

U. S. AND JAPAN CONDUCT SALMON RESEARCH IN COOPERATIVE CRUISE

By Robert R. French*

The Bureau of Commercial Fisheries (BCF) and the Japanese Fishery Agency have pooled their resources in a cooperative research cruise underway this spring in the North Pacific Ocean. The two nations and Canada are treaty members of the International North Pacific Fisheries Commission (INPFC). Each signatory is engaged in research on fishery resources of common interest for effective utilization and conservation.

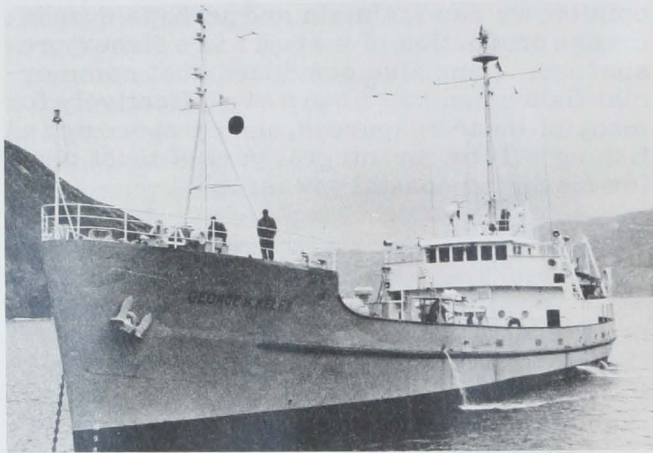


Fig. 1 - BCF's "George B. Kelez."

The vessels participating in the spring cruise are the BCF Seattle Biological Laboratory's R/V "George B. Kelez" (550 tons) and the Japanese research vessels "Wakashio-Maru" (150 tons) and "Hokko-Maru" (220 tons)--all veterans of research in North Pacific waters. The George B. Kelez left Seattle on April 2 and will return in early July. The Japanese vessels reached the fishing grounds in late April and will stay until early June.

Purpose of Cruise

The purpose of the cooperative cruise is to investigate the distribution of salmon and the associated oceanographic features south of the Aleutian Islands; the hypotheses concerning the relation between the distribution of salmon and their environment are being tested. Emphasis is on the distribution and migration of

*Fishery Biologist, BCF Biological Laboratory, Seattle, Wash. 98102.

sockeye salmon from Bristol Bay in relation to the Alaskan Stream and central Alaskan Gyre. The migration routes of these salmon and surface currents are illustrated in figure 2.

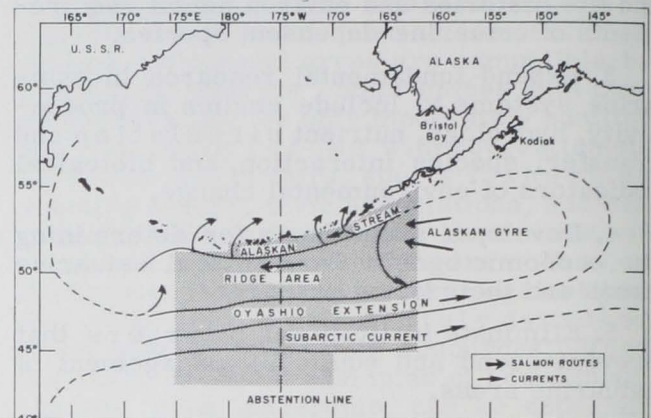


Fig. 2 - Salmon migration routes and surface currents of the study area (shaded) in the central North Pacific Ocean.

Under INPFC provisions, Japan (and her mothership fishing fleet) agreed in 1953 to abstain from fishing for salmon east of long. 175° W. Since then, however, we have found that sockeye salmon bound for Bristol Bay migrate past the abstention line. We hope that research in this area will add to our knowledge of the migration processes--and enable us to forecast the proportion of the run available to the Japanese fishery each year.

Cruise tracks of the vessels are illustrated in figures 3 and 4. The two Japanese vessels are collecting data on fish distribution in the western part of the sampling area; the U. S. vessel is collecting oceanographic data for all areas, as well as fishery data on the eastern section.

Fishing Gear

Fishing gear are gill nets. The U. S. vessel is fishing a basic string of 32 shackles (2.9 kilometers or 1.8 miles) with five mesh sizes ($5\frac{1}{4}$, $4\frac{1}{2}$, $3\frac{7}{8}$, $3\frac{1}{4}$, and $2\frac{1}{2}$ inches--133, 115, 98, 83, and 63 mm.), stretched measure. The Japanese vessels are fishing a basic string of either 50 tans (2.5 km.) or 100 tans (5.0 km.)

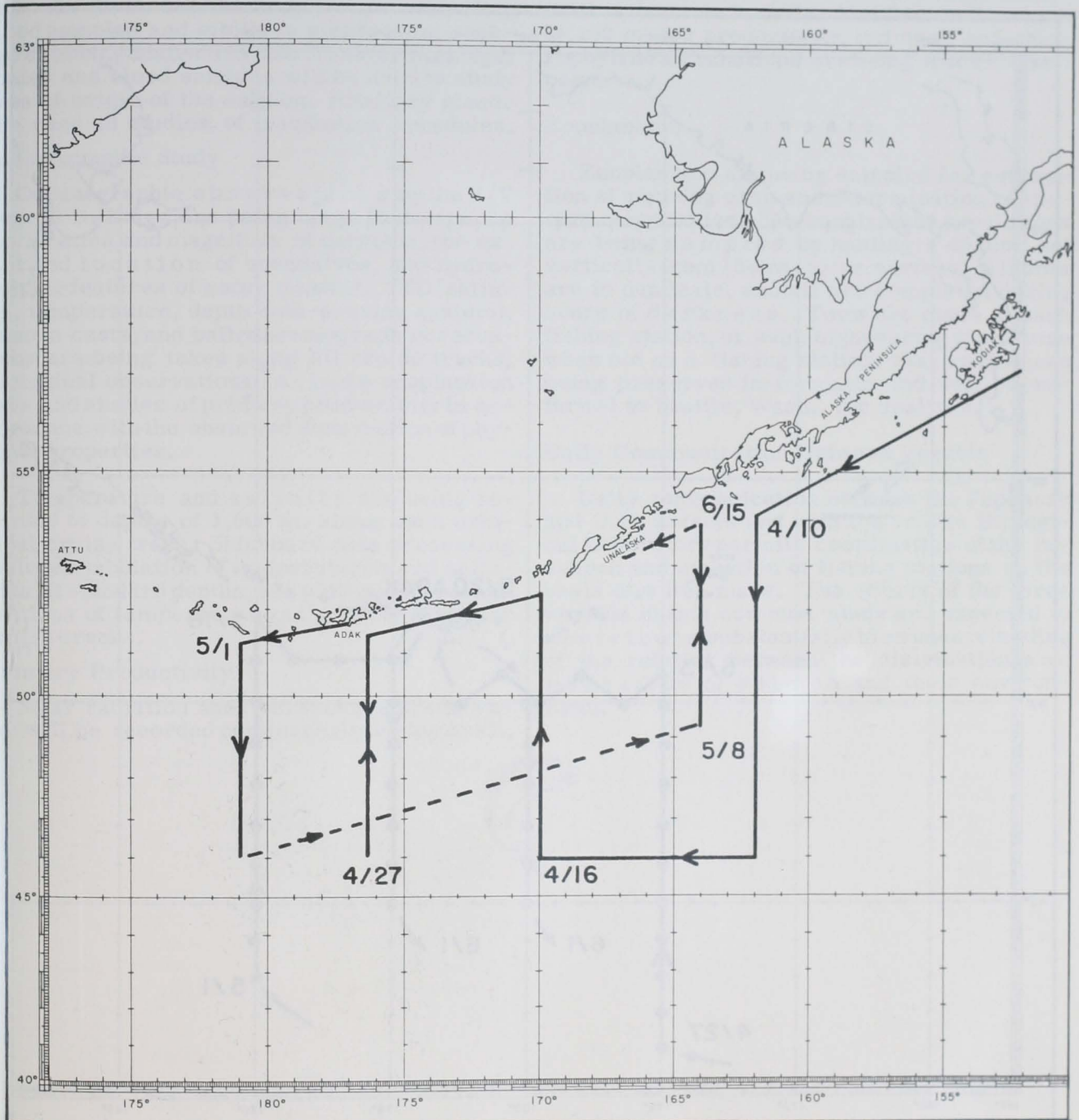


Fig. 3 - Cruise plan of R/V George B. Kelez, spring 1968.

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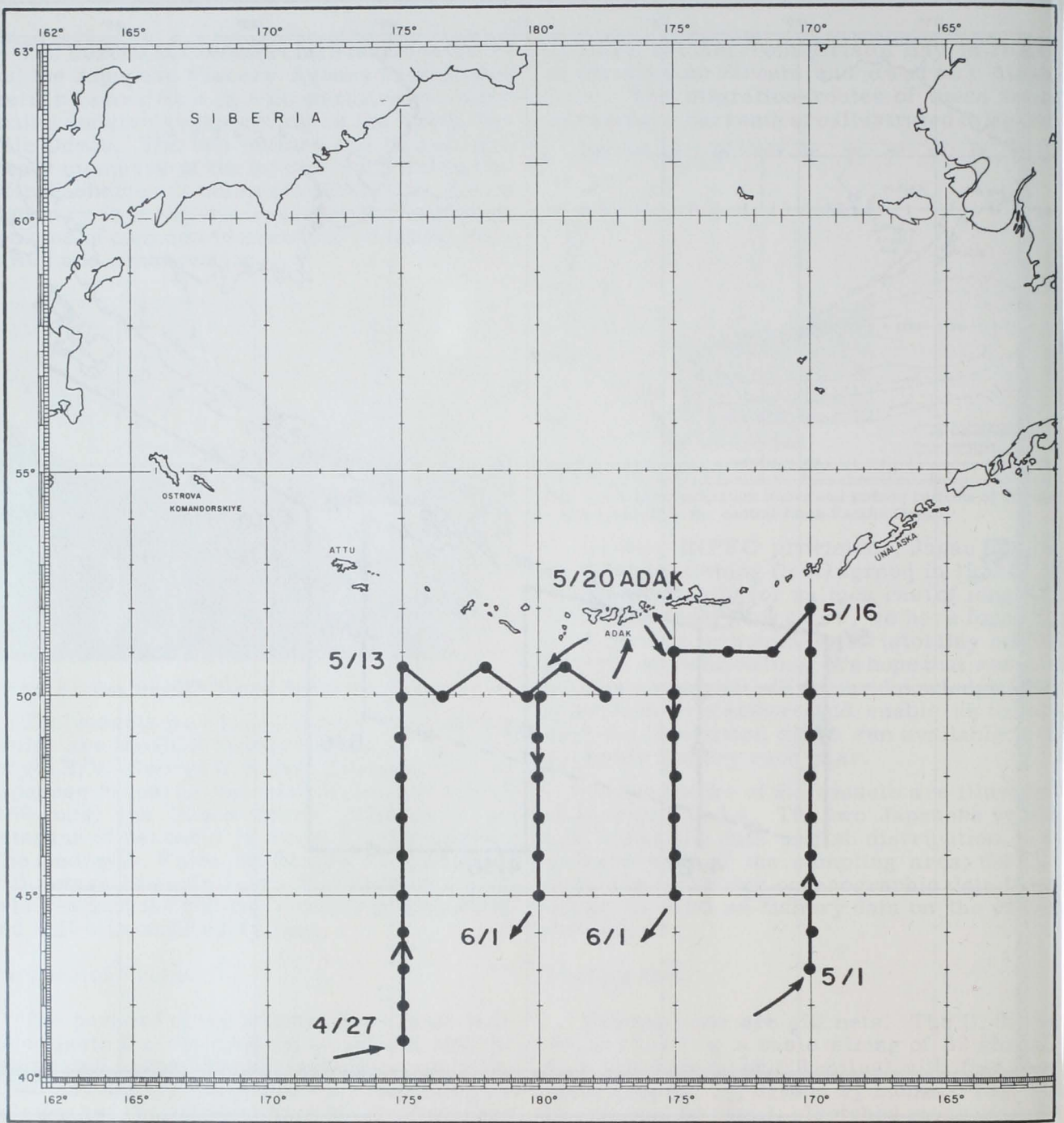


Fig. 4 - Cruise plans of R/V Wakashio-Marui and Hokko-Marui, spring 1968. (From Japanese Fishery Agency)

consisting of five mesh sizes (55, 72, 93, 121, and 157 mm., or 2.1, 2.8, 3.6, 4.7, and 6.1 inches). Data collected at each fishing site include catch by species for each mesh size, lengths of salmon, and scale samples from each fish; the U. S. scientists also are collecting blood samples and pituitary glands from sock-eye salmon. Scales are used to determine age; scales and blood samples will be used to study area of origin of the salmon. Pituitary glands are used in studies of maturation schedules.

Oceanographic Study

Oceanographic observations by the R/V George B. Kelez are being taken to determine the location and magnitude of currents, the extent and location of boundaries, and hydrographic features of water masses. STD (salinity, temperature, depth data-sensing system), Nansen casts, and bathythermograph observations are being taken along all cruise tracks. Biological observations include zooplankton tows and studies of primary productivity in accordance with the observed distribution of physical properties.

Temperature and salinity are being recorded to depths of 1,500 m. along each principal cruise track. Shipboard data processing includes tabulation of temperatures and salinities at standard depths, and plotting of vertical sections of temperature and salinity along the cruise tracks.

Primary Productivity

Solar radiation and fluorescence of sea water will be recorded continuously during April,

May, and June aboard the George B. Kelez. Water samples from the surface are being drawn three times each day for nutrient and chlorophyll analyses; Secchi disk depth and surface primary productivity are being measured at least once daily. Van Dorn bottle casts to 200 m. for productivity, nutrient, and chlorophyll determinations are being made as time permits.

Zooplankton

Zooplankton are being sampled for estimation of standing crop and determination of species composition. The zooplankton populations are being sampled by hauling a 45-cm. net vertically from 150 m. to the surface. All tows are in duplicate, and all are completed during hours of darkness. Tows are made at each fishing station, or each night during the cruise when not on a fishing station. Samples are being preserved in formalin and will be returned to Seattle, Wash., for analysis.

Daily Communication Between Vessels

Daily communication between the Japanese and U. S. vessels and with the Seattle Biological Laboratory permits coordination of the research and selection of fishing stations on the basis of water mass. The efforts of the three vessels in this common study are expected to contribute substantially to an understanding of the relation between the distribution and migration of salmon and their environment.

