

Working with nature to protect the coast

Coastal Management Fact Sheet 2.2

The coast of Victoria is a dynamic system constantly being changed and reworked by wind, wave and tidal forces. The natural coastal system is more able to respond and adapt to these changes than a modified 'hard engineered' coastline.

A functioning beach and dune system dissipates incoming storm energy by allowing sand to erode and move offshore. While the eroded beach may be narrow at first, this sand may then be returned onshore during calmer conditions.

In developed coastal areas, natural coastal systems are often replaced by hard seawalls and other structures that can't respond to coastal changes. These structures can be significantly damaged during storms, and costs of repair and maintenance can be high.

Therefore, best practice approaches to coastal management seek to design coastal solutions that work with nature to protect the coast. These solutions aim to maintain the coast's natural ability to adapt to coastal changes and reduce the costs for coastal managers.

Coastal hazard management options

Construction of hard structures on the open coast can have detrimental effects on the dynamic coastal system. Hard structures reflect incoming waves which then scour away sand as they travel back offshore. Alternative measures, termed 'soft' adaptation options, may be more effective at reducing erosion, and have a lesser impact on the coast.

There are many 'soft' coastal hazard management options; three are described in this fact sheet. These are provided as a guide only, and further coastal engineering advice must be sought prior to implementation. Many variations on these options exist; in some cases, several different adaptation options are used in combination to provide the best outcome.

All adaptation options must be carefully considered and costed. Decisions must be based on analysis of site-specific characteristics, as these options are not appropriate at all locations.

a) Sand trapping

Sand fences, comprising many pickets spaced a small distance apart, can be used to slow down wind-blown sand so that it settles and accumulates *in situ*. These structures are most effective if they are installed in dry sand above the high tide line.

Placement of woody debris at the base of dunes can similarly trap sand and promote dune growth. However, if placed within reach of incoming waves, sand may be scoured out from around these structures, reducing their effectiveness.



b) Geotextiles

Geotextiles are permeable fabrics that are installed on or within accumulations of sediment (soil or sand) to alter sediment properties such as stability and drainage.

Geotextiles can be used to enhance coastal dune stability by restricting sediment movement and providing a stable environment for vegetation colonisation and growth. Geotextiles are made of synthetic or natural fibres, and depending on the material used, biodegrade at different rates.

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Geotextile sandbag sea walls have been installed at several locations across Victoria to improve coastal stability and protect infrastructure. Unlike wooden or masonry sea walls, geotextile sandbags are more effective at dissipating incoming wave energy, reducing the degree of scour around the structure.

It is important to remember that all coastal structures have limitations and can be damaged if exposed to higher energy conditions than their design allows.

c) Beach renourishment

Beach renourishment involves the artificial addition of sediment to a beach system to increase beach width and provide a buffer between waves and coastal infrastructure. Renourished sand is then naturally redistributed over the site. This option, however, can be very expensive.

Successful renourishments have lifespans of 5-10 years before the beach returns to its original width. To maximise the lifespan, renourishments must be designed appropriately in terms of sediment volume, sand size, and the shape of the constructed beach profile.

Renourishment may also be designed in combination with other beach management techniques, including construction or modification of groynes. Ongoing monitoring and active sand management is strongly advised to ensure the renourishment is operating as designed, and to determine when or where further design improvements may be required.



Long term coastal planning

The Victorian Coastal Strategy sets out the long term vision for the Victorian coast and provides a policy and decision making framework for effective management.

The Strategy recommends a policy of planning for sea level rise of not less than 0.8 metres by 2100. It also requires coastal managers to, where practicable, 'avoid development within sand dunes and in low lying coastal areas' to reduce the risk of damage in these dynamic zones.

As coastal infrastructure ages and community needs change over time, there will be opportunities to strategically plan for future coastal management. As part of this process, coastal managers should consider long term plans for relocation of key infrastructure and facilities, and seek to improve their adaptive capacity to respond to dynamic coastal processes.

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.



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