typically related to global tectonics. The author considers a wide variety of locations, variable ages and morphologies. Wave energy spans the spectrum, tidal range varies between 1 and 3 meters, and the influence of the inner shelf, sediment source proximity, all contribute to global diversity.

As I stated at the outset, this book is a major contribution to the literature on the geology of Holocene barrier systems. In some regions it provides more detail than the special issue of *Marine Geology* (edited by G.F. Oertel and S.P. Leatherman) published in 1985 on this particular theme. However, it is clearly apparent that some of the contributors spent a substantial amount of time preparing their chapters, whereas, some were not so diligent. If there is a major weakness in this book it is the omission of the wealth of knowledge obtained from numerous studies performed on the deltaic coast of Louisiana. Only a few paragraphs are offered in Chapter 10 dealing with the Chandeleur Islands in eastern Louisiana. In addition, a large portion of the barrier and beach ridge systems comprising the Northeast Gulf were omitted, although the depositional history and morphodynamics have been worked out to some degree. I think the ordering of the text was not seriously considered and it would have made more sense to group the chapters by region. Nevertheless, this is a fine contribution and one that students, faculty and other professionals with coastal interests will find exceptionally useful.

Gregory W. Stone
Louisiana State University
Baton Rouge, LA 70803


This book is a contribution to the International Geological Correlation Program Project 274, "Coastal Evolution in the Quaternary". The book introduces a variety of the latest concepts in coastal morphodynamics in a number of environments including deltas, reefs, estuaries, lagoons, polar, wave-dominated, and tectonic coastlines in addition to developed coasts. The book is geared towards undergraduates (I suspect graduate students will find it very useful also) studying coastal geomorphology, geologists working on coastal sedimentary sequences in addition to environmental scientists, engineers, planners and coastal resource managers attempting to understand the processes of change in coastal systems.

Chapter 1 of *Coastal Evolution*, written by the editors, provides a launch point for the remainder of the book by reviewing such things as current paradigms governing coastal studies, the history of coastal evolution, time-space considerations in coastal research and human impacts. Chapter 2, Morphodynamics of Coastal Evolution (P.J. Cowell and B.G. Thom) is a comprehensive and indeed, thought provoking treatise of how the science has progressed since the seminal exposition of Wright and Thom’s 1977 paper on the realization of coastal morphodynamics. The general conclusion is that numerical modelling has added a new dimension to morphodynamic research, although uncertainties remain particularly with large-scale coastal behavior and *Markwian inheritance*—the antecedent control problem. Chapter 3, Deltaic Coasts written by John Suter, is a comprehensive, although probably familiar to most, overview of deltaic systems. Much of the data and literature presented originate from the Mississippi River delta and Louisiana State University. Chapter 4, Wave-Dominated Coasts written by P.S. Roy, P.J. Cowell, M.A. Ferland and B.G. Thom, provides a comprehensive overview of the large-scale behavior of wave dominated coasts, drawing from two central themes: first geological inheritance, or the significance of various land-forming processes that have operated over a long period of geological time to create regional landscapes; and second, the evolution of wave-dominated coasts over shorter time periods (centuries to millennia) emphasizing the large-scale morphodynamics of the deposits themselves. Chapter 5, Macrotidal Estuaries, written by J. Chappell and C.D. Woodroffe, concentrates on estuaries in tectonically stable parts of northern Australia. Although the chapter covers the high points of estuarine morphodynamics, discussion of topics such as araribanches, cheniers, beach ridges, and a gradual fall in sea level during the late Holocene, enforces the uniqueness of the north Australian environment. A short summary of the potential impacts of future sea-level rise is provided at the end of the chapter. Chapter 6, Lagoons and Macrotidal Coasts written by I.A.G. Cooper provides a most interesting and well-written account of the evolution of lagoonal coasts in lower (micro) tidal regimes. The chapter defines a number of lagoonal types, several documented examples of lagoonal evolution including examples from southeast Africa, Bermuda, Australia, Brazil and the U.S.A. The author synthesizes and presents perhaps the more salient processes of lagoon formation, evolutionary models under transgressive and regressive settings and finally, a short section in which the gaps and cutting edge questions are identified. In Chapter 7, Coral Atolls written by R.F. McLean and C.D. Woodroffe, provides a shift in emphasis to the Pacific Ocean and the Cocos (Keeling) Islands. Discussion on atoll structure, late Quaternary sea-level fluctuations, and Holocene reef development is provided in addition to a three-stage model for development of the Cocos Islands. A very useful synthesis of the pertinent literature is provided along with a clear discussion of atoll reef adjustment to post-glacial rises in sea level and the subsequent development of reef islands. Chapter 8, Continental Shelf Reef Systems, written by D. Hopley, provides a discussion of the distinctive features of shelf reefs, paying particular attention to the Great Barrier Reef. Arguments are presented which suggest the importance of geological inheritance on reef evolution and the sensitivity of these features to ocean changes. The chapter is brought to a close with comparisons made between the Great Barrier Reef and those of the Caribbean and a model for tropical carbonate accumulations during a transgression-stillstand cycle in sea level. Chapter 9, Arctic Coastal Plain Shorelines, written by P.R. Hill, P.W. Barnes, A. Hequette anad M-H Ruiz, is a "refreshing" review of polar coastlines and the complexities associated with permafrost, sea ice, and the evolution of the Arctic coastal plain shorelines. Several important points are raised pertain-
ing to zonal and azonal processes on the shoreface, with contrasting examples from the Canadian and Alaskan sectors of the Beaufort Sea, a critical point being the significance of long fetches and severe storms controlling the long-term evolution of the coast. Chapter 10 on Paraglacial Coasts written by D.L. Forbes and J.P.M. Syvitski is a very well written and comprehensive discussion of the disposition of glaciogenic deposits and their role as sediment sources for the coast. Several key points are presented in this chapter including the ubiquitous role of relative sea-level changes in coastal stratigraphy, and the importance in paraglacial areas where sediment sources and supply are highly sensitive to sea-level adjustment. The authors provide interesting discussion on major erosional features of glacial origin, fjord-head and proximal basin sedimentation, open coast outwash progradation, drumlin-coast interactions and sheltered coast response to reductions in sediment supply. Chapter 11, Coastal Cliffs and Platforms by G.B. Griggs and A.S. Trenhaile is an account of coastal geomorphology and processes on tectonically active margins. The discussion presents several factors important in the fashioning of rocky coasts—wave action, chemical and salt weathering, bioturbation, expansion-contraction, mass movement, rock type, tidal variation and human activity—although the point is emphasized that only speculation can be made on the mode of development of rock coasts given the time required for coastal change. In Chapter 12, P.A. Pirazzoli extends the arguments pertaining to crustal movement in the coastal zone with his chapter on Tectonic Shorelines. The main causes of vertical displacement are presented in addition to the effects of tectonics on coastal evolution. The final chapter (13) centers on Coastal Processes written by K.F. Nordstrom. The role of human activity in the evolution of developed coasts is presented by comparing pre- and post-development on a barrier type coast in New Jersey, U.S.A. An important argument is presented which suggests that some barriers may have passed a critical threshold beyond which the recovery to a more natural system is no longer an acceptable management option, a scenario that the author suggests will incorporate more and more barrier systems in the future.

On first browsing through this book I was a little skeptical that it was no more than a number of papers pulled together under the broad theme of coastal evolution and morphodynamics. I am happy to admit I was wrong. The editors have compiled a number of well-written papers in a logical order and are to be commended for their effort. On a sadder note, this was one of the last projects on which Bill Carter was to work. His sudden death in July 1993 resulted in the dedication of this book to his memory. Indeed it is a most fitting dedication because it engenders so many of the ideas and themes that Bill worked on throughout his career. Julian Orford, a long-time friend and colleague of Bill Carter, contributed a compassionate dedication which provides the reader additional insight into Bill the scientist and humanitarian. It is with great pleasure that I recommend this book highly to all interested in the coast.

Gregory W. Stone
Louisiana State University
Baton Rouge, LA 70803


Successful implementation of any environmental monitoring program intended to detect a biological impact caused by an anthropogenic discharge is a complex undertaking which may be thought of a four step process. First the problem at hand and the purpose of the monitoring must be fully stated. Second, this leads to the selection of monitoring parameters that provide information both upon the discharge and the biological response. Third, once it has been determined what is to be measured then strict criteria must be adopted for inferring causality. Fourth, sampling designs can then be adopted and the field program implemented. Writing, an ideal, comprehensive, text for biomonitoring is probably an impossible task. Therefore, there is a strong need for books which address various components. The collection of papers edited by Kees J.M. Kramer has mixed success at describing a wide variety of biological parameters.

The greatest single strength of the collection is the breadth of topics covered in fourteen chapters by twenty nine international experts. The topics range from induced molecular systems, to whole organism response, and conclude with benthic community monitoring. To the extent which the topics allow, all chapters have a parallel structure which includes case studies, and an appendix for more technical details. All chapters are well written in English in spite of the host of native languages involved. Since the topics covered have different levels of complexity, the success of providing useful information differs chapter to chapter. Most of the chapters on induced enzymes are highly informative and comprehensive. Whole organism response chapters tend to be more limited in content. And, the two chapters on community monitoring provide only the barest glimpses of that topic.

As with many collections, the book suffers from an absence of opening and closing chapters which put the individual topics in a broader monitoring context and balance the advocacy of the chapter authors with some critical evaluation. Therefore, the value of this book as a general reference or text depends upon the expertise of the user more than its contributors. To people already informed about biomonitoring, it is an interesting review of possible biological parameters. However, to the student few teachers have the breadth of expertise needed to guide the appropriate critical evaluation of the biological parameters being advocated.

One minor annoyance is a production style which makes it surprising difficult to follow complex topics. The text neither indents nor spaces for paragraphs. The only hint the reader has of where the text breaks is the length of the closing line in a paragraph. Unless it happens to be short, the reader may have to carefully dissect out lead sentences hidden in unbroken text stretching over one or two pages.

Robert S. Carney
Coastal Ecology Institute
Louisiana State University
Baton Rouge, LA 70803