tower totaled 12,000 fish (Table 24). The fishery was again closed on June 29 for 14 hours to promote additional early escapement.

The fishery was reopened on June 30 and remained open for 12 hours after which it closed one final time for 24 hours (Table 10). Inside test fish indices climbed substantially on July 1 following the June 30 closure, remained high through July 4, and then increased dramatically upward on July 5 (Figure 4 and Table 24). An aerial survey of Ugashik River and lagoon on July 1 indicated a large, but not accurately countable mass of sockeye present in muddy water areas just below the lagoon. The fishery was reopened based on this observation and extended day by day through July 7 based on increasing tower counts, inside test fish indices, and the relatively small commercial effort (Tables 13 and 24).

Through July 6 the commercial harvest at Ugashik had reached 507,000 sockeye, and the escapement past the tower was 147,000, while the inside test fish indices indicated an estimated 487,000 sockeye total had entered the river (Table 24). At midnight on July 7 the fishery was opened until further notice and the 48 hour waiting period for transfer of fishermen into the district was waived (Table 10). The escapement past the counting tower stood

at only 224,000 but inside test fish indices and projections indicated escapement goals were nearly certain to be achieved and it was necessary to stimulate maximum harvest pressure on the run or risk massive over escapement.

The commercial harvest peaked on July 10 with a daily catch of 232,000 sockeye, and catches remained high through July 14 and then tailed off quickly (Table 13). Peak harvest effort was observed July 12 with 142 drifters and 21 set gill nets fishing. Many of these drift gill net boats had transferred in from other districts where runs had peaked earlier.

Escapement at Ugashik tower peaked also on July 10 with a maximum 24 hour count of 196,000, and counts remained high through July 14 and then dropped quickly. Counting effort was terminated July 24 with 1.3 million sockeye in the escapement (Table 24).

A total of 31 processors/buyers purchased salmon in the Ugashik district during 1981 (Table 28). This was almost twice the processing effort available during the 1980 season. Nearly all the catch was frozen on floating processors, tendered to other districts, or flown out of Bristol Bay for canning or freezing.

The district catch of other salmon species in 1981 totaled 63,000 fish, and 3% of the total district commercial salmon harvest (Table 13). The king salmon catch of 4,000 exceeded the 20 year district average but wasn't unusual in any regard. Fishermen involved in the early June king fishery did report experiencing some problems with whales tearing up nets. The chum salmon harvest of 33,000 fish was a little more than twice the 20 year average (Appendix Table 13). The coho salmon harvest of 27,000 was the second largest in the history of the district (trailing only 1951 harvest of 36,000) and was over five times the 20 year average (Appendix Table 14).

Nushagak District

The large Nushagak preseason inshore sockeye salmon forecast in 1981 of 5.7 million called for a liberal management approach to achieve the desired high 79% exploitation rate necessary to harvest those fish in excess of escapement requirements. Escapement requirements to Nushagak tributary systems were 1.3 million, leaving 4.5 million fish available for the commercial harvest (Table 1). Wood and Igushik Rivers were expected to dominate and account for over 75% of this district's total run, while the Nuyakuk/Nushagak River system was expected to contribute 24% (Table 1).

Management of Nushagak's salmon resource is made more difficult by the multi-species aspect of this district's salmon runs, and by occurrence of more than one major sockeye salmon producing river system. Nushagak district has accounted for over 71% of Bristol Bay's commercial production of king salmon, and is the only area with a major directed commercial effort aimed at kings. Additionally, this district produces large numbers of chums (54% of the total Bay production), even-year pinks (85% of the total) and coho salmon (51% of total)(Appendix Tables 11-14).

With the relatively new and developing Togiak district herring fishery gaining prominence, and its close physical proximity, Nushagak has seen a dramatic increase in early season fishing effort directed toward king salmon. Fortunately, the king return to Nushagak has been well above average for the past four years (Appendix Table 35). Increased fishing effort has been balanced, since 1969, with an earlier commencement of the emergency regulatory period (June 16 compared to June 23) than other districts of Bristol Bay, and by decreased fishing time both before and after the beginning of regulated fishing activities on June 16.

Preseason estimates of expected fishing and processing effort indicated that 595 drift units and 279 set units would be available to participate in the Nushagak fishery (Table 9). Drift units peaked on June 8-13 at 542 during the king fishery, and on June 30 at 450 drift and 202 set units during the sockeye fishery. Processing effort continued to increase in 1981, when 36 processors and buyers operated in Nushagak compared with 33 in 1980 (Table 28). In addition to the three major long established shore-based canneries, floating freezer ship operations totaled 19, while airlifted salmon operations increased from 5 in 1980 to 15 in 1981 (Table 28).

Prior to the arrival of the sockeye run, management emphasis is directed toward determining the apparent strength of the incoming king run. Even with the dramatic increase of king salmon interception rates on the high seas by the Japanese mothership fishing fleet, expectations inshore remained high for a good run. Total Bristol Bay king production was expected to equal 150,000 fish, with Nushagak district accounting for 75% of the total.

Settlement of exvessel salmon prices between WACMA and major processors occurred on May 24, and commercial operations commenced in earnest on May 25. King catches up to the weekend closure on June 6-7 totaled 23,000 compared with the long-term average of 7,000 (Table 14). Early season fishing effort was over 300 drift units, which led to a low CPUE (5 to 22 fish per day) and the contention by many fishermen that a poor run was in progress. CPUE success increased the following week to 17-30 fish per day, and strong SW winds on June 9-10 produced catches which indicated that over 80,000 kings would enter the harvest if fishing time was allowed for the regular 5 day weekly period. Since king escapement trends, as monitored on a daily basis from subsistence nets at Dillingham and at the upriver Lewis Point fish camps, showed conclusively that the king escapement was not adequate, the fishery was closed on June 11 to improve the catch/escapement ratio (Table 8).

Age composition and weight analysis of the king harvest through June 11 indicated a normal show of age 5 and 6 year old fish, and that fish size was also normal (average 23 lbs.).

Final estimates of the king harvest through the closure on June 11 amounted to 66,000 fish, with the escapement roughly estimated at 20,000 (Table 14). With the large fishing fleet now in Nushagak (over 540 drift units), the fishery would remain closed until escapement indicators showed a significant improvement.

King escapement was monitored on a daily basis at both the Dillingham and Lewis Point subsistence sites, as well as at the Department's new sonar enumeration site on Nushagak River below the village of Portage Creek. Although the sonar program is new and all operational difficulties have not been solved to date, this program was instrumental in showing "escapement rates and trends" in 1981. Even though the sonar unit was operational after the king run had commenced and kings had been passing upriver two weeks prior, the sonar estimate was approaching 10,000 kings by June 16 with daily rates at 1-2,000 kings per day (Table 20).

With the closure on June 11, fishing effort began to transfer out of Nushagak to Naknek-Kvichak and Egegik districts, and by June 15 over 220 drift units had transferred to other districts to begin sockeye salmon fishing operations.

On June 14, strong SE winds commenced, and subsistence nets at Dillingham exhibited a significant improvement on June 15, jumping from 1 - 2 kings per net per tide to 12 - 21 kings per net (Table 8). With the improvement in the daily escapement rate, the total escapement was now roughly estimated at 35,000 fish and a 24 hour fishing period was announced for June 16-17 (Table 10).

Subsistence king catches at Lewis Point also improved significantly on June 15-16 to 11 - 20 kings per net indicating a strong upriver migration was in progress (Table 8). Despite calm non-productive king fishing weather conditions, 17,000 kings were caught in the June 16-17 period, and catches of over 9,000 sockeye and 7,000 chums indicated that some fishermen had changed to smaller mesh fishing gear (Table 14).

Sockeye catches on Igushik beach of 3,000 fish on June 16-17 prompted an Igushik section only fishing period on June 19-20, but Lewis Point subsistence king catches after the peak CPUE on June 16 indicated additional closure was necessary to insure escapement requirements (Table 8). Over 8,000 sockeye were taken on June 19-20 off Igushik beach, with the drift fleet accounting for 7,000 sockeye and over 8,000 kings, the largest king catch ever made in an Igushik only opening (Tables 14 and 15). Igushik section king catches generally range from 200 - 300 fish per fishing period, and the previous largest catch was 1,300 kings caught in a 12 hour period on June 24-25 in 1977.

Another 24 hour Igushik section fishing period was announced for June 22-23 to harvest Igushik River sockeye from what was expected to be a very strong run, and intentions on June 21, were to follow this Igushik opening with a 15 hour district wide fishing period. This strategy would allow uninterrupted fishing pressure on the Igushik sockeye run, and yet allow additional king escapement by extending the closure in the Nushagak section.

Prior to the Igushik section opening at 3 p.m. on June 22, a strong SW wind initiated a significant push of kings past the Lewis Point and sonar fishing sites. Subsistence nets at Lewis Point averaged 49 kings per net and the sonar counts increased significantly, and further, that area between Lewis Point and the sonar site was found to contain many "finners" and "jumpers" (Tables 8 and 20). It was now apparent that a large number of kings had been laying in the river, and were induced to move by the wind. With the king

escapement showing strength, the Igushik section fishing period was superceded by an announcement allowing a 24 hour district wide opening (Table 10).

For the next four days (June 23-26) fishing time was allowed continuously by daily announced extensions (Table 10). Sockeye catches were the strongest on record for this time period (June 22 - 89,000; June 23 - 60,000; June 24 - 67,000; June 25 - 195,000; and June 26 - 162,000), and through June 26, 598,000 sockeye and 222,000 chums, along with 61,000 incidentally caught kings, had been harvested (Table 14).

Through June 26 almost 600,000 sockeye had been caught with counted escapement into Wood (16,000) and Igushik (13,000) Rivers at a low daily rate (Table 19). However, it was apparent from the strong continuing daily catches that a significant run was in progress, and to keep on top of the situation, an aggressive fishing schedule would have to be maintained until catch and escapement indicators dictated a more conservative approach. Foremost in mind was the very high exploitation rate required to harvest fish in excess of escapement needs. Through June 26 all sockeye run indicators in Nushagak, as well as South Unimak commercial and Port Moller test fishing results, indicated a strong continuing run was in progress.

With the foregoing in mind, the Igushik section, where the inside test fish catches indicated that 39% (59,000) of the escapement goal had entered the river, was extended an additional 24 hours (through 9 p.m. June 27), and the Nushagak section was allowed to close for 24 hours followed by another 24 hour district wide fishing period (Table 10). This strategy would allow time to further assess catch and escapement run strength indicators in the Wood and Nushagak/Nuyakuk River systems.

The accumulative sockeye catch through June 26 was estimated to be composed of 350,000 fish of Nuyakuk River origin, 150,000 Igushik fish, and 100,000

destined for Wood River. Provided this catch proration estimate was accurate, only the Nuyakuk sockeye run, with a 37% harvest rate, was on schedule to achieve harvest/escapement goals, while Wood (7%) and Igushik (8%) harvest rates were well under that needed to harvest all fish excess to escapement requirements.

The Igushik June 26-27 period produced minimal sockeye catches (14,000) due primarily to lack of fishing effort (Table 14). Most fishermen took a day off after four days of continuous fishing to prepare for the entire district 24 hour opening on June 27-28.

The June 27-28 period produced heavy sockeye catches (355,000) as well as exceptional catches of kings (16,000) and chums (58,000)(Table 14). Sockeye catches continued to accelerate on Igushik beach, while the inside test fish catch through June 28 indicated an escapement of 70,000 or 47% of escapement needs (Tables 15 and 26). The Igushik section was subsequently extended for another 24 hours (June 28-29), and Nushagak section was reopened, after a 37 hour closure, for a 12 hour period on June 30 (Table 10). Strong 30-40 knot SW winds, which commenced the evening of June 28, were expected to move the sockeye rapidly through the district. If sufficient fishing time were not allowed, the apparent strong run would quickly accelerate beyond a point where harvest and particularly escapement control would be possible.

The June 30 fishing period saw over 509,000 fish of all species enter the catch (Table 14). The fishing fleet distribution indicated exceptional sockeye strength on Combine Flats in the upper district, while boats fishing near the lower limit line in Schooner's Channel were also "swamp-loaded".

With the good showing in the upper district, sockeye escapement rates into Wood River and past the Nushagak River sonar site were expected to improve. Aerial surveys on June 30 indicated a marginal improvement in both the Wood

and Nushagak River escapement rates. Through June 30, sockeye escapement past Wood and Nushagak River counting stations totaled 44,000 and 29,000, respectively (Tables 19 and 20). With the Igushik inside test fishing program indicating that 75,000 sockeye had entered the river (50% of escapement needs), a 24 hour fishing period extension was allowed in Igushik section (Tables 10 and 26). Nushagak section was allowed to close to improve the sockeye escapement rates into Wood and Nushagak Rivers.

Aerial surveillance was intensified on July 1, and both Wood (38,000) and Nushagak (48,000) Rivers showed significant improvements in escapement rates (Tables 25 and 27). With the strong sockeye catches on June 30, and indications of exceptional strength in the outer district, another 12 hour period was announced for July 2 (Table 10). Although yet to be confirmed, the strong catches prior to June 30 and the SW winds on June 28-30 was expected to have resulted in sockeye escapement to Wood and Nushagak Rivers in the 300-500,000 range (later lag time analysis of escapement indicated about 350,000 sockeye entered the Wood and Nushagak Rivers). Igushik section was extended again up to the district wide fishing period on July 2, as the inside test fish catches continued to indicate that over 50% of the escapement goal was accounted for (Table 26).

The 12 hour fishing period on July 2 shattered all past catch records for this district. Over 1.0 million fish were harvested, with the sockeye catch amounting to 975,000, bringing the accumulative to 2.5 million (Table 14). Following the record catch, the entire district was allowed to close to provide time to assess continuing run strength after the large harvest (Table 26).

The outside Nushagak test boat was sent on its one and only trip of the season on July 3 to help determine continuing sockeye run strength after the record commercial catch on July 2. Exceptionally high sockeye catch indices were evident at all stations fished from Kanakanak Beach near Dillingham to

Ekuk Bluff, and a aerial survey of the fishing district midday on July 3, just after high water slack, showed literally "solid jumpers", from Flounder Flats to midway up on Combine Flats (Table 7). With both test boat catches and aerial survey results showing that the sockeye run was continuing unabated, and aerial surveys on July 3 which showed "heavy fish activity" in the muddy lower portion of Wood River, and that Nushagak/Nuyakuk Rivers were estimated to be nearing their escapement goals, another 12 hour period was announced for July 4 (Tables 25 and 27).

Commercial catches were heavy throughout the district on July 4, and it appeared that another 1/2 million fish would enter the catch (Table 14). Concurrently with the fishery, aerial surveys of Wood and Nushagak Rivers showed significant numbers of fish. Wood River, with a counted escapement of 193,000 sockeye past the towers through 2 p.m. on July 4, showed heavy lower river strength, estimated at 200-300,000 (Table 25). Nushagak River with 197,000 sockeye past the sonar site by 2 p.m. July 4, was estimated to have at least 150-200,000 below the sonar site down to muddy water at Black Point (Table 27). With the Wood River sockeye escapement estimated at 50-60% of escapement goal, and Nushagak/Nuyakuk approaching the upper escapement goal range, fishing time in the entire district was extended for 15 hours (Table 10).

Heavy commercial sockeye catches continued on July 5 (668,000) and a 24 hour extension was announced when all major rivers in the district on July 5 were approaching their individual escapement goals: Wood - 346,000 past tower at 2 p.m., and 154,000 fish estimated below the tower by aerial survey; Igushik - 147,000 past the lower river test fish site through July 4; and Nushagak/Nuyakuk - 257,000 past the sonar site through July 4 (Tables 25-27).

Commercial catches continued unabated on July 6 (726,000), and fishing time in the entire district was extended until further notice and all

reregistration and waiting period requirements were waived, when it was apparent that escapement requirements would be met in all river systems (Table 10).

Heavy sockeye catches continued, and through July 14, 7.3 million fish had been harvested (Table 14). The Nushagak sockeye catch was now less than 135,000 fish from setting an all time record catch. The 75 year old record sockeye harvest of 7.388 million set in 1905, was broken on July 16, and by season end had totaled 7.713 million (Table 14).

Intermittent fishing period closures required throughout the season to balance sockeye catch and escapement, provided a relatively steady flow of fish to district processors. Very few fishing suspensions by processors were announced, and those that were did not affect the total balance between catch and escapement. The sockeye run exhibited the same onshore migration tendencies as seen in the Naknek-Kvichak and Egegik areas. Most of the run entered the district through Schooners and Ships Channels, and the onshore migration this season resulted in an exceptionally good season for set net fishermen. Contrary to early season expectations, the Nushagak sockeye run exhibited normal run timing.

Historically, Nushagak district has been the second most productive system in Bristol Bay, averaging a 5.0 million sockeye salmon catch for 20 years from 1899 to 1918, 2.8 million for the following 30 years, and finally dropping to an 882,000 average in the 29 year period from 1949 to 1977. Total run statistics (catch and escapement) exhibited the same drastic decline in production (Figures 5 and 6) with total sockeye runs dropping from over 5.7 million average return from 1908-1919 to 2.3 million in recent years (1958-77). High sustained exploitation rates (up to 80%) in the early years of the fishery resulted in precipitous declines in production, and although the other districts in Bristol Bay have experienced a decline as well, it has been neither so distinct nor so drastic in nature as in Nushagak district.

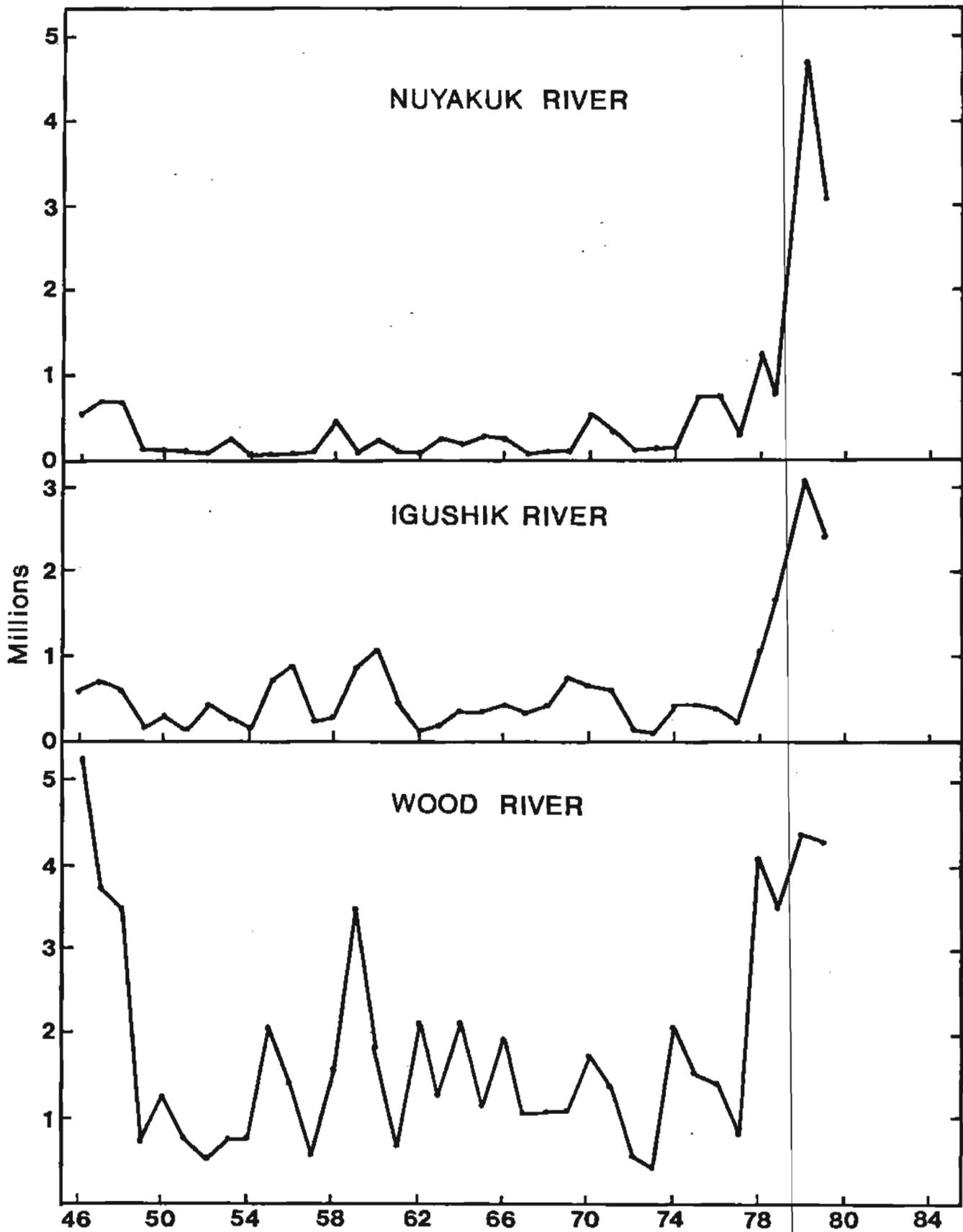


Figure 5. Total inshore return of sockeye salmon by major river system, Nushagak district, Bristol Bay, 1946-81.

In an effort to reverse the downward trend in Nushagak district sockeye production, larger escapements were provided by reduction in fishing time. The downward trend in force from the 1920's through the late 1950's was generally halted, and total run production was stabilized, but at a level well below that seen in the period of fishery development during the early 1900's.

Commencing in 1978 a remarkable transformation was experienced in Nushagak sockeye production, when 6.7 million fish returned, the largest inshore run recorded since the mid-1940's (Figure 6). The remarkable return in 1978 was followed by an equally strong return in 1979 (6.5 million), and in 1980 over 12.7 million sockeye returned to Nushagak district, breaking numerous long-held total run estimates, and establishing a record 8.3 million escapement to the district's river systems.

In 1981 the total sockeye return of 10.6 million was the fourth consecutive year of outstanding returns (Appendix Table 21). Escapement goals were achieved in all of this district's river systems, and the 7.7 million sockeye harvest broke the long-standing previous highest catch of 7.4 million set in 1905. Since 1978, Nushagak district's sockeye catch production has increased to 4.6 million fish, well above the recent long-term (1958-77) average of 943,000, while the total run from 1978-81 has averaged 9.1 million compared with the previous 20 year average (1958-77) of 2.3 million (Figure 6). The recent four year total run average of 9.1 million sockeye is 32% higher than any previous four year average in the long history of this fishery. The previous four year high Nushagak returns were: 1908-11 and 1913-16 - 6.2 million; 1915-18 - 6.5 million; 1933-36 - 4.8 million; and 1934-37 - 6.9 million. Although it is apparent that exceptional survival conditions have greatly aided in boosting sockeye production in the last four years, increased and consistent escapements to major contributing Nushagak district river systems appear to be essential to increased and sustained production for this fishery (Figure 5).

The commercial harvest of 8.9 million salmon of all species in Nushagak district in 1981 was an all time record harvest for this 89 year old fishery, three times higher than the 20 year average of 2.9 million fish, and breaking the recently established record of 8.3 million set in 1978 (Figure 6 and Appendix Table 15).

Nushagak king salmon accounted for 195,000 of the district harvest, breaking both the previous highest catch (157,000 in 1979) and escapement (141,000 in 1980). The king return in 1981 equaled a total run of 345,000, well above the previous largest in 1979 of 252,000 and average run of 147,000 since 1966 (Figure 6 and Appendix Table 35).

The Nushagak chum salmon catch of 773,000 was also well above the long-term average of 403,000 for this district, while the chum escapement of 177,000 equaled a total run of 950,000, above the long-term average total run of 704,000 (Figure 6 and Appendix Table 36).

For the second consecutive year the coho salmon return to Nushagak was exceptionally strong. The season commercial catch of 225,000 cohos was the second largest since 293,000 were caught in 1916, and was five times above the long-term average catch of 44,000 for this district (Figure 6 and Appendix Table 14). Increased late season fishing effort commenced in 1978 and catches since that time have reflected the expanded attention (Appendix Table 14).

Coho escapements to this district have yet to be fully evaluated, but the Nushagak sonar unit has demonstrated that cohos can be enumerated by this means. In 1981, sonar derived escapements were not attempted due to lack of adequate funding. The Nushagak coho escapement in 1981 was thought to be "equal to or higher" than the commercial catch, after evaluation of subsistence catches, and catch/run comments from the district's many sport fishermen and guides.

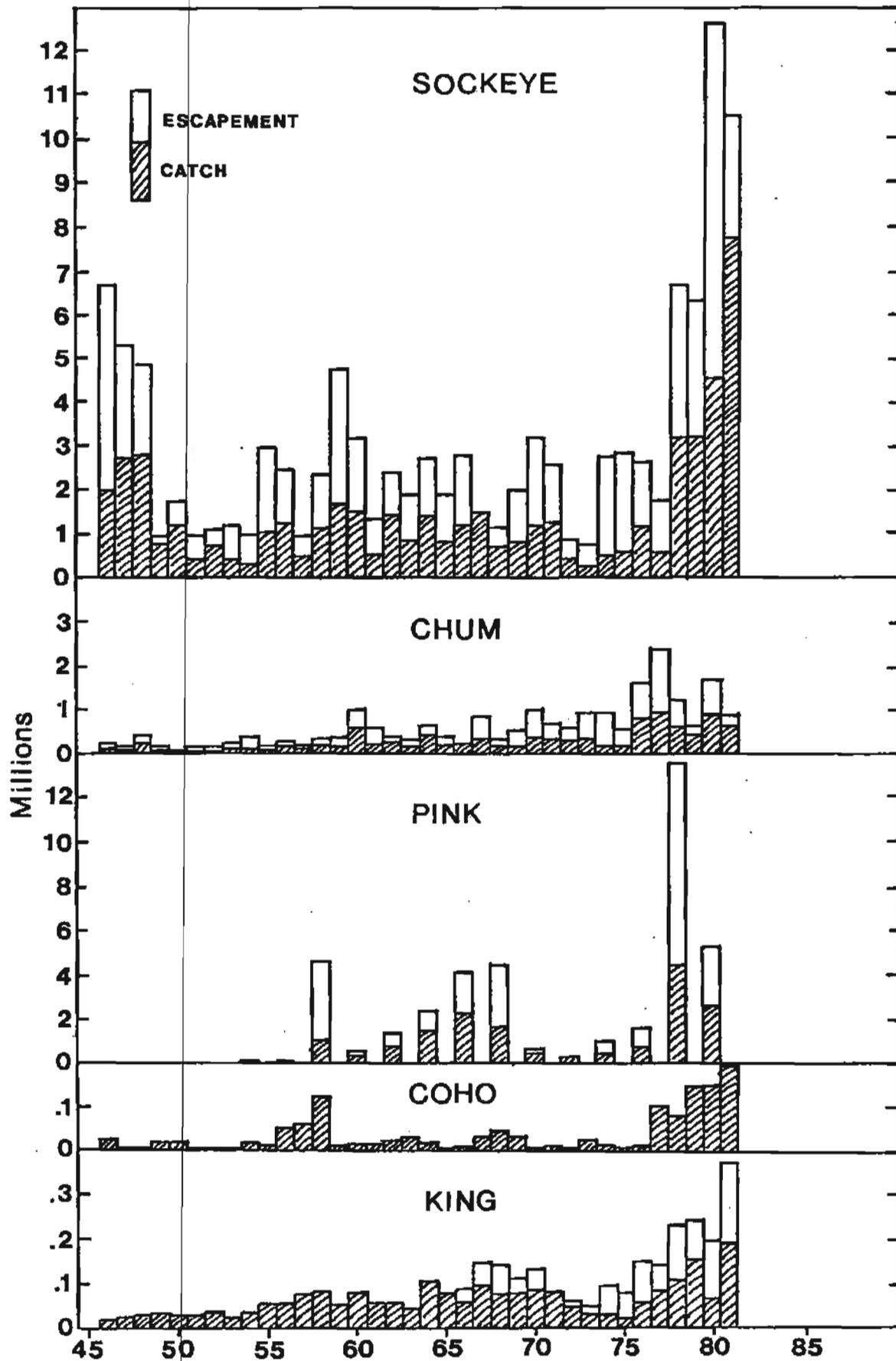


Figure 6. Total inshore return of salmon by species, Nushagak district, Bristol Bay, 1946-81.

Togiak District

The 1981 sockeye salmon forecast for the Togiak district was 647,000 with escapement requirements of 100,000 fish (Table 1). The Togiak district fishery is an exception to the emergency order management scheme employed in all the other districts. This district is fished by people from Togiak and adjacent villages, and fishing effort has remained fairly constant for many years. A gradual, but steady increase in fishing effort began in 1974, and by 1981 had increased about 30% over prior years. Additionally, the sockeye runs in this area tend to develop more gradually over a longer period of time. Consequently, the fishery is managed on a fixed schedule of 4 to 5 days per week with necessary adjustments for more or less time on a weekly basis as dictated by run strength as the season progresses.

During the recent large salmon returns to the Togiak district, a lack of processing capacity at the peak of the run has limited the total harvest. However, the 1981 season was the exception, as eight buyers were present during the peak week of July 6-11 and no harvest was lost due to a lack of available markets (Table 16). A total of fourteen companies operated in Togiak this year, but only two purchased fish for the entire season (Table 28).

Four fishing period extensions, in addition to the regular periods, allowed an uninterrupted harvest from July 6 to August 7, when the regular fishing schedule resumed (Table 10). Fishing effort during the peak of the season included over 100 drift units and 30 set nets, closely matching 1980.

Heavy catches from July 1 through 25 contributed to a record sockeye salmon harvest of 621,000, besting the previous record of 608,000 set in 1980 (Appendix Table 10). Near record sockeye escapements were achieved in the various river systems of the district and totaled 366,000, while the total sockeye return of 987,000 was the second largest in the history of this fishery (Appendix Table 22).

The king salmon catch of 24,000 was above the long-term average of 19,000, but below the 1978 record of 57,000 (Appendix Table 11). The king escapement of 27,000 was also well above the long-term year average of 16,000 (Appendix Table 35). Chum salmon also returned stronger than average with a harvest of 236,000 and an escapement of 331,000, well above the minimum required for maintenance of a healthy run (Appendix Table 36). This was a non-pink year, but the incidental catch of nearly 7,000 at Togiak was the largest in Bristol Bay.

The Togiak district coho salmon run did not materialize as expected and the fishery was closed on August 31 to obtain additional escapement (Table 10). An aerial survey flown on August 27 observed a large fishing fleet operating in the district and poor escapement in the river. The coho CPUE was low, averaging only 10 - 30 fish per delivery. Subsequent aerial surveys indicated an improvement in the escapement, but in numbers too low to allow any further commercial exploitation. The final district coho escapement totaled 41,000 with a commercial harvest of 30,000.

On two separate occasions in 1981 sockeye salmon were flag tagged in the lower Togiak River to determine migration time to the tower site. Travel time for the fish sighted averaged nine days and supports previous tagging data which indicated 10 to 14 days travel time from fishery to the tower.

Management of the Togiak district was greatly enhanced this season by the installation of a Departmental field radio at the Togiak cannery. Temporary seasonal personnel stationed at Togiak cannery to take age-weight-length catch samples, gathered daily harvest information from the processors and radioed it to the Dillingham office. Formerly, this data was available only once per week, or by making a special flight to the area.

1981 SUBSISTENCE SALMON FISHERY

Since 1963 the Department has been monitoring and maintaining records of subsistence harvests in the major river systems of Bristol Bay. The advent of the snow machine has replaced the dog sled as a means of winter travel, which has resulted in a substantial decrease in fish requirements to feed dogs. However, due to the recent revival of dog racing and sport mushing, demand for salmon to feed dogs is expanding.

An increase in non-watershed subsistence users, particularly in the Naknek-Kvichak district, population growth, and the strong salmon returns in Nushagak district, have resulted in an overall increase of fish taken for personal use in recent years (Appendix Table 49).

A new regulation passed in December 1980 by the Alaska Board of Fisheries, requires that subsistence salmon fishing permits for the Naknek River drainage be issued only to persons domiciled in the Naknek and Kvichak River drainages. Naknek River drainage subsistence salmon fishing permits are issued only through the Department's King Salmon office. Local issuance allows the staff to closely monitor the number of units fishing per area and to screen applicants for residency requirement.

The 1981 subsistence salmon harvest of 88,000 in the Naknek-Kvichak district closely matched the 1980 harvest of 94,000, but the number of permits dropped significantly from 759 to 649 (Appendix Table 49).

Salmon subsistence catches in Bristol Bay generally approach a season total of between 100 and 200,000 fish, and since 1963 have averaged 145,000 (Appendix Table 49). In 1981 subsistence records indicate a harvest of 171,000 salmon were taken for personal use by over 1,100 permit holders (Table 32 and Appendix Table 49).

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TABLES

Table 1. Inshore run of sockeye salmon compared with the preseason forecast, escapement goals and forecast commercial catch, by river system and district, Bristol Bay, 1981.

District and River System	Number of Fish in Thousands									
	Inshore Forecast			Escapement			Esc./ Goal	Inshore Catch		
	Forecast ^{1/}	Actual	Run/Fore.	Goal	Range	Actual ^{2/}		Forecast	Actual ^{3/}	Catch/Fore.
NAKNEK-KVICHAK DISTRICT										
Kvichak River	10,419	6,960	0.67	2,000	1,500-2,500	1,754	0.88	8,419	5,206	0.62
Branch River ^{3/}	342	319	0.93	185	170- 200	82	0.44	157	237	1.51
Naknek River	3,345	7,302	2.18	800	700- 900	1,796	2.25	2,545	5,506	2.16
Total ^{4/}	14,106	14,582	1.03	2,985	2,370-3,600	3,633	1.22	11,121	10,949	0.99
EGEGIK DISTRICT										
	3,173	5,175	1.63	600	500- 700	695	1.16	2,573	4,481	1.74
UGASHIK DISTRICT										
	3,029	3,277	1.08	500	400- 600	1,328 ^{5/}	2.66	2,529	1,950	0.77
NUSHAGAK DISTRICT										
Wood River	2,336	4,365	1.87	800	600-1,000	1,233	1.54	1,536	3,132	2.04
Igushik River	1,994	2,423	1.22	150	100- 200	591	3.94	1,844	1,832	0.99
Nuyakuk River ^{3/}	1,192	3,138	2.63	250	200- 300	834	3.34	942	2,304	2.45
Nushagak-Mu], Sys. ^{3/}	180	587	3.26	40	30- 50	177	4.43	140	410	2.93
Snake River ^{3/}	43	50	1.16	30	20- 40	15	0.50	13	35	2.69
Total ^{4/}	5,745	10,564	1.84	1,270	950-1,590	2,851	2.24	4,475	7,713	1.72
TOGIAC DISTRICT										
	647	987	1.53	100	60- 120	366 ^{6/}	3.66	547	621	1.14
TOTAL BRISTOL BAY^{4/}										
	26,700	34,585	1.30	5,455	4,280-6,610	8,872	1.63	21,245	25,713	1.21

^{1/} Final Bristol Bay sockeye salmon forecast of inshore run for 1981.

^{2/} Escapement data is final, while catch data is preliminary.

^{3/} These systems cannot be managed separately from the major system in the district. Consequently, the exploitation rates are merely the catch rates anticipated for the major system in the district; the corresponding escapement goals do not necessarily coincide with the escapement levels which would be achieved if these systems could be managed independently.

^{4/} Due to rounding, the totals may not equal the sum of the district totals.

^{5/} Including sockeye runs to Mother Goose system.

^{6/} Including sockeye runs to the various tributaries and minor river systems of Togiak district.

Table 2. Inshore forecast of sockeye salmon age class return by river system and district, Bristol Bay, 1981.

District and River System	Number of Fish in Thousands						Total
	Age Class (Brood Year)			Age Class (Brood Year)			
	4 ₂ (1977)	5 ₃ (1976)	2-Ocean	5 ₂ (1976)	6 ₃ (1975)	3-Ocean	
NAKNEK-KVICHAK DISTRICT							
Kvichak River	1,433	4,991	6,424	1,483	2,512	3,995	10,419
Branch River	79	99	178	137	27	164	342
Naknek River	302	649	951	1,281	1,113	2,394	3,345
Total	1,814	5,739	7,553	2,901	3,652	6,553	14,106
EGEGIK DISTRICT							
	324	1,396	1,720	287	1,166	1,453	3,173
UGASHIK DISTRICT							
	350	1,587	1,937	655	437	1,092	3,029
NUSHAGAK DISTRICT							
Wood River	810	189	999	1,175	162	1,337	2,336
Igushik River	67	193	260	1,453	281	1,734	1,994
Nuyakuk River	118	67	185	796	211	1,007	1,192
Nush.-Mulch. Sys.	56	3	59	90	31	121	180
Snake River	6	8	14	22	7	29	43
Total	1,057	460	1,517	3,536	692	4,228	5,745
TOGIAK DISTRICT							
	136	70	206	333	108	441	647
TOTAL BRISTOL BAY^{1/}	3,681	9,252	12,933	7,712	6,055	13,767	26,700

^{1/} Sockeye salmon of several minor age classes are expected to contribute an additional 1-2 percent to the total return.

Table 3. Inshore run of sockeye salmon by age class, river system and district, Bristol Bay, 1981.^{1/}

District and River System	Number of Fish in Thousands by Age Class						Total
	4 ₂	5 ₃	2-Ocean	5 ₂	6 ₃	3-Ocean	
NAKNEK-KVICHAK DISTRICT							
Kvichak River							
Number	1,826	3,817	5,643	764	541	1,305	6,948
Percent	26.3	54.9	81.2	11.0	7.8	18.8	100.0
Branch River							
Number	125	66	191	97	31	128	319
Percent	39.2	20.7	59.9	30.4	9.7	40.1	100.0
Naknek River							
Number	589	1,451	2,040	3,767	1,481	5,248	7,288
Percent	8.1	19.9	28.0	51.7	20.3	72.0	100.0
Total							
Number	2,540	5,334	7,874	4,628	2,053	6,681	14,555
Percent	17.5	36.6	54.1	31.8	14.1	45.9	100.0
EGEGIK DISTRICT							
Number	791	2,875	3,666	745	746	1,491	5,157
Percent	15.3	55.7	71.1	14.4	14.5	28.9	100.0
UGASHIK DISTRICT							
Number	524	1,102	1,626	1,345	288	1,633	3,259
Percent	16.1	33.8	49.9	41.3	8.8	50.1	100.0
NUSHAGAK DISTRICT							
Wood River							
Number	944	513	1,457	2,261	647	2,908	4,365
Percent	21.6	11.8	33.4	51.8	14.8	66.6	100.0
Igushik River							
Number	315	213	528	1,405	487	1,892	2,420
Percent	13.0	8.8	21.8	58.1	20.1	78.2	100.0
Nuyakuk River							
Number	298	52	350	2,567	214	2,781	3,131
Percent	9.5	0.2	11.2	82.0	6.8	88.8	100.0
Nushagak-Mulchnatna							
Number	41	15	56	465	50	515	571
Percent	7.2	2.6	9.8	81.4	8.8	90.2	100.0
Snake River							
Number	14	5	19	19	11	30	49
Percent	28.6	10.2	38.8	38.8	22.4	61.2	100.0
Total							
Number	1,612	798	2,410	6,717	1,409	8,126	10,536
Percent	15.3	7.6	22.9	63.8	13.4	77.1	100.0
TOGIAK DISTRICT							
Number	207	133	340	436	47	483	823
Percent	25.2	16.2	41.3	53.0	5.7	58.7	100.0
TOTAL BRISTOL BAY							
Number	5,674	10,242	15,916	13,871	4,543	18,414	34,330 ^{2/}
Percent	16.5	29.8	46.4	40.4	13.2	53.6	100.0

^{1/} The inshore run data does not include the 1981 Japanese high seas catch of maturing Bristol Bay sockeye or the 1980 Japanese catch of immatures.

^{2/} Approximately 255,000 additional sockeye salmon of several minor age classes returning in 1981 are not included in this total.

Table 4. Inshore commercial catch and escapement of sockeye salmon, Bristol Bay, 1981.^{1/}

District and River System	Number of Fish		
	Catch	Escapement	Total Run
<u>NAKNEK-KVICHAK DISTRICT</u>			
Kvichak River	5,205,854	1,754,358	6,960,212
Branch River	236,680	82,210	318,890
Naknek River	5,506,210	1,796,220	7,302,430
Total	10,948,744	3,632,788	14,581,532
<u>EGEGIK DISTRICT</u>	4,480,710	694,680	5,175,390
<u>UGASHIK DISTRICT</u>			
Ugashik River Mother Goose System		1,326,762 937	
Total	1,949,531	1,327,699	3,277,230
<u>NUSHAGAK DISTRICT</u>			
Wood River	3,131,767	1,233,318	4,365,085
Igushik River	1,832,046	591,144	2,423,190
Nuyakuk River	2,304,271	834,204	3,138,475
Nushagak-Mul. Sys.	410,114	177,400	587,514
Snake River	35,218	14,571	49,789
Total	7,713,416	2,850,637	10,564,053
<u>TOGIAK DISTRICT</u>			
Togiak Lake		208,080	
Togiak River		21,150	
Togiak Tributaries		18,500	
Kulukak System		58,780	
Ungalikthluk/Kuk. Sys.		33,400	
Other Systems		26,000	
Total	620,811	365,910	986,721
TOTAL BRISTOL BAY	25,713,212	8,871,714	34,584,926

^{1/} Inshore catch and apportionment by river system to the Naknek-Kvichak and Nushagak districts is preliminary, while escapements are final.

Table 5. Offshore test fishing catch indices and estimated inshore daily passage rate of sockeye salmon, Port Moller, Bristol Bay, 1981.^{1/}

Date	No. of Stations Fished	Sockeye Catch	Running Mean		Sockeye Salmon				Days Lag
			Weight (lbs.)	Length (mm)	Index ^{2/}		Passage Rate ^{3/}	Accum.	
					Daily	Accum.			
6/10	6	6	6.6	567	2.73	2.73	56	56	
11	5	3	6.7	561	1.34	4.07	27	83	
12	6	2	6.5	559	1.04	5.11	21	105	
13	5	3	6.2	551	1.54	6.65	32	136	
14	6	4	6.2	552	1.94	8.59	40	176	
15	4		6.2	552		8.59		176	
16			6.2	552		8.59		176	
17	5		6.2	552		8.59		176	
18	6		6.2	552		8.59		176	
19	2	14	6.6	563	6.27	14.86	158	374	6
20	6	78	6.5	562	33.27	48.13	1,086	1,571	6
21	6	75	6.7	564	33.16	81.29	1,140	2,796	6
22	6	176	6.7	567	69.76	156.05	5,199	11,631	6
23	6	156	6.7	567	76.65	232.70	5,235	15,894	6
24	5	205	6.6	566	105.72	338.42	6,136	19,643	6
25			6.6	566	(42.00)	380.42	1,709	15,483	6
26	5	103	6.6	568	58.31	438.73	2,373	17,856	6
27	6	137	6.6	568	81.31	562.04	2,599	17,967	6
28			6.6	568	(70.00)	632.04	1,768	15,966	7
29			6.6	568	(60.00)	692.04	1,516	17,482	7
30	5	93	6.6	568	54.73	746.77	1,383	18,864	7
7/ 1	3	55	6.6	567	43.48	860.25	964	19,068	8
2			6.6	567	(60.00)	932.25	1,394	21,664	7
3			6.6	567	(60.00)	992.26	1,394	23,058	7
4	5	111	6.6	568	67.29	1,059.54	1,564	24,621	7
5	6	43	6.6	567	21.50	1,081.04	500	25,121	7
6	5	45	6.6	568	24.28	1,107.33	615	28,070	7
Total	109	1,311	6.6	566		1,107.33		28,070	

1/ Passage rates are those actually used in season and adjusted daily as required.

2/ Indices expressed in fish/100 fathom hours and includes interpolations for missed days (in brackets) and stations.

3/ Estimated passage rate is expressed in thousands of fish and is adjusted throughout the season based on catchability and/or lag time.

Table 6. Offshore test fishing catch indices and estimated inshore daily passage rate of chum salmon, Port Moller, Bristol Bay, 1981.

Date	No. of Stations Fished	Chum Catch	Chum Salmon			
			Index ^{1/}		Passage Rate ^{2/}	
			Daily	Accumulative	Daily	Accumulative
6/10	6	18	7.95	7.95	83	83
11	5	15	6.71	14.66	70	153
12	6	5	2.62	17.28	27	181
13	5	15	7.45	24.73	78	258
14	6	5	2.50	27.23	26	286
15	4	3	1.51	28.74	16	300
16				28.74		300
17	5			28.74		300
18	6	1	.52	29.26	5	306
19	2	21	9.66	38.92	101	407
20	6	49	21.71	60.63	227	634
21	6	32	14.57	75.20	152	786
22	6	55	22.44	97.64	234	1,020
23	6	41	17.87	115.51	187	1,207
24	5	35	16.40	131.91	171	1,378
25			(12.00)	143.91	125	1,504
26	5	12	6.51	150.42	68	1,572
27	6	26	15.25	165.67	159	1,731
28			(11.00)	176.67	115	1,846
29			(9.00)	185.67	94	1,940
30	5	17	10.19	195.86	106	2,047
7/ 1	3	11	6.76	202.62	71	2,117
2				202.62		2,117
3				202.62		2,117
4	5	6	3.59	206.21	38	2,155
5	6	12	6.69	212.90	70	2,225
6	5	13	5.39	218.29	56	2,281
Total	109	392		218.29		2,281

1/ Indices expressed in fish/100 fathom hours and includes interpolations for missed days (in brackets) and stations.

2/ Estimated passage rate is expressed in thousands of fish, and is based on the historical average of 10,400 fish per adjusted index point (1979 not used in compiling average).

Table 7. Summary of outside sockeye salmon test fishing indices in the Nushagak district by index area and date, Bristol Bay, 1981.^{1/}

Index Area	Date July 3
Nushagak River	
Wood River	
Kanakanak Beach	11,779
Grassy Island	15,264
Nushagak Point	16,374
Coffee Point	
Combine Flats	13,858
Clarks Point	6,299 ^{2/}
Ekuk Bluff	8,107
Schooner Channel, N. W.	
Schooner Channel, S. E.	
Ships Channel, N. W.	
Ships Channel, S. E.	
Middle Channel, N. W.	
Middle Channel, S. E.	
West Channel, N. W.	
West Channel, S. E.	
Dead Man's Spit	
Nichols Spit	

^{1/} All indices expressed in number of fish/100 fathom hours to the nearest full index point.

^{2/} Average of two consecutive drifts in the same index area.

Table 8. Daily king salmon catch per unit of effort in subsistence nets at Dillingham and Lewis Point, Nushagak district, 1981.

Date	Catch Per Unit of Effort	
	Dillingham ^{1/}	Lewis Point ^{2/}
May 24		0.2
25		0.4
26		0.2
27		-
28		0.4
29		-
30		2.8
31		0.4
June 1		5.4
2		3.0
3		2.8
4		0.8
5		-
6		-
7		0.4
8		-
9	0.2	0.6
10	1.7	11.0
11	0.2	5.9
12	0.2	2.4
13	0	3.0
14	0	7.2
15	11.1	10.8
16	9.7	20.0
17	0	4.2
18	0	1.6
19	1.0	0.8
20	0	0.2
21		19.8
22	2.3	48.8

^{1/} Dillingham includes subsistence catches at Kakanak, Scandanavian and Snag Point beaches.

^{2/} Lewis Point includes subsistence catches from index nets at the lower fish camp location.

Table 9. Fishing entry permit registration by district, gear type and residency, Bristol Bay, 1981.^{1/}

District ^{2/}	Type of Gear ^{3/}			Total (Percent)
	Drift	Set	Total	
<u>NAKNEK-KVICHAK</u>				
Resident	347	313	660	(51)
Non-resident	558	69	627	(49)
Total	905	382	1,287	
<u>EGEGIK</u>				
Resident	83	134	217	(52)
Non-resident	99	98	197	(48)
Total	182	232	414	
<u>UGASHIK</u>				
Resident	31	20	51	(88)
Non-resident	4	3	7	(12)
Total	35	23	58	
<u>NUSHAGAK</u>				
Resident	488	248	736	(84)
Non-resident	107	31	138	(16)
Total	595	279	874	
<u>TOGIAK</u>				
Resident	107	41	148	(99)
Non-resident	1		1	(1)
Total	108	41	149	
<u>BRISTOL BAY</u>				
Resident	1,056	756	1,812	(65)
Non-resident	769	201	970	(35)
Total	1,825	957	2,782	

1/ Does not incorporate inseason district permit/vessel transfers.

2/ District entry permit totals computed using preseason processor fishing effort information and district fishing effort averages from 1975-77.

3/ Includes 95 interim-use drift permits and 42 interim-use set net permits.

(Data Sources: 2 and 14)

Table 10. Emergency order commercial salmon fishing periods and Commissioner's announcements by district, Bristol Bay, 1981.

I. Emergency Orders ^{1/}						
Number	Date and Time					Hours/Days Open
<u>NAKNEK-KVICHAK DISTRICT</u>						
AKN 01	June 23	9 a.m.	-	June 24	9 a.m.	24 hrs.
AKN 02	June 24	9 a.m.	-	June 25	4 p.m.	31 hrs.
AKN 03	June 25	4 p.m.	-	June 26	4 p.m.	24 hrs.
AKN 05	June 27	7 p.m.	-	June 28	7 p.m.	24 hrs.
AKN 08	June 30	9 a.m.	-	June 30	9 p.m.	12 hrs.
AKN 09	June 30	9 p.m.	-	July 1	9 a.m.	12 hrs.
AKN 12	July 1	10 p.m.	-	July 2	10 a.m.	12 hrs.
AKN 13	July 3	12 n	-	July 3	12 mn	12 hrs.
AKN 17	July 3	12 mn	-	July 4	12 n	12 hrs.
AKN 20	July 4	12 n	-	July 4	12 mn	12 hrs.
AKN 22	July 4	12 mn	-	July 5	12 mn	24 hrs.
AKN 26	July 5	12 mn	-	July 6	12 mn	24 hrs.
AKN 30	July 8	4 p.m.	-	July 9	4 p.m.	24 hrs.
AKN 31	July 9	4 p.m.	-	July 18	9 a.m.	8 days, 17 hrs.
AKN 32	July 18	9 a.m.	-	July 25	9 a.m.	7 days ^{2/}
<u>EGEGIK DISTRICT</u>						
AKN 01	June 23	9 a.m.	-	June 24	9 a.m.	24 hrs.
AKN 02	June 24	9 a.m.	-	June 25	4 p.m.	31 hrs.
AKN 03	June 25	4 p.m.	-	June 26	4 p.m.	24 hrs.
AKN 04	June 27	6 p.m.	-	June 28	6 p.m.	24 hrs.
AKN 06	June 28	6 p.m.	-	June 29	6 p.m.	24 hrs.
AKN 07	June 30	8 a.m.	-	June 30	8 p.m.	12 hrs.
AKN 10	July 1	8 a.m.	-	July 1	8 p.m.	12 hrs.
AKN 15	July 3	10 a.m.	-	July 3	10 p.m.	12 hrs.
AKN 18	July 3	10 p.m.	-	July 4	10 a.m.	12 hrs.
AKN 19	July 4	10 a.m.	-	July 4	10 p.m.	12 hrs.
AKN 23	July 4	10 p.m.	-	July 5	11 a.m.	13 hrs.
AKN 24	July 5	11 a.m.	-	July 5	12 mn	13 hrs.
AKN 25	July 5	12 mn	-	July 6	12 mn	24 hrs.
AKN 27	July 6	12 mn	-	July 17	9 a.m.	10 days, 21 hrs.
AKN 32	July 18	9 a.m.	-	July 25	9 a.m.	7 days ^{2/}
<u>UGASHIK DISTRICT</u>						
AKN 01	June 23	9 a.m.	-	June 24	9 a.m.	24 hrs.
AKN 02	June 24	9 a.m.	-	June 25	4 p.m.	31 hrs.
AKN 03	June 25	4 p.m.	-	June 26	4 p.m.	24 hrs.
AKN 04	June 27	6 p.m.	-	June 28	6 p.m.	24 hrs.
AKN 06	June 28	6 p.m.	-	June 29	6 p.m.	24 hrs.
AKN 07	June 30	8 a.m.	-	June 30	8 p.m.	12 hrs.
AKN 11	July 1	8 p.m.	-	July 2	8 p.m.	24 hrs.
AKN 14	July 2	8 p.m.	-	July 3	10 a.m.	14 hrs.
AKN 16	July 3	10 p.m.	-	July 4	10 p.m.	24 hrs.
AKN 21	July 4	10 p.m.	-	July 5	12 mn	26 hrs.
AKN 25	July 5	12 mn	-	July 6	12 mn	24 hrs.

(continued)

Table 10. (continued)

I. <u>Emergency Orders</u> ^{1/} Number	Date and Time	Hours/Days Open
<u>UGASHIK DISTRICT (continued)</u>		
AKN 28	July 6 12 mn - July 7 12 mn	24 hrs.
AKN 29	July 7 12 mn - July 17 9 a.m.	9 days, 21 hrs.
AKN 32	July 18 9 a.m. - July 25 9 a.m.	7 days ^{2/}
<u>NUSHAGAK DISTRICT</u>		
DLG 16	June 11 9 a.m. - June 16 9 a.m.	5 days ^{3/}
DLG 17	June 16 11 a.m. - June 17 11 a.m.	24 hrs.
DLG 20	June 22 3 p.m. - June 23 3 p.m.	24 hrs. ^{4/}
DLG 21	June 23 3 p.m. - June 24 3 p.m.	24 hrs.
DLG 22	June 24 3 p.m. - June 25 9 p.m.	30 hrs.
DLG 23	June 25 9 p.m. - June 26 9 p.m.	24 hrs.
DLG 26	June 27 9 p.m. - June 28 9 p.m.	24 hrs.
DLG 31	July 4 3 p.m. - July 5 3 a.m.	12 hrs.
DLG 32	July 5 3 a.m. - July 5 6 p.m.	15 hrs.
DLG 33	July 5 6 p.m. - July 6 6 p.m.	24 hrs.
DLG 34	July 6 6 p.m. - July 18 9 a.m.	11 days, 15 hrs.
DLG 36	July 18 9 a.m. - July 20 9 a.m.	2 days ^{2/}
Nushagak Section Only		
DLG 28	June 30 10 a.m. - June 30 10 p.m.	12 hrs.
DLG 30	July 2 12 n - July 2 12 mn	12 hrs.
Igushik Section Only		
DLG 18	June 19 1 p.m. - June 20 1 p.m.	24 hrs. ^{5/}
DLG 19	June 22 3 p.m. - June 23 3 p.m.	24 hrs.
DLG 25	June 26 9 p.m. - June 27 9 p.m.	24 hrs.
DLG 27	June 28 9 p.m. - June 29 9 p.m.	24 hrs.
DLG 28	June 29 9 p.m. - June 30 10 p.m.	25 hrs.
DLG 29	June 30 10 p.m. - July 1 10 p.m.	24 hrs.
DLG 30	July 1 10 p.m. - July 2 12 mn	26 hrs.
<u>TOGIK DISTRICT</u>		
DLG 24	June 25 3 p.m. - Sept. 30 12 mn	- ^{6/}
DLG 35	July 10 9 a.m. - July 13 9 a.m.	3 days ^{2/}
DLG 36	July 17 9 a.m. - July 20 9 a.m.	3 days ^{2/}
DLG 37	July 24 9 a.m. - July 27 9 a.m.	3 days ^{2/}
DLG 38	July 31 9 a.m. - Aug. 3 9 a.m.	3 days ^{2/}
DLG 39	Aug. 31 9 a.m. - Sept. 30 12 mn	30 days, 15 hrs. ^{3/}

(continued)

Table 10. (continued)

II. Commissioner's Announcements ^{1/}			
Number	Effective Date		Description
DLG 01-81	July 6 12 n		Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Nushagak district as required under 5 AAC 06.370.
AKN 01-81	July 6 12 mn		Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Egegik district as required under 5 AAC 06.370.
AKN 02-81	July 7 12 mn		Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Ugashik district as required under 5 AAC 06.370.
AKN 03-81	July 9 4 p.m.		Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Naknek-Kvichak district as required under 5 AAC 06.370.

^{1/} Prefix code on emergency orders and Commissioner's announcements indicate office where announcement originated ("AKN" for King Salmon, "DLG" for Dillingham and "JUN" for Juneau).

^{2/} Fishing time extended through the usual weekend closure.

^{3/} Closed to fishing.

^{4/} Supercedes emergency order No. DLG 19.

^{5/} Restricts fishing south of the sockeye salmon boundary line.

^{6/} Establishes an inner fishing boundary limit near the mouth of the Kulukak River in the Kulukak section.

Table 11. Commercial salmon catch by period and species, Naknek-Kvichak district, Bristol Bay, 1981.

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
6/ 1- 6	5 days				20				20
6/ 8-13	5 days			273	333				606
6/15-20	5 days	256	204	59,400	1,076	3,726			64,202
6/22	24 hrs.			37,835	340	2,469			40,644
6/23	24 hrs.			88,479	358	8,660			97,497
6/24	24 hrs.	770	355	139,383	440	7,982	1		147,806
6/25	24 hrs.			199,698	250	992	1		200,941
6/26	16 hrs.	919	355	188,066	442	385	2		188,895
6/27-28	24 hrs.			435,392	516	5,876			441,784
6/30-7/1	24 hrs.	925	394	1,157,549	288	10,911			1,168,748
7/ 1- 2	12 hrs.	935	394	1,100,859	262	10,580			1,111,701
7/ 3	12 hrs.			807,806	133	9,017			816,956
7/ 4	24 hrs.			1,154,126	619	17,925			1,172,670
7/ 5	24 hrs.	930	394	1,107,648	385	21,581			1,129,614
7/ 6	24 hrs.			1,043,485	339	19,945			1,063,769
7/ 8	8 hrs.	750	394	336,153	36	4,280			340,469
7/ 9	24 hrs.			679,897	428	11,963			692,288
7/10	24 hrs.			698,008	346	19,340			717,694
7/11	24 hrs.			570,052	567	17,917			588,536
7/12	24 hrs.	585	340	209,474	178	5,388			215,040
7/13	24 hrs.			193,297	230	3,310	3		196,840
7/14	24 hrs.			276,483	417	17,127	1	1	294,029
7/15	24 hrs.			138,486	371	12,348	2		151,207
7/16	24 hrs.			65,854	201	3,933	1	1	69,990
7/17	24 hrs.			75,105	322	12,868	1		88,296
7/18	24 hrs.			61,203	346	48,913	3	2	110,467
7/19-25	153 hrs.			116,739	732	37,274	9		154,754
7/27-8/1	5 days			7,607	385	30,867	95	576	39,530
8/ 3- 8	5 days			342	17	307	49	80	795
8/10-14	5 days			45	1	71	9	125	251
Total				10,948,744	10,378	345,955	177	785	11,306,039
Percent of District Catch				96.8	0.1	3.1	+	+	100.0

^{1/} Estimated fishing effort based on aerial surveys and processor reports.

Table 12. Commercial salmon catch by period and species, Egegik district, Bristol Bay, 1981.

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
6/ 1- 6	5 days			68	57	1			126
6/ 8-13	5 days	3	44	5,149	506	153		1	5,809
6/15	24 hrs.	121	85	5,747	218	338			6,303
6/16	24 hrs.			11,130	266	966			12,362
6/17	24 hrs.			20,180	207	1,562			21,949
6/18	24 hrs.			33,521	408	1,063			34,992
6/19	24 hrs.	168	160	40,790	456	628			41,874
6/20	9 hrs.			18,660	320				18,980
6/22	24 hrs.	133	132	39,369	104				39,473
6/23	24 hrs.			93,720	705	3,956			98,381
6/24	24 hrs.	128	188	104,766	978	7,486			113,230
6/25	24 hrs.	147	187	158,898	398				159,296
6/26	16 hrs.			150,040	253	1,224			151,517
6/27	6 hrs.			15,793	7	348			16,148
6/28	24 hrs.			211,019	174	4,646			215,839
6/29	18 hrs.			149,202	84	3,285			152,571
6/30	12 hrs.	177	169	479,523	134	7,698			487,355
7/ 1	12 hrs.			268,560	74	6,688			275,322
7/ 3	14 hrs.			259,288	45	4,121			263,454
7/ 4	24 hrs.	156	168	459,359	83	7,326			466,768
7/ 5	24 hrs.			338,023	83	4,731			342,837
7/ 6	24 hrs.			222,651	31	3,116			225,798
7/ 7	24 hrs.			238,521	14	3,339			241,874
7/ 8	24 hrs.			301,206	27	4,216			305,449
7/ 9	24 hrs.			221,856	22	3,105			224,983
7/10	24 hrs.			148,540	8	2,079			150,627
7/11	24 hrs.			116,166	15	1,626			117,807
7/12	24 hrs.			86,547	13	2,075			88,635
7/13	24 hrs.			83,112	16	1,992			85,120
7/14	24 hrs.			75,763	14	1,816			77,593
7/15	24 hrs.			36,279	10	846			36,135
7/16	24 hrs.			30,754	34	737			31,525
7/17	24 hrs.			11,666	10	280		2	11,958
7/18	24 hrs.			17,078	10	409		6	17,503
7/19-25	7 days			25,990	25	2,733	14	59	28,821
7/27-8/1	5 days			2,349	19	2,012	24	1,778	6,182
8/ 3- 8	5 days			427	6	851	46	8,996	10,326
8/10-15	5 days						129	11,275	11,404
8/17-22	5 days						42	7,152	7,194
8/24-29	5 days						7	1,333	1,340
Total				4,480,710	5,834	87,452	262	30,602	4,604,860
Percent of District Catch				97.3	0.1	1.9	+	0.7	100.0

^{1/} Estimated fishing effort based on aerial surveys.

Table 13. Commercial salmon catch by period and species, Ugashik district, Bristol Bay, 1981.

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
5/25/30	5 days				42				42
6/ 1- 6	5 days				409				409
6/ 8-13	5 days	15		1	803				804
6/15	24 hrs.			310	87	12			409
6/16	24 hrs.	20	6	619	704	25			1,348
6/17	24 hrs.			616	90	25			731
6/18	24 hrs.			1,359	135	55			1,549
6/19	24 hrs.			5,618	172	226			6,016
6/20	9 hrs.			1,693	50	68			1,811
6/22	24 hrs.	28	10	14,542	57	334			14,933
6/23	24 hrs.			8,517	347	196			9,060
6/24	24 hrs.	41	21	4,821	126	111			5,058
6/25	24 hrs.			8,126	48	187			8,361
6/26	16 hrs.			9,467	15	217			9,699
6/27	6 hrs.			2,506	2	59			2,567
6/28	24 hrs.			35,431	28	830			36,289
6/29	18 hrs.			25,197	64	590			25,851
6/30	12 hrs.			35,577	11	556			36,144
7/ 1- 2	40 hrs.			41,269	16	941			42,226
7/ 3	24 hrs.			56,953	9	797			57,759
7/ 4	24 hrs.	53	18	83,118	2	1,163			84,283
7/ 5	24 hrs.			59,298		974			60,272
7/ 6	24 hrs.			111,764	5	1,835			113,604
7/ 7	24 hrs.			95,827	5	1,574			97,406
7/ 8	24 hrs.	81	20	177,787	12	2,919			180,718
7/ 9	24 hrs.			151,502	39	2,488			154,029
7/10	24 hrs.			232,324	16	3,815			236,155
7/11	24 hrs.			206,349	64	3,388			209,801
7/12	24 hrs.	142	21	187,720	9	902			188,631
7/13	24 hrs.			155,496	62	2,110			157,668
7/14	24 hrs.			103,252	15	1,137			104,404
7/15	24 hrs.			46,846	13	1,172			48,031
7/16	24 hrs.			39,029	153	1,234			40,416
7/17	24 hrs.			25,082	6	1,242			26,330
7/18	24 hrs.			4,949	1	464			5,414
7/19-25	7 days			16,566	19	978			17,563
7/27-8/1	5 days							439	439
8/ 3- 8	5 days							586	586
8/10-15	5 days						24	4,138	4,162
8/17-22	5 days						3	5,064	5,067
8/24-29	5 days						2	5,561	5,563
8/31-9/5	5 days							6,703	6,703
9/ 7-12	5 days							4,326	4,326
Total				1,949,531	3,636	32,624	29	26,817	2,012,637
Percent of District Catch				96.9	0.2	1.6	+	1.3	100.0

1/ Estimated fishing effort based on aerial surveys.

Table 14. Commercial salmon catch by period and species, Nushagak district, Bristol Bay, 1981

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
5/18-23	5 days				31				31
5/25-30	5 days				4,284				4,284
6/ 1- 6	5 days	250			18,571	1			18,572
6/ 8-11	3 days			194	42,867	451			43,512
6/16-17	24 hrs.	427	127	9,475	17,475	7,493	2		34,445
6/19-20	24 hrs. ^{2/}	200	60	15,066	8,466	1,996	2		25,530
6/22	9 hrs.	429	184	89,285	19,913	67,835	7		177,040
6/23	24 hrs.			59,524	12,670	31,010	11		103,215
6/24	24 hrs.			67,437	9,050	31,965	18		108,470
6/25	24 hrs.			195,430	9,953	46,504	23		251,910
6/26	24 hrs.			161,711	9,050	34,873	38		205,672
6/26-27	24 hrs. ^{2/}	30	65	14,018	290	1,806	1		16,115
6/27-28	24 hrs.			354,572	15,735	58,306	26		428,639
6/28-30	37 hrs. ^{2/}			36,254	437	3,194			39,885
6/30	12 hrs.	450	202	477,344	2,341	30,059	5		509,749
7/ 1- 2	36 hrs. ^{2/}	98	9	22,661	635	2,840			26,136
7/ 2	12 hrs.			974,672	6,597	74,752	7		1,056,028
7/ 4	9 hrs.			456,307	1,938	32,638	3		490,886
7/ 5	24 hrs.			667,946	1,852	27,517	7		697,322
7/ 6	24 hrs.			725,851	1,591	37,758	8		765,208
7/ 7	24 hrs.			653,674	1,101	39,673	9		694,457
7/ 8	24 hrs.			592,099	1,098	33,907	7		627,111
7/ 9	24 hrs.			531,340	596	23,665	3		555,604
7/10	24 hrs.			289,933	679	29,432	8		320,052
7/11	24 hrs.			161,074	779	14,716	3	4	176,576
7/12	24 hrs.			241,637	988	21,670			264,295
7/13	24 hrs.			318,511	1,168	30,967	10		350,656
7/14	24 hrs.			138,064	902	16,715	12		155,693
7/15	24 hrs.			67,911	525	6,815	9		75,260
7/16	24 hrs.			70,152	144	9,287	15	11	79,609
7/17	24 hrs.			83,501	271	10,524	22	43	94,361
7/18	24 hrs.			54,563	174	6,192	36	165	61,130
7/19	24 hrs.			37,886	302	5,373	16	277	43,854
7/20	24 hrs.			58,414	416	9,398	11	504	68,743
7/21	24 hrs.			25,251	142	4,027	7	572	29,999
7/22	24 hrs.			36,317	473	5,371	5	2,976	45,142
7/23	24 hrs.			6,326	365	4,027	2	3,033	13,753
7/24-25	33 hrs.			6,309	184	2,715	2	2,856	12,067
7/27-8/1	5 days			10,599	591	6,214		70,009	87,413
8/ 3- 8	5 days			1,674	162	1,077		37,081	39,994
8/10-15	5 days			434	39	79		74,719	75,266
8/17-22	5 days				22	27	3	31,649	31,701
8/24-29	5 days				1			1,515	1,516
8/31-9/5	5 days								
Total				7,713,416	194,869	772,869	338	225,409	8,906,901
Percent of District Catch				86.6	2.2	8.7	+	2.5	100.0

^{1/} Estimated fishing effort based on aerial surveys and on reliable CPUE data from selected processors.

^{2/} Igushik section only.

Table 15. Commercial sockeye salmon catch by period from Clarks Point, Ekuk and Igushik beaches, Nushagak district, Bristol Bay, 1981.

Period	Time	Number of Fish		
		Clarks Point Beach ^{1/}	Ekuk Beach ^{2/}	Igushik Beach ^{3/}
6/ 8-11	3 days		42	5
6/16-17	24 hrs.		1,958	2,971
6/19-20	24 hrs. ^{4/}			8,403
6/22-26	4½ days	1,783	29,238	31,623
6/26-27	24 hrs. ^{4/}			7,048
6/27-28	24 hrs.	9,082	33,848	5,598
6/28-30	24 hrs. ^{4/}			13,519
6/30	12 hrs.	3,681	27,694	11,684
7/ 2	12 hrs.	14,106	68,010	11,719
7/ 4-11	7½ days	81,838	248,075	133,283
7/12-18	7 days	20,586	91,500	65,988
7/19-25	7 days	5,701	25,580	9,862
7/27-8/1	5 days	400		
8/ 3- 8	5 days	98		
8/10-15	5 days	39		
8/17-18	2 days	1		
Total		137,315	525,945	301,703

^{1/} Approximate fishing effort was 22 set nets. Sockeye salmon accounted for 96.3% of the total beach catch; catch of other species included 533 kings, 1,515 chums, 14 pinks and 3,250 cohos.

^{2/} Approximate fishing effort was 87 set nets. Sockeye salmon accounted for 98.3% of the total beach catch; catch of other species included 1,496 kings, 5,567 chums, 231 pinks and 1,720 cohos.

^{3/} Approximate fishing effort was 24 skiffs and 67 set nets. Sockeye salmon accounted for 94.9% of the total beach catch; catch of other species included 4,100 kings, 11,911 chums and 82 pinks.

^{4/} Igushik section only.

Table 16. Commercial salmon catch by period and species, Togiak district, Bristol Bay, 1981.

Period	Time ^{1/}	Effort ^{2/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
6/ 1- 6	5 days				10				10
6/ 8-13	5 days			130	773	69			972
6/15-20	5 days			1,681	4,390	2,881	5		8,957
6/22-27	5 days			17,793	5,449	19,706	459		43,407
6/29-7/4	5 days			50,791	6,553	31,675	2,059		91,078
7/ 6-11 ^{3/}	6 days			158,841	4,003	87,154	2,989		252,987
7/12-18	7 days			178,739	1,866	53,578	733		234,916
7/19-25	7 days			140,908	834	28,887	174		170,803
7/26-8/1	7 days			52,844	246	8,910	66	23	62,089
8/ 2- 8	7 days			15,786	81	2,226	72	266	18,431
8/10-15	5 days			3,298	65	790	55	2,426	6,634
8/17-22	5 days				45	404	96	11,498	12,043
8/24-29 ^{4/}	5 days				33	127	14	15,341	15,515
Total		110	30	620,811	24,348	236,407	6,722	29,554	917,842
Percent of District Catch				67.6	2.7	25.8	0.7	3.2	100.0
Summary Catch by Section									
Section	Number of Fish							Total	
	Sockeye	King	Chum	Pink	Coho				
Togiak	600,670	22,811	228,568	6,225	18,412	876,686			
Kulukak	16,184	1,405	5,484	266	7,014	30,353			
Osviak	150	6	188	101	3,790	4,235			
Matogak	3,807	126	2,167	130	338	6,568			
Total	620,811	24,348	236,407	6,722	29,554	917,842			

1/ Togiak River section open 4 days-per-week, while other sections open 5 days-per-week.

2/ Estimated fishing effort based on processor information for peak of sockeye season.

3/ Continuous fishing was allowed from July 6 through 9 a.m. August 7.

4/ Fishery closed effective 9 a.m. August 31 until further notice.

Table 17. Total commercial salmon catch by day and district, Bristol Bay, 1981.^{1/}

Date	Time	Number of Fish in Thousands					Total
		Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
5/18-23	5 days						
5/25-30	5 days				4		4
6/ 1- 6	5 days				19		19
6/ 8-13	5 days	1	6	1	44	1	53
6/15-20	5 days	64	136	12	60	9	281
6/22	24 hrs.	41	39	15	177	1	273
6/23	24 hrs.	97	98	9	103	8	315
6/24	24 hrs.	148	113	5	108	11	385
6/25	24 hrs.	201	159	8	252	11	631
6/26	24 hrs.	189	152	10	206	12	569
6/27	24 hrs.	442	16	3	16		477
6/28	24 hrs.		216	36	429		681
6/29	24 hrs.		153	26	40	5	224
6/30	24 hrs.	1,169	487	36	510	20	2,222
7/ 1	24 hrs.	1,112	275	42	26	26	1,481
7/ 2	24 hrs.				1,056	22	1,078
7/ 3	24 hrs.	817	263	58		18	1,156
7/ 4	24 hrs.	1,173	467	84	491		2,215
7/ 5	24 hrs.	1,130	343	60	697		2,230
7/ 6	24 hrs.	1,064	226	114	765	28	2,197
7/ 7	24 hrs.		242	97	694	58	1,091
7/ 8	24 hrs.	340	305	181	627	43	1,496
7/ 9	24 hrs.	692	225	154	556	40	1,667
7/10	24 hrs.	718	151	236	320	38	1,463
7/11	24 hrs.	589	118	210	177	46	1,140
7/12	24 hrs.	215	89	189	264	21	778
7/13	24 hrs.	197	85	158	351	29	820
7/14	24 hrs.	294	78	104	156	41	673
7/15	24 hrs.	151	36	48	75	51	361
7/16	24 hrs.	70	32	40	80	42	264
7/17	24 hrs.	88	12	26	94	32	252
7/18	24 hrs.	110	18	5	61	19	213
7/19-25	7 days	155	29	18	214	171	587
7/27-8/1	5 days	40	6		87	62	195
8/ 3- 8	5 days	1	10	1	40	18	70
8/10-15	5 days		11	4	75	7	97
8/17-22	5 days		7	5	32	12	56
8/24-29	5 days		1	6	2	16	25
8/31-9/5	5 days			7			7
9/ 7-12	5 days			4			4
Total		11,306	4,605	2,013	8,907	918	27,748

Table 18. Commercial salmon catch by district and species, Bristol Bay, 1981.^{1/}

District and River System	Number of Fish					Total
	Sockeye	King	Chum	Pink	Coho	
NAKNEK-KVICHAK DISTRICT						
Kvichak River	5,205,854					
Branch River	236,680					
Naknek River	5,506,210					
Total	10,948,744	10,378	345,955	177	785	11,306,039
EGEGIK DISTRICT	4,480,710	5,834	87,452	262	30,602	4,604,860
UGASHIK DISTRICT	1,949,531	3,636	32,624	29	26,817	2,012,637
NUSHAGAK DISTRICT						
Wood River	3,131,767					
Igushik River	1,832,046					
Nuyakuk River	2,304,271					
Nushagak-Mulchatna	410,114					
Snake River	35,281					
Total	7,713,416	194,869	772,869	338	225,409	8,906,901
TOGIAK DISTRICT						
Togiak Section	600,670	22,811	228,568	6,225	18,412	876,686
Kulukak Section	16,184	1,405	5,484	266	7,014	30,353
Osviak Section	150	6	188	101	3,790	4,235
Matogak Section	3,807	126	2,167	130	338	6,568
Total	620,811	24,348	236,407	6,722	29,554	917,842
TOTAL BRISTOL BAY	25,713,212	239,065	1,475,307	7,528	313,167	27,748,279
SPECIES PERCENT	92.7	0.9	5.3	+	1.1	100.0

^{1/} Apportionment of the inshore sockeye salmon catch by river system to the Naknek-Kvichak and Nushagak districts is preliminary.

Table 19. Daily sockeye salmon escapement tower counts by river system, Bristol Bay, 1981.

Date	Kvichak River		Naknek River		Egegik River		Ugashik River	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/16					0	0		
17	0	0			2,076	2,076		
18	0	0	0	0	3,828	5,904		
19	108	108	0	0	1,794	7,698		
20	366	474	228	228	(-6)	7,692	0	0
21	228	702	1,266	1,494	18	7,710	0	0
22	4,020	4,722	10,824	12,318	0	7,710	210	210
23	16,950	21,672	9,048	21,366	912	8,622	18	228
24	7,632	29,304	8,742	30,108	14,166	22,788	852	1,080
25	3,696	33,000	3,624	33,732	28,248	51,036	3,228	4,308
26	1,572	34,572	4,122	37,854	22,758	73,794	5,730	10,038
27	582	35,154	28,674	66,528	15,642	89,436	1,368	11,406
28	1,050	36,204	44,184	110,712	14,700	104,136	1,284	12,690
29	32,238	68,442	65,946	176,658	1,956	106,092	3,984	16,674
30	47,814	116,256	290,700	467,358	3,174	109,266	2,508	19,182
7/ 1	140,502	256,758	15,840	483,198	4,806	114,072	2,694	21,876
2	181,512	438,270	103,932	587,130	29,520	143,592	5,334	27,210
3	38,802	477,072	275,280	862,410	52,536	196,128	16,350	43,560
4	58,566	535,638	203,700	1,066,110	70,422	266,550	25,488	69,048
5	299,322	834,960	25,458	1,091,568	99,516	366,066	33,774	102,822
6	191,088	1,026,048	15,894	1,107,462	99,630	465,696	44,634	147,456
7	36,396	1,062,444	13,800	1,121,262	102,444	568,140	77,208	224,664
8	30,576	1,093,020	326,970	1,448,232	50,700	618,840	84,510	309,174
9	120,684	1,213,704	291,072	1,739,304	21,810	640,650	153,582	462,756
10	286,428	1,500,132	10,620	1,749,924	24,318	664,968	196,398	659,154
11	175,344	1,675,476	11,730	1,761,654	5,190	670,158	122,802	781,956
12	28,914	1,704,390	4,902	1,766,556	9,534	679,692	183,150	965,106
13	19,116	1,723,506	3,558	1,770,114	6,594	686,286	131,328	1,096,434
14	7,476	1,730,982	11,676	1,781,790	2,052	688,338	117,780	1,214,214
15	3,192	1,734,174	4,194	1,785,984	2,994	691,332	24,906	1,239,120
16	9,606	1,743,780	3,378	1,789,362	432	691,764	20,040	1,259,160
17	5,178	1,748,958	3,144	1,792,506	1,614	693,378	13,230	1,272,390
18	1,410	1,750,368	3,714	1,796,220	1,302	694,680	14,838	1,287,228
19	3,990	1,754,358					16,794	1,304,022
20							11,418	1,315,440
21							5,742	1,321,182
22							2,868	1,324,050
23							2,034	1,326,084
24							678	1,326,762
System Total		1,754,358		1,796,220		694,680		1,326,762

(continued)

Table 19. (continued)

Date	Hood River		Igushik River		Nuyakuk River		Snake River		Tootak River	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/16							0	0		
17							0	0		
18	30	30					0	0		
19	258	288					0	0		
20	1,110	1,398					0	0		
21	1,062	2,460	1,416	1,416			0	0		
22	4,530	6,990	1,716	3,132			0	0		
23	7,802	13,992	1,678	4,710			0	0		
24	1,752	15,744	1,908	6,618			0	0		
25	222	15,966	3,642	10,260	0	0	0	0		
26	180	16,146	2,550	12,810	0	0	8	8		
27	690	16,836	702	13,512	702	702	0	8	0	0
28	1,716	18,552	1,302	14,814	900	1,602	11	19	0	0
29	10,032	28,584	600	15,414	1,752	3,354	33	62	0	0
30	15,210	43,794	1,050	16,464	2,214	5,568	3	55	0	0
7/ 1	59,316	103,110	2,562	19,026	2,406	7,974	40	95	0	0
2	24,720	127,830	8,304	27,330	1,068	9,042	399	494	0	0
3	20,022	147,852	3,270	30,600	2,346	11,388	24	518	0	0
4	137,712	285,564	5,406	36,006	5,982	17,370	123	641	786	786
5	308,028	593,592	7,680	43,686	36,018	53,388	171	812	684	1,470
6	214,920	808,512	15,762	59,448	31,146	84,534	864	1,676	1,776	3,246
7	70,818	879,330	21,720	81,168	36,732	121,266	1,223	2,899	3,276	6,522
8	69,246	948,576	27,768	108,936	79,860	201,126	926	3,825	8,376	14,898
9	55,080	1,003,656	39,990	148,926	118,062	319,188	855	4,680	12,756	27,654
10	67,056	1,070,712	46,678	194,604	126,396	445,584	864	5,544	9,342	36,996
11	43,752	1,114,464	41,226	235,830	96,288	541,872	1,048	6,592	6,456	43,452
12	23,550	1,138,014	36,918	272,748	91,848	633,720	1,166	7,748	6,060	49,512
13	19,710	1,157,724	58,116	330,864	56,316	690,036	534	8,282	4,338	53,850
14	14,058	1,171,782	55,422	386,286	43,002	733,038	990	9,272	5,010	58,860
15	16,630	1,187,412	47,340	433,626	32,686	765,624	1,301	10,573	5,202	64,062
16	14,394	1,201,806	42,912	476,538	25,146	790,770	1,258	11,831	7,824	71,886
17	8,664	1,210,470	33,120	509,648	13,500	804,270	796	12,627	13,044	84,930
18	5,334	1,215,804	23,238	532,886	7,818	812,088	49	12,676	12,378	97,308
19	8,382	1,224,186	19,140	552,036	6,168	818,256	0	12,676	7,920	105,228
20	7,974	1,232,160	12,546	564,582	5,244	823,500	59	12,735	6,018	111,246
21	1,158	1,233,318	11,088	575,670	5,928	829,428	386	13,121	7,374	118,620
22			8,190	583,860	3,600	833,028	202	13,323	7,038	125,658
23			3,876	587,736	1,176	834,204	194	13,517	8,358	134,016
24			3,408	591,144			264	13,781	8,100	142,116
25							172	13,953	7,872	149,988
26							194	14,147	10,080	160,068
27							82	14,229	7,704	167,772
28							71	14,300	5,418	173,190
29							75	14,375	7,854	181,044
30							95	14,470	6,048	187,092
31							9	14,479	5,928	193,020
8/ 1							34	14,513	6,780	199,800
2							23	14,536	2,952	202,752
3							35	14,571	2,040	204,792
4									2,112	206,904
5									1,176	208,080
System Total		1,233,318		591,144		834,204		14,571		208,080

Table 20. Daily salmon escapement sonar counts by species, Nushagak River, Bristol Bay, 1981.

Date	Sockeye		King		Chum	
	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/12	243	243	1,128	1,128	364	364
13	457	700	2,124	3,252	686	1,050
14	420	1,120	1,951	5,203	630	1,680
15	323	1,443	1,500	6,703	485	2,165
16	573	2,016	2,660	9,363	859	3,024
17	1,514	3,530	909	10,272	330	3,354
18	972	4,502	584	10,856	212	3,566
19	893	5,395	568	11,424	162	3,728
20	1,247	6,642	14	11,438	95	3,823
21	5,134	11,776	56	11,494	391	4,214
22	3,426	15,202	2,056	13,550	3,084	7,298
23	2,490	17,692	3,556	17,106	2,845	10,143
24	239	17,931	7,500	24,606	239	10,382
25	.	17,931	11,472	36,078	1,275	11,657
26		17,931	7,049	43,127	2,106	13,763
27	195	18,126	5,592	48,719	715	14,478
28	1,701	19,827	1,625	50,344	454	14,932
29	3,287	23,114	3,140	53,484	876	15,808
30	6,143	29,257	3,909	57,393	1,117	16,925
7/ 1	76,193	105,450	2,432	59,825	2,432	19,357
2	41,641	147,091	21,917	81,742	9,497	28,854
3	52,501	199,592	14,789	96,531	6,655	35,509
4	82,221	281,813	10,517	107,048	2,868	38,377
5	223,247	505,060		107,048	4,556	42,933
6	150,089	655,149		107,048	4,642	47,575
7	25,267	680,416		107,048	32,159	79,734
8	22,271	702,687	1,028	108,076	10,964	90,698
9	22,068	724,755	1,720	109,796	4,872	95,570
10	42,360	767,115		109,796	11,948	107,518
11	22,629	789,744		109,796	6,383	113,901
12	12,296	802,040	2,049	111,845	6,149	120,050
13	6,774	808,814	1,103	112,948	7,877	127,927
14	3,517	812,331	959	113,907	6,180	134,107
15	1,213	813,544	934	114,841	7,187	141,294
16	343	813,887	264	115,105	2,030	143,324
Total		813,887		115,105		143,324

Table 21. Salmon aerial survey escapement estimates by species, district and river system, Bristol Bay, 1981 ^{1/}

District and River System	Number of Fish ^{2/}							
	Sockeye		King		Chum		Coho	
	Index	Total	Index	Total	Index	Total	Index	Total
NAKNEK-KVICHAK DISTRICT								
Kvichak River Branch River Naknek River ^{3/}	49,860	82,210	8,540		75,000		12,000	
			9,020					
Total	49,860	82,210	17,560		75,000		12,000	
EGEGIK DISTRICT								
Egegik River								
UGASHIK DISTRICT								
Ugashik River Mother Goose	937		50		200		13,300	
Total	937		50		200		13,300	
NUSHAGAK DISTRICT								
Wood River ^{4/} Muklung River Igushik River Nuyakuk River ^{5/} Nushagak River ^{6/} Mulchatna River ^{7/} Snake River	2,100		2,260					
		177,400		15,660		150,000		
	31,600		19,570					
	10,700							
Total	44,400	177,400	37,490		150,000			
TOGIK DISTRICT								
Togiak River ^{8/} Ungalikthluk River ^{9/} Kulukak River ^{10/} Nunavachak Creek Quigmy River Matogak River Osviak River Slug River	23,350	39,650	4,890	12,425	28,700	57,400	14,500	29,000
	16,700	33,400	1,640	4,190	18,400	36,800	940	1,880
	33,950	58,800	1,290	3,870	11,200	22,400	3,790	7,580
					10,800	21,600	1,080	2,160
	700	1,400	470	1,175	21,700	43,400		
	6,400	12,800	1,730	4,325	53,000	106,000		
	5,900	11,800	350	875	3,900	15,600		
Total	87,000	157,850	10,370	26,860	147,700	303,200	20,310	40,620
TOTAL BAY	182,197	417,460	65,470	176,860	222,900	303,200	45,610	40,620

- 1/ Detailed information on aerial survey derived escapements are published in annual summary reports.
- 2/ Aerial survey escapement estimates are categorized as: index - indices of total escapement; generally data is incomplete which will not allow determination of total escapement; total - aerial survey data is complete and does allow estimate of total escapement.
- 3/ Includes Paul's and King Salmon Creek(s).
- 4/ Includes Youth Creek.
- 5/ Below the counting tower.
- 6/ Includes Kokwok, Klutispaw, King Salmon and Chichitnok Rivers.
- 7/ Includes Stuyahok and Kaktuli Rivers.
- 8/ Includes Gechiak and Pungokepuk Creeks and Kashaik, Narogurum and Ongivinuck Rivers.
- 9/ Includes Kukayachagak River.
- 10/ Includes Kulukak Lake and Tithe Creek ponds.

Table 22. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Kvichak River, Bristol Bay, 1981.

Date	Escapement Enumeration Method in Thousands of Fish									
	Aerial Survey						River Test Fishing			
	Tower Count		Nakeen to Index	Index to Index	Index to Tower	Total	Fish Per Index Pt. ^{1/}	Accumulative		
Daily	Accum.	Index						Pt.	Escapement	
6/14						170	26			4
15						170	26			4
16						170	30			5
17	0	0				170	30			5
18	0	0				170	34			6
19	+	+				202	41			8
20	+	+				197	48			9
21	+	1				197	72			14
22	4	5	2	1	+	3	197	83		16
23	17	22					151	89		13
24	8	29					151	90		14
25	4	33					190	103		20
26	2	35	1	1	1	3	199	107		21
27	1	35					178	185		33
28	1	36					178	353		63
29	32	68					632	738		466
30	48	116	329	295	37	461	303	948		287
7/ 1	141	257	2	154	240	396	348	1,007		350
2	182	438	0	20	66	86	593	1,189		705
3	39	477	+	+	+	^{2/}	435	1,563		680
4	59	536	510	715	43	1,268	402	1,957		787
5	299	835	60	250	229	539	534	2,069		1,105
6	191	1,026	0	44	34	78	534	2,123		1,134
7	36	1,062					491	2,433		1,195
8	31	1,093	62	184	+	246	210	8,262		1,735
9	121	1,214					210	8,804		1,849
10	286	1,500					210	8,919		1,873
11	175	1,675					210	9,135		1,918
12	29	1,704								
13	19	1,724								
14	7	1,731								
15	3	1,734								
16	10	1,744								
17	5	1,749								
18	1	1,750								
19	4	1,754								
Total		1,754								1,918

^{1/} Fish per index point was originally based on the historic relationship between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

^{2/} Poor survey conditions.

Table 23. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Egegik River, Bristol Bay, 1981.

Date	Escapement Enumeration Method in Thousands of Fish						
	Tower Count		Aerial Survey			River Test Fishing	
	Daily	Accum.	Lagoon	River	Total	Fish Per Index Pt. ^{1/}	Accumulative Index Pt. Escapement
6/12			1	0	1		
13							
14						65	179
15			2	+	2	62	309
16	0	0	2		2	60	315
17	2	2				65	357
18	4	6				65	372
19	2	8	5		5	65	385
20	+	8				66	402
21	+	8				61	876
22	+	8	20		20	62	1,518
23	1	9				64	1,589
24	14	23	32		32	64	1,664
25	28	51	15		15	65	1,783
26	23	74	6		6	65	1,890
27	15	89				64	2,397
28	15	104				64	2,583
29	2	106				64	2,847
30	3	109	2		<u>2</u> ^{2/}	64	4,803
7/ 1	5	114	20		<u>20</u> ^{2/}	63	5,489
2	30	144				60	6,584
3	53	197				64	9,776
4	70	267	172		<u>172</u> ^{2/}	63	11,003
5	99	366	172		172	63	11,418
6	100	466	166	+	166	64	11,756
7	102	568				65	12,124
8	51	619				64	12,397
9	22	641				65	13,080
10	24	665				65	13,258
11	5	670				65	13,550
12	10	680				65	13,690
13	7	687				65	13,822
14	2	689					
15	3	692					
16	+	692					
17	2	694					
18	1	695					
Total		695					898

1/ Fish per index point was originally based on the historic relationship between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

2/ Poor survey conditions.

Table 24. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Ugashik River, Bristol Bay, 1981.

Date	Escapement Enumeration Method in Thousands of Fish							
	Tower Count		Aerial Survey			River Test Fishing		
	Daily	Accum.	Lagoon	River	Total	Fish Per Index Pt. ^{1/}	Accumulative Index Pt.	Escapement
6/17							51	
18						28	134	4
19						27	197	5
20	0	0				21	393	8
21	0	0				22	609	13
22	+	+	1		1	21	747	16
23	+	+				19	907	17
24	1	1	+	+	+2/	19	1,004	19
25	3	4				19	1,024	19
26	6	10				19	1,059	20
27	1	11				19	1,088	21
28	1	12				18	1,239	22
29	4	16				17	1,432	24
30	3	19				16	1,800	29
7/ 1	3	22	1	+	1 ^{2/}	17	3,143	53
2	5	27				20	5,194	104
3	16	43				20	7,684	154
4	25	68	13		13 ^{2/}	20	9,966	199
5	34	102				19	16,672	317
6	45	147	33	4	37 ^{2/}	20	24,352	487
7	77	224				19	32,134	611
8	84	308				20	40,577	812
9	154	462				21	48,254	1,013
10	196	658				22	57,651	1,268
11	123	781				22	63,746	1,402
12	183	964				22	67,291	1,480
13	131	1,095				23	70,435	1,620
14	118	1,213				23	70,994	1,633
15	25	1,238				23	71,606	1,647
16	20	1,258				23	72,073	1,658
17	13	1,271						
18	15	1,286						
19	17	1,303						
20	11	1,314						
21	6	1,320						
22	3	1,323						
23	2	1,325						
24	1	1,326						
Total		1,326						1,658

^{1/} Fish per index point was originally based on the historic relationship between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

^{2/} Poor survey conditions.

Table 25. Daily sockeye salmon tower counts and aerial survey escapement estimates, Wood River, Bristol Bay, 1981.

Date	Tower Count		Escapement Enumeration Method in Thousands of Fish		Comments
	Daily	Accum.	Aerial Survey ^{1/}		
6/21	1	2			
22	5	7	+		Good visibility.
23	7	14			
24	2	16			
25	+	16			
26	+	16			
27	1	17	0		Fair visibility.
28	2	19	+		Fair vis.; no fish in lower river.
29	10	29			
30	15	44	7		Poor vis.; no fish in lower river.
7/ 1	59	103	38		Poor vis.; no fish in lower river.
2	25	128	13		Good vis.; no fish in lower river.
3	20	148	11		Poor vis.; jumpers in lower river.
4	138	286	90		Exc. vis.; est. total river at 200-300,000.
5	308	594	154		Exc. vis.; est. total river at 200-400,000.
6	215	809	85		Exc. visibility.
7	71	879	18		Fair visibility.
8	69	949			
9	55	1,004			
10	67	1,071			
11	44	1,114			
12	24	1,138			
13	20	1,158			
14	14	1,172			
15	16	1,187			
16	14	1,202			
17	9	1,210			
18	5	1,216			
19	8	1,224			
20	8	1,232			
Total		1,233			

^{1/} Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.

Table 26. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Igushik River, Bristol Bay, 1981.

Date	Escapement Enumeration Method in Thousands of Fish							
	Tower Count		Aerial Survey ^{1/}			River Test Fishing		
	Daily	Accum.	Lagoon	River	Total	Fish Per Index Pt. ^{2/}	Accumulative Index Pt.	Escapement
6/19			+	+	+	40	120	5
20						40	343	14
21	1	1				40	480	20
22	2	3	+	1	1	35	775	27
23	2	5				35	1,237	43
24	2	7	1	1	1	35	1,516	53
25	4	10				35	1,676	59
26	3	13				35	1,787	63
27	1	14	+	+	+	35	1,908	67
28	1	15	+	+	+	35	1,991	70
29	1	15				35	2,146	75
30	1	16	1	+	1	35	3,014	105
7/ 1	3	19	+	1	1	21	3,666	77
2	8	27	+	2	2	21	4,211	88
3	3	31	+	1	1	21	5,537	116
4	5	36	+	1	1	20	7,359	147
5	8	44	+	1	1	20	10,103	202
6	16	59	3	3	5	20	13,032	261
7	22	81	7	7	14	20	15,595	312
8	28	109				20	19,435	389
9	40	149				20	22,840	457
10	46	195				20	26,452	529
11	41	236				20	29,443	589
12	37	273				20	31,043	621
13	58	331				20	34,083	682
14	55	386				20	36,683	734
15	47	434						
16	43	477						
17	33	510						
18	23	533						
19	19	552						
20	13	565						
21	11	576						
22	8	584						
23	4	588						
24	3	591						
Total		591					36,683	734

1/ Includes estimates of fish in clear water index areas immediately below the counting tower at the time of the survey.

2/ Fish per index point was originally based on the historic relationship (average of 34.8 fish per index point from 1976-80) between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

Table 27. Daily salmon sonar and tower counts and aerial survey escapement estimates, Nushagak/Nuyakuk Rivers, Bristol Bay, 1981.

Date	Escapement Enumeration Method in Thousands of Fish					Comments
	Nushagak River		Nuyakuk River		Aerial Survey ^{2/} Black Point to Portage Creek	
	Sockeye/King/Chum Sonar Count ^{1/}	Accum.	Sockeye Salmon Tower Count	Accum.		
6/12	2	2				
13	3	5				
14	3	8				
15	2	10				
16	4	14				
17	3	17				
18	2	19				
19	2	21				
20	1	22				
21	6	27				
22	9	36				
23	9	45				
24	8	53				
25	13	66				
26	9	75				
27	7	81	1	1		
28	4	85	1	2		
29	7	92	2	3		
30	11	104	2	6	25	Poor to fair visibility.
7/ 1	81	185	2	8	48	Poor to fair visibility.
2	73	258	1	9	22	Poor visibility.
3	74	332	2	11	50 - 100	Very poor visibility.
4	96	427	6	17	150 - 200	Exc. vis.; heavy in lower river
5	228	655	36	53		
6	155	810	31	86		
7	57	867	37	121		
8	34	901	80	201		
9	29	930	118	319		
10	54	984	126	446		
11	29	1,013	96	542		
12	20	1,034	92	634		
13	16	1,050	56	690		
14	11	1,060	43	733		
15	9	1,070	33	766		
16	3	1,072	25	791		
17			14	804		
18			8	812		
19			6	818		
20			5	824		
21			6	829		
22			4	833		
23			1	834		
Total		1,072		834		

^{1/} Sonar program is still in the initial design phase, and daily escapement counts include all species. Species breakdown was approximately 814,000 sockeye, 115,000 kings and 143,000 chums. Escapement estimates from the sonar program are considered as index trends only and do not reflect the actual escapements.

^{2/} Includes estimates of total sockeye/king/chum salmon in clear water index areas in lower Nushagak River.

Table 28. Commercial salmon processors and buyers operating by district, Bristol Bay, 1981 ^{1/}

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>NAKNEK-KVICHAK DISTRICT</u>							
1. A-Kemp Fisheries	M/V Bering Trader			Floater			
2. Al-Can Fish.	M/V Blue Ocean		Floater			Sea	Con. w/Coffee Pt. and Comeau.
3. Al-Lou's Fish	Naknek			Shore			
4. Alaskan Coast Fish.	M/V Ak. Coast					Sea	
5. Ak. Far East Corp.	Naknek		Shore				
6. Ak. Food Co.	M/V Invader					Sea	
7. Ak. Packers, Ass'n.	So. Naknek	2-1 lb. 2-½ lb.				Sea	
8. Alaskan Fish. Co.	M/V Alaskan I		Floater				
9. All Alaskan Seafoods	M/V All Alaskan		Floater				
10. Anchorage Seafoods	King Salmon				Air		
11. B & R Enterprises	M/V Aleutian Dragon		Floater				
12. Baranof Fisheries	M/V Baranof		Floater				Con. w/Courageous.
13. Big Cr. Fish. & Pack.	Naknek				Air		
14. Bristol Processors	M/V Pavlof		Floater				
15. Brown, Will H.	Naknek				Air		
16. Bumble Bee Seafoods	So. Naknek	3-1 lb. 2-½ lb.	Shore			Sea	
17. Can-Inter-Foods	M/V Jo Linda		Floater			Sea	
18. Coffee Pt. Fish. Co.	M/V Blue Ocean		Floater				Con. w/Al-Can Fish.
19. Comeau Int'l. Sales	M/V Lady Pacific		Floater			Sea	Con. w/Al-Can Fish.
20. Courageous Fisheries	M/V Courageous		Floater				Con. w/Baranof Fish.
21. Denali Seafoods	M/V Denali		Floater				
22. Double Star Fisheries	M/V Cape St. Elias		Floater				Tender to Ugashik for freezing.
23. Dagnet Fisheries	King Salmon				Air		
24. Dutch Harbor Seafoods	M/V Galaxy, M/V Viceroy		Floater				
25. EtoLin Pt. Salmon Co.	Dillingham				Air		
26. Fish West Co.	M/V West I		Floater				
27. Icicle Seafoods	Bering Star Arctic Star		Floater				
28. Int'l. Seafoods of Ak.	M/V Billy Don		Floater				
29. Jeffron Enterprises	M/V Jeffron		Floater				
30. Jonah of Alaska	M/V Victoria M.		Floater				
31. Kenai Packers	So. Naknek				Air	Sea	
32. Kodiak King Crab	Pederson Pt.		Shore			Sea	Con. w/Egegik Seafoods.
33. Living Stream Fish.	Dillingham				Air		
34. Longliner Joint Venture	M/V Longliner		Floater				
35. Mariner Seafoods Assoc.	Naknek				Air		
36. Martin Seafoods	Naknek/AKN				Air		
37. Mat-Su Pkg. & Proc.	King Salmon				Air		
38. Nelbro Packing Co.	Naknek	1-1 lb. 3-½ lb. 1-½ lb.					
39. Northcoast Sea. Proc.	M/V Polar Bear		Shore		Air		
40. Northern Peninsula Fish.	King Salmon		Floater				
41. Northland Sea Products	M/V Northland		Shore		Air		
42. Northwind Fisheries	M/V Sigrid K, M/V Kristin Gale		Floater			Sea	
43. Nuka Pt. Fisheries	M/V Maren I			Floater			
44. Pac. Int'l. Foods of Ak.	King Salmon				Air		
45. Pacific Mist Corp.	M/V Pacific Harvest, Harvester Barge		Floater	Floater			
46. Pacific Pride Fisheries	M/V Pacific Pride		Floater				
47. Pacific Star Seafoods	King Salmon				Air		
48. Pederson Fisheries	M/V Eskimo Princess, M/V Ocean Grace			Floater			

(continued)

Table 28. $\frac{1}{2}$ (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>NAKNEK-KVICHAK DISTRICT (con't.)</u>							
49. Peter Pan Seafoods	Naknek/So. Naknek					Sea	Tendered to Dig. for canning.
50. Polar Ice Seafoods	M/V Polar Ice		Floater				
51. Polar Seafoods	Naknek/AKN				Air		
52. Putman Fish Co.	King Salmon				Air		
53. Queen Fisheries	Naknek				Air		
54. Red Salmon Co.	Naknek	2-1 lb. 1- $\frac{1}{2}$ lb.					
55. Seafood International	M/V Northern King		Shore				
56. Sea Roe Fisheries	M/V Lafayette, M/V Speedwell		Floater		Air		"Birgit N", "Northwind".
57. Sitka Sound Seafoods	M/V Arctic Lady			Floater			
58. Tonka Seafoods	M/V Nordic Star			Floater			
59. Tradition Corp.	M/V Tradition		Floater				
60. Trident Seafood	M/V Tempest, Bountiful, Bristol Monarch		Floater				
61. Walrus Is. Fish.	King Salmon				Air		
62. Western Seas Fish. Coop.	M/V Trident		Floater				
63. Whitney-Fidalgo Seafoods	Naknek	1-1 lb. 1- $\frac{1}{2}$ lb.	Floater		Air	Sea	Yardarm Knot.
Total Naknek-Kvichak District:		5	37	7	20	12	
<u>EGEGIK DISTRICT</u>							
1. A-Kemp Fisheries	M/V Bering Trader			Floater			
2. Ak. Food Company	M/V Invader					Sea	
3. Ak. Packers Ass'n.	So. Naknek						Tendered to So. Naknek for canning.
4. Alaskan Fisheries Co.	M/V Alaskan I		Floater				
5. Aleutian Cold Storage	Egegik				Air		
6. All Alaskan Seafoods	Dillingham		Floater				
7. B & R Enterprises	M/V Aleutian Dragon		Floater				
8. Baranof Fisheries	M/V Baranof		Floater				Con. w/Courageous.
9. Big Cr. Fish & Packing	Big Creek				Air		
10. Bumble Bee Seafoods	So. Naknek		Shore			Sea	Tendered to So. Naknek for canning.
11. Comeau Int'l. Sales	M/V Lady Pacific		Floater			Sea	Con. w/AI-Can Fish.
12. Denali Seafoods	M/V Denali		Floater				
13. Egegik Res. Develop.	Egegik	3- $\frac{1}{2}$ lb.	Shore				dba Diamond E.
14. Egegik Seafoods	Egegik	1-1 lb. 1- $\frac{1}{2}$ lb.					Added $\frac{1}{2}$ lb. line in 1981.
15. Great Alaskan Fish Co.	M/V Great Alaskan Barge		Floater				
16. Homer Seafoods	Egegik Beach				Air		
17. Icicle Seafoods	Bering Star Arctic Star		Floater				
18. Kenai Packers	So. Naknek				Air		
19. Kodiak King Crab	Pederson Pt.		Shore				Tendered to Pederson Pt. for freezing.
20. Martin Seafoods	Naknek/AKN				Air		
21. Nelbro Packing Co.	Naknek						Tendered to Naknek for canning.
22. Northland Sea Products	M/V Northland		Floater				
23. Pacific Int'l. Foods	King Salmon				Air		
24. Putman Fish Co.	King Salmon				Air		

(continued)

Table 28.1/(continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>EGEGIK DISTRICT (con't.)</u>							
25. Red Salmon Co.	Naknek						Tendered to Naknek for canning.
26. Sea Roe Fisheries	M/V Lafayette, M/V Speedwell		Floater				"Birgit N" "Northwind".
27. Trident Seafoods	M/V Bristol Monarch		Floater				
28. Western Seas Fish. Coop.	M/V Trident		Floater		Air	Sea	
29. Whitney Fidalgo Seafoods	Naknek						Tendered to Naknek for canning.
Total Egegik District:		2	15	1	8	5	
<u>UGASHIK DISTRICT</u>							
1. A-Kemp Fisheries	M/V Bering Trader			Floater			Con. w/Comeau.
2. Al-Can Fish.	M/V Blue Ocean		Floater				
3. Ak. Coast Fisheries	M/V Alaska Coast					Sea	
4. Alaska Food Co.	M/V Invader					Sea	
5. Ak. Packers Ass'n.	So. Naknek						Tendered to So. Naknek for canning.
6. Alaskan Fisheries Co.	M/V Alaskan I		Floater				
7. All Alaskan Seafoods	M/V All Alaskan		Floater				
8. B & R Enterprises	M/V Aleutian Dragon		Floater				
9. Baranof Fisheries	M/V Baranof		Floater				Con. w/Courageous.
10. Briggs Way Co.	Ugashik	1-5 oz. glass					
11. Can-Inter-Foods	M/V Jo Linda					Sea	
12. Comeau Int'l. Sales	M/V Lady Pacific		Floater				Con. w/Al-Can Fish.
13. Courageous Fisheries	M/V Courageous		Floater				Con. w/Baranof Fish.
14. Denali Seafoods	M/V Denali		Floater				
15. Double Star Fisheries	M/V Cape St. Elias		Floater				
16. Dutch Harbor Seafoods	M/V Galaxy, M/V Viceroy		Floater				
17. Egegik Res. Develop.	Egegik						Tendered to Egegik for canning.
18. Fish West Co.	M/V West I		Floater				
19. Great Alaskan Fish Co.	M/V Great Alaskan Barge		Floater				
20. Icicle Seafoods	Bering Star Arctic Star		Floater				
21. Kodiak Island Seafoods	Tenders						
22. Kodiak King Crab	Pederson Pt.				Air	Sea	Tendered to Pederson Pt. for freezing.
23. Northland Sea Products	M/V Northland		Floater				
24. Oregon-Alaska Fish Co.	Pilot Point				Air		
25. Pacific Mist Corp.	M/V Pacific Harvest M/V Harvester Barge		Floater	Floater			
26. Sea Fisher Products	M/V Arctic Fisher		Floater				
27. Sea Roe Fisheries	M/V Lafayette, M/V Speedwell		Floater				"Birgit N" "Northwind".
28. Swiftsure Fisheries	M/V Nushagak		Floater			Sea	
29. Trident Seafoods	M/V Bristol Monarch		Floater				
30. Western Seas Fish. Coop.	M/V Trident		Floater			Sea	
31. Whitney-Fidalgo Seafoods	Naknek		Floater		Air	Sea	
Total Ugashik District:		1	21	2	3	8	

(continued)

Table 28.1/ (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>NUSHAGAK DISTRICT</u>							
1. Alaska Food Company	Tenders					Sea	
2. Alaska Packers Ass'n.	Clarks Pt./ Ultra Proc.		Floater			Sea	
3. Alaskan Fisheries Co.	M/V Alaskan I		Floater				
4. All Alaskan Seafoods	M/V All Alaskan		Floater				
5. Ball Brothers	Dillingham					Air	
6. Bristol Bay Coastal Fish.	Dillingham					Air	
7. Can-Inter-Foods	M/V Jo Linda		Floater				
8. Clark, Martin	Dillingham					Air	
9. Cold Sea Fisheries	M/V Ocean Champion		Floater				
10. Columbia-Wards Fisheries	Ekuk	3-1 lb. 1-½ lb.	Shore Floater			Sea	Also frozen on M/V Double Star.
11. Crusader Fisheries	M/V Crusader						
12. Dillingham Fish. Co.	Dillingham			Shore			
13. Dagnet Fisheries	King Salmon					Air	
14. Engstrom Brothers	Dillingham		Shore				
15. Etolin Pt. Fish Co.	Etolin Pt.					Air	Con. w/Swiftsure.
16. Great Alaskan Fish Co.	M/V Chignik Barge		Floater				
17. Icicle Seafoods	Arctic Star and Bering Star		Floater			Air Sea	Con. w/Swiftsure.
18. J and L Co.	Dillingham					Air	
19. Kenai Packers	So. Naknek					Air	
20. Kodiak King Crab	Pederson Pt.		Shore			Air Sea	Con. w/Swiftsure.
21. Living Stream Fisheries	Dillingham					Air	Con. w/Swiftsure.
22. Moran Maritime	Dillingham					Air	Con. w/Swiftsure.
23. Morpac	Dillingham					Air	
24. N & N Market	Dillingham		Shore				Retail market.
25. No. Coast Seafood Proc.	M/V Polar Bear		Floater				
26. Northwind Fisheries	M/V Sigrid K					Sea	
27. Nuka Point Fisheries	M/V Marin I					Floater	
28. Pacific Pride Fish.	M/V Pacific Pride		Floater				
29. Peter Pan Seafoods	Dillingham	2-1 lb. 2-½ lb.				Air Sea	
30. Queen Fisheries	Clarks Slough	1-1 lb. 2-½ lb. 1-½ lb.				Air	
31. Seafood International	M/V Northern King		Floater				
32. Sea Roe Fisheries	M/V Lafayette, Speedwell		Floater				
33. Sterling Seafoods	M/V Alaska Star		Floater				
34. Tradition Corp.	M/V Tradition		Floater				
35. Trident Seafoods	M/V Bountiful, Tempest, Bristol Monarch		Floater				
36. Whitney-Fidalgo Seafoods	Naknek					Air	
Total Nushagak District:		3	19	2	15	7	
<u>TOGIK DISTRICT</u>							
1. Ak. Packers Ass'n.	Clarks Point		Floater				Tendered to Clarks Pt. for freezing.
2. Alaskan Fisheries Co.	M/V Alaskan I		Floater				
3. Ball Brothers	Dillingham					Air	
4. Icicle Seafoods	Arctic Star, Bering Star		Floater				Tender to Nushagak for freezing.
5. J and L Company	Dillingham					Air	

(continued)

Table 28.1/ (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments		
		Canned	Frozen	Cured	Fresh	Brine			
TOGIK DISTRICT (con't.)									
6. Kachemak Seafoods	Togiak					Air	Tendered to Pederson Pt. for freezing.		
7. Kodiak King Crab	Pederson Pt.		Shore						
8. Noden Fish Co.	M/V Cougar					Floater	Tendered to Dlg. for canning. Vessel sank.		
9. Nuka Point Fisheries	M/V Marin I					Floater			
10. Peter Pan Seafoods	Dillingham								
11. Seafood International	M/V Northern King					Floater			
12. Togiak Fisheries	Togiak	1-1 lb.				Shore			
13. Trident Seafoods	M/V Tempest and Bristol Monarch	1-1/4 lb.				Floater			
14. Waterkist Corp.	Togiak					Air			
Total Togiak District:		1	7	2	4	0			
FISHERY OPERATOR SUMMARY									
District	Number of Operators (Total)	Processing Method			Export		Number of Canning Lines ^{2/}		
		Canned	Frozen	Cured	Fresh	Brine	1-lb.	1/2 lb.	1/4 lb.
Naknek-Kvichak	(63)	5	37	7	20	12	9	9	1
Egegik	(29)	2	15	1	8	5	1	4	
Ugashik	(31)	1	21	2	3	8			1
East Side	(73)	(8)	(39)	(7)	(25)	(16)	10	13	2
Nushagak	(36)	3	19	2	15	7	6	5	1
Togiak	(14)	1	7	2	4		1	1	
West Side	(40)	(4)	(20)	(3)	(17)	(7)	7	6	1
TOTAL BAY	(90)	12	48	9	35	18	17	19	3

1/ Indicates operators with either a physical plant or processing facility in a district or those operators from other areas buying fish and/or providing tender and support service for fishermen in districts away from the facility.

2/ Number of canning lines available for operation.

Table 29. Case pack and commercial production of frozen and cured salmon by species and district, Bristol Bay, 1981.^{1/}

Category by District	No. Operators	Pack and Production ^{2/}					Total
		Sockeye	King	Chum	Pink	Coho	
I. CASE PACK (in 48 - 1 lb. talls)							
Naknek-Kvichak	5	405,656	1,194	14,902			421,752
Egegik	2	100,378	122	2,822			103,322
Ugashik	1	74	6			158	238
Nushagak	3	270,614	2,882	36,856		785	311,137
Togiak	1	6,500	1,100	11,580	30		19,480
Total	12	783,222	5,304	66,430	30	943	855,929
II. FROZEN (in pounds)							
Naknek-Kvichak	37	19,376,992	157,071	^{3/}	13	939	19,535,015
Egegik	15	6,980,648	39,839	^{3/}			7,020,487
Ugashik	21	6,711,161	43,942	^{3/}		129,073	6,884,176
Nushagak	19	14,932,414	2,263,408	1,240,815	2,027	854,440	19,293,104
Togiak	7	1,612,418	97,806	130,652	612	81,121	1,922,609
Total	48	49,613,633	2,602,066	1,371,467	2,652	1,065,573	54,655,391
III. CURED (in pounds)							
Naknek-Kvichak	7	2,759,735	6,430	^{3/}		6,526	2,772,691
Egegik	1	158,969	2,109	^{3/}			161,078
Ugashik	2	940,142	627	^{3/}			940,769
Nushagak	2	541,220	2,291	19,260			562,771
Togiak	2	556,495	12,206	128,791			697,492
Total	9	4,956,561	23,663	148,051		6,526	5,134,801
IV. TOTAL FROZEN AND CURED (in pounds)							
Naknek-Kvichak	43	22,136,727	163,501	^{3/}	13	7,465	22,307,706
Egegik	16	7,139,617	41,948	^{3/}			7,181,565
Ugashik	22	7,651,303	44,569	^{3/}		129,073	7,824,945
Nushagak	21	15,473,634	2,265,699	1,260,075	2,027	854,440	19,855,875
Togiak	9	2,168,913	110,012	259,443	612	81,121	2,620,101
Total	56	54,570,194	2,625,729	1,519,518	2,652	1,072,099	59,790,192

^{1/} Includes only fish processed in Bristol Bay.

^{2/} Pack and production data extracted primarily from "Final Operations Reports" (BB-CF/303), and from catch and production reports or fish tickets if unavailable in final report form.

^{3/} Included with sockeye production.

Table 30. Salmon transported out of the area for processing, by species and district, Bristol Bay, 1981.^{1/}

I. FRESH EXPORT BY AIR^{2/} (in pounds)

District	No. Operators	Fresh/Brine Export					Total
		Sockeye	King	Chum	Pink	Coho	
Naknek-Kvichak	20	10,603,171	58,429	3/	195	8,370	10,665,165
Egegik	8	6,712,720	34,756	3/	1,209	195,203	6,943,888
Ugashik	3	791,302	17,794	3/	19	68,652	877,767
Nushagak	15	6,591,688	1,097,332	270,073	14	435,224	8,394,331
Togiak	4	1,244,156	94,668	547,918	7,948	97,983	1,992,673
Total	35	25,943,037	1,302,979	817,991	9,385	800,432	28,873,824

II. BRINE EXPORT BY SEA^{2/3/} (in number of fish and pounds)

District	Number		Number	
	Operators	Tenders	Fish	Pounds
Naknek-Kvichak	12	27	1,196,241	7,350,408
Egegik	5	16	712,628	4,256,951
Ugashik	8	12	426,757	2,723,968
Nushagak	7	25	964,492	6,181,407
Togiak				
Total	18	80	3,300,118	20,512,734

^{1/} Includes all fish exported from Bristol Bay in either brine or chilled sea water by sea-going tenders, or by air transportation.

^{2/} Export information extracted primarily from "Final Operations Reports" (BB-CF/303), and from catch and production reports or fish tickets if unavailable in final report form.

^{3/} Most processors report mixed sockeye and chums and complete specie breakdown is generally not available until fish are final processed.

Table 31. Average round weight and exvessel value of the commercial salmon catch, by species and district, Bristol Bay, 1981.

I. ROUND WEIGHT

District	Average Round Weight in Pounds ^{1/}					Total
	Sockeye	King	Chum	Pink	Coho	
Naknek-Kvichak	6.07	20.76	6.52	3.64	6.17	
Egegik	6.01	18.61	6.77	3.70	6.32	
Ugashik	6.25	18.93	7.16		7.59	
Nushagak	6.40	19.63	6.58	3.43	6.02	
Togiak	6.75	13.14	7.41	3.48	7.75	
Weighted Average	6.19	18.98	6.72	3.49	6.35	

Total Weight of Catch, All Districts ^{2/}	159,129	4,538	9,919	26	1,988	175,599

II. VALUE

Category	Estimated Value					Total
	Sockeye	King	Chum	Pink	Coho	
Average Price Per Pound ^{3/}	\$.7629	\$1.2337	\$.4060	\$.2937	\$.7334	

Average Price Per Fish	\$4.72	\$23.42	\$2.73	\$1.03	\$4.66	

Exvessel Value to Fishermen ^{2/}	\$121,399	\$5,599	\$4,027	\$ 8	\$1,458	\$132,490

1/ Data extracted from "Bristol Bay Final Operations Report" (BB-CF/303) and "Bristol Bay Salmon Catch Reports" (BB-CF/301), and is weighted by the catch of each processor against the total catch.

2/ Total weight and exvessel value shown in thousands of pounds and dollars, respectively; catches in pounds are preliminary.

3/ Average price per pound derived from individual company price schedules and is weighted by the catch of each processor against the total catch.

Table 32. Subsistence salmon catch by species, district and village area, Bristol Bay, 1981.

Area	Permits Issued	Number of Fish ^{1/}				Coho	Total
		Sockeye	King	Chum	Pink		
NAKNEK-KVICHAK DISTRICT:							
Naknek system ^{2/}	235	9,500	700	200	100	900	11,400
Kvichak system:							
Levelock	45	6,600	200	200	+	100	7,100
Igiugig	104	5,400	100	+	+	100	5,600
Newhalen	100	10,900					10,900
Nondalton	28	15,200	+	+			15,200
Port Alsworth	37	6,800	+				6,800
Iliamna	53	4,500	+	+	+		4,500
Pedro Bay	17	9,700	+	+	+		9,700
Kokhanok	30	16,500	+	+			16,500
District Total	649	85,100	1,000	400	100	1,100	87,700
EGEGIK DISTRICT							
Egegik system ^{3/}	4	+	+			+	+
UGASHIK DISTRICT							
Ugashik system ^{4/}	12	600	+	+		200	800
NUSHAGAK DISTRICT							
Nushagak Bay ^{5/}	281	13,100	3,500	1,500	200	4,800	23,100
Wood system ^{6/}	18	2,300	200	100	+	300	2,900
Igushik system							
Manokotak	30	5,800	300	+	200	500	6,800
Nushagak system							
Portage Creek	4	600	100	100		100	900
Ekwok	13	4,800	1,400	1,300	200	1,100	8,800
New Stuyahok	36	10,600	4,800	5,500	1,800	1,000	23,700
Koliganek	13	7,300	1,300	1,800		900	11,300
District Total	395	44,500	11,600	10,300	2,400	8,700	77,500
TOGIAK DISTRICT							
Togiak system ^{7/}	52	1,900	400	800	100	2,200	5,400
TOTAL BRISTOL BAY	1,112	132,100	13,000	11,500	2,600	12,200	171,400

^{1/} Catches rounded to nearest 100 fish.

^{2/} Includes the communities of Naknek, South Naknek and King Salmon.

^{3/} Includes the villages of Egegik and North Egegik.

^{4/} Includes the villages of Pilot Point and Ugashik.

^{5/} Includes the communities of Dillingham, Kakanak, Clarks Point, Clarks Slough (Queen), Ekwok, Igushik beach and the Lewis Point fish camps.

^{6/} Includes the village of Aleknagik.

^{7/} Includes the villages of Togiak and Twin Hills.

APPENDIX TABLES

APPENDIX TABLE 1. Forecast and inshore sockeye salmon return, Bristol Bay, 1962-1981.

Year	Number of Fish in Thousands		Inshore Return ^{4/}	% Return of Forecast	
	Forecast ^{1/}			F.R.I.	A.D.F.&G.
	F.R.I. ^{2/}	A.D.F.&G. ^{3/}			
1962	9,400	19,900	10,423	111	52
63	15,300	8,600	6,905	45	80
64	19,300	17,400	10,938	57	63
65 ^{5/}	26,500	27,780	53,129	200	191
66	34,000	31,271	17,553	52	56
1967	21,500	13,749	10,353	48	75
68	10,500	10,409	8,010	76	77
69	16,200	21,274	19,043	118	90
70	57,200	55,812	39,399	69	71
71	18,100	15,170	15,825	87	104
1972	6,600	9,744	5,400	82	55
73	5,800	6,200	2,444	42	39
74	3,900	5,004	10,961	281	219
75	12,100	11,960	24,232	200	203
76	9,800	11,969	11,539	118	96
1977	8,800	8,380	9,722	110	116
78	16,500	11,534	19,924	121	173
79	14,740	22,650	39,904	271	176
80		54,542	62,401 ^{6/}		114
81		26,700	34,585 ^{6/}		130

- ^{1/} Estimated Japanese immature/mature catch was not subtracted from either forecast until 1965.
- ^{2/} Forecast by Fisheries Research Institute based on purse seine data gathered south of Adak, and is not broken down by river system. Included North Peninsula and Bristol Bay sockeye salmon from 1960-64. Program was terminated in 1980.
- ^{3/} Inshore river system forecast by the Department is based on cycle analysis, smolt production and ratio of 2-ocean to 3-ocean age return.
- ^{4/} Inshore Bristol Bay catch plus escapement.
- ^{5/} Togiak, Snake and Nushagak-Mulchatna systems included for the first time in forecast.
- ^{6/} Preliminary.

(Data Sources: 5, 6, 7 and 15)

APPENDIX TABLE 2. Commercial salmon catch by the Japanese mothership and land-based driftnet high seas fisheries, by species, 1962-1981.^{1/}

Year	Number of Fish in Thousands											
	Sockeye		King		Chum		Pink		Coho		Total	
	MS	LB	MS	LB	MS	LB	MS	LB	MS	LB	MS	LB
1962	10,590	154	122	124	6,372	7,577	1,139	14,021	1,532	1,289	19,755	23,165
63	8,903	18	87	102	5,858	7,538	6,732	31,255	1,895	1,492	23,475	40,405
64	7,097	108	410	195	8,641	8,956	2,281	17,247	3,535	1,624	21,964	28,130
65	12,038	159	185	93	6,036	8,330	4,429	29,142	1,177	1,913	23,865	39,637
66	7,254	703	208	112	8,562	11,848	2,553	16,032	469	1,458	19,046	30,153
1967	8,087	2,566	128	110	6,837	11,078	7,781	23,051	226	1,329	23,059	38,134
68	6,373	2,769	362	88	8,107	8,457	3,823	15,899	898	1,421	19,563	28,634
69	5,935	2,495	554	83	7,721	4,908	6,972	23,610	1,306	3,328	22,488	34,424
70	6,944	2,966	437	101	9,638	6,585	1,726	13,403	180	2,259	18,925	25,314
71	3,554	3,026	206	134	9,968	6,250	8,202	16,977	454	2,373	22,384	28,760
1972	3,184	3,711	261	103	13,373	8,598	3,795	14,839	614	2,421	21,227	29,672
73	2,613	3,308	119	162	7,857	7,614	12,018	20,650	989	3,794	23,596	35,528
74	2,282	3,155	361	186	9,283	12,179	7,756	11,242	1,085	3,559	20,767	30,321
75	2,171	2,969	162	135	7,367	11,480	14,654	15,347	356	3,550	24,710	33,481
76	2,266	3,291	283	201	10,436	10,646	7,207	10,879	828	2,751	21,020	26,690
1977	1,508	1,289	93	146	5,996	6,230	9,100	15,041	79	1,722	16,776	24,428
78	1,882	1,292	105	210	3,802	3,488	1,853	7,846	609	2,512	8,251	15,349
79	2,186	756	126	161	3,277	2,661	3,405	11,190	281	1,199	9,275	15,967
80	2,412	787	704	160	3,098	2,697	561	11,612	656	1,205	7,431	16,461
81	2,224	859	88	190	2,539	2,509	4,094	11,292	615	1,209	9,560	16,059
20-Year Total	99,503	36,381	5,001	2,796	144,768	149,629	110,081	330,575	17,784	42,408	377,137	561,789
1962-71 Total	76,775	14,964	2,699	1,142	77,740	81,527	45,638	200,637	11,672	18,486	214,524	316,756
1972-81 Total	22,728	21,417	2,302	1,654	67,028	68,102	64,443	129,938	6,112	23,922	162,613	245,033
20-Year Average	4,975	1,819	250	140	7,238	7,481	5,504	16,529	889	2,120	18,857	28,089
1962-71 Average	7,678	1,496	270	114	7,774	8,153	4,564	20,064	1,167	1,849	21,452	31,676
1972-81 Average	2,273	2,142	230	165	6,703	6,810	6,444	12,994	611	2,392	16,261	24,503

^{1/} Mothership fishery (MS), and land-based fishery (LB).

(Data Source: 1 and 19)

APPENDIX TABLE 3. Japanese mothership commercial catch of maturing and immature sockeye salmon of Bristol Bay origin, 1962-81.

Year	Number Fish in Thousands		
	Matures ^{1/}	Immatures ^{2/}	Total
1962	833	72	905
63	929	60	989
64	254	843	1,097
65	6,100	404	6,504
66	1,531	56	1,587
1967	866	21	887
68	864	791	1,655
69	1,240	517	1,757
70	3,451	1,207	4,658
71	842	592	1,434
1972	710	214	924
73	625	259	884
74	251	708	959
75	645	222	867
76	779	228	1,007
1977	540	328	868
78	124	236	360
79	68	410	478
80 ^{3/}	180	681	861
81 ^{3/}	137	380	517
20-Year Total	20,969	8,229	29,198
1962-71 Total	16,910	4,563	21,473
1972-81 Total	4,059	3,666	7,725
20-Year Average	1,048	411	1,460
1962-71 Average	1,691	456	2,147
1972-81 Average	406	367	773

1/ Includes May and June 1-10 catches east of 170° E., June 11-20 catches east of 175° E., and June 21-30 catches east of 180°.

2/ Includes sockeye salmon taken on high seas at times and in areas where immature Bristol Bay sockeye salmon are in large majority. These are mostly .2 ocean age fish that otherwise would be expected to mature and return to Bristol Bay as .3 ocean. Includes July and August catches east of 170° E., and June 21-30 catches between 170° E. and 180° E.

3/ Preliminary.

(Data Source: 1 and 19)

APPENDIX TABLE 4. Inshore domestic and Japanese mothership high seas commercial catch of sockeye salmon of Bristol Bay origin, 1962-81.

Year	Sockeye Salmon in Thousands					Percent Japanese Catch of:	
	Bristol Bay Catch			Bristol Bay		Total Catch	Total Bay Run
	Inshore	Japanese ^{1/}	Total	Escapement	Return ^{2/}		
1962	4,718	960	5,678	5,705	11,383	16.9	8.4
63	2,871	1,001	3,872	4,033	7,905	25.9	12.7
64	5,596	314	5,910	5,341	11,251	5.3	2.8
65	24,255	6,943	31,198	28,873	60,071	22.3	11.6
66	9,314	1,935	11,249	8,239	19,488	17.2	9.9
1967	4,331	922	5,253	6,022	11,275	17.6	8.2
68	2,793	885	3,678	5,217	8,895	24.1	9.9
69	6,622	2,031	8,653	12,421	21,074	23.5	9.6
70	20,721	3,968	24,689	18,679	43,368	16.1	9.1
71	9,584	2,049	11,633	6,241	17,874	17.6	11.5
1972	2,416	1,302	3,718	2,984	6,702	35.0	19.4
73	761	839	1,600	1,683	3,283	52.4	25.6
74	1,362	510	1,872	9,603	11,475	27.2	4.4
75	4,899	1,353	6,252	19,333	25,585	22.6	5.3
76	5,619	1,001	6,620	5,920	12,540	15.1	8.0
1977	4,878	768	5,646	4,844	10,490	13.6	7.3
78	9,928	452	10,380	9,996	20,376	4.4	2.2
79	21,429	304	21,733	18,475	40,208	1.4	0.8
80	23,674 ^{3/}	590 ^{3/}	24,264	38,727	62,991	2.4	0.9
81	25,713 ^{3/}	818 ^{3/}	26,531	8,872	35,403	3.1	2.3
20-Year Total	191,485	28,945	220,429	221,208	441,637		
1962-71 Total	90,805	21,008	111,813	100,771	212,584		
1972-81 Total	100,680	7,937	108,616	120,437	229,053		
20-Year Average	9,574	1,461	11,021	11,060	22,082	13.3	6.6
1962-71 Average	9,081	2,101	11,181	10,077	21,258	18.8	9.9
1972-81 Average	10,068	794	10,862	12,044	22,905	7.3	3.5

1/ Includes immature sockeye salmon caught in previous year.

2/ Includes Bristol Bay catch and escapement and Japanese catch.

3/ Preliminary.

(Data Sources: 1, 5, and 19)

APPENDIX TABLE 5. Japanese mothership commercial catch of king salmon of western Alaska origin, 1962-81.

Year	Number Fish in Thousands		Origin Percent
	Total Mothership Catch	Catch of Western Alaska Number	
1962	122	30	26
63	87	41	47
64	410	253	62
65	185	106	57
66	208	112	54
1967	128	70	55
68	362	226	62
69	554	435	79
70	437	345	79
71	206	144	70
1972	261	170	65
73	119	47	39
74	361	287	80
75	162	109	67
76	283	168	59
1977	93	65	70
78	105	31	30
79	126	65	52
80 ^{1/}	704	380	54
81 ^{1/}	278	26	9
20-Year Total	5,191	3,110	
1962-71 Total	2,699	1,762	
1972-81 Total	2,492	1,348	
20-Year Average	260	156	60
1962-71 Average	270	176	65
1972-81 Average	249	135	54

^{1/} Preliminary.

(Data Sources: 1 and 19)

APPENDIX TABLE 6. Offshore test fishing catch indices at Port Moller and the inshore total run of sockeye and chum salmon, Bristol Bay, 1968-81.^{1/}

Year	Number of Stations Fished	Catch	Catch Indices ^{2/}		Total Inshore Run ^{3/}	Number Fish Per Adj. Index Pt.
			Actual	Adjusted		
<u>SOCKEYE SALMON</u>						
1968	128	522	226.9	298.9	8,010	26,800
69	101	1,287	548.7	727.8	19,043	26,200
70	98	1,033	603.2	823.8	39,399	47,800
71	84	858	544.7	653.5	15,825	24,200
72	69	120	65.6	94.9	5,400	56,900
1973	65	424	214.0	339.6	2,444	7,200
75	91	1,968	923.3	1,289.0	24,232	18,800
76	131	1,353	634.2	688.6	11,539	16,800
77	87	1,204	582.7	782.4	9,722	12,400
78	93	525	264.5	479.7	19,924	41,500
1979	85	1,422	827.3	1,034.4	39,904	38,600
80	151	782	411.4	526.6	62,401 ^{4/}	118,500
81	109	1,311	684.3	1,051.4	34,585 ^{4/}	32,900
<u>CHUM SALMON</u>						
1968	128	175	83.5	93.2	812	8,700
69	101	132	62.5	78.4	548	7,000
70	98	169	77.6	106.4	1,232	11,600
71	84	124	69.0	85.6	1,132	13,200
72	69	100	55.2	66.0	1,022	15,500
1973	65	175	82.7	142.1	1,047	7,400
75	91	102	48.0	74.2	519	7,000
76	131	409	197.3	213.8	2,221	10,400
77	87	400	194.9	274.9	2,703	9,800
78	93	166	84.7	135.3	1,847	13,700
1979	85	50	26.2	31.6	1,366	43,200
80	151	421	221.7	275.9	2,684 ^{4/}	9,700
81	109	392	186.3	218.3	1,983 ^{4/}	9,100

1/ Program not operated in 1974.

2/ Indices expressed in fish/100 fathom hours. Adjusted indices include linear estimates for unfished stations and days.

3/ Inshore catch and escapement in thousands of fish. Chum salmon escapement estimates from Nushagak and Togiak districts only.

4/ Preliminary.

(Data Sources: 1, 5, 11 and 13)

APPENDIX TABLE 7. Fishing entry permit registration by gear type and residency, Bristol Bay, 1962-81.^{1/}

Year	Drift Net			Set Net			Total
	Resident	Non-Resident	Total	Resident	Non-Resident	Total	
1962	791	400	1,191	619	20	639	1,830
63	914	545	1,459	773	116	889	2,348
64	947	689	1,636	793	137	930	2,566
65	916	677	1,593	868	125	993	2,586
66	1,019	846	1,865	826	139	965	2,830
1967	965	734	1,699	686	144	830	2,529
68	973	711	1,684	722	117	839	2,523
69	1,110	818	1,928	804	166	970	2,898
70	1,057	824	1,881	747	143	890	2,771
71	1,034	831	1,865	710	136	846	2,711
1972	993	771	1,764	722	132	854	2,618
73 ^{2/}	2,041	1,162	3,203	902	108	1,010	4,213
74	742	222	964	494	46	540	1,504
75	931	702	1,633	546	92	638	2,271
76	850	667	1,517	554	105	659	2,176
1977	920	648	1,568	600	111	711	2,279
78	1,025	722	1,747	721	150	871	2,618
79	1,037	742	1,779	752	160	912	2,691
80	1,039	788	1,827	731	217	948	2,775
81	1,056	769	1,825	756	201	957	2,782
20-Year Total	20,360	14,268	34,628	14,326	2,565	16,891	51,519
1962-71 Total	9,726	7,075	16,801	7,548	1,243	8,791	25,592
1972-81 Total	10,634	7,193	17,827	6,778	1,322	8,100	25,927
20-Year Average	1,018	713	1,731	716	128	845	2,576
1962-71 Average	973	708	1,680	755	124	879	2,559
1972-81 Average	1,063	719	1,783	678	132	810	2,593

^{1/} Allowable gear per license/permit is 150 fathoms for drift and 50 fathoms for set with the following exceptions: 1968 and 1975 - 75 F. drift and 25 F. set; 1969 - 125 F. drift; 1973 - 25 F. drift and 12½ set.

^{2/} Sliding gear scale in effect.

(Data Sources: 2 and 14)

APPENDIX TABLE 8. Fishing vessel registration by district, Bristol Bay, 1965-81.^{1/}

Year	Fishing Vessel Registration					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1965	826	301	146	563	94	1,930
66	983	327	156	581	53	2,100
67	779	331	134	618	98	1,960
68	757	348	106	521	98	1,830
69	849	280	92	664	105	1,990
1970	1,064	286	90	595	169	2,204
71	1,018	337	113	535	89	2,092
72	869	276	105	513	95	1,848
73	687	223	60	462	79	1,511
74	328	85	24	412	101	950
1975	753	254	26	516	93	1,642
76	761	237	53	511	107	1,669
77	695	290	47	575	121	1,728
78	801	271	52	615	125	1,864
79	1,004	339	65	771	156	2,335
1980	1,158	391	75	889	180	2,693
81 ^{2/}	1,019	343	66	782	159	2,369
17-Year Total	14,351	4,919	1,410	10,123	1,922	32,715
1965-74 Total	8,160	2,794	1,026	5,464	981	18,415
1975-81 Total	6,191	2,125	384	4,659	941	14,300
17-Year Average	844	289	83	595	113	1,924
1965-74 Average	816	279	103	546	98	1,842
1975-81 Average	884	304	55	666	134	2,043

^{1/} Beginning 1978 district vessel registration is based on 1973 through 1977 average percent by district.

^{2/} Does not incorporate some vessels which failed to register specifically for Bristol Bay.

(Data Source: 2 and 14)

APPENDIX TABLE 9. Fishing vessel registration by keel length, Bristol Bay, 1965-81.

Year	Keel Length in Feet			Total
	To 25 Ft.	26-29 Ft.	30-32 Ft.	
1965	596	484	850	1,930
66	676	494	930	2,100
67	660	383	917	1,960
68	544	381	905	1,830
69	656	416	918	1,990
1970	770	402	1,032	2,204
71	712	380	1,000	2,092
72	610	355	883	1,848
73	449	246	816	1,511
74	345	136	469	950
1975	455	243	944	1,642
76	489	254	926	1,669
77	517	286	925	1,728
78	561	351	952	1,864
79	717	419	1,199	2,335
1980	741	459	1,493	2,693
81 ^{1/}	626	378	1,365	2,369
17-Year Total	10,124	6,067	16,524	32,715
1965-74 Total	6,018	3,677	8,720	18,415
1975-81 Total	4,106	2,390	7,804	14,300
17-Year Average	596	357	972	1,924
1965-74 Average	602	368	872	1,842
1975-81 Average	587	341	1,115	2,043

^{1/} Does not incorporate some vessels which failed to register specifically for Bristol Bay.

(Data Sources: 2 and 14)

APPENDIX TABLE 10. Sockeye salmon commercial catch by district, Bristol Bay, 1962-81.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1962	2,281,284	638,862	243,159	1,461,766	92,945	4,718,016
63	957,902	695,582	188,695	842,744	186,213	2,871,136
64	2,243,701	1,103,935	576,768	1,420,941	250,775	5,596,120
65	9,139,567	3,179,559	925,690	793,323	217,100	24,255,239
66	5,397,538	2,101,174	445,458	1,170,271	199,799	9,314,240
1967	2,337,226	1,070,942	163,744	657,711	101,107	4,330,730
68	1,216,858	671,554	82,457	749,281	72,699	2,792,849
69	4,655,072	889,322	169,845	773,207	134,252	6,621,698
70	7,803,805	1,403,509	171,541	1,188,534	153,377	20,720,766
71	5,857,378	1,306,682	954,068	1,256,799	209,060	9,583,987
1972	1,102,365	839,820	17,440	381,347	75,261	2,416,233
73	168,249	221,337	3,920	272,093	95,723	761,322
74	538,163	172,253	2,151	510,571	139,341	1,362,479
75	3,085,416	964,024	14,558	645,902	188,914	4,898,814
76	2,547,276	1,329,788	174,923	1,265,422	301,883	5,619,292
1977	2,167,214	1,780,567	92,623	619,025	218,451	4,877,880
78	5,123,668	1,207,294	7,995	3,137,166	452,016	9,928,139
79	14,991,826	2,257,332	391,118	3,327,346	460,984	21,428,606
80 ^{1/}	15,123,160	2,613,284	926,011	4,403,652	607,874	23,673,981
81 ^{1/}	10,948,744	4,480,710	1,949,531	7,713,416	620,811	25,713,212
20-Year Total	117,686,412	28,927,530	7,501,695	32,590,517	4,778,585	191,484,739
1962-71 Total	61,890,331	13,061,121	3,921,425	10,314,577	1,617,327	90,804,781
1972-81 Total	55,796,081	15,866,409	3,580,270	22,275,940	3,161,258	100,679,958
20-Year Average	5,884,321	1,446,377	375,085	1,629,526	238,929	9,574,237
1962-71 Average	6,189,033	1,306,112	392,143	1,031,458	161,733	9,080,478
1972-81 Average	5,579,608	1,586,641	358,027	2,227,594	316,126	10,067,996

^{1/} Preliminary.

(Data Sources: 1 and 5)

APPENDIX TABLE 11. King salmon commercial catch by district, Bristol Bay, 1962-81.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1962	8,816	2,070	2,929	61,283	8,949	84,047
63	4,713	2,355	3,030	45,979	6,192	62,269
64	12,902	3,618	3,694	108,606	10,716	139,536
65	9,793	2,313	4,042	85,910	10,909	112,967
66	5,456	1,949	1,916	58,184	9,967	77,472
1967	3,705	2,285	1,582	96,240	13,381	117,193
68	6,398	3,472	2,153	78,201	13,499	103,723
69	19,016	2,801	2,107	80,803	20,181	124,908
70	19,037	3,765	1,498	87,547	28,664	140,511
71	10,254	2,187	779	82,769	27,026	123,015
1972	2,262	1,097	166	46,045	19,976	69,546
73	951	1,475	292	30,470	10,856	44,044
74	480	1,133	1,200	32,053	10,798	45,664
75	964	237	111	21,454	7,226	29,992
76	4,064	1,138	338	60,684	29,744	95,968
1977	4,373	3,694	2,167	85,074	35,218	130,526
78	6,930	3,126	5,935	118,548	57,000	191,539
79	10,415	5,547	9,568	157,321	30,022	212,873
80 ^{1/}	7,907	5,329	5,809	64,324	12,339	95,708
81 ^{1/}	10,378	5,834	3,636	194,869	24,348	239,065
20-Year Total	148,814	55,425	52,952	1,596,364	387,011	2,240,566
1962-71 Total	100,090	26,815	23,730	785,522	149,484	1,085,641
1972-81 Total	48,724	28,610	29,222	810,842	237,527	1,154,925
20-Year Average	7,441	2,771	2,648	79,818	19,351	112,028
1962-71 Average	10,009	2,682	2,373	78,552	14,948	108,564
1972-81 Average	4,872	2,861	2,922	81,084	23,753	115,493

^{1/} Preliminary.

(Data Sources: 1 and 5)

APPENDIX TABLE 12. Chum salmon commercial catch by district, Bristol Bay, 1962-81.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1962	176,712	23,053	22,040	290,633	165,107	677,545
63	100,408	14,807	10,554	167,161	77,167	370,097
64	153,644	23,496	30,688	463,309	131,371	802,508
65	45,430	11,188	14,971	177,434	111,521	360,544
66	57,273	32,085	29,100	129,344	95,410	343,212
1967	49,606	11,039	14,104	338,286	63,322	476,357
68	43,187	16,193	17,624	178,786	108,001	363,791
69	42,535	7,835	1,995	214,235	66,389	332,989
70	120,279	43,854	17,969	435,033	100,711	717,846
71	151,465	27,073	14,506	360,015	123,847	676,906
1972	115,737	42,172	9,689	310,126	178,885	656,609
73	123,610	23,034	6,092	336,331	195,431	684,498
74	41,347	4,022	2,334	157,941	80,710	286,354
75	79,740	4,094	1,634	152,891	87,058	325,417
76	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
78	185,451	44,480	1,449	651,743	274,967	1,158,090
79	196,398	38,004	12,174	440,279	219,942	906,797
80 ^{1/}	201,129	77,714	37,294	781,998	306,700	1,404,835
81 ^{1/}	345,955	87,452	32,624	772,869	236,407	1,475,307
20-Year Total	2,887,684	661,671	291,230	8,059,179	3,047,154	14,946,918
1962-71 Total	940,539	210,623	173,551	2,754,236	1,042,846	5,121,795
1972-81 Total	1,947,145	451,048	117,679	5,304,943	2,004,308	9,825,123
20-Year Average	144,384	33,084	14,562	402,959	152,358	747,346
1962-71 Average	94,054	21,062	17,355	275,424	104,285	512,180
1972-81 Average	194,715	45,105	11,768	530,494	200,431	982,512

^{1/} Preliminary.

(Data Sources: 1 and 5)

APPENDIX TABLE 13. Pink salmon commercial catch by district, Bristol Bay, 1962-81.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1962	32,436	43	1	880,424	1,030	913,934
63	56	1	2	226	176	461
64	49,127	606	18	1,497,817	2,001	1,549,569
65	514			95	91	700
66	142,221	8	11	2,337,066	13,545	2,492,851
1967	20			265	829	1,114
68	218,732	211		1,705,150	11,743	1,935,836
69	205	5	1	263	1,396	1,870
70	28,301	41		417,834	10,735	456,911
71	2			37	173	212
1972	57,074	12		67,953	1,984	127,023
73	109		1	61	216	387
74	508,534	4,405	340	413,613	13,086	939,978
75	6	9	2	126	279	422
76	264,631	4,121	116	739,590	28,085	1,036,543
1977	19		5	3,017	1,476	4,517
78	734,880	11,430	530	4,348,336	57,524	5,152,700
79	134	6	9	1,787	1,913	3,849
80 ^{1/}	266,712	2,565	49	2,311,419	69,670	2,650,415
81 ^{1/}	177	262	29	338	6,722	7,528
20-Year Total ^{2/}	2,302,648	23,442	1,065	14,749,202	209,403	17,255,760
1962-71 Total	470,817	909	30	6,838,291	39,054	7,349,101
1972-81 Total	1,831,831	22,533	1,035	7,880,911	170,349	9,906,659
20-Year Average ^{2/}	230,265	2,344	107	1,474,920	20,940	1,725,576
1962-71 Average	94,163	182	6	1,367,658	7,811	1,469,820
1972-81 Average	366,366	4,507	207	1,576,182	34,070	1,981,332

^{1/} Preliminary.

^{2/} Includes even-years only.

(Data Sources: 1 and 5)

APPENDIX TABLE 14. Coho salmon commercial catch by district, Bristol Bay, 1962-81.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1962	2,474	3,828	4,553	28,418	11	39,284
63	6,823	910	2,743	29,648	1,138	41,262
64	3,133	775	380	26,416	5,859	36,563
65	3,053	945	713	2,851	521	8,083
66	4,096	1,932	533	11,517	15,864	33,942
1967	1,175	1,044	1,901	31,517	18,159	53,796
68	7,357	6,507	5,771	48,867	24,872	93,374
69	17	5,548	9,292	37,799	28,720	81,376
70	53	7,027	1,695	3,688	2,027	14,490
71	89	923	469	8,036	3,192	12,709
1972	402	1,249		3,654	8,652	13,957
73	255	2,701	2,307	28,709	23,070	57,042
74	916	1,156	4,055	12,569	25,049	43,745
75	43	951	4,595	7,342	33,350	46,281
76	1,195	2,321	3,561	6,778	12,791	26,646
1977	2,883	2,685	3,884	52,562	45,201	107,215
78	913	2,256	2,024	44,740	44,338	94,271
79	12,355	15,148	17,886	129,607	119,403	294,399
80 ^{1/}	7,748	19,783	9,341	149,719	148,059	334,650
81 ^{1/}	785	30,602	26,817	225,409	29,554	313,167
20-Year Total	55,765	108,291	102,520	889,846	589,830	1,746,252
1962-71 Total	28,270	29,439	28,050	228,757	100,363	414,879
1972-81 Total	27,495	78,852	74,470	661,089	489,467	1,331,373
20-Year Average	2,788	5,415	5,126	44,492	29,492	87,313
1962-71 Average	2,827	2,944	2,805	22,876	10,036	41,488
1972-81 Average	2,750	7,885	7,447	66,109	48,947	133,137

^{1/} Preliminary.

(Data Sources: 1 and 5)

APPENDIX TABLE 15. Total salmon commercial catch by district, Bristol Bay, 1962-81.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1962	2,501,722	667,856	272,682	2,722,524	268,042	6,432,826
63	1,069,902	713,655	205,024	1,085,758	270,886	3,345,225
64	2,462,507	1,132,430	611,548	3,517,089	400,722	8,124,296
65	19,198,357	3,194,005	945,416	1,059,613	340,142	24,737,533
66	5,606,584	2,137,148	477,018	3,706,382	334,585	12,261,717
1967	2,391,732	1,085,310	181,331	1,124,019	196,798	4,979,190
68	1,492,532	697,937	108,005	2,760,285	230,814	5,289,573
69	4,716,845	905,511	183,240	1,106,307	250,938	7,162,841
70	17,971,475	1,458,196	192,703	2,132,636	295,514	22,050,524
71	6,019,188	1,336,865	969,822	1,707,656	363,298	10,396,829
1972	1,277,840	884,350	27,295	809,125	284,758	3,283,368
73	293,174	248,547	12,612	667,664	325,296	1,547,293
74	1,089,440	182,969	10,080	1,126,747	268,984	2,678,220
75	3,166,169	969,315	20,900	827,715	316,827	5,300,926
76	3,134,716	1,384,323	188,862	2,873,538	526,062	8,107,501
1977	2,514,717	1,870,067	103,144	1,659,379	570,995	6,718,302
78	6,051,842	1,268,586	17,933	8,300,533	885,845	16,524,739
79	15,211,128	2,316,037	430,755	4,056,340	832,264	22,846,524
80 ^{1/}	15,606,656	2,718,675	978,504	7,711,112	1,144,642	28,159,589
81 ^{1/}	11,306,039	4,604,860	2,012,637	8,906,901	917,842	27,748,279
20-Year Total	123,082,565	29,776,642	7,949,511	57,861,323	9,025,254	227,695,295
1962-71 Total	63,430,844	13,328,913	4,146,789	20,922,269	2,957,739	104,780,554
1972-81 Total	59,651,721	16,447,729	3,802,722	36,939,054	6,073,515	122,914,741
20-Year Average	6,154,128	1,488,832	397,476	2,893,066	451,263	11,384,764
1962-71 Average	6,343,084	1,332,891	414,679	2,092,227	295,174	10,478,055
1972-81 Average	5,965,172	1,644,773	380,272	3,693,905	607,352	12,291,474

^{1/} Preliminary.

(Data Sources: 1 and 5)

APPENDIX TABLE 16. Commercial salmon catch in percent by gear type and species, Bristol Bay, 1960-79.

Year	Catch in Percent by Gear Type and Species											
	Sockeye		King		Chum		Pink		Coho		Total	
	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set
1960	93	7	96	4	90	10	66	34	35	65	92	8
61	94	6	95	5	94	6	64	36	39	61	94	6
62	84	16	93	7	90	10	85	15	65	35	84	16
63	84	16	93	7	85	15	53	47	47	53	86	14
64	86	14	94	6	86	14	88	12	70	30	86	14
1965	92	8	94	6	88	12	88	12	56	44	92	8
66	89	11	95	5	87	13	89	11	76	24	89	11
67	89	11	97	3	96	4	74	26	81	19	90	10
68	90	10	98	2	95	5	89	11	76	24	90	10
69	88	12	96	4	95	5	84	16	75	25	89	11
1970	93	7	94	6	94	6	82	18	45	55	93	7
71	90	10	98	2	94	6	85	15	64	36	90	10
72	93	7	98	2	95	5	75	25	84	16	93	7
73	92	8	97	3	96	4	86	14	75	25	93	7
74	79	21	97	3	95	5	89	11	75	25	84	16
1975	91	9	96	4	94	6	61	39	80	20	91	9
76	90	10	94	6	96	4	89	11	63	37	91	9
77	89	11	96	4	96	4	88	12	83	17	90	10
78	88	12	97	3	95	5	89	11	76	24	89	11
79	87	13	94	6	92	8	73	27	79	21	88	12
20-Year Total	1,781	291	1,912	88	1,853	147	841	159 ^{1/}	1,344	656	1,794	206
1960-69 Total	889	111	951	49	906	94	417	83	620	380	892	108
1970-79 Total	892	108	961	39	947	53	424	76	724	276	902	98
20-Year Average	89	11	96	4	93	7	84	16 ^{1/}	67	33	90	10
1960-69 Average	89	11	95	5	91	9	83	17	62	38	89	11
1970-79 Average	89	11	96	4	95	5	85	15	72	28	90	10

^{1/} Includes even-years only.

(Data Source: 5)

APPENDIX TABLE 17. Commercial salmon catch in percent by gear type and district, Bristol Bay, 1960-79.^{1/}

Year	Catch in Percent by Gear Type and District											
	Naknek-Kvichak		Egegik		Ugashik		Nushagak		Togiak		Total	
	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set	Drift	Set
1960	95	5	93	7	82	18	81	19	100		92	8
61	95	5	95	5	84	16	75	25	100		94	6
62	91	9	57	43	87	13	83	17	91	9	84	16
63	88	12	83	17	78	22	82	18	100		86	14
64	88	12	82	18	74	26	87	13	98	2	86	14
1965	95	5	84	16	82	18	74	26	100		92	8
66	93	7	88	12	83	17	72	28	98	2	89	11
67	91	9	90	10	81	19	86	14	95	5	90	10
68	85	15	93	7	81	19	91	9	98	2	90	10
69	91	9	80	20	82	18	83	17	99	1	89	11
1970	96	4	84	16	76	24	77	23	99	1	93	7
71	92	8	87	13	89	11	82	18	100		90	10
72	94	6	90	10	46	54	93	7	100		93	7
73	89	11	89	11	84	16	94	6	99	1	93	7
74	84	16	77	23	53	47	83	17	94	6	84	16
1975	93	7	90	10	85	15	83	17	93	7	91	9
76	92	8	90	10	89	11	90	10	93	7	91	9
77	90	10	88	12	87	13	93	7	93	7	90	10
78	90	10	83	17	94	6	89	11	87	13	89	11
79	90	10	77	23	83	17	84	16	86	14	88	12
20-Year Total	1,822	178	1,700	300	1,600	400	1,682	318	1,923	77	1,794	206
1960-69 Total	912	88	845	155	814	186	814	186	979	21	892	108
1970-79 Total	810	90	855	145	786	214	868	132	944	56	902	98
20-Year Average	91	9	85	15	80	20	84	16	96	4	90	10
1960-69 Average	91	9	85	15	81	19	81	19	98	2	89	11
1970-79 Average	91	9	86	14	79	21	87	13	94	6	90	10

^{1/} All salmon species combined.

(Data Source: 5)

APPENDIX TABLE 18. Sockeye salmon escapement by district, Bristol Bay, 1962-81.

Year	Number of Fish					
	Naknek-Kvichak ^{1/}	Egegik	Ugashik ^{2/}	Nushagak ^{3/}	Togiak ^{4/}	Total
1962	3,394,580	1,027,482	274,026	937,698	71,552	5,705,338
63	1,447,422	997,602	397,004	1,063,856	127,596	4,033,480
64	2,555,424	849,576	482,770	1,339,004	114,674	5,341,448
65	25,218,744	1,444,608	997,862	1,099,266	112,786	28,873,266
66	4,965,965	804,246	714,836	1,630,726	122,998	8,238,771
1967	4,174,474	636,864	243,930	875,452	91,330	6,022,050
68	3,774,534	338,654	70,896	976,664	56,418	5,217,166
69	9,907,896	1,015,554	160,380	1,212,586	125,066	12,421,482
70	14,844,868	919,734	735,024	1,966,156	212,896	18,678,678
71	3,510,448	634,014	529,752	1,353,382	213,242	6,240,838
1972	1,747,668	546,402	79,428	528,650	81,970	2,984,118
73	618,510	328,842	38,988	581,307	114,930	1,682,577
74	5,889,750	1,275,630	61,854	2,267,468	108,492	9,603,194
75	15,267,616	1,173,840	429,336	2,273,038	189,162	19,332,992
76	3,367,854	509,160	356,308	1,486,276	200,590	5,920,188
1977	2,527,000	692,514	201,520	1,220,056	202,634	4,843,724
78	5,192,066	895,698	82,434	3,485,532	340,076	9,995,806
79	12,437,996	1,032,042	1,706,904	3,073,571	224,838	18,475,351
80	25,447,866	1,060,860	3,335,284	8,310,438	572,450	38,726,898
81	3,632,788	694,680	1,327,699	2,850,637	365,910	8,871,714
20-Year Total	149,923,469	16,878,002	12,226,235	38,531,763	3,649,610	221,209,079
1962-71 Total	73,794,355	8,668,334	4,606,480	12,454,790	1,248,558	100,772,517
1972-81 Total	76,129,114	8,209,668	7,619,755	26,076,973	2,401,052	120,436,562
20-Year Average	7,496,173	843,900	611,312	1,926,588	182,481	11,060,454
1962-71 Average	7,379,436	866,833	460,648	1,245,479	124,856	10,077,252
1972-81 Average	7,612,911	820,967	761,976	2,607,697	240,105	12,043,656

1/ Includes Kvichak, Branch and Naknek Rivers

2/ Includes Mother Goose system 1962-67 and 1976-81.

3/ Includes Wood, Igushik, Nuyakuk, Snake and Nushagak-Mulchatna Rivers.

4/ Includes Togiak River, Togiak tributaries, Kulukak system and other miscellaneous systems.

(Data Sources: 1, 7 and 20)

APPENDIX TABLE 19. Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak district by river system, Bristol Bay, 1962-81.

Year	Number of Fish					
	Catch	Escapement			Total	Total Run
		Kvichak ^{1/}	Branch ^{2/}	Naknek ^{1/}		
1962	2,281,284	2,580,884	90,630	723,066	3,394,580	5,675,864
63	957,902	338,760	203,304	905,358	1,447,422	2,405,324
64	2,243,701	957,120	248,700	1,349,604	2,555,424	4,799,125
65	19,139,567	24,325,926	175,020	717,798	25,218,744	44,358,311
66	5,397,538	3,775,184	174,336	1,016,445	4,965,965	10,363,503
1967	2,337,226	3,216,208	202,626	755,640	4,174,474	6,511,700
68	1,216,858	2,557,440	193,872	1,023,222	3,774,534	4,991,392
69	4,655,072	8,394,204	182,490	1,331,202	9,907,896	14,562,968
70	17,803,805	13,935,306	177,060	732,502	14,844,868	32,648,673
71	5,857,378	2,387,392	187,302	935,754	3,510,448	9,367,826
1972	1,102,365	1,009,962	151,188	586,518	1,747,668	2,850,033
73	168,249	226,554	35,280	356,676	618,510	786,759
74	538,163	4,433,844	214,848	1,241,058	5,889,750	6,427,913
75	3,085,416	13,140,450	100,480	2,026,686	15,267,616	18,353,032
76	2,547,276	1,965,282	81,822	1,320,750	3,367,854	5,915,130
1977	2,167,214	1,341,144	100,000	1,085,856	2,527,000	4,694,214
78	5,123,668	4,149,288	229,400	813,378	5,192,066	10,315,734
79	14,991,826	11,218,434	294,200	925,362	12,437,996	27,429,822
80	15,123,160 ^{3/}	22,505,268	297,900	2,644,698	25,447,866	40,571,026
81	10,948,744 ^{3/}	1,754,358	82,210	1,796,220	3,632,788	14,581,532
20-Year Total	117,686,412	124,213,008	3,422,668	22,287,793	149,923,469	267,609,881
1962-71 Total	61,890,331	62,468,424	1,835,340	9,490,591	73,794,355	135,684,686
1972-81 Total	55,796,081	61,744,584	1,587,328	12,797,202	76,129,114	131,925,195
20-Year Average	5,884,321	6,210,650	171,133	1,114,390	7,496,173	13,380,494
1962-71 Average	6,189,033	6,246,842	183,534	949,059	7,379,436	13,568,469
1972-81 Average	5,579,608	6,174,458	158,733	1,279,720	7,612,911	13,192,520

^{1/} Tower count.

^{2/} Tower count 1962-76 and aerial survey estimates 1977-81.

^{3/} Preliminary.

(Data Sources : 1, 7 and 20)

APPENDIX TABLE 20. Inshore commercial catch and escapement of sockeye salmon in the Egegik and Ugashik district by river system, Bristol Bay, 1962-1981.

Year	Number of Fish							
	Egegik District			Ugashik District				
	Catch	Escapement		Catch	Escapement			Total Run
Egegik ^{1/}		Total Run	Ugashik ^{1/}		Mother Goose ^{2/}	Total		
1962	638,862	1,027,482	1,666,344	243,159	255,426	18,600	274,026	517,185
63	695,582	997,602	1,693,184	188,695	388,254	8,750	397,004	585,699
64	1,103,935	849,576	1,953,511	576,768	472,770	10,000	482,770	1,059,538
65	3,179,559	1,444,608	4,624,167	925,690	996,612	1,250	997,862	1,923,552
66	2,101,174	804,246	2,905,420	445,458	704,436	10,400	714,836	1,160,294
1967	1,070,942	636,864	1,707,806	163,744	238,830	5,100	243,930	407,674
68	671,554	338,654	1,010,208	82,457	70,896		70,896	153,353
69	889,322	1,015,554	1,904,876	169,845	160,380		160,380	330,225
70	1,403,509	919,734	2,323,243	171,541	735,024		735,024	906,565
71	1,306,682	634,014	1,940,696	954,068	529,752		529,752	1,483,820
1972	839,820	546,402	1,386,222	17,440	79,428		79,428	96,868
73	221,337	328,842	550,179	3,920	38,988		38,988	42,908
74	172,253	1,275,630	1,447,883	2,151	61,854		61,854	64,005
75	964,024	1,173,840	2,137,864	14,558	429,336		429,336	443,894
76	1,329,788	509,160	1,838,948	174,923	341,808	14,500	356,308	531,231
1977	1,780,567	692,514	2,473,081	92,623	201,486	34	201,520	294,143
78	1,207,294	895,698	2,102,992	7,995	70,434	12,000	82,434	90,429
79	2,257,332	1,032,042	3,289,374	391,118	1,700,904	6,000	1,706,904	2,098,022
80	2,613,284 ^{3/}	1,060,860	3,674,144	926,011 ^{3/}	3,321,384	13,900	3,335,284	4,261,295
81	4,480,710 ^{3/}	694,680	5,175,390	1,949,531 ^{3/}	1,326,762	937	1,327,699	3,277,230
20-Year Total	28,927,530	16,878,002	45,805,532	7,501,695	12,124,764	101,471	12,226,235	19,727,930
1962-71 Total	13,061,121	8,668,334	21,729,455	3,921,425	4,552,380	54,100	4,606,480	8,527,905
1972-81 Total	15,866,409	8,209,668	24,076,077	3,580,270	7,572,384	47,371	7,619,755	11,200,025
20-Year Average	1,446,377 ^{4/}	843,900	2,290,277	375,085	606,238	8,456	611,312	986,397
1962-71 Average	1,306,112	866,833	2,172,946	392,143	455,238	9,017	460,648	852,791
1972-81 Average	1,586,641	820,967	2,407,608	358,027	757,238	7,895	761,976	1,120,003

^{1/} Tower count.

^{2/} Aerial survey estimate.

^{3/} Preliminary.

^{4/} Only years and systems with escapement data were included in calculating averages.

(Data Sources: 1, 7 and 20)

APPENDIX TABLE 21. Inshore commercial catch and escapement of sockeye salmon in the Nushagak district by river system, Bristol Bay, 1962-81.

Year	Number of Fish							Total	Total Run
	Catch	Escapement							
		Wood ^{1/}	Igushik ^{1/}	Nuyakuk ^{1/}	Nush/Mul ^{2/}	Snake ^{3/}			
1962	1,461,766	873,888	15,660	37,890	8,500	1,760	937,698	2,399,464	
63	842,744	721,404	92,184	166,608	45,700	37,960	1,063,856	1,906,600	
64	1,420,941	1,076,112	128,532	103,224	18,700	12,436	1,339,004	2,759,945	
65	793,323	675,156	180,840	203,070	28,200	12,000	1,099,266	1,892,589	
66	1,170,271	1,208,682	206,360	161,010	60,174	4,500	1,630,726	2,800,997	
1967	657,711	515,772	281,772	20,250	46,658	11,000	875,452	1,533,163	
68	749,281	649,344	194,508	96,642	32,070	4,100	976,664	1,725,945	
69	773,207	604,338	512,328	69,828	16,792	9,300	1,212,586	1,985,793	
70	1,188,534	1,161,964	370,920	364,648	44,824	23,800	1,966,156	3,154,690	
71	1,256,799	851,202	210,960	224,382	58,336	8,500	1,353,382	2,610,181	
1972	381,347	430,602	60,018	28,596	7,434	2,000	528,650	909,997	
73	272,093	330,474	59,508	110,016	80,394	915	581,307	853,400	
74	510,571	1,708,836	358,752	154,614	30,000	15,266	2,267,468	2,778,039	
75	645,902	1,270,116	241,086	669,918	82,400	9,518	2,273,038	2,918,940	
76	1,265,422	817,008	186,120	425,220	45,200	12,728	1,486,276	2,751,698	
1977	619,025	561,828	95,970	232,554	320,400	9,304	1,220,056	1,839,081	
78	3,137,166	2,267,238	536,154	576,666	87,400	18,074	3,485,532	6,622,698	
79	3,327,346	1,706,352	859,560	360,120	139,100	8,439	3,073,571	6,400,917	
80	4,403,652 ^{4/}	2,969,040	1,987,530	3,026,568	290,800	36,500	8,310,438	12,714,090	
81	7,713,416 ^{4/}	1,233,318	591,144	834,204	177,400	14,571	2,850,637	10,564,053	
20-Year Total	32,590,517	21,632,674	7,169,906	7,866,028	1,610,482	252,671	38,531,763	71,122,280	
1962-71 Total	10,314,577	8,337,862	2,194,064	1,447,552	349,954	125,356	12,454,790	22,769,367	
1972-81 Total	22,275,940	13,294,812	4,975,842	6,418,476	1,260,528	127,315	26,076,973	48,352,913	
20-Year Average	1,629,526	1,081,634	358,495	393,301	80,524	12,634	1,926,588	3,556,114	
1962-71 Average	1,031,458	833,786	219,406	144,755	34,995	12,536	1,245,479	2,276,937	
1972-81 Average	2,227,594	1,329,481	497,584	641,848	126,053	12,732	2,607,697	4,835,291	

1/ Tower count.

2/ Aerial survey estimate 1962-65 and 1977-81; tower counts 1966-70 and 1973-74. Tower not operated in 1971-72 and 1975-76; escapement estimates for these years were based on the average ratio of Nuyakuk/Nushagak-Mulchatna River system in those years when data was available.

3/ Tower count 1962-64; aerial survey estimate 1965-72 and 1980; weir count 1973-79 and 1981.

4/ Preliminary.

(Data Sources: 1, 7 and 16)

APPENDIX TABLE 22. Inshore commercial catch and escapement of sockeye salmon in the Togiak district by river system, Bristol Bay, 1962-81.

Year	Number of Fish									
	Catch				Escapement					
	Togiak	Kulukak	Os/Mat ^{1/}	Total	Togiak		Tribu- taries ^{4/}	Kulukak ^{5/}	Total	Total Run
				Lake ^{2/}	River ^{3/}					
1962	92,273	672		92,945	47,352		14,600	9,600	71,552	164,497
63	185,659	554		186,213	102,396		13,800	11,400	127,596	313,809
64	242,489	8,286		250,775	95,574		9,300	9,800	114,674	365,449
65	213,835	3,265		217,100	88,386		8,100	16,300	112,786	329,886
66	190,479	7,263	2,057	199,799	91,098		13,100	18,800	122,998	332,797
1967	71,512	24,379	5,216 ^{6/}	101,107	69,330		12,000	10,000	91,330	192,437
68	65,475	2,618	4,606	72,699	42,918		7,000	6,500	56,418	129,117
69	129,615	3,411	1,226	134,252	109,266		7,400	8,400	125,066	259,318
70	152,748		629	153,377	192,096		10,800	10,000	212,896	366,273
71	200,507	7,927	626	209,060	190,842		9,400	13,000	213,242	422,302
1972	51,354	17,244	6,663	75,261	74,070		4,500	3,400	81,970	157,231
73	75,694	15,551	4,478	95,723	95,730		11,200	8,000	114,930	210,653
74	110,886	13,615	14,840	139,341	82,992	12,000	8,600	4,900	108,492	247,833
75	184,856	3,821	237	188,914	160,962	12,200	7,400	8,600	189,162	378,076
76	293,016	4,822	4,045	301,883	158,190	16,000	16,200	11,200	200,590	502,473
1977	201,004	16,262	1,195	218,461	133,734	4,400	24,400	40,100	202,634	421,085
78	422,100	29,668	248	452,016	273,576	16,000	17,600	33,900	340,076	792,092
79	445,196	14,771	1,018	460,984	171,138	14,200	12,900	26,600	224,838	685,822
80	590,718	16,890	266	607,874 ^{7/}	461,850	27,900	37,000	45,700	572,450	1,180,324
81	600,670	16,184	3,957	620,811 ^{7/}	208,080	21,150	77,900	58,800	365,930	986,741
20-Year Total	4,520,085	207,193	51,307	4,778,585	2,849,580		323,200	355,000	3,649,630	8,428,215
1962-71 Total	1,544,592	58,375	14,360	1,617,327	1,029,258		105,500	113,800	1,248,558	2,865,885
1972-81 Total	2,975,493	148,818	36,947	3,161,258	1,820,322	121,850	217,700	241,200	2,401,072	5,562,330
20-Year Average ^{8/}	226,004	10,360	3,207	238,929	142,479		16,160	17,750	182,482	421,411
1962-71 Average	154,459	5,838	2,393	161,733	102,926		10,550	11,380	124,856	286,589
1972-81 Average	297,549	14,882	3,695	316,126	182,032	15,231	21,770	24,120	240,107	556,233

1/ Catches in the Osviak and Matogak sections were combined.

2/ Tower count.

3/ Aerial survey estimate.

4/ Aerial survey estimate; includes Gechiak, Pungokepuk, Ongivinuck, Ungalikthluk/Kukayachagak, and other miscellaneous river systems.

5/ Aerial survey estimate; includes Kulukak River and Lake and Tithe Creek ponds.

6/ Includes 25 fish from Cape Peirce section in 1967 and 248 in 1978.

7/ Preliminary.

8/ Only years and systems with catch/escapement data were included in calculating averages.

(Data Sources: 1, 7 and 18)

APPENDIX TABLE 23. Inshore total return of sockeye salmon by district, Bristol Bay, 1962-81.

Year	Commercial Catch and Escapement in Numbers of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1962	5,675,864	1,666,344	517,185	2,399,464	164,497	10,423,354
63	2,405,324	1,693,184	585,699	1,906,600	313,809	6,904,616
64	4,799,125	1,953,511	1,059,538	2,759,945	365,449	10,937,568
65	44,358,311	4,624,167	1,923,552	1,892,589	329,886	53,128,505
66	10,363,503	2,905,420	1,160,294	2,800,997	322,797	17,553,011
1967	6,511,700	1,707,806	407,674	1,533,163	192,437	10,352,780
68	4,991,392	1,010,208	153,353	1,725,945	129,117	8,010,015
69	14,562,968	1,904,876	330,225	1,985,793	259,318	19,043,180
70	32,648,673	2,323,243	906,565	3,154,690	366,273	39,399,444
71	9,367,826	1,940,696	1,483,820	2,610,181	422,302	15,824,825
1972	2,850,033	1,386,222	96,868	909,997	157,231	5,400,351
73	786,759	550,179	42,908	853,400	210,653	2,443,899
74	6,427,913	1,447,883	64,005	2,778,039	242,833	10,960,673
75	18,353,032	2,137,864	443,894	2,918,940	378,076	24,231,806
76	5,915,130	1,838,948	531,231	2,751,698	502,473	11,539,480
1977	4,694,214	2,473,081	294,143	1,839,081	421,085	9,721,604
78	10,315,734	2,102,992	90,429	6,622,698	792,092	19,923,945
79	27,429,822	3,289,374	2,098,022	6,400,917	685,822	39,903,957
80	40,571,026	3,674,144	4,261,295	12,714,090	1,180,324	62,400,879
81	14,581,532	5,175,390	3,277,230	10,564,053	986,721	34,584,926
20-Year Total	267,672,881	45,805,532	19,727,930	71,122,280	8,423,195	412,688,818
1962-71 Total	135,684,686	21,729,455	8,527,905	22,769,367	2,865,885	191,577,298
1972-81 Total	131,988,195	24,076,077	11,200,025	48,352,913	5,557,310	221,111,520
20-Year Average	13,383,644	2,290,277	986,397	3,556,114	421,160	20,634,441
1962-71 Average	13,568,469	2,172,946	852,791	2,276,937	286,589	19,157,730
1972-81 Average	13,198,820	2,407,608	1,120,003	4,835,291	555,731	22,111,152

(Data Sources: 1, 7, 16, 18 and 20)

APPENDIX TABLE 24. Kvichak River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	9,433	14	23,509	12,755	1,316		37,594	3.98
57	2,843	7	226	3,437	262	2	3,934	1.38
58	535		70	179	27	20	296	0.55
59	680		194	318	13		525	0.77
60	14,630		1,397	46,326	6,279	6	54,008	3.69
1961	3,706	1	317	2,415	666		3,399	0.92
62	2,581		96	4,743	406	7	5,252	2.04
63	339		49	676	354	19	1,098	3.24
64	957	8	2,083	2,662	681	11	5,445	5.69
65	24,326	23	9,787	32,066	1,345	2	43,223	1.78
1966	3,775	15	481	5,255	346	1	6,098	1.62
67	3,216		329	1,007	77		1,413	0.44
68	2,557		271	131	156	2	560	0.22
69	8,394		141	4,460	593	10	5,204	0.62
70	13,935	1	83	14,337	1,222	11	15,654	1.12
1971	2,387		260	2,192	284		2,736	1.15
72	1,010		248	1,351	302		1,901	1.88
73	227		587	1,244	568		2,399	10.59
74	4,434	10	6,539	18,365	769	5	25,688	5.79
75	13,140	5	5,822	29,461	565		(35,853)	(2.73)
1976	1,965	5	5,107	4,627			(9,739)	(4.96)
77	1,341	47	1,840				(1,887)	(1.41)
78	4,149							
79	11,218							
80	22,505							
1981	1,754							
Total	156,047	136	59,436	188,007	16,231	96	263,906	
1956-74								
Total	99,965	79	46,667	153,919	15,666	96	216,427	
Average ^{3/}	5,261	4	2,456	8,101	825	5	11,391	2.17
Percent		+	21.6	71.1	7.2	+	100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 25. Branch River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	784	5	1,825	435	64		2,329	2.97
57	127		5	65	13	1	84	0.66
58	95		39	53	52		144	1.52
59	825		275	387	95	6	763	0.92
60	1,241		101	313	30		444	0.36
1961	90	10	86	187			283	3.14
62	91	19	117	90	19		245	2.69
63	203		189	163	2		354	1.74
64	249	5	91	199	17	1	313	1.26
65	175	6	98	162	19		285	1.63
1966	174	13	264	243	10		530	3.04
67	203	9	278	87	7		381	1.88
68	194	8	117	33	3		161	0.84
69	182		5	155	24		184	1.01
70	177		73	75	2		150	0.84
1971	187	2	26	57	36	2	123	0.66
72	151	1	87	24	13		125	0.83
73	35		96	141	2		239	6.83
74	215	4	292	143	26		465	2.16
75	100	15	403	302	32		(752)	(7.52)
1976	82	26	203	167			(396)	(4.83)
77	100	24	126				(150)	(1.50)
78	229							
79	294							
80	298							
1981	82							
Total	6,583	147	4,796	3,481	466	10	8,900	
1956-74								
Total	5,398	82	4,064	3,012	434	10	7,602	
Average ^{3/}	284	4	214	159	23	1	400	1.41
Percent		1.1	53.5	39.6	5.7	+	100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 7 and 18)

APPENDIX TABLE 26. Naknek River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	1,773	1	458	1,615	324	2	2,400	1.35
57	635		51	821	680	3	1,555	2.45
58	278		106	735	176	13	1,030	3.71
59	2,232		325	1,077	854		2,256	1.01
60	828	1	1,366	1,294	1,237	3	3,901	4.71
1961	351		231	1,033	624	11	1,899	5.41
62	723		72	564	399	1	1,036	1.43
63	905		137	1,180	610	1	1,928	2.13
64	1,350	1	421	1,350	202	4	1,978	1.47
65	718	5	554	1,043	475	3	2,080	2.90
1966	1,016	5	683	2,205	565	1	3,459	3.40
67	756		309	918	317	1	1,545	2.04
68	1,023	3	141	288	314	2	748	0.73
69	1,331		52	1,251	1,174	3	2,480	1.86
70	733		172	2,134	371		2,677	3.65
1971	936	1	418	1,930	1,800	16	4,165	4.45
72	587	3	242	391	577	1	1,214	2.07
73	357		448	1,102	592		2,142	6.00
74	1,241	2	231	1,230	753	5	2,221	1.79
75	2,027	1	424	3,077	1,543		(5,045)	(2.49)
1976	1,321	4	1,026	5,378			(6,408)	(4.85)
77	1,086	10	599				(609)	(0.56)
78	813	1					(1)	(+)
79	925							
80	2,645							
1981	1,796							
Total	28,386	38	8,466	30,616	13,587	70	52,777	
1956-74								
Total	17,773	22	6,417	22,161	12,044	70	40,714	
Average ^{3/}	935	1	338	1,166	634	4	2,143	2.29
Percent		+	15.8	54.4	29.6	0.1	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

2/ Returns in parenthesis are incomplete.

3/ Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 27. Egegik River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	1,104	6	1,961	3,902	700	32	6,601	5.98
57	391		35	1,092	1,005	64	2,196	5.61
58	246		41	866	334	19	1,260	5.11
59	1,072		68	1,176	653	69	1,966	1.83
60	1,799	7	452	4,676	2,528	51	7,714	4.29
1961	702		81	657	806	14	1,558	2.22
62	1,027		20	1,001	399	56	1,476	1.44
63	998		17	635	595	13	1,260	1.26
64	850	1	117	1,490	382	52	2,042	2.40
65	1,445		133	2,003	941	46	3,123	2.16
1966	804		235	1,269	825	23	2,352	2.92
67	637		59	854	592	17	1,522	2.39
68	339		38	161	303	13	515	1.52
69	1,016		13	1,185	1,378	112	2,688	2.65
70	920		59	874	262	37	1,232	1.34
1971	634		46	1,537	1,017	53	2,653	4.18
72	546		60	1,579	1,241	18	2,898	5.31
73	329		74	697	878	4	1,653	5.02
74	1,276		147	2,277	533	3	2,960	2.32
75	1,174		153	2,520	791		(3,464)	(2.95)
1976	509	2	644	3,662			(4,308)	(8.46)
77	693	2	795				(797)	(1.15)
78	896							
79	1,032							
80	1,061							
1981	695							
Total	22,195	18	5,248	34,113	16,163	696	56,238	
1956-74 Total	16,135	14	3,656	27,931	15,372	696	47,669	
Average ^{3/}	849	1	192	1,470	809	37	2,509	2.95
Percent		+	7.7	58.6	32.2	1.5	100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 28. Ugashik River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	425	13	3,066	869	37		3,985	9.38
57	215		34	446	106	2	588	2.73
58	280		58	537	67		662	2.36
59	219		16	340	160	1	517	2.36
60	2,304		660	1,820	471	1	2,952	1.28
1961	349		233	728	117		1,078	3.09
62	255		73	306	26		405	1.59
63	388		13	109	22		144	0.37
64	473		37	255	19	9	320	0.68
65	997		82	275	179		536	0.54
1966	704	1	678	1,396	19		2,094	2.97
67	239		52	85	33		170	0.71
68	71		13	26	4		43	0.61
69	160		4	57	27	2	90	0.56
70	735		5	256	29	1	291	0.40
1971	530		176	497	123	1	797	1.50
72	79		33	176	35	4	248	3.14
73	39		18	21	50		89	2.28
74	62		19	603	84		706	11.39
75	429	3	1,442	2,184	302		(3,931)	(9.16)
1976	342		2,005	2,507			(4,512)	(13.19)
77	201	2	542				(544)	(2.71)
78	70							
79	1,701							
80	3,321							
1981	1,327							
Total	15,915	19	9,259	13,493	1,910	21	24,702	
1956-74 Total	8,524	14	5,270	8,802	1,608	21	15,715	
Average ^{3/}	449	1	277	463	85	1	827	1.84
Percent		+	33.5	56.0	10.2	0.1	100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 29. Wood River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	773		752	616			1,368	1.77
57	289		147	296			443	1.53
58	960	1	1,957	467	33		2,458	2.56
59	2,209		903	752	68	4	1,727	0.78
60	1,016	6	1,416	1,111	99		2,632	2.59
1961	461		251	1,124	29	2	1,406	3.05
62	874	2	886	506	43		1,437	1.64
63	721		574	722	44		1,340	1.86
64	1,076	1	382	696	72	7	1,158	1.08
65	675	3	487	997	199	4	1,690	2.50
1966	1,209	7	926	799	55		1,787	1.48
67	516	3	577	214	68		862	1.67
68	649	1	419	397	26		843	1.30
69	604		61	642	105	1	809	1.34
70	1,162	2	1,534	1,082	30		2,648	2.28
1971	851	2	442	757	63		1,264	1.49
72	431	3	771	602	39		1,415	3.28
73	330	2	211	1,130	33		1,376	4.17
74	1,709	7	2,902	2,022	60		4,991	2.92
75	1,270	55	1,543	2,275	674		(4,547)	(3.58)
1976	817	3	2,145	2,868			(5,016)	(6.14)
77	562	19	948				(967)	(1.72)
78	2,267							
79	1,706							
80	2,959							
1981	1,233							
Total	27,339	117	20,234	20,075	1,740	18	42,184	
1956-74								
Total	16,515	40	15,598	14,932	1,066	18	31,654	
Average ^{3/}	869	2	821	786	56	1	1,666	1.92
Percent		0.1	49.3	47.2	3.4	+	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

2/ Returns in parenthesis are incomplete.

3/ Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 30. Igushik River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	400		163	506	40		709	1.77
57	130		2	54	20		76	0.58
58	107		13	91	28		132	1.23
59	644		92	246	27		365	0.57
60	495		62	341	61		464	0.94
1961	294		32	404	7		443	1.51
62	16		32	144	14		190	11.88
63	92		168	290	23		481	5.23
64	129		174	586	54		814	6.31
65	181		313	647	123		1,083	5.98
1966	206		79	484	11	2	576	2.80
67	282		78	95	14		187	0.66
68	195		82	97	13		192	0.98
69	512		1	399	114		514	1.00
70	371		25	259	50		334	0.90
1971	211		55	220	27		302	1.43
72	60		89	114	19		222	3.70
73	60		19	621	24		664	11.07
74	359		454	1,057	23		1,534	4.27
75	241		759	2,580	508		(3,847)	(15.96)
1976	186		521	1,677			(2,198)	(11.82)
77	96		318				(318)	(3.31)
78	536							
79	860							
80	1,988							
1981	591							
Total	9,242		3,531	10,912	1,200	2	15,645	
1956-74 Total	4,744		1,933	6,655	692	2	9,282	
Average ^{3/}	250		102	350	36	+	489	1.96
Percent			20.8	71.7	7.5	+	100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 31. Nuyakuk River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	30		210	153			363	12.10
57	67		4	13	1		18	0.27
58	196		85	343	12		440	2.24
59	49		54	61	11		126	2.57
60	146	4	148	387	11		550	3.77
1961	80	1	67	297	1		366	4.58
62	38		20	43	2		65	1.71
63	167		13	167	6		186	1.11
64	103	1	15	67	2		85	0.83
65	203		87	596	54		737	3.63
1966	161	1	115	409	17		542	3.37
67	20	1	9	132	6		148	7.40
68	97		30	176	8		214	2.21
69	70	3	20	85	8		116	1.66
70	365		89	872	103		1,064	2.92
1971	224	1	105	794	43	1	944	4.21
72	29		59	304	144		507	17.48
73	110		44	1,014	1		1,059	9.63
74	155		117	244			361	2.33
75	670	10	505	4,432	225		(5,172)	(7.72)
1976	425	1	382	2,724			(3,107)	(7.31)
77	233		304				(304)	(1.30)
78	577							
79	360							
80	3,027							
1981	834							
Total	8,436	23	2,482	13,313	655	1	16,474	
1956-74 Total	2,310	12	1,291	6,157	430	1	7,891	
Average ^{3/}	122	1	68	324	23	+	415	3.42
Percent		0.2	16.4	78.0	5.4	+	100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 32. Nushagak-Mulchatna River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	5		49	3			52	10.40
57	10		99	12			111	11.10
58	5		16				16	3.20
59		1	62		1		64	
60		5	41	54	3		103	
1961	20	8	9	92	2		111	5.55
62	9		6	98	1		105	11.67
63	46		29	46	2		77	1.67
64	19	1	20	15			36	1.89
65	28	1	43	85	4		133	4.75
1966	50	3	40	88	3		134	2.68
67	47	1	29	12	7		49	1.04
68	32	1	7	75	9		92	2.88
69	17		66	9	7		82	4.82
70	45	1	23	98	7		129	2.87
1971	58	2	41	78	114		235	4.05
72	7		28	309	38		375	53.57
73	80		95	147	38		280	3.50
74	30	2	13	188	40		243	8.10
75	82		61	394	55		(510)	(6.22)
1976	45	3	49	499			(551)	(12.24)
77	320		55				(55)	(0.17)
78	87							
79	139							
80	291							
1981	177							
Total	1,649	29	881	2,302	331		3,543	
1956-74 Total ^{3/}	508	20	613	1,355	272		2,260	
Average ^{4/}	30	1	36	80	16		133	4.45
Percent		0.9	27.1	60.0	12.0		100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

2/ Returns in parenthesis are incomplete.

3/ Includes 1956-58 and 1961-74.

4/ Averages and percentages computed from 1956-58 and 1961-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 33. Snake River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement	Return by Year					Total	Return Per Spawner ^{2/}
		3	4	5	6	7		
1956	4		12	6			18	4.50
57	3		2	1			3	1.00
58	9		4	3			7	0.78
59	140		62	14	1		77	0.55
60	17		14	19			33	1.94
1961	5		5	4			9	1.80
62	2		3	5			8	4.00
63	38		7	3			10	0.26
64	12		2	6	1		9	0.75
65	12		4	12	1		17	1.42
1966	5		14	4			18	3.60
67	11		4	1			5	0.45
68	4		2	1	1		4	1.00
69	9		1	9	2		12	1.33
70	24		10	11			21	0.88
1971	9		5	19	5		29	3.22
72	2		6	2			8	4.00
73	1		8	7			15	15.00
74	15		26	7	5		38	2.53
75	10		10	24	12		(46)	(4.60)
1976	13		26	25			(51)	(3.92)
77	9		14				(14)	(0.78)
78	18							
79	8							
80	37							
1981	15							
Total	432		241	183	28		452	
1956-74								
Total	322		191	134	16		341	
Average ^{3/}	17		10	7	1		18	1.06
Percent			56.0	39.3	4.7		100.0	

^{1/} Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

^{2/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-74 totals only.

(Data Sources: 1 and 18)

APPENDIX TABLE 34. Togiak River sockeye salmon escapement and return by brood year, 1956-81.^{1/}

Brood Year	Escapement ^{2/}	Return by Year					Total	Return Per Spawner ^{3/}
		3	4	5	6	7		
1956	225		107	311	15	1	434	1.93
57	25	2	50	91	37		180	7.20
58	72	4	65	174	25		268	3.72
59	210		129	147	8		284	1.35
60	192		186	292	50		528	2.75
1961	122	1	84	226	19		330	2.70
62	62		50	102	8	1	161	2.60
63	116		42	79	23	4	148	1.28
64	105		40	115	17		172	1.64
65	96		149	201	40		390	4.06
1966	104	1	194	375	10	1	581	5.59
67	81	1	22	100	37		160	1.98
68	50		47	151	17		215	4.30
69	117		33	159	15		207	1.77
70	203		55	276	70	1	402	1.98
1971	200		111	376	70	2	559	2.80
72	79	1	93	174	101		369	4.67
73	107	1	163	406	16		586	5.48
74	104	1	262	375	47	1	686	6.60
75	181		280	928	56		(1,264)	(6.98)
1976	189		184	652			(836)	(4.42)
77	163		243				(243)	(1.49)
78	306	1					(1)	
79	198							
80	527							
1981	307							
Total	4,141	13	2,589	5,710	681	11	9,004	
1956-74								
Total	2,270	12	1,882	4,130	625	11	6,660	
Average ^{4/}	119	1	99	217	33	1	351	2.93
Percent		0.3	28.2	61.8	9.4	0.3	100.0	

1/ Includes estimates of Japanese high seas catch of Bristol Bay sockeye. All escapements and returns are rounded to nearest thousand fish.

2/ Includes Togiak Lake, Togiak River and tributary spawners.

3/ Returns in parenthesis are incomplete.

4/ Averages and percentages computed from 1956-74 totals only.

(Data Sources: 7 and 18).

APPENDIX TABLE 35. Inshore commercial catch and escapement of king salmon in the Nushagak and Togiak districts, Bristol Bay, 1966-81.^{1/}

Year	Number of Fish					
	Nushagak District			Togiak District		
	Catch	Escapement ^{2/}	Total Run	Catch	Escapement ^{3/}	Total Run
1966	58,184	40,000 ^{a/}	98,184	9,967		
67	96,240	65,000 ^{b/}	161,240	13,381	10,000	23,381
68	78,201	70,000	148,201	13,499	16,000	29,499
69	80,803	35,000	115,803	20,181	8,000	28,181
70	87,547	50,000	138,547	28,664	15,000	43,664
1971	82,769		^{4/}	27,026	20,000	47,026
72	46,045	25,000	71,045	19,976	14,000	33,976
73	30,470	35,000	65,470	10,856	11,000	21,856
74	32,053	70,000	102,053	10,798	15,000	25,798
75	21,454	70,000	91,454	7,226	11,000	18,226
1976	60,684	100,000	160,684	29,744	14,000	43,744
77	85,074	65,000	150,074	35,218	20,000	55,218
78	118,548	130,000	248,548	57,000	40,000	97,000
79	157,321	95,000	252,321	30,022	20,000	50,022
80	64,324 ^{5/}	141,000	205,324	12,339 ^{5/}	12,000	24,339
1981	194,869 ^{5/}	150,000	344,869	24,348 ^{5/}	27,000	51,348
16-Year Total	1,294,586	1,141,000	2,352,817	350,245	253,000	593,278
1966-75 Total	613,766	460,000	990,997	161,574	120,000	271,607
1976-81 Total	680,820	681,000	1,361,820	188,671	133,000	321,671
16-Year Average	80,912	71,313	147,051	21,890	15,813	37,080
1966-75 Average	61,377	51,111	110,111	16,157	13,333	30,179
1976-81 Average	113,470	113,500	226,970	31,445	22,167	53,612

^{1/} Escapement estimates are based on data collected on comprehensive aerial surveys of the spawning grounds; these escapement estimates supercede previously reported escapements, and are rounded to the nearest thousand fish.

^{2/} Comprehensive aerial coverage was begun in 1968; escapements prior to 1968 were derived from:

a/ tower enumeration data from Nushagak River, and estimate of total escapement accounted for by tower enumeration;

b/ tower enumeration data, minimal aerial survey coverage, and general run strength indicators (commercial and subsistence catches).

^{3/} Comprehensive aerial survey coverage was begun in 1967.

^{4/} Escapement estimate precluded by adverse weather; however, information indicates a "light escapement" compared to previous years.

^{5/} Preliminary.

(Data Sources: 1, 5 and 13)

APPENDIX TABLE 36. Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak districts, Bristol Bay, 1966-81.^{1/}

Year	Number of Fish					
	Nushagak District			Togiak District		
	Catch	Escapement ^{2/}	Total Run	Catch	Escapement ^{3/}	Total Run
1966	129,344	80,000	209,344	95,410		
67	338,286	200,000	538,286	63,322	179,000	242,322
68	178,786	100,000	278,786	108,001	348,000	456,001
69	214,235	130,000	344,235	66,389	85,000	151,389
70	435,033	273,000	708,033	100,711	241,000	341,711
1971	360,015	226,000	586,015	123,847	229,000	352,847
72	310,126	195,000	505,126	178,885	170,000	348,885
73	336,331	200,000	536,331	195,431	163,000	358,431
74	157,941	100,000	257,941	80,710	161,000	241,710
75	152,891	80,000	232,891	87,058	114,000	201,058
1976	801,064	500,000	1,301,064	153,559	392,000	545,559
77	899,701	609,000	1,508,701	270,649	496,000	766,649
78	651,743	293,000	944,743	274,967	396,000	670,967
79	440,279	166,000	606,279	219,942	293,000	512,942
80	781,998 ^{4/}	969,000	1,750,998	306,700 ^{4/}	415,000	721,700
1981	772,869 ^{4/}	177,000	949,869	236,407 ^{4/}	331,000	567,407
16-Year Total	6,960,642	4,298,000	11,258,642	2,561,988	4,013,000	6,479,578
1966-75 Total	2,612,988	1,584,000	4,196,988	1,099,764	1,690,000	2,694,354
1976-81 Total	4,347,654	2,714,000	7,061,654	1,462,224	2,323,000	3,785,224
16-Year Average	435,040	268,625	703,665	160,124	250,813	404,974
1966-75 Average	261,299	158,400	419,699	109,976	187,778	299,373
1976-81 Average	724,609	452,333	1,176,942	243,704	387,167	630,871

1/ Escapement estimates are based on data collected on comprehensive aerial surveys of the spawning grounds; these estimates supercede previously reported escapements, and are rounded to the nearest thousand fish.

2/ Comprehensive aerial coverage was begun in 1977; escapements were derived from:

(a) 1966 - tower enumeration data from Nushagak River; and estimates of total escapement accounted for by tower enumeration;

(b) 1967 and 1969 - tower enumeration data, and proportion of escapement to catch in 1966 and 1968;

(c) 1968 and 1973-74 - tower enumeration and aerial survey data;

(d) 1970-72 - average catch/escapement ratio for 1968-69 and 1973-81;

(e) 1975-78 - aerial survey data; and

(f) 1979-81 - sonar estimate from Portage Creek site.

3/ Comprehensive aerial survey coverage was begun in 1967.

4/ Preliminary.

(Data Sources: 1, 5 and 13)

APPENDIX TABLE 37. Inshore commercial catch and escapement of pink salmon in the Nushagak district by river system, Bristol Bay, 1958-80.^{1/}

Year	Catch	Number of Fish Escapement					Total	Total Run
		Wood ^{2/}	Igushik ^{3/}	Nuvakuk ^{4/}	Nush/Mu1 ^{5/}	Snake ^{6/}		
1958	1,113,794			4,000,000			4,000,000	5,113,794
60	289,781			146,359			146,359	436,140
62	880,424	25,000	12,000	493,914	6,100	6,000	543,014	1,423,438
64	1,497,817	1,560	450	883,500	25,000	50	910,560	2,408,377
66	2,337,066			1,442,424			1,442,424	3,779,490
68	1,705,150			2,161,116			2,161,116	3,866,266
1970	417,834			152,580			152,580	570,414
72	67,953			58,536			58,536	126,489
74	413,613	44,800	7,500	529,216	3,100	900	585,516	999,129
76	739,580	21,986	5,070	794,478	41,800	100	863,434	1,603,024
78	4,348,336	205,000	16,210	8,390,184	771,600	3,483	9,386,477	13,734,813
1980	2,311,419 ^{8/}	31,150	3,500	2,626,746	123,000	800	2,785,196	5,096,615
12-Year Total	16,122,777	329,496	44,730	21,679,053	970,600	11,333	23,035,212	39,157,989
12-Year Average ^{7/}	1,343,565	54,916	7,455	1,806,588	161,767	1,889	1,919,601	3,263,166

1/ Includes even-years only.

2/ Aerial survey estimate 1962 and 1974-80; tower count 1964.

3/ Aerial survey estimate 1962-80; aerial survey estimate and tower count 1976.

4/ Tower count 1960-80; aerial survey estimate 1958, and below counting tower 1962-64 and 1974-80.

5/ Aerial survey estimate.

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

7/ Only years and systems with escapement data were included in calculating averages.

8/ Preliminary.

(Data Sources: 1, 5 and 21)

APPENDIX TABLE 38. Nushagak district pink salmon escapement and return by brood year, 1958-80.^{1/}

Brood Year	Number of Fish		Return Per Spawner
	Escapement	Return	
1958	4,000	436	0.11
1960	149	1,423	9.75
62	543	2,408	4.43
64	911	3,779	4.15
66	1,442	3,866	2.68
68	2,161	570	0.26
1970	153	126	0.82
72	59	999	16.93
74	586	1,603	2.74
76	863	13,735	15.92
78	9,386	5,097	0.54
1980	2,785		
Total	23,035	34,042	58.33
Average	1,920	3,095	5.30

^{1/} Includes even-years only. All escapements and returns are rounded to nearest thousand fish.

(Data Sources: 1, 5 and 21)

APPENDIX TABLE 39. Average round weight of the commercial salmon catch by district and species, Bristol Bay, 1962-81.

Species and Year	Average Round Weight ^{1/}					Average Bristol Bay ^{2/}
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
<u>SOCKEYE SALMON</u>						
1962						5.6
63						5.2
64						5.2
65						4.5
66						6.1
1967						6.3
68				6.4		5.6
69	5.1	5.5		5.5	5.5	5.3
70	4.8	4.8		5.7	5.8	4.9
71	5.6	5.9		6.2	7.0	6.0
1972	6.1	6.0	6.1	6.0	6.4	6.0
73	6.7	7.1	7.3	7.1	7.9	7.1
74	5.5	5.7	5.2	5.7	7.0	5.8
75	5.2	5.7	5.2	6.1	6.7	5.5
76	5.8	5.9	6.2	6.6	7.5	6.1
1977	6.6	6.3	6.8	7.5	7.9	6.7
78	5.5	6.3	6.2	6.3	7.3	5.9
79	5.8	6.0	6.0	6.1	7.2	5.9
80	5.4	5.6	5.5	6.1	6.8	5.6
81	6.1	6.0	6.3	6.4	6.8	6.2
<u>KING SALMON</u>						
1962						15.7
63						13.2
64						13.7
65						14.6
66						19.5
1967						21.0
68				21.6		17.7
69	18.0			19.2	23.0	19.7
70	21.5	19.6		18.3	17.0	18.4
71	27.0	21.7		21.7	22.3	22.1
1972	25.5	21.6	17.3	19.8	21.1	20.3
73	23.5	21.4	21.0	22.6	24.1	23.0
74	20.8	18.6	20.7	23.2	21.0	22.4
75	25.0	19.5	18.1	18.8	14.0	17.8
76	27.6	18.6	13.5	18.7	12.1	17.0

(continued)

APPENDIX TABLE 39. (continued)

Species and Year	Average Round Weight ^{1/}					Average Bristol Bay ^{2/}
	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	
KING SALMON (continued)						
1977	30.5	22.1	23.8	23.4	20.8	22.9
78	28.3	23.6	29.2	22.3	26.1	23.9
79	21.8	21.2	22.7	21.1	22.2	21.3
80	20.5	21.0	21.9	19.6	18.0	19.7
81	20.8	18.6	18.9	19.6	13.1	19.0
CHUM SALMON						
1962						6.8
63						6.3
64						7.1
65						7.0
66						7.5
1967						6.8
68						6.3
69		6.1	5.4	6.0	5.7	5.9
70	5.8	6.5		5.9	6.3	5.9
71	6.5			6.4	6.7	6.5
1972	6.5	6.4	5.7	6.5	6.6	6.5
73	7.3	6.9	7.7	7.0	7.3	7.1
74	6.4	6.4	7.2	6.2	7.4	6.6
75	6.3	6.2	6.1	6.1	6.6	6.3
76	5.9	5.8		6.9	7.1	6.8
1977	7.3	6.5	6.7	7.3	8.2	7.4
78	6.6	6.7	6.2	7.1	8.1	7.2
79	6.8	7.2	7.5	6.2	7.8	6.8
80	6.2	6.6	6.3	5.9	6.7	6.2
81	6.5	6.8	7.2	6.6	7.4	6.7
PINK SALMON						
1962						3.2
64						3.0
66						3.1
68						3.0
70	2.9			3.0	3.7	3.0
1972	3.4			3.1	3.8	3.1
74	4.3	3.9	4.1	3.6	4.4	4.0
76	3.7	3.8		3.3	4.1	3.4
78	3.6	3.2	3.3	3.1	3.8	3.2
80	3.6	3.4		3.4	3.8	3.4

(continued)

APPENDIX TABLE 39. (continued)

Species and Year	Average Round Weight ^{1/}					Average Bristol Bay ^{2/}
	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	
COHO SALMON						
1962						6.3
63						6.9
64						6.0
65						6.3
66						7.5
1967						7.0
68		8.6	9.1	7.3	8.8	8.5 ^{3/}
69		6.3	7.6	6.2	8.7	7.0
70				5.7	8.2	6.8
71				6.3		6.3
1972		6.1		6.3	7.6	7.0
73	5.6	6.3	6.8	6.0	7.5	6.7
74	6.7	6.5	7.2	6.7	8.6	7.9
75	6.7	7.2	7.2	6.1	9.2	8.6
76	5.5	6.9		6.0	8.3	7.6
1977				6.5	9.4	7.8
78	6.4	6.3		6.8	8.2	7.5
79	5.2	7.3	8.4	6.7	9.0	7.8
80	6.8	6.8	7.8	6.1	8.0	7.0
81	6.2	6.3	7.6	6.0	7.8	6.4

^{1/} Average weight in pounds rounded to nearest tenth of a pound, and weighted by the number of fish in the catch of each processor.

^{2/} Average weight in 1962-68 from annual "Alaska Catch and Production Commercial Fisheries Statistics" (Statistical Leaflet Series), and 1969-81 weighted by district from processor catch reports.

^{3/} Weighted by district from processor annual reports.

(Data Sources: 4 and 10)

APPENDIX TABLE 40. Salmon prices paid to fishermen by species, Bristol Bay, 1962-81.^{1/}

Species	Price Per Fish in Dollars ^{2/}								Price Per Pound in Dollars ^{2/}											
	1962	1963	1964/65	1966	1967	1968	1969	1970		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
	<u>INDEPENDENT FISHERMEN</u>								<u>AIFMA</u>											
SOCKEYE	1.04	1.08	1.09	1.13	1.18	1.19	.24	.24	Canned Fresh/Frozen	.26	.27	.35	.48	.37	.52	.595	.68	.80 1.25	.57	.75
<u>KING</u>																				
Large	3.75	3.75	3.75	3.87	3.87	3.87														
Medium	1.87	1.87	1.87	1.94	1.94	1.94	.18	.18	Canned Fresh/Frozen	.20	.20	.28	.33	.35	.41	.45	.50	.55	.57	.75
Small	1.00	1.00	1.00	1.00	1.03	1.03				.24	.24		.45	.40	.45	.65	.55		1.25	
CHUM	.56	.58	.58	.60	.60	.60	.11	.11	Canned Fresh/Frozen	.12	.12	.18	.30	.18	.32	.375	.40	.55 .55	.34	.42
PINK	.31	.32	.32	.33	.33	.33	.11	.11		.12	.12	.18	.28	.19	.31	.36	.33	.33	.25	
COHO	1.04	1.08	1.09	1.13	1.18	1.19	.20	.20	Canned Fresh/Frozen	.26	.27	.35			.405		.68	.70 1.00	.57	.75
	<u>COMPANY FISHERMEN</u>								<u>WACMA</u>											
SOCKEYE	.64	.67	.67	.70	.73	.74	.14	.14	Canned Fresh/Frozen	.16	.17	.22	.30	.45	.475	.595	.68	.80 1.25	.57	.65 .75
<u>KING</u>																				
Large	2.70	2.70	2.70	2.40	2.78	2.78														
Medium	(2/1)	(2/1)	(2/1)	1.20	1.39	1.39	.11	.11	Canned Fresh/Frozen	.12	.13	.18	.21	.35	.41	.45	.50	.52	.45	1.15
Small				.64	.69	.69								.40	.46	.65	.70	1.00		
CHUM	.36	.37	.37	.37	.37	.37	.06	.06	Canned Fresh/Frozen	.08	.08	.11	.19	.30	.32	.36	.38	.41 .55	.34	.38
PINK				.20	.17	.17	.06	.06		.08	.13	.11	.18	.28	.308	.308	.33		.25	
COHO	.64	.67	.67	.70	.73	.74	.14	.14	Canned Fresh/Frozen	.16	.13	.19	.26	.45 .38	.475 .405	.5325	.62	.70 1.05	.57	.65 .75

^{1/} Company/independent fishermen classification was in effect through 1974; beginning in 1975 all fishermen are hereafter considered to be independent and the majority negotiated prices with the processors through the two active fishermen's groups in Bristol Bay (AIFMA-Alaska Independent Fishermen's Marketing Ass'n.; and WACMA-Western Alaska Cooperative Marketing Ass'n.).

^{2/} Prices per fish and per pound represent only the fixed base level price structure, and does not include any subsequent additional payments.

(Data Source: 9)

APPENDIX TABLE 41. Exvessel value of the commercial salmon catch by species, Bristol Bay, 1962-81.^{1/}

Year	Estimated Exvessel Value in Thousands of Dollars ^{2/}					Total
	Sockeye	King	Chum	Pink	Coho	
1962	\$ 4,907	\$ 276	\$ 379	\$ 283	\$ 41	\$ 5,886
63	3,101	204	215	+	45	3,565
64	6,100	458	465	496	40	7,559
65	26,438	371	209	+	9	27,027
66	10,525	262	206	823	38	11,854
1967	5,110	336	286	+	63	5,795
68	3,296	357	218	639	110	4,620
69	8,423	443	216	+	103	9,185
70	24,368	465	466	151	18	25,468
71	14,951	652	528	+	16	16,147
1972	3,914	339	512	47	20	4,832
73	1,892	284	829	+	115	3,120
74	3,793	460	567	1,053	142	6,015
75	11,047	214	615	+	151	12,027
76	17,139	742	2,892	1,093	82	21,948
1977	19,434	1,940	4,275	50	445	26,145
78	40,034	3,206	3,173	5,424	435	52,273
79	128,992	4,541	2,480	5	2,387	138,405
80 ^{3/}	75,837	1,884	2,957	2,246	1,337	84,262
81 ^{3/}	121,399	5,599	4,027	8	1,458	132,490
20-Year Total	\$530,700	\$23,033	\$25,515	\$12,255 ^{4/}	\$7,055	\$598,623
1962-71 Total	107,219	3,824	3,188	2,392	483	117,106
1972-81 Total	423,481	19,209	22,327	9,863	6,572	481,517
20-Year Average	\$ 26,535	\$ 1,152	\$ 1,276	\$ 1,226 ^{4/}	\$ 353	\$ 29,931
1962-71 Average	10,721	382	319	478	48	11,711
1972-81 Average	42,348	1,921	2,233	1,973	657	48,152

^{1/} Value paid to the fishermen.

^{2/} Exvessel value derived from price per fish or pounds times commercial catch.

^{3/} Preliminary.

^{4/} Includes even-years only.

(Data Sources: 1, 5, 9 and 10)

APPENDIX TABLE 42. Salmon case pack by species, Bristol Bay, 1962-81.

Year	48 1-lb. Cans Per Case					Total
	Sockeye	King	Chum	Pink	Coho	
1962	361,226	16,797	58,571	38,638	2,941	478,173
63	217,901	9,495	34,157	2	4,296	265,851
64	372,928	25,677	70,523	67,431	5,024	541,583
65	1,447,771	24,248	31,826		338	1,504,183
66	737,948	14,850	28,814	95,071	2,345	879,028
1967	334,177	19,499	45,321	8	3,100	402,105
68	229,514	12,971	36,638	63,011	4,321	346,455
69	457,911	17,860	30,997	33	2,198	508,999
70	1,117,163	19,401	58,766	16,772	802	1,212,904
71	694,199	23,118	56,852		437	774,606
1972	197,495	9,666	53,756	5,002	547	266,466
73	61,429	1,946	42,044		1,456	106,875
74	87,723	6,461	23,789	39,550	7,012	164,535
75	290,646	1,920	22,667		373	315,606
76	393,698	6,889	104,935	36,616	1,068	543,206
1977	353,133	3,119	137,838	5	2,383	496,478
78	551,648	6,982	76,926	163,230	2,916	801,702
79	688,882	3,058	34,517		1,236	727,693
80	571,347	820	63,616	48,055	3,767	687,605
81	783,222	5,304	66,430	30	943	855,929
20-Year Total	10,039,961	230,081	1,078,983	573,376 ^{2/}	47,503	11,879,982
1962-71 Total	6,060,738	183,916	452,465	280,923	25,802	6,913,887
1972-81 Total	3,979,223	46,165	626,518	292,453	21,701	4,966,095
20-Year Average	501,998	11,504	53,949	57,338 ^{2/}	2,375	593,999
1962-71 Average	606,074	18,392	45,247	56,185	2,580	691,389
1972-81 Average	397,922	4,617	62,652	58,491	2,170	496,610

^{1/} Includes only fish canned in Bristol Bay.

^{2/} Includes even-years only.

(Data Sources: 1, 4 and 17)

APPENDIX TABLE 43. Salmon fish per case by species, Bristol Bay, 1962-81.

Year	Fish Per Case				
	Sockeye	King	Chum	Pink ^{1/}	Coho
1962	12.45	4.66	11.47	25.80	12.10
63	12.15	5.49	11.36		12.21
64	13.57	5.31	11.01	25.58	12.58
65	15.75	4.28	12.31		9.08
66	12.06	4.52	11.33	26.92	11.90
1967	12.37	4.27	11.69		12.56
68	12.34	4.20	11.17	26.86	11.71
69	14.18	4.70	12.78		13.05
70	15.01	5.11	13.02	26.00	11.73
71	12.62	3.99	11.83		11.07
1972	12.35	4.46	12.00	26.76	12.28
73	10.57	4.23	11.27		12.33
74	12.38	3.91	12.04	19.52	9.64
75	13.18	5.02	12.69		10.19
76	11.84	5.06	11.72	24.04	10.06
1977	10.51	4.20	9.68		7.29
78	12.43	3.99	11.25	28.03	10.41
79	12.60	3.64	11.32		10.01
80	12.53	3.88	12.82	23.95	10.76
81	11.66	5.21	11.21		7.46
20-Year Total	25,255	9,013	23,397	25,346	21,842
1962-71 Total	13,250	4,653	11,797	13,116	11,799
1972-81 Total	12,005	4,360	11,600	12,230	10,043
20-Year Average	12.64	4.51	11.70	25.35	10.92
1962-71 Average	13.25	4.65	11.80	26.23	11.80
1972-81 Average	12.01	4.36	11.60	24.46	10.04

^{1/} Includes even-years only.

(Data Source: 1)

APPENDIX TABLE 44. Commercial production of frozen and cured salmon by species, Bristol Bay, 1962-81.^{1/}

Year	Production in Pounds					
	Sockeye	King	Chum	Pink	Coho	Total
1962	162,652	154,284	44,873	10	57,582	419,401
63	196,305	134,257	81,446	10	40,406	452,424
64	485,399	123,095	29,877	828	53,736	692,935
65	385,866	50,239	4,466		11,674	452,245
66	270,108	20,592	107,895	12	21,945	420,552
1967	212,996	360,633	71,712		47,208	692,549
68	309,126	326,867	126,448	1,504	270,286	1,034,231
69	751,691	747,473	377,858	133	416,783	2,293,938
70	3,271,798	688,662	262,299	33,877	14,076	4,270,712
71	1,827,786	504,776	128,166	12	46,607	2,507,347
1972	65,097	366,612	69,080	822	52,855	554,466
73	210,514	562,039	335,558	11	115,654	1,223,776
74	172,452	287,223	9,717	113,306	5,112	587,810
75	113,614	250,705	133,420		444,344	942,083
76	887,830	570,899	163,120	215,176	117,603	1,954,628
1977	586,101	1,155,811	336,373	258	238,778	2,317,321
78	6,987,063	1,853,615	778,417	1,677,626	148,765	11,445,486
79	41,683,018	2,308,202	1,367,919	2,854	1,351,300	46,713,293
80	36,097,705	1,199,473	1,677,910	3,050,414	834,767	42,860,269
81	54,570,194	2,625,729	1,519,518	2,652	1,072,099	59,790,192
20-Year Total	149,247,315	14,291,186	7,626,072	5,093,575 ^{2/}	5,361,580	181,625,658
1962-71 Total	7,873,727	3,110,878	1,235,040	36,231	980,303	13,236,334
1972-81 Total	141,373,588	11,180,308	6,391,032	5,057,344	4,381,277	168,389,324
20-Year Average	7,462,366	714,559	381,304	509,358 ^{2/}	268,079	9,081,283
1962-71 Average	787,373	311,088	123,504	7,246	98,030	1,323,633
1972-81 Average	14,137,359	1,118,031	639,103	1,011,469	438,128	16,838,932

^{1/} Includes only fish processed in Bristol Bay.

^{2/} Includes even-years only.

(Data Source: 3)

APPENDIX TABLE 45. Fresh export of salmon by air transportation, by species, Bristol Bay, 1962-81.^{1/}

Year	Export in Pounds					Total
	Sockeye	King	Chum	Pink	Coho	
1962						0
63						0
64		534				534
65						0
66	421	15,932	2,145		98,663	117,161
1967	183	73,773	184		124,502	198,642
68	9,884	74,693	806		1,717	87,100
69		75,293	2,372		217	77,882
70	676	185,564	661			186,901
71		232,912				232,912
1972	20,754	359,533	6,442		4,837	391,566
73	163,447	326,372	238,851	183	134,260	863,113
74	253,879	253,695	35,102	104,230	15,116	662,022
75	374,588	128,032	71,744	45	10,313	584,722
76	498,014	445,386	213,118	96,038	22,559	1,275,115
1977	997,899	1,134,791	961,537	14,438	409,058	3,517,723
78	5,149,427	1,548,439	984,408	1,967,420	341,212	9,990,906
79	22,838,654	1,652,904	1,176,549	3,822	933,539	26,605,468
80	23,284,065	514,638	617,989	612,276	1,196,502	26,225,470
81	25,943,037	1,302,979	817,991	9,385	800,432	28,873,824
20-Year Total	79,534,928	8,325,470	5,129,899	2,779,964 ^{2/}	4,092,927	99,891,061
1962-71 Total	11,164	658,701	6,168	0	225,099	901,132
1972-81 Total	79,523,764	7,666,769	5,123,731	2,779,964	3,867,828	98,989,929
20-Year Average	3,976,746	416,274	256,495	277,996 ^{2/}	204,646	4,994,553
1962-71 Average	1,116	65,870	617	0	22,510	90,113
1972-81 Average	7,952,376	766,677	512,373	555,993	386,783	9,898,993

^{1/} Includes all fish exported out of Bristol Bay by air in fresh condition regardless of final processing.

^{2/} Includes even-years only.

(Data Source: 3)

APPENDIX TABLE 46. Brine export of salmon by sea-going transportation, Bristol Bay, 1962-81.^{1/}

Year	Number ^{2/}		Brine Export	
	Operators	Tenders	Number	Pounds
1962			213,713	1,218,641
63			87,828	464,545
64			191,423	1,003,695
65			994,966	4,486,175
66			389,595	2,168,233
1967			127,818	807,144
68			97,404	466,488
69			297,973	1,592,593
70	7	(60)	2,712,837	13,327,829
71	5	(12)	523,784	3,162,326
1972	1	(1)	59,750	365,386
73	0	0	0	0
74	2	(2)	78,620	456,430
75	5	(20)	933,728	5,135,799
76	5	(21)	728,420	4,466,126
1977	5	15	623,523	3,603,382
78	9	(33)	1,602,224	9,304,376
79	12	(61)	2,987,456	17,557,354
80	14	101	4,987,000	27,780,210
81	18	80	3,300,118	20,512,734
20-Year Total	83	406	20,938,180	117,879,466
1962-71 Total	12	72	5,637,341	28,697,669
1972-81 Total	71	334	15,300,839	89,181,797
20-Year Average	7 ^{3/}	34 ^{3/}	1,046,909	5,893,973
1962-71 Average	6		563,734	2,869,767
1972-81 Average	7	28	1,530,084	8,918,180

^{1/} Includes only fish exported from Bristol Bay in brine or chilled sea water by sea-going tenders for eventual canning.

^{2/} Number of operators and tenders unavailable prior to 1970. Figures in parenthesis are estimates.

^{3/} Twelve year average.

(Data Source: 3)

APPENDIX TABLE 47. Commercial production and disposition of sockeye salmon, Bristol Bay, 1962-81.^{1/}

Year	Sockeye Salmon Production in Thousands of Pounds and Percent										
	Canned		Frozen		Cured		Export ^{2/}		Brine ^{3/}		Total
	Pounds	%	Pounds	%	Pounds	%	Fresh	%	Pounds	%	
1962	25,039	95	143	1	20	+			1,219	4	
63	14,269	96	186	1	10	+			465	3	14,930
64	27,610	95	468	2	18	+			1,004	3	29,100
65	104,278	96	367	+	18	+			4,486	4	109,149
66	54,379	96	263	+	7	+	+	+	2,168	4	56,817
1967	26,264	96	201	1	12	+	+	+	807	3	27,284
68	14,865	95	98	1	201	1	10	+	466	3	15,640
69	32,750	93	421	1	331	1			1,593	5	35,095
70	84,932	84	3,236	3	35	+	1	+	13,328	13	101,532
71	52,514	91	1,813	3	15	+			3,162	5	57,504
1972	14,045	97	55	+	11	+	21	+	365	3	14,497
73	5,030	93	187	3	24	+	163	3			5,405
74	7,020	89	147	2	25	+	254	3	456	6	7,902
75	21,319	79	102	+	12	+	375	1	5,136	19	26,944
76	28,426	83	884	3	4	+	498	1	4,466	13	34,278
1977	27,495	84	586	2	+	+	998	3	3,603	11	32,682
78	37,136	63	6,307	11	680	1	5,149	9	9,304	16	58,576
79	44,350	35	38,032	30	3,651	3	22,839	18	17,557	14	126,429
80 ^{4/}	45,886	34	31,856	24	4,242	3	23,284	18	27,780	21	133,048
81 ^{4/}	58,102	37	49,614	31	4,957	3	25,943	16	20,513	13	159,129
20-Year Total	725,709		134,966		14,273		79,535		117,878		1,072,362
1962-71 Total	436,900		7,196		667		11		28,698		473,472
1972-81 Total	288,809		127,770		13,606		79,524		89,180		598,890
20-Year Average	36,285	68	6,748	13	714	1	3,977	7	5,894	11	53,618
1962-71 Average	43,690	92	720	2	67	+	1	+	2,870	6	47,347
1972-81 Average	28,881	48	12,777	21	1,361	2	7,952	13	8,918	15	59,889

^{1/} Frozen and cured production includes some mixed fish (mostly chums).

^{2/} Includes all sockeye exported out of Bristol Bay regardless of final processing.

^{3/} Primarily sockeye salmon with minimal numbers of king and chum salmon.

^{4/} Preliminary.

(Data Sources: 1, 3, 4 and 17)

APPENDIX TABLE 48. South Unimak and Shumagin Island sockeye and chum salmon preseason quota and commercial catch, Alaska Peninsula, 1962-81.^{1/}

Year	In Thousands of Fish								
	South Unimak			Shumagin Islands			Total		
	Sockeye		Chum	Sockeye		Chum	Sockeye		Chum
Actual	Quota ^{2/}	Actual		Quota ^{2/}	Actual		Quota		
1962	272		209	54		61	326		270
63	116		81	33		36	149		117
64	159		161	85		67	244		228
65	568		121	207		45	775		166
66	528		215	54		17	582		232
1967	186		73	69		51	255		124
68	342		115	233		51	575		166
69	781		254	76		13	857		267
70	530		403	153		49	1,683		452
71	565		554	45		115	610		669
1972	443		468	76		108	519		576
73	239		189	23		23	262		212
74	60	50	15		25		60	75	15
75	190	165	65	49	50	36	239	215	101
76	235	350	327	72	75	74	307	425	401
1977	193	195	93	46	42	22	239	237	115
78	419	428	105	68	94	18	487	522	123
79	683	900	64	179	200	41	862	1,100	105
80	2,731	2,513	457	572	555	71	3,303	3,068	528
81	1,474	1,442	521	351	318	54	1,825	1,760	575
20-Year Total	11,714		4,490	2,445		952	14,159		5,442
1962-71 Total	5,047		2,186	1,009		505	6,056		2,691
1972-81 Total	6,667	6,043	2,304	1,436	1,359	447	8,103	7,402	2,751
20-Year Average	586		225	129		50	708		272
1962-71 Average	505		219	101		51	606		269
1972-81 Average	667	755	230	160	170	50	810	925	275

^{1/} South Unimak includes statistical area 284 in June and July, while Shumagin Islands includes statistical area 282 in June only.

^{2/} The sockeye quota system of management commenced in 1974, and is based on the final Bristol Bay projected inshore harvest and prior traditional harvest patterns.

(Data Source: 12)

APPENDIX TABLE 49. Subsistence catch of salmon by district and species, Bristol Bay, 1963-81.

Year	Permits Issued	Number of Fish ^{1/}					Total
		Sockeye	King	Chum	Pink	Coho	
<u>NAKNEK-KVICHAK DISTRICT</u>							
1963		61,700	500	100	+	400	62,700
64		85,900	500	+	1,100	800	88,300
65		71,900	500	100	+	300	72,800
66		74,500	600	300	2,700	400	78,500
67		68,500	500	100	+	500	69,600
1968		71,000	500	100	300	200	72,100
69		76,300	400	100	+	400	77,200
70	145	108,200	300	700	100	200	109,500
71	137	66,400	200	+	+	100	66,700
72	170	52,200	400	400	700	100	53,800
1973	219	41,600	600	300	+	500	43,000
74	263	102,600	1,000	1,100	1,600	200	106,500
75	301	122,600	700	300	+	200	123,800
76	346	82,200	900	900	1,500	600	86,100
77	352	81,400	1,300	600	100	300	83,700
1978	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
19-Year Total	4,157	1,508,300	13,800	8,300	11,500 ^{2/}	8,600	1,550,700
19-Year Average	346	79,400	700	400	1,300 ^{2/}	500	81,600
<u>EGEGIK DISTRICT</u>							
1972	2					100	100
73	3					100	100
74	7	300	+	+		+	300
75	3	200	+	+	+	+	200
76 ^{3/}	2						
1977	20	100	+	100	+	200	400
78	13	200		100		200	500
79	8	300				100	400
80	3	100					100
81	4	+	+			+	+
10-Year Total	65	1,200	+	200	+ ^{2/}	700	2,100
10-Year Average	7	100	+	+	+ ^{2/}	100	200

(continued)

APPENDIX TABLE 49. (continued)

Year	Permits Issued	Number of Fish ^{1/}					Total
		Sockeye	King	Chum	Pink	Coho	
<u>UGASHIK DISTRICT</u>							
1963	8	300	+	100	+	600	1,000
64	2	300					300
66	4	1,000					1,000
67	5	700	+	100	+	500	1,300
68	8	300	+	100	+	300	700
1969	3	100				200	300
70	9	1,400	+	+		+	1,400
71	9	300		+		100	400
72	13	200	100	100	+	300	700
73	14	200	+	100	+	600	900
1974	8	200	100	+	+	500	800
75	1	700	+	+	+	1,200	1,900
76	21	1,200	100	100	100	300	1,800
77	19	1,000	100	300	+	500	1,900
78	8	500	100	100	+	900	1,600
1979	8	200	+	+	+	100	300
80	10	200	+	+	+	200	400
81	12	600	+	+		200	800
18-Year Total	162	9,400	500	1,000	100 ^{2/}	6,500	17,500
18-Year Average	9	500	+	100	+ ^{2/}	400	1,000

(continued)

APPENDIX TABLE 49. (continued)

Year	Permits Issued	Number of Fish ^{1/}					Total
		Sockeye	King	Chum	Pink	Coho	
<u>NUSHAGAK DISTRICT^{4/}</u>							
1963	71	41,200	3,600	8,500	+	3,900	57,200
64	74	31,800	2,900	8,700	4,100	4,900	52,400
65	121	47,500	4,600	18,400	200	5,400	76,100
66	110	23,600	3,700	6,000	4,900	2,400	40,600
67	128	34,900	3,700	14,000	800	4,000	57,400
1968	115	30,000	6,600	8,600	5,800	1,900	52,900
69	162	27,700	7,100	8,200	100	7,100	50,200
70	147	38,200	6,900	8,800	1,000	1,000	55,900
71	164	42,400	4,400	4,200	+	2,300	53,300
72	168	24,100	4,000	8,200	1,200	1,000	38,500
1973	216	28,000	6,600	7,600	100	2,200	44,500
74	261	39,300	7,600	9,600	4,100	4,600	65,200
75	340	47,300	7,100	5,600	1,300	4,300	65,600
76	317	34,700	6,900	7,200	2,700	2,100	53,600
77	306	43,300	5,200	7,300	200	4,500	60,500
1978	331	33,000	6,500	14,300	11,000	2,500	67,300
79	364	40,200	8,900	6,800	500	5,200	61,600
80	425	76,500	11,700	11,600	7,600	5,100	112,500
81	395	44,500	11,600	10,300	2,400	8,700	77,500
19-Year Total	4,215	728,200	119,600	173,900	42,400 ^{2/}	73,100	1,142,800
19-Year Average	200	38,300	6,300	9,200	4,700 ^{2/}	3,800	60,100
<u>TOGIAK DISTRICT</u>							
1965	36	4,600	100	1,600	100	2,200	8,600
74	68	7,400	1,200	2,000	500	1,800	12,900
75	41	4,600	800	1,600	+	2,800	9,800
76	30	2,800	500	900	100	500	4,800
77	41	2,100	400	800	+	1,100	4,400
1978	29	900	300	700	300	500	2,700
79	25	800	200	300	0	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
9-Year Total	368	28,700	4,800	9,000	1,200 ^{2/}	13,000	56,900
9-Year Average	41	3,200	500	1,000	300 ^{2/}	1,400	6,300

(continued)

APPENDIX TABLE 49. (continued)

Year	Permits Issued	Number of Fish ^{1/}					Total
		Sockeye	King	Chum	Pink	Coho	
<u>TOTAL BRISTOL BAY</u>							
1963		103,200	4,100	8,700	+	4,900	120,900
64		118,000	3,400	8,700	5,200	5,700	141,000
65		119,400	5,100	18,500	200	5,700	148,900
66		99,100	4,300	6,300	7,600	2,800	120,100
67		104,100	4,200	14,200	800	5,000	128,300
1968		101,300	7,100	8,800	6,100	2,400	125,700
69		104,100	7,500	8,300	100	7,700	127,700
70	301	147,800	7,200	9,500	1,100	1,200	166,800
71	310	109,100	4,600	4,200	+	2,500	120,400
72	353	76,500	4,500	8,700	1,900	1,400	93,000
1973	452	69,800	7,200	8,000	100	3,300	88,400
74	607	149,800	9,900	12,700	6,200	7,100	185,700
75	701	175,400	8,600	7,500	1,300	8,500	201,300
76	716	120,900	8,400	9,100	4,400	3,500	146,300
77	738	127,900	7,000	9,100	300	6,600	150,900
1978	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
19-Year Total	8,135	2,271,200	138,600	190,800	55,200 ^{2/}	99,500	2,761,200
19-Year Average	678	119,500	7,300	10,000	6,100 ^{2/}	5,200	145,300

^{1/} Catches rounded to nearest hundred fish.

^{2/} Includes even-years only.

^{3/} No permits returned.

^{4/} Since 1975 catch data derived from subsistence permits only, prior years are expanded to include all family units of the area.

(Data Sources: 1 and 8)

APPENDIX A

BRISTOL BAY SALMON MANAGEMENT PLAN FOR 1981

The inshore sockeye salmon forecast for 1981 of 26.7 million will allow a commercial harvest of 21.2 million after escapement requirements are met. The combined sockeye escapement goal for all eleven of the major river systems in Bristol Bay total 5.5 million, which is the standard post-peak escapement requirements in the year following the peak cycle year (1980).

The projected sockeye harvest of 21.2 million fish will surpass the average post-peak catch of 8.5 million by over 12 million fish. Large numbers of sockeye will be in excess of escapement requirements in all districts. Ultimate fishing time allowed in the various districts will depend upon actual run strength; however, consistent early season fishing periods will be necessary to gauge district run strength and allow the processors and fishermen adequate breakin time for an efficient operation.

Provided the run develops as anticipated, it will be imperative that early season fishing is not interrupted or delayed, or significant harvest could be lost as in 1980.

King and chum salmon returns are expected to be strong as well, producing a total harvest of 150,000 and 1.5 million, respectively. The 1981 chum return will be produced by the 1977 brood year escapements, which were the largest on record. Pink salmon returns are negligible in odd years, while coho production is expected to continue at the high levels of recent years.

BRISTOL BAY HERRING FISHERY

1981

INTRODUCTION

The history of commercial herring and herring spawn on kelp fisheries in Bristol Bay is recent, dating from 1967. During this period there were two years that the herring sac roe fishery did not operate (1971 and 1976) due to a lack of buyers. From 1967 through 1975 the fishery remained small with 1 to 3 processors and averaging 24 gill net fishermen with only an occasional seiner entering the fishery during this 10 year exploratory period (Appendix Table 2).

Since 1977 there has been a major expansion of the herring fishery in the Togiak district. The large increase in fishing effort was influenced by world wide shortages of herring believed to be the result of over exploitation in traditional areas and from recruitment failure or adverse environmental changes. These shortages were further increased after implementation of 200 mile fishing zones by several nations, thus curtailing some countries that were targeting on herring outside their home waters. In the case of the U. S., the Fishery Conservation and Management Act of 1976 gave additional protection and incentive to domestic fishermen.

At this same time, the value of the dollar dropped relative to the Japanese yen. The Japanese are the primary consumers of herring sac roe and spawn on kelp on the international market. This combination of factors spurred the domestic fishing industry to pioneer exploratory efforts in Bristol Bay and other areas.

Herring are concentrated in the Togiak district, and this is the only area where commercial fishing has been conducted to date in Bristol Bay (Figure 1). Legal gear is restricted to purse seines 150 fathoms in length

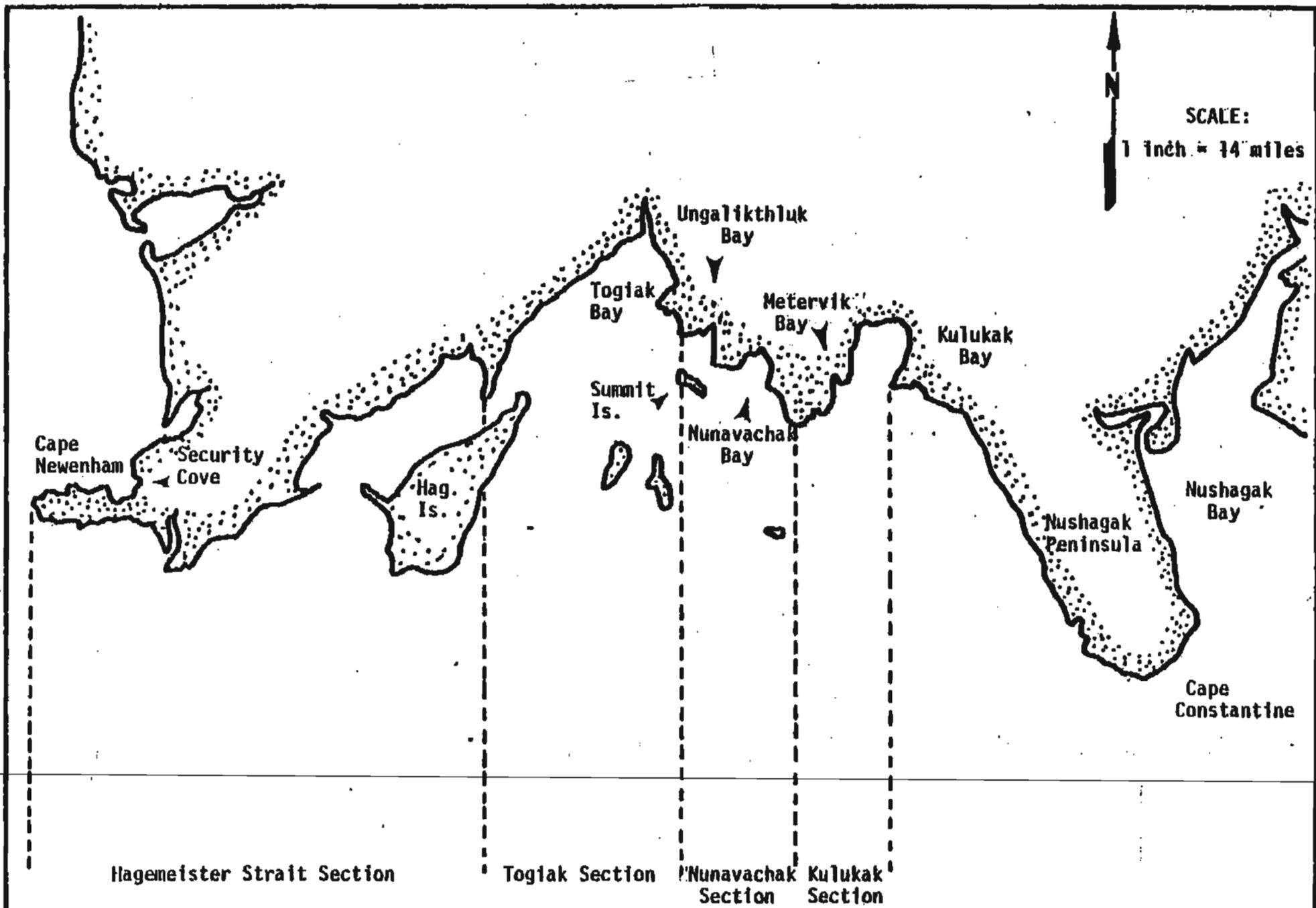


Figure 1. Togiak Herring Fishing District, Bristol Bay.

and 850 meshes in depth in this shallow water fishery, while gill nets are restricted to 150 fathoms in length and no more than 300 fathoms can be operated from a single vessel. The fishing season extends from April 25 to June 30, and is managed by emergency order field announcement, whereby the season is closed until a fishing period is announced by the Department.

The herring spawn on kelp fishery has grown steadily since its inception in 1968 (Appendix Table 5). Harvesting of the intertidal rockweed kelp (Fucus, sp.) is restricted to hand picking and hand operated rakes. The intensity and effectiveness of this fishery has resulted in specific and localized harvest quotas which are the basis for inseason management (Figure 2). Additional biomass estimates are made each spring and spawning success is evaluated in terms of egg deposition and density, and kelp harvest quotas and periods are frequently adjusted inseason to take into account local spawning success.

Herring Sac Roe Fishery

The commercial herring fishery was regulated by emergency order in 1981 to reduce resource wastage problems similar to that which occurred in 1980, and to achieve exploitation rate objectives of 10 to 20% (Table 2). Six commercial openings were allowed during May 2-12 (total fishing time - 101 hours), resulting in a harvest of 11,400 metric tons (m.t.)(Table 3). Over 99% of the harvest was taken for sac roe, with the remainder going for food or bait (Appendix Table 2). Purse seine vessels accounted for 82% of the total catch; gill net vessels accounted for 18% (Table 3). Average roe recovery for the season was 9.1%, while recovery from purse seine catches averaged 10.1% and gill net catches averaged 6.7%. Several processors commented that roe quality and recovery was higher than in previous seasons. The 1981 herring harvest was the second highest in the history of the fishery

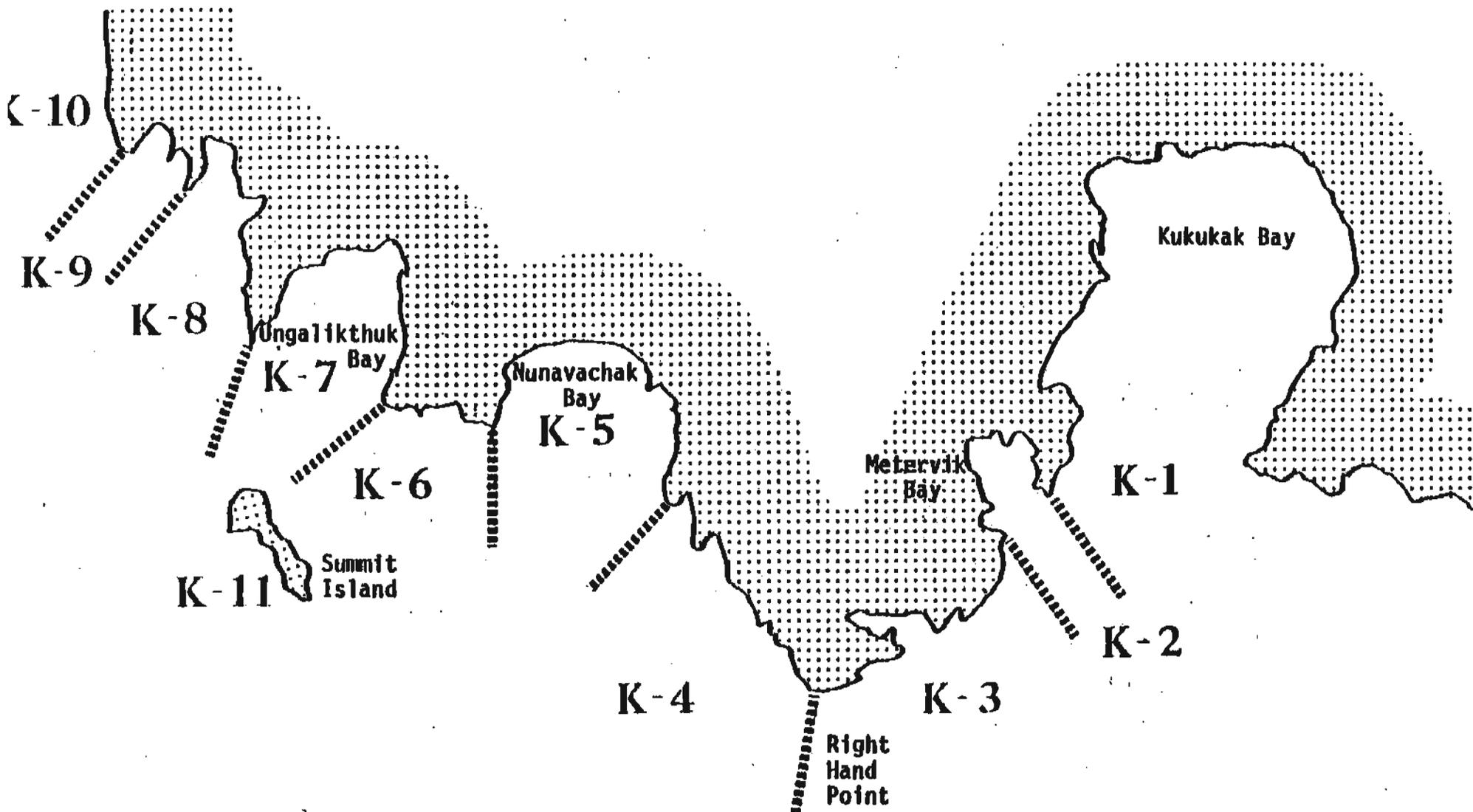


FIGURE 2.
HERRING SPAWN ON KELP MANAGEMENT AREAS (K-1 THROUGH K-11)

and the second highest reported in the State for 1981 (Appendix Table 2). Wastage of herring was estimated at less than 30 m.t., far below that which occurred in 1980 (5,200 m.t.). Value of harvested herring to fishermen was estimated to have been \$4.0 million (Appendix Table 7). Average price paid to fishermen was \$350 per short ton (s.t.) for 10% roe recovery, with an increase or decrease of \$35 per s.t. for each percentage point above or below 10%. Numbers of processors increased slightly over 1980, with 30 companies registering and 28 actually purchasing herring (Table 6). Numbers of fishing vessels decreased markedly. Only 83 purse seine and 106 gill net vessels participated in 1981, a decrease of 70% and 40%, respectively, from 1980 (Appendix 2).

The overall herring exploitation rate in 1981 was 8% of estimated available biomass, while harvest of younger, newly recruited, herring (age 4 and less) was 7% and harvest of older herring (age 5 and greater) was 9% (Table 5). Older herring could have been harvested at a higher level, but storms and resulting water turbidity prevented accurate assessment of herring biomass arriving on the spawning grounds during April 28 to May 3. The peak daily biomass estimate prior to May 3 was 7,000 m.t., well below the 20,000 m.t. threshold value set for allowing a harvest of older herring (Table 1). However, due to the extent and distribution of spawn, ADF&G staff felt that 13-18,000 m.t. of herring may have been present by May 2. A 10 hour commercial test opening on May 2-3 resulted in a harvest of less than 400 m.t. of herring (Table 3). On the afternoon of May 3 a huge aggregation of herring (estimated biomass 58,000 m.t. and 63,000 s.t.) was observed in Togiak section (Table 1). Although a commercial fishing period was opened immediately that evening, the majority of these herring proved to be spawned out, older fish. Soon after this date young herring began arriving on the spawning grounds, mixing with

older age herring which had already spawned. Good visibility conditions generally persisted until just after the peak of young herring abundance (86,000 m.t. and 95,000 s.t.) was reached on 15 May (Table 1). Later arrival of younger age fish allowed accurate assessments to be made so that harvests of these young herring were kept within Board of Fisheries guideline levels.

In general, management of the 1981 commercial herring fishery greatly benefited by adoption of emergency order regulation procedures and Board of Fisheries harvest directives. Wastage was minimized, sac roe recovery and quality was maximized, and catch reporting was timely and accurate. By channeling fishing effort into discrete periods a more normal onshore migration of herring was allowed, which resulted in more extensive, undisturbed spawning and enhanced ADF&G stock assessment capabilities. Increased mobility provided by a chartered helicopter and the ADF&G vessel R/V Sundance aided greatly in efforts to monitor and manage the fishery. This was particularly important since an estimated 49% of the harvest was taken in Hagemeister section, the most westerly and remote area within Togiak district (Figure 1). Periods of bad weather, although generally limited during the 1981 season, continued to pose difficulties to stock assessment efforts.

Herring Spawn on Kelp Fishery

Spawn on kelp harvests were also regulated by emergency order in accordance with a plan adopted by the Board of Fisheries in 1979. Nine commercial openings were allowed, resulting in a total harvest of 172 m.t. (Table 4). Harvests in individual kelp management areas were allowed to reach approximately 10% of the estimated total aquatic plant standing crop (Figure 2). Seven commercial processors purchased spawn on kelp from 108 fishermen. Value of the total harvest to fishermen was estimated to be \$250,000 and the average

price paid on the grounds to fishermen was \$0.66 per pound. The 1981 spawn on kelp harvest was the second highest in the history of Togiak district (Appendix Table 5). Less than 1/2 m.t. of spawn on kelp was lost during the 1981 season harvest.

Spawning was observed from late April through early June, and a total of 106 sightings encompassed 40 linear miles of beach (Appendix Table 6). It was obvious that spawn deposition in 1981 exceeded that in 1980 in extent (distribution), amount (number of layers) and time span. Two occurrences of subtidal spawning were documented for the first time and ground surveys to obtain information on the extent and density of herring spawn on kelp was continued. Studies on growth, mortality and revegetation rates of Fucus sp. (rockweed kelp) were initiated by investigators from University of Alaska, Juneau, under a contract with ADF&G. These studies will also provide information to develop better methods for assessment of kelp standing crop and herring spawn deposition.

Aerial Biomass Surveys

Aerial surveys were flown throughout the herring spawning season to determine relative abundance, distribution and biomass of herring schools. Occurrence and extent of mist, numbers of fishing vessels, and visibility factors affecting survey quality were also recorded. Data collection methods were similar to those used since 1978. A total of 107 hours of aerial survey coverage was conducted in 1981 (including 11 hours of helicopter flying time), which represented the most intensive aerial coverage ever achieved.

The first fixed wing survey was flown on April 20, but herring were not sighted until April 22 when 1,300 s.t. were observed (Table 1). A total of 42 aerial surveys were flown on 30 days from April 20 to June 3, with 24 of these flights conducted under fair to excellent survey conditions. Storm

conditions during the period April 28 to May 3 prevented accurate assessment of herring arriving on the spawning grounds until most older herring had already spawned. Generally, weather and sea conditions were improved over past years, allowing better conditions under which to make herring biomass estimates.

During the season, total herring biomass was estimated to be between 134,000 and 160,000 m.t. Analysis of data from test fishing and contracted purse seine catches resulted in a post-season herring biomass estimate of 144,000 m.t. (Appendix Table 3).

Age Composition

Commercial catch samples were taken from all four sections during open fishing periods, and variable mesh gill nets were used from late April until early June. Additional samples were also obtained from purse seine test sets made during the closed periods. Age composition data analysis of these samples indicated that 48% of the total biomass was composed of age 4 herring (1977 year class), while age 7 and 8 herring (1974 and 1973 year classes) accounted for most of the remaining biomass, 25% and 15%, respectively (Table 5). Temporal changes in age composition of test fish herring catches showed that older herring (age 5 and greater) arrived on the spawning grounds in peak numbers earlier in the season (May 3) than younger (age 4 and less), newly recruited, herring (May 15). This pattern had previously been documented in 1979 and 1980.

Test Fishery

Test fishing with variable mesh gillnets was conducted from April 21 to June 8 to determine age, size and sexual maturity of herring, and to estimate occurrence and abundance of other schooling fishes. A total of 3,700 herring were sampled from these catches and they comprised 94% of the total catch of pelagic schooling fishes.

Additionally, contracted purse seine vessels have provided data on tonnage per unit surface area for 12 herring schools within Togiak district (Appendix Table 1). This information provided further support to the hypothesis that herring school biomass (m.t./unit surface area) decreases as water depth decreases. Conversion factors of 1.2 (water depth 10 ft. or less), 2.2 (water depth 10-25 ft.) and 3.1 m.t./50 m² (mean all estimates) were used for post-season analysis of Togiak district aerial survey data (Appendix Table 1).

Enforcement

The unavailability of a large enforcement vessel limited the effectiveness of Fish and Wildlife Protection on the grounds in 1981. Major concerns were gill nets fishing after the closures and reported kelp harvests during closed periods and in closed areas. Numerous oil slicks, due to bilge pumping by vessels within the large fleet, were sighted, and this continued practice may have a long-term detrimental affect on herring spawning success. The situation is further complicated by the fact that few safe ship anchorages are available near the fishery.

Outlook and Management Strategy for 1982

Based on the large recruitment of age 4 herring and significant returns of age 7 and 8 herring during 1981, the Department anticipates a harvestable surplus of herring will be available in 1982. However, since no methods are available to forecast actual returns (or to estimate recruitment) harvest levels will be adjusted during the season according to observed herring biomass. As in 1981, separate management strategies will be applied to early run, older herring (age 5 and above) and late run, younger herring (age 4 and below). Magnitude and age composition of the run will be monitored during the spawning season through aerial surveys, test fishing and commercial catch sampling. Emergency order regulation authority will be used to adjust the

occurrence and length of fishing periods in relation to stock strength and spawning. No fishing will be allowed until older age herring reach a total daily observed biomass of 5,000 m.t. and spawning has commenced. This management strategy will allow a normal onshore migration, assure commencement of spawning, increase roe quality and content, and minimize waste. If it is not possible to determine herring abundance by using aerial surveys, stock condition will be assessed using commercial catch rates, roe recovery percentages, pre- to post-spawner ratios from test net and commercial catches, spawn deposition observations and 1980 aerial survey data. Harvest of these older herring will be 10 to 20% of estimated biomass. Spawn on kelp harvests will also be allowed in areas judged to have sufficient spawn deposition and adequate kelp standing crop. A more conservative approach will be taken in managing harvests of younger herring, as was done in 1981, since these herring are newly recruited to the spawning population and will contribute to future harvests and provide future spawning stock. A total daily observed biomass of 20,000 m.t. of younger age herring must be present before fishing is allowed. A graduated harvest rate of up to 20% of the biomass of these younger age herring will be harvested at that time. Additional spawn on kelp harvests may also be permitted during this period.

TABLES

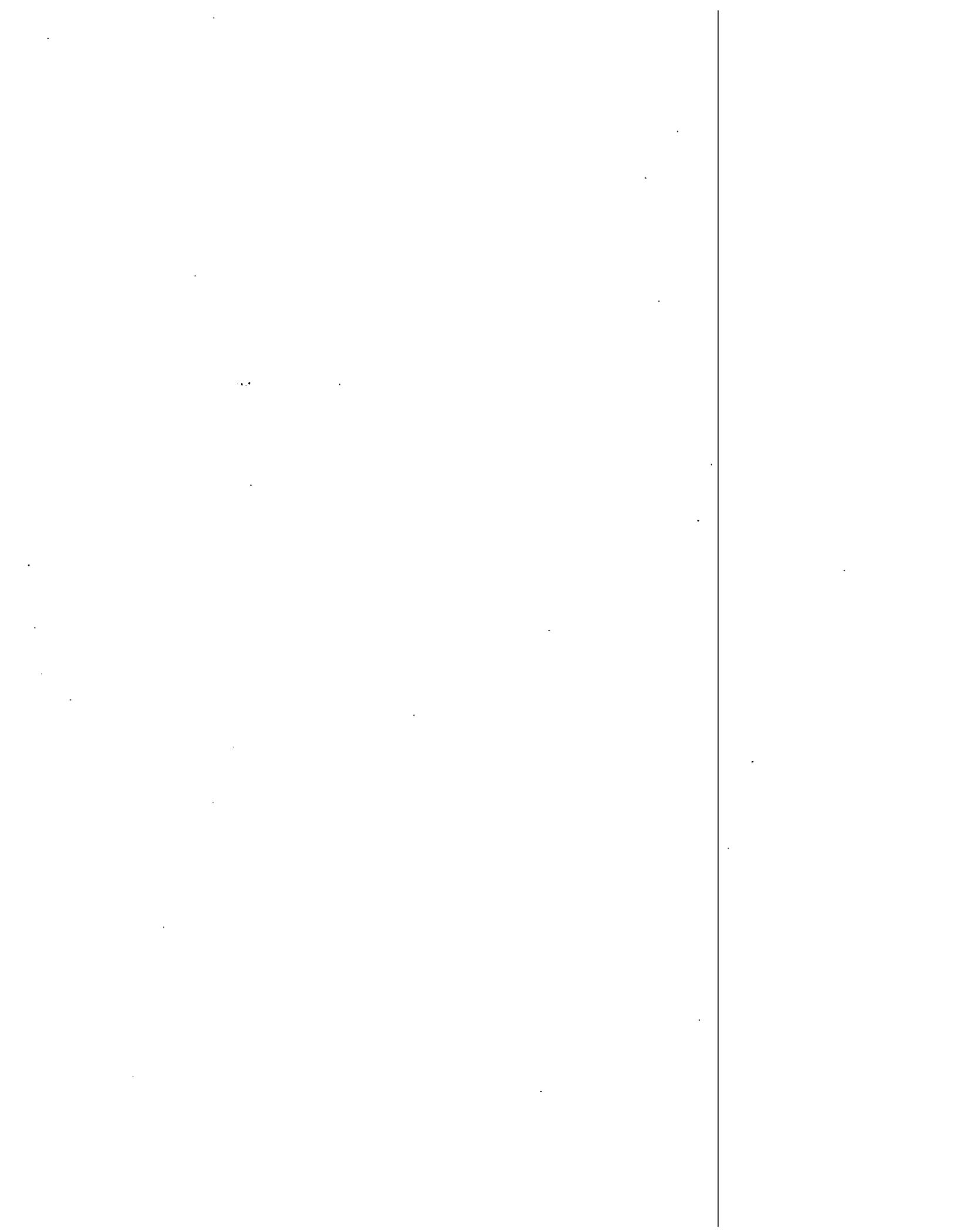


Table 1. Summary of herring aerial survey total run biomass estimates and observations of herring spawn, Togiak district, Bristol Bay, 1981.

Date	Survey Rating ^{1/}	Census Area Surveyed ^{2/}	Number Herring Schools Observed				Herring Biomass Est. ^{3/4/}		Herring Spawn	
			Small	Medium	Large	Total	Formula	Staff	No.	Miles
4/20	F/G	N1-T1								
22	G/E	N1-M2	12	52	6	70	1,300	1,500	3	1.3
23	G/E	N1-M2	39	72	12	123	3,700	3,000		
24	G/P	N1-M2	6	95	27	128	3,800	3,000		
25	G	N1-M2	15	134	38	187	5,700	4,000		
26	G/E	N1-CN2	32	181	40	253	6,400	8,000	5	1.4
27	G/F	N1-M1	1	55	19	75	6,800	7,000		
27	P	N1-T1	4	29	4	37	600			
28	P	N1-M1	24	344	69	437	6,800	7-9,000	1	0.3
30	U									
5/ 1	U	N1-M1		31	1	32	500	500	1	0.5
1	U	N1-T1	10	63	9	82	1,700	1,500	5	1.8
2	P/U	N1-U1	11	32		43	400	500	12	1.9
3	F/P	N1-M2	20	97	38	155	4,400	6,400	2	1.2
3	P/G	N1-T1		166	16	182	62,600	55,100	10	5.6
4	U	N1-K1		7		7				
4	G	N1-M2	80	174	27	281	4,900	3,800	4	2.9
5	P	N1-CN2	2	15		17	200	200	6	2.5
6	P	N1-M2		44	4	48	3,200	3,000		
7	G	N1-M2	74	215	37	326	24,500	15,700	2	0.4
8	G/E	N1-M2	103	675	20	798	30,100	33,100	3	1.0
9	G/E	N1-M2	53	417	66	536	31,200	32,500	5	1.4
10	P/U	N1-M2	7	76	11	94	3,000	3,000		
12	G/F	N1-CN1	55	344	95	494	35,400	40,900	15	4.8
13	G/E	N1-CN1	115	666	71	852	55,500	61,900	6	3.8
14	E	N1-M2	43	424	80	547	47,100	41,700	5	2.2
14	E	N1-CN2	46	595	114	755	70,600	62,300	5	2.5
15	G/E	N1-M2	26	616	425	1,067	95,300	89,900	2	1.5
16	P/U	N1-M2	1	205	36	242	11,400	8,400		
17	U	N2-N1								
20	U	N1-T2								
22	P/U	N1-U1								
23	F/P	K1-M2	6	73	11	90	1,600	2,100	10	2.1
26	G	N1-M2	81	38	13	132	27,500	26,400	3	0.2
6/ 3	G/F	N1-M1	3	32	17	52	1,600	2-3,000	1	0.8

1/ Survey rating: U = unacceptable; P = poor; F = fair; G = good; and E = excellent.

2/ Census areas: N = Nushagak Peninsula; K = Kulukak Bay; T = Togiak Bay; M = Matogak Bay; and CN = Cape Newenham.

3/ Short tons.

4/ Formula: Total RAI's x conversion factors of 1.0, 2.4, and 3.4 tons, by census area and fish density/distribution; Staff: Personal estimates by experienced Department spotters.

Table 2. Emergency order commercial herring sac roe and herring spawn on kelp fishing periods, Togiak district, Bristol Bay, 1981.

<u>Emergency Orders</u> ^{1/}			
Number	K Area	Date and Time	Hours/Days Open
I. <u>HERRING SAC ROE</u>			
DLG 01		May 2 6 p.m. - May 3 4 a.m.	10 hours
DLG 02		May 3 9 p.m. - May 4 9 p.m.	24 hours
DLG 03		May 4 9 p.m. - May 5 9 p.m.	24 hours
DLG 04		May 5 9 p.m. - May 6 9 p.m.	24 hours
DLG 12		May 12 6 p.m. - May 13 4 a.m.	10 hours
DLG 15		May 15 7 p.m. - May 16 4 a.m.	9 hours
II. <u>HERRING SPAWN-ON-KELP</u>			
DLG 05	K3-9	May 5 6 p.m. - May 6 6 p.m.	24 hours
DLG 06	K3-9	May 6 6 p.m. - May 7 6 p.m.	24 hours
DLG 07	K3-8	May 7 6 p.m. - June 30 12 mn	<u>2/</u>
DLG 08	K9	May 8 6 p.m. - June 30 12 mn	<u>3/</u>
DLG 09	K7	May 9 9 p.m. - June 30 12 mn	<u>3/</u>
DLG 10	K3	May 10 9 p.m. - June 30 12mn	<u>3/</u>
DLG 11	K5	May 10 10:30 p.m. - June 30 12 mn	<u>3/</u>
DLG 13	K8-9	May 12 9 p.m. - June 30 12 mn	<u>3/</u>
DLG 14		May 13 10 a.m. - June 30 12 mn	<u>4/</u>

- 1/ Prefix code on emergency orders indicate where announcements originated ("DLG" for Dillingham).
- 2/ Commercial kelping allowed through 12 mn June 30, or until the guideline harvest level is reached for each K area.
- 3/ Closed to the commercial harvest of herring spawn on kelp.
- 4/ Entire Togiak district closed to the commercial harvest of herring spawn-on-kelp.

Table 3. Inshore commercial herring catch by period and gear type, Togiak district, Bristol Bay, 1981.

Period	Time	Catch by Gear Type in Short/Metric Tons					
		Gear		Short Tons		Metric Tons	
		Gill Net	Purse Seine	Period	Accum.	Period	Accum. ^{1/}
5/ 2- 3	10 hrs.	170	203	373	373	338	338
5/ 3- 4	24 hrs.	539	2,707	3,246	3,619	2,944	3,282
5/ 5	24 hrs.	324	1,220	1,544	5,163	1,400	4,682
5/ 6	24 hrs.	259	1,695	1,954	7,117	1,772	6,454
5/12-13	10 hrs.	700	3,496	4,196	11,313	3,806	10,260
5/15-16	9 hrs.	276	949	1,225	12,538	1,111	11,372
Total	101	2,268	10,270	12,538	12,538	11,372	11,372
Percent of Catch		18.1	81.9	100.0			

^{1/} Due to rounding, the period catches may not equal the sum of the district catch.

Table 4. Commercial herring spawn on kelp harvest by day and area, Togiak district, Bristol Bay, 1981.

Date	Harvest in Pounds by Beach Kelp Area							Daily	
	K-3	K-4	K-5	K-6	K-7	K-8	K-9	Pounds	Metric Tons ^{1/}
5/ 5		8,250						8,250	4
6							15,134	15,134	7
7		1,075	890		5,290		4,600	11,855	5
8	2,000		3,960		16,106			22,066	10
9	7,060	4,050	38,420		43,090	1,895		94,515	43
10	51,210		31,363			7,935		90,508	41
11			1,430			26,509	11,476	39,415	18
12		13,658		8,675		44,791		67,124	30
13		26,215		3,125				29,340	13
Total	60,270	53,248	76,063	11,800	64,486	81,130	31,210	378,207	172
Season Quota	119,000	165,000	76,000	111,000	112,000	172,000	119,000	874,000	

^{1/} Due to rounding the daily harvests may not equal the sum of the K-area catch.

Table 5. Herring total run biomass and inshore commercial catch by year class, Togiak district, Bristol Bay, 1981.

Year Class	Age	Total Run and Catch by Year Class				Escapement in Metric Tons
		Total Run		Catch		
		Metric Tons	Percent	Metric Tons	Percent	
1972	9+	6,000	4	700	13	5,000
73	8	21,000	15	1,500	7	20,000
74	7	35,000	25	2,900	8	32,000
75	6	2,000	1	200	12	2,000
76	5	7,000	5	800	12	6,000
77	4	70,000	48	5,100	7	64,000
78	3	3,000	2	+	1	3,000
Total ^{1/}		143,900	100	11,400 ^{1/}	8	132,500

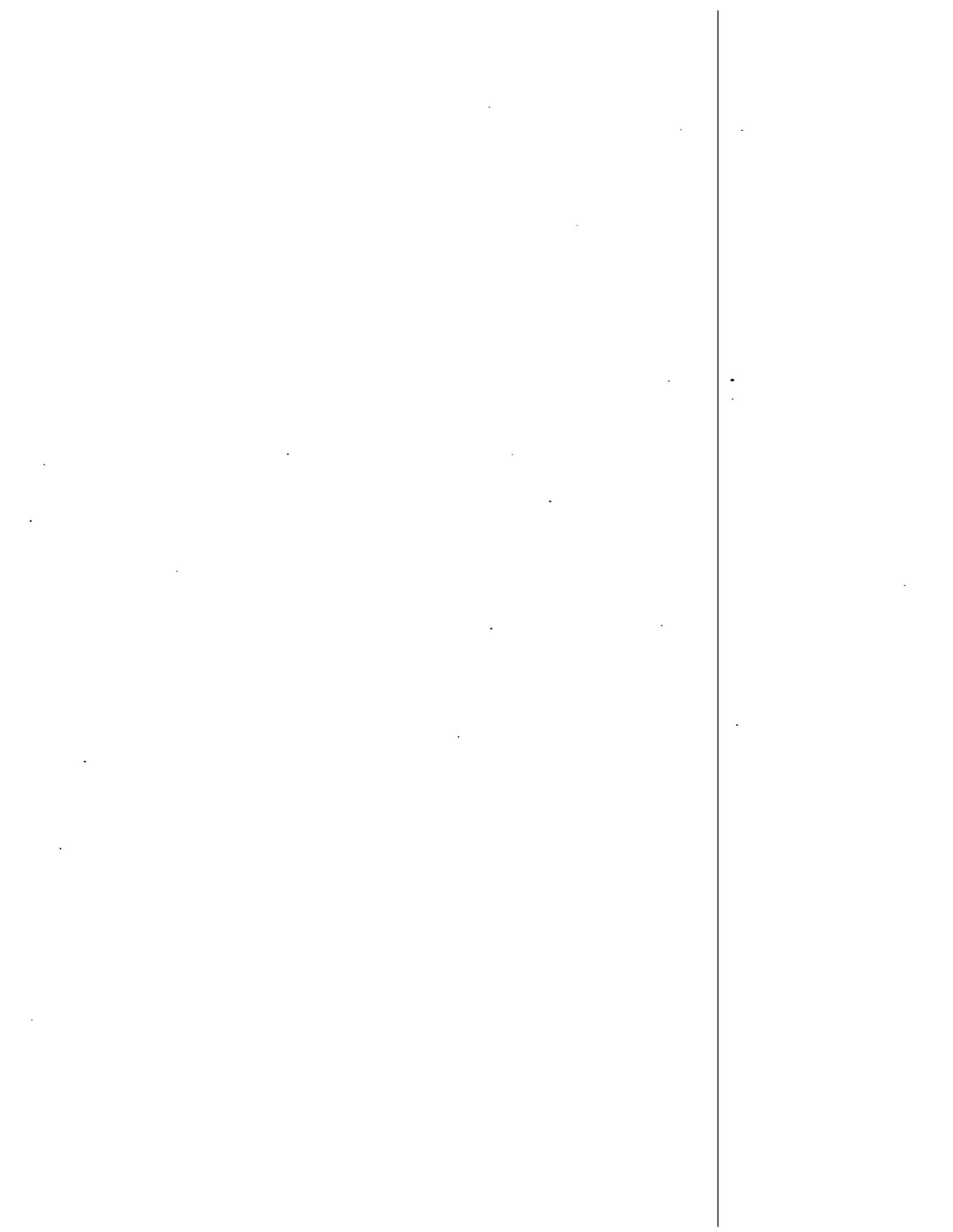
^{1/} Due to rounding the totals may not equal the sum of the year classes.

Table 6. Commercial herring sac roe and herring spawn on kelp processors and buyers operating in the Togiak district, Bristol Bay, 1981^{1/}

Name of Operator/Buyer	Base of Operations	Processing Method		Brine Export	Comments
		Frozen	Cured		
A. HERRING SAC ROE					
1. Ak. Coast Fisheries	M/V Alaska Coast			Floater	
2. Ak. Far East Corp.	M/V Grebe			Floater	Con. w/Trans Asiatic.
3. Alaskan Fisheries Co.	M/V Alaskan I	Floater			Con. w/Dragnet.
4. Ak. Herring Corp.	M/V Hatsue Maru #68	Floater			Joint venture with U.S. gillnetters.
5. Ak. Packers Ass'n.	M/V Alaska Monark			Floater	
6. Aleutian Cold Storage	M/V Shaman			Floater	
7. All Alaskan Seafoods	M/V All Alaskan	Floater			
8. BB 12 Enterprises	M/V B.B. 12			Floater	32 ft. vessel con. w/ American Eagle.
9. B & R Enterprises	M/V Aleutian Dragon	Floater			
10. Bristol Processors	M/V Pavlof	Floater			
11. Consolidated Fish Co.	M/V Aleutian Breeze			Floater	Con. w/Universal Seafoods.
12. Daerim America	M/V Patricia Lee			Floater	
13. Denali Seafoods	M/V Denali	Floater			
14. East Point Seafoods	M/V Lois M.			Floater	
15. Great Alaskan Fish Co.	M/V Chignik Barge	Floater			Con. w/Ursin Seafoods.
16. Hamco American	M/V Sea Quail	Floater		Floater	Con. w/Northland.
17. Icicle Seafoods	M/V Bering Star	Floater			Con. w/Seward Fisheries.
18. Kodiak King Crab	M/V Kodiak Queen			Floater	
19. Newby, Richard	M/V Red Baron			Floater	
20. Northcoast Seafood Proc.	M/V Polar Bear	Floater			
21. Offshore Fisheries	M/V Northwest Enterprise			Floater	
22. Sea Fisher Products	M/V Arctic Fisher	Floater			
23. Sea Roe Fisheries	M/V Lafayette	Floater			
24. Seward Marine Services	M/V Odyssey			Floater	
25. Sterling Seafoods	M/V Alaska Star	Floater			
26. Togiak Fisheries	Togiak	Shore			
27. Trident Seafoods	M/V Bountiful	Floater			
28. Whitney Fidalgo Seafoods	M/V Baltic Sea	Floater			
Total Togiak District:		16	2	11	
B. HERRING SPAWN ON KELP					
1. Ak. Far East Corp.	M/V Salvage King			Floater	
2. BB 12 Enterprises	M/V B.B. 12			Floater	
3. B & R Enterprises	M/V Aleutian Dragon			Floater	
4. Newby, Richard	M/V Red Baron			Floater	
5. Northcoast Seafood Proc.	M/V Polar Bear			Floater	
6. Sterling Seafoods	M/V Alaska Star			Floater	
7. Togiak Fisheries	Togiak			Shore	
Total Togiak District:		0	7	0	

^{1/} Indicates operators with either a physical plant or processing facility in a district or those operators from other areas buying herring or kelp and for providing tender and support service for fishermen in areas away from the facility.

APPENDIX TABLES



APPENDIX TABLE 1. Surface area and biomass conversion estimates of herring schools, by aerial survey, in the Togiak district, 1978-81.

Year	Month/ Day	Est. of Tons Per 50m ² ^{1/}	School Size in Feet	Weight of Catch in Metric Tons	Actual or Est. Weight of Catch	Fish Condition	Location of Purse Seine Set	Water Depth in Feet
<u>1978</u>	5/13	6.7			Estimated		Nunavachak Bay	
	18	11.0	80 x 60 ^{2/}	100 ^{2/}	Estimated	^{2/}	Nunavachak Bay	^{2/}
<u>1979</u>	5/ 4	2.4	40 dia.	5	Actual	Ripe	Ungalikthluk Bay	20
<u>1980</u>	5/15	1.2	60 x 40	5	Actual	Ripe	Ungalikthluk Bay	10
	15	1.6	40 x 30	4	Estimated	Spawn-outs	Ungalikthluk Bay	25
	16	1.1 ^{3/}	220 x 50	19	Actual	Spawn-outs	Nunavachak Bay	15
	16	1.2	65 x 20	3	Estimated	Fish lost	1 Mile West Ungalikthluk Pt.	16
	20	3.0	70 x 70	27	Estimated	Ripe	East of Eagle Bay	20
	20	2.6	150 x 75	54	Estimated	Fish lost	Eagle Bay	20
<u>1981</u>	5/ 3	1.1	400 x 200	80	Actual	Ripe	West Side, Tongue Pt.	7
	8	1.7	80 x 30	7	Actual	Spawn-outs	Togiak Bay, Mouth	18
	10	4.0	150 x 60	40	Actual	Ripe	Asigyukpak Spit Bight	25

3.1 Mean All Estimates

1.2 Mean Estimates at 7-10 ft. Water Depth

2.2 Mean Estimates at 16-25 ft. Water Depth

^{1/} Metric tons of fish per 50² meters of surface area.

^{2/} Incomplete data.

^{3/} Average of 2 observers estimates

(Data Source: 1)

APPENDIX TABLE 2. Inshore commercial catch of herring by gear type and product, Togiak district, Bristol Bay, 1967-81.

Year	Numbers of Processors	Units of Gear ^{2/}		Percent				Total Catch in Metric Tons ^{1/}
		Gill Net	Purse Seine	Gear			Product	
				Gill Net	Purse	Seine	Sac Roe	
1967	1	27		100			100	122
68	2	35	2	75	25		100	82
69	2	22	1	38	62		100	43
70	3	16	1	67	33		100	25
71 ^{3/}								
1972	1	18	1	40	60		100	74
73	2	26	1	100			100	46
74	3	10	1	16	84		100	112
75	2	39		100			100	50
76 ^{3/}								
1977	6	43	6	11	89		100	2,535
78	16	40	25	8	92		100	7,030
79	33	350	175	40	60		92	10,115 ^{4/}
80	27	363	140	16	84		85	17,774 ^{4/}
81	28	106	83	18	82		99	11,372 ^{4/}
13-Year Total	126	1,095	436					49,380
1967-76 Total	16	193	7					554
1977-81 Total	110	902	429					48,826
13-Year Average	10	84	40	20	80		93	3,798
1967-76 Average	2	24	1	65	35		100	69
1977-81 Average	22	180	86	20	80		93	9,765

1/ Catch not comparable, as harvest prior to 1973 reflects females only; most males were discarded and not weighed.

2/ Number of units derived from fish tickets until 1979-81, when they were estimated by aerial survey.

3/ Fishery not conducted.

4/ Preliminary.

(Data Source: 1)

APPENDIX TABLE 3. Estimated total run biomass and inshore commercial catch of herring, Togiak district, Bristol Bay, 1978-81.

Year	RAI ^{1/}	Total Run Biomass and Catch in Metric Tons			
		Run	Harvest	Percent	
				Roe Recovery	Run Harvested
1978	43,050	172,600	7,033	8.2	4.1
79	137,630	216,800	10,115	8.6	4.7
80	15,249	62,300	17,774 ^{1/}	9.2	28.5 ^{2/}
81	79,352	143,900	11,372	9.1	7.9

^{1/} R.A.I. = relative abundance indices; number of fish schools equivalent to 50m² surface area, unadjusted for presence of non-herring pelagic schools.

^{2/} Does not include an estimated 5,200 metric tons of waste.

(Data Source: 1)

APPENDIX TABLE 4. Age composition of the inshore herring run, Togiak district, Bristol Bay, 1977-81.

Age	Age Composition in Percent				
	1977 ^{1/}	1978 ^{1/}	1979 ^{2/}	1980 ^{2/}	1981 ^{2/}
3	4	11 ^{3/}	3	3	2
4	49	44	9	2	48
5	37	33	43	2	5
6	3	9	35	39	1
7	3	1	9	37	24
8	3	1	+	15	15
9+	1	1	1	2	4
Catch (m.t.)	2,535	7,030	10,115	17,774	11,372
Run (m.t.) ^{4/}		172,600	216,800	62,300	143,900

^{1/} Age composition based on number sampled, and not weighted by weight at age and aerial biomass estimates.

^{2/} Age composition weighted by weight at age and aerial biomass estimates.

^{3/} Includes age 1, 2 and 3.

^{4/} Estimate of total run, including commercial catch.

(Data Source: 1)

APPENDIX TABLE 5. Commercial harvest of herring spawn on kelp in the Togiak district, Bristol Bay, 1968-81.

Year	Number of Processors	Number		Harvest	
		Fishermen	Deliveries	Pounds	Metric Tons
1968	1	1	6	54,600	25
69	1	3	20	10,125	5
70	1	5	23	38,855	18
71	1	12	43	51,795	23
72	1	12	32	64,165	29
1973	1	10	11	11,596	5
74	3	26	49	125,646	57
75	2	44	98	111,087	50
76	5	49	118	295,780	134
77	5	75	266	275,774	125
1978	11	160	349	329,858	150
79	16	100	228	414,727	188
80	21	78	186	189,662	86
81	7	108	277	378,207	172
14 Year Total	76	683	1,706	2,351,877	1,067
1968-77 Total	21	237	666	1,039,423	471
1978-81 Total	55	446	1,040	1,312,454	596
14-Year Average	5	49	122	167,991	76
1968-77 Average	2	24	67	103,942	47
1978-81 Average	14	112	260	328,114	149

(Data Source: 1)

APPENDIX TABLE 6. Aerial observations of herring spawnings in the Togiak district, Bristol Bay, 1978-81.^{1/}

Date	1978		1979		1980		1981	
	No.	Miles	No.	Miles	No.	Miles	No.	Miles
4/30			2	2.5			9	3.0
5/ 1	1	0.4					6	2.3
2			21	8.3	11	4.0	12	1.9
3	1	0.4	14	5.0	8	3.0	12	6.8
4			8	3.1			4	2.9
5			1	1.3	0		6	2.5
6					3	0.9	0	
7			3	0.6	3	1.2	2	0.4
8	2	1.8			1	0.2	3	1.0
9			2	0.4			5	1.4
10			0				0	
11	9	7.7			0			
12	3	1.5	0		0		15	4.8
13	12	8.6			0		6	3.8
14	11	5.6	0		2	2.3	10	4.7
15					6	4.0	2	1.5
16			0		4	1.2	0	
17			0					
18	11	4.2						
19	3	2.5			1	0.3		
20					4	0.9		
21			0					
22					2	0.5		
23							10	2.1
24								
25	8	4.2						
26	2	2.2	1	0.7			3	0.2
27					3	0.3		
28	0							
29					8	1.6		
30	6	1.6						
31					2	0.8		
6/ 1								
2	1	0.5						
3							1	0.8
4								
5								
6								
7					6	3.1		
Total	70	41.2	52	21.9	64	24.3	106	40.1

^{1/} Survey area covers Nushagak Peninsula to Togiak Bay, and shows the number of individual herring spawnings and linear miles of spawn.

(Data Source: 1)

APPENDIX TABLE 7. Exvessel value of the commercial herring and spawn on kelp harvest, Togiak district, Bristol Bay, 1967-81.^{1/}

Year	Estimated Exvessel Value in Thousands of Dollars ^{2/}			
	Herring			Total
	Sac Roe	Food/Bait	Spawn on Kelp	
1967	11			11
68	7		8	15
69	4		1	5
70	2		6	8
71			8	8
1972	4		9	13
73	2		2	4
74	24		19	43
75	9		22	31
76			127	127
1977	447		116	563
78	2,635		120	2,755
79	6,561	180	249	6,990
80	3,055	150	95	3,300
81	3,988	1	250	4,239
15-Year Total	16,749	331	1,032	18,112
1967-76 Total	63		202	265
1977-81 Total	16,686	331	830	17,847
15-Year Average	1,288	110	74	1,207
1967-76 Average	8		22	27
1977-81 Average	3,337	110	166	3,569

^{1/} Value paid to the fishermen.

^{2/} Exvessel derived from price per pound times commercial harvest.

(Data Source: 1)

