



BRISTOL BAY ANNUAL MANAGEMENT REPORT-1972

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

ANNUAL MANAGEMENT REPORT
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BRISTOL BAY AREA

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PREFACE

Data in the 1972 Annual Management Report supercedes information presented in previous management reports and publications. Errors have been corrected whenever found. Data on the 1972 season are preliminary and will be finalized in next year's report.

Persons desiring additional information should direct a specific request to the area office in Anchorage outlining the information needed.

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INTRODUCTION

GENERAL BACKGROUND

Bristol Bay's lake and river systems historically have produced the largest red salmon runs in the world, however, all five species of Pacific salmon are commercially caught in Bristol Bay's five fishing districts (See preface map). Activity is intense during the relatively short season. Issuance of over 40 emergency orders for varied-length fishing periods during the one-month emergency order period (from mid-June to mid-July) is not uncommon. Fishing activity commences in early June on king salmon with most effort concentrated in the Nushagak district. The king salmon run generally peaks during the last two weeks in June when effort then shifts to red salmon in all fishing districts. The red salmon run generally begins during the last week in June, peaks around July 4, and is essentially over by mid-July. Timing of the chum salmon and red salmon runs are nearly identical, although chum catches are usually sustained an additional week as red catches diminish. Pink salmon runs occur only during even years primarily in the Nushagak district. Pink fishing commences in mid-June and is essentially over by the second week in August. Minimal fishing activity exists on cohos after the pink salmon run diminishes. Residents of the Bristol Bay area comprise the bulk of the fishing effort on the coho salmon run, which begins in mid-July and lasts through the month of August. Peak catches are generally made from the last week of July through mid-August, however, run timing varies considerably between districts.

Red salmon runs, because of their magnitude and commercial value, are the target for the bulk of management and research activities and commercial fishing effort in Bristol Bay. Other salmon species, however, constitute an important part of Bristol Bay's commercial salmon fishery, a fishery which has had an average annual first wholesale value of over \$30,000,000 during the past 12 years.

RED SALMON RUNS

Bristol Bay's red salmon runs are extremely cyclic and the economic depression rendered by low-cycle-year catches may be forgotten during the years of above-average catches. A grim reminder of this depression and accompanied problems borne by all individuals, companies and agencies associated with these runs was provided during the 1972 season. Not only was the red salmon catch one of the lowest on record but king, pink and coho salmon catches were far below average.

The potentially dangerous biological implications of this cyclic phenomena are of serious concern to fisheries management and research biologists. Presently, only one year's run in five exhibits exceptional production and if some environmental factor or combination of factors should induce high mortality on this production, a critical situation would exist. The causes of this cyclic pattern and the nature of the intricate biological interactions keeping it intact are unknown. Determination of the factors contributing to this phenomena, however, has top priority in management and research program planning in Bristol Bay.

This much is known about the production variance of Bristol Bay's red salmon runs: The present cyclic nature of these runs is related primarily to production variation in the Kvichak River, the major red salmon producer in Bristol Bay. Prior to 1940, two or three brood years per five-year cycle yielded good production in the Kvichak River watershed. A general decrease in production level from all years occurred during the 1940's and 1950's, during which time the present cycle pattern was evolving. This pattern became more predominant during the 1960's.

The first opportunity to obtain a substantial non-peak-year escapement in the Kvichak River during recent years (since 1952) came in 1969, when an escapement of over 8,000,000 was achieved. It is hoped that production from this brood year will result in better off-year returns without suppression of peak-year production. Adult returns from the 1969 escapement will occur primarily in 1973 and 1974. At present, there is considerable concern that the severe winters of 1970-71 and 1971-72 have limited production success from escapements in both 1969 and 1970. The extent of the adverse effects these winters may have had, if any, will be more evident after analyses of data collected from high seas sampling conducted by the Fisheries Research Institute during the summers of 1972 and 1973 and from smolt outmigration studies conducted by the Department in the spring of 1973. The actual production from the 1969 and 1970 escapements won't be known until completion of the adult returns in 1973, 1974 and 1975, assuming most of the adults will return as 4- and 5-year old fish.

1972 SEASON SUMMARY

The red salmon catch of 2,393,000 is the lowest on record since 1896, when the Bristol Bay commercial fishery was in its infancy. The inshore red salmon run totaled 5,377,000, approximately 45% lower than the Department's forecast. Escapements within desired ranges were achieved in only three river systems - the Branch, Egegik and Togiak (Table 1).

The forecasted inshore red salmon run was 9,744,000 with an escapement goal range of from 3,959,000 to 6,351,000 (Table 1). The inshore run totaled 5,377,000 comprised of a 2,393,000 catch and a 2,984,000 escapement (Table 2). Regulation of catch and escapement from June 16 through July 17 was accomplished by issuance of 27 emergency orders permitting varied-length fishing periods in respective districts (Table 4). Only 72 hours of fishing were permitted in the Naknek-Kvichak district during what could be considered the red salmon season, from June 25 through July 17. During this same period 278 hours of fishing were allowed in the Egegik district, only 48 hours in the Ugashik district, and only 96 hours in the Nushagak district. No fishing was permitted from July 8 to July 17 in the Naknek-Kvichak district, and from July 10 to July 17 in the Nushagak district, because of inadequate escapements.

Actual age composition of the red salmon run varied considerably from the forecasted age composition. The major shortage in actual numbers of fish compared to forecasted numbers by age class occurred in the 2-ocean age group. Approximately 50% of the total shortage occurred in the 5₃ age class, and 32% in the 4₂ age class; whereas the 3-ocean age group returned within 77% of the forecasted age composition.

King, pink and coho salmon catches were also considerably below average. The king salmon catch was 69,000 compared to a 20-year (1952-1971) average of 93,000. The pink salmon catch was 124,000 compared to the even-year average since 1952 of 890,000. The coho catch was 14,000 compared to the 20-year average of 40,000. The chum salmon catch of 625,000 was the only species catch to better its 20-year average which is 491,000. The total catch for all species was 3,225,000 or approximately 66% below the 20-year average of 9,362,000. The all-species catch was the lowest recorded since 1935 and ranks as the sixth lowest since 1893.

A case pack of 255,000 (equivalent one-pound talls) resulted from the total Bristol Bay salmon catch. Approximately 2% of the total catch was marketed as fresh, frozen or cured products. Only 1% of the red and chum salmon catches were marketed in this manner, while about 45% of the king catch and 56% of the coho catch were marketed as fresh, frozen or cured fish (Table 12). The 1972 wholesale value of all fishery products was \$14,868,000 compared to a 12-year average value of \$30,598,000.

An emergency regulation permitting only set net fishing in the Ugashik district during the emergency order period was the only significant regulation change imposed during the 1972 season. This measure of gear restriction was imposed because of the low red salmon run forecasted for this district. The forecasted run was 265,000; whereas, the optimum escapement range is from 350,000 to 550,000. The four 12-hour fishing periods during the emergency order period resulted in minimal catches which were sufficient for collecting in-season data to gauge forecast accuracy and run timing. All district boundaries were the same as in 1971.

Approximately 2,600 units of gear were registered to fish in Bristol Bay in 1972, about 100 units less than in 1971, but still about 160% more gear than was registered in the early 1960's (Table 3). This marks the third year in succession that gear registration has slightly declined from the record high registration of 2,900 in 1969.

Processing of fishing products in Bristol Bay during 1972 was accomplished by 21 operators. A total of 25 canning lines of the available 45 were operated by 11 shore and floating canneries. Salmon roe was also processed at most operating canneries. In addition, one floating cannery, nine freezer ships and other operators were involved in producing canned, fresh, frozen and cured salmon for market.

Department of Fish and Game, commercial fisheries research and management programs operative during 1971 included escapement enumeration and sampling, catch sampling, smolt enumeration, spawning ground surveys and offshore and inshore test fishing. Run magnitude and timing indices provided by the offshore test fishing programs did not prove as accurate in 1972 as they have in several previous years. A combination of factors may have contributed to the unreliability of these indices. First, the project began 10 days later than normal due to late arrival of the research vessel, and several days of fishing during a critical time period were missed because of gale winds and mechanical breakdowns. A considerable amount of data interpolation was necessitated by these missed fishing days. In addition, the 1972 run was the smallest since this project began in 1968, and some adjustment of the computation formula may be necessary to compensate for smaller runs.

DISTRICT SUMMARIESNAKNEK-KVICHAK DISTRICT

The Naknek-Kvichak district red salmon forecast was 5,682,000 and the actual run totaled 2,951,000 or 48% below forecast. The district red salmon catch totaled 1,204,000 and was approximately equal to the number of fish needed to achieve escapement goals in the Kvichak and Naknek Rivers (Tables 1 and 2). In essence, these escapement goals would have been achieved if no fishing whatsoever had been permitted during the emergency order period. The run weakness, however, was not positively determined until the 12-hour fishing period for the Kvichak section only on July 7-8, after which no fishing was permitted through the end of the emergency order period on July 17. Only four fishing periods totaling 72 hours were permitted in this district during the emergency order period - two 24-hour and one 12-hour period for the entire district prior to July 4 and one 12-hour period for only the Kvichak section on July 7-8 (Table 4).

Pre-season gear registration totaled 1,186 units consisting of 815 drift nets and 371 set nets (Table 3). This compares to 870 drift nets and 358 set nets registered in this district last year.

Timing of the red salmon run appeared normal and peak catches were made on July 3. Exact delineation of the run peak is difficult because of the few scattered fishing periods.

Management

By July 1, the only remaining optimistic indication that the Bristol Bay red salmon run would develop as forecasted was the Unimak area catch. The fishery in this area intercepts red salmon returning to Bristol Bay about two weeks prior to their arrival in the Bay's fishing districts. The Unimak area red salmon catch had peaked June 19 and totaled approximately 400,000. On this basis it was surmised that the Bristol Bay run may be within the 10-12,000,000 range as Unimak catches had consistently comprised from three to four per cent of the total Bristol Bay red salmon run since 1968.

Other indices, however, were less encouraging. Port Moller test fishing catches indicated a weak run, but because of the 10-day late start and four days of missed fishing the reliability of these indices was questionable. The first 24-hour fishing period on June 25-26 produced a red salmon catch of 85,000 and the second 24-hour fishing period on June 28-29 produced a catch of 476,000 reds (Table 5). Age determination of catch samples from these fishing periods showed a significant shortage of 2-ocean age group fish. In addition, escapement rates in the Kvichak and Naknek Rivers were lagging behind average.

A 75-hour closure elapsed before the 12-hour fishing period on July 2-3. Escapement rates had improved in both the Kvichak and Naknek Rivers during the closure but not sufficiently to warrant any optimistic prognostications

on run strength. The Naknek River escapement, in particular, had not responded as well to the closure as it should have if the run was developing normally. The period catch on July 2-3 was 344,000 bringing the cumulative district red salmon catch to 928,000 or 35% of the district's forecasted catch goal (Tables 1 and 5). Through July 3, the cumulative Naknek River escapement was 81,000 or only 10% of the 800,000 escapement goal, while the Kvichak River escapement was negligible. Approximately 13% of the Kvichak River escapement has, on the average, been achieved by this date. The 12-hour fishing period on July 2-3 was the last period for the Naknek section during the emergency order period, while the Kvichak section had only one more 12-hour fishing period.

All indices by July 4 pointed to the probability that the run was not going to develop as forecasted. Port Moller test fishing catches remained low with no evident peak. Test fishing in the Naknek-Kvichak district gave no indication of a substantial number of fish moving into the district. Kvichak River test fishing escapement indices remained low and no fish were observed in the Kvichak River during aerial surveys. Cumulative escapement to the Naknek River had doubled on July 4 but still accounted for only 20% of the escapement goal. A long district closure was inevitable unless a sudden, unforeseen increase in run development materialized.

Naknek River escapement peaked with a daily escapement of 109,000 on July 5, bringing the cumulative escapement to 261,000 or approximately one-third of the escapement goal. When the daily escapement rate dropped to 35,000 on July 8 it was obvious that the escapement goal was beyond achievement. The Naknek section of the Naknek-Kvichak district remained closed from July 3 to July 17, the end of the emergency order period. An escapement of 587,000 was achieved, approximately 213,000 short of the Naknek River escapement goal (Tables 1 and 2).

Port Moller test fishing catches remained poor with no indications of a peak by July 6. Approximately 5 to 8 days travel time is required for red salmon to reach Bristol Bay's fishing districts from the Port Moller area. Therefore, unless the test fishing indices were in error or the run was to be unusually late, a substantial build-up of fish could no longer be expected.

Test fishing at Nakeen on July 6 produced the best catches of the season and indicated a daily escapement to the Kvichak River of approximately one-half million fish. In addition, the first substantial numbers of fish in the Kvichak River were observed by an early-morning aerial survey on July 7. This rapid increase in escapement rate, plus the fact that the escapement goal would be achieved if this rate continued for another two days lead to the decision to open the fishery in the face of other run development indicators which were less encouraging. Test fishing within the district, for instance, had not revealed a substantial build-up of fish since the July 3 closure and at best only about one-third of the Kvichak River escapement goal could presently be accounted for.

The Kvichak section was opened for a 12-hour fishing period on July 7-8. The 230,000 red salmon catch resulting from this period was much lower than anticipated and gave indication that the run had peaked sometime earlier and was now tapering off. On July 9, the Department announced that the Naknek-Kvichak district would remain closed for the duration of the emergency order period unless significant escapement rate increases were experienced.

Kvichak River escapement peaked July 8 with a daily count of 265,000. Daily escapement counts remained above 100,000 through July 11 and then began a steady decline. The Naknek-Kvichak district remained closed until the end of the emergency order period. An escapement of just over 1,000,000 was achieved for the Kvichak River and the red salmon catch for the Naknek-Kvichak district totaled 1,204,000 at seasons end (Tables 1, 2 and 5).

Catch

Red salmon accounted for 88% of this district's total catch for all species and the district's red salmon catch was 50% of the total Bristol Bay red salmon catch. The Naknek-Kvichak district red salmon catch was 78% below the 20-year average. Age composition of the red salmon catch was 9% 4-year fish from the 1968 parent-year escapement, 58% 5-year fish from the 1967, and 33% 6-year fish from 1966.

The district catch for all species was 1,375,000 fish, 76% below the 20-year average. This catch comprised 43% of the 1972 Bristol Bay total catch.

The district's king salmon catch of 2,000 was about 79% below the 20-year average. The chum salmon catch was 114,000 or approximately 3% below the 20-year average and comprised 8% of the total district catch. The coho catch of less than 100 was 98% below the 20-year average, marking the fourth consecutive year of below-average coho catches.

Escapement

Only in Branch River, of the three contributing rivers to this district, was the escapement goal achieved. The Kvichak red salmon escapement fell approximately 1,000,000 fish or 50% below the escapement goal while the Naknek River escapement fell approximately 214,000 or 27% below the goal. Age composition of the Kvichak River escapement was 13% 4-year fish from the 1968 parent-year escapement, 68% 5-year fish and 19% 6-year fish; Branch River 56% 4-year fish, 41% 5-year fish and 3% 6-year fish; and Naknek River, 12% 4-year fish, 57% 5-year fish and 31% 6-year fish.

EGEGIK DISTRICT

The size of the Egegik district was the same in 1972. The total number of registered gear for the Egegik district in 1972 was 392 units (Table 3). Approximately 258 units actually participated in the fishery. There were 232 units of drift net gear and 160 units of set net gear registered for the district. There were 200 units of drift net gear and 58 units of set net gear that actually fished. This is a decrease of 57 units of gear registered for the Egegik district in 1972 over 1971. Registered set nets decreased by six units and registered drift nets decreased by 51 units. Resident fishermen comprised 52% of the total gear registered in the district in 1972.

The total Egegik district inshore forecast was 1,575,000 reds with a probable harvest of 975,000 reds leaving an escapement goal of 600,000 with a range of 400,000 - 800,000 reds.

Management

The weather in 1972, as in 1971, played a very important part in the progression of the commercial fishing in the Egegik district. Extremely cold air and water temperatures in the spring and the late breakup of the rivers and the lakes in the Bristol Bay area indicated that perhaps the 1972 run would have a similar timing with the 1971 run. High winds and colder than normal air temperatures were characteristic of the spring prior to the emergency order period. Before the start of the fishery, comparisons were being made between the coming 1972 run and the 1967 run which was the parent-year. Comparisons were also being made with the 1971 run because of the similar conditions of the spring weather and the timing of the spring breakup.

As the emergency order period approached, the False Pass fishery was progressing far better than the 1971 run and also much better than the 1967 run.

The False Pass fishery was experiencing large catches, however, the red percentage was beginning to drop. In retrospect this is indicative of the tailing off of the run even though the catches were very good for an off-peak year in the Bristol Bay area. During the period from June 9 through June 23, the beginning of the emergency order period in Bristol Bay, all the indications of the run timing and or magnitude came from the False Pass fishery.

The MV "Kittiwake" operating the offshore test fishing program at Port Moller arrived at Port Moller on June 20, ten days later than originally scheduled. The first drifts made by the "Kittiwake" were on June 21-22. On June 23, 24 and 25 the "Kittiwake" was unable to fish due to mechanical problems as well as inclement weather. The "Kittiwake" fished stations 1, 3 and 5 on June 26 before they had to return to port for radio repairs. Their catches were very small. Effectually the "Kittiwake" made no drifts between June 23-28. The False Pass catches which increased slightly on Monday, June 26 over Friday, June 24 and the small catches at Port Moller indicated that the bulk of the fish had not reached Port Moller and were still in the area between False Pass and Port Moller. The chum percentage in the Naknek-Kvichak district on June 27 was reported by one cannery to be approximately 3%. This is an unusually high percent for early in the run and was the first clue to the low red return.

The total catch of reds through June 23 in the False Pass fishery was 309,000 reds. This compared to only 136,000 reds in 1967 and 208,000 reds in 1971. Since there was still the feeling that the Bristol Bay run would be later than the normal July 4 peak the False Pass catches gave the impression that the Bristol Bay run would be somewhat larger than forecasted.

On June 23 when fishing ceased prior to the emergency order period a total of 38,000 reds had been caught (Table 6). This was approximately 16,000 more than the Naknek-Kvichak district and several thousand more than the other districts of the Bay. Emergency order #5 that opened the Egegik district for

24-hours for June 24-25 was announced one day earlier than the Naknek-Kvichak district primarily because the catch was higher in the Egegik district than the Naknek-Kvichak district. This unusual fact was construed to mean the Egegik district was coming in slightly stronger than predicted. This emergency opening produced a catch of 30,000 reds (Table 6).

The first drifts by the Egegik inside test fish boat were made on June 26. No escapement counts either in the lagoon or past the tower were recorded at this time. There were fish being caught by the inside Egegik test boat on June 26, but not in sufficient numbers to predict a large escapement rate. Since fish were passing the inside test boat which indicated that an escapement was being achieved normally, emergency order #8 was announced for 24-hours for June 27-28. The total catch for this fishing period was 111,000 reds (Table 6). This brought the accumulative catch up to 179,000 reds which accounted for 18% of the total projected harvest for the Egegik district. On June 29 the first Egegik lagoon survey was completed and 64,000 fish were estimated to be in the lagoon. This was equal to 11% of the escapement goal. By this date the inside Egegik test fish boat had begun making significantly larger catches which indicated the run was building at a normal pace.

At this stage of the run it was felt that the Egegik district was progressing slightly ahead of the other districts of the Bay and progressing in a normal sequence of catch to escapement with the possibility of being equal to or slightly exceeding the forecasted run. On June 30 excellent catches were being made by the Egegik test boat and 75,000 fish had been accounted for in the lagoon. No fish, however, had passed out of the lagoon and past the Egegik counting tower. Because of good indications from both lagoon surveys and inside Egegik test boat an emergency order opened the Egegik district for 12-hours on July 1 from 1:00 a.m. to 1:00 p.m. This period accounted for approximately 116,000 fish which brought the accumulative catch up to 295,000 fish (Table 6).

By June 28 the False Pass fishery catches were still holding up similar to the situation in 1971. It was the belief at this time that the run would be strung out over a long period of time rather than having a surge and a quick peak of fish as is normal in the Bristol Bay area. The catches on the "Kittiwake" as of June 29 were very small and occurred on the first five stations which is unusually close to shore. Most catches are generally made on stations three through seven which are in the midsection of the transect which is 30 to 35 miles offshore.

On June 30 the Egegik district indicated a strong run because of the excellent escapement into the lagoon for this time period (assuming a late run), good catches by the inside Egegik test boat and the fair catches in the Egegik district. On June 30 Port Moller and False Pass were giving conflicting impressions of the run. The low catches at Port Moller indicated a small run and the large catches at False Pass holding up over a longer period of time indicated a much larger than actual run.

The Egegik lagoon surveys on July 2 showed an excellent escapement of over 200,000 fish. Good catches still being made by the inside Egegik test fish boat which indicated that the Egegik district was the only district in the Bay showing good numbers of fish. Because of these favorable indications emergency order #15 was announced and opened the Egegik district for 12-hours

from July 3 at 3:00 p.m. to July 4 at 3:00 a.m. Continued good inside Egegik test boat catches and the good showings of escapement and catch prompted the extension of the fishing period for 12 additional hours on July 4 from 3:00 a.m. to 3:00 p.m. It was felt at this time that because of the strong showing of fish into the district that adequate escapement was being achieved proportionately to the catch. To prevent over escapement an additional 12-hours of fishing should be allowed.

Despite the fact that the False Pass fishery catches held on for a long period of time the Port Moller boat was still not showing any significant catches. The feeling was beginning to be experienced that the fish were possibly missed by the Port Moller boat during the five days that fishing was not being conducted (June 23 through June 28).

The Egegik district catch from the July 3-4 fishing period accounted for 283,000 fish for an accumulative catch of 578,000 (Table 6). This accumulative catch equaled 59% of the total projected harvest for the Egegik district. To this date 56% of the escapement goal was accounted for by aerial surveys.

It was determined by aerial observation that again in 1972 as in 1971 the fish in the Egegik lagoon were moving back and forth between the lower lagoon and the upper river. This was demonstrated by the leveling off the lagoon counts and remaining relatively in the same magnitude of counts. With the inside Egegik test boat catches still remaining fairly high it was felt by the Department that fish were moving back and forth through the sampling area and therefore escapement counts were being artificially raised and there was not actually as much escapement as was indicated by the inside test boat. On July 5 there was a total escapement past the counting tower of 4,000 fish. On July 6, however, 70,000 reds passed the counting tower. This equalled 13% of the total escapement finally achieved. On July 7 the counting tower had 124,000 reds counted for a total accumulation of 198,000 which was 33% of the escapement. The Egegik lagoon surveys still showed approximately 200,000 additional fish. Thus, the total amount of fish accounted for in the escapement was 66% of the escapement goal. The percent of the catch accounted for and the indices for the outside test fishery, which had an index larger than any previous index in any year, prompted the Department to open the Egegik district for 12-hours on July 7. The catch for the July 7 fishing period was 78,000 fish for an accumulation of 656,000 which represented 67% of the forecasted harvest (Table 6). This catch represented the first drop in the catch per unit effort in the Egegik district which is indictative of the peak of the fishery having passed.

Escapements passed the counting tower on July 8, 9 and 10 was 72,000, 82,000 and 92,000 respectively. This amounted to an accumulative escapement actually counted past the counting tower on July 10 of 445,000 or 74% of the escapement goal. The Egegik lagoon surveys indicated that the number of fish entering the Egegik lagoon was dropping off drastically which was substantiated by the catches of the inside Egegik test boat. It was fairly certain at this time that the run had peaked on July 5 or 6. The peak was difficult to pinpoint because it came between fishing periods. Since the lower range of escapement (400,000 fish) had been obtained it was felt that an emergency order opening the district until further notice was justified. This opening

was effected at 7:00 p.m. on July 8. This opening remained until 9:00 a.m., July 17 when by regulation fishing reverted to 5-days-per-week. Escapement counts continued through July 18 when the total accumulation count was reached of 546,000 reds.

UGASHIK DISTRICT

The boundaries of the Ugashik district remained the same in 1972 as they were in 1971. There were 138 units of gear registered for the Ugashik district in 1972, 50 units of set net gear and 88 units of drift gear (Table 3). However, before the fishery commenced an emergency order was announced that allowed fishing in the Ugashik district to be conducted by set net gear only during the emergency order period. Special late licensing was made available to those persons who were registered for drift gear in the Ugashik district who later wished to fish set net gear in the Ugashik district.

The total inshore forecast for the Ugashik district was 265,000 reds. The escapement goal ranged from 350,000 to 550,000 reds with a point estimate of 450,000 reds. With the escapement goal being larger than the anticipated inshore run, all the returning fish were required in the escapement. However, in order to determine the magnitude of the run as it was developing and to prevent the possibility of over escapement due to a return that exceeded the inshore forecast a limited set net only fishery was allowed. It was anticipated before the season began that three to four 12-hour fishing periods would be allowed to keep the total catch at a maximum of 15 to 20,000 fish. A test fishing program was set up to facilitate determining the magnitude of the developing run in the Ugashik district.

Management

At the beginning of the emergency order period the total catch to the Ugashik district was 1,000 red salmon. The first open fishing period was allowed on June 27 for 12 hours. This fishing period produced 1,000 reds which brought the accumulation up to 2,000 fish or 10% of the maximum probable harvest (Table 7). By July 1 no fish had been seen in the Ugashik lagoon and the Ugashik district was opened from 11:00 p.m. June 30 to 11:00 a.m. July 1. This period produced 6,000 fish which brought the accumulation to 8,000 fish which was 40% of the total probable harvest for the Ugashik district (Table 7). This magnitude of catch indicated that the strength of the run was developing at a rate which would not exceed the forecasted level or if it would be reached at all. On July 7 the Ugashik lagoon count did not exceed 3,000 fish. The first counts past the Ugashik tower occurred on July 7 when just over 100 fish passed. One final emergency order open period was announced on July 11 for 12-hours. This period produced a catch of 1,000 reds which brought the accumulative catch up to 14,000 which was 70% of the forecasted harvest (Table 7). No further openings were allowed until July 17 when, by regulation, the fishery reverted to a 5-day-per-week fishery. The tower counts peaked on July 14 with 16,000 fish passing the tower. Tower counting was completed on July 26 with a total escapement count of 79,000 reds. Thus, 18% of the escapement goal together with the total season catch of 18,000 fish accounted for 37% of the total forecasted run to the Ugashik district. Drift gill nets were again allowed after the emergency order fishing period and together with the set nets picked up a total of 13,000 fish of all species through the end of fish operations.

NUSHAGAK DISTRICT

The fishing area in the Nushagak district, which covers approximately 700 square miles, remained unchanged from 1971 and no boundary relocations were implemented during the course of the salmon season.

Fishing time in the Igushik section, which is managed separately from the remainder of the Nushagak district, was limited in 1972, while the Snake River section remained closed for the twelfth straight year.

The emergency order period was similar to 1971 (June 16 through July 17). During this 32 day period, the Nushagak district was open to fishing for 192 hours or 26% of the time, while the Igushik section was open an additional 24 hours for a total of 216 hours (29%) (Table 4). A standard 5-day-per-week fishery was allowed both prior to and after the emergency order period. Fishing time during the season was controlled by issuance of eight emergency orders (Table 4).

Pre-season fishing gear registration for the district was 786 gill nets, including both drift and set net gear, 16 units less than registered in 1971 (Table 3). Of this total, 85% were resident fishermen and 15% non-resident. Approximately 150 set nets of the 238 registered to fish participated in the fishery. Many resident fishermen license both drift and set net gear but do not use their set net gear. This, coupled with the poor season in 1972, resulted in the decision by many fishermen not to participate actively in the harvest.

Unlike 1970 and 1971, when over one-half of the Nushagak fishing fleet transferred to other districts in the Bay, the fleet transfers in 1972 were limited. Prior to the "red salmon season" approximately 80 boats transferred into Nushagak for "king season" and then transferred back to their home districts (Naknek-Kvichak and Egegik) prior to "red season". Transfers during the remainder of the salmon season were limited due to the extremely poor run and resultant lack of fishing time in any of the major districts. Most fishermen were not willing to "chance" a transfer on hopes of doing better in another district. Likewise, the usual large influx of drift gear the Nushagak normally receives just prior to "pink salmon season" did not take place due to the complete failure of the pink salmon return.

The highest estimated effort recorded for drift and set net gear indicated that approximately 450 units of drift gear and 150 units of set net gear participated in the fishery at the peak of the red salmon run on July 2 (Table 8).

The district inshore red salmon forecast of 2,096,000 had 1,414,000 assigned to Wood River; 422,000 to Igushik River; 137,000 to Nuyakuk River; and 123,000 to Snake River and the Nushagak/Mulchatna system combined (Table 1). The total return based on preliminary apportionment of the commercial catch by river system was: Wood - 699,000; Igushik - 158,000; Nuyakuk - 62,000; and Snake/Nushagak-Mulchatna - 27,000; for a total run of 916,000. This return was 56% lower than the forecasted district run (Table 1) and 60% lower than the average run of 2,277,000 for the last 10-years (1962-71). Further the 1972 total red salmon return was the lowest on record in the last 20-years (1952-71), although comparable with total returns in 1954 (1,007,000) and 1957 (990,000).

The pink salmon run was forecast to amount to 1,400,000 fish even though unusually severe winter conditions in the winter of 1970-71 and equally severe spring-summer conditions on the high seas the following spring (1971) indicated that mortality might be higher than usual. Although no forecast range was included in the original forecast, a minimum run of 500,000 was thought to represent the lower end of the forecast range. The actual return of 126,000 fish catch and escapement combined was only 9% of the forecast and the lowest return on record since adequate records were initiated in 1958.

Pre-season harvest levels were again forecasted for king, chum and coho salmon stocks of the Nushagak district. The projected king salmon harvest was 76,000, while chum and coho salmon harvest levels were estimated at 305,000 and 22,000 respectively. The actual king salmon harvest of 46,000 and coho harvest of 4,000 were well below that forecast, while the chum salmon harvest of 303,000 was within 1% of that forecast (Table 11).

Seven processors bought salmon in Nushagak in 1972. Three major canneries operated nine canning lines, while four operators purchased fish for the fresh-frozen market (Table 16).

Management

The general timing of all salmon movement "into Bristol Bay" was normal in 1972. The peak of red salmon catches in the major districts occurred between June 28 and July 4. However, in all river systems there occurred a delay of fish movement as the salmon moved into the fishing districts, through the connecting rivers and into the lake systems. It is probable that the unusually cold water temperatures, resulting from a late spring breakup, colder than normal spring weather and large snow pack run-off, delayed salmon movement through the districts and rivers.

The king salmon harvest prior to commencement of the emergency field regulation period (June 16) was approximately 12,000. This was 56% under the average catch of 27,000 fish for this stage of the run, but similar to the late run in 1971 which was "late" and "strong". Consequently, a 48-hour fishing period was announced for June 19-21. This 48-hour period produced a king catch of 4,000 fish, still well below the past average catch by this date (Table 8). Still feeling that the king run was "yet to come", another 48-hour period was announced for June 22-24. This second 48-hour period produced a catch of 14,000 kings, (bringing the accumulative catch to 30,000) still 45% below the average catch of 55,000 but considerably ahead of the 1971 catch and run timing.

Even though the king catch was lagging well below average it was still felt (as late as June 24) that the run would perhaps be a little under strength, but would approach the 20-year average catch of 68,000 fish. Subsequent periods, which were promulgated primarily for red salmon, failed to bear this out. At this writing, a strong case can be made for explaining the poor Nushagak king return (46,000 catch and "light" escapement). The Japanese high seas catch of mixed king and coho salmon amounted to over 800,000 fish (reported to be mostly kings). This is a four to five fold increase over past catches and may help to explain the Nushagak king failure in 1972.

During the last week in June two 24-hour fishing periods (June 26-27 and June 28-29) resulted in red salmon catches of 7,000 and 29,000 respectively (Table 8). Through June 29, only 39,000 red salmon had been caught, compared to the long-term average of 188,000. Counting towers on Wood and Igushik Rivers had yet to enumerate significant numbers of fish (2,000 total at Wood River and none at Igushik River) and it was concluded that the run was late as in 1971. There was as yet no overpowering reason(s) to suspect the contention that the run was a failure. Since moderate catches had been made on the outside of the district at the close of the period on June 29, there was reason to believe that the run was building and would soon produce significant catches and escapement.

Based on the low catch (39,000) and escapement (2,000) through June 30 and the long closure between openings (64 hours), a 12-hour period was announced for July 2. All drift effort (estimated at 450 boats and skiffs) was concentrated in Middle and West channels on the outside of the district near the red salmon boundary line. It was evident that no large body of fish had yet moved into the district. The resulting catch of 159,000 reds was somewhat disappointing, in that it was smaller than anticipated (adding more weight to a reduced run) and proved conclusively that the fish were not yet ready to move into the district. The accumulative red salmon catch through July 2 was 198,000 compared to the long-term average of 350,000 through this date (Table 8).

Continued aerial surveillance of both Wood and Igushik Rivers failed to show any increase in the red salmon escapement rate. The Nushagak test fishing boat completed 16 standard 30-minute drifts on July 3-4 and produced a catch of only 379 red salmon (345 of which were caught in one drift on the red salmon outer boundary line in West channel).

By July 4 it was evident that the bulk of the fish were still on the outside of the district and had yet to move in. A close watch was kept on this situation as well as the Igushik River escapement. Through the fishing period on July 2 the Igushik beach, a predominantly early producer, had accounted for only 12,000 reds caught, compared to the long-term average of 41,000 fish (Table 10).

The Nushagak test fishing boat made two subsequent trips on July 5-6 and July 7-8. The first test boat trip on July 5-6 produced only 63 reds in 21 standard drifts. The entire Nushagak district was covered and it was still evident that the fish were still holding out. The second trip on July 7-8 produced 984 reds in 21 standard drifts, with 469 of these fish being taken in four drifts in West channel on the outside boundary line.

Based on the good test boat catches in West channel, the recent increase of escapement at the Igushik River counting tower (from zero to over 1,000 fish per day), and estimating that the closure of 136 hours (5-1/2 days) would allow enough fish to escape the fishery to achieve at least the lower end of the escapement range (100,000), a 24-hour "Igushik section only" opening was announced for July 8-9.

Approximately 250 boats and skiffs as well as the Igushik beach set nets participated in the Igushik section opening on July 8-9. The total red salmon catch for the period amounted to 87,000 fish which brought the accumulative catch to 285,000 still well below the long-term average (Table 8). The Igushik

beach catches were very poor, amounting to only 11,000 fish (Table 10). The bulk of the fish caught in the outer portion of the Igushik section were probably headed for Wood, Nuyakuk and Nushagak Rivers.

Through July 8 the delay of the red salmon movement into and through the district was causing real concern. In addition to this was the strong suspicion that the run was well under what had been forecast. From previous experience, it was known that delay of upriver migration usually resulted in a heavy fast push once the salmon began their upstream movement. In some previous cases, most of the season escapement was achieved on a single flood tide. As of July 9 the Wood River escapement was only 6,000 fish and less than 4,000 had ascended the Igushik River past the counting tower. As of July 9, it was felt that there must be a "strong" showing well inside the fishery before another fishing period was announced.

The test boat was sent back out on the morning of July 9 and proceeded to make three drifts between Dillingham and the "inside" boundary line. A total of 646 reds were caught in these three sets and showed conclusively that the fish were well past the fishery. Consequently at 9:30 a.m. July 9 a 12-hour fishing period for the "Nushagak section only" was announced to start at 10:00 p.m. July 9 through 10:00 a.m. July 10. The Igushik section remained closed after an aerial survey of the river on July 9 failed to show an increase in the escapement rate. At the opening on July 9 the Nushagak section had been closed for 174 hours (7 days).

This 12-hour Nushagak section opening proved to be the last open period in the district until resumption of the normal 5-day-per-week fishery on July 17. After a brief flurry on the inside along Combine Flats the fleet had picked up all the fish that were available. The results of this fishing period marked the end of any hopes for a decent red salmon run to Nushagak. The period catch amounted to 87,000 reds and 83,000 chum salmon (Table 8). On July 12 the following general announcement was broadcast on the Department radio network: "Due to the low red salmon escapement rates in all systems of the Nushagak district, the possibility of an opening in the Nushagak is very remote for the balance of the emergency order period, which extends through 9:00 a.m. Monday, July 17". Over 84% of the total Wood River red salmon escapement was achieved in three days from July 9 through July 11 (365,000). The season-end escapement totaled only 431,000, 169,000 under the lower-end of escapement range of 600,000 to 900,000 (Table 1). The Igushik River red salmon escapement reached 60,000 at season's end, 40,000 under the lower-end of the escapement range of 100,000 to 200,000 (Table 1).

The red salmon catch at season's end amounted to 387,000 with only 26,000 fish coming off Igushik beach.

The chum salmon catch amounted to 303,000 for the season and would have undoubtedly been considerably higher had more fishing time been allowed. However, since reds and chums enter the fishery together, the closures necessary to insure adequate red salmon escapement held the chum harvest down somewhat. The pink salmon return was a complete failure with only 126,000 fish returning out of 1,400,000 forecast.

The weather during the 1972 season was generally good, with intermittent periods of cool and warm weather. No fishing was lost to storms in 1972.

The over-all preliminary age composition of the Nushagak red salmon catch and escapement combined was 52% 4-year fish from the 1968 parent-year escapement, 42% 5-year fish from 1967 and 6% 6-year fish from 1966.

Catch

The Nushagak district commercial catch of all species of salmon was 807,000 and represented 25% of the total Bristol Bay catch for 1972 (Table 11). This catch was 53% lower than the 20-year average (1962-71) of 1,733,000 for the district.

The red salmon catch of 387,000, which was the lowest since 1954, represented 16% of the Bristol Bay total harvest and was 60% lower than the average catch of 971,000 since 1952. Preliminary age composition of the district red catch was 35% 4-year fish from the 1968 parent-year escapement, 57% 5-year fish from 1967 and 8% 6-year fish from 1966. Preliminary sex ratio composition of the Nushagak catch was 53% males and 47% females, while the preliminary average weight (as determined by Alaska Department of Fish and Game sampling) for reds caught in the Nushagak section was 5.5 pounds. Cannery derived weights varied between 5.8 and 6.0 pounds.

The Nushagak district king salmon catch of 46,000 was the lowest since 1963 and was 33% lower than the average catch of 68,000 since 1952. Over 52% or 554,000 pounds were marketed as fresh-frozen products. The balance was canned and produced a case pack of over 4,000 (Table 12). Preliminary average weight of kings sampled randomly throughout the season was 20.3 pounds, while the preliminary sex ratio was 55% males and 45% females.

The total catch of 303,000 chum salmon was 25% higher than the average district catch of 243,000 for the past 20 years. Preliminary average weight was 6.8 pounds, while the preliminary sex ratio of the commercial catch was 35% males and 65% females.

The even-year pink salmon run produced a catch of 67,000 fish, 94% lower than the average even-year catch of 1,177,000 since 1958. Preliminary average weight was 3.0 pounds, while the preliminary sex ratio of the commercial catch was 31% males and 69% females.

Late season catches of coho salmon amounted to over 4,000 fish, and was 85% lower than the 20-year average harvest of 28,000.

Escapement

Counting towers were maintained on Wood, Igushik and Nuyakuk Rivers for the purpose of enumerating red salmon into these systems. Aerial surveys were employed to determine red salmon escapement into the Snake River system,

where a tower station is not maintained. For the second straight year the counting towers on the Nushagak River were not manned due to extremely high and turbid water conditions.

As in 1971, the Nushagak-Mulchatna red salmon escapement was estimated using previous escapement data and the ratio between the Nushagak and Nuyakuk red salmon escapements.

Total red salmon escapement to the district was 529,000 or 58% of the total run (Table 2). The final escapement and percent of the district total by systems were: Wood - 431,000 (82%); Igushik - 60,000 (12%); Nuyakuk - 29,000 (5%); Nushagak/Mulchatna - 7,000 (1%); and Snake - 2,000 (+%) (Table 2). The 1972 total district escapement was 58% lower than the 20-year average of 1,245,000. Escapements within the desired range were not obtained in any of the Nushagak River systems due to the extremely poor return.

Preliminary analysis of scales from those systems sampled showed that the major age classes of the red salmon escapement to the major rivers were: Wood - 70% 4-year fish from the 1968 parent-year escapement, 25% 5-year fish from 1967 and 5% 6-year fish from 1966; Igushik - 41% 4-year fish, 52% 5-year fish and 7% 6-year fish; and Nuyakuk - 8% 3-year fish, 25% 4-year fish, 62% 5-year fish and 5% 6-year fish. Over all preliminary age composition of the Nushagak district red salmon escapement was 63% 4-year fish from the 1968 parent-year escapement, 31% 5-year fish from 1967 and 5% 6-year fish from 1966. Preliminary sex ratios of the major river systems sampled were: Wood - 48% males and 52% females; Igushik - 60% males and 40% females; and Nuyakuk - 54% males and 46% females.

King salmon aerial surveys were flown for the fifth straight year on a comparable basis to establish relative escapement indices in key index streams important to spawning king salmon stocks. As in 1971, indications are that the spawning king salmon escapement was light when compared with previous years, but was a higher proportion of the total king return.

Chum salmon escapement estimates were not derived due to the non-operation of the Nushagak River counting station where the majority of the chums are enumerated. However, considering the strong chum catches in the commercial fishery and the long closures affected to obtain adequate red salmon escapements, it would appear that an adequate to very good chum salmon escapement was achieved.

Pink salmon were enumerated and sampled at the Nuyakuk River counting station where the majority of the district escapement passes on their way to the spawning grounds in the upper portion of the Nuyakuk and Tikchik Rivers. The total observed escapement of 59,000 fish was the lowest escapement recorded since the establishment of the Nuyakuk River counting station in 1959. Sex ratio of the spawning escapement was 31% males and 69% females.

TOGIAK DISTRICT

The Togiak district is comprised of five sections (Cape Peirce, Osviak, Matogak, Togiak and Kulukak), with the majority of the commercial harvest coming from the Togiak section. In 1972, 63% of the harvest came from the Togiak section, 19% from Osviak, 15% from Kulukak and 3% from Matogak.

Togiak district is not managed under the same concept as the other Bristol Bay districts. Open fishing periods at Togiak are set in advance and adjusted accordingly as required during the course of the salmon season. In 1972, the Togiak section weekly fishing periods were 4 days in length, while the other four sections were open 5 days each week.

Pre-season gear registration, drift and set net combined, totaled 116 units, 11 more than in 1971 (Table 3). Only one fisherman out of 116 registering nets in 1972 was a non-resident.

The total district inshore red salmon forecast was 126,000 (Table 1). Total run to the district in 1972 (excluding escapements to the Togiak tributaries and Kulukak River system which were not included in the forecast) was 148,000 reds, 18% higher than forecast (Tables 1 and 2). This return was 46% lower than the average run of 287,000 for the last 10-years (1962-71).

Levels of harvest were also forecast for king and chum salmon. The king salmon catch of 20,000 was only 7% lower than the forecast of 21,000, while the chum salmon catch of 179,000 was 45% higher than the forecast of 124,000.

Seven processors bought salmon or herring and herring roe-on-kelp in Togiak in 1972. One cannery operated two canning lines, while seven operators purchased fish or herring and/or herring roe-on-kelp for the canned, fresh, frozen and cured markets (Table 16).

Management

The early season salmon catches were centered in the Togiak section and were directed toward king salmon. The accumulative king salmon catch had reached 10,000 through July 1, 43% higher than the long-term average of 7,000 (Table 9).

With the low red salmon forecast (126,000), a conservative approach to management of the red salmon return was dictated if the escapement goal of 70,000 fish was to be achieved (Table 1). Regular 4-day-per-week fishing was allowed in the Togiak section through July 8, by which time the accumulative red salmon catch had amounted to 32,000, 54% under the long-term average of 70,000 and 57% of the anticipated total season harvest (Tables 1 and 9).

The Togiak section fishery was closed by emergency order for the following week (July 10-14) after evaluation of the situation through July 9: (a) 32,000 red catch, 54% below long-term average and 57% of the anticipated season harvest; (b) minimal escapement past the Togiak River counting station (less than 100 reds through July 9); and (c) results of an aerial survey of the lower Togiak River on July 8 which showed no fish in the lower river.

To encourage effort in the distant Osviak-Matogak sections these two areas were placed on 7-day-per-week fishing effective July 8 (Table 4). As a result of the Togiak section closure the fishing fleet dispersed to the Osviak, Matogak and Kulukak sections, where good to strong chum salmon runs were in

progress. Over 27,000 chums were caught between July 10-15 at Osviak, with another 10,000 taken in Kulukak and 6,000 in Matogak. The Osviak-Matogak sections were allowed to remain open over the weekend for two successive weekends (July 8-9 and July 15-16) and then both sections were returned to a 5-day-per-week basis (Table 4).

When the Togiak River escapement rate failed to pick up (8,000 reds through July 16) and aerial observations of the Togiak River on July 16 showed no increase could be expected for several days, the Togiak section was closed for 48 hours (July 17-19). By July 18 the enumerated red escapement past the Togiak River counting station had increased only 1,000 fish over the previous day to a total of 9,000, therefore, the Togiak section was closed the balance of the week (July 19-21) (Table 4).

Normal fishing was resumed in the Togiak section on July 24 after two successive weekly closures totaling 17 days. This decision was based on: (a) Togiak River red salmon escapement and rate was slowing increasing (38,000 through July 23 with the rate increasing from 1-2,000 per day to 4-6,000), (b) the likelihood of a large chum salmon harvest if the period was allowed to open on Monday, July 24, (59,000 were caught during the week) and (c) the expected red salmon harvest would not exceed 10-15,000 (it went 16,000).

By July 26 it was apparent that the escapement goal would be achieved (51,000 red salmon escapement through July 24 with the escapement rate holding up). A three day extension of fishing time was announced for Togiak section which allowed fishing to continue through the weekend (Table 4). This decision was reached when it was concluded that the red salmon escapement goal would be achieved and that the good escapement of chum salmon into Togiak River would allow additional harvest.

The season-end catch and escapement of red and chum salmon in the Togiak section fully justified the management decisions made during the course of the season. The red salmon catch in the Togiak section amounted to 53,000, while the escapement of 74,000 was only 6% over the goal of 70,000 (Tables 1 and 9). The chum salmon Togiak section catch totaled 100,000 with the escapement estimated at 61,000 fish.

Osviak, Matogak and Kulukak sections continued to produce good catches (especially chum salmon) all season long, and these three sections accounted for over 36% of all salmon caught in the Togiak district in 1972 (Table 9).

Like 1971, weather was not a limiting factor for the fishery in the Togiak district in 1972. As in most of Bristol Bay the weather was alternately warm and cool with very little wind throughout the season.

Over-all preliminary age composition of the Togiak red salmon catch and escapement combined was 31% 4-year fish from the 1968 parent-year escapement, 63% 5-year fish from 1967 and 6% 6-year fish from 1966.

Catch

The Togiak district commercial catch for all species of salmon was 283,000 (Table 11). This catch represented 9% of the total Bristol Bay catch for 1972,

and was 19% higher than the 18-year average of 237,000 for the area. Togiak River section accounted for 178,000 fish, while Osviak, Matogak and Kulukak sections contributed 52,000, 10,000 and 42,000 respectively (Table 9).

Red salmon contributed 26% of the district harvest in 1972. The 74,000 fish catch was the sixth smallest in the history of the fishery, 42% below the 17-year average of 129,000 and 54% below the last 10-year average catch of 162,000. Preliminary age composition of the district red salmon catch was 25% 4-year fish from the 1968 parent-year escapement, 68% 5-year fish from 1967 and 7% 6-year fish from 1966. Preliminary sex ratio of the commercial catch was 45% males and 55% females, while the average weight of reds sampled randomly throughout the season was 6.8 pounds.

The 20,000 king salmon harvest was the fourth largest in the 19-year history of the fishery. This catch was 96% higher than the long-term average catch of 10,000 and 31% higher than the previous 10-year average catch of 15,000. The Togiak king salmon catch accounted for 28% of the total Bay catch in 1972. The preliminary sex ratio of the commercial catch was 45% males and 55% females, while the preliminary average weight of kings sampled randomly from the catch was 27.3 pounds.

The total catch of 179,000 chum salmon was the third largest in the history of the fishery and was 99% higher than the average catch of 90,000 for the past 19-years (Table 11). The chum salmon harvest centered in the Togiak section (100,000) while the Osviak, Matogak and Kulukak sections produced 47,000, 9,000 and 24,000 fish respectively (Table 9). Preliminary sex ratio of the commercial chum catch was 44% males and 56% females, while the average weight was 7.4 pounds.

Escapement

A counting station was again maintained on the Togiak River to enumerate red salmon escapement into Togiak Lake, while red, chum and king salmon escapements in the remainder of the Togiak district were estimated from aerial surveys.

The Togiak River red salmon escapement goal was 70,000 fish, with a management range of 50 to 90,000 (Table 1). The final red salmon escapement past the Togiak River counting station was 74,000 fish, or 90% of the district escapement of 82,000. Total red salmon escapement to the district was 34% below the 20-year average of 125,000. Preliminary age composition of the red salmon escapement was 37% 4-year fish from the 1968 parent-year escapement, 58% 5-year fish from 1967 and 5% 6-year fish from 1966. Preliminary sex ratio of the red escapement was 41% males and 59% females.

King salmon escapement, which was derived from aerial survey indices, was estimated to be approximately 10 to 15,000 with the majority of the fish spawning in the main Togiak River and connecting tributaries.

Chum salmon aerial surveys of seven streams in the western portion of the district (west of Togiak River) in 1972 produced an escapement estimate

of 71,000 or 41% of the total escapement, as compared to 107,000 or 47% in 1971. Togiak River and five connecting tributaries received a spawning escapement of 61,000 chums or 36% of the district escapement, as compared to 56,000 or 24% in 1971. Three streams east of the Togiak River contributed 38,000 spawning chums or 23% of the district total, as compared to 66,000 and 29% in 1971. Total estimated chum salmon escapement for the entire district (16 streams surveyed) was 170,000, as compared to 229,000 in 1971.

OTHER FISHERIES

HERRING FISHERY

In 1972 both a limited herring sac-roe and roe-on-kelp fishery existed in the Togiak district of Bristol Bay.

One operator (Table 16) participated in the sac-roe fishery during late May - early June. Total herring catch amounted to over 162,000 pounds, compared with 269,000 pounds in 1967, 182,000 pounds in 1968, 94,000 pounds in 1969 and 55,000 pounds in 1970 (Table 15). Since the inception of the sac-roe fishery, the operation continues to be plagued by operational difficulties, fluctuating seasonal abundance of herring and poor weather conditions. Production of herring sac-roe amounted to 11,000 pounds, or 7% recovery from the total herring catch. Estimated wholesale value of sac-roe production to the processor was \$17,000.

The 1972 roe-on-kelp fishery production was 64,000 pounds as reported by the single processor (Tables 15 and 16). The 1972 production was the largest since this fishery was initiated in 1968. The estimated wholesale value of the roe-on-kelp production to the processor was \$38,000.

SUBSISTENCE FISHERY

The Bristol Bay salmon subsistence fishery for personal use and dog food consumption is centered around villages in the Naknek-Kvichak and Nushagak drainages. In these areas, local inhabitants, especially outlying villagers, are still dependent on salmon for winter dog food and augmentation to their own diets. Salmon subsistence catches, which have been documented since 1963, approach 100,000-170,000 fish annually in the two major drainages.

The 1972 subsistence salmon catch was 93,000 fish of all species for the Naknek-Kvichak and Nushagak districts. Since 1963, the subsistence salmon harvest for the two major drainages has averaged 133,000 fish of all species, with over 58% coming from the Naknek-Kvichak area.

FISHERY BY-PRODUCTS

In 1972, the salmon egg industry operated egg-taking facilities at 10 shore-based canneries and three floaters, with production estimated at 683,000 pounds and valued at approximately \$782,000 (Tables 14 and 16). Over-all, the 1972 production of 683,000 pounds was 41% below the 5-year average production of 1,160,000 pounds.

MISCELLANEOUS

Production of fresh-frozen and cured salmon by 11 operators amounted to 64,000 fish and 946,000 pounds in 1972 (Table 12). Total production of all species in 1972 was 68% lower than the 10-year average production of 203,000 fish.

Fresh-frozen and cured production of king salmon, primarily from Nushagak and Togiak districts, amounted to 31,000 fish weighing 726,000 pounds (Table 12).

The first wholesale value to the processors of all fresh-frozen and cured commercial production was estimated to be \$511,000 down 63% from the 1971 value of \$1,397,000.

TABLE 1. Preliminary 1972 Bristol Bay red salmon runs¹ by system compared with the pre-season forecast, escapement goals and forecasted harvest (in millions of fish).

System	Inshore Run		Run Deviation from Forecast	Run % Forecast	Escapement Goal	Escapement Range	Actual	Harvest	
	Forecast ^{1/}	Actual						Forecast	Actual
Kvichak	3.859	1.396	-2.461	-63.8	2.000	1.500-2.500	1.010	1.859	.386
Branch ^{2/}	.377	.198	- .179	-47.5	.200	.150- .250	.151	.177	.047
Naknek	1.446	1.357	- .089	- 6.2	.800	.700- .900	.587	.646	.770
Total	5.682	2.951	-2.729	-48.0	3.000	2.350-3.650	1.748	2.682	1.204
Egegik	1.575	1.256	- .319	-20.3	.600	.400- .800	.546	.975	.710
Ugashik ^{3/}	.265	.097	- .168	-63.4	.450	.350- .550	.079	0	.018
Wood	1.414	.669	- .745	-52.7	.750	.600- .900	.431	.664	.239
Igushik	.422	.158	- .264	-62.6	.150	.100- .200	.060	.272	.098
Snake ^{2/}	.022	.007	- .015	-68.2	.012	.010- .014	.002	.010	.005
Nuyakuk ^{2/}	.137	.061	- .076	-55.5	.071	.057- .085	.029	.066	.033
Nush./Mulch. ^{2/}	.101	.020	- .081	-80.2	.052	.042- .062	.007	.049	.012
Total	2.096	.916	-1.180	-56.3	1.035	.809-1.261	.529	1.061	.387
Togiak ^{4/}	.126	.148	+ .022	+17.5	.070	.050- .090	.074	.056	.074
Total Bristol Bay	9.744	5.368	-4.374	-44.9	5.155	3.959-6.351	2.976	4.774	2.393

1/ Final Bristol Bay red salmon forecast of run for 1972 by R. D. Paulus.

2/ These systems cannot be managed separately from the major system in their district. Consequently, the harvest rates are merely the harvest 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.

3/ Excluding Mother Goose system red salmon run.

4/ Excluding red salmon runs to the Togiak tributaries - Kulukak system.

TABLE 2. Bristol Bay red salmon catch and escapement, 1972.^{1/}

District and River System	Catch	Escapement	Total Run
<u>NAKNEK-KVICHAK DISTRICT</u>			
Kvichak River	386,357	1,009,962	1,396,319
Branch River	46,940	151,188	198,128
Naknek River	770,307	586,518	1,356,825
Total	1,203,604	1,747,668	2,951,272
<u>EGEGIK DISTRICT</u>	709,884	546,402	1,256,286
<u>UGASHIK DISTRICT</u>	18,029	79,428	97,457
<u>NUSHAGAK DISTRICT</u>			
Wood River	238,569	430,602	669,171
Igushik River	97,726	60,018	157,744
Snake River	5,205	2,000	7,205
Nuyakuk River	32,966	28,596	61,562
Nushagak-Mulchatna	12,434	7,434	19,868
Total	386,900	528,650	915,550
<u>TOGIK DISTRICT</u>			
Togiak River		74,070	
Togiak Tributaries		4,500	
Kulukak System		3,400	
Total	74,158	81,970	156,128
TOTAL BRISTOL BAY	2,392,575	2,984,118	5,376,693

^{1/} Final catch and escapement data, however, apportionment of inshore catch by river system to the Naknek-Kvichak and Nushagak districts is preliminary.

TABLE 3. Bristol Bay pre-season gear registration by district and type of gear, 1972.^{1/}

District	Type of Gear		Total
	Drift	Set	
<u>NAKNEK-KVICHAK</u>			
Resident	316	330	646
Non-resident	<u>499</u>	<u>41</u>	<u>540</u>
TOTAL	815	371	1,186
<u>EGEGIK</u>			
Resident	115	89	204
Non-resident	<u>117</u>	<u>71</u>	<u>188</u>
TOTAL	232	160	392
<u>UGASHIK</u>			
Resident	51	35	86
Non-resident	<u>37</u>	<u>15</u>	<u>52</u>
TOTAL	88	50	138
<u>NUSHAGAK</u>			
Resident	431	233	664
Non-resident	<u>117</u>	<u>5</u>	<u>122</u>
TOTAL	548	238	786
<u>TOGLAK</u>			
Resident	80	35	115
Non-resident	<u>1</u>	<u>0</u>	<u>1</u>
TOTAL	81	35	116
<u>BRISTOL BAY</u>			
Resident	993	722	1,715
Non-resident	<u>771</u>	<u>132</u>	<u>903</u>
TOTAL	1,764	854	2,618

^{1/} Based upon gear license count - registration at start of season - does not incorporate district transfers.

TABLE 4. Bristol Bay emergency orders by district, 1972.^{1/}

<u>NAKNEK-KVICHAK DISTRICT</u>				<u>UGASHIK DISTRICT</u>			
<u>E.O. No.</u>	<u>Date and Time</u>		<u>Hours Open</u>	<u>E.O. No.</u>	<u>Date and Time</u>		<u>Hours Open</u>
5	June 25	9 am - June 26	9 am 24	6	June 27	11 am - June 27	11 pm 12
9	June 28	11 am - June 29	11 am 24	11	June 30	11 pm - July 1	11 pm 12
14	July 2	2 pm - July 3	2 am 12	17	July 6	6 pm - July 7	6 pm 12
20 ^{2/}	July 7	7 pm - July 8	7 am 12	25	July 11	10 am - July 11	10 pm 12
<u>EGEGIK DISTRICT</u>				<u>NUSHAGAK DISTRICT</u>			
<u>E.O. No.</u>	<u>Date and Time</u>		<u>Hours Open</u>	<u>E.O. No.</u>	<u>Date and Time</u>		<u>Hours Open</u>
5	June 24	7 am - June 25	7 am 24	2	June 16	9 am - June 17	9 am 24
8	June 27	11 am - June 28	11 am 24	3	June 19	9 am - June 21	9 am 48
12	July 1	1 am - July 1	1 pm 12	4	June 22	9 am - June 24	9 am 48
15	July 3	3 pm - July 4	3 am 12	7	June 26	11 am - June 27	11 am 24
16	July 4	3 am - July 4	3 pm 12	10	June 28	Noon - June 29	Noon 24
19	July 7	5 am - July 7	5 pm 12	13	July 2	4 am - July 2	4 pm 12
22	July 8	7 pm - July 17	9 am 206	21 ^{3/}	July 8	8 am - July 9	8 am 24
				23 ^{4/}	July 9	10 pm - July 10	10 am 12
<u>TOGIK DISTRICT^{5/}</u>				<u>Osviak-Matogak Sections</u>			
<u>TOGIK RIVER SECTION</u>				<u>Osviak-Matogak Sections</u>			
<u>E.O. No.</u>	<u>Date and Time</u>		<u>Hours Closed</u>	<u>E.O. No.</u>	<u>Date and Time</u>		
24	July 10	9 am - July 17	9 am 168	18	Fishery allowed on 7-day-per-week basis until further notice. Effective July 6, 3 pm.		
26	July 17	9 am - July 19	9 am 48	26	Revert back to 5-day-per-week fishery, from 9 am Monday to 9 am Saturday Effective July 22, 9 am.		
27	July 19	9 am - July 24	9 am 120				
28	July 28	9 am - Aug. 4	9 am 168*				
* Hours open to fishery							

^{1/} Emergency order period: Naknek-Kvichak, Egegik, and Ugashik districts - 9 am June 23 to 9 am July 17; Nushagak district - 9 am June 16 to 9 am July 17.

^{2/} Kvichak section only.

^{3/} Igushik section only.

^{4/} Nushagak section only.

^{5/} Togiak River section open 9 am Monday to 9 am Friday, while Osviak, Matogak, Cape Pierce and Kulukak sections are open 9 am Monday to 9 am Saturday.

TABLE 5. Naknek-Kvichak district commercial catch by species and period, 1972.

Period	Hours	Catch by Species					Total
		Reds	Kings	Chums	Pinks	Cohos	
▷ 6/24	-	23,323	200	919			24,442
6/25-26	24	85,258	335	2,534			88,127
6/28-29	24	476,090	447	6,201			482,738
7/2-3	12	343,726	56	4,009			347,791
7/7-8 ^{1/}	12	230,438	99	7,868			238,405
7/17-22	5 days	43,681	667	47,085	4,862		96,295
7/24-29	5 days	957	263	25,185	33,860		60,265
7/31-8/5	5 days	131	59	20,572	16,481	40	37,283
Total		1,203,604	2,126	114,373	55,203	40	1,375,346
Percent of District Catch		87.5	0.2	8.3	4.0	+	100.0

^{1/} Kvichak section only.

TABLE 6. Egegik district commercial catch by species and period, 1972.

Period	Hours	Catch by Species					Total
		Reds	Kings	Chums	Pinks	Cohos	
▷ 6/23	-	38,475	276	580			39,331
6/24-25	24	29,523	119	632			30,274
6/27-28	24	111,363	164	1,669			113,196
7/1	12	115,971	71	1,105			117,147
7/3-4	24	282,532	171	4,648			287,351
7/7	12	78,104	52	4,653			82,809
7/8-16	8 days	48,077	57	1,517			49,651
7/17-22	5 days	5,763	21	4,005			9,789
7/24-29	5 days	76	3	163			242
7/31-8/5	5 days			352		341	693
8/7-12	5 days			563		1,311	1,874
Total		709,884	934	19,887	0	1,652	732,357
Percent of District Catch		97.0	0.1	2.7	0	0.2	100.0

TABLE 7. Ugashik district commercial catch by species and period, 1972.^{1/}

Period	Hours	Catch by Species					Total
		Reds	Kings	Chums	Pinks	Cohos	
▷ 6/23	-	1,096	30	11			1,137
6/27	12	902	6	13			921
6/30-7/1	12	5,696	16	80			5,792
7/6-7	12	5,137	12	52			5,201
7/11	12	1,400	7	14			1,421
7/17-22	5 days	3,684	76	8,408			12,168
7/24-29	5 days	114	2	640			756
Total		18,029	149	9,218	0	0	27,396
Percent of District Catch		65.8	0.5	33.7	0	0	100.0

^{1/} Set net gear was the only gear allowed during the emergency order period, June 23-July 17.

TABLE 8. Nushagak district commercial catch by species and period, 1972.

Period	Hours	Catch by Species					Total
		Reds	Kings	Chums	Pinks	Cohos	
6/5-10	5 days		1,886				1,886
6/12-17	5 days	9	10,395	9			10,413
6/19-21	48	51	3,800	110			3,961
6/22-24	48	3,214	14,033	1,300			18,547
6/26-27	24	6,949	2,305	4,472			13,726
6/28-29	24	29,027	6,945	25,765			61,737
7/2	12	158,591	885	57,209	13		216,698
7/8-9 ^{1/}	24	87,310	839	13,180	9		101,338
7/9-10 ^{2/}	12	86,678	3,904	82,586	176		173,344
7/17-22	5 days	12,627	824	93,711	40,778	406	148,346
7/24-29	5 days	1,910	113	21,155	25,344	1,506	50,028
7/31-8/5	5 days	519	8	892	650	193	2,262
8/7-12	5 days	15	9	2,351	41	2,047	4,463
Total		386,900	45,946	302,740	67,011	4,152	806,749
Percent of District Catch		48.0	5.7	37.5	8.3	0.5	100.0

^{1/} Igushik section only.

^{2/} Nushagak section only.

TABLE 9. Togiak district commercial catch by species and period, 1972.^{1/}

Period ^{2/}	Hours	Catch by Species					Total
		Reds	Kings	Chums	Pinks	Cohos	
6/12-17	5 days	1	112	1			114
6/19-24	5 days	146	2,289	60			2,495
6/26-7/1	5 days	5,234	7,899	4,414	20		17,567
7/3-8	5 days	31,448	7,534	21,009	167		60,158
7/10-16 ^{3/}	7 days	9,174	612	43,387	108	1	53,282
7/17-23 ^{3/}	7 days	7,280	218	28,697	166		36,361
7/24-30	7 days	15,827	816	58,834	1,104	18	76,599
7/31-8/5	6 days	3,466	55	12,327	176	72	16,096
8/7-12	5 days	1,112	5	4,862	16	448	6,443
8/14-19	5 days	392	10	4,721	2	2,218	7,343
8/21-26	5 days	62	4	777	3	2,812	3,658
8/28-9/2	5 days	10	1	106		1,915	2,032
9/4-9	5 days	6				791	797
9/11-16	5 days						
Total		74,158	19,555	179,195	1,762	8,275	282,945
Percent of District Catch		26.2	6.9	63.4	0.6	2.9	100.0

^{1/} Summary of catch by section:

Section	Reds	Kings	Chums	Pinks	Cohos	Total
Togiak	52,931	17,268	99,576	1,466	7,043	178,284
Kulukak	14,522	2,100	24,315	163	1,139	42,239
Osviak	5,491	161	46,575	119	93	52,439
Matogak	1,214	26	8,729	14	0	9,983
Total	74,158	19,555	179,195	1,762	8,275	282,945

^{2/} Togiak River section open 4-day-per-week, while Osviak, Matogak and Kulukak sections open 5-days-per-week.

^{3/} Togiak River section closed.

TABLE 10. Commercial catch of red salmon by period from Ekuk and Igushik beaches, Nushagak district, 1972.

Period	Hours	Red Salmon Catch by Period	
		Ekuk Beach ^{1/}	Igushik Beach ^{2/}
6/19-21	48	6	
6/22-24	48	221	2,340
6/26-27	24	175	3,584
6/28-29	24	136	2,627
7/2	12	10	3,814
7/8-9	24	- ^{3/}	11,370
7/9-10	12	10,204	- ^{4/}
7/17-22	5 days	1,449	1,777
7/24-29	5 days	230	75
7/31-8/5	5 days	21	
8/7-12	5 days	15	
Total		12,467	25,587

^{1/} Approximate fishing effort was 80 set nets. Red salmon accounted for 41% of total catch; catches of other species included 298 kings, 7,665 chums, 9,096 pinks and 1,021 cohos.

^{2/} Approximate fishing effort was 55 set nets and 25 drift skiffs. Red salmon accounted for 87% of total catch; catches of other species included 339 kings, 2,883 chums, 524 pinks and 2 cohos.

^{3/} Igushik section only.

^{4/} Nushagak section only.

TABLE 11. Bristol Bay commercial catch by district and species, 1972.^{1/}

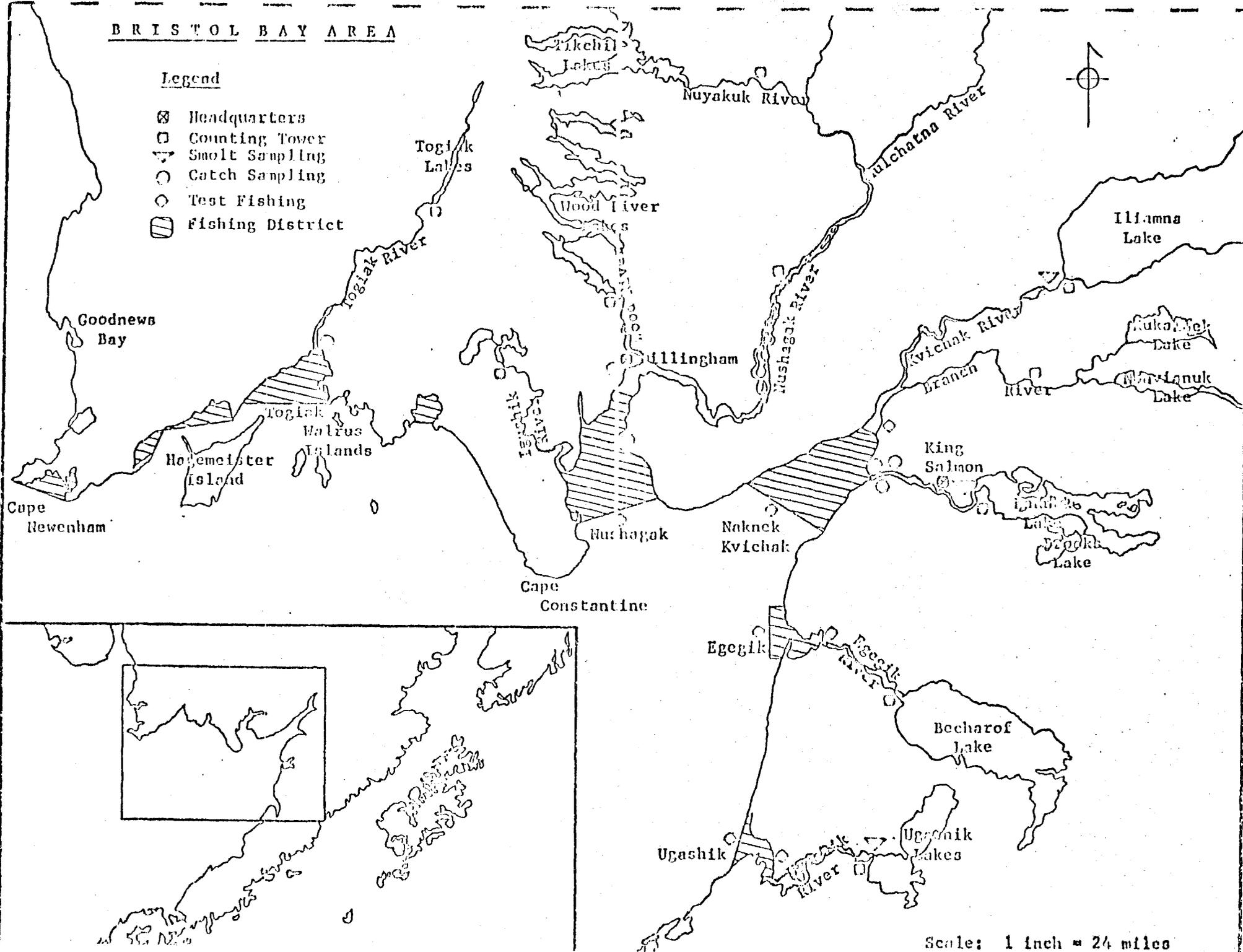
District and River System	Catch by Species					Total
	Reds	Kings	Chums	Pinks	Cohos	
<u>NAKNEK-KVICHAK</u>						
Kvichak River	386,357					
Branch River	46,940					
Naknek River	770,307					
Total	1,203,604	2,126	114,373	55,203	40	1,375,346
<u>EGEGIK</u>	709,884	934	19,887	0	1,652	732,357
<u>UGASHIK</u>	18,029	149	9,218	0	0	27,396
<u>NUSHAGAK</u>						
Wood River	238,569					
Igushik River	97,726					
Snake River	5,205					
Nuyakuk River	32,966					
Nush.-Mul. Sys.	12,434					
Total	386,900	45,946	302,740	67,011	4,152	806,749
<u>TOGIAK</u>	74,158	19,555	179,195	1,762	8,275	282,945
Total	2,392,575	68,710	625,413	123,976	14,119	3,224,793
Specie Percent	74.2	2.1	19.4	3.9	0.4	100.0

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

BRISTOL BAY AREA

Legend

- ⊗ Headquarters
- Counting Tower
- ▽ Smolt Sampling
- Catch Sampling
- ◇ Test Fishing
- ▨ Fishing District



Scale: 1 inch = 24 miles

TABLE 12. (Continued)

Name of Company	Pack and Catch by Species					Total
	Reds	Kings	Chums	Pinks	Cohos	
<u>Summary</u>						
Fresh Fish Totals	3,459	17,711	991	-	691	22,852
Frozen Fish Totals	8,708	13,309	8,999	247	3,317	34,580
Cured Fish Totals	1,680	145	1,282	10	3,895	7,012
Total	13,847	31,165	11,272	257	7,903	64,444
Average Round Weight in Pounds ^{6/}	6.2	23.3	6.7	3.2	7.3	
Fresh-Frozen-Cured Production in Pounds ^{7/}	85,851	726,145	75,522	822	57,692	946,032

- 1/ All data extracted from "Alaska Commercial Operators Annual Report for 1972" (11-122) unless otherwise noted and is final in nature.
- 2/ Case pack given in 48 - 1 lb. cans per case and includes only fish canned in Bristol Bay.
- 3/ Preliminary data extracted from "Final Operations Report" for Bristol Bay (BB-CF/33) or processor's catch reports.
- 4/ Excludes 3,060 cases of salmon packed from Kuskokwim area: Reds - 771 cases; Kings - 1,183 cases; Chums - 1,080 cases; Pinks - 22 cases; and cohos - 4 cases.
- 5/ Fresh-frozen and cured fish production given in numbers of fish and summarized by type of processing.
- 6/ Preliminary data by A.D.F.G.
- 7/ Preliminary production in pounds derived by using over-all average round weight for 1972.

TABLE 16. (Continued)

Name of Operator	Location	No. of Lines ^{2/}			Comments
		AV	OP	Size	
New England Fish Co.	Dillingham		None		Operate in consolidatio with Peter Pan Seafoods
Nushagak Fishermen, Inc.	Dillingham		None		Fresh and frozen salmon and salmon roe.
Peter Pan Seafoods	Dillingham	2 2	1 1	1 lb. tall 1/2 lb. flat	Canned salmon and salmo roe.
Queen Fisheries	Clark's Slough	1 2 1	1 1 1	1 lb. tall 1/2 lb. flat 1/4 lb. flat	Canned salmon and salmo roe.
Traco, Inc. 1836 Westlake Ave. Suite No. 105 Seattle, Washington 98109	Nushagak Bay M/V "Bobby"		None		Frozen salmon and salmo roe.
<u>TOGIAK DISTRICT</u>					
Alaska Marine Resources P.O. Box 129 Togiak, Alaska 99678	Togiak Village		None		Frozen salmon and salmo roe.
Arctic Roe	Kulukak Bay		None		Herring and herring roe
Columbia Wards Fisheries	(Nushagak)		None		Provided tender service for fishermen.
Gordon McCormick Company Box 57 Naknek, Alaska	Kulukak Bay		None		Herring roe-on-kelp.
Kachemak Seafoods P.O. Box 129 Togiak, Alaska 99078	Togiak Village		None		Fresh, frozen and salte salmon. Salmon roe.
Nushagak Fishermen, Inc.	(Dillingham)		None		Provided tender service for fishermen.
Togiak Fisheries	Togiak	1 1	1 1	1/2 lb. flat 1/4 lb. flat	Canned, fresh and froze salmon. Salmon roe. Herring and herring roe

(Continued)

TABLE 16. (Continued)

Name of Operator	Location	No. of Lines ^{2/}			Comments
		AV	OP	Size	

SUMMARY

District:	No. of Lines ^{2/}					
	1 lb. tall		1/2 lb flat		1/4 lb flat	
	AV	OP	AV	OP	AV	OP
Naknek-Kvichak	14	3	9	5	0	0
Egegik	5	1	1	0	0	0
Ugashik	0	0	1	1	0	0
Nushagak	6	3	5	3	1	1
Togiak	0	0	1	1	1	1
TOTAL	25	7	17	10	2	2

^{1/} Indicates operators with either a physical plant or processing facility in a district, or those operators providing tender service for fishermen in districts away from the cannery.

^{2/} AV - indicates number of canning lines available for operation.
OP - indicates number of canning lines actually operated.

TABLE 15. Togiak district herring and herring roe-on-kelp production in pounds by day, 1972.

Date	Number		Production in Pounds	
	Fishermen	Deliveries	Daily	Accumulative
<u>HERRING^{1/}</u>				
May 25 ^{2/}	1	1	49,070	49,070
June 2	2	2	2,450	51,520
3	11	13	24,965	76,485
5	9	11	21,039	97,524
5 ^{2/}	1	1	48,435	145,959
6	7	8	16,475	162,434
Total	18 ^{3/}	36	162,434	162,434
<u>HERRING ROE-ON-KELP^{4/}</u>				
June 5	7	7	10,465	10,465
6	11	11	21,850	32,315
7	2	2	6,590	38,905
9	6	6	12,470	51,375
10	6	6	12,790	64,165
Total	12	32	64,165	64,165

1/ All herring taken in Togiak Bay, except Kulukak Bay catch on May 25

2/ Catch by purse seiner, balance of herring taken with gill nets.

3/ Excluding May 25 and June 5 catches by purse seiner.

4/ Herring roe-on-kelp harvested from Metervik Bay.