

magnitude becomes overwhelming; or we may be unable to discern an adequate mathematical model in the first place, far less make decisions about optimality. In general terms, it is not immediately clear what problems can be tackled successfully — which is why this is an approach, rather than a definitive technique.

Two of the best known problems tackled by dynamic programming are the travelling salesman problem, and the knapsack problem. The travelling salesman problem involves finding the optimal route (in terms of time, money or any other quantifiable variable) between several locations, where each location is visited once, and once only. The knapsack problem [referred to in the book as 'The Wandering Applied Mathematician (continued)'] is one where several items of different sizes and values must be chosen in order to maximise the overall value, but subject to a total size constraint.

How is this applicable to coastal science? Only marginally — none of the problems chosen by the authors come close to the kinds of problems likely to be encountered by readers of this journal. If you spend time and effort packing a landrover (or even the family car), or have a fixed number of sites to visit, there are obvious applications (don't have too many sites — even dynamic programming is severely taxed when the number of locations to be visited exceed about 17!). It is difficult to imagine widespread application of dynamic programming to coastal science.

One way to tackle such problems is through computer power: sadly little attention is given to algorithmic description of the techniques described, although quite clearly the approaches given in the examples could be written for a computer (micro-, mini-, or mainframe). Whether they would then represent a computationally efficient solution is never assessed. The authors are aware of the applicability of computers in this area, but never address them directly in the examples.

The examples themselves are not very exciting. This is by no means exceptional in applied mathematics text books; they are there as flesh on the mathematical bones, and often seem a little forced. In a similar way, there is no explanation given of the choice of approach, or an examination of alternatives. Removal of the 'real world' component of the problems to leave only the mathematical formulation would not detract greatly.

The index is rudimentary. It is nevertheless a useful text, which is probably well-suited to its intended market. It is not particularly appropriate

as a source book for interested outsiders wishing to see how dynamic programming might be applicable to them.

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Environmental Effects of Offroad Vehicles: Impacts and Management in Arid Regions,

Edited by R.H. Webb and H.G. Wilshire.
Springer-Verlag 1983, 534p. Price: DM132
(\$US 52.40), ISBN 3-540-90373-8

This is something of a 'curate's egg.' Basically the book is about the degradation of the Californian Desert by the uncontrolled use of motor bikes and cars, a.k.a. ORVs. The book's interest to the coastal scientific community is that similar sorts of problems occur on coastal dunes and, to a lesser extent, on coastal wetlands. Oddly enough, it would appear that coastal types and desert types have followed the same tracks (metaphorically), but have never really sat down to compare notes. True some of the essays in this book cite coastal studies, but they are mostly passing references, although one essay — that by Gilbertson — is about Australian coastal dunes. But overall we seem to have been doing the same things, happily unaware of each other's presence.

This book should help bring things together. It comprises 23 essays (all disclaimed as official US viewpoints or policies, so it will make comforting reading in Central America), covering all aspects of the mis-use of vulnerable desert environments by uneducated ORV drivers. The essays are divided into five sets — physical abuse, biological abuse, rehabilitation, case studies and management. In all but the 'case studies' set, the first essay is a rather general 'scene setter,' e.g. 'Soil and soil formation in arid regions' and 'Plant ecology in deserts.' I found these general essays a little unnecessary, although undeniably, they make the volume more marketable. The essential basis of the book is the detailed account of the degradation process. The rapidity and irreversibility of many geomorphological and ecological changes is frightening (so too, in a different manner, is the article on natural asbestos pollution). Major changes in vegetation cover (often illustrated by splendid photographs), animal pop-

ulation densities, fecundity, soil infiltration, etc. lead to the overpowering feeling that the desert is in a bad way. Many of the chapters make for enjoyable reading. I particularly liked Wilshire's account of ORV impacts on desert soils, with a nice blend of science and common sense. Also Brattstrom and Bondello's work on noise effects was both entertaining and instructive — I know of no coastal equivalent to this.

My criticisms are mostly minor. The book is a mite introspective, with many citations to 'grey' publications, theses, etc. making life difficult for interested parties to read-up promising research lines. There is also a tendency to slip into jargon. I became weary of the irritating habit of giving everything requiring more than two words to describe it, an acronym. (I am tempted to give a prize for the first correct solution for unravelling OSHA, dBa, USFS, SPL, BLM, BOR, BOD, TWA (not the airline), CEQ, dBl, APC, CQI, ORV, DOI, and ESP (not psychological). This is the stuff of inter-departmental reports, not of scientific writing.

In summary, this is a good compilation, particularly valuable for those working on similar coastal problems. It is a good example of environmental science at its best.

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Environmental Oceanography,

Tom Beer.

Pergamon Press, Oxford, 1983, 263p.,
106 figures. £6.95.

This book's title and contents are clearly different from the average oceanographic text for undergraduate courses. The author suggests that it should bridge the gap between the pure oceanographic texts concentrating on non-coastal waters, and what he terms "low-level introductory texts." The book is the outcome of post-graduate courses taught by the author in Australia, related to natural resource management. This helps to explain the stance and the contents of the book. The stance is that of explaining oceanographic concepts for potential 'environmental managers' such that the coverage of the volume is probably wider than expected, with a mixture of theory and techniques by which coastal waters and their environmental problems may be understood by non-specialists. The

range of contents is greater than one would expect for undergraduate courses and as such makes the need for such a book unlikely as a central element in most mainstream oceanography, geography, and geology courses.

Chapter 1 is an attempt to define 'coastal oceanography' and to indicate some aspects of its growing importance in terms of the increasing biological/mineral exploitation of coastal waters. The race for exploitation only serves to underline the increasing concern of coastal nations to establish their rights of access, exploitation, and management, though hopefully not in that order.

Chapters on shore processes (Chapter 2) and waves (Chapter 3) are something of a disappointment as subject coverage is patchy and not up to the standard of the later oceanographic work. A number of irritating points are found in these chapters; a fixation with $c = (gd)^{0.5}$ for wave velocity in shallow water without making it clear that its realistic application is far from universal, especially in non-swell dominated seas. A discussion on breaker types is given which is not used in any subsequent mention of the action of waves on beaches, and sections which imply that all sand beaches produce storm bars and all sand bars are storm generated are clearly erroneous. Finally, on/offshore sediment transport is not due solely to wave set up/set down as implied in Chapter 3. More disturbing are the concepts which could be considered as essential for any coastal 'environmental manager' to be aware of, (ranking as important as knowledge of oceanic shelf dynamics) — yet omitted. There is nothing on the central problem of longshore sediment transport on beaches (though this may be forgiven if a strict adherence to chapter headings is to be made). There is no comment on the cause or mechanics of wave generation, nor any indication of temporal/spatial variability of wave climates.

The best chapters are undoubtedly the central five concerning tides (Chapter 4), water composition (Chapter 5), water circulation (Chapter 6), boundary layers (Chapter 7), and oceanic mixing (Chapter 8). These are of recommended value to any non-oceanographer who needs a readable, concise, and pertinent introduction into processes governing oceanic motion. They are well presented with useful informative illustrations and are capable of being understood by most undergraduates. However what 'environmental managers' would be able to do with this type of information is a moot point. In fact the absence of a clear example where this type of information has been used in an environ-