Part II

# SYMPOSIA OF THE CALCOFI CONFERENCE

## Lake Arrowhead Conference Center
## October 31 and November 1, 1995

## INTERDECADAL CHANGES IN THE ECOLOGY OF THE CALIFORNIA CURRENT: EVIDENCE AND POSSIBLE MECHANISMS

The CalCOFI program was initiated as a result of major change in the California Current—the decline of California's sardine fishery. The detection, description, and understanding of ecological change, including ultimate and proximate causes and implications, have remained central to CalCOFI's research. For example, the 1994 symposium, "The 1991–92 El Niño and Its Impact on Fisheries," emphasized interannual variation.

The present symposium was stimulated by a publication, based on data collected by CalCOFI since its inception, in which major decline in the biomass of macrozooplankton in the southern California sector of the California Current was described, together with an interdecadal rise in seawater temperature (Roemmich and McGowan 1995a, b). Because of the long time scale involved, it is likely that the rest of the California Current System (where data collection has been less regular) has changed. It is also likely that such a change has had consequences for other species, both prey of zooplankton (phytoplankton and microzooplankton) and predators (zooplanktivorous fish and higher marine vertebrates). Geochemical consequences (e.g., change in the vertical flux of particulate carbon) are also imaginable. Finally, Roemmich and McGowan presented evidence inconsistent with several plausible physical causes of the change. Thus the 1995 symposium had the goals of disseminating information about this change, documenting (or at least testing for) its manifestations in components other than zooplankton, discussing its possible driving mechanisms and implications, and identifying research needed to understand these aspects more fully.

A new feature of the 1995 symposium was a preparatory meeting convened by Thomas Hayward, with financial support from CalCOFI and SIO, to discuss the published evidence and its interpretation, to present relevant unpublished or ongoing work, and to recommend augmentation or other change in continuing research to improve understanding. The report of this meeting was distributed at Lake Arrowhead and discussed by Thomas Hayward, and is included in the symposium proceedings on the following pages.

It is also worth noting that other long time series of zooplanktonic biomass have been published (e.g., Tomosada and Odate 1995). Although this data set was obtained by different methods than the CalCOFI set, and did not have truly coincident physical data, it is internally consistent. Superficial examination of the data certainly does not suggest a pattern parallel to that in the California Current, but rigorous testing for frequency-specific coherences in several such data sets could indicate, for example, the spatial scale of causal mechanisms.

### LITERATURE CITED

Roemmich, D., and J. A. McGowan. 1995a. Climatic warming and the decline of zooplankton in the California Current. Science 267:324–1326.

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Tomosada, A., and K. Odate. 1995. Long-term variability in zooplankton biomass and environment. Umi to Sora (Sea and Sky), Mar. Meterol. Soc. Jpn. 71:3–7 (in Japanese).