

itself. Nevertheless, the book will be a useful addition for those interested in oceanographic modeling and wishing to reach for an up to date statement of North Sea research in the fields covered.

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Late Quaternary Environments of the United States, edited by H.E. Wright, Jr., 1983, University of Minnesota Press, Minneapolis, Minnesota. V. 1 The Late Pleistocene (S.C. Porter, editor), 407p. V. 2 The Holocene (H.E. Wright, Jr., editor), 277p. ISBN 0-8166-1169-6 and 0-8166-1171-8.

These volumes contain a wealth of data that will be invaluable to Quaternary specialists. Each contains a chapter by Arthur L. Bloom on sea level and coastal morphology. There is little or no discussion on morphological dynamics and both articles are seriously flawed by Bloom's simplistic models of sea-level change that make no provision for known climatic fluctuations. They are useful, however, for bringing the different types of coasts in the United States into a convenient synthesis and reviewing their paleogeographic evolution.

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Coasts: Institutional Arrangement for Management of Coastal Resources, by Jens C. Sorensen, Scott M. McCreary, and Marc J. Hershman, 1984, Research Planning Institute, Columbia, South Carolina, 165p. \$US 21.00, ISBN 0-9315-310-4.

The extensive environmental legislation passed in the U.S. during the 1970s has often been exported to developed and developing countries, yet little has been written comparing coastal zone management efforts on the national levels. Sorensen, McCreary and Hershman's monograph *Coasts: Institutional Arrangements for Management of Coastal Resources* is one of the first such attempts. The volume addresses coastal management efforts and institutional arrangements which coastal nation-states and their sub-entities (colonies, commonwealths, possessions, etc.) have created to deal with coastal resources.

This monograph totalling no more than 165 pages is divided into nine chapters and three appendices. The reader who seeks specific answers to particular

management problems will find few concrete answers to help him with day-to-day problems. Instead, this volume will be invaluable to those who may be charged with developing a coastal resources program on the national and sub-national levels. In fact, it should be required reading for both present and aspiring consultants, bureau officials, and academicians involved with international marine resource program implementation.

The nine chapters move logically from defining the coastal zone geographically through several chapters discussing the evolution of coastal zone management, specific issues confronting coastal zone managers, to an analysis of the management and governance system responsible for coastal zone resources and processes.

The authors' objectives are, by any standard, ambitious yet it is surprising how well they have succeeded. The volume is well organized describing and categorizing the problems confronting the coastal zone manager and planner. This is especially difficult considering the often complex interacting systems characterizing this environment. By the authors' own account a monograph undoubtedly could have been written on each of the topics covered in the nine chapters. Their success in summarizing the lessons learned in national and international coastal zone management is no less an accomplishment, particularly since it is well written even by those with only limited experience in coastal zone management.

A brief introductory chapter describes "the institutional arrangement that has been used to both conserve and develop coastal resources and environments." This is followed by a discussion of the coastal zone as defined from a spatial point of view. The numerous definitions which have described the coastal zone outside the U.S. closely follow the developments in the U.S. (ARMSTRONG, *et al.*, 1974), and have been nicely summarized by several interesting graphs and tables. Brief descriptions of integrated versus topical planning concludes this chapter.

The significance of the coastal zone as an environment with substantial resources located within it (fishing, mining, mangroves, wetlands, etc.) and as an area of transit (commercial shipping, warehousing, and manufacturing) is discussed in Chapter 3. Two coastal evaluation models are also presented which are of potential use when assessing the socio-environmental value of the coastal zone. The absence of coastal demographic information is noted in *Coasts*, a phenomenon that prevails in

most developing and many developed countries, including the U.S. considering that people and people-related processes in most instances are directly or indirectly the causes of coastal impacts, it is surprising that so few efforts have been made to routinely include demographic variables in coastal management assessments.

The coastal governance system is analyzed in Chapters 4 and 5. A four stage institutional model is presented in Chapter 4 which is followed by a discussion of an implementation model in the following chapter. These are by far the most thorough and well developed parts of the work and raise a number of interesting questions for future research. Considerable efforts have been made in identifying the various substages and the primary and alternate paths at each decision point in the two models.

What so far has driven much of the environmental programs — at least in the U.S. — has been influenced by issues (Chapter 5). These have been broken down into four major categories (impacts, hazards, development needs and organizational process problems) each of which have been further subdivided based on examples drawn from the author's own experience or international case studies. With few exceptions, these issues mirror those which have been repeatedly identified in North American reports and include among others water quality, access and wetlands, in addition to concerns specific to tropical and subtropical countries (*e.g.*, corals and mangroves).

Eleven coastal implementation strategies are identified and categorized in Chapter 6. A follow-up analysis may have suggested more efficient decision paths, in part based on the coastal states environmental development, and in part on the coastal nation-state's specific management objectives. The development of a plan which includes both the collection and processing of necessary data is expensive and difficult to accomplish, especially when technical and/or scientific resources are limited. The authors raise a number of most pertinent questions concerning the relationship between a country's "coastal orientation," economic development, coastal zone planning and implementation strategy most likely to succeed.

An interesting classification of coastal zone governance systems is developed in Chapter 8 which incorporates aspects of Mitchell's Typology of Coastal Zone Governance Approaches (MITCHELL, 1982). a hierarchical governance/planning approach is suggested which ranges from Sectoral Planning and Development (lowest) to an Integrated Coastal

Zone Management Plan (most advanced).

The last chapter is concerned with program implementation and evaluation and includes an excellent summary of current literature. Not surprisingly, most of the citations and examples are based on the experience in the U.S. and other developed countries. Much has been written about both process and outcome evaluation in coastal zone management which may or may not have specific application to other countries. The concluding chapter includes a number of implementation guidelines, followed by a discussion of international assistance problems in the context of national coastal zone plan implementation.

Not only have the authors succeeded in bringing together much of the grey literature and difficult-to-locate reports and papers on this subject, but they have managed to organize this material in a series of conceptual models which may well become the base line from which future research will be assessed.

The brevity of the volume raises two conceptual and several substantive questions. First, as stated by the authors, the intent was to provide a reasonably concise statement describing the "state-of-the-art" of coastal zone management as applied to developed and developing countries. In that they have admirably succeeded. However, the reader who expects formal testing and verification of the ideas and constructs presented may be disappointed. While numerous examples are cited to substantiate the authors' ideas, no formal testing or verification has been presented. In fact, had this been the objective, one suspects an entirely different volume would have resulted. This was clearly not the authors' objectives. While such efforts are sorely needed, one hopes that the ideas presented here will be subjected to critical testing in the future.

The second question which needs to be addressed concerns the brevity of several of the individual chapters. Very interesting ideas and models are described which could have been further developed, Chapter 3, for instance, discusses two coastal evaluation models accompanied by a table (3:1) identifying selected statistics for a few of the 176 coastal units included in the analysis. The utility of both the table and the analysis would have increased had the information on all coastal units been presented, perhaps as an appendix. Only by knowing the extent to which the institutional arrangements are congruent among all coastal states will it be possible to fully understand how

coastal governance systems work, politically, socially, environmentally and economically.

Similarly, the section which discusses the issues (Chapter 5) would have benefited from a comparative analysis between the coastal states governance and implementation system and its ability to deal with these "issues." Finally, some minor points might have improved the readability of the work. A list of the acronyms used in the text would have been particularly useful for those without extensive background in international aid work. Some of the tables appear incomplete and a few errors have crept in. The International Geophysical Union (p. 102) does not sponsor the Commission on Coastal Environments. The C.C.E. organization falls under the auspices of the International Geographical Union. Similarly, at least one citation Strickland and Cox (p. 45) was not included in the bibliography, which otherwise is most comprehensive. These are however, minor blemishes on an otherwise excellent conceptualization of the problems confronting those responsible for developing coastal zone management plans in developing countries.

Considering the growing recognition of the importance of the coastal zone in both developed and developing countries, this volume represents a very significant contribution to an otherwise sparse bibliography dealing with this topic. Some excellent ideas have been presented in a logical and most readable fashion. This volume bodes well for the Renewable Resources Information Series under which aegis Coastal Publication #1 has been published.

LITERATURE CITED

- ARMSTRONG, J., 1974. *Coastal Zone Management: The Process of Program Development*. Sandwich, Massachusetts: Coastal Zone Management Institute.
- MITCHELL, K.K., 1982. Coastal zone management: a comparative analysis of national programs. In: E.M. Borgese and N. Ginsburg (eds.) *Ocean Yearbook #3*. Chicago: University of Chicago Press.

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Physical Oceanography of Coastal Shelf Seas, edited by B. Johns, 1983, Elsevier, New York, xiv + 470p. \$US 86.50, ISBN 0-444-42153-X.

This book, number 35 in the Elsevier Ocean-

ography Series, contains ten chapters that deal with various interactions between sea-bed material and dynamic processes. Although geared for coastal engineers and sedimentologists attempting to estimate the movement of coastal and shelf sediments, others will find this volume of interest because there are discussions that relate seabed topography to ocean dynamics in shallow water. The scales of observation range from those of high-frequency gravity wave propagation over beaches up to those of tidal- and wind-induced circulations in shallow shelf seas.

Chapters 1 to 3 relate to smaller-scale dynamics associated with surface-wave propagation over beaches. Of particular interest to coastal specialists here are sections that detail wave reflection by rippled beds, wave-generated nearshore currents, littoral drift, sand transport on beaches, and turbulent flow beneath waves approaching a shoreline over a sloping beach.

Chapters 4 to 7 deal with the tidal-scale dynamics that exist farther offshore and over the adjacent shelf regions, as in the example of northwest Europe (Chapter 4). Chapter 5 specifically considers the principal features of the vertical current structure and associated turbulent properties observed in various kinds of bottom boundary layers in shelf seas. Chapters 6 and 7 present numerical models for shallow-water flow over topography and tidally-induced residual flows. The final chapters focus on the modeling of wind-induced circulation in the shallow shelf-seas of northwestern Europe.

Inasmuch as this volume is primarily concerned with the study of those processes that are dominated by the affect of seabed topography and friction, other topics normally expected to occur in a book on coastal and shelf dynamics (e.g., continental-shelf waves, storm surges, and coastal upwelling) are not considered.

This book is handsomely produced and the figures and illustrations are generally of high quality. An exception is the fold-out map on pages 143-146 which was reduced too much. Many coastal researchers will find aspects of this volume useful, but sections dealing with mathematical treatments and modeling will appeal especially to those concerned with the quantification of dynamic processes.

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