Part I

REPORTS, REVIEW, AND PUBLICATIONS

REPORT OF THE CALCOFI COMMITTEE

The year 1998 marks 49 years of CalCOFI's multidisciplinary work in the California Current. In addition, 1998 has been declared by the United Nations and by President Clinton as "The Year of the Ocean." The importance of the oceans to the U.S. economy is underscored by Secretary of Commerce William M. Daley's comment that "One of every six jobs in the U.S. is marine related, and one third of the nation's gross national product is produced in coastal areas through fishing, transportation, and recreation" (Baker 1998).

To CalCOFI researchers, the economic impact of changes in the availability of coastal resources looms large, since CalCOFI was born out of California's policy response to the decline of the sardine fishery (Burnette et al. 1950). For almost five decades federal, state, and University of California scientists and managers, and their many partners, have amassed a formidable array of data related to the biology, physics, chemistry, geology, and atmospheric interactions of the California Current region and its fishes and other living resources. It is hoped that such data will allow us to predict events, or to mitigate the probable results of events that may affect our society and economy.

One such well-known and episodic phenomenon is that known as El Niño. CalCOFI dedicated its 1958 conference to the El Niño of 1956–58 and, at that meeting, began to seriously examine the hemispheric and global oceanic and atmospheric connections implied by the data presented (Sette and Isaacs 1960). The advent of climate and ocean-atmosphere-interaction studies at the Scripps Institution of Oceanography was one direct result of that conference. Subsequent El Niño events have captured the attention of CalCOFI researchers, as well as agencies of the state and federal governments. The forecast that a major California El Niño would appear in the winter of 1997–98, indicated by developments along the equator, stimulated interest in increasing the temporal coverage of the event. Assisted by enhanced funding from NOAA, CalCOFI augmented its quarterly cruises with shorter cruises every month during 1998. Thanks to many hours at sea by CalCOFI staff, this El Niño event will probably be the best documented to this time in history, providing data for correlative studies of processes and for testing models. Continuous underway monitoring of near-surface properties, including fish eggs, provided much more detailed data on mesoscale distributions than was previously available. A presentation of early results may be seen in the paper by Lynn et al. in this volume.

El Niño was not the only phenomenon requiring additional effort in 1997–98. There was considerable interest in mapping the northward expansion of the California sardine. As a result, the quarterly CalCOFI cruises were extended northward to Monterey Bay, reestablishing the time series of physical and ecological data which had been terminated in 1984 for that region. These surveys and the development of small fisheries off Oregon, Washington, and British Columbia show that the population has increased and the distribution has extended northward, beyond the historically sampled CalCOFI grid. As a result, SWFSC and CDFG biologists have developed a crude and speculative stock-assessment model that suggests a coastwide sardine biomass of 570,000 metric tons.

A new program of ocean monitoring off Baja California, Mexico (fig. 1), was initiated in September 1997 by a consortium of seven Mexican institutions. Mexican and U.S. marine scientists have long called for the reactivation of the sampling plan off Baja California (Hayward 1996), abandoned in the 1980s by CalCOFI because of lack of funds. This program is known by the acronym IMECOCAL (Investigaciones Mexicanas de la Corriente de California). The IMECOCAL cruises are coordinated closely with CalCOFI cruises to provide an integrated description of the pelagic ecosystem (see paper by Lynn et al. in this volume). The core observations at each station include a CTD and rosette cast to measure temperature and salinity and to collect water from 10-liter sampling bottles for analysis of salinity, dissolved oxygen, nutrient chemistry, phytoplankton counts, and the pigments chlorophyll a and phaeophytin. Oblique net tows (505-micrometer mesh) are taken: one cod end is used to estimate zooplankton biomass and the other to estimate ichthyoplankton abundance. Continuous, underway measurements of near-surface temperature, salinity, and chlorophyll fluorescence are taken from water pumped through the ship's hull. An acoustic Doppler current profiler (ADCP) is operated continuously between stations.

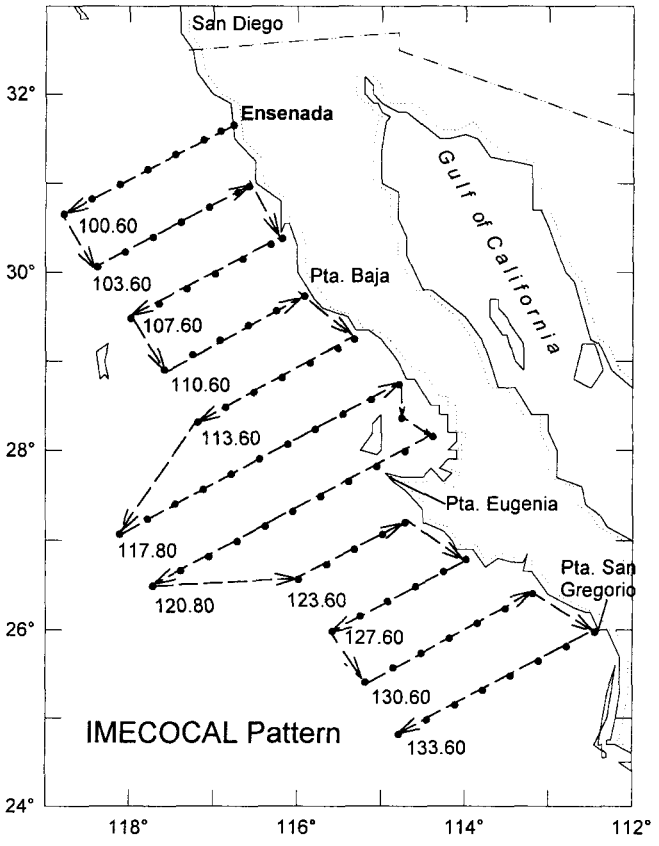

Figure 1. The IMECOCAL cruise pattern, established in 1997.

The market squid (*Loligo opalescens*) became California's most valuable marine resource in 1997, with reported landings valued at $30 million. As a result, the symposium of the 1997 CalCOFI Conference dealt with the biology, economics, and public policy assessment of the market squid. This symposium was cosponsored by CalCOFI, the California Seafood Council, and the Channel Islands National Marine Sanctuary. Workshops in the evenings of the conference brought together fishers, packers, union representatives, policy analysts, and scientists. Subsequently, CDFG and SWFSC completed a research plan for the market squid, and began a joint research program that focuses on the measurement of age, growth, longevity, fecundity, reproductive effort, and the integration of this information into a management strategy.

For several years, scientists of the SWFSC have been investigating the relation between climate variability, solar ultraviolet radiation, and the survival of pelagic fish eggs and larvae. They have discovered that, on days with clear skies, low winds, little mixing, and clear water, ultraviolet light is lethal to northern anchovy larvae to a depth of one meter, and causes measurable damage to DNA of larvae living as deep as 20 m. Scientists at the SWFSC and UC Santa Barbara are modeling the prevalence of such "bad days" in order to evaluate what proportion of total mortality is attributable to UV-induced mortality.

Catches of nearshore, rocky-reef fishes for the live-fish restaurant trade are increasing rapidly, and live fish command a high price. Little is known of the abundance, recruitment, and productivity of these species, and local stocks may have already been depleted in some regions. The SWFSC and CDFG have begun genetic studies of stock structure in nearshore rockfishes (*Sebastes*) to determine how much recruitment depends either on local production of larvae or on larval dispersion from genetically mixed populations located along the entire coast.

Director Jacqueline E. Schafer of the CDFG has announced plans to create a Marine Region with headquarters at Monterey Bay. This action is intended to emphasize the Department's commitment to safeguarding the state's complex and diverse marine ecosystems. The new Marine Region will coordinate policy implementation for all CDFG marine and maritime activities, expand local CDFG services to the public, and seek legislation to protect emergent fisheries.

The CalCOFI Committee extends its thanks to the many reviewers who gave so graciously of their time and expertise in critiquing the manuscripts published in this volume: Johann Augustyn, Barney Balch, Jay Barlow, Tom Barnes, Jon Brodziak, Steven Cadrin, Francisco Chavez, Earl Dawe, Lara Ferry-Graham, Stuart Helleren, George Hemingway, Raleigh Hood, Larry Jacobson, Bob Lavenberg, Beverly Macewicz, Greg Mitchell, Dick Parrish, Steve Ralston, Richard Sears, Ray Smith, Cindy Thomson, Chuck Trees, and Michael Vecchione. The Committee also thanks editor Julie Olfe for her excellent, careful editing of the manuscripts. We are very grateful for the support the directors of the SWFSC and the Scripps Institution for their help in securing additional ship-days and funding for the spatial extensions and temporal infill of the cruise patterns. Special thanks is extended to the officers and crews of the NOAA ship *David Starr Jordan*, the CDFG R/V *Mako*, the UCSD R/V *New Horizon*, and the UCSD R/V *Ellen B. Scripps* for their professional conduct of marine operations in support of CalCOFI's field research and monitoring of the California Current. We also thank the California Seafood Council and the Channel Islands National Marine Sanctuary for their contributions to the 1997 annual conference and to the publication of the symposium section of this volume.

Editor Julie Olfe offers particular thanks to two additional publications experts. Simone Llerandi has been typesetting *CalCOFI Reports* since 1985. Back then she worked at Thompson Type, and typed in every word of every paper. Now freelancing, she handles the disks and enters corrections to edited papers. But she still types the tables from scratch. Her work has been truly excellent for all these years. Designer and production expert

Barry Age took over from Sharon Tallman in 1994. Since then he has eased our transition into the computer age by making sure that each of the various disks we receive can be used, and by scanning in and placing many challenging pieces of art. His commitment to good design is obvious on every page of this book. The reliable dedication of these professionals helps make it possible for *CalCOFI Reports* to appear on schedule each year.

Portions of the *CalCOFI Reports*, as well as extensive data archives, calendars of operations, maps of cruise tracks, animations, links to cooperating agencies, and general information about CalCOFI are available online at *www-mlrg.ucsd.edu/calcofi.html.*

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