SUPPLEMENT A

Fact Sheets

Coastal landscapes, hazards and adaptation

FACTSHEET No.1

CARPENTARIA SHIRE
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This fact sheet provides a description of some of the more commonly used terms relevant to coastal hazard adaptation.

The coastal setting

Coastal geomorphology - The physical shape, processes and patterns associated with the coast, including landforms, soils, and geology.

Landform - The natural shape of the Earth's surface. Landforms range in size from small features such as dunes and estuaries found at a local scale, to large features such as mountain ranges and coastal plains that may exist at regional scales.

Shoreline - A designated line representing the landward limit of the sea. Methods used to defin e shorelines include fixed vertical levels or identifying the physical interface of water and land (e.g. with aerial photography).

Beach - The portion of the coastal zone periodically subjected to wave action. The seaward limit of a beach is typically defined as the spring low tide line, while the landward limit, as the vegetation line.

Coastal dunes – A ridge or series of sand ridges that form at the rear of the beach, by wind action (aeolian transport of sand).

Coastal plains - Flat, low-lying land adjacent to a sea coast.

Gulf – A deep inlet of the sea almost surrounded by land, with a narrow mouth.

Tides - The regular rise and fall of the water surface resulting from gravitational attraction of the moon and sun and other astronomical bodies acting upon the rotating earth.

Relative sea level - Sea level as measured by an official tide gauge with respect to the land upon which it is situated.

Climate change - A change in the state of the climate that persists for an extended period, typically decades or longer.

Sea-level rise - An increase in the mean level of the ocean.

Coastal hazards

Coastal hazards – Natural coastal processes that may negatively impact on the natural environment and human use of the coastal zone. Hazards include coastal erosion, storm tide inundation, and inundation due to sea-level rise.

Storm surge - Elevated sea level at the coast caused by the combined influence of low pressure and high winds associated with a severe storm such as a tropical cyclone or East Coast Low.

Storm tide - The total elevated sea height at the coast combining storm surge and the predicted tide height.

Storm tide inundation - When ocean water levels and waves are high enough to cause localised flooding of normally dry land.

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Coastal landscapes, hazards and adaptation

FACTSHEET No.1 (continued)

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Coastal erosion - Erosion occurs when winds, waves and coastal currents act to shift sediments away from an area of the shore.

Short term erosion (storm bite) - Erosion that occurs periodically on a short-term basis, often during a storm. The shoreline and beach then gradually regain sediment (rebuild).

Long term erosion (recession or retreat) - Erosion resulting in a continuing landward movement (loss) of the shoreline or a net landward movement of the shoreline within a specified time.

Accreting coast - Coasts that experience a deposition of sand instead of erosion. Accretion occurs during the calmer seasons. Beach accretion is generally much slower than beach erosion.

Resilience and adaptation

Coastal vulnerability - The threat to coastal landforms, social, economic and environmental systems, associated infrastructure or land use that may be caused by a sustained shift in environmental conditions.

Risk assessment - A systematic process of evaluating the potential risks that may be associated with an event or activity.

Resilience - The capacity of social, economic and environmental systems to cope with or 'bounce back' following a hazardous event or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure, while also maintaining the capacity to adapt and transform.

Adaptation - The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm, or exploit beneficial opportunities. In some natural systems, human intervention may help a system adjust to the expected climate and its effects.

Adaptive capacity - The ability of systems, institutions, humans, plants and animals to adjust to potential damage, to take advantage of opportunities or to respond to consequences.

Adaptation pathway - A series or sequence of management actions (over time) directed to achieving long-term adaptation objectives.

Coastal adaptation - Future modification of actions and behaviour through construction of infrastructure or change in land use practices that prevents or reduces adverse impacts associated with coastal hazards.

Reference

Terminology has been tailored for the Carpentaria Shire *Our Resilient Gulf* program and is consistent with the National CoastAdapt information manuals: https://coastadapt.com.au/information-manuals, and other sources.

More information on coastal hazards can be found at:

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

QCoast2100: www.qcoast2100.com.au/

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

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Coastal landscapes, hazards and adaptation

FACTSHEET No.2

CARPENTARIA SHIRE
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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 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.

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

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

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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).

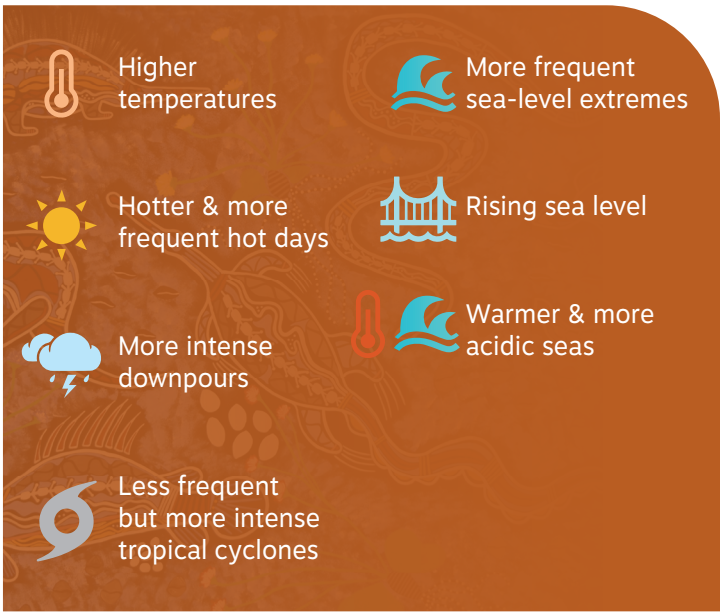

Figure 1. How will climate change affect the Gulf region?[1]

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.

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

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.

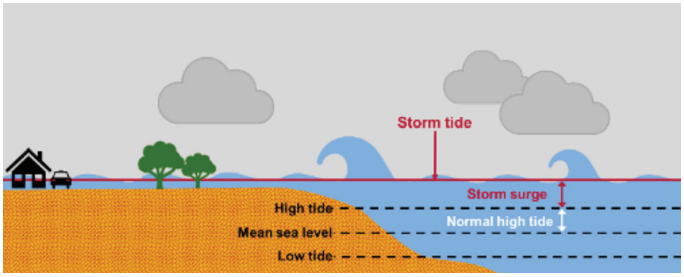

Figure 2. Storm tide

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.

Coastal landscapes, hazards and adaptation

FACTSHEET No.2 (cont.)

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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)

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.

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Coastal hazard adaptation

FACTSHEET No.3

CARPENTARIA SHIRE
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How can we adapt to coastal hazards?

There are a range of ways we can adapt to coastal hazards such as erosion and inundation. Adaptation options include:

1. Updates to strategic planning and land use
2. Changes and upgrades to buildings and infrastructure
3. Coastal engineering options
4. Initiatives to build resilience and adaptive capacity across communities

1. Updates to strategic planning

Updates to strategic planning may include:

- Planning for future land use
- Tailoring specific uses for coastal hazard prone areas
- Updating emergency response planning, including early warnings for impacted areas
- Identifying appropriate areas for any new development/assets (residential, industrial, tourism), and critical infrastructure (e.g. roads, hospitals).

A resilient coast has social, economic and environmental systems in place to cope with or 'bounce back' following a hazardous event or disturbance.

Resilience also means the ability to respond or reorganise in ways that maintain the essential function, identity and values of a region, while also being able to adapt and transform.

2. Changes and upgrades to buildings and infrastructure

Changes to buildings and infrastructure may include:

- Relocating critical infrastructure (e.g. essential access and services)
- Upgrading critical infrastructure that cannot readily be relocated
- Increasing floor levels (freeboard) of buildings in flood prone areas
- Building resilient homes
- Updating drainage networks and systems.

3. Coastal engineering

There are a range of coastal engineering adaptation options including the following.

Dune protection and maintenance

Dune protection and maintenance involves limiting disturbance to dunes and protecting/enhancing vegetation to increase the stability of the dunes.

Where present, the dune system is the beach's natural defence to coastal hazards. The foredunes dissipate wave energy and protect the land behind from impacts of erosion and inundation. Vegetation across the dunes

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traps windblown sand and enhances the ability of dunes to rebuild after storm activity. Vegetation plans can be tailored to each site, and with consideration of other needs (e.g. access).

Beach nourishment

Beach nourishment can include scraping of sand from the intertidal zone to accelerate recovery of the upper beach, and/or importing additional sand to increase the overall volume. Imported sand can be sourced from off-shore, quarries or other sources. Beach nourishment is typically combined with dune maintenance, to enhance the level of protection against erosion and inundation.

Beach nourishment has the benefit of providing increased protection from coastal hazards while maintaining the natural values of the beach and coastline.

Structures to assist with sand retention

Structures can be installed to assist with retaining sand in a specific area of the shoreline. Usually combined with beach nourishment and dune maintenance, these structures typically take the form of one or many groynes that extend perpendicular to the long-shore sand transport. Groynes will accumulate sand to the side where sand moves towards the groyne. Groynes are typically made of rock, wood, or geo-fabric bags.

Structures to assist with offshore energy dissipation

Structures can be installed offshore to create a zone where wave energy will break and dissipate prior to reaching the beach. These structures include breakwaters and artificial reefs, typically composed of materials such as rock, concrete or geotextile materials.

Living shorelines are a more recent concept of off-shore energy dissipation using a suite of erosion control techniques that combine natural coastal habitats with a natural or engineered means of breaking up a wave energy (e.g. mangrove island, oyster farm reefs/breakwater).

Mangroves have an important role in providing natural dissipation of wave energy. The significance of mangrove communities in providing coastal hazard protection is becoming increasingly recognised. Mangroves are well established along many parts of the Carpentaria coastline and have an important role in protecting the shoreline from erosion.

Last line of defence structures

Seawalls provide a physical barrier between the ocean and adjacent coastal land, and protect the coastal assets behind the wall from erosion. Seawalls are typically made of rock, concrete, synthetic blocks or geo-fabric bags, and can be designed as buried revetments or exposed walls.

A seawall is a hard barrier to wave energy. As a result, waves refract off the seawall and scour sand away from the base (or toe). The presence of a seawall can often result in a complete loss of the high tide sandy beach. The appropriateness of seawalls is considered on a site by site basis.

Structures to minimise inundation

A range of structures can be used to keep floodwaters from entering specific areas.

Dykes and levees are artificially elevated mounds or walls that can be made of earth, rock, concrete, geo-fabric bags or other materials. The presence of dykes and levees can be either part of an emergency planning approach, or more permanent features as part of a drainage network.

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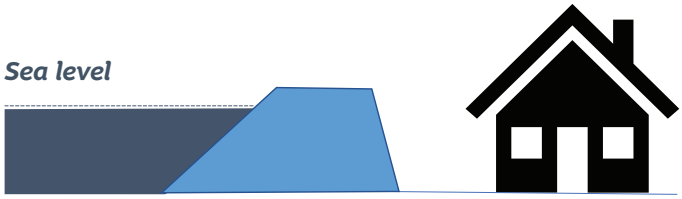

Storm tide/surge barriers (tidal barrages or gates) are physical barriers that prevent storm surges travelling inland along rivers, lagoons, inlets or other waterways.

Storm tide barriers can generally be opened and closed and are most effectively implemented at narrow tidal inlets. They can vary in size from a flow valve on pipes and culverts to large scale barrages.

Tidal gates provide an opening through which water may flow freely when the tide moves in one direction, but which closes automatically and prevents the water from flowing in the other direction.

Backflow protection involves the use of valves, flap gates or similar to stop backflow through drainage pipes that can occur at high tide.

4. Initiatives to build resilience and adaptive capacity

Initiatives to build adaptive capacity across our communities include:

- Developing programs and partnerships to support and enhance stewardship of the coastline
- Facilitating knowledge sharing and education on hazards and adaptation
- Monitoring changes in coastal hazard risk and effectiveness of adaptation.

Adaptation approaches:

- **Will vary from site to site within each region**
- **Are tailored to the needs of local communities**
- **Consider the relative impacts of coastal hazards**
- **Seek to safeguard the values (social, environmental and economic) and character of the landscape.**

Working together

Across Queensland, councils and communities are working together to develop a tailored approach to adaptation across different localities.

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
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Resilient Housing
FACTSHEET No.4

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What does a resilient home look like?

In coastal areas, private dwellings may be exposed to impacts from coastal hazards, including flooding associated with storm tide inundation. Smart choices in the design of your home can reduce the impact of flooding. If rebuilding, renovating, or building a new dwelling, it is worth considering these top tips for a resilient home.

Some of these changes may have higher initial upfront costs, but provide a longer term benefit. Making these changes over time can reduce damage from future flooding, and help you get back to normal quicker after a flood event.

Top tips for a resilient home:

Around the house

Raise electrical power outlets above waist height to reduce damage during a flood and allow power to be restored more quickly

Look at different floor and wall c overing options. Tiles and waterproof grout are much easier to clean after a flood than wallpaper or carpet

Living room

Raise TVs, speakers, WiFi modems and other electricals above waist height or mount on walls if possible to reduce damage during a flood

Bathroom

If fitting a new bathroom, think about a free-standing bath or shower that is easier to clean around after a flood rather that a fixed bath

Kitchen and laundry

Raise fridges, freezers, kitchen appliances and cupboards on plinths or stands with removable kickboards to reduce damage and make cleaning up easier

If replacing electrical appliances think about appliances which can be lifted or placed in higher locations such as a front-loading washing machine on a shelf or plinth instead of a top loader on the ground.

Bedroom

Metal or raised bed frames and other furniture will be easier to clean up than divan or upholstered furniture

Outside

Place work benches along the inside of garage walls to help reinforce the walls and reduce damage from floodwaters and strong winds

NOTE: Qualified tradespeople should be consulted as part of building modifications, especially for any structural and electrical alterations.

Further ideas for resilient homes can be found here:

- Flood Resilient Building Guidance for Queensland Homes - https://www.qra.qld.gov.au/sites/default/files/2019-04/flood_resilient_building_guidance_for_queensland_homes_-_april_2019.pdf
- Flood Resilient Homes Program - https://www. citysmart.com.au/floodwise/
- Flood-resilience strategies - https://www.citysmart. com.au/wp-content/uploads/2018/07/FWHS-Floodresilience-Strategies.pdf
- Rebuilding in storm tide prone areas - https://therocknews.files.wordpress.com/2011/08/ draft-part-1-lowres1.pdf

Resilient Housing

FACTSHEET No.4

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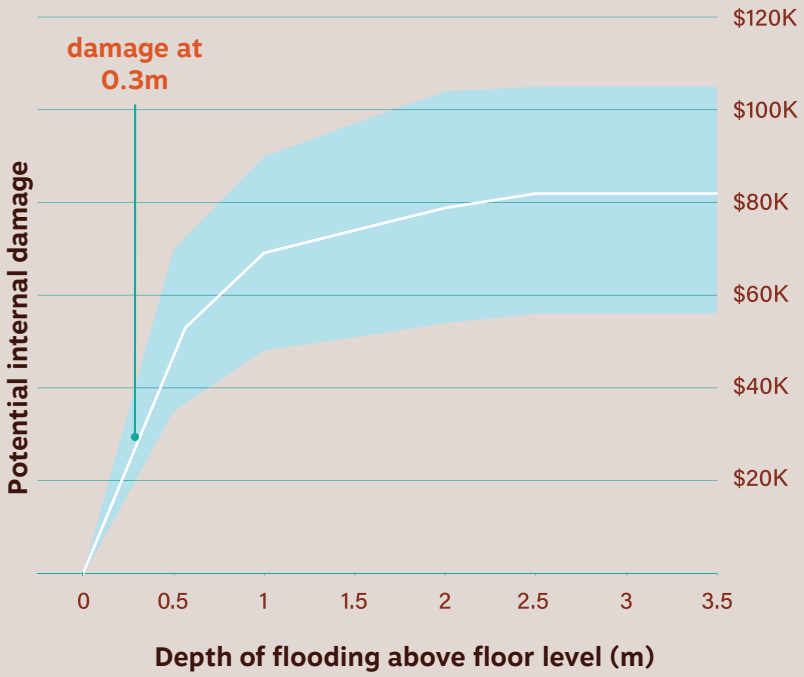

Figure 1. Indicative internal damage cost compared to depth of flooding in residential buildings. Shaded area represents uncertainty and variation from a number of studies.

Reference: Queensland Reconstruction Authority (2019). Flood resilient building guidance for Queensland homes.

Flood depth and damage

A relative shallow floodwater depth (10 - 30 cm) can cause substantial damage to the interior of a dwelling (Figure 1). A water depth in the order of 30 cm can often require rewiring, reflooring and replacement of appliances. Investing early in adaptation measures can significantly reduce the damage to your home and the costs associated with clearing up. The top tips for a resilient home are recommended even if your dwelling is only exposed to relatively minor flood events.

More information on coastal hazards can be found at:

Coast Adapt: https://coastadapt.com.au

QCoast2100: http://www.qcoast2100.com.au

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

FACT SHEETS IN THIS SERIES:

- Terminology
- Coastal landscape
- Coastal hazards
- Coastal adaptation
- Resilient homes

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Economics

FACTSHEET No.5

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The role of economics

Economic analysis is important for determining the best approach to coastal hazard adaptation in different localities.

Economic analysis is used in several ways, including to:

- Value assets and key industries
- Define a base case (cost of no additional action)
- Assess adaptation options

Valuing assets and industries

The first step in an economic analysis is to define the monetary value of assets and key industries across a region.

Value is assessed for a range of assets, including:

- The built environment: including public and private infrastructure, buildings and services
- The natural environment: examples include unique landforms, vegetation communities, mangroves, wetlands, endangered species and culturally significant sites.

The value of key industries to the economy is also considered. For Carpentaria Shire Council, this includes:

- the value of tourism
- the value of natural and cultural assets

Economists collate a range of information from existing and new data and studies to inform an understanding of the value of assets and industries.

Economic base case

The next step of an economic assessment in coastal hazard adaptation is to define a base case. This means determining the potential economic costs or losses associated with coastal hazards (and no additional adaptation). This becomes the baseline for a cost-benefit assessment of implementing adaptation options.

A base case is determined by examining the likelihood and consequence ($ damage) of coastal hazard impacts on assets across the region, and at different timeframes (e.g. present-day, 2050, 2100).

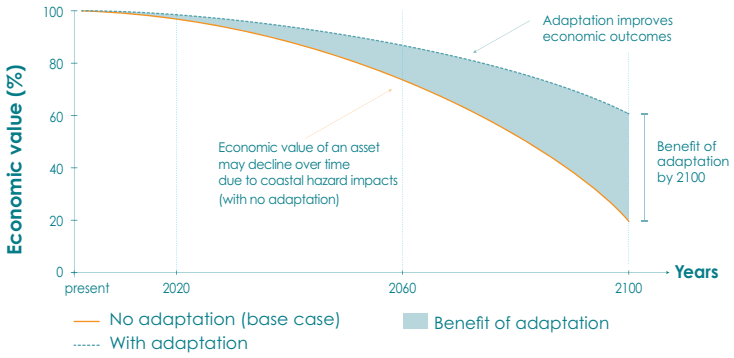

Figure 1. Economic benefits of adaptation actions

It is important to consider the change in economic value over the long term, both with no additional adaptation (the base case) and for various new adaptation options. As Figure 1 shows, over the long term, the economic benefit of adaptation can be substantial.

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Economics

FACTSHEET No.5 (cont.)

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Assessing adaptation options

The benefit of adaptation options can be assessed using multi-criteria and cost-benefit analysis techniques.

Where sufficient data is available, a cost-benefit analysis is the preferred approach.

Multi-criteria analysis

A multi-criteria analysis (MCA) is a tool for refining a list of suitable adaptation options. The aim of a multi-criteria analysis is not to pick the best option, but to screen the options and find those that are:

- Effective at reducing risk
- Feasible for the given location
- Acceptable to the community
- Cost-effective

Cost-benefit analysis

A cost-benefit analysis (CBA) is more detailed than a multi-criteria analysis. In this type of assessment, economists look at all the advantages or benefits of

implementing an adaptation option, and compare them to the disadvantages or costs of the same option.

Once the costs and benefits of each option have been assessed, decisions can be made on which option or combination of options provide the greatest benefit for the lowest cost.

PROS

The main **benefit** of an adaptation option will be the reduced risk of inundation and/or erosion, however benefits can also include:

- Increased engagement and community involvement
- Better awareness of coastal hazards
- Increased tourism and business opportunities
- Protection of natural assets and cultural resources
- Decreased insurance premiums

CONS

Costs include not only the upfront cost of construction or implementation, but could also include:

- Impact on businesses, the environment, ecology or cultural values
- Reduction in visual appeal of the area
- Ongoing maintenance and monitoring
- Reduced recreational opportunities
- Increased tourism and business opportunities
- Protection of natural assets and cultural resources
- Decreased insurance premiums

The development of the Carpentaria Shire Coastal Hazard Adaptation Strategy has been supported by a tailored economic analysis. This includes appraising built and natural assets across the region, defining an economic base case, developing a multi-criteria analysis for screening adaptation options, and tailoring a cost-benefit analysis of adaptation options to inform decision making from present-day to 2100.

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Carpentaria

PROJECT UPDATE No.1

What is *Our Resilient Gulf*?

Our Resilient Gulf is a program being undertaken by Carpentaria Shire Council to manage and adapt to current and future coastal hazard impacts on our coastline and communities. Coastal hazards include erosion and short or long-term inundation of low-lying areas.

The current focus of the program is a series of studies to identify areas prone to coastal hazards, explore coastal hazard risk (built and natural assets), and consider a range of adaptation options.

This work will enable us to:

- Share knowledge on coastal hazards and risks to communities, stakeholders and businesses
- Develop enhanced skills and knowledge to enable Council staff and other stakeholders to gain additional knowledge on the coastal hazards and build important partnerships
- Focus funding on building long-term resilience rather than short-term recovery/reconstruction
- Be inclusive of land owners and stakeholders, including Traditional Owners, residents, industry, tourism sector, community groups, and utility owners.

The adaptation process development is funded by the Queensland Government and the Local Government Association of Queensland (LGAQ) through the QCoast2100 Program. We are one of over 30 Queensland coastal councils participating in the process. More information about the process can be found at **http://www.qcoast2100.com.au.**

How to get involved

We're looking to gather your insights and your perspectives on adaptation.

To get involved you can:

- Watch the website to receive regular progress updates and notifications of opportunities to provide input **https://www.carpentaria.qld.gov.au/coastal-hazard-adaption-strategy**
- Share what you value about our coast by completing our values survey on the website
- Ask the team questions about coastal hazards, and share your knowledge with us by emailing the project team at marcello.sano@alluvium.com.au.

What's already happened?

In 2019, council completed Phases 1 and 2 of the six phase adaptation process which included a Stakeholder Engagement and Communication Plan and a technical scoping study of known coastal hazards to assist with building our base knowledge.

What's next?

In March 2020 phases 3 to 6 commenced. These phases include:

- Identifying areas exposed to current and future coastal hazards
- Identifying key assets potentially impacted
- Assessing coastal hazard risk (likelihood and consequence) for built and natural assets
- Scoping of options to mitigate risk, adapt to change and other opportunities for coastal management.

The work is due for completion by August 2020.

In addition to the technical work, council has commenced a number of initiatives that will enable the community to participate in the process.

We are currently inviting everyone to share their knowledge on coastal values and experiences via the online survey. This information will inform the technical work on coastal hazard areas and risk assessment. Please tell us what you love about the Carpentaria Shire coastal zone, and your experiences of coastal hazards, via this short online survey running over May – July on the website: **https://www.carpentaria.qld.gov.au/coastal-hazard-adaption-strategy**.

Indigenous artwork by M. Sailor

Carpentaria Shire Council

PROJECT UPDATE No. 2 (Sept 2020)

CARPENTARIA SHIRE
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Project team visits Carpentaria Shire.

Council is continuing technical investigations as part of their *Our Resilient Gulf* program.

The Carpentaria Shire Council is undertaking these investigations to better understand what impact coastal erosion and storm tide inundation (or flooding by seawater) and increasing king tides will have on Karumba and the surrounding region.

The project will allow Council to identify risks to essential community infrastructure such as roads, homes and businesses, public open space, water supply and boat ramps, as well as special cultural places and natural habitats. Once these risks are known, work can commence on developing long-term strategies to address future impacts, protecting these important values and assets for future generations.

The project team helping Council with the project recently visited the region. They met with the Mayor Jack Bawden and Councillors Andrew Murphy, Amanda Scott, Bradley Hawkins, and Peter Wells, as well as CEO Mark Crawley (Photo top right).

The project team from Alluvium Consulting and JB Pacific discussed the purpose of the project and the technical studies currently being undertaken to identify which areas may be affected by climate change and future inundation. Key community concerns and specific sites were also discussed.

The identification of assets and values that may be impacted has been completed and work is now continuing to understand the risk of future inundation or flooding by seawater and what the impact could be for the local community.

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Carpentaria Shire Council

PROJECT UPDATE No. 2 (Sept 2020)

CARPENTARIA SHIRE
Outback by the Sea®

During the project team's visit, they completed an assessment of all essential Council infrastructure including water supply infrastructure, boat ramps (a) and public foreshore areas important to the local community and tourism industry (b).

The team also held two community meetings with local residents and business owners to hear about local concerns and issues as well as to share local knowledge about impacts associated with previous storms and cyclones (c & d).

The whole Alluvium team would like to sincerely thank the Council and the local community for their warm hospitality and generosity in sharing their extensive knowledge and experience.

To find out more information about the *Our Resilient Coast* program please go to **https://www.carpentaria.qld.gov.au/coastal-hazard-adaption-strategy**.

(a)


(b)


(c)


(d)

QCoast2100 COUNCILS LEADING COASTAL ADAPTATION alluvium NCECONOMICS JBP scientists and engineers