

Lessons From GLOBEC


James A. Yoder

National Science Foundation • Arlington, Virginia USA

Quantifying ecosystem processes is difficult, and in relation to terrestrial ecosystems, quantifying marine ecosystem processes is particularly difficult. Unlike terrestrial systems, the substrate supporting marine biota is in constant motion and the most difficult scale of motion to study, turbulence, is arguably the most important to plankton ecosystems. One of the important legacies of GLOBEC will be that biological and physical oceanographers worked closer than ever before to understand relations between physical and biological processes relevant to important questions in fisheries oceanography. Their success, as evidenced for example by the manuscripts in this special issue, laid the groundwork for future studies of marine ecosystems, and we need more such studies!

Marine ecosystems are changing or have already changed dramatically during the past 100 years. This is the message one gets listening to those who study the dead zone in the Gulf of Mexico, Chesapeake and Narragansett Bays, the Baltic, the Mediterranean Sea, Caribbean reefs, the California Current, the North Pacific and virtually anywhere else where there are long time series of sustained biological observations (or where time series can be recreated with proxy measurements or with the historical record). We know or suspect that all marine ecosystems are changing, but we do not yet understand the causes. How important is overfishing (or just fishing), pollution, land use change, climate change, or natural cycles to the physical environment, such as associated with the Pacific Decadal Oscillation? We think we know the answer for some areas, but few are able to generalize beyond specific locales.

We do know, however, that we need answers to questions such as why are marine ecosystems changing? Are the changes for the better or worse or neutral? Are changes reversible? What are the end points? On what scale do we need marine refuges to preserve species diversity? Can we use ecosystem analyses to better manage fisheries? These are not easy questions, but we need the answers; if for no other reason than marine ecosystems are valuable. Fisheries, aquaculture, ecotourism, coastal water quality, marine recreation and human health are all dependent to some extent upon healthy marine ecosystems. Changes to

marine ecosystems will affect their economic value and affect those who depend upon marine ecosystems to support their livelihood. Not to mention that we are legally obligated to protect marine mammals and endangered species and have a moral obligation to preserve the natural environment for future generations. In many ways the GLOBEC approach of interagency, interdisciplinary and international cooperation is a pathfinder for future research programs that we need to better understand marine ecosystems and how they are changing. I congratulate the GLOBEC scientists for their results and for developing a viable model for the important ecosystem studies we need to do in the future. 

(The views expressed in this column are those of the author and do not necessarily reflect the position of the National Science Foundation.)



U.S. GLOBEC is supported by the Division of Ocean Sciences and the Office of Polar Programs of the National Science Foundation and the coastal Ocean Program of the National Oceanic and Atmospheric Administration.

Comments & Suggestions

...on this special issue of *Oceanography* should be directed to our editorial office at magazine@tos.org. Additional comments for specific authors can be sent to:

Hal Batchelder	hbatchelder@coas.oregonstate.edu
Michael Fogarty	mfogarty@whsun1.wh.who.edu
Amatzia Genin	amatzia@vms.huji.ac.il
Eileen Hofmann	hofmann@ccpo.odu.edu
Nathan Mantua	mantua@atmos.washington.edu
Dean McManus	mcmanus@ocean.washington.edu
P. Ted Strub	tstrub@coas.oregonstate.edu
Thomas Weingartner	weingart@ims.uaf.edu
Peter Wiebe	pwiebe@who.edu