

Managing Coastal Erosion

Introduction

This fact sheet provides basic information about options for erosion management and the consents necessary before you can undertake erosion management work. It is based on the Auckland Regional Council's Coastal Erosion Management Manual (<http://www.arc.govt.nz/arc/environment/coast/coastal-erosion.cfm>)

What is coastal erosion?

- Coastal erosion is the wearing away of land or the removal of beach or dune sediments by wave action, currents, or wind. It is a dynamic and often complex process that can be cyclical with periodic episodes of coastal retreat and rebuilding
- The nature and rate of erosion along a coastline is affected by the type of land (e.g. rocky 'hard' or sandy 'soft' shores) and the energy environment of the sea (e.g. a 'high energy' west coast surf beach or a 'low energy' sheltered estuary)
- Adjacent land management affects coastal processes e.g. streams and stormwater drainage may increase the rate of coastal erosion
- Coastal erosion is a natural process, but human activities (e.g. vehicles on dunes) and artificial structures can modify and exacerbate it. Ongoing development in coastal areas has increased concerns about erosion in some places



■ Is there a problem?

You need to identify whether the coastal erosion is causing a hazard before going to the expense of attempting to control it. Some coastal changes are long-term, others are short-lived or cyclical. Determine whether the erosion is a significant on-going threat to something valuable

You also need to decide if attempting to control the erosion is the best solution. Because of the expense involved in successful erosion management, it may be better to re-locate activities or structures threatened by erosion.

To avoid future problems, it is important to take erosion processes into account when planning new structures near the coast. According to the Intergovernmental Panel on Climate Change, ongoing coastal development and population growth in northern New Zealand are projected to exacerbate risks from sea-level rise and increases in the severity and frequency of storms and coastal flooding by 2050.

■ What is causing the problem?

The cause of erosion is not always obvious because the environmental processes operating on the coast are so complex.

- Consider coastal processes beyond the site where erosion is occurring (e.g. sea currents can carry sand and sediment long distances, so erosion at one location could be caused by changes kilometres away)
- You also need to understand processes occurring on adjacent land e.g. slips and drainage effects
- Professional expertise to determine the cause of erosion is recommended.

■ What is the solution?

A range of management methods should be considered before selecting the preferred option:

- Accommodate coastal processes rather than try to prevent their effects. Structures can affect the natural dynamics of the coastal environment by interrupting sediment supply, preventing natural wave energy absorption, or impeding natural coastline movement
 - Stop human activities or remove artificial structures
 - Non-structural are preferable because sea walls may affect the natural character of the coastal environment, public access, landscape and ecological values
 - Soft-structural options e.g. beach replenishment or planting, are preferred over hard-structural options
 - Hard engineering methods e.g. sea walls may be acceptable as a last line of defence to protect valuable infrastructure such as major roads.



It is important not to create or aggravate erosion problems, or shift adverse effects to adjacent properties or further along the coast. Erosion management techniques are not always successful, and all involve ongoing maintenance and costs.

Potential responses to coastal erosion include:

- Do nothing – monitor, observe, reassess
- Managed retreat or re-locate existing structures at risk

Soft solutions

These include a range of options intended to work with natural processes rather than against them.

- Manage beach access e.g. prevent vehicles and control pedestrians with fencing and dedicated beach access routes
 - Replenish sandy beaches, and reshape dunes. On open sandy coasts, intact dunes are the most effective and sustainable form of erosion management
 - Planting native sand binding plants helps build dunes and buffer against erosion. Native planting can also restore natural character and provide wildlife habitat. See Auckland Regional Council's (ARC) Coastal Planting Guide pamphlets for further information
- Clay banks can also be replanted to slow erosion. Sometimes reshaping may be useful to improve slope stability.

Hard engineering solutions

These are generally unacceptable for locations with high natural character values or for soft shorelines.

- Artificial reefs can dissipate wave energy and headlands can reduce erosion by holding beach sediment (including sand) in place and slowing its movement along the coast
- Structures made of shotcrete or mudcrete suitably coloured to match the natural setting can work well for coastal banks and cliffs
- Rip rap rock walls need to be carefully designed and constructed to resist erosion effectively. Laying geotextile cloth under the rocks prevents soil and fine debris from washing away. Try to use rock types that match local rocks
- Grouted rock walls can be built more steeply than sloping rock rip rap and have the advantage of occupying less space. Basalt walls may be suitable to match existing structures in Auckland's heritage areas such as Devonport
- Timber sea walls are generally less durable and require more maintenance than other methods
- Improve stormwater drainage e.g. moving the stormwater outlets along a beach to a rocky headland at the end of a beach can reduce the erosion in the middle of the beach. Subsurface drains can reduce erosion of a cliff face.



■ What consents do I need?

Coastal erosion management is mostly regulated under the Resource Management Act (1991) (RMA 1991) and requires a coastal permit from the ARC for works in the coastal marine area (CMA¹). Resource consent from your local council may also be necessary.

Unless your private property title extends to cover the part of the CMA where you would like to locate your structure, you will also need to apply for an occupation and use permit from the ARC.

For works landward of the mean high water springs (MHWS²), you will probably require resource consent from your local council for reshaping and planting activities and structures. This also needs to comply with the Building Act. Talk to your local council about their requirements.

■ For more information

The ARC can advise you on:

- The suitability of coastal erosion management methods
- What resource consents you require
- What supporting information and consultation you'll need to include with your application.

The ARC has a range of fact sheets that relate to the use of the region's coastline. Copies are available online at www.arc.govt.nz or upon request. Topics include:

- Public Access to Auckland's Coast
- What to Include in an Assessment of Environmental Effects for a Coastal Permit
- Moorings
- Jetties, Ramps and other Access Structures

How do I contact the ARC?

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¹ The CMA includes the foreshore, seabed, coastal water and the air above the sea from the line of the mean high water springs (MHWS) out to the 12 mile territorial limit.

² The location of MHWS can be estimated from the highest debris line on the beach, or the toe of a cliff, but needs to be defined by survey for consent purposes.