CQSS2030
CENTRAL QUEENSLAND
Sustainability Strategy 2030

Natural Assets and Drivers

Introduction

Healthy natural assets sustain us

Our personal health and wellbeing, lifestyles, businesses and economy all depend on the health of the natural environment that surrounds us. When we talk of natural assets in the CQSS2030, we mean the major parts of our natural environment that provide important environmental services to individuals, businesses and communities.
In the CQSS2030, six natural assets are identified and while each asset is explored individually, it is important to remember they do not exist or operate in isolation – they are all interconnected. Add to this the people who live in the region as well as climate (two key drivers) and we have an ever-changing region. Because of asset and driver connectivity and their influence on one another, any change in one always affects the others.

In this document, you can learn more about their importance and connections, threats and status in central Queensland.

A word about asset status

Our region is not at a point where available data can be collated and analysed using a scientifically validated model to produce an accurate report on the status of our region's six region's natural assets and two key drivers.

Asset status in the CQSS2030 is a ready estimator based on:

- Global, Australian and Queensland reports
- The likely impact on our businesses, communities, economy and future if we change nothing in the next five years
- Results of the 2020 regional natural assets community survey

Asset status is shown by the following symbols.

Amazing job everyone! Everything is doing great and current trends are stable and/or improving.

Good job everyone! Most things are going well and current trends are stable.

Time to think and talk about this! Most things are okay but current trends are borderline and could easily head downhill.

Time to act everyone! Trends are heading too fast in the wrong direction. Let's turn this around.

Urgent action is needed! Trends indicate things are in a bad way. We need to act now!

Summary of threats to our assets and drivers

Soil	Groundwater	Freshwater	Land	Coastal	Air	Climate	People	
								Altered natural process
✓	✓	✓	✓	✓	✓	✓	✓	Climate change/extreme weather
✓	✓	✓	✓	✓	✓	✓	✓	Habitat degradation/fragmentation/loss/disturbance
✓	✓	✓	✓	✓		✓	✓	Changes to water flow and cycles/hydrological changes
✓	✓	✓	✓	✓			✓	Erosion
✓	✓	✓	✓			✓	✓	Salinity
✓	✓	✓	✓		✓	✓	✓	Desertification
✓	✓	✓	✓	✓	✓	✓	✓	Altered fire regimes
			✓				✓	Loss of pollinators
								People impacts
✓	✓	✓	✓	✓	✓	✓	✓	Poor land management practices
✓		✓	✓	✓	✓		✓	Recreation and other activities
✓	✓	✓	✓	✓		✓	✓	Overuse or excessive extraction of resources
		✓	✓	✓			✓	Poaching/illegal hunting and fishing/bycatch
		✓	✓	✓			✓	Unmanaged domestic animals/pets
✓	✓	✓	✓	✓	✓	✓	✓	Disconnect between people and nature/landscapes
✓	✓	✓	✓	✓	✓	✓	✓	Loss of knowledge
✓	✓	✓	✓	✓	✓	✓	✓	Population increase
✓	✓	✓	✓	✓	✓	✓	✓	Land clearing
								Pests and disease
✓		✓	✓	✓		✓	✓	Weeds
			✓				✓	Feral cats
		✓	✓	✓			✓	Foxes
✓	✓	✓	✓	✓		✓	✓	Feral pigs
✓	✓	✓	✓	✓		✓	✓	Other feral/pest animals
✓	✓	✓	✓	✓	✓		✓	Disease/pathogens
								Pollution
✓		✓	✓	✓	✓	✓	✓	Air pollution
✓	✓	✓	✓	✓			✓	Soil/water quality changes due to chemicals/nutrients
		✓	✓	✓			✓	Light pollution/noise pollution
		✓	✓	✓			✓	Rubbish/litter/excessive waste (includes plastics and electronics)

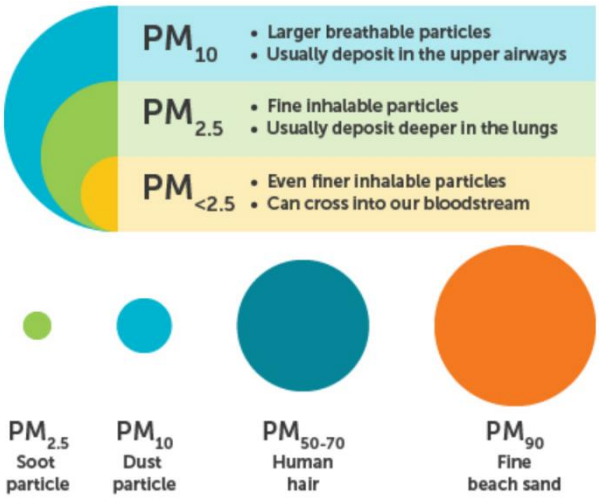
Air

The air we breathe provides oxygen that powers every cell and function in the human body; ensuring good air quality is critical to our health today and in future.

Importance	Threats	Status

Clean air provides free health insurance for everyone

Clear, clean air not only looks and smells good, but it is also good...for everyone including unborn babies. We now know that poor air quality raises the risk of developing lung and heart diseases, dying early and contracting some cancers. Children, the elderly, people with underlying health conditions and those living close to sources of air pollution are the most at risk. Clean air gives infants a higher chance of being born a healthy weight, staying healthy and developing normally. Studies as recent as 2016 indicate that air pollution in Australia claims more than 3,000 lives each year with related mortality costing the public approximately $16 billion each year. Lives and money are not the only cost of poor air quality. Air pollution causes damage to our buildings, cars and other infrastructure, impacts the health of plants, animals, waterways and oceans, and contributes to higher temperatures. This is because many of the air pollutants that damage human health also damage other living things, built environments and trap heat in the air.



Air quality is measured by the quantity and size of particulate matter in the air. The particle size of particulate matter is measured in micrometers (one millionth of a meter!). Particles that are smaller than 2.5 micrometers can cross into our bloodstream and cause problems elsewhere in our body.

Diagram adapted from US EPA

Put another way, maintaining good air quality helps:

- maintain good lung and heart health in young and old alike
- reduce the demands on our public health and home care systems
- keep our local (and cumulatively global) temperatures cooler
- keep our buildings and natural areas in better condition for longer
- reduce the demands on our tax dollars

DID YOU KNOW? There may be no safe level of air pollution. This is because long-term cumulative and short-term acute exposure both cause health effects. Source

Maintaining good air quality requires that we all do what we can to lower emissions and increase the health and extent of our land and marine ecosystems.

To breathe easy, we need to break a complex cycle

Climate change, air quality and human health are intimately linked in a cycle that presents a confronting challenge to the entire human population. Declines in air quality increase our risk of illness and increase local ambient temperatures. Temperature increases along with declined air quality contribute to changes in local as well as global weather patterns. This in turn requires more power generation for cooling and healthcare, which impacts air quality.
This cycle combined with declines in the extent and health of land-based and marine ecosystems (both locally and around the world) means our planet's ability to maintain good air quality is slowly declining.

Below provides a snapshot of the most common sources of pollution and/or particulate matter affecting air quality in the central Queensland region:

1. Emissions from fossil-fuel power generation and use (including exhaust from motor vehicles)
2. Smoke and gases from all types of fires
3. Dust and particulate matter from cleared land and disturbed soils
4. Pollen from flowering plants
5. Salts from soil and coastal areas
6. Loss of vegetation and in turn the screening and filtering services it provides
7. Prevailing weather conditions including high winds, extended dry periods, big storm events and high temperatures (which all influence 1, 2, 3, 4 and 5 above)

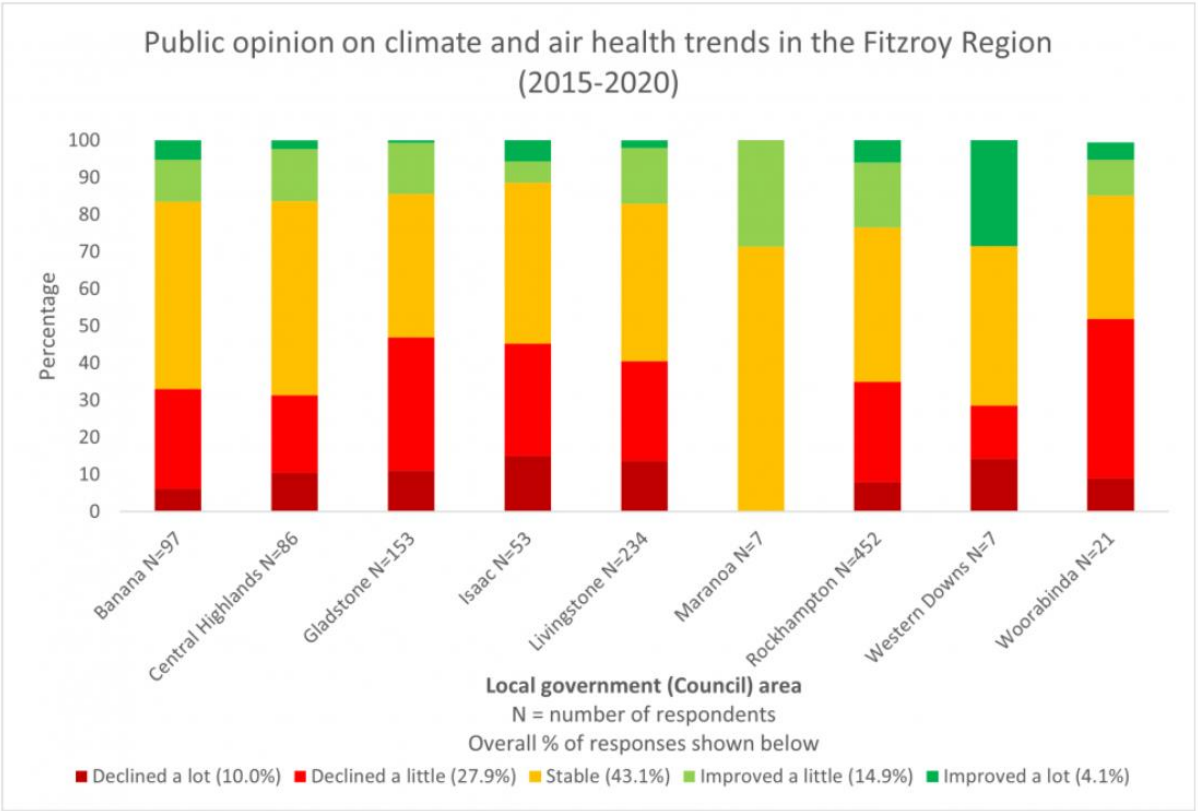
DID YOU KNOW? In Australia, air pollution from power generation, vehicle and industrial emissions causes more deaths per day than the national road toll. Source

Our air is okay, but is it good for our kids?

By world standards Australia's and central Queensland's air quality is relatively good, however, we cannot afford to be complacent. Events in recent years have resulted in periods of poor air quality in our region. Smoke from the 2019 bushfires around Rockhampton and the Capricorn Coast is just one instance. 2018 data from the National Pollutant Inventory (which provides publicly available information on substance emissions in Australia) shows central Queensland is home to at least 13 postcodes with high levels of air pollution. We are also home to one of the oldest (and subsequently more inefficient and less clean) power stations in Australia. As we get more hot days, higher temperatures, longer dry spells, and bigger and more frequent storm and fire events, our air quality and our health is at risk. These risks will only increase as we house and transport more people, and produce more goods and services in our region.

DID YOU KNOW? As recent as 2017, out of 35 OECD countries, Australia ranked lowest in fuel quality. In urban areas, vehicle emissions contribute up to 80% of nitrogen dioxide emissions. Reducing them would help improve our air quality and reduce childhood asthma rates. Source

In 2020, we asked our community how they thought the health of climate and air in their local government area were trending based on the preceding five years. The majority of respondents considered them stable, while more people considered them to be declining than improving.



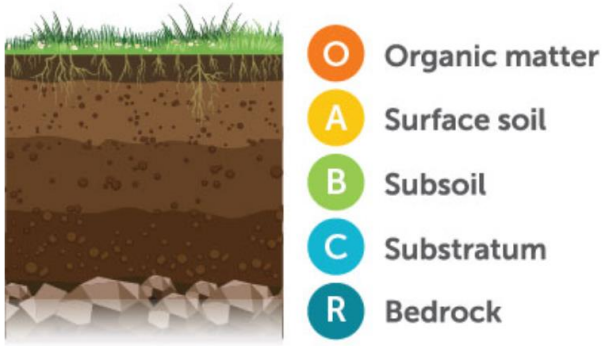
Soil

The health of everyone and everything around us depends on the quality of our soils. By protecting and nourishing them, we are looking after ourselves, our diets, rivers, creeks and the Great Barrier Reef.

Importance	Threats	Status

Healthy soils provide a healthy foundation for life

The food we eat, clothes we wear, air we breathe and water we drink all rely on healthy, productive soils. Modern science has only just scratched the surface on how our health is connected with soil and it's proving to be far more complicated than we might think. We do know however, that airborne soil particles cause respiratory problems, soil in waterways makes them and us sick, and toxins polluting soil pass through our food and into us.
It pays to keep soil healthy and where it belongs for these and many more reasons!
Soil is literally the foundation for central Queensland's multi-million agricultural industry – approximately 80% of our land area is managed for food and fibre production and we are home to over 25% of QLD's cattle (that's over 2.5million head!). Crops and pasture grasses fail to thrive when soil is in poor condition and along with them so do our crops, livestock, farms and local economy.



Soil is the loose surface material covering most land and is made up of parent rock, organic matter and living organisms. The topmost layers (O & A) are commonly referred to as 'top soil'.

Diagram adapted from Australian Environmental Education

Healthy soils also play a vital role in:

- filtering rainwater into underground aquifers and streams
- preventing runoff (flash flooding) and keeping our waterways clean
- nourishing native plants and animals
- preventing dust storms and maintaining air quality
- carbon storage which helps reduce and protect against climate change
- the production of medicines that humans rely on e.g. penicillin

- keeping our infrastructure safe (acid sulphate soils and salinity damage houses, bridges, and roads)
- building our resilience to natural disasters such as storms, bushfires, floods, and droughts (we all bounce back far quicker if our soils are healthy to begin with!)

DID YOU KNOW? We lose far more soil than can be produced. It can take up to 1,000 years to produce just 2-3cm of soil, while soil erosion rates on farmed land can be 100-1000 times higher than what would naturally occur. Source

Soil health requires the right balance of nutrients, organic and inorganic particles, and microbiology (microscopic plants and animals). The right type of land management and ground cover is also essential.

The future of our soils depends on us

By world standards, Australian soils are quite old and fragile. Because they are older, they are generally easy to wash or blow away, do not readily hold onto water and nutrients, and need more rest and care when they are in poor condition. Anything that damages or destroys soil biology (life), structure, or the soil's natural protective cover of plants and plant debris, makes them very susceptible to erosion and further decline.
In the central Queensland area, there are many threats to soil health and these are caused by a combination of how we use and manage our landscapes today, what has happened in the past, and what is happening right around the world.

Below provides a snapshot of the most common threats to soil health across our region:

1. Land clearing to accommodate agriculture, urban areas, industry and roads
2. Changes in weather patterns including increasing temperatures, dry periods and extreme rain events
3. Changes in weather patterns including increases in dry periods and extreme rain events
4. Compacting soils with heavy machinery, repeated vehicle, human or animal traffic
5. Adding or removing too many nutrients, or introducing toxins (including human and animal poo!)
6. Removing or transporting soils, or replacing them with other materials
7. Changes in the way water moves across and through the landscape (which is influenced by all of the above!)

DID YOU KNOW? As the world's 6th largest country, Australia has a size of over 7.7 million square kilometres. Over half is dedicated to agriculture which employs over 300,000 people. Source

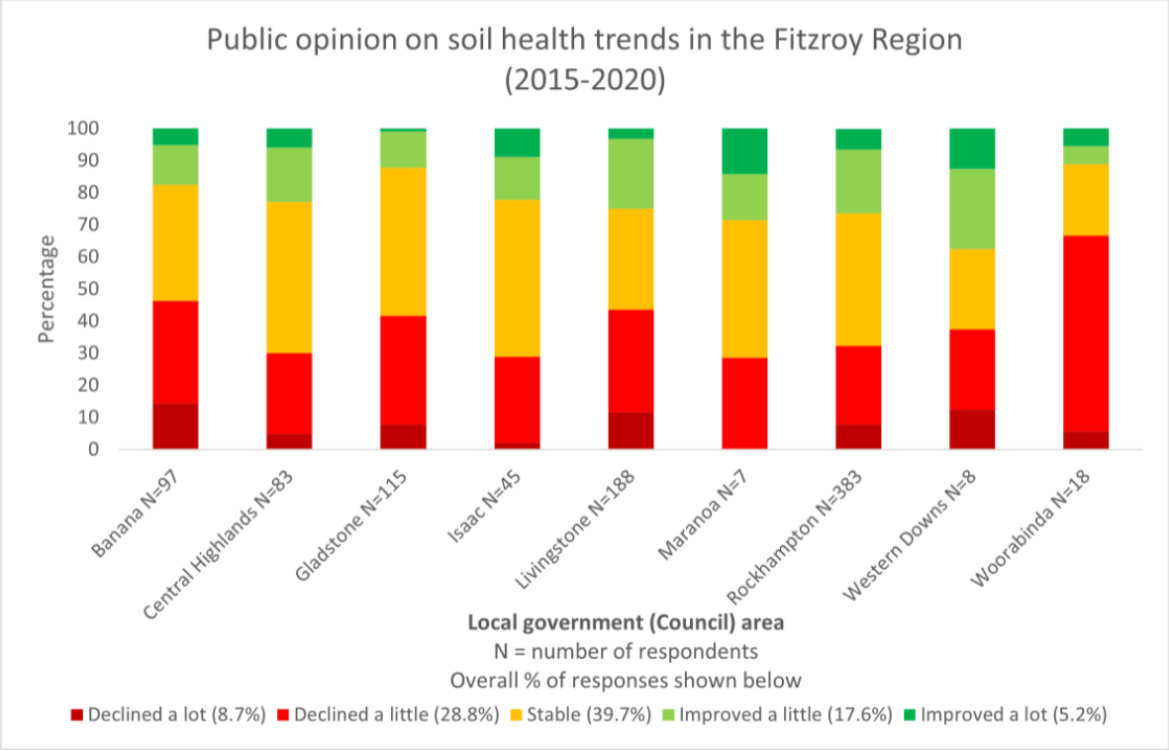
Our soils produce approximately 85% of our nation's daily food supply, as well as considerable exports (worth $49.2 billion in 2018-19). Source

CQ soils need urgent care and attention

The Fitzroy Basin (which covers most of central Queensland) loses an estimated 4.1million tonnes of top soil and sub-soil each year through wind and water erosion... that's enough soil to grow enough vegetables to feed 110,215 families every year.
As we get more hot days, higher temperatures, longer dry spells, and bigger but less frequent rain events we are likely to lose even more soil each year. Combine this with increasing pressures to home more people and produce more food from our region, it means the race is on to save the soil we have left and ensure it stays healthy.

DID YOU KNOW? The soil we lose each year through rain and wind events mostly ends up in our waterways and coastal waters where it damages life under water. Next to rising temperatures and sea levels, this sediment is the biggest threat to our part of the Great Barrier Reef! Source

In 2020, we asked our community how they thought the health of soils in their local government area were trending based on the preceding five years. The majority of respondents considered them stable to declining.



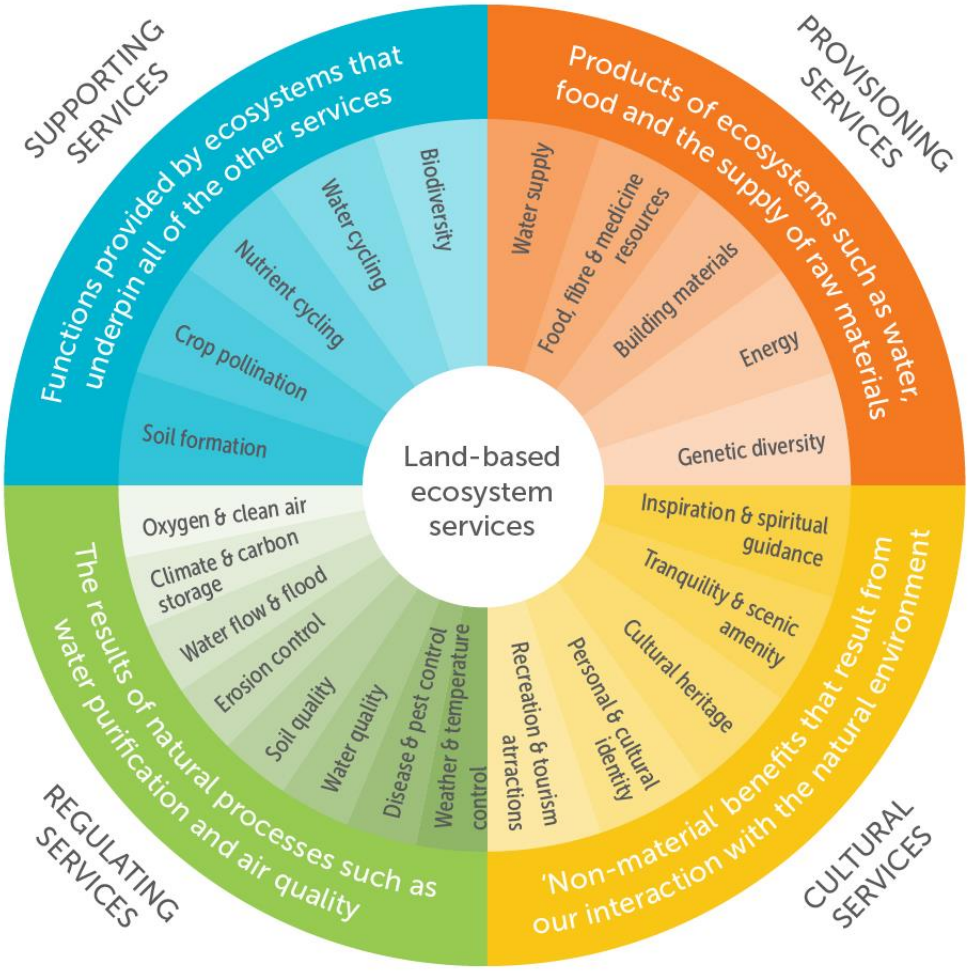
Land-based Ecosystems

Plants, animals and land-based ecosystems deliver many unseen and essential services. They support our wellbeing, businesses and lifestyles on a daily basis.

Importance	Threats	Status

Land-based ecosystems provide a critical workforce

While it may seem strange to think about plants, animals and ecosystems in terms of the services they provide, the truth is, if we lose any part of our land-based ecosystems, our ability to maintain our health, homes, businesses and economy decreases.
With over 6,700 different native plant and animal species making our region home, it's not hard to imagine just how complicated, diverse and widespread our land-based ecosystems are. Individually and as a whole they provide us with tourism attractions, clean air and water, pollinated crops, scenic amenity and much, much more. Every plant and animal plays an important role, and while we don't always understand or see their importance, they are connected with everything around it.



Like any workplace, losing just one worker means vital jobs and services are left undone. Losing a lot of workers results in unintended and unwanted consequences that can impact whole communities, including people, for decades or longer.

Our land-based ecosystems, including all our native plants and animals, provide many benefits we don't think about very often but can't live without.
Diagram adapted from IUCN

Together, native plants, animals and ecosystems help to:

- prevent runoff (flash flooding), keep our waterways clean and protect our Great Barrier Reef
- build soil, keep it healthy and where it belongs
- provide food and homes for other native plants and animals (foodchains)
- lessen the impacts of heatwaves, dust storms, floods and droughts on us
- provide medicines, foods, materials and spaces that people rely on
- keep our towns and cities attractive and liveable
- form part of our regional, state and national identity.

DID YOU KNOW? According to a 2019 survey of over 55,000 people, 'appreciation of the natural environment' was considered the second most important aspect of 'being Australian'; the first was 'respecting our institutions and laws'. Source

Our unpaid workforce needs our help

Just like people, native plants and animals need families, healthy communities and access to essential services to thrive. When too much vegetation is cleared or key plants and animals in the food chain disappear, the whole system starts breaking down. Everything that remains is under increased pressure to perform well without access to everything it needs to survive. As a result, the remaining plants, animals and systems become weaker or disappear altogether.
In the central Queensland area, there are many threats to our native plants and animals and the land-based ecosystems they support. These threats are caused by a combination of how we use and manage our landscapes today, what has happened in the past, and what is happening right around the world.

Below provides a snapshot of the most significant threats to land-based ecosystems across our region:

1. Land clearing to accommodate agriculture, urban areas, industry and roads
2. Changes in weather patterns including increasing temperatures, dry periods and extreme rain events
3. Uncontrolled fires, fires that are too intense, at the wrong time of year and/or fires that are too frequent
4. Overharvesting or removing too much or key parts of the ecosystem (this leads to loss of biodiversity and sometimes whole populations of plants and animals)
5. Feral animals, weed infestations and domestic animals that hunt native animals or introduce diseases
6. Introducing toxins and waste to the system (this includes human and pet food, rubbish and chemicals – both accidentally and intentionally)

7. Changes in the way water moves across and through the landscape (which means some areas get too much water and others don't get enough)

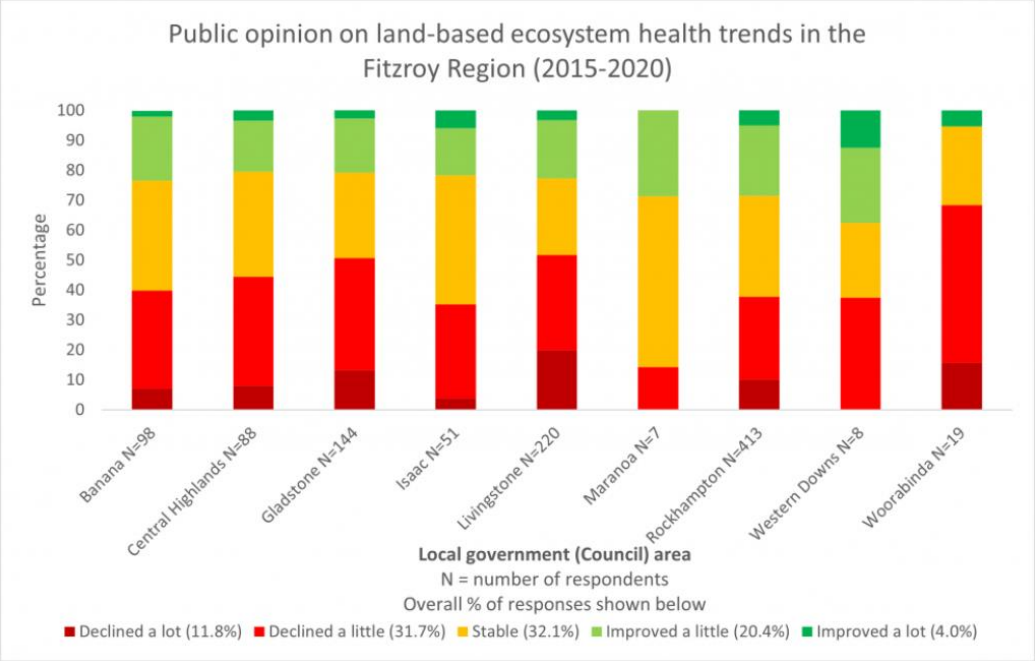
DID YOU KNOW? Over half of the world's gross domestic product (GDP) is moderately or highly dependent on natural capital and ecosystem services. A recent estimate values the ecosystem services provided by biodiversity at US$33 trillion per annum which is close to the combined GDP of the United States and China! Source

Our critical support workers are suffering badly

Central Queensland is home to four of the top 12 electorates in Australia for threatened species habitat loss between 2000 and 2017. Not only that, Queensland is by far the worst-performing state in the whole of Australia for native vegetation clearing. Some clearing is regulated and known about, while some of it is not. If we continue the way we are, we risk destroying the very plants, animals and ecosystem services that underpin our agricultural and tourism industries and make our region attractive to live in.
As we get more hot days, higher temperatures, longer dry spells, and bigger and more frequent severe weather events, our native plants, animals and ecosystem services will suffer along with us. Combined with increasing pressures to house more people and produce more food means we all have a role to play right now in protecting and providing for our native plants and animals.

DID YOU KNOW? In our highly modified landscapes, cities and towns provide critical, and sometimes the only, habitat for native plants and animals. This means every backyard can play a vital role in safeguarding what is left. Source

In 2020, we asked our community how they thought the health of land-based ecosystems in their local government area were trending based on the preceding five years. The majority of respondents considered them stable to declining.



Freshwater Ecosystems

Although two-thirds of the Earth's surface is water, less than 1% is accessible and fresh, making freshwater one of our most precious resources.

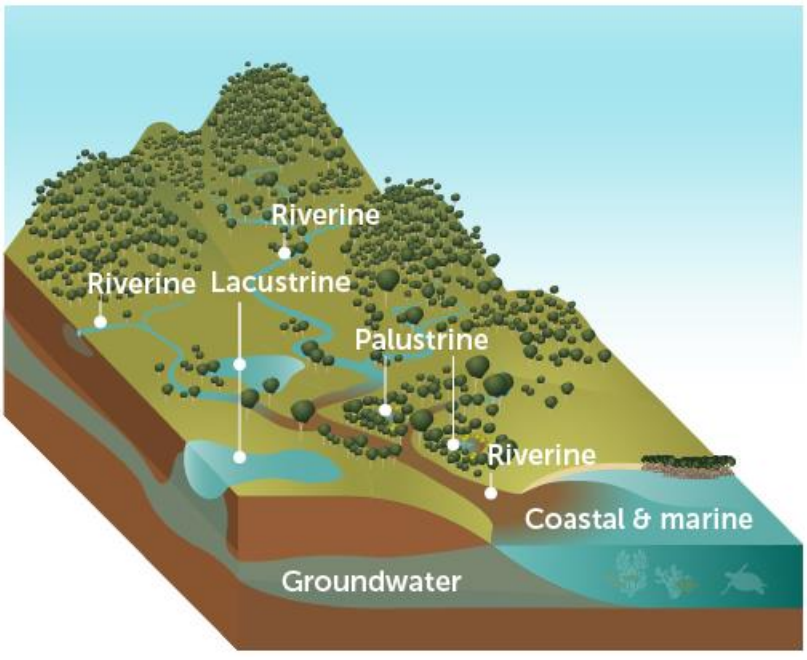
Importance	Threats	Status

No water, no life

Supporting life as we know it, our regional waterways (rivers, streams, lakes and wetlands) are vital for people and nature. We need freshwater for drinking, to produce and grow our food, keep clean, and manufacture nearly everything including our electricity.

Freshwater ecosystems are also rich in biodiversity, providing critical habitat for a wide variety of native plants, birds, fish, mammals and invertebrates. Many rely on different parts of waterways during different stages of their lives, including those that spend their adult lives in coastal and marine waters.

In central Queensland, freshwater is often discussed in relation to water *quality* because it supplies our drinking water, sustains healthy waterway ecosystems, and also because the water leaving our region ends up in the Great Barrier Reef (our region has the largest catchment draining to it). Poor water quality is a major threat to our Reef and the industries it supports because sediment, nutrients, chemicals and other pollutants transported by our waterways, damage the health of corals and many other marine species. Water *quantity* is also an important consideration because it determines how many plants, animals and industries our waterways can support, which in turn determines how resilient our region is to prolonged droughts, major weather events and changes to the economy.



The health of our waterways depends heavily on the health of our land-based ecosystems and groundwater reserves. Likewise, our region's groundwater and coastal and marine systems depend heavily on healthy waterways and land systems.

Diagram adapted from WetlandInfo

All freshwater ecosystems are invaluable in our region because they:

- purify and transport rain and water throughout our landscape
- are the lifeblood of our agricultural industry and most of our inland towns
- create important corridors for native animals to live and move throughout the region
- support a high diversity of native plant and animal species, many of which are threatened or facing extinction, some of which are found no-where else in the world
- provide a natural drainage system in big rain events, and storage system in dry times (sometimes providing an important source of fire-fighting water)
- help keep our landscapes cooler and wetter, which benefits people, stock and native plants and animals
- are part of our groundwater systems and influence the health of our coastal and marine ecosystems
- are part of a system that supports 20 wetlands of national significance, and two of international significance

DID YOU KNOW? The majority of water used in Queensland comes from surface water systems (approximately 95%), and about 2/3 of this is used to support our agricultural sector. Source

Importance	Threats	Status

Waterways receive and flush waste, and supply our drinking water

The health of freshwater environments is influenced by a range of human and environmental factors. Some are the direct result of our regional decisions and actions today, while others are the legacy of past generations. The health of our waterways is also influenced by the actions and decisions of people around the globe because of their influence on global weather patterns. Combined with our regional geology (land formations and rock types), and hydrology (the way water moves across and through our region), human behaviour and our local land management practices determine the state and health of our waterways now, creating our legacy for future generations.

The health of our rivers, streams, lakes, and wetlands in central Queensland is primarily influenced by:

1. Pollution from surrounding urban, industrial and agricultural areas including rubbish, chemicals, and nutrients and sediments from soil
2. Land management and building practices that create impermeable or bare ground (this leads to stronger, faster water flows that increase erosion and pollution)

3. Dams, water extraction and any activities that change where and how much water flows across and through the landscape (including underground)
4. Land clearing and land management practices that reduce plant-based ground cover (this changes soil water absorption, surface water flow and creates subtle changes in local weather patterns)
5. Weather patterns and events, especially heavy rains, extreme storm events, and longer, hotter dry seasons
6. Exotic plants and animals that change or overtake waterways, especially those that outcompete or prey on native plants and animals
7. Climate change intensifies the impact of 1-6 above.

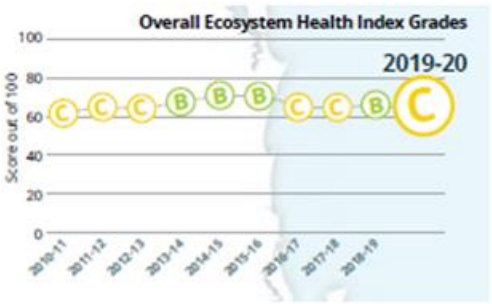
DID YOU KNOW? Of the OECD countries, Australia has one of the highest uses of water per person. Water constraints and scarcity, already a significant concern for billions of people around the world, is expected to become an even greater issue for Australians as the climate continues to warm. Source

Importance	Threats	Status

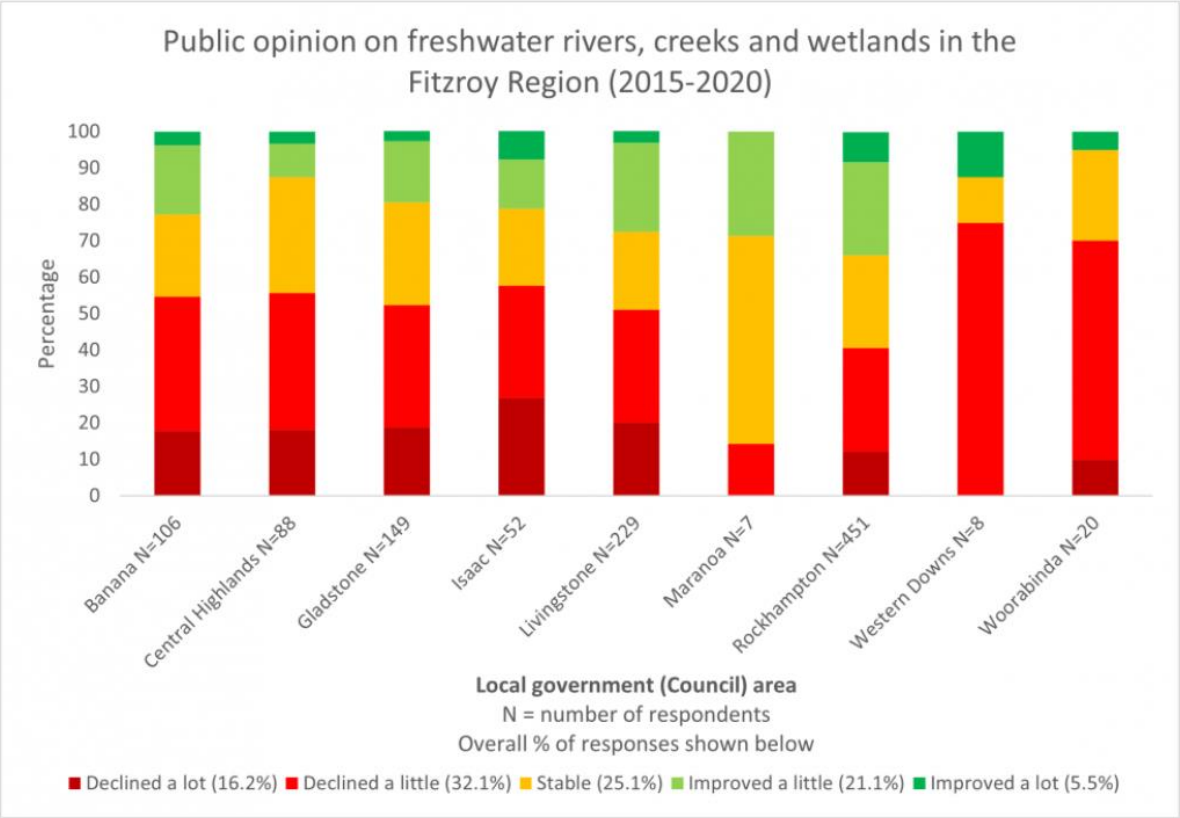
Are our waterways getting the best grades possible?

In central Queensland, we are fortunate to have designated water quality monitoring and reporting for the Fitzroy Basin. The Fitzroy Partnership for River Health (FPRH) releases reports cards on the state of 20,000km of waterways within 11 freshwater catchments of the Fitzroy Basin each year. Reports indicate a mix of fair and good results and that generally, water quality is within guideline levels aimed to protect ecosystem health. Considering the extent of land clearing over the past 200 years and the fact Fitzroy Basin is a busy, working catchment, our system has proven quite resilient so far.
Because water quality trends are closely linked to hydrology and in particular, rainfall events, and because modelling shows our weather patterns are changing, anything we can do now to further safeguard our waterways is in our best interests. Reducing sediment runoff is a critical factor as it can help improve water quality and ecosystem function. Both of these will become increasingly important to us as dry spells get longer and hotter, and as our demands for food, water and housing increase.

DID YOU KNOW? Our waterway report cards summarise data for various indicators collected at over 200 sites across the Fitzroy Basin. The grades are rigorously analysed and endorsed by an Independent Science Panel. The Fitzroy Basin does not include our coastal catchments, but waterway reporting soon will. Source



In 2020, we asked our community how they thought the health of freshwater environments in their local government area were trending based on the preceding five years. The majority of respondents reported no change to some decline.



Groundwater

Worth more than we think, groundwater pumped to the surface in a second may have taken centuries to form, and could take centuries to replenish.

Importance	Threats	Status

The most undocumented source of life may be beneath our feet

Shaped by underlying geology, groundwater systems are intimately connected with freshwater, land and coastal ecosystems and our weather; we still have a lot to learn about them and their interconnections. Despite the fact groundwater is not well mapped or understood (in our region or on the whole), it provides a critical water source for many of our inland communities, our agricultural sector and many surface waterways including wetlands, lakes and rivers. Even many of our region's native plant and animal communities could not survive without permanent or intermittent access to groundwater (these communities are referred to collectively as *groundwater dependent ecosystems* or GDEs).
The significance of groundwater is especially pronounced in Australia because we are one of the driest, inhabited continents on Earth. As dry seasons extend, rainfall events get fewer and further between, and average temperatures rise, our groundwater resources will become increasingly important to everything that relies on them.

It can take years, decades, centuries or even longer for groundwater reserves to be replenished from rainfall and surface wetlands. Similarly, the impacts of groundwater extraction may not be recognised until much later, sometimes also far away from the site of extraction. Source

Diagram adapted from ResearchGate

In summary, groundwater systems are important to our region because they:

- play a vital role in supplying water into our surface waterways (including wetlands of national and international significance)
- support groundwater dependent ecosystems that provide us with other valuable ecosystem services

- store water that is sometimes the only supply for people, plants and animals during times of extended drought
- are home to unique animals (called *stygofauna*) which help in nutrient cycling, indicate groundwater system health, and may also contain important properties yet to be discovered
- support our agricultural and mining sectors as well as many rural residents and communities

DID YOU KNOW? In 2013, the economic value of Australian production supported by groundwater was a staggering $33.8 billion! This excludes non-consumptive contributions to tourism through environmental biodiversity, cultural values and maintaining water quality. Source

Our least understood natural asset is also undervalued and overused

Because groundwater systems are vast, complex and hidden, the methods required to study, monitor and map them are still in the early stages of development relative to all other natural assets. Considering we are already extracting groundwater and there have been significant changes to the systems that replenish it, our lack of understanding and ability to accurately monitor groundwater may well present the biggest threat to its health and future.
The little we do know suggests that more caution and knowledge is urgently required. Mostly because it is well established that weather patterns are changing, demand for water is rising, surface water is already over-allocated, and the movement of water into underground aquifers is naturally slow (sometimes taking 10s or 100s of years).

The biggest threats to groundwater systems in our region are:

1. Lack of knowledge, including lack of consistent and regular monitoring
2. Over allocation and extraction of surface and groundwater (because of their interconnectedness, over-extracting surface water also limits groundwater recharge)
3. Impacts from coal seam gas fracking (CSG industry) that depressurises (causes leaks in) underground aquifers
4. Chemical pollution from urban, industrial, agricultural and mining operations
5. Changing weather patterns especially prolonged dry periods and lower rainfall
6. Increases in average temperatures which create higher evaporation rates and increase the use of water by all living things

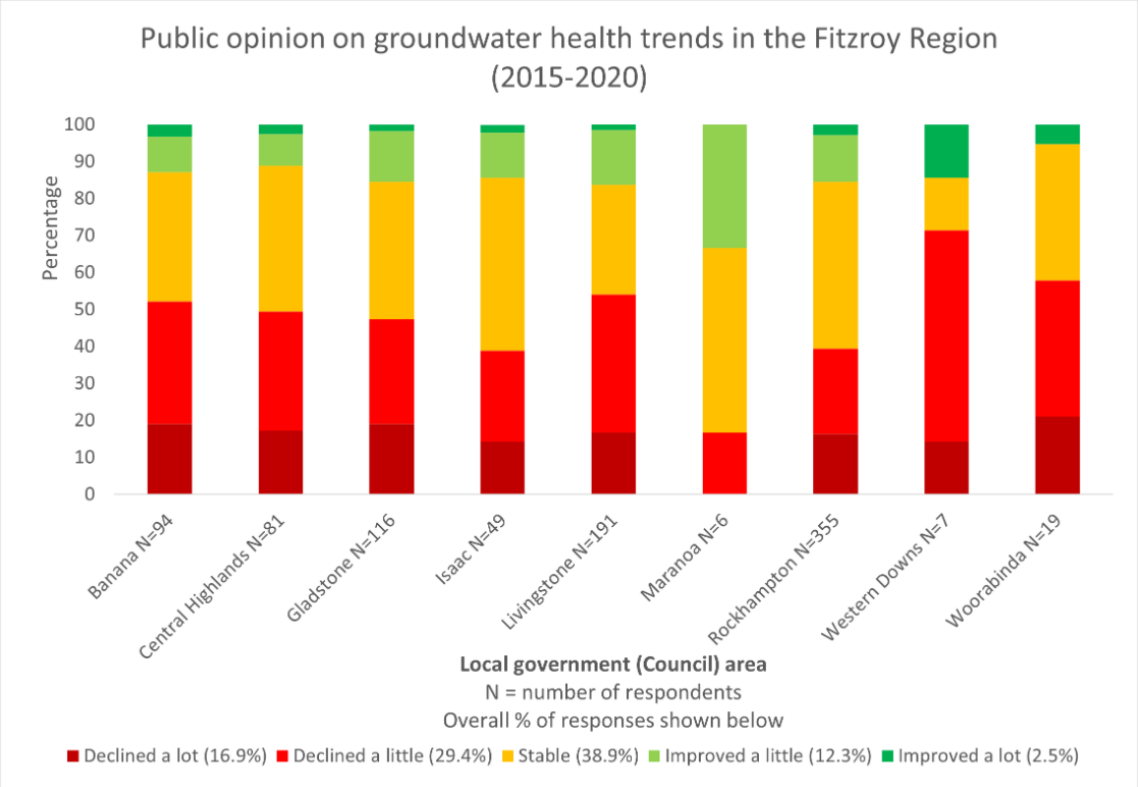
DID YOU KNOW? Groundwater makes up approximately 17% of accessible water in Australia, and accounts for over 30% of our total water consumption. Agriculture accounts for approximately 60-70% of this use. Source

What we know isn't much, but we know we need to do better

There has been an increase in the monitoring of groundwater in some areas, including central Queensland, which has started to reveal the health of our groundwater systems. The latest data shows that most monitoring sites show average to above-average levels of groundwater, however their status is considered to be poor and deteriorating. Their poor condition relates to historical overuse of groundwater, a lack of baseline data and accurate metering since, as well as a lack of understanding about the immediate and longer-term impacts on groundwater dependent ecosystems (GDEs).
Without sufficient and coordinated measurement and monitoring of groundwater and their associated GDEs in our region, it is not possible to know how much can be extracted without causing significant issues in connected surface waterway flows, groundwater dependent ecosystems or for other people who rely on it.

DID YOU KNOW? The oldest groundwater in the world was dated at 2.64billion years old (10 times older than the earliest dinosaur). Groundwater reserves can take up to 1000 years to replenish because surface water sometimes travels great distances through rock. Source

In 2020, we asked our community how they thought the health of groundwater in their local government area was trending based on the preceding five years. The majority of respondents considered it stable to declining.



Coastal and Marine Ecosystems

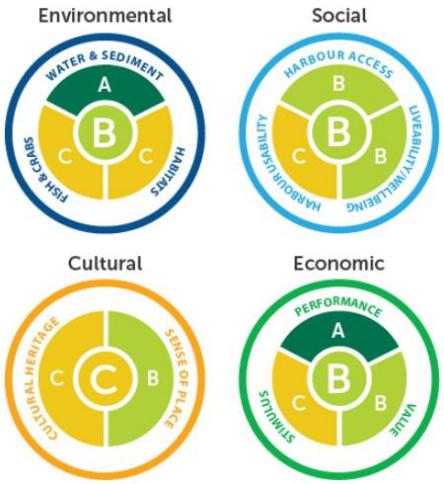
Our regional coastal and marine systems matter to more than just us; they provide economic, social, cultural and weather services here and around the globe.

Importance	Threats	Status

Our front door opens onto the southern expanse of an international icon

Coastal and marine systems, and particularly the infamous Great Barrier Reef, are a key part of our regional and Australian identity. More than 85% of Australians live within 50 kilometres of the sea, and our nation relies on the coast for almost all our international trade. Notably, Gladstone is home to Queensland's largest multi-commodity port and a key commercial fishing area for CQSS2030 region. Both commercial wild-catch fishing and tourism industries are important contributors to our regional and national economy (nationally, they are currently valued at approximately $50 billion per year, and expected to double over the next few years) and rely on healthy coastal and marine systems. Unsurprisingly, our coastal waters form an important basis for our regional recreation industry, with central Queensland residents reporting one of the state's highest recreational fishing rates. 33.2% and 28.4% of us report fishing at least once a year in the Gladstone and Rockhampton areas, with most preferring to fish in coastal estuaries and inshore waters.

Importantly, coastal and marine systems are at the frontline of rising sea levels, storm surges and extreme weather and play a critical role in controlling global weather patterns. They also support incredible biodiversity, containing a variety of species that have important biological, social, and cultural values to people here and right around the globe. In addition, they are one of the keys to ensuring human health with fish being the fourth-highest category of protein consumed by Australians, and oceans providing up to 80% of the oxygen we breathe.



Marine and coastal health is measured by a wide variety of things including the amount of pollution (plastic, fishing gear, sediment and/or chemicals), fish productivity, species populations, habitat condition and extent, water temperature and acidity levels. Social, cultural and economic indicators are also important indicators of system health.

Diagram adapted from GHHP

Put another way, our regional marine and coastal areas:

- help support global, national, and local food security
- form and help protect part of the Great Barrier Reef
- are a valuable tourist destination in their own right
- underpin local economic growth, jobs and wellbeing
- protect locally and globally significant species
- buffer our coastal communities and industries against extreme storms and tidal surges
- help keep our local (and cumulatively global) temperatures cooler
- absorb carbon which helps reduce greenhouse gases and global warming
- help produce up to 80% of the air we breathe

DID YOU KNOW? The Great Barrier Reef accounts for more than 15% of the world's tourism industry revenue (approximately US$5.7 billion each year). In 2015-16 alone, it was estimated to generate $3.9 billion and 33,000 jobs for Queensland. Source

All drains lead to the ocean...and back to us

Our coastal and marine systems face many threats from a wide variety of sources and the results often interact in a way that intensifies the damage. These negative feedback loops also impact us, our weather, and land-based ecosystems.
Many of the threats are a combination of local and global human activities that stem from not knowing how much damage one action can create or being focused (understandably) on more immediate concerns like earning a living or securing food. A lack of understanding about the interconnections between land, water, weather and marine systems and their connection to our personal health, and food and economic systems is also part of the problem. Luckily, there is a lot we can do in our region to help safeguard our local coasts and marine areas.

The biggest threats to our region's coastal and marine systems and the plants and animals they support include:

1. Increases in the ocean and air temperatures (on average, these have both risen by 1degree Celsius over the last century)
2. Regional land clearing for ports, industry, urban and agricultural areas (particularly in coastal areas, but clearing further inland also causes damage – see 3 below)
3. Pollution from agricultural, urban and industrial runoff. This includes soil and the nutrients and chemicals carried with it, as well as plastics and non-biodegradable rubbish of all types and sizes
4. Changes to water flow from and between freshwater, coastal and groundwater systems.
5. Rising sea levels and more frequent and severe weather events

6. Overharvesting of coastal, and more often marine plants and animals both locally and further afield
7. Damage caused by recreational and commercial boating and diving activities.

DID YOU KNOW? A 2019 study revealed that, on average, we consume the equvalent of a credit card in plastic each week (5g), or a dinner plate each year (250g). Most of this comes through seafood that has eaten microplastics from the cosmetics and non-natural clothes fibres that wash into the ocean. Source

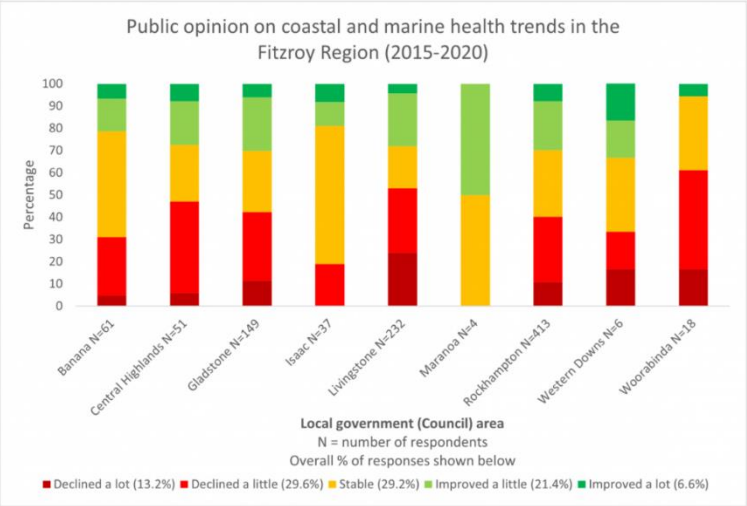
Importance	Threats	Status

We need to turn the tide on more than just global emissions

Because coastal and marine systems are at the end of the line (subject to everything that washes down our rivers and streams), and subject to global ocean currents and weather patterns, they face multiple interacting pressures and increased negative impacts. Extreme weather events in recent years have resulted in widespread coral bleaching, habitat loss and species mortality in our region. Whilst some pressures are decreasing due to stricter regulations on Australian commercial fisheries, development, agricultural industries, and the oil and gas industry, other pressures are continuing to increase with insufficient data available on their impacts. Although stricter regulations are in place for commercial fisheries, compliance is not well documented, and recreational fishing takes are not easily or routinely monitored. Bycatch from commercial and recreational fishing is also not well known or addressed. The level of vessel activity in marine waters and estuaries continues to grow, and along with it, the associated risks of vessel strike, boat groundings, damage to critical areas, and foreign species.
The combined impact of these multiple pressures will only worsen as our regional and coastal populations grow, sea levels and temperatures continue to rise and weather patterns change.

DID YOU KNOW? On our current trajectory, global temperatures are set to rise 1.5-2 degrees Celsius this century (another 0.5-1 degree Celsius). If we find ways to avoid this, we could save 70-99% of remaining coral reefs around the world, and in Australia more than 64,000 reef related jobs and $6+ billion in income. Source

In 2020, we asked our community how they thought the health of coastal and marine environments in the region were trending based on the preceding five years. The majority of respondents reported this asset to be stable to declining.



Climate

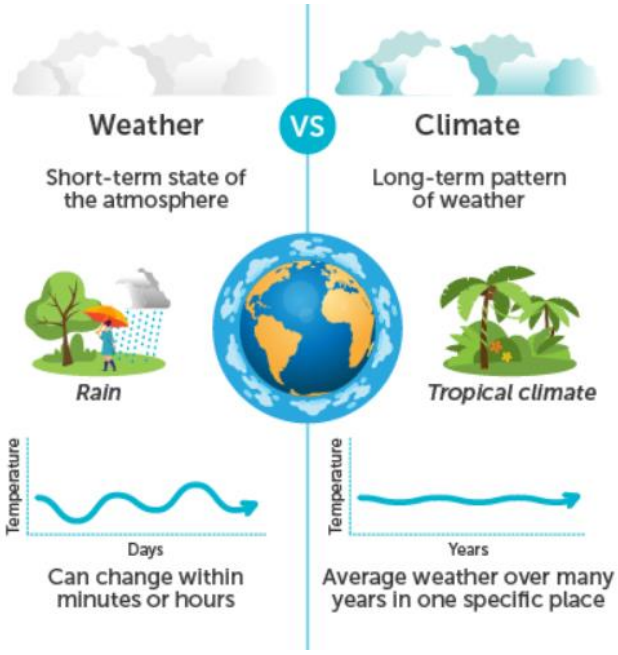
Climate is the key driver of all natural processes, determining which plants, animals and environments can exist. Changes to our climate cause changes to whole ecosystems, coastlines, economies and more.

Importance	Threats	Status

Climate controls who's in and who's out

Powered by the sun and determined by the movement and mixing of our oceans and atmosphere, climate refers to the average or expected weather pattern in a given area over a long period of time. Weather patterns (temperatures, rainfall and prevailing winds) determine the type of environments that dominate, which in turn dictate which plants and animals can thrive, merely exist or disappear altogether. As the biggest driver of all natural processes, climate also determines our lifestyles and livelihoods.

Because climate controls which plants and animals can live, how extreme weather gets and how much of the world's water is stored as ice, even small changes can result in big shifts for us. Changes include where and how we can build our homes, which businesses are needed and what goods or services they supply, what food we can grow, as well as how much insurance we need to pay and what exclusions apply. Climate also influences how much heating or cooling we need, so it even influences our electricity bills!



Local weather is influenced by a combination of things including land cover, distance from the earth's equator, prevailing winds, height above sea level, as well as the distance from the sea and aspect. The biggest driver however is our global climate.

Diagram adapted from [Australian Environmental Education]

Limiting human contributions to climate change (also known as *anthropogenic* climate change) will greatly assist with:

- reducing the need for humanitarian aid (and reduce migration)
- reducing the demands on our health and energy systems
- reducing the factors that threaten our health and wellbeing (including mental health)
- improving the recovery chances for threatened plants, animals and ecosystems
- improving Australia's food and water security
- our international relations

DID YOU KNOW? According to the Climate Council, the cost of climate-fuelled extreme weather in Australia totalled $35 billion over the past decade. Source

The most pressing cause of climate change is also the solution

Earth's climate has constantly changed since the planet formed billions of years ago, driving the development and adaptation of all plant and animal species. However over the past 150 years, changes to our atmosphere have sped up, and plants and animals are no longer able to adapt fast enough. In the past, significant climate changes happened over the course of centuries or millennia, but significant changes now occur within decades and certainly within one human lifetime. The Intergovernmental Panel on Climate Change's (IPCC) 2021 assessment report states there is no doubt that human activity has warmed the atmosphere, ocean and land, and that the scale of these changes is unprecedented over many centuries to many thousands of years.
While the activities that speed up climate change occur on global scale, what we do here in central Queensland matters at a local, national and global level.

The most common threats to climate from our regional activities include:

1. Greenhouse gas emissions from mining and electricity generation
2. Greenhouse gas emissions from transport and industry
3. Land clearing to accommodate agriculture, urban areas, industry and roads
4. Greenhouse gas emissions from landfill and agricultural practices

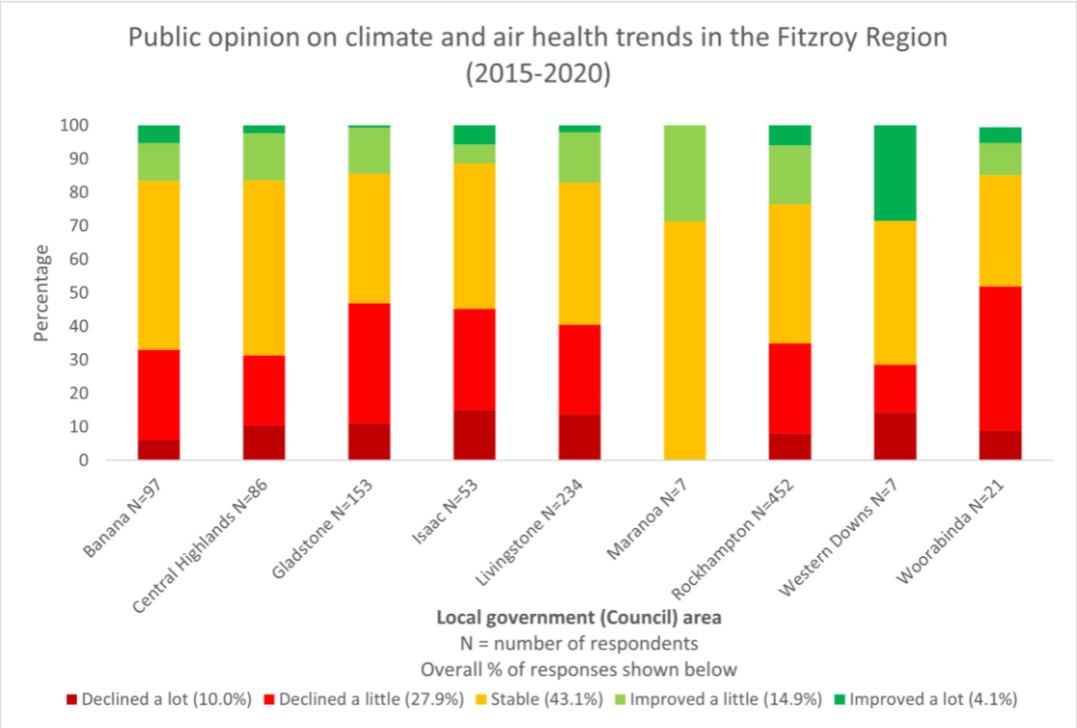
DID YOU KNOW? Since 1850, atmospheric carbon dioxide (a significant heat-trapping gas generated by land clearing and burning fossil fuel) has increased by 48% due to our post-industrial activities (the human population has increased by approximately 625%). Source

Climate changes are impacting where and how CQ lives

Detailed climate monitoring has occurred for more than 100 years, the results of which are reported by Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO). The 2020 State of the Climate report shows that Australia's climate has warmed on average by approximately 1.44°C. Unsurprisingly, we are experiencing more extreme heat events, a greater number of extreme fire days, and since the 1950s, longer fire seasons. This is despite a slight increase in average annual rainfall across the northern half of Australia (we now get fewer and more extreme rain events). Other changes include shifting coastlines and damage to our main tourism drawcard. Over the last 150 years, global sea levels have risen by approximately 25cm. Alarmingly, the rate is accelerating in central Queensland – approximately 15cm in just the last 30 years. Over the past 100 years, Australia's surrounding oceans have increased in acidity, and average temperatures have risen by more than 1 degree. Not only has this made it harder for corals to grow, but it's also contributed to wide-scale bleaching events on the Great Barrier Reef.

DID YOU KNOW? Increases in global temperature are the number one threat to corals that support and build the Great Barrier Reef. As on of Australia's key tourism drawcards, the Great Barrier Reef supports 64,000 Australian jobs each year. Source

In 2020, we asked our community to report on their opinion on the health of our climate and air in their local government area based on the preceding five years. The majority of respondents considered them stable, however, more people considered them to be declining than improving.



People

The actions we take every day impact the world around us. Whether we realise it or not, each of us is helping drive our region's future and what it brings.

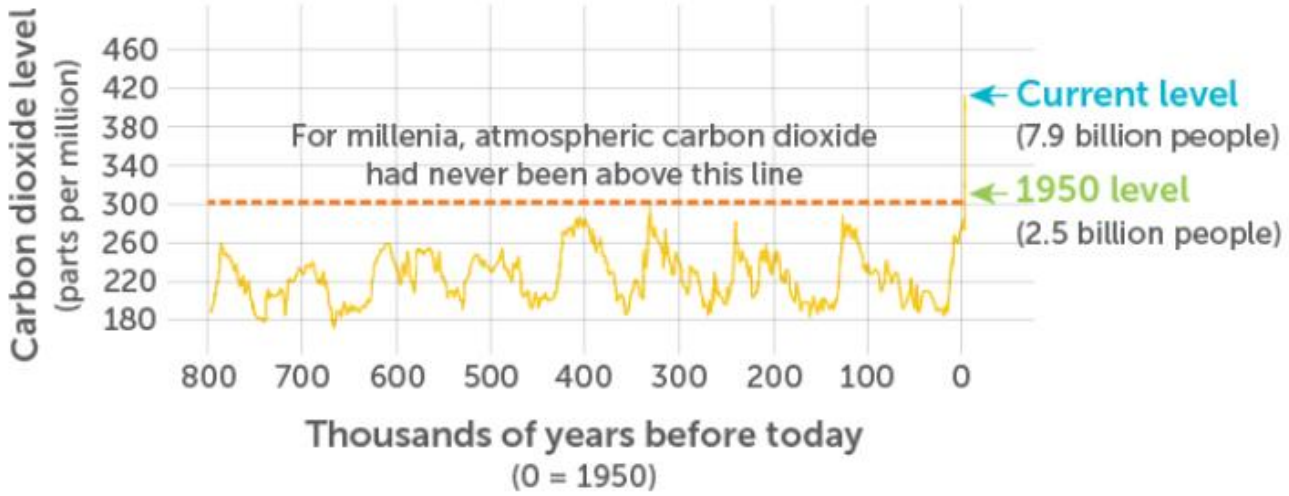
Importance	Threats	Status

People are our biggest asset and threat

While we often talk about people as separate to the natural world, we are in fact, an integral part of it. We have relied on and modified our surroundings since time immemorial, and we constantly change and respond to the world around us in both positive and negative ways. As our population grows, we need to consider whether we're making the best decisions for our future and the environment that supports us.

People are important drivers, so much so, the current geological age has unofficially been termed the *Anthropocene* to highlight our dominance and the impact our activities have on the climate, other species and ecosystems. One of the greatest challenges of our time, climate change, is now primarily influenced by us burning fossil fuels. Known as human-induced (or *Anthropogenic*) climate change, we are causing unprecedented shifts in natural systems. While this is a genuine cause for concern, it is important to remember that people are also the solution!

Ice cores show that atmospheric carbon dioxide, which creates a global warming effect, has significantly increased since the Industrial Revolution in 1850. Source



Along with the spike since 1950, the global human population has grown by 316%. Source

Diagram adapted from NASA

People achieve amazing things because we can:

- innovate new approaches and technologies to solve complex economic, health and environmental problems
- build and purchase companies, products and services that reduce negative impacts on our planet and promote positive change
- access knowledge and support one another right around the globe
- learn quickly and choose to adopt and promote sustainable practices
- commit spaces and resources to improve habitats for native plants and animals and the ecosystem services they provide
- work together to support and protect the natural ecosystem services that sustain us

DID YOU KNOW? Planting trees doesn't just help mitigate climate change and provide homes for animals; it makes our communities more liveable! A single tree can absorb an estimated 3000 litres of storm water, filter 27 kilograms of pollutants from the air and provide a cooling effect equivalent to 10 air conditioners running continuously. Source

Choosing to look after our natural environment in whatever way we can is looking after ourselves and generations to come. Every action, no matter how small, makes a difference!

Importance	Threats	Status

Threats to our environment ultimately threaten us

You've probably heard the phrase 'There is no PLANet B'. The interconnectedness of nature and our way of life is often underestimated and along with it, the impact that our actions and consumption patterns have on everything and everyone around us. Any damage to the environment ultimately loops back to impact us – sometimes immediately, and sometimes not for many generations. While it is true a singular action is small, if you multiply it by the number of people in our region (350,000+), in our country (25.79 million) or on our planet (7.9 billion), cumulatively that one action can make a very big difference to our health, livelihoods, lifestyles and future.

Below provides a snapshot of what has the biggest impact on people in our region and across the globe:

1. The choices made every single day. These decide our immediate and long-term future because they can either help reverse or accelerate everything outlined below.
2. Population growth. The earth is limited in what it can provide which means there is less there is to go around as our population increases.
3. Extreme weather events, hotter heat waves and longer fire seasons. These all threaten our personal health, homes and food and water security either directly or indirectly.

4. The disappearance or impairment of vital ecosystem services. These underpin our ability to grow sufficient nutritious food, access clean water, and breathe clean air. They also help buffer our coastlines and homes against the impacts of extreme weather.

5. Rising sea levels. This is changing Australia's coastline, some countries are literally going under, and it also threatens the Great Barrier Reef and associated livelihoods.

6. Arguing and pointing fingers rather than accepting responsibility to find solutions that meet everyone's needs. We all have valid concerns worthy of consideration.

DID YOU KNOW? The World Economic Forum' *2021Global Risk Report* announced the top three most likely global risks were environmental, two of which are directly linked to people. The good news is, we are in direct charge of removing two of our biggest risks!

Importance	Threats	Status

We're part of the lucky country, but for how long?

Central Queensland is known for offering a relaxed and affordable lifestyle, and we are spoiled for choice when it comes to natural assets; the most accessible part of the world renowned Great Barrier Reef is literally on our doorstep. That being said, our region is also projected to experience some of the greatest average temperature increases in Australia, and is already losing coastline to rising sea levels. This will put additional pressure on our unique land and seascapes as well as our regional services, industries, communities and economy. Coupled with a global population set to increase by 2 billion people over the next 30 years, the question our region needs to answer is: *How can we work together and sustainably manage our finite natural resources to ensure we have sufficient land, food, water, energy and materials to support our lifestyles and livelihoods into the future?*

Together we can achieve it!

DID YOU KNOW? Our global footprint means we now consume 1.75 times what the earth can re-generate each year. The beauty of our unsustainable behaviours is that people around the globe are creating sustainable alternatives with unusual and exciting innovations! Source

A few words from our region

In 2020, over 1,200 people who work, live, play and study in our region participated in an online survey to tell us what they wanted for our region's natural assets by 2030 and why it was so important.

Three key findings emerged:

1. Regardless of age, gender, background and location, everyone wants natural assets that can sustain our wellbeing, industries and economy; our lives, livelihoods and lifestyles *all* depend it!
2. It will take everyone working together to look after our natural assets and build a better future; we are all responsible for doing what we can whenever and wherever we can.
3. The time for doing is now – for our sake, our childrens' and generations beyond.

...natural assets management in our region does not lie with just one corporation, body or agency, but with renewed and improved cooperation and communication between many...
65+ male, Banana Shire Council

People involved as a community to help protect our assets.
35-44yo female, Central Highlands Regional Council

Better care of these natural assets... a simpler lifestyle where more thought is given to everyday consumables and their impact on our planet – there is no planet B.
55-64yo female, Gladstone Regional Council

That as a community we work with nature rather than against it.
45-55yo female, Isaac Regional Council

Put the natural assets number one and everything else will be ok. Clean air, clean water and clean food - I am sure this is what keeps humans alive.
45-54yo male, Livingstone Regional Council

For more people to care and want to make changes that have positive environmental outcomes.
25-34yo female, Rockhampton Regional Council

For the land to blossom again – bring the land to life again.
16-24yo male, Woorabinda

For further information

Visit www.cqss2030.com.au

Contact Fitzroy Basin Association
07 4999 2800

As the leading Natural Resource Management (NRM) body for the region, FBA is responsible for coordinating the review and maintenance of, and making publicly available the region's NRM plan – the CQSS2030.