

Part I

REPORTS, REVIEW, AND PUBLICATIONS

REPORT OF THE CALCOFI COMMITTEE

Fifty years of collaborative research in CalCOFI were celebrated at the annual CalCOFI meeting held at the Scripps Institution of Oceanography in La Jolla. The meeting included introductory comments by Charles Kennel, director of the Scripps Institution of Oceanography (SIO); Robert Hight, director of the California Department of Fish and Game (CDFG); and Rod McInnis, acting regional director, National Marine Fisheries Service (NMFS) Southwest Region. There was a special presentation of formal commendation from the California assembly. In celebration of the anniversary, the director of SIO hosted a reception at the Birch Aquarium. The conference attracted a record attendance for recent years.

At the conference, the CalCOFI Committee gratefully acknowledged the long-time service of Coordinator George Hemingway, who has retired from the position. George served CalCOFI in various capacities for 33 years, and was engaged in aspects of producing *CalCOFI Reports* and hosting the annual meeting for 20 years. He was the first CalCOFI coordinator and managing editor after the sunset of the enabling law for the Marine Research Committee of the state of California, replacing Herb Frey of CDFG. The CalCOFI Committee has appointed Kevin Hill of CDFG as the new coordinator. Thank you, George, for your many years of dedicated service!

The quarterly CalCOFI sampling program continued as planned in 2000. Additional northern stations, crucial for annual Pacific sardine assessments, were sampled during R/V *Jordan* cruise 0004. Much was accomplished in 1999 and 2000 with respect to processing and distributing CalCOFI data. Dissemination of CalCOFI products was enhanced by the completion of a CD-ROM containing data, information, and software. The CD-ROM presents the Web site's content in browsable (offline) form. CalCOFI data, hydrographic and productivity reports, as well as general and personnel information are included. The IEH data archives are retrievable by any application, especially software designed specifically for IEH processing. Software (Windows9x/NT) developed for extracting data, developing a database, and calculating climatological anomalies from IEH data are included.

The arduous task of identifying the backlog of CalCOFI ichthyoplankton samples was completed, and the database was revised in collaboration with Richard Charter (NMFS) and his staff. Ichthyoplankton and station data for 14 annual surveys (1985–98) were published as an NMFS Technical Memorandum series, authored by NMFS scientists David Ambrose, Sharon Charter, Elaine Sandknop, William Watson, and others. Ichthyoplankton data reports are now available for all cruises from 1951 to 1998.

Identification of larvae from selected rockfish species archived in the CalCOFI ichthyoplankton collection was also completed. Continuous time series were constructed for four species (*Sebastes paucispinis*, *S. levis*, *S. jordani*, and *S. aurora*), and partial time series were completed for two species (*S. diploproa* and *S. goodei*). The study was presented by Geoffrey Moser at the annual CalCOFI Conference in November 1999 and is published in this volume. The newly available time series for *S. levis*, the cowcod, has already proved valuable for population assessment and management of that species. Cowcod has been overfished, and a plan for rebuilding the stock is being formulated. Data on *S. paucispinis* (bocaccio) larvae from CalCOFI surveys will be an important component of future assessments and management strategies for this overexploited species.

Significant progress has been made toward producing CalCOFI Atlas number 34. Similar in design to Atlas 31, Atlas 34 will summarize the distribution and abundance of CalCOFI fish larvae for the entire time series from 1951 to 1998. The area covered is the Southern California Bight, the area bounded by the current sampling pattern. Geoffrey Moser, Richard Charter, and coauthors will complete work on this project in 2000.

CalCOFI oceanographic and ichthyoplankton data have been used to characterize larval fish survivors' habitat. Paul Smith and Elizabeth Logerwell have separated the embryonic and larval phases of the life cycle of anchovy, sardine, and hake into two categories. In the first category, the distribution pattern is a residual of the spawning adult pattern as modified by dispersal and survival. In the second category, the distribution pattern is one of survival as modified by larval swimming behavior and the onset of schooling or other aggregation.

Following a survey of the measured larvae of all three species, Logerwell has continued studies of sardine larvae which show that disproportionate numbers of large larvae are offshore of the main spawning areas. Until now this has been interpreted as expatriation of the planktonic stage. It may well be that the offshore habitat is important to the occasional augmented recruitment we find in sardine, rather than a disadvantage.

Through the Pacific Fisheries Management Council (PFMC), the CDFG and NMFS were extensively involved in managing West Coast fisheries, including salmon, groundfish, and coastal pelagics (Pacific sardine, Pacific mackerel, jack mackerel, northern anchovy, and market squid). The Coastal Pelagic Species Fishery Management Plan (CPS FMP) Amendment 8 was approved and implemented in January 2000. Harvest guidelines were established for Pacific sardines (186,000 metric tons) and Pacific mackerel (20,740 t). Several items in the plan were disapproved by NMFS, and PFMC teams are amending it to address (1) provisions to better describe bycatch in the CPS fishery; (2) maximum sustainable yield and acceptable biological catch for market squid; (3) capacity goals and permit transfer rules for the limited entry fishery; and (4) tribal fishing rights. CalCOFI egg and larval sampling continue to play a critical role in the monitoring and managing of coastal pelagic species.

The CDFG continued research on market squid and began developing an FMP. To support this work, three research cruises were conducted with a remotely operated vehicle and scuba divers. The research focused on egg-case deposition transects to identify spawning areas and enumerate density. In addition, a midwater trawl survey conducted aboard R/V *Mako* in February 2000 continued a relative-abundance time series for squid that was initiated during CDFG's sea surveys in the 1960s. The data will be incorporated with early life history, ageing, and fecundity studies to develop management scenarios for presentation to the state legislature by 1 April 2001.

During 1999, CDFG began implementing the Marine Life Management Act, the flagship of change in California management of marine resources. The legislation directed CDFG to begin preparing FMPs for all fisheries under state authority, and specified the order of preparation. The legislation also requires CDFG to enhance the procedure for involving constituents in the process, and moves management authority from the legislature to the California Fish and Game Commission. The commission has five members appointed by the governor and confirmed by the state senate. The first plans in preparation are for nearshore fisheries and white seabass.

The NMFS Marine Ecological Reserves Research Program (MERRP) study of planktonic fish egg and larvae production in nearshore waters has continued in

2000. The four southern California reserve sites include Big Sycamore Canyon and Vandenberg Marine Ecological Reserves, administered by the state of California, and Anacapa and San Miguel Islands, which are part of the Channel Islands National Marine Sanctuary. The fortuitous timing of the study included winter and summer surveys during the 1998 El Niño and the 1999 La Niña. Year 2000 is devoted to analyzing the ichthyoplankton data and completing side-scan habitat mapping of the four study sites.

Fieldwork for the final year of the MERRP program was completed during two cruises in 1999. Intensive fine-scale ichthyoplankton sampling was carried out at the four research sites. A total of 1,849 samples were taken with the continuous underway fish egg sampler (CUFES) during the two cruises. Vertical bongo tows were taken for the purpose of calibrating the CUFES samples and to capture fish larvae. Manta net and MOCNESS samples were taken on each cruise to provide information on the density of fish eggs and larvae at the surface and in the water column. The cruises also included a diving program to measure habitat variables and collect adult and juvenile rockfishes. Results from the first year of the MERRP ichthyoplankton program were published in *CalCOFI Reports*, volume 40 (Watson et al.).

The rockfish genetics program has completed sequencing the cytochrome b gene of almost all of the more than 70 species of rockfishes that occur along the west coast of North America. This study has opened a new window of interesting research collaboration between the genetics group and the ichthyoplankton survey portion of the CalCOFI program. It is now possible to identify almost all of the rockfish larvae encountered in the CalCOFI surveys. Currently, NMFS is examining the occurrence of previously unidentifiable nearshore rockfish larvae in CalCOFI's standard bongo survey samples. For the past several years CalCOFI material collected in the second net of the bongo has been preserved in ethanol, making it suitable for DNA analysis. If suitable visual characters can be determined for unknown but genetically identified material, it may be possible to reconstruct historical trends in the abundance of species or subgenera and estimate historical abundance of these presently nearshore species.

The NMFS genetics group has also been examining population genetic structure in nearshore rockfishes. These studies are beginning to reveal significant intraspecific genetic differences between northern, central, and southern California. These differences are almost certainly due to oceanographic barriers to larval dispersal (e.g., coastal jets and eddies). It is hoped that these genetic studies can give insights into long-term dispersal patterns along the California coast.

Within the Marine Life Research Group (MLRG), and in SIO at large, efforts to establish a CalCOFI-like collaboration between university, federal, and state agencies, as well as other entities interested in California's coastal zone, have increased considerably. Although many of the tools of investigation, and the scientific and resource management questions addressed, will differ from those of CalCOFI, the purpose is to establish a framework to emulate the remarkable success of CalCOFI as a continuing collaboration. Such a framework would serve as an important nucleus for establishing a still larger coastal observing system.

The seagoing personnel of SIO's MLRG, the SWFSC's Coastal Division, and CDFG's Marine Region all contributed, through their dedication and diligence, to the success of CalCOFI's quarterly fieldwork. The CalCOFI Committee thanks the officers and crews of the research vessels that have served us well as platforms for our observations during the past year: the NOAA Ship *David*

Starr Jordan; the University of California R/Vs *New Horizon*, *Roger Revelle*, and *Robert Gordon Sproul*; and the CDFG R/V *Mako*.

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