



Coastal landscapes, hazards and adaptation

FACTSHEET No.2



Our coastal landscape

The Shire of Carpentaria is situated on the south east coast of the Gulf of Carpentaria, with around 370 km of coastline. The coastal landscape is characterised by extensive low-lying coastal plains and a network of dynamic river systems and coastal creeks. The sandy open coastline is interspersed with rocky areas and mangrove communities.

The coastal zone supports a diversity of cultural, social, economic and environmental values, and is highly valued by Traditional Owners, local communities and visitors to the area.

One of the more challenging aspects of the coastal landscape is that it experiences constant, and often rapid change. Wind, waves and tides continually work to move sediment and shape the shoreline and adjacent coastal plains.

As the largest continuous marine intertidal flat system in northern Australia, the Southern Gulf is one of the most important shorebird habitat areas on the continent.

Drivers of change

Tides: The periodic rise and fall (or flood and ebb) of the daily tide moves sediment both on and off-shore and shapes the form of the beach and near-shore environment. The Carpentaria Shire coastal zone is diurnal, meaning one high and one low tide each day. The difference between the lowest and highest tides experienced under normal

Data on tides, wind, waves and climate patterns are collected by buoys, gauges and weather stations situated along our coastline

conditions is called the tidal range. The maximum spring tidal range is around 2.6 metres, but extreme weather events can cause considerably higher tides.

Wind and waves: Waves are generated by wind blowing across the water. Wind, combined with the morphology (shape) of the sea floor, drives the size, frequency, duration and energy of waves. Wave energy has the potential to move sediment both off-shore, on-shore, and along the coastline.

Sediment supply: Sediment is delivered to coastlines from catchments, rivers, dunes and offshore environments. When historical sediment supplies reduce or cease, coastlines may be prone to erosion. When sediment supply is abundant, coastlines will tend to build seaward. Sources of sediment for the Carpentaria coast include sediment from the major river systems, as well as sediment transported from offshore and along the coast.

People and communities: The number of people living, working and visiting coastal zones is also a key driver of landscape change. The development of urban areas, infrastructure and farmland, can restrict and/or accelerate change.

Weather and climate patterns: Local climatic conditions (e.g. dominant wind patterns) as well as extreme events like cyclones will influence how the coastal landscape develops and changes over time. Extreme weather events





Coastal landscapes, hazards and adaptation

FACTSHEET No.2 (cont.)



can drive major coastline changes in a short period of time. Long-term changes in climate also influence sea level and coastal processes.

Currently, cyclones can cause significant damage from inundation and erosion along the Gulf of Carpentaria in any given year. In the future, it is expected that the Gulf region will experience more intense downpours, less frequent but more intense tropical cyclones, sea level rise and more frequent sea level extremes (Figure 1).

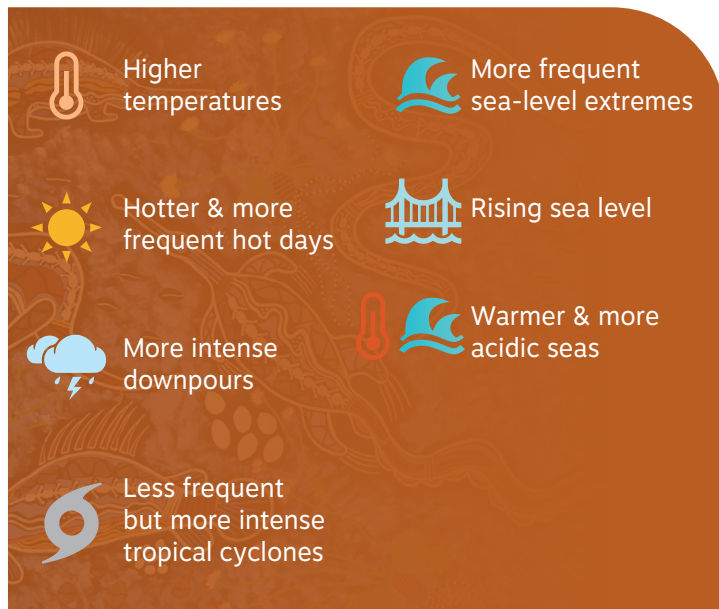


Figure 1. How will climate change affect the Gulf region?¹

What are coastal hazards?

Inundation and erosion are natural processes that contribute to shaping the unique landforms of each coastal region. They become coastal hazards when they impact on how we use and value the coast, such as having adverse impacts on infrastructure and natural assets. In north Queensland, major coastal hazard impacts are typically associated with Tropical Cyclones.

Storm tide inundation

Storm tide inundation is the flooding of low-lying coastal land from a locally elevated sea level (the 'storm tide'). The storm tide is a combination of the predicted tide, storm surge, and wave action (Figure 2). Storm surge is an accumulation of water driven by the combined influence of low atmospheric pressure and high winds associated with events such as Tropical Cyclones.

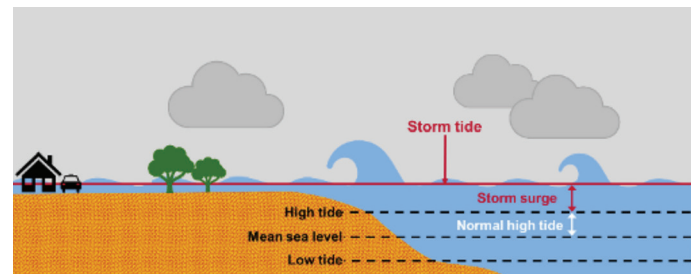


Figure 2. Storm tide

Coastal erosion

Coastal areas naturally erode and accrete over time, driven by variations in sediment supply and climate patterns. Erosion occurs when sediment is shifted away from a particular location over time. This can be a short or long-term change depending on site specific factors.

Shoreline erosion in the Carpentaria Shire coastal zone includes the loss/movement of sediment from open coast beaches, river channel migration, and riverbanks affected by tides and flood waters. Tidally inundated areas (up to Highest Astronomical Tide) are also considered to be part of the erosion prone area.

¹ Climate change in the Gulf region (State of Queensland 2019)





Coastal landscapes, hazards and adaptation

FACTSHEET No.2 (cont.)



Future impacts

Projected sea level rise and an increase in storm intensity for the Gulf region is anticipated to increase the extent and impact of coastal hazards.

Storm tide inundation:

- Sea level rise will increase the apparent severity and frequency of storm tide inundation and will cause inundation to occur further inland
- Increased storm intensity will add to the magnitude of storm tide events and the extent of inundation.

Coastal erosion:

- Increased water levels will accelerate coastal erosion
- Sediment transport patterns may be altered by shifts in wave direction, triggering changes to the form and location of shorelines
- Low-lying land may be permanently inundated
- Increased storm activity will escalate the severity of coastal erosion events.

Source: Coastal Hazard Technical Guideline (DEHP 2013)

Indigenous artwork by M. Sailor

Planning to adapt

Erosion and inundation have the potential to adversely impact existing and future assets in the coastal zone. These impacts can be minimised through strategic planning and adaptation actions. This involves:

- Understanding the physical processes
- Assessing the likely extent of storm tide inundation and erosion, now and in the future, and assets that may be impacted
- Assessing the consequence of impacts for communities and ecosystems
- Considering the range of planning and adaption options.

Through the *Our Resilient Gulf* program, Carpentaria Shire Council and the State government are actively planning to avoid or mitigate the impact of coastal hazards, both now and into the future.

More information

CoastAdapt: <https://coastadapt.com.au/>

QCoast2100: www.qcoast2100.com.au/

<https://www.carpentaria.qld.gov.au/coastal-hazard-adaption-strategy>.

Fact sheets in this series

- Terminology
- Coastal landscape and hazards
- Coastal hazard adaptation.

