FACTSHEET No.3

Coastal hazard adaptation

Resilient Coast

Resilient Gulf

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

- Planning for future landuses
- Tailoring specific uses for coastal hazard prone areas
- Updating emergency response planning, including monitoring programs and 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 infrastructure

Changes to infrastructure may include:

- Relocating critical infrastructure (e.g. essential access and services)
- Upgrading critical infrastructure that cannot readily be relocated
- increasing land levels (fill) in some areas
- 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 approaches to mitigate flooding and erosion in tidal areas.

Structures to minimise coastal flooding

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.

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

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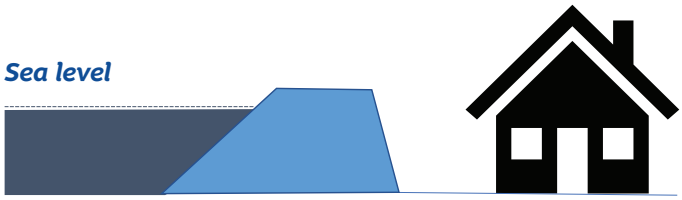

Storm surge barriers can generally be opened and closed and are most effectively implemented at narrow tidal inlets. They can vary in size from a flow valve on pipes and culverts to large scale barrages.

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.

Last line of defence structures

Seawalls or revetments provide a physical barrier between the tidal waters and adjacent coastal land, and protect the assets behind the wall from erosion. Seawalls are typically made of rock, concrete 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 scouring of sediment away from the toe of the wall. The appropriateness of seawalls is considered on a site by site basis.

Structures to assist with off-shore / off-bank energy dissipation

Structures can be installed off-shore (or adjacent to riverbanks) to create a zone where wave energy will break and dissipate prior to reaching the land.

Breakwaters are typically composed of materials such as rock, concrete or geotextile materials, floating or submerged.

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

Approaches to retain sediment as a buffer to erosion

Vegetation protection and maintenance involves limiting disturbance to dunes, riverbanks and vegetated areas to increase dune/bank stability and encourage accretion of sediment. When sand and silt accrete, this provides a buffer for future erosion events.

Sand nourishment involves importing additional sand or other sediment to increase the buffer to erosion in a particular area.

Groynes are structures (rock, geotextile, wood) that extent perpendicular from the shoreline or riverfront, and can assist with retaining sediment in a specific area. Sand, silt and mud will accumulate to one side of the groyne.

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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/**

Burke Shire Council **https://burke.engagementhub.com.au/resilient-coast-resilient-gulf**

Fact sheets in this series

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

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