



TORRES STRAIT

STATE OF ENVIRONMENT REPORT CARD

2021



Australian Government



TSRA
www.tsra.gov.au

ACKNOWLEDGMENTS

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We acknowledge the Traditional Owners of Torres Strait and pay our respects to their Elders past, present and emerging.

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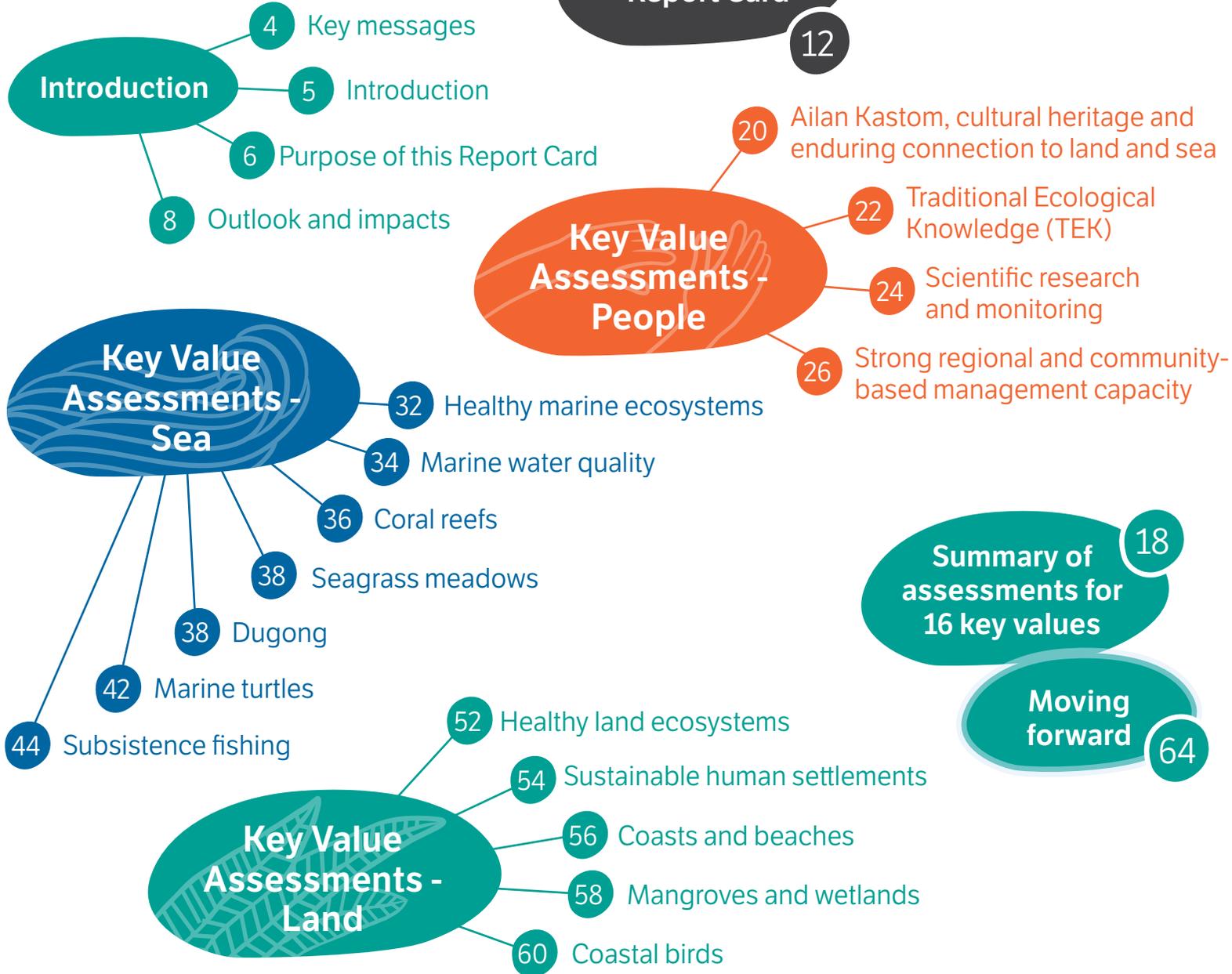
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www.torresstraitsoe.org.au

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Torres Strait is a **unique and irreplaceable**

biocultural land and seascape of global significance.

KEY MESSAGES

This State of the Environment (SoE) report card recognises Torres Strait is part of an **interconnected global ecosystem**. The report card links to state, national, and international frameworks, while considering the environment through the cultural lens of local Torres Strait Islanders and Aboriginal people.

The key values of Torres Strait are largely intact, but under **increasing pressure from multiple threats** operating from the international to the local scale. Global, human-induced climate change is the greatest threat to the health of the region's natural values.

Torres Strait Islanders are extremely concerned about the effects of a **rapidly changing climate** on their homelands, culture, communities, wellbeing and livelihoods. Other drivers of change relate to the eroding of *Ailan Kastom*, unsustainable resource use within Torres Strait and across the wider adjoining regions, and invasive species.

There are many aspects of the region for which there is **little or no recorded scientific information**. Future investment will be required to address critical gaps in understanding about the biocultural land and seascapes of Torres Strait for improved environmental outcomes.

The first recorded climate-induced mammal extinction event in Australia occurred on a small islet in eastern Torres Strait, and yet the deeper eastern waters of the region may become **critical climate refugia** for some coral species.

This SoE report provides a **vital insight into the health of the region** and the continuing need for appropriate funding, support and policy commitments to ensure Australia and Queensland meet national and international obligations to protect and restore the outstanding natural and cultural values of Torres Strait.

Much good work is underway to protect and manage the unique biocultural values of Torres Strait, but **greater investment is necessary** to increase capacity to ensure resilience across the region. This will help ensure future management efforts are well targeted, adaptive and enduring.

As traditional custodians of the region, the people of Torres Strait **rely on the health of their islands and sea country** to ensure communities, culture and customary practices remain viable. Country and culture are intricately intertwined – continuing custodianship of land and sea country, and contemporary community-based management approaches, are underpinned by local *Ailan Kastom* and Aboriginal Lore/Law, incorporating traditional ecological knowledge and governance systems.



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The low-lying island communities across the Torres Strait are **particularly vulnerable to rising sea levels** and may become Australia's first climate refugees if strong and urgent action to reduce greenhouse gas emissions does not occur.

INTRODUCTION

Our island homes

Torres Strait stretches 150km northwards from Cape York Peninsula to Papua New Guinea (PNG) and up to 300km from east to west. It includes five Traditional Owner nations of Kaiwalagal, Maluilgal, Guda Maluilgal, Kulkalgal and Kemer Kemer Meriam. The 48,000 km² region is the most northerly part of Australia and home to about 9,500 mostly Torres Strait Islander and Aboriginal people who live on 17 of the region's 300 islands.

Torres Strait holds a unique place in the natural, cultural, and social fabric of Australia. The region was formed about 10,000 years ago when sea level rose close to its current levels after the end of the last ice age. This flooded the land bridge that existed between Australia and PNG and created a spectacular diversity of natural and cultural land and sea values that are of international significance today.

Torres Strait is a pivotal point of connection for Australia. It is the confluence between the large and disparate continental islands of New Guinea and Australia, between the Arafura and Coral Seas, and between the Pacific and Indian Oceans. The largest reef system in the world - the Great Barrier Reef - reaches its northernmost extent here, with the region containing over 1,200 reefs and rich, shallow seagrass meadows. The Coral Triangle, the centre of coral biodiversity globally, sits directly to the north. Torres Strait is Australia's coral crown and the dugong capital of the world.



GUIDING PRINCIPLES FOR LAND AND SEA MANAGEMENT IN TORRES STRAIT:

- Be culturally appropriate
- Empower Traditional Owners
- Deliver enduring outcomes
- Adopt integrated decision making
- Demonstrate strong adaptive management
- Focus on protecting and managing key values

PURPOSE OF THIS REPORT CARD

This report card provides an update on the health of the Torres Strait environment. It draws on available traditional and scientific knowledge and incorporates professional judgement to describe changes in the condition of important natural and cultural values that make Torres Strait such a unique part of Australia.

Since 2006, the TSRA Land and Sea Management Unit (LSMU) has worked with Traditional Owners and Indigenous communities to care for land and sea country. The 2016 Land and Sea Management Strategy for Torres Strait included the first regional state of environment report card 'snapshot' based on 16 key land, sea, and people values. These community-identified values are significantly interconnected and galvanised by the continuing practice of *Ailan Kastom* and Aboriginal Lore/Law (see Figure 1).

Torres Strait is comprised of many nations working together as one society to manage their traditional land and sea country, as Aboriginal and Torres Strait Islander people have done for millennia. This report card is a foundational element of the contemporary regional approach to collaborative custodianship of country. It operates alongside other plans and programs to support a strategic regional approach to sustainable environmental management in the Torres Strait region, all underpinned by partnerships with Traditional Owners (see Figure 2).

This report card has been prepared to help review progress, reflect our current state of understanding, refine priorities, and highlight management actions and investment required to achieve our vision for land and sea management in the region (see opposite). It builds on the 2016 Torres Strait snapshot. It is anticipated that future editions will be improved with a stronger evidence base, and enhanced, co-designed processes for engaging with Traditional Owners and other regional partners.



Figure 1: Key Land, Sea and People themes for Torres Strait key values.

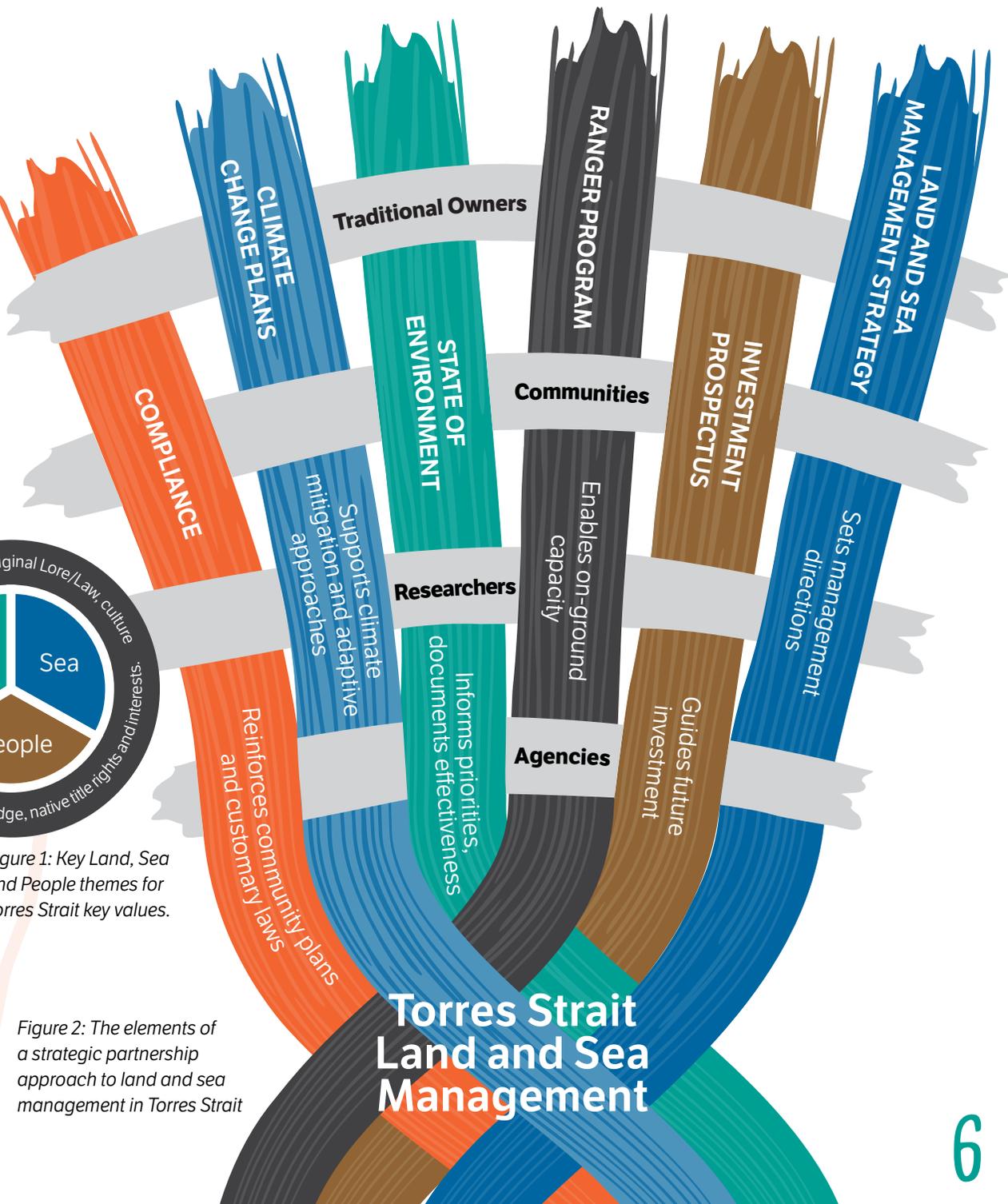


Figure 2: The elements of a strategic partnership approach to land and sea management in Torres Strait



VISION FOR TORRES STRAIT LAND AND SEA MANAGEMENT

Empowering Torres Strait Islander and Aboriginal peoples to sustainably manage and benefit from their land, sea, and cultural resources into the future, in accordance with Ailan Kastom, Aboriginal Lore/Law and native title rights and interests.

Due to its location and uniqueness, Torres Strait often falls off the map in terms of national and state environmental management, monitoring and planning initiatives. This report card is intended to raise the profile of this iconic region as a globally significant biocultural zone, and to help focus future attention, investment, and the collaborative management efforts of government agencies and communities.

OUTLOOK AND IMPACTS

Torres Strait is an internationally significant biocultural land and seascape. The region's key cultural and natural values across land and sea country are intricately intertwined, and the health of most key values is influenced by the health of other key values and the entire, integrated system. Many of the drivers of change that are impacting the region's natural values are global in scale and are caused by human activities in other parts of Australia and the world. Similarly, the environmental impacts experienced in the region have consequences for human health and wellbeing, as well as the viability and culture of Torres Strait communities. In the face of these drivers and pressures, the outlook for many of the region's key values is of very significant concern. Management efforts are increasingly focused on co-building human and environmental resilience, including through strengthening regional and local capacity for adaptive management and by enhancing collaborative arrangements with partners.

Unprecedented human-induced changes to our climate system are already impacting key values – and the magnitude of these impacts is expected to increase with continued global warming. Efforts to halt and reverse the effects of climate change at a global level are urgently required to prevent the deterioration of key values. At the local level, sustained partnership efforts are critical to maintain and build the capacity of island communities to understand and effectively address manageable threats to their land and sea country. Strong and enduring support across all scales of Australian and international governance is now urgently required to ensure the key values of this unique region are protected in the face of the challenges ahead.

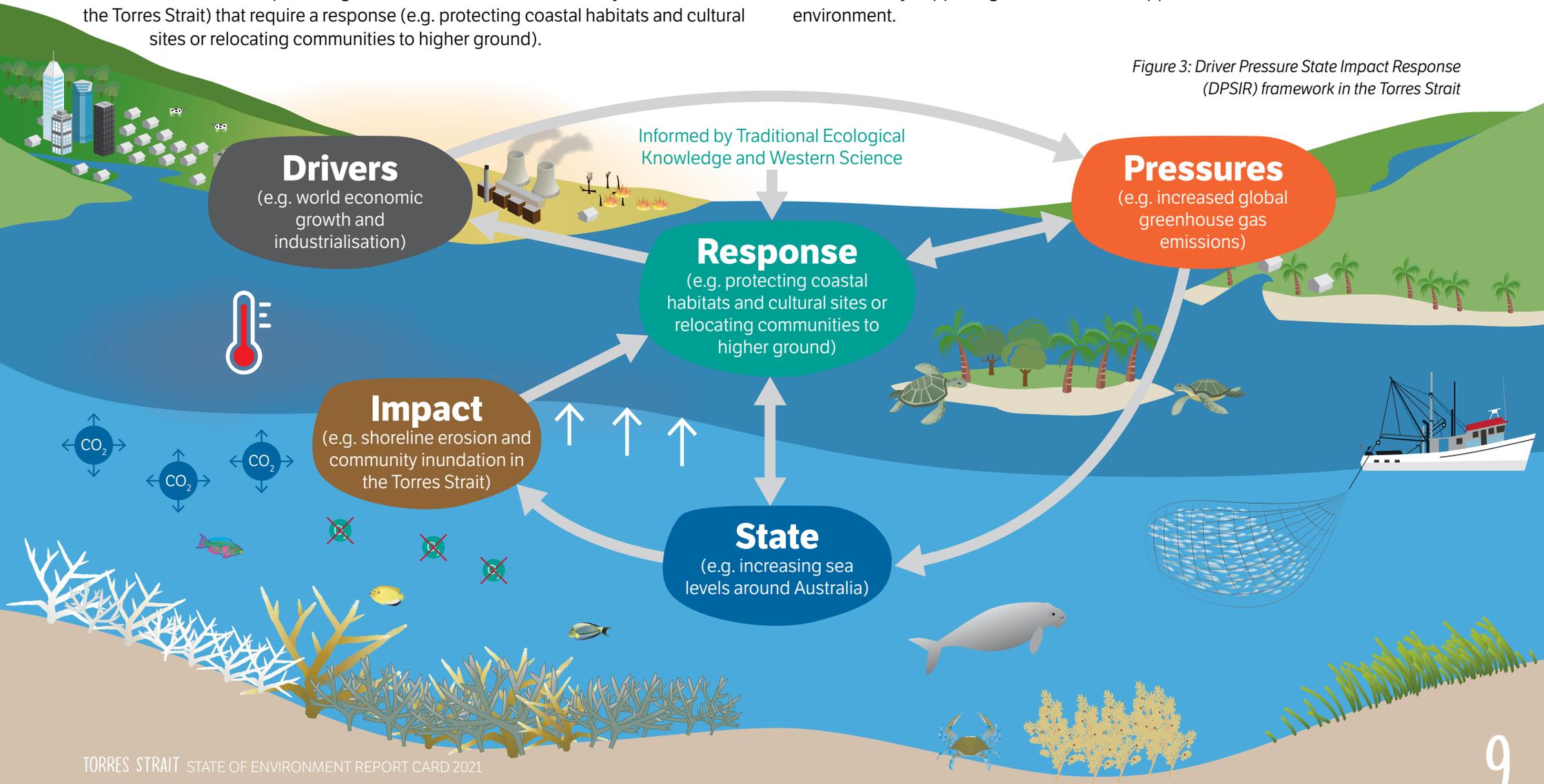


Torres Strait State of Environment process model

Many state of environment reports use a variation of the Driver-Pressure-State-Impact-Response (DPSIR) model to help understand and describe complex environmental and societal interactions and interdependencies at the international to local scale. Under the DPSIR model, driving forces (e.g. world economic growth and industrialisation) cause pressures (e.g. increased global greenhouse gas emissions) that affect the state of environmental conditions (e.g. increasing sea levels around Australia) that lead to impacts (e.g. shoreline erosion and community inundation in the Torres Strait) that require a response (e.g. protecting coastal habitats and cultural sites or relocating communities to higher ground).

This report uses a simplified version of the DPSIR model to assess each of the land, sea, and people key values. Driving forces and the Pressures they cause are collectively referred to as threats. State and Impacts are captured under condition, trend and outlook scores. Potential local management Response options are identified as part of the evaluation of management effectiveness for each key value. Together with the brief narrative the assessments provide a snapshot of what is already happening and what could happen in the future to the Torres Strait environment.

Figure 3: Driver Pressure State Impact Response (DPSIR) framework in the Torres Strait



Climate, oceans, and atmosphere – key drivers of change

The climate and oceanography of Torres Strait are critical drivers of the culture, biodiversity, and ecology of the region. All aspects of life and ecology are impacted by changes in these critical processes. Human-induced climate change is now driving changes in both oceanography and atmospheric processes that have significant ramifications for the region, its environment, and communities. Whilst average temperature increases in the tropics are lower than those experienced in other regions (like the polar regions), human and ecological systems in the tropics are not pre-adapted to the higher variability that is one of the signatures of a shifting climate. As such, tropical regions like Torres Strait are particularly vulnerable to even small changes in climate.

Over the last century, sea levels in the present-day Torres Strait began to rise again due to human driven increase in greenhouse gases. Sea level rise is not uniform around the world, and in the Torres Strait it has been increasing at about twice the global average rate (estimated to be between 6-8 mm per year in the past decade). Of the 17 inhabited islands, six are particularly exposed to sea level rise due to limited options for retreat away from the coast due to their small size and mostly flat topography. Many communities on other islands throughout the region also occupy low lying coastal areas.

While there is still great uncertainty as to the speed of global sea level rise, the rate and degree to which global emissions are reduced will significantly influence the outcome. According to the US National Oceanic and Atmospheric Administration, intermediate to high emissions pathways over the coming century will result in between 1-2 metres of sea level rise by 2100. This will have major impacts on all coastal areas and low-lying communities across the region and maps will need to be redrawn. The rate of sea level rise is expected to increase over time and will continue for centuries beyond 2100, even if emissions of greenhouse gases are reduced to net zero by 2050, due to the warming already locked into the climate system. The worst of the impacts can still potentially be reduced through immediate ambitious efforts to reduce atmospheric greenhouse gas levels.

Already, changes across the region are impacting Torres Strait culture and livelihoods, the health of islands and sea country and the species dependent on them. Climate change is already bringing warmer temperatures during the day and night, increased variability in the weather and seasons, more extreme weather events, greater variation in rainfall (with some decline in the annual average), warmer sea temperatures and more marine heat waves, accelerated increase in sea level rise, increases in ocean acidity, changes in ocean currents and less dissolved oxygen in the water.



For further information about the projected climate change risks and impacts to the region and communities, as well as what is happening to build resilience and adaptive capacity, see the [Torres Strait Climate Change Strategy and Regional Adaptation and Resilience Plan](#).



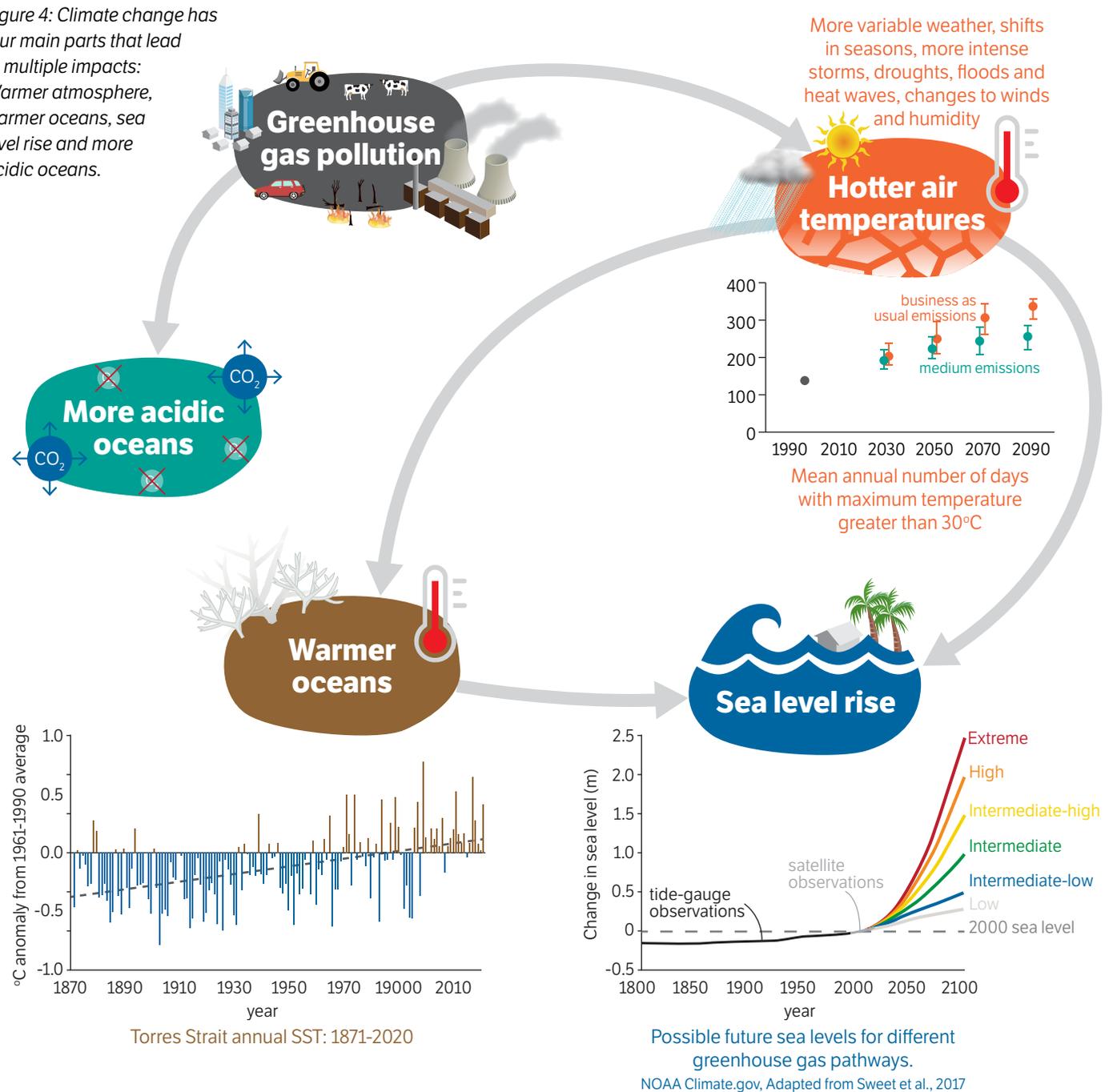
Miya Isherwood

Shifts in seasons are impacting the fruiting and flowering of some plants and the movements of many birds and animals and are likely to further disrupt traditional ecological knowledge of many local systems. Warmer temperatures and greater climate variability will also increase the spread and severity of many pests and diseases and increase fire risk to sensitive ecosystems. Until recently, Torres Strait was home to the endemic Bramble Cay melomys (*Melomys rubicola*) – the first species known to be declared extinct in Australia due to human caused climate change. Keystone species, including those of great cultural significance to the Torres Strait people, are also under threat. Turtles, coral reefs, and fisheries like the tropical rock lobster fishery are particularly vulnerable to warmer and more acidic ocean environments.

These changes have significant implications for human health and wellbeing as well as for species and ecosystems. While many residents in Torres Strait are used to a tropical climate, warmer temperatures and slight increases in humidity pose a significant health risk through heat stress, particularly for older inhabitants and people with chronic health issues. Data collected so far suggests heat is already a significant risk factor for health.

Warmer temperatures also increase the risk of insect-borne diseases from neighbouring PNG moving into the region. Longer dry seasons are affecting the water security of already water stressed communities. Sea level rise is increasing the frequency and severity of flooding and erosion of low-lying coastal areas, impacting settlements and crops as well as cultural and environmental values. Longer-term sea level rise may force some communities to reluctantly relocate.

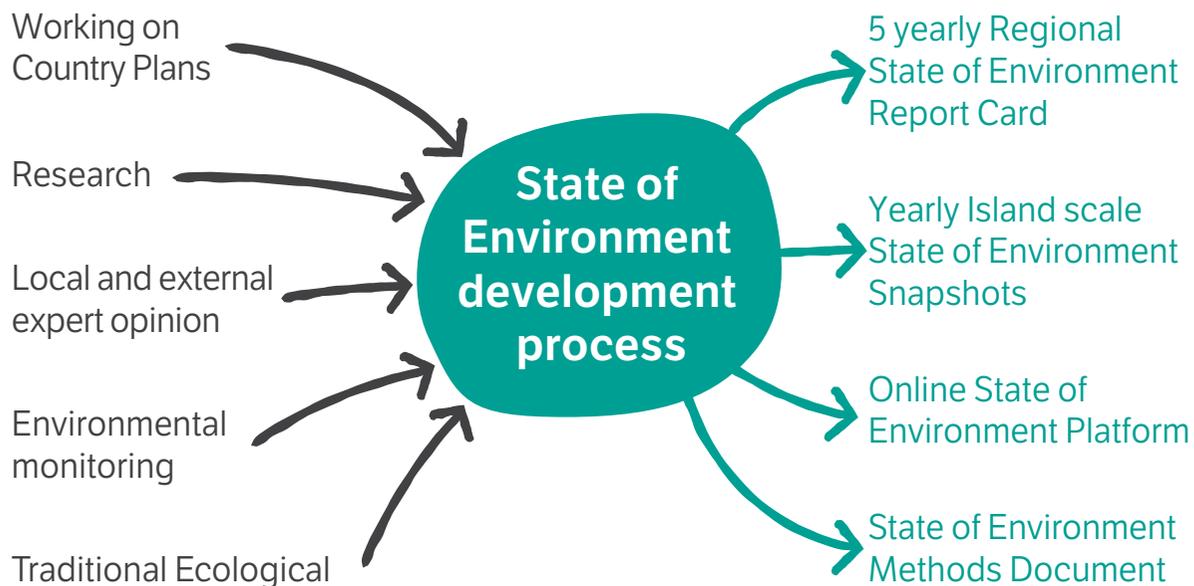
Figure 4: Climate change has four main parts that lead to multiple impacts: Warmer atmosphere, warmer oceans, sea level rise and more acidic oceans.



GUIDE TO USING THE REPORT CARD

Standard information categories and icons are used throughout this report to describe recently observed and likely future changes relevant to each key value. This summary information draws from local community plans, monitoring and reporting and broader consultation processes, is supported by a more detailed interactive web site, guidelines on assessment attributes and methods, as well as 17 individual Island land and sea snapshots.

Figure 5: The context and linkages between the State of Environment Report Card for Torres Strait and other plans and products



THREATS

While Torres Strait people, sea and land values are still relatively healthy and largely intact, concerted efforts across all levels of government are now vital to protect the region and its communities from a range of ongoing threats operating at the international to local scale.

The key threats affecting the region's natural and cultural values are identified below. To the extent possible, these threats align with those used in the national SoE reporting framework and the Great Barrier Reef Outlook Report, but we have also identified some unique threats – particularly to Indigenous wellbeing, culture, and livelihoods – for the purposes of this report card. Further background on these threats and how they were used in the key values assessment process is provided online.

The main threats facing Torres Strait's unique cultural values are related to the passing of Elders, decline in the use of traditional languages, knowledge, governance systems and customs, and associated erosion of culture and traditional governance systems. Unprecedented and escalating changes to climate systems pose the most significant threat to all the region's values. Declining ocean health, pest plants, animals and diseases, unsustainable coastal development and use of marine resources across the broader region (including in neighbouring jurisdictions) also threaten the region's biocultural values.

The drivers, or causes of these threats, are primarily global – coming from outside the region. They include population growth, increasing consumption, increasing carbon emissions from fossil fuel use, globalisation of food production systems, media, and homogenisation of cultural values. Local actions can't stop these threats but can help to reduce or delay their impacts.

The recognised threats are cumulative and interactive – and so are the solutions. This means that mitigation and adaptation actions implemented locally, even to address relatively low-level concerns, can build resilience, and buy the region time while global solutions to overarching risks like climate change and over-consumption are developed.

Four broad categories of threats have been identified (see www.torresstraitsoe.org.au for detail):



Eroding of traditional culture and governance (e.g., passing of Elders, decline in use of traditional languages, loss of livelihoods, poor health and well-being, lack of resources and capacity, migration from the region)



Climate change (e.g., rising sea level, increased sea, sand and air temperatures, ocean acidification, changes to currents, more intense and variable weather, shifting seasons, increased fire risk)



Problematic introduced and native species (e.g., pest weeds, feral animals, Crown-of-Thorns Starfish)



Unsustainable resource use (e.g., habitat alteration, shipping incidents, marine debris, resource extraction, direct use, pollution).



Key Values Icon

Significance

International, National, State, Regional, Local

Condition



Trend

The change in the condition of the key value between 2016 and 2021.

Outlook

The anticipated, projected, or possible change in the condition of the key value between 2021 and 2050.

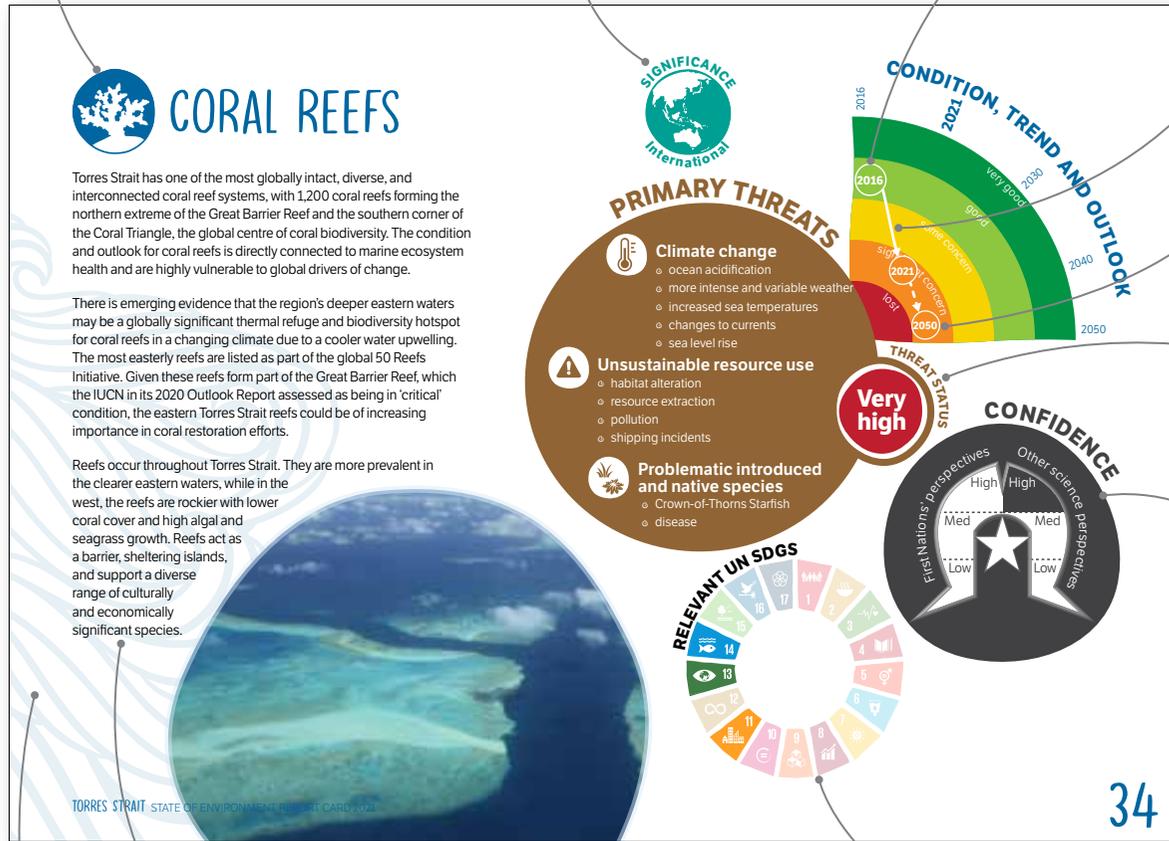
Threat type, status

See previous page for details



Confidence

The level of confidence (Low, Medium, High) in the assessment rating from a First Nations perspective and other science perspectives – where First Nations perspectives include traditional and local knowledge, observations and professional judgement exercised by rangers and Indigenous staff within the Land Sea Management Unit (LSMU) (see p. 17 for detail).



Theme

Narrative

People

A brief narrative summarises the main attributes for each key value, as well as 'what is already happening' (the current health of the key value, primary threats, and management actions underway) and 'what could happen' (potential future scenarios, based on the outlook and opportunities for future management interventions and improvements).

Sea

Land

United Nations Sustainable Development Goals

The 17 United Nations Sustainable Development Goals (SDGs) provide a shared blueprint for long-term peace and prosperity for people and our planet (see following page for details). As part of our commitment to thinking globally and acting locally, the relevant Sustainable Development Goals are highlighted for each key value in Torres Strait.

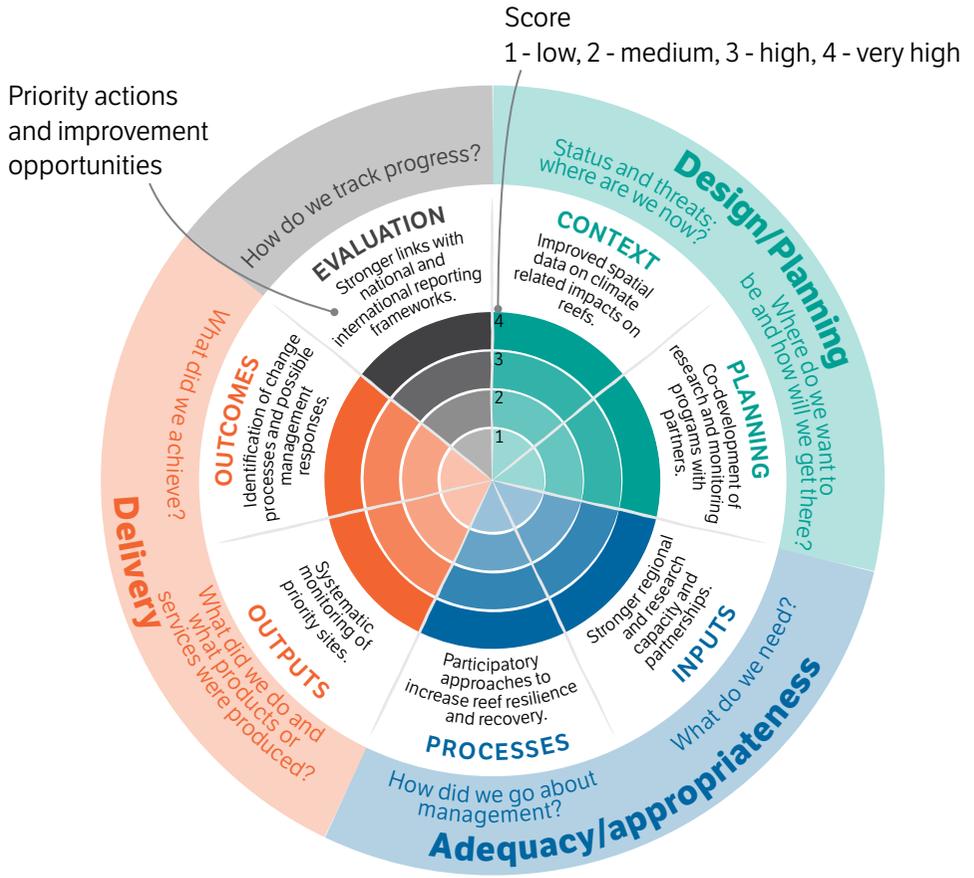
United Nations Sustainable Development Goals

For more information on the Goals, see: sdgs.un.org/goals



IUCN management effectiveness grading statements

Drawing on the International Union for Conservation of Nature (IUCN) management effectiveness framework for assessing the elements of management of protected areas, this report card includes a score (1-4) against each of these elements (context, planning, inputs, process, outputs, outcomes, evaluation) for each key value based on current management arrangements. It also includes an indication of the priority actions and next steps to improve management effectiveness in the future in relation to each management element (see example figure below). For further information see the [IUCN website](https://www.iucn.org).



The long-term aim is to have the highest score possible for all management elements.

Links to emerging biocultural approaches to SoE reporting

Future editions of this SoE are expected to consider emerging biocultural frameworks and indicators including:

- the post-2020 Global Biodiversity Framework
- key Indigenous themes in the national SoE Report
- Strong Peoples – Strong Country (Great Barrier Reef Indigenous heritage monitoring framework).

Evidence streams

This report card considers multiple streams of evidence including Traditional Ecological Knowledge (TEK), citizen science and other scientific data. Torres Strait is a predominantly Indigenous region, and the state of environment story is best told through a joint scientific and local, Traditional Owner cultural lens. In assessing the health of key values, especially in the absence of strong scientific data, emphasis has been placed on local, Indigenous knowledge and perspectives, and professional judgement. Stronger, holistic approaches will be required to collect, consider, compare, and communicate these multiple lines of evidence to create a more robust narrative for future editions.

Knowledge gaps and priorities

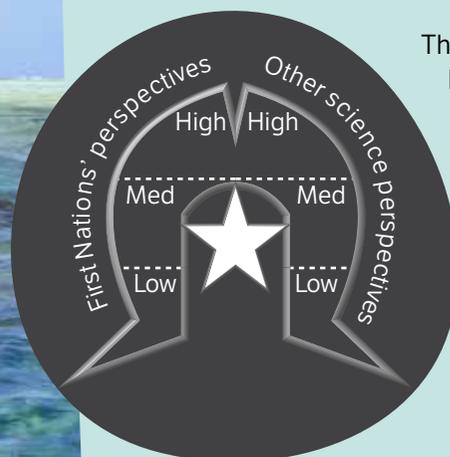
Despite a growing body of mainstream science information on the region's natural values, significant knowledge and information gaps still exist, particularly in relation to ecological processes, biogeography, invertebrates, and most non-consumed marine species. Some knowledge gaps and information priorities are flagged in the 'context' element of the management effectiveness grading statements for each key value (see previous page).

Building confidence in the SoE process

This State of Environment Report Card was made stronger by the professional judgement of Indigenous staff and rangers living and working on country.

When assessing the health of the Torres Strait environment we wanted both First Nations' perspectives and other science perspectives to be heard equally.

A group of experienced staff and rangers reviewed the draft SoE assessments at a workshop and scored their level of confidence in the findings based on their own local knowledge and professional judgement (not as community representatives). Expert reviewers were separately invited to provide their confidence scores.



The overall level of confidence in each key value assessment from both a First Nations' perspective and other science perspective is recorded in the 'Dhari graph' (see left). The aim was to combine two world views into one shared story to better understand and protect the Torres Strait's unique cultural and natural values.

The approach will continue to be improved and refined for future SoE reports, including through updating island snapshots to provide a clearer picture of shared confidence in the changes occurring across the region at local scales.

High confidence—Adequate high-quality evidence and high level of consensus (i.e. 'very sure this is right')

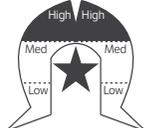
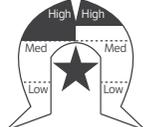
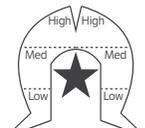
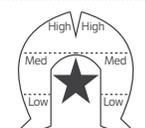
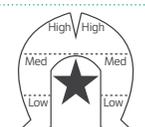
Medium confidence—Limited evidence or limited consensus (i.e. 'it's probably about right')

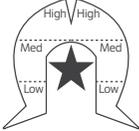
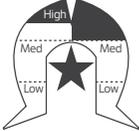
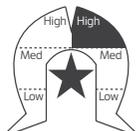
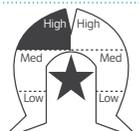
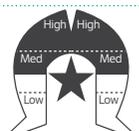
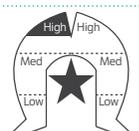
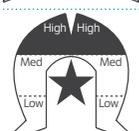
Low confidence—Very limited evidence, assessment based on anecdotal information and professional judgement (i.e. 'it's a hunch, but may not be right')

"This new approach recognises Indigenous staff and rangers as professional land and sea country managers. It's a better way because it listens to and respects their judgment in the same way that we listen to and respect the professional judgement of other science experts working in the region".

Stan Lui
Land and Sea Management Unit,
Torres Strait Regional Authority

SUMMARY OF ASSESSMENTS FOR 16 KEY VALUES

Key Value	Significance	Condition 2016	Condition 2021	Trend	Outlook	Threat Status	Confidence FNP Other science
PEOPLE							
 Traditional Ecological Knowledge (TEK)	 International	 Some concern	 Some concern		 Some concern	 High	
 Scientific research and monitoring	 International	 Some concern	 Some concern		 Good	 Medium	
 Strong regional and community-based management capacity	 National	 Good	 Good		 Some concern	 Medium	
LAND							
 Healthy land ecosystems	 National	 Good	 Some concern		 Some concern	 Medium	
 Sustainable human settlements	 National	 Some concern	 Some concern		 Some concern	 High	
 Coasts and beaches	 National	 Some concern	 Significant concern		 Significant concern	 Very high	
 Mangroves and wetlands	 International	 Good	 Significant concern		 Significant concern	 High	
 Coastal birds	 International	 Good	 Some concern		 Significant concern	 High	

Key Value	Significance	Condition 2016	Condition 2021	Trend	Outlook	Threat Status	Confidence FNP Other science
SEA							
 Healthy marine ecosystems	 International	 Good	 Some concern		 Significant concern	 High	
 Marine water quality	 International	 Very good	 Good		 Some concern	 Medium	
 Coral reefs	 International	 Good	 Significant concern		 Significant concern	 Very high	
 Seagrass meadows	 International	 Very good	 Some concern		 Some concern	 Medium	
 Dugong	 International	 Very good	 Good	No clear trend	 Some concern	 Medium	
 Marine turtles	 International	 Some concern	 Significant concern		 Significant concern	 Very high	
 Subsistence fishing	 National	 Good	 Good		 Some concern	 Medium	



AILAN KASTOM, CULTURAL HERITAGE AND ENDURING CONNECTION TO LAND AND SEA

The assessment of the health of this key value has been intentionally left out of this report card. Island communities and Traditional Owners themselves are best placed to evaluate the strength of their *Ailan Kastom*, cultural heritage and enduring connection to land and sea at appropriate scales and in line with their own cultural priorities, protocols, and governance systems.

The cultural identity of Torres Strait's traditional inhabitants is expressed and maintained through *Ailan Kastom* (Island Custom) and Aboriginal Law/Lore – the system of knowledge, traditions, laws, protocols, and practices that maintain Torres Strait Islander and Aboriginal peoples' relationships to others and their connections to country.

This body of knowledge has been passed down through generations by tribal leaders and Elders to heads of clans and kin through sit downs, cultural teaching, song, dance, myths, legends, art, and stories. In the Torres Strait, each Aboriginal and Torres Strait Islander group has its own parliamentary and social system administered through a structure known as *Kwod* (Kemer Kemer Meriam, Kulkalgal, Guda Maluilgal and Maluilgal nations), or *Kergne* (Kaiwalagal nation) for creating and managing all the associated processes and protocols applicable to the communal structure.

Although similar principles may exist between law and Lore/*Kastom*, it is important to recognise there is a distinction and Lore/*Kastom*, like law, can respond to change by absorbing contemporary influences and adapting to its consequences (e.g., Coming of the Light).

The enduring connections that Torres Strait Islander and Aboriginal people have with their country, and their cultural heritage, may be manifested in tangible and intangible ways. Maintaining and strengthening *Ailan Kastom* and Aboriginal Law/Lore is vital to build community capacity to sustainably manage land and sea resources into the future.

What is already happening?

While *Ailan Kastom* remains relatively strong, it is facing increasing pressure from modern western society and environmental and economic drivers from the local to global scales. Limited employment and housing mean most Islanders live outside the region. The passing of Elders, loss of traditional languages and disruption to traditional governance systems are key threats to *Ailan Kastom* and the unique governance systems, customary laws, and cultural heritage of Torres Strait Islanders.

Torres Strait communities are among the most vulnerable to climate change, both in Australia and internationally. Rising sea levels, destructive king tides and coastal erosion have impacted cemeteries, beaches, and roads and threatened important buildings and cultural sites. Cultural connection to coral reefs and customary fishing are also threatened by rising sea temperatures.

A range of formal agreements have been established between the LSMU and Traditional Owner groups to confirm agreed protocols to respect and strengthen *Ailan Kastom* and Aboriginal Lore/Law and to follow best-practice approaches for protecting Indigenous Cultural and Intellectual Property (ICIP) rights. Working on Country Plans have been developed for all outer island communities and are in the process of being updated. All these plans incorporate goals and strategies for managing cultural as well as natural values, and are underpinned by, and reinforce, *Ailan Kastom*.

Every inhabited island has a land and sea snapshot developed with Traditional Owner input. From 2021, each community will be able to update their own island snapshot to consider how well cultural protocols and practices are being respected and maintained.

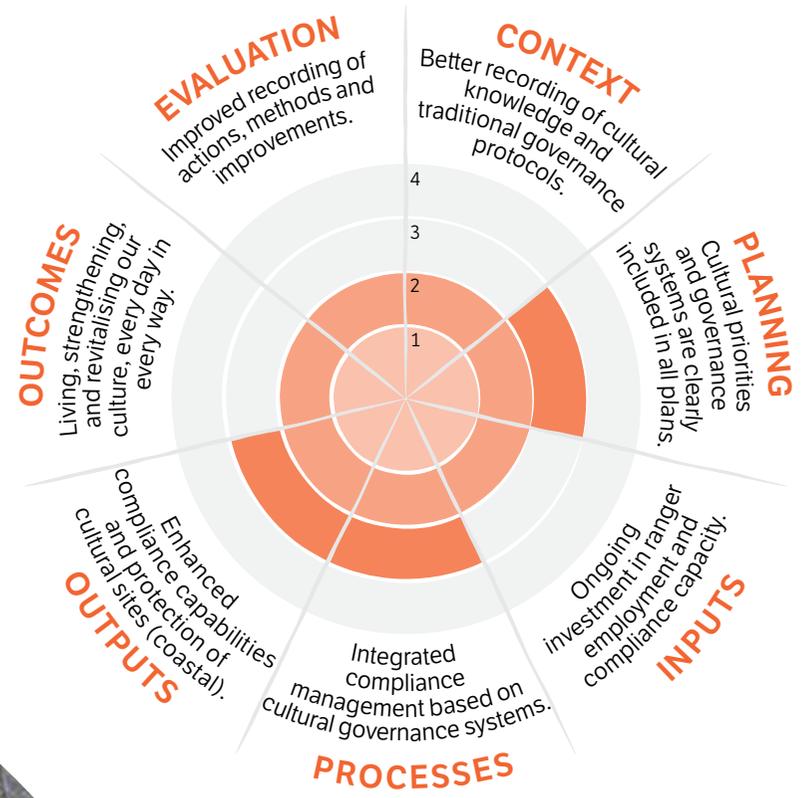
The number (and scale) of cultural sites that have been mapped, actively managed and restored by rangers and community members is gradually increasing (38 in 2016, and over 400 in 2021). Although coastal sites are subject to increasing risks from rising sea levels and extreme weather events, management strategies for protecting these sites are being included in updated Working on Country and Indigenous Protected Area (IPA) Plans.

What could happen?

In the absence of additional protection and support, *Ailan Kastom*, cultural heritage and enduring connections to land and sea could erode further, potentially undermining the resilience of all land, sea, and people values. For example, the potential loss of local turtle populations (primarily due to rising temperatures) would have catastrophic impacts on important cultural practices.

Stronger Traditional Ecological Knowledge (TEK) programs (e.g., use of language and development of seasonal calendars), expansion of IPAs and stronger local governance for community-based ranger programs could help to revitalise and strengthen *Ailan Kastom*.

The extension of successful compliance management initiatives in the region could reinforce and reinvigorate customary laws and governance systems (see case study p. 27).



“Ngoedheh bubu wamenasinu koey kunakan nga pungayk, ngalpun lagaw pawa a yawadhan ngoedheh kedha nge mura zapul kunakan palayk a thuma gasaman.

When the current is strong, everything comes into place, in line with *Ailan Kastom* and lore.”

Songhi Billy



TRADITIONAL ECOLOGICAL KNOWLEDGE (TEK)

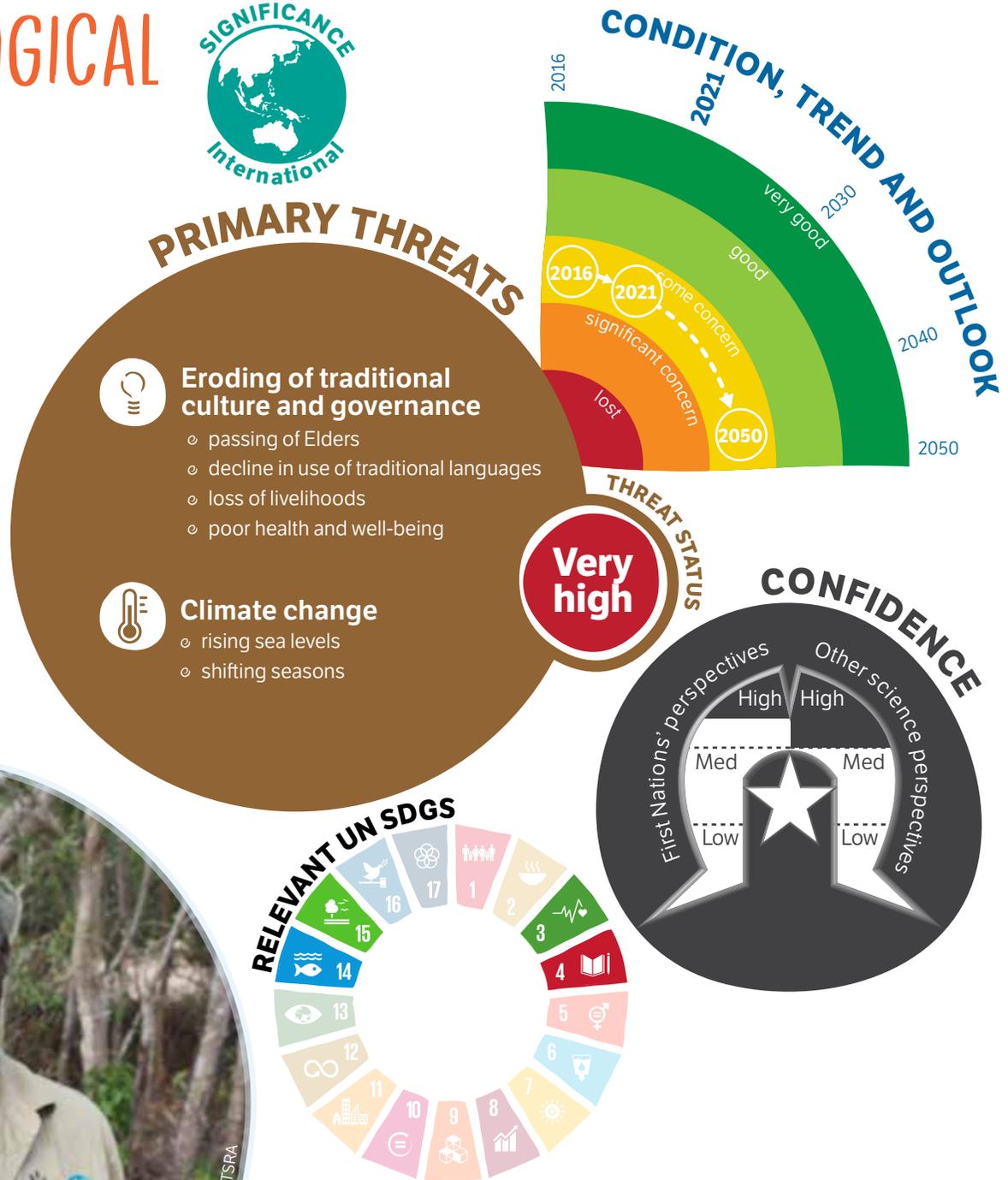


Since *bepor taim* (before time), the people of Torres Strait have actively managed their islands and sea country in line with *Ailan Kastom* and TEK – the cumulative worldview and body of knowledge about the environment and relationships within the living world. This deep knowledge has evolved by adaptive processes and been handed down through generations by cultural transmission.

TEK is often able to support sustainable use of environmental resources and build resilience in social-ecological systems - for example, by providing social methods of supporting or enforcing biodiversity conservation based on Indigenous value systems and narratives.

As Elders pass away and conditions change, it is vitally important that communities are supported to record and manage TEK for future generations, to prevent this extensive knowledge from being lost. TEK should ideally complement, inform, and underpin the sustainable management of the region's key cultural and natural values.

The preservation and use of TEK is intrinsically linked to language conservation. Everyday use by all community members is the best way to ensure the long-term survival of cultural knowledge gained from experience over thousands of years.

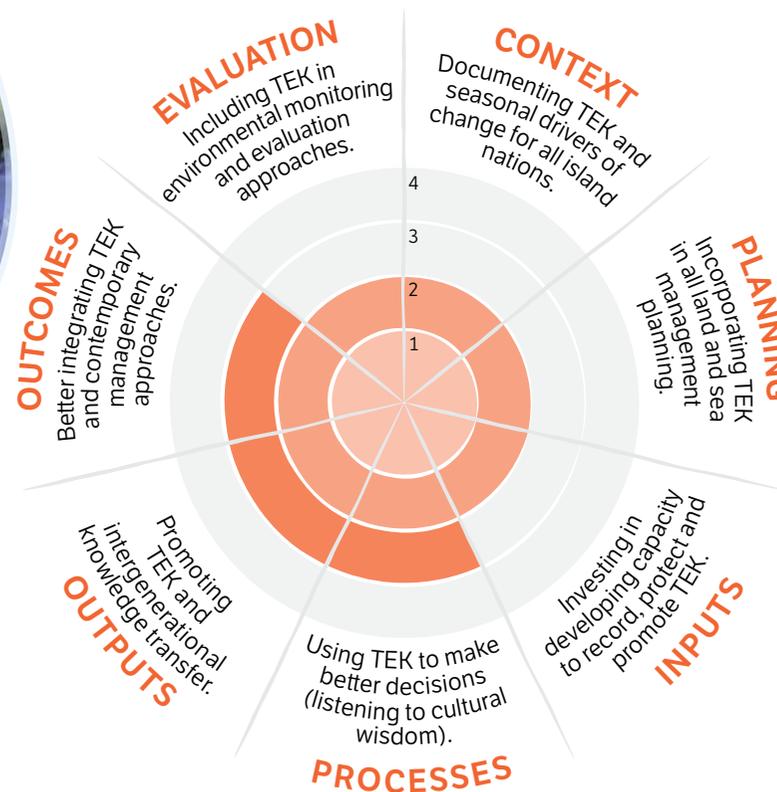


What is already happening?

The TEK of local communities in Torres Strait and elsewhere is becoming eroded and decreasing in depth of knowledge and language. The dynamics and drivers of TEK loss are complex and are associated with globalisation and exposure of Indigenous peoples to western cultural and economic norms, which has led to widespread loss of local languages, customary practices and governance systems.

TEK is recognised as playing a vital role in the fabric of Torres Strait culture and underpins the work of rangers to manage cultural and natural values. Management efforts are increasingly seeking to integrate TEK with western scientific approaches in a way that respects Indigenous cultural and intellectual property rights. Some communities also have traditional language programs closely linked to maintenance of TEK.

To date, 14 communities have been supported to establish a dedicated TEK database system, governed by traditional cultural protocols. Five communities have been supported to develop a seasonal calendar, two communities have prepared plant and animal booklets, and four TEK resources have been prepared and distributed to the 18 schools in the region and to agreed partners. Since 2017-18, rangers have actively facilitated 5,670 TEK collection events within their local communities, with the involvement of Elders and RNTBCs. TEK is also informing management strategies in updated Working on Country and IPA Plans being implemented by rangers.



What could happen?

The gradual passing of more Elders will lead to the further loss of traditional knowledge and languages, exacerbated by changing cultural values, migration of young people away from the region, rising sea level, shifting seasons and degradation of ecosystems due to climate change.

Adopting new ways of recording, preserving, and sharing TEK and languages (such as using contemporary technology and communication tools), will become increasingly important to engage more community members and youth in learning about TEK and to improve TEK integration into land and sea management.

Seasonal calendars (and plant and animal booklets) can help to promote TEK and rebuild important links between people and their knowledge of country. This highly successful approach could be extended to other interested island communities as a basis for reinvigorating TEK and informing culturally appropriate management of land and sea country.

"Your culture identifies you. Culture makes you who you are... Young people must understand when you take a step (on this land), you are stepping on your culture. Carry this one close to you... You walk on this land carrying the law with you."

Meriam Elder





SCIENTIFIC RESEARCH AND MONITORING

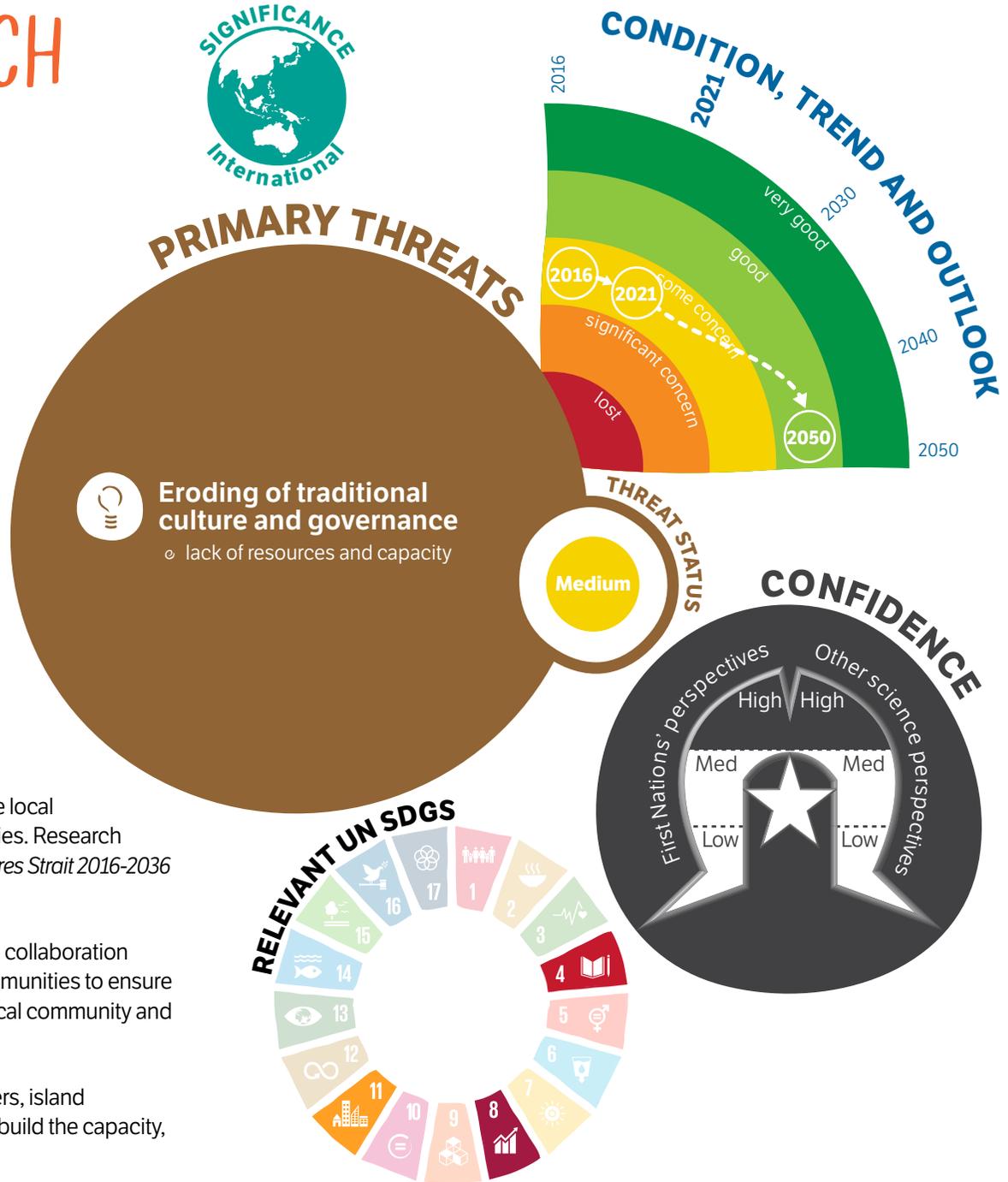
Effective management and protection of the unique cultural and natural values in Torres Strait requires a combination of local Indigenous knowledge and other scientific knowledge and approaches working together to support evidence-based decision making and regulatory approaches.

The quality and quantity of scientific knowledge about the region has grown over recent decades. Accurate baseline data and targeted monitoring of indicators is vital to assess the health of key values and to inform future management and planning, as well as adaptive responses to emerging threats. There are still large gaps in science knowledge and data in relation to trends in dugong abundance and movements, turtle abundance and movements, whales and dolphins, sharks and rays, non-commercial pelagic fish, littoral zone species, marine molluscs, crocodiles, invertebrates, mangrove crabs, fungi, general island ecology (e.g., small mammals, microbats, reptiles, distribution of rare plants, distribution of weeds – particularly on most uninhabited islands), and ground water.

Torres Strait Islander and Aboriginal communities and Traditional Owners want scientific research to align with cultural protocols, to respect and integrate local Indigenous knowledge, and to address local land and sea management priorities. Research should align with the priorities in the *Land and Sea Management Strategy for Torres Strait 2016-2036* and the knowledge gaps identified in this report card.

The future sustainability of the region's rich biodiversity is dependent on strong collaboration between researchers, management agencies and Traditional Owners and communities to ensure that scientific research complements planning and management efforts at a local community and regional scale

Research across the region should deliver mutual benefits for Traditional Owners, island communities, research institutions and investors, land and sea managers, and build the capacity, skills, and knowledge of local communities.



What is already happening?

Research partners are increasingly aware of the importance of seeking permission to undertake research in Torres Strait, engaging rangers and Traditional Owners in their research methods, addressing local priorities, and sharing research findings with communities. Increasingly, development of research and monitoring is being done as a co-design process with communities.

TSRA recognises that Torres Strait Islander and Aboriginal people have the right to maintain, control, protect and develop their Indigenous Cultural and Intellectual Property (ICIP) in accordance with Article 31 of the United Nations Declaration on the Rights of Indigenous Peoples.

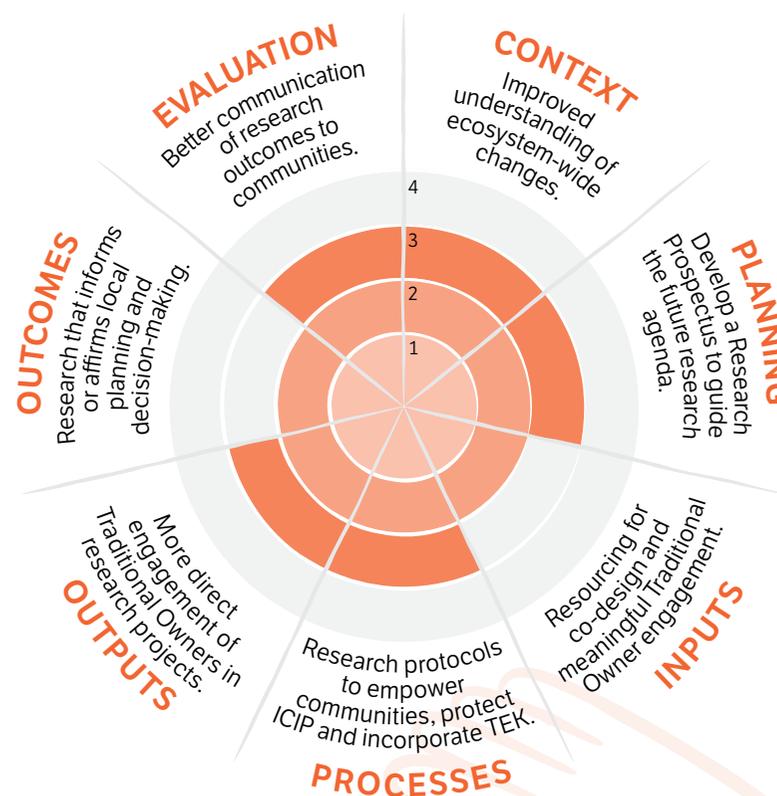
A variety of protocols have been developed, or are under development, to help ensure that ICIP created, used or shared in research partnerships is protected, that research priorities are identified and directed by Traditional Owners, and that land and sea management projects integrate knowledge collected by local research. Highly valued partnerships have been developed with key research institutions.

What could happen?

Mainstream scientific approaches could further complement local and traditional knowledge and understanding of the health of the region and explain some of the changes happening within the region that are linked to contemporary threats at a global scale, including from climate change.

Torres Strait Islanders could continue to influence research agendas to prioritise research that addresses key gaps in regional knowledge and helps to inform and empower communities to build their resilience and sustainability. Development of a research prospectus could support these objectives.

There is also significant potential for negotiating robust research agreements and developing stronger protocols that maximise opportunities for building capacity and career pathways and delivering co-benefits for Indigenous communities.



"This knowledge is not from university. This tamer (knowledge) is from Elders come down. Everything here (on the seasonal calendar) blo youpla (belongs to you)."

Aloe Tapim



STRONG REGIONAL AND COMMUNITY-BASED MANAGEMENT CAPACITY



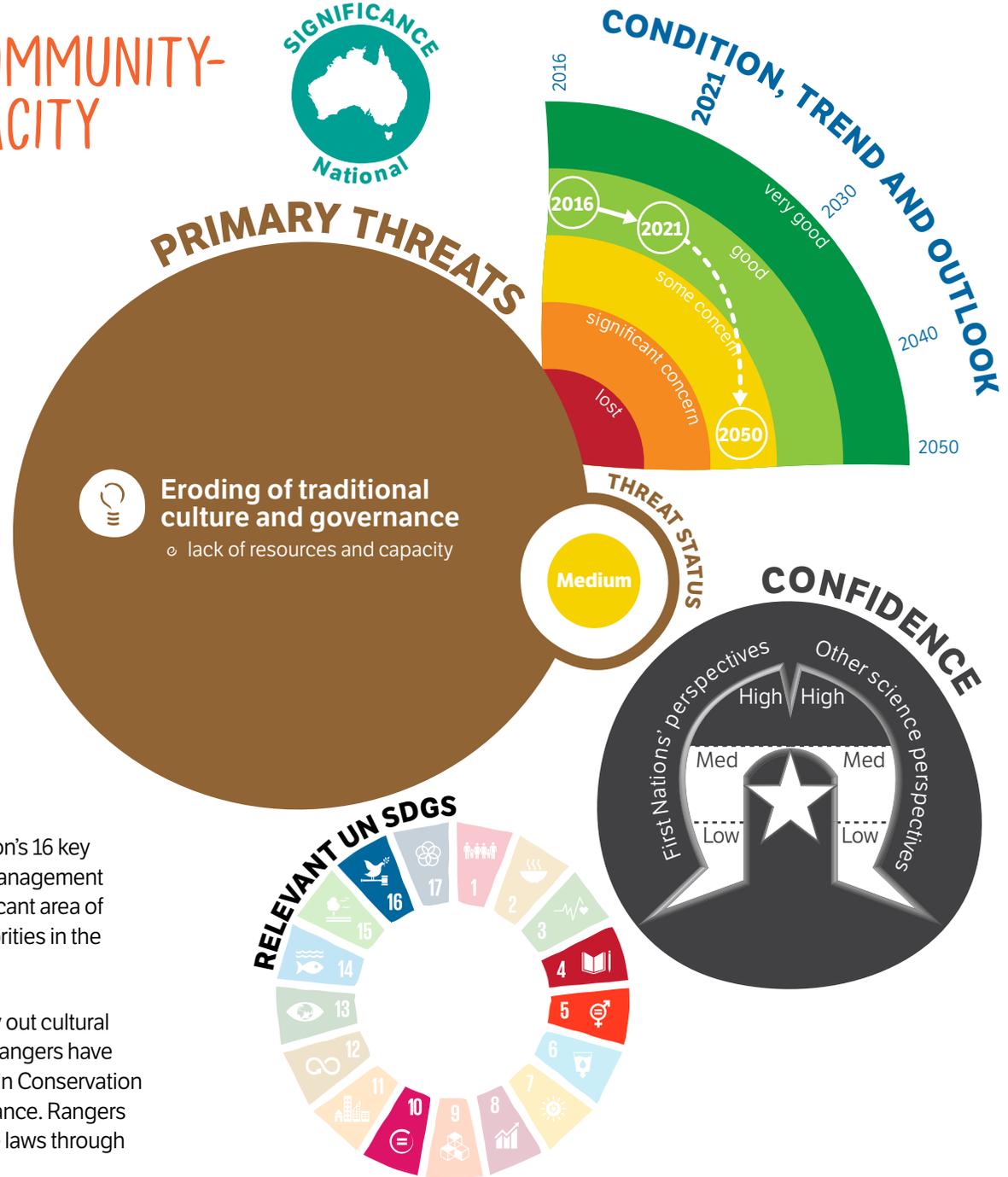
Sustainable land and sea management in Torres Strait must occur through an Indigenous-led, collaborative process, that empowers Traditional Owners in planning, management, and all levels of decision-making. The region has a proud record of developing and implementing community-based planning and management approaches, acknowledging the critical role of Traditional Owners as local custodians of their traditional estates.

Meaningful engagement through co-designed processes, two-way learning and capacity building is important to ensure the effective ongoing integration of science and customary knowledge in management arrangements. Continuing custodianship of land and sea country in Torres Strait also depends on strong leadership by Elders supported by traditional governance systems to regulate resource use and protect cultural values.

The recognition of native title across the region (following the *Mabo* decision in 1992) has led to the establishment of 21 corporations to hold and manage native title on behalf of Traditional Owners. These Registered Native Title Bodies Corporate (RNTBCs) work with Elders, communities, other parties, and all layers of government to protect and exercise native title rights and interests over islands and sea country.

The LSMU is supporting Indigenous-led, sustainable management of the region's 16 key cultural and natural values consistent with the vision, guiding principles and management directions in the Land and Sea Management Strategy for Torres Strait. A significant area of focus and investment is on building regional and local capacity to address priorities in the Strategy.

Sixty rangers are now employed across all 14 outer island communities to carry out cultural and natural resource management activities on behalf of Traditional Owners. Rangers have participated in 16 units of training that are accredited towards the Certificate III in Conservation and Land Management, as well as the Certificate IV level in Regulatory Compliance. Rangers can operate under both customary lore and relevant Commonwealth and State laws through established relationships with relevant regulatory agencies.



What is already happening?

Community feedback and consultation to date indicates that many Elders support the current arrangements for land and sea management in the region. However, opportunities have been identified to further strengthen Traditional Owner involvement in all aspects of program delivery.

The compliance program is helping to reinforce customary laws and decision-making processes in relation to land and sea management, while it is building ranger capacity for greater involvement in co-management of the Torres Strait Protected Zone.

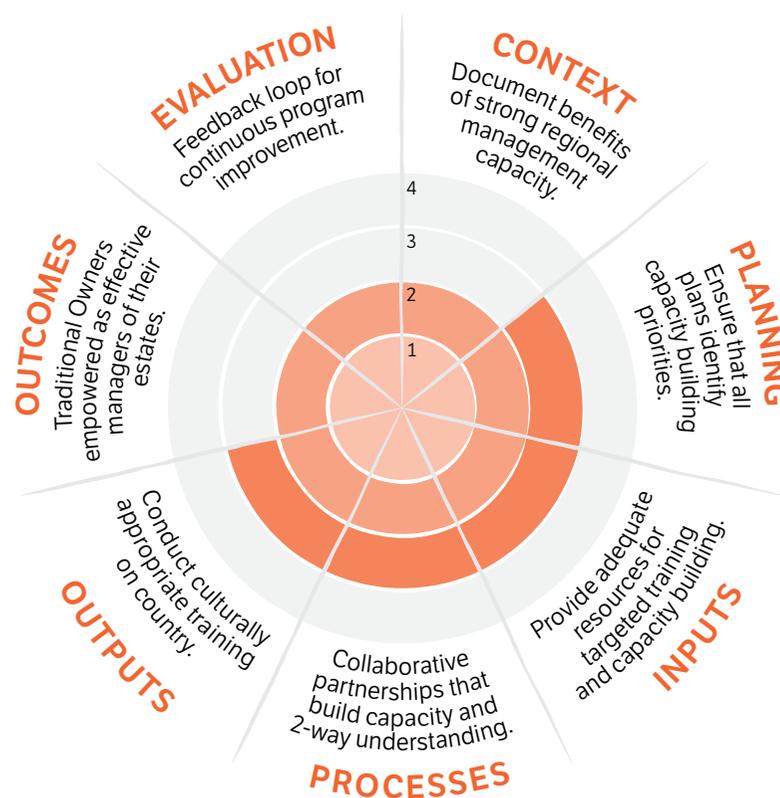
In recent years, there has been a 125% increase in the number of women rangers employed in the region. Updated Working on Country Plans that guide ranger work on the islands include more strategies that involve rangers working with RNTBCs.

What could happen?

The ongoing delivery of ranger and compliance management services is vital for ensuring enduring regional capability to address key strategic national priorities and to protect the region's unique biocultural values.

There is significant potential to enhance the involvement of Indigenous partner organisations engaged in land and sea management in the region, thereby building local and regional capacity in a way that aligns with cultural protocols, respects and integrates local Indigenous knowledge, and addresses local priorities.

Building capacity and securing resources for the Kaiwalagal region to address some of the most intense natural resource management challenges in Torres Strait—i.e., cane toads, increased development pressure, feral animals and weeds, waste and fire management—is also a priority for the future.



*"Ina lag nithamun yadaynga mamuy yawaykaru a ina malu nithamun yadaynga mamuy yawaykaru
The land is yours look after it and the sea is yours look after it."*

Porumalgal Elder

WOMEN RANGERS CARING FOR COUNTRY, CULTURE AND COMMUNITY

Laura Pearson is a talented and committed senior ranger supervisor, responsible for directly managing nine Indigenous rangers across three islands in the central Torres Strait. It was Laura's passion and pride that inspired her to apply for a job as a ranger back in 2012, as well as the knowledge she had passed on to her from her parents about how to survive and respect the land and sea and receive from it when in need.

Working as a ranger has helped Laura build strong relationships within her community and with other delivery partners. Being a ranger is very empowering. It provides a meaningful career path and local livelihood, as well as opportunities to gain knowledge, skills and understanding to help manage important issues facing her people and their traditional land and sea country.

"I wanted to be a ranger, educating the community and our children. I wanted to achieve things for my community, so people are safe, and we live sustainably: protecting turtle and dugong, restoring and preserving our language, maintaining traditional gardens for community members to enjoy".

Laura Pearson

TORRES STRAIT STATE OF ENVIRONMENT REPORT CARD 2021



TSSRA

CULTURALLY APPROPRIATE COMPLIANCE MANAGEMENT

In 2017, TSRA established a dedicated Compliance Management Unit (CMU) to help protect the unique and sensitive islands and waters of Torres Strait. Since then, compliance staff have designed, developed, and are implementing a culturally appropriate compliance program that identifies and embeds cultural authority beside western law. Over 50 rangers have received the nationally accredited Certificate IV in Regulatory Compliance as part of a broader training and development strategy. This enables rangers to undertake compliance activities in a safe, lawful, and professional manner while adapting to their ever-changing environment.

Rangers' intimate knowledge of their country helps them protect this unique region from threats such as illegal fishing, poaching, illegal foreign movements, and biosecurity risks. They appreciate that cooperative networks are required to operate effectively and understand their role in supporting our partner Australian regulatory agencies and neighbouring PNG officials.

The CMU and rangers have facilitated numerous patrols along the Australian / PNG border and participated in cross border multi-agency patrols with PNG officials. This international interaction allows critical information to be shared about the threats and pressures facing Torres Strait and opportunities for stronger collaboration.

"This area is absolutely beautiful and I propa sabe (know) now that I have to work propa close with my brothers and sisters here to protect it".

Karly Pamuan, Royal Papua New Guinea Constabulary, Daru.



TSRA

TSRA

TSRA Senior Compliance Officer Alicia Sabatino, TSRA rangers and members of the Royal Papua New Guinea Constabulary patrolling for poachers in remote areas west of Boigu Island, Torres Strait.

ERUB SEASONAL CALENDAR CHARTS THE WINDS OF CHANGE

Seasonal calendars are powerful tools for promoting and revitalising traditional languages and ecological knowledge, as well as recording and strengthening cultural connections between Torres Strait Islanders and their islands and sea country. Erubam Traditional Owners from Erub (Darnley Island) in eastern Torres Strait have recently developed *Erub Kerker*, a seasonal calendar poster that highlights how Erubam Le (people from Erub) traditionally coexisted with their land and sea country on Erub and surrounding islands.

Erubam Le RNTBC Chair, Mr Jimmy Gela, acknowledged the enormous contribution made to the project over three years by the Erubam community, Erub Arts, Elders and rangers.

Mr Gela stated, “By coming together and working as a team, Erubam community have demonstrated their commitment to protecting and preserving our language and cultural knowledge for future generations of Erubam Le. The *Erub Kerker* poster is an important tool to rekindle our kids’ interest in our culture. *Erub Kerker* is rich in language and incorporates artwork from the talented team at Erub arts. The poster depicts important elements of our ancestors’ traditional knowledge including the predominant seasonal winds and how Erubam people navigated, hunted, gardened and lived alongside nature in our part of the world.”

Erub Kerker has been delivered to all schools in Torres Strait and has been incorporated into the regional curriculum as an educational tool for youth and to promote the language and culture of Erub.



ANCIENT STONES HELP FORTIFY CULTURAL REVIVAL

During community consultations in 2020 to update the Mer Working on Country Ranger Plan, Meriam Elders from Mer in the eastern Torres Strait identified *Sai Arbir* – the ancient art of restoring the Sai or stone fish traps as a priority project for Meriam Rangers. Sai date back many thousands of years and are an important historical and cultural landmark of Mer and other islands in Torres Strait. Historically, Sai were used year-round by Meriam Le (people from Mer) to spear fish and squid in the shallow lagoons left behind by the outgoing tide. Like the receding tide, the traditional knowledge of *Sai Arbir* and the use of Sai for fishing is now a waning cultural practice on Mer.

This *Sai Arbir* restoration project was overseen by Meriam Elders who guided the 20 community members and rangers in the correct methods and cultural protocols for restoration of the 300m long Sai at Igir over a five-day period. Meriam Rangers will continue to undertake this restoration work on the remaining 22 Sai of Mer – restoring the iconic Sai themselves and working to preserve and promote the extensive body of Indigenous knowledge that governs their use and continuing restoration and maintenance.



TSRA



HEALTHY MARINE ECOSYSTEMS

The region's marine waters, seagrass meadows, coral reefs, mangroves, and wetlands support internationally significant populations of dugongs, turtles and seabirds and productive fisheries. All marine plants, animals, habitats and their interactions, as well as physical, chemical, and ecological processes, are inter-related components of marine ecosystems. A systems thinking approach requires the condition and outlook for all sea values to be considered in the context of overall marine ecosystem health. Although Torres Strait is one of the world's most intact and interconnected marine ecosystems, it is part of a broader ocean system which is under threat due to global drivers of change.

More than twelve distinct coastal and marine habitats have been identified in the Torres Strait, supporting a rich diversity of species which rely on different habitats during their life history – including many species of cultural significance.

Aboriginal and Torres Strait Islander people are heavily reliant on the sea for their culture and survival. Human interactions with sea country vary significantly across the larger region, as do the pressures on the marine ecosystem.

The location of Torres Strait at the confluence of multiple adjoining ocean systems is likely to assist the recovery of certain species and habitats following disturbances. However, high connectivity also brings with it the potential for negative impacts from neighbouring areas such as discharges from rivers contaminated by mining pollution and the transport of marine debris and microplastics on ocean currents. It can also result in local disturbances, such as oil spills, having far reaching consequences.

Tristan Simpson



PRIMARY THREATS



Climate change

- o rising sea level
- o ocean acidification
- o more intense and variable weather
- o increased sea temperatures
- o changes to currents



Unsustainable resource use

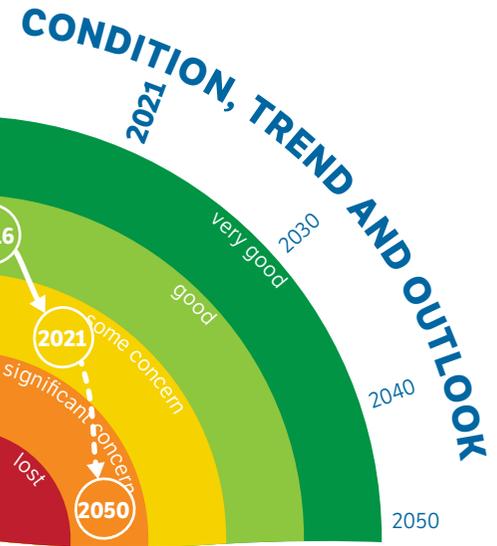
- o habitat alteration
- o resource extraction
- o pollution
- o shipping incidents



Problematic introduced and native species

- o Crown-of-Thorns Starfish

High

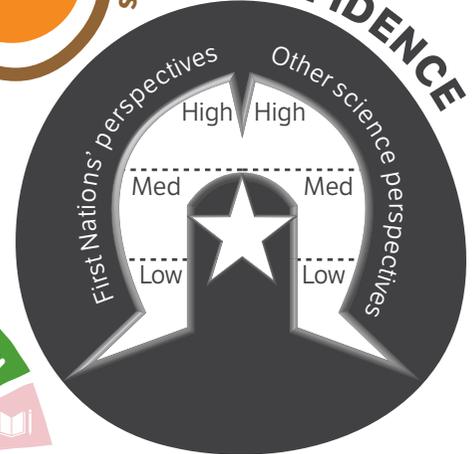


THREAT STATUS

RELEVANT UN SDGS



CONFIDENCE



What is already happening?

Climate change poses the greatest threat to marine ecosystems and is already impacting many of the physical, chemical, and ecological processes, as well as habitats in and adjacent to Torres Strait. Examples include the widespread bleaching and mortality of corals across central and western Torres Strait in 2016, 2017 and 2020 due to unprecedented marine heatwaves, and erosion and tidal inundation of turtle nesting sites on coral cays in eastern Torres Strait. Rising temperatures have changed the sex ratio of hatching turtles, leading to a critical shortage of male hatchlings.

As climate change makes oceans more acidic it affects the rate at which organisms can deposit calcium carbonate and can alter the survival, growth and abundance of a wide range of organisms including fish, phytoplankton, marine plants, corals and molluscs. Most significantly, these changes are making corals more brittle, susceptible to storm damage and less able to maintain their structural and functional integrity.

Losses in coral cover due to recent mass bleaching events are likely to have impacted the diversity and resilience of these reefs and species that rely on them. Similarly, any continuation of recent seagrass declines in western Torres Strait will likely affect important ecosystem processes.

Crown-of-Thorns Starfish (COTS) have recently been reported at outbreak levels across the eastern cluster of Erub and Mer. COTS can significantly affect ecosystem function, particularly when combined with other impacts on coral reefs such as bleaching.

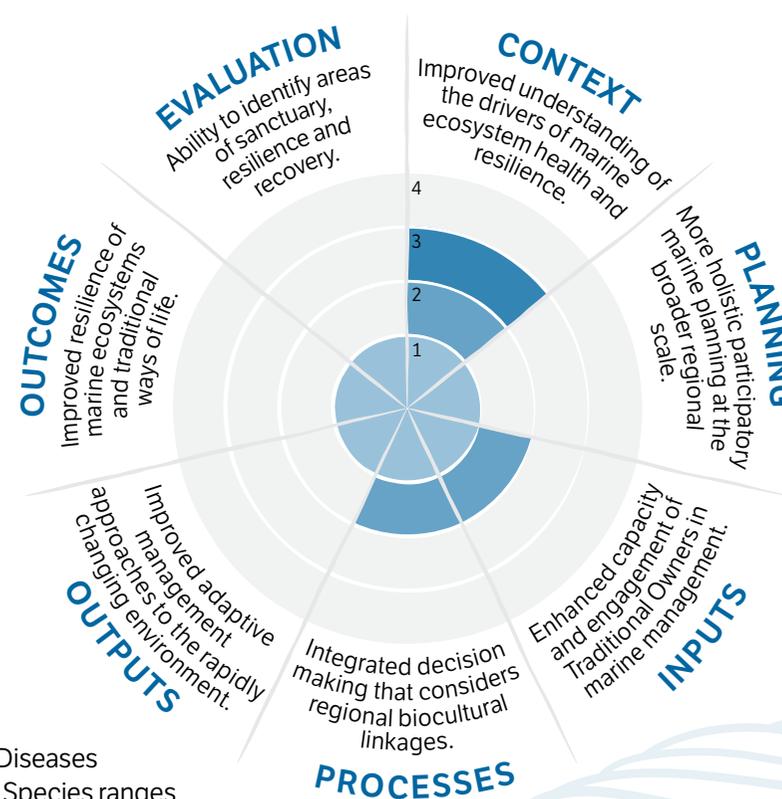
Major shipping lanes through the region make it vulnerable to the introduction of marine pests and diseases. Diseases affecting marine plants and animals are likely to increase with global warming and further declines in habitats. Species ranges are shifting as they adapt to future climate conditions also has the potential to introduce more pests from areas to the north.

What could happen?

Current climate projections, exacerbated by other local pressures and increasing levels of marine pollution, paint a bleak future for the future health of the world's oceans. Further ocean acidification, sea level rise, warmer sea surface temperatures and extreme weather events are likely to contribute to an intensification of coral mortality and further population decline. The scale, severity, and frequency at which these impacts are occurring is affecting the ability of marine ecosystems to recover from repeated disturbances and diminishing their resilience.

The health of sea country is going to continue to decline due to a changing climate. The future focus will be on strengthening partnerships to accelerate efforts to reduce global greenhouse emissions and influencing practice change at global and regional scales, together with maintaining the health and functionality of local marine ecosystems.

While we have a good understanding of system wide drivers, management needs to be directed towards understanding the local implications of environmental change for communities and the region's ecological integrity, while reducing pressures where we can and building resilience in priority species and ecosystems.



"The land is an extension of the sea, the sea is an extension of the land and they are both an extension of us."

Thomas Mooka



MARINE WATER QUALITY

Good water quality is essential to support healthy marine ecosystems and sustainable communities across Torres Strait. Water quality considers pollutants such as oil and plastics, and the physical, chemical, and biological characteristics of the water including oxygen content, temperature, and pH.

Water quality in the region is influenced by complex oceanography, including strong tidal currents, irregular bathymetry (water depth) offshore upwelling and circulation in the adjacent Coral Sea, northern Great Barrier Reef continental shelf, Gulf of Papua, and Gulf of Carpentaria. The geographic location of the Torres Strait places it at risk from the impacts of shipping, downstream impacts of mining, and land uses in Queensland and PNG.



PRIMARY THREATS



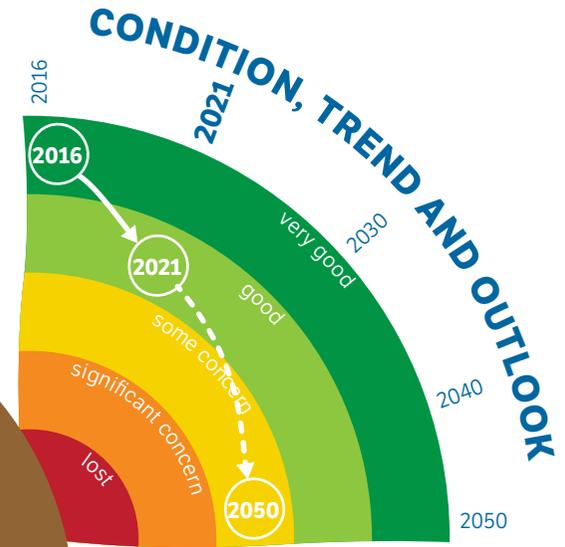
Climate change

- ocean acidification
- increased water temperatures
- more intense and variable weather



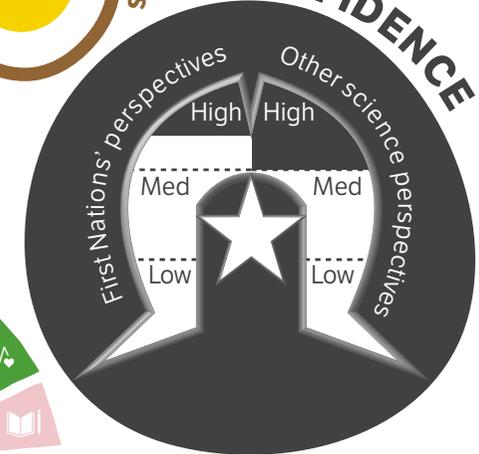
Unsustainable resource use

- habitat alteration
- resource extraction
- pollution
- shipping incidents



THREAT STATUS
Medium

CONFIDENCE



RELEVANT UN SDGs



What is already happening?

Local island waste management practices (including sewage and solid waste disposal) are improving but are still a key source of local marine pollution. Plastic pollution and marine debris (including ghost nets) pose significant concerns to island communities and threaten marine life. TSRA is actively fostering partnerships between communities, rangers and NGOs (e.g. Tangaroa Blue) to collect, analyse, remove and seek to prevent plastic (and other waste) from entering the ocean at its source.

Despite the Torres Strait being declared a Particularly Sensitive Sea Area (PSSA) in 2005, the transit of ships travelling between the Indian and Pacific Oceans through the region remains a significant and increasing threat. While the likelihood of a major shipping incident may be low, the consequences for the region, its ecosystems, people and economy, are potentially extreme. There have been over 20 separate shipping incidents reported since 1970, and over 3,300 transits are made each year through the region. TSRA has driven an effective partnership with the Australian Marine Safety Authority, Marine Safety Queensland, and Local Government to better understand and respond to the social and ecological risks of shipping incidents.

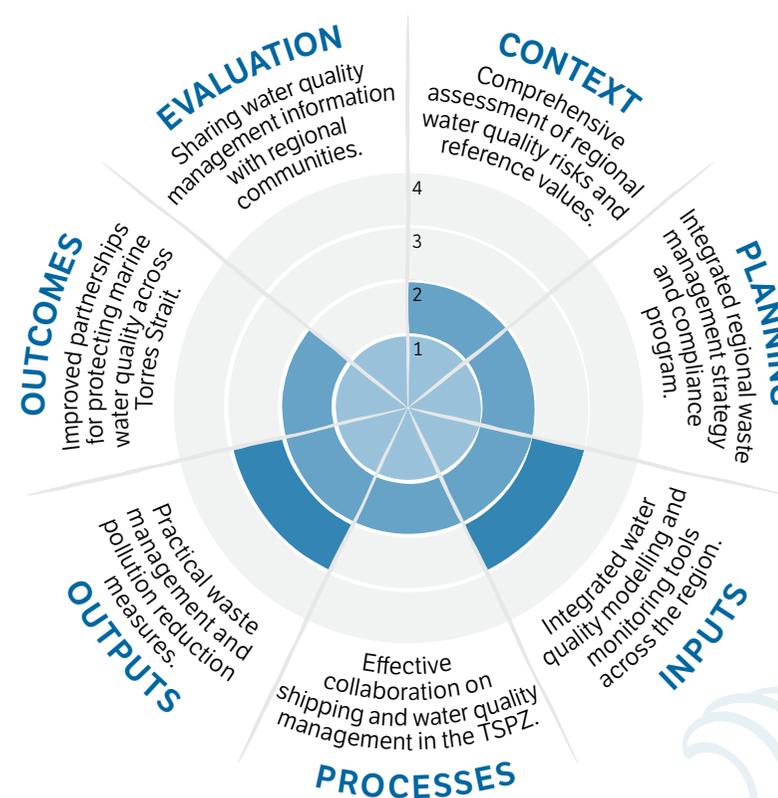
Increasing development, population pressures, resource extraction and more intensive land use practices in the Western Province of PNG are of growing concern. Under certain tidal and weather conditions, plumes of brackish and turbid water from the Fly River (and other local PNG river discharges) may extend into the northeast of Torres Strait. Trace metal concentrations are generally very low in the south and slightly more concentrated towards the north.

What could happen?

Plastics have become the most ubiquitous form of marine debris globally. Micro and other forms of plastics, pose a grave risk to the health of the world's oceans, including in the relatively clean waters of Torres Strait. Certain species, such as turtles, fish, whales, and birds, face growing risks related to entanglement, habitat degradation and ingestion of plastics.

The region's limited oil spill response capacity, remoteness, complex currents, and extensive reef networks mean that shipping poses a major and growing threat to the region's water quality, environmental values, and liveability.

Ocean acidification is likely to become a bigger risk to water quality over coming decades under a business-as-usual greenhouse gas emissions scenario, with adverse impacts on corals and other marine ecosystems within the region. It impairs the ability of marine animals to build and maintain their protective shells and skeletons, which could have major consequences for marine biodiversity and supply of coralline sand for beaches across the region. The impacts of global warming are a more immediate threat with marine heatwaves already causing substantial loss of corals. The warming of the region's waters also reduces the amount of oxygen the water can carry, posing another risk to the health of marine species.



"Meriam have a saying - 'Let the fish and the sea animals decorate our ocean for our future'".

Falen Passi



CORAL REEFS

Torres Strait has one of the most globally intact, diverse, and interconnected coral reef systems, with 1,200 coral reefs forming the northern extreme of the Great Barrier Reef and the southern corner of the Coral Triangle, the global centre of coral biodiversity. The condition and outlook for coral reefs is directly connected to marine ecosystem health and are highly vulnerable to global drivers of change.

There is emerging evidence that the region's deeper eastern waters may be a globally significant thermal refuge and biodiversity hotspot for coral reefs in a changing climate due to a cooler water upwelling. The most easterly reefs are listed as part of the global 50 Reefs Initiative. Given these reefs form part of the Great Barrier Reef, which the IUCN in its 2020 Outlook Report assessed as being in 'critical' condition, the eastern Torres Strait reefs could be of increasing importance in coral restoration efforts.

Reefs occur throughout Torres Strait. They are more prevalent in the clearer eastern waters, while in the west, the reefs are rockier with lower coral cover and high algal and seagrass growth. Reefs act as a barrier, sheltering islands, and support a diverse range of culturally and economically significant species.



PRIMARY THREATS



Climate change

- ocean acidification
- more intense and variable weather
- increased sea temperatures
- changes to currents
- sea level rise



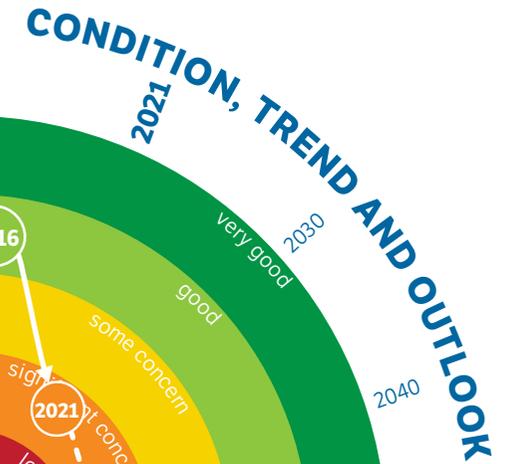
Unsustainable resource use

- habitat alteration
- resource extraction
- pollution
- shipping incidents



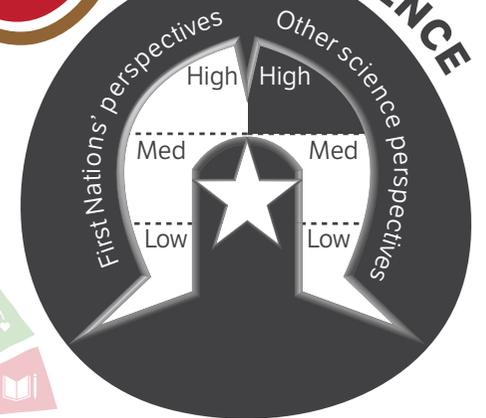
Problematic introduced and native species

- Crown-of-Thorns Starfish
- disease



THREAT STATUS
Very high

CONFIDENCE



RELEVANT UN SDGs



What is happening now?

Our rapidly changing climate and its impacts on marine ecosystem health is the biggest threat to coral reefs globally. Of concern are ongoing shifts in coral species composition on reefs and changes in coral recruitment due to the increased frequency of extreme climate-driven events. Increasing sea temperatures resulting in marine heatwaves is a major cause of coral stress and death. Reefs in central and western Torres Strait were impacted by the global bleaching events in 2016, 2017 and 2020.



The full extent of these impacts is unknown as there has been little monitoring of reefs in Torres Strait since the 2016 bleaching event. However, as of 2021, monitoring of critical coral reef sites has been re-instigated. Broader regional monitoring of coral reef health, and its integration with traditional ecological knowledge and observations, remains a priority.

Prior to catastrophic losses of corals in 2016, coral reefs were assessed to be in good condition in 2015 with high coral cover and species diversity, and minimal incidence of disease. The presence of Crown-of-Thorns Starfish (COTS) was recorded on all surveyed sites, with densities of possible concern around Erub and Mer. Surveys in 2021 over the eastern reefs (where coral cover remains high) observed COTS in significant numbers.

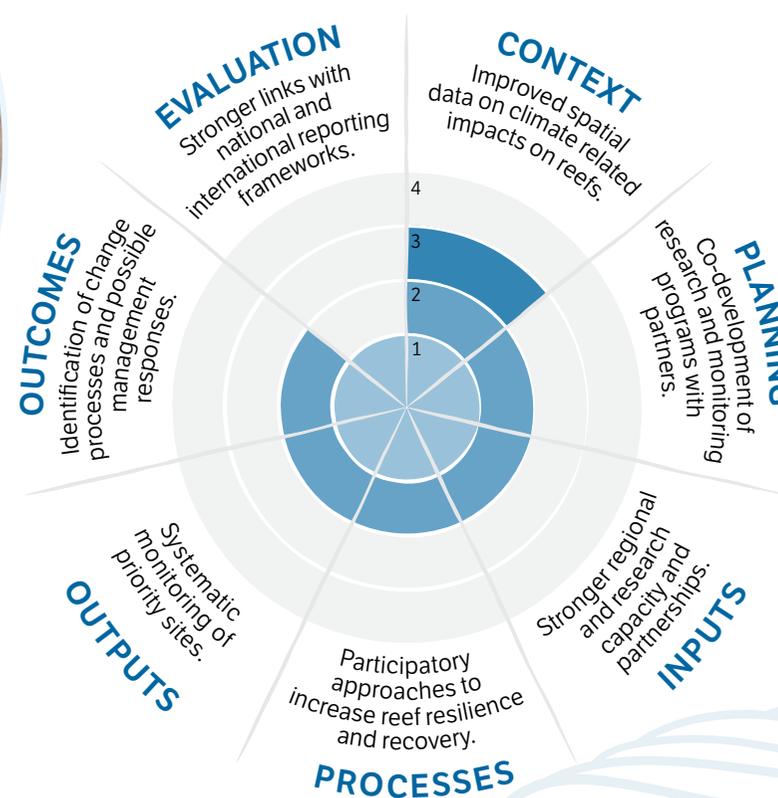
Given indications of declines in local coral species diversity, recruitment, and poor recovery from the 2016 mass bleaching event, the 2021 condition for coral reefs is assessed to be of 'significant concern'.

What is likely to happen?

General coral reef condition is expected to decline further in line with global trends based largely on climate projections. The role of eastern Torres Strait as a potential thermal stress refugia for coral reefs is likely to become increasingly significant.

Increased ocean acidity and warmer temperatures, exacerbated by more intense storms and extreme weather events, are likely to compromise coral reefs' ability to act as 'barriers' protecting islands. In turn, this will impact their capacity to support the diversity of marine life which make them iconic and critical to the health and wellbeing of First Nations peoples in Torres Strait and millions of people worldwide.

Strengthening partnerships with key research organisations, such as the Australian Institute of Marine Science (AIMS), and implementing technological advances in monitoring will remain a key focus.



"Despite the best efforts of Reef managers around the world, business-as-usual approaches to Reef management are no longer enough. The impacts of climate change mean that the scale and urgency of the challenges need new approaches, right now."

Great Barrier Reef Foundation



SEAGRASS MEADOWS

Torres Strait seagrass meadows are among the world's largest, covering over 13,000km². They are a primary driver of ecosystem productivity and play a significant role in cycling nutrients, stabilising sediments, improving water quality and carbon storage. They support high species diversity, are critical to sustaining traditional and commercial fisheries, and are an essential food source for the iconic and culturally significant dugong and green turtle. Torres Strait *Ailan Kastom* is deeply connected to and underpinned by the health of this critical habitat.

Seagrass habitats are ideal indicators for marine health as they are sensitive to environmental change. The natural variability of seagrass meadows can be very high. Occasional or dramatic loss of seagrass meadows has been recorded in Torres Strait over recent decades. Recovery times can range from months to decades, depending on the presence of a viable seedbank, high environmental connectivity and a lessening of drivers causing the declines.



PRIMARY THREATS



Climate change

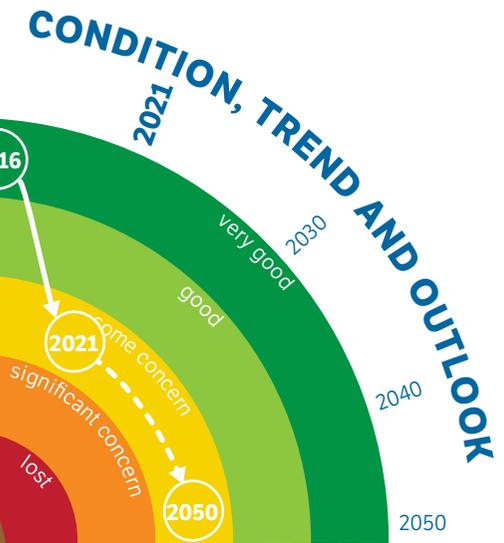
- more intense and variable weather
- increased sea temperatures
- changes to currents
- rising sea level



Problematic introduced and native species

- disease

Medium

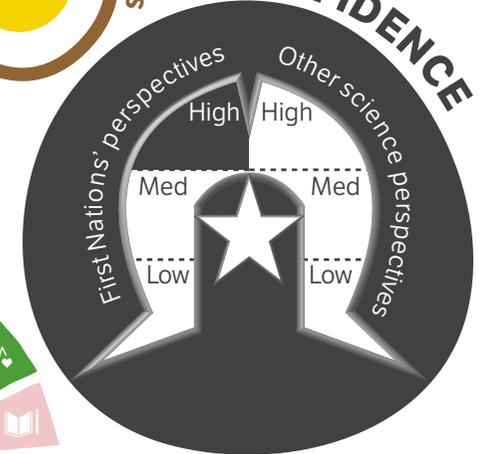


THREAT STATUS

RELEVANT UN SDGS



CONFIDENCE



What is happening now?

Information collected by rangers undertaking long-term monitoring programs (over intertidal seagrass meadows) and local Indigenous knowledge is being integrated with recently expanded scientific research and monitoring programs in the region.

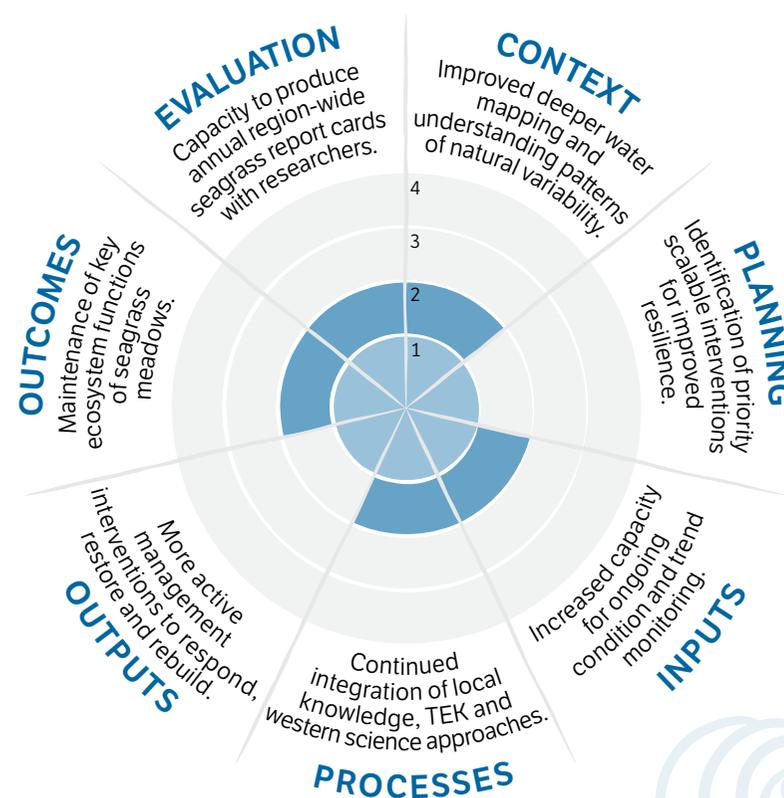
Between 2018-2021, dramatic declines in seagrass condition were observed in western Torres Strait. Declines occurred across a range of intertidal reef-top, island and deep-water seagrass communities. Causes being investigated include changes in wind patterns affecting tidal exposure and sediment movement, increased dugong and green turtle feeding density, and seagrass disease. Localised declines were not detected elsewhere, and the condition of seagrass was found to be moderate to good in most areas.

What could happen?

Seagrass condition is affected by changes in environmental conditions (e.g., rainfall, wind, temperature, benthic light, tidal exposure), extreme events (e.g. cyclones, marine heat waves), migratory patterns and abundances of herbivores such as green turtle and dugong, and disease. These factors often interact and are being exacerbated by accelerating changes in climate.

Managing seagrass threats requires a system-level understanding of changes at local, regional, and global levels to ensure that actions are appropriately targeted (e.g., water quality improvement or controlling damaging human activity).

Any large-scale loss of seagrass meadows would have wide-ranging effects in Torres Strait and beyond. Impacts would flow through the ecosystem, affecting species that are dependent on seagrass for habitat, food, and other ecosystem services. It would have far-reaching effects for island communities whose consumption of seafood is among the highest globally and whose *Ailan Kastom* is inextricably linked to the health of this habitat and the resources it supports.



"If seagrass die, dugong die, I die and my culture dies."

Johnny Kris

DUGONG

Dugongs are of immense practical, economic, cultural, and spiritual significance to Torres Strait Islander and Aboriginal people living in the region and remain their most highly valued marine food and cornerstone of their traditional subsistence economy.

Torres Strait Islanders are the local custodians of this species and play a continuing stewardship role in sustaining an estimated population of more than 100,000 dugongs in central and western Torres Strait – the largest aggregation globally. This estimate of population is much higher than previous estimates because of improvements in the correction factors for dugongs that are not available to observers in the deeper waters of Torres Strait. The region has been declared an Important Marine Mammal Area largely because of its globally significant dugong population. Due to their migratory nature, dugong conservation requires a coordinated effort across northern Australia and neighbouring countries.

The region's dugong population is supported by globally significant seagrass meadows and includes the 13,000km² Dugong Sanctuary. However, since 2018 there has been significant decline in some seagrass habitat, particularly in Western Torres Strait. Dugongs are vulnerable to climate change due to their total dependence on seagrass – with an adult dugong eating up to 40kg a day.

Dugongs are susceptible to climate-related changes in environmental conditions, the loss and deterioration of seagrass habitats, chemical pollution, and local threats such as incidental catch in fishing gear, boating activities, non-traditional take, and illegal fishing. Torres Strait is not immune to these pressures and although their effects on the region's dugong population is currently unknown, the outlook is one of some concern.

There has been limited dugong monitoring in the region since 2013. Consequently, the state of dugong needs to be viewed in the context of the system-wide declines occurring in marine health, water quality and regional habitats. There is a critical need to re-institute periodic aerial surveys to better understand factors influencing dugongs and trends in their abundance, breeding and mortality rates and movements.



PRIMARY THREATS



Climate change

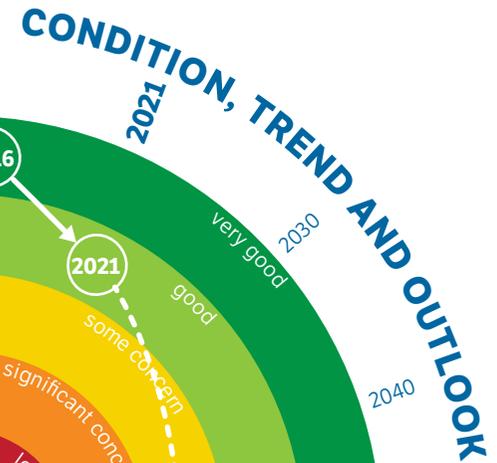
- more intense and variable weather
- rising sea level
- increased sea temperatures



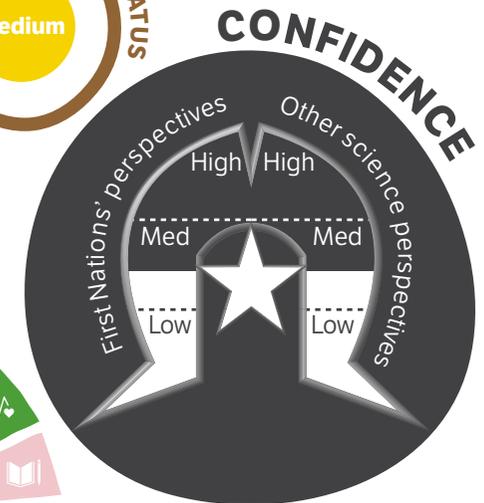
Unsustainable resource use

- habitat alteration
- resource extraction
- pollution
- shipping incidents

Medium



THREAT STATUS



What is happening now?

Within Torres Strait, efforts are focussed on strengthening the implementation of community-based management plans. These plans underpin the sustainable management of dugongs in the region based on Lore and law. Traditional Owners oversight the implementation of management plans in partnerships with rangers, researchers and fisheries management agencies, including through bilateral processes under the Treaty between PNG and Australia. The TSRA compliance team has supported capacity building with rangers for local-scale monitoring, critical surveillance and incident reporting.

An evaluation of the status of dugong in Torres Strait in 2015 indicated that dugong relative density was significantly higher in 2013 than in any other survey year and their area of occupancy has trended slightly upward since 1987. The proportion of calves in 2013 was the highest recorded. Genetic diversity is high.

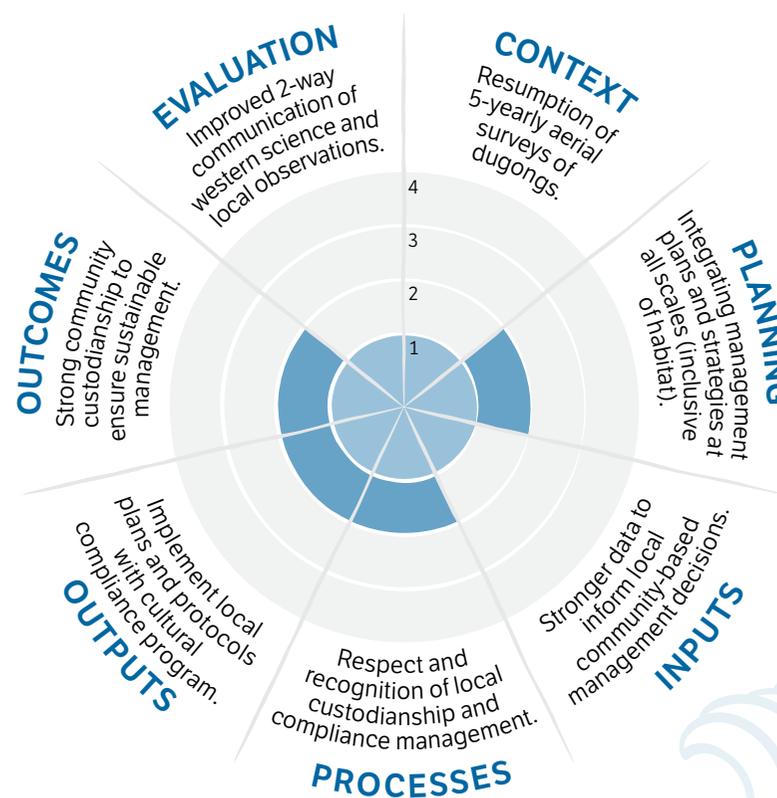
There are mixed anecdotal local reports of recent changes in the health and movement patterns of dugong across the region. Generally, more dugong have been observed close to island communities in western Torres Strait. However, local assessments of the number, sex and health of adult dugong and calves have been varied. These observations are generally consistent with widespread seagrass dieback and have been observed before, particularly in the 1970s.

What could happen?

Sustainable traditional harvest of dugongs within the region depends on successful, ongoing community-based management and compliance efforts that are aligned with *Ailan Kastom* and traditional governance structures, as well as the responsible traditional take of dugongs by neighbouring PNG communities.

In the medium to longer term, climate forecasts of sea level rise, increased severe storms, flood events and marine heatwaves leading to altered environmental conditions and changes in seagrass habitats are likely to affect dugong populations globally – as well as in Torres Strait.

A reduction in the dugong population within the region would have significant impacts on the region's marine ecosystems, subsistence, cultural values, and social fabric of Torres Strait communities, and would represent a huge loss to the world's marine biodiversity.





MARINE TURTLES

Six of the world's seven species of marine turtle (green, hawksbill, loggerhead, flatback, leatherback and olive ridley turtles) feed, nest and/or migrate through Torres Strait.

Marine turtles are an important feature of the natural and cultural landscape, and the region provides important refugial habitat for certain stocks. The region contains one of the largest remaining nesting populations of hawksbill turtles globally, and various cays on the fringe of the Torres Strait comprise the largest remaining rookery in the world for green turtles.

Marine turtles play an important ecological role in the region, contributing to food webs and nutrient cycling in seagrass meadows and coral reef ecosystems. Turtles feature prominently within the knowledge systems, customary laws and livelihoods of local traditional communities, and play a significant role in the region's traditional subsistence economy. Leatherback and olive ridley turtles are the least abundant and are not known to nest within the region.

Turtle populations are especially vulnerable to threats because individuals take decades to reach maturity, there is high natural mortality of young, they have strong loyalty to nesting and foraging areas, and migrate over long distances to breed. They use beaches and marine environments to complete their lifecycle, which makes them particularly vulnerable to predation, hunting, egg harvest and bycatch. Marine turtles also have characteristics that contribute to population resilience, including each population being supported by multiple breeding locations and widely dispersed foraging populations.

Community-based turtle and dugong management plans remain the cornerstone of local marine turtle protection and management efforts by Traditional Owners.



PRIMARY THREATS



Climate change

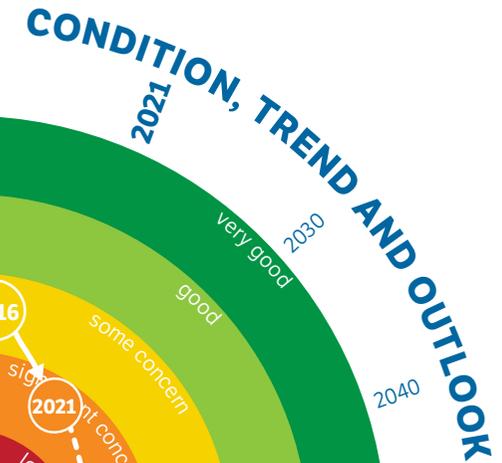
- more intense and variable weather
- increased sand temperatures
- changes to currents



Unsustainable resource use

- habitat alteration
- resource extraction
- pollution
- shipping incidents

Very high



THREAT STATUS

CONFIDENCE



RELEVANT UN SDGS



What is happening now?

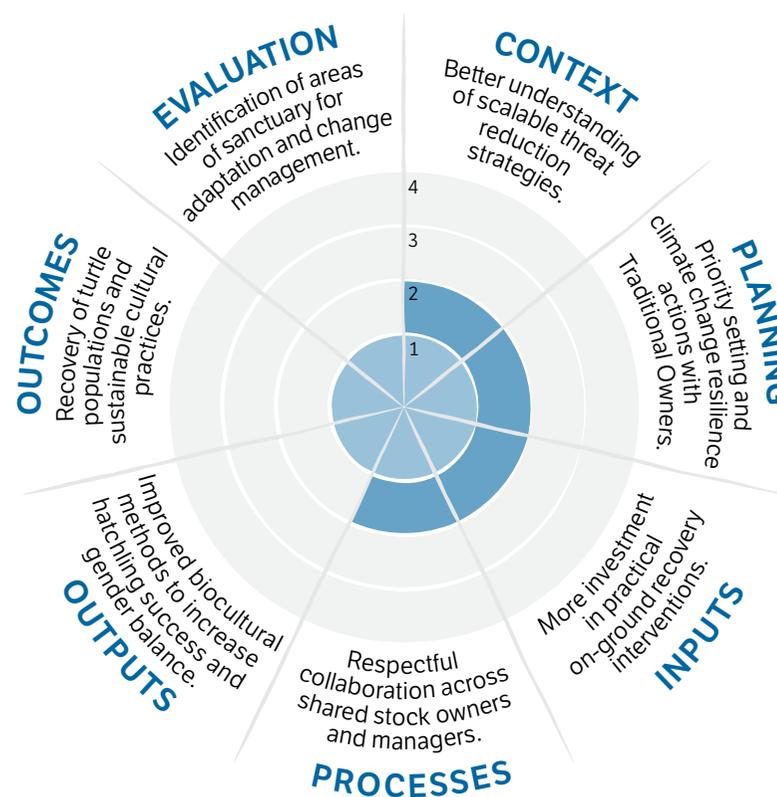
Marine turtles are in decline globally and all six of these migratory species are listed as 'vulnerable' or 'endangered' under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). In Torres Strait, their condition has declined from 'some concern' in 2016 to 'significant concern' in 2021 due to low levels of nesting and hatchling success for green turtles, concerns that very few male hatchlings are being produced, and poor recruitment of juvenile turtles to foraging grounds – leading to similar concerns for other species as well.

Climate change poses the greatest threat with sea-level rise, altered weather patterns and increased sand and water temperatures impacting nesting and hatchling success and feeding grounds. Warmer sand produces a higher proportion of female hatchlings, and there is concern that the number of males in the population is rapidly dwindling, which could lead to catastrophic declines.

Additional information is needed for Traditional Owners to decide how to best reduce threats and produce more male hatchlings. This will build on lessons from the Raine Island Recovery Project undertaken in partnership with the Kemer Kemer Meriam people.

What could happen?

A major decline in the northern Great Barrier Reef (and Torres Strait) population of green turtle is predicted to occur in the next 20-30 years, due mainly to the collapse of hatchling success at Raine Island, where more than 90% of this population nest. A continued decline in turtle populations is expected unless immediate additional actions are taken to mitigate climate change and other impacts. Continued low hatchling success and extreme feminisation will have a catastrophic impact on turtle populations and the future health and well-being of Indigenous culture across the region.



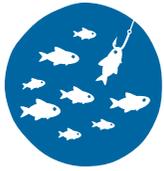
Future actions will need to enhance protection of existing high priority nesting and feeding sites, identify and safeguard potential future sites, protect adult males from traditional take, improve nesting and hatchling success at key rookeries, continue trialling and monitoring of management interventions (such as methods to cool nesting beaches), reduce ghost nets and marine debris, and increase education and awareness of the dramatic decline in the northern Great Barrier Reef green turtle population and required recovery actions.



TORRES STRAIT STATE OF ENVIRONMENT REPORT CARD 2021

"Only one in 1,000 green turtle hatchlings will reach maturity."

Department of Environment and Science, Raine Island Recovery Project



SUBSISTENCE FISHING

Subsistence, or customary, fishing is central to the Torres Strait way of life. Traditionally, Aboriginal and Torres Strait Islander people have hunted, fished, and harvested a wide range of marine species for subsistence and cultural purposes, using a variety of methods that are managed under regional and community-based arrangements.

Management of Torres Strait fisheries is complex. Overlaying traditional fisheries practices and protocols are a series of government-led management arrangements through the Protected Zone Joint Authority (PZJA) and Torres Strait Treaty. Commercial fisheries (including tropical rock lobster, finfish and beche de mer) are managed separately from traditional subsistence fisheries (including dugong, turtle and other non-commercial species, such as clams). In the finfish and rock lobster fisheries, traditional catch is prioritised over commercial take, with estimated non-commercial take subtracted from the total allowable catch. No limits are set on traditional take in these fisheries.

Subsistence fishing is traditionally the domain of women and children, and consequently they have an intimate knowledge of home reefs and systems that can help to provide a strong indication of the health of local subsistence fisheries and the customary practices they support.



PRIMARY THREATS



Climate change

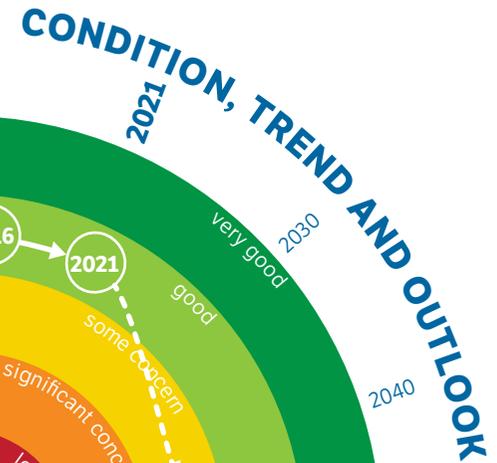
- o rising sea level
- o ocean acidification
- o more intense and variable weather
- o increased sea temperatures
- o changes to currents



Unsustainable resource use

- o resource extraction
- o pollution
- o habitat alteration
- o shipping incidents

Medium

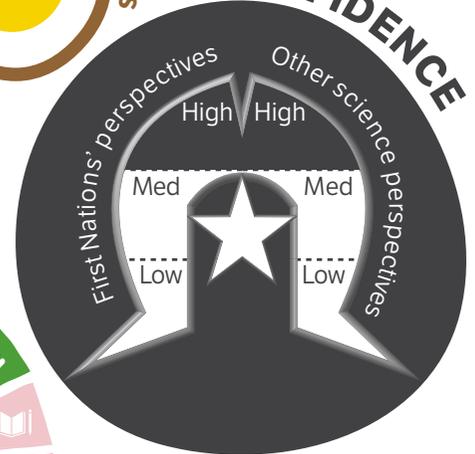


THREAT STATUS

RELEVANT UN SDGS



CONFIDENCE



What is happening now?

Regional and community-based management arrangements govern the key aspects of traditional use of marine resources, including the sustainable harvest of dugongs and marine turtles (classified as traditional subsistence fisheries under the *Torres Strait Fisheries Act 1984* (Cth)).

Rangers work closely with community native title bodies, Traditional Owners and hunters to implement community-based dugong and turtle plans using both customary and contemporary mechanisms to ensure sustainability. TSRA Rangers support culturally appropriate compliance with these Traditional Owner endorsed plans, reinforcing *Ailan Kastom* and traditional governance systems and ensuring strong linkages with regulatory frameworks and partner agencies.

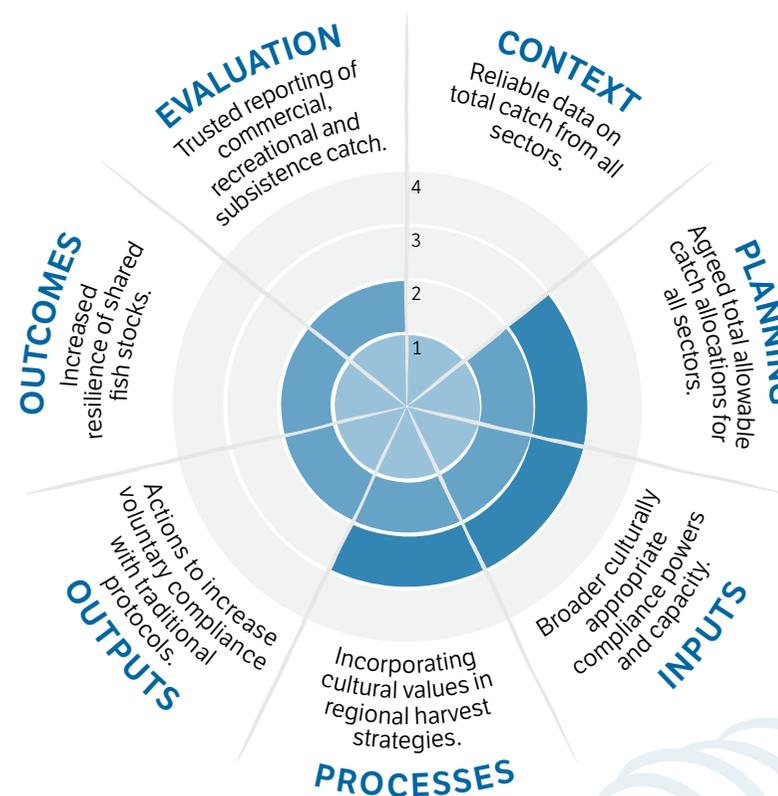
There are some tensions between commercial, recreational and subsistence fishing across Torres Strait, particularly in instances where there is overlap in the areas or fisheries targeted, and traditional protocols or community expectations are not complied with. The impacts of recreational fishing (by non-Indigenous people) tend to be concentrated around the Kaiwalagal (Inner Islands) area. The increasing tourism and population base around the Inner Islands, and pressures associated with recreational fishing, development, pollution, shipping, infrastructure, and lack of management capacity, exacerbate these tensions. Within island communities, the cultural dimensions of subsistence fishing are also changing rapidly with uptake of new technologies (e.g., freezers) and alternative food supplies. Currently there is very little data on the non-commercial take in the region.

What could happen?

Climate change and associated loss of coral reef and sea grass habitats is a significant risk for tropical fisheries with long-term declines in diversity and abundance expected. Fish stocks targeted by commercial, recreational and subsistence fishing are likely to be most vulnerable. Adaptive approaches, based on improved knowledge of system-wide changes combined with customary management tools such as spatial and seasonal closures, will become increasingly significant.

Pressures from large-scale fishing ventures operating in neighbouring jurisdictions or increases in illegal foreign fishing activity within the Torres Strait Protected Zone, could lead to further cumulative impacts on traditional subsistence fisheries.

There is potential for women to be increasingly recognised for their special knowledge and role in subsistence fishing in communities.



"Through our Traditional Owner representation and experience in the sustainable management of our commercial fisheries, there has been a growing appreciation and sense of responsibility for our need to also measure, monitor and manage our subsistence fishing, as custodians of our marine resources for future generations."

Kenny Bedford

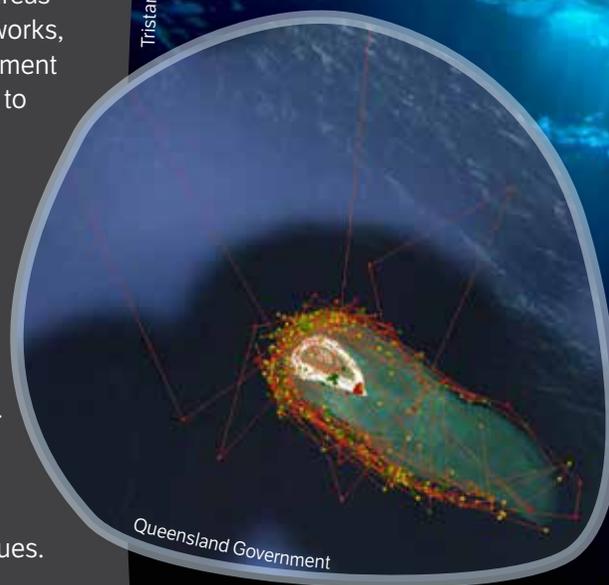
MARINE TURTLES AT THE CROSSROADS

Marine turtles are fundamental to all aspects of Indigenous culture, customs, and life in Torres Strait. While six of the world's seven species of marine turtle are found in the region, the green turtles of the northern Great Barrier Reef population are of critical importance. Threats to the internationally significant Raine Island rookery from rising sand temperatures and saltwater inundation of nests, potentially makes alternative habitat available in the Kemer Kemer Meriam Nation vital to the future of this species.

Sea-level rise, altered weather patterns and increased sand temperatures are impacting hatchling success and leading to extreme feminisation of the population – with a major population decline predicted in coming decades. As part of the Raine Island Recovery Project, Kemer Kemer Meriam Nation Traditional Owners are working with neighbouring Wuthathi Traditional Owners, government agencies and the corporate and not-for-profit sectors to help restore turtle nesting habitat and reduce the mortality of nesting turtles. These efforts have increased viable nesting areas and hatchling success. However, despite such intervention works, drivers of change on Raine Island require additional management and conservation actions in refuge areas across Torres Strait to ensure the sustainability of our green turtles.

Regional efforts are supporting community-based management interventions to enhance hatchling success, increase the proportion of male hatchlings and reduce overall pressures on the population. Actions balance enhancing protection at existing priority conservation sites and identifying potential alternate sites aimed at 'future-proofing' green turtle nesting grounds in a changing climate. Turtles are highly mobile so management collaboration across their geographic range is essential to their survival. Marine turtles are at a crossroads, and a path to recovery is critical for survival of the species and Indigenous cultural values.

Tristan Simpson



Satellite tracking showing the movement of turtles helps Traditional Owners and scientists understand where turtles feed and nest. This information is vital to identifying and addressing threats to declines in marine turtle populations.

DUGONG CAPITAL OF THE WORLD

Torres Strait is known as the dugong capital of the world. To our people, dugong, or *Dhangal/ Deger*, are central to our culture, communities, ceremonies, our subsistence economy and our spirituality and worldview. Dugong help define who we are and how we connect to our sea country. Across Torres Strait, communities are recognised as the primary custodians of this iconic species. We have sustainably managed dugong for thousands of years and are proud stewards of the largest dugong population on Earth.

Community-based management plans, reflecting customary protocols alongside western science and best-practice management approaches, are now being implemented by Traditional Owners across the region. The plans are endorsed, overseen, and owned by the community and Traditional Owners, and actioned through partnerships with LSMU, rangers, researchers, and fisheries management agencies, including through bilateral processes under the Treaty between PNG and Australia.

Our custodial management approaches are founded on respect for Elders and traditional lore. Rangers play a key role in supporting compliance with domestic environmental laws and assisting Traditional Owners to apply customary lore in relation to the sustainable management of dugongs in Torres Strait.

Toshi Nakata Jr



SAFE HAVENS FOR STRESSED CORALS?

Coral reefs harbour the highest biodiversity of any ecosystem, act as barriers protecting our coastlines and islands, and are critical to human health and wellbeing. They are also one of the most threatened ecosystems on Earth.

The coral reefs of Torres Strait form part of the Great Barrier Reef. Sitting at the northernmost point of the world's largest reef system, research suggests the region could be a biodiversity hotspot. Importantly, sea surface temperature data and modelling indicate cooler summertime water temperatures over the deeper waters of eastern Torres Strait. Along with anecdotal observations of coral health during bleaching events, this suggests the eastern Torres Strait could be an important refugia for corals and the biodiversity of species coral reefs support.

The region has been identified as one of the 50 coral reef areas globally to have the greatest potential of surviving the impacts of climate change and helping repopulate neighbouring reefs over time.

Further ocean monitoring and modelling is required to better understand drivers of sea temperature patterns across Torres Strait. It is also needed to better understand ecological connectivity between Torres Strait and other regionally significant systems, including the eastern Torres Strait's potential role in supplying larvae and aiding coral recovery in adjoining areas.



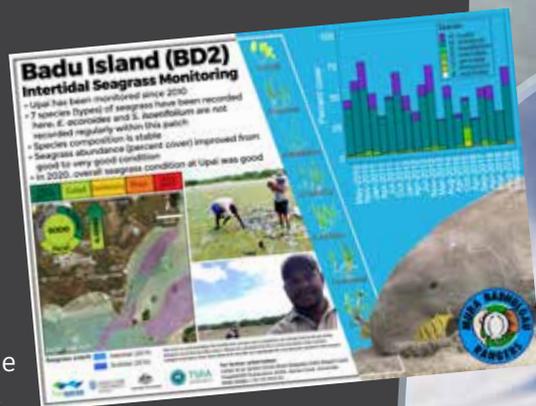
CHECKING FOR CHANGE IN SEAGRASS HEALTH

Torres Strait is home to one of the world's largest seagrass meadows. These highly productive habitats support commercial and traditional fisheries, significant dugong and turtle populations, and play an important role in recycling nutrients, stabilising sediment, improving water quality and storing carbon.

Seagrasses are an integral part of the natural and cultural landscape on which *Ailan Kastom* is founded and underpin the health and wellbeing of First Nations peoples in Torres Strait. Records of local Traditional Ecological Knowledge combined with expanded scientific research and monitoring programs are constantly improving and provide a shared understanding of seagrass health in the region.

Although extensive seagrass meadows remain, significant dieback has been observed in some western areas around Mabuyag Island and Orman Reef in 2019 and 2020. Surveys by James Cook University (JCU) and LSMU in the protected Dugong Sanctuary show substantial seagrass declines between 2018 and 2020.

These results suggest a declining trend and highlight the need to build on long running monitoring with more active management interventions to respond, restore and rebuild seagrass health. In 2020, the LSMU designed an ongoing screening program for possible disease with the Department of Agriculture, Water and the Environment (DAWE) Biosecurity lab in Cairns. Other potential causes of decline under investigation include changes in wind patterns affecting seagrass exposure and sediment movement, and increased dugong and turtle grazing pressure.



FIGHTING FLOTSAM, JETSAM, AND OTHER MARINE DEBRIS

Reducing marine debris across Torres Strait is the focus of a combined effort by LSMU, Tangaroa Blue, Clean-Up Australia, local governments, and schools. Human-made materials like ropes, plastic bottles and bags, glass and garbage often end up in our oceans where they become a danger to marine wildlife. This includes ghost nets and fishing lines that entangle and kill dugongs, turtles and sea birds, and debris such as plastic bags, that is mistaken by animals as food.

Together, the LSMU and partners work with local Islander communities to raise awareness and reduce the impacts of marine debris by organising beach clean-ups and engaging with schools. These initiatives promote recycling and reusable products and are reducing the flow of waste entering surrounding waters. Marine litter, much of which comes from passing ships or regional mainland neighbours, is regularly collected during coastal clean ups. In a community-driven initiative, residents on the island of Poruma often collect marine debris on their daily morning walk around the island.



TSRA



ADAPTING TO CLIMATE CHANGE

As island and sea people, Torres Strait islanders are very in tune with the ebb and flow of our local environment. The changes we are starting to experience are at odds with our traditional knowledge of the seasons passed on by our forefathers. This growing uncertainty is of great concern for us. My personal introduction to the negative impacts of climate change began in the early 1990s when more and more Elders, particularly on the central sand cays and north-western swamp islands, were expressing concern about their eroding shorelines. In more recent times, we see our coasts increasingly eaten away by the sea on all islands to varying degrees and worry about how much of our homelands might disappear beneath the waves in the future due to climate change. Our country and our culture are so interconnected that you cannot lose country without losing culture and with that, our identity as Torres Strait peoples. Our older people worry about what all this means for their children as well as things like ancestral graves.

Our region, its people and environments sit at the front line of climate change impacts. How are we meant to respond to this threat that comes to us from beyond our shores? How many species and cultural connections must be impacted upon or lost before the world gives this issue the action it needs?

Whilst recognising that these impacts are primarily caused by events and factors happening in other parts of our planet far away from our remote region, Islander communities are becoming more actively involved in making positive plans to deal with climate change issues at a local level.

Vic McGrath





HEALTHY LAND ECOSYSTEMS

The 300+ islands of Torres Strait were formed through a variety of coastal and geomorphic processes, and contain some of Australia's most iconic flora and fauna. From a global perspective, the islands of Torres Strait are significant dispersal and migratory steps for flora and fauna between Australia and New Guinea.

Island land ecosystems are shaped by generations of continuous traditional land use across the four island types (continental, coral cay, mud and volcanic). As such, there is significant variation across the region, and each island forms its own unique biocultural landscape. The health and resilience of these landscapes is of critical importance to the people of Torres Strait. The composition, significance, and management needs of Torres Strait terrestrial ecosystems within these landscapes are well documented, and there is a depth of local knowledge about how best to manage the islands. Nevertheless, there are knowledge gaps which have been identified.

As human-managed biocultural landscapes, the land ecosystems of Torres Strait are in various states of condition. Condition is influenced by multiple factors and impacts are varied. Some landscapes remain intact, stable and functional due to a long and continued history of sustainable management coupled with remoteness. Others are in various states of transition in response to complex inter-relationships around changing land use, recovery from historic impacts, or current and emerging threats. These threats include degradation by weeds and pest animals, changes in traditional land use, loss of cultural fire practices, loss of vegetation cover and habitat through coastal erosion and seawater inundation from climate change. Saline contamination of ground water is of concern to some island communities and landscapes. Effective threat management requires collaboration among people with in-depth local knowledge and scientists with expertise in threat management.



PRIMARY THREATS



Climate change

- increased fire risk
- more intense and variable weather
- rising sea level
- increased air temperatures



Unsustainable resource use

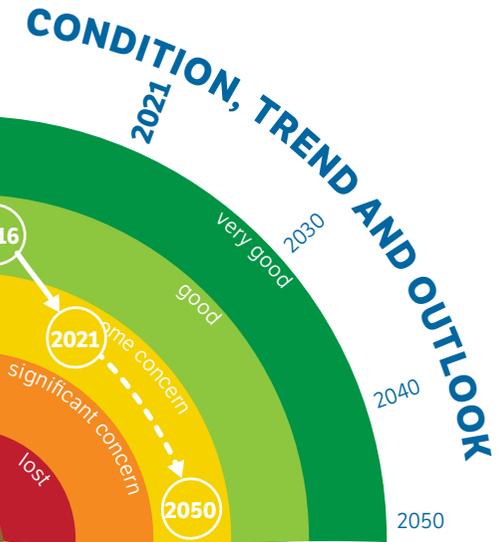
- habitat alteration
- pollution
- shipping incidents



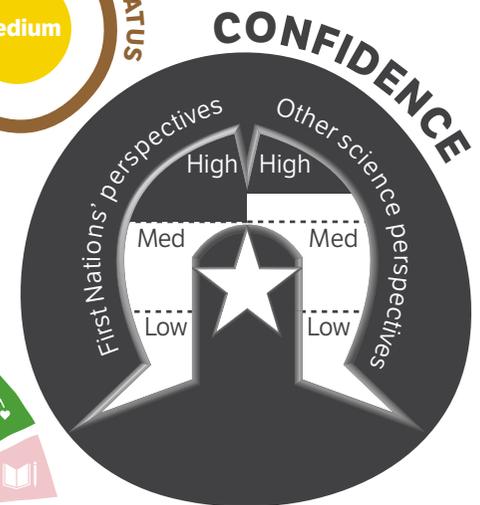
Problematic introduced and native species

- pest weeds
- feral animals

Medium



THREAT STATUS



What is happening now?

Baseline biocultural and ecological surveys have been completed on 43 islands since 2014. These surveys have increasingly focused on integrating local TEK to inform and guide survey methods, with the findings communicated back to Traditional Owners in a range of mediums. Surveys provide an opportunity for Traditional Owners and rangers to lead and work alongside ecology specialists to identify values, management issues and to develop solutions. These processes provide a baseline for ongoing monitoring of landscape condition and health and are developing a network of monitoring stations across the region. Importantly Traditional Owners and rangers are continually building capacity to develop and drive the integration of TEK and western science and to deliver benefits for communities.

Revegetation programs underway on Yarpar, Warraber, and Poruma are addressing the impacts of coastal erosion and historic deforestation and are increasing community amenity and fauna habitat through shade tree plantings in and around communities.

A biosecurity plan for all inhabited islands was developed in 2018 to guide management of invasive species. Pest animal management programs are active for 11 islands and weed management is ongoing on many islands across the region. Feral horse and pig control is being implemented on Mua. The impacts of feral rats, feral pigs, and feral cats on target islands remain of significant concern. Monitoring is currently active as is the development and actioning of management solutions.

Three Indigenous Protected Areas (IPAs) incorporating 20 uninhabited islands have been established and are managed to protect areas of high cultural and biodiversity significance. Protected areas under Queensland legislation occur on Booby, Possession and Erobac, and Raine Islands. Raine Island National Park (Scientific) is managed in partnerships with the Wuthathi and Kemer Kemer Meriam Traditional Owners.

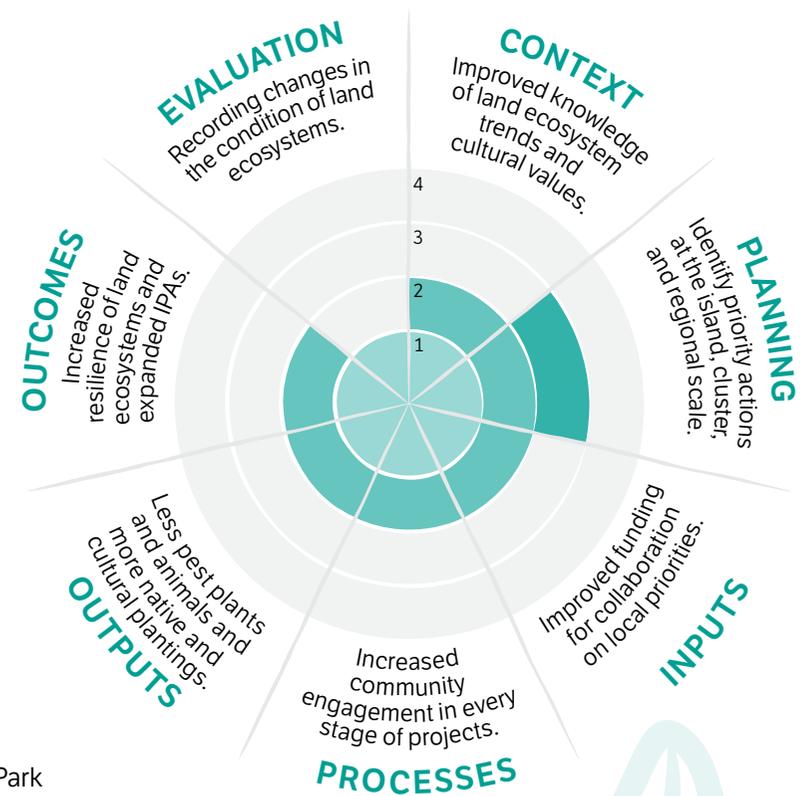
The Bramble Cay melomys (*Melomys rubicola*) was declared extinct by the Australian Government in 2019 – the first extinction of a mammal species due to anthropogenic climate change – proof that species can be lost quickly and silently.

What could happen?

Australia's northern border with Indonesia and PNG is recognised by health and biosecurity authorities as a potential route for the entry of exotic species and diseases into Australia. With community support and additional investment, many invasive species can be better controlled or even eradicated from the islands of Torres Strait.

Reassessment of fire regimes to reduce negative fire impacts on sensitive land ecosystems remains a priority. On some larger continental islands, reinstating traditional mosaic burning may be appropriate.

Increased capacity to regularly monitor and assess land ecosystem health would significantly enhance local community capacity to detect and respond to climate change and other impacts. Expansion of the Indigenous ranger program is required to ensure that land (and sea) ecosystem health is maintained and improved.



“Na ngalpun mura mabaygal zageth ngalpun goegyathka mamuy mayka, a moegi uruyka a bayika thumayawayka
It's everybody's business to keep our community healthy by managing pests and weeds.”

Hilda Mosby



SUSTAINABLE HUMAN SETTLEMENTS

There are 17 inhabited islands and 18 Indigenous communities in the region that support Aboriginal and Torres Strait Islander peoples' continuing connection to their traditional homelands.

Despite challenges associated with remote human settlements in Torres Strait, living on country provides enduring connection and the ability to continue managing land and sea country in line with unbroken traditions and customs. Over 90% of Torres Strait Islanders live outside the region due to limited housing, education, employment opportunities and island carrying capacities.

Primary risks to settlements include tidal flooding, heat stress, water security, sustainability of current infrastructure requirements and over-reliance on imported energy, food, and government services. These risks can vary significantly with small low-lying islands generally more vulnerable than larger islands with higher elevation.



PRIMARY THREATS



Climate change

- rising sea level
- more intense and variable weather
- increased air temperatures



Unsustainable resource use

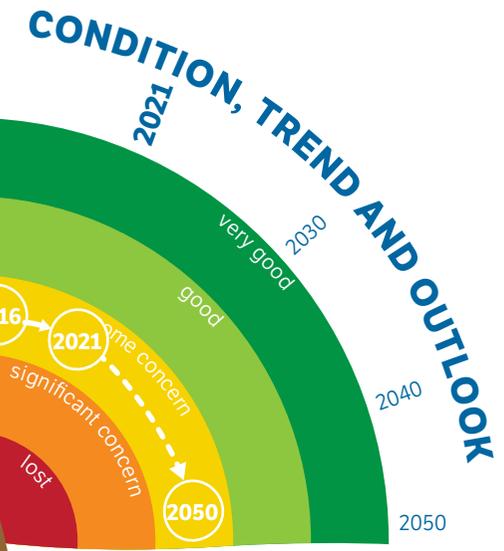
- habitat alteration
- pollution



Eroding of traditional culture and governance

- migration from the region
- loss of livelihoods

High



What is already happening?

Indigenous peoples of the region experience relatively higher levels of poor health and unemployment than urban Australians. Providing culturally appropriate and sustainable housing and addressing the high cost of living remains a challenge across most communities. The region is highly dependent on external support for critical resources and services. The ranger program provides important employment on remote island communities.

Climate change adaptation and resilience planning has improved across the region, and coastal defences installed on six islands is buying some time against rising sea levels. Despite high levels of investment, water supply infrastructure still struggles to meet demand and many communities experience extreme water restrictions for parts of the year (even where traditional wells and household water tanks augment supply).

Approximately 15 megalitres of diesel is used annually by the region's 17 power stations. Despite some uptake of renewable energy options (including two wind turbines on Thursday Island, a solar farm at Poruma and rooftop solar on some community stores and schools) total renewable energy is still below 20% of the region's power generation. A Renewable Energy Transition Plan has been developed to help guide and expedite the region's transition to clean energy, sustainable transport options and improved health outcomes.

What could happen?

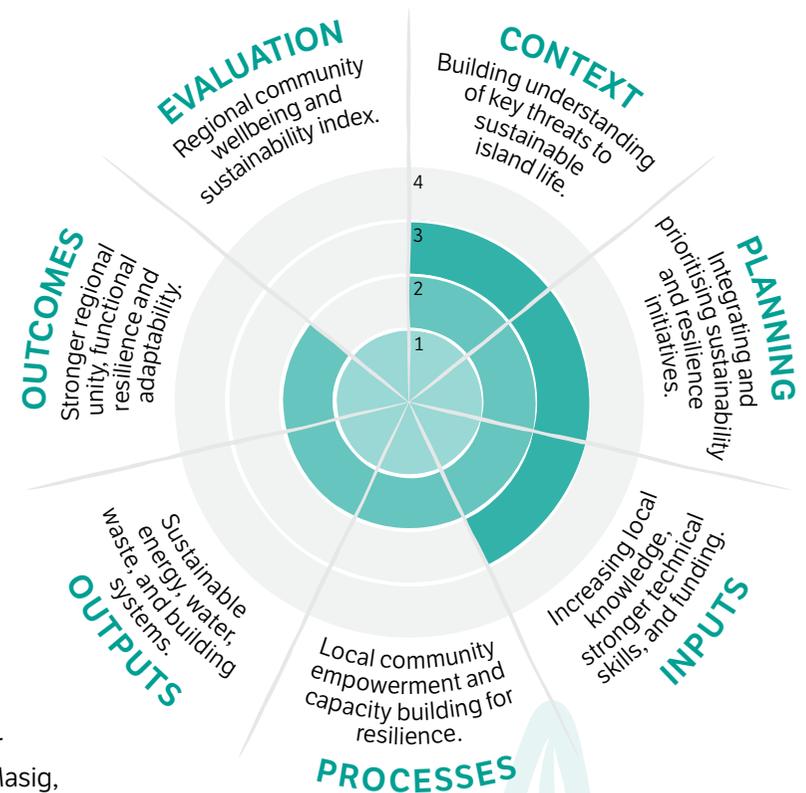
Climate change impacts including increased air temperatures and rising sea levels pose an extreme risk for many communities. Five communities that are already regularly affected by tidal flooding—Saibai, Boigu, Masig, Warraber and Iama—will be more severely impacted by sea level rise, and increased flooding and erosion and storm surge will be issues for Poruma, Erub, Mer and Mabuiag communities. All communities will experience coastal impacts from sea level rise.

Climate change will increase health risks associated with heat stress, spread of vector borne diseases, impacts on food and water quality and quantity, extreme weather and the impact of multiple climate related stresses on mental health and general wellbeing. The region also faces increasing risks from health and resource pressures from neighbouring regional communities. There is potential loss of cultural values that are entwined in food production and local self-sufficiency.

For Indigenous people, loss of land can lead to loss of identity and there is an increasing risk of Torres Strait Islanders being Australia's first systemic climate refugees.

With good planning, strong leadership and engagement there is great potential for communities to become more resilient and to be exemplars for sustainable living (e.g., sustainable food and energy production, enhanced water security, waste minimisation and greater community empowerment).

The continuing challenge is to ensure human settlements in the region are sustainable, maintain cultural connection and improve resilience, adaptive capacity, and self-sufficiency in perpetuity.



"Ngalpa ngalpun lagaw pawa a laga mina gima gasamka. Ngalpun danalayg kidhakidh. Ngoey bangal inab lag yawaykray.

We respect our home, our way of life (lagal pawa). We abide by that. We need to look after our place and respect it."

Moses Mene

COASTS AND BEACHES

There are approximately 650km of mostly pristine coastlines and beaches in the region that provide critical habitat for a variety of marine and terrestrial species, essential ecosystem services, natural resources, and immense amenity and cultural value to the region's communities. Torres Strait coastlines and beaches are increasingly subject to frequent tidal inundation, coastal erosion and extreme weather events associated with climate change.

These thin strips where the land meets the sea are a critical interface of significant environmental and cultural value in the region (e.g., intertidal fringing reefs and sea grass beds, nesting coastal birds and marine turtles, subsistence fishing, plant and animal resources). Rocky coastlines are home to a range of birds, plants and marine organisms which are typically only found in these environments. Beaches of the central coral cays formed from ground-up coral fragments and other marine organisms are especially vulnerable to ocean acidification.

Extensive research has been conducted into understanding coastal erosion and tidal inundation impacts across the region over the past decade. Knowledge of coastal vegetation cover and species assemblages has also been improved through ongoing biodiversity surveys on inhabited and uninhabited islands.



PRIMARY THREATS



Climate change

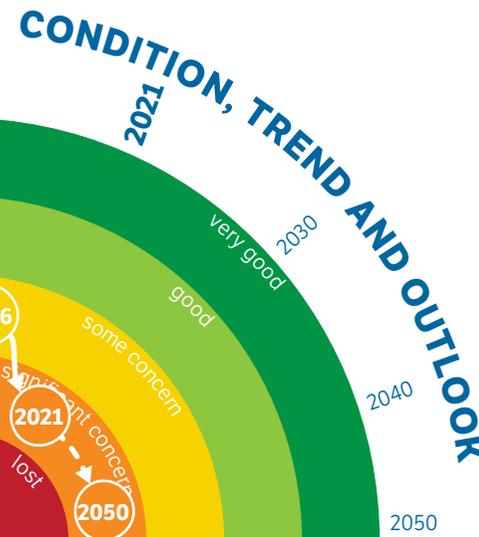
- sea level rise
- more intense and variable weather
- ocean acidification



Unsustainable resource use

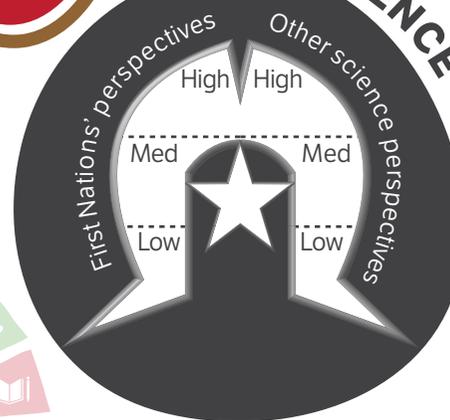
- habitat alteration
- pollution
- shipping incidents

Very high



THREAT STATUS

CONFIDENCE



RELEVANT UN SDGs



What is happening now?

Many beaches across the region are experiencing increased erosion as sea level increases. This includes loss of mature littoral forests and strand shorelines on coral cay islands. Coastal infrastructure such as barge ramps and channels has altered natural sand movement with impacts on adjacent beaches.

Coastal protection engineering infrastructure is being installed on six islands most exposed to tidal flooding and erosion. These structures provide increased protection for coastal communities but have flow-on impacts on adjoining coastal processes and loss of amenity and habitat value.

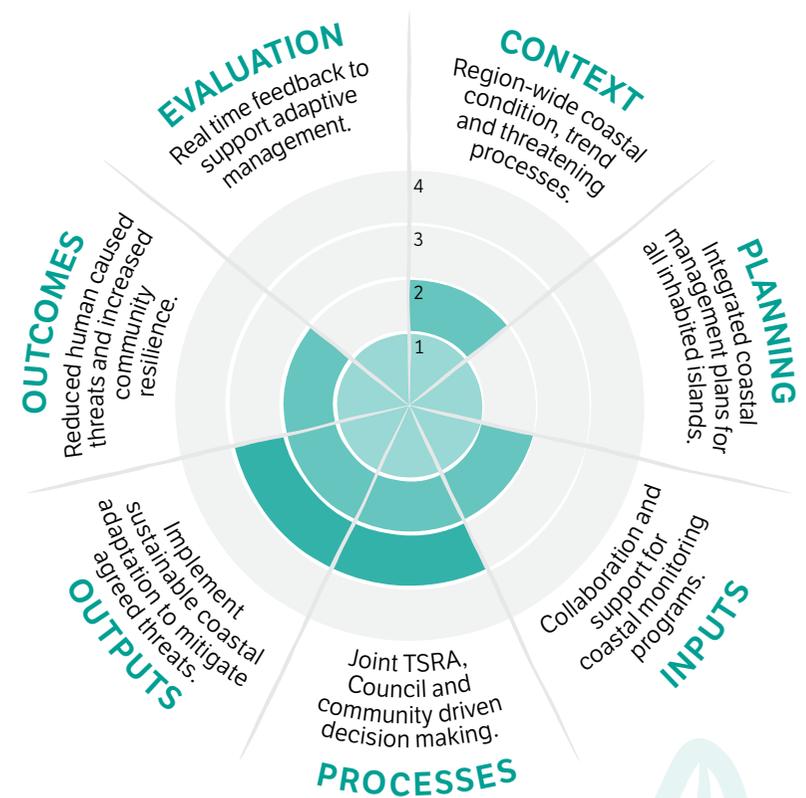
High resolution aerial mapping of priority beach areas is being undertaken by TSRA, and rangers in some communities are monitoring changes in beach profiles.

What could happen?

Engineered coastal defences buy communities some time but are not a long-term solution to sea level rise impacts. Longer term strategies will involve migrating people and infrastructure out of the coastal hazard zone, and strategic revegetation efforts.

Coral cays have some capacity to grow with increasing sea levels, but this depends on the rate of rise and the health of the corals needed to supply the coralline sand.

Coastal ecosystems are likely to be severely impacted by tidal flooding and increased storm driven erosion. Sites of cultural significance may be lost, along with vegetation cover, shade trees, fauna habitat and important cultural resources.



"I want my children, my grandchildren to live here and to experience the life that we experienced growing up."

Kabay Tamu



MANGROVES AND WETLANDS

Torres Strait supports large and internationally significant mangrove forests and associated tidal saltmarsh and salt pans and freshwater wetlands. Initial ecosystem surveys found there were around half the world's total number of mangrove species present (at least 35 species – including two species found nowhere else in Australia). Of the 30,000 ha of tidal wetlands across Torres Strait, more than 80% are dominated by mangrove trees and shrubs. Mangrove islands Sassie, Zagai and Buru are unique and important mangrove habitats in the Torres Strait. The perennial freshwater swamps of Badu, Mua and Muralag are the only representations of this habitat type in Torres Strait.

Mangroves are a highly important cultural resource providing construction and tool-making materials, medicines, and food. It has long been recognised by Torres Strait Islanders that mangroves are nurseries for many fish and crustacean species, and that they play an important role in providing shelter from strong winds and currents.

An extensive survey of mangroves and wetlands across much of Torres Strait occurred from 2012-2014. Many of the mangroves and tidal wetlands of Torres Strait are in moderate condition, but there were worrying localised impacts and broad changes taking place. A background of natural dynamics with erosion and deposition were having a large influence on mangrove extent and condition across Torres Strait. However, the preliminary surveys further documented significant indications of longer term, deteriorating trends and widespread damage. These mostly related to sea levels rising rapidly at much faster rates than the rest of Australia, coupled with the added pressure of human exploitation, access tracks, landfill, smothering weeds, uncontrolled fires and feral pigs.

The threats to tidal wetlands of Torres Strait also include invasive species (climbing perch, *Gambusia*, *Tilapia*, deer, pigs, cane toads, rats, cats, dogs, and weeds), overextraction of groundwater for community use, and damage from vehicles. Sea level rises associated with climate change have also created hypersaline wetlands on Boigu and Saibai.



PRIMARY THREATS



Climate change

- sea level rise
- more intense and variable weather



Unsustainable resource use

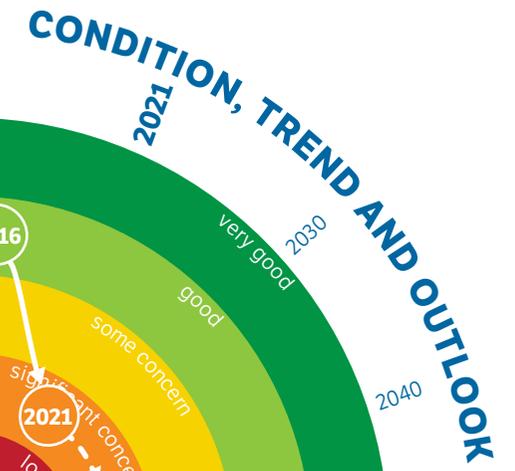
- resource extraction
- habitat alteration
- pollution
- shipping incidents



Problematic introduced and native species

- pest weeds
- feral animals

High



What is already happening?

A biosecurity plan for all the inhabited islands of Torres Strait was developed in 2018, which drew attention to invasive fish and mammals that have become established and are impacting wetlands across the region.

Indigenous ranger groups across Torres Strait have been trained on how to monitor water quality and install wetland condition monitoring points. A set of standardised annual monitoring sites was installed on Saibai in 2017 to measure wetland water quality, fish community, and mangrove condition.

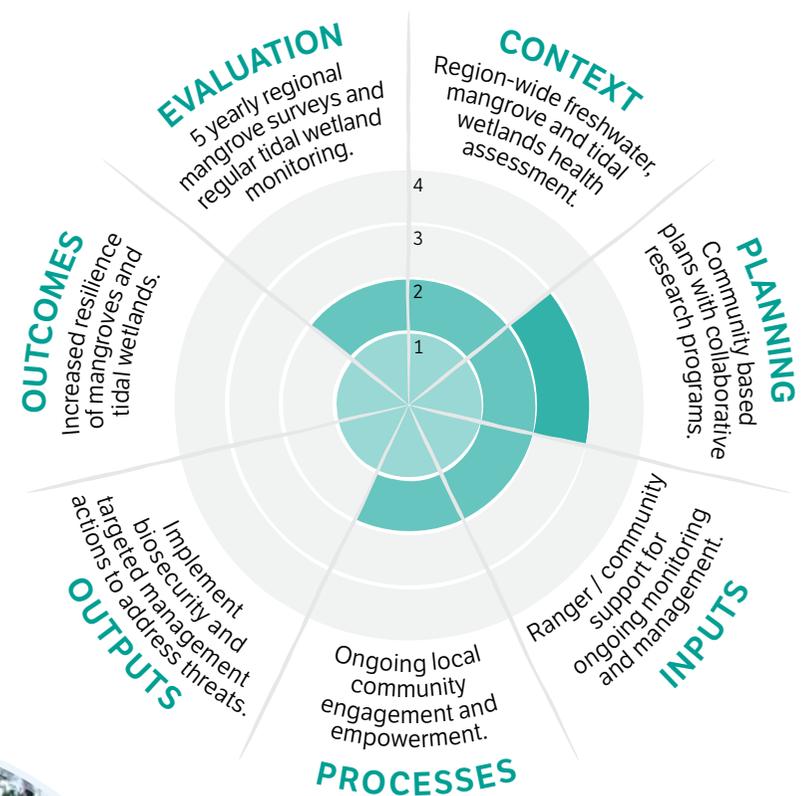
What could happen?

There are opportunities to work with communities and alleviate acute impacts such as chemical leaching, overcollection of firewood, overdrawn ground water, residential pollution, and urban pest species.

With community support and additional investment, invasive species such as weeds, pig, deer, and cane toad can be better controlled or even eradicated from the wetlands of Torres Strait. These controls will directly support and enable the relocation of mangrove seedlings into more upland elevations as sea levels rise. Increased resourcing and support for rangers to build their capacity for wetland monitoring will also assist with threat identification and assessment to guide future management approaches.

Research into potential methods for managing or eradicating climbing perch, *Gambusia* and *Tilapia*, and to detect these species in waterways, represent valuable returns on investment.

Rising sea levels are likely to have a net negative impact on mangrove communities across Torres Strait. The impacts include saline intrusion as well as saline inundation with greater numbers of extreme high tides. A greater consideration for impacts on mangroves during development proposals could result in more resilient mangrove communities across the region.



“Scientists learnt much during botanical surveys on Boigu and Saibai, finding many unlisted plant types with most mangroves having language names and stories of their traditional use”.

Dr Norman Duke
(James Cook University)



COASTAL BIRDS

Coastal birds (including shorebirds) are a vital part of the marine, island, and coastal ecosystems of Torres Strait, with over 50 species relying on the region for all or part of their life cycle. Many species are culturally significant to Torres Strait Islanders as totemic animals, traditional food sources, and indicators of seasonal change.

Torres Strait is an important region for feeding, nesting, and migrating coastal birds. It is arguable that region warrants important bird area status because of its importance to migratory shorebirds. The region is used by most of the migratory shorebirds that come to Australia, including critically endangered eastern curlew, great knot and curlew sandpiper. Islands recognised nationally as important areas for migratory shorebirds and nesting seabirds include Maizab Kaur, Kodal, Masig, Ngurupai (Horn), and (Damudth) Dalrymple. The region is also a crucial stopover for migrating coastal (and other) birds moving between Australia and PNG. Beach stone-curlews and bar-tailed godwits are of conservation concern to Queensland, yet they are abundant in the region.

The key manageable threats occurring across Torres Strait are egg and bird predation by rats, pigs, cats and dogs, disturbance and hunting, loss of roosting areas, ingestion of plastics and entanglement, and oil spills. The most significant threats to coastal birds come from far beyond the region (e.g., land reclamation in Asia, climate change, and plastic pollution). Torres Strait provides a critical haven for coastal birds while these broader threatening processes are addressed.

Tishan Simpson



PRIMARY THREATS



Climate change

- sea level rise
- increased air and sand temperatures
- more intense and variable weather
- shifting seasons
- ocean acidification



Unsustainable resource use

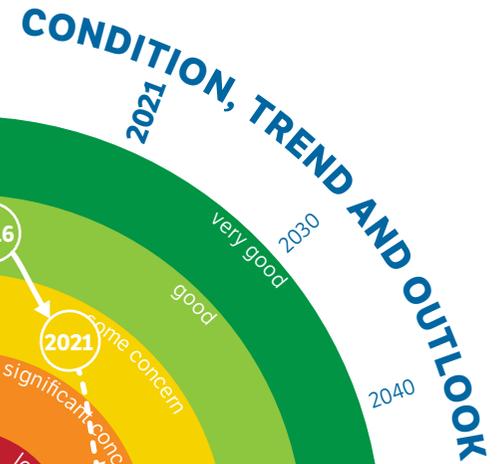
- habitat alteration
- pollution
- resource extraction



Problematic introduced and native species

- feral animals

High



THREAT STATUS



What is already happening?

Traditional knowledge about coastal birds is being captured through the TEK project database and seasonal calendars and is retained within communities. This helps raise awareness and support for community-based management programs (e.g., reduced hunting for eggs and birds).

Planning is underway for targeted island-scale rat, pig and cat eradication and management programs, and there are increased biosecurity measures in place and growing community awareness. However, there remain significant challenges to implement feral animal eradication programs due to remoteness, lack of management capacity and other constraints. Regular beach clean-ups are helping to reduce pressure on coastal birds.

There is still much to learn about coastal birds in the region, and the importance of Torres Strait at the national and global scale. With funding from DAWE, TSRA is currently brokering a program to better understand the seasonal use and distribution of the critically endangered eastern curlew and other migratory shorebirds across the region.

What could happen?

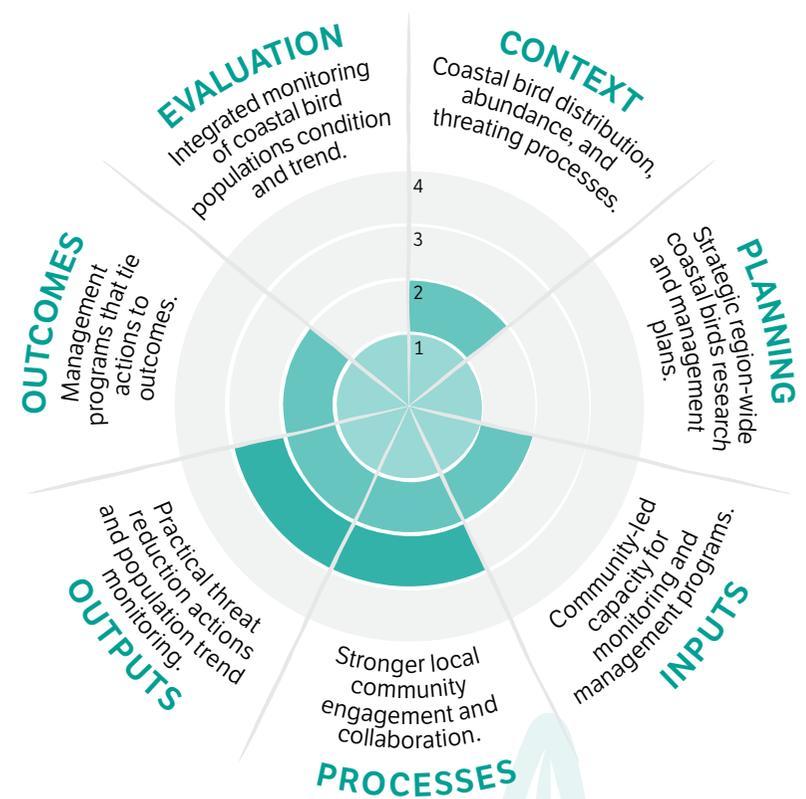
Despite good local community knowledge, there is still limited documented information about the distribution, nesting locations, abundance, and threats to coastal birds across the region. Community interviews, multi-season inventory surveys and ongoing monitoring are needed to improve understanding about coastal bird populations, trends, and management needs.

Locally nesting coastal birds and migratory shorebirds are most susceptible to disturbance by people and domestic dogs at nesting and feeding sites, and there have been catastrophic impacts of rats, cats and pigs on key islands. These threats could be significantly alleviated through community engagement programs.

Region-wide assessments of rat, pig, cat, and wild dog impacts on nesting coastal birds and migratory shorebirds would help target local management priorities. Without additional action to reduce local and international threats, coastal bird populations could decline in Torres Strait.



Tristan Simpson



The birds, they do more than just decorate our skies. They are our totems, our ancestors, our compasses and our time keepers. They are embedded deep in our culture.

Aaron Bon

MEKEM GARDEN PROJECT GROWS SUSTAINABLE COMMUNITIES

The Sustainable Horticulture project – or *Mekem Garden* (Make your garden) – helps communities throughout Torres Strait gain the skills needed to produce and access a range of fresh food. Established in 2012, the program aims to motivate people to re-engage with the practice of food gardening as a fundamental aspect of traditional daily life in Torres Strait, like it used to be. The project acknowledges the customary practices still occurring in some parts of the region and the immense value of traditional gardening knowledge and skills.

By establishing more gardens in all communities across Torres Strait, the project reduces reliance on imported foods and minimises compostable waste. Workshops and supplies are regularly provided for communities, and a ‘Horticulture in Schools’ project provides education to the next generation of island custodians. Modern techniques (including aquaponics) allow communities to produce ample fresh food while using very little land or water – both of which are in short supply in many island communities.

By establishing nurseries across the Torres Strait, the project can propagate plants locally for food production or revegetation. Nurseries on Warraber, Poruma, Masig and Erub, for example, propagate local saplings to revegetate and stabilise shorelines in danger of erosion.



TSRA

COLLABORATION FOR CANE TOAD CONTAINMENT

Once established, toxic cane toads are very hard – often impossible – to eradicate. Preventing cane toads from establishing populations in Torres Strait is of primary importance for healthy land ecosystems. Cane toads are currently present on Ngurupai (Horn Island) and Waiben (Thursday Island). These islands are the main transport links between islands in the region and the Australian mainland.

To reduce the risk of cane toad spread across Torres Strait, TSRA has brokered collaborative partnerships among multiple organisations, including the primary freight provider for the islands, local communities, My Pathways Community Development, TAGAI College, and the Torres Shire Council.

Installing cane toad exclusion fencing and traps around the major freight depots on Horn Island and in Cairns has added an important layer of protection. A multi-stakeholder plan to eradicate cane toads from Thursday Island has been developed and a combined rapid response team has successfully addressed five recent island incursions. Each phase of the program has provided insights into how to best cultivate and manage multiple stakeholder relationships for effective cane toad containment.



Melissa Bruton

TSRA



MOVING FORWARD

This second State of the Environment report card for Torres Strait is a key platform to support improved future management and priority-setting, targeted investment and partnerships for research and monitoring efforts in the region. It complements and works alongside the regional plans, strategies, programs and partnerships in place to support a strategic approach to Torres Strait land and sea management, underpinned by Traditional Ecological Knowledge and community custodianship of country.

Current monitoring programs will be reviewed and assessed in light of this report to help ensure we develop an increasingly robust dataset and critical indicators to inform management and research priorities and to feed into the 2026 State of the Environment Report card.



List of acronyms

AIMS	Australian Institute of Marine Science
AMSA	Australian Maritime Safety Authority
COTS	Crown-of-Thorns Starfish
DAWE	Department of Agriculture, Water and the Environment
DPSIR	Driver-Pressure-State-Impact-Response
FNP	First Nations People
GBR	Great Barrier Reef
ICIP	Indigenous Cultural and Intellectual Property
IPA	Indigenous Protected Area
IUCN	International Union for the Conservation of Nature
LSMU	The TSRA Land and Sea Management Unit
MEE	Management Effectiveness Evaluation
PNG	Papua New Guinea
PZJA	Protected Zone Joint Authority
RNTBC	Registered Native Title Body Corporate
SoE	State of the Environment
TEK	Traditional Ecological Knowledge
TSRA	Torres Strait Regional Authority
UNSDGs	United Nations Sustainable Development Goals
WOC	Working on Country



Caring for our
country, culture and
communities since time
immemorial and into
the future.



