

FACT SHEET

Coastal Climate Change Vulnerability and Adaptation Project



IN THIS FACT SHEET:

What is the Coastal Climate Change Vulnerability and Adaption Project?pg. 1
 Glossary of termspg. 1
 What were the objectives of the project?pg. 1
 Who was involved in the project?pg. 2
 What areas of the coast does the report cover?pg. 2
 How was the project funded?pg. 2
 What were the key findings?pg. 2
 How are coastal hazards affected by climate change?pg. 3
 How much are sea levels predicted to rise?pg. 3
 What would happen if assets are exposed to inundation or recession?.....pg. 4
 What are the next steps?pg. 4
 Where can I find more information about climate change and the coast?pg. 4
 Other relevant studies: Coastal Processes Study and Coastal Stability Study and Risk Assessmentpg. 4
 Contact uspg. 4

What is the Coastal Climate Change Vulnerability and Adaptation project?

The project involved a study into the potential effects of climate change on our coast. The resulting report also recommends potential adaption strategies and will provide a framework for future adaption planning.

Current sea level rise predictions were used to analyse potential future exposure to two hazards - recession (erosion) and inundation (flooding) - of the 55km stretch of coastline between Torquay and Lorne.

Potential risks posed by these hazards to coastal assets such as built infrastructure, the natural environment, roads and heritage sites were assessed.

What were the objectives of the project?

The project's objectives were to:

- Provide the first detailed climate change vulnerability assessment for the Surf Coast region;
- Recommend potential adaptive strategies to respond to climate change vulnerabilities;
- Provide a focal point for engaging the community in coastal climate change issues;
- Integrate with work at State and National levels;
- Provide a basis for future priority actions.

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GLOSSARY OF TERMS

ADAPTION	Adjustment (either natural or human) in response to actual and expected climate change to manage the associated impact of climate change.
ASSET	In this report, assets refer to valued resources and items along the coast. The report assesses the exposure of four main types of assets to coastal hazards. These main types of asset are: <ul style="list-style-type: none"> • Built infrastructure (e.g. boat ramps, car parks, amenities) • The natural environment • Roads • Heritage sites
CLIMATE CHANGE	Refers to a change in the state of the climate that can be identified by changes in the mean and/or variability of its properties, and that persists for an extended period, typically decades or longer.
COASTAL HAZARD	Coastal processes, such as wind, waves, tides and storms may create 'coastal hazards' that adversely affect assets such as built infrastructure and the natural environment. The primary coastal hazards that this project is concerned with are: <ul style="list-style-type: none"> • Inundation (coastal flooding) • Recession (coastal erosion)
INUNDATION	Coastal inundation is the flooding of land near coasts and estuaries by ocean waters or river catchments. It can be 'permanent' (daily inundation of low-lying areas by tides) or 'episodic' (temporary flooding as a result of events such as storm surges or high tides).
RECESSION	The retreat of a coastline under the influence of wind and wave action and potentially resulting from sea level rise. Movement of sediment may also result in some sections of coasts advancing.
RISK	The potential for realisation of unwanted, adverse consequences; usually based on the likelihood of an event occurring multiplied by the consequence of the event, given that it has occurred.

What areas of the coast did the project cover?

The study area of the project was Surf Coast from Pt Impossible near Torquay to Cumberland River near Lorne.

Assets within about 200 metres of the coast and in nearby coastal waters were considered.

Who was involved in the project?

The project was commissioned by the Great Ocean Road Coast Committee (GORCC) and undertaken by Sinclair Knight Merz (SKM) in conjunction with Griffith University and CSIRO Marine and Atmospheric Research.

The project was initiated by GORCC on behalf of a number of stakeholders including the Department of Sustainability and Environment, Parks Victoria, Corangamite Catchment Management Authority, Surf Coast Shire and VicRoads.



How was the project funded?

This project is one of four projects that are part of the Great Ocean Road Renewal Program, a three-year, \$1.35 million program, supported by \$1 million in funding from the Australian Government and \$350,000 in funding from GORCC.

What were the key findings?

Different parts of the coast differ markedly in their assessed risk from coastal inundation and recession. The differences reflect the relative concentrations of natural and (particularly) built assets, as well as coastal landform and geology (eg hard rock cliffs as compared to sandy beaches).

However, in general, it was found that should predicted sea level rises occur, assets along the Surf Coast are more at risk from recession of the coastline, as compared to inundation.

Some examples of key findings relating to the GORCC managed areas of coast are below:

Built infrastructure: \$21.7 million of built infrastructure on GORCC managed land, such as boat ramps, car parks and caravan parks will be exposed to inundation with 0.8 metres of sea level rise, while \$137 million of built infrastructure would be exposed to recession.

Roads: Approximately 1.7km of road is exposed to inundation under current conditions. This increases to 13.4 km with up to 0.8m of sea level rise. 43km of roads will be exposed to erosion if sea levels rose to 0.8m or more.

Native vegetation: Over 380ha of native vegetation would be exposed to inundation in the event of a 0.8m sea level rise. Over 700ha of native vegetation would be exposed to erosion with 0.8 m of sea level rise. This includes areas of native vegetation with conservation status classified as endangered, depleted or vulnerable.

Heritage assets: Some 33 registered indigenous cultural heritage assets are known to be located on land managed by GORCC. Eight of these assets would be exposed to inundation and 22 of these assets would be exposed to erosion if sea levels rose to 0.8m or more.

Analysis of risks to private land, such as residential or commercial properties, was not an objective of the study, which focused on coastal Crown land reserves.

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How are coastal hazards affected by climate change?

Climate change is likely to increase the frequency, intensity and extent of existing coastal hazards such as inundation and recession. It is projected that if sea level rise occurs as currently predicted, new areas of low-lying coastal land, in particular, will be exposed to increased inundation and recession. This is caused by events such as storm surges and high tides, and increased depth in water.

See Figure 1 below for an illustration of how tides, storm events and sea level rise influence coastal water levels.

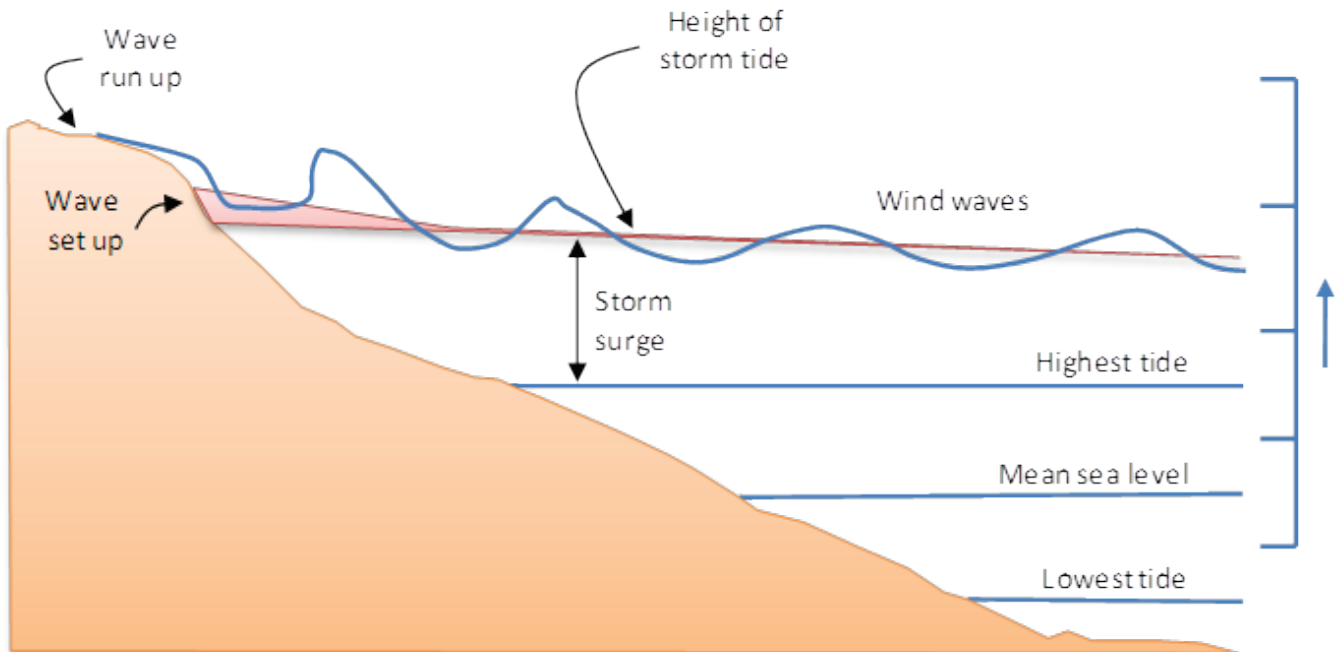


Figure 1. Illustration of how tides, storm events and sea level rise influence coastal water levels. Storm surges are temporary increases in coastal sea levels that are caused by lower atmospheric pressure and/or severe winds. Storm surges are often accompanied by a further increase in water level due to the cumulative effect of breaking waves (wave setup) and the run-up of individual waves. The height of a storm surge is influenced by its timing in relation to astronomical tides. The most extreme sea levels (storm tides) occur when storm surges combine with high astronomical tides. Warming of oceans and ice sheet melt associated with climate change are projected to contribute to rising sea levels and may exacerbate inundation under storm surge and storm tide conditions.

How much are sea levels expected to rise?

The study used four sea level scenarios to assess the exposure of the coast to hazards:

1. Current (or historical) conditions (allowing for the 100 year storm surges).
2. 0.2 m sea level rise (the projected amount of sea level rise for about 2030-2040).
3. 0.8 m sea level rise (the minimum required for planning for 2100 by the Victorian Coastal Strategy).
4. 1.4 m sea level rise (the plausible upper limit of 2100 sea level rise projections).



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What might happen if assets are exposed to coastal inundation or recession?

While the study found that some assets (eg boat ramps, vegetation communities located at low elevations that are already likely to be adapted to periodic short-term inundation) may be able to accommodate temporary inundation to some degree, in general, increased inundation and/or recession is expected to lead to a range of impacts to assets along the coast.

This includes physical damage to built infrastructure and roads, and loss of heritage sites and native vegetation. These impacts could in turn lead to reduced levels of access, safety and amenity for beach users, increased building and maintenance costs for infrastructure providers and loss of revenue for businesses reliant on the coast and visitation to it.

What are the next steps?

The report will be used by GORCC and other land managers in the Surf Coast region to understand and respond to the challenges posed by climate change.

The report recommends potential adaption strategies and will be used as the basis for more detailed adaption planning in the future. GORCC plans to undertake detailed adaption planning and work with partners to plan for and address the risks identified in the report.

All key stakeholders, including the wider community, will be involved and informed as adaption plans are developed and as GORCC and its partners continue to work towards protection of the coast.

Other relevant studies: How this project relates to other work GORCC is completing.

Coastal Process Study: A study and report on waves, sediment transport and other processes and how they are affecting the coast in the region. Part of this study involves using relevant findings from the climate change project to predict how coastal processes may change in the future, and in turn it will provide up-to-date information on this specific topic for use in the other studies.

Coastal Stability Study and Risk Assessment: A geotechnical study and report on the stability of priority cliff areas along the GORCC managed coast and an assessment of their associated risks to humans and infrastructure. Findings of the Coastal Processes Study and climate change project are being used to help assess how cliffs along the coast have changed in the past and may change in the future. Both reports will be made available on the GORCC website on their completion.

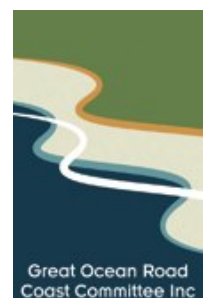
This project was commissioned by GORCC through funding from the Australian Government's Caring for our Country program.



Australian Government

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Where can I find more information about climate change and the coast?

Visit the websites below to learn more:

- Victorian Department of Sustainability and Environment's climate change website – www.climatechange.vic.gov.au
- Australian Government's climate change website – www.climatechange.gov.au
- Intergovernmental Panel on Climate Change website – www.ipcc.ch
- Victorian Coastal Council website – www.vcc.vic.gov.au
- CSIRO website – www.csiro.au



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