

Preface

Coastal Wetlands of the World follows the book by Scott, Medioli and Schafer (2001) on *Monitoring in Coastal Environments*. We are motivated to write this new book based on concern about the status of mangroves and salt marshes all over the world, from pole to pole, and by the fact that few students have the chance to look at our changing shorelines from both a geological and an ecological perspective. Coastal wetlands are being destroyed and degraded at alarming rates, and only a fraction remains. These wetlands protect us from storm buffering and have extremely high primary production, making them important storehouses of carbon and energy, habitats that nurture juvenile stages of commercially important fishes and that filter our waste water – yet we continue to damage them faster than we can preserve them. In some areas, less than a third of natural wetlands remain along the coast, and very few are entirely unaffected by *direct* human impacts. Furthermore, all our coastal wetlands are changing in response to *indirect* human impacts: global warming, sea level rise and increasing numbers of severe coastal storms. These impacts are further magnified in the Arctic, where the pace of climate warming is four times faster than other places on Earth, and where disappearing sea ice is encouraging rapid expansion of oil and gas exploration, with the associated risks of long-lasting pollution damage. Arctic people say that 'The Earth is faster now' – and it appears that traditional methods of coastal living are no longer viable. It is likely that circumpolar regions are already irreversibly changed – and the spill-over impacts on global air and ocean systems is already being felt by people in crowded cities of warm temperate regions.

We take an interdisciplinary approach to *Coastal Wetlands of the World* – there literally is something for everyone between the covers of this book. It was initially written for undergraduate students, focussing on classical studies that are the baselines for evaluating recent changes, but it soon became clear that more detail was needed to guide readers towards the proliferation of new scientific literature. As a result, we have included innumerable up-to-date references that will also help graduate students, naturalists and coastal-resource managers obtain a fresh view of tidal wetlands research across a wide spectrum of disciplines. Geologists, ecologists, conservationists, environmentalists, archeologists, historians and social scientists can all learn something new and clearly understand the issues at hand, for any area of the world. The book's global focus and ample illustrations are also intended to draw the student beyond their familiarity with a limited neighbourhood marshland toward a much bigger picture of wetlands geomorphology and biodiversity on a global scale.

Why yet another book covering coastal wetlands and ecosystems? Our literature search of the most widely used texts showed a large imbalance in coverage of the world's continents, despite the shrinking size of our Internet-linked Global Village. We have attempted to fill in large gaps for under-reported regions of Mexico, South America, Africa, Eastern Europe

and China, and we provide the only systematic and focussed coverage of global tidal wetlands. Most other wetlands books are broken into vari-authored chapters and/or report on either marshes or mangroves, presenting a somewhat schizophrenic perspective to the reader, as though the world has sharp boundaries. In contrast, our readers are provided a seamless virtual tour from the northern tip of continental North America to the southern tip of New Zealand. From geology to biology to ecology to human impacts, we introduce wetlands from a generic stand point (Chapters 1–6). We then dive into information about coastal wetlands across all continents, giving specific historical case studies, and earmarking new research and paradigm shifts in traditional concepts about drivers of coastal climate changes. The last section of our book focusses on unique applications of coastal wetlands studies, including a chapter on paleoseismology, paleoclimate and forecasting (updated and much expanded in the range of proxies from *Monitoring in Coastal Environments*), and an outline of how coastal wetlands are used as experimental mesocosms to better understand and replace what is lost. We are the first to cover both traditional knowledge and cutting-edge subcellular and genetic knowledge of the potential for salt-tolerant plants to combat crises of soil salinization in agricultural crops. The development of new salt-tolerant crops is a major part of the new Green Revolution needed to feed the world's rapidly expanding human population – simultaneously representing major carbon credits and conserving our fast-dwindling global freshwater resources. Education is the first step in the coastal crisis facing everyone 'living on the edge' – the more that can be taught about tidal wetlands, the more our global population can see the dire need to save what remains and wisely restore what we have destroyed.

We are indebted to many people and organizations who have helped in the writing of this book, answered multiple questions about places less familiar to us and provided illustrative materials. Invaluable help with diagrams comes from Rob Gauthier, Alexandre Pelletier-Michaud, Gary Grant and Matthew Chedrawe, and we are indebted to Ken Wallace for photo-compilations and design. The extended family of Petra Mudie have provided photo-coverage from all continents where there are tidal wetlands (thanks to Anita and Hilton Whittle, Helen Pease and Peter Mudie) and we sincerely thank all those who graciously provided other beautiful photos of wetlands and animals, as acknowledged in the figure captions. Finally, we are most grateful to Laura Clark and others at Cambridge University Press, who provided encouragement, guidance, and answered no less than 100 questions to help get this book from our heads into a beautiful printed volume.