

Understanding shoreline change on the Victorian coast: Lady Bay, Warrnambool



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.



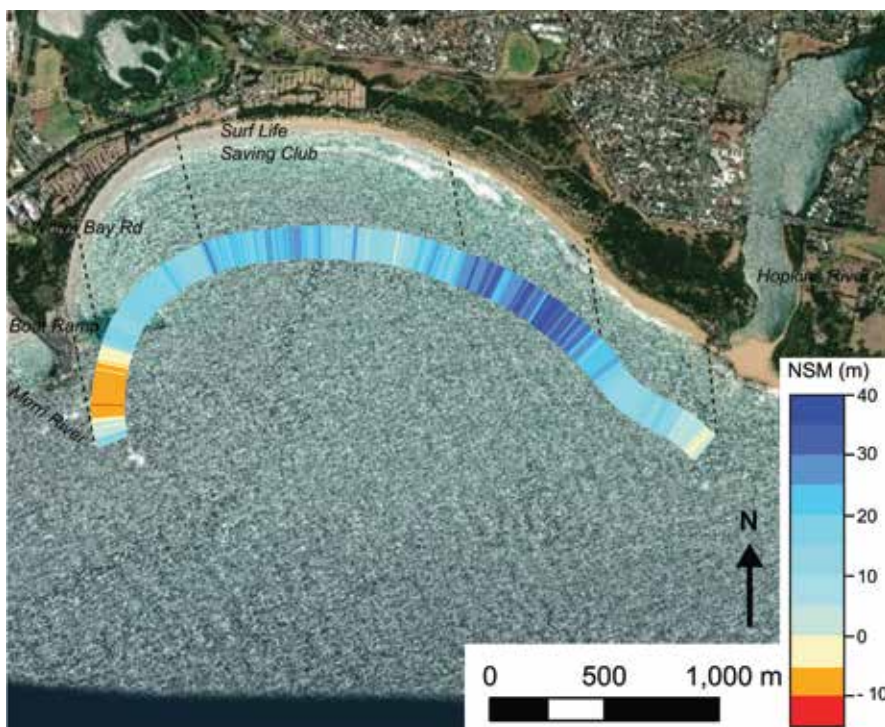
Understanding trends and changes in erosion rates is important for informing coastal management and planning activities. Researchers at the National Centre for Coasts and Climate (NCCC) in the Earth Systems and Climate Change Hub worked with the Department of Environment, Land, Water and Planning and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

Historic shoreline change on the Warrnambool coast

Warrnambool is a coastal town located 250 km west of Melbourne. Its main beach, Lady Bay, extends eastward from Merri River to the Hopkins River. This shoreline has grown seawards by up to 300 m since 1850 when construction of a series of coastal structures at Merri River altered sediment transport and wave processes. In recent years, erosion during storms has cliffed the dunes, leaving them vulnerable to collapse, and damaged beach access. There is concern that the once growing beach is now undergoing a period of sustained retreat.

Most of the Lady Bay shoreline – in the immediate lee of the Lady Bay Boat Ramp and eastwards from Worm Bay Road – has grown overall since 1969. In 2019 the coast was located on average 20 m seawards of its 1969 position. This shoreline advance has occurred episodically with periods of dune growth punctuated by minor storm driven erosion affecting different sections of coast at different times. Since 2014, the western sections have retreated slightly (~8 m) while the eastern sections have continued to grow.



Shoreline change on the Warrnambool coast at Lady Bay showing net shoreline movement (NSM), calculated as the distance between the earliest (1969) and most recent (2019) shorelines. Negative values (yellow/orange/red) indicate landward retreat (erosion) and positive values (green/blue) indicate seaward advance.

How was shoreline change determined?

Researchers compared the shoreline in aerial photos dating from 1969–1986 to photos taken during 2007–2019 and were able to detect changes of 5 m or more. The shoreline was defined as the seaward edge of vegetation or the top of any rock walls, whichever was applicable.

The western extent of Lady Bay – from the Lady Bay Boat Ramp carpark to Worm Bay Road – showed no significant net change or slight growth in shoreline position between 1969 and 1981, followed by a persistent trend of shoreline retreat. By 2007, a rock wall protected the shoreline adjacent to the carpark from further retreat. However, the unprotected coast has continued to erode, with rapid retreat

occurring between 2014 and 2016 following several major storms. Since 1969 the shoreline here has retreated by an average of ~7 m, although localised erosion of up to 11 m has occurred. Since 2016 there has been slight shoreline recovery in places, but the region remains vulnerable to further erosive events.

Implications for the future

Past shoreline changes have been the result of storms (causing erosion) and subsequent recovery periods. Historically this coast has been building up; however, erosion processes may now dominate on the western sections of Lady Bay. Dune rebuilding following erosion appears to occur slowly, so Lady Bay remains vulnerable to continued shoreline retreat. This coast is relatively undeveloped so retreat poses a minimal threat to built infrastructure, but continued erosion may adversely affect the important recreational assets of this coastline.

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.

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