

# Coastal Management Program

Coastal Hazards Factsheet May 2023

Learn more about the hazards affecting the Port Stephens Coastal Zone

The following information provides information about the threats and hazards impacting the Port Stephens Coastal zone.

## What are the key threats affecting the coastal zone?

A range of priority threats affecting the Port Stephens coastal zone have been identified. These include:

- Coastal hazards such as coastal inundation, tidal inundation, coastal erosion and dune transgression
- Coastal structures and other activities on private land that extend onto public land, impacting public access and the environment
- Water quality impacts arising from urban and agricultural stormwater runoff, acid drainage from acid sulphate soils as well as point sources such as marinas and on-site sewage systems
- Biodiversity impacts associated with land clearing, pests, weeds and disease

## What were the outcomes of the stage 2 coastal hazard study?

We identified our main coastal hazards as tidal inundation, coastal inundation, coastal erosion and dune transgression. Hazard modelling was undertaken to quantify each of the coastal hazards. The extent of these hazards were then mapped for the Port Stephens coastal zone to identify land, built and natural assets most likely to be vulnerable to coastal hazards. We've modelled the main hazards across our coastal areas for 2020 (present day), 2040 (short to medium term), 2070 (medium term) and 2120 (long term).

The coastal hazard mapping shows that there are already large areas that are vulnerable to coastal hazards.



## Learn more about the CMP



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# Tell me more about the key coastal hazards affecting Port Stephens

## Tidal inundation



**Tidal inundation** is caused by regular astronomical tides and is not associated with coastal storms or catchment flood events. Some parts of Port Stephens may become more regularly, or even permanently, inundated by the sea and others may have increased difficulty draining following a rainfall event.

Low-lying land would be inundated for a period of hours during the highest tidal water levels.

Under sea level rise conditions, the extent of tidal inundation will increase and low-lying will become permanently inundated.

## Coastal inundation



**Coastal inundation** is primarily associated with storms resulting in storm surge and waves. It means that ocean levels rise above normal elevations and inundate low-lying areas by overtopping dunes, structures and barriers.

The duration of coastal inundation may be several hours and will vary depending on the timing of the storm (e.g. if storm surge peaks on the high tide). Once the coastal storm passes, the water recedes and ocean water levels return to their normal tidal levels.

The risk of coastal inundation will increase as sea levels rise. If coastal storm intensity increases under climate change conditions, storm surge levels may also be higher, increasing coastal inundation.

## Coastal erosion



There are two types of **coastal erosion**:

- **Short-term erosion** (or 'storm bite') occurs over a period of days during a coastal storm event. Once the storm passes, the beach then gradually recovers over a period of months or years as the sand is transported back onto the beach under normal wave conditions.
- **Long-term erosion** occurs over a period of years to decades. If a very big storm has occurred, the sand eroded from the beach may be taken too far away and unable to make it back onto the same beach. If there is no new sand coming into the system, this can become a permanent loss of sand and the coastline gradually moves landward.

Higher water levels due to sea level rise will accelerate long-term erosion. The processes that transport sand may also change under climate change conditions, resulting in changes to the shape and width of beaches. If coastal storms increase in intensity, this will increase the severity of short-term erosion events.

## Dune transgression



**Dune transgression** is the process by which the windborne transport of sand causes a dune to gradually migrate over time. The Stockton Bight sand dunes are an example of transgressive dunes, forming the largest remaining moving coastal dunes in the Southern Hemisphere.

The long-term rate of dune transgression can be estimated by examining historical aerial photography. Previous studies have estimated that in excess of five metres of dune transgression occurs each year at Fern Bay.

The movement of sand off the beach and into the dunes by action of the wind also contributes to the loss of sand from Stockton Bight.