

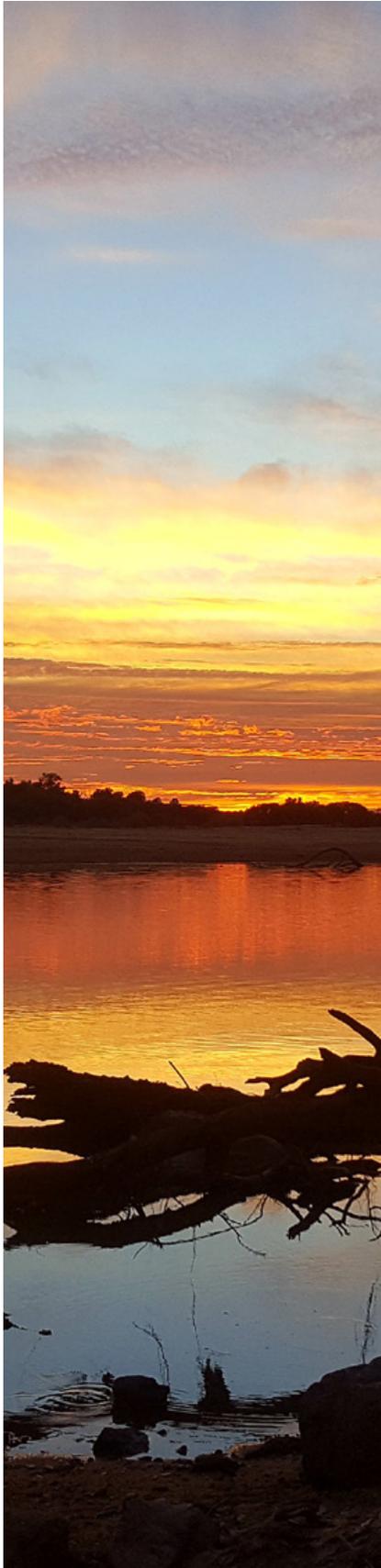
Department of Regional Development Manufacturing and Water

Bradfield Regional Assessment and Development Panel report

SUMMARY



A bold vision from last century



When eminent engineer Dr John Bradfield first proposed transforming Queensland’s dry western and south-western regions by piping rainfall thousands of kilometres from where it fell on the North Queensland coast, it was bold and remarkable.

On paper, the idea—now more than 80 years old—held great nation-building promise. The heavy rains and large river flows of northern and central Queensland are major regional, state and national assets.

Yet many versions of a Bradfield scheme have not been found viable.

In late 2020, the Queensland Government appointed the Bradfield Regional Assessment and Development Panel (the panel) to independently examine the many Bradfield proposals.

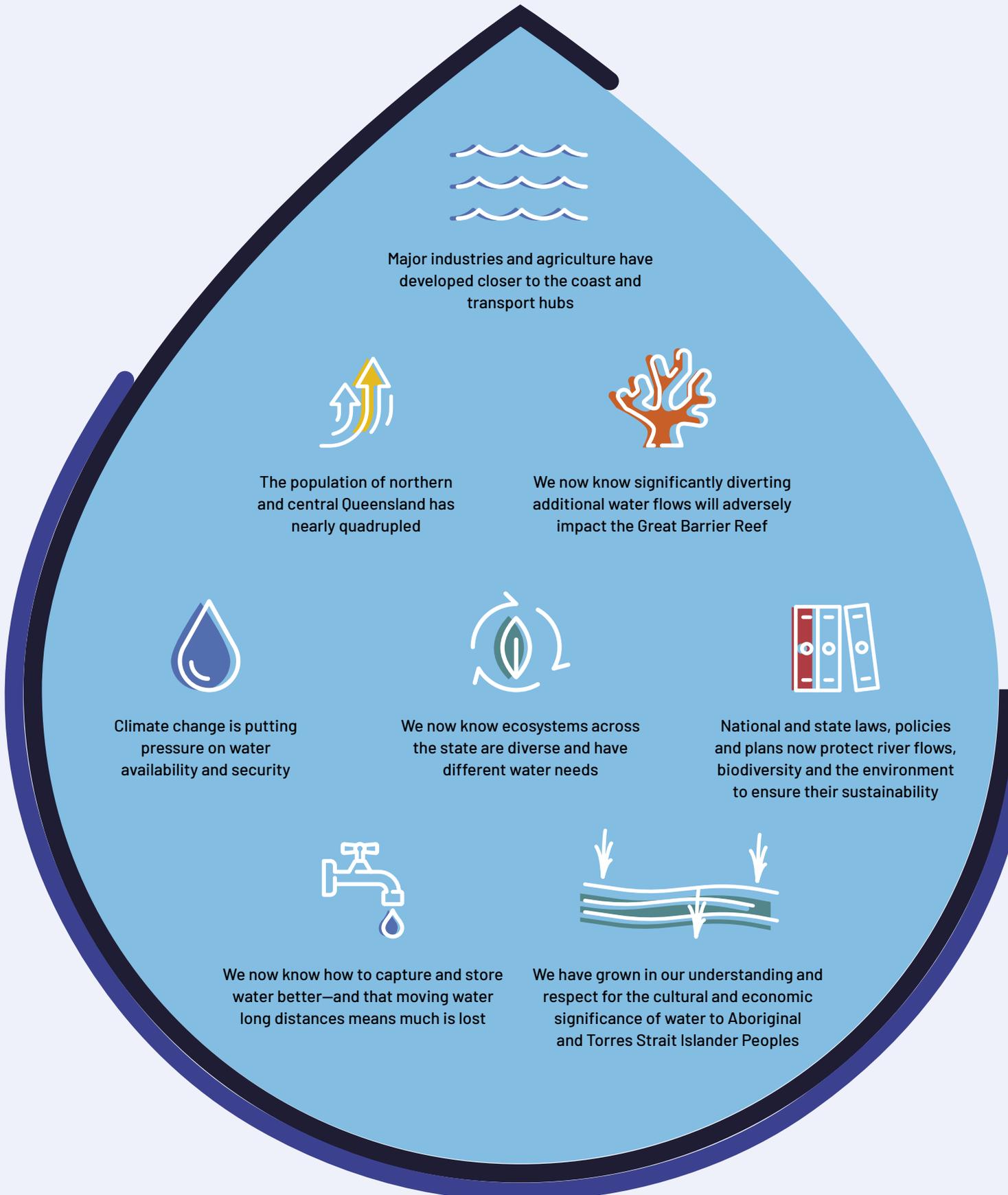
The panel’s report provides the most comprehensive examination of Bradfield schemes in 15 years.

Chaired by Professor Ross Garnaut with Dr Georgina Davis and Professor Allan Dale, the panel assessed the financial, economic, environmental, social and technical viability of the Bradfield schemes and made recommendations.

Images courtesy QG image library

What's changed in 84 years?

Dr John Bradfield first proposed the scheme in 1938. Since then, Queensland has changed and developed—and much of that transformation means the water is being used closer to where it falls.





Panel's key findings



After extensive consideration, the panel members recommended the Queensland Government not proceed with any of the proposed Bradfield schemes.

In fact, they found the schemes faltered at the first hurdle: There is simply not enough consistently available water to make the proposals work. Their findings also support the strength of current approaches and will help guide future water planning and development. However the assessment identified alternative ideas to increase water security as well as the economic use of water.

At the same time the panel was undertaking its work, CSIRO was also assessing the hydrology of annual water flows in the Burdekin and other rivers mentioned by Bradfield, as well as its economic feasibility.

Both the panel and CSIRO found that Dr John Bradfield's estimation of water flows were overestimates, effectively doubling the amount of actual water in the system. For example, long ground-truthed modelling shows an average of about 1665 gigalitres per annum flows along the Burdekin River. Bradfield had estimated 3678 gigalitres.

Without enough water, no Bradfield scheme would work.

The panel members, however, did suggest how significant available water across northern and central Queensland could be used best to benefit all Queenslanders.

For one, they found Queensland could compete in the renewables industry by creating what they called the Water, Agri-Business, Technology and Energy Regional Development Zone—the WATER Development Zone.

They also proposed an alternative approach to Bradfield, including a smaller series of connected Regional Water Grids.

Finally, the panel suggested ways to facilitate significant regional growth via targeted and sustainable water development in other regions, including those originally slated to benefit from the Bradfield Scheme (i.e. Lake Eyre Basin and the Gulf of Carpentaria).

The north Queensland town of Charters Towers, Australia

A comprehensive assessment



As well as water availability, the panel considered the Bradfield proposals on many grounds including economic, engineering, agronomic, environmental, and the social and cultural impacts specific to Aboriginal and Torres Strait Islander Peoples.

On these grounds, too, the panel members found the Bradfield proposals were unviable.

To form their views, they consulted regional community leaders and technical experts, including engineers, and engaged the Centre of Policy Studies at Victoria University to undertake economic modelling. The CSIRO report also supports the panel's economic assessment.

The panel considered climate change and highlighted its unpredictable impacts on rainfall, farming and industry practices, and evaporation across the state.

Since Bradfield's original proposal, there have been great advancements in how we analyse and understand climate, catchment and river ecology, how we use water, and the vast social and economic benefits of managing water resources wisely.

“Since Bradfield described the original scheme in 1938, there has been considerable water resource development across all three catchments.”

Bradfield report, page 201.



Fruitbat falls

The Bradfield schemes examined



The east coast and adjacent Great Dividing Range in Far North Queensland receive some of the highest annual rainfall on earth.

No wonder Bradfield dreamed of turning much of Queensland into rich agricultural farmland.

Fresh from his success in designing the Sydney Harbour Bridge and Brisbane’s Story Bridge, Bradfield proposed capturing water in a dam at Hells Gates on the Burdekin River, topping up the dam with transfers from the Tully and Herbert rivers.

Then, he suggested tunnels be built into the Flinders and Thomson rivers, channelling the water downstream to Cooper Creek and Lake Eyre.

In 1942, he followed up with a variant, suggesting water first be transferred directly into the Thomson.

Two more Bradfield variants, with different dam heights and using tunnels to transfer water to west of the Great Dividing Range, were also considered in 2021.

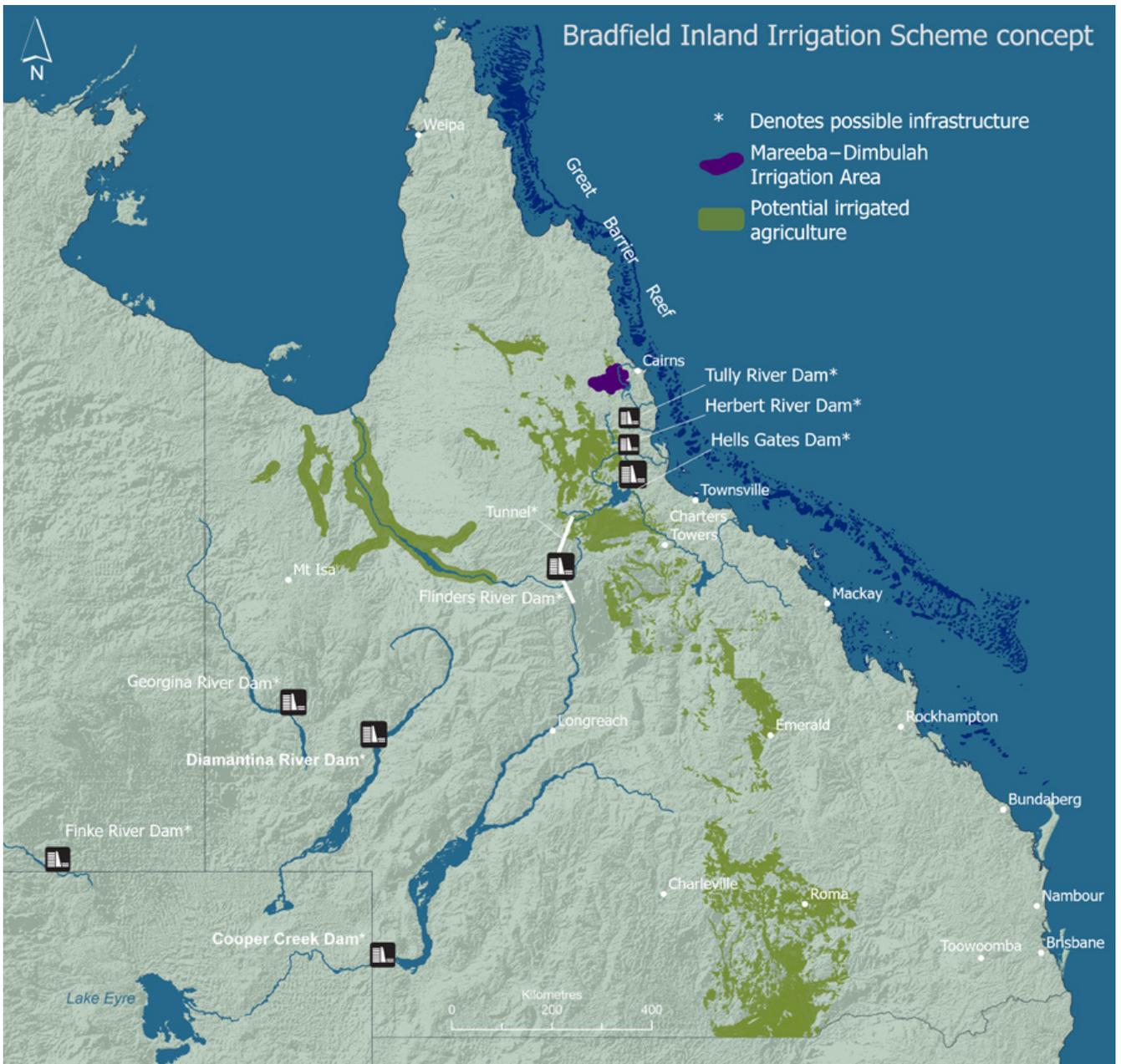
The cost of building Bradfield

In 2021, CSIRO estimated the 1938 Bradfield scheme would cost about \$22.5 billion.

The panel found that, primarily, water volumes are not available to support the Bradfield proposals. In addition, the panel said the high cost to build the Bradfield cannot be justified.

The four main Bradfield proposals examined by the panel

Scheme	Description
1938 Bradfield	<ul style="list-style-type: none"> Water diversion from the Tully and Herbert rivers to the Burdekin 122-metre high dam at Hells Gates 144-kilometre tunnel to west of the Great Dividing Range to the Flinders and Thomson rivers
1942 Bradfield	<ul style="list-style-type: none"> Variant of 1938 Bradfield 152-metre high Hells Gates dam 400 kilometres of twin pipes to the Thomson
CSIRO 1942 Bradfield Variant	<ul style="list-style-type: none"> Variant of 1942 Bradfield 97.5-metre high Hells Gates dam 679-kilometre channel to the Thomson
The Queensland Great Dividing Range Scheme, 2021	<ul style="list-style-type: none"> Variant of 1938 Bradfield 108-metre high Hells Gates dam 90-kilometre tunnel to the Flinders and Thomson



Map 2-1: The Bradfield Inland Irrigation Scheme. Bradfield report, page 13.

Technical assessments reviewed by the panel show that even if water was available to send west in the volumes required by the Bradfield schemes, it could cause severe damage to existing ecosystems and farmland.

Bradfield report, Appendix 2, pp 116-136.



Recommendations



Recommendation 1

There is no economic, environmental, social or cultural heritage case for immense storage of water in northern Queensland with a view to its movement over long distances west and south for irrigation. The panel recommends against proceeding with any of the Bradfield or Bradfield-like proposals.

Recommendation 2

There is a strong case for planning and investing in the use of water closer to where it falls to accelerate regional development in central and northern Queensland, including in the Gulf of Carpentaria and Lake Eyre Basin areas.

Recommendation 3

Within this development framework, explore the feasibility of four 'Mini-Bradfield Grids', referred to as Regional Water Grids in the report.

1. Tablelands-Cairns Regional Water Grid
2. Burdekin-Townsville Regional Water Grid
3. Fitzroy-Rockhampton-Gladstone Regional Water Grid
4. Burnett-Bundaberg Regional Water Grid

Recommendation 4

Explore and, where viable, build links between these Regional Water Grids so a temporary abundance of water in one grid can be used to balance a temporary dearth in another.

Recommendation 5

Make available water work better within individual catchments in northern and central Queensland outside the Regional Water Grids.

Recommendation 6

Increase public funding for research into the value of the use of water and land for agriculture, carbon sequestration and biomass for industry.

Recommendation 7

Review all matters affecting pricing of inputs into, and the use of, infrastructure. This should ensure cost-reflective pricing emerges from competitive markets (including water, energy and ecosystem service markets) and encompassing other development inputs. The review particularly needs to examine opportunities for expanding innovation in the role of water markets.

Recommendation 8

Move promptly to establish the proposed new approaches to water development planning. Delays will cause bottlenecks for infrastructure needed to build the WATER Development Zone and to deliver development for adjacent regions in central and northern Queensland.

The Queensland Government's response

The Queensland Government accepted all of the panel's recommendations in full or in principle, and recognised that continuing to meet best-practice preconditions would lead to success.

The Queensland Government carefully manages the competing interests for water.

Local communities, the environment, industries and agriculture all need to use water close to where it falls, including within the Bradfield area of the Tully, Herbert and Burdekin catchments.

The Queensland Water Act 2000, the National Water Initiative and Queensland's statutory water plans ensure the vast water resources of the State are sustainably managed now and into the future.

The review of water plans is an important time for government and community to consider the plan settings and how the allocation of risk and water available for different uses may need to change.

You can access the independent panel's full report and the government response from our home page www.rdmw.qld.gov.au



Where water goes

Once the needs of 21st century life and development are considered, the water needed for Bradfield is simply not consistently available. The report tells us the Bradfield schemes would damage the environment and impact established industries, and that water is needed in Queensland closer to where it falls. This diagram shows the major uses and calls on water from where it falls—close to the coast—through to the dry interior.



Our river systems are driven mostly by large and irregular rainfall events followed by dry periods. Ensuring the good times help us through the bad times is critical for sustainable development.



Modern dam and water storage technologies provide new options to create secure water supplies and capacity to ensure people have clothes to wear, food to eat and water to drink.



To balance growing demand for water regionally, modern water rules set limits on water taken to ensure the best outcomes for industry, agriculture, communities and the environment.



Demand for water is increasing in growing regional areas and cities. The population of North Queensland is four times bigger than it was in Bradfield's time.



Fresh water flows from rivers are needed to support our vast floodplains, the Great Barrier Reef and the surrounding environment. A healthy reef also supports tourism, industries and local jobs.



Not all rainfall ends up in our streams. It can be absorbed into soils and taken up by plants or join overland flow captures.



As water flows through rivers, it performs vital processes (i.e. water fills waterholes, infiltrates groundwater or re-enters the water cycle via evaporation). Stream flows keep rivers' ecology healthy to support life.



Queensland's river catchments are large and diverse, meaning agricultural uses of water occur throughout each system.



We use water from our waterways for many social, economic and cultural benefits. Each catchment is unique and must be managed sustainably to keep communities healthy and protect the environment.



North Queensland's most famous crops—sugar cane, mangoes, premium nuts and bananas—need ready access to water.



For industry, secure supply is just as important as the volume of water it uses. Newer industries that will make immense contributions to Queensland regional development in the zero-carbon economy will also need secure water supplies.



Climate change is warming the planet with higher temperatures leading to more evaporation and more variable rainfall. We must adapt to prepare for this.



Could water work better in Queensland?

As well as assessing the Bradfield schemes, the panel was asked for its advice on how water could be used better in the future.

Create a WATER Development Zone

Australian governments are looking to renewable energy sources to lessen our reliance on fossil fuels like coal and gas.

Queensland has some of the best solar and wind resources in the world.

WATER stands for Water, Agri-Business, Technology and Energy Regional Development Zone.

The creation of a WATER Development Zone—which would stretch from Georgetown in the north-west and Cairns in the north down to Gladstone and west to Barcaldine—could help Queensland to leverage its existing strengths in industry, agriculture and infrastructure, and to reduce its emissions.

“The combinations of solar, wind and rainfall for biomass within the development zone are superior to any others in eastern Australia and are among the best in the world.”

Bradfield report, page 36.



Build Regional Water Grids

The panel suggested interconnected grids could bring benefits closer to where the rain falls.

The Regional Water Grids—or ‘Mini-Bradfields’—could cover the areas around Cairns, Townsville, Rockhampton and Bundaberg to use water where it is most valuable, generate greater economic returns and create better water security.

Already, pipelines exist that would form the foundations of the grids, including the proposed pipeline from Fitzroy to Gladstone.

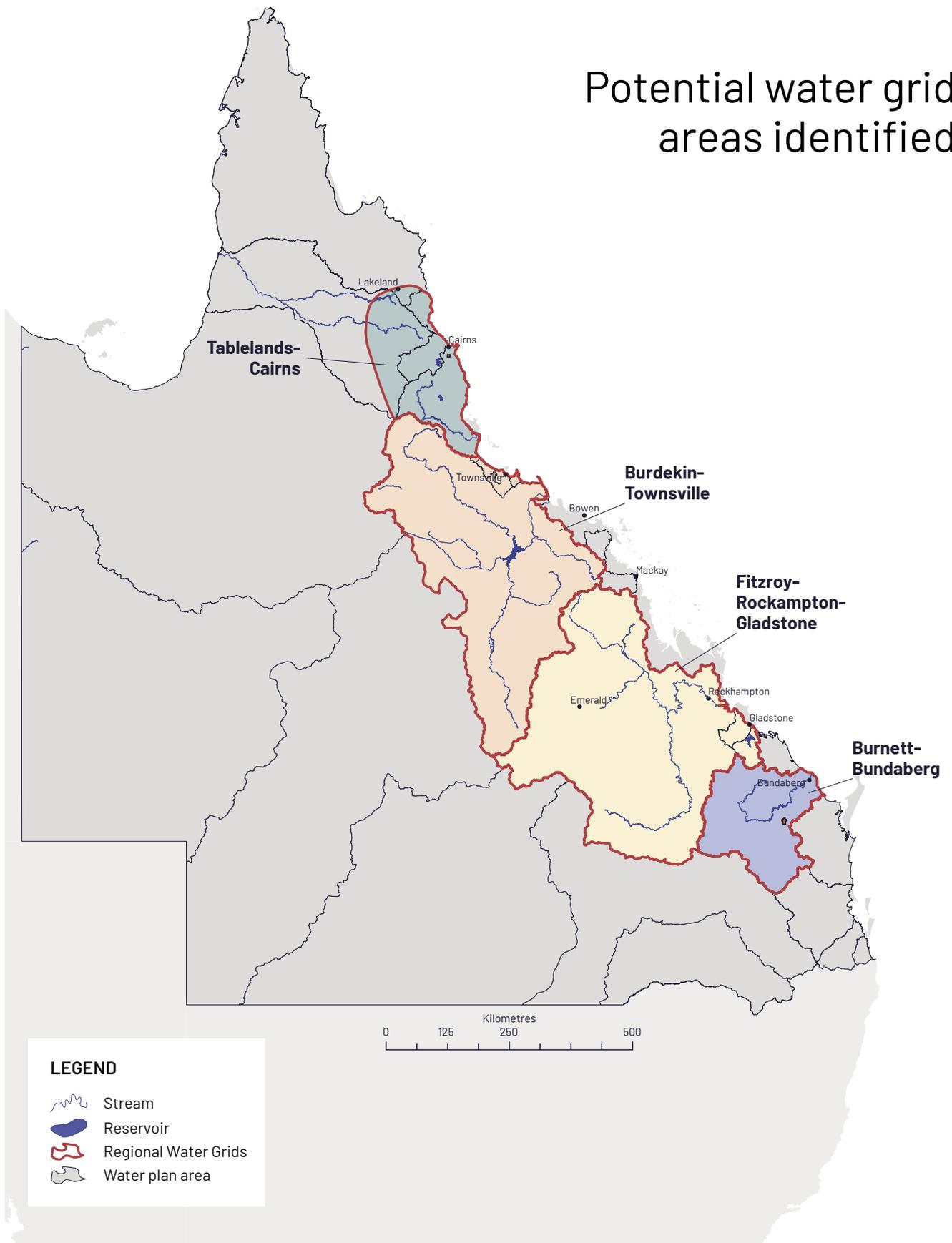
Long-term planning is needed to make these grids a reality, including new technology to capture, store and transfer water short distances.

“Realising central and northern Queensland’s immense potential for regional development can be achieved with sound policy, well-designed state and local institutions, and effective leadership in implementing development strategy.”

Bradfield report, page 78.

Building works at Rookwood Weir

Potential water grid areas identified



Map 6-1: The four Regional Water Grids regions and linkages between them. Bradfield report, page 47.



Use water more effectively

Termed the Making Water Work Scenario, the panel suggested small interventions in water and regional developments in six water plan areas in Queensland’s far north and west: Cape York, Mitchell, Gilbert, Flinders, Whitsunday–Pioneer and Lake Eyre Basin.

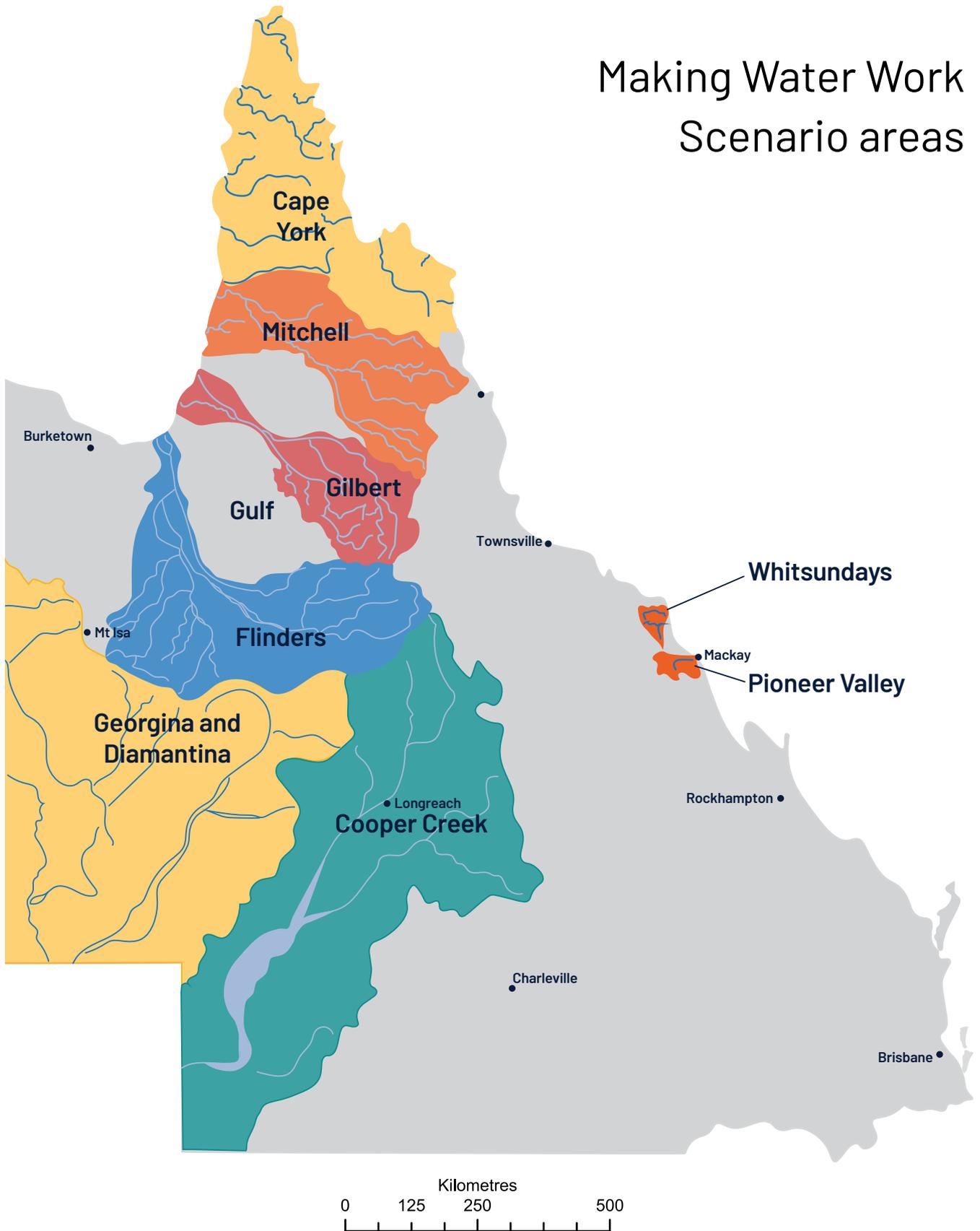
Making Water Work could create new agricultural and industrial hubs from innovative water use—including the small-scale movement of water—without affecting water allocations, water users, and environmental outcomes and objectives.

“(Queensland has) the sophisticated and robust water planning process required by law.”

Bradfield report, page 200.

Walla Weir

Making Water Work Scenario areas



Map 7-1: The Making Water Work Scenario catchments. Bradfield report, page 63.

What's next?



Several initiatives across the state are well under way to ensure the best use of water for thriving regional communities.

In 2022, they include investigating the raising of Burdekin Falls Dam and the rebuilding of Paradise Dam—part of the \$3.4 billion invested in water infrastructure projects throughout Queensland since 2015.

The Queensland Government will also continue to undertake detailed regional water assessments and to address water security and support development.

These initiatives and measures will ensure sustainable water use for Queensland for generations to come.

“The panel has found there is great opportunity for development through wise use of the large amount of water... in central and northern Queensland. Use that opportunity well, and Queensland citizens can look forward to regional growth in incomes, employment and population that greatly exceeds the scale of opportunities that would have come from the Bradfield vision.”

Bradfield report, page 88.

Queensland's enviable tourism experiences and regional service industries



Contact the department

Department of Regional Development,
Manufacturing and Water

c/- GPO Box 2247

Brisbane QLD 4001

Website: www.rdmw.qld.gov.au

We acknowledge the Traditional Owners and custodians of the lands and waters across the State of Queensland, and pay our respects to Elders past, present and emerging.