

Understanding shoreline change on the Victorian coast: Ocean Grove, Barwon Coast



Victoria has more than 2,500 km of coastline. In addition to its important and varied natural values, the coast provides critical social, cultural and economic benefits to communities. Coastal erosion already affects these values in many parts of Victoria. Climate change is likely to increase the frequency, intensity and extent of existing coastal hazards, further increasing the impact of erosion on the Victorian coast.

The Earth Systems and Climate Change Hub is investigating shoreline change in Victoria through the National Centre for Coasts and Climate.



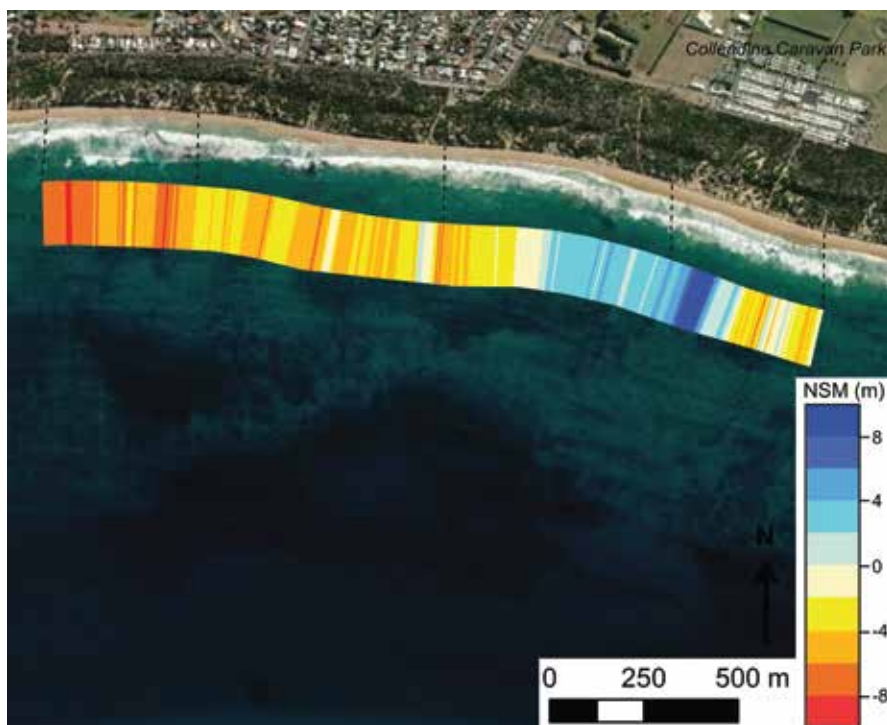
Understanding trends and changes in erosion rates is important for informing coastal management and planning activities. Researchers at the National Centre for Coasts and Climate (NCCC) in the Earth Systems and Climate Change Hub worked with the Department of Environment, Land, Water and Planning and Deakin University on the Victorian Coastal Monitoring Program to investigate changes in the frequency and intensity of historic erosion, and to shed light on the drivers of shoreline change, now and into the future. The program investigated historic shoreline change for 15 coastal areas in Victoria.

This fact sheet summarises the patterns of historic change for a section of the Buckley Park foreshore reserve on the Barwon Coast. This and other regional summaries are available at www.nesplclimate.com.au.

Historic shoreline change on the Ocean Grove coast (Buckley Park)

Buckley Park lies adjacent to the coastal town of Ocean Grove, located approximately 100 km from Melbourne on the Bellarine Peninsula. This is a relatively natural surf beach backed by a large 'mega-foredune', 10–20 m in height. Erosion by waves during periods of elevated sea level restricts pedestrian access to the coast and forms high and steep dune cliffs.

Shoreline change has been minor here compared to other regions in Victoria. The coastline has fluctuated around its 1966 position by less than ± 10 m over the 54-year period of study. The relative stability of this coastline is due to (1) frequent erosion by waves, which contribute to limited foredune development and shoreline growth, and (2) the mega-foredune which limits shoreline retreat. Most of the study area has shown periods of slight shoreline advance, resulting in the growth of plants on the beach and small dune development, followed by erosion and cliffing of the mega-foredune. In 2019, a narrow foredune – only ~4 m in width – had formed seaward of the mega-foredune along much of the study area.



How was shoreline change determined?

Researchers compared the shoreline in aerial photos dating from 1966–1991 to photos taken during 2004–2019 and were able to detect changes of 5 m or more. The shoreline was defined as the seaward edge of vegetation.

Implications for the future

Despite little overall change in position, the shoreline at Buckley Park is vulnerable to continued erosion. Erosive events occur frequently leaving limited opportunities for the shoreline to recover. Dunes, when they can form, are small and short-lived with limited capacity to protect the shoreline. The mega-dune, while preventing rapid shoreline retreat, also prevents the coastline here from adjusting to changing erosion regimes. Additionally, large dune cliffs form here, even during minor erosive events.

Living shorelines can reduce the threats of coastal erosion and flooding. NCCC researchers are developing national guidelines for coastal habitat restoration and eco-engineering to provide coastal managers and councils with more information to help manage threats to assets and mitigate future erosion risk.

Shoreline change on the Buckley Park foreshore reserve showing net shoreline movement (NSM), calculated as the distance between the earliest (1966) and most recent (2019) shorelines. Negative values (yellow/orange/red) indicate landward retreat (erosion) and positive values (green/blue) indicate seaward advance.

Only one short area of Buckley Park – a 100 m section of coast opposite the Collendina Caravan Park – has grown since 1966. In 2019 this section of shoreline was, on average, ~8 m seaward of its 1966 position.

The remainder of the study area has large sections showing no significant net change with occasional erosional sections. Most erosion occurred towards the western end of the study area.

Since 1966, these erosional sections have retreated by an average of ~6 m, although this extends up to 9 m in places. Most of the erosion occurred between 2010 and 2012; with little change in shoreline position since then.

The extent of shoreline change at Buckley Park is close to the detectable limits (± 5 m) of this study. For this reason, they should not be used for decision-making without closer investigation.

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