Earth Systems and Climate Change Hub

National Environmental Science Programme

Understanding shoreline change on the Victorian coast: Cowes, South Gippsland

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 Observation Beach at Cowes, South Gippsland. This and other regional summaries are available at www.nespclimate.com.au.

Historic shoreline change on the Cowes coast

Cowes is a coastal town situated on the northern shore of Phillip Island, approximately 140 km from Melbourne. Erosion has been a concern here since the late 1940s. Most of the study area is now protected by rock and timber walls and groynes; however, shoreline erosion continues to be a concern. Understanding past changes in shoreline position on this coast is important for mitigation of future erosion risk.

Through the western half of the study area – from Erehwon Point extending eastwards for ~1 km – the shoreline has been relatively stable, showing little to no shift (<5 m) in shoreline position since 1968. This stability is due to the early construction of shore protection structures which prevent shoreline retreat; in 1968 rock and timber walls adjacent to wooden groynes extended the length of this stable section of coast.

At the western-most extent of the study area there was some shoreline accretion from 1979 to 1989 related to the establishment of plants on the beach. This moved the shoreline up to 15 m seawards, but by 2010 the shoreline had retreated to its pre-1979 position.

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Shoreline change on the Cowes 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.

Elsewhere within this 'stable' 1 km section of coast the total range of shoreline movement has been less than ± 7 m.

In contrast, the eastern half of the study area has shown progressive erosion since 1968. There are two sections of coast that show different patterns of change. The first extends from the 'stable' zone east for ~500 m and retreated by ~10 m between 1968 and 1979 until construction of rock walls prevented further erosion. The remainder of the study area remains unprotected. Here the shoreline has retreated by between 24 m (at the western extent of the study area) to 54 m. Most of the erosion occurred between 1979 and 2010. Erosion has slowed here since 2010 but the shoreline remains vulnerable to further erosive events.

How was shoreline change determined?

Researchers compared the shoreline in aerial photos dating from 1968–1989 to photos taken during 2010–2019 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

Shore structures have been effective in stopping the retreat of the sections of shoreline they protect. However, these structures may have also contributed to continued retreat of the remaining unprotected sectors of coastline. This is because they trap the sand that is moved along the coast, so it is unavailable to rebuild the shoreline further along. This is an important consideration for the ongoing management of the Cowes coast.

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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