

6. Coastal hazard adaptation actions

Boigu

Community overview

Community	English name	Cluster	Type
Boigu	Talbot	Northern	Low lying mud island

Boigu is one of three islands located in the northern cluster of the Torres Strait islands (Saibai, Boigu and Dauan), and is also one of two flat mud islands found in the region. The island is approximately 90 km², with an approximate population of 199 people (ABS, 2021) who generally live in the main township on the north side of the island.

Boigu is generally low lying, as can be expected due to its geological composition, with mangroves covering the majority of the island. The township is of similar elevation to the rest of the island, however its location to the north offers some protection from wind and wave conditions due to the close proximity to Papua New Guinea (PNG) and smaller adjacent islands to the east and west. The island has been formed by an accumulation of mud and silt deposited on old coral platforms, however active coral growth is likely suppressed by the impact of fluvial discharges from the nearby rivers in PNG. Most of the sediments that make up the island are likely derived from fluvial sources rather than calcareous sources (TSIRC 2020a).

Some of the key infrastructure in the Boigu township include:

- Airport
- Regional Council Office
- State School (Years Pre Prep to 6)
- Health Centre with permanent nurse
- Two grocery/ convenience stores (IBIS and Tai pan)
- Sporting Facilities - School rugby league oval
- Council guest house
- Council workshop / compound
- Water plant reservoirs / filtration collection wells
- De-SAL water plant
- Power station
- Barge ramp
- Pier (small craft and passengers)
- Sewerage treatment plan
- Landfill site



Risk

The Boigu community is presently at very high risk from storm tide inundation, high risk from tidal inundation, and low risk from erosion. Tidal inundation risk is expected to increase by 2100 and while erosion poses less risk at present, it also expected to increase by 2100. The low risk from erosion is due to the recently built seawall. The medium to long term erosion risk gets progressively higher as the seawall deteriorates with age. Without maintenance and eventually an upgrade, the erosion risk will increase. However, Council's ongoing coastal protection works program has been occurring in parallel with development of this Strategy. New works, such as the new seawall construction, have the potential to reduce the risk once constructed.




Coastal hazards risk profile for Boigu from present day to 2100

Boigu Risk Profile	Present Day	2050	2100
Open coast erosion	Low	Medium	High
Tidal inundation	High	Very High	Very High
Storm tide inundation	Very High	Very High	Very High

Adaptation response

A strategic adaptation response has been developed for Boigu to guide decision making over multiple planning horizons from present day to 2100. Based on the risk assessment and risk profiles for each hazard across the planning horizons, the present day adaptation response for Boigu is to actively manage identified risks, through a range of initiatives including education, nature based and structural engineering solutions. By 2050, without further action, the coastal hazard risk profile for Boigu may become too high and some active management options will no longer be feasible (due to economic or other factors), triggering a change into a 'transition' adaptation approach. At this time a broad range of adaptation options exist including engineering options, transition of current land use and relocating current assets to lower risk areas. A strategic decision will need to be made in consultation with the local community and consider the values of the Boigu area. The 'transition' adaptation pathway approach continues to be appropriate in 2100.

Adaptation response profile for Boigu

Present day	2050	2100
Actively manage 	Transition and change 	Transition and change 

Adaptation pathways and priority actions

Key Management Areas (KMAs) have been defined based on which areas are most at risk, as well as feedback from community leaders and are mapped below. Tailored adaptation pathways for each key management area on Boigu are presented in the following pages.

Building on the outcomes of the risk assessment, adaptation response, and input from community leaders, specific priority adaptation actions have been developed to protect and enhance assets and coastal values in the Boigu community, as well as enhance community stewardship and improve decision-making. These actions are designed to progress the community along its adaptation pathways.



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TOWNSHIP

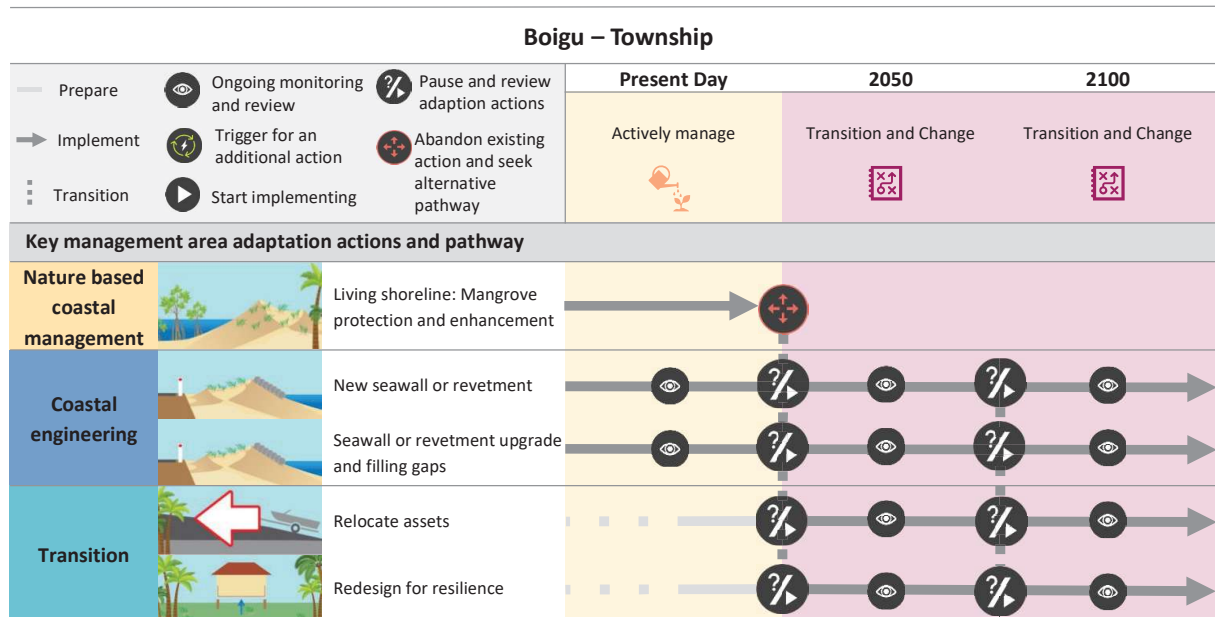
Overview of assets and values at risk

- The township has an engineered seawall in place to protect the area from coastal erosion (see image on page 68). Before this was installed, there was an area between the barge ramp and jetty that was in a state of disrepair.
- Wall material has been lost due to wash back, resulting in a lowering of the crest height.
- This allows more waves to overtop the wall causing further lowering of the crest.
- It is well protected from erosion but will potentially be inundated by storm tides now and may be impacted more frequently into the future.



Pathway description

In Boigu Island’s Township, active management can involve the protection and enhancement of living shorelines, specifically focusing on mangrove protection at two key locations. By 2050 the risks to coastal hazards are expected to be high, triggering the township transition into a “transition and change” pathway approach. The community can opt to build or upgrade seawalls and revetments or fill gaps in existing defences to further secure the area from erosion and inundation. As time progresses, the community should lead ongoing custodianship and monitoring with the option to revisit the option of relocating or redesigning assets. In the meantime, the community should avoid new development in hazard-prone areas.



MANGROVE AREA IN FRONT OF CEMETERY

Overview of assets and values at risk

- The cemetery is located at the eastern end of the township and is somewhat protected from erosion by a mangrove forest. The presence of the mangroves suggests it is a lower energy environment, which is supported by the orientation of the area (north-west facing coastline).
- The community has previously raised concerns over inundation of the cemetery during king or storm tides and the study found the northern section of the aerodrome is prone to erosion in the long term.
- The landfill site is also currently experiencing inundation.



Pathway description

The adaptation pathway for the Mangrove Area in front of the Cemetery on Boigu Island begins with an active management approach. This may include installing a bund or levee, ground raising, draining or constructing a new seawall or revetment to provide protection to the landward area. As time progresses, the community should lead ongoing custodianship and monitoring with the option to revisit the option of relocating or redesigning assets. In the meantime, the community should avoid new development in hazard-prone areas.

			Boigu – Mangrove Area in front of Cemetery								
			Present Day	2050	2100						
— Prepare	Ongoing monitoring and review	Pause and review adaption actions	Actively manage 	Transition and Change 	Transition and Change 						
→ Implement	Trigger for an additional action	Abandon existing action and seek alternative pathway									
⋮ Transition	Start implementing										
Key management area adaptation actions and pathway											
Coastal engineering		Bund, levee, ground raising and drainage									
		New seawall or revetment									
Transition		Relocate assets									
		Redesign for resilience									



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Boigu Community Action Plan		Indicative cost
1. Council-wide initiatives to enhance custodianship (Priority actions to be implemented within 10 years, and ongoing)		
1.1. Community stewardship		
Boigu1.1a	See Council wide actions. Consider how these actions can be effectively used in Boigu.	
1.2. Education and knowledge sharing		
Boigu1.2a	See Council wide actions. Consider how these actions can be effectively used in Boigu.	
1.3. Monitoring		
Boigu1.3a	See Council wide actions. Consider how these actions can be effectively used in Boigu.	
2. Planning updates (Priority actions to be implemented within 10 years, and ongoing)		
2.1. Land use planning		
Boigu2.1a	See Council wide actions. Consider how these actions can be effectively used in Boigu.	
Boigu2.1b	Develop a "Priority Asset Relocation and Redesign Strategy" involving significant community consultation and input. This should identify potential new settlement zone on Boigu where a staged relocation of assets can occur. This plan should explore the opportunity for a "Floating Community", or an "Above Water Community".	\$\$
2.2. Disaster planning		
Boigu2.2a	See Council wide actions. Consider how these actions can be effectively used in Boigu.	
3. Resilient built environment (Priority actions to be implemented within 10 years, and ongoing)		
3.1. Maintaining and improving infrastructure		
Boigu3.1a	See Council wide actions. Consider how these actions can be effectively used in Boigu.	
Boigu3.1b	Investigate opportunities to extend the airstrip east.	\$\$\$
4. Nature based coastal management (see adaptation pathways for timing)		
4.2. Living shorelines		
Boigu4.2a	Explore potential for a living shoreline to establish mangroves in the Township KMA.	\$\$
5. Coastal engineering (see adaptation pathways for timing)		
5.3. Last line of defence structures		
Boigu5.3a	Upgrade and extend the sea wall North of the Township KMA.	\$\$\$
5.4. Structures to minimise flooding		
Boigu5.4a	Extend the bund wall around the south east side of the township, including around waste facilities and cemetery.	\$\$\$
Boigu5.4b	Protect and enhance creek biodiversity and vegetation communities by installing tide gates at the creek mouths to the east and west of the township. This can also protect the community against flooding impacts.	\$\$\$

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Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1a	Establish a coastal resilience officer position within Council who will have responsibility over implementing the Zenadth Kes CHAS. This position will support Council's Climate Change Adaptation and Environment Committee and work closely with communities, across council and with other state and commonwealth agencies, streamlining and facilitating collaboration and effective implementation of adaptation actions.	\$\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1b	Seek co-funding/resources for further initiatives through grants and stakeholder partnerships.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1d	Promote coastal custodianship in the youth and future generations with community coast care events. These should weave in cultural knowledge and the idea of Zagat Torateti. They can also include art, communication, and science programs focused on coastal resilience.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1e	Establish and implement a dune and foreshore protection and maintenance program incorporating Zagat Torateti, access management, and community education. Support local communities in implementing this program.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.1. Community stewardship	C1.1f	Develop a dune and wetland vegetation seed bank for vegetation restoration efforts, involving Traditional Owners, Indigenous Land and Sea Rangers and schools.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2a	Develop a Zenadth Kes CHAS - Communication and Engagement Strategy. This will support Council in working with communities to raise awareness of and implement their Community Adaptation Plans. This will use creative and innovative communication channels, leveraging emerging community leaders and content creators. It will outline the appropriate level and protocols of engagement and consultation needed for a range of adaptation actions. Ideally, this communication and engagement strategy should not stand alone but be integrated with Council's existing engagement policies and practices so that its relevance for all current and future development and supporting community resilience is continuously acknowledged.	\$	Ongoing	High

Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2b	Develop locally and culturally appropriate educational materials about coastal processes, climate change, monitoring and adaptation with a focus on nature based management and innovative and island-appropriate design and development. Integrate these materials into the implementation of the Zenadth Kes CHAS - Communication and Engagement Strategy (action C1.2a).	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2c	Work with organisations like the TSRA, CSIRO, Universities, Non-Profits, and the Torres Strait Climate Centre of Excellence to support further research and innovation into coastal hazard and climate change adaptation.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2d	Continue to advance partnerships and collaboration with Traditional Owners to further consider needs and aspirations for Aboriginal and Torres Strait Islander People in coastal hazard adaptation.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.2. Education and knowledge sharing	C1.2e	Promote cross-sector partnerships and initiatives to enhance resilience and strategic adaptation for transport infrastructure, including boating infrastructure.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3a	Develop a tailored integrated monitoring and reporting program to inform future adaptation. Incorporates actions C1.3b-h.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3b	Undertake drone survey (elevation and aerial imagery) monitoring of beaches.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3c	Undertake underwater coral reef surveys to map the extent and condition. Explore the use of photogrammetry to create detailed 3D models of reefs.	\$\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3d	Establish a network of water level gauges throughout the TSIRC regions. Train community members to operate and maintain them.	\$\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3e	Undertake regular coastal protection structure condition assessments.	\$	Ongoing	High

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Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3f	Establish a monitoring program for sites of cultural significance that measures indicators such as spiritual/social value, archaeological value, physical condition, and protection of sites.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3g	Establish a system of Citizen Science photo monitoring points (CoastSnap, Fluker Post or similar) at beaches in the area.	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3h	Create a platform/process with Council for monitoring data storage and management	\$	Ongoing	High
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3i	Undertake detailed sediment supply and transport studies for coral cay islands and lagoons.	\$\$	Within 5 years	Medium
1. Council-wide initiatives to enhance custodianship	1.3. Monitoring	C1.3j	Review and further examine the sediment dynamics around TSIRC communities and the shoreline including: <ul style="list-style-type: none"> · Geomorphic assessment · Hydrodynamic modelling · Shoreline Erosion Management Plan. Linked to C1.3i	\$	Ongoing	High
2. Planning updates	2.1. Land use planning	C2.1a	Submit updated Erosion Prone Area layers to State Government for formal update to the existing State-wide mapping.	\$	Immediate	High
2. Planning updates	2.1. Land use planning	C2.1b	Use the updated Erosion Prone Area and storm tide mapping and outcomes of the Zenadth Kes CHAS in current and future Planning Scheme and Master Plan updates to inform decisions on development areas and strategic land use planning.	\$	Ongoing	High
2. Planning updates	2.1. Land use planning	C2.1c	Consider implications (within Council) of the Strategy for future development approvals and conditions, including: <ul style="list-style-type: none"> · Approval conditions for lots of undeveloped land, and · Implications for future development approvals and conditions. 	\$	Ongoing	High
2. Planning updates	2.2. Disaster management	C2.2a	Use the updated Erosion Prone Area and storm tide mapping, risk assessment and economic implications to update the TSIRC Local Disaster Management Plan. Ensure local community input is used to inform the updated plan.	\$	Within 5 years	Medium
2. Planning updates	2.2. Disaster management	C2.2b	Review the long-term adequacy of evacuation and shelter facilities and evacuation routes, including evacuation by land and sea.	\$	Ongoing	High

Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1a	Review at-risk infrastructure (from CHAS data outputs) and embed risks into current asset management plans/Master Plan (this could include 'betterment' at critical asset refurbishment/renewals points).	\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1b	Review access road renewals and upgrades (prioritisation), and upgrade design requirements and timing of upgrades.	\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1c	Produce "Resilient Housing and Development Guidelines and Designs" tailored to the Torres Strait Islands. This should cater to all island types. Community knowledge holders, elders and leaders should be heavily consulted for this process.	\$\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1d	Consult with utility providers on future services and upgrades, and implications of coastal hazard areas.	\$	Ongoing	High
3. Resilient built infrastructure	3.1. Increasing infrastructure resilience	C3.1e	Audit stormwater assets in areas subject to erosion and inundation, and develop plan to upgrade in line with refurbishment/renewals points.	\$\$	Ongoing	High
3. Resilient built infrastructure	3.2. Relocate infrastructure	C3.2a	Develop "Priority Asset Relocation and Redesign Guidelines" to assist communities in developing island specific relocation strategies. Community knowledge holders, Elders, other leaders and young people should be heavily consulted for this process. Factors to consider include: Approvals Native Title Hazards Master Plan Town Planning	\$	Immediate	High

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Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1a	Support local communities in re-establishing, rehabilitating, or protecting coastal dunes	\$	Ongoing	High
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1b	Support local communities in re-establishing, rehabilitating, or protecting mangroves	\$	Ongoing	High
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1c	Support local communities in re-establishing, rehabilitating, or protecting coral reefs	\$	Ongoing	High
4. Nature-based coastal management	4.1. Dune, mangrove and reef protection and enhancement	C4.1d	Scope the feasibility and priority locations for natural reef enhancement activities, requiring comprehensive knowledge of the latest scientific findings and methodologies to ensure effective implementation and multiple benefit outcomes.	\$\$	Within 5 years	Medium
4. Nature-based coastal management	4.2. Living shorelines	C4.2a	Develop a detailed "Living Shorelines Design and Implementation Plan" to prioritise and support the communities where a living shoreline has been determined as a feasible option.	\$\$	Within 5 years	Medium
4. Nature-based coastal management	4.2. Living shorelines	C4.2b	Develop a detailed "Artificial Reef Design and Implementation Plan" to prioritise and support the communities where an artificial reef has been determined as a feasible option.	\$\$	Within 5 years	Medium
4. Nature-based coastal management	4.3. Beach nourishment	C4.3a	Develop a detailed "Beach Nourishment Design and Implementation Plan" to prioritise and support the communities where beach nourishment or sand management has been determined as a feasible option.	\$\$	Within 5 years	Medium

Adaptation theme	Adaptation option	Action ID	2023 Priority strategic actions (completed within 5 – 10 years)	Indicative cost	Timing	Priority
5. Coastal engineering	5.1. Structures to reduce coastal hazards	C5.1a	Continue to implement the Seawall Project.	\$\$\$	Ongoing	High
5. Coastal engineering	5.1. Structures to reduce coastal hazards	C5.1b	Continue to monitor and maintain existing coastal and flood protection structures.	\$\$\$	Ongoing	High
5. Coastal engineering	5.1. Structures to reduce coastal hazards	C5.1c	Audit coastal and flood protection assets, and develop plan to upgrade where needed.	\$	Ongoing	High

