



# Queensland

## **STATE OF THE ENVIRONMENT 2017**

Summary and management responses

**Prepared by: Department of Environment and Science**

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October 2018

#31431

Front Cover Image: Birdsville, Queensland.

# Foreword



Queensland enjoys a natural environment that is envied around the world. With five World Heritage sites, including the iconic Great Barrier Reef, it is home to a diverse range of landscapes and plant and animal species.

A healthy environment is fundamental to our well-being and is essential for the continued prosperity of our communities, our economy and way of life.

That is why the Queensland Government is committed to managing our environment and natural resources in a way that is both sustainable and productive.

The State of the Environment report provides a comprehensive assessment of Queensland's environmental performance over the past two years, and builds upon the previous 2015 State of the Environment report.

The web-based report provides Queenslanders with detailed information about the extent and condition of the environment at both a statewide and regional level, including the pressures facing our environmental assets.

Using the best available science it presents detailed data across five report themes—biodiversity, heritage, pollution, climate and human settlements.

This evidence-based reporting is crucial for guiding our management responses and developing and prioritising appropriate policy and program actions.

This report has been prepared in collaboration with a range of government, industry and community partners. Their contributions to data collection and monitoring, modelling, analysis and presentation are greatly appreciated.

Through an ongoing commitment to collective knowledge sharing, we can continue to deliver environmental outcomes that support a resilient environment and protect our rich biodiversity.

The State of the Environment report is a valuable resource that allows all Queenslanders to explore, share and learn more about their environment.

A stylized, handwritten signature in black ink.

**Leeanne Enoch MP**  
**Minister for the Environment and the Great Barrier Reef and**  
**Minister for Science and Minister for the Arts**

A stylized, handwritten signature in black ink.

**Jamie Merrick**  
**Director-General**  
**Department of Environment and Science**

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# Introduction

The Queensland State of the Environment 2017 report provides an assessment of Queensland's environmental performance for the period 2016–2017, using the internationally accepted 'pressure-state-response' framework.

It meets the legislative requirements of both the *Environmental Protection Act 1994* and the *Coastal Protection and Management Act 1995*.

The report provides information structured around five themes—biodiversity, heritage, pollution, climate and human settlements.

These are divided into sub-themes which are reported on using indicators related to:

- extent and condition (state)
- pressures.

The 2017 report is the second report in a web-based format—[www.qld.gov.au/state-of-the-environment](http://www.qld.gov.au/state-of-the-environment), the first being in 2015. Although the statutory requirements are for four yearly reporting the biennial update better suits on-line reporting.

This Queensland State of the Environment 2017 Summary and Management Responses provides a high-level overview of some of the information included on the website.

It includes key findings related to each of the themes and sub-themes as well as management responses to the observed or anticipated pressures and impacts. In addition, this Summary and Management Responses document contains separate sections on:

- The Great Barrier Reef—due to the reef's size and complexity and its values which cut across multiple themes
- Climate change, which amplifies many of the pressures on the environment.

The Summary and Management Responses document is not intended to replace or replicate the complete online report. Due to the aggregation of some content areas, the structure and information contained in this summary differs slightly to the online report.

Each theme and sub-theme is represented in the document using the icons below.





Image courtesy of Tourism and Events Queensland

# 1.0 Great Barrier Reef



## Understanding the Great Barrier Reef

The Great Barrier Reef is one of the world's largest and most diverse marine ecosystems, with a wide range of habitats and many thousands of different species recorded.

The Great Barrier Reef is unique in that it stretches more than 2,000 kilometres and is the only living structure visible from space. The Reef provides critical habitat to a breathtaking array of species. The Great Barrier Reef extends over 14 degrees of latitude, from shallow estuarine areas to deep oceanic waters. Within this vast expanse are a range of ecological communities, habitats and species—all of which make the Reef one of the most complex natural ecosystems in the world.

The Great Barrier Reef faces a number of pressures and key ecosystems continue to be in poor condition, while the overall condition of the Reef's inshore marine environment is moderate. The collective impacts of land run-off associated with catchment development, coastal development activities, extreme weather events and climate change impacts such as coral bleaching events also continue to put pressure on the Great Barrier Reef.

Since 2013, there has been unprecedented large-scale coral cover decline due to three severe cyclones, two severe coral bleaching events and an ongoing crown-of-thorns starfish outbreak in the north.

Poor water quality resulting from land-based run-off is another key pressure on the Great Barrier Reef. Water flowing from land catchments into the Reef that carry significant amounts of sediment and pollutants, damages the Reef directly and adversely affects its ability to recover from disturbances. Scientific evidence is now showing that outbreaks of crown-of-thorns starfish, a major predator of coral, are linked to increased nutrient loads from agricultural run-off.

Other pressures on the Reef include the loss of wetlands, coastal habitat changes and reductions in connectivity, direct use and population growth.

Climate change is also predicted to have far-reaching consequences for the Reef ecosystem over the next 50 years. As the climate changes, the Reef is likely to experience more frequent and severe coral bleaching events and major losses of coral and seagrass from severe tropical cyclones.

# Key findings | Great Barrier Reef

## WORLD HERITAGE

Inscribed on the **World Heritage List** in **1981**, it was the **first coral reef** ecosystem in the world to be **listed as world heritage**. It is now **one of 46** marine world heritage areas.



## EXTENT

The Great Barrier Reef World Heritage Area covers **348,000km<sup>2</sup>** and includes both marine areas and all the Great Barrier Reef islands contained inside its boundary.



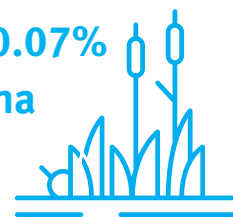
**92%** of pre-clear—estuarine wetland

0%

100%

**remains** within **North East Coast Great Barrier Reef drainage division**, but historical loss is unevenly distributed across catchments.

**Loss of estuarine wetland** during **2009—13** period was **294ha —0.07%** of the 2013 extent. Of this, **260ha** was **salt marsh/salt flat wetlands** and **24ha** was **mangrove wetland** in the Calliope catchment.



## CONDITION

The outstanding universal value of the Great Barrier Reef remains in good condition, but the overall condition of **some key attributes** is poor and many have **deteriorated** since its world heritage listing in 1981.

**Those assessed as being in overall poor condition now are:**



**Coral Reef & Seagrass Meadow Habitats**



**Marine Turtles**



**Seabirds**



**Dugong**



## CONDITION

**Marine condition** has been **affected** by **land management practices** and **severe weather**, such as cyclones and floods, but **progress** has been made **towards** meeting **water quality targets**.



**Climate change** is **affecting** the **Great Barrier Reef** with **significant mass coral bleaching events** occurring in the summers of **2016 and 2017**.



**Inshore seagrass** showed **signs of recovery** in some regions, but remained in **poor condition overall**.

## PRESSURES

At a **reef-wide scale**, **climate related variables** are already having an effect, and are predicted to **continue to have far-reaching consequences for the Reef ecosystem**.



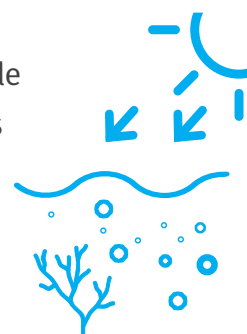
Evidence suggests **increased nutrient loads** contribute to **more frequent outbreaks of crown-of-thorns starfish**—a major predator of coral—**resulting in coral cover decline**.



The **main source** of **excess nutrients, fine sediment and pesticides** is from **agriculture**.



**Excess sediments** reduce the light available to seagrass ecosystems and inshore coral reefs and can **smother** these **important marine habitats**.



# 1.1 Management responses

Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in a multitude of ways, either individually or more often in concert with one another to bring about environmental change.

Management responses related to the Great Barrier Reef include:

## Scientific Consensus Statement

Since the last Scientific Consensus Statement, new information has been gained on the water quality outcomes of agricultural management practices on farms.

[www.reefplan.qld.gov.au/about/scientific-consensus-statement](http://www.reefplan.qld.gov.au/about/scientific-consensus-statement)

This research has reinforced previous conclusions about the efficacy of many established practices for managing pollutant discharges from agricultural lands, and led to increased confidence in the Water Quality Risk Frameworks used in the monitoring and evaluation of the Reef 2050 Water Quality Improvement Plan investments into practice change that reflect these previous conclusions. The Water Quality Risk Frameworks describe suites of practices for each agricultural industry on the Great Barrier and the relative risk of these practices to decreased water quality. Practices are ranked from lowest risk (innovative practices that have the lowest water quality risk) to high risk (superseded practices that have the highest water quality risk) for sugarcane, horticulture and grains. They are ranked from very low soil erosion and water quality risk to moderate-to-high soil erosion and water quality risk for grazing.

## Great Barrier Reef Region Strategic Assessment

The Great Barrier Reef Region Strategic Assessment was undertaken in two parts—one by the Australian Government and one by the Queensland Government—to assess the likely impacts of actions on relevant matters of national environmental significance including the Outstanding Universal Value of the Great Barrier Reef World Heritage Area, and the management arrangements to deal with such impacts.

The assessment looked at the marine environment and adjacent coastal zone, examining how natural and heritage values can be protected into the future. The strategic assessment feeds into the Australian and Queensland governments' Reef 2050 Long-Term Sustainability Plan, an overarching framework for improving the Reef's resilience.

As part of the strategic assessment of the Great Barrier Reef World Heritage Area and adjacent coastal zone, the Great Barrier Reef Marine Park Authority is required to assess the effectiveness of its management arrangements to protect the values that underpin matters of national environmental significance within the Great Barrier Reef Region.

Management effectiveness is strongest on issues limited in scale or intensity and presenting only minor or moderate complexity such as defence and research activities. Tourism operates across much of the region and is moderately complex. It has received significant management attention and is effectively managed.

Management effectiveness challenges are evident for those broad scale issues which are complex socially, biophysically and jurisdictionally. These include ports, shipping, climate change and extreme weather, coastal development, water quality protection, commercial and recreational fishing and indigenous heritage.

## Great Barrier Reef Outlook Report

Every five years, the Outlook Report examines the Great Barrier Reef's health, pressures and likely future. Based on the best available information, it provides a snapshot of current condition and trend of values and threats (through theme assessments). It also examines progress in protecting the Reef through an assessment of management effectiveness.

The Outlook Report 2014 noted that management measures have improved in a number of areas since the Outlook Report 2009, in part as a result of that report. Planning effectiveness has improved for the management of land-based run-off and traditional use, and understanding of the scope of the Region's heritage values has been considerably strengthened. At the same time, more users of the Region and residents and industries in the catchment are adopting best practices and contributing to monitoring to reduce impacts on the Reef and better protect it.

For the first time, the report specifically considers the Great Barrier Reef Region's heritage values, including Indigenous heritage, historic heritage and the area's world heritage values. This assessment is new and responds to revised requirements of Great Barrier Reef Marine Park Act 1975 and the World Heritage Committee requesting an explicit assessment of the area's outstanding universal value.

Even with the recent management initiatives to reduce threats and improve resilience, the overall outlook for the Great Barrier Reef is poor, has worsened since 2009 and is expected to further deteriorate in the future. Greater reductions of all threats at all levels, Reef-wide, regional and local, are required to prevent the projected declines in the Great Barrier Reef and to improve its capacity to recover.

### **Crown-of-thorns starfish response**

The Australian Government funds a crown-of-thorns starfish management program which involves manually injecting starfish to protect coral cover on priority reefs, particularly prime tourism sites.

The program involves dedicated dive teams from the Association of Marine Park Tourism Operators, with support from the Queensland Parks and Wildlife Service and the Great Barrier Reef Marine Park Authority. In 2014, the Reef and Rainforest Research Centre also joined management efforts.

The control program is made up of three elements:

- intelligence and dedicated surveillance to detect crown-of-thorns starfish and assess coral health
- a highly trained control team to cull the starfish using injection methods and to assess changes in coral health
- a comprehensive reef health database to monitor effectiveness of control efforts and adaptively manage the program.

The prevalence of crown-of-thorns starfish is monitored through programs such as the Field Management Program, the Australian Institute of Marine Science's long-term monitoring program and the Eye on program.

Data about crown-of-thorns starfish populations is entered into the Eye on the Reef database, enabling the effectiveness of the control program to be assessed and to help decide which sites need to be revisited and how often. A number of prime tourism reefs have also been selected for long-term monitoring to establish the change in coral cover over time.

The crown-of-thorns starfish control program continues scheduled culling on selected reefs in the Cairns–Cooktown and Townsville–Whitsundays management areas to help protect corals.

Since the control program began in 2012, more than 570,000 starfish have been culled from reefs of high tourism and ecological value in the Marine Park. The control program's capacity to protect coral will be expanded with a third vessel joining the fleet in 2018.

### **Reef 2050 Long-Term Sustainability Plan**

The Reef 2050 Plan is the overarching framework for protecting and managing the Great Barrier Reef from 2015 to 2050. The plan is a key component of the Australian Government's response to the recommendations of the UNESCO World Heritage Committee. At its core is an outcomes framework that will drive progress towards an overarching vision:

*"To ensure the Great Barrier Reef continues to improve on its Outstanding Universal Value every decade between now and 2050 to be a natural wonder for each successive generation to come."*

### **Reef Trust**

The Australian Government has committed \$225 million to the Reef Trust to provide innovative, targeted investment focused on improving water quality, restoring coastal ecosystem health and enhancing species protection in the Great Barrier Reef region.

### **Queensland Reef Water Quality Program**

The Queensland Government's key response to addressing water quality impacts affecting the Great Barrier Reef is the Queensland Reef Water Quality Program. This Program contributes to the implementation of the Reef 2050 Water Quality Improvement Plan. An investment of over \$261 million will be made across 2017–18 to 2021–22 to deliver a range of activities to accelerate progress toward water quality targets. Activities include support for voluntary industry-led BMPs, extension and education, innovative approaches to land management, catchment restoration and monitoring sensors, and targeted project of direct on-ground actions. The Program includes the Queensland and Australian Government funded Paddock to Reef Integrated Monitoring, Modelling and Reporting program for measuring and reporting progress towards the targets of the Reef 2050 Water Quality Improvement Plan.

### **Reef 2050 Water Quality Improvement Plan**

The Reef 2050 Water Quality Improvement Plan (Reef 2050 WQIP) is a nested plan under the water quality theme of the Australian and Queensland governments' Great Barrier Reef 2050 Long-Term Sustainability Plan (Reef 2050).

The Reef 2050 WQIP is a joint commitment of the Australian and Queensland governments to address all land-based run-off flowing from the catchments adjacent to the Great Barrier Reef, building on from the Reef Water Quality Protection Plans (2003, 2009 and 2013).

The plan sets targets for reducing water pollution at the catchment, regional and whole-of-Reef scale, which means actions can be prioritised by catchments. The plan sets the strategic priorities for the whole Reef catchment. The regional water quality improvement plans, developed by regional natural resource management bodies, support the plan in providing locally relevant information and guiding local priority actions within regions.

## **Great Barrier Reef Report Card and Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef Program)**

The Great Barrier Reef Report Card (Reef Report Card) [www.reefplan.qld.gov.au/measuring-success/report-cards/](http://www.reefplan.qld.gov.au/measuring-success/report-cards/) measures progress towards the Reef 2050 WQIP goal and targets for improved water quality, land and catchment management. Through the Paddock to Reef Program, a combination of monitoring and modelling is used to assess reductions in sediment, nutrients and pesticides at the end of catchments that flow to the Reef. The area of agricultural land managed using best practice systems is also assessed, along with key catchment health indicators such as groundcover, riparian extent and the extent and improvement in ecological processes and environmental values of natural wetlands.

Paddock monitoring assesses water quality improvements from different land management practices. Catchment loads monitoring tracks long-term trends in water quality entering the Reef from high priority catchments and is used to validate modelling. Inshore marine water quality is also assessed. All of the information is combined in the annual Reef Report Card.

### **Regional report cards**

Regional report cards are produced annually to monitor and report on a range of regional social, economic and environmental conditions. They are a collaborative partnership involving the Australian and Queensland governments, local government; industry; ports; conservation groups; science, tourism, Indigenous and community groups.

The regional report cards measure and assess environmental catchment conditions and ecological function within waters adjacent to the Great Barrier Reef. The results help inform the development of management actions to improve waterway health.

Regional report cards use fine scale data to report against state or regional water quality targets and on ecological condition of regional freshwater, estuarine, inshore marine habitats and offshore reefs.

Regional report cards also include social, economic and cultural indicators. Some report cards also include voluntary performance reports on best management practice and stewardship of agriculture, urban, ports and heavy industry and aquaculture industries.

There are five regional report card partnerships within the Great Barrier Reef region: Wet Tropics, Townsville, Mackay Whitsunday, Fitzroy and Gladstone.

## ***Vegetation Management Act 1999***

The *Vegetation Management Act 1999* regulates the clearing of vegetation in Queensland in a way that aims to:

- conserve remnant vegetation
- ensure clearing does not cause land degradation
- prevent loss of biodiversity
- maintain ecological processes
- reduce greenhouse gas emissions
- allow for sustainable land use.

The 2015–16 Statewide Land Assessment and Tree Study (SLATS) report showed an increase in annual clearing rates from 298,000ha in 2014–15 to about 395,000ha in 2015–16.

The Queensland Government has delivered on its election commitment and commitments under the Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan), to reinstate its nation leading vegetation management protections to improve the resilience of the Great Barrier Reef and reduce carbon emissions. The strengthened vegetation management laws increase protection for high-value regrowth and remnant vegetation, and boost protection for important habitats, including waterways leading to the Great Barrier Reef.



Image courtesy of Commonwealth of Australia (GBRMPA)



# 2.0 Climate Change



## Understanding climate change in Queensland

Climate change refers to variations in average weather conditions and patterns that last for an extended period of time (i.e. decades and centuries). By shifting and amplifying natural climatic conditions, climate change affects both the natural and built environments.

Queensland's climate is changing. Hotter summers, more frequent natural disasters and impacts on the natural environment are some of the physical climate changes that are already occurring.

Queensland has a highly variable climate and often experiences extremes such as floods, droughts, heatwaves, and bushfires. Climate change is likely to exacerbate the frequency and severity of these types of events. Projected changes in temperature, rainfall, sea level and extreme weather conditions will increasingly affect Queenslanders and the environment, particularly the health and condition of the natural environment.

While the range of likely changes to Queensland's climate in the coming years and decades may present some opportunities, they also pose major threats to the economy, communities, environment and way of life.

Queensland is adapting to its changing climate by preparing for current and future climate impacts in a way that reduces risk and increases resilience.

The Climate theme of this report provides more information about physical changes to Queensland's climate.

Alongside these physical changes, countries around the world are also undergoing a major economic transition as they move to reduce their greenhouse gas emissions and adopt low and zero emission alternatives. To meet the goals of the Paris Agreement, Queensland has committed to reduce its carbon pollution and has set a target of zero net emissions by 2050.

Queensland is the highest emitter of greenhouse gases in Australia, responsible for producing 29% of national emissions. As a high-carbon economy, Queensland will need to undergo a structural economic change in order to diversify its economy. This decarbonisation presents both opportunities and risks for Queensland's industries and communities.

The Pollution theme of this report provides more information about Queensland's greenhouse gas emissions.

The transition to a low carbon, clean growth economy and adapting to a changing climate will help deliver better outcomes for Queensland communities and improve the health and condition of Queensland's natural environment including its unique biodiversity and ecosystems.

As climate change is a pressure on all aspects of Queensland's environment, it is also addressed in other areas of this report.

## Key findings | Climate change

### EMISSIONS

**28.7%** of Australia's **greenhouse gas emissions** are generated in **Queensland**.



### CLIMATE



About **1°C increase** in **average temperatures** across **Queensland** since **1910**.

**3.4mm average rise** in **sea level per year** since **1996** (similar to the global mean trend).



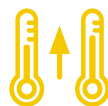
**2017** was the **hottest year on record**.

**2 large scale coral bleaching events** occurred on the **Great Barrier Reef** in **2016** and **2017**.



### FUTURE CLIMATE\*

Global climate models project various future changes to Queensland's climate, including:



**1.2°C–3.9°C increase** in temperature by 2070



**0.8 metre sea level rise** by 2100



Hotter and more frequent hot days



Warmer and more acidic oceans



Harsher fire weather



More time in drought for some areas of Queensland



More intense heavy rainfall events



Fewer frosts

\*As this information relates to future climate projections, there is no corresponding data contained in the State of the Environment 2017 report.



## 2.1 Management responses

Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in a multitude of ways, either individually or more often in concert with one another to bring about environmental change.

Management responses related to climate change include:

The Queensland Climate Change Response—which includes the Queensland Climate Transition Strategy and Queensland Climate Adaptation Strategy—outlines how the state will transition to a low carbon, clean growth economy and adapt to the impacts of a changing climate.

The Queensland Government is partnering with industry, councils, and communities, as well as with other subnational jurisdictions to address the economic and physical impacts of a changing climate by minimising the risks and harnessing the opportunities presented.

Highlights from the Queensland Climate Change Response are outlined below.

### Emissions reduction targets

Central to the Queensland Government's climate change management response is a target of zero net greenhouse gas emissions by 2050, supported by an interim target of reducing emissions by at least 30% below 2005 levels by 2030.

### A low carbon energy sector

The Queensland Government is working with industry and the community to transition to an efficient, affordable, and fair clean energy system. This includes setting a 50% Renewable Energy Target for achievement by 2030 to cut carbon pollution while growing jobs and investment.

### Skilling Queenslanders for new economy jobs

Together with Queensland's industries and communities, the Queensland Government is developing a Workforce Development and Skills Plan for low and zero emissions jobs so that the state is in the best position to take advantage of the global shift to a low carbon economy while making significant cuts to its greenhouse gas emissions.

### The Future is Electric: Queensland's Electric Vehicle Strategy

Queensland's Electric Vehicle Strategy aims to encourage, support and accelerate the uptake of electric vehicles in Queensland, and to reduce the carbon emissions from fuel combustion. An action under the Strategy is the Queensland

Electric Super Highway, which comprises a series of 17 electric car fast-charging stations between Coolangatta and Cairns, making it the world's longest electric vehicle highway in a single state. The energy supplied in the fast-charging stations is green energy bought through green energy credits or offsets.

### Carbon farming in Queensland

Carbon farming involves activities like savannah burning and vegetation management to store carbon or avoid the release of greenhouse gas emissions. The Queensland Government is working to keep carbon in the ground through a \$500 million Land Restoration Fund, which will also bring an array of social, environmental and economic development benefits. This work builds on the existing Carbon Plus program, which is already delivering on-the-ground outcomes in Indigenous communities.

### *Vegetation Management Act 1999*

The *Vegetation Management Act 1999* regulates the clearing of vegetation in Queensland in a way that aims to:

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- prevent loss of biodiversity
- maintain ecological processes
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- allow for sustainable land use.

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## Queensland Treasury Corporation Green Bonds

Queensland Treasury Corporation Green Bonds are supporting Queensland's transition to a low-carbon and climate resilient economy. Proceeds from the issue of green bonds will be used to fund qualifying green projects and assets throughout the state. Projects funded so far using green bonds include light rail projects on the Gold Coast and Moreton Bay, solar photovoltaic projects, cycleways and electric rail.

## Encouraging innovation and low carbon technologies

The Queensland Government has engaged with the start-up community to promote Zero Emissions Innovation in Action. It has supported key initiatives including: Climate-KIC, a global Knowledge Innovation Community designed to catalyse transformative, cross-sectoral responses to climate change; and the 2017 Global Business Challenge to find innovative renewable energy solutions. These initiatives complement the Queensland Government's broader innovation agenda driven by the Advance Queensland program.

## Leading by example in climate transition

Key Queensland Government climate transition initiatives include:

- joining the international Under2Coalition to support the global transition to zero net emissions by 2050
- reducing emissions from Queensland Government operations (buildings, vehicles, electricity, and procurement)
- integrating climate transition risks and opportunities into government decision-making
- developing a Zero Net Emissions Transport Roadmap
- using the land-use planning system to support delivery of zero net emissions
- reintroducing comprehensive vegetation management legislation.

## Reducing emissions from the built environment and infrastructure

The Queensland Government is also leading by example with its aim to reduce carbon emissions from the built environment and undertake sustainability assessments for all capital works projects over \$100 million, while encouraging assessments for projects below this threshold, as part of the State Infrastructure Plan.

## Queensland Government Adaptation Action Plan

The Government Adaptation Action Plan encourages a whole-of-government response to the risks and opportunities climate change poses to policies, programs and operations, and to the physical assets of Queensland Government departments.

## Sector Adaptation Plans

The Queensland Government is assisting leading sectors to identify adaptation needs and prioritise adaptation activities. Industry-led Sector Adaptation Plans have been developed for the built environment and infrastructure sector and the agriculture sector. Adaptation plans are also being developed for the human health and wellbeing, tourism, biodiversity and ecosystems, small and medium business, industry and resources, and emergency services sectors.

## Supporting local governments and regions to adapt

Helping Queenslanders prepare for climate change is central to Queensland's management response and actions. This includes facilitating coastal hazard planning, partnering with Indigenous local councils and Natural Resource Management groups, and providing regionally-specific information and tools.

## Queensland Climate Resilient Councils

The Queensland Climate Resilient Councils program assists Queensland local governments to strengthen internal council decision-making processes so that they can better respond to climate change. The program provides practical resources for planning and decision making for climate change mitigation and adaptation.

## QCoast2100

The Queensland Government, in partnership with the Local Government Association of Queensland, is investing \$12 million to help coastal councils and their communities plan and prepare for storm tide, coastal erosion and rising sea levels resulting from climate change.

## Supporting Queensland communities to take action

The Queensland Government is building leadership capacity within communities to develop place-based climate transition roadmaps; providing tools, data and financial support for communities in transition; decarbonising remote communities; and working with local governments to build climate transition capacity.

## Building community capacity and resilience

Through best practice community engagement, the Queensland Government is also building the capacity and resilience of Queenslanders to understand and adapt to climate change. This includes advancing climate science and developing climate risk toolkits for households and businesses.

Some other programs that make up Queensland's climate change management response include:

- Queensland Strategy for Disaster Resilience
- Drought and Climate Adaptation Program
- State Planning Framework, including guidelines to address the impacts of climate change.



# 3.0 Biodiversity

The variety of life—its biological diversity—is commonly referred to as biodiversity.

Queensland is widely considered a biodiversity ‘hotspot’. Our state’s vast landscape covers an estimated area of 172.8 million hectares, has a mainland coastline of about 6,900 kilometres and 1,165 offshore islands and cays.

This vast area contains a huge number of plant and animal species as well as different ecosystems such as deserts, rainforests and coral reefs—all of which are part of a biologically diverse Queensland.

An ecosystem is a collection of communities of both living and non-living things that are interrelated. The biotic, or living, things found in an ecosystem include various life forms such as plants and animals. The abiotic, or non-living, things found in an ecosystem include the various land-forms and the climate.

The biodiversity theme comprises Terrestrial ecosystems, Aquatic ecosystems (including freshwater wetland and estuarine and marine ecosystems) and Species and habitat.





## 3.1 Terrestrial ecosystems

Terrestrial ecosystems are entirely land-based. They comprise communities of organisms and their environments that occur on the land masses of continents and islands, and they provide important habitat for many animals and plants. They include regional ecosystems which are discrete vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. The biodiversity status of regional ecosystems is classified as: 'Endangered'; 'Of concern'; and 'No concern at present'.

Broad vegetation groups are a higher-level grouping of vegetation communities across the state, encompassing a wide variety of landscapes across temperate, wet and dry tropics and semi-arid to arid climatic zones.

### Why terrestrial ecosystems are important

Terrestrial ecosystems are the community of living organisms and the non-living environmental features that support them. They are essential for the provision of services (e.g. food, fuel) and ecological processes for all life on Earth. The challenges of improving ecosystems include options to conserve or enhance them and the services they provide in ways that boost co-benefits and reduce negative trade-offs.

### Condition

Currently there is a lack of information about the condition of terrestrial ecosystems. However, the Queensland Herbarium is developing BioCondition—a vegetation condition assessment tool to provide a measure of how well a terrestrial ecosystem is functioning for the maintenance of biodiversity values at a local or property scale. The tool is site-based and has a quantitative and repeatable assessment procedure. Benchmark descriptions for each of the state's currently recognised 1,459 regional ecosystems are being compiled for the tool, with 491 available. While the tool can be used for assessing condition at a site and extrapolated to an area, there is no established program for mapping condition of vegetation on a regional basis in Queensland.

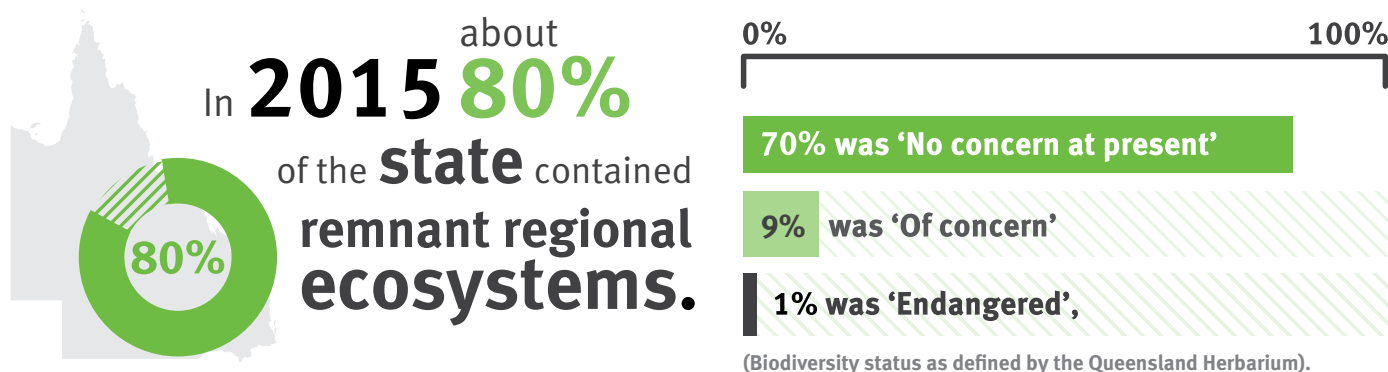
### Pressures

- Invasive non-native fauna species place significant pressure on Queensland's native biodiversity through predation, competition for food and shelter, destruction of habitat, altering ecosystem balance and poisoning. Invasive non-native flora species degrade natural vegetation and impact on biodiversity.
- Land clearing, predominantly for pasture, and fragmentation are significant pressures on terrestrial ecosystems. Fragmentation—the 'breaking up' of large areas of intact native vegetation for the purposes of clearing for development—reduces the ecological connectivity between habitats which allows for wildlife to cross the landscape for food, breeding and, ultimately, survival.

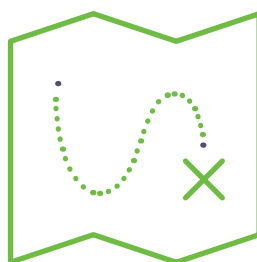


# Key findings | Terrestrial ecosystems

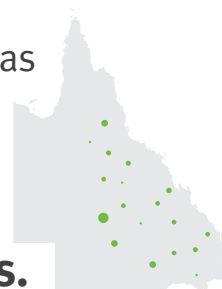
## REGIONAL ECOSYSTEMS



**Surveying and mapping** of regional ecosystems has been **completed for 100%** of Queensland showing the extent of **native vegetation remaining** from pre-settlement clearing and 2015 remnant.



Queensland has **1,459** regional ecosystems.



## EXTENT AND RATE OF CHANGE

In **2013–15**, rates of **remnant native vegetation loss increased to 0.058% per year**, mainly due to clearing land for pasture.



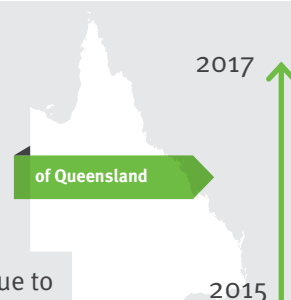
As at **2015**, **two Broad Vegetation Groups** (mainly comprising acacia and eucalypt forests) had **less than 60%** remnant **native vegetation.**

## PROTECTION

**Remnant vegetation** covers **80%** of the **state** with **9.6%** of this **remnant vegetation** in **protected areas.**



The **protected area estate** (including national parks and nature refuges) **covers 8.2%** an **increase of 0.5 million hectares** between 2015–17 largely due to an increase in nature refuges.



## LAND CLEARING

In 2015–16, 395,000 hectares per year of woody vegetation was **cleared**, an **increase** of

→ **33%**  
from **2014–15**



In 2015–16,

**35%**

of clearing was of remnant woody vegetation and



**65%**

was of non-remnant woody vegetation.



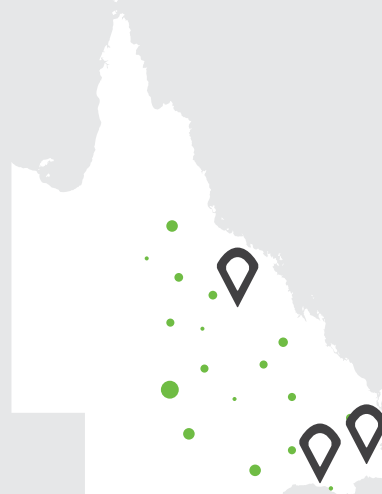
## INVASIVE NON-NATIVE SPECIES

**Invasive non-native** fauna and flora species place **significant pressure** on **Queensland's** native **biodiversity**.



## FRAGMENTATION

The **south-eastern bioregions** are the most **heavily fragmented** in Queensland. The **New England Tableland**, **South East Queensland** and the **Brigalow Belt** have a **high level of fragmentation**.





## 3.2 Aquatic ecosystems

### Aquatic ecosystems comprise freshwater wetland, estuarine and marine ecosystems.

Freshwater wetland ecosystems include lakes, rivers, streams, springs, marshes and swamps. They have many functions, from reducing floods to producing clean water and food for humans, industry and agriculture; they also provide important habitat for many animals and plants.

Estuarine wetlands are those with marine or oceanic water which is diluted with freshwater run-off from the land. They are usually in an area where a river meets the sea, providing an important habitat for many species.

Marine wetlands include the area of ocean from the coastline to 6 metres below the lowest astronomical tide. They provide important habitat for many animals and plants. Some, such as the Great Barrier Reef, are world-renowned marine wetland areas, attracting visitors from all over the world.

### Why aquatic ecosystems are important

Queensland's freshwater wetland, estuarine and marine ecosystems are important habitats, supporting much of the state's native biodiversity including migratory birds, frogs, fish, dugongs, dolphins, turtles and other threatened species.

They are important for the economy because they provide nurseries for fish and water for farming. Wetlands help protect people and property from storms and floods; they also protect other downstream habitats by removing sediments and transforming nutrients and pesticides.

### Condition

Queensland's aquatic ecosystems vary significantly in condition. Some are in good to very good condition while others do not meet standards for water quality. Depending on location, water quality report cards document the state of water quality, habitat condition and other ecosystem features at various spatial and time scales. Regional report card partnerships produce annual water quality report cards for a number of Great Barrier Reef catchments, including Gladstone Harbour, Fitzroy Basin, Mackay-Whitsundays and the Wet Tropics. The Healthy Land and Water Report Card details South East Queensland's aquatic conditions. The Queensland Government QCatchments program conducts water quality assessments for many freshwater systems in Queensland.

These report cards provide in-depth information on aquatic ecosystem health.



## 3.2 Aquatic ecosystems

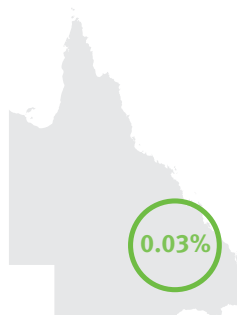
### Pressures

- Invasive non-native fauna species, particularly pest fish, are relatively widespread in some sections of Queensland's freshwater ecosystems and have the potential to degrade and modify aquatic environments as well as displace native species.
- Invasive non-native flora species can have significant impacts on freshwater ecosystems including smothering native vegetation, blocking creeks, reducing water quality by preventing light penetration, reducing oxygenation of water, and choking out fish and other aquatic wildlife.
- Queensland remains largely free of invasive non-native marine flora and fauna species (marine pests), despite a high possibility of introduction through international shipping activity. Asian green mussels have been detected on vessels on a number of occasions however rapid response to the detections mean no populations are known to have established.
- Sediment, nutrients, chemicals, litter, loss of riparian forests, filling, hydrological modifications, extraction and draining are the major catchment pressures that broadly impact Queensland's freshwater wetland, estuarine and marine ecosystems. These vary in their relative importance between regions.

# Key findings | Aquatic ecosystems

## EXTENT AND RATE OF CHANGE

In **2013**, more than **94%** of the pre-European settlement extent of **freshwater wetlands**, and more than **96%** of the pre-European settlement extent of **estuarine wetlands**, remained in Queensland.



Since 2001, the **highest rate** of **estuarine wetland loss** was **0.03%**—occurring in the **North East Coast drainage division** during **2009–13**.

**Freshwater wetland loss** during **2009–13** was **0.03%**.

The greatest ongoing losses occurred in palustrine and riverine systems in the Murray Darling and North East Coast Drainage divisions.



## CONDITION

The **majority** of **Queensland's key fish stocks** are considered **sustainable**.



## PROTECTION

**39%** of **estuarine wetlands across Queensland** are within an area of **managed protection** (which often overlap). This includes:

**28%** in declared fish habitat areas  
**12%** in highly protected marine park zones  
**5%** in protected areas.



**8.7%** of **freshwater wetlands in Queensland** are within **protected areas**.

The majority are palustrine systems and within national parks.



**1.8 million hectares** of **marine wetlands in Queensland waters** are in **highly protected marine park zones** or a **declared fish habitat area**, representing about **17%** of the state's **total marine wetlands**.





## 3.3 Species and habitat

Queensland has some of the most naturally diverse species and habitat in Australia, both native flora (plants) and fauna (animals). Every species requires a certain set of environmental conditions to be able to survive, move around, feed and reproduce. Whether in the forest, grassland, desert or ocean, the place where each species finds the conditions needed to live and thrive is called its habitat. When habitats are threatened, so are the animals and plants that live there.

**Queensland has about 85% of Australia's native mammals, 72% of its native birds, more than half of the nation's native reptile and frog species and more than 14,000 native plant species.**

### Why species and habitat are important

Queensland's native flora and fauna are unique and valuable elements of our state's rich biodiversity. Conserving our native biodiversity not only ensures its protection for future generations but helps maintain healthy ecosystems, clean water and clean air.

Some species of flora and fauna are at risk of extinction due to threatening processes including the clearing of habitat. These 'threatened' flora and fauna are declared under *Queensland's Nature Conservation Act 1992*.

Understanding the distribution of threatened species habitat prior to land clearing allows examination of trends in habitat loss, determination of the adequacy of the current reserve system for protecting threatened species habitat and the prioritisation of new areas for protection or restoration.

Monitoring the changes in threatened species numbers provides an overview of whether species, over time, are still experiencing pressures that put them at risk of extinction.

### Condition

Currently there is a lack of information about habitat condition.

However, the Queensland Herbarium is developing BioCondition, a vegetation condition assessment tool to provide a measure of how well a terrestrial ecosystem is functioning for the maintenance of biodiversity values at a local or property scale. The tool can be used for assessing vegetation condition (and, by extension, the habitats it supports) at a site and extrapolated to an area. There is no established program, however, for mapping condition of vegetation on a regional basis in Queensland.

The Queensland Government also supports a number of regional waterway health report cards to provide in-depth information on aquatic ecosystem health which will help inform habitat condition.

### Pressures

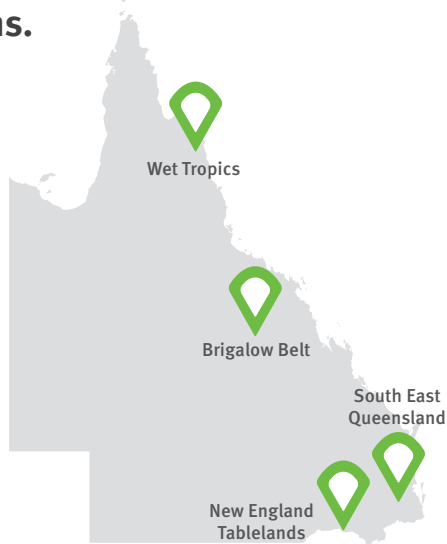
- A range of pressures put species at threat of extinction within Queensland. Major threats have been identified under the Back on Track species prioritisation framework, most significantly:
  - inappropriate fire regimes
  - clearing of vegetation, including for urban expansion
  - inappropriate grazing regimes
  - weeds.
- Land clearing for pasture (which includes clearing for grazing, thinning, fodder, rural residential and future urban land use) is the greatest pressure on threatened fauna and flora pre-clearing habitat. Clearing has almost quadrupled since 2009–10, when clearing rates were at their lowest since annual reporting began in 1999–2000.
- Although a large proportion of pre-clear threatened flora and fauna habitat remains in Queensland, threatened flora and fauna habitat loss is ongoing and has accelerated between 2013 and 2015.



## Key findings | Species and habitat

### THREATENED SPECIES HABITAT

The **highest densities** of **terrestrial threatened fauna and flora species habitat** are found in the **South East Queensland, Wet Tropics, Brigalow Belt and New England Tablelands** bioregions.



### MAJOR THREATS

**34** **major threats** have been identified that impact on **Queensland threatened flora**. The threats affecting the most species are:



Clearing of vegetation



Inappropriate fire regimes



Weeds

**Queensland's threatened fauna** are at risk from

**68** **major threats** most commonly



Clearing of vegetation



Inappropriate fire regimes



Inappropriate grazing regimes

### THREATENED SPECIES NUMBERS

An additional

**79** **fauna species** were listed as **vulnerable, endangered or extinct in the wild** in Queensland between **2007** and **2017**.

**3** **frog species** and **1** **mammal species** have been listed as **extinct in the wild** since 2007.

An additional

**275** **flora species** were listed as **threatened** in Queensland between **2007** and **2017**.

In 2017, there were

**6** **less flora species** listed as **extinct in the wild** than in **2007**.



## 3.4 Management responses

Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in a multitude of ways, either individually or, more often, in concert with one another to bring about environmental change.

Management responses related to biodiversity include:

### ***Vegetation Management Act 1999***

The *Vegetation Management Act 1999* regulates the clearing of vegetation in Queensland in a way that:

- conserves remnant vegetation
- ensures clearing does not cause land degradation
- prevents loss of biodiversity
- maintains ecological processes
- reduces greenhouse gas emissions
- allows for sustainable land use.

The 2015–16 *Statewide Land Assessment and Tree Study (SLATS)* report showed an increase in annual clearing rates from 298,000ha in 2014–15 to about 395,000ha in 2015–16.

The Queensland Government has delivered on its election commitment, as well as commitments under the Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan), to reinstate its nation leading vegetation management protections to increase the resilience of the Great Barrier Reef and reduce carbon emissions.

In March 2018, the Queensland Government introduced to Parliament the Vegetation Management and Other Legislation Amendment Bill 2018. The Bill was passed by the Queensland Parliament in May 2018 and strengthens Queensland's vegetation management laws by:

- removing provisions that allow clearing for high-value agriculture and irrigated high-value agriculture
- extending the protection of high value regrowth vegetation on freehold and Indigenous land, and on occupation licences and agriculture and grazing leases under the *Land Act 1994*
- including near-threatened species in the Essential Habitat layer for remnant and high-value regrowth vegetation
- protecting regrowth vegetation along waterways in all reef catchments
- regulating the removal of vegetation in a watercourse under a riverine protection permit

- enhancing compliance measures; to modernise enforcement tools, and increasing penalties to align with other natural resource and planning legislation in Queensland.

In addition to the amendments to the *Vegetation Management Act 1999*, the government has made further changes to the vegetation management framework by:

- releasing an updated Regulated Vegetation Management Map and Supporting Map
- updating the accepted development vegetation clearing codes dealing with fodder and Category C (high value regrowth) & R (regrowth watercourse) areas
- revoking the relevant vegetation clearing code so that managing thickened vegetation will now require a development approval.

The changes increase protection for high-value regrowth and remnant vegetation and boost protection for important habitats, including waterways leading to the Great Barrier Reef.

### ***Environmental Offsets Act 2014***

Under the *Environmental Offsets Act 2014*, an environmental offset is defined as an activity undertaken to counterbalance a significant residual impact of a prescribed environmental matter. Unlike mitigation actions which occur on-site as part of the project and reduce the direct impact of that project, offsets are undertaken at another location which contains the same environmental values.

Key features of the environmental offsets framework, include:

- Strategic Offset Investment Corridors (SOICs), which identify some of the best places in the landscape for environmental offsets
- a record of landholders within the SOICs interested in having offsets on their land

- Direct Benefit Management Plans, which provide proponents with the flexibility to deliver offsets across multiple properties and in a more strategic and cost efficient way
- the option to meet an offset obligation by means of a financial payment to a secured offsets fund, managed by the Department of Environment and Science (DES) and used to deliver strategic outcomes with the assistance of an independent committee.

A single dataset is available for all offsets approved since 1 July 2014 in the form of an offsets register, maintained by DES and publicly available on the Queensland Government's website. This register includes information on all permits that have been granted with an offset condition, as well as specific details on financial payments, land based offsets and advanced offsets, all of which are updated on a quarterly basis.

### ***Nature Conservation Act 1992***

The *Nature Conservation Act 1992* (the Act) provides the legislative basis for the conservation of nature through the dedication, declaration and management of protected areas and the protection of native wildlife and its habitat.

As at 30 June 2017, there were 9,802,778ha of State land and Aboriginal freehold land included in nine national parks (scientific), 274 national parks, 28 national parks (Cape York Peninsula Aboriginal land), 229 conservation parks and 51 resources reserves in Queensland. Dedication of these lands provides a high level of protection for species and the ecosystems upon which they rely within the 13 terrestrial bioregions in the state. Additionally, 3,803,619ha of nature refuges—which are protected areas declared over private land with landowner consent—further adds to the conservation protection of lands across the state. The Queensland Government has committed to a target of 17% of land in protected areas.

The Act provides the legislative framework to manage these areas so that their natural and cultural values are protected and conserved while recognising other compatible uses.

Similarly, outside of protected areas, the majority of native plants and animals are protected under the Act, so that they are managed under a legislative framework designed to promote the continuation of viable and sustainable populations in the wild.

Specific tools for managing protected areas, and for managing wildlife outside of protected areas, include park management plans and statements, regulatory notices, protected area permits and other authorities, licences and permits for the taking or use of wildlife, and individual conservation plans or recovery plans for species with particular needs.

### **Landscape Fragmentation Connectivity tool**

The Landscape Fragmentation Connectivity tool performs a desktop assessment of development impacts on connectivity areas containing remnant vegetation. Connectivity areas are defined in Schedule 2 of the Environmental Offsets Regulation 2014.

The tool is effective as a test for significant residual impacts on connectivity, a prescribed environmental matter under the Environmental Offsets Framework. It is also effective as a mechanism for quantifying the fragmentation of remnant regional ecosystems at the bioregion scale.

A significant residual impact on connectivity by a prescribed activity is counterbalanced through the delivery of an offset in a non-remnant ecosystem. The outcome maintains overall ecosystem connectivity within the affected bioregion.

### **BioCondition**

BioCondition is a biodiversity/vegetation condition assessment tool used to measure how well a terrestrial ecosystem is functioning for the maintenance of biodiversity values at a local or property scale. It is a site-based, quantitative and repeatable assessment procedure that either provides a numeric score that can be summarised as a condition rating of 1, 2, 3 or 4, or is described as functional through to dysfunctional condition for biodiversity.

Vegetation condition is referred to as “... how much the attributes of a patch of vegetation differ from the attributes of the same vegetation type in its reference state”. The reference state refers to the natural variability in attributes of a regional ecosystem in ‘best-on-offer’ condition, or patches of vegetation that have been least impacted by local disturbances.

BioCondition is used for environmental offsets to determine condition of an offset proposal and its potential biodiversity value, as well as in the assessment of mining rehabilitation. Benchmark descriptions for each of the state's currently recognised 1,459 regional ecosystems are being compiled for the tool: 491 are so far available. While BioCondition is a proven tool for assessing condition at a site and extrapolated to an area, currently there is no established program for mapping condition of vegetation on a regional basis.

### **Carbon farming in Queensland**

Carbon farming involves activities like savannah burning and vegetation management to store carbon or avoid the release of greenhouse gas emissions. The Queensland Government is working to keep carbon in the ground through a \$500 million Land Restoration Fund, which will also bring an array of social, environmental and economic development benefits. This work builds on the existing Carbon Plus program, which is already delivering on-the-ground outcomes in Indigenous communities.

## Protected area management arrangements

The Queensland Government works in partnership with Traditional Owners to manage protected areas to ensure the natural and cultural values are preserved for the benefit of all Queenslanders.

These partnerships recognise the critical role of Aboriginal and Torres Strait Islander peoples, not only as custodians of their land and sea country, but as partners with significant knowledge, skill and understanding that contribute to the preservation of Queensland's protected areas.

Partnerships also provide an opportunity for Traditional Owners to derive cultural and economic benefits from managing their country and are formalised through a range of agreements including Indigenous Management Agreements, Indigenous Land Use Agreements and Memoranda of Understanding.

The Queensland Government continues to develop and strengthen partnerships with Traditional Owners, and investigate opportunities to create other arrangements by agreement, to improve protected area management and enrich the experience of visitors.

## Protected areas

Additions to the Queensland protected area system are made with the goal of maximising the protection and conservation of biodiversity. These additions contributed to the Queensland Government's current target of 17% of the terrestrial area of the state under protected areas. This includes the acquisition and dedication of properties as state-owned protected areas (e.g. national parks) and the negotiation of private protected areas on private land (i.e. nature refuges).

Between 2015 and 2017, the extent of protected areas increased by more than half a million hectares (a 3.5% increase within that period) to cover about 8.2% of Queensland.

## Protected area acquisition

During 2016 and 2017, land was purchased for addition to the protected area system. Four properties, totalling approximately 60,000 hectares, were purchased including the 56,000 hectare Springvale Station which is now a State-owned nature refuge.

## Nature Refuges Program and NatureAssist

The Nature Refuges Program forms part of the Queensland Government's commitment to saving habitat, protecting wildlife and restoring land. Through the program, landholders voluntarily establish areas of land called nature refuges on their properties. While nature refuges are established through perpetual, legally binding agreements, compatible and sustainable land uses can continue. The Queensland Trust for Nature partners with DES to service additional demand for nature refuges.

NatureAssist is a financial incentives program that targets properties that meet the Queensland Government's priorities for the Nature Refuges Program. Properties have previously been selected for their significant conservation values, connectivity and/or their predicted resilience to a changing climate. The landholders of these identified properties are contacted by the government to ask if they are interested in participating. Nature Refuge Program staff work with landholders to protect significant conservation values on their land and enhance the resilience of the property. Participation is conditional on a formal nature refuge agreement being signed by the landholder and the Minister.

As at 31 December 2017, nature refuges comprised just over 2.5% of Queensland.

## Selection and prioritisation of new protected areas

DES has implemented a strategic, evidence-based approach to identifying and prioritisation land for possible addition to the protected area system. This CAR-based (Comprehensive, Adequate and Representative) approach incorporates the effects of threats, such as climate change, on Queensland's biodiversity and identifies land that would contribute the most to retaining underrepresented and at risk species and ecosystems in the current protected area system.

## Indigenous Protected Areas

In addition to the efforts of the Queensland Government, approximately 917,500 hectares of Indigenous Protected Area have been established over land and inland waterways in Queensland by the Australian Government in association with Indigenous landholders. Of this, 543,400 hectares exists outside the State's protected areas.

## Indigenous Land and Sea Rangers

Through the Queensland Indigenous Land and Sea Ranger program, the Queensland Government partners with Aboriginal and Torres Strait Islander communities to care for biodiversity values and cultural heritage on country.

In 2017 the Queensland Government funded 76 Indigenous land and sea rangers, employed through Aboriginal and Torres Strait Islander host organisations across 17 communities. From 2018, this will increase to 100 rangers.

Land and sea ranger activities include a variety of caring for country actions, with priorities determined in consultation with traditional owners and partner agencies. Activities include: weed and feral animal management; fire management; biodiversity surveys; cultural heritage site management and community engagement in conservation effort through Junior Ranger and other local programs.

In 2017, Indigenous land and sea rangers:

- carried out fire management over more than 1,210,000ha of land
- completed more than 800 biodiversity surveys (including protected species)
- removed more than 290 ghost nets from Queensland foreshores
- removed more than 8,000 feral animals (predominantly pigs)
- actively managed more than 370 cultural sites
- treated more than 117,000ha of land for weeds
- engaged nearly 1,000 school-aged children in junior ranger activities.

### Indigenous Land and Sea Rangers response—case study

#### ***Predation control to help save the Olive Ridley turtle***

The Olive Ridley turtle (*Lepidochelys olivacea*) is listed, under the Environmental Protection Biodiversity Conservation Act 1999, as an endangered marine turtle.

Over the past 8 years, Pormpuraaw Land and Sea Rangers have worked to improve hatchlings' survival rate in Western Cape York Peninsula. In this area, Olive Ridley turtle and hatchlings are prey to feral pigs, wild dogs and native goannas.

During the 2017 Olive Ridley nesting season, Pormpuraaw rangers undertook a two-fold management program to improve survival of the turtle hatchlings:

- Aerial shooting removed nearly 1,300 feral pigs from the area.
- About 120 purpose-built aluminium cages were installed over turtle nests along 18km of coastline, protecting them from predation.

These efforts aided the successful hatching of 11,087 Olive Ridley turtles.

Ongoing work by the Pormpuraaw Land and Sea Rangers to protect the vulnerable Olive Ridley nests will increase the future populations of this iconic marine turtle species.

## Nest to Ocean Program

The Nest To Ocean Program undertakes predator control and turtle nest monitoring activities across 32 beaches covering 564 km of Queensland coastline. It has contributed to 19,100 turtle nests being monitored, the removal of 21,864 feral pigs, the direct protection of 282 nests and the fumigation of 218 fox dens. As a result, 18,060 turtle nests survived predation (approximately 93% of the monitored nests), producing 1.28 million turtle hatchlings. Studies of turtle nesting on Cape York in the late 1970s and early 1980s showed that feral pigs were responsible for predation of more than 70% of turtle nests. The Nest to Ocean Program has made a dramatic improvement to turtle hatchling survival in the past 4 years. The program has been supported by 111 Indigenous rangers who undertook predator control and nest monitoring.

## Strategic Fire Management Program

Fire is a natural and integral part of the landscape that can benefit nature conservation, however if poorly managed it can impact on adjoining communities and on the intrinsic values of protected areas and forests estate.

The Strategic Fire Management Program (SFMP) provides funding for targeted planned burn programs in priority areas. The Department of Environment and Science, through the Queensland Parks and Wildlife Service, is actively committed to the protection of life and property and reducing risk from wildfire to natural values, urban interfaces and rural communities across the more than 1,000 parcels of protected area estate and State forests it manages.

The successful implementation of a strategic planned burn program in association with broader fire programs across the parks and forests estate reduces fuel loads and the subsequent intensity of wildfires that may occur in areas recently burnt.

The SFMP funding has steadily increased since the program's inception and has averaged nearly \$1.29 million per annum over the past 5 years. The department aims to achieve burn programs over 5% of its managed estate for hazard reduction and the maintenance of healthy ecosystems, to which the SFMP contributes.

## Strategic Pest Management Program

Plant and animal pests cause significant adverse impacts in Queensland. The *Biosecurity Act 2014* places a responsibility on government agencies, including the Queensland Parks and Wildlife Service (QPWS), to manage pests on land and water bodies for which they have direct management responsibility.

The QPWS Strategic Pest Management Program (SPMP) provides funding for targeted and priority pest management projects across Queensland to support early intervention activities or reduce the impact of pests on key park values. Since its inception in 2004, the allocation for SPMP has varied between \$ 0.9 million and \$1.96 million per year, and the number of projects ranged between 41 and 90 per year. SPMP projects have included campaigns in western Queensland to bait, shoot and trap feral pigs, goats and horses, as well as, large scale projects in north Queensland that targeted highly invasive weeds.

### Invasive pest species management and eradication

Where priority invasive pest species have become established and are no longer considered feasible to eradicate, the management focus changes from eradication to containment or asset protection. National pest eradication programs target the highest invasive species threats that are considered feasible to eradicate such as tropical weeds and Red Imported Fire Ants.

## Invasive pest management response—case study

### *Myrtle rust threatens native Myrtaceae species*

Myrtle rust, first detected in New South Wales in 2010, poses one of the biggest ecological threats to Australia.

This exotic plant pathogenic fungus—also known as eucalyptus rust or guava rust—has rapidly spread along the east coast, infecting more than 350 species of Myrtaceae, a dominant, iconic and ecologically important Australian plant family that includes eucalypts, paperbarks, and lilly pillies.

Myrtle rust infects young leaves, shoots and stems, flowers and fruits.

Managing its impact is in the very early stages and has focused on gaining a better understanding of the threat posed, including the direct impact on plants and indirect impacts to plant and animal communities.

Research, funded by the Plant Biosecurity CRC, has so far concentrated on factors influencing disease development and severity of impact, and identifying species and environments at greatest risk in the short and long term.

Myrtle rust has been reported from a range of ecosystems, including World Heritage rainforest (Gondwana and Wet Tropics), sand islands (Fraser Island) and coastal wetlands.

Since its introduction, 2 common rainforest species, *Rhodamnia rubescens* (scrub turpentine) and *Rhodomyrtus psidioides* (native guava), have rapidly declined with local extinctions recorded: these are now considered for listing as critically endangered. Their decline results in a change in plant communities. Instances of affected areas being invaded by exotic weeds, such as lantana, have been observed.

Although the flow-on effects of species loss and subsequent changes in plant composition are not yet known, they are likely to impact pollinators and species relying on fruit as a food source, including native birds, mammals and insects.

While natural resistance has been observed in some species, including broad-leaved melaleuca and some eucalypts, further research is needed to capture the ecological damage of the entire ecosystem and to guide effective management strategies, including options to conserve the species most at risk of extinction.

## Status of key fish stocks

Nationally agreed assessment protocols record the status of key fish stocks in Queensland, assisting fishery managers to ensure that harvesting is at sustainable levels.

### Key fish stocks program response—case study

#### ***Ballot's Saucer Scallop—Measures to allow Queensland East Coast Stock recovery***

Ballot's Saucer Scallops occur naturally from Esperance in Western Australia, across the tropics and down to the south coast of NSW.

When the 2016 national Status of Australian Fish Stocks (SAFS) process classified Queensland East Coast scallop stock as 'overfished', immediate measures were made to allow the stock to recover.

The initial management response was to commission a quantitative stock assessment to provide more detailed analysis of the status of the stock. That assessment estimated Ballot's Saucer scallops in Queensland waters were at about 10% of the unfished level.

In consultation with the fishing industry, the Department of Agriculture and Fisheries implemented, key restrictions:

- permanent closure of Scallop Replenishment Areas
- total closure of the fishery between May and November.

A new collaborative research program with the Fisheries Research and Development Corporation, the University of Queensland and James Cook University also commenced.

Better understanding of environmental influences that impact scallop stocks will inform any further management measures, including future fishing.

Meanwhile the status of the Queensland East Coast scallop stock will continue to be assessed annually until the stock has recovered to a sustainable level.

## Sustainable Fisheries Strategy

In 2017, the Queensland Government approved a new Sustainable Fisheries Strategy, which details the government's reform agenda for the next 10 years. It sets out clear targets to achieve by the years 2020 and 2027 and a range of actions to deliver on these.

There are 33 actions across 10 reform areas. Key actions include: additional monitoring and research (including new technologies); setting clear sustainable limits for each of fish stocks; working groups and a Sustainable Fisheries Expert Panel to engage stakeholders; establishing harvest strategies for all fisheries to set clear targets for fishery performance; triggers for action, and clear decision rules for the actions that will be taken; piloting regionally based fisheries management; satellite tracking on all commercial fishing vessels; and helping facilitate industry-led structural adjustment to reduce the number of fishing licences and improve sustainability and profitability.

To implement the strategy the Queensland Government will invest in more compliance officers, monitoring and research, improved engagement with stakeholders and more responsive decision-making.

## Healthy Waters Management Plans

The Environmental Protection (Water) Policy 2009 (EPP Water), subordinate legislation under the *Environmental Protection Act 1994*, establishes Healthy Waters Management Plans (HWMPs) as a key planning mechanism to improve the quality of Queensland waters. HWMPs identify environmental values, water quality objectives and catchment-based management actions through consultation and best available science. HWMPs are being progressively developed for Queensland Murray-Darling Basin catchments. For these catchments, the HWMPs will not only fulfil requirements under the EPP Water, but also water quality planning provisions under the Murray-Darling Basin Plan 2012. In 2016, the Warrego, Paroo, Bulloo and Nebine Basins HWMP was approved. This plan identified the key risks to water quality across these catchments over the next ten years and highlighted potential management responses to address the risks.

HWMPs are broader than ‘just water quality’ as they protect aquatic ecosystems through specifying water quality objectives for indicators such as macroinvertebrates, fish, riparian vegetation and groundcover. These plans are typically delivered through collaborative partnerships between the Queensland Government and natural resource management groups.

For Great Barrier Reef (GBR) catchments, Water Quality Improvement Plans (WQIPs) have been developed, which perform a similar function to Healthy Waters Management Plans. WQIPs were initially prepared by regional NRM bodies under the Australian Government’s Coastal Catchments Initiative, in consultation with the Queensland Government. WQIPs undertaken in GBR catchments use the monitoring and evaluation tools generated by the Paddock to Reef Program. For example, GBR catchment water quality modelling and monitoring is used to prioritise areas for on-ground investment in management improvements and to predict water quality improvements from proposed management options.

## Queensland Regional Natural Resource Management Investment Program—2013 to 2018

The Queensland Government allocated \$80 million to the Regional Natural Resource Management Investment Program over five years from 2013 to 2018. This includes \$30 million to protect the Great Barrier Reef.

The majority of the funding supports projects delivered through Queensland’s regional natural resource management bodies (regional NRM bodies). Largely community-based, these organisations provide an important link between governments and communities. They work collaboratively with Indigenous groups, volunteer and grassroot organisations such as Landcare, rural industry groups and landholders.

Funded projects implement on-ground activities that protect, improve and restore waterways and rangelands by addressing weeds and pests, implementing sustainable

agricultural practices, and improving soil, vegetation and water quality at a catchment or landscape scale.

The Queensland Regional Natural Resource Management Investment Program Progress Report 2017 (the report) provides information on the outcomes achieved during the 2016–17 financial year which focussed on the following seven themes:

- managing priority and invasive weeds
- managing priority and invasive animal pests
- restoring soil condition
- adoption of best practice landscape management
- restoration of native riparian vegetation along priority waterways
- restoration of native vegetation in priority wetlands and
- engaged, knowledgeable and skilled communities.

Highlights for the 2016–17 year include:

- weed control across 600,000 hectares, protecting priority ecosystems and agricultural land
- 4,444 hectares of wetlands have been protected or restored
- soil restoration activities, including gully remediation and stock exclusion, were undertaken over 550 hectares
- 190 farmers have improved land management practices across 1.9 million hectares
- invasive pest animal control was undertaken across 7.9 million hectares.

The Queensland Government has committed to ongoing funding of regional natural resource management through the Natural Resources Investment Program 2018–2022.

## National Landcare Programme

The National Landcare Program (NLP) is the Australian Government’s key natural resource management (NRM) investment. The two phases of the current NLP build on the achievements of previous iterations, such as Caring for our Country (2008–2013) and the Natural Heritage Trust (1996–2008). These programs involved significant investment in regional delivery to deliver benefits for agricultural productivity, environmental conservation and community engagement.

The first phase of the existing NLP began in July 2014 and will run until June 2018. With an overarching aim to regularly evaluate and report on the program’s progress, the Australian Government conducted a review of the NLP in 2016 which prompted clearer, more targeted outcomes for the second phase (NLP2). This phase will run from July 2018 to June 2023, and involves an investment of more than \$1 billion into a range of sub-programs. Investments include \$134 million into the Smart Farms program to support the development and uptake of improvements in management practices, tools and technologies, and \$450 million into Regional Land Partnerships (RLP) to deliver national NRM priorities at a regional and local level.

The NLP's monitoring, evaluation, reporting and improvement (MERI) approach supports the collection of data and information to demonstrate achievements and allow ongoing improvements to be made at the project and program level. This approach will also be adopted for the RLP.

The RLP aims to achieve the following long-term outcomes:

- the ecological character of Ramsar sites is maintained or improved
- the trajectory of species targeted under the Threatened Species Strategy, and other *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) priority species, is improved
- the natural heritage Outstanding Universal Value of World Heritage properties is maintained or improved
- the condition of EPBC Act listed Threatened Ecological Communities is improved
- the condition of soil, biodiversity and vegetation are improved
- agriculture systems have adapted to significant changes in climate and market demands.

The government aims to work in partnership with state and local governments, industry, communities and individuals to support sustainable NRM and to protect Australia's biodiversity. For example, NLP investment has assisted land managers to adopt improved, innovative land management practices which have reduced the discharge of nutrients, sediment and chemicals to the Great Barrier Reef lagoon and improved resilience to climate change. NLP2 provides additional funding towards the Reef 2050 Plan, which was released by the Australian and Queensland governments in March 2015 and is the overarching framework for protecting and managing the Reef. Programs administered under the NLP align with the Queensland Natural Resources Investment Program<sup>1</sup> to support initiatives that improve the capacity of Queensland's natural resource base. Significantly for northern and remote areas of Queensland, which contain intact high conservation value landscapes, land managers have been supported to uptake sustainable grazing practices while protecting important biodiversity.

The Australian Government's role in delivering the NLP includes providing policy design and implementation which can support the delivery of NRM services while maintaining volunteerism, which is at the core of the Landcare approach. Continued funding and coordination efforts at a federal level allows it to leverage the ongoing grassroots Landcare movement to deliver improved agricultural and environmental outcomes for the whole of Australia. The NLP is also a vehicle for the Australian Government to fulfil its obligations under international environmental treaties.

## The Convention on Wetlands (Ramsar Convention)

The Convention on Wetlands of International Importance, commonly referred to as the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Queensland has five Ramsar sites.

The EPBC Act establishes a framework for protecting and managing Ramsar wetlands in Australia. Australian Ramsar management principles cover matters relevant to the preparation of Ramsar site management plans, including community consultation processes.

Primary responsibility for managing wetlands and their associated flora and fauna is vested in the appropriate landholders/land managers. Individual local, state and territory governments have the primary legislative and policy responsibility for natural resource management.

## Regional Waterway Health Report Cards

The Queensland Government supports a number of regional waterway health report cards in the Great Barrier Reef. This is an action under the Reef 2050 Long-Term Sustainability Plan.

Report Card Partnerships in the Great Barrier Reef catchments:

- Active since 2016, the Wet Tropics Healthy Waterways Partnership reports on the following Great Barrier Reef catchments: Daintree, Mossman, Barron, Russell, Mulgrave, Johnstone, Tully, Murray, and Herbert river basins.
- Active since 2017, the Townsville Report Card Partnership will launch the pilot report card on the Black and Ross river basins in 2018.
- Active since 2010, the Fitzroy Partnership for River Health reports on the largest catchment flowing to the Great Barrier Reef; the Fitzroy Basin.
- Active since 2014, the Gladstone Healthy Harbour Partnership reports on the ecological, social and economic health of the Gladstone Harbour region, which is home to the world's third largest coal exporting terminal.
- Active since 2015, The Healthy Rivers to Reef Partnership - Mackay Whitsunday reports on the following Great Barrier Reef catchments: Don, O'Connell, Proserpine, Plane and Pioneer river basins.

<sup>1</sup> Formerly the National Resources Management Regional Investment Program

## Regional waterway health report card—case study

### ***Mackay–Whitsunday Report Card***

An annual report card is proving a useful tool in bringing community, industry, science, tourism and government together to see where, and how, improvements can be made for Mackay-Whitsundays waterways.

The Mackay-Whitsunday report card reports on the catchments of the Don, Proserpine, Pioneer, O'Connell and Plane basins, 8 estuaries, and the inshore and offshore marine areas to the eastern boundary of the Great Barrier Reef.

First released in October 2015, the report cards rate priority aquatic ecosystem indicators from Very Good (A) to Very Poor (E).

Regional data for each indicator is compared to benchmarks using indicator-specific methodology to produce a score. Scores for each indicator are aggregated into categories and indices: these scores produce an overall score for an individual reporting zone in the region.

A Technical Working Group works to ensure the report card indicators and scoring methods are based on the best available science, are locally relevant, reflect changes to waterway health, and are consistent with other report card programs across Queensland where applicable.

The Mackay-Whitsunday report card draws on data from the Paddock to Reef Program to report on seagrass, coral and water quality in our inshore marine zones, water quality in our catchments and management practice for sugarcane, grazing and horticulture.

Agriculture stewardship assessments are adopted from the Great Barrier Reef Report Card. Stakeholders can see that sugarcane has made real improvements in management practices affecting waterways since reporting began.

Environmental management efforts of other industries—including heavy industry, aquaculture, tourism and port operations—are also measured for their effectiveness. The report card ratings for management practices indicate subtle improvements since 2014.

### **South East Queensland (SEQ) Healthy Catchments Program**

The Queensland Government has continued to work with stakeholders and invest in a range of initiatives in South East Queensland to improve water quality and catchment health. Management responses implemented through the 2017–18 SEQ Healthy Catchments Program include:

- SEQ water quality monitoring (annual report card) to track waterway health and identify issues for management action, in addition to supporting the Healthy Land and Water Awards to recognise individual, community and industry participation in waterway protection
- facilitation of horticultural research and development, as well as the delivery of the Horticulture Best Management Practice Program to reduce erosion and nutrient loss to improve water quality
- catchment improvement activities to restore riverbanks, protect horticultural land and reduce sediment flowing to waterways under the Healthy Country Program
- improvements to urban stormwater erosion and sediment control associated with construction and post-construction phases of urban development, which focusses management action on addressing the source of 35% of sediment emissions to SEQ waterways.

The SEQ Healthy Catchments Program continues to deliver multiple benefits to water quality and ecosystem health, agricultural land, the building and land development industry, and the community. In addition, the Queensland Government is working with the SEQ Council of Mayors Resilient Rivers Initiative to ensure a coordinated approach to catchment management is implemented across the region.

## **Marine Parks Act 2004**

The *Marine Parks Act 2004* (the Act) provides for the conservation of Queensland's marine environment by implementing a comprehensive range of management strategies including the declaration of marine parks and the establishment of zones and designated areas, including highly protected areas within marine parks. These management arrangements are formalised through the gazettal of zoning plans and in some instances the development of management plans.

The Act aims to achieve a coordinated and integrated approach with other environmental conservation legislation, and recognises the cultural, economic, environmental and social relationships between marine parks and their adjacent lands and waters.

Australia's international responsibilities and intergovernmental agreements are important considerations in park management. Marine parks extend across areas adjacent to the Queensland coast which are under the control of both the Commonwealth and State governments. Both governments have agreed that, as far as practicable, in managing marine parks, state legislation will be consistent with the relevant Commonwealth legislation. This is critical in the Great Barrier Reef region where complementary measures support the management of this significant area.

Marine parks are multiple-use areas providing for a range of activities and visitor opportunities, for example fishing, tourism, education, research and some structures. The zoning plans prescribed under the Act spell out the types of uses and management measures.

Three marine parks have been declared under the Act with corresponding zoning plans established—Great Barrier Reef Coast Marine Park, Great Sandy Marine Park and the Moreton Bay Marine Park. Along with the Commonwealth Great Barrier Reef Marine Park, 99% of the east coast of Queensland currently sits within a marine park.

Each marine park has a zoning plan which is reviewed every 10 years to ensure that the management arrangements in place are the most appropriate to conserve the marine environment while allowing for sustainable use.

## **Northern Hairy-Nosed Wombat Program**

The northern hairy-nosed wombat (*Lasiorhinus krefftii*) is listed as endangered under Queensland's *Nature Conservation Act 1992*. Since European settlement, competition for food from introduced grazing animals, such as sheep, cattle and rabbits—particularly during droughts—is believed to have been the main reason for the rapid decline of the species.

In the 1980s it was estimated there were 35 northern hairy-nosed wombats remaining in a small area on Epping Forest National Park in Central Queensland. Since then, dedicated managers and scientists have worked hard to protect and increase the population, and have successfully established a translocated colony at Richard Underwood Nature Refuge near St George in south west Queensland.

At the last census in 2016, there was an estimated population of 240 northern hairy-nosed wombats at Epping Forest National Park. A recent birth at Richard Underwood Nature Refuge brings that colony's population to 11, so it is estimated there are approximately 250 northern hairy-nosed wombats in the wild. This is a major improvement on the estimated 35 wombats remaining in the 1980s. The search continues to find more suitable habitat to create a third colony to help secure the future for this threatened species.

## **Conservation and management of crocodiles**

Estuarine crocodiles (*Crocodylus porosus*) are listed as vulnerable under the *Nature Conservation Act 1992*. They were nearly hunted to extinction in Queensland prior to 1974, and habitat destruction is now considered a major threat to their survival in Queensland. The Queensland Crocodile Management Plan, together with the Nature Conservation (Estuarine Crocodile) Conservation Plan 2007, provides Queensland's strategic management framework to ensure the conservation of estuarine crocodiles in the wild, and reduce the risk to public safety. The purpose of these plans is to conserve viable populations in the wild, enhance public safety, prevent losses in the aquaculture industries from problem crocodiles, and ensure the commercial use of estuarine crocodiles is sustainable.

In 2017, the management plan was extended to include a 3-year monitoring and research program, a CrocWatch telephone service for reporting and investigating crocodile sightings, and a Crocwise public safety education campaign.

## **Fisheries Act 1994 (Fish Habitat Areas)**

Queensland has 72 declared fish habitat areas (FHA) along its coast. These areas are declared under the *Fisheries Act 1994* and protect more than 1,200,000ha of high-quality fish habitat. This network provides long-term protection from the physical impacts associated with coastal development—essential for sustaining recreational, commercial and indigenous fisheries.

In September 2016, following the Central Queensland Fish Habitat Area Investigation Program, two new FHAs were declared and an existing declared FHA expanded. The two new areas are the Balban Dara Guya (Leekes Creek) declared FHA at Great Keppel Island (876ha) and the Dē-rāi-lī (Calliope River) declared FHA near Gladstone (314ha). The Fitzroy River declared FHA was expanded by 48,625ha taking the total area of this FHA to 77,878ha.

Declared FHA Network Assessment Reports document the status of the declared FHA network every five years. The first report was published in 2012, with the second due in early 2018. Assessment criteria are based on the aims of the Declared FHA Network Strategy.

Annual progress reports review and summarise the effectiveness of responses to recommended management actions.

### **Fish Habitat Areas—case study**

#### ***Central Queensland Declared Fish Habitat Area Investigations Program***

A declared fish habitat area (FHA) is an area protected against physical disturbance from coastal development while still allowing fishing.

In 2016, Balban Dara Guya (Leekes Creek) FHA on Great Keppel Island and Dē-rāi-lī (Calliope River) FHA near Gladstone were declared and the Fitzroy River declared FHA near Rockhampton extended.

This followed extensive community and stakeholder consultation informed by fish and habitat surveys of candidate areas, and desktop studies of existing information. More than 500 public submissions were received, with overwhelming support for the proposed/expanded FHAs. Woppaburra and Gidarjil People joined in field surveys, advised on cultural values and aspirations for the areas, provided Aboriginal language names for the new declared FHAs and helped develop interpretive signage.

Balban Dara Guya (Leekes Creek) is the first declared FHA centred on an offshore continental island, with a diverse mix of estuarine and reef habitats and fish. Along with Dē-rāi-lī (Calliope River), this is the first declared FHA to have an Aboriginal language primary name, meaning ‘mangrove’, ‘creek’, ‘fish’. This name was provided by the Woppaburra People of the Keppel Islands. It is also the first to have Aboriginal interpretive signage explaining both the fish habitat and cultural values of the area.

Dē-rāi-lī (Calliope River) declared FHA protects high-quality estuarine fish habitats, including nursery and grow-out habitats for barramundi. Dē-rāi-lī is the Gidarjil People’s name for the Calliope River.

Expansion of the Fitzroy River declared FHA further protects breeding grounds and critical habitats for barramundi, king salmon, mud crabs and other popular fisheries species. The expansion delivered a Queensland Government commitment in the Reef 2050 Long-Term Sustainability Plan.

Another declared FHA in central Queensland, Cawarral Creek near Emu Park was reassessed, that process revealing a much broader range of fish habitat values than had previously been documented, reinforcing the importance of protecting the area.





# 4.0 Heritage



Queensland has a rich and diverse heritage. Heritage places, areas and objects contribute to our sense of place, reinforce our identity and help define Queensland's story. They form part of our common inheritance and we have a responsibility to ensure their conservation for present and future generations.

Queensland's most important historic heritage places are entered in the Queensland Heritage Register which aims to be a comprehensive and representative record of Queensland's past. Places that are important at a local level, but which do not necessarily meet the state heritage threshold, are required to be recognised on a local government heritage register or be identified in the local planning scheme. Natural, historic and Indigenous places of outstanding significance to Australia are entered in the National Heritage List.

The heritage theme is separated into the following sub-themes: Aboriginal and Torres Strait Islander; Historic; and World.





## 4.1 Aboriginal and Torres Strait Islander

Aboriginal and Torres Strait Islander people have distinct identities, histories and cultural traditions. Their cultural heritage includes areas, objects, and evidence of archaeological or historic significance of Aboriginal or Torres Strait Islander occupation of an area of Queensland. Areas and objects of traditional, customary, and archaeological significance are protected in Queensland.

### Why Aboriginal and Torres Strait Islander cultural heritage is important

Aboriginal and Torres Strait Islander cultural heritage can be both tangible and intangible. It intrinsically links people to place and enables cultural connections with country.

There are many different types of Aboriginal and Torres Strait Islander sites and places throughout Queensland and numerous ways of describing them. Efforts to protect, conserve and interpret Aboriginal and Torres Strait Islander cultural heritage are important in preserving and respecting the cultural values of a place or object.

### Pressures

There is decreasing pressure on cultural heritage from major resource and infrastructure projects, but there is consistent pressure from general land use activities.

The Department of Aboriginal and Torres Strait Islander Partnerships has produced the Aboriginal and Torres Strait Islander Cultural Heritage Map of Queensland, which describes Indigenous cultural heritage and its protection under Queensland legislation.

The map also describes various aspects of Indigenous cultural heritage and the importance of understanding time and place.

A copy of this free map is available from the Department of Aboriginal and Torres Strait Islander Partnerships' Cultural Heritage Unit.



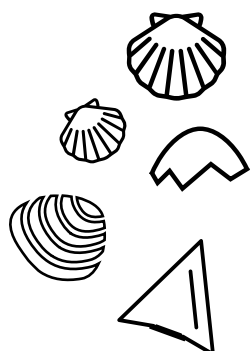
## Key findings | Aboriginal and Torres Strait Islander

### CULTURAL HERITAGE

**1,106 new** site locations  
were recorded on the

**cultural  
heritage  
database  
since July 2015**

(As at 31 December 2016, there were 43,643 site locations on the register.)



Between  
**July 2015–December 2016**

**19**  
cultural  
heritage  
management  
plans

were approved and registered.



### PRESSURES

There is

**decreasing pressure**

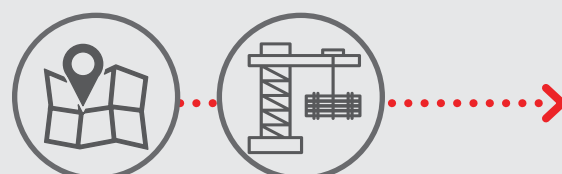
on **cultural heritage**

from the **mining and  
resources sector**



There is

**consistent pressure**



from **general land use  
activities**



Image courtesy of Tourism and Events Queensland





## 4.2 Historic

Queensland's heritage comprises places from our past that we want to keep, respect and pass on to future generations. These places reflect our history and evoke special meaning for us as individuals, and as members of communities.

Heritage places help tell us who we are and how we connect with the things that have formed our community and environment. These places are tangible expressions of the way people interact with their wider natural, social and economic environments. Some places are important to the nation, some are important to the state, while others have importance to regional and local communities.

The Queensland Heritage Register is a comprehensive record of the state's most significant historic heritage places, and includes buildings and structures, cemeteries, archaeological sites, gardens and landscapes. The majority of local heritage places and areas are identified and protected through local government planning schemes.

### Why historic heritage is important

Heritage places are central to our community's character and identity—allowing us to trace our history and feel connected to the important stories about our progress.

Protecting, conserving and promoting heritage places and their stories plays an important role in creating community identity, sustaining local economies and contributing to Queensland's cultural heritage tourism industry.

Queensland's shipwrecks reflect the diverse stories of adventure, industry, disaster and ingenuity that stem from the state's maritime heritage. Many shipwrecks continue to serve the economy as recreational diving locations.



## Key findings | Historic

### HISTORIC HERITAGE

Since 2012, **one Queensland place** has been added to the **National Heritage List**.



Between **2016–17** the following **changes** were made to the **Queensland Heritage Register**:



**27** places were **entered**.



**0** State Heritage Places were **destroyed**.

Since 2012, the **Australian National Shipwreck Database** was **updated** to include:

**990** existing shipwreck entries



**39** new shipwreck entries



**52** aircraft entries



**12** relic entries



Of the **78** local governments in Queensland, **58** identify local heritage places in their planning schemes (as of August 2017).



### OPEN HOUSE EVENTS

**BNE OPEN HOUSE**

Queensland's Open House events encourage the community to explore a region's significant buildings and history.

In 2017, the event attracted

**87,634** visitors.

**67,371** Brisbane Open House

**7,270** Maryborough Open House

**6,814** Toowoomba Open House

**2,500** Gold Coast Open House

**2,809** Sunshine Coast Open House

**870** Bundaberg Open House.





## 4.3 World

World heritage areas are considered the most outstanding natural or cultural heritage places. They are selected by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). Queensland, one of the most naturally diverse places on earth, has five world heritage areas: the Great Barrier Reef; Wet Tropics of Queensland; Riversleigh section of the Australian Fossil Mammal Sites; Fraser Island; and Gondwana Rainforests of Australia.

### Why world heritage is important

World Heritage areas are places that have universal value that transcends the value they hold for a particular nation. These qualities are expressed in the Convention concerning the Protection of the World Cultural and Natural Heritage (the World Heritage Convention). The World Heritage Convention aims to promote cooperation among nations to protect heritage from around the world that is of such outstanding universal value that its conservation is important for current and future generations.

### Pressures

Pressures on Queensland's world heritage areas include:

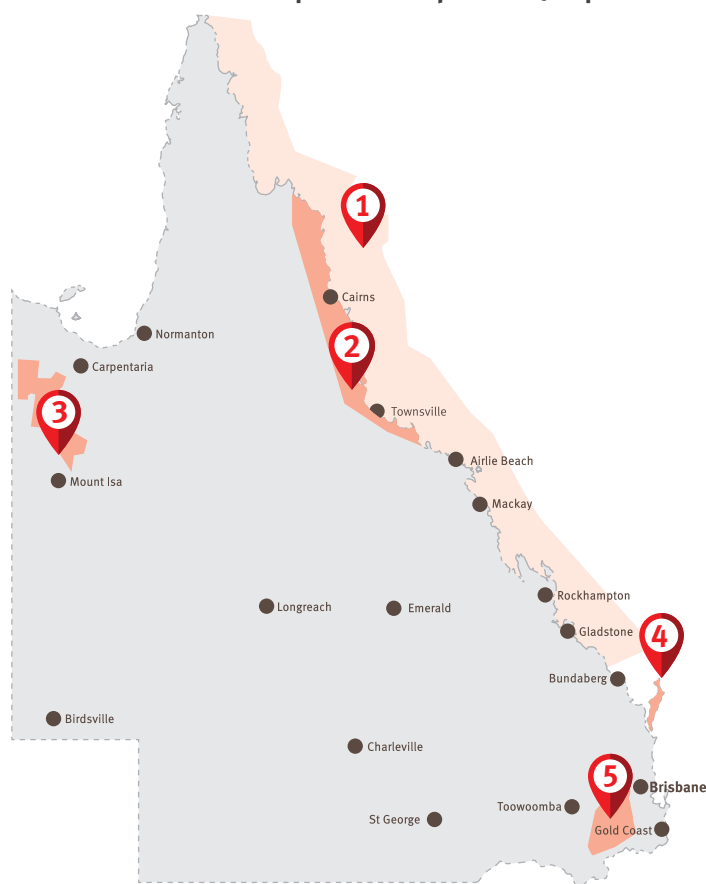
- The Great Barrier Reef—crown-of-thorns starfish, climate change, coastal development, land-based run-off, and direct use.
- Wet Tropics of Queensland—invasive species, and climate change.
- Fraser Island—increased tourism, climate change, invasive species, and altered fire regimes
- Gondwana Rainforests of Australia—climate change, invasive species, tourism, altered fire regimes and fragmentation.



# Key findings | World

## QUEENSLAND'S WORLD HERITAGE AREAS

1. Great Barrier Reef | 2. Wet Tropics of QLD | 3. Riversleigh | 4. Fraser Island | 5. Gondwana Rainforests



### 1. Inscribed on the World Heritage List: 1981.

The Great Barrier Reef became the first coral reef ecosystem to be listed on the World Heritage List in recognition of its outstanding universal value and importance to the global community.

### 2. Inscribed on the World Heritage List: 1988.

The Wet Tropics of Queensland, although small in area, conserves an extraordinary percentage of Australia's biodiversity and is the only habitat for many endemic and threatened species.

### 3. Inscribed on the World Heritage List: 1994.

The Riversleigh section of the Australian Fossil Mammal Sites is one of the most significant fossil deposits in the world, and has the richest known mammal deposit in Australia.

### 4. Inscribed on the World Heritage List: 1992.

Fraser Island, also known by its Aboriginal name of K'gari, is the world's largest sand island. It is an outstanding example of ongoing biological, hydrological and geomorphological processes and features the world's largest unconfined aquifer on a sand island.

### 5. Inscribed on the World Heritage List: 1986.

The Gondwana Rainforests of Australia feature outstanding examples of major stages of Earth's evolutionary history as well as ongoing geological and biological processes and exceptional biological diversity.



## 4.4 Management responses

**Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in a multitude of ways, either individually or, more often, in concert with one another to bring about environmental change.**

**Management responses related to heritage include:**

### 4.4.1 Aboriginal and Torres Strait Islander

#### **Aboriginal and Torres Strait Islander cultural heritage legislation**

The *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003* provide effective recognition, protection and conservation of Aboriginal and Torres Strait Islander cultural heritage, defined as anything that is:

- a significant Aboriginal or Torres Strait Islander area or object in Queensland; or
- evidence, of archaeological or historic significance, of Aboriginal or Torres Strait Islander occupation of an area of Queensland.

An area or object is significant because of either or both of the following:

- Aboriginal or Torres Strait Islander tradition
- history including contemporary history of any Aboriginal or Torres Strait Islander party for the area.

The Acts:

- provide blanket protection of areas and objects of traditional, customary, and archaeological significance
- recognise the key role of traditional owners in cultural heritage matters
- establish practical and flexible processes for dealing with cultural heritage in a timely manner.

#### **Aboriginal and Torres Strait Islander cultural heritage database and cultural heritage register**

The purpose of the cultural heritage database is to assemble information in a central and accessible location, to be used as a research and planning tool to assist with the assessment of cultural heritage values of particular areas. The database is not publicly accessible.

The cultural heritage register, which is available to the public, holds information regarding:

- cultural heritage studies
- Designated Landscape Areas
- whether a particular area has been the subject of a cultural heritage management plan
- cultural heritage bodies
- details of statutory Aboriginal and Torres Strait Islander parties.

The register also contains information used for land-use planning. It is used as a research and planning tool to assist with the assessment of cultural heritage values of particular objects and areas.

#### **Cultural Heritage Management Plans**

A cultural heritage management plan (CHMP) is an agreement between a land user and Traditional Owners, developed under Part 7 of the Acts, that explains how land use activities can be managed to avoid or minimise harm to Aboriginal or Torres Strait Islander cultural heritage.

While a CHMP must be developed and approved under Part 7 of the legislation when an environmental impact statement is required for a project, any land user can voluntarily develop and seek to have a CHMP approved.

A statutory one-month notification of an intention to develop a CHMP is followed by a three-month negotiation and consultation period with the Aboriginal or Torres Strait Islander party regarding the terms of the plan.

## 4.4.2 Historic

### **Queensland Heritage Act 1992**

The *Queensland Heritage Act 1992* is the primary legislation by which Queensland's historic heritage places are identified and protected, creating an environment for growing recognition of heritage by local government. The Act is administered by the Department of Environment and Science (DES) and the Queensland Heritage Council, an independent statutory body. The Heritage Council has sole responsibility for deciding which places are entered in, or removed from, the state's Heritage Register.

Amendments to the *Queensland Heritage Act 1992* commenced in September 2015, along with a new Heritage Regulation. The changes focused on reducing regulatory burden while strengthening protections for Queensland's heritage places, emphasising the important role played by local government in heritage protection and reinforcing the strategic role of the Queensland Heritage Council. The amendments were the subject of public consultation through release of *Our heritage: A collaborative effort. Discussion paper – Review of the Queensland Heritage Act 1992*.

Subsequently, Heritage Register processes were streamlined. Excluded place provisions replaced the out-dated Certificate of Immunity provisions; the scope of Exemption Certificates was expanded to reduce the regulatory burden for owners when they undertake low-impact work on a heritage place; Essential Repair and Maintenance provisions were strengthened to better target wilful neglect; and the orders available to the court in penalising those convicted of certain offences under the Heritage Act were expanded. A requirement was also introduced requiring underwater cultural heritage artefacts (including ship and aircraft wrecks lost in Queensland waters, rivers and bays for at least 75 years) to be reported and protecting these discoveries from interference without consent.

Local governments' vital role in protecting local heritage places was emphasised and updated along with Exemption Certificate, Essential Repair and Maintenance and Heritage Agreement powers for local heritage places.

### **Queensland Heritage Register**

The Queensland Heritage Register is the primary instrument by which places of heritage value to Queensland as a whole are identified and protected. DES manages the details about places in the Queensland Heritage Register, but the Queensland Heritage Council makes decisions about which places are entered in or removed from it, and when substantial changes are made to those entry documents.

Amendments to the *Queensland Heritage Act 1992* commenced in 2015. Queensland Heritage Register processes were streamlined and aligned with Certificate of Immunity provisions; the process of updating entry details was rationalised to allow for greater currency of information; and a higher standard of application information will be required so that only well-researched and evidenced applications are progressed.

### **Monitoring of historic shipwreck sites**

Monitoring of historic shipwreck sites is undertaken periodically, after severe weather events, and in response to notifications made by members of the public.

DES recently prepared a condition report form that must be completed by applicants for permits to enter protected zones. This form can also be used to provide information on any historic shipwreck site. Accompanying guides for seven popular historic shipwrecks, and for visiting historic shipwrecks generally, have also been prepared.

Information obtained from monitoring activities is used to update the Australian National Shipwreck Database and the Living Heritage Information System.

Monitoring helps keep sites open and enables risks to be addressed. This supports commercial and recreational divers to responsibly engage with the state's underwater heritage.

### **Historic shipwreck survey**

Of the estimated 1,100 historic shipwrecks along the Queensland coastline, only 10% have been properly documented with an exact location and description of the site. Through a combination of survey work, historical research, and information from the public, the number of properly documented historic shipwrecks is increasing.

Historic shipwreck entries in the Australian National Shipwreck Database are updated with an exact location and site description. Accurate identification of historic shipwrecks allows appropriate management and protection of these wrecks for current and future generations.

### **Open House visitation data collation**

Open House visitation data is used to guide and improve future events.

Starting in London in 1992, the Open House movement showcases outstanding architecture and encourages people to explore and understand the value of a well-designed built environment.

Following the lead of Melbourne in 2008, Open Houses started in Brisbane in 2010, satellite events commenced in Maryborough (2012), Toowoomba (2013), Gold Coast (2015), Bundaberg (2016) and Sunshine Coast (2017).

Visitation numbers are used to:

- maintain current sponsorship commitments and to secure new sponsors
- encourage other regional centres to become involved in the Open House movement
- develop and refine programs at future events
- allocate volunteer resources more efficiently.

### 4.4.3 World Heritage

#### World Heritage List

The World Heritage List comprises natural and cultural places of ‘outstanding universal value’ selected by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Committee.

The Committee is responsible for implementing the World Heritage Convention, defining the use of the World Heritage Fund and allocating financial assistance, deciding whether a property is inscribed on the World Heritage List, examining reports on the state of conservation of inscribed properties, and asking for action to be taken when properties are not being properly managed. It also decides on the inscription or deletion of properties on the List of World Heritage in Danger.

Once a property is inscribed on the World Heritage List, effective and active measures must be taken for its protection, conservation and presentation.

While UNESCO and the World Heritage Committee does not direct the management of listed World Heritage properties, it does provide high level guidelines. It also requires that reporting on the state of properties conservation is undertaken and can liaise with State parties regarding possible concerns.

The day to day management and protection of the World Heritage property is primarily carried out by the Queensland Parks and Wildlife Service under the provisions of the *Nature Conservation Act 1992*, *Recreation Areas Management Act 2006*, *Wet Tropics World Heritage Protection and Management Act 1993* the *Commonwealth Great Barrier Reef Marine Park Act 1975*.

#### Strategic Management Planning

In Australia World Heritage obligations are met through co-operative and legislative arrangements between the Australian Government, State and Territory governments, local government agencies, property owners/site managers and traditional owners.

The World Heritage Convention and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) require the preparation of Strategic Management Plans (Plans) for each of Australia’s World Heritage properties.

Property-specific plans provide direction for effective co-ordination of management efforts by providing a clear ‘line of sight’ between strategic goals, objectives, strategies and those responsible for implementation.

#### Monitoring and reporting

Monitoring and reporting of the World Heritage values is undertaken regularly through a number of State, Commonwealth and World Heritage Centre processes including conservation outlook, State of the Environment, State of the Parks reporting as well as other periodic reports.

These documents detail how effectively the World Heritage properties are being managed by collecting data from various sources and reporting on value, threat (impacts, scale and extent), condition, trend and management responses.

Outcomes of these monitoring and reporting processes help inform management responses for the responsible management agencies.

### Wet Tropics of Queensland World Heritage Area—case study

#### Yellow crazy ant eradication program

The yellow crazy ant is among the world’s top 100 worst invasive species, according to the International Union for Conservation of Nature.

It has caused substantial environmental harm on numerous islands in the eastern Pacific and Papua New Guinea—and is present in and around the Wet Tropics of Queensland World Heritage Area. Its presence not only threatens endangered species and ecological communities and the property’s Outstanding Universal Value but also agriculture and community safety.

The yellow crazy ants eat a wide range of foods and can build high population densities. Their omnivorous diet ranges from seeds and fruit to invertebrates (worms, grubs, insects and spiders) and small vertebrates including frogs, nesting birds and lizards—even juvenile mammals when they attack in unison.

Impacts on wildlife and Australian’s unique tropical ecosystems may be direct, through predation or harassment, or indirect through removal of lower food-chain organisms or disruption of critical processes such as pollination, seed dispersal and decomposition.

The Wet Tropics Management Authority (WTMA) has a 10-year program to eradicate yellow crazy ant infestations in, and adjacent to, the Wet Tropics World Heritage Area. The Australian and Queensland governments have provided funding for 3 years to June 2019.

Already, 1,124ha have been under treatment: 63.3ha within the Wet Tropics World Heritage Area. Treatment areas undergo aerial and on-ground baiting 3 times per year with regular monitoring and surveillance determining the success of baiting or further spread of yellow crazy ants.

Funding has also enabled scientific research—critical to guide, monitor and enhance control efforts—and community education and engagement.



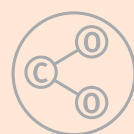


# 5.0 Pollution

**Pollution can affect human health, impact the environment and result in economic costs**

While greenhouse gas emissions cause global warming, all forms of pollution can cause harm to our native species and their habitat and impact on the scenic amenity of Queensland's natural areas.

The pollution theme is separated into the following sub-themes: Air quality; Water quality; Waste; and Greenhouse gas emissions.





## 5.1 Air quality

Air quality is a measure of the purity of the atmosphere, in terms of the quantity of solid, liquid or gaseous air pollutants. The impacts of these pollutants tend to be localised near major sources or groups of sources, since pollutants are continually removed from the atmosphere by processes such as gravitational deposition, rainfall, chemical reaction and solution in water bodies.

The effects of air pollutants can include human health impacts (short term and long term), irritation, nuisance (for example, soiling of surfaces from deposited dust or increased corrosion rates), aesthetics (light scattering, visual range, haze) and flora and fauna impacts.

### Why air quality is important

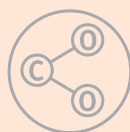
Good air quality is important to maintain environmental health, including human health. Poor air quality can cause reduced visibility and damage our environment and ecosystems. Ground-level ozone damages agricultural crops, forests and plants, reducing their growth rates. Nitrogen oxides and sulphur dioxide harm soil, lakes and rivers which can cause a loss of animal and plant life: ammonia and nitrogen oxides disrupt land and water ecosystems.

Air quality in Queensland has improved significantly over the last three decades, despite pressures from growing population, and increase in motor vehicle use and industrial growth. Air quality improvements are a result of Queensland's regulation of industry, stricter emissions standards for motor vehicles and new emissions reduction technology.

### Pressures

Air pollutant emissions for industrial sources in Queensland have generally been trending slightly upwards for the past five years. Increases in industrial emissions for a number of key air pollutants reflect increased demand in commodities.

Emissions from motor vehicles are a function of many factors—but most importantly total travel, fleet mix, emission control technology and driving behaviour.



# Key findings | Air quality

## AIR QUALITY

### Air quality

has **improved significantly** over the **last three decades** and remains relatively good as a result of industry regulation, stricter emission standards for motor vehicles and new emission reduction technology.

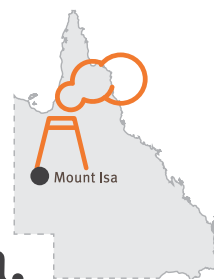
### Most measures of air quality

- Carbon Dioxide
- Lead
- Nitrogen Dioxide
- Sulphur Dioxide And
- Ozone Concentrations

have **significantly reduced**.

### Sulphur dioxide

has occasionally **exceeded** the **standard** in **Mount Isa**.



**Particle pollution** is the most **significant air quality issue** in **Queensland** with,



During 2012–17, the majority of the **air toxics (pollutants)**

measured at one location in **Brisbane**, and one in **Gladstone** were at levels **below** the **national air quality investigation levels**.

## VEHICLES

**Registered motor vehicles** (cars, truck, buses, motorcycles, campervans) and the **kilometres** they travel **continue to climb**.



## MAJOR AIR POLLUTANTS

The **National Pollutant Inventory** (NPI) tracks air pollutant emissions for industrial sources across Australia.

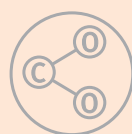
**NPI results** for **industrial sources** in Queensland show that **several pollutants** have generally been **trending upwards** for the **past five years** reflecting an **increased demand** in **commodities**.

The main sources of **industrial air pollutants** are from the

- **primary metal manufacturing**
- **coal mining**
- **electricity supply sectors**.



The **increased production** of **sulfur dioxide** is driven by the primary metal manufacturing sector and particulate matter by the coal mining sector.





## 5.2 Water quality

Water is essential to human life and the health of the environment. Water quality is commonly defined by its physical, chemical, biological and aesthetic (appearance and odour) characteristics. A healthy environment is one in which the water quality supports a rich and varied community of organisms and protects public health.

Water quality is highly variable year to year in many regions depending on rainfall. As a result, a combination of monitoring and modelling is often used to better understand long-term improvements in water quality.

### Why water quality is important

Clean water is needed to protect freshwater, estuarine and marine plants and animals. Poor water quality has been attributed to algal blooms, declines in seagrass and coral loss. It can also affect our drinking water supplies. Many marine systems, such as the Great Barrier Reef, are likely to face a number of pressures from climate change into the future. Improving water quality and reducing some of the local stressors will create resilience against the likely impacts from climate change.

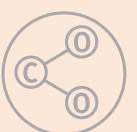
### Condition

Queensland's aquatic ecosystems vary significantly in condition. Some are in pristine condition while others do not meet standards for water quality. Depending on location, water quality report cards document the state of water quality, habitat condition and other ecosystem features at various spatial and time scales. Regional report card partnerships produce annual water quality report cards for a number of Great Barrier Reef catchments, including Gladstone Harbour, Fitzroy Basin, Mackay-Whitsundays and the Wet Tropics. The Healthy Land and Water Report Card details South East Queensland's aquatic conditions. The Queensland Government QCatchments program conducts water quality assessments for many freshwater systems in Queensland. These report cards provide in-depth information on aquatic ecosystem health.

### Pressures

The pressures affecting Queensland's aquatic ecosystems vary depending on local conditions and level of development. Broadly, sediments, nutrients and pesticides are the main catchment pressures on our aquatic ecosystems. Climate change is another pressure, particularly the Great Barrier Reef.

Nitrogen and phosphorus are significant contaminants resulting from both diffuse sources (such as farmland) and point sources (such as sewage treatment plants): they cause ecological imbalance through growth of algae and other species.



# Key findings | Water quality

## UNDERSTANDING WATER QUALITY REPORT CARDS

Regional waterway health report cards provide **finer scale information on water quality in local streams, rivers and bays.**

These show that many **waterways** are in **poor condition**, and that the condition is heavily **dependent on rainfall** during the relevant period.

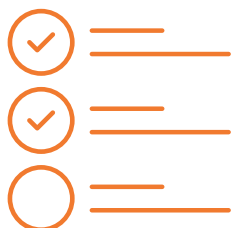


In the 2017 SEQ report card

**Moreton Bay** zones were found to be in good or **excellent condition.** ✓

The overall grade in the 2017

**Gladstone harbour** report card remained as **satisfactory.**



**Mackay-Whitsunday** report card grades vary across different reporting zones: **some are in good condition** while others have been more heavily impacted by rural and coastal land use

The 2015–16 **Fitzroy Basin** report card overall condition grade remained as **good.**

The 2017 **Wet Tropics** report card scored the offshore marine as **very good** and inshore marine as **moderate.**

## PRESSURES

**Sediments**



**Pesticides**



**Nutrients**



**Climate Change**

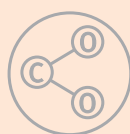
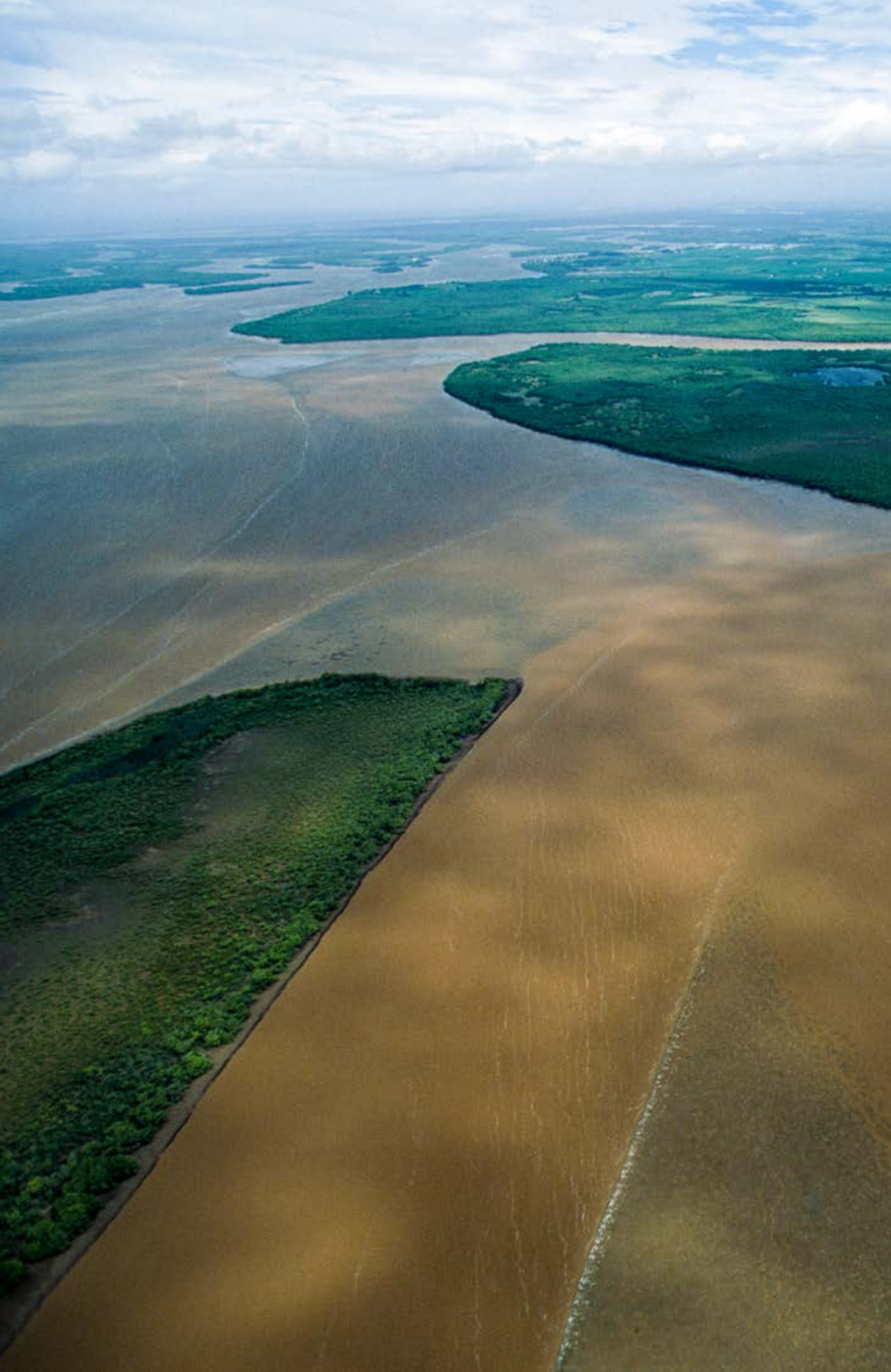


are the **main catchment pressures** on aquatic ecosystems.

## DISCHARGE INTO WATERWAYS

Current levels of **contaminants** from **sewage treatment plants** are **relatively stable.** Annual volume and load of nitrogen and **phosphorus** from coastal sewage treatment plants have **reduced** since 2015.







## 5.3 Waste

Waste generation and disposal have significant social, economic and environmental costs. Having a decentralised population spread across a vast geographic area presents logistical challenges for waste management in Queensland.

### Why waste management is important

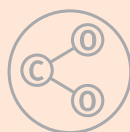
Waste is managed to protect human health and environmental quality, and to improve the efficiency of resource use. The amount of waste generated and the proportion of materials recovered are indicators of the sustainability of the community's use of resources. Reductions in the amounts of waste generated and increases in the proportions recovered would suggest improved resource use efficiency.

Litter and illegally dumped items are visible indicators of pollution in our environment—adversely affecting aesthetic and environmental values, degrading natural areas, facilitating the spread of pests and weeds, and harming wildlife that eat or are entangled in the waste.

### Pressures

Queensland disposes of millions of tonnes of general waste per year. In recent years, the amount of waste sent to landfill in Queensland has been boosted by waste from interstate sources. It is likely that the relatively low costs of landfill disposal in Queensland have been the motivator for this cross-border flow.

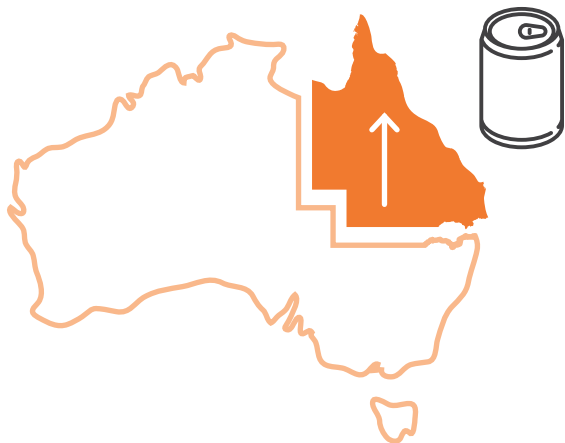
Littering and illegal dumping causes serious environmental impacts, with reports suggesting that the problem is widespread throughout the state. Recent surveys indicate that approximately 25% of the population admits to littering and approximately 10% admits to illegal dumping.



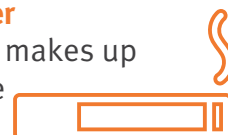
## Key findings | Waste

### IMPACT OF LITTER AND ILLEGAL DUMPING

The average number of **litter items** is **higher in Queensland** than **other Australian states**, particularly at beaches, retail strips and recreational areas.



The **most prevalent type of litter** is **cigarette butts** although this makes up only a **very small fraction** of the total volume of litter.



**Plastic and paper** are frequently **littered items**, both in terms of number and volume.



**Illegal dumping** is defined in Queensland as the **unlawful depositing of 200 litres or more of waste**.

Collecting and properly disposing of illegally dumped materials imposes substantial costs, particularly on local governments.

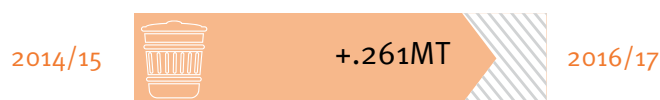
### WASTE LANDFILLED

**1.26 million tonnes (MT)** of **domestic kerbside waste** was sent to **landfill** in **2016–17**



an **increase** from **1.21 million tonnes** in **2014–15**.

**2.146 million tonnes (MT)** of **construction and demolition waste** was sent to **landfill** in **2016–17**

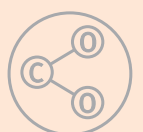


an **increase** of **261,000 tonnes** from **2014–15** (and 1.297MT higher than in 2011–12).



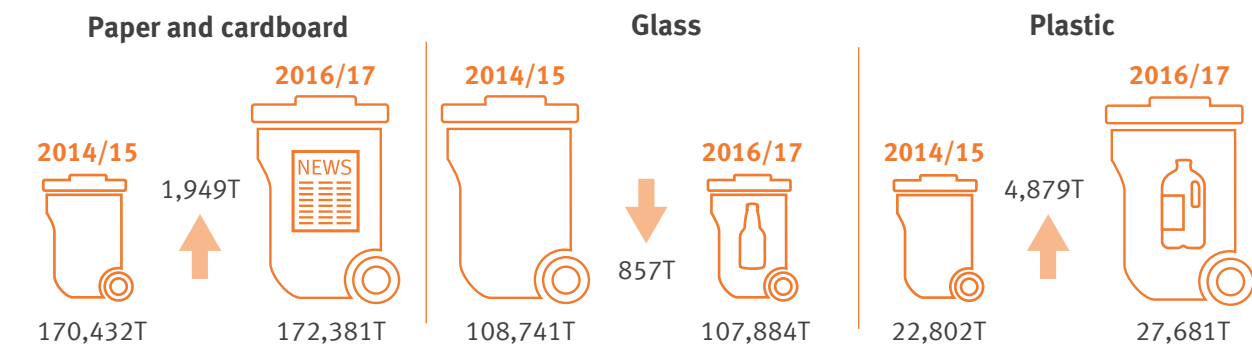
**1.443 million tonnes** of **commercial and industrial waste** was sent to landfill in **2016–17**

—similar to amounts reported in previous years.

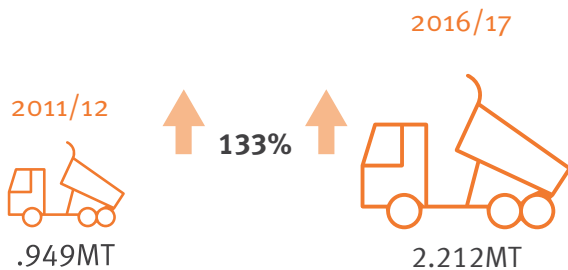


## WASTE RECOVERED OR RECYCLED

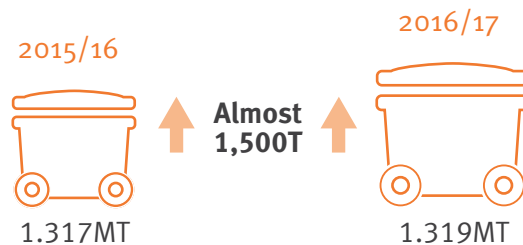
### Household waste sent for recycling



### Construction and demolition waste recovered

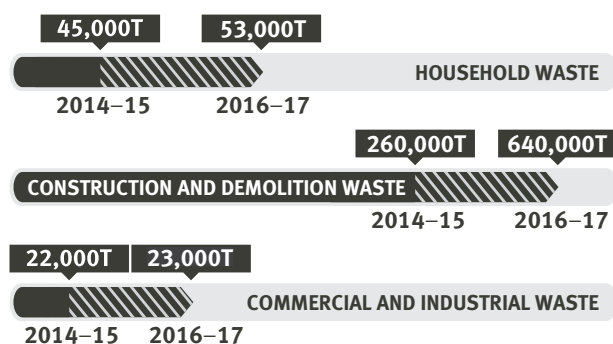


### Commercial and industrial waste recovered or recycled



## INTERSTATE WASTE RECEIVED

In **2016–17**, the following **wastes generated interstate** were **transported to Queensland landfills** for disposal:



### Trackable waste

received from interstate **increased** from about **13,000T** in 2011–12 to about **52,200T** in 2015–16





## 5.4 Greenhouse gas emissions

A greenhouse gas is a gas that traps heat in the atmosphere. Increasing levels of greenhouse gases in the atmosphere from human activities is leading to changes in the global climate system. Activities such as burning fossil fuels for electricity and transport, and deforestation are significant sources of greenhouse gas emissions.

Mitigating the effects of climate change by reducing greenhouse gas emissions is important for the overall health of the environment and can substantially reduce the risks associated with human-induced global warming. Both the Queensland and Australian governments have committed to reducing greenhouse gas emissions.



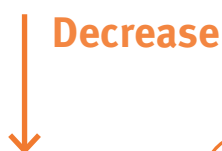
# Key findings | Greenhouse gas emissions

## GREENHOUSE GAS EMISSIONS

**Queensland** accounted for **28.7%** of Australia's total **greenhouse gas emissions**, the **highest** state/territory **contributor**.



Between 2005 and 2016, Queensland greenhouse gas emissions data showed:



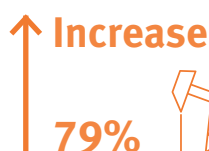
**Decrease**

**15%**



**greenhouse gas**

In 2016, Queensland greenhouse gas emissions were 15% lower than in 2005.



**Increase**

**79%**



**total fugitive emissions**

(11% of total emissions)

This is due to an increase in coal and gas production.

**17%**



**waste sector**

(2% of total emissions)

However waste emissions have fallen since 2011 due to increased capture and combustion of landfill gas.

**26%**



**transport sector**

(15% of total emissions)

Road transport including passenger cars were the main source of emissions.

**11%**



**industrial processes sector**

(4% of total emissions)

This is due to increased use of replacements for ozone-depleting substances.

**14%**



**stationary energy sector**

(48% of total emissions)

This sector continues to be the highest source of Queensland's emissions.

**80%**



**land sector**

(8% of total emissions)

Queensland is the largest source of this type of emission in Australia.

**6%**



**agriculture sector**

(12% of total emissions)

This is mainly due to decreased livestock numbers.



## 5.5 Management responses

Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in a multitude of ways, either individually or, more often, in concert with one another to bring about environmental change.

Management responses related to pollution include:

### 5.5.1 Air quality

#### **National Environment Protection (Ambient Air Quality) Measure 1998**

Transport and industrial activities are the main sources of air pollutants in Queensland although rural and domestic activities also play a role.

The National Environment Protection (Ambient Air Quality) Measure 1998 establishes national goals for sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, particles and lead.

Australian Design Rules (ADRs), under the Commonwealth *Motor Vehicle Standards Act 1989*, set emission standards for new vehicles. Ongoing tightening of ADRs over the past 20 years has resulted in significant reductions in emissions of lead, carbon monoxide, nitrogen oxides, hydrocarbons and particles.

The Commonwealth *Fuel Quality Standards Act 2000* sets national quality standards for a wide range of fuel quality properties to reduce emissions or improve engine performance.

#### **National Environment Protection Measure standards**

The National Environment Protection Measure for Ambient Air Quality (Air NEPM) requires annual reporting of Queensland's air quality against the Air NEPM standards.

The requirement applies to 13 stations across the state and focuses on normal population exposure (for example, stations that are not close to industrial areas or major roads).

Ambient air quality monitoring at AAQ NEPM sites in Queensland between January and December 2016 showed no exceedances of the AAQ NEPM air quality standards for carbon monoxide, nitrogen dioxide, ozone, PM<sub>2.5</sub> (particles less than 2.5 micrometres in diameter) and lead at any monitoring location.

Exceedances of the AAQ NEPM standards occurred for:

- one-hour average sulphur dioxide at the Menzies and The Gap monitoring sites in Mount Isa due to industrial emissions
- 24-hour average sulphur dioxide emissions at the Menzies monitoring site in Mount Isa due to industrial emissions
- 24-hour average PM<sub>10</sub> (particles less than 10 micrometres in diameter) at The Gap monitoring site in Mount Isa due to a dust storm.

The AAQ NEPM goals were met in all regions with the exception of:

- one-hour average sulphur dioxide at the Menzies and The Gap sites in Mount Isa due to industrial emissions.

Compliance with the AAQ NEPM standards and goals could not be demonstrated for carbon monoxide at Woolloongabba, and nitrogen dioxide, ozone, sulphur dioxide and PM<sub>10</sub> at Pimlico because data availability was below the level required to make a valid assessment.

Low data availability between October and December 2016 as a result of equipment failure meant that a valid assessment of compliance with the AAQ NEPM annual standard for lead at The Gap monitoring site in Mount Isa could not be made, however it is considered highly probable that compliance with the annual standard would have been achieved.

#### **Environmental Protection Act 1994**

The *Environmental Protection Act 1994* and the Environmental Protection Regulations 2008 establish a list of industrial activities (called environmentally-relevant activities—ERAs) that must have a current development approval or environmental authority.

The Environmental Protection (Air) Policy 2008 (Air EPP) establishes long-term objectives for sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, particles, lead and a number of air toxics. The Air EPP is due for a review in 2018 and it is expected that recent changes in air quality standards will be reflected in the reviewed document.

## Euro 5 emission standards

Australia has had road vehicle emission standards for new vehicles in place since the early 1970s.

Australian Design Rules (ADRs), under the Commonwealth *Motor Vehicle Standards Act 1989*, set emission standards for new vehicles. In November 2013, the first stage of the introduction of the Euro 5 emission standards commenced for light vehicles, which includes cars and light commercial vehicles.

It is generally accepted that the increasing proportion of vehicles meeting tighter emission standards has played a major part in improvements in a number of air quality indicators over the past 10 years.

ADRs are performance standards which specify the maximum levels of emissions permitted under a specified test, and do not mandate the use of particular technology.

## National Clean Air Agreement

In December 2015, Australia's environment ministers established the National Clean Air Agreement (NCAA). The agreement seeks to ensure that the community continues to enjoy clean air and address the impacts on human health and the environment.

The agreement focuses on actions to reduce air pollution and improve air quality through cooperative action between industry and government at the national, state and local levels. The agreement is designed to incorporate a range of existing, new and complementary measures to improve Australia's air quality.

Under the agreement, emission standards for new non-road spark ignition engines and equipment will be introduced through Commonwealth legislation in 2018. State and territory governments are working towards adopting standards for new wood heaters and particles. Queensland has adopted the new wood heater standards in 2016. Particle pollution is the most significant air quality issue in Queensland: particles are emitted into the atmosphere from a variety of sources including motor vehicles and industrial activities, as well as climatic conditions, agricultural burning and hazard-reduction burning.

Under the NCAA the Ambient Air Quality NEPM Standards for Sulphur Dioxide, Nitrogen Dioxide and Ozone are currently being reviewed and it is expected that new standards will be recommended in 2018. The Commonwealth and the States/Territories are currently reviewing the work plan under the NCAA. It is highly likely that the new Work Plan will contain topical and emerging air quality issues that need to be addressed in the near future.

## Moving Freight

Queensland's freight task is a measure of goods uplifted and distance transported. It is estimated to grow by approximately 27% from 157 billion tonne-kilometres in 2014–15 to more than 200 billion tonne-kilometres by 2024–25. In terms of uplift, freight volumes are estimated to increase at a similar rate from 911 million tonnes to over 1156 million tonnes.

In 2013, the Department of Transport and Main Roads (TMR) released *Moving Freight, a 10-year strategy* identifying 38 actions to improve freight movement in Queensland. TMR is currently reviewing *Moving Freight* in partnership with industry to ensure the freight system is responsive to emerging trends and continues to meet the state's transport needs now and into the future.

## The Future is Electric: Queensland's electric vehicle strategy

TMR released *The Future is Electric: Queensland's Electric Vehicle Strategy* (EV Strategy) in October 2017. The EV Strategy marks the beginning of a new era in transport fuel sources that will also include bio-fuels and alternative new technologies supporting environmentally friendly transport options, particularly from renewable energy.

The EV Strategy will help prepare and position Queensland for an increase in the number of electric vehicles. It outlines 16 cost-effective initiatives to empower consumers, enable supporting infrastructure, explore cost-effective support programs and envisage future government actions.

One of the key actions from the EV Strategy is the Queensland Electric Super Highway (QESH), which includes a series of fast chargers linking the Gold Coast to Cairns and Brisbane to Toowoomba.

## 5.5.2 Water quality

### Healthy Waters Management Plans

The Environmental Protection (Water) Policy 2009 (EPP Water), subordinate legislation under the *Environmental Protection Act 1994*, establishes Healthy Waters Management Plans (HWMPs) as a key planning mechanism to improve the quality of Queensland waters. HWMPs identify environmental values, water quality objectives and catchment-based management actions through consultation and best available science. HWMPs are being progressively developed for Queensland Murray-Darling Basin catchments. For these catchments, the HWMPs will not only fulfil requirements under the EPP Water, but also water quality planning provisions under the Murray-Darling Basin Plan 2012. In 2016, the Warrego, Paroo, Bulloo and Nebine Basins HWMP was approved. This plan identified the key risks to water quality across these catchments over the next ten years and highlighted potential management responses to address the risks.

HWMPs are broader than ‘just water quality’ as they protect aquatic ecosystems through specifying water quality objectives for indicators such as macroinvertebrates, fish, riparian vegetation and groundcover. These plans are typically delivered through collaborative partnerships between the Queensland Government and natural resource management groups.

For Great Barrier Reef (GBR) catchments, Water Quality Improvement Plans (WQIPs) have been developed, which perform a similar function to Healthy Waters Management Plans. WQIPs were initially prepared by regional NRM bodies under the Australian Government’s Coastal Catchments Initiative, in consultation with the Queensland Government. WQIPs undertaken in GBR catchments use the monitoring and evaluation tools generated by the Paddock to Reef Program. For example, GBR catchment water quality modelling and monitoring is used to prioritise areas for on-ground investment in management improvements and to predict water quality improvements from proposed management options.

### Queensland Regional Natural Resource Management Investment Program—2013 to 2018

The Queensland Government allocated \$80 million to the Regional Natural Resource Management Investment Program over five years from 2013 to 2018. This includes \$30 million to protect the Great Barrier Reef.

The majority of the funding supports projects delivered through Queensland’s regional natural resource management bodies (regional NRM bodies). Largely community-based, these organisations provide an important link between governments and communities. They work collaboratively with Indigenous groups, volunteer and grassroots organisations such as Landcare, rural industry groups and landholders.

Funded projects implement on-ground activities that protect, improve and restore waterways and rangelands by addressing weeds and pests, implementing sustainable agricultural practices, and improving soil, vegetation and water quality at a catchment or landscape scale.

The Queensland Regional Natural Resource Management Investment Program Progress Report 2017 (the report) provides information on the outcomes achieved during the 2016–17 financial year which focussed on the following seven themes:

- managing priority and invasive weeds
- managing priority and invasive animal pests
- restoring soil condition
- adoption of best practice landscape management
- restoration of native riparian vegetation along priority waterways
- restoration of native vegetation in priority wetlands and
- engaged, knowledgeable and skilled communities.

Highlights for the 2016–17 year included:

- weed control across 600,000 hectares, protecting priority ecosystems and agricultural land
- 4,444 hectares of wetlands have been protected or restored
- soil restoration activities, including gully remediation and stock exclusion, were undertaken over 550 hectares
- 190 farmers improved land management practices across 1.9 million hectares
- invasive pest animal control was undertaken across 7.9 million hectares.

The Queensland Government has committed to ongoing funding of regional natural resource management through the Natural Resources Investment Program 2018–2022.

## National Landcare Programme

The National Landcare Program (NLP) is the Australian Government's key natural resource management (NRM) investment. The two phases of the current NLP build on the achievements of previous iterations, such as Caring for our Country (2008–2013) and the Natural Heritage Trust (1996–2008). These programs involved significant investment in regional delivery to deliver benefits for agricultural productivity, environmental conservation and community engagement.

The first phase of the existing NLP began in July 2014 and will run until June 2018. With an overarching aim to regularly evaluate and report on the program's progress, the Australian Government conducted a review of the NLP in 2016 which prompted clearer, more targeted outcomes for the second phase (NLP2). This phase will run from July 2018 to June 2023, and involves an investment of more than \$1 billion into a range of sub-programs. Investments include \$134 million into the Smart Farms program to support the development and uptake of improvements in management practices, tools and technologies, and \$450 million into Regional Land Partnerships (RLP) to deliver national NRM priorities at a regional and local level.

The NLP's monitoring, evaluation, reporting and improvement (MERI) approach supports the collection of data and information to demonstrate achievements and allow ongoing improvements to be made at the project and program level. This approach will also be adopted for the RLP.

The RLP aims to achieve six long-term outcomes:

- the ecological character of Ramsar sites is maintained or improved
- the trajectory of species targeted under the Threatened Species Strategy, and other *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) priority species, is improved
- the natural heritage Outstanding Universal Value of World Heritage properties is maintained or improved
- the condition of EPBC Act listed Threatened Ecological Communities is improved
- the condition of soil, biodiversity and vegetation are improved
- agriculture systems have adapted to significant changes in climate and market demands.

The Government aims to work in partnership with state and local governments, industry, communities and individuals to support sustainable NRM and to protect Australia's biodiversity. For example, NLP investment has assisted land managers to adopt improved, innovative land management practices which have reduced the discharge of nutrients, sediment and chemicals to the Great Barrier Reef lagoon and improved resilience to climate change. NLP2 provides additional funding towards the Reef 2050 Plan, which was released by the Australian and Queensland governments in March 2015 and is the overarching framework for protecting and managing the Reef. Programs administered under the NLP align with the Queensland Natural Resources Investment Program<sup>1</sup> to support initiatives that improve the capacity of Queensland's natural resource base. Significantly for northern and remote areas of Queensland, which contain intact high conservation value landscapes, land managers have been supported to uptake sustainable grazing practices while protecting important biodiversity.

The Australian Government's role in delivering the NLP includes providing policy design and implementation which can support the delivery of NRM Services while maintaining volunteerism, which is at the core of the Landcare approach. Continued funding and coordination efforts at a federal level allows the government to leverage the ongoing grassroots Landcare movement to deliver improved agricultural and environmental outcomes for the whole of Australia. The NLP is also a vehicle for the Australian Government to fulfil its obligations under international environmental treaties.

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<sup>1</sup> Formerly the National Resources Management Regional Investment Program

## South East Queensland (SEQ) Healthy Catchments Program

The Queensland Government continued to work with stakeholders and invest in a range of initiatives in South East Queensland to improve water quality and catchment health. Management responses implemented through the 2017–18 SEQ Healthy Catchments Program included:

- SEQ water quality monitoring (annual report card) to track waterway health and identify issues for management action, in addition to supporting the Healthy Land and Water Awards to recognise individual, community and industry participation in waterway protection
- facilitation of horticultural research and development, as well as the delivery of the Horticulture Best Management Practice Program to reduce erosion and nutrient loss to improve water quality
- catchment improvement activities to restore riverbanks, protect horticultural land and reduce sediment flowing to waterways under the Healthy Country Program
- improvements to urban stormwater erosion and sediment control associated with construction and post-construction phases of urban development, which focusses management action on addressing the source of 35% of sediment emissions to SEQ waterways.

The SEQ Healthy Catchments Program continues to deliver multiple benefits to water quality and ecosystem health, agricultural land, the building and land development industry, and the community. In addition, the Queensland Government is working with the SEQ Council of Mayors Resilient Rivers Initiative to ensure a coordinated approach to catchment management is implemented across the region.

### SEQ Healthy Catchments Program response—case study

#### *Port of Brisbane Stormwater management*

Stormwater runoff is the name given to rainfall that ‘runs off’ a site rather than soaking into the ground. Stormwater management is essential to maintain the health of our waterways and reduce the amount of sediment flowing to important ecosystems such as Moreton Bay.

In South East Queensland, the Port of Brisbane Pty Ltd has been working with key stakeholders to improve the environmental health of the Brisbane River and Moreton Bay through best practice stormwater management. While the Port uses a range of Water Sensitive Urban Design options onsite to slow down stormwater run-off, a recent project undertaken by the Port provides a leading example of the implementation of the State’s emerging offsite stormwater treatment policy.

A major source of the sediment to the Brisbane River and Moreton Bay comes from stream bank erosion originating in the Lockyer Valley, including Laidley Creek. In 2016-2017, the Port of Brisbane joined the State Government, Lockyer Valley Regional Council, Queensland Urban Utilities, Healthy Land and Water and Mulgowie Farming Company to pilot an offsite stormwater management project in Laidley Creek. This first-of-a-kind project has now transformed 3 kilometres of unstable, eroding banks in the creek.

This project has prevented approximately 16,000 tonnes of sediment, 11 tonnes of nitrogen and 22 tonnes of phosphorous from entering the creek and flowing to Moreton Bay and is a great example of collaborative action to improve waterway health.

## Regional Waterway Health Report Cards

The Queensland Government supports a number of regional waterway health report cards in the Great Barrier Reef as part of the Reef 2050 Long-Term Sustainability Plan.

Report Card Partnerships in the Great Barrier Reef catchments:

- Active since 2016, the Wet Tropics Healthy Waterways Partnership reports on the following Great Barrier Reef catchments: Daintree, Mossman, Barron, Russell, Mulgrave, Johnstone, Tully, Murray, and Herbert river basins.
- Active since 2017, the Townsville Report Card Partnership will launch the pilot report card in on the Black and Ross river basins in 2018.
- Active since 2010, the Fitzroy Partnership for River Health reports on the largest catchment flowing to the Great Barrier Reef; the Fitzroy Basin.
- Active since 2014, the Gladstone Healthy Harbour Partnership reports on the ecological, social and economic health of the Gladstone Harbour region, which is home to the world's third largest coal exporting terminal.
- Active since 2015, The Healthy Rivers to Reef Partnership–Mackay Whitsunday reports on the following Great Barrier Reef catchments: Don, O'Connell, Proserpine, Plane and Pioneer river basins.

## Regional waterway health report card—case study

### *Gladstone Harbour Report Card 2016*

The Gladstone Harbour Report Card reports on estuarine and marine condition in the harbour based on monitoring of ecological and biological indicators as well as environmental, social, economic and cultural indicators. The report card helps enable stakeholders to have confidence in the efforts to maintain and improve the health of the harbour.

In 2015, the Gladstone Healthy Harbour Partnership developed a stewardship reporting framework for ports and industry (including major industry and fishing). This framework describes management efforts within the Gladstone Harbour area.

The results of the stewardship reporting framework showed:

- Port--'effective' overall stewardship, in the 2014-2015 financial year.
- Industry--'effective' overall stewardship
- Fishing—'fully effective' stewardship for recreational fishing and 'effective' stewardship for commercial fishing, based on fishing and vessel compliance data provided by the Queensland Department of Agriculture and Fisheries from their boating and fishing patrols and inspections.

For 2015–2016, an updated stewardship assessment included the following industries:

- Port: port authorities, plus terminal operators that completed dredging and shipping activities
- Heavy Industry: large industrial facilities such as coal terminals, mineral refineries and LNG facilities
- Urban: local governments, airports, urban developers and master-planned communities.

Using the new assessment, Port and heavy Industry maintained 'effective' ratings. There is a high degree of environmental regulation within these industries, and effective environmental management strategies are in place. Companies often work together in partnerships to pool their resources and implement programs that are of mutual benefit to participants and the environment.

The urban 'industry' was assessed for the first time in 2015–16 and was rated as effective. The Gladstone Healthy Harbour Report Card assessment included the need for improved development and implementation of environmental management plans and increasing the low rate of compliance with environmental legislation and approval conditions.

For Great Barrier Reef management responses, see section 1.

## 5.5.3 Waste

### ***Waste Reduction and Recycling Act 2011***

The *Waste Reduction and Recycling Act 2011* contains a suite of measures to reduce waste generation and landfill disposal and encourage recycling.

It aims to modernise waste management and resource recovery practices in Queensland, promote waste avoidance and reduction, and encourage resource recovery and efficiency.

In addition, the legislation also provides a regulatory framework for enforcing compliance action against littering and illegal dumping incidences in Queensland—regardless of land tenure or property ownership—and third party reporting of littering and illegal dumping.

### ***Waste Reduction and Recycling Act 2011—case study***

#### ***Operation TORA***

Operation TORA is an intensive compliance program undertaken by a special Waste Industry Compliance Investigation Taskforce set up by the Department of Environment and Science (DES).

It was established in 2015 to stamp out any unlicensed waste management operators in Queensland. In 2017, Operation TORA expanded to also target licensed operators not complying with their environmental obligations.

Operation TORA aims to deliver an integrated compliance and regulatory operation, in partnership with industry and the community, to protect environmental values, and promote community confidence in waste management and regulation.

Activities are focused on reducing any impacts from regulated waste activities, such as waste recycling or reprocessing, waste storage, waste transport, and waste treatment.

It involves proactive targeted compliance programs, response to community and industry information reports, and industry and community engagement.

Operators found to be operating unlawfully, or unlicensed, will be met with appropriate enforcement action such as penalty infringement notices or prosecution in accordance with enforcement guidelines.

As at December 2017, Operation TORA has resulted in:

- more than 600 waste management operations investigated
- more than 180 waste transport vehicle intercepts and inspections
- 65 waste tyre inspections
- 116 treated timber waste inspections
- 114 enforcement measures issued including:
  - › 2 prosecutions. One operator was convicted and fined \$25,000 and ordered to pay nearly \$3000 in legal and investigation costs; another operator was convicted and fined \$63,000, and ordered to pay legal and investigation costs of nearly \$3,000.
  - › 24 penalty infringement notices
  - › 5 direction notices
  - › 80 warning notices
  - › 1 clean-up notice
  - › 4 Environmental Protection Orders
  - › 1 emergency direction.

## **Waste Strategy**

A review of the current Waste Strategy for Queensland was undertaken in 2017. In March 2018 the Queensland Government announced the development of a comprehensive new waste strategy, to be underpinned by the introduction of a waste disposal levy.

The new strategy will transition Queensland away from the take-make-dispose linear economy to one where everything we use has value and nothing is wasted.

The new strategy will be underpinned by a set of principles and a waste and resource management hierarchy, which sets out an order of preference for options for managing waste—from avoiding, to reducing, reusing, recovering and disposing of waste.

New targets will be developed to measure our performance, including focusing on reducing the amount of waste that goes to landfill, improving recycling performance, and reducing per capita waste generation. Progress will be reported annually.

## **Recycling and waste in Queensland report**

The Recycling and waste in Queensland report includes information gathered each year through the Queensland Waste Data System annual survey.

The reported results and findings are exclusive to the year the data is collected, and the results are assessed against the targets set in the Waste Strategy.

## **Queensland's Litter and Illegal Dumping Action Plan**

Queensland's Litter and Illegal Dumping Action Plan, released in October 2013, outlines the key actions undertaken by the state government in managing this problem. It is an integrated plan that focuses on a suite of actions to positively influence community attitudes and behaviours to encourage the appropriate disposal of waste.

## **Litter and Illegal Dumping Online Reporting System**

The Litter and Illegal Dumping Online Reporting System enables the public to report online, or via a smart phone or tablet, incidents of littering and illegal dumping from a vehicle or vessel.

## **Container Refund Scheme**

Queensland's container refund scheme aims to improve the rate of recycling in Queensland. It gives people an incentive to collect and return containers for recycling, in exchange for a refund payment. This will help to reduce the amount of beverage container litter that enters the environment and increase Queensland's recycling rate. The scheme is due to commence on 1 November 2018.

## **Plastic bag ban**

From 1 July 2018, retailers will not be allowed to supply lightweight single-use plastic shopping bags to customers. The plastic bag ban aims to reduce the impact of plastic pollution on marine animals and reduce littering. It is estimated that nearly 1 billion single-use lightweight plastic shopping bags are used in Queensland each year. The majority of these bags end up in landfill, but around 16 million bags enter the environment in Queensland each year. Plastic bags are one of the most conspicuous items in the litter stream and pose real threats to land and marine environments. They often end up in waterways where they endanger marine life through entanglement or ingestion. Littered plastic bags also significantly impact on visual amenity, and can clog drains and waterways, leading to increased risk of flooding. Restricting the number of plastic shopping bags used in Queensland will contribute to the reduction of the total plastic load in the environment.

## 5.5.4 Greenhouse gas emissions

### Queensland Climate Transition Strategy

Queensland Climate Transition Strategy outlines how the state will transition to a low carbon, clean growth economy, and includes the following management responses:

#### Emissions reduction targets

Central to the Queensland Government's climate change management response is a target of zero net greenhouse gas emissions by 2050, supported by an interim target of reducing emissions by at least 30% below 2005 levels by 2030.

#### A low carbon energy sector

The Queensland Government is working with industry and the community to transition to an efficient, affordable, and fair clean energy system. This includes setting a 50% Renewable Energy Target by 2030 to help cut carbon pollution while growing jobs and investment.

#### Carbon farming in Queensland

Carbon farming involves activities like savannah burning and vegetation management to store carbon or avoid the release of greenhouse gas emissions. The Queensland Government is working to keep carbon in the ground through a \$500 million Land Restoration Fund, which will also bring an array of social, environmental and economic development benefits. This work builds on the existing Carbon Plus program, which is already delivering on-the-ground outcomes in Indigenous communities.

#### Vegetation Management Act 1999

The *Vegetation Management Act 1999* regulates the clearing of vegetation in Queensland in a way that aims to:

- conserve remnant vegetation
- ensure clearing does not cause land degradation
- prevent loss of biodiversity
- maintain ecological processes
- reduce greenhouse gas emissions
- allow for sustainable land use.

The 2015–16 Statewide Land Assessment and Tree Study (SLATS) report showed an increase in annual clearing rates from 298,000ha in 2014–15 to about 395,000ha in 2015–16.

The Queensland Government has delivered on its election commitment and commitments under the Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan), to reinstate its nation leading vegetation management protections to improve the resilience of the Great Barrier Reef and reduce carbon emissions. The strengthened vegetation management laws increase protection for high-value regrowth and remnant vegetation, and boost protection for important habitats, including waterways leading to the Great Barrier Reef.

### A net-zero emissions transport roadmap for Queensland

As identified in the Queensland Climate Transition Strategy, the Department of Transport and Main Roads (TMR) is developing a net-zero emissions transport roadmap. Transport accounts for approximately 15% of Queensland's greenhouse gas emissions and this project will identify how TMR can contribute to the whole-of-government targets to reduce emissions below 30% on 2005 levels by 2030 and net-zero emissions by 2050.

#### Leading by example in climate transition

Key Queensland Government climate transition initiatives include:

- joining the international Under2Coalition to support the global transition to zero net emissions by 2050
- reducing emissions from Queensland Government operations (buildings, vehicles, electricity, and procurement)
- integrating climate transition risks and opportunities into government decision-making
- developing a Zero Net Emissions Transport Roadmap
- using the land-use planning system to support delivery of zero net emissions
- reintroducing comprehensive vegetation management legislation.

#### Reducing emissions from the built environment and infrastructure

The Queensland Government is also leading by example with its aim to reduce carbon emissions from the built environment and undertake sustainability assessments for all capital works projects over \$100 million, while encouraging assessments for projects below this threshold, as part of the State Infrastructure Plan.

#### Emissions Reduction Fund

The Emissions Reduction Fund (ERF) provides incentives for emissions reduction activities across the Australian economy. The ERF operates alongside existing programs that are already working to reduce Australia's emissions growth such as the Renewable Energy Target and energy efficiency standards on appliances, equipment and buildings. The Safeguard mechanism began in July 2016, to ensure emissions reductions paid for through the ERF are not offset by significant increases in emissions elsewhere in the economy. The Australian Government provided \$2.55 billion toward the ERF, with further funding to be considered in future budgets.

The ERF offers a range of opportunities for businesses, local councils, state governments and land managers to reduce their greenhouse gas emissions associated with agriculture, energy, waste, transport and industrial processes. As of December 2017, the ERF had secured over 191 million tonnes of abatement through 438 projects.

### **Large-scale Renewable Energy Target and the Small-scale Renewable Energy Scheme**

The Large-scale Renewable Energy Target (LRET) creates a financial incentive for the establishment or expansion of renewable energy power stations, such as wind and solar farms or hydro-electric power stations.

The Small-scale Renewable Energy Scheme (SRES) creates a financial incentive for households, small businesses and community groups to install eligible small-scale renewable energy systems such as solar water heaters, heat pumps, solar photovoltaic (PV) systems, small-scale wind systems, or small-scale hydro systems.

The Climate Change Authority released its second review of the Renewable Energy Target on 22 December 2014. It found that the LRET was effective in reducing emissions at reasonable cost in the electricity sector and can be relied upon to deliver sizeable volumes of emissions reductions.

### **One million solar rooftops target**

The Queensland Government has set a target of one million rooftops—or 3000 megawatts of solar photovoltaics (PV)—in Queensland by 2020. As of May 2017, there were more than 438,000 residential rooftops with solar connections and 1,706 megawatts of solar power in Queensland.

The solar target will help Queensland grow solar PV on businesses, community buildings and even large commercial or industrial sites.

### **Solar 150**

The Queensland Government's Solar 150 initiative will support up to 150 megawatts of solar power generation to encourage large-scale solar generation and investment in Queensland.

In collaboration with the Australian Renewable Energy Agency, Solar 150 will help support the development of local, large-scale solar projects. This will provide a long-term revenue contract to successful Queensland bidders.



# 6.0 Climate

Climate is the long-term pattern of prevailing weather conditions (rainfall, temperature etc.) for a particular locality or region, whereas weather refers to the state of the atmosphere at, or for, a brief period of time.

Queensland's climate variability is strongly influenced by seasonal variations, such as the location and intensity of the summer monsoon season and year-to-year fluctuations in the global climate system related to the El Niño Southern Oscillation phenomenon.

In Queensland, El Niño is often, although not always, associated with below average rainfall throughout winter, spring and summer. La Niña, the opposite of El Niño, is often linked to an increased risk of above average summer rainfall, floods and tropical cyclones.

The climate theme is separated into the following sub-themes: Climate observations; and Coasts and oceans.





## 6.1 Climate observations

### Why climate observations are important

High-quality observations of climate variables are important for understanding historical trends and helping to build resilience to future events.

Climate patterns, variability and change data contributes to informed decision making to help effectively manage for seasonal variability, the effects of climate change and implement appropriate mitigation and adaptation strategies to ensure the economic, social and environmental health of Queensland.

Climate variability statistics help with understanding Queensland's climate, especially in regard to agricultural and water resources. For example, with an understanding of historical climate variability and its drivers, climate outlooks can be developed using statistical modelling for specific periods (i.e. the summer wet season), to help decision-makers plan for future drought and flood events.



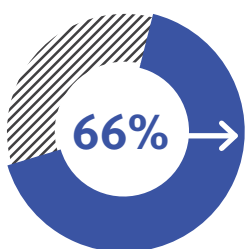
# Key findings | Climate observations

## AVERAGE RAINFALL

In **2016**, Queensland experienced a **wetter than average** year,



followed by **drier than average conditions** in, across much of **inland Queensland**.

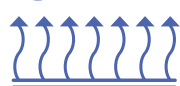


As of **December 2017**, **66%** of Queensland was **drought declared**.

## EVAPORATION RATE

### Annual Evaporation

is much **higher** than mean annual rainfall in **semi-arid inland** locations.



**Extreme hot days** were **more frequent** than **average** at several **inland locations** between **2013 and 2017**.

## TEMPERATURE

**Annual average temperature** across Queensland **increased** by about **1°C** since **1910**.

Most of this warming has occurred over the **past 50 to 60 years**.



The **strongest warming** since **1960** has been observed across the **southern half of the state**.



**2017** was Queensland's **warmest year** on record. The third, fourth, fifth and sixth **warmest years** on record between **2013 and 2016**.



Days with **very heavy rainfall** are **common** in **north-eastern coastal locations** and **rare** in the **south west**.







## 6.2 Coasts and oceans

The coast is the interface between the land, ocean and atmosphere. Sea surface temperatures around Queensland (particularly in the Coral Sea, but also in the Gulf of Carpentaria) provide an indicator of the likelihood of the formation and development of tropical cyclones and east coast lows.

Warmer than average sea surface temperatures favour the development of these weather systems, which often bring flood-producing rainfall and damaging wind and storm surges to coastal Queensland. While a recent change in the mean sea level is not significant, sea level rise over the historical tide gauge record is discernible.

Coastal hazards impact on both the natural environment and human settlements. Coastal erosion and storm tide inundation are part of normal coastal processes albeit at the extreme end of natural fluctuations.

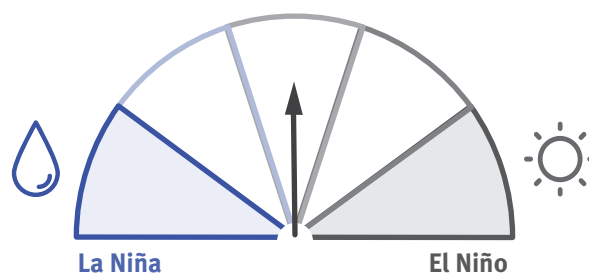
Understanding the risks associated with coastal hazards can improve decision-making for managing the natural environment and new urban development; it can also help build resilience for existing development that is exposed to these hazards.



# Key findings | Coasts and oceans

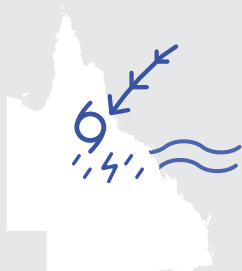
## SOUTHERN OSCILLATION INDEX

A **transition** occurred from **El Niño** conditions at the start of **2016** to **neutral conditions** throughout **2017**.



## CYCLONE ACTIVITY

**2 cyclones** were experienced between **March 2015** and **December 2017**.



Both made landfall as **category 4 severe cyclones**.

## EROSION PRONE AREA

During **2015–17**, **coastal erosion** continued to **impact** the **Queensland coast**, with **several major incidents** at developed areas.



## SEA LEVEL

Historical tide gauge records show a trend of mean **sea level rise**.

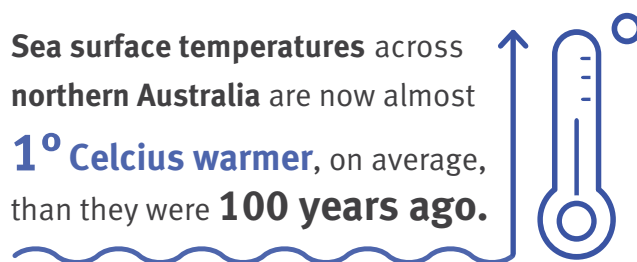
Changes between **2015 and 2017** were dominated by seasonal trends.

**Storm tide level** at **Laguna Quays** was **0.91m** above the **highest astronomical tide** during **Cyclone Debbie** in **March 2017**.



## SEA SURFACE TEMPERATURE

Sea surface temperatures across northern **Australia** are now almost **1°C warmer**, on average, than they were **100 years ago**.





## 6.3 Management responses

Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in a multitude of ways, either individually or, more often, in concert with one another to bring about environmental change.

Management responses related to climate include:

### ***Coastal Protection and Management Act 1995***

Queensland's coast is a significant natural resource and provides valuable ecosystem services that support the state's economic and social development.

The *Coastal Protection and Management Act 1995* provides for the protection, conservation, rehabilitation and management of the coastal zone, including its resources and biological diversity.

### **Shoreline erosion management plans**

Shoreline erosion management plans, prepared by local governments with technical advice from the State, support localised, effective and sustainable responses to shoreline erosion issues within specific communities.

### **Coastal Management District**

The *Coastal Protection and Management Act 1995* provides for the declaration of a Coastal Management District over coastal areas that need protection or management, especially with respect to the area's vulnerability to erosion, to maintain or enhance coastal resources, or for planning and development management of the area.

### **Coastal Management Plan**

The Coastal Management Plan commenced in March 2014, formed under the *Coastal Protection and Management Act 1995*. It provides non-regulatory policy guidance to coastal land managers. The plan deals with key management policies such as:

- maintaining coastal landforms and physical coastal processes
- conserving nature
- maintaining access to coastal resources for indigenous cultural activities
- maintaining or enhancing public access
- management planning
- knowledge sharing and community engagement.



## Natural Disaster Relief and Recovery Arrangements (NDRRA)

Natural Disaster Relief and Recovery Arrangements are jointly funded by the Australian and Queensland governments to provide financial support for communities affected by natural disasters. Under the arrangements, the relevant state or territory government determines which areas receive NDRRA assistance and what assistance is available to individuals and communities based on the extent of the natural disaster. Where the NDRRA is activated, the Australian Government provides up to 75% of the assistance, which is delivered through state and territory agencies.

### NDRRA response—case study

#### *Natural disaster relief and recovery after Severe Tropical Cyclone Debbie*

The In March 2017, Severe Tropical Cyclone Debbie caused widespread destruction and economic loss in Queensland.

The Australian and Queensland governments responded with jointly funded Natural Disaster Relief and Recovery Arrangements (NDRRA) for impacted individuals, primary producers, small businesses, non-profit organisations and local governments.

This included NDRRA Category D funding of more than \$96 million to rebuild more resilient infrastructure, repair the environment, reinvigorate local economies and support small business, agriculture and industry.

Environmental recovery represented a \$35 million component comprised of 5 parts, addressing:

- coastal works including removal of debris, restoration of mangroves and other coastal vegetation and restoration of beaches (Part A)
- clean-up and restoration of recreational assets and clean-up of green waste (Part B)
- riparian recovery, weed control and soil conservation (Part C)
- improved mapping and data collection (Part D)
- excess debris removal from watercourses and gully and streambank stabilisation (Part E).

The on-ground works produced through the Environmental Recovery Package will enhance catchment resilience and complement existing projects that the Queensland Government is undertaking to reduce the amount of sediment and nutrients flowing to the Great Barrier Reef and Moreton Bay.

The Queensland Reconstruction Authority (QRA) is coordinating Parts A and B of the Environmental Recovery Package; the Department of Environment and Science is responsible for Parts C to E.

Numerous projects will be implemented under the Environmental Recovery Package and delivered by local councils and regional Natural Resource Management Groups in collaboration with River Improvement Trusts, landholders and other relevant organisations.

## Queensland Climate Adaptation Strategy

The Queensland Climate Adaptation Strategy outlines how the state will adapt to the impacts of a changing climate. Highlights from the strategy are outlined below.

### Queensland Government Adaptation Action Plan

The Government Adaptation Action Plan encourages a whole-of-government response to the risks and opportunities climate change poses to policies, programs and operations, and to the physical assets of Queensland Government departments.

### Sector Adaptation Plans

The Queensland Government is assisting leading sectors to identify adaptation needs and prioritise adaptation activities. Industry-led Sector Adaptation Plans have been developed for the built environment and infrastructure sector and the agriculture sector. Adaptation plans are also being developed for the human health and wellbeing, tourism, biodiversity and ecosystems, small and medium business, industry and resources, and emergency services sectors.

### Supporting local governments and regions to adapt

Helping Queenslanders prepare for climate change is central to Queensland's management response and actions. This includes facilitating coastal hazard planning, partnering with Indigenous local councils and Natural Resource Management groups, and providing regionally-specific information and tools.

### Queensland Climate Resilient Councils

The Queensland Climate Resilient Councils program assists Queensland local governments to strengthen internal council decision-making processes so that they can better respond to climate change. The program provides practical resources for planning and decision making for climate change mitigation and adaptation.

### Building community capacity and resilience

Through best practice community engagement, the Queensland Government is also building the capacity and resilience of Queenslanders to understand and adapt to climate change. This includes advancing climate science and developing climate risk toolkits for households and businesses.

Some other programs that make up Queensland's climate change management response include:

- Queensland Strategy for Disaster Resilience
- Drought and Climate Adaptation Program
- State Planning Framework, including guidelines to address the impacts of climate change.

## QCoast2100

The Queensland Government is investing \$12 million in partnership with the Local Government Association of Queensland to help coastal communities plan and prepare for storm tide inundation, coastal erosion and rising sea levels from climate change. Open to coastal councils, the investment attracts additional funding through local council contributions and support council decision-making along the Queensland coast.

QCoast2100 aims to support coastal councils in their progression from identifying coastal hazards and climate change risks through to the decision-making and implementation phases. The program recognises that Queensland's coastal councils are at different stages in their adaptation journey, with some yet to commence and others having completed a comprehensive coastal hazard adaptation strategy.

### Sea level rise

The State Planning Policy recognises that mitigating and adapting to climate change is an important consideration for planning at all levels and that all State Interests should be applied and considered in the context of a changing climate.

Sea level rise from climate change is required to be considered in the natural hazards State Interest for coastal erosion and storm tide inundation. The policy mandates a sea level rise factor of 0.8m at 2100. This factor has been incorporated into statutory erosion prone area plans and indirectly in the coastal management district, which is a statutory layer used for triggering development assessment on the coast under the Planning Regulation 2017.



# 7.0

## Human Settlements



**Human settlements can be a major driver of environmental change, through land use change as populations grow and expand, putting pressure on the natural environment.**

This chapter focuses on urban settlements, and how population growth and the expansion of human settlements can affect our communities and quality of life. It can also cause changes in land use, not just in urban areas, but also in adjacent rural locations.

The next update of this report will be released in 2020 and will include rural settlements.

Most people live in urban areas along Queensland's east coast, with more than 70% of the state's population living in South East Queensland, and the liveability of these areas is important.





## 7.1 Urban

### Why urban areas are important

Good design and planning is essential for creating more liveable urban areas while reducing impacts on the environment. New housing types that meet changing lifestyles and demographic needs can improve housing choice and affordability and help minimise urban sprawl. Well-planned, higher density residential areas can create more connected communities by providing easy access to essential services as well as green spaces and outdoor recreation areas.

An efficient, reliable transport network also plays an important role in improving the liveability of urban areas and reducing emissions. High-quality, high-frequency public transport systems provide economic and social benefits, improve social cohesion and help reduce pollution. Good bikeway networks in urban areas can promote healthy living by reducing a dependence on cars and encouraging a more active lifestyle.



# Key findings | Human settlements

## HOUSING

Queensland's **housing stock** is **dominated** by **detached dwellings**, but the number of **high-rise dwellings** is **increasing**.



Of Queensland's total housing stock:



**75.8%** are **detached dwellings**



**19.7%** are **attached dwellings** (1–3 storeys)

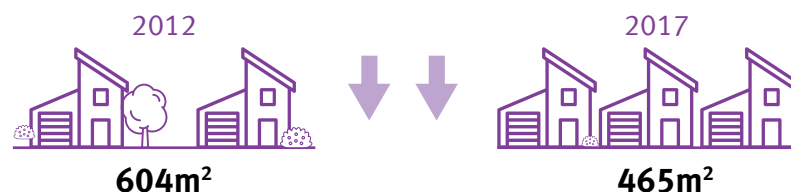


**4.5%** are **high-rise dwellings**

**42,414 dwellings** were **approved** in Queensland in **2016–2017**, of these **37,355** were in **South East Queensland**.



**Median lot sizes** for **urban lots** **decreased** from



**Dwelling density** increased from **11.4 dwellings per hectare** in 2011 to **13.5 per hectare** in 2016.

## TRANSPORT

**95%** increase in the number of **light commercial vehicles** registered between **2001 and 2017**.



**62%** increase in the the number of **heavy vehicles** registered between **2001 and 2017**.



Use of **monitored bikeways** in **SEQ** has increased. The **average daily** count at ANZAC Park (Toowong, Brisbane) **increased** from **1192** in 2015 to **1663** in 2017.



Average road-network **commute travel times** **increased marginally** between 2015 and 2017: **morning peak hour 11.1 to 11.3 mins per km**; **afternoon peak 11.6 to 11.9 mins per km**.

**On-time running** for **SEQ public transport** in 2016–17:



Train  
**94.7%**



Bus  
**94.6%**



Tram  
**99.9%**



## 7.2 Management responses

Management responses are the actions or initiatives undertaken to protect, maintain and restore environmental assets, as well as those that prevent, mitigate or adapt to changes in the environment. They are generally developed in reaction to the observed or anticipated pressures and impacts, or the state of the environment. They act in many ways, either individually or, more often, in concert with one another to bring about environmental change.

Management responses related to human settlements include:

### ***Planning Act 2016***

The *Planning Act 2016* (the Act) provides the legislative framework for the development and implementation of planning instruments. Planning instruments set out policies for planning and development assessment, and include State Planning Instruments, such as the State Planning Policy (SPP) and regional plans, which are made to protect or give effect to state interests, such as housing supply and diversity.

Regional plans generally advance the interests of the SPP through providing a spatial context, defining key outcomes and establishing strategies, and directions to achieve these outcomes in response to each region's unique values.

### **State Planning Policy**

The SPP outlines the guiding principles and state interests that underpin the delivery of local and regional plans. In making a regional plan, the Planning Minister must consider which state interests apply in a region and how these should be given appropriate effect in that region.

### **Regional Planning Program**

The Queensland Government has released regional plans for most of the state's planning regions. Regional plans identify matters that are important and specific to each region in Queensland, and support growth and development in regions while protecting and contextualising state interests in each region. Regional plans are made through collaboration with local governments, residents, key industry groups and the wider community. Regional plans must also be considered by local governments in a region when preparing local planning schemes.

Regional plans currently exist for the following regions:

- Cape York
- Central Queensland
- Central West
- Darling Downs
- Far North Queensland
- The Gulf
- Mackay, Isaac and Whitsunday
- Maranoa-Balonne (noting that this covers part of the Darling Downs region)
- North West
- South East Queensland
- South West
- Wide Bay Burnett
- North Queensland (note that this is currently under preparation).

The regional planning program promotes housing diversity through policies for increased housing density and through encouraging the consolidation of regional settlement patterns in urban areas (where appropriate), which leads to efficiencies in terms of the use of land and the provision of essential infrastructure and services such as transport, water cycle and health care services. Consolidating regional settlement patterns can also assist with providing employment opportunities close to where people live, and supports the '30-minute city' concept (for urban and regional centres) in the Australian Government's *Smart Cities Plan*.

The regional planning program manages dwelling density through encouraging increased dwelling densities in and around urban and regional centres where appropriate, including locations with good access to employment, services and high frequency public transport, which again leads to efficiencies in the provision of infrastructure and services. Ensuring higher densities are concentrated in existing urban and regional centres means that our regional landscapes and significant environmental areas/areas with high biodiversity values can more easily be protected.

## Regional Planning Program—case study

### *South East Queensland Regional Plan influencing housing diversity and dwelling density*

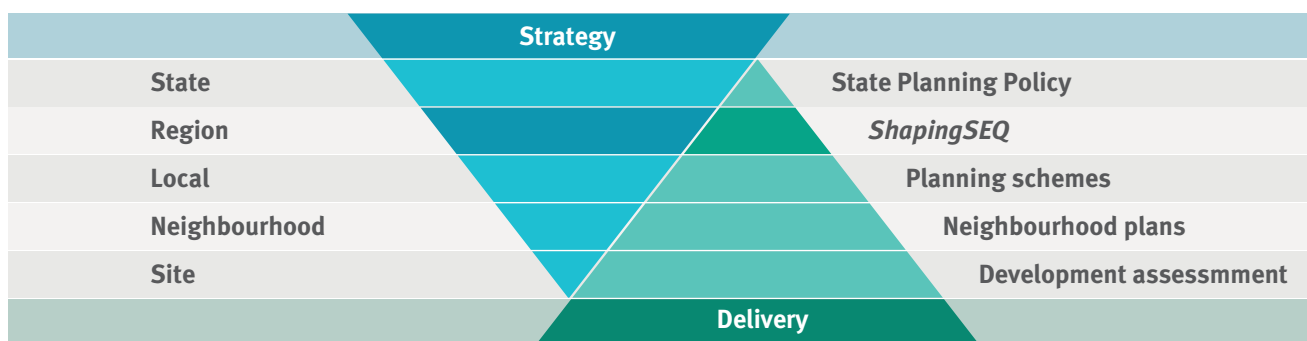
The South East Queensland Regional Plan 2017 (ShapingSEQ), the statutory regional plan for the South East Queensland (SEQ) region, is a state planning instrument providing a framework to manage growth, change, land use and development in SEQ. ShapingSEQ manages growth by reflecting state policy and informing a range of other, more detailed planning instruments (such as local government planning schemes) responsible for delivering good land use and infrastructure outcomes.

As detailed in the following diagram, ShapingSEQ sits below the State Planning Policy (SPP) in Queensland's planning framework and informs:

- the making and amending of local government planning schemes and local area or neighbourhood plans
- the assessment of certain development applications made under the Planning Act 2016.

Local government planning schemes subsequently give local regulatory and policy effect to state and regional planning (such as ShapingSEQ) and local interests, such as appropriate planning and development outcomes. The broad guidance of the SPP about state interests—such as Housing Supply and Diversity and Liveable Communities, and a regional plan's intent for densification around centres and public transport stations—are reflected in planning schemes through mechanisms such as the zoning of land and the level of assessment for each use. Those provisions define the suitability and permissibility of different dwelling types and densities.

Brisbane City Council's implementation of the 2009 South East Queensland Regional Plan (2009 SEQRP) centres network provides an example of how the Queensland planning framework is implemented through local government planning schemes and future development outcomes. In the 2009 SEQRP, Upper Mt Gravatt is identified as a Principal Regional Activity Centre, and as such stipulated that the centre should accommodate higher density residential development, employment and uses that generate activity such as retail and entertainment. Brisbane City Council subsequently released the Mt Gravatt Corridor Plan in 2012, which recognised Upper Mt Gravatt as a centre, with the purpose of the Neighbourhood Plan code outlining that the Upper Mt Gravatt precinct will be a focal point for higher density residential and mixed-use development.



Queensland Planning Framework

## Local government planning schemes

Local government planning schemes give local regulatory and policy effect to state and regional planning and local interests, such as appropriate planning and development outcomes and infrastructure needs. Planning schemes manage housing density, with the zoning of land identifying the most acceptable locations for a range of densities in the local government area.

Planning schemes also describe the suitability and outline the permissibility of different dwelling types and densities through performance outcomes and the level of assessment of each use. For example, a high-rise building would be identified as inappropriate and have a higher level of assessment and thus a more rigorous set of requirements to meet if it were proposed in an area that had been determined suitable for low-rise development. The acceptability of different lot sizes is also regulated in a similar way.

## Queensland Transport Policy

TMR is developing the 30-year Queensland Transport Policy to ensure the state's transport system meets customer needs now, and into the future. All Queenslanders, including transport innovators, entrepreneurs, industry, and the community will be provided opportunities to develop the new policy.

## Transport coordination plan

TMR has developed a new transport coordination plan in accordance with the requirements of the *Transport Planning and Coordination Act 1994*. The *Transport Coordination Plan* provides a strategic framework for the planning and management of transport resources in Queensland over a 10 year time frame. The updated plan also includes transport key performance indicators to monitor progress towards these objectives, along with decision making principles and criteria for spending on transport.

## South East Queensland's Rail Horizon

By 2036, the population of South East Queensland is forecast to reach almost 4.9 million people. This will place increasing pressure on transport systems, particularly in growth corridors and where the system converges in the Brisbane CBD. *South East Queensland's Rail Horizon* outlines the strategic priorities for the region's rail network, which include optimising the existing network, upgrading services and infrastructure, and delivering critical new infrastructure.

## Moving Freight

Queensland's freight task, a measure of goods uplifted and distance transported, is currently estimated to grow around 27% from 157 billion tonne-kilometres in 2014–15 to more than 200 billion tonne-kilometres by 2024–25. In terms of uplift, freight volumes are estimated to increase at a similar rate from 911 million tonnes to more than 1156 million tonnes.

In 2013, TMR released *Moving Freight*, a 10-year strategy identifying 38 actions to improve freight movement in Queensland. TMR is currently reviewing *Moving Freight* in partnership with industry to ensure the freight system is responsive to emerging trends and continues to meet our transport needs now and into the future.

## Providing efficient public transport

The Queensland Government is strongly committed to developing an efficient public transport system and recognises its key role in providing a sustainable transport solution for the state. A number of current and committed projects and initiatives will contribute to a more efficient and sustainable public transport system. These include the following:

- **Cross River Rail (CRR)**  
Revolutionising rail operations through the heart of the Brisbane CBD, CRR will provide additional rail access, capacity, efficiency and reliability to meet future population and employment growth in South East Queensland.
- **New rail signalling system**  
The European Train Control System (ETCS) level 2 will improve the rail network's signalling system in SEQ such that trains can travel closer together on critical sections of the network. This will increase the capacity, safety and reliability of the passenger rail system.
- **New generation rolling stock**  
The introduction of 75 new passenger trains on the city train network will renew the aging fleet, increase train reliability and increase passenger capacity and comfort.
- **Gold Coast light rail**  
The continued rollout of a light rail network on the Gold Coast will provide continuous connection between Coolangatta and Helensvale. To date, 20kms of light rail track have been constructed, with the latest stage connecting to Helensvale. The third and final stage is currently being investigated.
- **New Gold Coast rail stations**  
The Queensland Government will undertake the detailed planning and design for three new rail stations at Pimpama, Helensvale North and Worongary/Merrimac.

## Reduced fares for South East Queensland Public Transport Users

During 2017 the Department of Transport and Main Roads (TMR) implemented 'Fairer Fares' across the South East Queensland transport network. Changes included:

- reducing zones from 23 smaller zones to eight wider zones, making local travel more affordable
- reducing fares for all zones
- extending the weekday morning off-peak period to 6am
- introducing free weekend travel for children aged five to 14 years travelling on an orange child *go* card
- replacing the '9 and free' incentive with '8 paid journeys and 50% off subsequent journeys per week'.

## Preserving transport corridors

Urban and economic development requires efficient and integrated transport systems to ensure they operate efficiently. Also, transport systems need to be planned and provided such that impacts on the environment are minimised.

The most efficient way to achieve delivery of the above is to identify and protect the required transport corridors before development (or significant redevelopment) occurs across these corridors. The Queensland Government continues to identify and preserve future corridors where appropriate.

## Regional transport plans

Regional Transport Plans will be progressively developed to help define the strategic direction of integrated transport systems over the next 15 years and guide future investment by the department.

## Queensland Cycling Strategy

The Queensland Cycling Strategy was released during 2017 and details the direction for cycling in Queensland over the next 10 years.

## Improving the capacity of the transport network

TMR produces an annual plan that documents the future improvements to the reliability and efficiency of transport infrastructure. The *Queensland Transport and Roads Investment Program* (QTRIP) details the transport and road projects that the Queensland Government plans to deliver over the next four years to meet the infrastructure needs of this rapidly growing state.

Programs that will have a particularly significant impact on freight and commuter efficiency are:

- **Gateway Upgrade North project (GUN)**  
Construction continues in Brisbane's north on the \$1.143 billion Gateway Upgrade North project which aims to increase capacity and freight efficiency along this important freight corridor. This massive infrastructure project will ultimately reduce congestion and improve safety through upgrading the motorway to six lanes, providing wider shoulders, ramp extensions, safety barriers, traffic separation, intelligent transport systems, and improved motorway alignment and signage.
- **New Generation Rollingstock (NGR)**  
The \$4.4 billion NGR will deliver 75, six-car trains for the South East Queensland passenger rail network to meet the growing demand for rail services. In 2016, the project delivered a purpose-built maintenance centre using award-winning Business Information Modelling technology, to service and repair the new trains for the next 30 years. The trains will replace aging units and increase the overall size of the fleet by 30%.
- **G:Link**  
Delivered months ahead of schedule the second stage of G:link was completed in 2017. The 7.3km extension to the current network incorporates three new stations and two park'n'ride facilities with 1400 commuter parking spaces. For the first time, passengers can travel by tram from Broadbeach to Helensvale and connect with heavy rail services to Brisbane and beyond.  
In addition, public transport users will have the option of 19 light rail stations with bus connections at key activity centres along the corridor between Helensvale and Broadbeach.
- **Bruce and Warrego highways upgrade programs**  
These are long term programs that include a wide range of projects that include improvements to safety, flood immunity, and capacity improvements.

## **Introduction of QLD*Traffic***

TMR introduced QLD*Traffic*, the public's go-to source for traffic and travel information across Queensland. The new website and mobile app, QLD*Traffic* gives you the latest news about road incidents and conditions right at your fingertips, and provides customers with journey planning and an interactive map detailing where incidents are on Queensland roads.

## **Cooperative and Automated Vehicle Initiative (CAVI)**

The transport industry is transforming at a rapid rate—new technologies, ideas and partnerships are driving change, and intelligent transport systems are already a major factor in the future of transport technologies. The Cooperative and Automated Vehicle Initiative (CAVI) is Australia's largest trial of Cooperative Intelligent Transport Systems (C-ITS). The CAVI project will prepare the department for the arrival of vehicles that feature both cooperative and automated functions. The C-ITS pilot will involve around 500 cars retrofitted with C-ITS technologies interacting within a test-bed located in Ipswich. The vehicles will be interacting with roadside C-ITS technologies and cloud-based messaging to enable the vehicles to 'talk' to each other. Testing will also be conducted with a small number of cooperative and highly automated vehicles on both public and private roads in South East Queensland.

CAVI will help TMR better understand the implications for our infrastructure and Queensland road users, and the improvements to safety when vehicles can 'talk' to infrastructure and other vehicles. For Queenslanders, rapidly developing cooperative and automated vehicle technologies have the potential to significantly reduce crashes and resulting gridlock, as well as reduce vehicle emissions and fuel use over the coming decades.

## **The Future is Electric: Queensland's Electric Vehicle Strategy**

Queensland's Electric Vehicle Strategy aims to encourage, support and accelerate the uptake of electric vehicles in Queensland, and to reduce the carbon emissions from fuel combustion. An action under the Strategy is the Queensland Electric Super Highway, which comprises a series of 17 electric car fast-charging stations between Coolangatta and Cairns, making it the world's longest electric vehicle highway in a single state. The energy supplied in the fast-charging stations is green energy bought through green energy credits or offsets.



