

MEMORANDUM

State of Alaska

TO: Report Recipients

DATE: April 15, 1983

FILE NO:

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SUBJECT: 1982 Bristol Bay Annual
Management Report

The attached report represents our continuing and most recent efforts to update and upgrade fishery statistics useful in describing the Bristol Bay salmon and herring fisheries.

Many of the new data tables first included in 1975 have been continued, and the major reorganization of fishery statistics which began in 1981, has been continued 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

-1982-

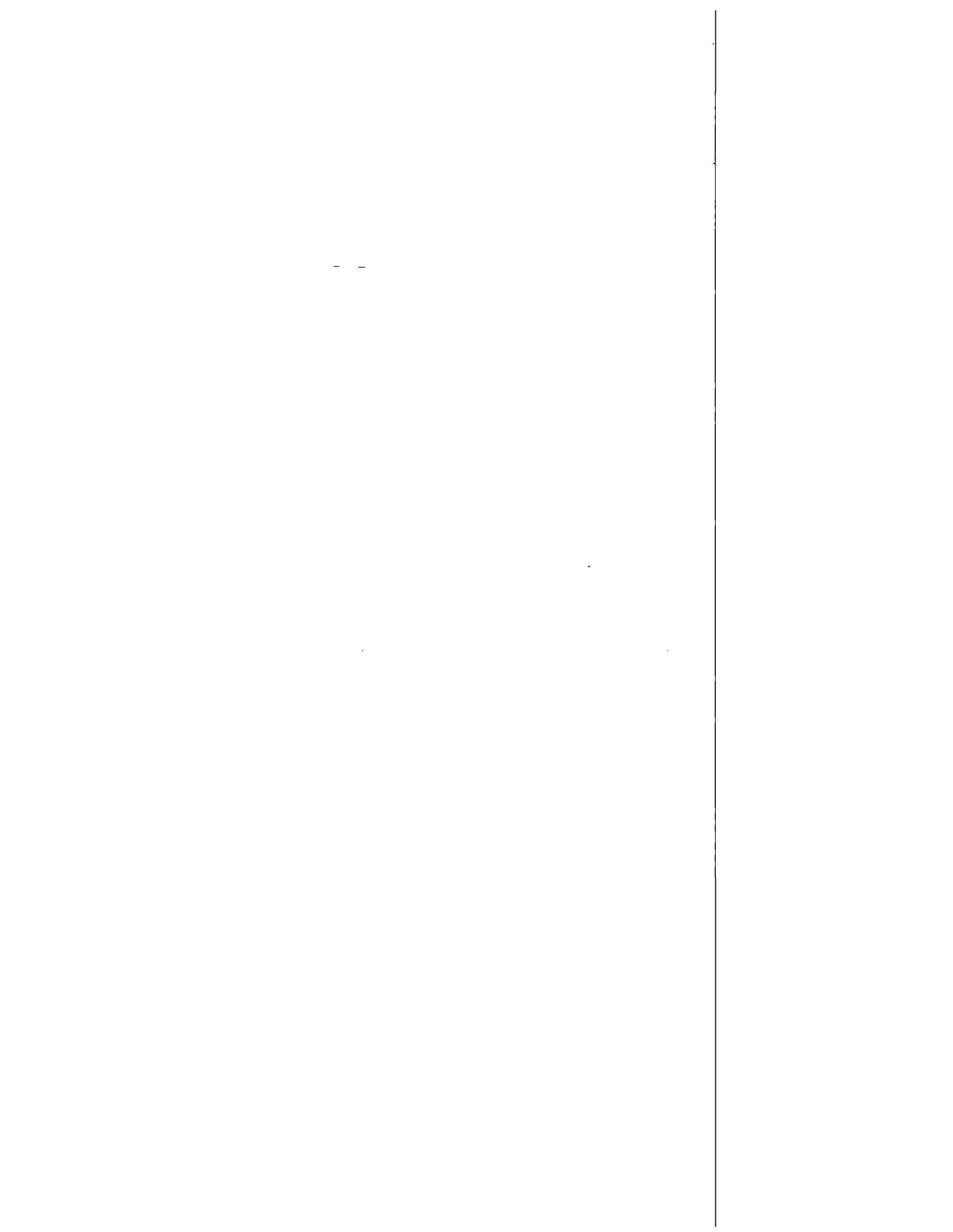
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April, 1983



PREFACE

The 1982 Bristol Bay Management Report is the twenty-third 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 1982. 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 1981-82 catch data are preliminary pending receipt of final computer listings of fish ticket catches.

Data tabulation has been divided between current year TABLES (1982) and comparative APPENDIX TABLES (1963-82) 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 (1963-82), 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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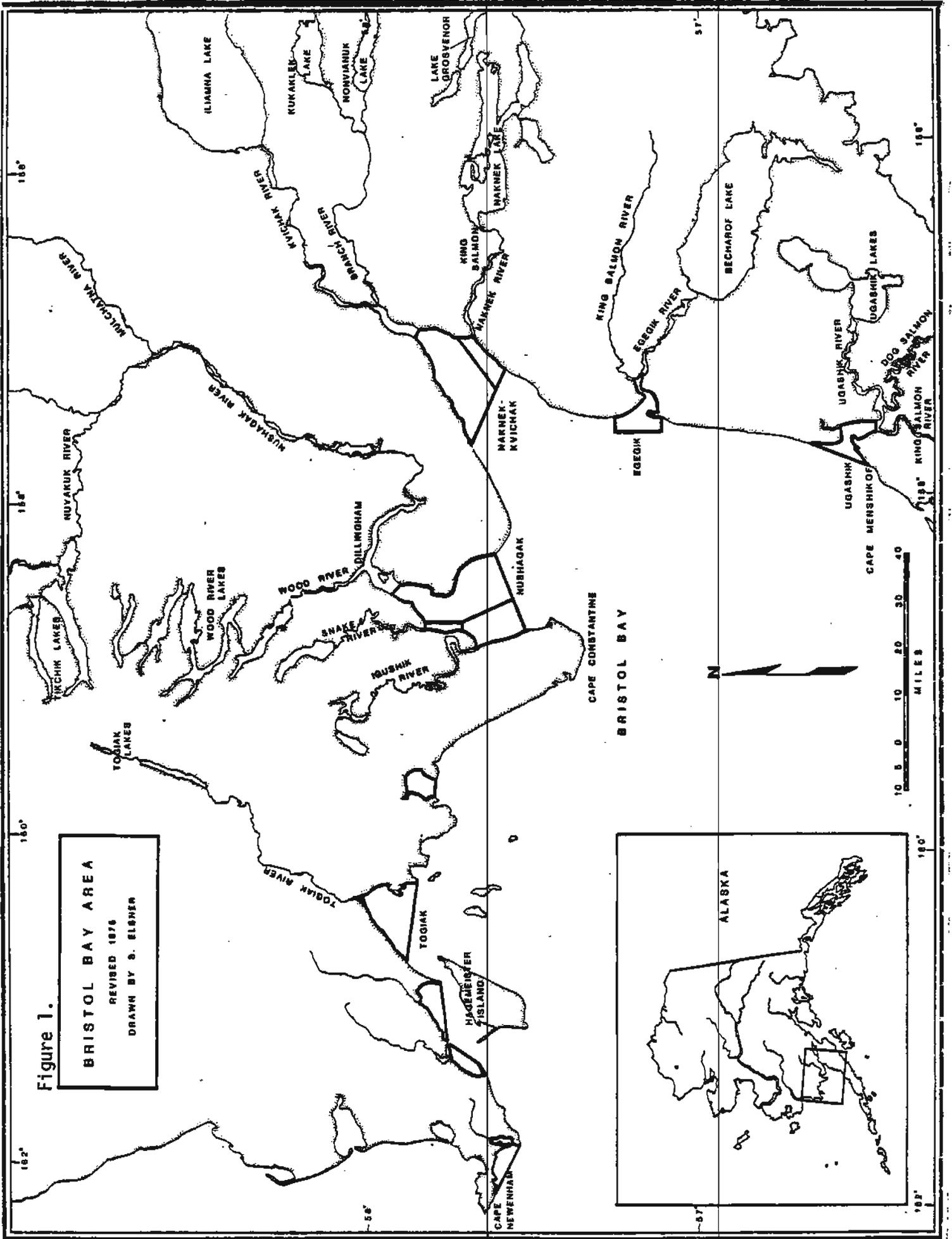


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ANNUAL MANAGEMENT REPORT
BRISTOL BAY SALMON FISHERY
1982

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 most productive sockeye salmon producing region in the world, and also supports substantial commercial fisheries on other salmon species, herring and herring spawn on kelp.

The 1982 sockeye salmon forecast anticipated substantial numbers of harvestable fish in all of the five major districts and totalled a potential record harvest of 27.2 million from a total run forecast of 34.6 million fish (Table 1). The preseason management strategy called for a liberal fishing schedule to help determine run strength to individual districts, and to harvest those fish in excess of escapement requirements (Appendix A). However, for the second time in the past three years, the sockeye commercial fishery was the setting for a lengthy price dispute between fishermen and processors which seriously delayed full fishing effort until the run was well underway in most districts.

Even though the 1982 sockeye salmon total run of 22.2 million was less than the forecast of 34.6 million, the actual run cannot be characterized as a bust by historical standards. Bristol Bay sockeye runs rise and fall in cycles and the 1982 total run was 2.5 times higher than the previous comparable four cycle year average (1962-67-72-77), and the 1982 commercial harvest of 15.1 million sockeye salmon was triple the average cycle year since 1956.

The total salmon harvest of 18.5 million in 1982 was almost twice the long-term average, and was valued at over \$81 million to the fishermen, and accounted for 17% of the entire statewide catch. All time catch records for king and coho salmon were established with harvests of 265,000 kings and 663,000 coho. As expected, the chum salmon return was average in every respect, as was the pink salmon return. The large pink return forecast to the Nushagak district did not materialize, and foreign processing, which was allowed for a brief period, was quickly terminated.

Fishery Economics

A low demand for canned salmon coupled with the lower than anticipated return of sockeye and pink salmon posed serious economic problems for Bristol Bay salmon fishermen and processors in 1982. These problems were magnified by the occurrence of the longest fishermen/processor price dispute in the history of the fishery.

Salmon price negotiations between the processors and the two largest fishermen associations in Bristol Bay were intense, and a major proportion of the fishing fleet and beach fishermen, did not participate in the fishery until well into the sockeye run. Western Alaska Cooperative Marketing Association (WACMA) reached a price agreement on July 4, and fishermen in Nushagak and Togiak districts were fully involved in the fishery by late afternoon of July 4. The Alaska Independent Fishermen's Marketing Association (AIFMA) did not reach a settlement until July 7, by which time a major proportion of the eventual total catch in the Naknek-Kvichak (58%), Egegik (59%), and Ugashik (42%) districts had already been accounted for (Table 17).

Unlike previous seasons, when price disputes tied up virtually the entire fishery until an agreement was reached, this season saw approximately 50% of the fishing fleet participating in the fishery during the price dispute.

The very significant fishing effort that did not participate in the price dispute, was sizable enough to generally harvest the available fish, and the eventual harvest was not seriously affected, except in the Togiak district. Considerable potential harvest was lost at Togiak, where virtually the entire fleet "went on the hook" until a settlement was reached.

Final fish prices in 1982 showed significant decreases over prices paid in 1981, except for king salmon (Appendix Table 45). The unstable market conditions in 1982 resulted in an overall decrease of 13% over prices paid fishermen in 1981, with decreases ranging from 31% for chums to 7% for sockeye salmon (Appendix Table 45).

Exvessel value (or value to the fishermen) of the 1982 Bristol Bay salmon fishery totalled \$81.4 million, highest in the State, and accounting for 26% of the total estimated exvessel value of Alaska's entire salmon fishery (Table 33).

Japanese High Seas Fishery

Since 1974 the Japanese high seas mothership gill net 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 again in 1982 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 1982 Bristol Bay sockeye run included 380,000 fish caught as immatures in 1981, and 63,000 fish harvested as matures in 1982, or 443,000 fish and 2% of the total Bay run (Appendix Tables 4 and 5). This level of interception is well below the 20 year average of 7% and 1.4 million fish. In addition, the

continuing relatively low level of sockeye catches first established in 1979, by the Japanese land-based gill net 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 3).

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 1963-79 the average king harvest was only 240,000 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 in 1980 (or 380,000) were estimated to be of Western Alaska origin (Appendix Table 6). In response to concerns by the U. S., Japan voluntarily agreed to limit king salmon harvests by the mothership 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. Actual mothership king harvests during the first two years of this agreement was 88,000 and 107,000, respectively (Appendix Table 6).

While inshore king returns to Bristol Bay in 1982 were at record high levels, inshore returns to the Yukon and Kuskokwim Rivers and Norton Sound were relatively weaker than in the previous three years. Over 90% of the king salmon harvested on the high seas in 1980 were 4 years old, a large proportion of which should have matured and returned in 1982 as 6 year old fish. Using average maturity schedules and estimated natural mortality rates, it is possible that an additional 133,000 6-year old king salmon (over 3.0 million pounds) would have returned to western Alaska in 1982 had they not been harvested in 1980 as 4 year olds. Unfortunately, the distribution of this potential loss to individual stocks of major western Alaska drainages is not completely understood at this time. More precise stock identification studies are currently underway through contract.

Based on the increasing abundance trends observed in western Alaska over the past 3-5 years, and upon the large mothership king catch in 1980 of the year class which returned predominantly in 1982, a record level return was expected in all districts. The fact that the return was somewhat weaker than expected, especially north of Bristol Bay, may indicate that the 1976 year class was selectively diminished by the high seas fishery operating in 1980. This possibility is further supported by the decreased contribution of 6 year old fish to the Nushagak River system.

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 totalled 28.3 million, compared to the ADF&G forecast of 34.6 million (Appendix Table 1). The age composition estimated from the Japanese data was 55% 2-ocean, and 45% 3-ocean, compared with the Department forecast of 63% 2-ocean and 37% 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 of similar magnitude.

South Unimak/Shumagin Fishery

The inseason development of the Unimak/Shumagin June cape intercept sockeye 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 1.9 million sockeye and the Shumagin quota was 408,000 (Appendix Table 54). The June quotas were further broken down

into weekly time period quotas so that the catch would be spread out over the entire month. The actual catches were 1.7 million and 451,000 for the South Unimak and Shumagin Islands fisheries, respectively (Appendix Table 54).

During the South Unimak June fishery, purse seiners accounted for 905,000 sockeye and 431,000 chums. Drift gillnetters caught 745,000 sockeye and 501,000 chums while set gillnetters took 20,000 sockeye and 2,000 chums. Approximately 75 purse seiners, 130 drift gillnetters, and 15 set gillnetters (8 at South Unimak) participated in the South Unimak and Shumagin Islands June fisheries. Immature salmon did not appear in significant numbers during 1982.

Both Shumagin and South Unimak fishing success is highly dependent on weather conditions, which in turn affect migratory patterns of fish as they pass these cape fishery areas. Southerly winds tend to set fish onshore, and high fishing success from moderate sized runs can be obtained if these conditions persist.

Daily catches of sockeye salmon in the South Unimak fishery began to increase dramatically on June 15, after the price settlement. Under either good fishing weather (nearly calm seas), or fishable S to SE winds, catches continued to accelerate up through June 19 (95 to 179,000 sockeye per day). The Unimak fishery was blown out on June 20 (SE 35-40 K), and resumed with high catches for the next six days (84 to 151,000 sockeye per day).

Inseason staff assessment placed the Unimak sockeye peak on June 24 when 151,000 sockeye were caught by the gill net fleet, with the majority of the purse seine fleet hampered by high winds. On the average, the peak of the Unimak fishery occurs about 13 days prior to the peak of the Bristol Bay commercial sockeye catch. Based upon Unimak catches, the Bay sockeye run was expected to peak between July 6-8 in the major districts. Nushagak district was the only fishery where continuous fishing was taking place,

which in turn allowed a true look at migration timing, unaffected by buildup of fish in a district during a closure. The Nushagak district sockeye run peaked on July 5-6, right on schedule with South Unimak timing.

Post season analysis on Shumagin and Unimak sockeye catches show strong evidence that the southerly winds that prevailed during much of the season, drove passing fish further onshore, where a high CPUE was achieved. Fish also seemed to be migrating in a narrow band, and once located, catch rates were high.

Experiences this season point out the fallacy of using Shumagin/Unimak sockeye catches as true indicators of relative abundance. Unimak catches have value as a "general" timing/magnitude indicator, and along with similar data from the Department's Port Moller test boat, are useful management tools, but 1982 is a good example of the variability of results that can be expected from Unimak catch data alone.

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.

Initial estimates of sockeye run strength were made based on the relationship between return per index and mean length, and as the season progressed, from lag time analysis. Lag time analysis tended to over-estimate the inshore return early in the season, and under-estimate run strength late in the season, which suggested that daily migration rates were lower early in the season.

In past years the proportion of 2-ocean sockeye in the Port Moller test catches were very close to the proportion 2-ocean in the inshore returns. The ability to predict the ocean age composition of the inshore sockeye return accurately early in the season has potential for inseason evaluation of the forecast.

Inseason, the Port Moller test fishery was indicating a sockeye run size of only 14.9 million based on a return per index of 16,000 fish per index point and mean length, as compared to the preseason forecast of 34.6 million. The final estimate of return per index point was 29,300 fish per index point, and was consistent with the recent trend of low catchability of sockeye at Port Moller (Appendix Table 7). Inseason sockeye estimates of run strength, based on mean length from sampling at Port Moller, and length/temperature model of run strength was 16.5 million fish, or 26% below the actual return.

In 1982, 357 chum salmon were caught during sampling at Port Moller, generating 210 total indices including values interpolated for missed fishing time (Table 7). The season chum forecast based upon the historic mean of 12,800 inshore fish per index point was 2.7 million, roughly 52% above the actual run of 1.3 million (Appendix Table 7). 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 and length.

1982 COMMERCIAL SALMON FISHERY

Fishing Effort

Commercial fishing effort in 1982 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 8). Estimates of peak fishing effort on July 5-11 after the price settlement, showed that actual drift effort was approximately 72% of that registered, and set net effort was 81% of available registered gear. Overall, approximately 96% of preseason registered effort participated at one time in the fishery in 1982 (Appendix Table 10). 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 (Appendix Table 10).

District fishing effort was heavily directed toward Naknek-Kvichak and Nushagak districts, with approximately 66% of the total effort taking place in these two districts during the peak of the sockeye run (Tables 11 and 14). Registration by residency continued to show an overall resident/non-resident ratio of 2 to 1 (Appendix Table 8).

Industry Harvest Potential

At the request of industry groups and state agencies, the Department prepared a preliminary report on the processing capacity available for the 1982 salmon harvest (Appendix B). The processing report indicated that a potential shortage of processing capacity may occur in the Prince William Sound, Norton Sound, Nushagak Bay, and southern Southeast Alaska pink salmon fisheries. The potential shortfall in processing capacity was discussed by the Board of Fisheries during the April, 1982 spring meeting. The Board reviewed information and data regarding expected Alaskan salmon runs,

anticipated processing capability of U. S. processors, the anticipated market situation and other factors. The Board then granted limited exceptions to 5 AAC 39.198 allowing the use of foreign vessels to process surplus pink salmon in those areas where the possible return of pinks was expected to be beyond the capability of domestic processors to handle. Nushagak Bay was one of the areas so identified. The Board concluded that Nushagak Bay may have 4.0 million surplus pink salmon available from July 20 through August 10, and that a possible shortage of available processing capability may exist.

In allowing foreign processing in Nushagak Bay, the Board stressed that these were tentative surpluses and that no guarantee of actual availability of these fish to foreign vessels could be made. The Board further developed guidelines for use by the Commissioner of Fish and Game in his deliberations as to whether foreign processing vessels may be granted a permit to operate in the State's internal waters.

Foreign processing was allowed in Nushagak district for a short time between July 21-27, when it appeared that the pink salmon return would exceed the domestic industry's ability to handle the volume of fish in excess of spawning requirements (Table 10). When it became apparent that the Nushagak pink run was either showing late run timing or substantially less than forecast, foreign processing was quickly terminated (Table 10).

The preseason sockeye forecast and other specie catch trends indicated a potential salmon harvest of 36.9 million fish, with sockeye expected to contribute nearly 74% of the total:

<u>Species</u>	<u>Harvest in 1,000's of Fish</u>	
	<u>Potential</u>	<u>Actual</u>
Sockeye-----	27,170	15,145
King-----	200	265
Chum-----	1,000	942
Pink-----	8,200	1,437
Coho-----	300	663
Total	36,870	18,453

The actual total harvest of 18.5 million was only 50% of preseason expectations and resulted from failure of the sockeye forecast (particularly 2-ocean 4-year old fish to Kvichak River) and pink salmon forecast to Nushagak district (Appendix Tables 1 and 2).

The salmon canning industry made operational all of the Bay's available canning lines, which numbered 17 1-lb. talls, 20 ½-lb. flats, and 3 ¼-lb. flats in 12 operational plants (Table 29). In addition to the landbased canning operations, 60 additional companies operated in the Bristol Bay area in 1982 in the fresh export, brine export, frozen and cured salmon marketing areas (Table 29). A total of 72 processors/buyers reported catches in Bristol Bay in 1982.

Daily catches at no time exceeded the daily production capacity of available processors and very little, if any, harvest was lost due to processor suspensions or limits. Post season analysis showed that the daily sustained processing production in 1982 amounted to 1.225 million fish from July 3-8, compared with 1.620 million in 1981 (Table 17). The daily sustained production in 1982 was influenced by the fishermen-processor price dispute which was not fully settled until July 7.

Market Production

The increasing trend of salmon production in the fresh export and frozen/cured processing categories continued in 1982. Frozen salmon production in Bristol Bay totalled 68.0 million pounds of all species in 1982, up significantly from 1979-81 when 42.9, 38.3 and 54.7 million pounds were processed in this manner (Table 30 and Appendix Table 49). The significant shift in market emphasis from canned to frozen salmon continued, and was accelerated in 1982 by the fishermen-processor price dispute.

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

all specie salmon production by product type:

Type Production	Percent of Total Production				
	1978	1979	1980	1981	1982
Canned.....	63	36	34	38	15
Frozen/Cured.....	12	32	27	36	61
Fresh Export.....	9	18	18	13	21
Brine Export.....	16	14	21	13	3

Analysis of Department records indicate that an average of 92% of all sockeye salmon harvested from 1963-72 were processed as a canned product, compared with 44% from 1973-82 (Appendix Table 53). The more recent shift to frozen and export production of sockeye salmon is shown on Appendix Table 53. 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

Fishing effort in all districts was reduced early in the season as fishermen and processors negotiated salmon prices. Simultaneously, the inshore sockeye salmon run did not develop as anticipated. Run strength was under that forecast, particularly 4 year old fish to the Kvichak River system, and although run timing was near normal, entry patterns into and through the districts were atypical in many areas.

Early results from the Department's Port Moller test fishery which provides information on timing, magnitude and age composition of the sockeye run one week in advance of the inshore fishery was indicating nearly normal run timing, a run considerably less than forecast, and a missing age class of fish (2-ocean, 4 year old). On the other hand, Department sampling and catch analysis in the Shumagin-South Unimak intercept fisheries indicated a run later than normal or bimodal with indications of separation in run

timing between older (3-ocean, 5 year old fish) and the younger (2-ocean, 4 year old fish), most of which were thought destined for Kvichak River.

The inability to analyze these data quickly enough inseason and the near failure of the Kvichak 2-ocean sockeye return, resulted in a less than desirable escapement to that river. The 1.1 million escapement to Kvichak River was only 28% of preseason goals and 57% of the inseason adjusted escapement goal (Table 1). The preseason escapement goal of 4.0 million was based on the desire to boost the escapement in the important Lake Clark system to a level at which natural predation would minimally affect production (Appendix C). When it became apparent that the 2-ocean, 4 year old return was considerably under forecast, the escapement goal was dropped back to the original goal of 2.0 million.

Due primarily to the low return to the Kvichak River system, the total run of 22.2 million sockeye to Bristol Bay was only 64% of the preseason forecast of 34.6 million (Table 1). Actual sockeye salmon returns compared to forecast returns (in millions of fish) are presented by river system below:

<u>River System</u>	<u>Forecast Return</u>	<u>Actual Return</u>	<u>Percent</u>
Kvichak	13.1	2.6	20%
Naknek	3.8	4.2	111%
Egegik	4.2	3.4	81%
Ugashik	2.1	2.3	114%
Wood	4.9	3.9	80%
Igushik	1.8	1.7	92%
Nuyakuk	2.6	2.1	82%
Togiak	0.9	0.9	99%
Total	34.6	22.2	64%

The Bay-wide run was 36% below forecast, compared with the 20 year average forecast error of 43% (Appendix Table 1).

King Salmon

The 265,000 king salmon harvested in Bristol Bay in 1982 broke the historical catch record of 239,000 set in 1981, and was over twice the long-

term average catch of 121,000 (Appendix Table 12). The Nushagak district, which normally produces over 75% of the Bristol Bay catch, showed a catch of 200,000 and an escapement of 147,000 while the Togiak district produced a catch of 40,000 and escapement of 17,000 (Appendix Table 40).

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 higher 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 assume that total runs have averaged over 300,000 kings in recent years (1976-82) throughout Bristol Bay. The outlook for the next several years is promising due to very good escapements in recent years.

Chum Salmon

The chum salmon harvest in Bristol Bay was 942,000 and was the eighth largest harvest in the history of the fishery and was highlighted by large catches in the Naknek-Kvichak (194,000), Nushagak (456,000), and Togiak (159,000) districts (Table 18). Escapements in the Nushagak (256,000) and Togiak (86,000) districts were above minimal escapement requirements (Appendix Table 41). Chum salmon escapements are not evaluated in the remaining districts.

Pink Salmon

Failure of the pink salmon to return as expected was another major disappointment in 1982. The preseason forecast for pinks returning to Nushagak district was 9.2 million, which would have provided for a potential harvest of 8.2 million (Appendix Table 2). Based on this large forecast harvest, and the probability of this harvest exceeding the processing capability of domestic processors, foreign processing and tendering was allowed in Nushagak district beginning 4:00 p.m., July 21 (Table 10).

Up through July 23, the Nushagak pink return had exceeded the parent year totals, and the accumulative season catch was closely following the long-term average catch by that date. The peak of the run was on schedule for July 24-26, but when the magnitude of return proved to be less than 1/3 of that expected, foreign involvement was terminated effective 6:00 a.m. on July 27 (Table 10). The Nushagak pink salmon run amounted to 2.9 million (1.3 catch and 1.7 escapement), only 32% of the preseason forecast (Appendix Table 2).

Coho Salmon

The commercial coho harvest for all districts of 663,000 fish combined was the largest in the history of the fishery (Appendix Table 15). The previous record catch of 348,000 occurred in 1980. The Nushagak and Togiak districts accounted for 80% of the area-wide harvest and was highlighted by a catch of 388,000 fish in the Nushagak district which broke the previous record of 293,000 reported in 1916. Coho catches at Egegik (72,000) and Ugashik districts (51,000) were also record catches (Appendix Table 15).

A sharp increase in coho harvests in recent years has been attributed to greater late season fishing effort and processing capacity; however, the run of this species was strong in all systems this season and escapements throughout the area also appeared to be large.

Aerial escapement surveys were initiated for the first time at Togiak in 1980 in recognition of the increased late season fishing pressure. Aerial survey indices indicate the coho escapement approximated 54,000 fish in those areas surveyed. Weather was a major factor inhibiting surveys in 1982, and the Togiak district coho escapement is considered a minimal estimate.

At Nushagak, where sonar gear was used to enumerate salmon into the Nushagak River, over 227,000 coho had escaped the fishery by August 18 (Table 21). The Nushagak district coho escapement of 227,000 and commercial harvest of 388,000 provided a total run of 615,000 fish.

1982 DISTRICT MANAGEMENT SUMMARIES

Naknek-Kvichak District

The 1982 forecasted sockeye salmon run to the Naknek-Kvichak district was 17.5 million of which 12.5 million were projected to enter the harvest (Table 1). The Kvichak River escapement goal was increased to 4.0 million as opposed to the 2.0 million goal that is normal for this year in the cycle (Table 1). The decision to raise the goal was based on three considerations: (1) by investing another 2.0 million spawners it would saturate predators with food, thereby increasing recruitment for additional spawners above the 2.0 million transitional low point; (2) the Lake Clark segment of the run had produced well at 1.5 to 2.0 million escapements in the past and if historical production levels were to be reached, about half of the 4.0 million goal should have been secured from the early portion of the run; (3) the forecasted surplus of Naknek-Kvichak fish was such that an additional 2.0 million fish in the escapement would represent only a 13% decrease in the catch (Appendix C).

The actual run to the district was 7.5 million sockeye, 43% of forecast (Table 1). Both the Naknek and Branch River runs were slightly above forecast, however, the Kvichak run totalled only 2.6 million, 20% of forecast. The 2-ocean Kvichak River forecast was 91% of the total run, with the 4 year old segment representing 75% (Table 2). The actual 2-ocean Kvichak run was 1.8 million compared to the 11.9 million forecasted (Tables 2 and 3). The disastrously poor 2-ocean return has yet to be explained, although evidence indicates the mortality took place after the fish left their freshwater environment.

Aerial surveys and processor reports indicate that peak fishing effort took place on July 8 when about 450 drift units and 253 set net units were fishing (Table 11). This peak effort coincided with the settlement on July 7 of the lengthy price dispute.

Preseason management strategy called for early and frequent fishing periods to assess sockeye run strength and timing and to harvest those fish in excess of escapement needs, while still allowing escapement from the early portion of the run to bolster the Lake Clark segment. The Port Moller test fishery began on June 11 with good catches of both sockeye and chum salmon (Tables 6 and 7). Both the South Unimak and Shumigan Island catches were negligible until a price settlement was reached on June 14. Catches by gill netters were averaging just over 400 sockeye for the previous three days prior to the price settlement. Timing from the South Unimak fishery to Bristol Bay is generally 13-14 days and from Port Moller to Bristol Bay generally 6-8 days. Catches on June 15, both at South Unimak and the Shumigans, were strong (95,000 and 18,000, respectively). Port Moller catches were varying with a low of 3 index points and a high of 29 on June 15 (Table 6). The Port Moller index on June 19 was 50, but high winds the afternoon of June 20 allowed but 2 stations to be fished (Table 6). Sockeye were being caught mainly on stations 6-9 indicating a more normal migration pattern as compared to the atypical shoreward migration of 1981.

The only real indication that the Bristol Bay run would be much smaller than expected was the size of sockeye being caught at Unimak and at Port Moller. In both fisheries, the average weight was in excess of that expected. South Unimak was averaging just over six pounds and Port Moller was averaging 6.9 to 7.0 pounds. The estimated passage past Port Moller through June 20 was 2.8 million sockeye with the peak projected to be around June 26-28 (Table 6).

Commercial catches in the Naknek-Kvichak district were just beginning on June 21 and 22 and fish were beginning to pass the counting towers on both Naknek and Kvichak Rivers (Tables 11 and 19). The inside test fish program

on the Kvichak River had begun on June 21 and catches were very light on both June 21 and 22 (Table 23). A 27 hour district extension was announced on June 22 in order to provide additional inshore catch information on timing and magnitude of the incoming run (Table 10).

An extended price dispute between the two major fishermen organizations and the processors began on June 23 and fishing effort was reduced to about one seventh of what normally would be expected. The Port Moller test boat again showed good catches on June 23 (32 index points), and the size of fish began to drop slightly (Table 6). Inside test fish and counting towers were still showing very little fish, while the commercial catch remained about the same with less effort. The open fishing period was again extended, for an additional 24 hours (Table 10).

Port Moller indices were again good on June 24 with still another slight drop in the size of fish. An estimate based on size of fish was made at Port Moller and indicated that the age class breakdown was 31% 2-ocean and 69% 3-ocean, compared with the forecast of 63% 2-ocean and 37% 3-ocean (Table 2). The inshore run should have been increasing beginning around June 25 based on the increased catches at Port Moller on June 19 and 20. A 50 hour fishery extension until 2:00 p.m., June 27 was announced for the entire district (Table 10). Port Moller catches picked up marginally on June 25 and average size again dropped slightly, and the estimated passage past Port Moller was now 5.5 million (Table 6). If normal timing was assumed, the passage should reach at least 17 million by June 26 or 27. Samples of age classes from both the South Unimak commercial catch and Port Moller test fishery became available on June 25. South Unimak showed 32% 2-ocean and 68% 3-ocean while Port Moller showed 16% 2-ocean and 77% 3-ocean, both indicating a problem with the proportion of the 2-ocean age component.

The commercial sockeye catch began to increase on June 26, with boats averaging around 550 fish per delivery in the Naknek-Kvichak district and from 400-800 in other districts (Table 11). Another 24 hour fishing period extension was allowed as fishing success began to improve. Poor weather on June 27 again forced the Port Moller test boat to terminate fishing after two drifts. Indices had dropped slightly and may have been attributable to weather and fishing conditions. The commercial catch increased slightly, however, the CPUE decreased and this was probably caused by rough seas in the district. Estimates of total run size based on the four age classes of sockeye from Port Moller catches and actual inshore run size to date gave estimates between 17.6 and 21.4 million fish. Estimates based on Port Moller catchability and lag time gave estimates past Port Moller through June 27 of 5.3 and 6.1 million fish, respectively.

Both the Kvichak inside test fish and Naknek tower began picking up substantial fish on June 28. Commercial effort was increasing slightly each day even though the price dispute was still in progress. Because of increasing escapement rates in both the Kvichak and Naknek Rivers, and fair catches and escapements in other areas, a 26 hour extension of fishing was announced that would end at 4:00 p.m., June 29 (Table 10).

The inside Kvichak test fish indices jumped dramatically on the first tide of June 29. Although visibility was extremely poor at Naknek tower, fish began to move upriver in large numbers. Reports that the commercial fleet were making good catches was confirmed during a late morning district survey. Port Moller was finally able to fish but catches were poor, partially due to fishing conditions. Concern at this time was that the total run may be weaker than forecast. As more inshore catch and escapement data became available, the inshore run was lagged back to Port Moller catches. The estimate

past Port Moller through June 28 based on a lag time of 11 days was just over 4 million fish. Another 26 hour extension of fishing time was allowed in order to assess the strength of the run inside the district. Effort was now up to about 90 boats and 161 set nets. Samples of the commercial catch varied greatly on June 24 (27% 2-ocean) and June 25 (12% 2-ocean), whereas a sample taken from the west side set nets on June 29 showed 71% 2-ocean. The first two Port Moller drifts on June 30 made good catches, but the inside Kvichak test fish drift catches dropped dramatically (Table 23). The escapement past Naknek tower through 10:00 a.m., June 30 was 38,000 with over 5,000 sockeye per hour passing the tower. As yet nothing was passing Kvichak tower and a morning aerial survey of the river under poor conditions indicated very few fish. CPUE in the fishery dropped significantly on the first tide of June 30 and most catches were made on the east side of the district. Another 24 hour fishing extension was announced based on catch and escapement trends in the Naknek-Kvichak district and in other areas.

Comparison of the 2-ocean age classes in the Naknek-Kvichak catch and Kvichak and Naknek escapements of samples taken through June 30 showed that much of the commercial catch to that point had been Naknek fish. Concern that the Kvichak run was much weaker than forecast was mounting, even though most of the other river systems were doing well at the time. Inside Kvichak River test fish catches were again low and both tower counts and an aerial survey of the river showed few fish on July 1 (Table 23). The Naknek sockeye escapement meanwhile had reached 271,000 (246,000 on June 30), 34% of the goal, through 2:00 p.m. on July 1 (Table 19). Most of the commercial catch was coming from the east side of the district with very little being taken on the west side beaches. It was determined that until the Kvichak run showed more promise, fishing would be allowed only in the Naknek section, and a

announcement was made to extend the Naknek section only for an additional 24 hours (Table 10). Sockeye escapement began moving past Kvichak tower with over 8,000 counted on July 1, while the Naknek escapement through 10:00 a.m., July 2 reached 294,000, 37% of the goal. Run magnitude estimates past Port Moller through July 1 were 6.3 million using catchability, and 12.3 million using an 11 day lag. Estimates of 2-ocean and 3-ocean fish past Port Moller were 4.9 million and 3.8 million, respectively, while reports from processors and fishermen were indicating smaller fish in the catch. An aerial survey of Kvichak River on July 2 showed a few fish in the upper half of the river while the lower half was too muddy to make any estimates. The Naknek section was extended 24 hours until 7:00 p.m., July 3 and the Kvichak section was opened for 12 hours beginning at 7:00 a.m., July 3 (Table 10).

The future looked a little brighter from information received on July 3. The Port Moller test boat produced the highest index of the year, (74) and the size of fish again dropped slightly (Table 6). If the fish were migrating slower than normal, which seemed to be the case based on lag time between Port Moller and inshore Bristol Bay, it would not be unreasonable to use nine days as a lag time between South Unimak and Port Moller. The west side of the district seemed to be producing good catches based on processor reports and a aerial survey of the district. The inside Kvichak test fish boat also made fair catches, especially on the west side of the river (Table 23). The Naknek section was extended for 24 hours until 7:00 p.m., July 4, but the Kvichak section was allowed to close until the escapement from the previous closure could be determined. The night tide of July 3 produced very good catches, averaging around 750 fish per delivery. Through July 3, the Naknek sockeye escapement had reached 368,000, or 46% of the goal (Table 19). The Kvichak River count was only 16,000, and although inside test fish indices remained fair,

it was determined to allow the Kvichak section to remain closed in order to accelerate the escapement rate, while extending fishing time in the Naknek section (Table 10).

Kvichak inside test fish indices increased on July 4, and the sockeye escapement past the inside test fish program through July 3 was estimated at 272,000 (Table 23). Port Moller indices dropped significantly on July 4 and the estimates past the project site ranged from 8-12 million through July 3, with an estimated breakdown of 7.2 million 2-ocean fish and 4.6 million 3-ocean fish. Catches remained about the same at Port Moller through the end of the project on July 8. If July 3 was the peak at Port Moller, about 16-24 million fish would make up the total Bristol Bay run.

Naknek tower counts again picked up dramatically the morning of July 4 and by the end of the day totalled 495,000, 62% of the goal. Commercial catches remained good with average deliveries of over 700 fish on July 3 and over 900 on July 4. An aerial survey of the Kvichak River on July 4 gave a total river estimate of 24,000 (Table 23). The Western Alaska Cooperative Marketing Association (WACMA), the smaller of the two major fishermen organizations, settled prices with most processors on July 4. No large increase of effort was expected to take place in the Naknek-Kvichak district as most WACMA fishermen were fishing the Nushagak district.

The estimated escapement past the Kvichak inside test fish site through July 4 was 346,000, and an aerial survey of the river indicated about 45,000 fish in the river (Table 23). Kvichak River, with a forecast of 91% 2-ocean fish, was definitely going to be weaker than forecast. One of the considerations for raising the escapement goal to 4.0 million was the large forecast to the system. Once it was realized that the run would be weaker than forecast, the goal was lowered to the historical 2.0 million for that year of the cycle.

was 308,000 and had been averaging 10,000 fish per hour, meanwhile the Naknek escapement through the same time was 771,000. The lack of strength of Kvichak fish in the district and the low escapement both past the tower and in the river indicated a closure was necessary and an extension of 28 hours was made for fishing in the Naknek section only (Table 10).

Inside Kvichak River test fish catches on July 9 again decreased with most of the catch taking place on the east bank. The drift fleet were concentrated at Libbyville on the ebb and set nets near Libbyville were showing strong catches. Port Moller's last fishing day had been July 8 and the total estimated passage had been 23.7 million based on inshore information lagged 10 days. If the July 3 peak catch at Port Moller wasn't a fluke, fish should be showing in strong numbers by July 11 or 12. Nushagak, Egegik, and Ugashik districts and the Naknek River runs were all strong and seemed to have already peaked. Through 2:00 p.m., July 9 the Naknek escapement had reached 844,000, and the Naknek section was extended for the remainder of the emergency order period (Table 10). At the same time, the 48 hour waiting period for relocation of set net sites was waived by Commissioner's Announcement so that set netters in the Kvichak section could move to areas open for fishing.

Information gathered on July 10 confirmed further that the Kvichak run was a disaster. Commercial catches were dropping off and a flight to Middle Bluff and Low Point produced negative results of evidence of fish. Fish were still being caught in fair numbers on the east shore by the inside Kvichak test boat, but very little on the west shore. A river survey indicated about 52,000 fish from the river on July 10, with the tower count expected to reach about 600,000 through July 10 (Table 23). Commercial effort was concentrated on the outside line during the flood tides and at Libbyville during the ebbs. Two separate contingents of set netters, one from the west side of the Kvichak

section and one from the east side of the section, were asking and petitioning for a set net only opening in the Kvichak section. Kvichak River test fish indices on July 11, 12, and 13 were all poor, and the estimated escapement past the project site through July 13 was 1.7 million, however this estimate was not corroborated by other evidence (Table 23). Aerial surveys of Kvichak River on July 11, 12, and 13 gave estimates of 93,000, 23,000 and 8,000 sockeye respectively, and commercial catches were also dropping off and totalled 143,000, 75,000, and 81,000 during the same three days (Table 11). Reports were coming in from processors, fishermen, and the Public Safety patrol vessel "Vigilant", that fish were showing in numbers at various places and times. Fish were reported in the north Ugashik district, on the Johnson Hill line, and around Etoin Point.

Kvichak River fish, based on age class and location of catch, were being taken in substantial numbers at Libbyville. Instead of moving directly up the river, many fish were reentering the district on the ebb tide and were available to the fishing fleet a number of times before progressing upriver. Because of the low escapement into Kvichak River and the large run to Naknek River, the Naknek section was closed to drift net fishing beginning at 9:00 a.m., July 15 until 9:00 a.m., July 17. An outside test boat was sent out the morning of July 15 and caught very few fish (Table 8). The Kvichak inside catch indices had increased sharply the second tide on July 14 and increased again on July 15. Indices were again good on July 17 and 18; however, aerial surveys of the river on July 16, 17, and 18 gave estimates of only 26,000, 31,000 and 23,000 (Table 23). The Kvichak tower count totalled 937,000 by 2:00 p.m., July 18. Naknek tower counts had jumped from a 7,000 daily passage on July 16 to 83,000 on July 17 as a result of the closure on drift net fishing. In order to obtain as much Kvichak River escapement as possible,

Because the Kvichak escapement was less than desirable the section remained closed, however, due to the strong Naknek River run, the Naknek section was extended until 10:00 p.m., July 6, an additional 24 hours (Table 10).

The Naknek sockeye escapement through July 5 rose to 612,000, 76% of the point goal and only 88,000 short of the lower end of the management range with 2,000 fish per hour passing the tower, while the Kvichak River tower count was only 31,000 through July 5 (Table 19). Kvichak inside test fish catches on the morning tide of July 6 were high with most of the fish being caught on the east side of the river. It was now estimated that 548,000 sockeye had passed the lower river project site through July 5 (Table 23). Because of the increased catches by the inside test boat on July 5 and the morning tide of July 6 and the need to assess run strength in the district in addition to obtaining age class samples, the Kvichak section was opened for a 12 hour period beginning at 10 p.m., July 6 (Table 10). Catches for the inside Kvichak test fish boat were again high on the afternoon tide on July 6 with the majority of the catch again made on the east side of the river. The estimated sockeye escapement through the afternoon tide had now reached 968,000. The actual Kvichak tower escapement through 2:00 p.m. was 32,000 and an aerial survey of the river gave an estimate of 99,000 with most of the strength in the middle part of the river (Table 23). The Naknek River escapement through 2:00 p.m. on July 6 was 651,000 with about 4,000 fish per hour passing the tower site. The Port Moller boat was still making fair catches and the estimated passage through July 5 was 16.1 million based on an 11 day lag time. Commercial catches were still good and age class composition indicated that during the Naknek only openings, 26-45% of the catch were 2-ocean fish. Because of the apparent increase in Kvichak River fish both in the escapement and in the catch, both the Naknek and Kvichak sections were extended until 10:00 p.m., July 7 (Table 10).

Through 2:00 p.m., July 7, the Naknek escapement was 691,000, while the Kvichak tower escapement was only 78,000 (Table 19). Inside test fish indices on the first tide of July 7 were in excess of 2,000, and a aerial survey of the river in the early afternoon showed a continuous band of fish 5-10 wide for the entire length of clear water. Estimates made at the time of survey indicated about 650,000 in the river, while later computations totalled 400,000 as a final estimate (Table 23). The commercial catch remained relatively the same with effort the morning of July 7 scattered throughout the Naknek section and the upper one-third of the Kvichak section. None of the beach areas looked good, and on the afternoon flood tide, most of the fishing effort was on the Johnson Hill line near the pivot buoy. Some drift effort was between Half Moon Bay and Ship's Anchorage and appeared to be making good catches. Due to the good inside Kvichak test fish indices and an estimate of 1.3 million fish past the project site, some good catches of the fish in the Kvichak section, and age class information from the July 6 commercial catch which showed 34% 2-ocean fish for the entire district, the entire district was extended for 24 hours until 10:00 p.m., July 8 (Table 10).

The Alaska Independent Fishermen's Marketing Association (AIFMA) meanwhile had settled prices and most of the fishermen were able to fish the evening of July 7. On July 8, the entire fleet was out and a survey of the district and processor reports showed 450 boats and 253 set nets. Catches were good, especially in and near the Naknek section, with few boats and very little catch on the west side. An aerial survey of the Kvichak River was very disappointing. Fish were moving past the inside test fish program and through the river in just over 24 hours. The river was virtually empty until just above Egg Island. Inside test fish indices dropped off drastically on July 8 (Table 23). Escapement past Kvichak tower through 2:00 p.m., July 8

the drift closure was extended until 11:00 a.m., July 21 in the Naknek section along with the entire Kvichak section (Table 10). The outside test fish boat was sent out again on July 18 but had to cancel after one drift because of engine trouble (Table 8). Kvichak River tower counts picked up on July 16 as the result of the drift closure and during the five days of July 16-20, over 400,000 sockeye passed the tower (Table 19). In order to obtain these Kvichak fish, approximately 90,000 Naknek sockeye escaped instead of entering the catch. In most years, only 2-3% of the Kvichak sockeye run is harvested after July 20. Because of the number of other species of salmon in the area and the low expected sockeye catch, the entire district was allowed to open (Table 10). On July 21-22, 134,000 sockeye, 44,000 chum, and 20,000 pink salmon were harvested (Table 11). The sockeye catch dropped off dramatically after July 22.

The total sockeye catch from the Naknek-Kvichak district was 5.0 million, 40% of forecast (Table 1). The preliminary sockeye allocation saw a harvest of 1.5 million from Kvichak, 428,000 from Branch, and 3.1 million from Naknek (Table 4). The escapement to the Kvichak River was 1.135 million, 57% of the inseason goal and 28% of the preseason goal. Only four years in the past 20 has the Kvichak River had less escapement. The total Kvichak run of 2.6 million was only 20% of the preseason forecast (Table 1). The Naknek River run totalled 4.2 million, consisting of an escapement of 1.2 million and a catch of 3.1 million, while the Branch River system, which cannot be managed separately from the Kvichak, produced a total run of 667,000, consisting of 428,000 in the catch and 239,000 in the escapement (Table 1). Other species catches in the district were 13,000 kings, 194,000 chums, 126,000 pinks, and 9,000 coho, and represented 6.4% of the total district salmon catch of 5.3 million (Table 18).

A total of 41 processor/buyers reported catches from the Naknek-Kvichak district in 1982, down from the 63 that reported the previous year (Table 29). Production from the district catch was broken down as follows: 19.3 million pounds frozen or cured, 7.9 million pounds exported by air, 738,000 pounds exported by sea, and the remainder were canned (Tables 30 and 31).

The subsistence catch in the entire district was 75,000, just below the long-term average (Table 34). Even though the Lake Clark-Iliamna escapement was low, only the Nondalton fishermen seemed to be affected. The village harvested 11,000 fish compared to the long-term average of 27,000 (Appendix Table 56). This was the first year in the Lake Clark-Iliamna area when only watershed residents were allowed to obtain permits. This was also the first year for the Naknek River personal use fishery. This fourth category of resource user was initiated by the Board of Fisheries for the 1982 season. Once the upper limit of the sockeye escapement range (900,000) was reached, the Naknek River was opened to personal use fishing. Gear allowed included set gill nets and dip nets, and gill net specifications and operations as well as areas and times to be fished were the same as for the subsistence fishery. The dip net fishery was allowed in the same area, however, it was open seven days a week. A total of 75 sockeye salmon per household was allowed and the only restriction was that the person needed a valid resident sport fishing license. A total of 12 permittees took advantage of this fishery in 1982, and harvested just under 500 fish, all caught using set gill nets.

A 50 ft. and a 20 ft. steel tower(s) were erected on the east side of the lower Naknek-Kvichak boundary line in 1982, and strobe lights were mounted on the top of each tower. The times the lights were operational during the season seemed to provide favorable visibility. Concrete pads were poured on the west side for two more towers to be erected in 1983, and work is also proceeding

to establish an electrical power system which will allow full season usage of the strobe lights. The lighted buoys worked well again, however, they still seem to drift around somewhat and one disappeared completely. The new lower Naknek-Kvichak line described by Loran C worked well and received many favorable comments by fishermen and Fish and Wildlife Protection.

Egegik District

The 1982 sockeye salmon run to the Egegik district totalled 3.4 million fish, 81% of the preseason forecast of 4.2 million (Table 1). A harvest totalling 2.4 million was attained. This was the third consecutive year in which sockeye harvests in this district have exceeded 2.0 million fish and only the ninth year that 2.0 million fish harvest levels have been achieved since the inception of the fishery in 1895. This season's sockeye harvest was the sixth largest in the history of the fishery yet still fell 34% short of the preseason predicted harvest level of 3.6 million. An escapement slightly in excess of 1.0 million sockeye was achieved exceeding the point goal (600,000) by 73% and the 20 year mean of 844,000 by 23% (Appendix Table 21). This was the eighth largest escapement at Egegik in the 31 years that actual counts have been obtained (since 1952). Total Egegik sockeye runs returning during comparable cycle years dating back to 1952 have ranged from 1.2 to 2.5 million with a mean of 1.7 million, so for this cycle year the 1982 run ranks as the largest on record and was twice the long-term average.

Based on optimistic preseason forecasts for all Bristol Bay districts and considering recent years trends toward larger runs a fairly liberal approach to management at Egegik was initially adopted. This approach was continued into midseason until it was apparent that the run was either late or considerably below forecast. As soon as it was determined that the run was of major magnitude a liberal approach to harvest and fishing time was again implemented.

Commercial sockeye landings commenced in the district on June 7 with a few fish caught in set nets near Egegik village. Catches remained small through June 15 when the first drift boats began fishing (Table 12). An aerial survey of Egegik lagoon on June 15 indicated an estimated 1,000 sockeye had already entered clear waters upriver of the fishery matching the earliest date they have previously been recorded in the escapement (same as 1981). Egegik River inside test fishing commenced June 18 and initially indicated small numbers of fish passing the commercial fishery (Table 24).

Drift gillnet effort increased to 65 units by June 18 and to 137 units (the season's high) on June 21 as fishermen sought to test their gear and land some fish prior to expiration of the 1981 price schedule (June 23). Catches remained fairly small with a total of 115,000 sockeye landed prior to the onset of the "Emergency Order Period" on June 23 (Table 12). Escapement past Egegik counting tower prior to the "Emergency Order Period" totalled less than 1,000 fish.

South Unimak sockeye catches began showing strength (estimated daily catch of 95,000 fish) on June 16. Projecting a 14 day passage time from South Unimak to inshore Bristol Bay, it was expected that catches at Egegik would increase substantially on or about June 30. Subsequently Port Moller offshore test fish indices climbed June 19-20 to the second highest level attained all season. Assuming a seven day passage time from Port Moller to inshore Bristol Bay, landings at Egegik could be expected to increase on or about June 26-27. As South Unimak remained strong through June 26 there was a general feeling amongst management staff that the preseason run prediction to Bristol Bay was reasonably accurate.

Beginning June 23 (and lasting into July 7) a major salmon price dispute ensued between the two Bristol Bay fishermen's bargaining entities and the

major processors throughout most of Bristol Bay. This resulted in disruption of the normal fishery even in the Egegik district as some fishermen did not fish and some processors did not receive fish in any magnitude until a settlement was reached. It affected fleet distribution as many drift fishermen, based on past experiences located themselves in the Naknek-Kvichak district rather than Egegik to await the settlement to be near the largest predicted run when accord was reached. Drift effort was noticeably below normal at Egegik all season long.

The "Emergency Order Period" began on June 23 with the fishery open at Egegik, and the fishery remained open until noon June 25. Roughly 25% of the drift fleet in the district did not fish but set net effort was near normal. A catch of 142,000 sockeye was achieved June 23-25 while escapement remained minimal. At noon June 25, a 50 hour district closure was put into effect to provide some early run fish in the escapement. Inside test fish indices for June 26-27 indicated increased escapement rates following the closure (Figure 2).

The fishery was reopened on June 27 and remained open until 6 p.m., June 30 (Table 10). A total of 419,000 sockeye were landed during this interval bringing the catch to date to 736,000 (Table 12). Drift effort during this period totalled 90 units (roughly 50% of normal effort) but set net effort remained normal. In spite of below average drift effort the fishery effectively "corked off" escapement as indicated by small inside test fish indices (Table 24). As expected, catches picked up on schedule but not to as high a level as was anticipated considering the forecast. As escapement past Egegik tower was still less than 2,000 fish with an estimated 44,000 above the inside test fish site, the fishery was closed at 6 p.m., June 30 to boost escapement totals to an acceptable midseason level.

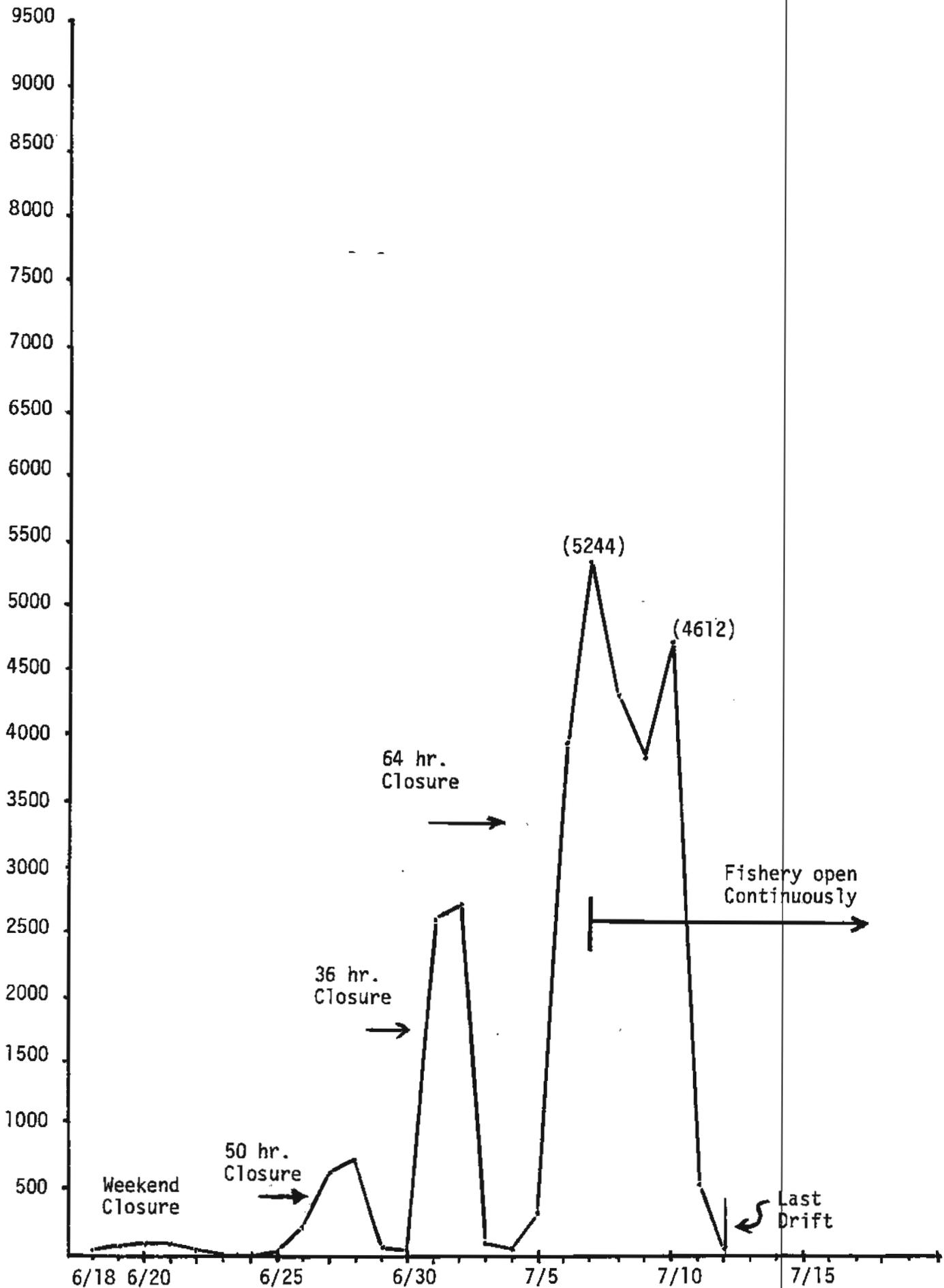


Figure 2. Average daily inside test fish indices, Egegik River, 1982.

Weather problems at Port Moller June 21-22 and again on June 27-28 caused cancellation of daily drifts on those dates and added an element of uncertainty as to the progress of the main bulk of the sockeye run. Drifts made on June 23-26 did not indicate run strength at Port Moller commensurate with preseason predictions as to magnitude or age composition. Catches appeared to be comprised mainly of older age fish while large portions of the forecast were based on returns of four year old (younger) fish. However, it was too early to tell if there was a problem in regard to the eventual abundance of younger fish or whether they were still between Port Moller and outer Bristol Bay.

Inside test fishery indices at Egegik increased substantially on July 1 and it was thought that perhaps the main body of the run was approaching so the district fishery was reopened at 6 a.m., July 2 (Table 24). However, no increase in fish activity occurred in the district and in fact catches dropped off sharply as compared to previous days to 46,000 fish on July 2 and 78,000 on July 3 (Table 12).

Escapement past Egegik tower through July 2 totalled 24,000 fish, and a aerial survey July 3 of clear water areas below the tower yielded an estimate of 38,000 fish (Table 24). Accumulative inside test fish data projections through July 2 indicated 172,000 fish total had passed the test fish site. July 3 daily test fish indices dropped to virtually nothing indicating either that fish were not moving or that the available fleet was cleaning up the district (Table 24). With a catch of approximately 860,000 fish and an escapement of perhaps 170,000 in the river and with the historic peak of the fishery at hand, but with catch rates dropping, it appeared that the run was either late, bimodal, or possibly over estimated. With the Nushagak run arriving in strength and the Naknek run beginning to show well, concern began to exist as to where the Egegik run was and when it would arrive. The July 3 Port

Moller test fish indices, however, were the highest to date so the prevailing feeling was perhaps the fish were just late. At any rate, escapement levels were too low to prudently leave the Egegik fishery open, so it was closed at 6 p.m., July 3 and it remained so until 10 a.m., July 6 (Table 10).

July 4 proved to be a very "flat" day in the district with no fishing, and little evidence of fish movement past the inside test fish site. July 5 began similarly, however during the late afternoon calls began coming in from both fishermen and processors indicating that large movements of fish were occurring in the mouth of Egegik Bay. Inside test fish indices increased dramatically on the last scheduled drift of the day so a further verification drift (on the ebb) was quickly authorized and it also indicated a large movement of fish into the lower Egegik River. As the escapement was still at least 400,000 fish short of the escapement goal, it was decided to allow at least one tide's worth of these incoming fish to enter the river before reopening the district. Subsequently the fishery reopened at 10 a.m., July 6 (Table 10).

In spite of the price dispute total fishing effort reached its peak in the district July 6 with 305 units of gear (drift and set combined) in operation. Most of the effort was concentrated within Egegik Bay proper due to the abundance of fish moving into the river and the presence of rough seas on the outside. A catch of 224,000 sockeye was landed and this coupled with sharply increasing inside test fish indices indicated the main body of the run was arriving (Tables 12 and 24). The fishery was not curtailing escapement so the open period was extended through July 7.

Weather improved considerably on July 7 and an aerial survey of Egegik River and lagoon was accomplished indicating at least 660,000 fish present in the river above the fishery (Table 24). Although escapement past the

counting tower through July 6 totalled only 100,000 fish it was apparent, based on the aerial survey observations, that the escapement goal would be met without restricting the fishery further. At 3 p.m., July 7, the open commercial fishing period was extended until further notice and the 48 hour waiting period for transfers into the fishery was waived (Table 10). The fish price dispute was settled the same afternoon and by evening both fishermen and processors were fully participating in the fishery.

July 7 proved to be the peak day in the district based on both total catch and CPUE data. A peak daily catch of 465,000 sockeye was achieved, and large catches lasted only for two days following the peak and then the run tailed off rather quickly (Table 12). By July 10 daily landings totalled only 81,000 fish and by July 13 they were down to 36,000. By July 28 all drift effort for sockeye had been suspended although a few fish continued to show up in set net catches. The last sockeye catches of the season were reported from set nets August 21.

Sockeye escapement at Egegik tower began increasing rapidly on July 8 and subsequently peaked July 10 with a daily passage of 184,000 fish (Table 24). The escapement point goal (600,000 fish) was reached July 11 and passage continued at a high rate through July 13 after which the daily totals dropped quickly (Table 24). The counting program was continued through July 20 and then terminated with slightly over 1.0 million sockeye accounted for.

There were no reported instances of processors putting fishermen "on limits" at Egegik during 1982. The price dispute, availability of cash buyers, and the short duration of peak catches all helped prevent daily catches from exceeding processing capacity. Set net fishermen, especially along the northern outside beach areas, did not fare nearly as well in 1982 as during 1981. Fish entered the bay farther offshore during 1982 and there

were no large tides to push them onshore during peak periods. Some increase was observed in set net distribution this season with 6-8 nets observed fishing along the South Spit near Goose Point. An emergency order was also issued to clarify the King Salmon River line and clear up confusion regarding several set net sites-on King Salmon Island and at King Salmon Point (Table 10).

The 1982 commercial harvest of other salmon species in the district totalled 161,000 fish, 6% of the total district harvest, and was highlighted by a 72,000 coho catch (Table 18). This broke the previous all time coho harvest record of 31,000 set in 1981, and was approximately eight times the long-term seasonal average (see Appendix Table 15). Late season effort for cohos was substantial with an many as 15 drift boats (mostly skiffs) and 127 set nets participating. Peak catches were obtained during the period August 9-21 (Table 12). No systematic coho escapement surveys were conducted, however, a single aerial survey of Egegik River and lagoon on August 20 yielded an estimate of 20,000 cohos in the river above the fishery on that date (Table 22).

The king salmon catch totalled 5,000 fish making it the fourth largest in the history of the fishery, similarly, the chum salmon harvest was the third largest on record totalling 82,000 fish. In spite of being an "even year", pink salmon harvests totalled only 2,000 fish (Table 18).

Thirty four processors and buyers operated in the district during 1982, a 17% increase over 1981 (Table 29). Competition was evident, especially between cash buyers operating "floaters" in the district. The price dispute and shortfall of the Kvichak sockeye run contributed to a situation in which some floaters were scrambling to get their quotas and were raising prices to attract deliveries.

In retrospect, management of the Egegik fishery during the season could have been improved had one decision been made that was not. If an outside test fish boat had been dispatched to sample the availability of sockeye in the outer district waters, and perhaps in nearby areas outside the district on July 4-5, an indication of the buildup and impending surge of fish (July 5-9) would probably have been detected and the fishery could have been opened a little sooner, thus cutting down the number of fish excess to the desired escapement range. In spite of this missed opportunity however, the season was a very successful one.

The use of Loran C coordinates to describe the outer district boundary worked well except for two brief periods when the Loran station was inoperative for routine maintenance. Respect for the enforcement of fishing regulations improved, especially after the local magistrate began holding court once a week at Egegik village. Enforcement effort was also far more effective than during 1981.

Looking ahead to future seasons it is becoming apparent that interest in the coho fishery is growing rapidly. Increased attention to management of this fishery is becoming necessary if higher harvest levels are to be sustained. Some measure of daily and seasonal coho escapement is a very real need in the assessment of this fishery and needs to be incorporated into future management plans.

Ugashik District

The 1982 sockeye salmon run to the Ugashik district totalled 2.3 million fish, 14% greater than the preseason forecast of 2.1 million (Table 1). The run was almost equally distributed between catch and escapement with each totalling slightly less than 1.2 million fish. The harvest was the sixth largest in the history of the fishery and was only

the twelfth catch exceeding 1.0 million fish since the 1893 inception of the fishery. Considered along with the 1981 catch, it marks the fourth time over the period of the fishery that two consecutive years sockeye catches have exceeded 1.0 million fish (the last being 1943-44). This year's catch exceeded the 20 year average harvest (419,000 fish) by nearly a factor of three (see Appendix Table 11). The escapement obtained surpassed the desired point goal (500,000) by 658,000 fish, marking the fourth consecutive year that greater than 1.0 million fish have reached the spawning grounds (Appendix Table 21). Compared to similar cycle years dating back to 1952, the 1982 total run ranks as the largest on record exceeding the cycle year average (737,000 sockeye) by a factor of three. The run was primarily comprised (83%) of older age fish (ages 5 and 6) that had spent three growing seasons at sea, progeny of the 1976-77 escapements (Table 3). The fish were large, averaging 6.5 pounds. Considering both the average size of the fish and the overall magnitude of the run, recent growing conditions in the ocean must have been very favorable.

Based on the large preseason forecast, large escapements obtained during 1979-81, and recent levels of interest in the fishery as evidenced by the numbers of fishermen and processors operating in the district the last four years, a fairly liberal approach to management of the fishery was the option pursued during 1982.

Fishing began in the district the week of June 7-12 and small catches of sockeye were made immediately (Table 13). Catches remained small for the next two weeks as both drift and set net fishermen concentrated on catching kings and getting their gear in order. By the onset of the "Emergency Order Period" (June 23), a catch of approximately 5,000 sockeye and 6,000 kings had been attained (Table 13). Fishing effort was small and only three buyers were operating in the district.

The beginning of the "Emergency Order Period" marked the onset of the price dispute between the fishermen's bargaining entities and the major processors in Bristol Bay, but this situation did not seem to have a noticeable effect on fishing and processing activities at Ugashik. The commercial opening was extended on June 23 without apparent changes in fleet size. The fishery remained open until noon, June 25, and then closed for 50 hours to allow some early run fish into the escapement. Inside test fishing began in the district June 25. The fishery reopened at 2 p.m., June 27, and remained open until 6 p.m., June 30, a period during which 73,000 sockeye were landed bringing the seasons accumulative catch up to 96,000 (Table 13). No sockeye had yet appeared at the counting tower at the outlet of Lower Ugashik Lake.

The fishery was again closed (36 hours) to provide another increment of early run fish in the escapement. It reopened at 6 a.m., July 2 for 24 hours with two subsequent extensions keeping it open until the evening of July 4 (Table 10). Weather was very inclement on July 2 causing catch totals to drop, but they improved noticeably on July 3-4 (Table 13). Total catches during this period amounted to 153,000 fish bringing the seasons accumulative catch up to 249,000, or 16% of forecast. Daily catches were increasing rapidly enough to indicate the main body of the run was approaching. Effort in the district by July 3 had increased to 44 drift and 38 set nets and eight receiver boats (Table 13).

Another closure of the fishery was announced effective at 2 p.m., July 4 to boost escapement totals (Table 10). Inside test fish indices were still minimal as were upriver tower counts (Figure 3 and Table 25). The Egegik and Kvichak runs were late at this point, but Port Moller test fish indices had just registered the seasonal high on July 3. Inside test fish indices remained small on July 5, but reports from fishermen and other observers indicated

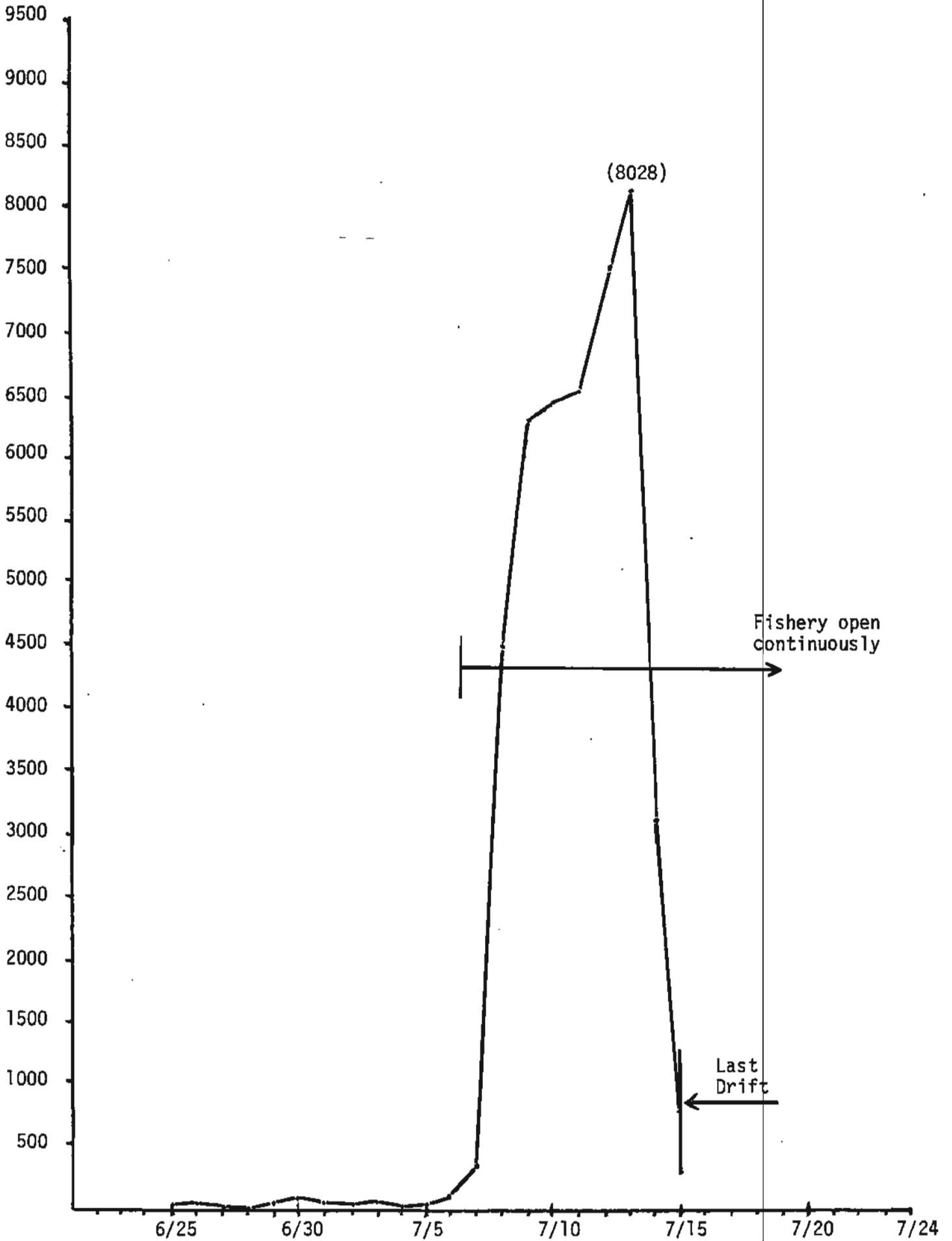


Figure 3. Average daily inside test fish indices, Ugashik River, 1982.

numerous fish were finning and milling at the entrance to Ugashik Bay. Additionally, it appeared that a run of small sockeye was moving past the test fish site as fish were hitting the nets, but not being gilled, and this was biasing the indices downward. After consideration of these observations and the relatively small amount of fishing effort present, the district was reopened for 12 hours at 10 a.m., July 6 (Table 10). An aerial survey flown 1/2 hour after the opening confirmed that large numbers of fish were moving through the district as fishermen were making large catches throughout Ugashik Bay from the entrance clear into the Muddy Point line. Some drift boats were almost swamped already, and observations later in the day from Ugashik village set netters confirmed that large numbers of fish were moving upriver into the escapement so the fishery was extended another 12 hours until 10 a.m., July 7.

Based on the July 6 catch (95,000 sockeye) and the observations both out in the district and at Ugashik village, the commercial opening was extended further on July 7 (an additional 25 hours). The mass of fish had not yet reached the inside test fishery so evaluating its contribution to the escapement was purely subjective. However, the run appeared strong, the fleet was still too small to stop the fish, and the prevailing feeling was that adequate escapement rates into the lower river were occurring.

The July 7 catch was the peak daily catch of the season (135,000 fish) although the catch per hour was higher on July 6 (Table 13). Inside test fish indices began to inch upward (Figure 3) and the fishery was extended another 25 hours (through noon on July 9). Escapement past Ugashik tower through July 7 had reached 7,000 sockeye. A catch of 132,000 sockeye was attained on July 8. This day's harvest would have been higher yet, but some tenders were at, or near, capacity causing the village set nets at Ugashik to be fished

only one tide due to delivery problems. The fish in the lower river reached the inside test fish site on July 8 as indicated by rapidly increasing indices (Figure 3 and Table 25).

The fishery was extended another 25 hours effective at noon, July 9 following a report from the test fish crew that "jumpers" were sighted at locations all along the river from the test fish site to Ugashik lagoon during an extra survey conducted earlier that day. Muddy waters prevented quantitative reports, but this survey indicated the fish were spreading out and that continuing high test fish indices were being generated by new fish moving into the river rather than by the same school of fish milling back and forth with the tides past the test fish sample sites. Catches in the fishery on July 9 totalled 108,000 sockeye, indicating the run was still strong. Numerous fishermen and several additional processors transferred into the district as the Egegik run began to slow down and due to uncertainty regarding the situation in the Kvichak district.

Fish began entering Ugashik lagoon in large numbers on July 10. An aerial survey indicated an estimated 52,000 were present in the clear lagoon with more streaming in (Table 25). "Jumpers" were noted downriver further confirming that large numbers of fish were about to arrive at the counting station. The fishery was again extended another 25 hours (through 2 p.m., July 11). Accumulative sockeye catch through July 9 totalled 755,000 (48% of preseason harvest forecast). Another 84,000 were caught July 10 by a fleet that had increased to 134 drift and 45 set nets (Table 13). With the increased drift fleet and calm weather, the distribution of fishing effort shifted noticeably. Whereas in previous days the major effort was inside Ugashik Bay in sheltered waters and close to the tenders about 1/3 of the fleet on July 10 had moved out into the vicinity of Cape Grieg (the northern

outer boundary) where they were trying to intercept incoming fish as they entered the district. A total of 18 receiver boats were present in the district buying for 12 companies.

An aerial survey of Ugashik River and lagoon July 11 yielded an estimate of over 800,000 fish in the river, thus confirming that escapement needs would be met without further restricting the fishery (Table 25). Consequently at 6 p.m., July 11 the district was opened until further notice and district transfer restrictions were waived (Table 10). The day's commercial catch totalled 102,000 sockeye, marking the final big day in the fishery. It was also the peak day in the fishery for processor participation with 17 companies buying fish.

Daily catches dropped rapidly beginning on July 12 but fishing effort tailed off more gradually. Catches dropped to less than 10,000 fish per day by July 18 and by July 20 the drift fleet numbered only 41 boats. Sockeye deliveries continued (mostly set net catches) up through the week of August 9-14 and then ceased.

Escapement counts at Ugashik tower began picking up on July 11, peaked on July 13, and were tailing off rapidly by July 16 (Table 25). The fish surged past the tower July 13-15 in great abundance with the peak day's count totalling 363,000 sockeye. Counts continued through July 27 and then the counting program was discontinued.

The district catch of other salmon species during 1982 totalled 109,000 fish, 9% of the total district salmon catch (Table 18). The 7,000 fish king salmon harvest was the third largest in the history of the fishery, exceeded only by catches in 1950 and 1979, and was $2\frac{1}{2}$ times the 20 year average (Appendix Table 12). The chum salmon catch totalled 50,000 fish, making it the fifth largest in the history of the fishery. It far exceeded the 20 year

average catch of 16,000 fish (Appendix Table 13). The coho salmon catch of 51,000 fish broke the previous district record of 36,000 set in 1951 and surpassed the 20 year mean catch of 8,000 by a factor of over seven (Appendix Table 15). Only a few pink salmon were landed in the district.

A total of 28 buyers purchased fish in the district during 1982, three less than the number present during 1981 (Table 29). Most of the buyers were present only during the period July 10-13 trying to cash in on peak catches, however, they were about three days late. As during 1981, most of the catch was either frozen on floating processors, tendered to other districts, or flown to other areas for further processing.

Some growth in the set net fishery was noted this season with more sites fished between Dago Creek and Smokey Point and a few sites fished periodically between Smokey Point and Cape Grieg. With regard to future management more emphasis on obtaining inseason coho run strength and escapement data is necessary to properly manage this growing fishery at Ugashik. Also, a more intensive enforcement program at Ugashik would be beneficial (especially late in the season).

Nushagak District

Unlike other major districts in Bristol Bay, Nushagak district produces important runs of king, chum and coho salmon, and also supports a significant even-year pink salmon run. Fishing effort in recent years has been intensified on these "other stocks", and fishery monitoring activities have developed as well, to assure that these stocks are not overfished.

Formal preseason forecasts are prepared for Nushagak district sockeye and pink salmon, and catch projections based on brood year escapements, average age composition data, and recent catch levels are made for king, chum and coho salmon. The preseason sockeye inshore forecast of 9.9 million

to all river systems was the largest projection ever made for this district (Table 1). Likewise, the pink salmon forecast of 9.2 million was also a record prediction, but unlike the sockeye forecast, was thought to be very "unreliable".

Catch projections for king, chum and coho salmon for all of Bristol Bay were 200,000, 1.0 million and 300,000, respectively. Nushagak district has accounted for over 71% of Bristol Bay's commercial catch of king salmon, 54% of the total chum catch, 85% of even-year pink salmon and 52% of the total coho salmon catch (Appendix Tables 12-15).

Preseason estimates of expected fishing and processing effort indicated that 659 drift units and 260 set units would be available to participate in the Nushagak fishery. Drift units peaked on June 11-16 at 484 during the king fishery, and on July 5 at 450 drift and 207 set units during the sockeye fishery (Table 14). Processing effort continued to increase in 1982, when 41 processors and buyers operated in Nushagak compared with 36 in 1981 (Table 29). In addition to the three major long established shore-based canneries, floating freezer ship operations totaled 23, while airlifted salmon operations increased from 5 in 1980 to 15 in 1981-82 (Table 29).

Settlement of exvessel salmon prices between WACMA and major processors was not finalized until July 4, although an agreement was concluded on June 13 for king salmon exvessel prices. The large number of floating frozen processors in Nushagak paying "cash" provided ready markets for all fishermen.

King salmon catches up to the weekend closure on June 12-13 totalled 37,000 compared with the long-term average of 20,000 (Table 14). The Nushagak district reopened to scheduled fishing on June 14 for a 48 hour period, and then closed on June 16 with the commencement of the "Emergency Order Period". The king catch through the closure on June 16 was 59,000, well above the

long-term average of 25,000 (Table 14). King salmon 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 (roughly estimated at "less than 10,000") was not adequate, and additional closure would be necessary to improve the catch/escapement ratio (Table 9). The king salmon escapement was continuously monitored at the Dillingham/Lewis Point subsistence sites, as well as at the sonar enumeration site on Nushagak River below the village of Portage Creek.

With the closure on June 16, fishing effort began to transfer out of Nushagak to Naknek-Kvichak and Egegik districts, and by June 19 over 175 drift units had transferred to other districts to begin sockeye salmon fishing operations. A 12 hour period was allowed in the Igushik section only on June 21 to help gauge early season run strength of the Igushik system sockeye run (Table 10). The Nushagak section remained closed to further improve the escapement rate of king salmon into the Nushagak River system. Along with the Igushik section opening, moderately strong easterly 15 K winds commenced on June 20, and subsistence nets at Lewis Point and Dillingham exhibited a significant improvement on June 21, jumping from 0 kings per net per tide to 30-51 kings per net, respectively (Table 9). With the improvement in the daily escapement rate, the total escapement was now roughly estimated at 30,000 fish and a 24 hour fishing period was announced for June 23-24 (Table 10).

The 12 hour Igushik only period on June 21 produced only 10,000 fish, but the 6,000 kings caught showed that a strong king run was in progress (Table 14). With the strong king run and lack of a price settlement, a large majority of the fishing fleet (estimated at over 500 drift units) used larger mesh king salmon gear (Table 14). Catches for the June 23-24 period totalled 75,000 fish; 25,000 kings, 37,000 sockeye and 11,000 chums, and the relatively

large sockeye catch in primarily king gear showed that sockeye were arriving in strength (Table 14).

The Igushik section only was extended for 29 hours (June 24-25) in an effort to put fishing pressure on what was expected to be a very strong run (Table 10). The king-salmon catch through June 24 totalled 99,000, with the escapement roughly estimated at 50-60,000 fish based on continued strong subsistence catches, and the Nushagak River sonar enumeration count of 44,000 (Tables 9 and 21). With the king escapement approaching the lower management range, and all species showing increasing strength, a 24 hour district-wide period was announced for June 25-26 (Table 10).

Over 215,000 fish of all species were taken on June 25, with the 42,000 king catch one of the largest in a 24 hour period (Table 14). Only a portion of the fishing fleet (estimated at 1/3 to 1/2) participated during the next nine days of continuous fishing due to the price dispute. WACMA pulled their fishermen out of the fishery on June 24, and most fishermen did not participate in the fishery until the settlement on July 4.

With a strong sockeye run in progress, as shown by increasing daily sockeye catches: June 26 - 139,000; June 27 - 145,000; June 28 - 245,000 and June 29 - 339,000, fishing time was extended on a daily basis (Tables 10 and 14).

Continuous sockeye escapement monitoring by the Igushik River inside test fish program, counting towers on Wood and Igushik Rivers, sonar enumeration on Nushagak River, and aerial survey estimates of all rivers below the enumeration sites showed a building sockeye escapement in all rivers. Through June 30 the sockeye catch had totalled 1.1 million fish, with escapements in Wood, Igushik and Nushagak/Nuyakuk reaching 25%, 38% and 21%, respectively of requirements (Tables 26-28). With the large sockeye forecast and all

rivers showing actual escapements well ahead of the average accumulative curve through June 30, additional fishing time was warranted.

By late June estimates of actual drift fishing effort in all districts of Bristol Bay was only 26% of that available due to the continuation of the price dispute. A continued, uninterrupted fishing schedule was allowed in Nushagak district where only 36% of available fishing effort was actively participating.

After a short slow down of sockeye catches on June 30-July 1 (205,000 and 230,000) daily catches began to mount steadily and rapidly once the price settlement was reached on July 4: July 2 - 369,000; July 3 - 410,000; July 4 - 461,000; peaking on July 5-6 at 606,000 and 625,000, respectively, and totalling 3.8 million through July 6 (Table 14). By July 7 several processors had suspended buying operations for varying periods of time due to heavy catches, but these suspensions had no effect on the overall catch/escapement ratio.

Sockeye escapement rates and totals through July 1 continued to accelerate in all river systems: Wood - 37% of escapement requirements passed the counting station with another 150 to 250,000 in Wood River below the towers, or 56 to 69% of the escapement goal; Igushik - 66% of requirements estimated passed the lower river test fish site; and Nushagak/Nuyakuk - 31% of requirements passed the sonar site (Tables 26-28).

With the favorable escapement rates and continued strong showing in the fishery, the Nushagak fishery was extended successively on a daily basis after all escapement/catch indicators were examined (Table 10). By July 6 sockeye escapement levels were nearing individual system goals: Wood - 86% of requirements; Igushik - 100%; and Nushagak/Nuyakuk - 71% (Tables 26-28). One additional 24 hour fishing period was announced for

July 6-7 to insure that all rivers were at, or close enough to total escapement requirements to achieve the escapement goals before announcing continuous fishing (Table 10). By July 7, Wood and Nushagak/Nuyakuk Rivers were at 92% and 86% of their respective escapement goals, and both river systems goals were assured (Tables 28 and 28). A continuous fishing schedule was announced on July 7, and the normally required 48 hour waiting period, when changing districts and gear, was waived for fishermen entering Nushagak district (Table 10).

In 1982 the total sockeye return of 8.0 million was the fifth consecutive year of outstanding returns (Appendix Table 22). Escapement goals were achieved in all of this district's river systems, and the 6.0 million sockeye harvest was the seventh largest since records were first recorded in 1893. Since 1978, Nushagak district's sockeye average catch production has increased to 4.9 million fish, well above the recent long-term (1958-77) average of 943,000, while the total run from 1978-82 has averaged 8.9 million compared with the previous 20 year average (1958-77) of 2.3 million (Figure 4). The recent five year total run average of 8.9 million sockeye is higher than any previous five year average in the long history of this fishery. Although it is apparent that exceptional survival conditions have greatly aided in boosting sockeye production in the last five 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 4).

A continuous fishing schedule was maintained after the sockeye run to harvest an expected large run of pink salmon, however by July 24 it was apparent that the pink run was either showing late run timing or was significantly weaker than expected, or both (Table 14). The formal pink preseason forecast to Nushagak district amounted to 9.2 million fish, although this forecast was

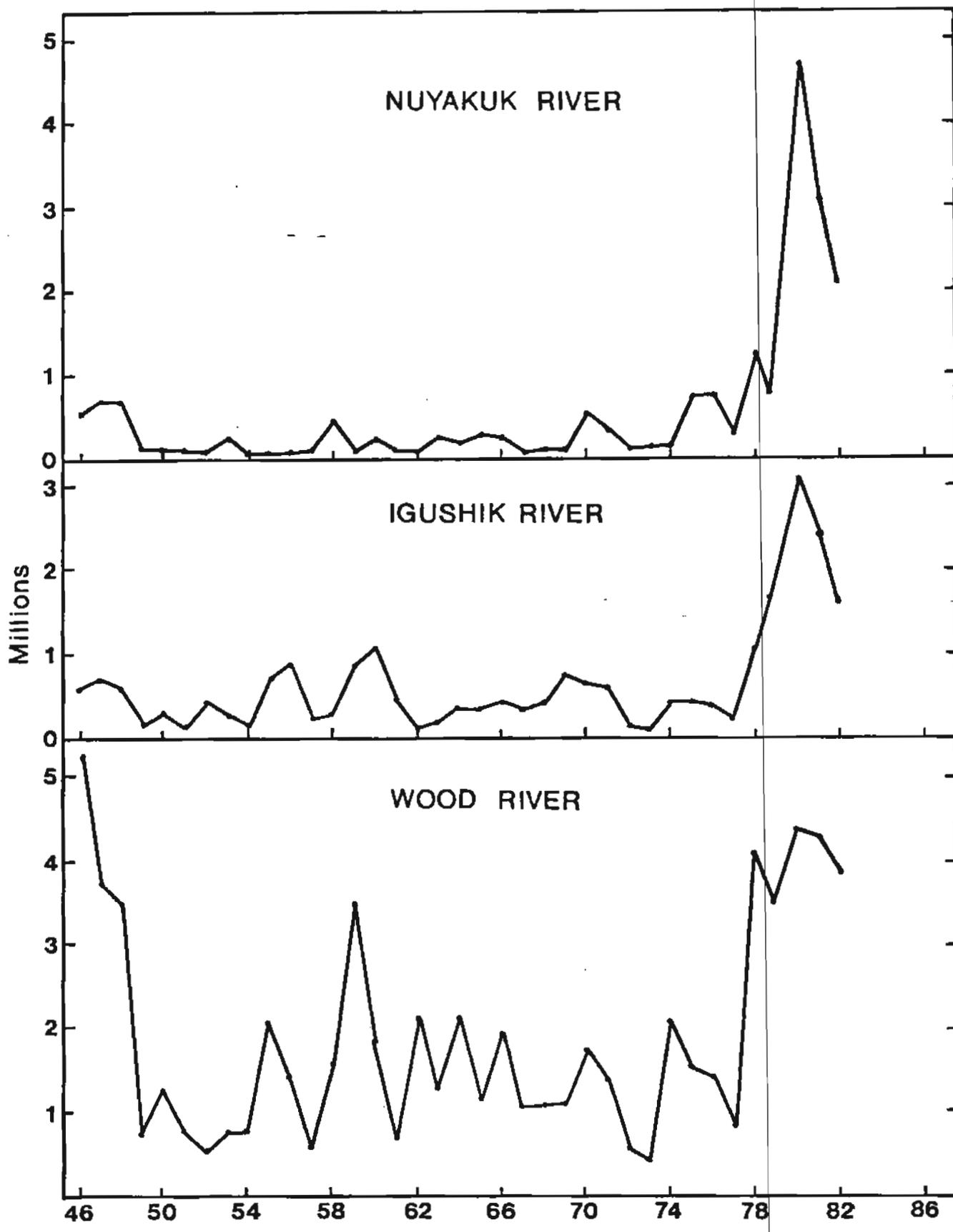


Figure 4. Total inshore return of sockeye salmon by major river system, Nushagak district, Bristol Bay, 1946-82.

looked upon with much skepticism as all previous returns from similar sized brood year escapements (2.8 million in 1980) had failed to reproduce themselves (Appendix Table 43). A preliminary pink salmon forecast based on the new Nushagak River pink fry trap program was also available, as well as a forecast based on the old escapement/return relationships without the more recent adjustments using water level and temperature data. Since the 1981 fry program was the first attempt at forecasting based on total fry outmigration, the preliminary forecast of 4.1 million was difficult to evaluate. The old E/R method of forecasting gave forecast returns of 2.5 to 3.2 million depending upon which years were selected as representative of the 1982 return. A final hindcast in the winter of 1982-83 from complete analysis of fry outmigration data gave a forecast return of 2.8 million, only 7% lower than the final pink return of 2.9 million to Nushagak district (Appendix Table 2).

Through July 22 only 291,000 pinks had been harvested due to the lack of the use of smaller mesh pink gear brought on by the continuing strong sockeye catches, lower prices paid for pinks, adverse fishing weather, and what eventually turned out to be a run considerably under that forecast (Table 14).

However, escapement levels at the Nuyakuk River counting station were well ahead of schedule and estimated river fish not yet enumerated past the counting station brought the pink escapement estimate up to 200,000 fish, 20% of the district goal (Table 20). With this favorable catch/escapement balance, the fishery was extended through the weekend of July 24-26 (Table 10).

Even though it was suspected that the pink run was faltering and not coming up to forecast, a decision to allow foreign tendering and processing in Nushagak district was effected at 4 p.m. on July 21 based on the criteria as established by the Board of Fisheries (Table 10). The decision to allow foreign processing to participate in the pink fishery was made with the

realization that to wait for run strength verification would be too late to effectively initiate the added processing capacity if the run did exceed domestic daily capacity. The indicated preseason domestic daily capacity was limited to less than 200,000 fish, and was closely tied to the low prices offered by the domestic industry. When it became apparent that the large forecast pink return was questionable, Nushagak district was closed to foreign processing effective 6 p.m., July 27 (Table 10).

The pink fishery was extended again through the weekend of July 31-August 2, and although the total run came in at only 32% of forecast (2.9 million compared with 9.2 million forecast), run strength was adequate to obtain escapement goals. The total district pink run totalled 2.9 million, 1.3 million catch and 1.7 million escapement, compared to the long-term average of 3.2 million (Appendix Table 42).

The commercial harvest of 8.3 million salmon of all species in Nushagak district in 1982 was the second largest for this 90 year old fishery, over 2½ times higher than the 20 year average of 3.2 million fish, and topping the recently established record of 7.4 million average for 1978-82 (Appendix Table 16).

Nushagak king salmon accounted for 200,000 of the district harvest, breaking the previous highest catch (195,000 in 1981), while the escapement of 147,000 was second in size only to the record escapement of 150,000 in 1981 (Appendix Table 40). The king return in 1982 equaled a total run of 347,000 well above the average run of 244,000 since 1966 (Appendix Table 40).

The Nushagak chum salmon catch of 456,000 was equal to the long-term average of 406,000 for this district, while the chum escapement of 256,000 equaled a total run of 712,000, compared to the long-term average total run of 698,000 (Appendix Tables 13 and 41).

For the third consecutive year the coho salmon return to Nushagak was exceptionally strong. The season commercial catch of 388,000 cohos was the largest ever, breaking the previous record of 293,000 in 1916. Increased late season fishing effort commenced in 1978 and coho catches since that time have reflected the expanded attention (Appendix Table 15). 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 1982, sonar derived escapements in Nushagak River were estimated at 227,000 through August 18 (Table 21).

Togiak District

The 1982 sockeye salmon forecast for the Togiak district was 937,000, twice the actual long-term average total run (Appendix Table 23). With an escapement goal of 100,000 fish, the large anticipated return dictated a liberal approach to the management of this fishery. The Togiak district is managed differently than the rest of Bristol Bay and has a fixed fishing schedule of four days-per-week in the Togiak section and five days-per-week in Kulukak, Osviak, Matogak and Cape Peirce sections. These fixed fishing periods are reduced or extended by emergency order inseason, as needed to achieve desired escapements.

Fishing effort at Togiak has increased steadily since 1974 and reached approximately 150 drift units and 40 set nets in 1982 (Table 16). In past seasons, processing capacity has been limited and served to severely reduce the harvest, but 1982 witnessed 12 companies present and few, if any, fishermen were restricted by the lack of a market (Table 29). However, virtually all of the fishing fleet sat on the beach from June 25 until the morning of July 5 in a price dispute with the processors.

After the price settlement, the fishing fleet was immediately successful and began landing "loads" at every delivery. On an aerial survey of the Togiak River on July 8 sockeye salmon were observed from the village, the entire distance to the tower site, despite poor visibility due to turbid water and high winds. - With approximately 16% of the escapement goal accounted for, and a apparently strong run in progress, an emergency order was issued extending the fishery over the weekend in all five sections (Table 10).

By July 15 approximately 80% of the sockeye escapement goal had passed the tower, with 8 to 12 days of fish still in the river past the commercial fishery. With the escapement goal assured, the entire district was extended from July 16 until August 6 and a Commissioner's Announcement was issued, waiving the 48 hour transfer period into the Togiak district (Table 10).

Scale samples from the Togiak sockeye catch taken throughout the season indicated a large portion of the run (84%) was composed of 3-ocean fish (Table 3). This caused some concern early in the run because the preseason forecast indicated that 49% of the sockeye return was predicted to be 2-ocean fish (Table 2). The final breakdown was approximately 16% 2-ocean and 84% 3-ocean and the apparent lack of 2-ocean fish was compensated for by the stronger than forecast 3-ocean return (Table 3).

This was the seventh consecutive year of outstanding salmon runs to the Togiak district. The preliminary total sockeye harvest of 584,000 was third largest in the 28 year history of this fishery and the escapement appeared to be excellent throughout the district (Appendix Table 23). The estimated 925,000 total sockeye return was also the third largest ever recorded. The chum salmon run was the only disappointment at Togiak in 1982. The harvest of 159,000 falls close to the 20 year average of 152,000, but the escapement of 86,000, district-wide, was minimally acceptable (Appendix Table 41). Pink

salmon are not a targeted species at Togiak but the harvest of 24,000 was the fourth largest reported and the escapement appeared to be in the same magnitude as the catch (Table 22).

Coho salmon were an important part of the harvest at Togiak as early as 1968, but have been heavily targeted since 1977 (Appendix Table 15). The increased interest is due, in part, to higher fish prices, the recent strong runs, the large body size of this stock of fish, and the later season at Togiak. The 1982 coho harvest of 143,000 was the second largest in the history of this fishery. Aerial escapement surveys for coho have been flown since 1980, and the estimate of 54,000 this season was well distributed in the streams that were surveyed (Table 22). Enforcement problems with illegal "upriver" fishing experienced in the past were largely eliminated by the presence of a 32 ft. Fish and Wildlife Protection patrol vessel that was present for the bulk of the coho fishery.

For the second year management of the fishery at Togiak was greatly enhanced by the installation of a Department field radio at the Togiak cannery. The ADF&G catch sampler stationed there relayed daily catch information from the processors to the management staff in Dillingham. Formerly, this harvest data was available once per week, or by a special flight to the area.

1982 SUBSISTENCE SALMON FISHERY

Since 1963 the Department has maintained records of the subsistence harvest of salmon in the major river systems of Bristol Bay. Historically, large numbers of fish were taken for feeding dog teams. This practice was greatly reduced with the introduction of the snow machine, but has begun to increase again with the renewed interest in dog racing and sport mushing.

Subsistence catches of salmon in Bristol Bay normally range between 100-200,000 fish and have gradually increased in recent years (Appendix Table 55). This is due to the increasing local population, better reporting and a considerable number of non-watershed residents who now come to the area to participate in the harvest. Competition for the resource, and for fishing space, has resulted in regulations in the Naknek River drainage and the Iliamna-Lake Clark drainages restricting the issuance of salmon subsistence permits to only those persons domiciled in those areas. The watershed residency restrictions only apply to subsistence permits. The 1982 subsistence catch of 157,000 salmon slightly exceeded the Bay-wide average of 146,000 since 1963 (Table 34 and Appendix Table 55).

In 1982 a personal use fishery was allowed for the first time in Bristol Bay. This was a special fishery established by the Board of Fisheries to allow non-watershed residents the opportunity to participate in times of surplus. The personal use fishery is restricted to the Naknek River and is not allowed until the upper range of the escapement goal (900,000) has been reached. Only set gill nets or dip nets may be used, and the limit is 75 salmon per household. Fishing time is allowed two days-per-week for the personal use set nets and seven days-per-week for dip nets. In 1982 12 permits were issued and all were for set nets. The 12 personal use permittees reported a catch of 500 salmon, mostly sockeye salmon, the targeted species.

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(continued)

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, 1982.

District and River System	Number of Fish in Thousands									
	Inshore Forecast			Escapement ^{2/}		Esc./ Goal	Inshore Catch ^{2/}			
	Forecast ^{1/}	Actual	Run/Fore.	Goal	Range		Actual	Forecast	Actual ^{3/}	Catch/Fore.
NAKNEK-KVICHAK DISTRICT										
Kvichak River	13,079	2,635	0.20	4,000 ^{7/}	3,000-5,000	1,135	0.28	9,079	1,500	0.17
Branch River ^{3/}	624	667	1.07	185	170- 200	239	1.29	439	428	0.97
Naknek River	3,812	4,215	1.11	800	700- 900	1,156	1.45	3,012	3,060	1.02
Total ^{4/}	17,515	7,518	0.43	4,985	3,870-6,100	2,530	0.51	12,530	4,988	0.40
EGEGIK DISTRICT										
	4,236	3,449	0.81	600	500- 700	1,035	1.73	3,636	2,414	0.66
UGASHIK DISTRICT										
	2,065	2,347	1.14	500	400- 600	1,186 ^{5/}	2.37	1,565	1,161	0.74
NUSHAGAK DISTRICT										
Wood River	4,900	3,921	0.80	800	600-1,000	976	1.22	4,100	2,945	0.72
Igushik River	1,827	1,682	0.92	150	100- 200	424	2.83	1,677	1,258	0.75
Nuyakuk River ^{3/}	2,603	2,132	0.82	250	200- 300	538	2.15	2,353	1,594	0.68
Nushagak-Mul. Sys. ^{3/}	501	226	0.45	40	30- 50	63	1.58	461	163	0.35
Snake River ^{3/}	41	51	1.24	30	20- 40	12	0.40	11	39	3.55
Total ^{4/}	9,872	8,012	0.81	1,270	950-1,590	2,013	1.59	8,602	5,999	0.70
TOGIAK DISTRICT										
	937	925	0.99	100	60- 120	341 ^{6/}	3.41	837	584	0.70
TOTAL BRISTOL BAY^{4/}										
	34,625	22,250	0.64	7,455	5,780-9,110	7,104	0.95	27,170	15,146	0.56

1/ Final Bristol Bay sockeye salmon forecast of inshore run for 1982.

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 run to Mother Goose system.

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

7/ Adjusted to 2,000,000 in season.

Table 2. Inshore forecast of sockeye salmon age class return by river system and district, Bristol Bay, 1982.

District and River System	Number of Fish in Thousands						Total
	Age Class (Brood Year)			Age Class (Brood Year)			
	4 ₂ (1978)	5 ₃ (1977)	2-Ocean	5 _s (1977)	6 ₃ (1976)	3-Ocean	
NAKNEK-KVICHAK DISTRICT							
Kvichak River	9,773	2,105	11,878	587	614	1,201	13,079
Branch River	385	81	466	123	35	158	624
Naknek River	307	1,276	1,583	1,335	894	2,229	3,812
Total	10,465	3,462	13,927	2,045	1,543	3,588	17,515
EGEGIK DISTRICT							
	746	1,472	2,218	986	1,032	2,018	4,236
UGASHIK DISTRICT							
	149	1,066	1,215	510	340	850	2,065
NUSHAGAK DISTRICT							
Wood River	2,516	40	2,556	2,133	211	2,344	4,900
Igushik River	580	201	781	836	210	1,046	1,827
Nuyakuk River	728	20	748	1,681	174	1,855	2,603
Nush.-Mulch. Sys.	30	13	43	340	118	458	501
Snake River	24	5	29	9	3	12	41
Total	3,878	279	4,157	4,999	716	5,715	9,872
TOGIAK DISTRICT							
	364	96	460	449	28	477	937
TOTAL BRISTOL BAY^{1/}	15,602	6,375	21,977	8,989	3,659	12,648	34,625

^{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, 1982.^{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	1,604	192	1,796	609	178	787	2,583
Percent	62.1	7.4	69.5	23.6	6.9	30.5	100.0
Branch River							
Number	247	90	337	261	75	336	673
Percent	36.7	13.4	50.1	38.8	11.1	49.9	100.0
Naknek River							
Number	385	96	481	2,343	1,381	3,724	4,205
Percent	9.2	2.3	11.4	55.7	32.8	88.6	100.0
Total	2,236	378	2,614	3,213	1,634	4,847	7,461
Percent	30.0	5.1	35.1	43.0	21.9	64.9	100.0
EGEGIK DISTRICT							
Number	291	453	744	2,001	713	2,714	3,458
Percent	8.4	13.1	21.5	57.9	20.6	78.5	100.0
UGASHIK DISTRICT							
Number	197	208	405	1,512	403	1,915	2,320
Percent	8.5	9.0	17.5	65.2	17.4	82.5	100.0
NUSHAGAK DISTRICT							
Wood River							
Number	862	53	915	2,759	262	3,021	3,936
Percent	21.9	1.3	23.2	70.1	6.7	76.8	100.0
Igushik River							
Number	74	10	84	1,403	177	1,580	1,664
Percent	4.4	0.6	5.0	84.3	10.6	95.0	100.0
Nuyakuk River							
Number	160	14	174	1,720	219	1,939	2,113
Percent	7.6	0.7	8.2	81.4	10.4	91.8	100.0
Nushagak-Mulchatna							
Number	22	12	34	151	26	177	211
Percent	10.4	5.7	16.1	71.6	12.3	83.9	100.0
Snake River							
Number	26	8	34	14	3	17	51
Percent	51.0	15.7	66.7	27.5	5.9	33.3	100.0
Total	1,144	97	1,241	6,047	687	6,734	7,975
Percent	14.3	1.2	15.6	75.8	8.6	84.4	100.0
TOGIAK DISTRICT							
Number	131	13	144	631	151	782	926
Percent	14.2	1.4	15.6	68.1	16.3	84.4	100.0
TOTAL BRISTOL BAY							
Number	3,998	1,150	5,148	13,405	3,587	16,992	22,140 ^{2/}
Percent	18.1	5.2	23.2	60.6	16.2	76.8	100.0

1/ The inshore run data does not include the 1982 Japanese high seas catch of maturing Bristol Bay sockeye or the 1981 Japanese catch of immatures.

2/ Approximately 110,000 additional sockeye salmon of several minor age classes returning in 1982 are not included in this total.

Table 4. Inshore commercial catch and escapement of sockeye salmon, Bristol Bay, 1982.^{1/}

District and River System	Number of Fish		
	Catch	Escapement	Total Run
<u>NAKNEK-KVICHAK DISTRICT</u>			
Kvichak River	1,500,244	1,134,840	2,635,084
Branch River	427,902	239,300	667,202
Naknek River	3,059,776	1,155,552	4,215,328
Total	4,987,922	2,529,692	7,517,614
<u>EGEGIK DISTRICT</u>	2,413,935	1,034,628	3,448,563
<u>UGASHIK DISTRICT</u>			
Ugashik River		1,157,526	
Mother Goose System		28,025	
Total	1,161,117	1,185,551	2,346,668
<u>NUSHAGAK DISTRICT</u>			
Wood River	2,944,684	976,470	3,921,154
Igushik River	1,257,737	423,768	1,681,505
Nuyakuk River	1,594,081	537,864	2,131,945
Nushagak-Mul. Sys.	163,059	63,000	226,059
Snake River	39,269	11,640	50,909
Total	5,998,830	2,012,742	8,011,572
<u>TOGIAK DISTRICT</u>			
Togiak Lake		244,824	
Togiak River		3,450	
Togiak Tributaries		22,000	
Kulukak System		52,750	
Other Systems		18,400	
Total	583,701	341,424	925,125
<u>TOTAL BRISTOL BAY</u>	15,145,505	7,104,037	22,249,542

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

Table 5. Inshore commercial catch and escapement of pink salmon,
Bristol Bay, 1982.^{1/}

District and River System	Number of Fish		
	Catch	Escapement	Total Run
<u>NAKNEK-KVICHAK DISTRICT</u>			
Kvichak River		50,000	
Branch River		34,000	
Naknek River			
Total	125,869	84,000	209,869
<u>EGEGIK DISTRICT</u>			
	1,973	15,000	16,973
<u>UGASHIK DISTRICT</u>			
	14	6,000	6,014
<u>NUSHAGAK DISTRICT</u>			
Wood River Drainage		36,100	
Igushik River ^{2/}		8,430	
Nuyakuk River ^{2/}		1,537,716	
Nuyakuk River ^{3/}		54,380	
Nushagak River		19,130	
Mulchatna River			
Snake River		900	
Total	1,285,947	1,656,656	2,942,603
<u>TOGIK DISTRICT</u>			
Togiak River		31,900	
Osviak River		3,800	
Matogak River		4,000	
Slug River		4,600	
Total	23,660	44,300	67,960
TOTAL BRISTOL BAY	1,437,463	1,805,956	3,243,419

^{1/} Inshore district catches are preliminary, while escapements are final.

^{2/} Up-river from the counting station.

^{3/} Down-river from the counting station.

Table 6. Offshore test fishing catch indices and estimated inshore daily passage rate of sockeye salmon, Port Moller, Bristol Bay, 1982.^{1/}

Date	No. of Stations Fished	Sockeye Catch	Running Mean		Sockeye Salmon				Days Lag
			Weight (lbs.)	Length (mm)	Index ^{2/}		Passage Rate ^{3/}		
					Daily	Accum.	Daily	Accum.	
6/11	6	27	7.1	581	12	12	110	110	
12	4	14	6.8	575	7	19	66	176	
13	6	7	6.8	577	3	22	29	205	
14	5	26	6.8	575	13	35	128	357	
15	6	68	6.9	572	29	64	297	653	
16	5	14	6.9	572	7	71	72	722	
17	4	40	7.0	572	19	90	196	919	
18	5	30	7.0	572	14	104	147	1,078	
19	6	106	7.0	573	50	154	708	2,201	
20	2	69	7.0	572	45	199	645	2,846	
21		(40)	7.0	572	(41)	240	582	3,428	
22		(36)	7.0	572	(37)	277	519	3,947	
23	6	69	6.9	571	32	309	456	4,403	
24	5	64	6.9	570	33	342	470	4,873	
25	6	86	6.8	569	47	389	672	5,546	
26	1	44	6.8	569	40	429	452	4,867	
27	2	36	6.8	569	36	465	401	5,255	11
28		(20)	6.8	569	(20)	485	226	5,481	11
29	6	11	6.8	569	6	491	69	5,550	10
30	5	63	6.8	569	30	521	345	5,958	10
7/ 1	6	50	6.8	569	25	546	289	6,284	11
2		(49)	6.8	569	(49)	595	590	7,128	10
3	6	160	6.8	568	74	669	879	8,008	10
4	5	26	6.8	568	15	684	303	14,170	10
5	6	26	6.8	568	13	697	309	16,054	11
6	4	38	6.8	568	20	717	474	17,411	12
7	6	46	6.7	568	25	742	773	23,024	10
8	5	30	6.7	567	16	758	497	23,686	10
Total	118	1,295	6.7	567		758		23,686	

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 7. Offshore test fishing catch indices and estimated inshore daily passage rate of chum salmon, Port Moller, Bristol Bay, 1982.

Date	No. of Stations Fished	Chum Catch	Chum Salmon			
			Index ^{1/}		Passage Rate ^{2/}	
			Daily	Accumulative	Daily	Accumulative
6/11	6	25	12	12	157	157
12	4	9	5	17	59	216
13	6	6	3	20	36	252
14	5	33	17	37	221	474
15	6	10	5	42	63	537
16	5	22	10	52	134	670
17	4	4	2	54	25	696
18	5	22	10	64	129	825
19	6	26	12	76	152	976
20	2	12	10	86	127	1,103
21		(7)	(7)	93	90	1,193
22		(5)	(5)	98	64	1,257
23	6	8	5	103	60	1,317
24	5	5	3	106	34	1,351
25	6	19	12	118	155	1,505
26	1	6	6	124	71	1,576
27	2	5	5	129	64	1,640
28		(4)	(4)	133	51	1,691
29	6	7	4	137	50	1,741
30	5	8	4	141	49	1,789
7/ 1	6	11	7	148	84	1,873
2		(16)	(16)	164	205	2,078
3	6	23	11	175	145	2,223
4	5	8	5	180	59	2,282
5	6	21	11	191	140	2,422
6	4	12	6	197	76	2,498
7	6	7	4	201	49	2,547
8	5	16	9	210	111	2,658
Total	118	357		210		2,658

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 12,790 fish per adjusted index point (1979 not used in compiling average).

Table 8. Summary of outside sockeye salmon test fishing indices in the Naknek-Kvichak district by index area and date, Bristol Bay, 1982. ^{1/}

Index Area	Date	
	July 15	July 18 ^{2/}
Naknek River (1)		
Middle Naknek (2)		
Johnston Hill (3)		
Low Point Onshore (4)	23	
Low Point Offshore (5)		
Middle Channel (6)	6	
Ships Anchorage (7)		
Pederson Point (8)	56	0
Graveyard (9)		
Salmon Flats (10)		
Alberts Channel (11)	16	
Gravel Spit (12)	0	
Half Moon Bay (13)	0	
Deadman Sands (14)	0	
Low Point-Middle Bluff (15)		
Middle Bluff (16)	38	

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

^{2/} Fishing schedule cancelled after one drift due to vessel breakdown.

Table 9. Daily king salmon catch per unit of effort in subsistence nets at Kakanak Beach and Lewis Point, Nushagak district, 1982.

Date	Time Fished	Wind ^{1/}		Catch Per Unit of Effort ^{2/}	
		Direction	Knots	Kakanak Beach	Lewis Point
6/ 3	P.M.	SE	15	0.0	
4	A.M.			0.0	
4	P.M.			0.1	
5	A.M.	Calm		0.1	
5	P.M.	-Calm		0.1	
6	A.M.	Calm		0.0	
6	P.M.	S	10	0.2	
7	A.M.	SE	10	0.0	0.5
7	P.M.	SE	5	0.0	0.0
8	A.M.	Calm		0.0	0.5
8	P.M.	S	5	0.0	0.0
9	A.M.	Calm		0.0	0.0
9	P.M.	N	5	0.0	0.0
10	A.M.	NE	15	0.0	0.0
10	P.M.	NE	15	0.0	0.0
11	A.M.	NW	20	0.0	0.4
11	P.M.	Calm		0.0	0.0
12	A.M.	NW	5	0.0	0.2
12	P.M.	N	5	0.2	0.0
13	A.M.	Calm		0.5	0.4
13	P.M.				0.0
14	A.M.				0.5
14	P.M.	N	5	0.5	0.0
15	A.M.	Calm		0.3	0.0
15	P.M.	S	8	0.0	0.0
16	A.M.	Calm			0.1
16	P.M.	W	3	0.0	0.0
17	A.M.	NE	5		0.0
17	P.M.	Calm		0.0	0.2
18	A.M.	NW	2		0.0
18	P.M.	W	7	0.0	0.0
19	A.M.	NE	5	0.0	0.0
19	P.M.	SE	3		0.0
20	A.M.	SE	7		0.0
20	P.M.	SE	15		0.0
21	A.M.	NE	15	30.0	50.7
21	P.M.	SE	10		9.0
22	A.M.	NE	6	10.2	66.0
22	P.M.	SE	6		3.0
23	A.M.	Calm			36.3
23	P.M.	N	5	1.9	0.0
24	A.M.	NE	11	0.7	16.0
24	P.M.	Calm		0.0	5.0
25	A.M.	NE	5		6.0
25	P.M.	SE	5	12.7	3.5
Season Average CPUE				1.2	7.2

1/ As recorded on Kakanak Beach at time of survey.

2/ Average number of kings per net at Kakanak Beach in Dillingham, and the

Table 10. Emergency order commercial salmon fishing periods, Commissioner's announcements, and general announcements, by district, Bristol Bay, 1982.

I. Emergency Orders ^{1/}					
Number	Date and Time		Hours/Days Open		
<u>NAKNEK-KVICHAK DISTRICT</u>					
AKN 02	June 23	9 a.m. - June 24	12 N	27 hrs.	
AKN 03	June 24	12 N - June 25	12 N	24 hrs.	
AKN 04	June 25	12 N - June 27	2 p.m.	50 hrs.	
AKN 05	June 27	2 p.m. - June 28	2 p.m.	24 hrs.	
AKN 06	June 28	2 p.m. - June 29	4 p.m.	26 hrs.	
AKN 07	June 29	4 p.m. - June 30	6 p.m.	26 hrs.	
AKN 08	June 30	6 p.m. - July 1	6 p.m.	24 hrs.	
AKN 22	July 7	10 p.m. - July 8	10 p.m.	24 hrs.	
<u>Naknek Section Only</u>					
AKN 09	July 1	6 p.m. - July 2	6 p.m.	24 hrs.	
AKN 11	July 2	6 p.m. - July 3	7 p.m.	25 hrs.	
AKN 13	July 3	7 p.m. - July 4	7 p.m.	24 hrs.	
AKN 15	July 4	7 p.m. - July 5	10 p.m.	27 hrs.	
AKN 16	July 5	10 p.m. - July 6	10 p.m.	24 hrs.	
AKN 20	July 6	10 p.m. - July 7	10 p.m.	24 hrs.	
AKN 24	July 8	10 p.m. - July 10	2 a.m.	28 hrs.	
AKN 26	July 10	2 a.m. - July 17	9 a.m.	7 days, 7 hrs.	
AKN 30	July 15	9 a.m. - July 17	9 a.m.	48 hrs. ^{2/}	
AKN 32	July 19	9 a.m. - July 21	11 a.m.	50 hrs. ^{3/}	
<u>Kvichak Section Only</u>					
AKN 11	July 3	7 a.m. - July 3	7 p.m.	12 hrs.	
AKN 18	July 6	10 p.m. - July 7	10 a.m.	12 hrs.	
AKN 20	July 7	10 a.m. - July 7	10 p.m.	12 hrs.	
AKN 32	July 19	9 a.m. - July 21	11 a.m.	50 hrs. ^{4/}	
<u>EGEGIK DISTRICT</u>					
AKN 01	June 11	12 N - Dec. 31	12 MN	<u>5/</u>	
AKN 02	June 23	9 a.m. - June 24	12 N	27 hrs.	
AKN 03	June 24	12 N - June 25	12 N	24 hrs.	
AKN 05	June 27	2 p.m. - June 28	2 p.m.	24 hrs.	
AKN 06	June 28	2 p.m. - June 29	4 p.m.	26 hrs.	
AKN 07	June 29	4 p.m. - June 30	6 p.m.	26 hrs.	
AKN 10	July 2	6 a.m. - July 3	6 a.m.	24 hrs.	
AKN 12	July 3	6 a.m. - July 3	6 p.m.	12 hrs.	
AKN 17	July 6	10 a.m. - July 6	10 p.m.	12 hrs.	
AKN 19	July 7	10 a.m. - July 8	11 a.m.	25 hrs.	
AKN 21	July 7	3 p.m. - July 17	9 a.m.	9 days, 18 hrs.	
AKN 31	July 17	9 a.m. - July 19	9 a.m.	48 hrs.	

(continued)

Table 10. (continued)

I. <u>Emergency Orders</u> ^{1/}		Date and Time		Hours/Days Open
Number				
<u>UGASHIK DISTRICT</u>				
AKN 02	June 23	9 a.m.	- June 24 12 N	27 hrs.
AKN 03	June 24	12 N	- June 25 12 N	24 hrs.
AKN 05	June 27	2 p.m.	- June 28 2 p.m.	24 hrs.
AKN 06	June 28	2 p.m.	- June 29 4 p.m.	26 hrs.
AKN 07	June 29	4 p.m.	- June 30 6 p.m.	26 hrs.
AKN 10	July 2	6 a.m.	- July 3 6 a.m.	24 hrs.
AKN 12	July 3	6 a.m.	- July 3 6 p.m.	12 hrs.
AKN 14	July 3	6 p.m.	- July 4 8 p.m.	26 hrs.
AKN 17	July 6	10 a.m.	- July 6 10 p.m.	12 hrs.
AKN 19	July 7	10 a.m.	- July 8 11 a.m.	25 hrs.
AKN 23	July 8	11 a.m.	- July 9 12 N	25 hrs.
AKN 25	July 9	12 N	- July 10 1 p.m.	25 hrs.
AKN 27	July 10	1 p.m.	- July 11 2 p.m.	25 hrs.
AKN 28	July 11	2 p.m.	- July 12 2 p.m.	24 hrs.
AKN 29	July 11	6 p.m.	- July 17 9 a.m.	5 days, 15 hrs.
AKN 31	July 17	9 a.m.	- July 19 9 a.m.	48 hrs.
<u>NUSHAGAK DISTRICT</u>				
DLG 01	June 18	12 N	- Sept. 30 MN	-- <u>6/</u>
DLG 03	June 23	1 p.m.	- June 24 1 p.m.	24 hrs.
DLG 05	June 25	6 p.m.	- June 26 6 p.m.	24 hrs.
DLG 06	June 26	6 p.m.	- June 28 6 p.m.	48 hrs.
DLG 07	June 28	6 p.m.	- June 29 8 p.m.	26 hrs.
DLG 08	June 29	8 p.m.	- June 30 8 p.m.	24 hrs.
DLG 09	June 30	8 p.m.	- July 1 10 p.m.	26 hrs.
DLG 10	July 1	10 p.m.	- July 2 10 p.m.	24 hrs.
DLG 11	July 2	10 p.m.	- July 3 10 p.m.	24 hrs.
DLG 12	July 3	10 p.m.	- July 4 10 p.m.	24 hrs.
DLG 13	July 4	10 p.m.	- July 5 10 p.m.	24 hrs.
DLG 14	July 5	10 p.m.	- July 6 10 p.m.	24 hrs.
DLG 15	July 6	10 p.m.	- July 7 10 p.m.	24 hrs.
DLG 16	July 7	10 p.m.	- July 19 9 a.m.	11 days, 11 hrs.
DLG 19	July 24	9 a.m.	- July 26 9 a.m.	48 hrs.
DLG 20	July 31	9 a.m.	- Aug. 2 9 a.m.	48 hrs.
<u>Igushik Section Only</u>				
DLG 02	June 21	11 a.m.	- June 21 11 p.m.	12 hrs.
DLG 04	June 24	1 p.m.	- June 25 6 p.m.	29 hrs.
<u>TOGIAK DISTRICT</u>				
DLG 01	June 18	12N	- Sept. 30 MN	-- <u>7/</u>
DLG 17	July 9	9 a.m.	- July 12 9 a.m.	3 days
DLG 18	July 16	9 a.m.	- Aug. 6 9 a.m.	21 days

(continued)

Table 10. (continued)

II. Commissioner's Announcements ^{1/}			
Number	Effective Date		Description
DLG 01-82	July 7 3 p.m.		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.
DLG 02-82	July 15 12 N		Waives the 48 hour waiting period for district transfers, changing type of gear fished, and relocation of set net sites in Togiak district as required under 5 AAC 06.370.
AKN 01-82	July 7 3 p.m.		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 02-82	July 9 6 p.m.		Waives the 48 hour waiting period for relocation of set net sites in the Naknek-Kvichak district as required under 5 AAC 06.370.
AKN 03-82	July 11 6 p.m.		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.
JUN 02-82	July 21 4 p.m.		Granted a limited exception to 5 AAC 39.198 and permitted foreign processors to receive, process and tender pink salmon from Nushagak district under conditions of a State of Alaska foreign processing or tendering permit.
JUN 03-82	July 27 6 p.m.		Amended Commissioner's Announcement No. JUN 02-82 by closing Nushagak district to foreign processing and tendering of pink salmon.

(continued)

III. General Announcements ^{1/}			
Number	Date		Description
DLG 1	June 15 12 N		The present Nushagak fishing period will close at 9 a.m. on Wed., June 16. We anticipate a closure of undetermined length to improve the rate of king salmon escapement into the Nushagak River. Presently we estimate a king escapement of less than 10,000 fish, while the commercial catch is projected to total about 45-50,000 through Wed. morning's closure. Continuous monitoring of the king daily escapement rates will be conducted through analysis of subsistence catches in the Dillingham area and at the Lewis Pt. fish camps, as well as a final check at our sonar counting station just below Portage Creek. Sonar counts to date show daily rates of 200-400 fish passing the site per day, with the majority of these fish being chums. Sockeye catches at South Unimak and at our Port Moller test fish site through June 14 indicate that the sockeye run is on schedule, and of expected magnitude. Good early sockeye catches were made on June 11, the first day of test fishing at Port Moller and these fish will begin to show in Bristol Bay as early as June 18-19. Incidental catches in Nushagak district of sockeye and chums are higher than last year at this time, indicating that the sockeye and chum runs are on schedule, and that fish may be present in the Nushagak district as early as next week in significant numbers.
DLG 2	June 17 12 N		This is the ADF&G with a general announcement concerning the Nushagak district boundary markers. The Nushagak district Fish and Game buoys were placed Thursday, June 17 to help define the Igushik section fishing boundary. Two lighted buoys were placed to locate the closed Snake River section, and the lower limit of the Igushik River section. Both buoys have radar reflectors and a flashing light with a 2 second flash and a 3 second eclipse. Please remember that these buoys are aids to help fishermen locate the boundary lines. If the buoys drag or are pulled out of position, the legal boundary does not shift position. Fishermen are also reminded it is prohibited by regulation to tie up to Department buoys. Land markers, range lights and panels have been deployed at Etolin Pt. and Nichols Hills to help define the outer Nushagak sockeye salmon boundary line. Maps and marker descriptions are available at the Dillingham Fish and Game office.

- ^{1/} Prefix code on emergency orders and Commissioner's announcements and general announcements indicate office where announcement originated ("AKN" for King Salmon, "DLG" for Dillingham and "JUN" for Juneau).
- ^{2/} Fishing allowed with set gill nets only.
- ^{3/} Closed fishing to drift gill nets only.
- ^{4/} Closed fishing to all gear types.
- ^{5/} Clarifies location of the inner Egegik district boundary.
- ^{6/} Restricts fishing south of the sockeye salmon boundary line, and redefines the boundary line.
- ^{7/} 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, 1982.

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
5/31-6/5	5 days				12				12
	7-12			7	65				72
	14-19			2,902	572	204			3,778
21	15 hrs.	74	216	13,036	639	2,143			15,818
22	24 hrs.			26,261	996	2,320			29,577
23	24 hrs.			17,305	285	1,256			18,846
24	24 hrs.	59	150	5,551	86	194			5,831
25	24 hrs.			48,871	169	1,227			50,267
26	24 hrs.	68	150	79,002	326	2,044			81,372
27	24 hrs.			94,102	523	3,989			98,614
28	24 hrs.			147,940	830	4,936			153,706
29	24 hrs.	90	161	293,150	828	12,594			306,572
30	24 hrs.	136	161	196,324	448	5,957			202,729
7/ 1 ^{2/}	24 hrs.			264,922	244	7,003			272,169
2 ^{3/}	24 hrs.			110,530	178	2,580			113,288
3 ^{4/}	24 hrs.			359,719	515	10,145			370,379
4 ^{5/}	24 hrs.			336,541	390	8,819			345,750
5 ^{6/}	24 hrs.			272,468	338	9,057			281,863
6 ^{7/}	24 hrs.	147	54	385,966	471	8,565			395,002
7 ^{8/}	24 hrs.	150	253	363,402	433	6,936			370,771
8 ^{9/}	24 hrs.			789,288	617	16,140			806,045
9 ^{10/}	24 hrs.			375,346	407	5,124			380,877
10 ^{3/7/}	24 hrs.			125,080	282	3,383			128,745
11 ^{3/}	24 hrs.	450	170	143,385	252	3,430	3		147,070
12 ^{3/}	24 hrs.			74,991	163	1,544	1		76,699
13 ^{3/}	24 hrs.			81,258	222	1,652	1		83,133
14 ^{3/}	24 hrs.			117,774	335	2,830			120,939
15 ^{3/8/}	24 hrs.			50,373	122	1,142	2		51,639
16 ^{9/}	24 hrs.			23,419	155	423	9		24,006
17 ^{9/}	9 hrs.			14,270	57	159	1		14,487
19 ^{9/}	15 hrs.			3,450	49	167	29		3,695
20 ^{9/}	24 hrs.			4,445	66	122	75		4,708
21 ^{10/}	24 hrs.			93,063	263	28,053	10,024	8	131,411
22	24 hrs.	154	273	40,620	274	15,575	9,681	31	66,181
23	24 hrs.			17,408	228	5,270	8,191	73	31,170
24	9 hrs.			2,343	96	942	1,890	21	5,292
26-31	5 days			12,124	345	17,387	80,486	2,538	112,880
8/ 1- 7	5 days			896	86	528	8,592	703	10,805
9-14	5 days			299	27	371	6,072	3,876	10,645
16-21	5 days			91	9	45	812	1,861	2,818
Total				4,987,922	12,503	194,256	125,869	9,111	5,329,661
Percent of District Catch				93.6	0.2	3.6	2.4	0.2	100.0

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

2/ Naknek section only 6 p.m. - 12 MN.

3/ Naknek section only.

4/ Naknek section only until 7 a.m., entire district 7 a.m. until 7 p.m., Naknek section only 7 p.m. until 12 MN.

5/ Naknek section open 24 hours, Kvichak section open 10 p.m. until MN.

6/ Naknek section open 24 hours, Kvichak section open until 10 p.m.

7/ Naknek section open from 2 a.m. until 9 a.m., July 17.

8/ Naknek section closed to drift gill net fishing from 9 a.m., July 15 until 9 a.m., July 17.

9/ Naknek section open only for set gill net.

10/ Entire district open at 11 a.m. for 5-day per week fishing.

Table 12. Commercial salmon catch by period and species, Egegik district, Bristol Bay, 1982.

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
6/ 7	15 hrs.		10+	11	9	4			24
8	24 hrs.			138	14	26			178
9	24 hrs.			235	17	57			309
10	24 hrs.			251	69	164			484
11	24 hrs.			168	103	248			519
12	9 hrs.			112	72	107			291
14	15 hrs.			498	88	67			653
15	24 hrs.	3	62	1,316	162	246			1,724
16	24 hrs.			2,656	161	465			3,282
17	24 hrs.			10,481	251	594			11,326
18	24 hrs.	65	87	14,541	429	857			15,827
19	9 hrs.			29,867	280	2,036			32,183
21	15 hrs.	137	87	15,114	374	723			16,211
22	24 hrs.			39,731	312	2,144			42,187
23	24 hrs.			27,699	295	1,917			29,911
24	24 hrs.	105	149	32,958	305	1,696			34,959
25	12 hrs.			81,818	526	2,062			84,406
27	10 hrs.			46,626	149	1,737			48,512
28	24 hrs.	90	176	139,920	190	3,718			143,828
29	24 hrs.			110,809	215	2,714			113,738
30	18 hrs.			122,087	200	2,017			124,304
7/ 2	18 hrs.			45,757	69	564			46,390
3	18 hrs.	92	159	77,737	160	1,760			79,657
6	14 hrs.	115	190	223,864	26	1,365			225,255
7	24 hrs.	107	185	464,760	59	8,615			473,434
8	24 hrs.			331,782	67	6,022			337,871
9	24 hrs.			189,287	48	7,090			196,425
10	24 hrs.	128	200	81,267	44	3,555			84,866
11	24 hrs.			82,699	31	5,441			88,171
12	24 hrs.			64,482	32	3,479		1	67,994
13	24 hrs.	105	185	35,677	107	3,577			39,361
14	24 hrs.			33,559	23	1,254			34,836
15	24 hrs.			21,851	19	631		1	22,502
16	24 hrs.			16,976	11	907			17,894
17	24 hrs.			17,634	13	696			18,343
18	24 hrs.			23,297		2,735			26,032
19	24 hrs.			11,073	4	3,063		22	14,162
20	24 hrs.	29	140	9,578	9	2,495	3	11	12,096
21	24 hrs.			2,835	8	623		10	3,476
22	24 hrs.			632	1	168	1	17	819

(continued)

Table 12. (continued)

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
7/23	24 hrs.			578		222	2	34	836
24	9 hrs.			216	2	106	6		330
26	15 hrs.			193		120	9	120	442
27	24 hrs.			195	5	285	32	295	812
28	24 hrs.		92	179	3	310	32	291	815
29	24 hrs.			125	1	396	93	463	1,078
30	24 hrs.			82	4	465	122	870	1,543
31	9 hrs.			34	1	169	44	294	542
8/ 2	15 hrs.			84	2	498	214	2,111	2,909
3	24 hrs.			130	5	485	199	2,375	3,194
4	24 hrs.			74	1	168	157	1,921	2,321
5	24 hrs.	15	127	51		288	272	3,090	3,701
6	24 hrs.			62	3	260	262	3,910	4,497
7	9 hrs.			26		69	46	838	979
9-14	5 days	12	126	88	3	443	387	18,206	19,127
16-21	5 days			35	2	117	92	19,804	20,050
23-28	5 days	7	101					10,145	10,145
30-9/4	5 days							6,386	6,386
6-11	5 days							511	511
13-18	5 days							424	424
20-25	5 days							35	35
Total				2,413,935	4,984	82,040	1,973	72,185	2,575,117
Percent of District Catch				93.7	0.2	3.2	0.1	2.8	100.0

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

Table 13. Commercial salmon catch by period and species, Ugashik district, Bristol Bay, 1982.

Period	Time	Effort ^{1/}		Number of Fish				Coho	Total
		Drift	Set	Sockeye	King	Chum	Pink		
6/ 7-12	5 days	3	2	81	1,428	5			1,514
14	15 hrs.			89	477	5			571
15	24 hrs.	15	13	89	477	5			571
16	24 hrs.			99	484	5			588
17	24 hrs.			131	510	6			647
18	24 hrs.	12	14	225	611	12			848
19	9 hrs.			94	480	5			579
21	15 hrs.	17	14	1,577	555	87			2,219
22	24 hrs.			2,090	496	116			2,702
23	24 hrs.			4,488	174	251			4,913
24	24 hrs.			3,382	42	189			3,613
25	12 hrs.			14,902	212	834			15,948
27	10 hrs.			16,147	76	363			16,586
28	24 hrs.	20	40	30,055	78	2,071			32,204
29	24 hrs.			27,006	180	1,781			28,967
30	18 hrs.			31,621	96	2,211			33,928
7/ 2	18 hrs.			6,743	11	82			6,836
3	24 hrs.	44	38	51,141	64	449			51,654
4	20 hrs.			94,713	68	1,007			95,788
6	14 hrs.	50	59	94,640	28	551			95,219
7	24 hrs.			135,306	51	5,111			140,468
8	24 hrs.	53	50	132,203	17	3,821			136,041
9	24 hrs.			107,828	47	2,742	2	1	110,620
10	24 hrs.	134	46	84,356	66	2,880			87,302
11	24 hrs.			101,542	85	4,639			106,266
12	24 hrs.			33,415	45	2,318			35,778
13	24 hrs.	90	41	49,973	86	2,165			52,224
14	24 hrs.			34,790	12	2,562			37,364
15	24 hrs.			36,608	58	3,677			40,343
16	24 hrs.			11,792	17	1,523			13,332
17	24 hrs.	90		12,675	14	1,487			14,176
18	24 hrs.			5,607	5	757			6,369
19	24 hrs.			3,292	10	541			3,843
20	24 hrs.	41	41	6,306	9	1,575	1		7,891
21	24 hrs.			2,521	7	734			3,262
22	24 hrs.			1,538	1	800			2,339
23	24 hrs.			1,852		914	1		2,767
24	9 hrs.			35		2			37
26	15 hrs.			1,658		109		155	1,922
27	24 hrs.			3,261		223	1	328	3,813

(continued)

Table 13. (continued)

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
7/28	24 hrs.	1	25	1,761		100	2	209	2,072
29	24 hrs.	-	-	1,498		110		124	1,732
30	24 hrs.			2,675	1	149	7	330	3,162
31	9 hrs.			57		3		6	66
8/2-7	5 days	0	34	8,827		1,000		2,347	12,174
9-14	5 days	0	35	428		306		4,119	4,998
16-21	5 days							11,502	6,563
23-28	5 days	1	34					16,853	19,068
30-9/4	5 days							10,027	10,027
6-11	5 days							5,175	5,175
13-18	5 days								
Total				1,161,117	7,078	50,283	14	51,176	1,269,668
Percent of District Catch				91.4	0.6	4.0	+	4.0	100.0

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

Table 14. Commercial salmon catch by period and species, Nushagak district, Bristol Bay, 1982.

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
5/31-6/5	5 days			2	5,723	56			5,781
7	15 hrs.	72		2	213	21			236
8	24 hrs.	190		6	584	61			651
9	24 hrs.	173		25	664	33			722
10	24 hrs.	274		20	3,812	84			3,916
11	24 hrs.	441		85	16,782	620			17,487
12	9 hrs.	300		55	9,576	84		1	9,716
14	15 hrs.	296		166	3,221	335			3,722
15	24 hrs.	429		260	8,767	922			9,949
16	9 hrs.	484		483	9,213	1,097			10,793
21 ^{2/}	12 hrs.	153	4	3,239	6,217	450			9,906
23	11 hrs.	507	104	21,726	8,328	8,939			38,993
24 ^{2/}	13 hrs.			33,695	25,274	10,623			69,592
24 ^{2/}	11 hrs.	69		3,728	1,011	566			5,305
25 ^{2/}	18 hrs.			8,655	7,467	3,207			19,329
26	24 hrs.	323	27	139,160	41,582	34,327			215,069
27	24 hrs.	199	31	145,135	6,158	22,449			173,742
28	24 hrs.	224		244,657	6,157	22,306			273,120
29	24 hrs.	205	17	339,147	2,439	25,083			366,669
30	24 hrs.	197	35	204,735	860	11,149			216,744
7/ 1	24 hrs.	167	37	230,495	1,420	11,551			243,466
2	24 hrs.	107	29	368,559	2,331	15,270			386,160
3	24 hrs.	141	22	409,860	487	15,216	1	1	425,565
4	24 hrs.	150	30	461,475	1,426	24,118	6		487,025
5	24 hrs.		207	605,543	1,915	32,701	8		640,167
6	24 hrs.			624,568	3,744	31,258	10		659,580
7	24 hrs.			419,972	1,947	24,973	10	1	446,903
8	24 hrs.			315,708	2,527	17,000	215	2	335,452
9	24 hrs.			351,673	2,212	21,434	239	4	375,562
10	24 hrs.			198,196	1,557	11,088	502	7	211,350
11	24 hrs.			183,609	1,135	11,267	122	21	196,154
12	24 hrs.			163,935	1,853	14,211	284	4	180,287
13	24 hrs.			117,624	5,028	17,238	1,512	76	141,478
14	24 hrs.			81,931	2,209	11,986	4,136	60	100,322
15	24 hrs.			75,635	825	9,360	4,093	482	90,395
16	24 hrs.			50,739	616	7,730	3,819	657	63,561
17	24 hrs.			39,629	517	4,744	10,306	470	55,666
18	24 hrs.			48,201	1,135	10,314	25,647	2,736	88,033
19	24 hrs.			33,137	771	8,704	43,478	3,410	89,500
20	24 hrs.			22,711	530	2,688	85,741	3,138	114,808

(continued)

Table 14. (continued)

Period	Time	Effort ^{1/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
7/21	24 hrs.			20,636	355	2,087	45,356	7,075	75,509
22	24 hrs.			9,304	587	1,991	65,249	16,480	93,611
23	24 hrs.			5,030	241	1,012	68,970	13,177	88,430
24	24 hrs.			2,273	98	604	83,996	4,335	91,306
25	24 hrs.			2,854	59	1,000	134,360	9,369	147,642
26	24 hrs.			4,644	73	2,186	136,670	33,073	176,646
27	24 hrs.			1,008	59	466	55,580	30,197	87,310
28	24 hrs.			894	44	178	64,567	9,809	75,492
29	24 hrs.			565	29	157	76,651	20,233	97,635
30	24 hrs.			323	28	156	66,956	26,802	94,265
31	24 hrs.			441	29	150	31,473	8,416	40,509
8/ 1	24 hrs.			180	22	111	49,281	6,261	55,855
2	24 hrs.			487	26	75	58,974	3,155	62,717
3	24 hrs.			588	26	163	57,557	1,844	60,178
4	24 hrs.			750	23	206	44,187	957	46,123
5	24 hrs.			179	20	145	34,804	1,674	36,822
6	24 hrs.			121	23	133	22,533	4,532	27,342
7	9 hrs.			203	15	68	1,508	4,474	6,268
9	15 hrs.			14	25	138	3,159	47,619	50,955
10	24 hrs.			145	24	141	2,056	70,034	72,400
11	24 hrs.			6	1	1	715	11,052	11,775
12	24 hrs.				2		469	2,691	3,162
13	24 hrs.			4	1	6	612	10,714	11,337
14	9 hrs.						39	3,374	3,413
16-21	5 days				8	4	96	13,059	13,167
23-28	5 days				6			15,649	15,655
30-9/4	5 days							676	676
Total				5,998,830	200,057	456,441	1,285,947	387,801	8,329,076
Percent of District Catch				72.0	2.4	5.5	15.4	4.7	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, 1982.

Period	Time ^{1/}	Number of Fish		
		Clark's Point Beach ^{2/}	Ekuk Beach ^{3/}	Igushik Beach ^{4/}
6/ 7-12	5 days		35	
14-16	48 hrs.		98	
21-5/6	12 hrs.			1,394
23-24	24 hrs.	307	2,260	1,962
25-26	2 days			
27-28	2 days			
28-7/3	6 days			8,949
4-10	7 days	7,445	60,971	109,101
11-17	7 days	12,068	41,289	36,133
18-24	7 days	2,145	33,537	5,033
25-31	7 days	279	18,764	440
8/ 1- 7	6 days	58	3,328	125
Total		22,302	160,282	163,137

1/ Fishing effort and harvest was severely reduced by the fishermen-industry price dispute through July 3.

2/ Approximate fishing effort was 21 set nets. Sockeye salmon accounted for 37.6% of the total beach catch; catch of other species included 478 kings, 766 chums, 31,707 pinks and 4,111 cohos.

3/ Approximate fishing effort was 84 set nets. Sockeye salmon accounted for 60.9% of the total beach catch; catch of other species included 803 kings, 6,030 chums, 91,380 pinks and 4,650 cohos.

4/ Approximate fishing effort was 15 skiffs and 68 set nets. Sockeye salmon accounted for 93.9% of the total beach catch; catch of other species included 2,127 kings, 4,643 chums, 2,863 pinks and 910 cohos.

5/ Igushik section only.

Table 16. Commercial salmon catch by period and species, Togiak district, Bristol Bay, 1982.

Period	Time ^{1/}	Effort ^{2/}		Number of Fish					Total
		Drift	Set	Sockeye	King	Chum	Pink	Coho	
6/14-19				1,237	1,554	382			3,173
21				146	177	26			349
22				1,681	3,927	720			6,328
23				2,046	2,455	947	3		5,451
24				1,973	1,620	1,229			4,822
25				1,390	1,477	1,022	2		3,891
28				470	931	75			1,476
29				3,558	4,482	898			8,938
30				4,558	3,657	1,241	3		9,459
7/ 1				4,480	2,605	1,237	10		8,332
2				1,752	1,043	813	3		3,611
5 ^{3/}				10,132	1,431	5,563	82		17,208
6				33,446	2,854	12,875	550		49,725
7				34,894	1,466	7,796	255		44,411
8				30,275	1,328	8,471	292		40,366
9				27,018	899	8,900	204		37,021
10				29,285	503	5,049	251		35,088
11				7,508	113	935	62		8,618
12				21,392	860	5,965	213		28,430
13				30,117	785	14,730	425		46,057
14				24,543	929	8,359	813		34,644
15				26,430	391	7,737	630		35,188
16				18,586	288	6,236	502		25,612
17				13,921	173	3,416	154		17,664
18				13,653	280	4,021	272		18,226
19				27,468	659	8,562	827		37,516
20				35,535	998	11,422	1,599	2	49,556
21				31,224	487	6,060	1,562	4	39,337
22				19,139	403	2,303	773	3	22,621
23				19,526	252	3,552	1,048	6	24,384
24				15,282	259	2,130	1,253	4	18,928
25				6,598	18	1,063	600	3	8,282
26				15,606	73	2,622	1,120	12	19,433
27				9,264	111	1,495	749	23	11,642
28				7,136	61	1,462	1,235	44	9,938

(continued)

Table 16. (continued)

Period	Time ^{1/}	Effort ^{2/}		Number of Fish				Coho	Total
		Drift	Set	Sockeye	King	Chum	Pink		
7/29				9,506	56	2,110	2,081	38	13,791
30				7,523	73	1,415	1,295	127	10,433
31				4,727	30	848	648	79	6,332
8/ 1- 7				25,142	182	3,545	3,578	1,543	33,990
9-14				5,534	32	1,521	404	1,624	19,115
16-21					59	327	136	53,224	53,746
23-28					15	46	22	65,327	65,410
30-9/4					1	10	4	9,191	9,206
6-11								1,372	1,372
13-18								326	326
Total		150	40	583,701	39,997	159,136	23,660	142,952	949,446
Percent of District Catch				61.5	4.2	16.8	2.5	15.0	100.0

Summary Catch by Section

Section	Number of Fish				Coho	Total
	Sockeye	King	Chum	Pink		
Togiak	563,890	38,165	152,880	22,927	107,927	885,789
Kulukak	19,810	1,829	6,219	718	21,221	49,797
Osviak			11	3	10,854	10,868
Matogak	1	3	26	12	2,950	2,992
Total	583,701	39,997	159,136	23,660	142,952	949,446

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 5 through 9 a.m., August 6.

Table 17. Total commercial salmon catch by day and district, Bristol Bay, 1982^{1/}

Date	Time	Number of Fish in Thousands					Total
		Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
> 6/12			2	2	39		43
14-19	5 days	4	65	4	24	3	100
21	24 hrs.	16	16	2	10		44
22	24 hrs.	30	42	3		6	81
23	24 hrs.	19	30	5	39	5	98
24	24 hrs.	6	35	4	75	5	125
25	24 hrs.	50	84	16	19	4	173
26	24 hrs.	81			215		296
27	24 hrs.	99	49	17	174		339
28	24 hrs.	154	144	32	273	1	604
29	24 hrs.	307	114	29	367	9	826
30	24 hrs.	203	124	34	217	9	587
7/ 1	24 hrs.	272			243	8	523
2	24 hrs.	113	46	7	386	4	556
3	24 hrs.	370	80	52	426		928
4	24 hrs.	346		96	487		929
5	24 hrs.	282			640	17	939
6	24 hrs.	395	225	95	660	50	1,425
7	24 hrs.	371	473	140	447	44	1,475
8	24 hrs.	806	338	136	335	40	1,655
9	24 hrs.	381	196	111	376	37	1,101
10	24 hrs.	129	85	87	211	35	547
11	24 hrs.	147	88	106	196	9	546
12	24 hrs.	77	68	36	180	28	389
13	24 hrs.	83	39	52	141	46	361
14	24 hrs.	121	35	37	100	35	328
15	24 hrs.	52	23	40	90	35	240
16	24 hrs.	24	18	13	64	26	145
17	24 hrs.	14	18	14	56	18	120
18	24 hrs.		26	6	88	18	138
19	24 hrs.	4	14	4	90	38	150
20	24 hrs.	5	12	8	115	50	190
21	24 hrs.	131	3	3	76	39	255
22	24 hrs.	66	1	2	94	23	186
23	24 hrs.	31	1	3	88	24	147
24	24 hrs.	5			91	19	115
25-31	7 days	113	5	13	719	80	930
8/ 1- 7	7 days	10	18	12	295	34	369
9-14	5 days	11	19	5	153	19	207
16-21	5 days	3	20	7	13	54	97
23-28	5 days		10	19	16	65	110
30 >			7	15	1	11	34
Total		5,330	2,575	1,270	8,329	949	18,453

Table 18. Commercial salmon catch by district and species, Bristol Bay, 1982.^{1/}

District and River System	Number of Fish				Coho	Total
	Sockeye	King	Chum	Pink		
<u>NAKNEK-KVICHAK DISTRICT</u>						
Kvichak River	1,500,244					
Branch River	427,902					
Naknek River	3,059,776					
Total	4,987,922	12,503	194,256	125,869	9,111	5,329,661
<u>EGEGIK DISTRICT</u>	2,413,935	4,984	82,040	1,973	72,185	2,575,117
<u>UGASHIK DISTRICT</u>	1,161,117	7,078	50,283	14	51,176	1,269,668
<u>NUSHAGAK DISTRICT</u>						
Wood River	2,944,684					
Igushik River	1,257,737					
Nuyakuk River	1,594,081					
Nushagak-Mulchatna Snake River	163,059 39,269					
Total	5,998,830	200,057	456,441	1,285,947	387,801	8,329,076
<u>TOGIAK DISTRICT</u>						
Togiak Section	563,890	38,165	152,880	22,927	107,927	885,789
Kulukak Section	19,810	1,829	6,219	718	21,221	49,797
Osviak Section			11	3	10,854	10,868
Matogak Section	1	3	26	12	2,950	2,992
Total	583,701	39,997	159,136	23,660	142,952	949,446
TOTAL BRISTOL BAY	15,145,505	264,619	942,156	1,437,463	663,225	18,452,968
SPECIES PERCENT	82.1	1.4	5.1	7.8	3.6	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, 1982.

Date	Kvichak River		Naknek River		Egegik River		Ugashik River	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/19			36	36				
20			6	42	0	0		
21	0	0	-744	786	24	24		
22	30	30	120	906	180	204		
23	12	42	0	906	24	228		
24	18	60	6	912	54	282		
25	0	60	24	936	6	288		
26	6	66	18	954	6	294		
27	0	66	798	1,752	0	294		
28	12	78	4,800	6,552	648	942		
29	18	96	43,440	49,992	720	1,662		
30	18	114	246,114	296,106	234	1,896	0	0
7/ 1	8,460	8,574	33,618	329,724	1,920	3,816	36	36
2	6,306	14,880	7,038	336,762	20,214	24,030	0	36
3	1,398	16,278	30,840	367,602	-12	24,018	6	42
4	9,066	25,344	214,350	581,952	7,206	31,224	492	534
5	5,658	31,002	117,498	699,450	39,198	70,422	162	696
6	15,102	46,104	46,746	746,196	30,042	100,464	282	978
7	92,112	138,216	50,442	796,638	51,516	151,980	6,240	7,218
8	282,342	420,558	83,070	879,708	99,258	251,238	222	7,440
9	130,500	551,058	74,010	953,718	143,424	394,662	600	8,040
10	47,262	598,320	34,578	988,296	184,158	578,820	114	8,154
11	32,286	630,606	5,616	993,912	151,122	729,942	10,098	18,252
12	49,086	679,692	9,156	1,003,068	137,766	867,708	83,364	101,616
13	17,220	696,912	3,348	1,006,416	98,736	966,444	362,574	464,190
14	9,378	706,290	2,760	1,009,176	49,746	1,016,190	193,482	657,672
15	6,738	713,028	10,770	1,019,946	13,494	1,029,684	222,864	880,536
16	96,768	809,796	6,594	1,026,540	1,128	1,030,812	111,204	991,740
17	112,752	922,548	83,004	1,109,544	1,470	1,032,282	47,286	1,039,026
18	59,202	981,750	19,452	1,128,996	558	1,032,840	68,688	1,107,714
19	93,876	1,075,626	5,166	1,134,162	870	1,033,710	12,966	1,120,680
20	38,994	1,114,620	8,016	1,142,178	918	1,034,628	12,444	1,133,124
21	2,394	1,117,014	2,592	1,144,770			5,454	1,138,578
22	1,734	1,118,748	9,096	1,153,866			7,782	1,146,360
23	1,248	1,119,996	1,686	1,155,552			3,090	1,149,450
24	3,576	1,123,572					3,108	1,152,558
25	5,916	1,129,488					3,330	1,155,888
26	4,392	1,133,880					1,422	1,157,310
27	960	1,134,840					216	1,157,526
System Total	1,134,840		1,155,552		1,034,628		1,157,526	

(continued)

Table 19. (continued)

Date	Wood River		Igushik River		Nuyakuk River		Toqiak River	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/17	0	0						
18	0	0						
19	0	0						
20	0	0						
21	750	750						
22	2,718	3,468						
23	2,304	5,772	0	0				
24	696	6,468	0	0				
25	864	7,332	0	0				
26	1,968	9,300	0	0				
27	16,062	25,362	0	0				
28	33,492	58,854	12,858	12,858				
29	43,494	102,348	0	12,858				
30	94,734	197,082	2,718	15,576			12	12
7/ 1	100,752	297,834	34,626	50,202			162	174
2	68,298	336,132	5,448	55,650			18	192
3	65,544	431,676	34,518	90,168			108	300
4	126,222	557,898	40,380	130,548	0	0	246	546
5	129,912	687,810	56,370	186,918	1,812	1,812	1,056	1,602
6	44,322	732,132	63,426	250,344	44,958	46,770	2,124	3,726
7	41,154	773,286	37,752	288,096	66,798	113,568	4,686	8,412
8	33,882	807,168	27,960	316,056	62,280	175,848	7,782	16,284
9	16,470	823,638	16,014	332,070	73,410	249,258	10,602	26,886
10	12,306	835,944	32,310	364,380	71,610	320,868	9,690	36,576
11	18,948	854,892	13,386	377,766	76,056	396,924	7,500	44,076
12	17,034	871,926	9,420	387,186	47,190	444,114	10,482	54,558
13	15,288	887,214	5,514	392,700	31,830	475,944	9,750	64,308
14	22,200	909,414	4,098	396,798	18,234	494,178	13,320	77,628
15	14,352	923,766	5,520	402,318	11,568	505,746	17,226	94,854
16	10,536	934,302	5,232	407,550	9,564	515,310	12,246	107,100
17	13,206	947,508	3,870	411,420	6,648	521,958	8,556	115,656
18	12,600	960,108	4,830	416,250	4,476	526,434	3,492	119,148
19	7,782	967,890	3,390	419,640	2,706	529,140	5,340	124,488
20	5,064	972,954	2,418	422,058	2,154	531,294	5,610	130,098
21	3,420	976,374	1,386	423,444	1,008	532,302	6,270	136,368
22	96	976,470	324	423,768	852	533,154	9,792	146,160
23					1,464	534,618	10,236	156,396
24					1,182	535,800	5,418	161,814
25					522	536,322	3,546	165,360
26					468	536,790	3,918	169,278
27					366	537,156	4,938	174,216
28					336	537,492	5,316	179,532
29					288	537,780	5,370	184,902
30					84	537,864	7,242	192,144
31							8,580	200,724
8/ 1							10,242	210,966
2							6,828	217,794
3							5,844	223,638
4							4,308	227,946
5							3,360	231,306
6							3,426	234,732
7							2,730	237,462
8							2,376	239,838
9							2,328	242,166
10							1,746	243,912
11							912	244,824
System Total		976,470		423,768		537,864		244,824

Table 20. Daily pink salmon escapement tower counts, Nuyakuk River, Bristol Bay, 1982.

Date	Escapement Counts		Percent	
	Daily	Accumulative	Daily	Accumulative
7/ 8	42	42	.00	.00
9	48	90	.00	.01
10	66	156	.00	.01
11	126	282	.01	.02
12	576	858	.04	.05
13	588	1,446	.04	.09
14	600	2,046	.04	.13
15	234	2,280	.01	.14
16	558	2,838	.04	.18
17	2,580	5,418	.16	.34
18	4,374	9,792	.27	.62
19	6,456	16,248	.41	1.02
20	10,290	26,538	.65	1.67
21	13,032	39,570	.82	2.49
22	17,418	56,988	1.09	3.58
23	24,876	81,864	1.56	5.14
24	25,812	107,676	1.62	6.76
25	25,662	133,338	1.61	8.37
26	35,124	168,462	2.21	10.58
27	45,870	214,332	2.88	13.46
28	61,626	275,958	3.87	17.33
29	66,294	342,252	4.16	21.50
30	77,976	420,228	4.90	26.39
31	83,856	504,084	5.27	31.66
8/ 1	60,720	564,804	3.81	35.48
2	66,996	631,800	4.21	39.68
3	64,440	696,240	4.05	43.73
4	74,574	770,814	4.68	48.42
5	93,228	864,042	5.86	54.27
6	125,352	989,394	7.87	62.14
7	129,450	1,118,844	8.13	70.27
8	87,564	1,206,408	5.50	75.77
9	36,594	1,243,002	2.30	78.07
10	53,688	1,296,690	3.37	81.45
11	22,038	1,318,728	1.38	82.83
12	24,702	1,343,430	1.55	84.38
13	40,986	1,384,416	2.57	86.96
14	35,172	1,419,588	2.21	89.16
15	29,592	1,449,180	1.86	91.02
16	31,662	1,480,842	1.99	93.01
17	25,596	1,506,438	1.66	97.97
18	17,364	1,523,802	1.13	99.10
19	12,360	1,536,162	.80	99.90
20	1,554	1,537,716	.10	100.00

Summary:	Accumulative	Percent
Tower Enumeration	1,537,716	96.58
Aerial Enumeration	54,380	3.42
System Total	1,592,096	100.00

1/ Tower enumeration through termination of counting on August 20. Aerial survey estimate of spawning pink salmon in Nuyakuk River below counting tower on Aug. 20.

Table 21. Daily salmon escapement sonar counts by species, Nushagak River, Bristol Bay, 1982. ^{1/}

Date	Sockeye		King		Chum		Pink		Coho		Total	
	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.	Daily	Accum.
6/14	120	120	281	281	100	100					501	501
15	252	372	589	870	210	310					1,051	1,552
16	239	611	557	1,427	199	509					995	2,547
17	614	1,225	1,432	2,859	512	1,021					2,558	5,105
18	678	1,903	1,583	4,442	565	1,586					2,826	7,931
19	481	2,384	1,123	5,565	401	1,987					2,005	9,936
20	338	2,722	790	6,355	282	2,269					1,410	11,346
21	0	2,722	7,836	14,191	3,895	6,164					11,731	23,077
22	7,133	9,855	5,746	19,937	3,895	10,059					16,774	39,851
23	23,182	33,037	6,791	26,728	1,948	12,007					31,921	71,772
24	39,230	72,267	17,239	43,967	7,790	19,797					64,259	136,031
25	7,133	79,400	4,179	48,146	5,194	24,991					16,506	152,537
26	0	79,400	2,612	50,758	14,282	39,273					16,894	169,431
27	8,916	88,316	1,567	52,325	12,335	51,608					22,818	192,249
28	21,398	109,714	1,567	53,892	10,387	61,996					33,352	225,601
29	14,266	123,980	3,134	57,027	1,948	63,944					19,348	244,949
30	16,049	140,029	5,224	62,251	7,790	71,734					29,063	274,012
7/ 1	41,014	181,042	5,746	67,997	9,738	81,472					56,498	330,510
2	37,447	218,490	5,746	73,744	7,141	88,613					50,334	380,844
3	35,664	254,154	5,224	78,968	21,424	110,037					62,312	443,156
4	32,098	286,251	1,045	80,012	6,492	116,529					39,635	482,791
5	30,314	316,566	4,179	84,192	5,194	121,722					39,687	522,478
6	37,447	354,013	4,179	88,371	2,597	124,319					44,223	566,701
7	23,182	377,194	3,657	92,028	3,246	127,565					30,085	596,786
8	24,965	402,159	1,567	93,595	9,089	136,654					35,621	632,407
9	5,350	407,509	2,090	95,684	3,895	140,549					11,335	643,742
10	7,133	414,642	3,134	98,819	7,141	147,690					17,408	661,150
11	14,266	428,907	1,567	100,386	8,440	156,130					24,273	685,423
12	8,916	437,823	2,612	102,998	8,440	164,570					19,968	705,391
13	12,482	450,306	2,090	105,088	9,089	173,658					23,661	729,052
14	5,350	455,655	2,090	107,177	2,597	176,255	3,216	3,216			13,253	742,305
15	5,350	461,005	4,702	111,879	2,597	178,852	3,216	6,432			15,865	758,170
16	7,133	468,138	1,567	113,446	2,597	181,449	3,216	9,648			14,513	772,683
17	10,699	478,837	2,090	115,536	3,895	185,344	3,216	12,864	1,354	1,354	21,254	793,937
18	7,133	485,970	2,090	117,625	7,141	192,485	12,864	25,729	1,354	2,708	30,582	824,519
19	16,049	502,018	522	118,148	5,843	198,328	9,648	35,377	0	2,708	32,062	856,581
20	5,350	507,368	1,045	119,192	8,440	206,768	12,864	48,241	0	2,708	27,699	884,280
21	7,133	514,501	522	119,715	2,597	209,364	19,297	67,538	1,354	4,062	30,903	915,183
22	5,350	519,850	1,567	121,282	1,948	211,312	19,297	86,835	2,708	6,771	30,870	946,053
23	7,133	526,983	522	121,804	1,298	212,610	35,377	122,212	4,062	10,833	48,392	994,445
24	7,133	534,116	1,045	122,849	2,597	215,207	16,081	138,292	10,833	21,666	37,689	1,032,134
25	1,783	535,899	0	122,849	2,597	217,804	61,106	199,398	5,416	27,082	70,902	1,103,036
26	1,783	537,682	2,090	124,939	2,597	220,401	25,729	225,127	6,771	33,853	38,970	1,142,006
27					2,597	222,998	196,182	421,309	0	33,853	192,779	1,340,785
28					1,948	224,945	93,267	514,576	9,479	43,331	104,694	1,445,479
29					649	225,594	109,347	623,923	8,125	51,456	118,121	1,563,600
30					649	226,244	109,347	733,271	5,416	56,872	115,412	1,679,012
31					649	226,893	147,941	881,211	4,062	60,935	152,652	1,831,664
8/ 1					0	226,893	173,669	1,054,881	2,708	63,643	176,377	2,008,041
2					3,246	230,139	118,996	1,173,876	6,771	70,413	129,013	2,137,054
3					0	230,139	67,538	1,241,415	0	70,413	67,538	2,204,592
4					0	230,139	54,674	1,296,088	0	70,413	54,674	2,259,266
5							38,593	1,334,681	1,354	71,767	39,947	2,299,213
6							9,648	1,344,330	5,416	77,184	15,064	2,314,277
7							3,216	1,347,546	1,354	78,538	4,570	2,318,847
8							9,648	1,357,194	1,354	79,892	11,002	2,329,849
9							12,864	1,370,059	5,416	85,308	18,280	2,348,129
10							35,377	1,405,436	10,833	96,141	46,210	2,394,339
11							19,297	1,424,732	51,456	147,597	70,753	2,465,092
12							0	1,424,732	20,312	167,908	20,312	2,485,404
13									13,541	181,449	13,541	2,498,945
14									0	181,449	0	2,498,945
15									27,082	208,531	27,082	2,526,027
16									8,180	216,711	8,180	2,534,207
17									7,873	224,584	7,873	2,542,080
18									2,653	227,237	2,653	2,544,733
Total		537,682		124,939		230,139		1,424,732		227,237		2,544,733

1/ Post-season final sonar counts.

Table 22. Salmon aerial survey escapement estimates by species, district and river system, Bristol Bay, 1982.^{1/}

District and River System	Number of Fish ^{2/}									
	Sockeye		King		Chum		Pink		Coho	
	Index	Total	Index	Total	Index	Total	Index	Total	Index	Total
NAKNEK-KVICHAK DISTRICT										
Kvichak River										
Branch River ^{3/}		239,300		5,500		30,000		50,000		7,000
Naknek River ^{3/}		-		17,200		3,500		34,000		
Total		239,300		22,700		33,500		84,000		7,000
EGEGIK DISTRICT										
Egegik River ^{11/}				1,500		14,000		15,000		20,000
UGASHIK DISTRICT										
Ugashik River										6,000
Mother Goose		28,025		1,400		54,650		6,000		4,000
Total		28,025		1,400		54,650		6,000		10,000
NUSHAGAK DISTRICT										
Wood River ^{4/}										36,100
Muklung River	3,300			790						
Igushik River										4,200
Nuyakuk River ^{5/}								43,500		54,380
Nushagak River ^{6/}	5,300			22,260				15,300		19,130
Mulchatna River ^{7/}	5,700			10,420						
Snake River										900
Total	14,300	63,000	33,470	147,000				58,800	114,710	
TOGIK DISTRICT										
Togiak River ^{8/}	13,300	25,250	2,720	6,800	19,550	39,100	12,000	12,000	23,300	46,600
Ungalikthluk River ^{9/}	2,700	5,400	1,880	4,700	1,430	2,860				
Kulukak River ^{10/}	31,200	52,750	1,690	4,225	8,300	16,600			3,830	7,660
Nunavachak Creek										
Quigmy River			90	225	1,300	2,600				
Matogak River	1,000	2,000	290	725	3,100	6,200	2,000	4,000		
Osviak River			320	800	5,500	11,000	1,900	3,800		
Slug River	5,500	11,000			2,400	7,200	2,300	4,600		
Total	53,700	96,400	6,990	17,475	41,580	85,560	18,200	24,400	27,130	54,260
TOTAL BAY	68,000	426,725	66,060	164,475	143,370	85,560	182,000	139,110	64,130	54,260

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, King Salmon and Big Creeks.

4/ Includes Youth and Sunshine Creeks.

5/ Below the counting tower.

6/ Includes Klutuk Creek and Iowithla, Kokwok, Klutispaw, King Salmon and Chichitnok Rivers.

7/ Includes Stuyahok and Kuktuli Rivers.

8/ Includes Gechiak and Pungokepek Creeks and Kashaik, Narogurum and Ongivinuck Rivers.

9/ Includes Kukayachagak River

10/ Includes Kulukak Lake and Tithe Creek ponds.

11/ Includes Gertrude and Contact Creeks.

Table 23. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Kvichak River, Bristol Bay, 1982

Date	Escapement Enumeration Method in Thousands of Fish									
	Aerial Survey					River Test Fishing				
	Tower Count Daily	Accum.	Nakeen to Index	Index to Index	Index to Tower	Total	Fish Per Index Pt. ^{1/}	Index Pts. Daily	Accum.	Accumulative Escapement
6/21	0	0					193	39	39	8
22	+	+					193	3	42	8
23	+	+					193	2	44	8
24	+	+					193	0	44	8
25	0	+					193	1	45	9
26	+	+					193	0	45	9
27	0	+					193	7	52	10
28	+	+					193	53	105	20
29	+	+					193	822	927	179
30	+	+	0	0	0	0 ^{2/}	193	12	939	181
7/ 1	8	9	+	+	+	+ ^{2/}	193	16	955	184
2	6	15					193	367	1,322	255
3	1	16					193	87	1,409	272
4	9	25	2	18	4	24 ^{2/}	193	385	1,794	346
5	6	31	28	7	10	45 ^{2/}	193	1,045	2,839	548
6	15	46	76	19	5	100	190	2,256	5,095	968
7	92	138	171	197	32	400	171	2,313	7,408	1,267
8	282	421	152	168	172	492	176	549	7,957	1,361
9	131	551	36	13	18	67	176	626	8,583	1,468
10	47	598	41	4	7	52	176	960	9,543	1,632
11	32	631	63	18	12	93	176	57	9,600	1,642
12	49	680	4	1	18	23	176	84	9,684	1,656
13	17	697	5	+	3	8	176	116	9,800	1,676
14	9	706					176	1,385	11,185	1,913
15	7	713	91	+	2	93	165	995	12,180	2,010
16	97	810		12	14	26 ^{2/}	165	543	12,723	2,099
17	113	923		+	31	31 ^{2/}	165	1,237	13,960	2,303
18	59	982		5	18	23 ^{2/}	165	116	14,076	2,323
19	94	1,076		25	41	66	165	62	14,138	2,333
20	39	1,115		5	18	23	165	46	14,184	2,340
21	2	1,117					165	0	14,184	2,340
22	2	1,119		2	1	3 ^{2/}				
23	1	1,120								
24	4	1,124								
25	6	1,129								
26	4	1,134								
27	1	1,135								
Total		1,135							14,184	2,340

^{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, Egegik River, Bristol Bay, 1982.

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/}	Index Pts. Daily	Accumulative Escapement
6/15			1		1			
16								
17								
18							33	33
19							71	104
20	0	0					90	194
21	+	+					91	285
22	+	+					22	307
23	+	+					4	311
24	+	+	4		4		7	318
25	+	+					12	330
26	+	+					222	552
27	0	+					621	1,173
28	1	1				23	715	1,888
29	1	2				23	32	1,920
30	+	2	12		12	23	31	1,951
7/ 1	2	4				23	2,564	4,515
2	20	24				23	2,645	7,160
3	+	24	38		38	24	81	7,241
4	7	31				24	12	7,253
5	39	70	38		38	24	325	7,578
6	30	100				24	3,854	11,432
7	52	152	163	500	663	24	4,954	16,386
8	99	251	178	300	478	29	5,019	21,405
9	143	395				29	3,771	25,176
10	184	579				29	4,636	29,812
11	151	730				29	505	30,317
12	138	868				30	44	30,361
13	99	966						
14	50	1,016						
15	13	1,030						
16	1	1,031						
17	1	1,032						
18	1	1,033						
19	1	1,034						
20	1	1,035						
Total	1,035						30,361	911

^{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.

Table 25. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Ugashik River, Bristol Bay, 1982.

Date	Escapement Enumeration Method in Thousands of Fish								
	Tower Count		Aerial Survey			Fish Per Index Pt. ^{1/}	River Test Fishing		Accumulative Escapement
	Daily	Accum.	Lagoon	River	Total		Index Pt.	Accum.	
6/25							13	13	
26							15	28	
27							0	28	
28							0	28	
29							28	56	
30	0	0					93	149	
7/ 1	+	+					34	183	
2	0	+				9	9	192	2
3	+	+	+		+	9	26	218	2
4	+	1				9	2	220	2
5	+	1				9	9	229	2
6	+	1				9	73	302	3
7	6	7				9	243	545	5
8	+	7	2		2	7	4,308	4,853	34
9	1	8				7	5,887	10,740	75
10	+	8	52		52	7	6,367	17,107	120
11	10	18	107	800	907	7	6,438	23,545	165
12	83	102				16	7,451	30,996	496
13	363	464				16	12,937	43,933	703
14	193	658				16	3,066	46,999	752
15	223	881				21	1,058	48,057	1,009
16	111	992							
17	47	1,039							
18	69	1,108							
19	13	1,121							
20	12	1,133							
21	5	1,139							
22	8	1,146							
23	3	1,149							
24	3	1,153							
25	3	1,156							
26	1	1,157							
27	+	1,158							
Total		1,158						48,057	1,009

^{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.

Table 26. Daily sockeye salmon tower counts and aerial survey escapement estimates, Wood River, Bristol Bay, 1982.

Date	Tower Count		Escapement Enumeration Method in Thousands of Fish		Comments
	Daily	Accum.	Number	Aerial Survey ^{1/}	
6/17	0	0			
18	0	0			
19	0	0	0		
20	0	0	-		
21	1	1			
22	3	3			
23	2	6			
24	1	6			
25	1	7			
26	2	9			
27	16	25	3		Poor vis.; no fish in lower river.
28	33	59			
29	43	102	5		Poor vis.; est. total river at 30,000.
30	95	197	-		Very poor vis.; good show mid-river, 7-8 wide.
7/ 1	101	298	72		Fair vis.; est. total river at 150 to 250,000.
2	68	366	16		Poor visibility.
3	66	432	-		Very poor vis.; heavy show in lower river.
4	126	558	110		Fair vis.; estimate total river at 200-250,000.
5	130	688	41		Poor visibility.
6	44	732	16		Fair visibility.
7	41	773			
8	34	807			
9	16	824			
10	12	836			
11	19	855			
12	17	872			
13	15	887			
14	22	909			
15	14	924			
16	11	934			
17	13	948			
18	13	960			
19	8	968			
20	5	973			
21	3	976			
22	+	976			
Total		976			

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

Table 27. Daily sockeye salmon tower counts, aerial survey and river test fishing escapement estimates, Igushik River, Bristol Bay, 1982.

Date	Escapement Enumeration Method in Thousands of Fish								
	Tower Count		Aerial Survey ^{1/}			Fish Per Index Pt. ^{2/}	River Test Fishing		Accumulative Escapement
	Daily	Accum.	Lagoon	River	Total		Daily	Accum.	
6/19			+	0	+	15	42	42	1
20						15	33	75	1
21			-	-		15	28	103	2
22						15	395	498	7
23	0	0				15	763	1,261	19
24	0	0	0	0	0	15	522	1,783	27
25	0	0				15	450	2,233	33
26	0	0				15	654	2,887	43
27	0	0	+	0	+	15	688	3,575	54
28	13	13				9	811	4,386	38
29	0	13	2	0	2	9	916	5,302	46
30	3	16				9	1,321	6,623	57
7/ 1	35	50	9	4	12	13	993	7,616	99
2	5	56	7	+	7	13	749	8,365	109
3	35	90	6	+	6	14	1,191	9,556	136
4	40	131	18	8	26	14	1,220	10,776	153
5	56	187				14	605	11,381	162
6	63	250				14	213	11,594	165
7	38	288				14	347	11,941	170
8	28	316				14	332	12,273	174
9	16	332				14	150	12,423	176
10	32	364				41	105	12,528	514
11	13	378				41	51	12,579	516
12	9	387				41	65	12,644	518
13	6	393							
14	4	397							
15	6	402							
16	5	408							
17	4	411							
18	5	416							
19	3	420							
20	2	422							
21	1	423							
22	+	424							
Total		424						12,644	518

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 30.8 fish per index point from 1976-81) between escapements and test fishing indices, and was adjusted periodically during the season based on catchability and lag timing factors.

Table 28. Daily sockeye salmon sonar and tower counts and aerial survey escapement estimates, Nushagak/Nuyakuk Rivers, Bristol Bay, 1982.

Date	Escapement Enumeration Method in Thousands of Fish					Aerial Survey Black Pt. to Portage Cr. ^{2/} Comments
	Nushagak River Sockeye Salmon Sonar Count 1/ Daily/ Accum.		Nuyakuk River Sockeye Salmon Tower Count Daily/ Accum.		Number	
6/19						- Very poor vis., fish not visible.
20 >		4				
21	0	4				
22	5	9				
23	4	13				
24	3	16				
25	6	22				
26	0	20				
27	6	26				
28	12	38				
29	13	50				
30	11	62				
7/ 1	27	89				
2	37	126				
3	15	141				
4	32	173	0	0		
5	32	205	2	2		
6	37	242	45	47		
7	31	273	67	114		
8	40	313	62	176		
9	13	325	73	250		
10	15	341	72	321		
11	15	356	76	397		
12	7	363	47	444		
13	4	366	32	476		
14	3	370	18	494		
15	5	375	12	506		
16	8	383	10	515		
17	10	393	7	522		
18	5	398	4	526		
19	13	411	3	529		
20	5	416	2	531		- Very poor vis., "pink" salmon running in bands 6-10 wide, but broken.
21	16	432	1	532		
22	9	441	1	533		
23	23	464	1	535		
24	12	476	1	536		
25	4	480	1	536		
26	2	483	+	537		
27	0	483	+	537		
28	0	483	+	537		
29	0	483	+	538		
30*	0	483	+	538		
Total		483		538		

1/ In-season preliminary sonar counts.

2/ Includes estimates of total salmon in clear water index areas in lower Nushagak River.

Table 29. Commercial salmon processors and buyers operating by district, Bristol Bay, 1982. 1/

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
NAKNEK-KVICHAK DISTRICT							
1. A. Kemp Fisheries	M/V Bering Trader		Floater				
2. Al Lou's Fish.	Naknek			Shore			
3. Alaska Far East Corp.	Naknek			Shore	Air		
4. Alaska Packers Ass'n.	So. Naknek	2 1-lb.					Frozen on M/V Sea Alaska and R. L. Resoff.
		2 1/2-lb.	Floater				
5. Alaska Seafare	Naknek				Air		
6. Alaskan Fisheries Co.	M/V Alaskan I		Floater				Con. w/Dragnet.
7. Aleut Western Seafood	M/V Pribilof		Floater				
8. American Eagle Seafoods	M/V Aleutian Dragon		Floater				
9. ARPRO Company	M/V Arctic Producer		Floater				
10. Bristol Bay Coastal Fish.	Dillingham				Air		
11. Bumble Bee Seafoods	So. Naknek	3 1-lb.	Shore				
		2 1/2-lb.					
12. Comeau International Sales	M/V Francis Lee		Floater				
13. Dragnet Fisheries	King Salmon				Air		Con./Ak. Fisheries.
14. Etoin Point Salmon Co.	Dillingham				Air		Ship via Swiftsure.
15. Fish West Co.	M/V West I		Floater				
16. Icicle Seafoods	Bering Star, Arctic Star		Floater		Air		
17. International Multifoods	King Salmon				Air		
18. Jeffron Enterprises	M/V Jeffron		Floater				
19. Kenai Packers	So. Naknek				Air		
20. Kodiak King Crab	Pederson Point		Shore		Air	Sea	Tendered to Kodiak; con. w/Egegik Sea.
21. Lafayette, Inc.	M/V Lafayette, Western Pioneer		Floater				DBA Sea Roe Fish.
22. LRI, Limited	Naknek				Air		
23. Living Streams Fisheries	Ekuk Beach				Air		
24. Marine Enterprises	M/V Al-Ind-Esk-A-Sea		Floater				
25. Mariner Seafoods Ass'n.	Naknek				Air		
26. Nelbro Packing Co.	Naknek	1 1-lb.	Shore				
		3 1/2-lb.					
		1 1/2-lb.					
27. North Coast Seafood Proc.	M/V Polar Bear		Floater				
28. Northern Peninsula Fish.	King Salmon				Air		
29. Northland Sea Products	M/V Northland		Floater				
30. Oceanic Seafoods	M/V Harvester Barge, Denali		Floater		Air		
31. Offshore Fisheries	M/V Alaska Enterprise, Westward Wind		Floater				
32. Pacific Star Seafoods	King Salmon				Air		
33. Pan Alaska Fisheries	M/V Royal Sea		Floater		Air		
34. Peter Pan Seafoods	Naknek						Tendered to Dig. for canning.
35. Polar Seafoods	Naknek				Air		
36. Queen Fisheries	Naknek				Air		
37. Red Salmon Co.	Nannek	2 1-lb.					
		2 1/2-lb.	Shore		Air		
38. Trident Seafoods	M/V Tempest and Bountiful and Neptune		Floater				
39. Walrus Island Fisheries	King Salmon				Air		
40. Western Seas Fishermen's Coop.	M/V Northern Endeavor, Trident		Floater			Sea	Tendered to Anacortes, Wash.
41. Whitney Fidalgo Seafoods	Naknek	1 1-lb.	Floater		Air		Frozen on M/V Yardarm Knot.
		1 1/2-lb.					
Total Naknek-Kvichak District:		5	25	1	21	2	

(continued)

Table 29.1/ (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>EGEGIK DISTRICT</u>							
1. A. Kemp Fisheries	M/V Bering Trader		Floater				
2. Alaska Far East Corp.	Naknek		Shore				
3. Alaska Packers Ass'n.	So. Naknek						Tendered to So. Naknek for canning and freezing.
4. Aleut Western Seafoods	M/V Pribilof		Floater				
5. All Alaskan Seafoods	M/V All Alaskan		Floater				
6. Big Creek Fishing and Packing	Big Creek				Air		
7. Bristol Monarch	M/V Bristol Monarch		Floater				
8. Bumble Bee Seafoods	So. Naknek		Shore				Tendered to So. Naknek for canning.
9. Comeau International Sales	Lady Pacific		Floater				
10. Dragnet Fisheries	King Salmon				Air		Con. w/Alaskan Fisheries. DBA Diamond E.
11. Egegik Res. Develop.	Egegik	3 1/2-lb.	Shore				Tendered to Kodiak; con. w/ Kodiak King Crab.
12. Egegik Seafoods	Egegik	1 1-lb.	Shore		Sea		
		1 1/2-lb.					
13. FAVCO, Inc.	Anchorage				Air		
14. Fish West Co.	M/V West I		Floater				
15. Homer Seafoods	Egegik Beach				Air		
16. Icicle Seafoods	Arctic Star, Bering Star		Floater				
17. Kenai Packers	So. Naknek				Air		
18. Kodiak King Crab	Pederson Point		Shore		Sea		Tendered to Kodiak; con. w/ Egegik Sea.
19. Marine Enterprises	M/V Al-Ind-Esk-A-Sea		Floater				
20. Nelbro Packing Co.	Naknek						Tendered to Naknek for canning.
21. Norther Peninsula Fish.	King Salmon				Air		
22. Northland Sea Products	M/V Northland		Floater				
23. Oceanic Seafoods	M/V Harvester Barge		Floater				
24. Offshore Fisheries	M/V Westward Wind		Floater				
25. Pacific Star Seafoods	King Salmon				Air		
26. Peter Pan Seafoods	Naknek						Tendered to Dig. for canning.
27. Queen Fisheries	Naknek				Air		
28. Red Salmon Co.	Naknek				Air		Tendered to Naknek for canning and fresh export.
29. Scotch Cap Fisheries	M/V Scotch Cap		Floater				
30. Sea Roe Fisheries	M/V Lafayette		Floater				
31. Sea Run Seafoods	M/V Polar Shell			Floater			
32. Trident Seafoods	Neptune		Floater				
33. Western Seas Fishermen's Coop.	M/V Northern Endeavor, Trident		Floater				
34. Whitney Fidalgo Seafoods	Naknek, M/V Yardarm Knot		Floater				Tendered to Naknek for canning & freezing.
Total Egegik District:		2	21	1	9	2	
<u>UGASHIK DISTRICT</u>							
1. A. Kemp Fisheries	M/V Bering Trader		Floater				
2. Alaska Far East Corp.	Naknek		Shore				
3. Alaska Packers Ass'n.	So. Naknek		Floater				Tendered to So. Naknek for canning and freezing.
4. Alaskan Fisheries Co.	M/V Alaskan I		Floater				Con. w/Dragnet.
5. All Alaskan Seafoods	M/V All Alaskan		Floater				

(continued)

Table 29.1/ (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>UGASHIK DISTRICT (con't.)</u>							
6. Briggs-Way Co.	Ugashik	1 5-oz. glass					
7. Bristol Monarch	M/V Bristol Monarch		Floater				
8. Clark, Inc.	Dillingham		Shore				
9. Can-Inter Foods, Ltd.	M/V Jo Linda		Floater				
10. Dagnet Fisheries	King Salmon				Air		Con. w/Alaskan Fish.
11. Double Star Fisheries	M/V Cape St. Elias		Floater				
12. Egegik Res. Develop.	Egegik						Tendered to Eg. for canning.
13. Icicle Seafoods	Arctic Star, Bering Star		Floater				
14. Jeffron Enterprises	M/V Jeffron		Floater				
15. Kodiak King Crab	Pederson Point					Sea	Tendered to Kodiak and Pederson Point; con. w/Eg. Seaf.
16. Marine Enterprises	M/V Al-Ind-Esk-A-Sea		Floater				
17. Northern Peninsula Fish.	King Salmon				Air		
18. Northland Sea Products	M/V Northland		Floater				
19. Oceanic Seafoods	M/V Harvester Barge		Floater				
20. Offshore Fisheries	M/V Westward Wind, Express		Floater				
21. Oregon-Alaska Seafoods	Pilot Point				Air		
22. Pan Alaska Fisheries	M/V Royal Sea		Floater		Air	Sea	Tendered to Dutch Harbor.
23. Sea Fisher Products	M/V Arctic Fisher		Floater				
24. Sea Run Seafoods	M/V Polar Shell			Floater			
25. Sea Roe Fisheries	M/V Lafayette		Floater				
26. Swiftsure Fisheries	M/V Teddy, Tiger		Floater				
27. Trident Seafoods	Neptune		Floater				
28. Whitney Fidalgo Seafoods	Naknek, M/V Yarkarm Knot		Floater		Air	Sea	Tendered to Uyak and Naknek for fresh export and freezing.
Total Ugashik District:		1	21	1	5	3	
<u>NUSHAGAK DISTRICT</u>							
1. A. Kemp Fisheries	Dillingham		Shore/ Floater				Tendered to Nak. for freezing on M/V Bering Trader.
2. Alaska Far East Corp.	Naknek		Shore				
3. Alaska Herring Corp.	M/V Hatsue Maru 68		Floater				Four (4) Maru vessels. Tendered to So. Nak. for canning.
4. Alaska Packers Ass'n.	Clarks Point/ M/V Sea Alaska, Sea Producer, R. L. Resoff		Floater				
5. All Alaskan Seafoods	M/V All Alaskan		Floater		Air		
6. ARPRO Co.	M/V Arctic Producer		Floater				
7. Ball Brothers	Dillingham		Shore		Air		
8. Bristol Bay Coastal Fish.	Dillingham				Air		
9. Bumble Bee Seafoods	So. Naknek		Shore				
10. Can-Inter Foods, Ltd.	M/V Jo Linda, Nicolle N.		Floater				
11. Clark, Inc.	Dillingham		Shore		Air		
12. Cold Sea Fisheries	M/V Ocean Champion		Floater				
13. Columbia-Wards Fisheries	Ekuk	3 1-lb. 1 1/2-lb.	Shore, Floater				Frozen on M/V Double Star.
14. Comeau International Sales	M/V Arctic Lady		Floater				
15. Daerim America	M/V Patricia Lee			Floater			
16. Dillingham Fish Co.	Dillingham				Air		

(continued)

Table 29.1/ (continued)

Name of Operator/Buyer	Base of Operations	Processing Method			Export		Comments
		Canned	Frozen	Cured	Fresh	Brine	
<u>NUSHAGAK DISTRICT (con't.)</u>							
17. Dagnet Fisheries	Dlg./AKN				Air		
18. EtoIn Point Salmon Co.	EtoIn Pt.				Air		Ship via Swiftsure.
19. Fish West Company	M/V West I		Floater				
20. Great Alaska Fish Co.	Great Alaska		Floater				
21. Icicle Seafoods	Arctic Star		Floater				
22. J. and L. Company	Dillingham			Shore	Air		DBA Yupik'em; Ship via Swiftsure.
23. Kenai Packers	Dillingham				Air		
24. Kodiak King Crab	Pederson Pt.		Shore		Air	Sea	Tendered to Kodiak.
25. Living Streams Fisheries	Ekuk Beach				Air		Ship via Swiftsure.
26. Markwood Packing Corp.	M/V Intrepid					Sea	Tendered to Kushiro, Japan.
27. Moran Maritime	Dillingham				Air		Ship via Swiftsure.
28. Morpac, Inc.	Dillingham		Floater			Sea	Frozen on M/V Viceroy, Galaxy; tendered to Dutch Harbor.
29. North Coast Seafood Proc.	M/V Polar Bear		Floater				
30. Northland Sea Products	M/V Northland		Floater				
31. Nuka Point Fisheries	Maren I			Floater			
32. Oceanic Seafoods	M/V Denali, Harvester Barge		Floater				
33. Offshore Fisheries	M/V Westward Wind		Floater				
34. Peter Pan Seafoods	Dillingham	2 1-lb. 2 1/2-lb.	Floater		Air	Sea	Frozen on M/V Baranof, Courageous; tendered to King Cove.
35. Polar Ice Seafoods	M/V Polar Ice		Floater				
36. Queen Fisheries	Clarks Slough	1 1-lb. 2 1/2-lb. 1 1/2-lb.			Air		
37. Sea Roe Fisheries	M/V Lafayette		Floater				DBA Lafayette, Inc.
38. Sterling Seafoods	M/V Alaska Star		Floater				
39. Swiftsure Fisheries	M/V Teddy, Tiger		Floater				
40. Trident Seafoods	Neptune, M/V Bountiful,		Floater				
41. Whitney-Fidalgo Seafoods	Tempest Naknek				Air		
Total Nushagak District:		3	28	3	15	4	
<u>TOGIK DISTRICT</u>							
1. A. Kemp Fisheries	Dillingham		Shore				Tendered to Nushagak for freezing.
2. Alaska Packers Ass'n.	Clarks Point		Floater				Tendered to Clarks Point for freezing.
3. All Alaskan Seafoods	M/V All Alaskan		Floater				
4. Ball Brothers	Dillingham				Air		
5. Clark, Inc.	Dillingham				Air		Operated out of Kulukak Bay.
6. Cold Sea Fisheries	M/V Ocean Champion		Floater				
7. Dagnet Fisheries	Dillingham				Air		
8. Kachemak Seafoods	Togiak				Air		
9. Nuka Point Fisheries	M/V Maren I			Floater			
10. Polar Ice Seafoods	M/V Polar Ice		Floater				
11. Togiak Fisheries	Togiak	1 1-lb. 1 1/2-lb.	Shore		Air		
12. Trident Seafoods	Neptune		Floater				
Total Togiak District:		1	7	1	5	0	

(continued)

Table 29.^{1/} (continued)

<u>FISHERY OPERATOR SUMMARY</u>									
District	Number of Operators						Number of Canning Lines ^{2/}		
	(Total)	Processing Method			Export		1-lb.	1/2 lb.	1/4 lb.
		Canned	Frozen	Cured	Fresh	Brine			
Naknek-Kvichak	(41)	5	25	1	21	2	9	10	1
Egegik	(34)	2	21	1	9	2	1	4	
Ugashik	(28)	1	21	1	5	3			1
East Side	(57)	(8)	(35)	(2)	(24)	(5)	10	14	2
Nushagak	(41)	3	28	3	15	4	6	5	1
Togiak	(12)	1	7	1	5		1	1	
West Side	(43)	(4)	(29)	(3)	(17)	(4)	7	6	1
TOTAL BAY	(72)	12	45	5	33	8	17	20	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 30. Case pack and commercial production of frozen and cured salmon by species and district, Bristol Bay, 1982. 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	95,548	314	5,521	2,793	128	104,304
Egegik	2	26,851	9	1,001			27,861
Ugashik	1	111	2			73	186
Nushagak	3	65,161	825	6,498	23,996	7,309	103,789
Togiak	1	5,650	550	4,300			10,500
Total	12	193,321	1,700	17,320	26,789	7,510	246,640
II. FROZEN (in pounds)							
Naknek-Kvichak	25	18,949,967	140,745	^{3/}	191,131	8,066	19,289,909
Egegik	21	8,610,110	50,125	^{3/}	4,465	213	8,664,913
Ugashik	21	5,143,413	19,951	^{3/}	10	41,589	5,204,963
Nushagak	28	22,997,670	2,538,603	1,816,281	2,098,856	1,872,803	31,324,213
Togiak	7	1,935,629	296,289	366,794	51,736	823,742	3,474,190
Total	45	57,636,789	3,045,713	2,183,075	2,346,198	2,746,413	67,958,188
III. CURED (in pounds)							
Naknek-Kvichak	1	1,126		^{3/}		866	1,992
Egegik	1	18,621	175	^{3/}			18,796
Ugashik	1	596,308	1,096	^{3/}			597,404
Nushagak	3	1,941,618	56,921	105,568	1,000	600	2,105,707
Togiak	1	665,125	17,560	171,445	11,780		865,910
Total	5	3,222,798	75,752	277,013	12,780	1,466	3,589,809
IV. TOTAL FROZEN AND CURED (in pounds)							
Naknek-Kvichak	26	18,951,093	140,745	^{3/}	191,131	8,932	19,291,901
Egegik	23	8,628,731	50,300	^{3/}	4,465	213	8,683,709
Ugashik	22	5,739,721	21,047	^{3/}	10	41,589	5,802,367
Nushagak	31	24,939,288	2,595,524	1,921,849	2,099,856	1,873,403	33,429,920
Togiak	8	2,600,754	313,849	538,239	63,516	823,742	4,340,100
Total	50	60,859,587	3,121,465	2,460,088	2,358,978	2,747,879	71,547,997

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 31. Salmon transported out of the area for processing, by species and district, Bristol Bay, 1982.^{1/}

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

District	No. Operators	Fresh/Brine Export				Coho	Total
		Sockeye	King	Chum	Pink		
Naknek-Kvichak	21	7,657,660	73,273		$\frac{3/}{3/}$ 100,484	57,533	7,888,950
Egegik	9	3,875,925	24,998		$\frac{3/}{3/}$ 1,279	433,285	4,335,487
Ugashik	5	1,187,322	114,111		$\frac{3/}{3/}$ 102	372,684	1,674,219
Nushagak	15	6,419,972	1,601,036	705,202	61,160	220,236	9,007,606
Togiak	5	1,275,805	243,232	322,615	3,647	493,023	2,338,322
Total	33	20,416,684	2,056,650	1,027,817	166,672	1,576,761	25,244,584

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

District	Number		Number	
	Operators	Tenders	Fish	Pounds
Naknek-Kvichak	2	3	119,091	737,501
Egegik	2	9	115,406	754,879
Ugashik	3	3	61,537	403,169
Nushagak	4	12	269,857	1,687,355
Togiak				
Total	8	27	565,891	3,582,904

^{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 32. Average round weight of the commercial salmon catch, by species and district, Bristol Bay, 1982

District	Average Round Weight in Pounds ^{1/}					Total
	Sockeye	King	Chum	Pink	Coho	
Naknek-Kvichak	6.26	19.39	6.31	3.56	7.18	
Egegik	6.40	18.46	6.61		7.07	
Ugashik	6.51	20.07	6.83	4.08	7.72	
Nushagak	6.40	20.40	6.67	3.45	6.81	
Togiak	7.36	15.40	7.30	3.52	8.65	
Weighted Average	6.40	19.55	6.71	3.46	7.31	

Total Weight of Catch, All Districts ^{2/}	96,924	5,174	6,318	4,975	4,848	118,238

^{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 shown in thousands of pounds, and is derived from preliminary catch data.

Table 33. Price paid per pound and exvessel value of the commercial salmon catch, by species and district, Bristol Bay, 1982.^{1/}

I. PRICE PAID PER POUND

District	Average Price Paid Per Pound ^{2/}				
	Sockeye	King	Chum	Pink	Coho
Naknek-Kvichak	\$.7011	\$1.0511	\$.3315	\$.1743	\$.6041
Egegik	.7195	1.0860	.4085	-	.7000
Ugashik	.7165	1.1397	.3508	.1700	.6967
Nushagak	.6874	1.2568	.3316	.2204	.7028
Togiak	.8129	1.1524	.3737	.1642	.7239
Weighted Average	\$.7047	\$1.2284	\$.3469	\$.2152	\$.7060

II. EXVESSEL VALUE

District	Total Exvessel Value in 1,000's of Dollars ^{3/}					
	Sockeye	King	Chum	Pink	Coho	Total
Naknek-Kvichak	\$21,891	\$ 255	\$ 406	\$ 78	\$ 40	\$22,670
Egegik	11,116	100	222	1	357	11,795
Ugashik	5,416	162	120	+	275	5,974
Nushagak	26,393	5,129	1,010	978	1,856	35,366
Togiak	3,492	710	434	14	895	5,545
Total	\$68,308	\$6,356	\$2,192	\$1,071	\$3,423	\$81,350

^{1/} Data extracted from "Bristol Bay Final Operations Report" (BB-CF/303).

^{2/} Average price per pound derived from individual company price schedules and is weighted by the catch of each processor against the total catch.

^{3/} Preliminary catch in pounds times district average price; totals may not equal sum of district value due to rounding.

Table 34. Subsistence salmon catch by species, district and village area, Bristol Bay, 1982.

Area	Permits Issued	Number of Fish ^{1/}					Total
		Sockeye	King	Chum	Pink	Coho	
NAKNEK-KVICHAK DISTRICT:							
Naknek system ^{2/}	215	10,100	900	300	800	900	13,000
Kvichak system:							
Levelock	15	5,400	200	200	+	100	5,900
Igiugig	3	1,900	+	+	+	0	1,900
Newhalen	15	9,900	+	100	+	0	10,000
Nondalton	18	11,200	+	0	0	0	11,200
Port Alsworth	19	4,500	0	0	0	0	4,500
Iliamna	25	3,600	+	+	100	+	3,700
Pedro Bay	17	8,200	+	+	+	+	8,200
Kokhanok	23	16,600	+	+	+	+	16,600
District Total	350	71,400	1,100	600	900	1,000	75,000
EGEGIK DISTRICT							
Egegik system ^{3/}	19	2,400	+	0	0	+	2,400
UGASHIK DISTRICT							
Ugashik system ^{4/}	11	400	+	+	+	300	700
NUSHAGAK DISTRICT							
Nushagak Bay ^{5/}	275	9,200	4,500	1,800	4,300	4,900	24,700
Wood system ^{6/}	15	2,000	100	200	+	100	2,400
Igushik system							
Manokotak	20	1,900	100	100	100	700	2,900
Nushagak system							
Portage Creek ^{7/}							
Ekwok	14	3,800	1,000	1,400	500	800	7,500
New Stuyahok	42	9,200	5,500	3,700	2,300	2,000	22,700
Koliganek	10	8,600	1,000	4,300	100	400	14,400
District Total	376	34,700	12,200	11,500	7,300	8,900	74,600
TOGIK DISTRICT							
Togiak system ^{8/}	50	1,900	400	300	400	1,300	4,300
TOTAL BRISTOL BAY	806	110,800	13,700	12,400	8,600	11,500	157,000

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, Kanakanak, Clarks Point, Clarks Slough, (Queen), Ekuk, Igushik Beach and the Lewis Point fish camps.

6/ Includes the village of Aleknagik.

7/ Included in with Nushagak Bay catches.

8/ Includes the villages of Togiak and Twin Hills.

APPENDIX TABLES

APPENDIX TABLE 1. Forecast and inshore sockeye salmon return, Bristol Bay, 1963-82.

Year	Number of Fish in Thousands			Inshore Return ^{5/}	Percent Deviation from Forecast		
	Forecast ^{1/}				F.R.I.	ADF&G	Japanese
	F.R.I. ^{2/}	ADF&G ^{3/}	Japanese ^{4/}				
1963	15,300	8,600		6,905	- 55	- 20	
64	19,300	17,400		10,938	- 43	- 37	
65 ^{6/}	26,500	27,780	- -	53,129	+100	+ 91	
66	34,000	31,271		17,553	- 48	- 44	
67	21,500	13,749		10,353	- 52	- 25	
1968	10,500	10,409		8,010	- 24	- 23	
69	16,200	21,274		19,043	+ 18	- 10	
70	57,200	55,812		39,399	- 31	- 29	
71	18,100	15,170		15,825	- 13	+ 4	
72	6,600	9,744		5,400	- 18	- 45	
1973	5,800	6,194	9,500	2,444	- 58	- 61	- 74
74	3,900	5,004	7,600	10,961	+181	+119	+ 44
75	12,100	11,960	21,600	24,232	+100	+103	+ 12
76	9,800	11,969	22,300	11,539	+ 18	- 4	- 48
77	8,800	8,380	19,300	9,722	+ 10	+ 16	- 50
1978	16,500	11,534	22,600	19,924	+ 21	+ 73	- 12
79	14,740	22,650	22,300	39,904	+171	+ 76	+ 79
80		54,542	73,600	62,489 ^{7/}		+ 15	- 15
81		26,700	26,800	34,585 ^{7/}		+ 30	+ 29
82		34,625	28,300	22,250 ^{7/}		- 36	- 21
Average Percent Forecast Deviation ^{8/}					57	43	38

- ^{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 "forecast" by the Department based on CPUE data from Japanese research vessels. The "forecasts" for 1973-79 are not forecasts, as data for these years went into the regression model that was used to make a "forecast" for these same years. The values for 1980-82 are actual forecasts based on prior years data.
- ^{5/} Inshore Bristol Bay catch plus escapement.
- ^{6/} Togiak, Snake and Nushagak-Mulchatna systems included for the first time in forecast.
- ^{7/} Preliminary.
- ^{8/} Absolute deviation without regard to sign.

(Literature Cited: 1, 5, 6, 7 and 15)

APPENDIX TABLE 2. Forecast and inshore pink salmon return, Nushagak district, Bristol Bay, 1966-82.^{1/}

Year	Number Fish in Thousands			Percent Deviation from Forecast	
	Forecast ^{2/}		Inshore ^{3/} Return	from Forecast	
	Escapement/Return	Fry		Escape/Return	Fry
1966	2,300	-	3,779	+ 64	
68	4,500		3,866	- 14	
1970	2,500		570	- 77	
72	1,400		126	- 91	
74	307		999	+225	
76	3,047		1,603	- 47	
78	3,193		13,735	+330	
1980	15,700		4,988	- 68	
82	9,200	2,752	2,943 ^{4/}	- 68	+7
Average Percent Forecast Deviation ^{5/}				109	

^{1/} Includes even-years only.

^{2/} Forecast based on escapement/return data from Nushagak/Nuyakuk River system and beginning in 1982, total fry production from Nushagak/Nuyakuk systems.

^{3/} Inshore Nushagak district catch plus escapement.

^{4/} Preliminary.

^{5/} Absolute deviation without regard to sign.

(Literature Cited: 1, 5 and 6)

APPENDIX TABLE 3. Commercial salmon catch by the Japanese mothership and land-based drift net high seas fisheries, by species, 1963-82.^{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
1963	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
67	8,087	2,566	128	110	6,837	11,078	7,781	23,051	226	1,329	23,059	38,134
1968	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
72	3,184	3,711	261	103	13,373	8,598	3,795	14,839	614	2,421	21,227	29,672
1973	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
77	1,508	1,289	93	146	5,996	6,230	9,100	15,041	79	1,722	16,776	24,428
1978	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/}	2,224	859	88	190	2,539	2,509	4,094	11,292	615	1,209	9,560	16,059
82 ^{2/}	1,738	723	107	165	3,217	2,930	1,654	11,035	1,183	1,201	7,899	16,054
20-Year Total	90,651	36,950	4,986	2,837	141,613	144,982	110,596	327,589	17,435	42,320	365,281	554,678
1963-72 Total	69,369	18,521	2,838	1,121	84,741	82,548	48,294	201,455	10,754	19,618	215,996	323,263
1973-82 Total	21,282	18,429	2,148	1,716	56,872	62,434	62,302	126,134	6,681	22,702	149,285	231,415
20-Year Average	4,533	1,848	249	142	7,081	7,249	5,530	16,379	872	2,116	18,264	27,734
1963-72 Average	6,937	1,852	284	112	8,474	8,255	4,829	20,146	1,075	1,962	21,600	32,326
1973-82 Average	2,128	1,843	215	172	5,687	6,243	6,230	12,613	668	2,270	14,929	23,142

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

^{2/} Preliminary.

(Literature Cited: 1 and 19)

APPENDIX TABLE 4. Japanese mothership commercial catch of maturing and immature sockeye salmon of Bristol Bay origin, 1963-82

Year	Number of Fish in Thousands		
	Matures ^{1/}	Immatures ^{2/}	Total
1963	929	60	989
64	254	843	1,097
65	6,100	404	6,504
66	1,531	56	1,587
67	866	21	887
1968	864	791	1,655
69	1,240	517	1,757
70	3,451	1,207	4,658
71	842	592	1,434
72	710	214	924
1973	625	259	884
74	251	708	959
75	645	222	867
76	779	228	1,007
77	540	328	868
1978	124	236	360
79	68	410	478
80	180	681	861
81 ^{3/}	137	380	517
82 ^{3/}	63	228	291
20-Year Total	20,199	8,385	28,584
1963-72 Total	16,787	4,705	21,492
1973-82 Total	3,412	3,680	7,092
20-Year Average	1,010	419	1,429
1963-72 Average	1,679	471	2,149
1973-82 Average	341	368	709

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.

(Literature Cited: 1 and 19)

APPENDIX TABLE 5. Inshore domestic and Japanese mothership high seas commercial catch of sockeye salmon of Bristol Bay origin, 1963-82.

Year	Number Fish in Thousands					Percent Japanese	
	Bristol Bay Catch			Bristol Bay		Catch of:	
	Inshore	Japanese ^{1/}	Total	Escapement	Total Return ^{2/}	Total Catch	Total Bay Run
1963	2,871	1,001	3,872	4,033	7,905	26	13
64	5,596	314	5,910	5,341	11,251	5	3
65	24,255	6,943	31,198	28,873	60,071	22	12
66	9,314	1,935	11,249	8,239	19,488	17	10
67	4,331	922	5,253	6,022	11,275	18	8
1968	2,793	885	3,678	5,217	8,895	24	10
69	6,622	2,031	8,653	12,421	21,074	24	10
70	20,721	3,968	24,689	18,679	43,368	16	9
71	9,584	2,049	11,633	6,241	17,874	18	12
72	2,416	1,302	3,718	2,984	6,702	35	19
1973	761	839	1,600	1,683	3,283	52	26
74	1,362	510	1,872	9,603	11,475	27	4
75	4,899	1,353	6,252	19,333	25,585	23	5
76	5,619	1,001	6,620	5,920	12,540	15	8
77	4,878	768	5,646	4,844	10,490	14	7
1978	9,928	452	10,380	9,996	20,376	4	2
79	21,429	304	21,733	18,475	40,208	1	1
80	23,762 ^{3/}	590	24,352	38,727	63,079	2	1
81	25,713 ^{3/}	818 ^{3/}	26,531	8,872	35,403	3	2
82	15,146 ^{3/}	443 ^{3/}	15,589	7,104	22,693	3	2
20-Year Total	202,001	28,428	230,428	222,607	453,035		
1963-72 Total	88,503	21,350	109,853	98,050	207,903		
1973-82 Total	113,498	7,078	120,575	124,557	245,132		
20-Year Average	10,100	1,421	11,521	11,130	22,652	12	7
1963-72 Average	8,850	2,135	10,985	9,805	20,790	19	11
1973-82 Average	11,350	708	12,058	12,456	24,513	6	3

1/ Includes immature fish caught in previous year.

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

3/ Preliminary.

(Literature Cited: 1, 5, and 19)

APPENDIX TABLE 6. Japanese mothership commercial catch of king salmon of western Alaska origin, 1963-82.

Year	Number Fish in Thousands		
	Total Mothership Catch	Catch of Western Alaska Origin	
		Number	Percent
1963	87	41	47
64	410	253	62
65	185	106	57
66	208	112	54
67	128	70	55
1968	362	226	62
69	554	435	79
70	437	345	79
71	206	144	70
72	261	170	65
1973	119	47	39
74	361	287	80
75	162	109	67
76	283	168	59
77	93	65	70
1978	105	31	30
79	126	65	52
80 ^{1/}	704	380	54
81 ^{1/}	88	26	30
82 ^{1/}	107	43	40
20-Year Total	4,986	3,123	
1963-72 Total	2,838	1,902	
1973-82 Total	2,148	1,221	
20-Year Average	249	156	63
1963-72 Average	284	190	67
1973-82 Average	215	122	57

^{1/} Preliminary.

(Literature Cited: 1 and 19)

APPENDIX TABLE 7. Offshore test fishing catch indices at Port Moller and the inshore total run of sockeye and chum salmon, Bristol Bay, 1968-82. 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	227	299	8,010	26,800
69	101	1,287	549	728	19,043	26,200
70	98	1,033	603	824	39,399	47,800
71	84	858	545	654	15,825	24,200
72	69	120	66	95	5,400	56,900
1973	65	424	214	340	2,444	7,200
75	91	1,968	923	1,289	24,232	18,800
76	131	1,353	634	689	11,539	16,800
77	87	1,204	583	782	9,722	12,400
78	93	525	265	480	19,924	41,500
1979	85	1,422	827	1,034	39,904	38,600
80	151	782	411	527	62,489	118,600
81	109	1,311	684	1,051	34,585 ^{4/}	32,900
82	118	1,150	612	759	22,250 ^{4/}	29,300
<u>CHUM SALMON</u>						
1968	128	175	84	93	812	8,700
69	101	132	63	78	548	7,000
70	98	169	78	106	1,232	11,600
71	84	124	69	86	1,132	13,200
72	69	100	55	66	1,022	15,500
1973	65	175	83	142	1,047	7,400
75	91	102	48	74	519	7,000
76	131	409	197	214	2,221	10,400
77	87	400	195	275	2,703	9,800
78	93	166	85	135	1,847	13,700
1979	85	50	26	32	1,366	43,200
80	151	421	222	276	2,685	9,700
81	109	392	186	218	1,983 ^{4/}	9,100
82	118	325	176	208	1,284 ^{4/}	6,200

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.

(Literature Cited: 1, 5, 11 and 13)

APPENDIX TABLE 8. Salmon fishing entry permit registration by gear type and residency, Bristol Bay, 1963-82.^{1/}

Year	Drift Net ^{2/}			Set Net ^{2/}			Total	Total
	Resident	Non-Resident	Total	Resident	Non-Resident	Total		
1963	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	
67	965	734	1,699	686	144	830	2,529	
1968	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	
72	993	771	1,764	722	132	854	2,618	
1973 ^{3/}	2,041	1,162	3,203	902	108	1,010	4,213	
74 ^{4/}	634 (634)	238 (238)	872	475 (475)	55 (55)	530	1,402	
75	1,216 (450)	843 (194)	2,059	751 (159)	169 (45)	920	2,979	
76	987 (69)	734 (30)	1,721	624 (5)	139 (0)	763	2,484	
77	999 (52)	729 (13)	1,728	683 (15)	156 (1)	839	2,567	
1978	1,039 (66)	737 (11)	1,776	748 (16)	161 (3)	909	2,685	
79	1,046 (73)	754 (10)	1,800	763 (19)	170 (5)	933	2,733	
80	1,060 (92)	767 (18)	1,827	760 (29)	187 (5)	947	2,774	
81	1,055 (89)	771 (18)	1,826	754 (37)	202 (5)	956	2,782	
82	1,047 (85)	775 (15)	1,822	735 (36)	212 (5)	947	2,769	
20-Year Total	21,052	14,956	36,008	14,846	2,914	17,760	53,768	
1963-72 Total	9,928	7,446	17,374	7,651	1,355	9,006	26,380	
1973-82 Total	11,124	7,510	18,634	7,195	1,559	8,754	27,388	
20-Year Average	1,053	748	1,800	742	146	888	2,688	
1963-72 Average	993	745	1,737	765	136	901	2,638	
1973-82 Average	1,112	751	1,863	720	156	875	2,739	

1/ Total permit registration; not all permittee's actually fished.

2/ 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 12-1/2 set.

3/ Sliding gear scale in effect.

4/ Limited Entry went into effect. Figures in parenthesis are interim-use permits, and are included in totals.

(Literature Cited: 2 and 14)

APPENDIX TABLE 9. Fishing vessel registration by keel length, Bristol Bay, 1965-82.

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 ^{1/}	741	459	1,493	2,693
81 ^{1/}	626	378	1,365	2,369
82 ^{1/}	725	428	1,493	2,646
18-Year Total	10,849	6,495	18,017	35,361
1965-74 Total	6,018	3,677	8,720	18,415
1975-82 Total	4,831	2,818	9,297	16,946
18-Year Average	603	361	1,001	1,965
1965-74 Average	602	368	872	1,842
1975-82 Average	604	352	1,162	2,118

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

(Literature Cited: 2 and 14)

APPENDIX TABLE 10. Salmon fishing interim-use and permanent entry permits actually fished, by gear type, Bristol Bay, 1975-82.

Year	Number Permits Issued ^{1/}			Number Number	Permits Fished Percent
	Interim-Use	Permanent	Total		
<u>DRIFT GILL NET</u>					
1975	644	1,416	2,060	1,195	58
76	99	1,621	1,720	1,288	75
77	65	1,663	1,728	1,287	74
78	78	1,700	1,778	1,490	84
79	83	1,717	1,800	1,610	89
1980 ^{2/}	110	1,717	1,827	1,670	91
81 ^{2/}	107	1,720	1,827	1,667	91
82 ^{2/}	100	1,722	1,822	1,791	98
Average	161	1,660	1,820	1,500	82
<u>SET GILL NET</u>					
1975	205	716	921	409	44
76	5	759	764	471	62
77	16	824	840	478	57
78	19	891	910	610	67
79	24	911	935	718	77
1980 ^{2/}	34	914	948	754	80
81 ^{2/}	42	915	957	744	78
82 ^{2/}	41	906	947	859	91
Average	48	855	903	630	70
<u>TOTAL DRIFT/ SET GILL NET</u>					
1975	849	2,132	2,981	1,604	54
76	104	2,380	2,484	1,759	71
77	81	2,487	2,568	1,765	69
78	97	2,591	2,688	2,100	78
79	107	2,628	2,735	2,328	85
1980 ^{2/}	144	2,631	2,775	2,424	87
81 ^{2/}	149	2,635	2,784	2,411	87
82 ^{2/}	141	2,628	2,769	2,650	96
Average	209	2,514	2,723	2,130	78

^{1/} Number of permanent permits include unrenewed permits.

^{2/} Preliminary

(Literature Cited: 14)

APPENDIX TABLE 11. Sockeye salmon commercial catch by district, Bristol Bay, 1963-82.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Toqiak	Total
1963	957,902	695,582	188,695	842,744	186,213	2,871,136
64	2,243,701	1,103,935	576,768	1,420,940	250,775	5,596,120
65	19,139,567	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
67	2,337,226	1,070,942	163,744	657,711	101,107	4,330,730
1968	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	17,803,805	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
72	1,102,365	839,820	17,440	381,347	75,261	2,416,233
1973	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
77	2,167,214	1,780,567	92,623	619,025	218,451	4,877,880
1978	5,123,668	1,207,294	7,995	3,137,166	452,016	9,928,139
79	14,991,826	2,257,332	391,118	3,327,346	460,984	21,428,606
80 ^{1/}	15,120,457	2,623,066	885,875	4,497,787	634,561	23,761,746
81 ^{1/}	10,948,744	4,480,710	1,949,531	7,713,416	620,811	25,713,212
82 ^{1/}	4,987,922	2,413,935	1,161,117	5,998,830	583,701	15,145,505
20-Year Total	120,390,347	30,712,385	8,379,517	37,221,716	5,296,028	201,999,993
1963-72 Total	60,711,412	13,262,079	3,695,706	9,234,158	1,599,643	88,502,998
1973-82 Total	59,678,935	17,450,306	4,683,811	27,987,558	3,696,385	113,496,995
20-Year Average	6,019,517	1,535,619	418,976	1,861,086	264,801	10,100,000
1963-72 Average	6,071,141	1,326,208	369,571	923,416	159,964	8,850,300
1973-82 Average	5,967,894	1,745,031	468,381	2,798,756	369,639	11,349,700

1/ Preliminary.

(Literature Cited: 1 and 5)

APPENDIX TABLE 12. King salmon commercial catch by district, Bristol Bay, 1963-82.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1963	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
67	3,705	2,285	1,582	96,240	13,381	117,193
1968	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
72	2,262	1,097	166	46,045	19,976	69,546
1973	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
77	4,373	3,694	2,167	85,074	35,218	130,526
1978	6,930	3,126	5,935	118,548	57,000	191,539
79	10,415	5,547	9,568	157,321	30,022	212,873
80 ^{1/}	7,517	5,610	4,900	64,958	12,543	95,528
81 ^{1/}	10,378	5,834	3,636	194,869	24,348	239,065
82 ^{1/}	12,503	4,984	7,078	200,057	39,997	264,619
20-Year Total	152,111	58,620	56,192	1,735,772	418,263	2,420,958
1963-72 Total	93,536	25,842	20,967	770,284	160,511	1,071,140
1973-82 Total	58,575	32,778	35,225	965,488	257,752	1,349,818
20-Year Average	7,606	2,931	2,810	86,789	20,913	121,048
1963-72 Average	9,354	2,584	2,097	77,028	16,051	107,114
1973-82 Average	5,858	3,278	3,523	96,549	25,775	134,982

^{1/} Preliminary.

(Literature Cited: 1 and 5)

APPENDIX TABLE 13. Chum salmon commercial catch by district, Bristol Bay, 1963-82.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1963	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
67	49,606	11,039	14,104	338,286	63,322	476,357
1968	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
72	115,737	42,172	9,689	310,126	178,885	656,609
1973	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
77	340,228	83,121	4,465	899,701	270,649	1,598,164
1978	185,451	44,480	1,449	651,743	274,967	1,158,090
79	196,398	38,004	12,174	440,279	219,942	906,797
80 ^{1/}	204,515	78,556	36,343	681,930	299,682	1,301,026
81 ^{1/}	345,955	87,452	32,624	772,869	236,407	1,475,307
82 ^{1/}	194,256	82,040	50,283	456,441	159,136	942,156
20-Year Total	2,908,614	721,500	318,522	8,124,919	3,034,165	15,107,720
1963-72 Total	879,564	229,742	161,200	2,773,729	1,056,624	5,100,859
1973-82 Total	2,029,050	491,758	157,322	5,351,190	1,977,541	10,006,861
20-Year Average	145,431	36,075	15,926	406,246	151,708	755,386
1963-72 Average	87,956	22,974	16,120	277,373	105,662	510,086
1973-82 Average	202,905	49,176	15,732	535,119	197,754	1,000,686

^{1/} Preliminary.

(Literature Cited: 1 and 5)

APPENDIX TABLE 14. Pink salmon commercial catch by district, Bristol Bay, 1963-82.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1963	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
67	20			265	829	1,114
1968	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
72	57,074	12		67,953	1,984	127,023
1973	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
77	19		5	3,017	1,476	4,517
1978	734,880	11,430	530	4,348,336	57,524	5,152,700
79	134	6	9	1,787	1,913	3,849
80	288,363	2,476	51	2,202,545	70,033	2,563,468
81 ^{1/}	177	262	29	338	6,722	7,528
82 ^{1/}	125,869	1,973	14	1,285,947	23,660	1,437,463
20-Year Total ^{2/}	2,417,732	25,283	1,080	15,045,851	232,396	17,692,342
1963-72 Total	495,455	878	29	6,025,820	40,008	6,562,190
1973-82 Total	1,922,277	24,405	1,051	8,990,031	192,388	11,130,152
20-Year Average ^{2/}	241,773	2,528	108	1,504,585	23,240	1,769,234
1963-72 Average	99,091	176	6	1,205,164	8,002	1,312,438
1973-82 Average	384,455	4,881	210	1,798,006	38,478	2,226,030

^{1/} Preliminary.

^{2/} Includes even-years only.

(Literature Cited: 1 and 5)

APPENDIX TABLE 15. Coho salmon commercial catch by district, Bristol Bay, 1963-82.

Year	Number of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1963	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
67	1,175	1,044	1,901	31,517	18,159	53,796
1968	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
72	402	1,249	0	3,654	8,652	13,957
1973	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
77	2,883	2,685	3,884	52,562	45,201	107,215
1978	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	7,802	22,537	19,419	147,726	151,000	348,484
81 ^{1/}	785	30,602	26,817	225,409	29,554	313,167
82 ^{1/}	9,111	72,185	51,176	387,801	142,952	663,225
20-Year Total	62,456	179,402	159,221	1,247,236	735,712	2,384,027
1963-72 Total	26,198	26,860	23,497	203,993	109,004	389,552
1973-82 Total	36,258	152,542	135,724	1,043,243	626,708	1,994,475
20-Year Average	3,123	8,970	7,961	62,362	36,786	119,201
1963-72 Average	2,620	2,686	2,350	20,399	10,900	38,955
1973-82 Average	3,626	15,254	13,572	104,324	62,671	199,448

^{1/} Preliminary.

(Literature Cited: 1 and 5)

APPENDIX TABLE 16. Total salmon commercial catch by district, Bristol Bay, 1963-82.

Year	Number of Fish					Total
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	
1963	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
67	2,391,732	1,085,310	181,331	1,124,019	196,798	4,979,190
1968	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
72	1,277,840	884,350	27,295	809,125	284,758	3,283,368
1973	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
77	2,514,717	1,870,067	103,144	1,659,379	570,995	6,718,302
1978	6,051,842	1,268,586	17,933	8,300,533	885,845	16,524,739
79	15,211,128	2,316,037	430,755	4,056,340	832,264	22,846,524
80	15,628,654	2,732,245	946,588	7,594,946	1,167,819	28,070,252
81 ^{1/}	11,306,039	4,604,860	2,012,637	8,906,901	917,842	27,748,279
82 ^{2/}	5,329,661	2,575,117	1,269,668	8,329,076	949,446	18,452,968
20-Year Total	125,932,502	31,697,473	8,914,581	63,351,709	9,729,835	239,626,100
1963-72 Total	62,206,962	13,545,407	3,901,402	19,008,870	2,968,455	101,631,096
1973-82 Total	63,725,540	18,152,066	5,013,179	44,342,839	6,761,380	137,995,004
20-Year Average	6,296,625	1,584,874	445,729	3,167,585	486,492	11,981,305
1963-72 Average	6,220,696	1,354,541	390,140	1,900,887	296,846	10,163,110
1973-82 Average	6,372,554	1,815,207	501,318	4,434,284	676,138	13,799,500

^{1/} Preliminary.

(Literature Cited: 1 and 5)

APPENDIX TABLE 17. Commercial salmon catch in percent by gear type and species, Bristol Bay, 1961-80.

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
1961	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
65	92	8	94	6	88	12	88	12	56	44	92	8
1966	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
70	93	7	94	6	94	6	82	18	45	55	93	7
1971	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
75	91	9	96	4	94	6	61	39	80	20	91	9
1976	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
80	86	14	89	11	91	9	88	12	78	22	86	14
20-Year Total	1,774	226	1,905	95	1,854	146	863	137 ^{1/}	1,387	613	1,788	212
1961-70 Total	889	111	949	51	910	90	433	67	630	370	893	107
1971-80 Total	885	115	956	44	944	56	430	70	757	243	895	105
20-Year Average	89	11	95	5	93	7	86	14 ^{1/}	69	31	89	11
1961-70 Average	89	11	95	5	91	9	87	13	63	37	89	11
1971-80 Average	89	11	96	4	94	6	86	14	76	24	90	10

^{1/} Includes even-years only.

(Literature Cited: 5)

APPENDIX TABLE 18. Commercial salmon catch in percent by gear type and district, Bristol Bay, 1961-80.^{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
1961	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
65	95	5	84	16	82	18	74	26	100		92	8
1966	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
70	96	4	84	16	76	24	77	23	99	1	93	7
1971	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
75	93	7	90	10	85	15	83	17	93	7	91	9
1976	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
80	89	11	71	29	88	12	87	13	86	14	86	14
20-Year Total	1,816	184	1,678	322	1,606	394	1,688	312	1,909	91	1,788	212
1961-70 Total	913	87	836	164	808	192	810	190	978	22	893	107
1971-80 Total	903	97	842	158	798	202	878	122	931	69	895	105
20-Year Average	91	9	84	16	80	20	84	16	95	5	89	11
1961-70 Average	91	9	84	16	81	19	81	19	98	2	89	11
1971-80 Average	90	10	84	16	80	20	88	12	93	7	90	10

^{1/} All salmon species combined.

(Literature Cited: 5)

APPENDIX TABLE 19. Sockeye salmon escapement by district, Bristol Bay, 1963-82.

Year	Number of Fish					Total
	Naknek-Kvichak ^{1/}	Egegik	Ugashik ^{2/}	Nushagak ^{3/}	Togiak ^{4/}	
1963	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
67	4,174,474	636,864	243,930	875,452	91,330	6,022,050
1968	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
72	1,747,668	546,402	79,428	528,650	81,970	2,984,118
1973	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	3,867,854	509,160	356,308	1,486,276	200,590	5,920,188
77	2,527,000	692,514	201,520	1,220,056	202,634	4,843,724
1978	5,192,066	895,698	82,434	3,485,532	340,076	9,995,806
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
82	2,529,692	1,034,628	1,185,551	2,012,742	341,424	7,104,037
20-Year Total	149,058,581	16,885,148	13,137,760	39,606,807	3,919,482	222,607,778
1963-72 Total	72,147,443	8,187,254	4,411,882	12,045,742	1,258,976	98,051,297
1973-82 Total	76,911,138	8,697,894	8,725,878	27,561,065	2,660,506	124,556,481
20-Year Average	7,452,929	844,257	656,888	1,980,340	195,974	11,130,389
1963-72 Average	7,214,744	818,725	441,188	1,204,574	125,898	9,805,130
1973-82 Average	7,691,114	869,789	872,588	2,756,107	266,051	12,455,648

1/ Includes Kvichak, Branch and Naknek Rivers.

2/ Includes Mother Goose system 1963-67 and 1976-82.

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

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

(Literature Cited: 1, 7 and 20)

APPENDIX TABLE 20. Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak district by river system, Bristol Bay, 1963-82.

Year	Catch	Number of Fish Escapement			Total	Total Run
		Kvichak ^{1/}	Branch ^{2/}	Naknek ^{1/}		
1963	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
67	2,337,226	3,216,208	202,626	755,640	4,174,474	6,511,700
1968	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
72	1,102,365	1,009,962	151,188	586,518	1,747,668	2,850,033
1973	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
77	2,167,214	1,341,144	100,000	1,085,856	2,527,000	4,694,214
1978	5,123,668	4,149,288	229,400	813,378	5,192,066	10,315,734
79	14,991,826	11,218,434	294,200	925,362	12,437,996	27,429,822
80	15,120,457	22,505,268	297,900	2,644,698	25,447,866	40,568,323
81	10,948,744 ^{3/}	1,754,358	82,210	1,796,220	3,632,788	14,581,532
82	4,987,922 ^{3/}	1,134,840	239,300	1,155,552	2,529,692	7,517,614
20-Year Total	120,390,347	122,766,964	3,571,338	22,720,279	149,058,581	269,448,928
1963-72 Total	60,711,412	60,897,502	1,895,898	9,354,043	72,147,443	132,858,855
1973-82 Total	59,678,935	61,869,462	1,675,440	13,366,236	76,911,138	136,590,073
20-Year Average	6,019,517	6,138,348	178,567	1,136,014	7,452,929	13,472,446
1963-72 Average	6,071,141	6,089,750	189,898	935,404	7,214,744	13,285,886
1973-82 Average	5,967,894	6,186,946	167,544	1,336,624	7,691,114	13,659,007

1/ Tower count

2/ Tower count 1963-76 and aerial survey estimates 1977-82.

3/ Preliminary.

(Literature Cited: 1, 7 and 20)

APPENDIX TABLE 21. Inshore commercial catch and escapement of sockeye salmon in the Egegik and Ugashik district by river system, Bristol Bay, 1963-82.

Year	Number of Fish							
	Egegik District			Ugashik District				
	Catch	Escapement		Catch	Escapement			Total Run
Egegik ^{1/}		Total Run	Ugashik ^{1/}		Mother Goose ^{2/}	Total		
1963	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
67	1,070,942	636,864	1,707,806	163,744	238,830	5,100	243,930	407,674
1968	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
72	839,820	546,402	1,386,222	17,440	79,428		79,428	96,868
1973	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
77	1,780,567	692,514	2,473,081	92,623	201,486	34	201,520	294,143
1978	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	2,623,066 ^{3/}	1,060,860	3,683,926	885,875 ^{3/}	3,321,384	13,900	3,335,284	4,221,159
81	4,480,710 ^{3/}	694,680	5,175,390	1,949,531 ^{3/}	1,326,762	937	1,327,699	3,277,230
82	2,413,935 ^{3/}	1,034,628	3,448,563	1,161,117 ^{3/}	1,157,526	28,025	1,185,551	2,346,668
20-Year Total	30,712,385	16,885,148	47,597,533	8,379,517	13,026,864	110,896	13,207,190	21,517,277
1963-72 Total	13,262,079	8,187,254	21,449,333	3,695,706	4,376,382	35,500	4,411,882	8,107,588
1973-82 Total	17,450,306	8,697,894	26,148,200	4,683,811	8,650,482	75,396	8,795,308	13,409,689
20-Year Average ^{4/}	1,535,619	844,257	2,379,877	418,976	651,343	9,243	660,360	1,075,864
1963-72 Average	1,326,208	818,725	2,144,933	369,571	437,638	7,100	441,188	810,759
1973-82 Average	1,745,031	869,789	2,614,820	468,381	865,048	10,771	879,531	1,340,969

1/ Tower count. 2/ Aerial survey estimate. 3/ Preliminary.
 4/ Only years and systems with escapement data were included in calculating averages.

(Literature Cited: 1, 7 and 20)

APPENDIX TABLE 22. Inshore commercial catch and escapement of sockeye salmon in the Nushagak district by river system, Bristol Bay, 1963-82.

Year	Catch	Number of Fish Escapement					Total	Total Run
		Wood ^{1/}	Iqushik ^{1/}	Nuyakuk ^{1/}	Nush/Mul ^{2/}	Snake ^{3/}		
1963	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	50,174	4,500	1,630,726	2,800,997
67	657,711	515,772	281,772	20,250	46,658	11,000	875,452	1,533,163
1968	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	58,338	8,500	1,353,382	2,610,181
72	381,347	430,602	60,018	28,596	7,434	2,000	528,650	909,997
1973	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
77	619,025	561,828	95,970	232,554	320,400	9,304	1,220,056	1,839,081
1978	3,137,166	2,267,238	536,154	576,666	87,400	18,074	3,485,532	6,622,698
79	3,327,346	1,706,352	859,560	360,120	139,100	8,439	3,073,571	6,400,917
80	4,497,787 ^{4/}	2,969,040	1,987,530	3,026,568	290,800	36,500	8,310,438	12,808,225
81	7,713,416 ^{4/}	1,233,318	591,144	834,204	177,400	14,571	2,850,637	10,564,053
82	5,998,830 ^{4/}	976,470	423,768	537,864	63,000	11,640	2,012,742	8,011,572
20-Year Total	37,221,716	21,735,256	7,578,014	8,366,002	1,664,982	262,551	39,606,807	76,828,523
1963-72 Total	9,234,158	7,894,576	2,238,422	1,438,258	348,888	125,596	12,045,742	21,279,900
1973-82 Total	27,987,558	13,840,680	5,339,592	6,927,744	1,316,094	136,955	27,561,065	55,548,623
20-Year Average	1,861,086	1,086,763	378,901	418,300	83,249	13,128	1,980,340	3,841,426
1963-72 Average	923,416	789,458	223,842	143,826	34,889	12,560	1,204,574	2,127,990
1973-82 Average	2,798,756	1,384,068	533,959	692,774	131,609	13,696	2,756,107	5,554,862

1/ Tower count.

2/ Aerial survey estimate 1963-65 and 1977-82; 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 1963-64; aerial survey estimate 1965-72, 1980 and 1982; weir count 1973-79 and 1981.

4/ Preliminary.

(Literature Cited: 1, 7 and 16)

APPENDIX TABLE 23. Inshore commercial catch and escapement of sockeye salmon in the Togiak district by river system, Bristol Bay, 1963-82.

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/}					
1963	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 ^{6/}	199,799	91,098		13,100	18,800	122,998	332,797
67	71,512	24,379	5,216 ^{6/}	101,107	69,330		12,000	10,000	91,330	192,437
1968	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
72	51,354	17,244	6,663	75,261	74,070		4,500	3,400	81,970	157,231
1973	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	15,000	16,200	11,200	200,590	502,473
77	201,004	16,252	1,195	218,451	133,734	4,400	24,400	40,100	202,634	421,085
1978	422,100	29,668	248 ^{6/}	452,016	273,576	15,000	17,600	33,900	340,076	792,092
79	393,337	66,629	1,018	460,984	171,138	14,200	12,900	26,600	224,838	685,822
80	591,470	42,811	280	634,561 ^{7/}	461,850	27,900	37,000	45,700	572,450	1,207,011
81	600,670	16,184	3,957	620,811 ^{7/}	208,080	21,150	77,900	58,780	365,910	986,721
82	563,890	19,810	1	583,701 ^{7/}	244,824	3,450	40,400	52,750	341,424	925,125
20-Year Total	4,940,596	304,110	51,322	5,296,028	3,047,052		349,000	398,130	3,919,482	9,215,510
1963-72 Total	1,503,673	74,947	21,023	1,599,643	1,055,976		95,400	107,600	1,258,976	2,858,619
1973-82 Total	3,436,923	229,163	30,299	3,696,385	1,991,076	125,300	253,600	290,530	2,660,506	6,356,891
20-Year Average ^{8/}	247,030	16,006	3,019	264,801	152,353		17,450	19,907	195,974	460,776
1963-72 Average	150,367	8,327	3,003	159,964	105,598		9,540	10,760	125,898	285,862
1973-82 Average	343,692	22,916	3,030	369,639	199,108	13,922	25,360	29,053	266,051	635,689

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

2/ Tower count.

3/ Aerial survey estimate.

4/ Aerial survey estimate; includes Gechiak, Pungokepek, 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.

(Literature Cited: 1, 7 and 18)

APPENDIX TABLE 24. Inshore total return of sockeye salmon by district, Bristol Bay, 1963-82.

Year	Commercial Catch and Escapement in Numbers of Fish					
	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1963	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
67	6,511,700	1,707,806	407,674	1,533,163	192,437	10,352,780
1968	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
72	2,850,033	1,386,222	96,868	909,997	157,231	5,400,351
1973	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
77	4,694,214	2,473,081	294,143	1,839,081	421,085	9,721,604
1978	10,315,734	2,102,992	90,429	6,622,698	792,092	19,923,945
79	27,429,822	3,289,374	2,098,022	6,400,917	685,822	39,903,957
80	40,568,323	3,683,926	4,221,159	12,808,225	1,207,011	62,488,644
81 ^{1/}	14,581,532	5,175,390	3,277,230	10,564,053	986,721	34,584,926
82 ^{1/}	7,517,614	3,448,563	2,346,668	8,011,572	925,125	22,249,542
20-Year Total	269,448,928	47,597,533	21,517,277	76,828,523	9,215,510	424,602,771
1963-72 Total	132,858,855	21,449,333	8,107,588	21,279,900	2,858,619	186,554,295
1973-82 Total	136,590,073	26,148,200	13,409,689	55,548,623	6,356,891	238,048,476
20-Year Average	13,472,446	2,379,877	1,075,864	3,841,426	460,776	21,230,139
1963-72 Average	13,285,886	2,144,933	810,759	2,127,990	285,862	18,655,430
1973-82 Average	13,659,007	2,614,820	1,340,969	5,554,862	635,689	23,804,848

^{1/} Preliminary catch.

(Literature Cited: 1, 7, 16, 18 and 20)

APPENDIX TABLE 25. Inshore sockeye salmon total run, escapement goals and deviation, in the Kvichak and Naknek River systems, Bristol Bay, 1963-82.

Year	Number of Fish in Thousands							
	Inshore Run		Kvichak River			Naknek River		
	Kvichak	Naknek	Escapement Goal	Actual	Percent Deviation ^{1/}	Escapement Goal	Actual	Percent Deviation ^{1/}
1963	562	1,526	750	339	- 55	750	905	+ 21
64	1,721	2,556	5,000	957	- 81	850	1,350	+ 59
65	42,112	1,832	8,000	24,326	+204	800	718	- 10
66	7,944	2,109	6,000	3,775	- 37	800	1,016	+ 27
67	5,017	1,225	3,500	3,216	- 8	1,000	756	- 24
1968	2,945	1,791	874	2,557	+193	1,000	1,023	+ 2
69	12,155	2,135	6,000	8,394	+ 40	1,000	1,331	+ 33
70	30,517	1,726	19,000	13,935	- 27	1,000	733	- 27
71	6,152	2,706	2,500	2,387	- 5	900	936	+ 4
72	1,352	1,315	2,000	1,010	- 50	800	587	- 27
1973	248	501	2,000	227	- 89	800	357	- 55
74	4,582	1,621	6,000	4,434	- 26	800	1,241	+ 55
75	14,746	3,493	14,000	13,140	- 6	800	2,027	+153
76	3,423	2,354	2,000	1,965	- 2	800	1,321	+ 65
77	2,081	2,463	2,000	1,341	- 33	800	1,086	+ 36
1978	7,965	1,896	2,000	4,149	+107	800	813	+ 2
79 ^{2/}	24,637	2,219	6,000	11,218	+ 87	800	925	+ 16
80 ^{2/}	35,234	4,791	14,000	22,505	+ 61	800	2,665	+233
81 ^{2/}	6,960	7,302	2,000	1,754	- 12	800	1,796	+125
82 ^{2/}	2,635	4,215	2,000	1,135	- 43	800	1,156	+ 45
20-Year Total	212,988	49,776	105,624	122,764	1,166	16,900	22,742	1,019
1963-72 Total	110,477	18,921	53,624	60,896	700	8,900	9,355	234
1973-82 Total	102,511	30,855	52,000	61,868	466	8,000	13,387	785
20-Year Average	10,649	2,489	5,281	6,138	58 ^{3/}	845	1,137	51 ^{3/}
1963-72 Average	11,048	1,892	5,362	6,090	70	890	936	23
1973-82 Average	10,251	3,086	5,200	6,187	47	800	1,339	79

^{1/} Percent deviation = deviation from goal divided by goal.

^{2/} Preliminary catch apportionment.

^{3/} Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

APPENDIX TABLE 26. Inshore sockeye salmon total run, escapement goals and deviation, in the Egegik and Ugashik River systems, Bristol Bay, 1963-82.

Year	Number of Fish in Thousands							
	Egegik River					Ugashik River		
	Inshore Run		Escapement		Percent Deviation ^{1/}	Escapement ^{2/}		Percent Deviation ^{1/}
Egegik	Ugashik	Goal	Actual	Goal		Actual		
1963	1,693	577	850	998	+ 17	650	388	- 40
64	1,954	1,060	850	850	0	600	473	- 21
65	4,624	1,922	1,000	1,445	+ 45	800	997	+ 25
66	2,905	1,150	1,000	804	- 20	850	704	- 17
67	1,708	403	1,000	637	- 36	850	239	- 72
1968	1,010	153	1,000	339	- 66	750	71	- 91
69	1,905	330	700	1,016	+ 45	400	160	- 60
70	2,323	907	1,000	920	- 8	700	735	+ 5
71	1,941	1,484	600	634	+ 6	500	530	+ 6
72	1,386	97	600	546	- 9	450	79	- 82
1973	550	43	500	329	- 34	188	39	- 79
74	1,448	64	600	1,276	+113	500	62	- 88
75	2,138	444	600	1,174	+ 96	500	429	- 14
76	1,839	517	600	509	- 15	500	342	- 32
77	2,473	294	600	693	+ 16	500	201	- 60
1978	2,103	78	600	896	+ 49	500	70	- 86
79	3,289	2,092	600	1,032	+ 72	500	1,701	+240
80 ^{3/}	3,684	4,207	600	1,061	+ 77	500	3,321	+564
81 ^{3/}	5,175	3,276	600	695	+ 16	500	1,327	+165
82 ^{3/}	3,449	2,319	600	1,035	+ 73	500	1,158	+132
20-Year Total	47,597	21,417	14,500	16,889	813	11,238	13,026	1,879
1963-72 Total	21,449	8,083	8,600	8,189	252	6,550	4,376	419
1973-82 Total	26,148	13,334	5,900	8,700	561	4,688	8,650	1,460
20-Year Average	2,380	1,071	725	844	41 ^{4/}	562	651	94 ^{4/}
1963-72 Average	2,145	808	860	819	25	655	438	42
1973-82 Average	2,615	1,333	590	870	56	469	865	146

1/ Percent deviation = deviation from goal divided by goal.

2/ Does not include Mother Goose River system.

3/ Preliminary catch apportionment.

4/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

APPENDIX TABLE 27. Inshore sockeye salmon total run, escapement goals and deviation, in the Wood and Igushik River systems, Bristol Bay, 1963-82.

Year	Number of Fish in Thousands							
	Inshore Run		Wood River			Igushik River		
	Wood	Igushik	Goal	Actual	Percent Deviation ^{1/}	Goal	Actual	Percent Deviation ^{1/}
1963	1,255	181	1,200	721	- 40	400	92	- 77
64	2,151	319	900	1,076	+ 20	250	129	- 48
65	1,144	314	500	675	+ 35	250	181	- 28
66	1,963	445	900	1,209	+ 34	200	206	+ 3
67	1,046	300	1,100	516	- 53	153	282	+ 84
1968	1,056	439	1,000	649	- 35	150	195	+ 30
69	1,056	752	750	604	- 19	200	512	+156
70	1,758	671	1,000	1,162	+ 16	200	371	+ 86
71	1,438	619	750	851	+ 13	150	211	+ 41
72	587	157	750	431	- 43	150	60	- 60
1973	444	96	700	330	- 53	150	60	- 60
74	2,132	421	800	1,709	+114	150	359	+139
75	1,493	387	800	1,270	+ 59	150	241	+ 61
76	1,443	328	800	817	+ 2	150	186	+ 24
77	825	149	800	562	- 30	150	96	- 36
1978	4,059	1,075	800	2,267	+183	150	536	+257
79 ^{2/}	3,544	1,814	800	1,706	+113	150	860	+473
80 ^{2/}	4,438	3,056	800	2,969	+271	150	1,988	+1,225
81 ^{2/}	4,365	2,423	800	1,233	+ 54	150	591	+294
82 ^{2/}	3,921	1,682	800	976	+ 22	150	424	+183
20-Year Total	40,118	15,628	16,750	21,733	1,209	3,603	7,580	3,365
1963-72 Total	13,454	4,197	8,850	7,894	308	2,103	2,239	613
1973-82 Total	26,664	11,431	7,900	13,839	901	1,500	5,341	2,752
20-Year Average	2,006	781	838	1,087	60 ^{3/}	180	379	168 ^{3/}
1963-72 Average	1,345	420	885	789	31	210	224	61
1973-82 Average	2,666	1,143	790	1,384	90	150	534	275

1/ Percent deviation = deviation from goal divided by goal.

2/ Preliminary catch apportionment.

3/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

APPENDIX TABLE 28. Inshore sockeye salmon total run, escapement goals and deviation, in the Nuyakuk and Togiak River systems, Bristol Bay, 1963-82.

Year	Number of Fish in Thousands							
	Nuyakuk River					Togiak River		
	Inshore Run		Escapement		Percent Deviation ^{1/}	Escapement ^{2/}		Percent Deviation ^{1/}
Nuyakuk	Togiak	Goal	Actual	Goal		Actual		
1963	344	288	200	167	- 17	100	102	+ 2
64	215	338	100	103	+ 3	100	96	- 4
65	364	302	200	203	+ 2	150	88	- 41
66	294	282	150	161	+ 7	120	91	- 24
67	53	141	80	20	- 75	90	69	- 23
1968	168	108	200	97	- 52	110	43	- 61
69	129	239	150	70	- 53	100	109	+ 9
70	604	345	214	365	+ 71	100	192	+ 92
71	432	391	132	224	+ 70	115	191	+ 66
72	146	125	71	29	- 59	70	74	+ 6
1973	176	171	150	110	- 27	80	96	+ 20
74	172	194	250	155	- 38	100	83	- 17
75	889	346	250	670	+168	100	161	+ 61
76	856	451	250	425	+ 70	100	158	+ 58
77	365	335	250	233	- 7	100	134	+ 34
1978	1,262	696	250	577	+131	100	274	+174
79 ^{3/}	743	564	250	360	+ 44	100	171	+ 71
80 ^{3/}	4,695	1,053	250	3,027	+1,111	100	462	+362
81 ^{3/}	3,138	809	250	834	+234	100	208	+108
82 ^{3/}	2,132	809	250	538	+115	100	245	+145
20-Year Total	17,177	7,987	3,897	8,368	2,354	2,035	3,047	1,378
1963-72 Total	2,749	2,559	1,497	1,439	409	1,055	1,055	328
1973-82 Total	14,428	5,428	2,400	6,929	1,945	980	1,992	1,050
20-Year Average	859	399	195	418	118 ^{4/}	102	152	69 ^{4/}
1963-72 Average	275	256	150	144	41	106	106	33
1973-82 Average	1,443	543	240	693	195	98	199	105

1/ Percent deviation = deviation from goal divided by goal.

2/ Does not include Togiak River and tributaries.

3/ Preliminary catch apportionment.

4/ Absolute deviation without regard to sign.

(Literature Cited: 1 and 7)

APPENDIX TABLE 29. Kvichak River sockeye salmon escapement and return by brood year, 1956-82.^{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	253		(9,992)	(5.08)
77	1,341	47	1,840	1,041			(2,928)	(2.18)
78	4,149		1,729				(1,729)	(0.42)
79	11,218	58					(58)	(0.01)
80	22,505							
1981	1,754							
82	1,135							
Total	157,172	194	61,165	189,048	16,484	96	266,987	
1956-75 Total	113,105	84	52,489	183,380	16,231	96	252,280	
Average ^{3/}	5,655	4	2,624	9,169	824	5	12,614	2.23
Percent		+	20.8	72.7	6.5	+	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 compute from 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 30. Branch River sockeye salmon escapement and return by brood year, 1956-82.^{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	49		(445)	(5.42)
77	100	24	126	639			(789)	(7.89)
78	229		92				(92)	(0.40)
79	294	3					(3)	(0.01)
80	298							
1981	82							
82	239							
Total	6,822	150	4,888	4,120	515	10	9,683	
1956-75 Total	5,498	97	4,467	3,314	466	10	8,354	
Average ^{3/}	275	5	223	166	23	1	418	1.52
Percent		1.2	53.4	39.7	5.5	0.2	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 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 31. Naknek River sockeye salmon escapement and return by brood year, 1956-82. 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	8	5,053	2.49
1976	1,321	4	1,026	5,378	1,354		(7,762)	(5.88)
77	1,086	10	599	2,148			(2,757)	(2.54)
78	813	1	289				(290)	(0.36)
79	925	4					(4)	(0.00)
80	2,645							
1981	1,796							
82	1,156							
Total	29,542	42	8,755	32,764	14,941	78	56,580	
1956-75 Total	19,800	23	6,841	25,238	13,587	78	45,767	
Average ^{3/}	990	1	342	1,262	679	4	2,288	2.31
Percent		+	15.0	55.2	29.7	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 1956-75 totals only.

(Literature Cited: 7 and 18)

APPENDIX TABLE 32. Egegik River sockeye salmon escapement and return by brood year, 1956-82.^{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	3,467	2.95
1976	509	2	644	3,662	757		(5,065)	(9.95)
77	693	2	795	2,384			(3,181)	(4.59)
78	896		371				(371)	(0.41)
79	1,032	3					(3)	(0.00)
80	1,061							
1981	695							
82	1,035							
Total	23,230	21	5,619	36,497	16,920	699	59,756	
1956-75 Total	17,309	14	3,809	30,451	16,163	699	51,136	
Average ^{3/}	865	1	190	1,523	808	35	2,557	2.96
Percent		+	7.4	59.6	31.6	1.4	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 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 33. Ugashik River sockeye salmon escapement and return by brood year, 1956-82.^{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	2,341		660	1,820	471	1	2,952	1.26
1961	366		233	728	117		1,078	2.95
62	274		73	306	26		405	1.48
63	397		13	109	22		144	0.36
64	483		37	255	19	9	320	0.66
65	998		82	275	179		536	0.54
1966	715	1	678	1,396	19		2,094	2.93
67	244		52	85	33		170	0.70
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	1	3,932	9.17
1976	356		2,005	2,507	398		(4,910)	(13.79)
77	202	2	542	1,709			(2,253)	(11.15)
78	82		238				(238)	(2.90)
79	1,707	19					(19)	(0.01)
80	3,335							
1981	1,328							
82	1,186							
Total	17,258	38	9,497	15,202	2,308	22	27,067	
1956-75 Total	9,062	17	6,712	10,986	1,910	22	19,647	
Average ^{3/}	453	1	336	549	96	1	982	2.17
Percent		0.1	34.2	55.9	9.7	0.1	100.0	

^{1/} Includes aerial estimates of King Salmon River escapements 1960-67, and 1976-82. 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 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 34. Wood River sockeye salmon escapement and return by brood year, 1956-82.^{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	271		(5,287)	(6.47)
77	562	19	948	2,234			(3,201)	(5.70)
78	2,267		1,176				(1,176)	(0.52)
79	1,706	8					(8)	(0.00)
80	2,969							
1981	1,233							
82	976							
Total	28,315	125	21,410	22,309	2,011	18	45,873	
1956-75 Total	17,785	95	17,141	17,207	1,740	18	36,201	
Average ^{3/}	889	5	857	860	87	1	1,810	2.04
Percent		0.3	47.4	47.5	4.8	+	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 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 35. Igushik River sockeye salmon escapement and return by brood year, 1956-82.^{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	214		(2,412)	(12.97)
77	96		318	1,596			(1,914)	(19.94)
78	536		54				(54)	(0.10)
79	860							
80	1,988							
1981	591							
82	424							
Total	9,666		3,585	12,508	1,414	2	17,509	
1956-75 Total	4,985		2,692	9,235	1,200	2	13,129	
Average ^{3/}	249		135	462	60	+	656	2.64
Percent			20.5	70.4	9.1	+	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 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 36. Nuyakuk River sockeye salmon escapement and return by brood year, 1956-82.^{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	1	5,173	7.72
1976	425	1	382	2,724	269		(3,376)	(7.94)
77	233		304	1,959			(2,263)	(9.71)
78	577		107				(107)	(0.19)
79	360	1					(1)	(0.00)
80	3,027							
1981	834							
82	538							
Total	8,974	24	2,589	15,272	924	2	18,811	
1956-75 Total	2,980	22	1,796	10,589	655	2	13,064	
Average ^{3/}	149	1	90	529	33	+	653	4.38
Percent		0.1	13.8	81.0	5.1	+	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 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 37. Nushagak-Mulchatna River sockeye salmon escapement and return by brood year, 1956-82.^{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	36		(587)	(13.04)
77	320		55	191			(246)	(0.77)
78	87		13				(13)	(0.15)
79	139							
80	291							
1981	177							
82	63							
Total	1,712	29	894	2,493	367		3,783	
1956-75 ^{3/}								
Total	590	20	674	1,749	327		2,770	
Average ^{4/}	33	1	37	97	18		154	4.66
Percent		0.7	24.3	63.2	11.8		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 1961-75.

4/ Averages and percentages computed from 1956-58 and 1961-75 totals only.

Literature Cited: 7 and 18)

APPENDIX TABLE 38. Snake River sockeye salmon escapement and return by brood year, 1956-82.^{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	4		(55)	(4.23)
77	9		14	22			(36)	(4.00)
78	18		17				(17)	(0.94)
79	8							
80	37							
1981	15							
82	12							
Total	444		258	205	32		495	
1956-75 Total	332		201	158	28		387	
Average ^{3/}	17		10	8	1		19	1.12
Percent			52.6	42.1	5.3		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/} Returns in parenthesis are incomplete.

^{3/} Averages and percentages computed from 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 39. Togiak River sockeye salmon escapement and return by brood year, 1956-82.^{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	260	66	1	382	1.88
1971	200		107	353	66	2	528	2.64
72	79	1	87	165	98		351	4.44
73	107	1	146	391	16		554	5.18
74	104	1	248	358	47	1	655	6.30
75	181		270	873	51		1,194	6.60
1976	189		173	587	145		(905)	(4.79)
77	163		210	569			(779)	(4.78)
78	306		129				(129)	(0.42)
79	198	2					(2)	(0.01)
80	527							
1981	307							
82	270							
Total	4,411	14	2,623	6,079	810	11	9,537	
1956-75 Total	2,451	12	2,111	4,923	665	11	7,722	
Average ^{3/}	123	1	106	246	33	1	386	3.14
Percent		0.2	27.3	63.7	8.6	0.2	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/} Includes Togiak Lake, Togiak River and tributary spawners.

^{3/} Returns in parenthesis are incomplete.

^{4/} Averages and percentages computed from 1956-75 totals only.

(Literature Cited: 1 and 18)

APPENDIX TABLE 40. Inshore commercial catch and escapement of king salmon in the Nushagak and Togiak districts, Bristol Bay, 1966-82.^{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	137,547	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	64,958	141,000	205,958	12,543	12,000	24,543
1981	194,869 ^{5/}	150,000	344,869	24,348 ^{5/}	27,000	51,348
82	200,057 ^{5/}	147,000	347,057	39,997 ^{5/}	17,000	56,997
17-Year Total	1,495,277	1,288,000	2,700,508	390,446	270,000	650,479
1966-75 Total	613,766	460,000	990,997	161,574	120,000	271,607
1976-82 Total	881,511	828,000	1,709,511	228,872	150,000	378,872
17-Year Average	87,957	80,500	168,782	22,967	16,875	40,655
1966-75 Average	61,377	51,111	110,111	16,157	13,333	30,179
1976-82 Average	125,930	118,286	244,216	32,696	21,429	54,125

^{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.

(Literature Cited: 1, 5 and 13)

APPENDIX TABLE 41. Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak districts, Bristol Bay, 1966-82.^{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	681,930	969,000	1,650,930	299,682	415,000	714,682
1981	772,869 ^{4/}	177,000	949,869	236,407 ^{4/}	331,000	567,407
82	456,441 ^{4/}	256,000	712,441	159,136 ^{4/}	86,000	245,136
17-Year Total	7,317,015	4,554,000	11,871,015	2,714,106	4,099,000	6,717,696
1966-75 Total	2,612,988	1,584,000	4,196,988	1,099,764	1,690,000	2,694,354
1976-82 Total	4,704,027	2,970,000	7,674,027	1,614,342	2,409,000	4,023,342
17-Year Average	430,413	267,882	698,295	159,653	256,188	419,856
1966-75 Average	261,299	158,400	419,699	109,976	187,778	299,373
1976-82 Average	672,004	424,286	1,096,290	230,620	344,143	574,763

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 - 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 - adjusted sonar estimate from Portage Creek site.

3/ Comprehensive aerial survey coverage was begun in 1967.

4/ Preliminary.

(Literature Cited: 1, 5 and 13)

APPENDIX TABLE 42. Inshore commercial catch and escapement of pink salmon in the Nushagak district by river system, Bristol Bay, 1958-82.^{1/}

Year	Catch	Number of Fish					Total	Total Run
		Escapement						
		Wood ^{2/}	Iqushik ^{3/}	Nuyakuk ^{4/}	Nush/Mul ^{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	2,202,545	31,150	3,500	2,626,746	123,000	800	2,785,196	4,987,741
82	1,285,947 ^{8/}	36,100	8,430	1,592,096	19,130	900	1,656,656	2,942,603
13-Year Total	17,299,850	365,596	53,160	23,271,149	989,730	12,233	24,691,868	41,991,718
13-Year Average ^{7/}	1,330,758	52,228	7,594	1,790,088	141,390	1,748	1,899,374	3,230,132

^{1/} Includes even-years only.

^{2/} Aerial survey estimate 1962 and 1974-82; tower count 1964.

^{3/} Aerial survey estimate 1962-80; aerial survey estimate and tower count 1976 and 1982.

^{4/} Tower count 1960-82; aerial survey estimate 1958, and below counting tower 1962-64 and 1974-82.

^{5/} Aerial survey estimate.

^{6/} Aerial survey estimate 1962-64, 1974-76 and 1980-82, and weir count 1978.

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

^{8/} Preliminary.

(Literature Cited: 1, 5 and 21)

APPENDIX TABLE 43. Nushagak district pink salmon escapement and return by brood year, 1958-82.^{1/}

Brood Year	Number of Fish		Return Per Spawner
	Escapement	Return	
1958	4,000	436	0.11
1960	146	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	4,988	0.53
1980	2,785	2,943	1.06
82	1,657		
Total	24,692	36,876	
1958-80 Total	23,035	36,876	
Average ^{2/}	1,920	3,073	1.60

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

^{2/} Averages and percentages computed from 1958-80 totals only.

(Literature Cited: 1, 5 and 21)

APPENDIX TABLE 44. Average round weight of the commercial salmon catch by district and species, Bristol Bay, 1963-82.

Species and Year	Average Round Weight ^{1/}					Average Bristol Bay ^{2/}
	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	
SOCKEYE SALMON						
1963						5.2
64						5.2
65						4.5
66						6.1
67						6.3
1968				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
72	6.1	6.0	6.1	6.0	6.4	6.0
1973	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
77	6.6	6.3	6.8	7.5	7.9	6.7
1978	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
82	6.3	6.4	6.5	6.4	7.4	6.4
KING SALMON						
1963						13.2
64						13.7
65						14.6
66						19.5
67						21.0
1968				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
72	25.5	21.6	17.3	19.8	21.1	20.3
1973	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
77	30.5	22.1	23.8	23.4	20.8	22.9

(continued)

APPENDIX TABLE 44. (continued)

Species and Year	Average Round Weight ^{1/}					Average Bristol Bay ^{2/}
	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	
<u>KING SALMON (continued)</u>						
1978	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
82	19.4	18.5	20.1	20.4	15.4	19.6
<u>CHUM SALMON</u>						
1963						6.3
64						7.1
65						7.0
66						7.5
67						6.8
1968						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
72	6.5	6.4	5.7	6.5	6.6	6.5
1973	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
77	7.3	6.5	6.7	7.3	8.2	7.4
1978	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
82	6.3	6.6	6.8	6.7	7.3	6.7
<u>PINK SALMON</u>						
1964						3.0
66						3.1
68						3.0
70	2.9			3.0	3.7	3.0
72	3.4			3.1	3.8	3.1
1974	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
82	3.6		4.1	3.5	3.5	3.5

(continued)

APPENDIX TABLE 44. (continued)

Species and Year	Average Round Weight ^{1/}					Average Bristol Bay ^{2/}
	Naknek- Kvichak	Egegik	Ugashik	Nushagak	Togiak	
<u>COHO SALMON</u>						
1963						6.9
64						6.0
65						6.3
66						7.5
67						7.0
1968		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
72		6.1		6.3	7.6	7.0
1973	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
77				6.5	9.4	7.8
1978	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
82	7.2	7.1	7.7	6.8	8.7	7.3

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 1963-68 from annual "Alaska Catch and Production Commercial Fisheries Statistics" (Statistical Leaflet Series), and 1969-82 weighted by district from processor catch reports.

3/ Weighted by district from processor annual reports.

(Literature Cited: 4 and 10)

APPENDIX TABLE 45. Salmon prices paid to fishermen by species, Bristol Bay, 1963-82.^{1/}

Species	Price Per Fish in Dollars ^{2/}							Price Per Pound in Dollars ^{2/}												
	1963	1964/65	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	
	<u>INDEPENDENT FISHERMEN</u>							<u>AIFMA</u>												
SOCKEYE	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	.70

KING																				
Large	3.75	3.75	3.87	3.87	3.87															
Medium	1.87	1.87	1.94	1.94	1.94	.18	.18	Canned	.20	.20	.28	.33	.35	.41	.45	.50	.55	.57	.75	.75
Small	1.00	1.00	1.00	1.03	1.03			Fresh/Frozen	.24	.24		.45	.40	.45	.65		.55		1.25	1.30

CHUM	.58	.58	.60	.60	.60	.11	.11	Canned Fresh/Frozen	.12	.12	.18	.30	.18	.32	.375	.40	.55 .55	.34	.42	.32

PINK	.32	.32	.33	.33	.33	.11	.11		.12	.12	.18	.28	.19	.31	.36	.33	.33	.25	-	.18

COHO	1.08	1.09	1.13	1.18	1.19	.20	.20	Canned Fresh/Frozen	.26	.27	.35					.70			.75	.70
									.20	.20	.30	.41	-	.405	-	.68	1.00	.57		

	<u>COMPANY FISHERMEN</u>							<u>WACMA</u>												
SOCKEYE	.67	.67	.70	.73	.74	.14	.14	Canned Fresh/Frozen	.16	.17	.22	.30	.45	.475	.595	.68	.80 1.25	.57	.65 .75	.56 .70

KING																				
Large	2.70	2.70	2.40	2.78	2.78															
Medium	(2/1)	(2/1)	1.20	1.39	1.39	.11	.11	Canned	.12	.13	.18	.21	.35	.41	.45	.50	.52	.45	1.15	.75
Small			.64	.69	.69			Fresh/Frozen					.40	.46	.65	.70	1.00			1.17

CHUM	.37	.37	.37	.37	.37	.06	.06	Canned Fresh/Frozen	.08	.08	.11	.19	.30	.32	.36	.38	.41 .55	.34	.38	.32

PINK	-	-	.20	.17	.17	.06	.06		.08	.13	.11	.18	.28	.308	.308	.33	-	.25	-	.30 ^{3/}

COHO	.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.

3/ Only a limited number operators paid this price

(Literature Cited: 9)

APPENDIX TABLE 46. Exvessel value of the commercial salmon catch by species, Bristol Bay, 1963-82.^{1/}

Year	Estimated Exvessel Value in Thousands of Dollars ^{2/}					
	Sockeye	King	Chum	Pink	Coho	Total
1963	\$ 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
67	5,110	336	286	+	63	5,795
1968	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
72	3,914	339	512	47	20	4,832
1973	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
77	19,434	1,940	4,275	50	445	26,145
1978	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/}	76,118	1,881	2,738	2,173	1,392	84,302
81 ^{3/}	121,399	5,599	4,027	8	1,458	132,491
82 ^{3/}	68,308	6,356	2,192	1,071	3,423	81,350
20-Year Total	\$594,382	\$29,110	\$27,109	\$12,970 ^{4/}	\$10,492	\$674,128
1963-72 Total	106,226	3,887	3,321	2,156	462	116,052
1973-82 Total	488,156	25,223	23,788	11,097	10,030	558,076
20-Year Average	\$ 29,719	\$ 1,456	\$ 1,355	\$ 1,297 ^{4/}	\$ 525	\$ 33,706
1963-72 Average	10,623	389	332	431	46	11,605
1973-82 Average	48,816	2,522	2,379	2,219	1,003	55,808

^{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.

(Literature Cited: 1, 5, 9 and 10)

APPENDIX TABLE 47. Salmon case pack by species, Bristol Bay, 1963-82.^{1/}

Year	48 1-lb. Cans Per Case					Total
	Sockeye	King	Chum	Pink	Coho	
1963	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
67	334,177	19,499	45,321	8	3,100	402,105
1968	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
72	197,495	9,666	53,756	5,002	547	266,466
1973	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
77	353,133	3,119	137,838	5	2,383	496,478
1978	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
82	193,321	1,700	17,320	26,789	7,510	246,640
20-Year Total	9,872,056	214,984	1,037,732	561,527 ^{2/}	52,072	11,648,449
1963-72 Total	5,897,007	176,785	447,650	247,287	23,408	6,702,180
1973-82 Total	3,975,049	38,199	590,082	314,240	28,664	4,946,269
20-Year Average	493,603	10,749	51,887	56,153 ^{2/}	2,604	582,422
1963-72 Average	589,701	17,679	44,765	49,457	2,341	670,218
1973-82 Average	397,505	3,820	59,008	62,848	2,866	494,627

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

^{2/} Includes even-years only.

(Literature Cited: 1, 4 and 17)

APPENDIX TABLE 48. Salmon fish per case by species, Bristol Bay, 1963-82.

Year	Fish Per Case				
	Sockeye	King	Chum	Pink ^{1/}	Coho
1963	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
67	12.37	4.27	11.69		12.56
1968	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
72	12.35	4.46	12.00	26.76	12.28
1973	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
77	10.51	4.20	9.68		7.29
1978	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
82	11.48	3.53	10.60	23.52	10.22
20-Year Total	25,158	8,900	23,310	25,118	21,654
1963-72 Total	13,240	4,633	11,850	13,212	11,817
1973-82 Total	11,918	4,267	11,460	11,906	9,837
20-Year Average	12.58	4.45	11.66	25.12	10.83
1963-72 Average	13.24	4.63	11.85	26.42	11.82
1973-82 Average	11.92	4.27	11.46	23.81	9.84

^{1/} Includes even-years only.

(Literature Cited: 1)

APPENDIX TABLE 49. Commercial production of frozen salmon by species, Bristol Bay, 1963-82.^{1/}

Year	Production in Pounds					
	Sockeye	King	Chum	Pink	Coho	Total
1963	185,957	115,540	80,539	7	19,002	401,045
64	467,849	18,784	29,799	36	36	516,504
65	367,461	19,360	4,361			391,182
66	262,825	10,628	107,250	12	322	381,037
67	201,146	356,223	69,910		40,908	668,187
1968	99,120	184,222	48,485			331,827
69	421,248	353,256	6,537		7,669	788,710
70	3,234,500	535,159	175,504	33,368	50	3,978,581
71	1,812,864	356,422	115,388	12	40,925	2,325,611
72	54,571	362,653	60,466	790	24,308	502,788
1973	186,663	557,422	307,790	11	98,115	1,150,001
74	147,475	281,821	7,212	113,241	582	550,331
75	101,751	230,045	133,339		444,344	909,479
76	883,620	570,837	163,030	215,176	117,603	1,950,266
77	586,098	1,155,791	336,283	258	235,607	2,314,037
1978	6,306,661	1,848,951	761,029	1,580,236	145,355	10,642,232
79	38,031,872	2,291,378	1,231,334	2,451	1,350,300	42,907,335
80	31,855,642	1,189,870	1,391,797	3,040,765	828,114	38,306,188
81	49,613,633	2,602,066	1,371,467	2,652	1,065,573	54,655,391
82	57,636,789	3,045,713	2,183,075	2,346,198	2,746,413	67,958,188
20-Year Total	192,457,745	16,086,141	8,584,595	7,329,822	7,165,226	231,628,920
1963-72 Total	7,107,541	2,312,247	698,239	34,206	133,220	10,285,472
1973-82 Total	185,350,204	13,773,894	7,886,356	7,295,616	7,032,006	221,343,448
20-Year Average	9,622,887	804,307	429,230	732,982	3,582,613	11,581,446
1963-72 Average	710,754	231,225	69,824	6,841	13,322	1,028,547
1973-82 Average	18,535,020	1,377,389	788,636	1,459,123	703,201	22,134,345

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

^{2/} Includes even-years only.

(Literature Cited: 3)

APPENDIX TABLE 50. Commercial production of cured salmon by species, Bristol Bay, 1963-82.^{1/}

Year	Production in Pounds					Total
	Sockeye	King	Chum	Pink	Coho	
1963	10,348	18,717	907	3	21,404	51,379
64	17,550	104,311	78	792	53,700	176,431
65	18,405	30,879	105		11,674	61,063
66	7,283	9,964	645		21,623	39,515
67	11,850	4,410	1,802		6,300	24,362
1968	210,006	142,645	77,963	1,504	270,286	702,404
69	330,443	394,217	371,321	133	409,114	1,505,228
70	37,298	153,503	86,795	509	14,026	292,131
71	14,922	148,354	12,778		5,682	181,736
72	10,526	3,959	8,614	32	28,547	51,678
1973	23,851	4,617	27,768		17,539	73,775
74	24,977	5,402	2,505	65	4,530	37,479
75	11,863	20,660	81			32,604
76	4,210	62	90			4,362
77	3	20	90		3,171	3,284
1978	680,402	4,664	17,388	97,390	3,410	803,254
79	3,651,146	16,824	136,585	403	1,000	3,805,958
80	4,242,063	9,603	286,113	9,649	6,653	4,554,081
81	4,956,561	23,663	148,051		6,526	5,134,801
82	3,222,798	75,752	277,013	12,780	1,466	3,589,809
20-Year Total	17,486,505	1,172,226	1,456,692	122,721 ^{2/}	886,651	21,125,334
1963-72 Total	668,631	1,010,959	561,008	2,837	842,356	3,085,927
1973-82 Total	16,817,874	161,267	895,684	119,884	44,295	18,039,407
20-Year Average	874,325	58,611	72,835	12,272 ^{2/}	44,333	105,627
1963-72 Average	66,863	101,096	56,101	567	84,236	308,593
1973-82 Average	1,681,787	16,127	89,568	23,977	4,430	1,803,941

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

^{2/} Includes even-years only.

(Literature Cited: 3)

APPENDIX TABLE 51. Fresh export of salmon by air transportation, by species, Bristol Bay, 1963-82.^{1/}

Year	Export in Pounds					
	Sockeye	King	Chum	Pink	Coho	Total
1963						0
64		534				534
65						0
66	421	15,932	2,145		98,663	117,161
67	183	73,773	184		124,502	198,642
1968	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
72	20,754	359,533	6,442		4,837	391,566
1973	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
77	997,899	1,134,791	961,537	14,438	409,058	3,517,723
1978	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
82	20,416,684	2,056,650	1,027,817	166,672	1,576,761	25,244,584
20-Year Total	99,951,612	10,382,120	6,157,716	2,946,636 ^{2/}	5,669,688	125,135,645
1963-72 Total	31,918	1,018,234	12,610	0	229,936	1,292,698
1973-82 Total	99,919,694	9,363,886	6,145,106	2,946,636	5,439,752	123,842,947
20-Year Average	4,997,581	519,106	307,886	294,664 ^{2/}	283,484	6,256,782
1963-72 Average	3,192	101,823	1,261	0	22,994	129,270
1973-82 Average	9,991,969	936,389	614,511	589,327	543,975	12,384,295

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

^{2/} Includes even-years only.

(Literature Cited: 3)

APPENDIX TABLE 52. Brine export of salmon by sea-going transportation, Bristol Bay, 1963-82.^{1/}

Year	Number ^{2/}		Brine Export	
	Operators	Tenders	Number	Pounds
1963			87,828	464,545
64			191,423	1,003,695
65			994,966	4,486,175
66			389,595	2,168,233
67			127,818	807,144
1968			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
72	1	(1)	59,750	365,386
1973	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
77	5	15	623,523	3,603,382
1978	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
82	8	27	565,891	3,582,904
20-Year Total	91	433	21,290,358	120,243,729
1963-72 Total	13	73	5,483,378	27,844,414
1973-82 Total	78	360	15,806,980	92,399,315
20-Year Average	7 ^{3/}	33 ^{3/}	1,064,518	6,012,186
1963-72 Average	4	24	548,338	2,784,441
1973-82 Average	8	36	1,580,698	9,239,932

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

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

3/ Thirteen year average.

(Literature Cited: 3)

APPENDIX TABLE 53. Commercial production and disposition of sockeye salmon, Bristol Bay, 1963-82.^{1/}

Year	Sockeye Salmon Production in Thousands of Pounds and Percent											
	Canned		Frozen		Cured		Export ^{2/}				Total	
	Pounds	%	Pounds	%	Pounds	%	Fresh		Brine ^{3/}			
						Pounds	%	Pounds	%			
1963	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
67	26,264	96	201	1	12	+	+	+		807	3	27,284
1968	14,865	95	98	1	210	1	10	+		466	3	15,649
69	32,750	93	421	1	331	1				1,593	5	35,095
70	84,932	84	3,236	3	37	+	1	+		13,328	13	101,534
71	52,514	91	1,813	3	15	+				3,162	5	57,504
72	14,045	97	55	+	11	+	21	+		365	3	14,497
1973	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
77	27,495	84	586	2	+	+	998	3		3,603	11	32,682
1978	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	46,379	35	31,856	24	4,242	3	23,284	17		27,780	21	133,541
81 ^{4/}	58,102	37	49,614	31	4,957	3	25,943	16		20,513	13	159,129
82 ^{4/}	33,378	28	57,637	49	3,223	3	20,417	17		3,583	3	118,238
20-Year Total	734,541		192,460		17,487		99,952			120,242		1,164,683
1963-72 Total	425,906		7,108		669		32			27,844		461,559
1973-82 Total	308,635		185,352		16,818		99,920			92,398		703,124
20-Year Average	36,727	63	9,623	17	874	1	4,998	9		6,012	10	58,234
1963-72 Average	42,591	92	711	2	67	+	3	+		2,784	6	46,156
1973-82 Average	30,864	44	18,535	26	1,682	3	9,992	14		9,240	13	70,312

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.

(Literature Cited: 1, 3, 4 and 17)

APPENDIX TABLE 54. South Unimak and Shumagin Island sockeye and chum salmon preseason quota and commercial catch, Alaska Peninsula, 1963-82. ^{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		
1963	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
67	186		73	69		51	255		124
1968	342		115	233		51	575		166
69	781		254	76		13	857		267
70	1,530		403	153		49	1,683		452
71	565		554	45		115	610		669
72	443		468	76		108	519		576
1973	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
77	193	195	93	46	42	22	239	237	115
1978	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
82	1,670	1,850	934	451	408	160	2,121	2,258	1,094
20-Year Total	13,112		5,215	2,842		1,051	15,954		6,266
1963-72 Total	5,218		2,445	1,031		552	6,249		2,997
1973-82 Total	7,894	7,893	2,770	1,811	1,767	499	9,705	9,660	3,269
20-Year Average	656		261	142		53	798		313
1963-72 Average	522		245	103		55	625		300
1973-82 Average	789	877	277	181	196	50	971	1,073	327

^{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.

(Literature Cited: 12)

APPENDIX TABLE 55. Subsistence catch of salmon by district and species, Bristol Bay, 1963-82. 163

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
82	350	71,400	1,100	600	900	1,000	75,000
20-Year Total	4,507	1,579,700	14,900	8,900	12,400 ^{2/}	9,600	1,625,700
20-Year Average	347	79,000	700	400	1,200 ^{2/}	500	81,300
<u>EGEGIK DISTRICT</u>							
1972	2					100	100
73	3					100	100
74	7	300	+	+		+	300
75 ^{3/}	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	+	+			+	+
1982	19	2,400	+			+	2,400
11-Year Total	84	3,600	+	200	+ ^{2/}	700	4,500
11-Year Average	8	300	+	+	+ ^{2/}	100	400

(continued)

APPENDIX TABLE 55. (continued)

Year	Permits Issued	Number of Fish ^{1/}				Coho	Total
		Sockeye	King	Chum	Pink		
<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
82	11	400	+	+	+	300	700
19-Year Total	173	9,800	500	1,000	100 ^{2/}	6,800	18,200
19-Year Average	9	500	+	100	+ ^{2/}	400	1,000

(continued)

APPENDIX TABLE 55. (continued)

Year	Permits Issued	Number of Fish ^{1/}					Total
		Sockeye	King	Chum	Pink	Coho	
<u>NUSHAGAK DISTRICT^{4/}</u>							
1963	71	4,200	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
82	376	34,700	12,200	11,500	7,300	8,900	74,600
20-Year Total	4,591	762,900	131,800	185,400	49,700 ^{2/}	82,000	1,217,400
20-Year Average	230	38,100	6,600	9,300	5,000 ^{2/}	4,100	60,900
<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
82	50	1,900	400	300	400	1,300	4,300
10-Year Total	418	30,600	5,200	9,300	1,600 ^{2/}	14,300	61,200
10-Year Average	42	3,100	500	1,000	300 ^{2/}	1,400	6,100

(continued)

APPENDIX TABLE 55. (continued)

Year	Permits Issued	Number of Fish ^{1/}				Coho	Total
		Sockeye	King	Chum	Pink		
<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
82	806	110,800	13,700	12,400	8,600	11,500	157,000
20-Year Total	8,941	2,382,000	152,300	203,200	63,800 ^{2/}	11,000	2,918,200
1963-72 Total	964	1,082,600	52,000	95,900	21,900	39,300	1,292,800
1973-82 Total	7,977	1,299,400	100,300	107,300	41,900	71,700	1,625,400
20-Year Average	688	119,100	7,600	10,200	6,400 ^{2/}	5,600	145,900
1963-72 Average	321	108,300	5,200	9,600	4,400	3,900	129,300
1973-82 Average	798	129,900	10,000	10,700	8,400	7,200	162,500

^{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.

(Literature Cited: 1 and 8)

APPENDIX TABLE 56. Subsistence catch of sockeye salmon by village, Kvichak River drainage, Bristol Bay, 1963-82.

Year	Number of Fish by Village ^{1/}								Total
	Levelock	Igiugig	Newhalen	Nondalton	Port Aisworth	Iliamna	Pedro Bay	Kokhanok	
1963	600 ^{2/}	-	7,000	25,000	-	3,000	14,000	7,000	56,600
64	1,000 ^{2/}	4,000	16,000 ^{3/}	35,000	-	3,000 ^{4/}	12,000	8,000	79,000
65	1,000 ^{2/}	3,300	9,700 ^{3/}	35,500	-	4/	9,800	10,200	69,500
66	600	1,200	6,600 ^{3/}	45,800	-	4/	6,000	10,500	70,700
67	1,400	3,400	9,100 ^{3/}	29,600	-	4/	9,900	10,200	63,600
1968	1,400 ^{2/}	4,800	8,700 ^{3/}	33,700	-	4/	9,800 ^{2/}	10,200 ^{2/}	68,600
69	1,000 ^{2/}	5,100	4,900 ^{3/}	44,000	-	4/	4,200	15,000	74,200
70	1,600 ^{2/}	11,200	16,400 ^{3/}	42,900	-	4/	11,200	22,300	105,600
71	1,600 ^{2/}	6,500	6,500	22,100	-	2,000	10,100	12,800	61,600
72	1,600 ^{2/}	2,200	6,600	24,100	-	3,400	4,000	8,300	50,200
1973	4,800	2,200	7,000	8,500	1,300	3,200	2,900	9,200	39,100
74	8,600	6,200	9,300	29,500	1,500	7,100	14,400	21,500	98,100
75	5,300	6,400	19,400 ^{3/}	48,700	2,100	7,300 ^{4/}	8,300	18,000	115,500
76	5,300	6,800	16,300 ^{3/}	20,500	5,500	4,400	17,100	75,900	
77	2,600	6,000	1,600	27,200	4,900	9,800	5,600	14,300	72,000
1978	8,900	8,800	6,100	17,300	3,000	4,900	11,200	23,700	83,900
79	4,400	6,600	4,200	14,700	4,200	11,700	3,500	16,200	65,500
80	6,100	8,100	7,000	11,300	6,000	4,100	7,400	22,600	72,600
81	6,600	5,400	10,900	15,200	6,800	4,500	9,700	16,500	75,600
82	5,400	1,900	9,900	11,200	4,500	3,600	8,200	16,600	61,300
20-Year Total	69,800	100,100	111,500	541,800		67,600	166,600	290,200	1,459,100
1963-72 Total	11,800	41,700	36,100	337,700		11,400	91,000	114,500	699,600
1973-82 Total	58,000	58,400	75,400	204,100	39,800	56,200	75,600	175,700	759,500
20-Year Average	3,500	5,300	8,600 ^{5/}	27,100		5,200	8,300	14,500	73,000
1963-72 Average	1,200	4,600	9,000	33,800		2,900	9,100	11,500	70,000
1973-82 Average	5,800	5,800	8,400	20,400	4,000	6,200	7,600	17,600	76,000

1/ Catches rounded to nearest hundred fish.

2/ Catch interpolated.

3/ Includes Iliamna.

4/ Included with Newhalen.

5/ Excluding 1965-70 and 1976.

(Literature Cited: 1 and 8)

APPENDIX A

BRISTOL BAY SALMON MANAGEMENT PLAN FOR 1982

The inshore sockeye salmon forecast for 1982 of 34.6 million will allow a commercial harvest of 29.2 million after escapement goals are met. Large numbers of harvestable sockeye are expected in all districts. Consistent early season fishing will be necessary to gauge district run strength and to allow processors and fishermen break-in time for more efficient operations. Ultimate fishing time allowed in the various districts will be determined by actual run strength in individual districts. 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.

The even-year pink salmon run to Nushagak district in 1982 is expected to produce 8.2 million fish in excess of escapement needs. Close scrutiny of the pink run will be necessary because of large differences in the past between forecasts and actual returns.

The anticipated harvest of 200,000 king salmon is well above the long-term average catch as is the 1.0 million chum salmon anticipated catch and the 300,000 coho salmon expected catch.

APPENDIX B

1. ANALYSIS OF 1982 BRISTOL BAY SALMON PROCESSING CAPACITY (November, 1981)

Introduction

The forecast of salmon runs returning to Bristol Bay in 1982 are expected to continue the exceptional production first manifest in 1978. Since 1978, and continuing through 1981, total Bristol Bay production (commercial catch) has averaged 24.0 million fish of all species. These large catches have severely stressed all components of the fishing industry: fishermen, processors, and market.

Department forecasts and harvest projections for 1982 indicate another large harvest potential is probable. The preseason outlook indicates a potential total salmon harvest of over 38 million fish, with sockeye and pink salmon expected to contribute over 96% of the total.

In recognition of the potential large harvest of sockeye and pink salmon for Bristol Bay in 1982, this report will address the question of the adequacy of processing capacity to handle the potential harvests.

Sockeye Salmon

To gain a perspective on the issue of the ability to handle or control a large sockeye return, the 1980-81 forecast, harvests, and escapements are compared with 1982 expectations:

APPENDIX B (continued)

Sockeye Salmon (in millions)

Year	Forecast			Actual Run		
	Total	Catch	Escapement	Total	Catch	Escapement
1980 ^{1/}	54.5	37.1	17.5	62.4	23.7	38.7
81	26.7	21.2	5.5	34.6	25.7	8.9
82 ^{2/}	34.6	29.2	5.5	-	-	-

1/ A price dispute delayed fishing until July 3 and significantly altered the balance between catch and escapement.

2/ Escapement goals for several river systems may be revised upward with a consequent decrease in potential harvest.

Factors which will have a bearing on the ability to adequately handle the 1982 sockeye run, other than actual run size, are:

- (1) Timing/Distribution - These factors are not controllable, but to a large degree they can drastically affect the ability of fishermen and industry's efforts to "stay on top the run". Timing in both 1980-81 was normal, and in both years the sockeye runs were well spread over time, which is a major factor in the industry's ability to process the catch in a timely manner. Distribution in 1980 was normal, but atypical in 1981. Although total catch was not affected, the onshore migratory habits in 1981 made for a "less than orderly" fishery.
- (2) Price Negotiations - The 1980 price dispute, which delayed fishing activities until July 3, resulted in approximately 10 million fish lost to the harvest (worth \$32 million in lost revenue to the fishermen alone), and an additional 3.5 million fish were lost to the harvest as a result of "down fishing time" by various companies. In 1981, price negotiations did not tie up the fleet, the run was fished early and industry was able to graduate into the run allowing processing problems to be largely solved before heavy fishing began in late June. There was very little fish lost inseason to "down time" in 1981, as the run was well spread in time, and Department closures to allow for escapement were adequate for industry to "stay on top of the run".
- (3) Size of Fish - Size of fish drastically affect total poundage. The 1982 projected harvest potential of 29.2 million sockeye would equal 161 million pounds at a 5.5 pound average, and would increase/decrease 3 million pounds for every tenth of a pound above or below the 5.5 pound average. The actual 1980-81 sockeye average weights and estimated 1982 average weight are shown below:

Year	% Age Composition		Sockeye Average Wt. (in lbs.)
	.2 ocean	.3 ocean	
1980	75	25	5.62
81 ^{1/}	46	54	6.50
82 ^{2/}	63	37	5.50

1/ Preliminary.

2/ Estimated.

APPENDIX B (continued)

- (4) Processing Capacity - The actual sustained processing capacity is affected by all the factors previously mentioned, as well as marketing conditions. The estimated and actual daily sustained processing capacity in 1980-81 is shown below:

<u>Year</u>	<u>Daily Sustained Processing Capacity (in 1,000's)</u>	
	<u>Estimated</u>	<u>Actual</u> ^{1/}
1980	1,630	1,970
1981	(Similar to 1980)	1,611

^{1/} Sustained processing capacity: 1980-July 3-12, and 1981-June 30-July 11.

Even though there was no loss of early season fishing time in 1981, which allowed for a break in period before heavy catches commenced, and double shifts at several major canning plants was in force, along with an increased number of both floating freezers and full production from several new major shore-based freezer plants, the sheer magnitude of the daily sockeye run in 1980 provided for peak sustained production. Provided all factors are equal, the 1982 daily sustained processing capacity should equal 1.8 million fish per day.

- (5) Processors and Production - The number of shore-based processing plants which can fish has remained constant for years, and beyond annual "efficiency efforts", the daily capacity of canned product has remained fairly constant. The number and capacity of both shore-based and floating processors (frozen and cured production), and export operators (airlift and sea transport) has increased dramatically since 1977 as shown below:

<u>Year</u>	<u>Production in Pounds (in millions)</u>		
	<u>Frozen/Cured</u>	<u>Export</u>	
		<u>Fresh</u>	<u>Brine</u>
1977	2.3	3.5	3.6
78	11.4	10.0	9.3
79	46.7	26.6	17.6
80 ^{1/}	42.9	26.2	27.8
81 ^{1/}	59.4	22.2	21.5

^{1/} Preliminary.

Fresh airlifted export may have reached a peak in 1979-80, while brine or chilled sea water export is further influenced by both run size and timing, and status or run strength in other districts and areas.

APPENDIX B (continued)

Again if all factors are equal in 1982, we should continue to see an increase in frozen production, a leveling of the air export, and an equal amount of export by sea transportation.

The strong South Peninsula and Kodiak pink salmon forecasts may limit the ability of Bristol Bay operators to ship fish to other areas for processing.

Pink Salmon

Pink salmon anticipated run strength in 1982 and processor capacity to handle the run is a problem exclusive to Nushagak district. The anticipated pink run is expected to total 9.2 million, with escapement requirements of 1.0 million, leaving 8.2 million as potential harvest.

What constitutes the problem is a series of factors:

- (1) the wide range of the inshore returns (from 126,000 in 1972 to 13.7 million in 1978), and the Department's inability to adequately forecast the return;
- (2) the generally small size of the fish (average 3.0 lbs.), which both slows production, and inhibits frozen production;
- (3) the "soft" nature of the fish, which requires quick processing (ie: Nushagak pinks deteriorate quickly which makes them less transportable to distant plants for processing), and
- (4) the run timing coincides with both South Peninsula and Kodiak pink runs.

Factors in favor of pink production is their general constant return over time. Although run timing has fluctuated up to one week in past years, the run itself spreads itself out over several weeks, allowing ample opportunity for harvest and processing.

Peak production (catch) in Nushagak district occurred in three (3) previous years:

<u>Year</u>	<u>Pink Salmon (in millions)</u>		
	<u>Catch</u>	<u>Escapement</u>	<u>Total Run</u>
1966	2.3	1.4	3.8
78	4.3	9.4	13.7
80	2.3	2.8	5.1

Total runs in the range of 3 to 5 million, which is the average return, are generally easily handled by what fishing and processing effort remains after sockeye season. Total runs in the magnitude of 1978 (13.7 million) did create both harvest and processing problems and a potential 9.2 million return in 1982 will probably create additional problems.

APPENDIX B (continued)

The heavy state-wide forecast harvest of pinks (60% of total catch or 81 million fish) will no doubt cast Nushagak pinks in a poor light. The low price paid in 1980 (25¢/lb.) was not well received, and this factor will probably be of primary importance at upcoming price negotiations.

Conclusions

If all factors in 1982 are equal to 1981, the existing industry and fishermen have the ability to adequately handle the 1982 sockeye run. If price negotiations stall the season opening, results similar to 1980 can be expected to result.

The pink salmon picture is complicated by many factors, but the anticipated harvest may not be achieved. Factors, such as industry interest and intent due to recent marketing trends, are outside of Department preview, but they certainly will form a major component of industry intent in 1982.

2. PRELIMINARY 1982 PROCESSING CAPACITY REPORT (Dec., 1981) (Excerpts re Bristol Bay from report to the Board of Fisheries)

Introduction

The 1982 statewide forecast is also unique, with 81 million (or 60%) of the total 135 million fish harvested projected to be pink salmon. Pink salmon harvest of that level would surpass the old record of 77.8 million pink salmon harvested in 1941. Record pink salmon surpluses in the major fisheries around the Gulf of Alaska may have profound effects on market availability and price paid to fishermen in many of the more remote pink salmon fisheries in Norton Sound, Nushagak Bay and along the Alaska Peninsula.

While a total statewide harvest of this magnitude provides important opportunities and great potential benefits, it also presents great challenges to the State and industry to insure proper utilization of the valuable resource available. In recent past seasons large salmon harvests in some areas have stressed domestic processing capabilities which have resulted in some harvestable surpluses lost to the fisheries. The 1980 Bristol Bay sockeye salmon fishery provides an example where fishing activities delayed by price disputes and processing capacity shortfalls resulted in approximately 13.5 million fish, worth \$43 million to fishermen alone, lost to the harvest.

To seek a solution for these situations the Department of Fish and Game and the Alaska Board of Fisheries, with the aid of industry and fishermen, have attempted to document existing domestic harvesting and processing capacities and identify potential shortfalls in a series of annual processing capacity reports. The first report published in the spring of 1978 aided government and industry officials in developing plans to deal with the processing problems identified. Similar reports were also published in 1979 and 1980 to document problems anticipated as a result of record level forecasts.

APPENDIX B (continued)

Like the preceding reports, this report is intended to serve as a first step in the planning process for the anticipated record 1982 salmon runs by identifying fisheries where significant processing capacity deficiencies may well occur. Comparisons of actual processing performances observed during the past two seasons or potential capacities based on facilities available are made to the size and timing of the 1982 forecasted harvests by area and serve as basis for capacity determinations. Clearly it is difficult if not impossible for this report to address actual processing capacities domestic processors may plan for the 1982 season as that will largely depend on price and marketing factors still largely undetermined. Government and industry officials should evaluate the material presented in this brief analysis and focus further analysis and planning efforts on the problems identified.

Capacity information provided in this report was compiled by Commercial Fisheries Division personnel in early November through direct contact with local area processors and/or assessment of industry performance in 1980-81 (Table 1).

Statewide Overview

The 1980 and 1981 commercial salmon fisheries in Alaska provided total annual harvests of 110.3 and 111.4 million fish, respectively. Many local salmon fisheries documented new record harvests during the two years and provided new challenges to the fishermen and processors alike. Harvest levels observed during those years provide one quick way to gauge how well fishermen and processors may respond to the record level salmon runs anticipated for the 1982 fisheries. A simple comparison of the 1980 and 1981 commercial salmon harvests by region or area to the estimated 1982 harvest levels identifies three fisheries (Southeastern, Prince William Sound, and Bristol Bay) that may face harvests significantly greater than those recorded in recent years (Table 1). The three areas showing significant potential harvest increases warrant further discussion.

Bristol Bay

The 1982 forecast of salmon harvest in Bristol Bay shows the greatest difference from the 1980 and 1981 catch levels presented in Table 1. If realized, the 1982 harvest will continue the exceptional salmon production first manifested in 1978. Annual commercial catches since 1978 have averaged 24.0 million fish. As a consequence the Bristol Bay salmon fishery has been the focus of all earlier processing capacity reports in an effort to forestall harvesting and processing problems. Even so, in 1979 and 1980 price disputes delayed fishing activities and resulted in harvests lost to the fishery and further aggravated domestic processing problems. In 1979 and 1980 exceptions were granted under the authority of 5 AAC 39.198, a regulation governing commercial fishing and related operations by aliens not lawfully admitted to the United States. The intent was that foreign vessels and aliens be allowed limited participation in the Bristol Bay salmon fishery in order to supplement domestic processing capacity.

In the 1982 season the 38 million salmon harvest projected for the Bristol Bay fishery should surpass all prior recorded harvests. Sockeye and pink

APPENDIX B (continued)

salmon fisheries, the two most crucial, are expected to contribute 29.1 and 8.2 million fish, respectively, to the harvest. Due to the non-overlapping run timing of the two species, consideration of their harvest impacts on processing capacity is best accomplished separately.

Sockeye salmon harvests normally peak during the first week to ten days in July. In 1980 and 1981 daily catches of 1.0 to 2.0 million salmon were recorded from June 30 through July 12, while daily catches of 2.0 to 2.5 million were recorded between July 3 and 7. At the forecasted run level similar catch rates are expected during the 1982 sockeye fishery. Certainly this may vary as a result of changes in run timing or onshore migratory patterns and may drastically affect the ability of fishermen and industry to "stay on top of the run". Timing in both 1980 and 1981 was normal, consequently the sockeye salmon run was well spread over time and enabled the fishery to process the number of fish handled seasonally in both those years.

Size of fish can drastically affect the processors' ability to handle a run of this magnitude. The 1982 forecasted 29.2 million fish harvest would equal 161 million pounds at a 5.5 pound average and would increase or decrease 3 million pounds for every tenth of a pound change in average weight. Biologists are anticipating the run to consist of 63 percent 2 ocean fish, which may lower the average weight from the 6.5 pound average recorded in 1981.

The observed average daily sustained processing capacity of the Bristol Bay fishery in 1980 and 1981 provides the best perspective of processing capacity that may be available in 1982. Records show at peak harvest levels Bristol Bay processors were able to sustain an average 2.0 million fish daily processing capacity in 1980 and 1.6 million fish in 1981. Based on information available now, processors should be able to sustain at least a 1.8 million fish daily capacity during the 1982 season.

In summary, if similar capacities are on line for the 1982 sockeye salmon fishery as were observed in 1980-81, fishermen and industry have the ability to adequately handle the 1982 forecasted harvest. If price negotiations delay fishing activities, harvestable surpluses will be lost to the fishery. Fish size and run timing can also greatly impact the processing capacity picture and should be closely monitored by Department staff.

The anticipated pink salmon run in 1982 and processors' capacity to handle the harvest is a problem exclusive to the Nushagak district. The anticipated 9.2 million pink salmon run could potentially provide a harvest of 8.2 million fish and establish a new record catch.

Several factors will present major obstacles to the complete harvesting and processing of Nushagak district pink salmon in 1982. First, pink salmon returns have been extremely variable (from 126,000 in 1972 to 13.7 million fish in 1978) and the Department has not been able to accurately forecast returns, making it difficult for industry to plan operations. Secondly, the generally small size of the fish (average 3 pounds) slows processing and inhibits frozen production. Also, the soft nature of the Nushagak district

APPENDIX B (continued)

pink salmon requires quick processing and inhibits transportation to distant plants for processing. Lastly, run timing coincides with both South Peninsula and Kodiak pink salmon fisheries, thereby reducing the availability of processing capacity outside Bristol Bay.

Large pink salmon runs were recorded in three previous years in Nushagak Bay: 3.8 million fish in 1966, 13.7 million fish in 1978, and 5.1 million fish in 1980. Based on those seasons, runs of 3 to 5 million fish are generally easily handled by what fishing and processing effort remains after the sockeye salmon fishery. Total runs in the magnitude of 1978 (13.7 million fish) created severe harvesting and processing problems, resulting in fish dumping and lost harvest. It is anticipated that the 1982 pink salmon run, if it occurs as forecast, would create similar problems. It is impossible to predict at this time what processing capacity will be on line for the 1982 pink fishery.

The projected pink salmon harvest level presents many problems to the fishery which may not be resolved. Market conditions and fishermen and industry interest will largely control whether the harvest is achieved.

As in past seasons, Kodiak and Lower Cook Inlet facilities should provide a major outlet for surplus Prince William Sound pink and chum salmon harvests as well as for Bristol Bay sockeye salmon fishery surpluses. It is doubtful that any of these areas (Kodiak or Alaska Peninsula) would be situated to lend supplemental capacity to Nushagak district pink salmon processing due to run timing conflicts with their own principle fisheries.

Status of State's Foreign Processing Regulation

On February 13, 1981, the Bristol Bay Herring Marketing Cooperative and others sued the State of Alaska to prevent enforcement of the provisions of 5 AAC 39.198 and allow them to sell unprocessed herring to the North Pacific Longline Gillnet Association, a group of Japanese fishermen. On March 27, 1981 Federal District Court Judge James H. Fitzgerald issued his findings, conclusions and opinion on the suit. The judge concluded that the State's regulation was "an unlawful burden under the commerce clause of the United States Constitution"; that the Coop would suffer irreparable injury as they would be precluded from honoring their contract with the Association and that the State had the ability to protect the resource. The judge restrained the State from enforcing its foreign processing regulations, but made the restraining order applicable only to the Coop's actions. Other groups could not engage in similar activities.

Recommendations

Considering the industry capacity demonstrated in 1980 and 1981, it would seem that if the runs materialize at or below the point forecast, the majority of the available surplus would be harvested. The Department has pointed out that runs in Southeastern, Prince William Sound, and Bristol Bay are most likely to exceed past demonstrated capacity. We can obviously not guarantee, at this point, where the runs will fall within the forecast range.

APPENDIX B (continued)

We also cannot predict industry intent due to our lack of firm knowledge of market conditions which will prevail this season. Nevertheless, we do know that pink salmon make up some 60% of the statewide total and would be a historical record if they materialize as forecast. The three fisheries identified as having possible surpluses in excess of capacity all would have surpluses of pink salmon. This may make the potential for surplus more credible.

We would also point out that, given the potential for a surplus of available pink salmon, there may be a lack of interest in harvest of this species in more remote areas or where quality is less than in the more usual fisheries. Unharvested surpluses of pink salmon have commonly occurred in Norton Sound, and in recent years, in Bristol Bay. Terminal area harvests at hatchery facilities may also produce lower quality fish of lessened demand.

We have highlighted certain area/species problems. None are so clear as to demand action without further consideration of industry intent. Nevertheless, the potential for unharvested surpluses clearly exists and we suggest this trigger the need for further study and possible action by appropriate bodies.

APPENDIX B (continued)

Appendix B Table 1. Summary of 1980-81 salmon harvest and 1982 harvest projection, daily processing capacity, and operational canning lines available, Bristol Bay, 1982.^{1/}

I. Comparison of 1980 and 1981 Commercial Salmon Harvests with 1982 Projections (in thousands of fish):				
Area	Harvest		1982 Projection	
	1980	1981		
Bristol Bay	28,100	27,700	36,900	

II. Projected Daily Processing Capacity Estimate for the 1982 Salmon Fishery (in thousands of fish):				
Area	Daily Processing Capacity			
	Canning	Fresh/Frozen	Export	Total
Bristol Bay	684	648	468	1,800

III. Plants and Operational Canning Lines Available for the 1982 Salmon Season:					
Area	Number Plants	Operational Canning Lines Available			
		1/4 lb.	1/2 lb.	1 lb.	Total
Bristol Bay	12	2	18	18	38

^{1/} All data in this table extracted from appendix tables in "Preliminary 1982 Processing Capacity Report" to the Alaska Board of Fisheries, December, 1981.

APPENDIX B (continued)

3. 1982 PROCESSING CAPACITY UPDATE (April, 1982)
(Excerpts re Bristol Bay from Report to the Board of Fisheries)Introduction

The 1982 Alaskan salmon processing picture continues to demand serious attention by fishermen, processors, and government officials. Central to the success of what could represent a record commercial salmon season for Alaska is the ability of the salmon industry to catch and process the surpluses as they become available for harvest. The Alaska Board of Fisheries and the Department of Fish and Game has attempted to anticipate potential harvesting and processing difficulties so that unplanned under utilization or wastage of Alaska's important renewable fish resources may be avoided. The Department of Fish and Game compiled a preliminary evaluation of the potential 1982 domestic processing capacity for presentation to the Board of Fisheries in December 1981. It was recognized that important additional information would become available as industry plans solidified and that an updated evaluation of the processing picture would aid the Board of Fisheries in further considering possible regulatory solutions during their spring meeting. This update is intended to serve in that capacity by reporting what limited new information has come to light since December 1981.

The information contained in this report is intended to supplement the Preliminary 1982 Processing Capacity Report. Only those fisheries identified as strong candidates for processing shortfalls are addressed. It is also hoped that additional information will be brought to the Board's attention as a result of the public hearing.

Fishery Updates and Recommendations

No new information has been obtained from Bristol Bay salmon processors that would alter the preliminary capacity evaluation of the areas sockeye salmon fishery. Department biologists have revised the Kvichak River escape-ment goal from 2.0 to 4.0 million sockeye salmon spawners for the 1982 season to strengthen the normally weak mid-cycle year production. This lowers the anticipated sockeye salmon harvest to 27.2 million and may further ease the processing picture in the Naknek-Kvichak fishing district. Overall, Bristol Bay processors have demonstrated adequate capacity to handle the 1982 forecasted sockeye salmon harvest.

The situation may be considerably different during the Nushagak district pink salmon fishery which could potentially provide a record harvest of 8.2 million fish. Recent contact with processors show limited interest in this late July, early August, fishery. Although adequate processing capacity does potentially exist to handle the harvest it is now evident that processing capacity shortfalls are likely. Unfortunately the Department cannot now quantify what the shortfall may be nor can the normally variable Nushagak River pink salmon forecast be expected to be precise. Certainly, the lack of processor commitment is related to confidence in the forecast; it is difficult to plan a processing operation for a fishery that may not materialize as predicted. The Nushagak district pink salmon fishery may be a strong candidate for foreign processing unless processors show considerably more interest.

APPENDIX C

KVICHAK AND WOOD RIVER ESCAPEMENT
GOAL REVISIONS, 1982

Due to excellent sockeye salmon production during the last few years and anticipated record levels of abundance in 1982, and increased biological understanding of the mechanisms influencing salmon production, an opportunity has presented itself to sustain increased runs and harvests in future years, specifically from the Kvichak - Lake Clark and Wood River systems.

The Kvichak - Lake Clark system demonstrates two stable levels of production, one at escapement levels below about 3 million spawners and the other above that number. The Department is attempting to cross this transition boundary from the lower production stability domain to the higher production stability domain by increasing the escapement goal from the typical non-peak goal of 2 million up to 4 million spawners for 1982. Recent analysis of salmon production from escapements of 4 million indicates that juvenile salmon production will increase four-fold and that an additional 5 to 10 million adults could be expected, spread over the years 1986, 1987, and 1988. The Lake Clark component of the system may be playing an important role in the 1982 salmon run. It now appears that this rumored past major salmon contributor has returned to production. A significant portion of the 1982 run is anticipated to be of Lake Clark origin and our desire is to achieve strong escapements to Lake Clark. Much of the escapement to Lake Clark is expected to come from the early portion of the run.

The Wood River system may also see an increase beyond the traditional 800,000 escapement goal, depending on age composition of the run. The larger 3-ocean sockeye tend to spawn in the short rivers connecting the Wood River Lakes while the smaller 2-ocean fish tend to spawn on lake beach areas and smaller streams. The river areas have quite limited spawning areas while the beach and small stream spawning areas are considerably more extensive. Therefore, if the salmon return has a high percentage of 3-ocean river spawners, the escapement goal would remain at 800,000, whereas, if the return had a high percentage of 2-ocean beach and stream spawners, the system could accommodate an increased number of spawners and the escapement goal would be set at 1.2 million fish. The age composition will be determined in season, as will the specific escapement goal.

Through these adjustments to escapement goals the Department hopes to increase and sustain high levels of salmon production in future years.



1982 TIDE TABLES
 BIGGER THE DOT-BETTER THE FISHING
 PUBLISHED CONTINUOUSLY SINCE 1947
NUSHAGAK TIDES

NUSHAGAK BAY DISTRICT
CORRECTION TABLE

To correct the TIME and HEIGHT for HIGH or LOW tides for the points from the low, add or subtract TIME and FEET from the NUSHAGAK District Tide Table.

Point	TIME		FEET	
	High	Low	High	Low
BRISTOL BAY				
Port Moller (Entrance Point)	+1:20	-1:20	+0.30	+0.30
NUSKOGIV RIVER				
Entrance	+1:20	-1:20	+0.30	+0.30
Spring	+1:20	-1:20	+0.30	+0.30
Kivikak Bay	+1:20	-1:20	+0.30	+0.30
NUSKOGIV RIVER				
Entrance	+1:20	-1:20	+0.30	+0.30
Merrill Point	+1:10	-1:10	+0.30	+0.30
Omarsuk Point	+1:20	-1:20	+0.30	+0.30
Kivikak Bay	+1:20	-1:20	+0.30	+0.30
KIVIKAK RIVER				
Entrance	+1:20	-1:20	+0.30	+0.30
Kivikak	+1:20	-1:20	+0.30	+0.30
NUSHAGAK BAY				
Entrance Point	+1:20	-1:20	+0.30	+0.30
Black Point	+1:20	-1:20	+0.30	+0.30
Walrus Island	+1:20	-1:20	+0.30	+0.30
ST. LAWRENCE ISLAND				
Northern Cape	+1:20	-1:20	+0.30	+0.30
Point River	+1:20	-1:20	+0.30	+0.30
Nushagak Lagoon	+1:20	-1:20	+0.30	+0.30
Entrance	+1:20	-1:20	+0.30	+0.30

* Low water falls below -3 feet.
 * Multiply height of District Tide by proper ratio to correct height of High or Low T. Ft.

HIGH Tides NUSHAGAK District
MAY 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	Sat		9:49 22.5	9:55 16.
2	SUN		10:42 21.8	10:59 16.
3	Mon		11:34 20.9	
4	Tues		0:06 17.3	12:27 19.1
5	Wed		1:10 17.7	1:18 18.1
6	Thur		2:13 18.2	2:06 17.
7	Fri		3:11 18.7	2:53 16.1
8	Sat		4:03 19.1	3:38 15.1
9	SUN		4:49 19.4	4:20 14.1
10	Mon		5:35 19.5	5:00 13.4
11	Tues		6:18 19.6	5:41 12.9
12	Wed		6:55 19.6	6:23 12.4
13	Thur		7:34 19.6	7:06 12.1
14	Fri		8:12 19.6	7:51 12.7
15	Sat		8:50 19.4	8:35 13.0
16	SUN		9:29 19.3	9:27 13.1
17	Mon		10:08 19.0	10:20 14.3
18	Tues		10:45 18.7	11:17 15.2
19	Wed		11:27 18.3	
20	Thur		0:13 18.5	12:08 17.9
21	Fri		1:10 17.9	12:51 17.4
22	Sat		2:08 19.5	1:40 17.0
23	SUN		3:04 21.0	2:32 18.5
24	Mon		4:00 22.3	3:24 18.4
25	Tues		4:55 23.2	4:23 18.2
26	Wed		5:51 23.8	5:26 18.1
27	Thur		6:46 24.0	6:26 18.1
28	Fri		7:39 23.9	7:35 18.2
29	Sat		8:34 23.3	8:43 18.4
30	SUN		9:27 22.5	9:48 18.7
31	Mon		10:17 21.5	10:57 17.2

LOW Tides NUSHAGAK District
MAY 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	Sat		3:05 -1.7	4:11 2.8
2	SUN		4:08 -0.8	5:07 1.9
3	Mon		5:09 0.6	6:02 1.2
4	Tues		6:09 1.9	6:53 0.8
5	Wed		7:10 3.1	7:43 0.8
6	Thur		8:09 4.2	8:28 0.4
7	Fri		9:08 5.0	9:15 0.5
8	Sat		10:04 5.6	9:57 0.7
9	SUN		10:57 6.0	10:38 1.0
10	Mon		11:47 6.2	11:20 1.2
11	Tues			12:35 0.3
12	Wed		0:02 1.5	1:17 0.3
13	Thur		0:42 1.8	2:03 0.2
14	Fri		1:24 2.1	2:42 0.9
15	Sat		2:06 2.4	3:24 0.5
16	SUN		2:52 2.7	4:06 0.0
17	Mon		3:38 3.2	4:48 4.2
18	Tues		4:29 3.7	5:27 3.2
19	Wed		5:22 4.3	6:08 2.0
20	Thur		6:18 4.8	6:51 0.7
21	Fri		7:18 5.2	7:36 -0.4
22	Sat		8:18 5.5	8:22 -1.3
23	SUN		9:18 5.6	9:11 -2.8
24	Mon		10:15 5.4	10:04 -3.5
25	Tues		11:14 5.0	10:58 -3.8
26	Wed		12:12 4.3	11:55 -3.8
27	Thur			1:50 3.5
28	Fri		0:54 -3.0	2:45 2.8
29	Sat		1:51 -2.0	3:40 2.1
30	SUN		2:50 -0.8	3:35 1.2
31	Mon		3:51 0.9	4:48 0.4

HIGH Tides NUSHAGAK District
JUNE 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	Tues		11:07 20.3	
2	Wed		0:03 17.7	11:55 18.9
3	Thur		1:05 18.3	12:49 17.9
4	Fri		2:03 18.8	1:32 18.2
5	Sat		2:59 19.2	2:14 14.9
6	SUN		3:45 19.6	2:59 13.8
7	Mon		4:30 19.7	3:38 13.1
8	Tues		5:09 19.8	4:20 12.6
9	Wed		5:50 19.9	5:02 12.3
10	Thur		6:28 19.8	5:44 12.1
11	Fri		7:01 19.8	6:28 12.2
12	Sat		7:37 19.7	7:17 12.4
13	SUN		8:12 19.8	8:07 12.8
14	Mon		8:48 19.4	9:01 13.7
15	Tues		9:24 19.1	9:57 14.8
16	Wed		9:59 18.8	10:56 18.1
17	Thur		10:41 18.4	11:52 17.8
18	Fri		11:25 18.0	
19	Sat		0:51 19.2	12:12 17.5
20	SUN		1:49 20.8	1:04 17.2
21	Mon		2:46 22.1	2:01 16.8
22	Tues		3:41 23.1	3:02 16.8
23	Wed		4:37 23.8	4:09 16.4
24	Thur		5:32 24.1	5:09 16.4
25	Fri		6:24 24.0	6:15 16.4
26	Sat		7:17 23.6	7:24 16.5
27	SUN		8:10 22.8	8:32 16.7
28	Mon		9:00 21.8	9:39 17.1
29	Tues		9:48 20.6	10:46 17.6
30	Wed		10:36 19.3	11:47 18.1

LOW Tides NUSHAGAK District
JUNE 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	Tues		4:53 2.4	5:37 -0.1
2	Wed		5:55 3.9	6:28 -0.4
3	Thur		6:55 5.0	7:18 -0.8
4	Fri		7:54 5.9	7:59 -0.4
5	Sat		8:51 6.8	8:42 -0.1
6	SUN		9:47 8.9	9:28 0.2
7	Mon		10:37 7.1	10:05 0.6
8	Tues		11:24 7.1	10:48 1.0
9	Wed		12:10 7.8	11:24 1.4
10	Thur			12:52 2.8
11	Fri		0:08 1.7	2:34 0.4
12	Sat		0:47 2.2	2:13 5.9
13	SUN		1:31 2.7	2:52 5.1
14	Mon		2:16 3.3	3:30 4.1
15	Tues		3:05 3.9	4:08 3.0
16	Wed		3:58 4.6	4:48 1.8
17	Thur		4:54 5.3	5:30 0.2
18	Fri		5:54 5.9	6:15 -1.3
19	Sat		6:54 6.2	7:04 -2.6
20	SUN		7:54 8.3	7:52 -3.7
21	Mon		8:54 8.2	8:47 -4.3
22	Tues		9:55 5.7	9:41 -4.8
23	Wed		10:54 5.1	10:38 -4.3
24	Thur		11:51 4.2	11:26 -3.8
25	Fri			12:47 3.2
26	Sat		0:35 -2.4	1:42 2.1
27	SUN		1:34 -1.0	2:38 1.7
28	Mon		2:34 0.7	3:30 0.2
29	Tues		3:32 2.4	4:21 -0.4
30	Wed		4:34 3.9	5:11 -0.8

HIGH Tides NUSHAGAK District
JULY 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	Thur		11:25 17.9	
2	Fri		0:46 18.6	12:11 16.8
3	Sat		1:42 19.0	12:53 15.4
4	SUN		2:31 19.3	1:35 14.4
5	Mon		3:19 19.5	2:21 13.8
6	Tues		4:01 19.8	3:00 13.8
7	Wed		4:41 19.6	3:44 12.8
8	Thur		5:19 19.8	4:26 12.4
9	Fri		5:53 19.8	5:14 12.4
10	Sat		6:27 19.5	6:00 12.6
11	SUN		7:00 19.4	6:52 12.8
12	Mon		7:34 19.2	7:45 13.7
13	Tues		8:08 19.0	8:42 14.8
14	Wed		8:45 18.7	9:36 18.0
15	Thur		9:23 18.4	10:34 17.5
16	Fri		10:05 18.1	11:33 18.9
17	Sat		10:54 17.8	
18	SUN		0:29 20.3	11:46 17.6
19	Mon		1:28 21.4	12:42 17.4
20	Tues		2:23 22.4	1:41 17.2
21	Wed		3:19 23.0	2:45 17.0
22	Thur		4:18 23.2	3:50 16.9
23	Fri		5:09 23.2	4:58 16.8
24	Sat		6:01 22.9	6:04 17.8
25	SUN		6:53 22.2	7:12 17.1
26	Mon		7:42 21.4	8:18 17.4
27	Tues		8:30 20.3	9:22 17.7
28	Wed		9:19 19.1	10:23 18.1
29	Thur		10:04 17.9	11:21 18.4
30	Fri		10:49 16.8	
31	Sat		0:15 18.7	11:35 15.8

LOW Tides NUSHAGAK District
JULY 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	Thur		5:33 5.2	6:30 -0.8
2	Fri		6:30 6.2	6:44 -0.8
3	Sat		7:30 6.9	7:28 -0.8
4	SUN		8:28 7.3	8:12 -0.2
5	Mon		9:17 7.6	8:53 0.1
6	Tues		10:07 7.8	9:35 0.5
7	Wed		10:52 7.5	10:14 1.1
8	Thur		11:38 7.2	10:56 1.4
9	Fri		12:20 6.8	11:38 1.9
10	Sat			12:58 6.2
11	SUN		0:17 2.5	1:37 5.4
12	Mon		1:02 3.1	2:16 4.4
13	Tues		1:50 3.8	2:51 3.1
14	Wed		2:41 4.6	3:33 1.7
15	Thur		3:36 5.3	4:13 0.2
16	Fri		4:34 5.9	4:58 -1.3
17	Sat		5:32 6.3	5:47 -2.5
18	SUN		6:32 6.5	6:38 -3.6
19	Mon		7:33 6.4	7:31 -4.3
20	Tues		8:33 6.1	8:27 -4.5
21	Wed		9:31 5.4	9:24 -4.2
22	Thur		10:30 4.8	10:22 -3.5
23	Fri		11:28 3.5	11:21 -2.4
24	Sat			12:24 2.5
25	SUN		0:18 -1.0	1:17 1.4
26	Mon		1:17 0.5	2:09 0.6
27	Tues		2:18 2.1	3:00 -0.1
28	Wed		3:14 3.6	3:50 -0.4
29	Thur		4:14 4.8	4:37 -0.6
30	Fri		5:10 5.8	5:24 -0.5
31	Sat		6:05 6.8	6:10 -0.3

HIGH Tides NUSHAGAK District
AUGUST 1982

DATE	DAY	DAY'S	A.M.	P.M.
		GUIDE	TIME	TIME
1	SUN		1:06 18.8	12:17 15.8
2	Mon		1:55 18.9	1:02 14.3
3	Tues		2:41 19.0	1:45 13.5
4	Wed		3:23 19.0	2:28 13.5
5	Thur		4:03 18.9	3:19 13.3
6	Fri		4:41 18.9	4:01 13.3
7	Sat		5:14 18.8	4:50 13.4
8	SUN		5:49 18.7	5:40 13.9
9	Mon		6:21 18.5	6:33 14.6
10	Tues		6:57 18.3	7:29 15.5
11	Wed		7:31 18.1	8:21 16.7
12	Thur		8:12	

ANNUAL MANAGEMENT REPORT
BRISTOL BAY HERRING FISHERY
1982

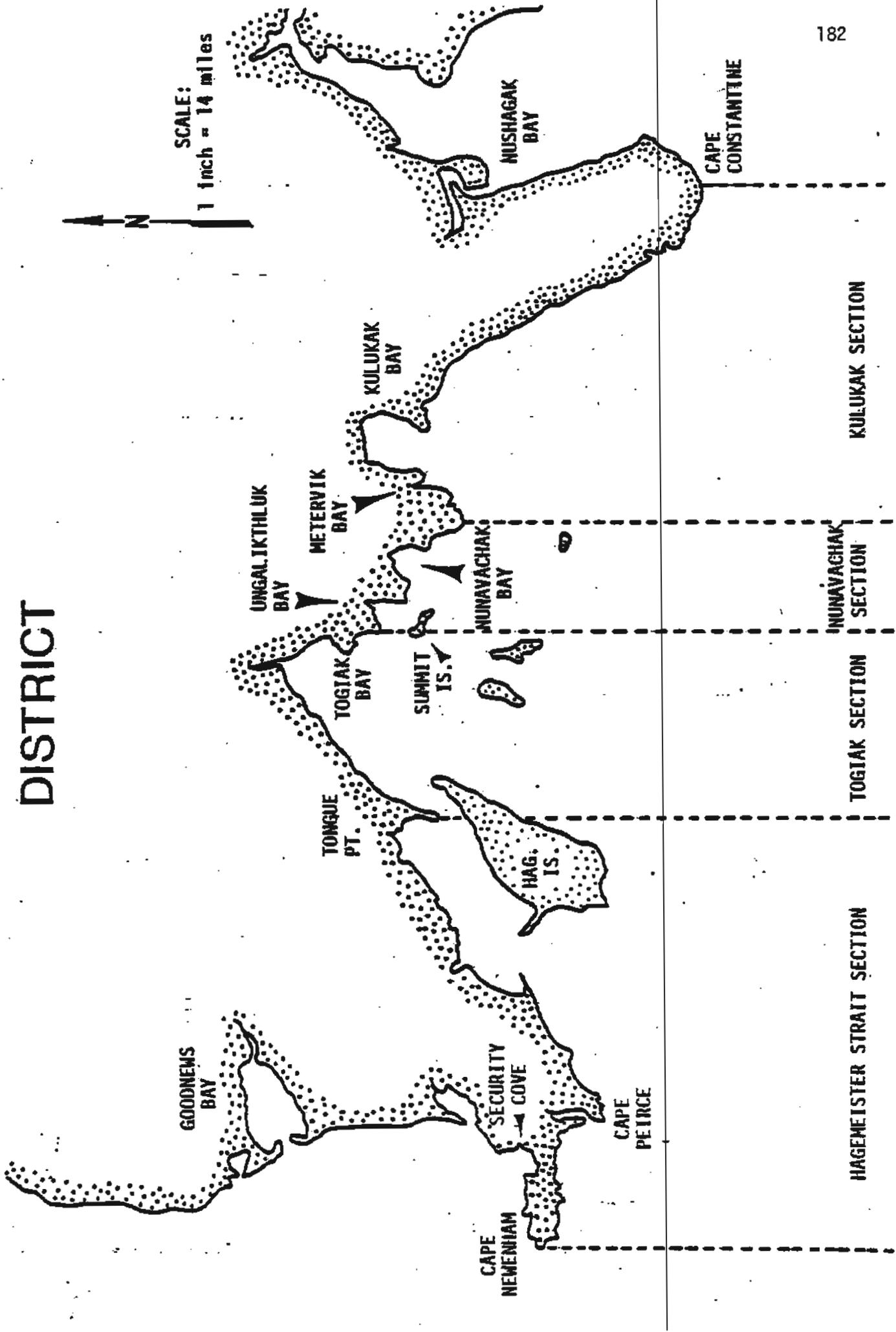
INTRODUCTION

The commercial sac roe herring fishery began in Bristol Bay in 1967, followed by the spawn on kelp fishery in 1968. Due to a lack of buyers in 1971 and 1976, the sac roe fishery did not operate in those years. During the first 10 years, this fishery remained quite small with an average fleet of 24 vessels and very few buyers (Appendix Table 2). Favorable economic conditions and a general lack of herring on the world market led to a major expansion of the fishery in 1977. Further incentive and protection was provided to domestic fishermen by the Fishery Conservation and Management Act of 1976 (the 200 mile limit). This bill curtailed some countries that were targeting on herring in the United States zone.

Herring are found in several locations in Bristol Bay, but the major concentration occurs in and around the Togiak district, the site of the commercial fishery (Figure 1). Fishing gear is limited to gill nets, purse seines and hand purse seines, 150 fathoms in length. At the present time 300 fathoms of gill net may be fished from a single vessel if two entry permit holders are aboard. The herring season runs from April 25 to June 30, and has been managed by emergency order field announcement since 1981. The Board has directed the staff to manage for the highest possible roe recovery and to minimize waste of the resource. In 1982 the Board of Fisheries adopted two fishery management plans for Togiak herring (Appendix A and B). The first plan describes the basic guidelines to follow in managing the resource, dictates varying exploitation rates for young vs. old year age classes, and sets a level of tonnage that must be present prior to a fishery.

Figure 1.

TOGIAK HERRING FISHING DISTRICT



The second management plan concerns a time allocation and allows the gill net fleet three times more fishing time than the purse seiners, in openings of less than 24 hours. In openings longer than 24 hours, the time is equal for both gear types.

Since it began in 1968, the herring spawn on kelp fishery has experienced steady growth until it peaked in 1979 at over 400,000 pounds (Appendix Table 5). The participants in this fishery are mostly local watershed residents who harvest the intertidal rockweed kelp, (Fucus sp.) by hand or hand-held rakes, the legally approved methods. Management of the spawn on kelp harvest is based on quotas by beach area, determined by biomass surveys of the coastal plant community, and is conducted under a plan approved by the Board of Fisheries in 1979 (Appendix C). Density and distribution of spawn is evaluated inseason and this fishery is also regulated by emergency order field announcement. Harvest areas are designated by a K-series map, made available to the fishermen prior to the season (Figure 2).

Herring Sac Roe Fishery

For the second consecutive year the commercial herring fishery at Togiak was managed by emergency order field announcement (Table 2). This type of management has resulted in reduced waste and was necessary for conservation of the resource and to achieve the exploitation objective of 10 to 20% established by the Board of Fisheries.

Due to heavy pack ice in the northern part of Bristol Bay, many processors and fishermen had great difficulty getting to the grounds. Many commented about the "late breakup", but in reality, 1982 may have been more "normal" than recent years. Department camps were established at Summit Island and at Metervik Bay on May 5 and by May 6 both processing and fishing vessels were arriving steadily from the south, even though as much as 50 miles of ice was still reported offshore.

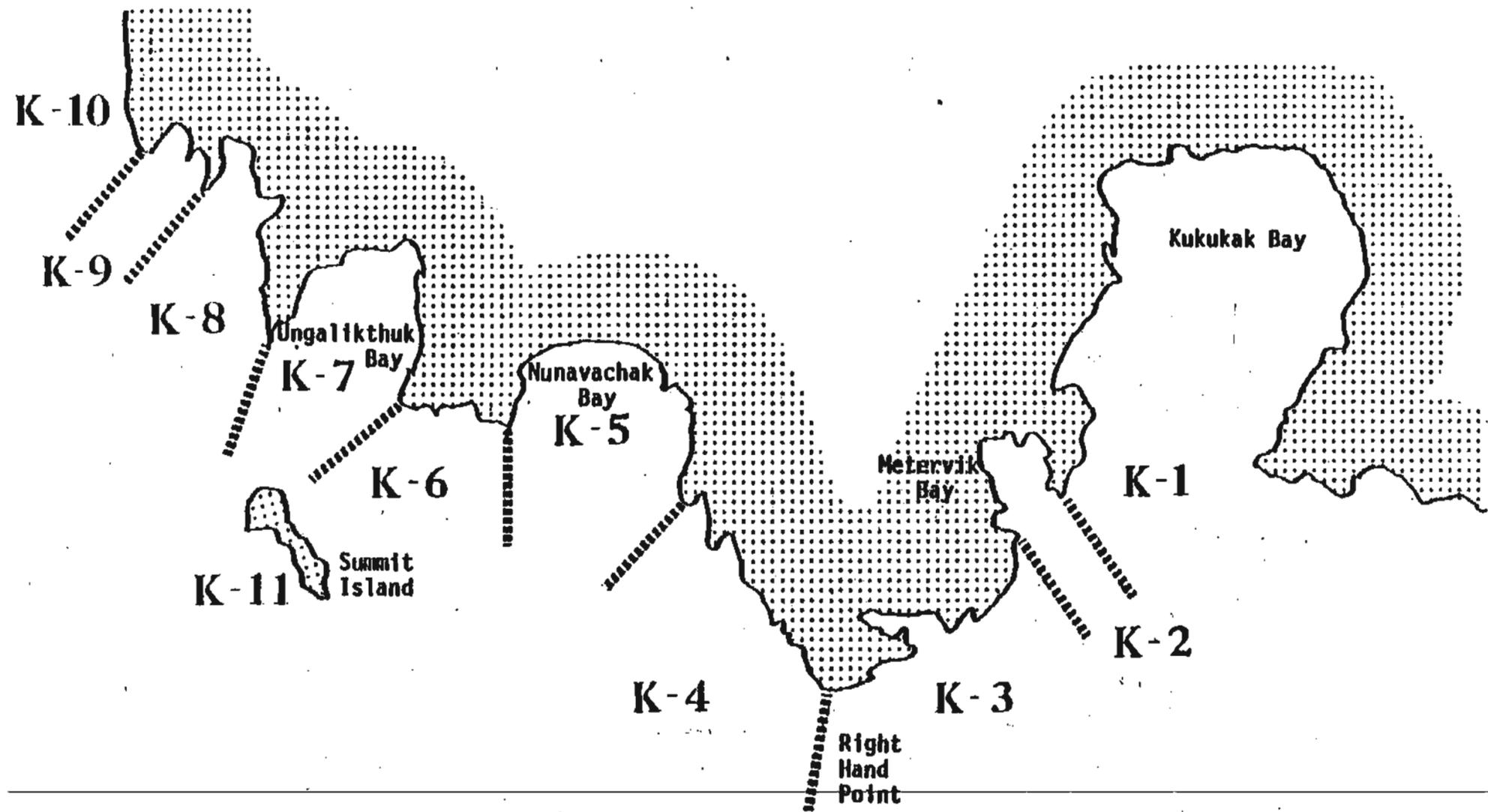


Figure 2.

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

The first herring were sighted on May 12 in the area offshore of the Constantine Peninsula and Kulukak Bay and were estimated at less than 500 short tons (Table 1). By the May 13 aerial survey, the biomass had increased to 3,600 s. tons and was steadily building, with numerous schools sighted in the Togiak Bay area near the beach (Table 1). The preliminary age composition of a small sample from Metervik Bay (135 fish) indicated that 74% of the herring were age seven and above, and many were listed as gonad index five (nearly mature). Due to the rapidly increasing biomass, the close proximity of the herring to the beach, and the apparent maturity of the early roe samples, a short test opening was announced for May 14 (Table 2).

This first fishing period resulted in a harvest of 1,000 s. tons, most of which were reported as food herring (Table 3). Virtually 100% of the fish were green (immature) and many schools were "tested" and released. During the following days, aerial surveys continued to record increases in the biomass (Table 1). On May 15 a purse seine test fishing program was initiated to monitor roe maturity and to collect AWL samples. This program was expanded to two vessels on May 16 and four vessels on May 18. The first small spawn of the season was reported on May 16 on the west side of Right Hand Point. On May 18 an open invitation was extended to all processors to observe the roe testing procedures of the samples aboard the Department's research vessel, the R/V Resolution. This sampling procedure was repeated on May 18 through May 20. The Department aerial spotter located the major concentrations of herring in the district and the four P/S sampling vessels made multiple sets on the largest schools. A Department representative was on board each vessel making test sets, and care was used to make certain that a random sample was obtained from each haul. The bags of herring were then transported to the R/V Resolution where an industry representative publicly tested them for maturity. The samples were then labeled as to the origin of the set, the

percentage of roe, and left on the back deck for public viewing. Each day after the testing was complete, all of the companies submitted their confidential recommendations to the staff by completing a questionnaire that was provided. This input was valuable in helping the managers predict when the bulk of the biomass would be at the peak of maturity (roe recovery). This program was well received by the processors and useful to the staff and will be continued in the future as conditions allow.

On May 18 a total of 11 samples were tested and the highest was only 5% mature. All 18 companies present recommended waiting an additional 1 to 3 days before fishing. On May 19 the samples showed some improvement but the highest recovery was only 6%. Most technicians felt the "peak" was still 1 to 2 days away, and all 23 companies recommended waiting an additional day before fishing. On May 20 herring were beginning to spawn in all areas of the district, with major subtidal spawns reported in Ungalikthluk, Middle Bay and Rocky Bay. Ice was becoming a major concern and due to southerly winds, a large pack had moved to within 3/4 mile off Eagle Bay. The May 20 test samples showed considerable improvement from the previous day and the aerial surveys indicated that the bulk of the biomass of herring was moving to the beach to spawn. The majority of the processors present at the roe testing felt that an additional 24 hour delay would hit the peak of maturity. Due to the amount of spawning that had taken place (over 29 linear miles), and the quantity of harvestable fish already on the beaches (approximately 72,000 s. tons) an opening was announced allowing the gill net fishery to begin at 6:00 p.m., May 20 for an 18 hour period, and the purse seine fishery to begin at 6:00 a.m, May 21 for a 6 hour period (Tables 1 and 2). This fishing schedule was consistent with the Board policy to allow the gill netters three times the fishing time for periods less than 24 hours in length.

Additionally, it allowed for a harvest on those herring near the beach that would likely have spawned out before the next morning. This announcement drew criticism from some purse seiners who felt that it was unfair and that the gill nets would scatter the schools and displace part of the grounds traditionally used by purse seiners. However, none of these issues proved to be a problem during the fishery. Postseason, the Board of Fisheries also gave their approval to this type of fishing schedule if conditions again warrant it in the future.

On May 21 the fishery was obviously very strong and both gear types were doing extremely well, with gill net deliveries averaging 3 to 5 s. tons each and many purse seiners with large sets. An aerial survey in the early morning indicated many new schools of herring were showing outside Togiak Bay and in Hagemeister Strait. An analysis of the aerial surveys to date through May 21 indicated a total biomass of 82 to 108,000 s. tons and a extension of fishing time for an additional 24 hours was announced at 9:30 a.m, May 21 (Table 2). Fishing continued to be excellent throughout the day and some of the processors began to report being at, or near, their capacity.

The fishery was closed at noon on May 22 to allow the staff to tally the catch, and to reassess the biomass. An aerial survey on May 23 estimated the total season biomass at approximately 110,000 s. tons with new schools continuing to appear to the west. The harvest removal as of May 23 stood at approximately 19,000 s. tons or about 17% exploitation (Table 3). With the large biomass still present on the grounds, and the considerable amount of spawn that had been sighted, a final fishing period was announced for May 24 (Table 2). At this point, some of the processors were still over capacity, and not all of the fleet participated. Spawning had already peaked and many boats reportedly released fish that were "spawn outs". The final fishing period catch was tallied at just over 2,000 s. tons (Table 3).

The three commercial openings and one extension resulted in a season total harvest of 21,560 s. tons (19,556 metric tons) and a removal of approximately 22% of the estimated total biomass (Table 3 and Appendix Table 3). This harvest was a new record for the Togiak district and the largest herring catch in the state this season. Over 200 gill net vessels participated in 1982 landing 6,700 s. tons during 60 hours of fishing time which represented 31% of the total catch (Table 3). The gill net harvest was somewhat limited by a lack of processing capacity, resulting in some lost fish.

The purse seine fleet, estimated at 135 vessels, accounted for 14,900 s. tons, and 69% of the total harvest (Table 3). The majority of the herring harvest (93.5%) were reported as sac roe product, 0.1% as bait, and 6.4% were taken for the food market (Appendix Table 2). The estimated average roe recovery for the season for both gear types combined was 8.8%, down slightly from 9.1% reported in 1981 (Appendix Table 3). A total of 33 companies participated this season and paid the fishermen approximately \$6.2 million for their catch, an average of \$350 per ton for 10% herring (Table 6 and Appendix Table 7). From the preseason processor registrations, it was estimated that the daily capacity of all the companies was in excess of 7,500 s. tons and their season goal was over 40,000 s. tons.

The staff was aided in their management efforts this season by a chartered helicopter and the R/V Resolution. These two units allowed good mobility to monitor both the resource and the fleet. Good weather and hence good visibility generally persisted during May 13-23, which allowed reliable aerial estimates to be made of the herring biomass. Storms during the remainder of May hindered aerial assessment efforts and damaged several commercial vessels.

Herring Spawn on Kelp Fishery

The herring spawn on kelp fishery was managed under a plan approved by the Board of Fisheries in 1979 (Appendix C). The coastline of Togiak district east of the Togiak Fisheries, Inc. cannery in Togiak Bay is divided into 11 harvest K-areas (Figure 2). Each area has a separate quota based on a 10% removal of the rockweed kelp (Fucus sp.) biomass present. The quota has been adjusted recently based on new biomass estimates as they become available by K-area, therefore, the harvest quotas in the 1979 management plan do not reflect the new updated harvest guidelines.

Kelp processors are registered on grounds prior to the harvest and are required to report all landings by K-area. Fishermen are distributed maps prior to and during the season and are required to report the location of their harvest upon each delivery. When the observed level of spawn deposition in the district is judged to be sufficient, the fishery is opened by emergency order field announcement. Spawn on kelp openings are not considered prior to a herring opening, thus insuring that a level of spawn and minimum level of biomass is guaranteed for escapement needs.

In 1982 a total of 103 fixed wing aerial spawn (milt) sightings encompassed 40.6 linear miles of beach were enumerated, closely matching the excellent spawning observed in 1981 (Appendix Table 6). Low level aerial spawn surveys were conducted with the helicopter for the first time this season, and this technique showed considerable promise as a future assessment tool. The helicopter surveys enabled the observer to visually determine the density as well as distribution of the spawn layers by the color, and major subtidal spawns were observed in Ungalikthluk, Middle, Rocky, and Metervik Bays. These subtidal spawns are somewhat protected from the commercial fishery which occurs primarily in the intertidal zone. The importance and extent of subtidal spawning contribution to the overall spawn survival is as yet undetermined.

Two commercial spawn on kelp openings were allowed in 1982 for a total of 39 hours harvest time (Table 2). This was the shortest harvest period in the history of this fishery, but due to the record level of effort (214 pickers) the landed total of 235,000 pounds exceeded the 15 year average (Appendix Table 5). During the first opening on May 21, 76% of the season total was landed, the highest harvest ever recorded during a 24 hour period. Most of the first period harvest came from areas K-3, K-8 and K-9 (Table 4). No further commercial exploitation was allowed in these three K-areas to protect the remaining spawn and plants from over exploitation. An additional harvest in areas K-4 through K-7 was allowed on May 24 (Table 2). On May 25 a storm moved into the area and all vessels began seeking shelter. By May 25, a full gale was in progress with winds reported at 70 knots. This storm stirred up the sediment and much of the spawn that remained available for harvest was contaminated with sand and some of the early layers of eggs had begun to "eye up" making them unsalable. The commercial spawn on kelp fishery remained closed for the remainder of the season although minor "spawn" sightings were reported as late as July 4.

Eight commercial processors purchased spawn on kelp in 1982 and the average price of \$.75 per pound put the value of this fishery at \$176,000 (Appendix Table 7). For the second year two contracted graduate students from the University of Alaska, Juneau continued a research program investigating the growth, regeneration and recolonization of (Fucus sp.) near the Department's Metervik Bay field camp. The results of this Department sponsored research will be incorporated into future management plans for the kelp fishery.

A new management problem was discovered this season on one of the aerial surveys, when approximately 50 individuals were observed harvesting kelp in a closed area during a closed period. This unreported harvest was for subsistence

use and immediately identified the need for such removal to be calculated into the quota by area for the management plan to be effective. An intensive monitoring program to calculate the subsistence removal is being developed for the 1983 season.

Aerial Biomass Surveys

A total of 20 aerial surveys were flown on 18 days during the 1982 season, from May 5 to June 3 (Table 1). About half of these biomass surveys were made under fair to excellent conditions, but storms hindered assessment during the latter part of the season from May 24 to June 4. Of the 63 hours flown, approximately 4.5 hours were completed with the helicopter from the Summit Island base camp. The purpose of the surveys is to determine relative abundance, distribution and biomass of herring schools. Areas surveyed extended from the Nushagak Peninsula on the east to Cape Newenham on the west, and data collection methods were similar to those used since 1978. Occurrence and extent of milt, numbers of fishing vessels, and visibility factors affecting survey quality were also recorded.

Herring were first sighted on May 12 and were observed until June 4 when the program was terminated. Tonnage estimates by area were relayed daily from the aerial spotter to the management biologist on the grounds via VHF radio from the aircraft, by HF radio from Dillingham, or by prearranged meetings on the beach. Biomass estimates were derived from school counts of 50 m² equivalents, multiplied by conversion factors of 1.2 (water depth 5 m or less), 2.5 (water depth greater than 5 m) and 3.0 (water depth greater than 8 m). A grid tube was used for size verification of smaller schools, and large ones were sized with a stop watch and air speed. Observations were recorded on maps and forms and were reanalyzed postseason. The inseason estimate of 110,000 s. tons closely matched the adjusted postseason final

estimate of 98,000 s. tons, from which the other non-herring species has been removed. The percent (6%) of non-herring species (primarily boreal smelt) that was removed from the biomass estimate was calculated from the species composition of the variable mesh gill net catches throughout the season.

The weakest point in the biomass data concerns the tonnage conversions used. To choose a different conversion number can result in a large change in the biomass in some instances and this amplifies the great need for more verified point estimates. An expanded test fish program was planned to accomplish this in 1982, but was hindered by helicopter mechanical problems and only one new estimate was obtained (Appendix Table 1).

Age Composition

AWL samples were obtained from all four sections of the commercial catch and from variable mesh gill nets set by Department personnel from late April until early June. This data was supplemented by a large number of samples from contract purse seine test boats from May 15 to 20. Approximately 56% of the total biomass was composed of age 5 herring (1977 year class) (Appendix Table 4). Age 4 and 8 herring (1978 and 1974 year classes) accounted for most of the remaining biomass, 16% and 13%, respectively. Although the relative proportion of young, newly recruited herring (age 4 and less) increased as the season progressed, it was not possible to identify separate abundance peaks for young and old (age 5 and greater) herring as had been documented during 1979-81. The inability to define separate peaks of young and old year classes required the staff to vary from the Board approved management plan of differential harvest rates, and the statewide policy of a 10 to 20% exploitation was utilized. Apparently cold water temperatures and ice delayed the 1982 inshore migration and compressed spawning into a shorter time than had been observed during the last three years. Peak abundance of herring occurred during the period May 19-23.

Enforcement

The 1982 enforcement staff for the herring season were housed aboard the P/V Vigilant and arrived on site May 9. The Fish and Wildlife Protection Division directed all of the search and rescue related activities in addition to their regular duties. Related problems included several medical evacuations, boat fires and swamped vessels. Oil spills continued to be a major problem in this fishery and in an effort to control them, a Department of Environmental Conservation representative and a U. S. Coast Guardsman were stationed on grounds for approximately a week. Results from this on-grounds enforcement effort showed that the program needs to be expanded in scope and duration in future seasons.

By far, the biggest enforcement problems this season concerned gill nets fishing after the closures, and purse seine sets before the openings. After the closure on May 22, as many as 40 gill nets still remained in the water. This same situation occurred in 1981 and was again complicated by the fact that Public Safety did not have the necessary equipment on their vessel to pull gill nets. Rather than take an aggressive approach and have abandoned nets scattered throughout the district, warnings were issued and fishermen were encouraged to pull their gear as soon as possible. Many complaints were voiced about these issues after the season and a strong, well equipped enforcement effort will be required for 1983.

Outlook and Management Strategy for 1983

Based on the strong return of age 5 herring in 1982 (56% of the total return) and age 4 (16%), it is assumed that with normal overwinter mortality that there will again be a harvestable surplus of herring in 1983. With the large amount of spawning observed in 1978, it is also possible that there will be a significant recruitment of age 4 herring as well, although

the portion of 3 year olds present in the 1982 samples does not tend to support this contention. The same management strategies used in 1982 will again be employed in 1983 (Appendix A, B and C).

Continued interest has been expressed in the development of a Togiak capelin fishery. Several companies have taken capelin deliveries in past seasons as a test of the market, but a directed fishery has not yet developed. In anticipation of a future fishery on this species, the Board of Fisheries has developed a policy regarding capelin, but it is more clearly to control any covert operations on herring (Appendix D). Reportedly, at least one company is gearing up for capelin in 1983.

TABLES

Table 1. Summary of herring aerial survey total run biomass estimates and observations of herring spawn, Togiak district, Bristol Bay, 1982.

Date	Survey Rating ^{1/}	Census Area Surveyed ^{2/}	Number Herring Schools Observed				Herring Biomass Est. ^{3/4/}		Herring Spawn Miles				
			Small	Medium	Large	Total	Formula	Staff	No.	Each	Accum.		
5/ 7	P	N2-0				0							
10	F/P	N2-0				0							
12	F/P	N2-M	1	4	2	7	200	500					
13	F/G	N2-M	52	55	16	123	2,300	3,500					
14	G/E	N2-M	3	27	26	56	1,500	1,700					
14	G	N2-0	31	208	55	294	5,400	5,100					
15	E	N2-M	26	142	99	267	10,700	11,800					
16	P/U	N2-T1		10	22	32	600	1,000	1	0.1	0.1		
17	F/E	N2-0	67	335	170	572	25,100	24,000	4	0.7	0.8		
18	F/G	N2-M	19	389	252	660	44,600	31,700	22	7.0	7.8		
18	G	N2-T	8	214	166	388	33,900	26,700	7	2.3	10.1		
19	G	N2-0	27	804	549	1,380	71,500	62,500	16	5.2	15.3		
20	U/E	N2-0		393	229	622	28,500	26,400	19	14.0	29.3		
21	U/G	0		360	0	360	4,300	7,000	3	2.0	31.3		
22	U/G	N -0		453	411	864	40,400	38,000	3	1.5	32.8		
23	G/E	N -0		1,800	476	2,276	78,000	74,300	11	3.3	36.1		
24	P	N -0		-Fleet Survey-						5	1.4	37.5	
25	P/U	N -T		-Ice/Spawn Survey-						1	0.3	37.8	
6/ 1	F/P	N -T	3	76	80	159	4,300	4,600	7	2.6	40.4		
3	G/F	N -T		41	57	98	3,500	3,100	4	0.2	40.6		

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; O = Osviak Bay; M = Matogak Bay; and CN = Cape Newenham.

3/ Short tons.

4/ Formula: Total RAI's x conversion factors of 1.3, 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, 1982.

Emergency Orders ^{1/}							
Number	K Area	Date, Time and Gear		Hours/Days Open			
I. HERRING SAC ROE							
DLG 01		May 14	9 a.m. -	May 14	12N	Purse Seine	3 hours
		May 14	9 a.m. -	May 14	6 p.m.	Gill Net	9 hours
DLG 02		May 20	6 p.m. -	May 21	12N	Gill Net	18 hours
		May 21	6 a.m. -	May 21	12N	Purse Seine	6 hours
DLG 03		May 21	12N -	May 22	12N	Gill Net and Purse Seine	24 hours
DLG 06		May 24	9 a.m. -	May 24	12N	Purse Seine	3 hours
		May 24	9 a.m. -	May 24	6 p.m.	Gill Net	9 hours
II. HERRING SPAWN ON KELP							
DLG 04	K3-9	May 21	3 p.m. -	May 22	10 a.m.		19 hours
DLG 05	K4-7	May 22	4 p.m. -	May 23	12N		20 hours

^{1/} Prefix code on emergency orders indicate where announcements originated ("DLG" for Dillingham).

Table 3. Inshore commercial herring catch by period and gear type, Togiak district, Bristol Bay, 1982.

Period	Time PS/GN	Catch by Gear Type in Short/Metric Tons					
		Gear		Short Tons		Metric Tons	
		Gill Net	Purse Seine	Period	Accum.	Period	Accum.
5/14	3/ 9 hrs.	97	907	1,004	1,004	911	911
20-21	6/18 hrs	4,643	8,027	12,670	13,674	11,492	12,403
21-22	24 hrs.	1,486	4,350	5,846	19,520	5,303	17,706
24	3/ 9 hrs.	448	1,592	2,040	21,560	1,850	19,556
Total		6,674	14,886	21,560	21,560	19,556	19,556
Percent of Catch		30.9	69.1	100.0			

Table 4. Commercial herring spawn on kelp harvest by day and area, Togiak district, Bristol Bay, 1982.

Date	Harvest in Pounds by Beach Kelp Area							Daily Metric	
	K-3	K-4	K-5	K-6	K-7	K-8	K-9	Pounds	Tons
5/21	34,425		4,702		470	47,634	91,918	179,149	81
23			18,454	7,011	30,310			55,775	25
Total	34,425		23,156	7,011	30,780	47,634	91,918	234,924	106
Season Quota	45,000	49,000	46,000	56,000	64,000	49,000	36,000	345,000	

Table 5. Herring total run biomass and inshore commercial catch by year class, Togiak district, Bristol Bay, 1982.

Year Class	Age	Total Run and Catch by Year Class				Escapement in Metric Tons
		Total Run		Catch		
		Metric Tons	Percent	Metric Tons	Percent	
1973+	9+	9,608	11	1,241	6	8,367
74	8	11,818	13	1,948	10	9,870
75	7	625	1	126	1	499
76	6	2,773	3	676	4	2,097
77	5	49,531	56	11,234	57	38,297
78	4	14,403	16	4,331	22	10,072
79	3	0	0	0	0	0
Total		88,758	100	19,556	100	69,202

Table 6. Commercial herring sac roe and herring spawn on kelp processors and buyers operating in the Togiak district, Bristol Bay, 1982.1/

Name of Operator/Buyer	Base of Operations	Processing Method		Brine Export	Comments
		Frozen	Cured		
A. HERRING SAC ROE					
1 A. Kemp Fisheries	M/V Bering Trader	Floater			
2 Ak. Herring Corp.	M/V Hatsue Maru #68	Floater			Joint venture w/U.S. Gill-Netters
3 Alaskan Fisheries	M/V Alaskan I	Floater			Con. w/Dragnet Fisheries
4 All Alaskan Seafoods	M/V All Alaskan	Floater			
5 ARPRO Co.	M/V Arctic Producer	Floater			
6 Bristol Monarch	M/V Bristol Monarch	Floater			
7 Can-Inter-Foods Ltd.	M/V Jo-Linda	Floater			
8 Daerim America	M/V Cape St. Elias	Floater			
9 Denali Seafoods	M/V Denali	Floater			
10 Great Alaskan Fish Co.	M/V Great Alaskan	Floater			
11 Icicle Seafoods	M/V Bering Star	Floater			
12 Jeffron Enterprises	M/V Jeffron			Floater	
13 Kodiak King Crab	M/V Shelikof Straits	Floater			
14 Lady Pacific	M/V Lady Pacific	Floater			Con. w/Comeau Seafoods.
15 New West Fisheries	M/V Golden Dawn			Floater	
16 Newby, Richard	M/V Red Baron			Floater	
17 North Coast Seafood Processors	M/V Polar Bear	Floater			
18 Northland Sea Products	M/V Northland	Floater			
19 Northwind Fisheries	M/V Prowler			Floater	Con. w/Nelbro.
20 Nuka Point Fisheries	M/V Maren I			Floater	Some fish stripped.
21 Offshore Fisheries	M/V Westward Wind	Floater			Some fish stripped.
22 Plancich Seafoods	M/V Royal Venture	Floater			
23 Sea Alaska Products	M/V Sea Producer	Floater			
24 Sea Fisher Products	M/V Arctic Fisher	Floater			
25 Sea Roe Fisheries	M/V Lafayette			Floater	
26 Seward Marine Services	M/V Trident			Floater	Stripped at Seward.
27 Sterling Seafoods	M/V Alaska Star	Floater			
28 Swiftsure Fisheries	M/V Teddy	Floater			
29 T.N.P.	Togiak	Shore			Con. w/C.W.F. and Nuka Pt. Fisheries.
30 Togiak Fisheries	Togiak	Shore			

(continued)

Table 6. (continued)

Name of Operator/Buyer	Base of Operations	Processing Method		Brine Export	Comments
		Frozen	Cured		
A. <u>HERRING SAC ROE</u> (con't.)					
31	Trident Seafoods	M/V Bountiful	Floater		
32	Universal Seafoods	M/V Courageous	Floater		
33	Whitney Fidalgo Seafoods	M/V Hallo Bay	Floater		
Total Togiak District:			26	1	6
B. <u>HERRING SPAWN ON KELP</u>					
1	Ak. Far East Corp.	M/V Salvage King		Floater	
2	Allen Aspelund Co.	Metervik Bay		Floater	Con. w/ Al-Lou's Fish.
3	Carl, John R.	Metervik Bay		Floater	
4	Hakala/Nuotio	F/V Branden		Floater	
5	Newby, Richard	M/V Red Baron		Floater	
6	North Coast Seafood Processors	M/V Polar Bear		Floater	
7	Nuka Point Fisheries	M/V Maren I		Floater	
8	Togiak Fisheries	Togiak		Shore	
Total Togiak District:			0	8	

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, 1978-82.

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 18	6.7 11.0	<u>2/</u> 80 x 60	<u>2/</u> 100	Estimated Estimated	<u>2/</u> <u>2/</u>	Nunavachak Bay Nunavachak Bay	<u>2/</u> <u>2/</u>
<u>1979</u>	5/ 4	2.4	40 dia.	5	Actual	Ripe	Ungalikthluk Bay	20
<u>1980</u>	5/15 15 16 16 20 20	1.2 1.6 ^{3/} 1.1 ^{3/} 1.2 3.0 2.6	60 x 40 40 x 30 220 x 50 65 x 20 70 x 70 150 x 75	5 4 19 3 27 54	Actual Estimated Actual Estimated Estimated Estimated	Ripe Spawn-outs Spawn-outs Fish lost Ripe Fish lost	Ungalikthluk Bay Ungalikthluk Bay Nunavachak Bay 1 Mile West Ungalikthluk Pt. East of Eagle Bay Eagle Bay	10 25 15 16 20 20
<u>1981</u>	5/ 3 8 10	1.1 1.7 4.0	400 x 200 80 x 30 150 x 60	80 7 40	Actual Actual Actual	Ripe Spawn-outs Ripe	West Side, Tongue Pt. Togiak Bay, Mouth Asigyukpak Spit Bight	7 18 25
<u>1982</u>	5/15	<u>1.9</u>	200 x 150	100	Estimated	Green	Kulukak Bay	24
		3.0	Mean All Estimates					
		1.2	Mean Estimates at 7-16 ft. Water Depth					
		2.5	Mean Estimates at 20-26 ft. Water Depth					

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

2/ Incomplete data.

3/ Average of 2 observers estimates.

(Literature Cited: 1)

APPENDIX TABLE 2. Inshore commercial catch of herring by gear type and product, Togiak district, Bristol Bay, 1967-82.

Year	Numbers of Processors	Units of Gear ^{2/}		Percent Catch by Gear and Product Type				Total Catch in Metric Tons ^{2/}
		Gill Net	Purse Seine	Gear		Product		
				Gill Net	Purse Seine	Sac Roe	Food/Bait	
1967	1	27		100		100		122
68	2	35	2	75	25	100		82
69	2	22	1	38	62	100		43
70 ^{3/}	3	16	1	67	33	100		25
71 ^{3/}								
1972	1	18	1	40	60	100		73
73	2	26	1	100		100		46
74	3	10	1	16	84	100		112
75 ^{3/}	2	39		100		100		51
76 ^{3/}								
1977	6	43	6	11	89	100		2,534 ^{4/}
78	16	40	25	8	92	100		7,030 ^{4/}
79	33	350	175	40	60	92	8	10,115 ^{4/}
80	27	363	140	16	84	85	15	17,774 ^{4/}
81	28	106	83	18	82	99	1	11,372 ^{4/}
1982	33	200	135	31	69	93	7	19,556 ^{4/}
14-Year Total	159	1,295	571					68,935
1967-76 Total	16	193	7					554
1977-82 Total	143	1,102	564					68,381
14-Year Average	11	93	41	47	53	98	2	4,924
1967-76 Average	2	24	1	67	33	100		69
1977-82 Average	24	184	94	21	79	95	5	11,397

1/ Number of units derived from fish tickets until 1979-82, when they were estimated by aerial survey.

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

3/ Fishery not conducted.

4/ Preliminary.

(Literature Cited: 1)

APPENDIX TABLE 3. Estimated total run biomass and inshore commercial catch of herring, Togiak district, Bristol Bay, 1978-82.

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
82	49,998	88,800	19,556	8.8	22.0

^{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.

(Literature Cited: 1)

APPENDIX TABLE 4. Age composition of the inshore herring run, Togiak district, Bristol Bay, 1977-82.

Age	Age Composition in Percent ^{1/}					
	1977	1978	1979	1980	1981	1982
3	4	11 ^{2/}	3	3	2	
4	49	44	9	2	48	16
5	37	33	43	2	5	56
6	3	9	35	39	1	3
7	3	1	9	37	25	1
8	3	1	+	15	15	13
9+	1	1	1	2	4	11
Catch (m.t.)	2,535	7,030	10,115	17,774	11,372	19,556
Run (m.t.) ^{3/}		172,600	216,800	62,300	143,900	88,800

^{1/} Age composition in 1977-78 based on number sampled, and not weighted by weight at age and aerial biomass estimates; while age composition in 1979-82 is weighted by weight at age and aerial biomass estimates.

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

^{3/} Estimate of total run, including commercial catch.

(Literature Cited: 1)

APPENDIX TABLE 5. Commercial harvest of herring spawn on kelp in the Togiak district, Bristol Bay, 1968-82.

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
82	8	214	167	234,924	107
15-Year Total	84	897	1,873	2,586,801	1,173
1968-77 Total	21	237	666	1,039,423	471
1978-82 Total	63	660	1,207	1,547,378	702
15-Year Average	6	60	125	172,453	78
1968-77 Average	2	24	67	103,942	47
1978-82 Average	13	132	241	309,476	140

(Literature Cited: 1)

APPENDIX TABLE 6. Aerial observations of herring spawnings in the Togiak district, Bristol Bay, 1978-82.^{1/}

Date	1978		1979		1980		1981		1982	
	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	0	
8	2	1.8			1	0.2	3	1.0		
9			2	0.4			5	1.4		
10			0				0		0	
11	9	7.7			0					
12	3	1.5	0		0		15	4.8	0	
13	12	8.6			0		6	3.8	0	
14	11	5.6	0		2	2.3	10	4.7	0	
15					6	4.0	2	1.5	0	
16			0		4	1.2	0		1	0.1
17			0						4	0.7
18	11	4.2							29	7.3
19	3	2.5			1	0.3			16	5.2
20					4	0.9			19	14.0
21			0						3	2.0
22					2	0.5			3	1.5
23							10	2.1	11	3.3
24									5	1.4
25	8	4.2							1	0.3
26	2	2.2	1	0.7			3	0.2	0	
27					3	0.3			0	
28	0								0	
29					8	1.6			0	
30	6	1.6							0	
31					2	0.8			0	
6/ 1									7	2.6
2	1	0.5							0	
3							1	0.8	4	0.2
4										
5										
6										
7					6	3.1				
Total	70	41.2	52	21.9	64	24.3	106	40.1	103	40.6

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

(Literature Cited: 1)

APPENDIX TABLE 7. Exvessel value of the commercial herring and spawn on kelp harvest, Togiak district, Bristol Bay, 1967-82.^{1/}

Year	Estimated Exvessel Value in Thousands of Dollars ^{2/}			Total
	Herring		Spawn on Kelp	
	Sac Roe	Food/Bait		
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
1982	6,070	105	176	6,351
16-Year Total	\$22,819	\$436	\$1,208	\$24,463
1967-76 Total	63		202	265
1977-82 Total	22,756	436	1,006	24,198
16-Year Average	\$ 1,630	\$ 31	\$ 81	\$ 1,529
1967-76 Average	8		22	27
1977-82 Average	3,793	73	168	4,033

^{1/} Value paid to the fishermen.

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

(Literature Cited: 1)

APPENDIX A

BRISTOL BAY HERRING MANAGEMENT GUIDELINES, 1982

The 1982 Bristol Bay herring and herring spawn on kelp fishery will be managed within the following guidelines:

1. A minimum threshold level of biomass for conservation of the stocks will be maintained;
2. Differing harvest rates for older (5 yrs. or greater) and younger age class (4 yrs. or less) herring will be used;
3. The commercial harvest will not begin until the start of spawning, thus insuring the opportunity for the highest roe recovery; and
4. The harvest management should minimize wastage of the resource.

Therefore, the Department staff will take the following action given the specified circumstances:

1. When the total daily observed biomass of early season, older age class herring exceeds 5,000 metric tons, and some spawning has occurred, the season will open and the harvest rate will be from 10% to 20% of the observed biomass;
2. When the total observed biomass of later season, younger age class herring exceeds 20,000 metric tons, a harvest rate of up to 20% will be allowed; and
3. The number of openings allowed in the herring spawn on kelp fishery will be based on the fishing time in the herring fishery, and density and distribution of observed spawn.

APPENDIX B

5 AAC 27.865. BRISTOL BAY HERRING MANAGEMENT PLAN. (a) The Bristol Bay herring fishery is still rapidly developing. Harvest trends by gear types are not well established between seine and gill net gear. Run timing, distribution and magnitude cannot be predicted based on past data for this fishery and most forms of inseason or preseason regulation to achieve any predetermined catch allocation between gear types are not feasible.

(b) It is the Board of Fisheries feeling that resource size, relative gear numbers and efficiency of the two gear types will insure that all users will have ample opportunity to satisfy their economic requirements. Nevertheless, it is desirable to try to insure that neither gear type group is totally disadvantaged. The Board therefore directs the staff of the Department to take the following actions given the specified circumstances:

- (1) when circumstance preclude the Department from adequately assessing biomass, the Department may use the gill net fleet to test run strength;

APPENDIX B (continued)

(2) when any single seine opening is less than 24 hours long, the opening for gill nets shall be three times that allowed for seines;

(3) when any single seine opening is 24 hours or more, the opening for gill nets shall be equal to the opening for seines.

APPENDIX C

MANAGEMENT PLAN TO REGULATE THE HERRING
SPAWN ON KELP HARVEST IN THE BRISTOL BAY AREA

Management of the Togiak herring spawn on kelp harvest should center upon a predetermined level of exploitation of Fucus sp. The Department recommends the establishment of a conservative exploitation objective of 10% of the available Fucus sp. biomass.

The Department has estimated the total Fucus sp. biomass within nine beach areas studied at 4,135,000 pounds. These areas were chosen on the basis of beach surveys such that individual kelp beds could be described and such that harvest could be monitored by individual area. A 95% confidence interval has been calculated for the biomass estimate for each beach area. To be conservative, 10% of the lower range estimate for each area will be emphasized as the management objective. Actual harvest quotas of spawn on kelp product have been derived by assuming that the reported weight of commercial grade spawn on kelp is composed of 25% plant weight (Fucus sp.).

Individual kelp management areas, in the Department's opinion, should be kept open to commercial harvest until that harvest reaches the allowable harvest quota. At that time, particular kelp management areas should be closed by emergency order for the remainder of the fishing season.

Realization of this management plan is dependent upon monitoring of effort and harvest levels and upon enforcement of the quota system. The harvest needs to be monitored on a daily basis in season for each kelp management area as the commercial fleet already has the capability of attaining the proposed quota for several management areas in a single day.

The primary effect of this management strategy is to provide protection to those kelp beds that have historically sustained a large harvest. The Department is not recommending that the kelp harvest be reduced. Since 1978, the Department has conducted studies to determine specific regeneration rates of Fucus sp. in the Bristol Bay area. Utilization of this management strategy will minimize potential negative effects on the spawn on kelp harvest on the kelp resource until ongoing biological studies of Fucus sp. in the Togiak area are completed.

Adopted in Anchorage, Alaska, December 12, 1979 by the Alaska Board of Fisheries.

APPENDIX D

STATEMENT OF POLICY CONCERNING
RELATIONSHIPS BETWEEN HERRING AND
SMELT-CAPELIN FISHERIES

The seasonal occurrence of smelt, capelin and herring in coastal waters of the Bering Sea overlap to varying extent depending on location and year. Present commercial fishing regulations do not provide for any restrictions on the taking of smelt and capelin. It is possible that a legitimate fishery for smelt or capelin may result in incidental catches that could result in overharvests of herring. Also current herring fishery regulations (ie: prohibition of purse seining in some districts) could be circumvented by fishermen claiming they are fishing for smelt or capelin.

It is recognized that there is potential for development of a capelin fishery in the Bering Sea and that specific regulations will need to be developed if the fishery expands. The emphasis of this policy statement is to minimize potential adverse impacts that development of smelt-capelin fisheries may have on herring stocks and fisheries.

The Board directs the staff of the Department of Fish and Game to take necessary action through emergency order authority to insure that current herring fishing regulations are not circumvented and to minimize the incidental capture of herring as a result of fisheries targeting on smelt or capelin through one or more of the following measures:

- (1) area-time closures should be utilized to contain smelt-capelin fisheries in areas of low herring abundance.
- (2) when the incidental herring catch made after the close of the commercial herring season approaches or exceeds (10%) of the total commercial herring catch or individual landings are consistently composed of (20%) or greater incidence of herring, the smelt-capelin fishery will be closed.

The Board further directs the staff of the Department of Fish and Game to incorporate specific management strategies relating to smelt-capelin fisheries in management plans prepared for each Bering Sea herring district.

Adopted in Anchorage, Alaska, December 15, 1980 by the Alaska Board of Fisheries.

