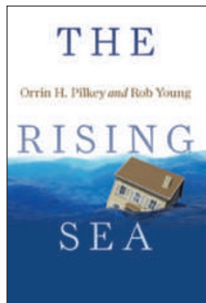


# Living on the edge



## The Rising Sea

by Orrin H. Pilkey and Rob Young

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In this short and easy-to-read book, Orrin Pilkey and Rob Young examine the implications of sea-level rise due to human-induced global warming. They conclude that the rise is likely to be substantial, and given the potentially large impacts of such a rise, they strongly advocate a major public policy response that includes a widespread, or even universal, retreat from the coast. The approach suggested in this book is consistent with most of Pilkey's work, which advocates a retreat philosophy for coastal management; that is, learning to live with a dynamic coast rather than focusing on engineering measures aimed at coastal protection.

In the opening chapter, the authors provide a glimpse into the predicament of coastal communities around the world — such as the residents of the small Arctic villages and tiny Pacific islands — who live in locations that are vulnerable to sea-level rise. In doing so, they provide compelling examples of why sea level matters and raise the question of whether remediation, and the massive expenditure that it entails, is an approach worth pursuing. The statement in this chapter that “six small villages on the Norfolk Broads northeast of London will be abandoned as sea level rises” has, however, been superseded by a ministerial statement that these defences will be maintained until at least 2050.

The following three chapters take a look at various aspects of sea-level rise, including how it can be predicted, how it would affect coastlines and the uncertainties involved. Here, readers will also find consideration of the “800-pound gorillas” — the Greenland and West Antarctic ice sheets — which can disintegrate and lead to a substantial rise in sea levels. Pilkey and Young consider a two-metre rise in sea level as “the planning scenario” for the twenty-first century,

acknowledging that this is well above the recent scenarios of the Intergovernmental Panel on Climate Change. I agree that we need to consider the risk of possible large changes, but the authors almost certainly overstate the threat from sea-level rise over the next 100 years. Several factors could change the level of threat; for example, ice-sheet decline may be much slower and even avoided with strident climate mitigation.

In chapter five, the authors deal with climate sceptics, and criticize the “manufactured doubt” about the need for action. They provide an interesting checklist for non-scientists to determine the validity of the claims and counterclaims that abound in the media. It has always struck me as odd that sea-level rise is not considered an issue on the US East and Gulf coasts, even though extensive measurements (forget models and projections) show a significant rise. For example in subsiding Louisiana the rate of sea-level rise is up to one metre per century.

Subsequently, the book dwells on the impacts of sea-level rise on coasts, their ecosystems and their human communities, using Hurricane Katrina as a metaphor. The authors also include a discussion of how rising sea levels will affect various coastal nations. The final chapter, which is entitled ‘Sounding Retreat’, reiterates the overall message of the book and argues that protection — be it by sea walls and dykes or by beach nourishment — is ultimately futile.

There is little doubt that there is a need to combat rising sea level. However, what this response might be is open to debate, which is why this book needs to be read with caution. I think that engineering measures to protect coastal populations must be considered in the coming decades, if only around our large urban areas.

For example, in the UK, which the authors highlight as an example of a country that is preparing for sea-level rise, it is accepted that a variety of responses are required, including “hold the line” as well as “retreat the line”, and measures such as flood resilience for new buildings. In other words, only some coastal communities will need to be relocated, whereas others will receive help to institute protection measures. The recent Delta Commission in the Netherlands (see Commentary on page 450 of this issue) has in fact advocated an innovative hold-the-line approach for most of the country.

Looking at the book as a whole, climate mitigation receives little mention, and a large rise in sea level is taken as inevitable. Although a substantial rise is indeed inevitable, it is important to bear in mind that a recent report of the Intergovernmental Panel on Climate Change has argued for combining adaptation with mitigation to ensure that the rise remains manageable. Reducing greenhouse-gas emissions is in fact the subject of the United Nations Climate Change Conference, which will take place in Copenhagen in December.

The book comes off to me as rather US-centric; this is exemplified by the call to “Get the Corps [US Army Corps of Engineers] off the shore”. Despite many international examples, most of what is said is relevant only to the US barrier coasts (East and Gulf coasts), where Pilkey has worked most extensively and advocated retreat in response to erosion and storms for more than 20 years.

Readers of this book will probably perceive a dislike of most things related to coastal remediation, including sea walls, beach nourishment, quantitative hydrodynamic and morphodynamic models, and coastal engineers. It is especially puzzling that models are largely dismissed as being incapable of useful prediction. And yet, how are we to respond to future conditions outside our experience without a modelling framework? In fact, our understanding of future sea-level rise emerges from models. The deficiencies of existing models of beach behaviour (which are not as bad as the authors suggest) can be seen as a call for improved models, rather than their rejection altogether. Without some sort of a ‘model’, it may be difficult to estimate how far inland we need to retreat.

Retreat is one possible adaptation response to coastal retreat and sea-level rise, but there are other options on the table, and they all need to be considered. The debate about the best approach to adaptation will continue and remains an important research priority to inform coastal management. □

## REVIEWED BY ROBERT NICHOLLS

Robert Nicholls is at the Tyndall Centre for Climate Change Research, University of Southampton, Highfield, Southampton SO17 1BJ, UK.  
e-mail: r.j.nicholls@oton.ac.uk