

Cluster of eggs stripped from ripe Pacific saury (scale is in millimeters).

(Photo: R. C. Counts & A. M. Vrooman, BCF, La Jolla, Calif.)

SEASONAL AND GEOGRAPHIC CHARACTERISTICS OF FISHERY RESOURCES

California Current Region--II. Pacific Saury

David Kramer and Paul E. Smith

This is the second in a series of reports¹ in which we are describing characteristics of the fishery resources in the California Current region, emphasizing predictions of the times and localities of adult fish spawning and suggesting the potential for production of the spawning resources. We did this for the jack mackerel (Kramer and Smith, 1970) and will now do the same for the Pacific saury.²

Data of the California Cooperative Oceanic Fisheries Investigations (CalCOFI) indicate that major centers of the spawning populations of the Pacific saury can first be located in January in a relatively small area about 150-200 miles offshore from southern California and northern Baja California.

A major center of spawning is where 20 percent or greater occurrence of saury eggs is found in standard plankton hauls--fig. 1. In February and March, the centers of spawning spread inshore and northward to Point Conception and, in April, May and June, to San Francisco. Although eggs may be found as far south as Magdalena Bay, the major spawning centers seldom extend much farther than northern Baja California.

It can be assumed from egg data and visual observations (Smith, Ahlstrom, and Casey, 1970) that the saury ranges at least from southern Baja California to the Gulf of Alaska. The CalCOFI pattern does not delimit saury spawning (fig. 1). But a survey by BCF's Honolulu Laboratory in spring 1956 (fig. 2) and the NORPAC survey in late summer (August) 1955 (fig. 3) showed that spawning extends at least to 180° W. longitude. Smith, Ahlstrom, and Casey have stated that spawning probably occurs completely across the

Pacific. From data for 2 months of peak spawning--April and May--Smith, Ahlstrom, and Casey estimated the spawning resource at about 500,000 tons in the CalCOFI area. The 2 peak months were used for this estimate because the unusual spawning behavior of the saury introduces two sources of error in the estimate of the size of this resource: First, the saury is a repetitive spawner in 2-month intervals during the year (Hatanaka, 1956). Thus, if eggs are sampled continually it is most likely that the same populations may be repetitively sampled and overestimated. Second, saury eggs are adhesive and often collected in clumps of 20 or more; this diminishes the precision of sampling because the eggs are not independently distributed. Saury eggs found outside the pattern, as noted above, indicate that there may be as much spawning out of the pattern as in it--and thus would increase the estimate of resource size possibly by an equal amount.

Smith, Ahlstrom, and Casey pointed out that the saury is not likely to be available to the fisherman in the CalCOFI survey pattern during its spawning cycle. Their data from visual observations during spawning and non-spawning periods indicate that the saury might be most available during September through December and, most likely, in the areas from San Diego to northern California and Oregon--with the maximum numbers 40 miles and more offshore. Novikov and Kulikov (1966), in their account of Russian surveys off the west coast of North America, reported that the most dense concentrations of adult saury were between latitudes 42°18' and 44°22' in August, October, and November at water temperature 54°-55° F. (12.5-13.5° C.).

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¹These are introductions to existing and forthcoming comprehensive reports and analyses based on more than 20 years of intensive research by the CalCOFI--founded in 1949 to determine the reasons for the decline of the sardine resource.

²Organizations, area of investigations, and treatment of the data were presented in the report on jack mackerel.

U.S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Reprint No. 876

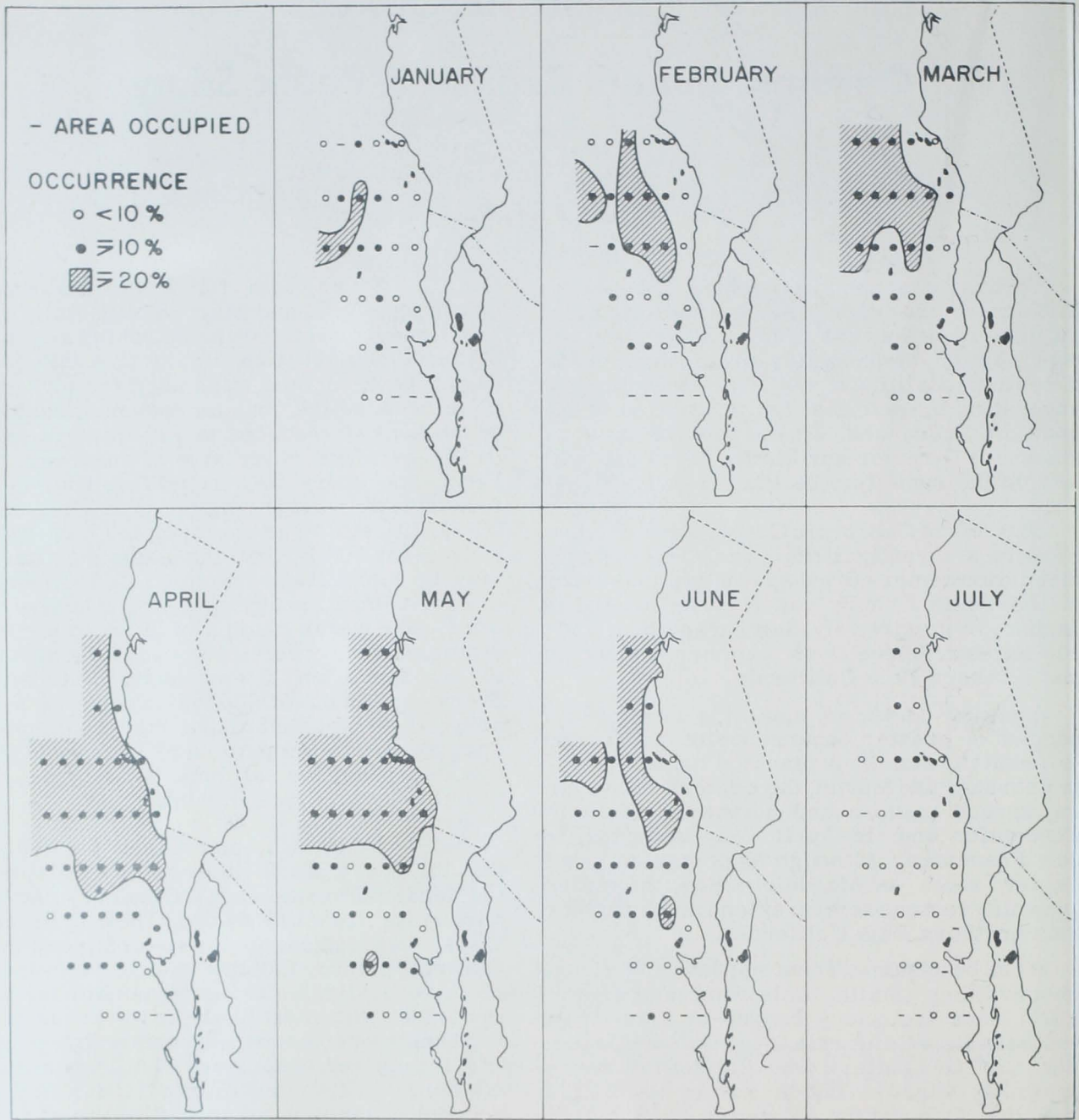


Fig. 1 - Percent occurrence of saury eggs in 1951-60 on the survey pattern of the California Cooperative Oceanic Fisheries Investigations (CalCOFI)--see figure 2.

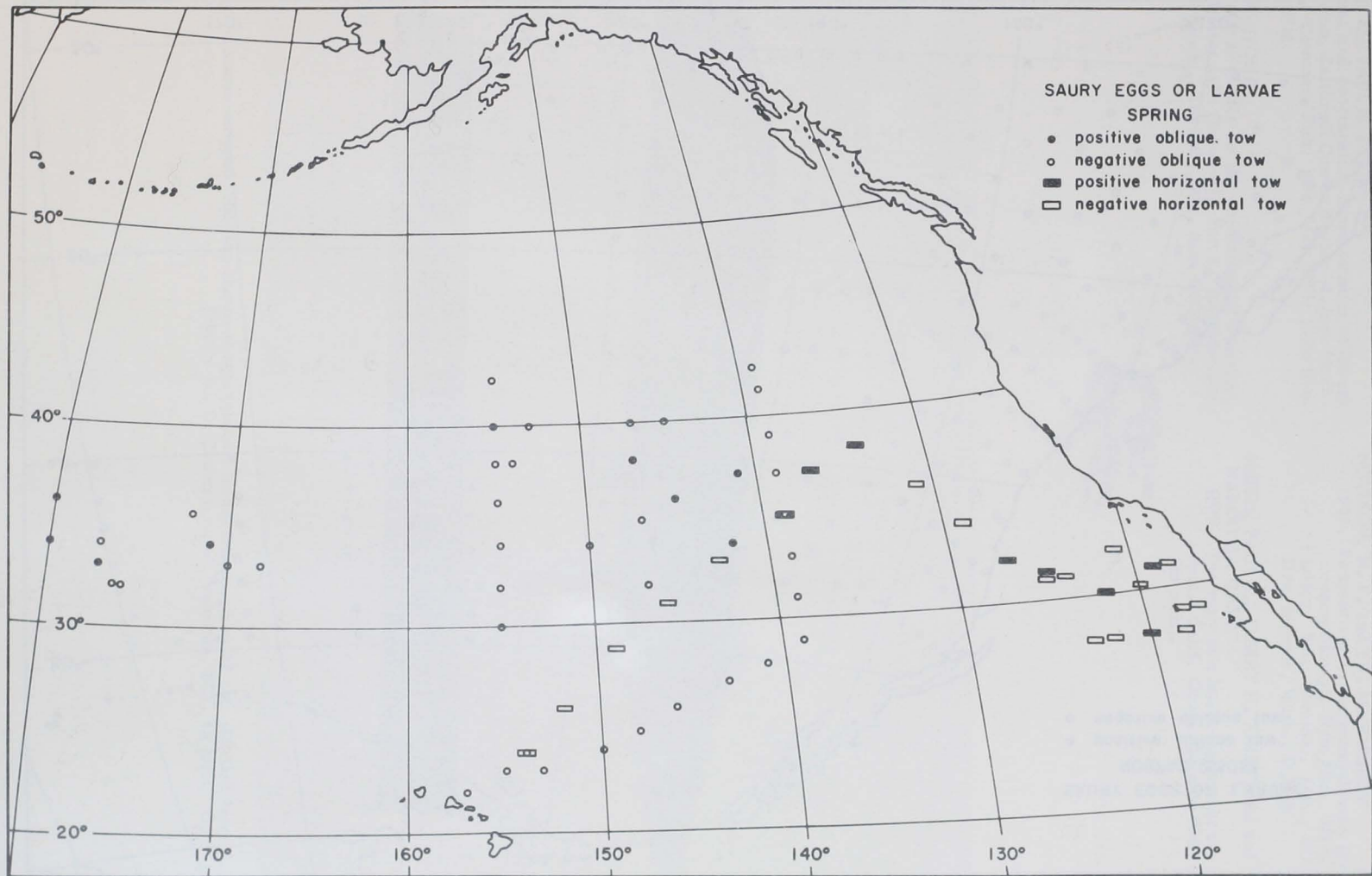


Fig. 2 - Distribution of saury eggs or larvae from survey by the BCF Honolulu Laboratory in the spring of 1956 (figure 4a of Smith, Ahlstrom, and Casey, in press).

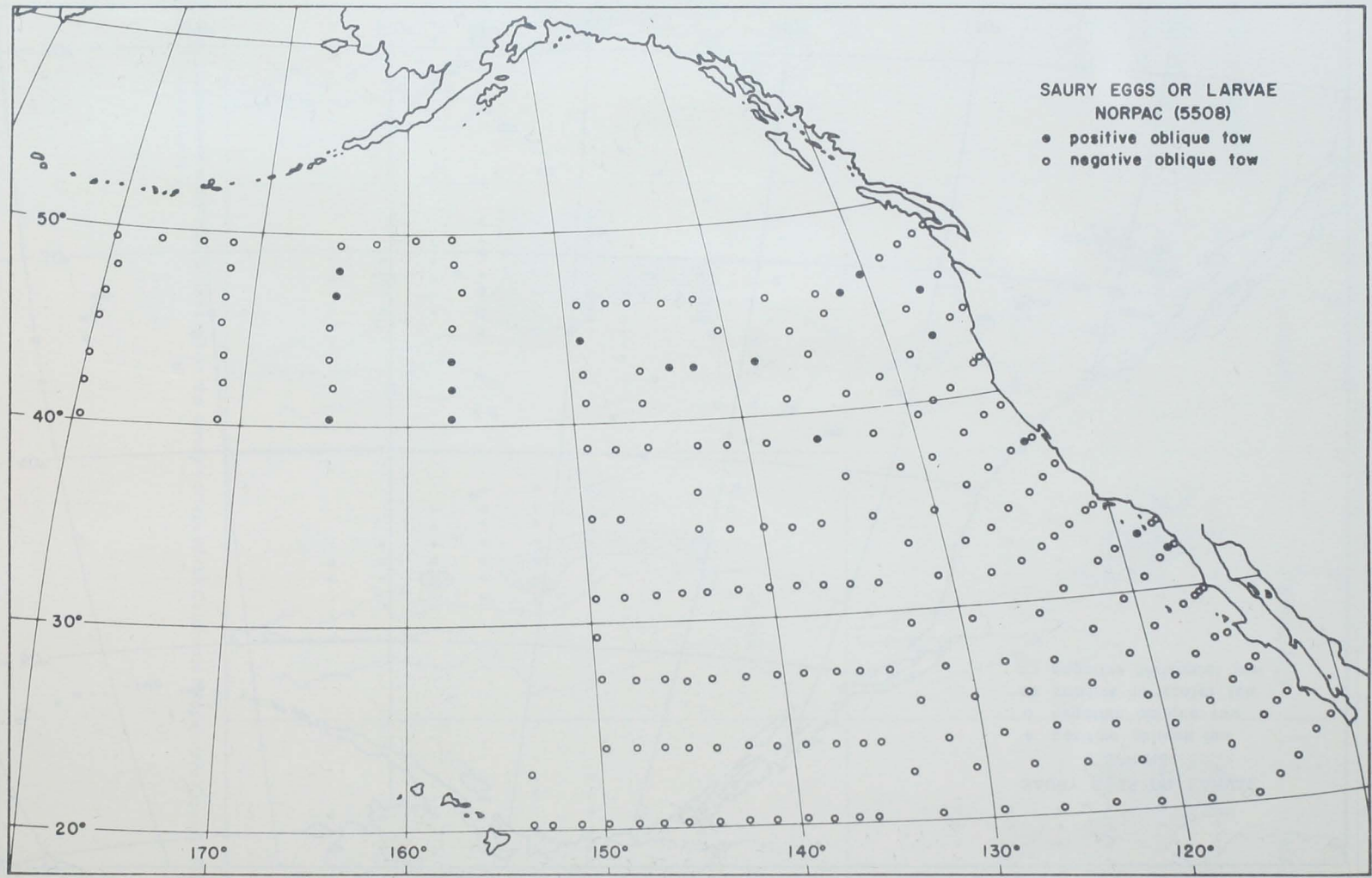


Fig. 3 - Distribution of saury eggs or larvae from NORPAC survey in late summer, August 1955 (figure 3 of Smith, Ahlstrom, and Casey, in press).

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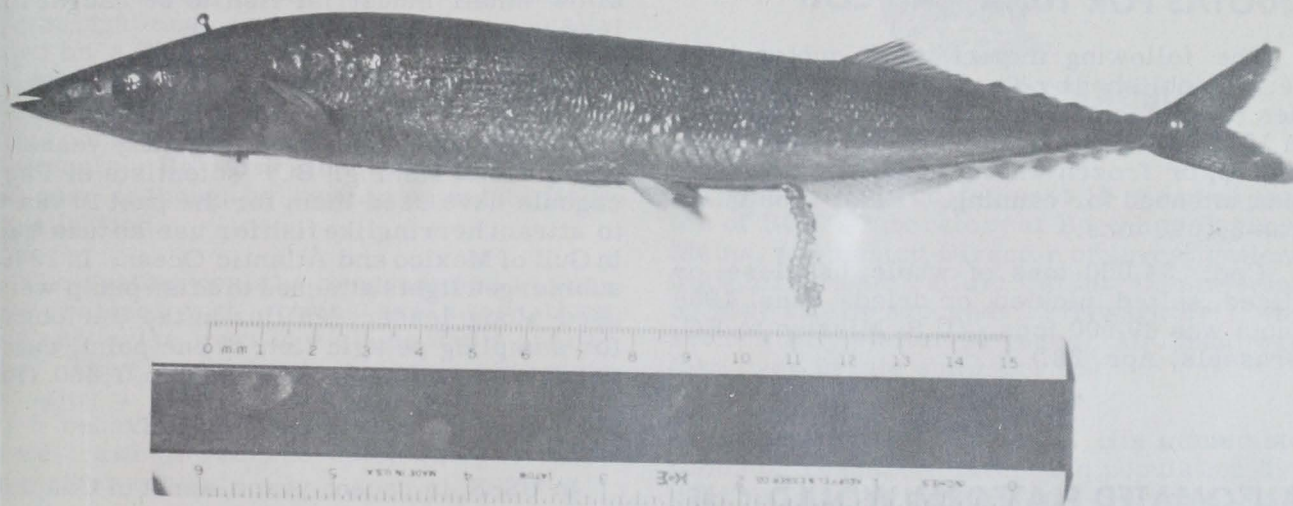
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Pacific saury--stripped, showing cluster of eggs (about 9 inches fork length or 22 cm. standard length).
(Photo: R. C. Counts & A. M. Vrooman, BCF, La Jolla, Calif.)