

Understanding shoreline change on the Victorian coast: Mounts Bay, Great Ocean Road



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.



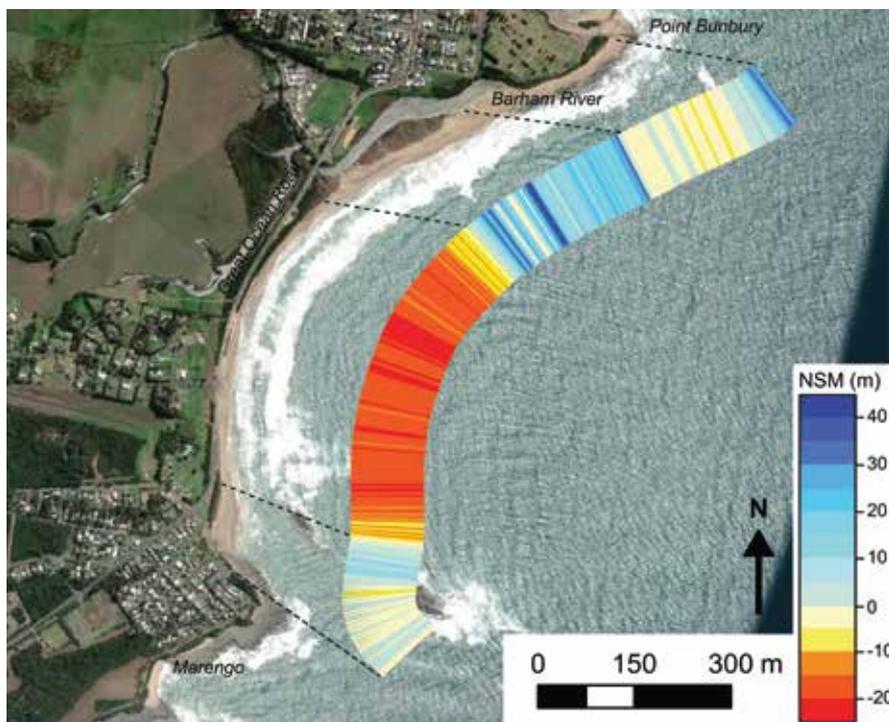
Understanding trends and changes in erosion rates is important for informing coastal management and planning activities. Researchers at the National Centre for Coasts and Climate (NCCC) in the Earth Systems and Climate Change Hub worked with the Department of Environment, Land, Water and Planning and 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 Mounts Bay (Marengo) on the Great Ocean Road. This and other regional summaries are available at www.nespclimate.com.au.

Historic shoreline change on the Mounts Bay coast

Mounts Bay is situated on the Great Ocean Road, approximately 200 km south-west of Melbourne. It extends from the small town of Marengo to the southern boundary of Apollo Bay Harbour (Point Bunbury). Past shoreline changes have been the result of storms (causing erosion) and the movement of the Barham river mouth, with subsequent (albeit limited) recovery periods.

Two areas of the Mounts Bay shoreline – the north-eastern extent of the study area adjacent to the Point Bunbury breakwater and the sand spit at the Barham River mouth – have grown overall since 1968. Shoreline advance at the sand spit has occurred only recently. Erosion between 1968 and 1986 led to the removal of pre-existing dunes on the sand spit. Re-establishment of dune plants on the spit since 2008 has formed a series of dune ridges measuring 5 m in height and up to 100 m in width. In 2019 the shoreline was located approximately 17 m seawards of its 1965 position.



How was shoreline change determined?

Researchers compared the shoreline in aerial photos dating from 1968–1991 to photos taken during 2008–2019 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

The overall retreat and acceleration of erosion rates identified in this study indicates that erosion processes related to longshore sediment transport and shoreline realignment may dominate on this coast. Erosion has removed the sand dunes, decreasing their capacity for shoreline protection, so Mounts Bay remains vulnerable to continued erosion during storms. Storm driven erosion now threatens assets on the coast including carparks, walking paths, sewer and water mains, stormwater drains and the Great Ocean Road itself.

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 Mounts Bay coast showing net shoreline movement (NSM), calculated as the distance between the earliest (1968) and most recent (2019) shorelines. Negative values (yellow/orange/red) indicate landward retreat (erosion) and positive values (green/blue) indicate seaward advance.

Most of the remaining coastline here is eroded with occasional sections showing no significant net change in shoreline position. Since 1968, the shoreline between the Barham River mouth and Marengo has retreated by an average of ~3 m, although this extends to an average of ~8 m near the centre of the bay. Between 1968 and 1991 shoreline retreat occurred periodically, followed by periods of limited dune development and accretion. Erosion rates have

accelerated since 1991. The coast now consists of a steep erosion scarp, just 6 m from the road in places, compared to the wide (~20 m) foreshore reserve and dune present in 1968. Some of this sand is likely to have accumulated in the newly built sand spit dunes. Since 2017, beach renourishment and dune creation has been carried out on the most erosion-prone sectors of the coast, but shorelines are yet to show any substantial recovery.

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