

WATER RESOURCES SITUATIONAL ANALYSIS

for the Central
Queensland
region



FOREWORD

Available safe water, and its sustainable management, are fundamental to economic prosperity, environmental functions, and human survival. As all oceans connect, what we do in our catchment has far-reaching environmental, social, cultural and economic impacts. The Fitzroy region is a powerful example of this.

In the Fitzroy region alone, approximately 6,000 gigalitres flow from 156,000 square kilometres of productive land to the Heritage Listed Great Barrier Reef lagoon each year. This water moves through the lands of more than 17 First Nations groups, the Beef Capital of the country, a major mineral hub and the epicentre of Australia's multilateral regional security framework. As the water flows, these land uses impact the health of the water, and the health of the downstream ecosystems.

The sustainable management of water is a complex issue. It involves many different stakeholders, varied (and sometimes competing) users and a wide range of regulations and policies. Traditionally, water considerations are segmented and siloed and rarely look at the bigger picture or how to serve more than a single purpose or goal.

The Central Queensland Water Resources Situational Analysis is one of the first comprehensive studies undertaken in this region where every aspect of water management has been considered, publicly available information reviewed, and management challenges collectively identified. Across urban, mining and agricultural land uses, from the top of the Fitzroy region to Great Barrier Reef, in waters various forms and functions, and in the context of environmental, social, cultural and economic values this situational analysis encompasses it all.

Many different individuals and organisations were invited to share local knowledge about what they value about water in the region, along with their concerns and challenges about water and its management. A small group of stakeholders including Fitzroy Basin Association, Isaac Regional Council, North Queensland Bulk Ports, Central Highlands Economic Development Corporation, and the University of Queensland helped to validate the key findings and recommendations, including ensuring alignment with existing water-related initiatives.

This holistic analysis is a conversation starter and an important means to initiate collaboration with the many important and critical stakeholders. With a better regional future in mind, this resource provides the Fitzroy region with the opportunity to find and create longevity in lifestyle and livelihoods.



The recommendations and suggestions for future action will require continued shared effort and resources to drive change. I believe that this study provides a solid foundation for a range of organisations to continue new and innovative opportunities for shared sustainable water management.

As people we rely on water as do our flora and fauna, our lifestyles, and our industries. If you are interested in joining the journey towards collective, holistic water management in the Fitzroy region, I empower you to reach out.

Elyse Riethmuller
Chief Executive Officer
Fitzroy Basin Association

Acknowledgements

We acknowledge the Traditional Owners of all the Central Queensland region and acknowledge their continuing connection to Country and culture. We pay our respects to their Elders past, present and emerging. We also acknowledge all First Nations Peoples who continue to live in spiritual and sacred relationships with this country.

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UNDERSTANDING THE BIGGER PICTURE

The catchments and water resources of the Fitzroy River Basin in Central Queensland, Australia and the surrounding region delivers a multitude of essential environmental, social, cultural and economic benefits and ecosystem services to the community.

If we want these benefits and services to continue long into the future, water and natural resource users and managers must work together to better understand any adverse impacts our shared use of local water resources might be having and importantly to identify opportunities to ensure their sustainable use.

One way to help build a picture of what water resource challenges may exist in a specific location is to undertake a situational analysis. A water resources situational analysis is an independent process used, to document and understand how people value their local water resources, identify current and future water resource challenges and discuss opportunities for future collaboration and collective action. The Central Queensland Water Resources Situational Analysis was undertaken using published information that was supplemented with data collected during a series of stakeholder interviews. It is important to note that the views in this document may not necessarily reflect the views of the region's Traditional Owners. Engagement with them and other First Nations organisations is important and is an ongoing process in the region.

When the whole community benefits from our precious water resources in Central Queensland, it is our collective responsibility to manage the region's water resources in an ecologically sustainable way so that our community, culture, economy and natural environment can continue to prosper.

This Water Resources Situational Analysis for the Central Queensland region will help local stakeholders to identify opportunities to work together combining resources and knowledge to address priority challenges and setting collective action targets to guide investment and management decisions.



What do we mean by a shared challenge?

A shared challenge is a challenge or issue that exists for more than one person or stakeholder in an area. They arise when those things that are important and valuable to the community (also referred to as values) are threatened or where there is competition between different values in the same area.



The Fitzroy River Basin, is located in the central Queensland on the east coast of Australia. It has the southern Great Barrier Reef on its doorstep.

The Fitzroy Basin and the surrounding region is characterised by a tropical to sub-tropical climate. Across the Basin, conditions range from semi-arid in the western region becoming more humid with proximity to the coast.

Generally, the region experiences wet summers (December – February) and mild and dry winters (June – August). Rainfall across the region is highly variable and evaporation rate are generally high. It is common for the region to experience prolonged dry periods that are often followed by floods. Many floods are the result of the effects of tropical cyclones during the wet season.

The high inter-annual variability and seasonality of rainfall has a noticeable impact on stream flows across the region. Long-term rainfall averages vary across the Basin but range between 750 mm/year in the west to 1500mm/year in northeast.

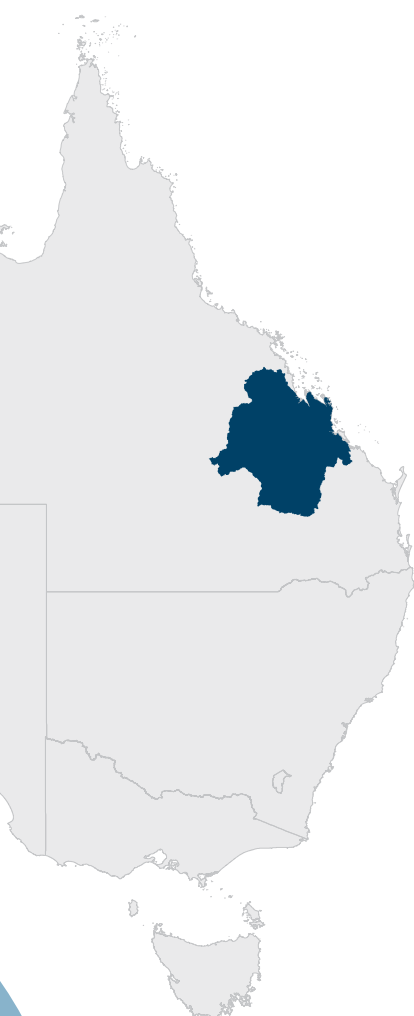
Over the last 10 years there has been a declining trend in rainfall totals across all subcatchments compared with the long-term average. The largest decreases in rainfall have occurred during the summer months of the wet season.

Temperatures across the region are generally mild year-round. Rockhampton, in the east of the Basin has an annual mean temperature of 28.5°C. Highest maximum temperatures generally occur in December (mean temperature of 32.3°C) and the lowest maximum temperatures usually occur in July (mean temperature of 23.3°C). Emerald which is located further west in the Basin has a mean annual temperature of 29.9°C. Here highest maximum temperatures generally occur in January (mean temperature of 34.6°C) and lowest maximum temperatures generally occur in June and July (mean temperature of 23.4°C).

Across the region, temperatures have been increasing. At Taroom for example, the number of days above 38°C has increased from an average of six per year between 1959 and 1988 to an average of 11 per year between 1989 and 2018. Instance of consecutive days above 38°C have also increased. Maximum temperatures have also increased along with their frequency (CSIRO and Bureau of Meteorology, 2021).

In terms of rainfall, changes are likely although a clear long-term trend is not apparent. Natural variability in rainfall is anticipated over time. And while there is a current declining trend in rainfall across the region, the intensity of rainfall events that will occur are expected to increase in intensity.

Approximately 80% of the land in the region is used for grazing beef cattle with smaller areas of cropping and horticulture. It supports Queensland's resources industry with more than 70% of the State's active coal mines located here along with significant ports infrastructure such as Hay Point and the third largest coal exporting terminal in the world in the Port of Gladstone.



A BEAUTIFUL LAND OF DROUGHTS AND FLOODING RAINS

WATER RESOURCES OVERVIEW

The Fitzroy Basin catchment covers over

9%

of the Queensland mainland and contains

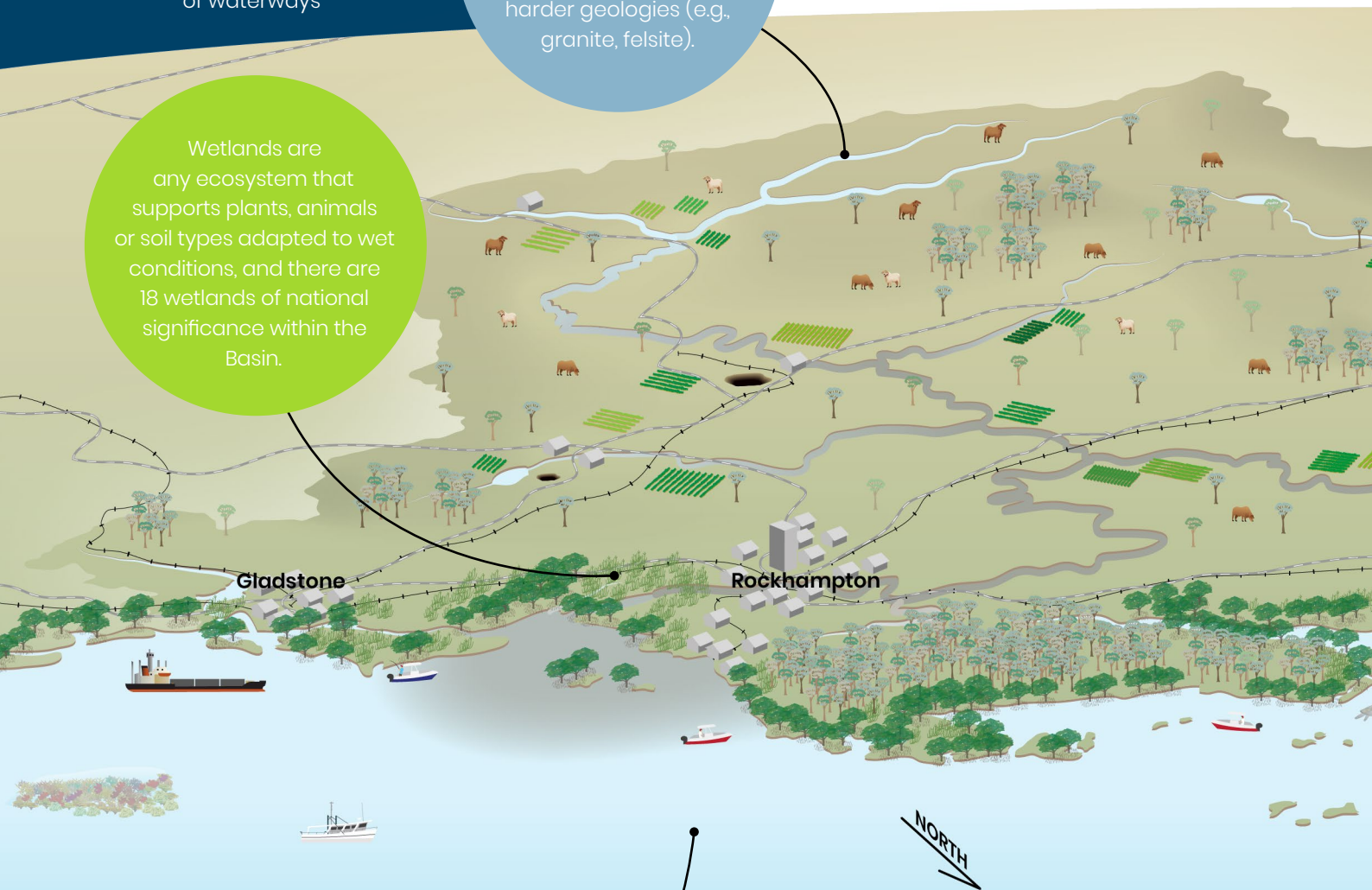
20,000km

of waterways

Water resources in the Fitzroy Basin (and surrounding regions) includes surface water collected by the natural landscape, groundwater, as well as water systems for storage, flow regulation and water distribution (reservoirs, dams, irrigation channels, pipelines).

Surface water is collected in water bodies such as creeks, rivers and wetlands due to surface water runoff over harder geologies (e.g., granite, felsite).

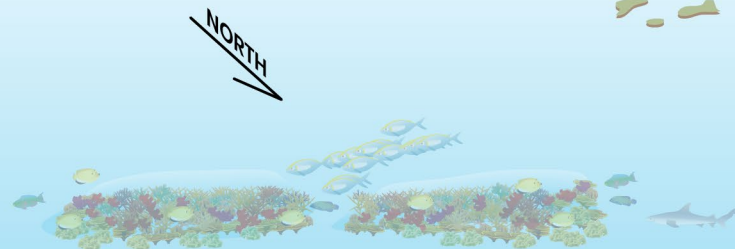
Wetlands are any ecosystem that supports plants, animals or soil types adapted to wet conditions, and there are 18 wetlands of national significance within the Basin.



Approximately

6,000 gicalitres

of water from the Fitzroy catchment is discharged to the southern Great Barrier Reef Lagoon – a marine water resource. A variety of industries utilise and depend on these water resources including agriculture, forestry and fishing, mining, manufacturing, electricity, gas, water, and waste services.



Dams, weirs, reservoirs, and rural water storages (farm dams) hold water for use that would normally flow through a waterway. This allows extraction and use of the water, but also modifies natural patterns of water flow. The Fitzroy Basin boasts 28 dams and weirs, the largest of which are Lake Maraboon and the Fitzroy Barrage.

At its capacity, Lake Maraboon has a surface area of 15,000 hectares, equivalent to three times the size of the Sydney Harbour and can hold as much as

**1,300
gigalitres**



Groundwater accumulates as unconsolidated sediments (e.g., sands, muds) enable groundwater infiltration. Groundwater supports many terrestrial and aquatic ecosystems and is also extracted for human use through bores. There are

5 multi-purpose groundwater reserves

in the Fitzroy basin that are responsible for supplying small towns, stock and domestic purposes, irrigated agriculture, mining, and industry. Additionally, the Braeside Borefield, located 120km southwest of Mackay, supplies water to mines in the region and pumps up to 3,250ML annually.



Healthy aquatic ecosystems

We value the healthy habitats that provide the basic life support system for plants and animals, including refugia in times of drought. They support our World Heritage listed Great Barrier Reef and provide important ecosystem services such as storing, cleaning and transporting water, nutrient recycling, and providing connections between different habitats.



Abundant and diverse native aquatic and riparian flora and fauna

We value the region's naturally high biodiversity including the more than 6,000 native plants and animals that live here. We want to continue to safely eat native plants and animals and enjoy recreational fishing. We want to preserve endangered and vulnerable species, and their nesting, feeding and breeding sites.



Cultural and spiritual connections with land and sea country

We feel a sense of belonging and wellbeing in healthy landscapes and experience a better quality of life. Traditional Owners and First Nations Peoples value their spiritual relationships, song lines and storylines, and significant cultural heritage places and sites. They value the importance to be custodians of their land.



Water for safe human consumption

We value safe drinking water and access to safe drinking water is a basic human right. Healthy aquatic ecosystems purify our water, potentially reducing treatment costs.

SHARED VALUES IN THE CENTRAL QUEENSLAND REGION

Managing our water resources for the collective good requires continual collaboration. Collaboration works best when there is a shared understanding of the values and challenges different people and organisations experience in relation to water resources in the Central Queensland region.

Eight high level water resource-related value areas have been identified. These values are highly interrelated. Activities that effect one value are highly likely to have flow on effects to other values.





What is a shared value?

A value is something that is important and meaningful (of value) to someone. A shared water value means that a specific value has been identified by more than one individual or organisation. They can include environmental, cultural, economic and/or social aspects. A shared water challenge arises when more than one stakeholder identifies that a value is being threatened, or that a stakeholder's activities is seen to be in competition with the protection of a value.



Water for primary industries and industrial water

Water supports our livelihoods. We need water for agriculture, for industry (including mining), aquaculture, power generation, and safe access to marine areas to support our shipping and export economy.



Safe recreational waters and amenity

We value and need clean water systems for recreation, ceremonial purposes, and local ecotourism ventures. Healthy aquatic ecosystems provide optimal safety in water quality and scenic benefit.



Water security

We value water for the future too. We do not want our children to face water scarcity or for water to be unaffordable or for their livelihoods to be compromised.



First Nations people have self-determination with respect to land water matters

We value equity in decision-making and ensuring Traditional Owners' right to determine their own future and participate in determining the future management of our water resources.



LACK OF INTEGRATED WATER RESOURCE PLANNING AND MANAGEMENT

Lack of integrated catchment planning

Consequences

- Siloed decision-making
- Inability to manage impacts associated with land use change
- Poor alignment between management actions and monitoring and evaluation to inform decision making
- High competition for limited funds between local and regional partners

Causes

- Poor collaboration across jurisdictions, Traditional Owners and other stakeholders
- Insufficient data sets with a low level of confidence to support decision making
- Hesitance of partnerships due to previous negative experiences
- Absence of data sharing & limited on-ground examples/ case studies available to update models

Relevant stakeholders*

 Utilities

 Industry

 Economic and regional development

 Research and science

 Local Government

 Queensland Government

 Mining

 Non-government organisation

 Natural resource management

Fragmentation and lack of transparency in current governance, regulation, and planning arrangements

Consequences

- Limited potential reduction on pollution
- Missed opportunities to explore alternatives for achieving reductions in pollution

Causes

- Lack of targeted regulations at the key contributors of pollution
- Lack of understanding of mining operations and the rules and regulations that limit access to water
- Inaccurate perceptions of wastewater management of mining companies – lack of transparency and understanding of the decision-making process

Relevant stakeholders*

 Agriculture

 Research and science

 Mining

 Non-government organisation

Current collective action

Review of the Central Queensland Regional Plan

* Relevant stakeholders includes those organisations that during the study identified this issue as a challenge and/ or a value that this shared challenge affects.

Shared challenge

LIMITED PARTICIPATION AND ACCESS OF FIRST NATIONS TO LAND AND SEA COUNTRY

First Nations people not active in water planning

Consequences

- Pressures on securing water for cultural uses
- Lack of control and input into Land and Sea Country management
- Loss of economic development opportunity
- Inability to achieve self-determination

Causes

- Lack of recognition about the values of traditional knowledge in water planning
- Lack of culturally appropriate opportunities for participation
- Lack of culturally appropriate documentation of cultural heritage sites and knowledge to inform decision making

Relevant stakeholders*

Industry

Local Government

Mining

Research and science

Queensland Government

Lack of access to Country for cultural purposes

Consequences

- Pressures on securing water for cultural uses
- Lack of control and input into Land and Sea Country management
- Loss of economic development opportunity
- Inability to achieve self-determination

Causes

- Lack of culturally appropriate opportunities for participation
- Lack of culturally appropriate documentation of cultural heritage sites & knowledge to inform decision making

Relevant stakeholders*

Industry

Local Government

Mining

Research and science

Queensland Government

Current collective action

Queensland Indigenous Land and Sea Ranger Program

Greening Australia Queensland Indigenous Land Conservation Project

* Relevant stakeholders includes those organisations that during the study identified this issue as a challenge and/ or a value that this shared challenge affects.

LIMITED WATER FOR ECONOMIC AND SOCIAL WELLBEING

Loss of economic productivity and opportunities



Consequences

- Siloed decision-making
- Inability to manage impacts associated with land use change
- High competition for limited funds between local and regional partners
- Lost opportunities for improved infrastructure/ network planning

Causes

- Poor collaboration across jurisdictions, Traditional Owners and other stakeholders
- Insufficient data sets with a low level of confidence to support decision making
- Hesitance of partnerships due to previous negative experiences
- Lack of opportunities for appropriate water re-use

Relevant stakeholders*

- Utilities
- Industry
- Small business
- Agriculture
- Economic and regional development
- Research and science
- Local Government
- Queensland Government
- Mining
- Non-government organisation
- Natural resource management

Pressures on community health and well-being



Consequences

- Limited potential reduction on pollution
- Missed opportunities to explore alternatives for achieving reductions in pollution

Causes

- Lack of understanding of mining operations and the rules and regulations that limit access to water
- Inaccurate perceptions of wastewater management of mining companies
- Adverse health impacts from contact with poor water quality

Relevant stakeholders

- Utilities
- Industry
- Communities and citizens
- Agriculture
- Research and science
- Local Government
- Queensland Government
- Mining
- Natural resource management

Loss of community access to waterways



Consequences

- Adverse health impacts from contact with poor water quality

Causes

- Construction of large instream infrastructure including weirs

Relevant stakeholders*

- Small business

Current collective action

Receiving Environment Monitoring Program (Regional REMP)

Fitzroy Partnership for River Health Report Card

Mackay-Whitsunday-Isaac Healthy Rivers to Reef Partnership Report Card

* Relevant stakeholders includes those organisations that during the study identified this issue as a challenge and/ or a value that this shared challenge affects.

LIMITED DATA CONFIDENCE AND KNOWLEDGE

Delivering confidence in investment planning and prioritisation

Consequences

- Uncertainty in the effectiveness of management responses
- Low confidence that the most effective management solutions are being targeted

Causes

- Insufficient data to validate the performance of regional water quality objectives in delivering desired management outcomes
- Insufficient data to determine the cause and effect of contamination sources and the effectiveness of management responses

Relevant stakeholders*

-  Utilities
-  Natural resource management
-  Research and science

Limited understanding of surface and groundwater interactions



Consequences

- Limited understanding about cumulative impacts of mining on groundwater
- Insufficient monitoring and assessment of groundwater resources and its quality

Causes

- Lack of knowledge and long-term data sets
- Impacts of mining on groundwater are poorly quantified

Relevant stakeholders*

-  Utilities
-  Agriculture
-  Research and science
-  Local Government
-  Mining
-  Non-government organisation
-  Natural resource management

Current collective action

- Receiving Environment Monitoring Program (Regional REMP)
- Fitzroy Partnership for River Health Report Card
- Mackay-Whitsunday-Isaac Healthy Rivers to Reef Partnership Report Card

* Relevant stakeholders includes those organisations that during the study identified this issue as a challenge and/or a value that this shared challenge affects.

Shared challenge

POOR WATER AND CATCHMENT QUALITY

Lack of sufficient water to support ecosystems



Consequences

- Decline in the condition of habitats and ecological communities
- Loss of biodiversity and key species
- Increased opportunities for invasive species

Causes

- Over-allocation of the available water resources
- Construction of small-scale artificial ponds and wetlands on rural properties
- Water infrastructure businesses tend to prioritise profit-based outcomes rather than environmental benefits

Relevant stakeholders*

-  Utilities
-  Communities and citizens
-  Research and science
-  Queensland Government
-  Mining
-  Non-government organisation
-  Natural resource management

Negative impacts on the Great Barrier Reef



Consequences

- Enhanced severity and frequency of coral bleaching

Causes

- Increasing ocean temperatures linked to climate changes

Relevant stakeholders*

-  Non-government organisation

Rising salinity levels



Causes

- Extended dry periods within catchments linked to climate change
- Potentially unsustainable use and extraction from aquifers – especially hyper saline aquifers

Relevant stakeholders*

-  Research and science
-  Local Government

* Relevant stakeholders includes those organisations that during the study identified this issue as a challenge and/ or a value that this shared challenge affects.

Excessive sediment loads entering receiving waters



Consequences

- Accumulation of sediments in water storages reducing their capacity
- High turbidity in downstream waterways and inshore lagoons
- Increase in domestic water treatment costs

Causes

- Agricultural runoff from intensive horticulture, cropping and grazing practices
- Clearing and degradation of riparian vegetation
- Stormwater runoff and runoff from mine sites
- Reduced water storage capacities due to increased siltation

Relevant stakeholders*

- Utilities
- Small business
- Research and science
- Local Government
- Mining
- Non-government organisation
- Natural resource management

Excessive run-off of toxicants and chemicals



Consequences

- Decline in the condition of habitats and ecological communities
- Closure of recreational spaces due to the introduction of contamination
- Adverse health impacts from contact with poor water quality

Causes

- Mine water discharge during extreme events
- Stormwater runoff from untreated urban land uses and poor development controls
- Licenced and unlicensed sewage treatment plant discharges

Relevant stakeholders*

- Agriculture
- Research and science
- Mining

High levels of pesticides, nitrogen, and phosphorus run-off



Consequences

- Increase in blue-green algae blooms
- Increase in outbreaks of crown of thorns starfish

Causes

- Agricultural runoff from intensive horticulture, cropping and grazing practices
- Urban runoff and point source discharge

Relevant stakeholders*

- Utilities
- Research and science
- Mining
- Natural resource management

Current collective action

- Queensland Government Reef Water Quality Program
- National Landcare Program
- Reef 2050 Water Quality Improvement Plan
- Natural Resource Investment Program 2018-2020
- Fitzroy Water Quality Program
- GBRF Water Quality Improvement Investment Plan
- Queensland Indigenous Land and Sea Ranger Program
- Fitzroy and Mackay-Whitsunday Extension Plans and Coordinators
- Fitzroy Partnership for River Health Report Card
- Regional Land Partnership
- The Central Queensland Sustainability Strategy 2030
- Mackay-Whitsunday-Isaac Healthy Rivers to Reef Partnership Report Card
- Queensland Wetlands Program
- Fitzroy Basin Water Quality Improvement Plan

COLLECTIVE ACTION OPPORTUNITIES

The WRSa found hundreds of examples of collective actions already being undertaken collaboratively by stakeholders across the Central Queensland region. Despite this important work, the shared challenges and their causes identified during the study prompted further discussion regarding opportunities for future effort and investment. The opportunities for collective identified below each require additional discussion with key stakeholders

Integrated water resource planning and management

Water for economic and social well-being

Identify strategies to enable greater coordination, collaboration and resource sharing across water resource-related and location-specific strategic plans and other plans of management.

Ensure future regional planning initiatives gives greater consideration to planning for water and land management that respects the full suite of values identified in this WRSa, takes a whole-of-water or integrated water cycle perspective, and builds on the extensive amount of knowledge and thinking that already exists in the region.

First Nations connection to Land and Sea Country

Non-First Nations individuals and organisations invest in their own cultural awareness training and building individual and organisational capacity in areas such as truth telling, understanding cultural lore, values, language and aspirations, and respect building.

All individuals and organisations respect the time required to ensure all parties have the appropriate capacity and capability to participate in regional dialogue and engagement processes that are inclusive and equitable.

Where positive and proactive engagement has already commenced, it is important that this continues with local Traditional Owner organisations while identifying opportunities to share lessons and outcomes with others in the region.

Water and catchment quality

Data confidence and knowledge

The Fitzroy REMP and regional Reef Report Card partnerships (e.g. Fitzroy Partnership for River Health) are key regional decision support tools and processes supported by both public and private investment. Evidence-based decision-making will only be possible into the future if the investment and coordination is maintained for these essential programs. Maintaining a strong value proposition for private investment is important and needs to ensure regulators continue to explore incentives and support collaborative initiatives such as the REMP.

Ensuring there is a current and joint stakeholder prioritised list of regional research needs aligned to regional environmental, economic, social and cultural targets and aspirations will help potential funding investors, including industry-led research and development programs, to direct investment to the greatest regional need.

Identifying opportunities for landholders to directly participate in monitoring initiatives that are integrated with open data sharing and communication initiatives.

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