BRISTOL BAY AREA

1961

FIELD SEASON REPORT

BRISTOL BAY (1961)

During the second season of Management's responsibility, the Division continued the major aspects of the field program of the preceding year, assumed additional management duties, and carried out or cooperated in applied research programs of immediate concern. These activities are herein summarized, together with the important happenings of 1961 which concern the Bristol Bay salmon fishery. Abundance and utilization of this year's return are discussed in relation to recent trends.

FIELD PROGRAM ACTIVITIES

Enumeration and Sampling of Escapement

Counting tower operations were continued by the Department on the following rivers in 1961: Alagnak (Branch), Naknek, Egegik, Ugashik, Igushik, Nuyakuk, Togiak, and Snake. In addition, the activities at the important Wood and Kvichak River stations, previously operated by the Fisheries Research Institute of the University of Washington, were undertaken by the State for the first time. No serious problems were encountered at any station and all counts obtained are considered highly dependable.

Sampling of the escapement for size, age, and sex composition was carried on at the Togiak, Igushik, Wood, Kvichak, Alagnak, Egegik, and Ugashik sites. Attempts were made at Nuyakuk to develop a method of sampling which would be successful at that station. At Wood River this work was accomplished cooperatively in conjunction with a tagging program of the Fisheries Research Institute for the purpose of investigating the relationship between distribution within the system and time of migration.

Though all major red salmon spawning areas are now covered by tower enumeration, the following minor sub-systems were included in the annual aerial survey: lakes of the Togiak River drainage other than Upper and Lower Togiak Lake; the waters of the Kulukak section; the main Nushagak and the Mulchatna Rivers and their tributaries;

the King Salmon River watershed in the Ugashik District. These contributed slightly more than 1% of the total Bristol Bay escapement in 1961.

Detailed coverage of the distribution of the red salmon escapement on the spawning grounds of the Nushagak and Togiak Districts was continued. This type of coverage is being extended to the watersheds of the remaining districts of the Bay as circumstances permit; the Ugashik and Egegik areas were added this year.

The index of king salmon escapement in the Nushagak drainage was obtained in the usual manner through aerial and floating surveys of key streams.

Sampling of the Commercial Catch

In addition to sampling the commercial catch in the Nushagak and Togiak Districts as in 1960, the remaining fisheries of the area were covered during 1961 by the placement of samplers at Naknek and Egegik. The catch from the Ugashik District was also covered at the latter station. Sampling in these districts was previously handled by the federal agency.

Smolt Migration Sampling

In 1961, State personnel stepped into the work of obtaining an index of seaward migration at the vital Mosquito Point and Igiugig stations, which were pioneered by the Fisheries Research Institute of the University of Washington.

Migration out of the Wood River Lakes reached a value of 518 index points for the highest index in the eleven consecutive years of the study. The progeny of the large 1959 escapement made up 93% of this total.

Sampling of the outmigration from Lake Iliamna was seriously impeded by the abnormal flow of ice from the Lake which occurred this season. (See Fig.____.) Though this prevented sampling until after the start of the run and curtailed operations for a number of days during the migration, it is certain from the values which were obtained that no large movement occurred during the non-fishing period. The inclusion of a reasonable estimate for the time during which it was impossible to fish still leaves the 1961 index among the smallest of those recorded since the inception of the work at this

location in 1955. The migrants were divided between the progeny of the 1958 and 1959 spawning escapements with the latter in the majority.

Egegik Tagging Study

Previous tagging work by other agencies has indicated strongly that catches from within the present confines of the Egegik District include significant numbers of fish bound for other rivers. These earlier experiments point to the possibility that the number of fish involved might be so great as to seriously affect management of the other districts concerned, as well as in Egegik. If this intermingling were re-confirmed, the need would again be indicated for some means of isolating the Egegik effort from the Naknek, Kvichak, and Ugashik races or of obtaining a workable method for determining the composition of the catch during the season with sufficient dispatch to meet management's needs.

The 1961 project utilized a crew working from a gillnet vessel as in the Ugashik experiment of the previous year. The results again showed the high degree of mixing found in the earlier studies. Tagging south of the mouth of Egegik Bay showed that catches in that area included fish destined for the Ugashik River. Recoveries from fish marked in the northern part of the fishing area and at Middle Bluff were closely divided between the Egegik and the Naknek-Kvichak Districts.

On the basis of these results, combined with the demonstrated need for an improved ability to better manage each race concerned on a more individualized basis, curtailment of the fishing area outside the mouth of Egegik Bay appears desirable.

Test Fishing

The use of test fishing to secure an indication of the magnitude of the escapement was instituted on the Kvichak River in 1960. This program was expanded in 1961 to include the Ugashik and Egegik Rivers. A drift gillnet was again fished in a prescribed manner on the Kvichak and at the new Ugashik project, while the Egegik index was obtained with the use of a set net.

Test fishing reports were of particular value in managing the Ugashik fishery where this information may be credited with preventing a catch of a size not warranted by the disappointing return. The Egegik index continued to represent the relative strength of the escapement in spite of changes in the fishing location necessitated during the season by movement of the inner boundary. Results from the Kvichak River showed an excellent correlation for the second straight year between the volume of the escapement and the current test index.

This work has provided management personnel with information of immediate value which at present cannot be obtained by any other means. Test fishing has proved itself to be an extremely important link in the management process.

Evaluation of Gillnet Mesh Size Efficiency

A project to determine the relative efficiency of gillnets of varying mesh dimensions in catching red salmon was carried out in the Naknek-Kvichak District. One of the major goals of this work was to obtain the knowledge necessary to permit calculation of the effect which might be expected from a given mesh in fishing upon red salmon populations of various size compositions. This work was undertaken at the request of the Alaska Board of Fish and Game in order to obtain immediate information which would assist in determining the proper minimum mesh size for use in the Bristol Bay fishery, or to find whether any minimum mesh requirements were necessary.

Two drift gillnet boats utilized nylon nets composed of several panels of gear arranged in accordance with a mathematical design. Each consisted of a single mesh size in the 4-3/4 to 6 inch range. This gear was fished in a specific manner in the area just outside of the Naknek-Kvichak fishery. The catch of each panel was carefully processed and measurements such as the sex, weight, length, and girth were taken and recorded from each fish. An adequate volume of information was obtained to permit realization of the project goal. A detailed description of methods and results is contained in a mimeographed report which may be obtained from the

Alaska Department of Fish and Game, Subport Building, Juneau, Alaska.

Summarized very briefly, the findings showed that the nylon nets caught fish of a size proportional to the size of the mesh. Although the small mesh nets tended to catch greater numbers, they were selective for smaller fish while the larger mesh nets were selective for larger fish. Inasmuch as female red salmon are consistently smaller than the males of the same age group, female fish predominated in the catches of the smaller-meshed nets while males were in the majority in the larger. In nets of 5-1/2 inches stretched measure, the proportions of each sex were approximately equal. To avoid the creation of an undesirable imbalance upon the spawning grounds in favor of the males, the maintenance of the minimum mesh size for red salmon fishing at or above 5-1/2 inches stretched measure is clearly indicated.

This work was undertaken cooperatively with the Division of Biological Research, which assisted in planning, supplied immediate supervision of the field work, and completed the tabulation and analysis of the data.

[Note to editor: If a report on this mesh experiment is included in Tace's section, the foregoing may be deleted, if you think best and a reference to his write-up substituted.]

MANAGEMENT OF THE FISHERY IN 1961

General

In 1961, the Alaska Department of Fish and Game again followed its past system of close supervision of events in each district. Emergency regulations were promulgated from the Dillingham and King Salmon offices on pre-announced radio frequencies. This continued to permit the flexibility of management necessary to assure the best obtainable apportionment of the runs between the commercial fishery and the requirements of the spawning grounds. The Division of Communications of the Department of Public Works gave valuable service in the difficult task of providing a radio network adequate for the needs of the far-flung Fish and Game program. Arrangements for use of certain facilities belonging to the U. S. Fish and Wildlife Service, Bureau of

Commercial Fisheries at their King Salmon base were continued on a basis similar to that of 1960.

A major regulatory change adopted by the Alaska Board of Fish and Game for the 1961 season was the lowering of the minimum mesh size for red salmon fishing from 5-1/2 inches to 5-3/8 inches.

Outstanding among the other factors influencing the course of the entire Bristol Bay fishery and its management was the generally healthy forecast for the 1961 season. Only for the Nushagak District was a poor return predicted. This optimistic outlook, coupled with the success of the fishery in 1960, was responsible for the assembly of the largest array of gear since power boats were legalized in 1951 and certainly the most efficient fleet in the history of the fishery. Processing plants were also geared for peak production efforts.

While the nature of the assembled material available at the time of the issuance of the 1961 forecast left considerable latitude regarding the strength of the expected return, reports from the early-season operations of high-seas tagging vessels of the United States left little room for doubt that the return would reach the upper levels of the forecast.

Naknek-Kvichak District

Substantial escapement was realized for the Kvichak River at an unusually early date inspite of heavy catches by the large effort present. This early strong appearance coupled with continuing, optimistic reports from the high-seas research vessels prompted management personnel to use every means available to further the cropping of the return in this district. All favorable indications notwithstanding, the run dropped off abruptly at the time when it could normally be expected to peak and did not again recover. Only small catches were taken thereafter.

Although the escapement obtained in the Kvichak River at the time of the run's cessation was already well above the minimum figure desired, achievement of escapement

goals in the Naknek River had not kept pace proportionally. To remedy this insofar as possible, a closure to drift fishing was placed in effect in the area off the mouth of the Naknek River from Pedersen Point to Johnson Hill. The decline of the run was so unusually abrupt, however, that even this exceptional action failed to secure full attainment of the Department's aims. It is difficult to ascertain at present whether the 1961 return to the Naknek River was actually reduced in number or whether these fish were particularly vulnerable to the heavy concentration of gear present below the mouth of the river prior to the protective closure.

The Alagnak (Branch) River escapement figure was also disappointing, but this appears to be clearly a matter of proportionally low return.

Figures for the catch in the Naknek-Kvichak District and the escapement to each of its three rivers since 1955 are shown in Table _____. The extreme variation in the magnitude of return to this district is readily observable. Examination of the complete series of annual catch records, together with available reports of observers on the spawning grounds reveals several points which are important in any analysis of trends within this fishery: (1) these fluctuations are produced primarily by variations in the return to the Kvichak River, which is normally the largest producer by far; (2) they may be traced through the entire history of the commercial exploitation; (3) each peak and each low has appeared regularly within a four to six year period; (4) overlapping caused by the return of a given parent year at different ages has occurred but has not altered the regular pattern of a complete fluctuation within the four to six year period. A similar cyclic condition is present in many of the sockeye producing syb-systems of the Fraser River in British Columbia, where its occurrence long prior to the existence of any commercial exploitation has been substantiated beyond any doubt.

While the factors which are responsible for maintaining the steady succession of large and small returns are not yet understood, the existence of the cycle itself in the Kvichak run is undeniable.

The Department's goal for the Kvichak River is the restoration of the early pattern in which the years of substantial return outnumbered those of low return. Since today's depressed condition must be attributed to the effects of the fishery, it is felt that re-establishment may be accomplished through careful control of the Kvichak escapements in a pattern guided by up-to-date biological findings and which recognizes the importance of the cyclic influence. The yearly escapement goals of the Department for this river are in accordance with this plan. This figure will understandably vary from year to year according to the cycle and the degree of success attained in the realization of prior escapement goals. As previously stated, the number of spawners obtained from the 1961 run was within the range desired for this year and is considered satisfactory.

Though total size of the smaller Naknek River run is masked by the effect of the joint Naknek-Kvichak fishery, its later years reflect a high degree of variation as evidenced by escapement records. While poor years are now numerous, there is no clear indication of the long-unbroken series of regular cycles which is found on the Kvichak. Consistent securement of spawning populations within the desired range can be expected to do much toward stabilizing returns at a higher level. The emergency creation within the Naknek-Kvichak District of a Naknek Section, which may be closed to provide a protected corridor for the Naknek races, set a precedent which makes available an improved ability to meet escapement objectives for this river during future seasons. At its fall meeting the Alaska Board of Fish and Game adopted the Naknek Section as a regular feature of the regulations.

Probably one of the most important results which may be looked forward to from the successful achievement of the foregoing management program for this district is the raising of the present reduced level of the low years. Though there seems to be little basis at this time for believing that the lows can be eliminated altogether, improvement can be expected to result through the joint contribution of better and more stable returns to each system.

Nushagak District

After yielding a healthy catch during the early part of the season, the Nushagak king salmon run tapered off and the number taken incidental to the red salmon fishery was unusually small. While the magnitude of the king salmon return in this district is not always reflected by the size of the catch, escapement surveys indicated that this was probably true in 1961. This year's catch of 60,953 fish is slightly below the average attained during the last seven years. It is questionable whether the effort directed at this species was sufficient to fully harvest the run for a period of over 20 years prior to 1955. Since that time, the size of the fleet engaging in this fishery has grown to the point where a reduction in the amount of fishing pressure permitted may sometimes be necessary.

Because of the prediction for a low red salmon return on the Nushagak of only 1.3 million, many boats left for other Bristol Bay Districts after the passing of the main king run. In spite of numerous transfers and sharply restricted fishing time, the gear which remained proved adequate to prevent achievement of the Wood River system's escapement needs from the weak run which materialized. Except in the Igushik Section, low catches were the rule and a closure was found necessary throughout the remainder of the district beginning July 4. After nine days, the count at the Aleknagik towers was improved enough to permit additional fishing, though the run had not become stronger and catches remained small.

The Igushik run remained steady throughout the season and provided both a healthy catch and an excellent escapement. Contributions from other minor producing areas were not sufficient to affect the general course of management for the district, which must be based upon the requirements of the Wood River producing area. For the second straight year the Snake River Section was closed throughout the entire season.

Nushagak District catches together with escapements to each sub-system are shown in Table _____. The close agreement between the 1961 prediction and the

of 1.37 million
observed return is notable. The escapement obtained for Wood River must be considered a compromise between biological goals and economic needs. Nevertheless it does represent a worthwhile increase over the number of spawners secured in 1957, one of the parent years of the 1961 run. The 1957 brood-year, however, contributed only one fish in five to this year's return. The bulk of the remainder were produced by the healthy 1956 escapement.

Egegik District

The early run at Egegik was even more notable for its abundance than was the case in the Naknek-Kvichak District. Catches were not only very large but began in strength at an unusually early date. Fishing continued for ten days after June 26 with only brief closed periods. By July 5, the take had already passed the 1-1/2 million mark and excellent catches were continuing. Since the escapement total had begun to accumulate with unusual rapidity, the inner boundary was relocated further upriver and the period which commenced on that date was extended until further notice.

During this open period it became clear from the test-fishing index that the run into the Egegik River had slackened, although very good catches were still being tallied from the large effort which had moved into the district. Visual check of the lagoon below the counting towers also confirmed the virtual stoppage of the up-river migration. Though the minimum escapement goal had nearly been attained at this time, it soon became obvious that the effectiveness of the effort upon the now-reduced run was such that further safeguards would be necessary to secure the desired number of spawners. This protection was provided through a four-day closure commencing on July 11. The escapement which was subsequently obtained brought the season's total to an acceptable level. Though no significant catches were made after this closure, the 1961 Egegik take proved to be the largest ever recorded in the entire history of the fishery.

Values for the catch, escapement and total run ascribed to the Egegik District

for the ten-year period 1952-1961 are represented in Fig. _____. In reviewing this information, it should be remembered that the inclusion of other races within the Egegik catch has been a regular occurrence and that salmon returning to the Egegik River have also contributed significantly to the take of the neighboring districts in the past.

Not only was this year's catch of 2,686,076 fish exceptionally large, but the 3,387,614 total return exceeded that of 1960 and is the largest recorded since reliable escapement counts were first instituted on a continuing basis in 1952. The escapement of 701,538 fish closely approximates the ten-year average.

Ugashik District

While the run for the Ugashik District was predicted to be unusually good, early returns to the fishery provided little justification for such optimism. Management personnel continued to recognize the possibility that the expected heavy run might yet materialize in this district, considered to be later in its timing than the other rivers of the Bay, and proceeded with extreme caution. Current catches, the test-fishing index, and visual observations of the progress of the escapement migration received continuous attention. As the indications of a very large run were not forthcoming, quite a number of boats transferred to other districts, leaving the available effort much reduced in strength during most of the season.

During the July 3-4 period, the fleet contacted a body of fish and fair catches were made. Additional fishing time was granted but expectations for the arrival of a stronger run proved groundless at this time. The likelihood that a sizeable run might yet materialize was still felt to be strong enough to warrant another brief period of twelve hours on July 6. The resulting catch was again disappointing.

Because of a sharp increase in the test-fishing index on the 8th, an opening of thirty-six hours was effected on July 9. During this period the fleet had access to the group of fish whose vanguard had been responsible for the improved test index

and the best catches of the season were made. Though the run appeared to be continuing, no extension could be granted inasmuch as escapement into the lagoon and past the tower was practically non-existant. After two days of closure, during which the test fishing index continued at a relatively high level, good numbers of reds began to make their appearance at the lagoon and another opening was allowed. Catches during this time showed that the main body had already passed upriver. The closure maintained during this peak of migration was subsequently justified by the season's final tally from the towers which showed that the majority of the escapement had been secured during these few days.

Returns to this district during the last ten years are illustrated in Fig. _____. The 1961 red salmon run totalled 723,662 fish which were almost evenly divided between catch and escapement with 357,223 and 366,439 respectively. The latter figure includes an estimated 17,800 spawners from the Mother Goose Lake system. Estimates of escapement in this system are also included in the totals for 1958 and 1960.

The high variation factor present in the Ugashik District is clearly portrayed and the effect of the unusual 1960 return upon the ten-year average may be easily visualized.

The wide difference between the predicted and actual return made management's task in this fishery particularly difficult this year. Because of this fact, the division secured between catch and escapement is gratifying. The improved management methods employed this year, such as test-fishing, can be counted on to produce a consistent achievement of soundly-based biological goals in the future.

Togiak District

In 1961, the run of 320,000 red salmon for this district closely approximated the excellent return of the preceding year. Fishing effort registered only a slight expansion. Open periods followed the regular five-day per week pattern throughout the season with the exception of a 48-hour extension of the week-end

closure of July 29-30. The catch of 192,000 fish was the largest recorded for this district and represents a substantial increase above the 140,000 permitted during 1960.

This increase in catch resulted from a reduction in the arbitrary escapement goals of the Department's first year of management responsibility and was brought about through an analysis of information made available by that season's program. Following the completion of the first tower count into Togiak Lake in 1960, the aerial survey of this population was compared with similar estimates of previous year's escapements. This revealed that the 1960 escapement of 163,000 into Togiak and Upper Togiak Lake compared very favorably with the best escapements of earlier seasons. More extensive aerial surveys of small lakes tributary to the Togiak River, in both 1959 and 1960, disclosed the existence of a consistent contribution from this source, also. The 1960 and 1961 escapements in the Togiak drainage include 29,000 and 27,000 fish respectively from Gechiak, Ongvinuk, and Pungokepuk Lakes.

The 1961 escapement is considered to be well within the desired range.

Total figures for the entire district this year contain catch and estimated escapement from the Kulukak Section, where a small fishing effort operated throughout the season. Several boats also fished experimentally off the Osviak River in the Hagemeister Straits Section for a brief time. As expected, catches here consisted almost entirely of chum salmon.

The total chum salmon catch for the entire district was down to 190,000 from the 255,000 taken last year, though the king salmon catch rose from approximately 7,000 to 11,000 fish.

Conclusion

No discussion of any recent Bristol Bay red salmon season can ignore the influence of the high-seas gillnet fishery which is carried on by Japanese nationals. Although presently restricted from fishing closer to Bristol Bay than 175° W. longitude,

these operations do take place in areas of proven intermingling between salmon of Asian and North American origin. From information gained through several lines of scientific study, the conclusion is irrefutably reached that red salmon from Bristol Bay comprise a significant proportion of these catches. Due to difficulty in obtaining adequate information on either the size or composition of the high-seas take, it has not been possible to state a definite figure for the 1961 harvest of Alaskan-spawned red salmon by this fishery. It is know, however, that several million fish were taken.

Had the migration of all red salmon of North American origin been unmolested, the numbers reaching Alaskan waters would have been far greater and the outcome of the Bristol Bay fishery correspondingly affected. It is likely that the overall level of the returns to each district would have shown marked improvement, though the possibility does exist that certain races may be more vulnerable than others. The 1961 run into the Egegik and the Naknek-Kvichak Districts was much earlier than is normal, yet the abrupt decline following the peak appears to be an effect which would, for instance, logically follow the removal from the run of large numbers of those fish whose route took them furthest to the westward.

The problem of meeting the goals of enlightened management in the face of uncertainties such as are interposed by the present pelagic fishery will, at best, continue to be a difficult one. It is not unreasonable to believe that if the Bristol Bay red salmon fishery as we know it today is to continue to survive, it will depend upon agreements arrived at through the framework of the International North Pacific Fisheries Commission.

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Summary of 1961 Season

The background of understanding for the 1961 season centered primarily about the excellent 1960 return and the general optimism reflected in the joint 1961 prediction. As a result, both fishing and processing efforts were geared for high production.

While the nature of the material available at the time of the issuance of the joint prediction left considerable latitude regarding the strength of the expected return, many of these questions were removed by the reports from early operations of American high-seas tagging vessels. All elements of the fishing community were in agreement that a run of unusual magnitude was imminent.

Of particular concern to the managing agency in the face of an anticipated run of this strength was the problem of maintaining escapement levels within the previously-stated latitudes. A major contributing factor was the likelihood that processing and handling effort could realistically be expected to constitute a limiting factor to management's ability to control escapement should these goals be approached too closely before the peak of the run passed through the fishery. This problem presented itself with particular force in the Naknek-Kvichak and Ugashik districts.

NAKNEK-KVICHAK DISTRICT

As is the case in every year of the dominant Kvichak cycle, the run to this river could be expected to far overshadow those to the Branch and Naknek rivers. In the event of an unusually large run, the goal set by the Department for maximum desired escapement could comprise a relatively small proportion of the total.

In spite of the large efficient fleet, substantial escapement (as well as catch) was realized at an exceptionally early date. Much of this had occurred during open fishing periods. The above-mentioned problem seemed well on the way to becoming a reality, if the curve of the run were to follow its normal course and peak within the expected range of time. Accordingly, early in the season every reasonable effort was made to crop the run as heavily as possible. Additional effort materialized from other less-fortunate districts, particularly the Nushagak.

The run, however, soon slackened. This occurred at a time when an imposing array of information indicated that additional numbers could reasonably be expected.

Although the Kvichak escapement secured by this time was well above desired minimums, that of the Naknek River had not fared as well. To remedy this insofar as possible, a closure to drift fishing was effected in the area off the mouth of the Naknek. Unfortunately, the extremely sharp and unexpected decline of the run after the peak precluded full attainment of the desired figure. It is difficult at present to ascertain whether the 1961 Naknek return was proportional to the early escapement showing or whether these fish were particularly vulnerable to the heavy concentration of gear present at the lower line throughout the season.

The Branch River escapement figure was also disappointing but this appears to be clearly a matter of proportionally low return.

NUSHAGAK DISTRICT

An exception to the general optimism of the 1961 forecast existed in the Nushagak. While the Igushik and Tikchik runs were expected to be healthy, the districts' main-producing Wood River system was anticipating the return of a low smolt outmigration.

In spite of numerous transfers to other districts, the remaining Nushagak gear demonstrated an ability to prevent significant escapement into the Wood River Lakes. Catches were low throughout the District with the exception of the Igushik section which also enjoyed a proportional escapement.

To obtain escapement into Wood River it finally became necessary to close all of the district except Igushik for a period that extended beyond nine days. The body of fish which appeared at the end of this time made possible further openings but the final Wood River escapement total is undeniably a compromise between biological and economic necessity.

It may be stated that the Wood River and Tikchik returns fell slightly short of minimum expectations, though the Igushik run materialized as predicted. While fish from the main Nushagak and Mulchatna Rivers were evident in the catch, the contribution of these and other minor producing areas was not sufficient to affect the general course of management.

EGEGIK DISTRICT

It was in this district that the vanguard of the 1961 run made its first appearance in strength. The early date of this appearance was noteworthy. As in the Kvichak, good escapement was obtained from the first of the run. Effort was limited by closure only briefly during the major portion of the run. Liberalization of the upriver boundary was also announced, permitting fishing within the river. Effort in this upriver portion of the district proved so efficient that it was later found necessary to close the entire district for a time in order to bring escapement levels up when the pressure of the run slacked off unexpectedly. Though the abnormal decline was not as marked here as in the Naknek-Kvichak, it is felt that had the run followed an entirely normal pattern, desired escapement would have been more fully attained. Even so, the escapement can be described as very good and the final catch figures show this year's catch to have been the largest ever taken in the 66-year history of this fishery.

The possibility that the large catch may have been partially dependant upon fish destined for other rivers is supported by preliminary results of tagging carried on in this district by this Department.

UGASHIK DISTRICT

By the most conservative standards, the predicted run to the Ugashik district was expected to be very good. Early returns, however, provided no such indication. While proceeding with caution, management was forced to consider the possibility that a heavy run might yet materialize in this usually late river. Because of the disappointing return, an exodus of gear to other districts occurred, which considerably reduced the total available effort. Restrictions were imposed which were successful in protecting approximately half of the run but the final totals can here, as in the Nushagak, be considered a compromise between biology and economics. It should be noted, however, that excellent returns have been

obtained in this system from brood stocks of this magnitude.

TOGIAK DISTRICT

With the largest effort present ever to fish in this district, it is gratifying to note that the return of 1961 appears to have also been one of the largest ever observed. The catch was the greatest ever recorded, yet the escapements obtained are considered very satisfactory. Deviation from the regular 5-day-per-week fishing schedule was required only on one occasion late in the season to allow for additional escapement.

CONCLUSION

In spite of the several unexpected developments which occurred during the course of the past season, the flexibility of management was able to cope with all situations in a satisfactory fashion. The total escapement obtained for the Bay approximated the Department's stated minimum objectives. During the period of maximum fishing effort in the Naknek-Kvichak and Egegik districts, all salmon were processed satisfactorily and it appears likely that the upper range of the predicted run might have been successfully handled without either loss of fish or exceeding of escapement maximums.

Though escapements in two districts did not reach the level of the stated minimums, it is noted that the total returns in those districts also failed to reach the levels predicted. It should be further noted that these escapements cannot be considered to have approached dangerous levels. The failure to attain the desired figures may in some cases be correlated with the abrupt decline in the strength of the latter portion of the run. That this may, in turn, be related to high-seas fishing effort should receive careful consideration in view of the large number of net-marked salmon observed in the catch following the peak of the run.

BRISTOL BAY LICENSE STATISTICS, 1960-1961

	1960	1961
COMMERCIAL FISHING LICENSES		
Resident	1,422	2,112
Non-resident	745	1,506
Total	2,167	3,618
VESSEL LICENSES		
Fishing vessels		
Resident	804	1,058
Non-resident	350	665
Total	1,154	1,723
Scows		
Resident	22	14
Non-resident	28	46
Total	50	60
GEAR LICENSES(1)		
Resident 150 fathom drift	561	674
Resident 100 fathom drift	89	106
Resident 50 fathom set-net	345	496
Total Resident	995	1,276
Non-resident 150 fathom drift	342	600
Non-resident 100 fathom drift	22	38
Non-resident 50 fathom set-net	0	10
Total non-resident	364	648
TOTAL GEAR	1,359	1,924

(1) Number of licenses, not units of gear.

Fishing Periods - 1961

NUSHAGAK DISTRICT

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 25	26 9 A.M.	27 9 A.M.	28	29 9 A.M.	30 9 A.M.	July 1
2	3 9 A.M.	4 9 A.M.	5 3 P.M. Igushik sub-section	6	7	8
9	10	11	12	13 12 noon	14	15 6 P.M.
16	17 9 A.M.	18	19	20	21	22 9 A.M.
23	24 9 A.M.	25	26	27	28	29 9 A.M.
30	31 9 A.M.	August 1	2	3	4	5 9 A.M.

Shaded areas indicate closed periods.

Fishing Periods - 1961

TOGIAK DISTRICT

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 25	26 9 A.M.	27	28	29	30	July 1 9 A.M.
2	3 9 A.M.	4	5	6	7	8 9 A.M.
9	10 9 A.M.	11	12	13	14	15 9 A.M.
16	17 9 A.M.	18	19	20	21	22 9 A.M.
23	24 9 A.M.	25	26	27	28 9 A.M.	29
30	31	August 1 9 A.M.	2	3	4	5 9 A.M.

Shaded areas indicate closed periods.

Fishing Periods - 1961

NAKNEK-KVICHAK DISTRICT

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 25	26 9 A.M.	27 9 A.M. 9 P.M.	28	29 9 A.M.	30 12 noon	July 1
2 12 noon 6 P.M.	3 9 P.M.	4 12 noon	5 12 noon 3 P.M.	6	7	8 6 P.M.
* 9 9 A.M. 9 P.M.	10 9 P.M.	11 9 A.M.	12	13 9 A.M. 9 P.M.	14 12 noon	15 12 noon
16	17 9 A.M.	18	19	20	21	22 9 A.M.
23	24 9 A.M.	25	26	27	28	29 9 A.M.
30	* 31 9 A.M.	August 1	2	3	4	5

Shaded areas indicate closed periods

* Area on east side of Kvichak Bay from Pederson Point closed to drift fishing between July 9 and July 31.

Fishing Periods - 1961

EGEGIK DISTRICT

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 25	26 9 A.M.	27 9 A.M.	28 9 P.M.	29 9 A.M.	30 9 P.M.	July 1
2 9 A.M.	3 9 P.M.	4 9 P.M. 9 A.M.	5 9 A.M.	6 6 P.M.	7	8
9	10	11 12 noon	12	13	14	15 9 A.M. 9 P.M.
16	17 9 A.M.	18	19	20	21	22 9 A.M.
23	24 9 A.M.	25	26	27	28	29 9 A.M.
30	31 9 A.M.	August 1	2	3	4	5 9 A.M.

Shaded areas indicate closed periods.

Fi[illegible]ing Periods - 1961

[illegible]ASHIK DISTRICT

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 25	26 9 A.M.	27 9 A.M.	28	29 9 A.M.	30 9 A.M.	July 1 9 A.M.
2 9 A.M.	3 9 A.M.	4 9 A.M. 12 noon	5 12 noon	6 9 A.M. 9 P.M.	7	8
9 6 A.M.	10 6 P.M	11	12	13 10 A.M.	14 9 P.M.	15
16	17 9 A.M.	18	19	20	21	22 9 A.M.
23	24 9 A.M.	25	26	27	28	29 9 A.M.
30	31 9 A.M.	August 1	2	3	4	5 9 A.M.

Shaded areas indicate closed periods.

Preliminary NUSHAGAK DISTRICT Catch - 1961

Period	King	Red	Chum	Coho	Pink	Total
June 1-3	319	1	1			321
5-10	16,078	173	330			16,581
12-17	25,992	4,830	7,335			38,157
19-24	12,898	47,479	84,714		3	145,094
26-27	3,019	55,702	44,991		1	103,713
27-28	908	39,204	33,165		3	73,280
July 3-4	704	170,605	28,229		11	199,549
5-8(1)	225	56,642	3,752		25	60,644
9-12(1)	137	61,508	6,170		25	67,840
13-15	180	40,721	5,927	233	50	47,111
16(1)	6	1,602	157	2	3	1,770
17-22	384	25,707	45,190	770	58	72,109
24-29	75	5,068	6,415	3,564	50	15,172
31-Aug. 5	13	1,237	680	1,759	8	3,697
Aug. 7-12	6	791	101	3,205	10	4,113
14-19	9	208	16	6,626	1	6,860
21-26		5		324		329
28-Sept. 1			3	170		173
TOTAL	60,953	511,483	267,176	16,653	248	856,513

(1) Igushik Section only.

Preliminary TOGIAK DISTRICT Catch - 1961

Period	King	Red	Chum	Coho	Pink	Total
June 6-10	316					316
12-17	1,301	46	142			1,489
19-24	2,861	4,173	10,949	1	7	17,991
26-July 1	3,416	20,024	47,906	1	22	71,369
July 3-8	1,672	64,559	41,523		35	107,789
10-15	959	56,506	48,519		77	106,061
17-22	164	31,430	25,879		51	57,524
24-28	59	15,423	15,081	3	52	30,618
31			2		1	3
Total	10,748	192,161	190,001	5	245	393,160

Kulukak Section included.

Preliminary NAKNEK-KVICHAK DISTRICT Catch - 1961

Period	King	Red	Chum	Coho	Pink	Total
June 12-17	273	462	7			743
19-24	1,652	109,666	4,097			115,415
26-27	991	910,197	12,172			923,360
27-29	708	506,708	7,669			515,085
30 - July 2	1,034	2,204,467	26,433		1	2,231,935
July 2-3	562	1,147,826	11,574			1,159,962
4-5	678	1,290,690	14,926			1,306,294
5-8	1,165	1,119,680	13,729		3	1,134,577
9	340	183,274	8,681		1	192,296
10-11	852	372,993	18,030			391,875
13	139	73,067	6,811	1		80,018
14-15	337	94,393	10,842		3	105,575
17-22	1,100	128,531	38,687	107	20	168,445
24-29	255	23,062	7,679	14	6	31,016
31 - Aug. 5	81	1,518	760	72	5	2,436
Aug.6 - 12	39	444	292	219	2	996
13-15		4	9	13	1	27
Total	10,206	8,166,983	182,398	426	42	8,360,055

Preliminary EGEGIK DISTRICT Catch - 1961

Period	King	Red	Chum	Coho	Pink	Total
June 5-10	141	205	12			358
12-17	431	8,468	824			9,723
19-24	1,373	367,621	17,875			386,869
26-27	214	179,630	4,627			184,471
27-29	270	168,211	4,161			172,642
29-July 2	197	356,074	7,192			363,463
July 2-3	101	161,153	1,398			162,652
4-5	142	294,777	2,607			297,526
5-8	172	629,409	5,658		1	635,240
9-11	173	460,818	8,629			469,620
15	20	22,823	563			23,406
17-22	29	32,340	2,683			35,052
24-29	2	3,496	1,030	19		4,547
31-Aug. 5		392	128	386		906
7-12		299	17	834	2	1,152
14-19	1	341	25	1,611		1,978
21-26		6		313		319
28-31		13		370		383
TOTAL	3,266	2,686,076	57,429	3,533	3	2,750,307

Preliminary UGASHIK DISTRICT Catch - 1961

Period	Kings	Reds	Chums	Coho	Total
June 12-17	313	258	66		637
19-24	1,412	17,542	4,621		23,575
26-27	524	13,367	1,328		15,219
29-30	275	9,035	895		10,205
July 1-2	180	12,537	1,244		13,961
3-4	124	44,964	3,475		48,563
4-5	122	46,462	3,588		50,172
6	79	25,485	1,968		12,513
9-10	80	106,277	5,947		112,344
13-14	162	53,613	2,580		56,355
17-22	201	26,550	5,011		31,762
24-29	6	995	184		1,185
31-Aug. 5	1	24	3		28
Aug. 7-12	2	59	9	12	82
14-15	2	55	9	4	70
TOTAL	3,483	357,223	30,928	16	391,650

BRISTOL BAY RED SALMON CATCH IN
NUMBERS OF FISH BY RIVER SYSTEM
1950 - 1962

YEAR	NUSHAGAK	NAKNEK KVICHAK	EGEGIK	UGASHIK	TOGIAK	TOTAL
1950	1,212,091	4,366,471	791,329	787,384	---	7,157,275
1951	436,950	2,926,413	644,551	318,629	---	4,326,543
1952	698,071	9,401,060	886,852	280,146	---	11,266,129
1953	449,341	3,738,839	1,234,600	688,720	---	6,111,500
1954	315,357	1,819,666	1,437,791	1,067,531	12,280	4,652,625
1955	1,054,978	2,564,341	622,885	240,817	66,085	4,549,106
1956	1,263,186	5,987,750	1,187,099	341,499	101,933	8,881,467
1957	491,498	4,578,643	814,459	350,858	40,044	6,275,502
1958	1,092,156	922,611	500,684	433,813	36,402	2,985,666
1959	1,719,687	1,689,425	662,391	423,414	113,202	4,608,119
1960	1,517,988	9,847,848	1,446,884	752,634	139,648	13,705,002
1961	511,483	8,166,983	2,686,076	357,223	192,161	11,913,926
12 year av. 1950 - 1961	896,898	4,667,504	1,076,300	503,556	87,719 2/	7,202,738
69 year av. 1893 - 1961	2,950,011	7,335,289	848,319 1/	574,956	---	11,723,533
1962	1,432,079	2,357,336	640,874	251,015	97,687	4,778,991

1/ 67 year average; 1895 - 1961

2/ 8 year average; 1954 - 1961

BRISTOL BAY CASE PACKS BY SPECIES
(1951 - 1962)

YEAR	REDS	PINKS	CHUMS	COHOS	KINGS	TOTAL
1951	337,848	0	18,336	3,647	4,598	364,429
1952	702,166	1,258	31,238	694	11,301	746,657
1953	460,886	8	37,666	280	8,065	506,905
1954	341,133	4,710	33,721	2,848	9,052	391,464
1955	312,284	90	20,113	1,541	12,859	346,887
1956	529,726	3,920	30,899	4,441	9,902	578,888
1957	471,979	0	31,074	5,220	20,562	528,835
1958	241,099	60,189	42,143	12,694	25,956	382,081
1959	332,713	25	42,672	6,597	15,872	397,879
1960	852,150	12,176	102,890	2,967	19,068	989,251
1961	934,544	106	62,783	4,116	17,789	1,019,338
Ten-year Average-1951-1961	517,868	16,451	43,519	4,139	15,042	538,818
48-year Average	895,014	17,103	41,984	3,841	12,905	963,008
1962	358,504	37,275	58,747	2,812	16,817	474,155

Average case pack on pinks includes even years only.

Daily Red Salmon Counts--Wood River Escapement
1956-1961

Date	1956	1957	1958	1959	1960	1961
7/19					114	
20			825	57	192	
21		0	1,365	480	96	
22		656	2,376	348	132	
23		720	6,747	996	211	
24		1,194	5,541	1,452	512	
25		986	1,512	1,176	1,296	30
26		900	2,247	3,048	10,013	1,104
27		1,284	2,172	16,986	8,208	4,224
28	--	2,298	902	105,804	4,116	2,874
29	5,048	3,216	1,119	32,752	4,770	2,805
30	4,388	9,062	17,681	62,766	1,488	3,006
7/31	856	15,725	81,246	85,542	1,443	96
8/1	2,077	6,138	40,935	115,712	1,830	9,030
2	1,390	3,752	12,749	340,872	5,844	15,438
3	16,049	4,338	8,586	201,870	2,826	24,594
4	43,292	2,541	12,295	184,740	6,474	23,433
5	49,074	3,660	103,860	163,254	98,460	30,588
6	26,249	4,011	189,830	85,116	232,140	30,474
7	16,945	3,700	129,855	29,682	199,596	21,510
8	8,259	7,754	80,631	23,802	167,094	16,728
9	5,665	7,908	30,149	23,292	103,746	30,924
10	87,281	81,337	21,314	13,758	41,190	26,022
11	81,118	62,092	14,555	116,058	15,600	75,009
12	69,880	29,366	74,523	250,614	13,188	77,736
13	47,839	12,453	33,249	129,270	15,708	43,734
14	79,446	4,965	24,648	52,236	16,728	8,250
15	67,913	5,086	7,823	14,088	17,418	5,682
16	46,747	3,038	4,391	11,334	16,872	3,492
17	17,910	1,977	3,023	24,612	9,120	1,209
18	21,949	2,563	4,214	27,738	6,444	1,176
19	18,361	2,211	7,926	13,242	4,392	507
20	14,055	3,710	8,288	5,976	1,524	186
21	6,724	2,995	6,756	4,680	1,376	0
22	3,835	898	2,652	3,912	368	24
23	2,464	617	2,232	4,266	760	54
24	3,689	839	1,694	1,515	2,312	486
25	3,287	1,085	1,533	2,718	1,920	186
26	1,226	2,617	1,038	912	552	54
27	No count	1,350	1,500	1,575	--	54
28	1,229	--	1,637	552		18
29	888		1,932	54		--
30	936		1,905	1,836		
8/31	336		1,788	--		
9/1	--		654			
2						
3						
TOTAL	756,405	299,852	961,818	2,211,793	1,016,073	460,737

Daily Red Salmon Counts--Igushik River Escapement
1958-1961

Date	1958	1959	1960	1961
6/21		--		
22		492		
23		897		192
24		804		144
25	--	1,725	0	162
26	1,422	1,110	30	108
27	1,596	1,416	48	348
28	306	1,593	726	1,812
29	2,544	4,281	4,008	5,880
30	1,770	9,561	9,048	9,234
7/ 1	2,400	10,977	2,892	12,270
2	3,108	17,280	4,452	14,220
3	1,668	28,878	6,474	16,548
4	1,746	32,538	8,196	14,070
5	5,844	38,654	11,370	18,516
6	2,364	55,998	14,442	20,556
7	3,810	38,034	13,878	21,030
8	4,896	35,796	14,352	26,946
9	10,500	45,915	18,702	20,568
10	16,410	37,461	34,674	17,946
11	11,310	31,578	34,812	17,886
12	1,932	29,839	45,426	13,980
13	3,540	15,042	42,780	11,520
14	4,242	11,418	31,314	10,038
15	6,444	19,893	25,434	10,212
16	3,240	20,475	20,064	5,760
17	3,324	16,257	11,892	6,138
18	3,768	21,822	17,322	3,564
19	2,904	23,571	16,686	2,730
20	1,170	22,644	13,872	1,884
21	1,338	18,861	13,080	2,130
22	696	15,906	12,642	1,002
23	978	6,129	12,108	1,146
24	648	5,520	11,958	36
25	372	3,719	8,628	684
26	270	2,961	6,582	1,110
27	78	1,306	6,156	540
28	54	4,635	3,930	390
29	120	2,946	4,152	630
30	66	1,706	3,384	444
31	0	1,734	2,094	756
8/ 1	0	1,069	2,340	414
2	--	360	1,590	558
3		957	1,296	150
4		--	1,260	--
5			720	
6			Tower discont.	
TOTAL	107,478	643,788	494,814	294,252

Daily Red Salmon Counts--Snake River Escapement
1960-1961

Date	1960	1961
6/24	0	
25	0	
26	0	
27	81	0
28	75	0
29	0	30
30	54	0
7/ 1	0	0
2	24	6
3	0	0
4	52	0
5	0	0
6	144	0
7	336	0
8	1,124	0
9	2,824	312
10	3,140	32
11	2,368	8
12	1,408	44
13	1,024	760
14	840	1,792
15	472	584
16	564	464
17	236	192
18	32	308
19	924	112
20	500	108
21	264	0
22	84	0
23	20	28
24	8	12
25	0	8
26	Tower discont.	4
27		52
TOTAL	16,598	4,856

Daily Red Salmon Counts--Nuyakuk River Escapement
1959-1961

Date	1959	1960	1961
7/ 4	0		
5	498		
6	492		
7	2,442	144	1,896
8	3,363	594	9,192
9	3,213	888	10,698
10	5,637	1,848	7,044
11	6,321	8,430	6,864
12	3,597	37,290	3,462
13	3,849	38,952	2,544
14	2,526	28,830	5,508
15	2,208	12,330	6,150
16	1,656	4,896	4,980
17	930	5,328	6,642
18	384	3,636	5,922
19	399	1,488	3,840
20	1,533	300	2,088
21	1,485	156	756
22	1,344	78	426
23	1,371	18	372
24	1,326	0	354
25	675	0	222
26	639	6	162
27	411	6	114
28	381	12	150
29	411	36	138
30	249	0	66
31	291	12	66
8/ 1	324	18	84
2	354	36	48
3	225	0	--
4	117	6	
5	96	0	
6	114	0	
7	--	0	
8		0	
9		12	
10		36	
11		30	
12		0	
13		6	
14		6	
15		18	
16		0	
17		6	
18		6	
19		6	
20		6	
21		30	
22		0	
23		--	
TOTAL	48,861	145,500	79,788

Daily Red Salmon Counts--Togiak River Escapement
1960-1961

Date	1960	1961
7/ 3		0
4		42
5		84
6		0
7		876
8		1,050
9	219	3,348
10	3,738	4,818
11	4,875	4,194
12	6,234	3,696
13	7,728	3,294
14	8,739	4,374
15	7,281	5,736
16	7,680	6,162
17	6,852	4,176
18	5,190	3,078
19	7,050	3,942
20	6,366	6,126
21	5,862	5,874
22	5,112	3,084
23	5,346	2,328
24	5,190	1,164
25	4,680	1,368
26	2,598	1,686
27	3,672	2,208
28	4,422	2,970
29	6,510	4,098
30	5,004	2,484
31	3,378	1,662
8/ 1	1,608	1,380
2	3,522	966
3	5,418	2,166
4	5,244	1,866
5	5,070	1,134
6	4,926	1,638
7	4,710	786
8	3,300	282
9	2,088	504
10	1,878	144
11	1,320	252
12	Tower discont.	192
13		222
TOTAL	162,810	95,454

Daily Red Salmon Counts--Kvichak River Escapements
1956-1961

Date	1956	1957	1958	1959	1960	1961
6/21				308	432=	
22				623	135	120
23	8		0	307	312	120
24	38		0	99	90	120
25	32		0	212	0	264
26	30	7,337	24	941	18	3,378
27	88	4,987	29	416	186	51,192=
28	263	2,922	58	1,133	2,322	88,884
29	229	9,305	515	440	1,776	134,934
30	343	55,827	582	1,098	1,998	122,316
7/ 1	311	51,797	174	588	9,747	78,510
2	311	62,332	1,485	384	155,394	33,804
3	373	82,789	960	1,152	221,582	270,726
4	11,280	60,394	153	7,872	361,632	232,488
5	10,256	70,371	129	49,612	384,072	375,048
6	63,065	48,245	48	51,288	359,946	470,478
7	75,851	45,703	29,328	48,780	586,608	420,846
8	134,163	83,275	161,109	30,758	641,478	261,840
9	221,055	56,435	148,760	12,524	702,966	146,634
10	268,179	133,815	44,945	19,097	727,644	72,684
11	268,048	296,310	24,802	32,627	1,075,212	169,254
12	375,393	358,194	3,575	21,285	1,324,554	128,100
13	498,944	461,961	2,241	52,818	1,046,130	200,028
14	583,882	371,154	3,966	88,226	972,978	161,700
15	694,874	147,430	43,458	90,994	943,860	125,376
16	923,007	88,426	47,559	55,343	1,001,322	48,552
17	1,053,583	56,012	5,946	23,398	1,116,582	14,634
18	910,574	30,330	1,530	16,093	1,262,790	24,546
19	711,050	49,258	879	17,357	928,780	26,826
20	650,430	72,705	1,017	13,225	529,158	10,848
21	606,643	37,966	2,673	9,140	116,707	5,166
22	440,420	26,820	834	5,637	39,312	8,628
23	288,795	23,152	2,130	5,631	--	6,393
24	212,571	25,612	2,274	3,801		4,038
25	154,609	14,536	999	1,514		2,760
26	98,495	)	357	2,119		2,508
27	66,923	34,409)	543	2,189		960
28	37,516	)	938	2,592		642
29	25,100		384	1,800		264
30	20,353		381	390		180
31	15,999					60
8/ 1	14,558					
2	5,676			6,189*		
TOTAL	9,443,388	2,842,810	534,785	685,615	14,515,723**	3,705,849

* Estimated late season migration.
** Preliminary total.

Daily Red Salmon Counts--Branch(Alagnak) River Escapement
1956-1961

Date	1956 [1]	1957	1958	1959	1960	1961
6/21						
22						
23						
24						
25						
26					6	--
27				--	0	735
28		--		375	6	2,214
29		66		1,128	0	8,295
30		694	--	1,143	54	4,968
7/ 1		1,521	234	258	2,652	276
2		1,586	234	870	72,018	150
3		430	426	1,350	120,792	3,102
4		1,266	48	27,198	37,926	21,402
5		203	0	68,544	13,170	11,364
6		997	1,044	68,650	50,700	5,292
7		2,640	4,320	82,179	162,516	588
8		1,422	17,646	25,017	199,386	324
9		3,378	23,682	19,455	185,598	216
10		10,842	9,444	28,791	134,592	372
11		18,174	1,830	3,174	81,912	462
12		28,470	1,236	53,655	32,910	1,770
13		14,205	390	96,355	22,860	7,998
14		4,912	5,484	124,545	15,582	10,512
15		4,668	19,146	112,694	23,706	2,880
16		7,090	4,518	24,462	45,150	804
17		3,114	1,854	6,734	20,610	144
18		1,356	678	26,973	8,598	906
19		5,562	636	20,553	3,204	1,344
20		3,384	168	10,443	1,668	408
21		1,050	918	5,040	2,682	474
22		1,228	444	4,365	1,182	522
23		1,424	66	1,623	570	840
24		3,846	36	759	276	438
25		1,140	114	2,331	180	714
26		1,104	12	4,404	12	144
27		372	0	1,884	12	48
28		204	18	141	Tower discont.	60
29		247	24	216	--	144
30		--	--	132	--	126
TOTAL		126,595	94,650	825,421	1,240,53-	90,030

1/ Aerial survey only, escapement approximately 600,000.

Daily Red Salmon Counts--Naknek River Escapement
1956-1961

DAte	1956 1/	1957 1/	1958 2/	1959 2/	1960 2/	1961 2/
6/20	0	--	--	--	--	--
21	0	--	--	18	--	--
22	0	--	--	858	--	--
23	50	--	--	156	--	--
24	455	--	0	2,688	--	--
25	454	--	0	1,182	0	--
26	72	--	0	594	0	11,166
27	664	-- 3/	174	7,437	0	13,044
28	2,797	1,263	18	7,113	0	4,044
29	660	6,375	474	429	582	2,028
30	8,179	7,401	660	7,542	8,376	1,296
7/ 1	995	7,937	258	22,875	89,502	1,218
2	224	1,380	3,108	68,895	31,890	1,836
3	247	9,831	4,296	177,099	11,322	99,042
4	6,414	3,704	9,456	166,311	20,058	12,258
5	55,732	6,350	8,352	177,054	9,642	10,038
6	83,866	13,777	59,016	132,645	147,228	4,266
7	58,218	2,662	56,676	51,144	95,916	1,674
8	108,669	93,592	36,690	80,364	62,976	5,472
9	69,331	75,536	20,244	119,436	90,828	5,592
10	183,599	149,787	11,550	43,386	36,144	13,668
11	56,253	58,415	5,364	103,233	15,828	34,302
12	438,609	31,852	3,306	460,839	19,698	52,218
13	153,224	17,072	4,032	284,553	20,904	27,228
14	110,512	21,079	23,718	112,880	11,568	10,260
15	168,232	19,659	8,592	32,440	39,972	3,000
16	136,578	5,943	2,448	27,036	36,444	5,556
17	51,546	16,573	2,316	47,244	10,830	8,664
18	16,458	22,411	2,136	26,973	14,088	5,922
19	14,592	8,916	2,430	19,132	9,432	684
20	8,293	6,203	2,442	6,396	6,810	552
21	3,506	10,162	2,610	6,016	6,660	984
22	5,409	8,693	1,908	6,256	4,092	552
23	5,979	4,242	1,488	7,804	3,432	336
24	5,383	6,328	1,566	6,684	2,928	2,748
25	2,553	4,887	882	5,824	2,220	1,674
26	2,511	2,536	774	3,432	2,622	462
27	2,265	1,633	354	1,860	2,844	324
28	2,445	856	318	1,988	2,496	438
29	1,638	2,647	270	1,112	2,535	324
30	2,319	1,336	36	2,104	2,901	204
31	972	1,036	108	1,612	1,356	429
8/ 1	761	908	48	--	1,194	354
2	345	657	0	--	822	84
3	279	910	--	--	1,005	141
4	467	306	--	--	756	- --
8/ 5-8/19	835				480	
TOTAL	1,772,593	634,655	278,118	2,230,000	828,381	351,078

1/ Weir counts 2/Tower counts 3/ Cumlative count

Daily Red Salmon Counts--Egegik River Escapement
1956-1961

Date	1956 [1]	1957 [2]	1958 [2]	1959 [2]	1960 [2]	1961 [2]
6/29	--	--	--	0	--	--
30	--	--	16,212	4,800	--	--
7/ 1	--	9,960	3,606	4,506	0	--
2	--	20,136	7,632	0	0	11,286
3	--	3,042	7,524	0	0	58,308
4	--	7,524	13,644	80	0	17,826
5	--	8,848	30,198	20,348	1,416	17,100
6	0	5,632	31,872	15,684	108	49,908
7	0	7,552	27,492	98,920	92,346	74,454
8	428	13,656	44,490	127,512	62,058	65,562
9	2,656	20,826	18,606	90,436	17,778	119,526
10	4,081	44,664	8,358	96,960	154,728	62,790
11	17,909	85,639	12,042	88,904	193,404	27,414
12	3,230	64,132	5,316	17,152	310,710	22,158
13	24,361	35,985	1,176	2,216	267,738	9,258
14	41,415	8,722	2,094	30,132	68,832	39,228
15	18,823	17,179	408	58,544	216,763	9,390
16	15,994	21,302	294	86,392	165,102	13,446
17	200,342	361	3,534	51,820	137,442	19,626
18	321,572	3,783	3,132	106,704	33,792	18,348
19	171,878	4,596	924	21,840	43,890	23,220
20	112,903	3,063	1,308	51,152	20,136	17,658
21	64,595	120	288	25,540	12,108	4,944
22	2,323	1,169	1,362	21,352	402	588
23	510	681	1,302	8,940	6	2,472
24	1,707	1,205	264	5,596	0	9,258
25	8,802	801	432	1,156	0	3,564
26	26,025	154	570	4,624	0	1,404
27	19,392	295	1,266	2,404	Tower Discont.	450
28	23,434	42	432	6,544	--	612
29	6,407	42	30	1,412		366
30	1,505	96	174	741		228
31	644	--	198	48		378
8/ 1	850	--	114	0		294
2	3,708	--	60	--		246
3	1,007	--	--	--		132
4	1,951	--	--	--		126
5	594					--
6	584					
7	476					
8	2,130					
9	989					
10	417					
11	218					
12	71					
13	42					
14	76					
15	123					
16	68					
17	5					
18	4					
19	19					
TOTAL	1,104,230	391,207	246,354	1,072,459	1,798,764	701,538

Daily Red Salmon Counts--Ugashik River Escapement
1956-1961

Date	1956 1/	1957 2/	1958 2/	1959 2/	1960 2/	1961 2/
7/ 1	--				0	
2	--				0	
3	--	0	--		0	
4	--	0	4,992		0	
5	--	361	15,012		0	
6	--	0	26,514		0	1,110
7	--	296	39,594		0	1,392
8	--	10	7,938	0	0	2,328
9	0	126	15,726	2,535	0	9,174
10	0	8,514	18,540	29,589	0	5,106
11	157	5,754	20,226	25,845	30	1,560
12	133	2,994	15,726	20,646	45,672	3,744
13	576	12,528	11,202	12,336	200,282	1,980
14	2,095	13,056	25,170	5,715	299,628	38,385
15	164	19,434	8,712	2,712	220,122	97,302
16	431	19,771	10,740	19,869	59,250	39,786
17	6,846	33,420	11,994	5,743	38,310	28,962
18	43,015	28,908	6,774	11,277	261,470	24,042
19	48,127	10,530	7,110	16,806	508,176	39,972
20	60,061	4,208	8,898	4,608	216,636	4,050
21	49,355	7,215	2,010	6,477	179,238	10,584
22	4,522	2,560	3,600	7,701	146,988	9,708
23	4,542	3,292	2,586	6,192	53,256	10,410
24	17,390	2,880	1,620	7,707	8,628	5,655
25	39,248	8,394	1,572	4,460	17,970	3,795
26	111,141	5,988	798	4,984	5,592	930
27	18,183	1,096	1,608	5,508	5,214	726
28	2,470	1,730	1,476	1,863	7,146	924
29	135	4,482	1,164	1,719	1,842	630
30	29	448	1,674	2,213	6,702	1,314
31	254	6,509	1,416	1,335	3,324	1,380
8/ 1	2	2,184	2,364	2,002	3,012	940
2	16	1,156	570	2,269	2,448	858
3	2,645	1,396	408	1,655	1,266	468
4	5,302	1,132	144	1,393	444	543
5	1,639	513	516	1,521	1,554	153
6	458	832	522	801	Tower discont.	300
7	1,382	1,864	516	1,320		285
8	1,294	526	108	422		162
9	750	695	--	--		--
10	661					
11	297					
12	208					
13	358					
14	515					
15	485					
16	226					
17	106					
18	51					
19	16					
TOTAL	425,285	214,802	279,546	218,723	2,304,200	348,639

1/ Weir 2/Tower

BRISTOL BAY RED SALMON ESCAPEMENT IN
NUMBERS OF FISH BY RIVER SYSTEM
1950 - 1962

YEAR	NUSHAGAK	NAKNEK KVICHAK	EGEGIK	UGASHIK	TOGIAK	TOTAL
1950	573,000	1,964,000	625,800	998,342	---	4,161,142
1951	540,000	3,724,000	1,950,000	205,881	---	6,419,881
1952	434,000	4,486,000	756,921	651,209	---	6,328,130
1953	829,000	2,200,000	519,098	1,056,052	---	4,604,150
1954	692,000	1,544,613	506,157	457,834	---	3,200,604
1955	1,934,000	638,187	271,039	76,841	---	2,920,067
1956	1,214,000	11,215,983	1,104,203	425,295	---	13,959,481
1957	499,852	3,604,060	391,207	214,802	25,000	4,734,921
1958	1,274,296	907,553	246,354	279,546	57,000	2,764,749
1959	2,964,462	3,738,065	1,072,459	218,723	178,740	8,172,449
1960	1,672,985	16,698,911	1,798,764	2,304,200	162,810	22,637,670
1961	839,633	4,146,963	701,538	348,639	95,454	6,132,227
12 year av. 1950 - 1961	1,122,269	4,572,361	828,628	603,114	103,800 1/	7,169,623
1962	937,698	3,393,264	1,027,482	288,676	71,552	5,718,672

1/ 5 year average; 1957 - 1961

Preliminary Summary

1961 Bristol Bay Red Salmon Catch & Escapement

	Escapement System	Escapement District	Catch[1]	Total Run[1]
NAKNEK-KVICHAK DISTRICT				
Kvichak	3,705,849			
Naknek	351,078			
Alagnak (Branch)	90,036			
		4,146,963	8,166,983	12,313,946
NUSHAGAK DISTRICT				
Wood River	460,737			
Igushik	294,252			
Tikchik Lakes	79,788			
Snake River	4,856			
Nushagak-Mulchatna	20,200[2]			
		859,833	511,483	1,371,316
EGEGIK DISTRICT	701,538	701,538	2,686,076	3,387,614
UGASHIK DISTRICT				
Ugashik Lakes	348,639			
Mother Goose	17,800[2]			
		366,439	357,223	723,662
TOGIAK DISTRICT				
Togiak Lakes	95,454			
Other	26,800[2]			
Kulukak Section	5,200[2]			
		127,454	192,161	319,615
Total BRISTOL BAY		6,202,227	11,913,926	18,116,153

1/ All figures for catch and total run are preliminary.
2/ Estimates from aerial surveys.

COMPARATIVE INDICES FOR RED SALMON SMOLT
AT MOSQUITO POINT, 1951 - 1962

Year	Index Points	Number of Smolts
1951	9.9	16,809
1952	100.0 1/	170,034
1953	296.1	503,444
1954	438.6	745,769
1955	221.7	376,965
1956	326.6	555,331
1957	165.5	281,406
1958	230.9	392,609
1959	60.0	102,020
1960	223.0	379,176
1961	518.7	881,911
1962	177.6	301,892

1/ Base year: assigned value of 100.00

1 index point = 1700.34 smolts