

Living with cliffs

Coastal cliff hazards and how we can manage them

Coastal Management Fact Sheet 1.1

Cliffs and bluffs occupy 46% of the Victorian coastline. Over time they have been shaped into variable and often spectacular features. They include some of our most iconic natural sites, such as the Twelve Apostles in the Port Campbell Marine National Park. Many cliffs are fronted by beaches or rocky platforms that are exposed at low tide.

Cliffed coastlines are not static. The processes that have carved them over millions of years are still at work today. These effects can be observed as the gradual weathering of cliff features, or sudden topples or slips of large formations.



Changes to coastal cliffs

On a human timescale change to cliffs occurs slowly, depending on their geology and exposure to erosive processes. At times however, changes to cliffs may occur rapidly, and may pose risk to the public and to coastal infrastructure.

Understanding coastal cliff processes and associated hazards enables land managers to make effective management decisions. This knowledge informs risk mitigation both prior to and after cliff collapse.

Common hazards on cliffs

Cliff hazards can be divided into two categories: general slip, trip and fall hazards (managed by coastal land managers on an ongoing basis) and hazards that result from slope collapse or other physical change.

Collapses, also known as cliff failures, occur when the internal strength of the formation is reduced beyond a threshold where it can no longer support its own weight. This can occur when the cliff is exposed to:

- Erosion at the cliff toe
- Changes in cliff moisture content
- Extremes of heat and cold
- Large rainfall events and erosive runoff
- Seismic activity

Cliff failures occur at a range of scales, depending on the cliff structure and the trigger for collapse. Cliff failures may range from a localised rock topple to a large-scale rotational landslide. Indicators of imminent collapse include:

- Enlargement of an overhang
- New fractures in the cliff face
- Debris fall or small downward land movements
- Disturbance to vegetation root zones



Fractures in the cliff face at Point Roadknight, Anglesea

Living with cliffs

Adaptive risk management on cliffs

Risk of cliff failure and subsequent damage to life and property can be reduced by effective adaptive and preventative risk measures.

This requires an understanding of cliff processes and an assessment of risk levels to direct and prioritise management or mitigation measures. Examples of these actions include:

- Improving surface drainage
- Installing warning signs
- Assessing cliff stability and identifying features that may be at risk of collapse
- Investigating cliff stabilisation options (all works will be supported by expert geotechnical advice).
- Planning for strategic relocation of infrastructure away from high risk areas where tolerable risk may be exceeded



Risk mitigation following a collapse

The above measures will not fully remove the risk of cliff collapse. Where a failure event does occur, coastal managers may find it necessary to undertake immediate actions to reduce the risk to users, including:

- Installing warning signs
- Excluding public access until risks are mitigated where required and the site is assessed as safe
- Investigating cliff stabilisation options

Ongoing management and monitoring

It is important that we understand and monitor the condition of our cliffs. Any chosen management action must be proportionate to the risk, and where possible maintain appropriate access for the public to experience and appreciate our iconic rocky coastline.

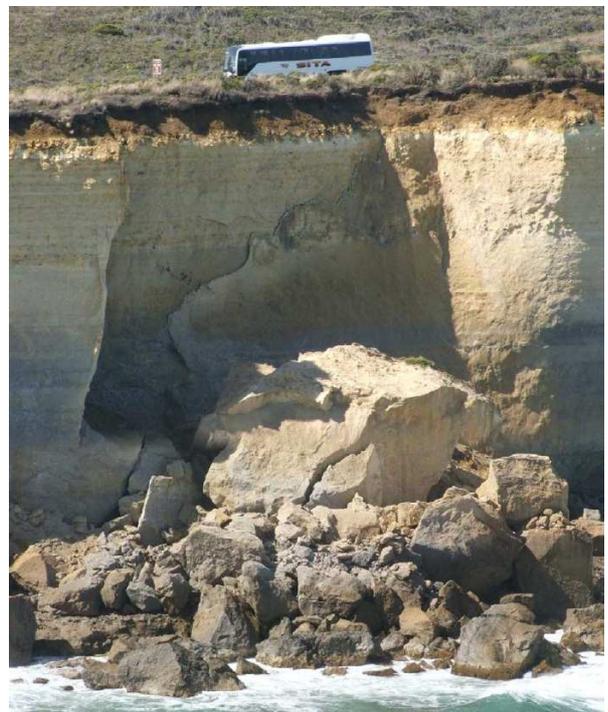
Published by the Victorian Government Department of Environment and Primary Industries Melbourne, September 2013

© The State of Victoria Department of Environment and Primary Industries Melbourne September 2013

This publication is copyright. No part may be reproduced by any process except in accordance with the provisions of the *Copyright Act 1968*.

What can I do to help?

- Avoid walking near cliff edges or at the base of cliffs and encourage others to do the same
- Keep to formalised paths at the cliff top
- Do not climb on cliffs as this can cause localised damage and increase the rate of erosion
- Avoid damaging vegetation: vegetation promotes water infiltration and reduces erosive runoff
- Obey all signs and stay behind safety fences
- If you see evidence of a recent slip or collapse, take a photo and report it to your local land manager.



Further information

For more information, please see the Victorian Coastal Hazard Guide, (available at www.climatechange.vic.gov.au) or consult your local DEPI environmental planner.

To report a slip, topple or any other change to a cliff formation, contact your local land manager.

Accessibility

If you would like to receive this publication in an alternative format, please telephone DEPI Customer Service Centre 136 186, email customer.service@dse.vic.gov.au (or relevant address), via the National Relay Service on 133 677 www.relayservice.com.au This document is also available in on the internet at www.depi.vic.gov.au

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.