Title

Large Marine Ecosystems of the North Atlantic: Changing States and Sustainability Edited by K. Sherman and H.R. Skoldal. Elsevier Science, Amsterdam. ISBN 0 444 51011 7 (hardcover). Eur 99, US$99; 449 pp.

Journal

Journal of Experimental Marine Biology and Ecology, 287(1)

ISSN

0022-0981

Author

Ohman, Mark D

Publication Date

2003-02-01

DOI

10.1016/s0022-0981(02)00599-3

Peer reviewed

Ketil Hylland*
Norwegian Institute for Water Research (NIVA), P.O. Box 173, Kjelsås, Oslo N-0411, Norway
Section of Molecular Biology, Department of Biology, University of Oslo, P.O. Box 1050, Blindern, Oslo N-0316, Norway
E-mail addresses: ketil.hylland@bio.uio.no, ketil.hylland@niva.no

doi:10.1016/S0022-0981(02)00598-1

Large Marine Ecosystems of the North Atlantic: Changing States and Sustainability Edited by K. Sherman and H.R. Skoldal. Elsevier Science, Amsterdam. ISBN 0 444 51011 7 (hardcover). Eur 99, US$99; 449 pp.

Large marine ecosystems (LME) are the coastally bounded marine environments in which, we are told, 95% of the annual marine fishery harvests occur worldwide. This focus on coastally accessible resources explains the omission of the largest of marine ecosystems: the open ocean gyres and the deep sea. The LMEs have become focal regions not only for monitoring plankton and fisheries, but also for assessments of socioeconomic issues, pollution and "ecosystem health" and for shared governance decisions related to marine resources. The LME movement has identified 50 LMEs as assessment and management units around the world, 10 of which are treated in the present volume on the temperate-boreal Atlantic. As these include the longest studied marine ecosystems in the Atlantic, one might expect there to be several lessons learned about their changing states and sustainability.

Indeed, there are. As this volume pans from the U.S. Northeast Shelf to the Iberian Coastal System, a few common themes emerge. (1) *Large-scale forcing can markedly influence the variability of locally sampled populations*. This point is nicely illustrated in Taylor's summary of the relationship of zooplankton variations to the North Atlantic Oscillation (NAO) and the latitude of the north wall of the Gulf Stream. The point is reinforced in several subsequent chapters treating temporal variations in fish catches. (2) *Anthropogenic influences are nearly ubiquitous*. The direct effects of fishing on catch and bycatch are discernable in virtually all LMEs, but other anthropogenic influences exist: McGlade's comprehensive chapter reports biological invasions, pollution, extraction industries, degradation of the benthic environment by trawling, etc., in the North Sea. (3) *Causality by single factors is rare*. The longer term studies reveal that time series of abundance and/or recruitment often show the influence of different dominant factors at different points in the series. Fishing pressure or changes in top predators can interact with climate forcing to generate population variability. Reid and Beaugrand's update of the relationship between the NAO and *Calanus finmarchicus* is arresting: the inverse relationship that held for 28 years broke down beginning in 1996. The explanation requires looking at other dimensions of the ecosystem.

Additional themes that could have been amplified further include: (4) *The need to assess rate processes in time series*. Long time series are essential, but a focus on state variables alone is usually insufficient to explain (and manage) the variability of marine

populations. To resolve major questions of causality, primary and secondary production rates and rates of growth, fecundity and mortality of target populations are essential. (5) *The paucity of true ecosystem models*. Serious attention needs to be paid to the development of coupled ecosystem models that give equal weight to the physics of the system and to biological interactions. Coordination with some of the GLOBEC programs may help with these latter two points.

Who should read this volume? Scientists and managers interested in marine resources and in strategies to ensure their sustainability will benefit from this volume. So will students of the ocean who wish to move beyond textbook idealizations to understand the reality of natural variability of the ocean environment.

Mark D. Ohman
Integrative Oceanography Division, Scripps Institution of Oceanography, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0218, USA
E-mail address: mohman@ucsd.edu

doi:10.1016/S0022-0981(02)00598-1