Erupting volcanoes

Around 255 million years ago, in the Permian Period, the climate and landscape around Newcastle were very different to those today. Wide rivers flowed across a cold and thickly forested landscape, depositing sediments over vast floodplains and swamps. From time to time, distant volcanic eruptions would disturb the forest, producing dust clouds that would drift across the region, producing small deposits of volcanic ash. The New England volcanic field, in the north of New South Wales near the New England town of Inverell, created the current coastline and injecting volcanic dykes that are still visible in cliffs and rock platforms. Over time, the ash settled to form new rock layers, in this instance producing the 28-m-thick Bossa Nova sandstone layer. The New England volcanic field was active for around 80 million years, resulting in migration of the shoreline up to 25 km east and 30 km west of its current position.

The geotrail

Newcastle Coastal Geotrail largely follows scenic Bathers Way and is about 10 km long today. You can also drive to stops, which are mostly accessible from nearby car parks, although parking restrictions apply. Public buses service Nobbys Beach, Hewett Beach and coastal areas in between.

散热平台

散热平台是一个严酷的环境，居住在这里的生物有什么不同，它们如何让自己适应这种严酷的环境呢？

古生代末期的煤炭

煤炭是地质时期重要的沉积岩之一，它是由古代植物遗体经过漫长的地质过程形成。古生代末期的煤炭主要分布在澳大利亚的东海岸地区，包括新南威尔士州和昆士兰州。煤炭的形成需要适合的地理条件，如温暖湿润的气候和缓慢的沉积速度。新南威尔士州的煤炭主要分布在近海区域，与沉积岩的形成过程密切相关。煤炭的开采和利用对现代社会的发展有着重要的影响。

Newcastle Coastal Geotrail – our dynamic coast

Over 300 million years ago, in the Permian Period, the climate and geography around Newcastle were very different to those today. Wide rivers flowed across a cold and thickly forested landscape, depositing sediments over vast floodplains and swamps. From time to time, distant volcanic eruptions would disturb the forest, producing dust clouds that would drift across the region, producing small deposits of volcanic ash. The New England volcanic field, in the north of New South Wales near the New England town of Inverell, created the current coastline and injecting volcanic dykes that are still visible in cliffs and rock platforms. Over time, the ash settled to form new rock layers, in this instance producing the 28-m-thick Bossa Nova sandstone layer. The New England volcanic field was active for around 80 million years, resulting in migration of the shoreline up to 25 km east and 30 km west of its current position.

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Virginia's first type identified by geologists in the area. Rock platforms are a harsh environment to live in; they are exposed to the elements, and the water can be very salty. However, there are still many species that live on these platforms. For example, the species known as “Galeolaria worm tubes” which form dense colonies in the sand and gravel. These species are also found in places that are further inland, such as in dunes and near the coast. They are all very important to the ecosystem, as they help to prevent erosion by limiting the movement of sand and gravel. 1797, Shortland noted several coal seams in the feature, which was first named Coal Island. To improve the harbour, Governor Macquarie had a platform constructed from sandstone from 1816 to 1836. The breakwater was constructed in 1823. Part of the southern end of the wall was used for loading coal and held a coal cell and a furnace. The TRACK MObile has a path around the coal island, where you can see a variety of interesting fossil trees and minerals. Some of these are very difficult to find elsewhere, so this is a great opportunity to see them up close. The wall of coal that forms the northern part of the Track MObile contains a large variety of minerals, including coal, sandstone, limestone, and more. These minerals were deposited in a coal wetland, known as a peatland, where the coal was formed from the remains of ancient trees. These trees were then covered by layers of coal and other materials, which preserved the coal for millions of years. Most of this wall contains metamorphic rocks called quartzites that have been formed by the heat and pressure of deep burial. Some of these rocks contain minerals such as quartz, which is very hard and durable. The Coal Wall at Nobbys Head contains a large variety of interesting fossils, including fossil tree trunks that were deposited in the Coal Wetland. These fossils are very important, as they provide clues about the past climate and environment of the area. For example, the presence of certain types of trees in the fossil record can tell us about the local climate and environment in the past. The Coal Wall is a great place to learn about the history of the area, and to appreciate the beauty of the fossils that have been preserved in the coal.
Newcastle coastline – generalised cross-section and geotrail map

A pioneer’s view

A Cliff exposure is visible behind a fence at the Merewether Tuff, North Rocks. From here, you can see a magnified view of the rocks exposed in the Cliff, allowing you to see fossils in the sandstone.

The Nobbys Tuff is located high in the cliff here. The cliff, which is exposed by the Merewether Sandstone (the bottom layer of the Newcastle Coal Measures), is the landform you can see from the Cliff. The northern part of this cliff has been transported far by wind or water. This cliff is a great place to spot dolphins and migrating whales.

The changing seascape

Deposited in channels, crevasse splays and peat swamps. The changing seascape was due to the influence of the sea on the land. New landforms formed as a result of the sea’s movement. These columnar trees are living fossils, dating back to the Carboniferous Period. They are dominated by kauri gum trees (Thamnochota species) but also include a variety of native and introduced plants. If you can get a closer look at this view, you can see a magnified view of the rocks exposed in the Cliff, allowing you to see fossils in the sandstone.

Layers of time

In the cliff to the northeastern end of Susan Gilmore Beach you can see the thickest sequence of sediments along the Newcastle coast. This is because it is the highest part of the terrace in the rocks, and also because the resistant Merewether Conglomerate at the crest of the terrace was eroded back. This area is the place where many species of fish can be found. As you walk down from the Cliff you can see fossils in the sandstone.

The modern landscape

From Strickland Lookout on top of the Merewether Conglomerate, there are 360-degree views of the modern landscape of Newcastle. On a clear day, you can see over the city and suburb to northeast to first Stephens, south along the beaches and coastal cliffs to Merewether and Redhead north to Barrington Tops, northeast up the Hunter Valley and west to Mount Sugarloaf.

Geological processes and the resultant landscape

Newland’s rocks of the Newcastle Coal Measures are topped by the Merewether Conglomerate. The Merewether Conglomerate has resisted the resistant conglomerate remaining on the fore-reef area and has eroded out over time. The Hunter River estuary and delta, Creek erosion of the Merewether Conglomerate has resulted in the resistant conglomerate remaining on the beach. The Hunter River estuary and delta have eroded the conglomerate out of the delta. The Merewether Conglomerate has been transported far by wind or water. This cliff is a great place to spot dolphins and migrating whales.

Rocks and sediments under stress

At Merewether headland you can see evidence of movement by rocks and sediments due to Earth’s forces. Look up to the cliff face and see the forceful movement. The gully follows a normal fault preserved in the cliff face. A fault is a break in the rocks along which they have moved. In this fault the southern side of the fault has moved 5 m downwards relative to the rocks on the northern side (the ‘footwall’ of the fault).

The Australian landscape has been here for about 7000 years. Before then, the Merewether Conglomerate was a sedimentary rock formed from particles of sand, silt, clay and other materials. The geological processes that formed these rocks happened millions of years ago. The landscape of Newcastle is determined by its underlying rocks, which are transported far by wind or water. The modern landscape of Newcastle is determined by the underlying rocks, which are transported far by wind or water. The modern landscape of Newcastle is determined by the underlying rocks, which are transported far by wind or water.

Two splits with a sandstone in between. The water trapped in the pores of the sandstone can melt. During the last ice age 18 000 years ago, the sea level fell during ice ages and rose when the ice melted. The last ice age ice 18 000 years ago, the sea level fell over 120 m and the shoreline at Newcastle migrated outward around 20–30 km. As the sea level rose, the shoreline coastline migrated back inland over 120 m to about 50 m and the sea level oscillated over 12 m.

The Nobbys Tuff is located high in the cliff here. The cliff, which is exposed by the Merewether Sandstone (the bottom layer of the Newcastle Coal Measures), is the landform you can see from the Cliff. The northern part of this cliff has been transported far by wind or water. This cliff is a great place to spot dolphins and migrating whales.

Between Nobbys Tuff and Merewether Beach, the Merewether Conglomerate is eroded away. The sea has transported the fossils far by wind or water. This cliff is a great place to spot dolphins and migrating whales.

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