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# TIMING OF MIGRATION OF RED SALMON ALONG THE NORTH SIDE OF THE ALASKA PENINSULA

SPECIAL MANAGEMENT STUDY 57-1

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# TIMING OF MIGRATION OF RED SALMON

# ALONG THE NORTH SIDE OF THE ALASKA PENINSULA

## Routes and Rates of Migration.

Various tagging experiments have indicated generally the migration rates and routes of red salmon as they approach Bristol Bay and its spawning tributaries.

Tagging by Gilbert[1/] in 1922 and 1923 off Ikatan Peninsula in the Pacific Ocean indicated that tagged red salmon traveled to Bristol Bay in a median time of 20 and 21 days, or at a rate of about 17 miles per day. Gilbert showed that late fish traveled at a faster rate than fish tagged earlier, and thus were not proportionately later in reaching the spawning grounds. Fish tagged at Ikatan Bay varied in daily migration rate from 14 to 29.5 miles. Those tagged July 1 and prior varied from 14 to 18.5 miles per day. Therefore, the median rate of 17 miles per day is used in this study. It should be pointed out that this rate is the best known approximation and does not mean that each fish traveling along the Alaska Peninsula to Bristol Bay does so at 17 miles per day. Tagging experiments by the Service in Bristol Bay and by the Fisheries Research Institute south of the Aleutian Islands in 1956 tend to substantiate this rate of travel.

Barnaby[2/] fished for salmon in 1939 and 1940 at stations along a line from Cape Seniavin to Cape Newenham. In 1939, using a purse seine and gill nets, he found red salmon at all stations but they were most abundant in the southern half of the Bay within 60 miles of Cape Seniavin. In 1940, using gill nets only, many of the stations were repeated and the best catch by far was made at Station 1, ten miles off Cape Seniavin.

Barnaby tagged part of his catch at stations 1, 3, 4, 5, 6, and 8 in 1939 (not reported in his paper). Most recoveries were made in Bristol Bay and at Chignik but a few occurred in the Aleutians and Kuskokwim. The recoveries from stations 1 and 3, 10 and 30 miles from Cape Seniavin respectively, are shown in Table 1. About half are from Bristol Bay and half from Chignik.

This fishing and tagging demonstrates that Bristol Bay fish traverse the north side of the Alaska Peninsula and are potentially

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1/ Second Experiment in Tagging Salmon in the Alaska Peninsula Fisheries Reservation, Summer of 1923. Charles H. Gilbert and Willis H. Rich; Bu. Fish. Doc. 991, P. 67.

2/ Offshore Fishing in Bristol Bay and Bering Sea, Joseph T. Barnaby; Spec. Scientific Rpt.: Fish. No. 89.

available to commercial fishing there prior to reaching Bristol Bay. Tagging experiments by the Service in 1956 between Port Heiden and Cape Menshikof indicate that Bristol Bay fish pass that area in numbers within three miles of shore (Table 2). The tagging sites referred to in this section are shown in Figure 1.

Timing of Bristol Bay Runs.

Bristol Bay runs are generally short and vary somewhat in their time of appearance from year to year. Also, of the runs in the various tributaries of the Bay, the Nushagak and Naknek-Kvichak fish are usually at least two to three days earlier than those of the Egegik and Ugashik.

The principal period of occurrence of the runs to these rivers has been calculated for the years 1948-1956 by defining the principal period of occurrence as that period during which the average catch-per-boat per period remained at or above 25% of the average catch of the peak period. The dates of occurrences so calculated are shown in Table 3, columns 2, 5, 8, and 11.

By applying a rate of travel of 17 miles per day (as observed by Gilbert) to the dates of occurence of the runs to the various rivers, it is possible to estimate when these fish migrate past various points along the north shore of the Alaska Peninsula. Such estimated times for Port Moller and Port Heiden have been calculated and are presented in Table 3. The extent of time in which the runs of the various rivers may be expected to occur off Port Heiden is shown in Figure 2. This, of course, is a picture of the occurrence of the runs, as defined above with the dates advanced in accordance with the distance to be traveled from Port Heiden to the various rivers. It may be seen that the portion of the Bristol Bay run that moves along the north shore of the Peninsula is present on the average in the Port Heiden area in late June and the first week of July. Ugashik fish are later and are present from about June 28 through the first two weeks of July.

Conclusions.

1. Bristol Bay destined red salmon migrate along the north side of the Alaska Peninsula at a rate of about 17 miles per day.

2. Bristol Bay destined red salmon are present off Port Heiden and significant numbers probably occur within the three-mile limit.

3. Bristol Bay destined red salmon are present in the Port Heiden area as late as mid-July.

TABLE 1 SOME DETAILS OF RED SALMON TAGGING BY BARNABY IN 1939

| Tagging Locations | No. Tagged | Date Tagged | Area and No. Recovered | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Nushagak | Naknek Kvichak | Egegik | Ugashik | Bear & Sandy Rivers | Chignik |
| Sta. 1 10 miles off Cape Semiavin | 56 | 6/27 | 2 | 1 | 0 | 1 | 1 | 5 |
| | 23 | 7/16 | 1 | 1 | 0 | 2 | 2 | 6 |
| | 25 | 7/17 | 1 | 0 | 0 | 1 | 0 | 2 |
| Sta. 3 30 miles off Cape Semiavin | 126 | 6/28 | 9 | 2 | 1 | 0 | 0 | 12 |
| | 23 | 7/20 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE 2 COMMERCIAL RECOVERIES OF 1956 FISH AND WILDLIFE TAGGING AT SITES 18, 19 AND 20, BRISTOL BAY

| Tagging Site | Date Tagged | No. Tagged | Recoveries[1] | | |
|---|---|---|---|---|---|
| | | | Nak-Kvi | Egegik | Ugashik |
| 18 | June 22 | 3 | 0 | 0 | 1 |
| 18 | July 5 | 74 | 6 | 5 | 10 |
| 18 | July 7 | 282 | 25 | 31 | 47 |
| 18 | July 10 | 154 | 18 | 15 | 17 |
| 18 | July 15 | 165 | 1 | 1 | 31 |
| 19 | June 23 | 1 | 0 | 0 | 0 |
| 19 | July 3 | 30 | 0 | 2 | 7 |
| 19 | July 13 | 47 | 0 | 1 | 5 |
| 19 | July 17 | 26 | 0 | 2 | 4 |
| 19 | July 20 | 1 | 0 | 0 | 0 |
| 20 | June 25 | 33 | 1 | 3 | 5 |
| 20 | July 2 | 10 | 0 | 0 | 4 |
| 20 | July 8 | 95 | 3 | 3 | 33 |
| 20 | July 13 | 4 | 0 | 0 | 1 |

[1] No recoveries were made in Nushagak.

Table 3 TIME OF OCCURRENCE OF BRISTOL BAY RED SALMON RUNS

| | Time of Occurrence | | | Time of Occurrence | | | Time of Occurrence | | | Time of Occurrence | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Actual Naknek Kvichak | Est. P.Heiden | Est. P.Moller | Actual Egegik | Est. P.Heiden | Est. P.Moller | Actual Nushagak | Est. P.Heiden | Est. P.Moller | Actual Ugashik | Est. P.Heiden | Est. P.Moller |
| 1956 | July 2 to July 17 | June 25 to July 10 | June 20 to July 5 | July 5 to July 17 | June 30 to July 12 | June 26 to July 8 | July 5 to July 17 | June 29 to July 11 | June 25 to July 7 | July 5 to July 17 | July 3 to July 15 | June 28 to July 10 |
| 1955 | June 27 to July 15 | June 20 to July 8 | June 15 to July 3 | June 25 to July 19 | June 20 to July 14 | June 16 to July 10 | July 4 to July 12 | June 28 to July 6 | June 24 to July 2 | July 1 to July 15 | June 29 to July 13 | June 24 to July 8 |
| 1954 | June 30 to July 17 | June 23 to July 10 | June 18 to July 5 | June 28 to July 17 | June 23 to July 12 | June 19 to July 8 | June 28 to July 10 | June 22 to July 4 | June 18 to June 30 | June 30 to July 17 | June 28 to July 15 | June 23 to July 10 |
| 1953 | June 26 to July 14 | June 19 to July 7 | June 14 to July 2 | June 26 to July 14 | June 21 to July 9 | June 17 to July 5 | June 26 to July 18 | June 20 to July 12 | June 16 to July 8 | June 29 to July 14 | June 27 to July 12 | June 22 to July 7 |
| 1952 | June 27 to July 18 | June 20 to July 11 | June 15 to July 6 | June 27 to July 15 | June 22 to July 10 | June 18 to July 6 | June 27 to July 12 | June 21 to July 6 | June 17 to July 2 | June 27 to July 15 | June 25 to July 13 | June 20 to July 8 |
| 1951 | June 30 to July 16 | June 23 to July 9 | June 18 to July 4 | June 29 to July 13 | June 24 to July 8 | June 20 to July 4 | July 4 to July 14 | June 29 to July 8 | June 25 to July 4 | July 2 to July 11 | June 30 to July 9 | June 25 to July 4 |
| 1950 | June 30 to July 10 | June 23 to July 3 | June 18 to June 28 | June 29 to July 13 | June 24 to July 8 | June 20 to July 4 | June 28 to July 13 | June 22 to July 7 | June 18 to July 3 | July 2 to July 13 | June 30 to July 11 | June 25 to July 6 |
| 1949 | June 25 to July 15 | June 18 to July 8 | June 13 to July 3 | June 25 to July 23 | June 20 to July 18 | June 16 to July 14 | June 27 to July 8 | June 21 to July 2 | June 17 to June 28 | June 30 to July 19 | June 28 to July 17 | June 23 to July 12 |
| 1948 | June 30 to July 21 | June 23 to July 14 | June 18 to July 9 | June 30 to July 14 | June 25 to July 9 | June 21 to July 5 | June 30 to July 22 | June 24 to July 16 | June 20 to July 12 | June 30 to July 20 | June 28 to July 18 | June 23 to July 13 |

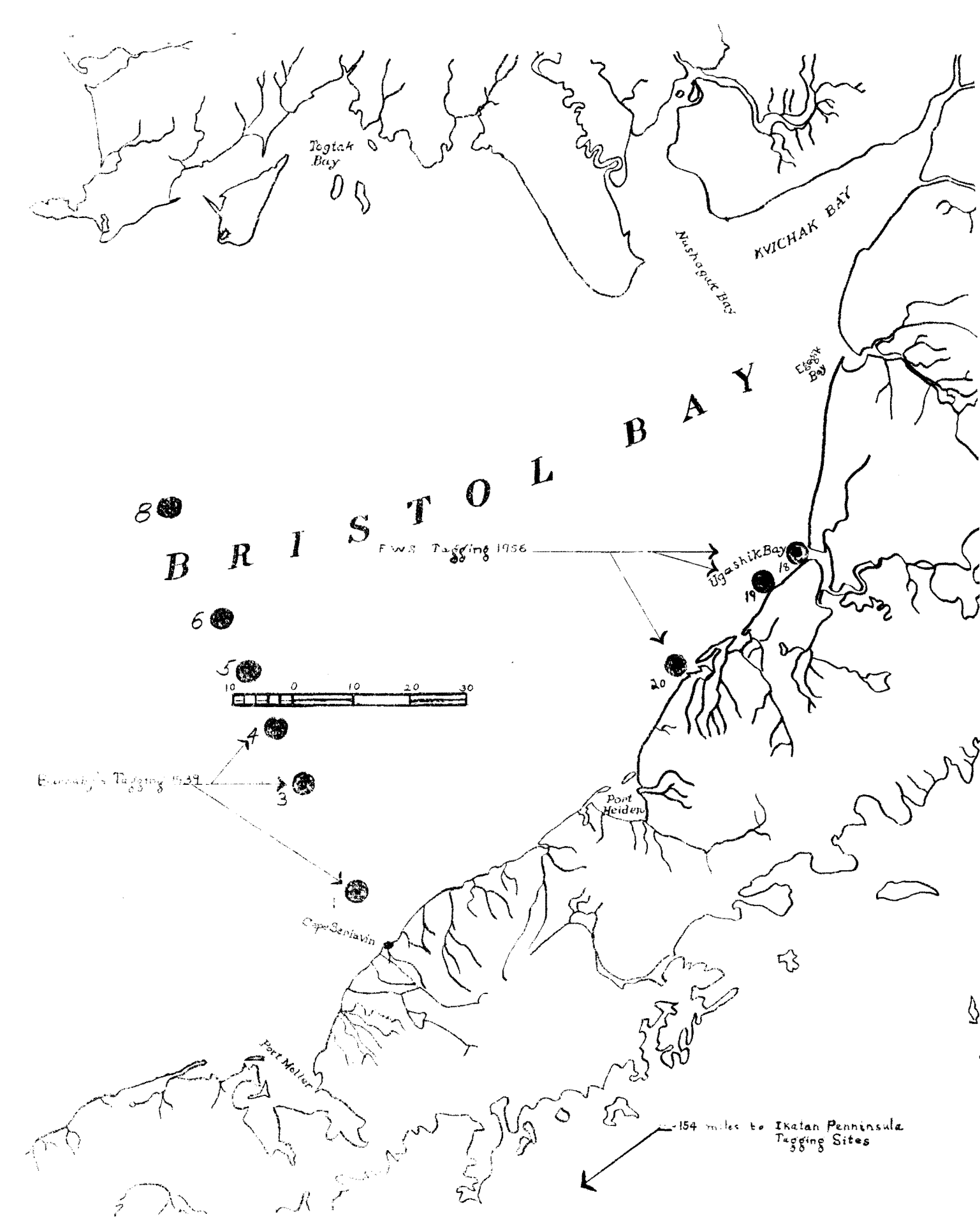


Figure 1. Chart showing tagging sites referred to in this study.

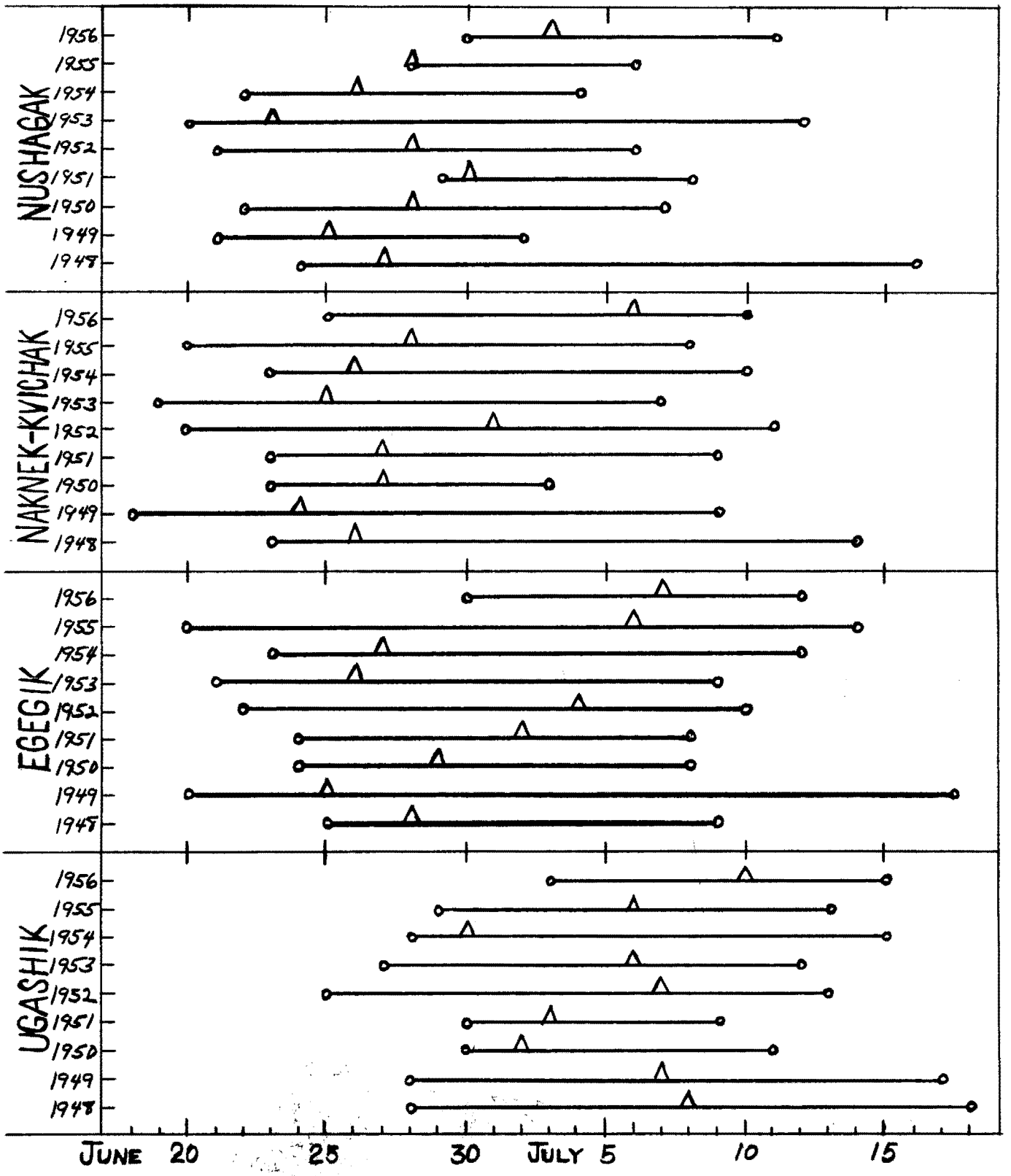


Figure 2. Estimated dates of occurrence of Bristol Bay Red Salmon off Port Heiden, 1948 - 1956, as calculated from Bristol Bay landing statistics and migration rate of 17 miles per day.

$\Lambda$ = calculated peak.