Earth Systems and Climate Change Hub

National Environmental Science Programme

Understanding shoreline change on the Victorian coast: Apollo 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.

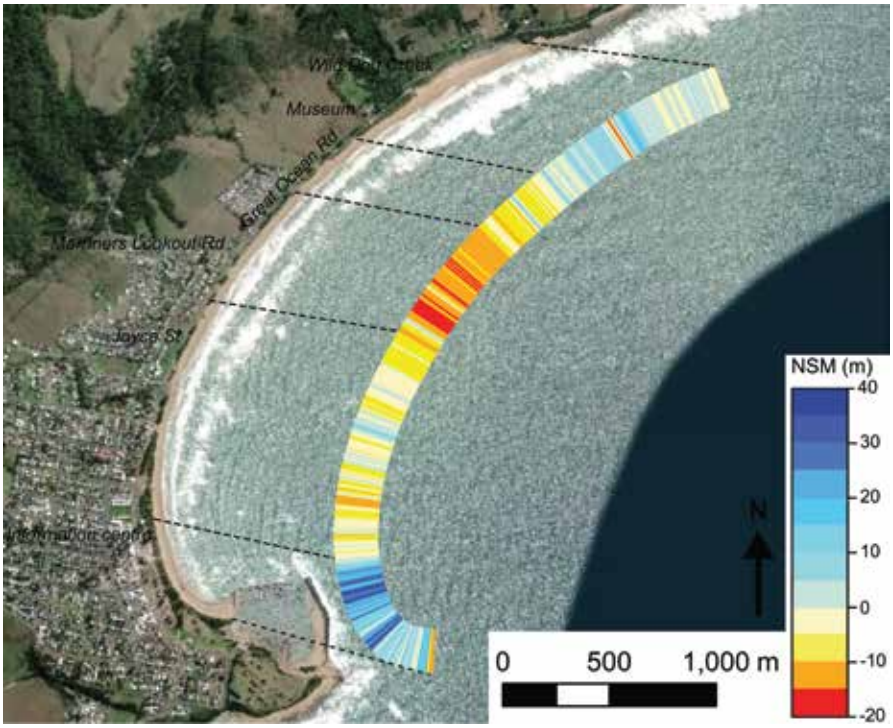
This fact sheet summarises the patterns of historic change for Apollo Bay on the Great Ocean Road. This and other regional summaries are available at www.nespclimate.com.au.

Historic shoreline change on the Apollo Bay coast

Apollo Bay is situated on the Great Ocean Road, approximately 200 km south-west of Melbourne. Coastline changes here have been documented since the 1950s when construction of the harbour resulted in the accumulation of sand at the southern corner of the bay, and long-term erosion further along the bay. Storm-driven erosion now threatens assets including carparks, walking paths, sewer and water mains, stormwater drains and the Great Ocean Road itself.

Two areas of Apollo Bay – from the harbour to the Apollo Bay Information Centre and from the Apollo Bay Museum to Wild Dog Creek – have grown since 1968. The growth at the western end of the bay occurred up to 1986 as sand accumulated and vegetation established in the lee of the newly built harbour breakwaters. Erosion has dominated here since 1991, but the current shoreline is still located on average ~17 m seaward of its 1968 position. At the eastern end of the bay the shoreline has grown by an average ~6 m since 1968.

The **Earth Systems and Climate Change Hub** is funded by the Australian Government's National Environmental Science Program



Shoreline change on the Apollo 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.

The remainder of the study area has large eroded sections along with occasional sections showing no significant net change or slight accretion in shoreline position. Most erosion occurred over a 1 km section that extends north-east from Joyce Street. Since 1965 the shoreline here has retreated by an average of ~9 m, although this extends up to 18 m near the Marriners Lookout Road intersection.

This erosion has progressively occurred mostly since 1986 with few periods of shoreline recovery evident since then. The net result has been the loss of the protective dunes which in 1968 occupied a zone up to 45 m wide seaward of the Great Ocean Road. This dune has been completely removed in several places now and the Great Ocean Road is separated from the beach by only a few metres.

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 or the top of any rock walls, whichever was applicable.

Implications for the future

Since 1986 erosional processes have dominated most of Apollo Bay. The cause is not known but likely reflects some change in sand transport, wave or storm patterns resulting in frequent erosion events and limited opportunities for shoreline recovery. Erosion has narrowed or completely removed the dunes, decreasing their capacity to protect the shoreline and leaving parts of Apollo Bay vulnerable to continued erosion or inundation when sea level is elevated.

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.

This research was led by ESCC Hub Project 5.9 *Natural habitats for coastal protection and carbon sequestration (NCCC Phase 2)* and supported by the Victorian Coastal Monitoring Program funded through the Victoria Sustainability Fund. For more information contact: Dr Teresa Konlechner t.konlechner@unimelb.edu.au.

NCCC National Centre for Coasts and Climate

DEAKIN UNIVERSITY

VICTORIA State Government | Environment, Land, Water and Planning