# DEPARTMENT OF THE INTERIOR

## INFORMATION SERVICE

FISH AND WILDLIFE SERVICE

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As the wind blows, Pacific pilchards may thrive or fail.

This conclusion is reached by scientists who have been searching for "a system having the elements to explain the wide variation in size, composition and abundance of sardines of commercial age such as has occurred during the last 20 years," according to Oscar E. Sette, biologist in charge of South Pacific Investigations for the Fish and Wildlife Service, United States Department of the Interior.

If this system, which weaves together a pattern involving subsea upwells and ocean currents, "continues in 1941 and perhaps future seasons," there may be resolved "the complex relation between the winds and sardine survival."

In 1940, sardines (or pilchards) spawned mainly along the inside border of the dominant current which flowed in a southeasterly direction some 100 miles from the Southern California coast. (This was ascertained during the survey made in 1940 jointly by the Scripps Institute of Oceanography and the Service.)

"There the spawning shoals had found water which, sometime earlier," according to Sette, "had been brought from deeper levels by the process of upwelling." This water was somewhat cooler, supported a larger diatom population, and had greater potential productivity of zooplankton than waters elsewhere in the region.

"Spawning was well under way in March when the 1940 survey began, reached maximum activity in May, shortly before the process of upwelling, current flow, and diatom production reached their maxima, and practically ceased in early June, when the survey for the season terminated."

The spawning was located with reference to the circulation pattern in such a way as to carry the newly hatched and helplessly drifting sardines in part toward the coastal nursery area, where survival conditions are presumed to be favorable, and in part to southerly offshore waters where chances for survival are presumed to be poor.

"Since the system of circulation, including both the upwelling process and the southeasterly transport, are dependent on the northwesterly winds prevailing in the springtime," Sette concludes, "annual variations in the direction, strength, and continuity of winds can be expected to cause variations in the location and extent of spawning, and variations in the drift and survival of the spawning products."

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