Part II

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PACIFIC SARDINE: PAST, PRESENT, AND FUTURE

Over 55 years ago, the rapid decline of the Pacific sardine (*Sardinops sagax*) resource sparked the formation of the California Cooperative Sardine Research Program, an inter-agency research program now called CalCOFI. CalCOFI has evolved over the years to address a much broader range of scientific questions about the California Current ecosystem but, at the same time, has been reduced in geographic scope and sampling frequency relative to the historic program. Fortunately, CalCOFI has survived to help document recovery of the Pacific sardine resource. CalCOFI continues to play a vital role in our population assessments and contributes to understanding connectivity between the California Current ecosystem and sardine population dynamics and productivity.

Unfortunately, many of the basic scientific questions posed by pioneers like Frances Clark, Jack Marr, and Garth Murphy remain unanswered today. While the latest sardine recovery began with an improved understanding of the past, current relevance of the historical perspective must be tempered with the realization that the recovery has occurred under a different set of conditions, favorable to the population's return. Thus, our preconceived notions regarding stock structure, movement, and productivity should be viewed with some skepticism and investigated with even more vigor.

The good news is that a new generation of scientific tools and data is available to assess the sardine's present status and forecast the future. From the onset of the sardine's recovery, new research and monitoring programs were initiated from México to Canada. Efforts are underway to coordinate and implement synoptic resource surveys, coast-wide, on a regular basis. The sardine population can be monitored in "real-time" using Continuous Underway Fish Egg Samplers (CUFES) coupled with advanced hydroacoustic and aerial (LIDAR) technologies currently under development. Population assessments, the basis for annual management in the U.S. and Canada, are accomplished using sophisticated statistical catch-at-age models and advanced computing power, light years beyond tools available to Garth Murphy in the early 1960s. The harvest policy adopted in the U.S. fishery management plan includes a simple, yet innovative, environmentally-based component linking fishery exploitation rate to prevailing oceanic conditions.

International management agreements are still needed to ensure the future stability of this trans-boundary resource, which is now fully utilized through the combined harvest of México, the U.S., and Canada. In the meantime, international scientific collaboration has been nurtured through the Trinational Sardine Forum, which has met annually since the year 2000. The goal of the proceeding joint CalCOFI-Trinational Sardine Forum Sardine Symposium was to highlight results from the latest sardine research and provide a venue for open discussion about the present and future status of the sardine resource.

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