

Part 1

REPORTS, REVIEW, AND PUBLICATIONS

REPORT OF THE CALCOFI COMMITTEE

Now in its forty-fifth year of service to the state of California and to the community of scholars worldwide, the California Cooperative Oceanic Fisheries Investigations is pleased to be able to offer the largest-scale long-term data suite from any ocean ecosystem in the world. Thousands of horizontal and vertical profiles of physical, chemical, and biological variables, as well as the discrete data from which they were assembled, are published in hard-copy data reports of the Scripps Institution of Oceanography (SIO) Reference Series and are now available on-line via telnet to **nemo.ucsd.edu**; username: **info**. Typical of the kinds of syntheses that depend upon such a data suite is the paper by Hernández-Vázquez in this volume.

Anomalously warm temperatures have continued over much of the southern California sector of the California Current System, presenting further opportunities to study how large-scale variations in the ocean's climate affect marine life, from single-celled phytoplankton to marine birds and mammals. The report by Hayward et al. in this volume describes some of these oceanographic events. The electronic collection of environmental data has become standard on CalCOFI quarterly survey cruises: researchers measure surface properties while the ship is under way and assemble vertical profiles by using the CTD rosette at each station. We continue to benefit from the cooperation of non-CalCOFI scientists on the cruises, especially for bio-optical measurements in preparation for the launching of the next generation of satellite sensors for plant pigments, and for testing, in cooperation with personnel of the Woods Hole Oceanographic Institution, of a free-falling, fast-profiling instrument called the Fast Fish.

Sardine spawning biomass was estimated at the fourth and fifth annual Pacific Sardine Resource Assessment and Management workshops. Because estimates declined from 374,200 MT in 1991 to 71,700 MT in 1993, the recovery of the sardine resource appears to have slowed or leveled off. Factors contributing to this change may include environmental perturbations, excessive harvest, or natural fluctuations in abundance. It is clearly vital to both U.S. and Mexican interests that the sardine resource recover and that rational management models be elaborated, based on the best possible estimates of the

condition of the population. In order to improve the accuracy of future estimates, scientists from the Southwest Fisheries Science Center (NMFS/SWFSC), the California Department of Fish and Game (CDFG), and the Mexican Secretariat of Fisheries (SEPESCA), using five research vessels—*McArthur*, *David Starr Jordan*, and *Mako* (U.S. vessels); *El Puma* and *BIP XII* (Mexican vessels)—initiated daily egg production method cruises ranging from San Francisco, California, to Punta Abreojos, Baja California Sur, in April of 1994. It is hoped that careful management will ensure the continued recovery of the resource.

The Coastal Pelagic Fisheries Management Plan was tabled indefinitely by the Pacific Marine Fisheries Commission (PMFC). Thus CDFG retains management responsibility, and plans to hold meetings for the purpose of streamlining quota-setting procedures for the fishery.

In addition to the sardine biomass cruises, 1993 activities aboard the R/V *Mako* included:

1. "Swept area" trawls to assess halibut stocks and to evaluate the effects of the recent gill net fishing closure (Proposition 132) within California waters south of Point Arguello
2. Diving assessments for withering syndrome in southern California abalone populations
3. Continued shark longline sampling and tagging studies with NMFS
4. Live-fish trapping to assess effects of the fishery on sheephead and to determine bycatch
5. Nearshore trawls to determine critical habitat for some marine sportfish including halibut, kelp bass, sand bass, croaker, surfperch, and corbina.

The SWFSC started a new project this year to evaluate the use of airborne lasers (lidar) for detecting and estimating the biomass of epipelagic schooling fishes—mackerel, sardine, anchovy, and others. A workshop has been held, and several cruises are planned.

Coastal Division scientists, in cooperation with the SWFSC Tiburon Laboratory, NOAA's National Undersea Research Program, and the Monterey Bay Aquarium Research Institute, continue to develop technology and procedures for using remotely operated underwater vehicles to estimate abundance of fish stocks. Traditional

swept-area methods may underestimate biomass in many cases. These studies are intended to develop new, cost-effective means for measuring biomass, to provide information about ecology of the slope community, and to improve trawl-based biomass estimates.

A new approach to measuring Dover sole biomass using egg and larval survey data was published in 1993. A paper dealing with a similar approach for estimating sablefish biomass is published in this volume.

The SWFSC's Coastal Division has conducted three FORAGE Program cruises in cooperation with Oregon State University to investigate how oceanographic processes affect groundfish recruitment. The cruises involved detailed measurements of oceanographic and biological variables stratified by area, depth, and season.

Several projects designed to improve management of thornyhead (*Sebastolobus* sp.) stocks are under way. The first project—a joint effort of scientists at SIO, Moss Landing Marine Laboratory, and the University of Hawaii—involves using radioisotope ratios to validate criteria used to age shortspine and longspine thornyhead. Coastal Division personnel are also participating in an effort by the Alaska Fisheries Science Center to update assessments for shortspine and longspine thornyheads north of Point Conception.

The molecular genetics project has focused on long- and shortspine thornyhead, but Dover sole and sablefish have also been sequenced. Mitochondrial DNA sequences from populations of thornyhead from Alaska, Oregon, and five sites in California have now been sequenced. The data show a high degree of site-specific variation, which indicates less mixing of populations than originally anticipated. The results suggest that, even though both thornyhead species have protracted larval and juvenile stages of longer than one year, they are retained to some degree in their natal regions. New genetic studies of rockfish (*Sebastes*) are being initiated in three areas: (1) determination of phylogenetic relationships among species, (2) development of genetic techniques for identifying eggs and early-stage larvae not identifiable by other means (by amplification and sequencing of larval DNA followed by comparison to adult sequences from phylogenetic studies), and (3) analysis of rockfish population structure based on microsatellite DNA allele frequencies. The symposium of the 1993 CalCOFI Conference, on the topic of the genetics of the fauna of the California Current, is published in this volume.

The CalCOFI Committee is pleased to announce the

publication this year of CalCOFI Atlas 32, *Distributional Atlas of Fish Larvae and Eggs in the California Current Region: Taxa with Less than 1000 Total Larvae, 1951 through 1984*, by Geoff Moser and his team. We also look forward to the publication next year of CalCOFI Atlas 33, an identification guide to the eggs, larvae, and juveniles of about 500 species of fishes of the California Current region. The illustrations alone would make this work a classic, but the Moser team will also provide textual descriptions of the stages as well as morphometric, meristic, and life-history data for each species. The volumes will be hardbound for durability and Smyth-stitched to lie flat for bench use. Prepublication offerings will be announced early in 1995 for a hoped-for midyear press run.

The Committee thanks the officers and crews of the state of California vessel *Mako*, the NOAA ships *David Starr Jordan* and *McArthur*, and the University of California ship *New Horizon* for their continued support of the CalCOFI research program, and the Secretaría de Pesca, Government of Mexico, for its long-standing collegiality and cooperation. The Committee and the coordinator especially thank all those reviewers whose gift of time and thought has enriched the scientific community and served both the authors and the readers of this volume: Anne Hollowed, Robert Cowan, Nancy Lo, George Hunt, Elizabeth Venrick, Freda Reid, Teresa Chereskin, Loren Haury, Gregor Caillet, Doyle Hanan, Kurt Schaefer, William Lenarz, Steve Ralston, Jon Shenker, Larry Jacobson, Alec MacCall, Michael Domeier, Tim Barnett, Jon Govoni, Rick Methot, Irv Kornfield, Stewart Grant, Susan Picquelle, Stewart Hurlbert, John Butler, Lou Botsford, and George Hemingway. And finally, we thank the editor of *CalCOFI Reports*, Julie Olfe, and the Spanish language editor, Jesús Pineda.

The Committee notes the retirement of George Hemingway, long-time assistant to the director of MLRG and CalCOFI coordinator during several terms, including that at the time of his retirement. The Committee is grateful for his dedication to CalCOFI and for his skill at furthering its activities and purposes, and is very pleased that he has agreed to be recalled to active duty so that he may continue as coordinator. Thomas Hayward has been appointed academic administrator in MLRG to continue organizing the very successful research program that Mr. Hemingway has shepherded for so many years.