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# Preface

While I am writing this preface, long spells of extreme weather are affecting people worldwide. Stormy and wet weather have caused floods that are disrupting lives across England and Wales for more than three months. The Met Office has announced that January 2014 was the wettest in some parts of the UK since records began to be collected more than 100 years ago. Heat waves and record high temperatures mark the summer in southern Australia and southern Brazil. The ‘big freeze’ affects the USA where some locations have had the coldest temperatures ever recorded. Due to population growth and climate change, the challenges brought by extreme weather will be faced by more and more people each year.

This is particularly concerning in coastal areas, where extreme storms can coincide with high tides and exacerbate flooding and erosion risk to people, economies and natural habitats. Examples of such extreme conditions are widespread, such as seen in the USA during hurricanes Katrina (New Orleans in 2005) and Sandy (New York in 2012), in the Philippines during Tropical Storm Trami (Manila in 2013) and typhoon Haiyan (Tacloban in 2013) and the recent floods in the UK (affecting East Anglia, Southwest, Midlands and Wales), just to name a few. No single event can be attributed to climate change. Independent from whether climate change is human-induced or not, the effects of climate change are upon us. Adaptation is inevitable and we all (individually and collectively) need to learn new ways of living to become more resilient to the consequences of extreme weather events.

This book is not about extreme weather or climate change. It is about how they are provoking a change in the way flooding and erosion risks are managed in coastal areas and the alternatives that exist to counteract their negative socio-economic and environmental effects. More specifically, this book describes and discusses a relatively new alternative called managed realignment. Managed realignment is a soft engineering approach that aims to provide a more sustainable way to manage coastal erosion and flood risk by enhancing the natural adaptive capacity of intertidal habitats. In other words, managed realignment creates space for coastlines to evolve more naturally, adjusting dynamically to changing environmental conditions, including rising sea levels. Therefore, managed realignment represents a shift from the traditional hard engineering approach to coastal protection.

Although managed realignment is becoming increasingly popular worldwide, its implementation is faced by great challenges, including public acceptance, limited knowledge, funding constraints and uncertainties related to natural coastal evolution. The first managed realignment projects were implemented in the 1980s (in France, Germany and the Netherlands). In the early 2000s, managed realignment became an important climate change adaptation mechanism in national strategies (e.g. in the UK) aiming to deliver economically and environmentally sustainable coastal management. Since then, there has been a great increase in the number of publications addressing the subject. However, the great majority are ‘white papers’ produced by government agencies and consultants involved in the design or delivery of managed realignment projects. Only few independent studies have been published and even fewer present reliable documentation and analysis of how realigned sites are actually evolving.

This is the first book focusing on managed realignment. It is written with the objective to provide an independent overview about managed realignment, how it has been implemented in different countries, its current achievements and limitations, and its potential to deliver sustainable long-term coastal management. Investments in managed realignment are increasing. In the UK, there are plans to realign 10% of the English and Welsh coastline by 2030. In France, the *National Strategy for Integrated Shoreline Management* explicitly includes planning for retreat from high risk areas as a priority action. It is time that managed realignment is clearly explained and independently assessed.

The content of the book provides a balance between academic research and practical experience. I have used my academic judgement based on the available literature to clarify the basic concepts and definitions and summarise the state-of-the-art knowledge about managed realignment. In five chapters, external contributions provide an account of practical experience in planning, designing and implementing managed realignment in the Netherlands, the USA and the UK. The book describes general concepts and discusses approaches used internationally. However, the content does have a European and British bias, as most of the literature available is produced in Europe, and the UK is the country with the largest number of known projects.

The first three chapters provide an overview of the basic concepts required to understand managed realignment, including underlying drivers, terminology and methods of implementation. In Chapter 1, I explain the socio-economic and environmental drivers underpinning the need for managed realignment. The terminology associated with managed realignment is often used inconsistently in the literature and variable across countries. With that in mind in Chapter 2, I clarify the most common terminology and propose a new (and broader) definition for managed realignment to incorporate the different methods of implementation that exist. These different methods of implementation are explained in Chapter 3.

The following six chapters describe and illustrate the different managed realignment approaches and strategies implemented by different countries. Chapter 4 describes some of the relevant national and transnational strategies that are currently in place to support managed realignment and other innovative alternatives to

manage coastal flood and erosion risk. Chapters 5, 6 and 7 illustrate the range of approaches that can be adopted to implement managed realignment in practice, varying from a combination of hard and soft engineering used in the Netherlands (Chap. 5), the removal of coastal defences used by the National Trust in England and Wales (Chap. 6) and managed retreat used in Maui, Hawaii (Chap. 7).

In Chap. 5, Joost Stronkhorst and Jan Mulder describe the coastal management strategies implemented in the Netherlands and provide examples of different managed realignment methods implemented along the sandy coast of the North Sea and the silty shorelines of estuaries and the Wadden Sea. It is common knowledge that the Netherlands is a low-lying country where land reclamation and protection against floods are of paramount importance. Therefore, the Dutch experience demonstrates that managed realignment, alongside other coastal engineering approaches, can be strategically implemented to provide coastal protection and promote sustainable uses.

In Chapter 6, Phil Dyke and Tony Flux describe the principles of coastal management adopted by the National Trust and present their experience in a project where managed realignment was implemented through removal of coastal defences in Brownsea Island, UK. The National Trust is a non-governmental charity organisation that owns about 10% of the coastline of England and Wales and is recognised worldwide as a role model of institutional capacity for promoting the sustainable management of coastlines. Chapter 7 provides an example of managed retreat alternatives for developed coastlines reliant on beach-related tourism. In this chapter Thorne Abbott describes how the implementation of a setback line in Maui (Hawaii, USA) assists managed retreat and contributes to maintain and enhance the local economy.

Chapters 8 and 9 focus on the UK, where managed realignment is undertaken mainly through the realignment of defences with the objective of creating intertidal habitat. These chapters benchmark the current state of affairs of managed realignment in the UK through the perspective of practitioners in the public and private sectors. In Chapter 8, Karen Thomas describes emerging policies and the drivers underpinning the implementation of managed realignment. She also examines the lessons learned so far by the Environment Agency, the government agency responsible for overseeing coastal flooding and erosion risk management in England and Wales. Chapter 9 brings the experience and views of Nigel Pontee, a private consultant involved in planning, designing and delivering managed realignment projects. He identifies and discusses the factors influencing the long-term sustainability of managed realignment.

Chapter 10 draws from existing literature and the results of a survey conducted in 2013 to expand on the challenges and achievements discussed in Chapters 8 and 9 to the wider context. This chapter discusses evidence of achievements attributed to managed realignment in relation to improvement of flood risk management, creation of intertidal habitats and the potential to deliver other ecosystem services such as carbon sequestration. It also compares how researchers, practitioners and stakeholders perceive managed realignment in the UK and elsewhere in the world.



Finally, Chapter 11 synthesises the current research and understanding presented in previous chapters to provide final remarks about the long-term sustainability of managed realignment. The Appendix provides a ‘work in progress’ list of managed realignment projects implemented in Europe and few examples of projects in the USA that fit the broad definition of managed realignment suggested in this book. Readers can keep updated with the progress of compiling a more comprehensive list of managed realignment projects, by accessing the online map of all identified projects through the link provided in the Appendix.

Managed realignment involves complex issues which vary in space and time. The knowledge of how the many social, economic and technical aspects of this strategy interact is evolving fast as new policies are formulated, more projects are implemented and new monitoring data become available. I have learned a great deal during the process of writing this book and hopefully you will find in these pages enough content to get you started in this interesting and relevant topic. Throughout the book you will find relevant sources of information you can access online to find out more and keep track of recent developments. I hope you enjoy reading.

February 2014  
Winchester, UK

Luciana S. Esteves

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