THE COAST OF AUSTRALIA

Andrew D. Short and Colin D. Woodroffe

Australia boasts one of the longest, most diverse and pristine coastlines in the world. Ranging from the oldest rocks on the planet to those that are still evolving today, the Australian coast is a dynamic, ever-changing suite of dramatic landforms and productive ecosystems. From iconic beaches such as Bondi and the long, unbroken sands of the Coorong, to the seemingly endless curtain of the Nullarbor cliffs along the Great Australian Bight, this book takes you on an illuminating journey around Australia's coastline. Covering 36 000 kilometres of shoreline, it details the various coastal systems that exist around the continent, including beaches, dunes, estuaries, deltas, rocky coast and coral reefs.

Written by two of Australia's leading coastal scientists, Andrew Short and Colin Woodroffe, *The Coast of Australia* provides the first comprehensive account of the Australian coast, revealing why it formed and how it continues to change.

Andrew Short is Professor of Marine Science and Geosciences at the University of Sydney. He has degrees from the University of Sydney, the University of Hawai'i and Louisiana State University. He has studied the coasts of North and South America, the Arctic Ocean, Hawai'i, New Zealand, the British Isles and Europe, as well as the entire Australian coast.

Colin Woodroffe is Professor in the School of Earth and Environmental Sciences at the University of Wollongong. He has a BA, PhD and ScD from the University of Cambridge and a Masters in Applied Science from the University of New South Wales. He has studied tropical coasts in the West Indies and the Indian and Pacific Oceans, and has undertaken research on many of the remote coasts of Australia.

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To Professor Bruce G. Thom
for his leadership in the study and
management of the Australian coast

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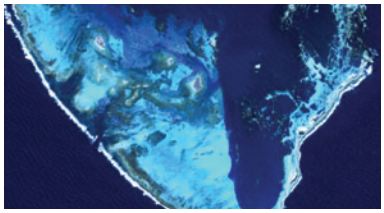

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PROLOGUE

Australia has one of the longest, most ancient, diverse, pristine and spectacular coastlines in the world. The shoreline ranges in age from the oldest rocks on the planet, to those that are still being formed today through the addition of sediment from rivers or the breakdown and accumulation of organisms such as coral or shell. The continent experiences a wide range of climates around its coast, from tropical monsoon in the north through to temperate–humid and arid climates in the south and west. Half of the mainland's more than 30 000-kilometre coast consists of over 10 000 sandy beaches; the remainder is predominantly rock, much of which is sculpted into impassably steep cliffs. Australia's coast is home to many plants and animals that are found nowhere else on Earth. Across the northern shoreline are the most extensive coral reef systems in the world, along with some of the largest areas of undisturbed mangrove forests and extensive tropical seagrass meadows. The southern half of the continent is exposed to the world's most energetic wave climate and supports the world's most extensive temperate seagrass meadows and shelf carbonate system, which has supplied massive volumes of marine sand to build the beaches and dunes.

The Australian coastline is a dynamic, ever-changing suite of dramatic landforms and productive ecosystems. Coastal waterbodies include more than 1000 estuary and delta systems where rivers reach the coast, along with over 1500 smaller streams and tidal creeks. The majestic Port Jackson, which includes Sydney Harbour, is one of the many estuaries located along the east coast. By contrast, on the west coast lies Shark Bay, a large, arid, salty bay that contains rare colonies of algal stromatolites, the modern equivalents of one of the oldest life forms on earth – these are our living 'fossils'. Across northern Australia there are many estuaries with broad tidal flats covered with mangroves. Here, the tidal range can reach several metres, with the world's third-highest tides found in King Sound, Western Australia. The southern coast is pummelled by large waves, and the mouth of our largest river, the mighty Murray, is shaped by wave action, which on occasion seals off the much-reduced river flow.

Australia's beaches include the iconic Bondi Beach in Sydney, long unbroken beaches such as the Coorong in South Australia, Ninety Mile Beach, which flanks the Gippsland lakes in Victoria, and Eighty Mile Beach, located near Broome in Western Australia. The strong westerly winds in the south of the continent and the southeast trade winds that affect the north coast have built some of the largest and most extensive

coastal dune systems in the world, including the world's largest sand island, Fraser Island.

Vast stretches of coastline are composed of cliffs. The seemingly endless curtain of the Nullarbor cliffs along the Great Australian Bight, and the scenic, indented cliffscape near Port Campbell contrast with the stately sandstone cliffs that flank the heads and line the shores of Sydney, the dolerite columns of the southern shore of Tasmania and the rugged granite cliffs forming numerous capes and headlands in between. Bold, rocky coasts in the tropics support fringing coral reefs. The Great Barrier Reef is the most extensive coral reef in the world, containing a multitude of rugged volcanic islands and secluded coral cays across its broad lagoonal shelf. The pristine Ningaloo reef fringes the shore along the arid North West Cape, and more remote and lesser-known reefs occur along the north coast and offshore.

In this book we take you on a journey to admire these magnificent landforms and to understand why they formed and how they change, continually responding to waves, tides, wind and other climatic and oceanographic factors. Many of our coasts bear the imprint of humans. On some parts of the coast, traces remain of use by the earliest inhabitants of the Australian continent. In other places, high-rise apartments support high densities of inhabitants, and the desire for a 'seachange' lifestyle sees many more people migrating to the coasts each year. Other coasts remain almost untouched, even today, although the indirect effects of climate change are threatening them and seem certain to be felt in coming years. Most Australians have seen little of, and know little about, these national treasures. Come with us on a journey of discovery and share our wonder for the magnificent coast of Australia.