



Sampling matters on rocky shores

Murray, S. N., Ambrose, R. F. & Dethier, M. N. (2006) *Monitoring rocky shores*. University of California Press, Berkeley and Los Angeles (CA, USA). xvi + 220 pp. 52 figs, including 19 b/w photographs and 32 line illustrations, 11 tables, index. Hardback: price US\$49.95 ISBN, 978-0-520-24728-4.

Almost all biological sciences departments with a long history have prominently displayed historical photos of eminent professors clad in tweed jackets gazing pensively at specimens held aloft in pristine field settings. The implicit serenity and ambience of quiet contemplation and a sedate pace of thoughtful inquiry can bring wistful sighs to modern ecologists as they load their trucks with quadrats, survey tapes, sampling devices, cameras, slates, pencils, data sheets, maps, voucher specimens, preservatives, waders, wet-weather gear, research assistants and, alas, little by way of retro-stylish tweed. On rocky marine shores, contemporary questions are more likely to involve biodiversity, spatial and temporal heterogeneity, habitat structure, and sample variance than a most interesting observation on the morphological variation of a favourite species. Addressing these issues adequately involves a fusion of procedures, methods, statistics and taxonomic knowledge, or at least an ability to identify hundreds of taxa in their benthic stages. *Monitoring Rocky Shores (MRS)* is aimed directly at the complexities of sampling in these highly heterogeneous environments. Its stated purpose is to provide the information required to develop methods and procedures for intertidal sampling and to aid in making decisions involving the time, cost and value of collected data. It is aimed at 'research and agency scientists, agency managers, and advanced university students'.

Structurally, there are eight chapters, which incorporate descriptions and assessments of sampling designs, site classification, methods of sampling, measuring

abundance and individual-based parameters of select species. Fifty-two photos and illustrations and eleven tables augment the text. There are few aspects of sampling intertidal shores that are not mentioned. *MRS* rates, therefore, as one of the most comprehensive texts specifically aimed at the complexities of sampling in intertidal environments. The book is referenced throughout, which provides a ready means of tracking back to primary sources. The layout of the book is useful and logical. It begins with an overview of monitoring and impact studies on rocky shores, goals, designs and some of the statistical underpinnings that are relevant to setting up a monitoring programme. The need to deal with spatial and temporal complexity, often over very small gradients, leads to a consideration of site classification and selection. Mapping and categorization techniques have occupied marine ecologists from early times, and *MRS* gives a reasonable review of the topic. What to sample is a major consideration of all marine field studies because of the wide array of benthic algae and invertebrates encountered in any survey. As the authors point out, monitoring for spatial and temporal changes requires *a priori* decisions even though future stressors and conditions and their interactions are unknown. Sampling efficiency is a major consideration in all monitoring programs, as are the sampling units, methods of sample allocation, and ways of quantifying abundance, which are well discussed in *MRS*. There is a useful compendium of the numerous techniques developed and used by intertidal ecologists in a wide range of studies, which may save monitoring novices a great deal of time in formulating studies.

There are drawbacks to books of this nature. *MRS* is not a 'cook book' or stand-alone text for how to monitor rocky shores, but rather an aid for those who are relatively new to such work. Numerous other books discuss relevant methods and techniques broadly applicable across the ecological

disciplines, for example Krebs (1998), Southwood & Henderson (2000) and Eleftheriou & McIntyre (2005), and, for the logic and design of sampling and experiments, the indispensable Green (1979) and Underwood (1997), not all of which appear in the reference lists to *MRS*. The title is slightly misleading: the subtidal zone occupies the greatest area of most rocky shores but is not covered in this book. Kingsford & Battershill (1998) is more useful for subtidal studies, and is cited throughout *MRS*. My first impression of *MRS* was that one would need to read much of the book to come away with a specific notion of how to go about monitoring. The index is not always helpful to those wanting to browse a topic. For example, BACI (before-after-control-impact) designs are a major tool in monitoring studies, and are discussed but not referenced in the index. Those experienced in monitoring studies and responsible for teaching may have a few niggles about the book. One area that could have used more attention was the mechanics of data handling and transcription into electronic data bases. This is the bane of novices and experienced researchers alike and constitutes a major portion of the time spent on any monitoring program. Organizing data sheets so that they mirror data bases imposes a useful structure for recording data that invariably saves time in the program. A few specific illustrations of this would have been useful.

This book no doubt took a while to write and produce, which may account for the fact that it is not entirely up to date. Although mentioned somewhat in passing, high-quality digital cameras have largely replaced film cameras, in fact making the photographic methods, analysis and illustrations described in the text far easier and more versatile than they were a few years ago. Many researchers now record data electronically in the field using mini-computers such as palm pilots, which can provide major time savings in monitoring studies. GIS-based techniques for mapping sites, topography and habitats have

improved markedly and are used in most studies. Moreover, 'monitoring' is not just about organisms and their abundances. Small temperature loggers, wave pressure gauges, wave force meters and numerous other nifty gadgets are used extensively in virtually all continuing monitoring programs to help tie together physical and biological variables across sites and habitats.

Overall, this book will have considerable resonance with marine ecologists, who know that their discipline requires specialist techniques that are not covered in more general texts. Monitoring and surveys of the marine environment have assumed ever-increasing importance as numerous agencies worldwide set up programs to detect changes in the marine environment and to underpin management of marine shores. Future historical

photographs of this generation are, therefore, unlikely to show us gazing pensively at a specimen jar but rather to see us surrounded by seaweed and crashing waves, clad in gumboots and wet-weather gear, festooned with strung quadrats and survey tapes, with perhaps a stylish touch of gore-tex to complete the ensemble.

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