

CALIFORNIA
COOPERATIVE
OCEANIC
FISHERIES
INVESTIGATIONS

Reports

VOLUME 37
January 1 to December 31, 1995

Cooperating Agencies:

CALIFORNIA DEPARTMENT OF FISH AND GAME
UNIVERSITY OF CALIFORNIA, SCRIPPS INSTITUTION OF OCEANOGRAPHY
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL MARINE FISHERIES SERVICE

CALCOFI COORDINATOR George Hemingway

EDITOR Julie Olfe

This report is not copyrighted, except where otherwise indicated, and may be reproduced in other publications provided credit is given to the California Cooperative Oceanic Fisheries Investigations and to the author(s). Inquiries concerning this report should be addressed to CalCOFI Coordinator, University of California, San Diego, Marine Life Research Group, Scripps Institution of Oceanography, 9500 Gilman Drive, La Jolla, CA 92093-0227.

EDITORIAL BOARD

**Doyle Hanan
Michael Mullin
Michael Tillman**

***Published October 1996, La Jolla, California
ISSN 0575-3317***

CONTENTS

I. Reports, Review, and Publications	
Report of the CalCOFI Committee	5
Review of Some California Fisheries for 1995	7
The State of the California Current in 1995–1996: Continuing Declines in Macrozooplankton Biomass during a Period of Nearly Normal Circulation. <i>Thomas L. Hayward, Sherry L. Cummings, Daniel R. Cayán, Francisco P. Chavez, Ronald J. Lynn, Arnold W. Mantyla, Pearn P. Niiler, Franklin B. Schwing, Richard R. Veit, and Elizabeth L. Venrick</i>	22
Publications	38
II. Symposia of the CalCOFI Conference, 1995	
INTERDECADAL CHANGES IN THE ECOLOGY OF THE CALIFORNIA CURRENT: EVIDENCE AND POSSIBLE MECHANISMS	39
Long-Term Change in the North Pacific Ocean: A Consideration of Some Important Issues. <i>Thomas L. Hayward</i>	41
Plankton Patterns, Climate, and Change in the California Current. <i>John A. McGowan, Dudley B. Chelton, and Alessandra Conversi</i>	45
Recent Advances in California Current Modeling: Decadal and Interannual Thermocline Variations. <i>Arthur J. Miller</i>	69
Interannual Variations in Zooplankton Biomass in the Gulf of Alaska, and Covariation with California Current Zooplankton Biomass. <i>Richard D. Brodeur, Bruce W. Frost, Steven R. Hare, Robert C. Francis, and W. James Ingraham Jr.</i>	80
Patterns of Low-Frequency Variability in Fish Populations of the California Current. <i>Alec D. MacCall</i>	100
Is There Evidence for Long-Term Climatic Change in Southern California Kelp Forests? <i>Mia J. Tegner, Paul K. Dayton, Peter B. Edwards, and Kristin L. Riser</i>	111
SARDINE SYMPOSIUM	127
The 1994 Mexico–U.S. Spawning Biomass Survey for Pacific Sardine (<i>Sardinops sagax</i>) and the 1995 CalCOFI Sardine Symposium. <i>Pablo R. Arenas, John R. Hunter, and Larry D. Jacobson</i>	129
A High-Speed Midwater Rope Trawl for Collecting Coastal Pelagic Fishes. <i>Ronald C. Dotson and David A. Griffith</i>	134
Adult Reproductive Parameters of Pacific Sardine (<i>Sardinops sagax</i>) during 1994. <i>Beverly J. Macewicz, José Julián Castro-González, Celia Eva Cotero-Altamirano, and J. Roe Hunter</i>	140
Age Composition, Growth, and Maturation of the Pacific Sardine (<i>Sardinops sagax</i>) during 1994. <i>John L. Butler, María Luisa Granados G., J. Thomas Barnes, Marci Yaremko, and Beverly J. Macewicz</i>	152
Egg Production and Spawning Biomass of Pacific Sardine (<i>Sardinops sagax</i>) in 1994, Determined by the Daily Egg Production Method. <i>Nancy C. H. Lo, Yanira A. Green Ruiz, Mercedes J. Cervantes, H. Geoffrey Moser, and Ronald J. Lynn</i>	160
Catch-at-Age Analysis for Pacific Sardine (<i>Sardinops sagax</i>), 1983–1995. <i>Richard B. Deriso, J. Thomas Barnes, Larry D. Jacobson, and Pablo R. Arenas</i>	175
The Sardine Fishery along the Western Coast of Baja California, 1981 to 1994. <i>Roberto Félix-Uraga, Reyna Ma. Alvarado-Castillo, and Roberto Carmona-Piña</i>	188
Egg Production of Pacific Sardine (<i>Sardinops sagax</i>) off Oregon in 1994. <i>Paul J. Bentley, Robert L. Emmett, Nancy C. H. Lo, and H. Geoffrey Moser</i>	193
Modeling Deterministic Effects of Age Structure, Density Dependence, Environmental Forcing, and Fishing on the Population Dynamics of <i>Sardinops sagax caeruleus</i> in the Gulf of California. <i>Miguel A. Cisneros-Mata, Gabriela Montemayor-López, and Manuel O. Nevárez-Martínez</i>	201
III. Scientific Contributions	
Demersal Fish Trawls off Palos Verdes, Southern California, 1973–1993. <i>Janet K. Stull and Chi-Li Tang</i>	211
Relationship between Deep Chlorophyll Maximum and Surface Chlorophyll Concentration in the California Current System. <i>Roberto Millán-Núñez, Saúl Alvarez-Borrego, and Charles C. Trees</i>	241
Filtering Apparatus and Feeding of the Pacific Mackerel (<i>Scomber japonicus</i>) in the Gulf of California. <i>Raúl E. Molina, Fernando A. Maurique, and Héctor E. Velasco</i>	251
Annual Variability of Ocean Currents at 350-m Depth over the Continental Slope off Point Sur, California. <i>Curtis A. Collins, Robert G. Paquette, and Steven R. Ramp</i>	257
Instructions to Authors	264
CalCOFI Basic Station Plan	inside back cover

Indexed in *Current Contents*. Abstracted in *Aquatic Sciences and Fisheries Abstracts* and *Oceanic Abstracts*.