

6. Coastal hazard adaptation actions

Mabuiag

Community overview

Community	English name	Cluster	Type
Mabuiag	Jervis	Western	Continental volcanic and granitic rock island

Mabuiag is situated in the eastern island cluster of the Torres Strait. It has an estimated population of 253 people (ABS 2021), and an area just over 6 km². Mabuiag is a continental type island with geology similar to that found on mainland Australia, comprising the main island with the township and numerous smaller surrounding islands. The island is hilly in nature, with the township and associated infrastructure located on the coastal fringe to the east and northeast.

The majority of the community live in the main township. Due to the location of the township it is somewhat protected from strong seasonal winds and waves by offshore islands and reefs. The main beach adjacent to the township is approximately 2 km in length, separated into two compartments by an ephemeral waterway. The coastal fringe consists of a low, wide coastal plain. There is geological evidence that the area used to be a reef structure. It is likely that the wide coastal plain was formed by accretion of the coastal strip over a long period.

Key infrastructure on Mabuiagi includes:

- Airport
- Regional council office
- State School (Years Pre-prep to year 6)
- Health Centre with permanent nurse
- Two grocery stores
- Ngalpun Ngulaygaw Lag Resource Centre
- Sporting Facilities – outdoor rugby league oval, undercover basketball court
- Community police services
- Council workshop / compound
- Water plant reservoirs / filtration collection wells
- Power station
- Sewerage treatment plant
- Barge ramp
- Pier (small craft and passengers only)



Risk

The Mabuia community is currently considered low risk from coastal hazards, with the risk from storm tide expected to increase to high risk within the medium to long term planning horizon of this strategy. The erosion risk is expected to increase somewhat to in the medium to long term.

Coastal hazards risk profile for Mabuia from present day to 2100

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

Adaptation response

A strategic adaptation response has been developed for Mabuia 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 Mabuia is to avoid creating new assets in hazard areas and maintain current assets. By 2050, increased risk will trigger the adaptation response to focus on actively managing identified risks, through a range of initiatives including education, nature based and structural engineering solutions. The 'actively manage' adaptation pathway approach will continue to be implemented into 2100.

Adaptation response profile for Mabuia

Present day	2050	2100
Avoid (and maintain) 	Actively manage 	Actively manage 

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 Mabuia 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 Mabuia 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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NORTH BEACH

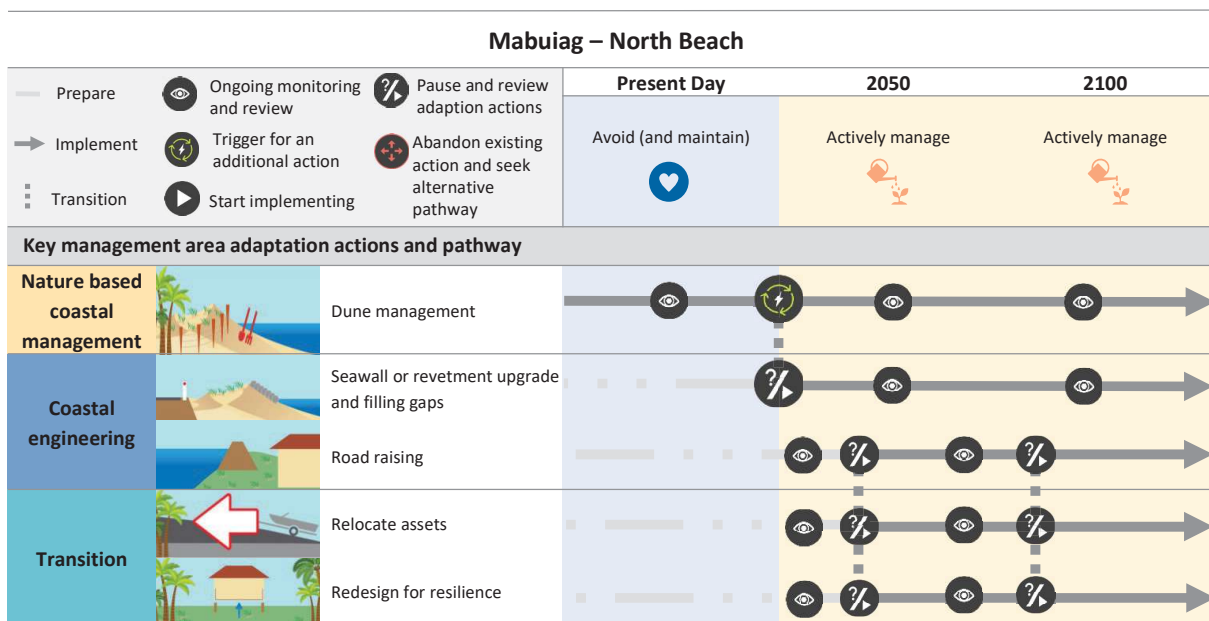
Overview of assets and values at risk

- This is the section of beach north of the creek which enters the beach near the water supply reservoir. This beach has significantly more coastal protection works compared to the south due to the location of the township.
- The seawalls here are of unknown design and in various states of disrepair. The seawalls form part of the community infrastructure, as they are often a gathering point in the afternoons and evenings.
- During previous consultation, the only erosion concern held by the community was the erosion of the road leading to the barge ramp.
- The study found the township was unlikely to be impacted by coastal erosion but was at risk in the longer term from permanent inundation due to sea level rise and storm tide inundation.



Pathway description

At Mabuiag’s North Beach, the adaptation process starts with dune management and maintenance of the existing informal seawalls. As the situation evolves, the community can upgrade and fill gaps in existing seawalls or revetments. To address inundation, the community can selectively raise roads to preserve access. Moving forward, the community will need to decide whether to continue to maintain and upgrade any new protection structures, relocate or redesign assets. Input into this decision will involve consideration of sea level rise, and island geomorphology and sediment dynamics. Ongoing custodianship and monitoring should be maintained, avoiding new development in hazard-prone areas.



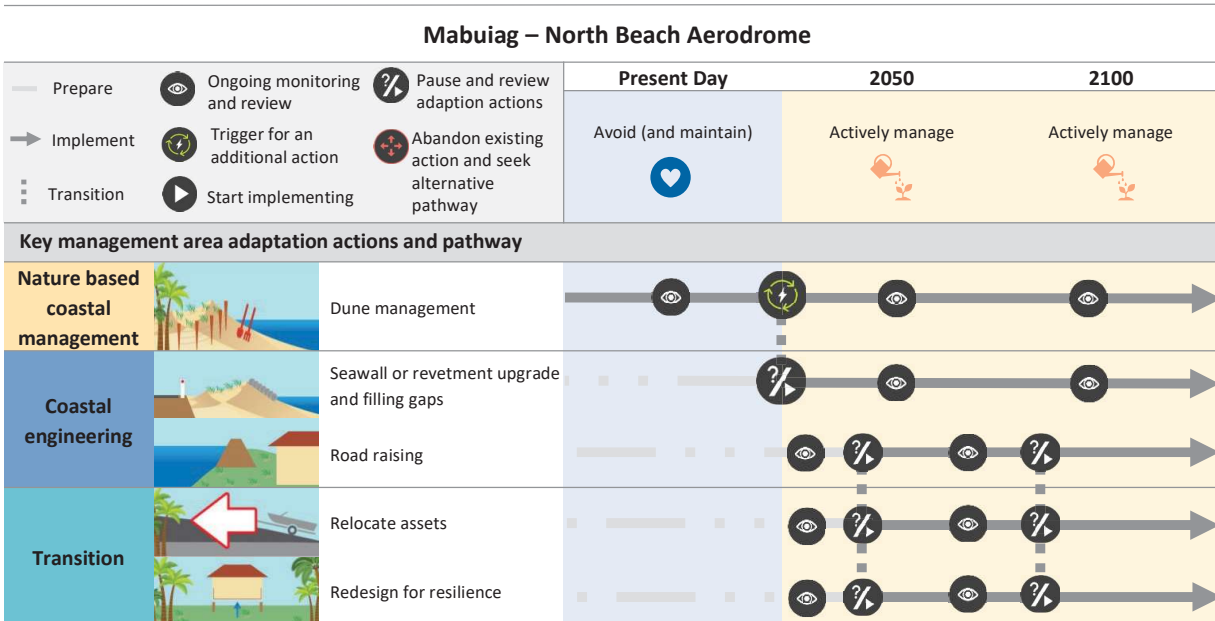
NORTH BEACH AERODROME

Overview of assets and values at risk

- This end of the beach has a creek that enters the beach system, fanning out onto the reef flat.
- Various seawalls, which are largely in disrepair, are protecting the road to the barge ramp area and the end of the runway.

Pathway description

In the north beach aerodrome area of Mabuig, initial actions can involve maintaining the existing seawall. As trigger points are reached, upgrading existing seawalls and revetments, filling gaps, can be undertaken to enhance coastal protection and ground raising of certain access roads to prevent inundation. Throughout the process, ongoing custodianship and monitoring should be maintained, avoiding new development in hazard-prone areas.



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Mabuiag

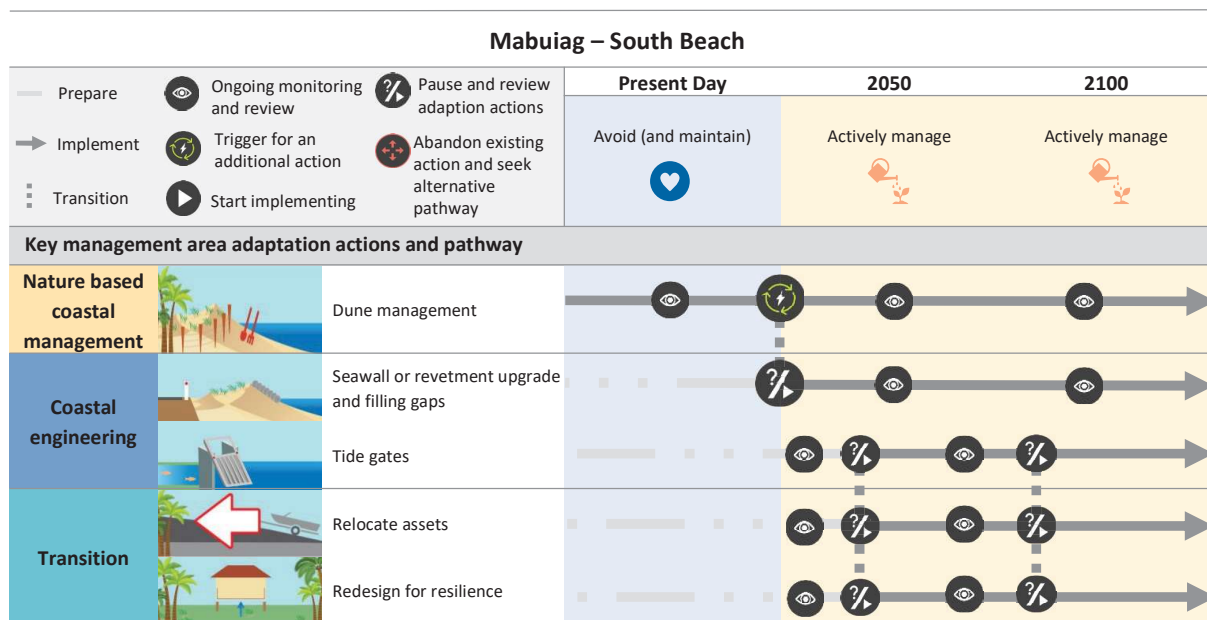
SOUTH BEACH

Overview of assets and values at risk

- This end of the beach has several creeks that enter the beach system, creating large fan deltas onto the reef flat. During significant flood events, sand is brought from inland areas out onto the reef flat. Storm events and winds distribute the sand back onto the beach.
- Some erosion of the dune system is present along the southern half of the beach.
- There are no seawalls present on this section of beach.

Pathway description

At Mabuiag’s South Beach, the adaptation pathway begins with dune management. As trigger points are reached, for example when the cemetery is encroached by erosion or inundation, the community can begin to actively managed the hazards by importing sand to nourish the beach, constructing a bund or new seawalls or revetments. Another option to mitigate inundation is to install tide gates in the creeks. Ongoing custodianship and monitoring should be maintained, avoiding new development in hazard-prone areas



Mabuiag 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		
Mabuiag1.1a	See Council wide actions. Consider how these actions can be effectively used in Mabuiag.	
1.2. Education and knowledge sharing		
Mabuiag1.2a	See Council wide actions. Consider how these actions can be effectively used in Mabuiag.	
1.3. Monitoring		
Mabuiag1.3a	See Council wide actions. Consider how these actions can be effectively used in Mabuiag.	



Mabuiag Community Action Plan		Indicative cost
2. Planning updates (Priority actions to be implemented within 10 years, and ongoing)		
2.1. Land use planning		
Mabuiag2.1a	See Council wide actions. Consider how these actions can be effectively used in Mabuiag.	
Mabuiag2.1b	Consider establishment of a stone quarry to provide materials for coastal protection throughout the Torres Strait.	\$\$
2.2. Disaster planning		
Mabuiag2.2a	See Council wide actions. Consider how these actions can be effectively used in Mabuiag.	
3. Resilient built environment (Priority actions to be implemented within 10 years, and ongoing)		
3.1. Maintaining and improving infrastructure		
Mabuiag3.1a	See Council wide actions. Consider how these actions can be effectively used in Mabuiag.	
Mabuiag3.1b	Consider relocation or redesign for resilience of buildings (in line with the Resilient Housing and Development Guidelines and Designs from action C3.1c) exposed to erosion and inundation in the North Beach and South Beach KMAs.	\$\$
4. Nature based coastal management (see adaptation pathways for timing)		
4.1 Dune, mangrove and reef protection and enhancement		
Mabuiag4.1a	Identify degraded dunes in all Key Management Areas. Protect and enhance them using local knowledge and Zaget Torateti, including the use of native dune plants, and other stabilising vegetation. Manage access for an appropriate time period to allow vegetation to establish.	\$
4.3 Beach nourishment		
Mabuiag4.3a	Consider small scale beach nourishment or sand scraping to enhance degraded dunes in front of key assets. Supplement with dune restoration and access management, see action Mabuiag4.1.a.	\$\$
5. Coastal engineering (see adaptation pathways for timing)		
5.3 Last line of defence structures		
Mabuiag5.3a	Continue to monitor and maintain existing coastal protection structures in the North Beach and Aerodrome KMAs and develop plan to upgrade where needed.	\$\$
Mabuiag5.3b	As part of the adaptation pathway in the North Beach KMA, consider the construction of a coastal protection structure to protect exposed houses. This action should not occur before Mabuiag3.1b, Mabuiag4.1a and Mabuiag4.3a are considered.	\$\$\$
5.4 Structures to minimise flooding		



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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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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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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

