

Estuaries of the World

Eric Wolanski
Editor

Estuaries of Australia in 2050 and Beyond

 Springer

Estuaries of the World

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Estuaries of Australia in 2050 and Beyond

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I dedicate this book to my grandson Oliver, born and being brought up on the shores of Australian estuaries; I hope that some will remain healthy for him to entrust to his children.

Eric Wolanski

Foreword

Why This Book Series? Why This Book?

Over the last decade, there have been numerous advances in both understanding and managing estuaries, with an increasing focus on multidisciplinary studies, through numerous case studies and projects at local and national levels. In addition, regional and global programmes have been developed; some are being implemented and some are in evolution. However, despite the rapidly increasing knowledge about estuarine ecosystems, crucial questions on the causes of variability and the effects of global change versus local anthropogenic pressures are still poorly understood. At the same time, courses at university increasingly focus on environmental science and management but with comparatively very little emphasis on estuaries. There are excellent textbooks in this field, mostly process-based and about synthesising science, but by and large they do not reflect the great variety of estuaries around the world; so the practical application of this knowledge to one estuary or one coast with several estuaries is very complex and not straightforward. As a result, most of the time, students studying a particular estuary or coast use ill-assorted websites, sometimes of doubtful quality. The situation is comparable to that of decision-makers and managers. They are submerged by all sorts of publications, very few concentrating on one estuary or on specific problems.

Because the perception of politicians and managers of coasts is slowly shifting from a mainly short-term economic approach towards a long-term socio-ecological perspective, Springer Publishers recognised the need to make existing scientific information much more manageable to non-specialists, without compromising the quality of the information. The series *Estuaries of the World* was established in such a context, giving the scientific community the opportunity to assemble and put in order (sometimes disorganised) existing knowledge. Overall, the series will encompass all scientific aspects of estuaries through a multidisciplinary approach.

This book (the first in the collection) deals with a selection of estuaries which are characteristic of a whole continent: Australia. The country is so large that it spreads from the tropics (10th parallel) to the temperate zone in Tasmania. Estuaries themselves differ by an order of magnitude in terms of size; yet, they all have common properties and processes. In Australia, as anywhere else in the world, the coastal zone and its estuaries, large or small, are amongst the most endangered areas. Pollution, eutrophication, urbanisation, land reclamation, dams, irrigation, over-fishing and exploitation continuously threaten the future of some estuaries, which bear the full pressure of these developments. However, unaffected systems still exist in Australia and, if not strictly pristine, enjoy an exceptional ecological quality. In between these two categories, unfortunately some high-quality environments are currently being degraded because of loose management. The major challenge that humans face today is protecting estuaries, which benefit from a good ecological status, by managing their use. Preventing other systems to further degrade and restoring them require immediate action so that future generations can also enjoy the fantastic visual, cultural and edible products that

they provide. Such an approach assumes that all users of the environment share views and are able to communicate wisely on the basis of robust science. Current changes in climate (e.g. temperature rise, sea-level rise, increased risks of floods and droughts and ocean acidification) may increase the risk of abrupt and non-linear changes in many estuarine ecosystems, which would affect their composition, function, biodiversity and productivity. In order to provide a solid scientific background to future debates, this book does not just attempt compiling case studies but puts into light best practice both in scientific research and coastal management.

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Jean-Paul Ducrottoy

Eric Wolanski

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Prologue

The majority of the Australian population lives near estuaries and the coast. Many Australian estuaries were historically degraded and others are at risk of degrading as the population and the economy are increasing rapidly. Is Australia's development ecologically sustainable for estuaries and coasts? This book addresses this question by detailed studies of a number of iconic Australian estuaries and bays. This book demonstrates, through the writings of eminent Australian scientists, how these estuaries function by merging the physical oceanography, the ecosystem processes and the socio-economic science. The chapters describe most types of Australian estuaries from pristine in the tropics to those impacted by irrigation, urbanisation and industrialisation. The key message is that the basic science has been done, and this makes it possible to understand how these brackish water ecosystems function. This enables the scientists to forecast with some confidence what these estuaries will look like by 2050 based on political and socio-economic decisions that are now made.

This book offers science-based solutions to achieve ecologically sustainable development. It is a wake-up call that every Australian estuary faces present and future socio-economic and environmental problems with various scales. This book shows that we have much to learn by understanding the lessons from the past and from each other as they apply to the wide variety of Australian estuaries in order to ensure that future developments do not occur at the cost of the environment. To help achieve this outcome, this book demonstrates how to use science to balance the socio-economic imperatives with the ecological needs of the estuaries so that they can deliver the full range of ecosystem services – such as a high quality of life – that the population expects.

I commend this book for its comprehensive coverage of the variety of estuaries in Australia and for using the best science available. I hope that it will create constructive discussions and awareness of the opportunities and risks for Australian estuaries and the human population living on its shores and the need for integrating our efforts to deal with these development issues.

This book is especially important because both major political parties have virtually adopted a policy of a “little Australia”, probably as a means of avoiding environmental and developmental difficulties and the investment that would be needed for both.

There are some people in Australia who believe that this country is already fully populated. Nobody in any other country in the world, having regard to the world's population pressures, would hold a similar view.

In other words, Australia's current policies are not sustainable.

At the end of the Second World War, Australian political leaders of all persuasions knew that Australia was indefensible with its resources and population. They set about expanding both in a vigorous and farsighted manner which has done much to benefit Australia and to diversify our society.

We need to embrace the future with a similar commitment. We need to aim for a much larger population, not only to justify our holding a large and wealthy continent in the eyes of the world but also to give us greater weight to advance Australian values, to make a greater contribution to security and to peace throughout the Western Pacific.

In short, an Australia of 40 or 50 million would find it much easier to be independent of major powers. We have too often followed major powers into their wars of no direct interest to Australia. That policy which has dogged Australia since Federation needs now, quite desperately, to be ended.

This book is valuable because the research gives us intimate knowledge of how to handle the consequent population pressures, how to protect and enhance the environment and what investments will be necessary to do so. It can therefore be most helpful as a guide for the future of Australia.

*The Right Honourable Malcolm Fraser, AC CH
Former Prime Minister of Australia, 1975–1983*

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