

Sand Dune Conservation, Management and Restoration

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J. Patrick Doody

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*To Norma who has fought the trials
and tribulations of life with fortitude
and humour and to Jean, for being there.*

Preface

Sandy beaches and inland dunes occupy an important place in the coastal ecosystem. They occur in moderately energetic environments where waves and then wind move sand grains towards the land. They are essentially terrestrial in character, although in the early stages of development the plant and animal communities colonising the sandy shore are tolerant of saline conditions. They provide coastal protection, buffering tides and waves, which may be particularly important in areas where relative sea level is rising, and during storms. They support a rich and varied fauna and flora with many species especially adapted to the habitat. Managing these assets in the face of continuing pressure from human populations on a sustainable basis is a major task.

The book is a guide introducing the sand dune and its main features, together with a summary of the changes brought about by human activities. Thereafter it provides a description of the various states in which the habitat exists, and information on their values. There are signposts to issues and activities, which alter the ecosystem services the sand dune system provides. Options for management are considered and the likely consequences of taking a particular course of action highlighted. These options include the traditional approaches to management (for the conservation of wildlife and landscapes) as well as habitat restoration.

This is an ecological textbook. However, coastal systems are highly dynamic. It is therefore important to consider the geomorphological context for the development of the sand dune system's biological attributes. Due to this, discussion includes the active sand-sharing system at the beach/foredune interface (Chaps. 4 and 6) and the inland¹ sand dune (Chaps. 5 and 7).

This book concentrates on sand dunes in temperate regions of the world using examples mainly from the British Isles, mainland Europe and North America. It includes information based on personal knowledge, published scientific papers, reports and the internet. It is for those with a special interest in the practical aspects of sand dune conservation, management and restoration and undergraduates.

¹Note "inland" refers to the sand dune immediately behind the beach/foredune.

Plant names are those given in the International Plant Names Index (IPNI <http://www.ipni.org/index.html>). At first mention, English and Latin names are given with Latin names used thereafter. Similarly, animals have both Latin and English names but with English names where they appear in subsequent text.

Acknowledgments

This book represents a synthesis of research and information derived from the work of a large number of scientists, managers and policy advisors over the last 70 years or so. The studies of people such as Ranwell (1972) and work that is more recent (Packham and Willis 1997; Maun 2009) provide a foundation for understanding the ecology of coastal sand dunes. Carter (1989), Carter and Woodroffe (1994) and Psuty (2004) provide a geomorphological context.

Thanks to all friends and former colleagues from the United Kingdom Nature Conservancy Council and Joint Nature Conservation Committee for their help during my time as coastal specialist within those organisations. Dr Paul Rooney, Liverpool Hope University, played an important part in highlighting errors and omissions from an early draft of the book. Thanks to him for all his efforts. Dr Albert Salman, The Coastal and Marine Union (EUCC), commented on several chapters. Thanks also to Dr. Maike Isermann, Bremen University, for identifying omissions in Chap. 8 and Dr. Stewart Angus, Scottish Natural Heritage (Chap. 11). Special thanks to Prof. Norbert Psuty of the Institute of Marine and Coastal Sciences, Rutgers University, New Jersey, who provided important and critical comment on all aspects of the book, especially its geomorphological content. His help was invaluable.

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