

Part I

REPORTS, REVIEW, AND PUBLICATIONS

REPORT OF THE CALCOFI COMMITTEE

The CalCOFI agencies continued their collaborative investigations of marine systems. Serious budget shortfalls in 1990 impacted programs, particularly for CalCOFI's state organizations. In dealing with current fiscal constraints, we gave top priority to continuing oceanographic and fisheries measurements in the California Current. All four quarterly CalCOFI cruises surveying the southern California sector of the California Current were completed. Maintaining the seagoing time series, for which the CalCOFI program is world famous, is especially critical in view of the emerging importance of global change.

The sardine resource continued to recover, and the CalCOFI agencies continued to monitor its status. At a sardine management workshop involving state, federal, industrial, and Mexican federal biologists, various sources of information, including data from aerial surveys (fish school spotters) and CalCOFI surveys, led participants to conclude that the spawning biomass had increased to about 100,000 tons, a level similar to that of the early 1960s. A draft policy for sardine management during recovery and postrecovery phases was outlined. As a result of this information, the California Department of Fish and Game (CDFG) opened a 2,499-ton fishery quota on January 1, 1991; the southern allocation (1,666 tons) was landed in two days, completing the shortest season to date. This was the first time the quota had been increased above 1,000 tons since sardine fishing was reopened in 1986. A reexamination of the workshop information led to a second quota increase and a total 1991 quota of 6,150 tons. The 2,434 tons added to the southern allocation were landed in four 24-hour fishing periods.

A 30-day sardine egg survey was conducted to assess the spawning biomass and trends in sardine abundance. No other cruises were conducted by the CDFG because of budget constraints.

The annual groundfish survey was conducted off the coast of Oregon in January and February to define the offshore limits and distribution of sablefish eggs, to relate sablefish egg distribution to oceanographic features, and to determine the feasibility of estimating sablefish biomass by the egg production

method. It was determined that a successful egg production survey for sablefish off Washington and Oregon would have to extend seaward at least 200 nautical miles, and would require a vessel capable of sampling in heavy seas. Additional groundfish work included a larval production assessment survey, age and stock assessment of thornyheads, and assessment of juvenile rockfish recruitment. We continue to use the CalCOFI collections to describe early life stages and life strategies of various groundfish species.

We used 1990 CalCOFI collections of anchovy eggs and larvae to estimate daily egg production, which was incorporated into a stock synthesis estimate of anchovy spawning biomass. Results indicated that the biomass was greater in 1990 than in 1989. Efforts to improve the stock synthesis estimates continue: in 1990 we confirmed that including aerial survey data yields more precise spawning biomass estimates for anchovy. National Marine Fisheries Service (NMFS) and CDFG scientists revised an amendment to the anchovy Fishery Management Plan to include a description of anchovy habitat, an analysis of how anchovy management affects vessel safety, and a definition of overfishing.

On the quarterly CalCOFI cruises, we have begun comparing data collected with a newly purchased CTD (with a rosette for water bottles) and data from the standard hydrographic casts, with the intent of shifting entirely to the CTD. Also, data on temperature, salinity, and chlorophyll are now collected electronically from the seawater system while the vessel is under way. An acoustic Doppler current profiler, which allows measurements of zooplankton volume and current speed, depth, and direction, was installed on the *David Starr Jordan*. Data are summarized once per minute while the vessel is under way, resulting in a complete profile averaged over 300 meters. A 1-m² multiple opening/closing net environmental sampling system (MOCNESS), which will be used for Dover sole egg production surveys, was purchased. Studies on how continental slope fishes adapt physiologically to the oxygen minimum zone, and on the genetic differences among groundfish stocks and other marine species

will be conducted at a new NMFS physiology-genetics laboratory in La Jolla. The CDFG 80-ft RV *Mako* was added to the CalCOFI fleet in July, but is not expected to be fully staffed and operational until the beginning of 1992. With the addition of the *Mako*, the CDFG will regain the ability to do offshore work, which was lost with the sale of the RV *Alaska* in 1980.

International cooperation remained an important aspect of CalCOFI. At the fourth annual meeting of MEXUS-Pacifico, the focus of our cooperative fisheries research agreement was expanded to include work on marine mammals and sea turtles. We continued our routine exchange of fisheries and biological data; in the future we plan to share additional information, including data from CalCOFI, aerial, and Scripps Pier temperature surveys. A second workshop on aging pelagic fishes was held in Ensenada, Baja California. CalCOFI continued to support the Spanish-Portuguese Sardine Anchovy Recruitment Program (SARP). We assisted with the application of egg production technology, and enjoyed a visit by a SARP scientist. Also, plans were made for a cooperative NMFS-Soviet cruise in 1991 to collect information about the reproduction of jack mackerel.

In 1990 the CalCOFI Conference was held at Asilomar Conference Center in Pacific Grove for the first time. As we had hoped, more scientists and students from northern locations attended. In the future, we plan to alternate the location of our annual conferences between the south and the north. The conference symposium focused on a wide range of recent and developing applications of oceanography to fisheries problems. Some of the papers from that symposium are printed in this volume.

The Committee wishes to acknowledge the recent retirement of Herbert W. Frey from the CDFG. Amid his accomplishments and responsibilities over the last three decades, Herb found time to serve

CalCOFI as coordinator, *Reports* editor, and committee member. He also served as an executive secretary for the Marine Resources Committee, which was established by the same legislation that provided the initial funding for the California Cooperative Sardine Research Program, the forerunner of CalCOFI. We wish Herb a long and busy retirement.

Many thanks to the officers and crews who help us with our work on the University of California RV *New Horizon*, the National Oceanic and Atmospheric Administration ship *David Starr Jordan*, and the Southern California Ocean Studies Consortium RV *Yellowfin*. The Committee also wishes to thank everyone who contributed to Volume 32 of *CalCOFI Reports*: editor Julie Olfe for her patient assistance, gracious accommodation of numerous delays—which were beyond her control—in the manuscript process, and diligent efforts to keep publication of the *Reports* on track in spite of a changing schedule; Spanish editor Maria Vernet; George Hemingway for technical assistance at the conference; Mary Larson and Diana Watters for assistance with conference registration; and Coordinator Patricia Wolf. The reviewers and editorial consultants for this volume were Larry Allen, Dan Anderson, William Balch, George Boehlert, Edward Brinton, Mark Carr, David Checkley, Calvin Chun, Jeff Cross, John Cullen, Edward DeMartini, Thomas Hayward, Michael Horn, John Hunter, Larry Jacobson, Richard Klingbeil, Sharon Kramer, Ralph Larson, Alec MacCall, Kathleen Matthews, Richard Parrish, William Percy, Stephen Ralston, Jeff Runge, Donald Schultze, Paul Smith, Erik Thuesen, and Elizabeth Venrick.

The CalCOFI Committee:
Izadore Barrett
Richard Klingbeil
Michael Mullin