

## Flood mapping information to be centralised under joint project

A significant milestone was reached for the National Flood Risk Information Project (The Project) when results from Phase 1 were released at Geoscience Australia in November 2012. This has brought access to centrally located flood mapping information one step closer.

Released by the Federal Minister for Resources and Energy, the Hon Martin Ferguson, AM MP, and the Minister for Emergency Management, the Hon Nicola Roxon, MP, Phase 1 results included the updated Australian flood studies database, and a pilot series of maps derived from satellite imagery.

The updated database contains details on over 1300 existing flood studies and direct access to an increasing number of flood studies reports, making it easier for planners, the public and insurers to determine flood hazard.

“Easy access to flood risk information will give communities and planners a better understanding of their exposure to floods, as well as assist insurers in developing fair and reasonable policies,” said Minister Ferguson at the release.

The satellite imagery derived maps show the observed extent of floods over the last six years for three key study areas: Condamine River, Queensland; Flinders and Norman Rivers, Queensland; and Goulburn and Loddon Rivers, Victoria. These maps will be used to understand the frequency and extent of flooding across large regions, especially in areas where flood studies have not been undertaken.



**Figure 1.** The Hon Nicola Roxon MP (left), the Hon Martin Ferguson, AM MP (centre) and Gai Brodtmann MP (right) at the release of the National Flood Risk Information Project at Geoscience Australia.

The national project was created as part of the Australian Government response to the Natural Disaster Insurance Review, and aims to increase the quality, consistency and accessibility of flood risk information in Australia.

The Project will also see the development of a flood information portal over four years (starting 2012) which will be hosted by Geoscience Australia and updated in November each year.

“We are working towards a portal that will provide a single access point to all available flood maps and studies where users can assess whether they are in an area at risk of flooding,” said Minister Ferguson.

Moving beyond 2012, Phase 2 of the Project will see further enhancements to the database including access to more data and improved functionality. The database will bring together flood studies information with satellite derived flood extents for priority areas across the country. This newly integrated information will be accessible through a spatially enabled web-interface with enhanced functionality. These improvements will enable easier data entry and retrieval for users and data custodians.

During the project Geoscience Australia will work with Engineers Australia to revise and publish the *Australian Rainfall and Runoff* guide. “The new guide will enable engineers to develop more accurate and detailed flood studies, and will

enable them to consider the potential impact of climate induced changes to rainfall and river flow patterns,” Minister Ferguson said.

The Project – a joint Australian Government initiative from Geoscience Australia and the Attorney-General’s Department – directly supports implementation of the National Strategy for Disaster Resilience, which emphasises the importance of building community resilience to reducing the impact of natural disasters.

### **For more information**

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## **Australian mineral exploration investment opportunities promoted in China and Japan**

Geoscience Australia, together with senior representatives from State and Northern Territory (NT) government geoscience agencies (*Australia Minerals* team), visited China and Japan in November to promote investment in Australian mineral exploration and mining opportunities. Geoscience Australia’s Mineral Exploration Promotion team in the Minerals and Natural Hazards Division coordinates and leads the *Australia Minerals* promotional activities both domestically and internationally.

*Australia Minerals* had a major presence at the China Mining convention in Tianjin (3 to 6 November), with a new and upgraded booth plus a symposium on ‘Australia: Mineral Exploration and Mining Opportunities’. The convention attracted more than 5000

### **Related articles/websites**

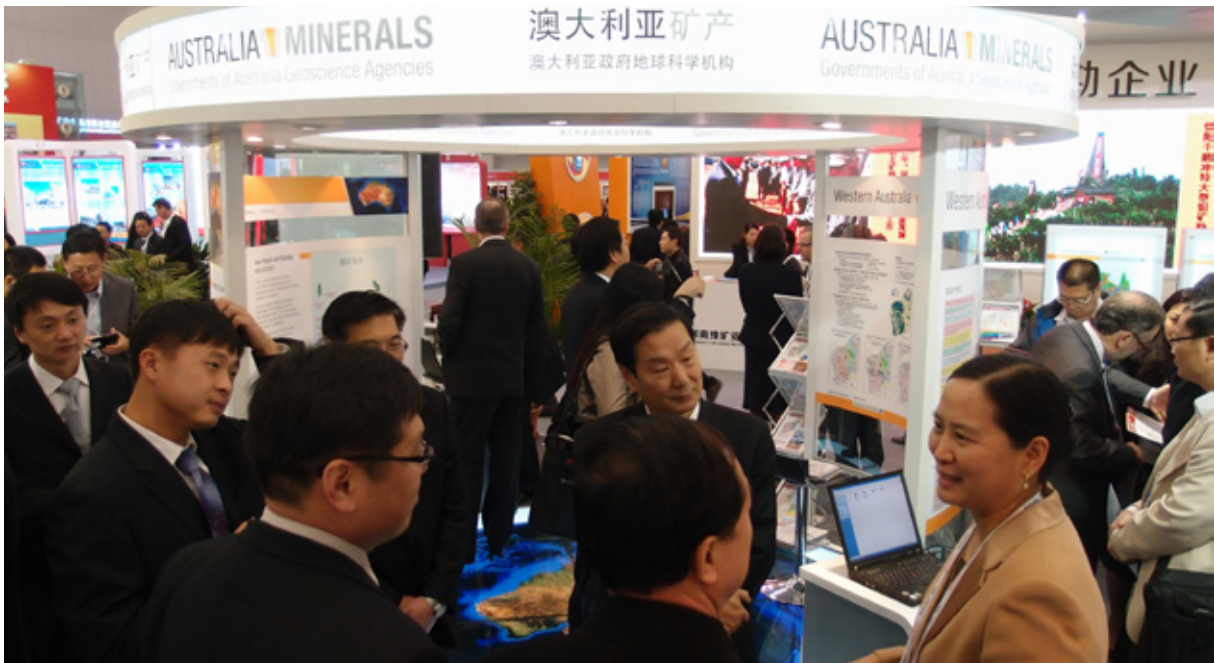
The National Flood Risk Information Portal

[www.ga.gov.au/flood-study-search/](http://www.ga.gov.au/flood-study-search/)

Natural Disaster Insurance Review Report

[www.ndir.gov.au/content/Content.aspx?doc=report.htm](http://www.ndir.gov.au/content/Content.aspx?doc=report.htm)

Chinese and international delegates, and is the second most important forum *Australia Minerals* attends after the annual Prospectors and Developers Association of Canada (PDAC) convention in Toronto. In addition to questions on specific projects and opportunities received at the booth, many of the questions at the symposium were focused on issues around doing business in Australia.



**Figure 1.** *Australia Minerals* booth at the China Mining Convention, Tianjin, November 2012.

Seminars on opportunities for mineral exploration investment were also held in Beijing in conjunction with the China Ministry of Land and Resources and in Tokyo with Austrade and sponsored by Japan Oil, Gas and Metals National Corporation. The Beijing seminar attracted approximately 300 participants and involved speakers from Austrade and Department of Resources, Energy and Tourism, Geoscience Australia, most states and the NT, four Australian exploration companies, and the China Mining Association.

Some of the key messages delivered in these promotional activities

are that Australia is still under-explored and has high potential particularly in areas 'under cover'; the sovereign risk is low; and federal and state/NT governments strongly support investment through provision of free pre-competitive geoscientific data and other programs.

**For more information**

email [ausgeomail@ga.gov.au](mailto:ausgeomail@ga.gov.au)

**Living on the edge – the coast**

Summertime and the coast are synonymous for many Australians.

But what makes our coastline so special. Is it our geological features that make our coastline so distinct from the rest of the world or is it how our nation developed with the reliance on the coast and seas for transport and trade during European settlement through to present day where it is the setting for most of Australia's population, industry, tourism and recreation?

*Living on the edge - waterfront views* is Chapter 6 from Geoscience Australia's publication *Shaping a Nation: A Geology of Australia* and explores this very question.

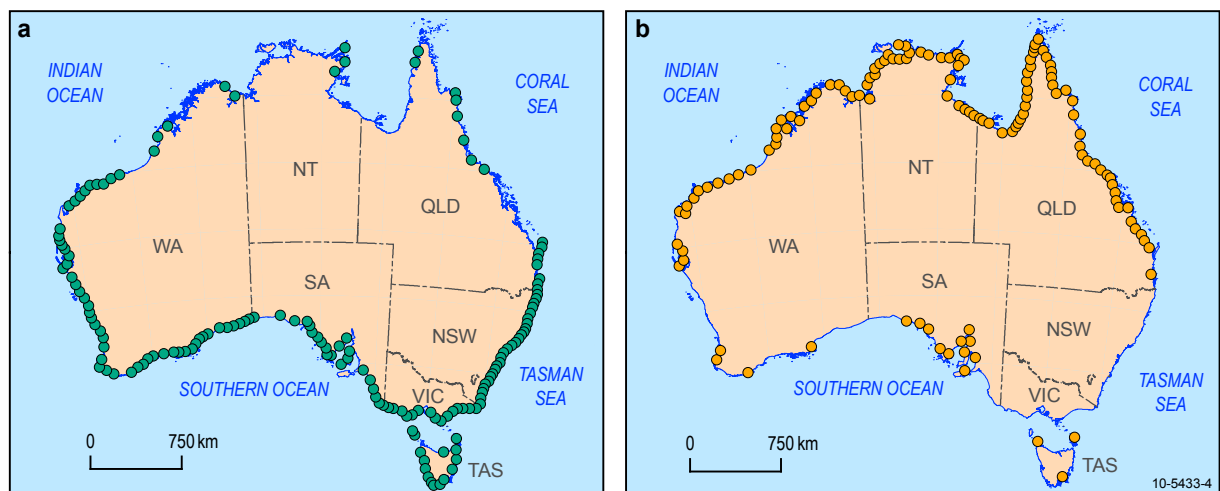
The coast of Australia takes many forms, but it is the sand, surf and sun that are the well-known characteristics of the Australian coast, which totals more than 36 000 km in length.

A range of characteristics of the Australian coast clearly distinguishes it from other continents. These features are a consequence of the

continent's geological evolution which has set the configuration and aspect of the coast, in concert with a unique set of climatic and oceanographic regimes that determine wave and tide energy and the supply and distribution of sediment.

**Why are Australia's beaches so good for surfing?**

Well, not all of them are. Australia's beaches can be classified into four major types: wave dominated, tide modified, tide dominated, and beaches



Source: Geoscience Australia

● Wave dominated beaches

● Tide dominated beaches

**Figure 1.** Distribution of a) wave-dominated beaches and b) tide-dominated beaches.



**Figure 2.** Wave-dominated beach—Lighthouse beach.

fronted by rock or reef flats. In Australia wave- and tide-dominated and tide-modified beaches represent nearly 90% of all beaches. They are typically bound by headlands and are usually free from offshore rocks and reefs. Wave-dominated beaches occur principally around the southern half of Australia; tide-influenced and tide-dominated beaches occur mainly along the northern half; and beaches with rock and reef flats are slightly more abundant in the north.

In reality, each beach can be classified by a ‘modal state’ that is aligned with the most common wave conditions to which it is subject. The morphology of a beach changes in response to variations in wave energy. Thus, wave-dominated beaches experience persistent high wave energy throughout the year and develop a wide, low gradient profile. This is in contrast to Northern Hemisphere low-gradient beaches that often experience greater seasonality, with a distinctive low-wave energy season.

The morphology of wave-dominated beaches results in their being particularly good for surfing, but they are also relatively hazardous for swimming due to the plunging breakers and well-developed rip currents. For beaches fronted by rocks and reef flats, waves breaking on the steep upper beachface at high tide produce very dangerous surf conditions. These beaches are therefore some of the most hazardous, particularly along the southern Australian coast. At low tide, the rock or reef platform is exposed and waves break far offshore.

In southern Australia, beaches are wave dominated and have been clearly the most favoured backdrop for European settlement and urban expansion. These beaches have a broad low-gradient beach face made of well sorted sand, and a wide surf zone with well-developed sandbar and troughs. They are often set between prominent headlands, comprise clean, white quartz or carbonate sand, with clear, clean water, and with a wave climate that produces regular year-round surf.

Many of the beaches in Northern Australia are largely shaped or significantly influenced by tides. They generally have a narrow, steep beach face or relatively coarse shelly sand, fronted by an extensive low-gradient sand or mud flat. At low tide, the shoreline may be hundreds of metres to a few kilometres (on low-gradient coasts) from the sandy beach face, the width increasing with tidal range. These beaches usually lack good surfing waves as a consequence of the large tides, beach morphology and generally low wave energy. They occur where there are macrotidal regimes or where tidal energy is high relative to wave energy, such as Cable Beach near Broome or Carmila Beach near Broad Sound.

### **Coastal dunes**

Approximately 85% of the sandy beaches in Australia are backed by coastal dunes. These aeolian landforms comprise sand that was transported to the beach by waves from the continental shelf (offshore) or from rivers (alongshore), then eroded from the beach by strong onshore winds and deposited inland.

There are significant differences between the coastal dunes of northern and southern Australia. In southern Australia, dunes are more extensive and contain a far larger volume of sand than those in the north. A few exceptions are large coastal dunefields in Arnhem Land, and Cape St Lambert. Overall, these



**Figure 3.** The Dawesville Channel was opened in 1994 to provide a new and permanent opening to the sea for the large Peel Estuary in Western Australia. *Source: Port Bouvard Marina (www.portbouvardmarina.com.au)*

differences are a product of the higher wind- and wave-energy regimes of beaches in the south, where the coast feels the impact of strong swell and onshore wind, especially from the Southern Ocean, and a supply of sand from offshore (shelf) or alongshore (river). In contrast, the coast of northern Australia experiences much lower levels of wave energy and therefore lower rates of sediment delivery to beaches, as well as less frequent strong onshore wind.

### ***Australia's coastal waterways and estuaries***

Estuaries are transition zones between marine and terrestrial environments. Frequent changes in the relative influence of land and marine processes result in estuaries being highly dynamic environments. We rely on estuaries for essential ecosystem services, such as shoreline protection and disturbance regulation (e.g. mangrove mitigation of cyclones), nutrient cycling, habitat diversity, food production and recreation. There are more than 1000 estuaries and other coastal waterways around Australia, and these have been classified into different types based on sediment supply and the relative influence of wave, tide and river processes.

### **Better valuing the edge**

Two common adages of real estate are 'you can't beat a waterfront view' and 'location, location, location'. The allure of a coastal home in temperate Australia has been a major factor in the recent rapid expansion of the large coastal cities of Australia, driven by a growing population and prolonged strong economic growth generated by the other 'boom' in the export of commodities. This expansion of coastal cities has been an important driver of the domestic economy and has further increased the proportion of the population in these cities. In the



more remote and sparsely populated sections of coast are the ports that play a key role in the expansion of the commodities trade and the economic prosperity of Australia.

There is much more to the 'clinging to the coast' by Australians than the desire for a waterfront view. Much of the Australian coast is dry, wild and remote and represents the antithesis of a 'good location' for European settlement and development.

As a consequence, modern Australian society is concentrated in the more benign humid, temperate coastal regions. The spatial distribution of the Australian population, therefore, reflects the strong influence of the continent's geological evolution on the geomorphological and oceanographic character of the coast. This interaction of geology, ocean and climate has produced the distinctive, as well as the less well-known, coastal environments of Australia.

*Shaping a Nation: A Geology of Australia* is the story of a continent's geological evolution as seen through the lens of human impacts. Exploring the geology, resources and landscapes of Australia, the book reveals how these have helped to shape this nation's society, environment and wealth. Presented in a refreshingly non-linear format, the book summarises much of what we know about this country's geological history, discussing the fossil record and evolution of life across the continent, describing its mineral and energy reserves, and revealing the significance of its coastal and groundwater systems.

The book also explores some of the challenges and opportunities presented by Australia's rich geological heritage, and outlines the issues they present in Australian society today. Based on much of the latest science, the book reveals Australia's expertise in the geosciences and reinforces the vital role they play in informing its present and future development.

In presenting the latest geoscientific knowledge, *Shaping a Nation: A Geology of Australia* is vividly illustrated by technical drawings and figures and accompanied by stunning photography that reveals the extraordinary beauty of Australia's geology and landscapes. For the avid reader, an accompanying DVD hosts extensive appendices, including supplementary reading and reference material, maps, movies and an interactive 3D model showcasing many geoscience datasets.

### **Related articles/websites**

Shaping a Nation: A Geology of Australia

[www.ga.gov.au/products-services/publications/shaping-a-nation.html](http://www.ga.gov.au/products-services/publications/shaping-a-nation.html)

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