

BOOK REVIEW

Marine Artificial Reef Research and Development—Integrating Fisheries Management Objectives

Edited by Stephen A. Bortone. Windham, NH, American Fisheries Society, 2018. 321 pages. \$79.00 (softcover).

Charles A. Barans | SC Marine Resources Division (Ret.), 644 Clearview Dr., Charleston, SC, 29412

The wide diversity of pertinent papers in this book allows for a rapid assimilation of information presented by prominent researchers at both a recent symposium and a conference. The up-to-date collection should be of interest to most ocean environmentalists and those interested in fisheries past and future efforts to shape physical habitats in attempts to influence aquatic communities. Information from research on the application of artificial reefs (ARs) to the management of fish stocks has been very limited.

The book's 18 papers are divided into four theme areas: relationships between AR characteristics and the associated biological communities; AR uses in environmental mitigation/conservation; AR resource management through cooperation between users and administrative groups; and application of planning and design to future AR development and incorporation into resource management. The application of AR research findings to the management of fisheries should remain an ultimate goal despite the lack of previous long-term studies to scientifically address the difficult social and biological questions.

The papers cover important areas, often not fully considered in ARs deployed solely for increasing recreational catches. Examples were presented to describe many of the complexities involved with environmental modifications. Pre-establishment considerations for an AR should include: planning simple, well defined management questions and objectives to be addressed; simple criteria adequate to evaluate success of defined objectives; the design, construction, and placement of reef units; the types and methods of data to be collected and associated statistical analyses necessary to reach valid conclusions; support of stakeholders and regulatory agencies; as well as public and organizational commitment to long-term funding and support. The future use of ARs in the management of fisheries may depend on strong collaborations between local human communities as fishers/users and funding agencies as

policymakers and enforcers, based upon sound and slowly expanding scientific knowledge of interactions between AR biological communities and their dynamic environments. Some species-specific management recommendations were made and a model was developed and presented to assist in AR site selection.

The deployment of ARs within Marine Protected Areas suggests potential for actual production of benthic fish species following adult aggregation, but only with protection of spawners from poaching. Several papers remind us of the difficulties associated with over use (legal or illegal) of an unprotected common property resource such as the fish assemblages of most ARs.

There was no mention of the relatively recent controversy over strict U.S. government-enforced limitations on AR construction based upon perceived potential harm to turtles (entanglement/entrapment) and whales.

Recurrent thoughts from papers focus on the need for complete planning of each new AR deployment to adequately answer critical management questions and the great need for marine enforcement of any established fishing or non-fishing policies. If fishing occurs during a research study, fish removal must be quantified (or estimated) as an important variable. Often research results are complicated by uncontrolled and/or non-quantified removal of fish. The editor did not attempt to summarize the wide diversity of topics covered, but he recommended that future ARs be designed for more general management of trophic guilds of fishes to simplify scientific study and allow more universal application of findings.

After reading this collection of high quality research papers, one can imagine the tremendous marine and fisheries potential that might be positively influenced, including mitigation and conservation, beyond immediate increases in catches, through the application of knowledge from future long-term research on ARs. [AFS](#)

