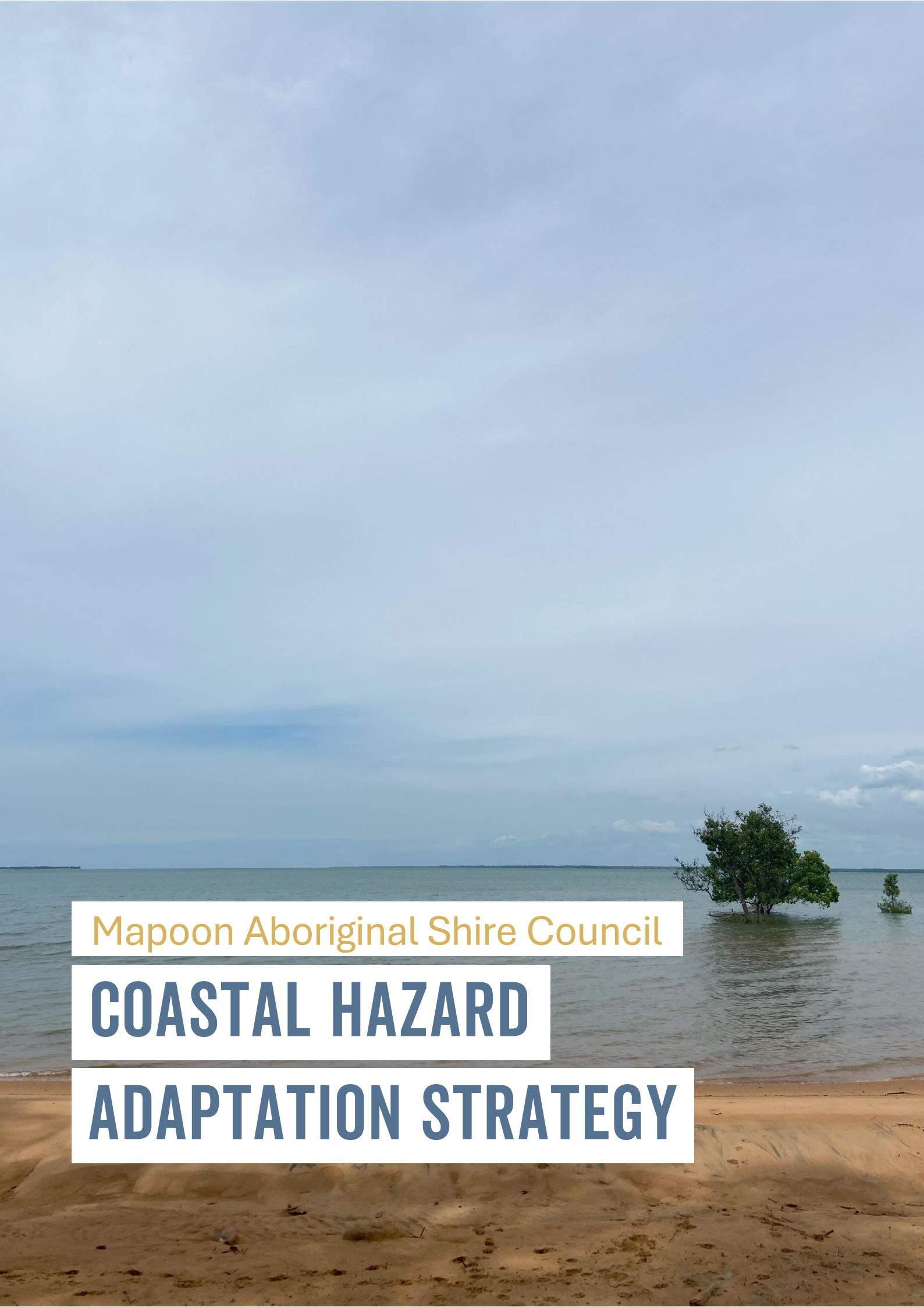


Mapoon Aboriginal Shire Council

COASTAL HAZARD ADAPTATION STRATEGY

FORWARD

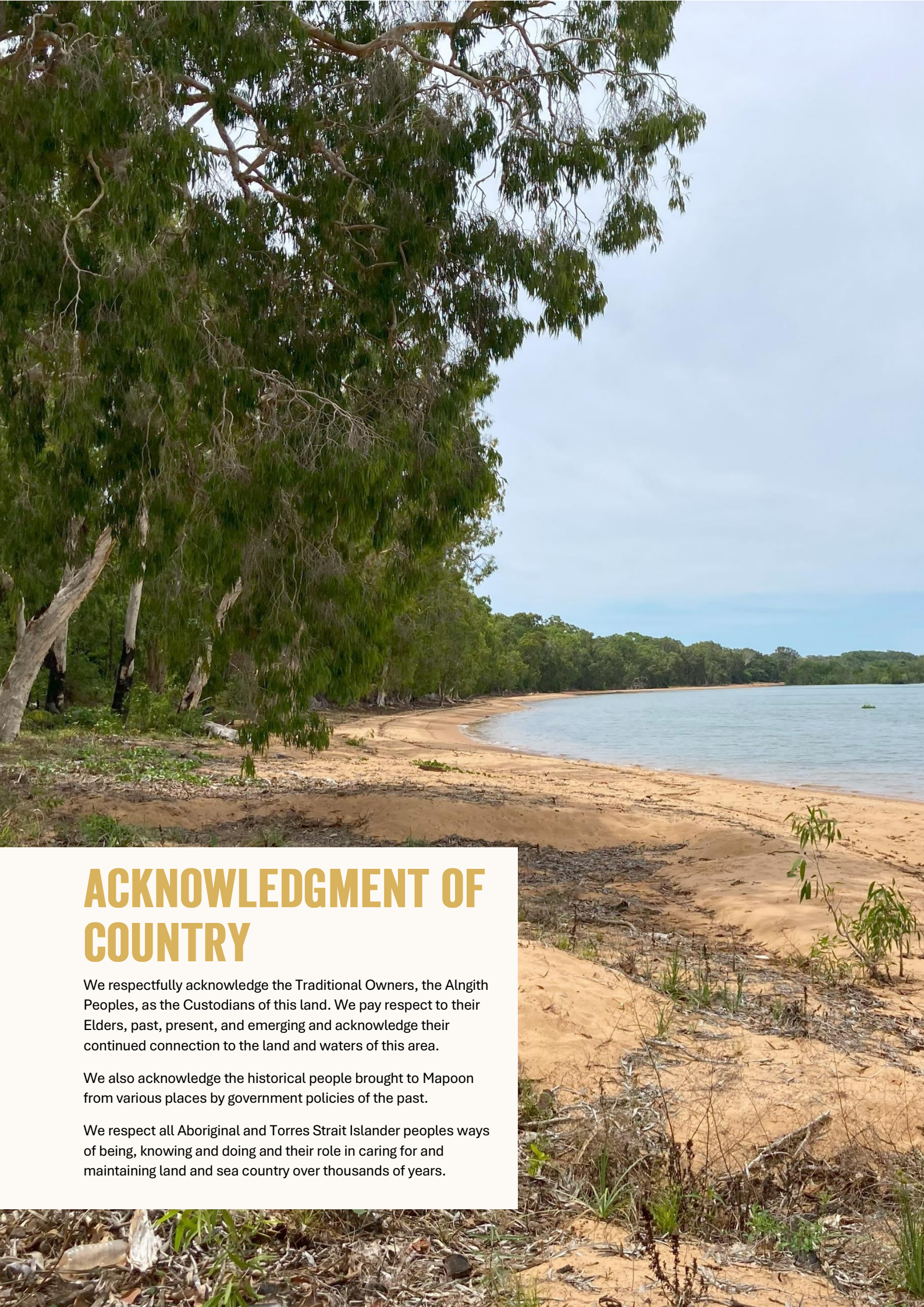
MAYOR'S MESSAGE

<insert message here>

INPUT FROM ADJOINING COMMUNITIES

The local authority boundaries for Mapoon, Napranum and Weipa Town Authority are highly irregular and residents and visitors of the region often traverse these boundaries to utilise different areas of the coast.

To maximise efficiency and knowledge sharing, Council, Mapoon Aboriginal Shire Council (MASC) and Weipa Town Authority (WTA) have collectively prepared Coastal Hazard Adaptation Strategies (CHAS) for their respective areas of management. This approach supports a greater appreciation of community values and use of the entire coastline in the region, irrespective of Council boundaries. The responses received during engagement activities identify that community members from Mapoon, Napranum and Weipa utilise the coast in all of these areas in similar ways – particularly for recreational activities such as camping, fishing and recreational driving along the beach.



ACKNOWLEDGMENT OF COUNTRY

We respectfully acknowledge the Traditional Owners, the Alngith Peoples, as the Custodians of this land. We pay respect to their Elders, past, present, and emerging and acknowledge their continued connection to the land and waters of this area.

We also acknowledge the historical people brought to Mapoon from various places by government policies of the past.

We respect all Aboriginal and Torres Strait Islander peoples ways of being, knowing and doing and their role in caring for and maintaining land and sea country over thousands of years.

CONTENTS

1.0 INTRODUCTION

Mapoon Aboriginal Shire Council (Council), with the support of the QCoast2100 program, has developed a Coastal Hazard Adaptation Strategy (the Strategy). This Strategy helps us to better understand emerging coastal hazard risks and proactively manage the impacts of those risks on our community, environment, cultural values, infrastructure, liveability and essential services. This Strategy is designed to strengthen our community both now and into the future (to 2100) so that our children and their children can maintain their connection to Land and Sea Country.

Mapoon is home to a unique landscape, history and people. The coastal region is comprised of estuaries, freshwater and tidal wetlands and long sandy beaches bounded by well-formed but low-profile dune systems, often fronted by wide, shallow nearshore areas.

Our coastal landscape is always changing, being shaped by natural processes like wind, tides and currents and changing sea levels. The continual cycles of sand loss (erosion), rebuilding (accretion) of the shoreline, and flooding of coastal areas by sea water during king tides and storms are all part of these natural processes. These processes are referred to as coastal hazards when they have the potential to negatively impact on infrastructure, access, services, our lifestyle and the economy.

Building the resilience of our coastline and community is one of our top priorities. To achieve this, we need to understand how our coast is being affected by coastal hazards today and how our coast might change in the future under the influence of a changing climate. We can then proactively plan, prepare and respond to those coastal hazard risks over time.

This Strategy has been informed by the best available science and was a collaborative effort with members of our community, who have shared their experiences and knowledge to help us understand what is important to them.

CONTEXT & APPROACH:

This Strategy has been developed under QCoast2100, a state-wide coastal hazard adaptation program supported by the Queensland Government and Local Government Association of Queensland (LGAQ). QCoast2100 assists Councils to proactively plan for long-term coastal resilience and minimising the risk of coastal hazards to communities and valuable assets such as roads, utilities, parks, natural areas and heritage places.

PURPOSE

The Strategy is a risk and change management initiative. It provides an understanding of current and future coastal hazard risks, including how the coast might change or be impacted in the future, and what we can do to proactively plan, prepare, and respond to these risks over time to improve our resilience to coastal hazards.

This strategy outlines the:

- coastal values of the region;
- current and future coastal hazard risks, nominally to the year 2100;
- short, medium and long-term actions to avoid, reduce and adapt to the social, cultural, economic, and environmental risks associated with coastal hazards; and
- recommended approaches to consider in managing our coastline.

The Strategy is underpinned by extensive stakeholder input and the best available science, engineering, and economic studies. It forms the foundation to strengthen the resilience of our coast and community and facilitates informed decision-making.

We all have a role to play in maintaining our resilience to coastal hazards and this document is the start of a broader discussion to assist all of us when responding to the impacts of a changing coast.

PROCESS

The Strategy was developed through an iterative eight-phase process as outlined in the *QCoast2100 Minimum Standards and Guidelines*. The process has included technical studies and engagement. The outputs of this work have:

- Identified existing coastal hazard exposure and how this exposure may change in the future under the influence of rising sea levels;
- Assessed the vulnerability of and risk to natural and built assets through a comprehensive data collection and spatial analysis process;
- Identified priorities by distinguishing between urgent and future risks;
- Engaged with the community to understand preferred approaches to adaptation and develop potential approaches to adapt to coastal hazards;
- Assessed the viability of adaptation approaches through stakeholder engagement and multi-criteria analysis; and
- Informed the development of implementation planning (timing, staging and sequencing) of preferred adaptation options over time.

Figure 1. CHAS structure - phases and engagement touch points

Engagement touch points with stakeholders and community

Source: Cape York Weekly

ALIGNING WITH OUR CORPORATE STRATEGIES

The Strategy is a non-statutory document that provides a high-level plan for the future management of coastal hazards through to 2100 and involves identifying regionally focused priority areas and actions. The identification of more detailed localised planning and the implementation of physical works will occur through annual operational programs such as asset management and shoreline erosion management planning.

Just like our coastal environment, the Strategy will evolve as new information, observations and technologies become available. The Strategy will be reviewed periodically to align it with leading practice and community expectations.

The Strategy, and supporting technical work, form an important part of Council's long-term planning and strategic framework and will inform and influence a range of other Council strategies, plans, policies, and future decision making. In addition to the Corporate Plan 2020 – 2024 and Mapoon Master Plan, other key Council documents that should be updated (where required) to align with, integrate and embed coastal hazard risk considerations from the Strategy include:

- Operational Plan 2023-2024
- Mapoon Master Plan 2019
- Mapoon Aboriginal Shire Council Planning Scheme 2015
- Local Government Infrastructure plan

2.0 WHY DO WE NEED A STRATEGY

Our coastal zone is dynamic and always changing. Many of us are familiar with coastal change having observed beach erosion, shifting sands and periodic inundation of low-lying areas from high tides and storm events. These natural processes are referred to as coastal hazards when they impact on how we use and enjoy our coastal areas.

Coastal hazard impacts can occur quickly during significant storm events or develop slowly, over several years in response to long term natural coastal processes. These impacts can result in temporary or permanent changes to our coastline, affecting our region's natural beauty and places of cultural and ecological significance as well as our community's infrastructure – our roads, services, drainage, homes, businesses and utilities.

The extent of coastal land vulnerable to coastal hazards, as well as the consequences of these coastal hazards, are expected to increase in the future as sea levels rise. Climate change is also expected to increase the severity, frequency and risk associated with coastal hazards over time. This Strategy focuses on three coastal hazards that affect our coastline – storm tide inundation, coastal erosion and sea level rise.

STORM TIDE INUNDATION:

Storm tide is the temporary water level that results from the combination of normal tides and a storm surge from severe weather such as cyclones or strong winds. If a storm surge coincides with higher tides, the resulting storm tide and waves can submerge the open coastline or inundate land behind the open coastline through the overflow of waterways, estuaries and drains that connect to the ocean.

Our coast is vulnerable to storm tide inundation along our low-lying sandy foreshores and wetlands. A number of Mapoon's important environmental and social and cultural assets will be affected by storm tide inundation in the years to come including environmentally significant turtle nesting areas, freshwater and saline wetlands, burial and cultural sites, the missionary cemetery, boat ramp and camping area, and electricity, water and road infrastructure.

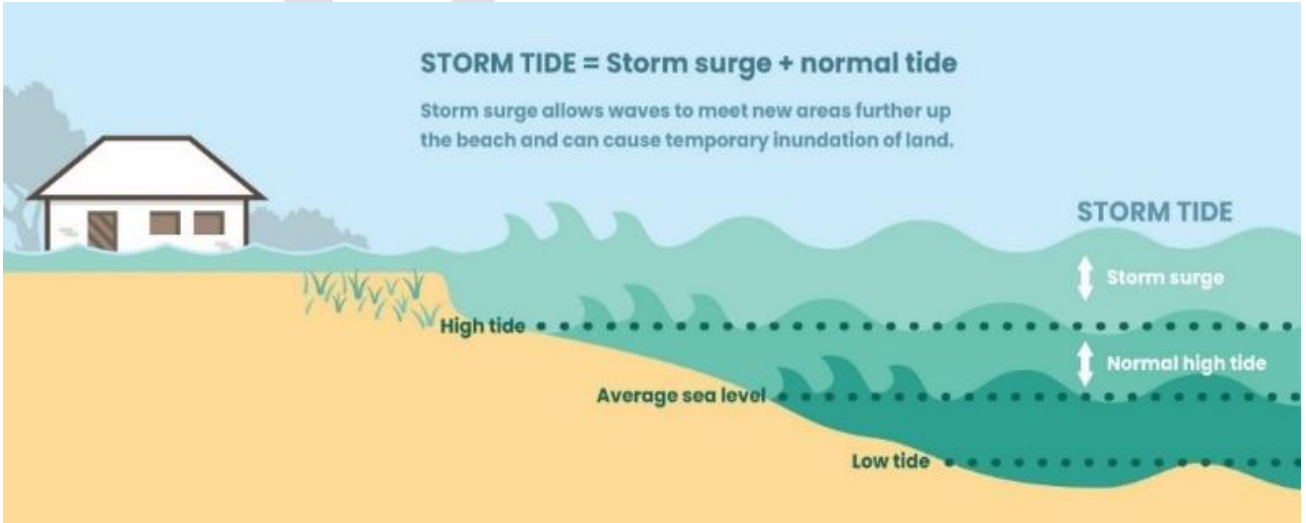


Figure 2. Storm-tide inundation process

COASTAL EROSION:

Coastal erosion is the temporary or permanent loss of coastal land, beaches or dunes by wave or wind action, tidal currents, water flows or sea level rise. Coastal erosion is often associated with extreme weather such as coastal storms, but many coastal foreshores also naturally undergo cycles of erosion and accretion (build up) over weeks and years.

Within the Mapoon township, the beach and densely vegetated hind beach area at Red Beach are, and to continue to be, exposed to high risks from erosion. The adjacent residential area and water treatment plant are also anticipated to be at high risk from erosion hazard in the future (2050 onwards). This includes the presently undeveloped esplanade area immediately landward of the beach. South of Red Beach at High Rise, residential land and water infrastructure is at high risk from erosion by 2100.

Outside of the main town area, there are several highly valued areas and assets at high to extreme risk of erosion between present day and 2100 including the beach and dune system along Mission Beach, Back Beach and Pennefather Beach; the area landward of Mission Beach, including local roads and the esplanade; vehicular access route between Cullen Point to Janie Creek; residences, traditional lands, cultural sites and along Pennefather Beach and low lying land containing burial and cultural sites, the missionary cemetery, boat ramp and camping area, and electricity, water and road infrastructure.

Over the long-term, sea-level rise is expected to exacerbate slow-onset coastal erosion in Mapoon.

SEA LEVEL RISE:

Sea level rise is not a distinct process causing impact on its own, but rather, increases the extent of land subject to other coastal processes (including tidal inundation, coastal inundation, coastal erosion and shoreline recession)[1].

A projected rise in mean (average) sea level of 0.8 metres by the year 2100 has been adopted as a planning benchmark by the Queensland Government based on climate modelling. If effective coastal adaptation strategies are not implemented, this increase could result in permanent sea water inundation of low-lying areas and exposure of the places we love and value such as our beaches, parks, important community infrastructure like roads and drainage, and private assets.

In Mapoon, several key assets are projected to be exposed to sea level rise between now and 2100. These include the beach and dune system at Mission Beach and dwellings, burial sites and cultural sites, and electricity and water supply infrastructure South of Mamoose Street. Cullen Point Road, in the vicinity of Peters Corner, and environmentally significant turtle nesting areas, freshwater and saline wetlands and cultural sites west of Cullen Point Road to Back Beach are also at high to extreme risk from sea level rise under the from 2050 onwards.

Figure 3. Process of coastal erosion and sea level rise

[1] Insurance Council of Australia (2021), *Climate Change Impact Series: Actions of the Sea and Future Risks*.


BACK BEACH
CULLEN POI
JANIE CREEK
CAMP SITE

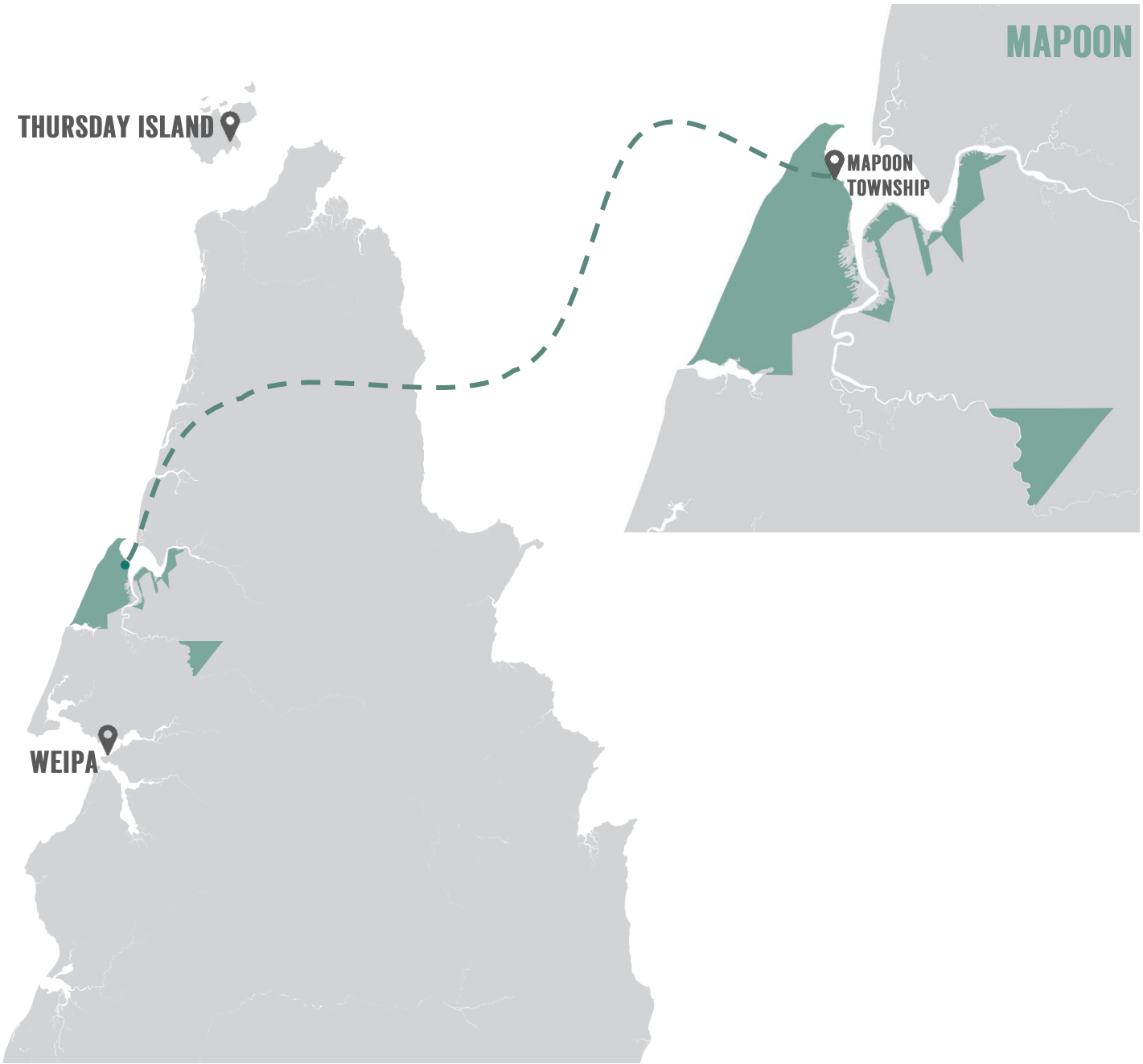
3.0 OUR COAST

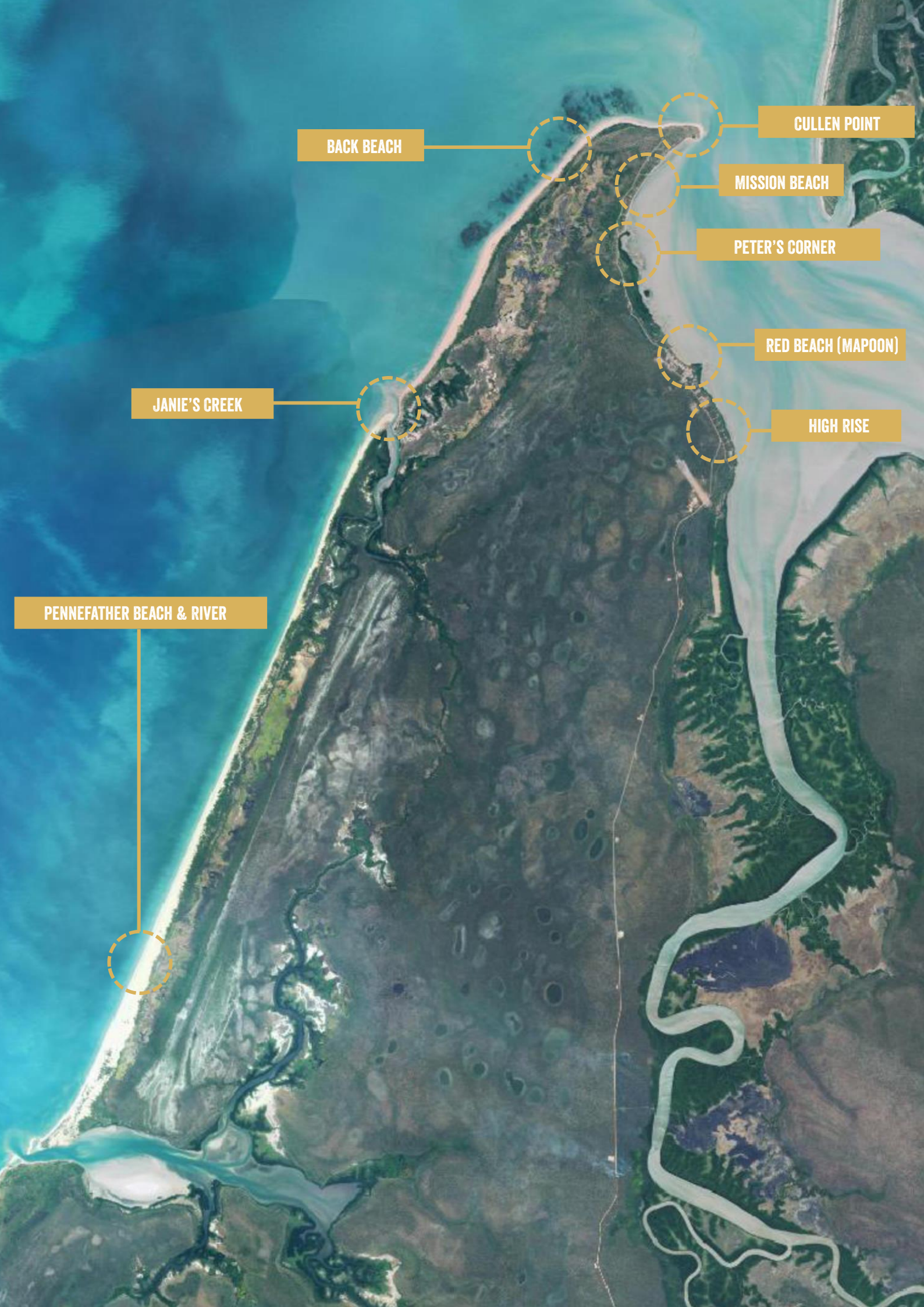
> Mapoon is a remote indigenous community located in the northern most tip of Queensland, approximately 840km from Cairns. The Mapoon Aboriginal Shire Council area covers approximately 530km2 of land across Cape York Peninsula and is divided into two sections, one coastal and the other inland.

The largest contiguous area includes Mapoon township, which is situated north of Pennefather River on the traditional lands of the Tjungundji people at Rugapayn (Red Beach). This area, and the adjacent area known as High Rise, is well elevated above the estuary. The community also extends northwards along the broad and low dune system and coastal plain of Mission Beach up to Cullen Point.

The inland section of Mapoon is wholly surrounded by Cook Shire and Napranum Shire and is largely undeveloped and managed for conservation purposes.

The Mapoon Aboriginal Shire Council area also includes nearly 40km of coastline directly fronting the Gulf of Carpentaria, from Pennefather River north to Port Musgrave at Cullen Point. Backed by extensive and culturally important wetland areas, this area is accessible by boat or 4WD vehicles only, with popular camping areas around Janie Creek. This area is managed by several indigenous organisations.




BACK BEACH
CULLEN POINT
MISSION BEACH
PETER'S CORNER
RED BEACH (MAPOON)
JANIE'S CREEK
HIGH RISE
PENNEFATHER BEACH & RIVER

OUR STORY

> Mapoon is the traditional and spiritual homeland of the Tjungundji people who have cared for the land and sea of this ancient landscape for thousands of years.

In more recent history, the region has also seen the migration of other traditional owner groups including the Mpakwithi, Taepithiggi, Thaynhakwith, Warrangku, Wimarangga and Yupungathi people.

The Mapoon community has endured many hardships and have shown great strength and determination in the fight to remain on country. On 26 April 1989 a Deed of Grant of Land in Trust (DOGIT) for 'Aboriginal Reserve Purposes' under the Land Act (Qld.) and covering 1,839 square kilometres, was granted to the Mapoon people by the Queensland Government.

The Mapoon Aboriginal Shire Council (MASC) Council is the trustee for the township area and the Old Mapoon Aboriginal Corporation is the Trustee for the non-town area. This arrangement has governance implications in matters such as leasing and development of land that may be subject to coastal hazards.

The Mapoon coastline continues to be inextricably linked to our community's culture and identify and integral to the livelihoods, customs and spiritual beliefs of Aboriginal and Torres Strait Islander peoples. Many of our culturally significant areas are located close to or within beach, dune and wetland areas and continued access to these areas is critical for community well-being.

Council acknowledges that the traditional knowledge systems and practices of First Nations People are a major resource for, and integral to, adapting to climate change. This Strategy seeks to integrate such knowledge with existing coastal practices and technical information to increase the effectiveness of coastal hazard adaptation.

Source: Western Cape York Stories

OUR COASTAL LANDSCAPE

> The coastal landscape of Mapoon is home to diverse marine and coastal ecosystems of national significance and is one of our most valuable natural assets. Mapoon's coastline sweeps gently from the north with long sandy beaches and dune systems backed by extensive tidal wetlands, such as those associated with Janie Creek and its tributaries.

Our natural foreshores, beaches and coastal vegetation support important habitat areas for our native plants and animals. Mapoon is home to over 596 species of native fauna and flora including 2 rare or threatened plant species and 16 rare or threatened animal species . The area from Pennefather River to Back Beach supports important nesting areas for Sea Turtles and shorebirds.

Wetland and waterways such as the Pennefather River and Janie Creek are an essential part of our natural environment and underpin the health, prosperity and wellbeing of our region. Port Musgrave, a large estuary fed by the Ducie and Wenlock Rivers, and its connection to the coast are equally essential supporting large extents of protected ecosystems.

Approximately 36km2 (7%) of our region comprises wetland habitat1, including 18.6km2 of mangroves (3.5% of the total land area). The area along the Back Beach frontage west of Cullen Point Road, supports several perched freshwater wetlands of significant environmental and cultural importance to the community.

COMMUNITY SNAPSHOT

432 PEOPLE IN 2021[2]

RELATIVELY YOUNG POPULATION

WITH A MEDIAN AGE OF **27 YEARS**[3]

78%

POPULATION IDENTIFY AS ABORIGINAL OR TORRES STRAIT ISLANDER[3]

2.1%

ANNUAL GROWTH RATE OVER THE PAST 10 YEARS[3]

2

BUSINESSES[3]

14%

POPULATION WAS BORN OVERSEAS[3]

The coastal landscape has cultural, social and economic significance for the local community who value the protection and sustainability of the Land and Sea Country. Important environmental features of the Mapoon coastline include:

- diverse coastal landscapes including sandy beaches and estuaries;
- highly ecologically significant freshwater and intertidal wetlands, seagrass and mangrove forests; endangered or vulnerable wildlife who depend on the ocean and coastal zone for food, breeding and protection; and
- healthy coastal dune systems.

Locals and tourists alike value easy access to water-based activities and the natural, unspoiled environment that can be enjoyed in and around Mapoon's numerous wetlands and beaches. Some of our favourite ways to use coastal places are boating and fishing and foreshore recreational activities such as casually socializing, camping and four-wheel driving. As a result, coastal dependent infrastructure, particularly supporting recreational activities, is important for maintaining our community's way of life.

Our response to coastal hazards today will have a direct impact on the strength on lifestyle opportunities and attractiveness of visiting or living on the coast in the future.

[2] Australian Bureau of Statistics (2021) *Quick Stats: Mapoon*

[3] Queensland Government Statistician's Office, Queensland Treasury (2023), *Queensland Regional Profiles: Resident Profile: Mapoon (S) LGA*

4.0 BUILDING RESILIENCE TOGETHER

> Looking after our coast now and into the future is a shared responsibility which involves everyone – local, Queensland and Australian governments, Traditional Owners, business owners, property owners, residents and the broader community.

To inform the Strategy, we reached out to the community and key stakeholder groups through a range of engagement activities. This process allowed us to receive key feedback and understand our community's coastal values, priorities and concerns.

Engagement with the community and key stakeholders highlights that our coastal environment underpins a diversity of environmental, social and cultural values, and supports lifestyle and recreational opportunities unique to Mapoon. Easy access to the coast for recreational activities such including boating, camping, four-wheel driving and fishing is an extremely important lifestyle value for both residents and visitors alike. We appreciate the natural coastal environment and our cultural and spiritual connection with nature. We want to protect our coastal areas and the ecosystems they support such as turtle nesting areas.

All input and feedback received has assisted in shaping the direction of technical investigations underpinning the Strategy and the identification of priority adaptation actions for Mapoon.

COMMUNITY VALUES ENGAGEMENT FEBRUARY 2021

1 conversation with community groups

3 conversations with Traditional Owner/ Indigenous interest groups

15 survey responses

ADAPTATION APPROACHES ENGAGEMENT NOVEMBER 2021

18 people engaged at pop up

33 comments recorded at pop up activity

8 Targeted conversations with key stakeholder groups

1 social media post

FEEDBACK ON DRAFT COASTAL ADAPTATION PLAN NOVEMBER 2023

<insert November engagement feedback here>

OUR COASTAL VALUES:

Protecting coastal areas particularly Mission Beach, Cullen Point, Back Beach and Janie Creek

Respecting and protecting **cultural connections** to land

Turtle nesting sites along the foreshore

Recreational activities including camping, fishing and recreational driving

Providing **continued access** to coastal areas (including vehicles)

OUR COASTAL VULNERABILITIES:

Our community has experienced the following changes to coastal areas:

- Pollution (litter/ marine debris) in natural areas
- Loss of vegetation
- Changes to dunes and shorelines
- Coastal and stormwater erosion
- Damage to dunes, vegetation and animal habitat and nesting areas due to improperly managed beach access (uncontrolled horses and recreational driving)

5.0 UNDERSTANDING THE RISK FROM COASTAL HAZARDS

We all have special places, features, qualities or memories of the coast that are important to us for different reasons – social, economic environmental, cultural or personal. These elements of the coast are at risk when coastal hazards threaten to impact them. Risks can be either direct (e.g. road inundation) or indirect (e.g. inundation that isolates a community) and can be assessed across a range from low to extreme risk.

To identify current and future risks along our coast, we need to first understand the impacts of coastal hazards, including the areas affected and what the impacts are on our special places and important infrastructure. Coastal hazard modelling was used to assess the risk resulting from coastal hazards to our assets, key community values and our natural and urban areas over time. To determine risk, we followed the process outlined below:

1

Modelling exposure to coastal hazards

Updating Council's existing coastal hazard mapping based on the best available science.

2

Identifying assets and community values

Identifying land and assets along our coast that are exposed to coastal hazard and engaging with the community to understand what values (social, economic, environmental) should be considered as part of the strategy.

3

Calculating and mapping risk

Calculating the level of risk (low, medium, high, extreme) that coastal hazards pose to our community assets and values now and in the future.

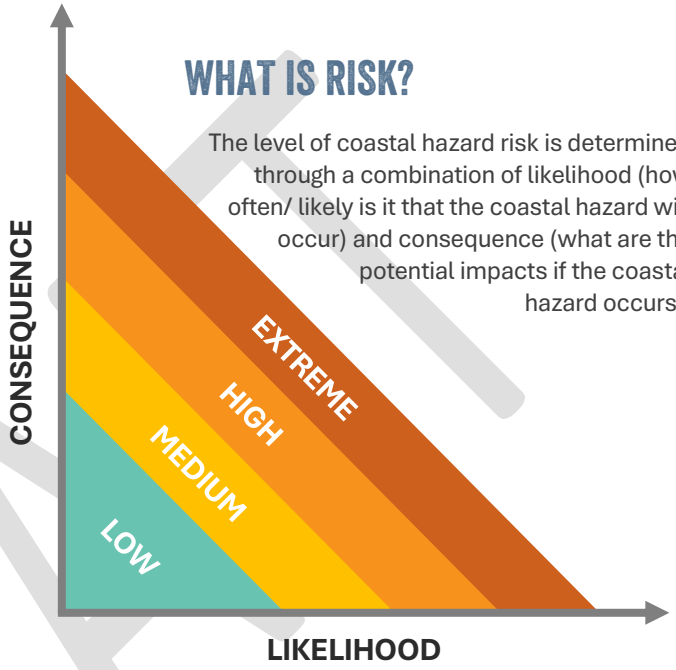
4

Evaluating risk

Understanding what a tolerable/ acceptable level of risk is and if there are any controls or mitigating actions currently in place to minimise risk.

WHAT IS RISK?

The level of coastal hazard risk is determined through a combination of likelihood (how often/ likely is it that the coastal hazard will occur) and consequence (what are the potential impacts if the coastal hazard occurs).



RISK ASSESSMENT PROCESS

The outcome sought by risk-based planning is not to diminish development potential in coastal hazard risk areas, but rather, to better inform the planning process and create clear visibility on locations across the coast with lower and higher exposure to coastal hazard risks. This ensures:

- more vulnerable or sensitive land uses are located in less hazardous or lower risk areas;
- a proactive long-term approach for maintaining or reducing the exposure of existing and future coastal settlements to existing and future unacceptable risks;
- the resilient design of infrastructure and development in appropriate locations where the risk can be managed to an acceptable level; and
- a coordinated response with emergency management and other coastal hazard adaptation approaches.

Being aware of an increasing risk profile means we have time to prepare, respond and implement adaptation actions now and over the coming decades to mitigate reactive responses and avoid impacts before they occur.

WHAT AREAS AND ASSETS ARE AT RISK OF COASTAL HAZARDS?

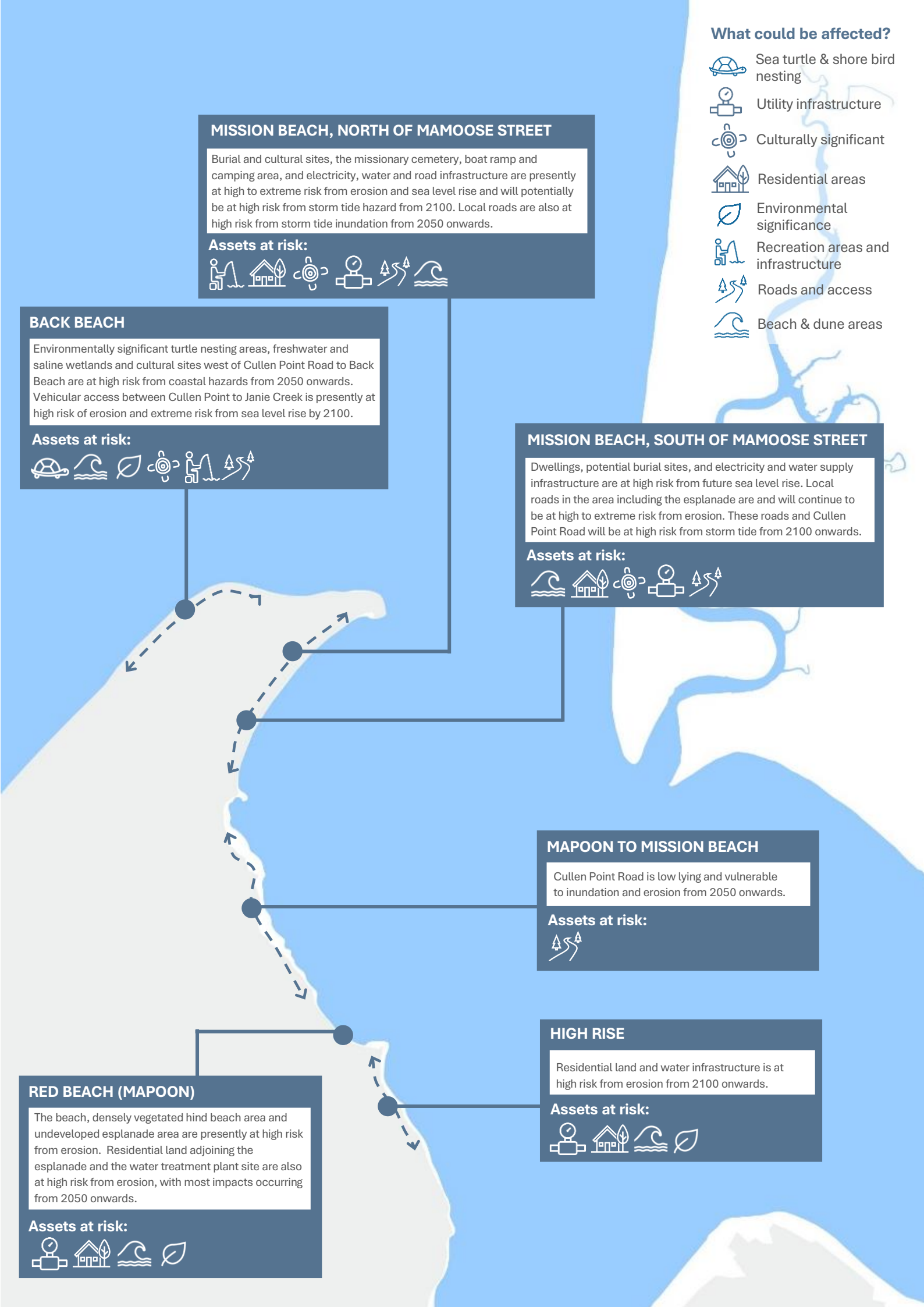
Coastal hazards have the potential to negatively impact the community, infrastructure, essential services and our lifestyle today and long into the future.

The coastal location of our community makes it increasingly exposed to coastal hazards over time. The presently undeveloped esplanade area immediately landward of the beach at Red Beach as well as the residential land adjoining the esplanade is at high risk from erosion now and into the future.

Our natural and open space areas, like our beach and dune areas, turtle and shorebird nesting areas, and wetland areas will become increasingly exposed to coastal erosion and storm-tide inundation.

Traditional lands and cultural sites, including burial sites and the missionary cemetery, and key community infrastructure such as the boat ramp, camping area, and electricity, water and road infrastructure north of Mamoose Street to Cullen Point are also increasingly exposed to coastal hazards over time.

A technical risk assessment for Mapoon identified the following special places and important infrastructure at high or very high risk at present day, by 2050 or at 2100.


What could be affected?
Sea turtle & shore bird nesting
Utility infrastructure
Culturally significant
Residential areas
Environmental significance
Recreation areas and infrastructure
Roads and access
Beach & dune areas
MISSION BEACH, NORTH OF MAMOOSE STREET
Burial and cultural sites, the missionary cemetery, boat ramp and camping area, and electricity, water and road infrastructure are presently at high to extreme risk from erosion and sea level rise and will potentially be at high risk from storm tide hazard from 2100. Local roads are also at high risk from storm tide inundation from 2050 onwards.
Assets at risk:
BACK BEACH
Environmentally significant turtle nesting areas, freshwater and saline wetlands and cultural sites west of Cullen Point Road to Back Beach are at high risk from coastal hazards from 2050 onwards. Vehicular access between Cullen Point to Janie Creek is presently at high risk of erosion and extreme risk from sea level rise by 2100.
Assets at risk:
MISSION BEACH, SOUTH OF MAMOOSE STREET
Dwellings, potential burial sites, and electricity and water supply infrastructure are at high risk from future sea level rise. Local roads in the area including the esplanade are and will continue to be at high to extreme risk from erosion. These roads and Cullen Point Road will be at high risk from storm tide from 2100 onwards.
Assets at risk:
MAPOON TO MISSION BEACH
Cullen Point Road is low lying and vulnerable to inundation and erosion from 2050 onwards.
Assets at risk:
HIGH RISE
Residential land and water infrastructure is at high risk from erosion from 2100 onwards.
Assets at risk:
RED BEACH (MAPOON)
The beach, densely vegetated hind beach area and undeveloped esplanade area are presently at high risk from erosion. Residential land adjoining the esplanade and the water treatment plant site are also at high risk from erosion, with most impacts occurring from 2050 onwards.
Assets at risk:

5.0 OUR STRATEGY FOR BUILDING A RESILIENT COAST

Across Australia and internationally, coastal land managers are taking a strategic approach to managing the risk of coastal hazards and enhancing the resilience of our coastal zones. A tailored approach has been developed to guide decision making on identifying and selecting adaptation responses across Mapoon coastal areas.

Adaptation principles, whole of coast actions and local adaptation pathways have been developed to guide how we manage the risks from coastal hazards and enhance the resilience of our coastal areas and community. This is essential to ensure our communities today, as well as future generations, can continue to enjoy our coast and valued lifestyle.

OUR STRATEGY IS MADE UP OF THE FOLLOWING COMPONENTS:

- ADAPTATION PRINCIPLES AND HIERARCHY
- ADAPTATION APPROACHES
- WHOLE OF COAST ADAPTATION ACTIONS
- LOCAL ADAPTATION PATHWAYS
- IMPLEMENTATION ACTION PLAN

OUR ADAPTATION PRINCIPLES

> The development of this strategy and its implementation are underpinned by a set of principles and a hierarchy of preferred broad types of adaptation approaches ("adaptation hierarchy").

These principles have been developed based on best practice coastal hazard risk management, technical findings and community input which provided key insight into what types of adaptation responses the community thinks are acceptable to manage the projected impacts of coastal hazards.

The principles provide a foundation for considering the suitability of different adaptation actions and supporting consistent decision making for the implementation of the Strategy. The principles also establish Council's key responsibilities and the limits of these responsibilities.

The principles underpinning adaption in Mapoon are:

1. Adaptation pathways retain and enhance the unique and iconic coastal identity, qualities and character of the western Cape coastal region.
2. We build community awareness of risk and promote partnerships and collective action by involving stakeholders and our community when implementing adaptation pathways.
3. We prioritise adaptation responses in higher risk areas to keep people safe and limit future land use exposure in areas of unacceptable or intolerable risk.
4. We prioritise natural and soft solutions over hard engineering solutions where practicable.
5. Physical adaptation responses compliment their surroundings and achieve multiple public benefits. Fitting in with 'place' is important.
6. Future investment in community assets and infrastructure is 'risk informed' – we avoid investing in long design life or costly community assets and infrastructure in higher risk areas and transition our priority assets out of higher risk areas.
7. Adaptation options comply with environmental regulations to protect natural coastal processes, ecological processes and wildlife habitats.

OUR ADAPTATION HIERARCHY

There are many actions we can use to respond to coastal hazards, ranging from natural solutions like revegetation, to engineered solutions like seawalls, to relocating assets out of vulnerable areas.

Together with the Adaptation Principles, our Adaptation Hierarchy helps us to choose which action/s will work best at a particular place or point in time. The most appropriate adaptation action is based on the values to be protected in a certain location as well as the social, environmental and economic costs of the options.

Overall, consultation feedback indicated a stronger preference for more natural solutions (i.e. foreshore and mangrove revegetation) or planning responses over hard engineering solutions and last line of defence structures (like seawalls and groynes). As a result, natural responses which enhance the resilience of at-risk coastal areas will be prioritised in the short term over hard structures.

OUR ADAPTATION HIERARCHY

Council's **most preferred** action → Council's **least preferred** action

The hierarchy of preferred adaptation approaches, in order of highest to lowest preference is:

1. AVOID

Avoid placing new development in areas affected by coastal hazards.

2. RESTORE AND ENHANCE

Reinstate and enhance degraded natural coastal ecosystems – like stabilizing and revegetating coastal dunes and wetlands.

3. ACCOMMODATE

Maintain existing land uses but make existing and future buildings and infrastructure more resilient – build things 'higher and stronger' – and evacuation planning.

4. RETREAT

Withdraw, relocate or abandon existing buildings, structures and infrastructure in high-risk areas; let coastal ecosystems expand landward as sea levels rise.

5. PROTECT

Protect priority shorelines, infrastructure, and buildings from erosion and inundation through soft (beach nourishment) or hard (structures like seawalls or groynes) engineering solutions.

OUR ADAPTATION PATHWAYS APPROACH

> Pinpointing the timing of when coastal hazards may occur, or the rate of coastal change can be challenging. Adaptation planning using the pathways approach supports flexibility by allowing options to be adapted to changes in circumstances (e.g. new technology and knowledge) and community values, aspirations and risk appetite over time [4].

Adaptation pathways involve a sequence of adaptation actions (or combination of actions) to be implemented over time. When an adaptation action is implemented, it is used until it is no longer effective or viable to manage the risk or extent of change, at which time another option is used. This is called a "trigger point."

Due to the deep uncertainty and complexity associated with climate change, it is unlikely that only one adaptation action will be sufficient to respond to coastal hazard risk and exposure now and in the future. An adaptation pathway approach allows decisions makers to keep their options open, with the ability to change the timing of planned actions based on active monitoring of coastal hazard risks and associated triggers. This allows adaptation to be responsive and iterative, avoiding premature decisions that have the potential to prevent Council from implementing other, more effective options in the future.

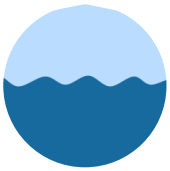
The Strategy includes a range of adaptation actions that should be implemented across the whole coast, as well as some more specific, local adaptation pathways for key areas to support community values and address local risks.

Adaptation actions and local adaptation pathways have been prepared based on short, medium and long-term priorities which are linked to projected sea level rise and indicative coastal hazard extent mapping for three planning timeframes – 2020 (present day), 2050 (0.3m sea level rise) and 2100 (0.8m sea level rise).

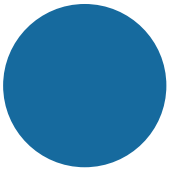
TRIGGER POINTS

"Trigger points" are linked to a change in hazard exposure or associated risk. The implementation of actions relies on regular monitoring of coastal areas to understand when trigger points are approaching or have been reached. Trigger points can also be used in locations where hazards are not yet occurring but are likely to occur in the future.

SHORT TERM
Current coastal hazard risk (0-0.3m sea level rise)



MEDIUM TERM
Coastal hazard risks around 2050 (0.3 m sea level rise)



LONG TERM
Coastal hazard risks around 2100 (0.8m sea level rise)

Local adaptation pathways and their associated actions will continue to be refined based on the best available science and community attitudes. Key factors we must consider when responding to coastal hazards and selecting suitable adaptation actions include:

MAXIMISING BENEFITS
Protecting what the community values about the coast and maximizing community benefit.

COST
Adaptation can be very expensive. We need to focus on low-cost solutions (like revegetation) wherever we can and be strategic about where and when we invest in high-cost shoreline protection.

TIMING
Identifying what needs protection now and in the future.

PROTECTING SPECIAL PLACES & ASSETS
Protecting important assets should not be at the expense of what we value and love.

[4] NCCARF (2017), CoastAdapt: Climate change and sea-level rise based on observed data. Available at: https://coastadapt.com.au/

STRATEGIC ADAPTATION APPROACHES

Four adaptation approaches have been developed for Mapoon. Each approach contains a suite of adaption actions which form the basis for our response to coastal hazard risk across different areas of our coast (local adaptation pathways).

1 Maintain and improve

The Maintain and Improve approach involves the continued use of a place or asset where the current coastal hazard risk profile is low. Actions underpinning this approach often include activities and programs which are already being undertaken such as community awareness raising, active management of natural areas and ecosystems and emergency response. Key to all approaches is regular monitoring to understand the extent of coastal change at the local level, and to identify when additional actions should be implemented.

While 'Maintain' actions do not always directly reduce or remove the risk of coastal hazards, they are important to build and strengthen the natural resilience of our coast and community over time. If, over time, the risk profile is observed to increase (as indicated by local trigger points), then the adaptation response may shift to **modify**.

2 Avoid

This approach seeks to avoid placing new development or assets in areas affected by coastal hazards. This may be achieved through appropriate land use planning and asset management. The preference is to ensure land uses in coastal hazard areas reflect the level of risk for coastal hazard impacts, while also being a use that maximises the economic, social, and environmental value to the region.

Any new development / infrastructure that is placed in coastal hazard areas will need to align with the *State Planning Policy 2017* and relevant approval requirements including necessary mitigation measures.

3 Modify

The Modify approach uses physical measures to accommodate and mitigate against coastal hazard risks to an acceptable or tolerable level. These actions include various engineering (soft and hard) options and hazard resilient design measures to protect or upgrade assets and reduce the impacts of coastal hazards.

If, over time, monitoring indicates the risk profile is increasing (as indicated by local trigger levels), and the modify option is no longer effective or efficient to accommodate or mitigate coastal hazards, then the adaptation response may shift to **planned transition**.

4 Planned Transition

The Planned Transition approach involves making a strategic decision to relocate assets from specific areas that have very high or intolerable exposure to coastal hazards and/or mitigation becomes infeasible (due to economic or other factors). This approach is intended to facilitate change in how we use and manage land in high or extreme risk areas and may involve a range of policy responses to reflect more 'risk-appropriate' land uses in hazard areas.

ADAPTATION ACTIONS

An adaptation action is a recommended response to assist in mitigating the impacts from coastal hazards. A range of adaptation actions have been developed to support a strategic approach to coastal hazard adaptation across the Mapoon coast and to achieve the goals and aspirations of the community. Adaptation actions have been developed for the whole of Mapoon, as well as some specific coastal locations to support key community values and adequately address the local risk profile.

	COASTAL HAZARD ADAPTATION			
	MAPOON-WIDE ADAPTATION ACTIONS		LOCAL ADAPTATION PATHWAYS	
Adaptation response	**Maintain and Improve**	**Avoid**	**Modify**	**Planned Transition**
Adaptation options	Monitoring and planning initiatives to enhance adaptive capacity		Full suite of adaptation actions	
Timing	All timeframes		Refer to adaptation pathways	

A program of priority actions has been informed by an initial screening of options, as well as a detailed cost-benefit analysis. Specific adaptation actions we have explored with our community and stakeholders include:

1 Maintain and improve

Maintain and Improve adaptation actions apply to all coastal areas within Mapoon. These actions often encompass "common sense" measures, some of which are already being undertaken by Council, the community and other organisations. Maintain and Improve adaptation actions are fundamental to the success of the Strategy and underpin the implementation of all adaptation pathways.

Monitoring

Monitoring allows us to observe how coastal areas and their risk profiles change over time. This helps to determine if our current adaptation pathway is appropriate and effective or needs adjusting (i.e. a trigger point has been reached and an additional or alternative adaptation action is required).

Monitoring also improves our understanding of coastal processes and coastal hazards over time and can be used to support hazard and risk refinement. It covers a wide variety of activities and may involve examining the beach profile and conditions, mangrove/ dune vegetation extents and recession rates, dune stability, frequency of damage to beach access and other infrastructure, asset condition, frequency of tidal inundation, number of properties impacted by hazard events and habitat health, connectivity and availability etc.

Community awareness, education and partnerships

Building community understanding and awareness of coastal hazards and adaptation is essential for the successful implementation of this Strategy. Developing opportunities for community involvement in programs and activities which promote climate change adaptation, such as dune and wetland restoration and monitoring activities, can enhance stewardship of the coastline and assist in capacity building, while benefiting from traditional knowledge. It can also improve the community's resilience by empowering them to make informed choices about where and what to invest in.

Community awareness requires strong relationships between all levels of government, Traditional Owners, business, industry and the community, as well as ongoing education, information and messaging about

coastal hazards, risks, monitoring and adaptation. It can be promoted through targeted coastal hazard campaigns and communications materials including signage, events, newsletters and social media.

Enhance coastline and habitat resilience

Supporting and strengthening our natural coastal processes and ecosystems including native habitats, dune and wetlands areas can improve the protective function of coastal landforms and vegetation and assist in mitigating the risks associated with coastal hazards. Enhancing coastline resilience can also improve amenity and create opportunities to involve and educate the community to naturally manage coastal hazard risks and support monitoring activities. Using nature-based responses is preferred over hard engineering works, but may require some hard engineering support for establishment.

Ecosystem management can be achieved through habitat management programs such as dune revegetation and planting within and around wetlands and waterways. Particular consideration will be given to beach access management (discouraging unnecessary or informal pedestrian and vehicle access and formalising appropriate public paths) and the protection and management of turtle and shoreline bird nesting areas.

Emergency response (e.g. evacuation planning)

Monitoring and early warning systems, including evacuation strategies and community engagement, are essential mechanisms which can assist in keeping the community safe. Council, State Emergency Service, volunteers and local disaster management groups play a lead role in our emergency response. Council's Disaster Management Plan provides information on preparation, response and recovery to potential coastal hazard events.

2 Avoid

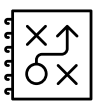
Avoid adaptation actions seek to prevent the development of new 'high value' or 'long-life' assets into areas at high risks from coastal hazards.

Planning responses

Implementing land use planning responses that are appropriate for the level of risk in coastal hazard areas enables informed, risked based decision making. Land use and development policy, zoning and development controls will be used to maintain the current risk profile in areas of acceptable and tolerable risk. Likewise, in coastal hazard areas where the risk is high or intolerable, land use planning tools will be used to reduce or avoid increasing the future risk exposure of people, buildings, community facilities and infrastructure.

Planning responses will build on current planning scheme requirements and may also involve the use of development controls such as coastal setbacks and planning processes such as master planning or trigger-based development approvals.

Particular focus will be on avoiding locating future vulnerable uses and people (e.g. new homes or accommodation) and reducing the future intensity of uses within high risk coastal hazard areas.



Hazard avoidance for new and replacement community infrastructure

Over time, Council or community infrastructure may come to the end of its design life (regardless of exposure to coastal hazard) and need to be replaced or upgraded to meet community needs.

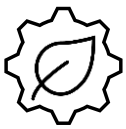
Where this happens, it is important that care is taken to avoid locating new important community infrastructure with a long design life in hazard areas. This adaptation action may involve progressively locating the footprint of replacement infrastructure further landward (if appropriate or technically possible).

While planning a new asset, asset owners should consider its design life and location in relation to coastal hazards. Monitoring will be important to determine when an asset's relocation may be socially and economically acceptable.

3 Modify

Modify adaptation actions actively seek to alter our coastal environment through a range of engineering (soft and hard) options and hazard resilient design measures to protect assets and reduce coastal hazard risks affecting people and property.

While modify adaptation actions have the ability to reduce risk, it is important we think about the potential impacts or "flow on effects" these actions may have on amenity, beach access and ecological processes.



Coastal engineering (soft)

Soft engineering solutions can assist in protecting our beaches, foreshores, and riverfront areas from coastal hazards. Examples include:

- Dune construction and restoration – improving the function of existing coastal dunes or artificially constructing new dunes using imported sand from inactive sand sources
- Beach nourishment – maintaining existing beaches and dunes by manually placing extra sand on the beach from inactive sand sources
- Beach scraping – stabilising dunes and minimising further slumping by manually pushing of a thin layer of sand from the beach face (above high tide) towards the dunes (usually immediately following storm erosion).

These actions are intended to complement the existing function of our natural coastal areas and should only be implemented where and when it is environmentally appropriate to do so.

Coastal engineering (hard)

Hard engineering solutions can assist in protecting areas adjacent to foreshores and creek banks from coastal hazards. Examples include:

- Seawalls / scour protection – a rock or concrete wall or embankment constructed parallel to the beach or along the banks of a waterway to stop coastal erosion and limit inundation.
- Levees / dykes – an artificial barrier, often constructed of vegetation covered earth, to prevent inundation of landward areas.
- Groynes and artificial headlands – an artificial barrier constructed perpendicular to the beach to trap and hold beach sediments and increase beach width.
- Tide gates – permanent artificial barriers across narrow waterways to stop elevated water levels from moving to upstream areas.

Some of these approaches can be used in conjunction with ecosystem-based or soft-engineering responses.

Modify infrastructure and implement hazard resilient design

This action involves the continued use of our infrastructure, buildings and assets in areas where the coastal hazard risk is tolerable. Where any new or upgraded infrastructure or built assets are being developed, they should reflect hazard resilient design or be constructed to accommodate impacts.

Our key services such as our roads, water supply, electricity and telecommunications should be designed to remain operational during and after a coastal hazard event. This can be achieved by considering potential coastal hazards during the infrastructure design process and actions such as raising land levels, modifying drainage networks and building on piles to increase the height of building floor levels, reducing exposure to temporary inundation.

Asset management and maintenance decisions should be informed by a complete understanding of coastal hazard risks. Asset owners must consider implications for the design life and resilience of assets to coastal hazards.

4 Planned Transition

In some specific places, if the coastal hazard risk profile is very high, and/or mitigation becomes impractical (due to economic or other factors), a strategic decision may be made to relocate or reposition assets.

Planned transition is often a costly, last resort option. It may occur gradually over time or, in some cases, as a rapid action in response to a threshold trigger or event.

Relocate important infrastructure and assets at risk

Critical Council or community assets, infrastructure and buildings that are in coastal hazard areas may be relocated to lower-risk areas or outside of the coastal hazard area when they reach the end of their useful life or need significant renovation to improve resilience (if the asset has a long-life design).

Monitoring will be important to determine when relocation may be socially and economically acceptable.

Accept the risk and embrace coastal processes

Embracing coastal processes without further intervention may be the most viable option in some instances. This includes:

- Accepting the loss of land affected by coastal hazards on unprotected shorelines.
- Allowing coastal dunes and habitats to migrate landward without intervention and accept there may be damage to or loss of infrastructure.

MAPOON-WIDE ADAPTATION ACTIONS

> This strategy includes a range of Mapoon-wide adaptation actions which are relevant to all coastal areas and seek to build on existing coastal hazard mitigation mechanisms and regulation. These adaptation actions fall within the '**Maintain and Improve**' and '**Avoid**' responses and are intended to be implemented over the short to medium term and continued over the lifetime of the strategy. A monitoring program, as well as ongoing community education, will be fundamental to the implementation of all adaptation pathways.

Across Mapoon, some key measures have already been implemented to manage present day coastal hazard risks and protect our coastal environment. These include, but are not limited to land use planning responses embedded in the Mapoon Aboriginal Shire Council Planning Scheme 2015 which seek to mitigate and avoid coastal hazard risks.

Mapoon-wide adaptation actions include:

MAPOON-WIDE ADAPTATION ACTIONS	TIMING BASED ON SEA LEVEL RISE SHORT TERM 0m	MED TERM 0.3m	LONG TERM 0.8m
MAINTAIN AND IMPROVE			
Monitoring			
Community awareness, education and partnerships			
Enhance coastline and habitat resilience			
Emergency response (e.g. evacuation planning)			
AVOID			
Hazard avoidance for new and replacement community infrastructure			
Planning responses			

LOCAL ADAPTATION PATHWAYS

> In addition to adaptation actions which apply to the whole of the Mapoon coast, we have begun considering local adaptation pathways to support key community values, respond to the local risk profile and reflect best practice principles for coastal hazard risk management.

The actions seek to reflect that the community has a very strong connection to the land and sea interface, with many culturally important areas located close to, on or within the beach and estuarine waterways. Continued access to these areas is critical for community well-being.

The Strategy focuses on special places and important infrastructure including:

- High Rise
- Red Beach
- Mapoon to Mission Beach
- Mission Beach
- Mission Beach, south of Mamoose Street
- Mission Beach, north of Mamoose Street

HIGH RISE

Land extending south from Red Beach is known as 'High Rise.' This area is intended for future residential development and has been identified as a logical extension from Red Beach to ensure coordinated land use development and efficient usage and delivery of infrastructure. Coastal hazard risks at High Rise are mainly associated with the long term (2100 future climate) risk of erosion. This includes risks to future residential development and associated water infrastructure. Avoiding placing new development in the hazard extent is the preferred adaptation response. This may be achieved through the use of specific planning responses such as development setbacks. Relocation of water infrastructure in the long term (before the 2100 future climate) may also be required.

RED BEACH

Red Beach is the main settlement area of Mapoon. The beach is backed by an esplanade consisting of a densely vegetated, steep embankment adjoined by elevated residential land. There are no sand dunes in this area as the landform is reflective of a an estuarine/riverine environment.

While the esplanade is presently undeveloped, it has been identified as an area to accommodate tourist infrastructure such as boardwalks. Any infrastructure in this area will need to be designed to be hazard resilient. While residential land is currently outside of erosion hazard extents, it is at risk by the 2050 future climate. Similarly, the water treatment plant is vulnerable to erosion by the 2100 future climate.

Not placing new or redeveloped 'long-life' development or infrastructure within the hazard extent regardless of climate is the preferred response to avoid increasing risks to the community.

MAPOON TO MISSION BEACH

The area between the main township of Mapoon and Mission Beach contains Cullen Point Road which is the sole vehicular access between Mapoon township and Mission Beach, the Cullen Point boat/barge ramp, and the adjacent camping ground, and is the alternative vehicular access to Janie's Creek via Back Beach. Cullen Point Road is low lying and vulnerable to inundation and erosion from 2050 onwards. Retention of this access is vital for the community. Modification to the drainage system initially may need to be accompanied by raising the road level in future road rebuilds.

MISSION BEACH, SOUTH OF MAMOOSE STREET

Mission Beach runs from Peter's Corner north to Cullen Point, a distance of nearly 4km. Positioned immediately inside the mouth of Port Musgrave, this narrow sandy beach is backed by a very low dune system that is vulnerable to inundation, particularly under future climates.

South of Mamoose Street, assets at high risk from future sea level rise include dwellings, potential burial sites, and electricity and water supply infrastructure. Local roads in the area including the esplanade are and will continue to be at high to extreme risk from erosion.

MISSION BEACH, NORTH OF MAMOOSE STREET

From north of Mamoose Street to Cullen Point the land is low lying and contains additional community assets, cultural sites and infrastructure. Burial and cultural sites, the missionary cemetery, boat ramp and camping area, and electricity, water and road infrastructure are at high to extreme risk from erosion in this area, and of high risk of future storm tide inundation and extreme risk from future sea level rise. Local roads and substantial lengths of Cullen Point Road are also at high risk from 2050 onwards. Measures to improve the natural resilience of the dune to mitigate against erosion and inundation are preferred in this area, particularly to facilitate low-key or seasonal uses such as camping.

BACK BEACH

The beach and dune areas from Cullen Point to Janie Creek (Back Beach) are environmentally significant for turtle and shorebird nesting and are backed by culturally significant freshwater and saline wetlands as well as other sites of cultural significance. The beach is also a very popular beach driving route for residents and visitors.

Retention of an intact dune system is important to preserve the integrity of the wetland areas, particularly the freshwater wetlands. Erosion risks are exacerbated by vehicles driving on dune areas, including due to unavailability of a 'dry' beach.

Low key measures to further limit damage to the dunes and support natural dune migration are preferred, but it is recognised that strategic intervention may be required to prevent breaching of the dune barrier protecting freshwater wetlands.

OUR ASSETS AT RISK

MISSION BEACH, NORTH OF MAMOOSE STREET

Burial and cultural sites, the former Mission cemetery, boat ramp and camping area, and electricity, water and road infrastructure are presently at high to extreme risk from erosion and sea level rise. Local roads are also at high risk from storm tide inundation from 2050

Assets at risk:

BACK BEACH

Environmentally significant turtle nesting areas, freshwater and saline wetlands and cultural sites west of Cullen Point Road to Back Beach are at high risk from coastal hazards from 2050 onwards. Vehicular access along the beach between Cullen Point and Janie Creek is presently at high risk of erosion.

Assets at risk:

MISSION BEACH, SOUTH OF MAMOOSE STREET

Dwellings, potential burial sites, and electricity and water supply infrastructure are at high risk from future sea level rise. Local roads including the esplanade are and will continue to be at high to extreme risk from erosion. These roads and Cullen Point Road will be at high risk from storm tide from 2100 onwards.

Assets at risk:

MAPOON TO MISSION BEACH

Cullen Point Road is low lying in places and vulnerable to inundation and erosion from 2050 onwards.

Assets at risk:

HIGH RISE

Residential land and water infrastructure is at high risk from erosion from 2100 onwards.

Assets at risk:

RED BEACH (MAPOON)

The beach, densely vegetated hind beach area and undeveloped esplanade area are presently at high risk from erosion. Residential land adjoining the esplanade and the water treatment plant site are also at high risk from erosion, with most impacts occurring from 2050 onwards.

Assets at risk:

What could be affected?

- Sea turtle & shore bird nesting
- Utility infrastructure
- Culturally significant
- Residential areas
- Environmental significance
- Recreation areas and infrastructure
- Roads and access
- Beach & dune areas

Mapoon-wide adaptation actions will be implemented within each location, in addition to any location specific actions.

LOCAL ADAPTATION ACTIONS

TIMING BASED ON SEA LEVEL RISE

	SHORT TERM 0M	MID TERM 0.3M	LONG TERM 0.8M
HIGH RISE			
Mapoon-wide actions	→	→	→
Site specific planning tools – New builds outside of hazard area	→	→	→
Site specific planning tools – Coastal building lines / development setbacks	→	→	→
Accept the risk – Allow dunes to recede without intervention and accept there will be some damage or loss to habitat		→	→
RED BEACH			
Mapoon-wide actions	→	→	→
Active dune and habitat management including vegetation planting and management	→	→	→
Site specific planning tools – New builds outside of hazard area	→	→	→
Site specific planning tools – Coastal building lines / development setbacks	→	→	→
Hazard resilient design for new/ upgraded public infrastructure	→	→	→
MAPOON TO MISSION BEACH			
Mapoon-wide actions	→	→	→
Modify local drainage network to limit excessive tidal inundation (tide gates, levees, stormwater)		→	→
Hazard resilient design for new/ upgraded public infrastructure		→	→
MISSION BEACH, SOUTH OF MAMOOSE STREET			
Mapoon-wide actions	→	→	→
Active dune and habitat management including vegetation planting and management	→	→	→
Site specific planning tools – New builds outside of hazard area	→	→	→
Site specific planning tools – Coastal building lines / development setbacks	→	→	→
Accept the risk – allow foreshore recession	→	→	→
Relocate esplanade track		→	→
Hazard resilient design for new/ upgraded public infrastructure (water and roads)			→
MISSION BEACH, NORTH OF MAMOOSE STREET			
Mapoon-wide actions	→	→	→
Active dune and habitat management including vegetation planting and management	→	→	→
Beach scraping	→	→	→

LOCAL ADAPTATION ACTIONS

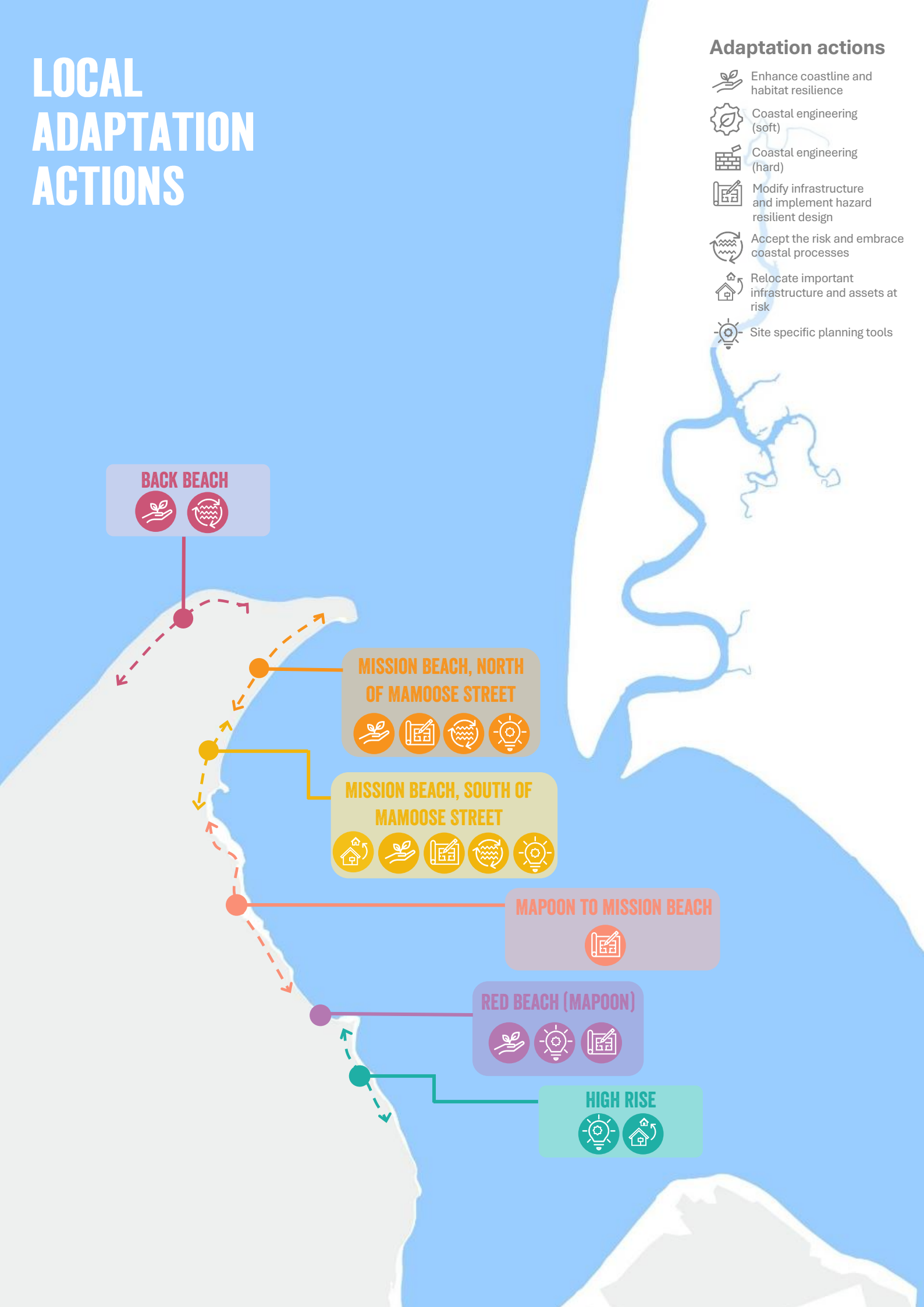
	TIMING BASED ON SEA LEVEL RISE SHORT TERM 0M	MID TERM 0.3M	LONG TERM 0.8M
Site specific planning tools – New builds outside of hazard area	→	→	→
Site specific planning tools – Reduce intensity of future development	→	→	→
Accept the risk – Operational responses for campground management	→	→	→
Accept the risk - Emergency management response (truck or fly in goods if ramp unavailable)	→	→	→
Upgrade boat ramp facility with a groyne	→	→	→
Allow foreshore recession	→	→	→
Scour protection to protect road	→	→	→
Low earthen bunds along road		→	→

BACK BEACH

Active dune and habitat management including vegetation planting and management	→	→	→
Localised beach scraping to prevent freshwater wetland breach	→	→	→
Accept the risk – Allow foreshore recession	→	→	→

*Options require further consideration and are subject to further detailed site investigations, business case, funding commitments, detailed design and statutory approvals. The lead up time is intended to be a trigger to provide sufficient time for further consideration and detailed investigations/funding commitments and approvals to be obtained.

LOCAL ADAPTATION ACTIONS



IMPLEMENTATION PLAN

A summary of implementation actions for Mapoon-wide strategic adaptation responses is provided in the Table below. The implementation plan focuses on short term actions to be delivered over the next 5 to 10 years.

STRATEGIC ADAPTATION ACTION	INDICATIVE PRIORITY IMPLEMENTATION ACTIONS (TO BE IMPLEMENTED WITHIN 5-10 YEARS)
MAINTAIN AND IMPROVE	
Monitoring Monitoring is essential for improving our understanding of coastal hazards and how coastal areas and their risk profiles change over time. This helps to determine if our current adaptation pathway is appropriate and effective or our response needs adjusting (i.e. a trigger point has been reached and an additional or alternative adaptation action is required).	• Seek State and Federal Government funding to ensure the ongoing operation of the Mapoon Land and Sea Rangers program which undertakes beach monitoring and ensures sites of cultural significance are recorded and projected. • Work with Mapoon Land and Sea Rangers to document key measures for each cultural heritage site including spiritual/social value, archaeological value, physical condition, and protection measures. • Establish a photo monitoring program, led by the Mapoon Land and Sea Rangers to capture images of key sites and locations to assist in monitoring key changes across the coast (beach profile, mangrove/ dune vegetation extents). • Work with the Mapoon Land and Sea Rangers to register and document the frequency and location of habitat management activities such as dune revegetation and planting within and around wetlands and waterways. • Connect to existing elevation and aerial imagery collection to support monitoring and reporting needed to inform adaptive management and the next planning scheme review.*
Enhance coastline and habitat resilience Supporting and strengthening our natural coastal processes and ecosystems including native habitats, dune and wetlands areas, can improve the protective function of coastal landforms and vegetation and assist in mitigating the risks associated with coastal hazards. Particular consideration will be given to beach access management (removing unnecessary or informal pedestrian and vehicle access and formalising appropriate public paths) and the protection and management of turtle and shoreline bird nesting areas.	• Continue to support the Mapoon Land and Sea Rangers active dune and habitat protection, maintenance and improvement program utilising Council, Traditional Owners and volunteer resources. • Identify priority management areas and develop a Council endorsed plan for ecosystem management. The plan should focus on Mission Beach, Cullen Point and Back Beach. • Seek State and Federal Government funding to explore opportunities for promoting and undertake dune care activities. • Expand Council officer resources to support implementation of the active dune and habitat protection, maintenance and improvement program. • Discourage unnecessary or informal pedestrian and vehicle access points and formalise appropriate public paths. • Continue to limit recreational driving in vulnerable areas.*

STRATEGIC ADAPTATION ACTION	INDICATIVE PRIORITY IMPLEMENTATION ACTIONS (TO BE IMPLEMENTED WITHIN 5-10 YEARS)
Emergency response (e.g. evacuation planning) Early warning systems, including evacuation strategies and community engagement, are important mechanisms which can assist in keeping the community safe. Council, State Emergency Service, volunteers and local disaster management groups play a lead role in our emergency response and keeping the community safe. Council's Disaster Management Plan provides information on preparation, response and recovery to potential coastal hazard events.	• Review and update the Mapoon Local Disaster Management Plan with updated coastal hazard mapping and embed risk outcomes in emergency management and response planning* • Monitor frequency and nature of emergency management responses and call outs.
Community awareness, education and partnerships Building community understanding and awareness of coastal hazard adaptation is critical to the successful implementation of this Strategy. Being 'risk aware' can enhance stewardship of the coastline and assist in capacity building. It can also improve the community's resilience by empowering them to make informed choices about where and what to invest in. Council will strongly advocate for collaboration and partnerships with other stakeholders and community to share information and responsibility in delivering adaptation actions.	• Explore opportunities within Council to build internal capacity, understanding and awareness of coastal hazards, their impacts and implications for Council assets and operations. • Identify new and existing networks to share and promote knowledge sharing and understanding of coastal hazard risks and adaptation – particularly with other similar nearby Councils such as Napranum. • Seek co-funding/resources for further initiatives through grants and stakeholder partnerships. • Leverage from existing key stakeholder groups (Ranger Program, Traditional Owners, Council, research agencies and community) to form a coastal working group to collaboratively advise on the management of coastal hazards within Mapoon Shire.* • Promote coastal custodianship in the youth and future generations with community dune and coast care events.* • Continue partnerships with the Mapoon Land and Sea Rangers dune protection and maintenance program. • Investigate opportunities to develop a seed bank with involvement from Mapoon Land and Sea Rangers, local schools and Traditional Owners.* • Enhance community adaptive capacity to coastal hazards, including awareness of increasing coastal hazard exposure and risk, and ways to improve individual preparedness and adaptive capacity through training, education and events.* • 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.* • Promote cross-sector partnerships and initiatives to enhance resilience and strategic adaptation for transport infrastructure, including boating infrastructure.* • Promote resilient homes within the community.

STRATEGIC ADAPTATION ACTION	INDICATIVE PRIORITY IMPLEMENTATION ACTIONS (TO BE IMPLEMENTED WITHIN 5-10 YEARS)
AVOID	
Hazard avoidance for new and replacement community infrastructure Where the coastal hazard risk is tolerable, we can continue the ongoing use of infrastructure, buildings and assets. Where any new or upgraded infrastructure or built assets are being developed, they should reflect hazard resilient design or be constructed to accommodate coastal hazard impacts.	• Review at-risk infrastructure based on current and future coastal hazard risks and embed risks into current asset management plans/Master Plan (this could include 'betterment' at critical asset refurbishment/renewal points). • Advocate with Maritime Safety Queensland on future upgrades around Cullen Point with respect to coastal hazard impacts.
Planning and technical responses Land use planning establishes certainty and clear expectations around development. Council will ensure its planning framework and land use controls only allow for risk appropriate land uses in hazard areas. Land use planning will build on current planning scheme requirements to reduce or avoid increasing the future risk and exposure of people, buildings, community facilities and infrastructure through the implementation of setbacks, hazard resilient design requirements and minimum floor planning levels.	• Integrate coastal hazard mapping and considerations into current and future planning schemes and all strategic planning processes to inform strategic land use planning. • Work with State Government to obtain recognition of the erosion hazards assessed in this document as declared Erosion Prone Areas. • Consider updated hazard mapping and risk assessment outcomes when deciding on new land use and development in hazard areas as part of the development assessment process. Continue engagement with Western Cape Communities Trust (WACCA) to ensure native title rights and interests are appropriately reflected in development decisions and approval conditions.

* Collaboration with other agencies and organisations required for implementation

WHAT'S NEXT?

GOVERNANCE

Everyone has a role to play in maintaining and developing a resilient coastal community. While Council is primarily responsible for implementing adaptation actions relating to Council-managed public infrastructure and assets, successful adaptation will require collaboration and partnerships between Council, Federal and State Government agencies, Traditional Custodians, businesses, community organisations, private landowners and residents.

- Council's ongoing role as the Strategy facilitator will involve informing, observing, planning and acting on coastal hazard management by:
- Data gathering and undertaking on-the-ground monitoring of areas affected by coastal hazards to understand changes and inform the implementation of adaptation options.
- Monitoring Council owned and managed assets affected by coastal hazards as part of operational management programs.
- Informing the community through information sharing and education.
- Updating the Mapoon Aboriginal Shire Planning Scheme to reflect the outcomes of the Coastal Hazard Adaptation Strategy and coastal hazard mapping which will provide policy guidance and planning controls for land use and development.
- Providing resilient community infrastructure and implementing adaptation actions to protect, maintain and manage Council owned land, assets and infrastructure.

It is important to note that Council is not responsible for managing coastal hazard impacts on areas not owned or managed by Council or non-Council owned public assets or property. Asset owners/entities are responsible for maintaining their assets in the context of relevant State and Council policy and statutory requirements.

IMPLEMENTATION

An implementation plan will be prepared to guide how Council will embed the Strategy across Council business areas, programs and processes. The implementation plan will provide details on:

- Council plans, policies, strategies, and processes to be updated or created to support action delivery.
- Indicative timeframes for delivery of whole of coast and locality-based actions
- Governance, processes, and resourcing.
- Monitoring and evaluation approaches.
- Partnership and collaboration opportunities with the community, stakeholders, other levels of government and external infrastructure providers.

REVIEW AND UPDATE

This Strategy will be regularly reviewed to inform land use and infrastructure planning and ensure technical information remains up to date. The strategy review process should consider:

- The success of actions delivered to date is based on factors such as the reduction and management of coastal hazard risk and community and stakeholder awareness, feedback and attitudes.
- New information and knowledge about climate change and coastal hazard risks including updated technical information (coastal hazard modelling, risk assessment, monitoring data or changes to coastal hazard indicators).
- Updates to State and/or Federal legislation, planning and policy frameworks relating to coastal hazards and their management

RESOURCES

BMT (2018), *Mapoon and Napranum Aboriginal Shire Councils and Weipa Town Authority Coastal hazard Risk: Scoping Study*. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

BMT (2021), *Napranum Aboriginal Shire Council, Weipa Town Authority, Mapoon Aboriginal Shire Council – Coastal Hazard Adaptation Strategy Phase 4: Asset Exposure to Hazards*. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

BMT (2022), *Napranum, Weipa and Mapoon Phase 5: Risk Assessment*. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

BMT (2022), *Coastal Hazard Adaptation Strategy Phase 6: Options for Adaptation*. Report by BMT for Napranum Aboriginal Shire Council, Weipa Town Authority and Mapoon Aboriginal Shire Council.

Department of Environment and Heritage Protection (2013). Coastal hazard technical guide: Determining coastal hazard areas. Available at https://www.qld.gov.au/__data/assets/pdf_file/0025/67462/hazards-guideline.pdf

Insurance Council of Australia (2021), *Climate Change Impact Series: Actions of the Sea and Future Risks*. Available at https://insurancecouncil.com.au/wp-content/uploads/2021/11/2021Oct_Actions-of-the-sea_Final.pdf

Local Government Association of Queensland, Department of Environment and Heritage Protection (2016), *Developing a Coastal Hazard Adaptation Strategy: Minimum Standards and Guideline for Queensland Local Governments*. Available at https://www.qcoast2100.com.au/downloads/file/55/minimum-standards-and-guideline

Mapoon Aboriginal Shire Council (2021), *Mapoon Aboriginal Shire Council Coastal Hazard Adaptation Strategy – Engagement Summary Phase 3 & Phase 4*. Report by Reel Planning for Mapoon Aboriginal Shire Council.

Mapoon Aboriginal Shire Council (2021), *Coastal Hazard Adaptation Strategy: Engagement Summary – Phase 5 & 6*. Report by Reel Planning for Mapoon Aboriginal Shire Council.

Mapoon Aboriginal Shire Council (2023), *Coastal Hazard Adaptation Strategy: Phase 7 – Adaptation Options Assessment*. Report by BMT for Mapoon Aboriginal Shire Council.

NCCARF (2017), *CoastAdapt: Climate change and sea-level rise based on observed data*. Available at: https://coastadapt.com.au/