

Minister's Performance Assessment Report

Water Plan (Georgina and Diamantina) 2004

May 2019

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Minister's foreword

I am pleased to publish this report which provides an overview of the implementation of the Water Plan (Georgina and Diamantina) 2004 (plan) and summarises the findings of the assessments undertaken from the commencement of the plan in 2004 to the present.

This report finds that the implementation of the plan's strategies have effectively advanced the sustainable management of the precious water resources of the Georgina and Diamantina water plan area.

The plan continues to support towns, industry, tourism and agriculture by providing water to support growth. Additionally, the plan continues to maintain water quality conditions, waterholes and fish communities. Recent changes to the *Water Act 2000* recognises Aboriginal peoples and Torres Strait Islanders close cultural connection with the land and water, and the important role water resources play in supporting the health and wellbeing in Aboriginal and Torres Strait Islander communities. These changes require consideration of the interests of Aboriginal people and Torres Strait Islanders during the development of water plans. My department will consult with Aboriginal people and Torres Strait Islanders .

The Queensland Government remains committed to our obligations under the Lake Eyre Basin Intergovernmental Agreement ensuring that the Lake Eyre water resources are managed consistently across all Queensland, South Australia and the Australian Governments. The plan is consistent with our obligations under the Lake Eyre Basin Intergovernmental Agreement.

I propose to continue the current plan until it expires on 5 August 2024, as it is fit for purpose. No adverse impacts are expected on water entitlement holders or natural ecosystems in the plan area if the plan continues.

Monitoring will continue to identify and evaluate potential emerging risks ensuring the plan continues to meet its outcomes. Any identified risks that can't be dealt with under the current plan it can be reviewed or amended at any time.

I encourage anyone with an interest in the management of water resources in this plan area to consider the actions recommended in this report.

Hon Dr Anthony Lynham MP

Minister for Natural Resources Mines and Energy

Executive summary

Under the *Water Act 2000* (s49) (Water Act), a report on each water plan must be prepared at least every five years to assess the effectiveness of the plan and its implementation. The Water Regulation 2016 (regulation) states the matters to be addressed.

This report provides an assessment of the performance of the plan against these matters. **Table 1** Summary of the performance assessment of the plan provides a summary of the report in addressing these matters.

Existing information indicates the implementation of the plan has been effective in achieving all of the plan outcomes and no significant threats to plan outcomes have been identified. One medium risk was identified relating to the ability of the plan and unallocated water reserves to support significant new growth in future, however the plan can meet existing demand.

Beyond the life of the current plan, some potential emerging issues have been identified including:

- increasing evaporation over time due to climate change and climate variability
- potential for future oil and gas industry expansion activities that may impact the natural course of flows across floodplains in the channel country
- further consultation is required before the plan expires to better understand cultural values and uses of water.

It is noted that oil and gas industry expansion activities are currently regulated through Strategic Environmental Areas under the *Planning Interests Act*.

The plan expires on 5 August 2024. On the basis of the assessment completed, it is proposed to continue the plan without change until expiry as the plan remains fit for purpose.

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Table 1 – Summary of the performance assessment of the plan







Matters to be addressed	Comment	Section of report	Status
Effectiveness of the plan in advancing the sustainable management of Queensland's water resources	Social, environmental and economic assessments indicate that the plan is achieving the purposes of the <i>Water Act</i> .	Section 3	
Effectiveness of the implementation of the plan in achieving the plan outcomes	There was insufficient information available to assess the outcome relating to water-related cultural values in the plan area. However, previous reports prepared about the plan did not highlight any significant issues with plan implementation.	Section 4	
Summary of water usage and entitlements including those taken or interfered with under statutory authorisations	Water users have access to water, taken under a water entitlement or under a statutory authorisation through the <i>Water Act</i> (e.g. low risk or prescribed activities such as stock or domestic use).	Section 5	
Summary of research and monitoring findings	The department has conducted a number of monitoring programs across the catchment. Ecological assets (species and habitat) were chosen as best indicators of the success of achieving the plan outcomes.	Section 6	
Summary of amendments to the plan since its commencement	Since the plan implementation a number of amendments have been made in order to improve the effectiveness.	Section 7	
Summary of identified risks to the plan outcomes	A risk assessment process has not identified any risks to the plan outcomes.	Section 8 and 9	
Summary of non-compliances under a water entitlement or other authorisation in the plan area	There have been no reported non-compliances under a water entitlement or other authorisations in the plan area.	Section 10	
Overall status and recommendation for plan	The plan is performing well and should continue to be implemented until its expiry in 2024.		
 Completed	 On track / no issues	 Some minor issues	
 Some major issues	 Not achieved	 Insufficient information available	

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1 Purpose of the report

The Water Act includes provisions under section 49 that require the Minister to prepare reports for each water plan to ensure the implementation and effectiveness of each plan is regularly reviewed and evaluated as part of an adaptive management cycle of planning, implementation, monitoring and reporting. The Water Regulation 2016 requires these reports to be prepared at five year intervals and address a range of matters relevant to the ongoing sustainable management of Queensland's water resources including—

- a) whether the plan is advancing the sustainable management of Queensland's water resources
- b) an assessment of the effectiveness of the implementation of the plan in achieving the plan's outcomes
- c) information on water use and authorisations in the plan area, including—
 - i. water entitlements
 - ii. water taken or interfered with under statutory authorisations
- d) a summary of the findings of research and monitoring for the plan
- e) any identified risks to the plan's outcomes
- f) what amendments, if any, have been made to the plan since its commencement
- g) any noncompliance under a water entitlement or other authorisation in the plan area.

This report provides an overview of the above and evaluates the implementation of the water plan to date, with an emphasis on progress since the previous report was prepared in 2013.

2 Plan area

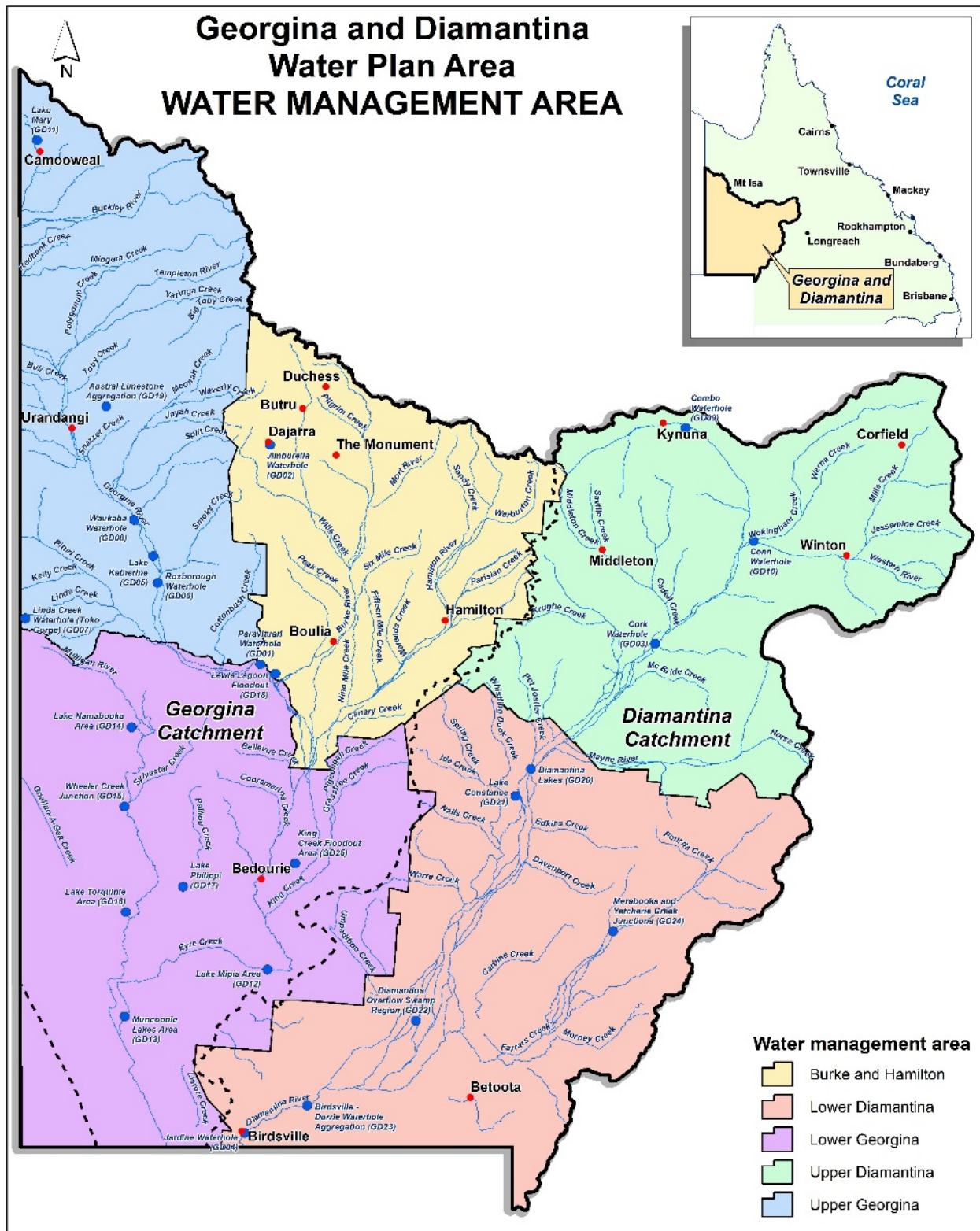
The plan area covers approximately 266,000 square kilometres consisting of the Queensland part of the Georgina, Diamantina and Hay catchments forming part of the Lake Eyre Basin. **Figure 1** shows the plan area and water management areas.

Water is predominately used for grazing and town water supply. There are few water licences currently in the plan area, resulting in the Georgina, Diamantina and Hay rivers retaining a near natural flow regime. The Water Plan (Georgina and Diamantina) 2004 (plan) manages unsupplemented extractions, overland flow water harvesting and underground water hydraulically linked to surface water, whilst also setting aside unallocated water for future development.

The plan promotes consistency with the *Lake Eyre Basin Intergovernmental Agreement 2001*, to which Queensland is a signatory. This agreement recognises the ecological, pastoral, tourism and cultural significance of the Lake Eyre Basin.

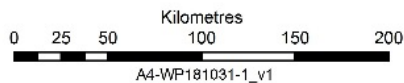
All streams in the plan area are ephemeral, with the majority characterised by short periods of flow following rain events, and long periods of no flow. Average annual rainfall within the plan area ranges between 200 mm and almost 600 mm with the upper catchment receiving the most precipitation. Rainfall is highly seasonal with 70 per cent on average falling in the five-month period from December to April. This seasonality is driven by monsoonal weather patterns, which are typified by heavier falls through the summer months with extended dry winters.

Figure 1 – Water management areas within the water plan area



Legend

- Town
- Significant waterhole
- - - Catchment boundary
- ~ Major watercourse
- ⊞ Water plan area



3 How the plan advances the sustainable management of Queensland's water resources

This section discusses how the plan advances sustainable management of Queensland water resources by incorporating the principles of ecologically sustainable development. The plan establishes a system for the allocation and use of water resources in the Georgina Diamantina for the economic, environmental and social well-being of the people of Queensland.

In particular the plan provides outcomes and strategies to advance the sustainable management of ecosystems, water quality, water-dependent ecological processes and biological diversity associated with watercourses, lakes, springs and other natural water systems. For a more detailed summary of the linkages between plan outcomes, strategies and rules see **appendix A**:

3.1 Ecologically sustainable development

The plan was developed based on long-term hydrological models for surface water and hydraulically linked underground water as well as flow related ecological and geomorphological assessments to better understand patterns of water use, availability and security. The plan includes outcomes that aim to encourage the efficient use of water, whilst making water available to support current and emerging economic activity, while recognising the social and cultural values of communities in the plan area.

The Lake Eyre Basin Rivers Assessment (LEBRA)¹ has shown that riverine ecosystems and biodiversity are in good condition overall. The plan area has experienced relatively limited human alteration of water regimes or landscapes. This is reflected in the rich and diverse riverine communities (for example, fish and waterbirds).

3.2 Allocation and use of water resources for economic, physical and social well-being of the people of Queensland

The plan has outcomes that provide a framework for the allocation and use of water resources in the Georgina and Diamantina water plan area for the economic, physical and social well-being of the people of Queensland.

The plan's defined volumes of unallocated water for future development provide certainty for water users to promote economic development while also supporting population and industry growth as well as aesthetic and recreational values.

The risk assessment in 2018 determined that most of the risks relating to the allocation and use of water resources for economic, physical and social well-being of the people of Queensland were low. Up until 2024 the plan can meet this demand, assuming reliable rainfall (**Appendix A**: Assessment of plan outcomes).

3.3 Sustain the health of ecosystems

The plan contains ecological outcomes for a number of key catchments across the plan area. These ecological outcomes aim to support the ongoing protection of ecological assets and their habitats.

Specific ecological outcomes for particular areas include maintaining the ecological integrity and natural function of in-stream, wetland and floodplain ecosystems, both in the plan area and downstream of the plan area in South Australia. An outcome to promote an improved understanding

¹ <http://www.lakeeyrebasin.gov.au/programs/leb-rivers-assessment>

of the matters affecting the health of the riverine and associated systems in the plan area is stated in the plan.

The plan also requires consideration of the health of the ecosystems when making decisions under the plan; with particular strategies regarding water entitlements granted from unallocated water such as pass flow conditions, limitations on the additional take of water from lakes and waterholes, and consideration of environmental values.

In addition, the plan also provides for the take of overland flow water associated with developments under the *Environmental Protection Act 1994* and contaminated agricultural runoff.

Ecosystems within the Georgina and Diamantina plan area are in good condition overall. Riverine communities (such as fish and waterbirds) are rich and diverse due to limited human alteration of the water regimes or landscapes.

3.4 Recognise the interests of Aboriginal peoples and Torres Strait Islanders

The plan contains an outcome to support water-related cultural values in the plan area, including the values of the traditional owners of the plan area.

The recent amendment to the Water Act recognises the importance of water resources to Aboriginal peoples and Torres Strait Islanders, including their strong spiritual connection to water.

Despite the current engagement with Aboriginal groups through the Lake Eyre Basin Intergovernmental Agreement, there is a need for further, specific engagement with Aboriginal peoples to better understand current and emerging cultural water needs in the plan area. To support the preparation of the next Minister's report in December 2023, we are proposing to:

- re-engage with Aboriginal peoples, continue the conversation and undertake further engagement
- improve understanding of cultural values and uses of water
- record the engagement process

3.5 Enable water resources to be obtained through fair, transparent, orderly processes

The plan provides a strategic reserve of unallocated water. The plan outcomes, together with the Water Regulation 2016, provide the framework for fair and transparent release of this reserved water, including through market-based mechanisms such as tender, auction or direct sales of unallocated water parcels.

Since the commencement of the plan, no unallocated water has been released. See section 5.1.2 for more information about unallocated water releases.

3.6 Build confidence regarding availability, security and value of water entitlements and authorisations

The plan states outcomes which aim to provide, protect and improve access to available water resources. The plan provides for the continued use of existing water entitlements and other authorisations to take or interfere with water which included replacing a number of historical authorities to take water with volumetric water licences and better specification of water entitlements, for example stating an annual volume and other conditions. The plan's defined volumes of

unallocated water for future development, provides certainty and security for current water users while also making water available to support towns, communities and industrial and agricultural growth.

Trading is not provided for under the current plan.

3.7 Promote efficient use of water through water markets, allocation, risk assessments and community education

The plan has an outcome related to encouraging continual improvement in the efficient use of water. This is achieved through the establishment of limitations on overland flow water take to specific purposes from existing works. In addition, the efficiency of existing and proposed water use practices is a consideration in granting water entitlements from the unallocated water reserves. When the State sells unallocated water, a price is set encouraging recognition of water as a valuable resource, and promoting its highest value and most efficient use.

3.8 Facilitate community involvement in planning for the management and allocation of water

Community involvement is ensured through consultation processes for water planning initiatives. Community consultation was integral to the development of the resource operations plan (ROP)², which implemented a number of plan requirements on its release in July 2006.

4 Assessment of the effectiveness of the implementation of the plan in achieving the plan's outcomes

The department monitors the implementation of each plan to make sure it is achieving its outcomes. The plan's strategies were effectively implemented through the ROP which states the monitoring requirements for water and natural ecosystems for this plan.

The plan's outcomes were implemented by the release of the Georgina and Diamantina ROP in July 2006, as well as other specific actions required by the plan. Key achievements in implementing the plan include:

- meeting plan outcomes to sustain economic activity, while recognising community social and cultural values, in the plan area
- increasing monitoring in order to assess water quality outcomes
- meeting plan outcomes relating to maintaining existing water quality conditions, waterholes and fish communities
- continuing to meet responsibilities under the *Lake Eyre Basin Agreement Act 2001*.

Appendix A: Assessment of plan outcomes provides a comprehensive assessment of the effectiveness of the implementation of the plan in achieving the plan's outcomes.

Existing information indicates the implementation of the plan has been effective in achieving all of the plan outcomes. There was insufficient information available to assess the outcome relating to water-related cultural values in the plan area.

² Note: The ROP will transition to statutory instruments such as the water management protocol in the future.

5 Information on water use and authorisations in the plan area

Water users have access to water taken under a water entitlement (e.g. water licence) or under a statutory authorisation through the Water Act (e.g. low risk or prescribed activities such as stock or domestic use). Unallocated water is reserved and can be made available for future use with consideration to protecting existing entitlements and the environment.

5.1 Information on water use under water entitlements

Entitlements within the plan area (**Appendix B: Water entitlements, table 4**) are spread across five water management areas and consist of unsupplemented water licences. There are no water allocations in the plan area.

5.1.1 Announced allocation

There are no water allocations in the plan area.

5.1.2 Entitlements granted from unallocated water reserves

The plan provides reserves of unallocated water: there are strategic and general reserves. The strategic reserve is available for projects of state significance. The general reserve is for any purpose, either for category A (for larger-scale purposes) or category B (for smaller-scale purposes i.e. non-riparian stock or domestic use and small cropping, etc.).

There have been no releases of unallocated water reserves over the five year period. **Appendix B: Water entitlements, table 5** provides current reserve volumes.

5.1.3 Water trading

The plan does not provide for any water trading in the plan area.

5.1.4 Water use

There is limited available information on water use, as there are no metered entitlements in the plan area. The department is currently completing a review of the non-urban water metering policy as part of the response to the Independent Audit of Non-urban Water Measurement and Compliance³.

The plan places threshold limits on take in the plan area to maintain current levels so that the ecological integrity and natural function of in-stream, wetland and floodplain ecosystems are maintained whilst managing the sharing of water resources between water users and the environment.

The current water usage in the plan area is estimated to be low.

5.2 Water taken or interfered with under statutory authorisations

The take of water under the category of statutory authorisations, such as stock or domestic take by riparian landholders, overland flow water take for stock or domestic purposes, and various prescribed activities, is typically not measured, making an accurate quantitative assessment difficult. As a result, no water use data has been provided in this report. However, by identifying broad trends in consumptive behaviour, it is possible to infer whether these trends are at risk of affecting existing water users' access to water or risk to the environment.

³ <https://www.dnrme.qld.gov.au/land-water/initiatives/water-measurement-compliance-audit>

Appendix C: Water taken or interfered with under statutory authorisations assesses the risk posed to water users and the environment by the activities under the Water Act section 93 to 103. The assessment is based on the best available information at the time of publication.

6 Summary of research and monitoring findings for the water plan

6.1 Summary of ecological monitoring

The Summary of Monitoring Report (2019) provides a summary of relevant monitoring information gathered by the Queensland Government and includes data acquired through collaborative projects, and information presented in stakeholder reports.

Research shows that riverine ecosystems and biodiversity in the plan area are in good condition overall. Limited human alteration of water regimes or landscapes has occurred in the plan area and this is reflected by rich and diverse riverine communities (e.g. fish and waterbirds).

The Lake Eyre Basin Intergovernmental Agreement (IGA) under the *Lake Eyre Basin Agreement Act 2001* is between the Australian, Queensland, South Australian and Northern Territory governments. The IGA provides for the sustainable management of the water and natural resources associated with river systems in the Lake Eyre Basin Agreement Area, which includes the plan area. This includes the LEBRA project which collects data on fish, water quality and hydrology, in order to monitor the environmental condition of rivers, build ecological understanding of watercourses and catchments, and contribute to periodic reporting of condition. The information collected during LEBRA monitoring constitutes a large body of work related to the management of natural flow patterns and habitats, and addresses cross-border impacts, cultural values, climate change, and flow regime based outcomes in the plan area. This information will improve our understanding of environmental water needs in the Cooper Creek and Georgina-Diamantina regions of Queensland.

6.2 Summary of water monitoring

The stream monitoring network is operated by water monitoring staff within a quality management framework under International Organisation for Standardisation ISO 9001:2015 accreditation. Measurements taken at stream monitoring sites show that the plan area is characterised by highly variable river flows, both within and between years.

The catchment receives most of its rainfall during the summer months from December through to April. There are times when the catchment can also receive significant rainfall during winter months. Rainfall varies from year to year and throughout the plan area. Some years receive extreme rainfall events due to cyclonic or monsoonal influence. The long-term annual average rainfall within the catchment area varies from less than 200 mm to almost 600 mm.

Major rainfall events in the northern areas can cause major flood events throughout the basin and these events are normally linked to strong monsoonal/cyclonic influences. Flood events throughout the system can extend for weeks throughout the plan area. There can be months of prolonged hot and dry weather between flood events, which can turn to days and sometimes weeks of general and widespread rainfall that generates some prolonged flows. For example, consecutive years of no to low flow at gauging station 002104A Diamantina River at Diamantina Lakes may be followed by a flood peak of more than 573,360 megalitres (ML) which may take weeks to subside to base -low.

Annual flows at Diamantina River at Diamantina Lakes can range from 70,600 ML in 2012-13 to a maximum recorded of 10,831,250 ML in 1973-74. The median flow is 900,000 ML per year. The maximum total daily flow recorded was 573,360 ML on 31 January 1974.

6.3 Summary of resource operations licence holder monitoring

There are no resource operations licence holders within the plan area.

6.4 Assessment of low risk aquifers

The plan regulates underground water that is hydraulically linked to surface water. Other underground water in the plan geographical area is regulated through the Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017, the Greater Western Underground Water Area or the Upper Georgina Underground Water Area. The latter two are underground water areas regulated through the Water Regulation 2016.

6.5 Assessment of overland flow water development

The plan regulates the taking of overland flow water through the provision of unallocated water reserves as well as authorising existing take if notified in accordance with the plan. The plan provides for limited taking without an authorisation for some purposes such as stock or domestic use. No unallocated water has been released within the catchment and there has been no observable increase in the development of overland flow water for the limited purposes provided for in the plan area.

6.6 Social and economic assessment

The plan supports growth in population and industries and aims to maintain flows that support water-related economic values in the plan area. It provides this through unallocated water releases and the establishment of a water market. Volumes of unallocated water are available in **appendix B: Water entitlements, table 5**.

The basis of the statistics used in this section is the Australian Bureau of Statistics (ABS) census data (ABS 2016) using relevant Statistical Areas - level 2 (SA2s). For the purpose of the report a conglomerate of SA2s were chosen to represent the plan area. This information was used to assess whether the plan is providing for the social and economic outcomes in the plan.

Socioeconomic data was generated using the [Queensland Government Statistician's Office](http://www.qgso.qld.gov.au/)⁴ generation of a report based on the SA2s chosen to represent the plan area.

6.6.1 Population information

As at 30 June 2017, the estimated population for the plan area was 3399. This was a reduction of 13.5 per cent for the last five years while Queensland's growth rate over the same time was 7.9 per cent. While the plan contains a strategic reserve of water, the release of this water to service targeted growth areas such as these may be limited by the current plan strategies.

⁴ <http://www.qgso.qld.gov.au/>

6.6.2 Employment by industry

The top three industries in the region are:

- Agriculture, forestry and fishing (26%)
- Public Administration and Safety (14.6%)
- Mining (10%).

The Georgina and Diamantina catchments predominantly support grazing, however resource industries, such as gas and oil industries, are increasing activities in the plan area.

Water use in the plan area is used for grazing and agriculture, town water supplies and mining. Surface water taken for irrigation across the plan area is used for fodder crops.

6.6.3 Australian Bureau of Statistics farm surveys

The value for agricultural commodities in the region for the 201516 financial year was estimated at \$332 million, being an increase of \$109 million or 48.8% from 201011. In comparison with Queensland the percentage increase was 38.3. The reserves of unallocated water available across the plan area can partially facilitate further expansion and diversification of agriculture.

6.6.4 Water trading and water prices

This does not apply as there are no water allocations in the plan area. There is also no provision for seasonal water assignment or relocation of water licences.

6.7 Climate assessment

6.7.1 Recent climate variation

A review of climate predictions for the plan area was undertaken to determine if there has been a significant change that affects the plan's ability to provide consumptive and non-consumptive water use for the remaining life of the plan. There is no hydrologic model (to simulate various water availability and use scenarios) for either catchment in the plan area due to the low population, development and amount of recorded data. The Department of Environment and Science undertook comparisons of recorded data from before and after the last plan's publication date. The data since plan commencement in 2004 is referred to as the 'extended period.'

The purpose of this assessment was to determine any significant variation in the recent climatic conditions that could affect the plan's ability to provide for consumptive and non-consumptive use for the remaining life of the plan. The rainfall, evaporation and flow data from before 2004 was compared with the data from the extended period

6.7.1.1 Rainfall

For the Georgina catchment, Boulia Airport meteorological station (38003) was chosen to represent the catchment.

The catchment rainfall at this location over the extended period was slightly below average, but falls within the historical variation (**figure 2**).

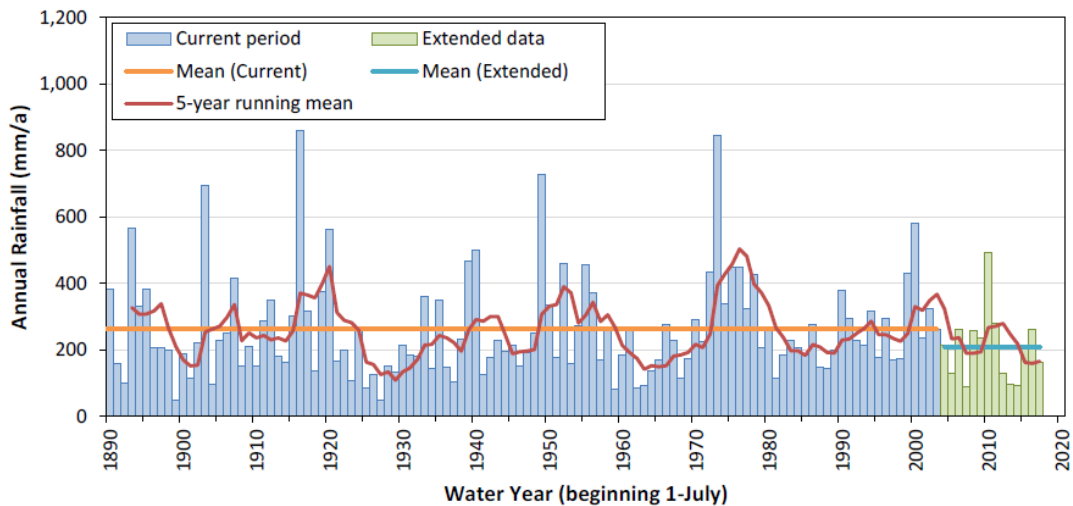


Figure 2 – Annual rainfall at Boulia Airport (38003)

For the Diamantina catchment, Brighton Downs meteorological station (37007) was chosen to represent the catchment.

The catchment rainfall at this location over the extended period was slightly below average, but again falls within the historical variation (**figure 3**).

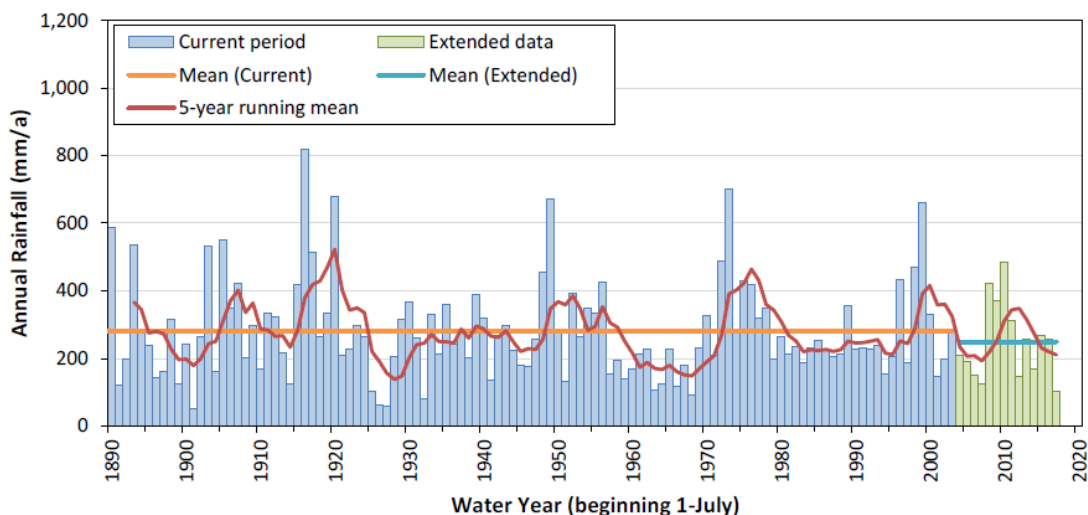


Figure 3 – Annual rainfall at Brighton Downs (37007)

6.7.1.2 Streamflow

For the Georgina catchment, Georgina River at Roxborough Downs meteorological station (001203A) was chosen as a representative of the western catchment for annual streamflow. **Figure 4** shows that at this location, the annual flows are average over the extended period. During that period, the second highest annual flow was recorded.

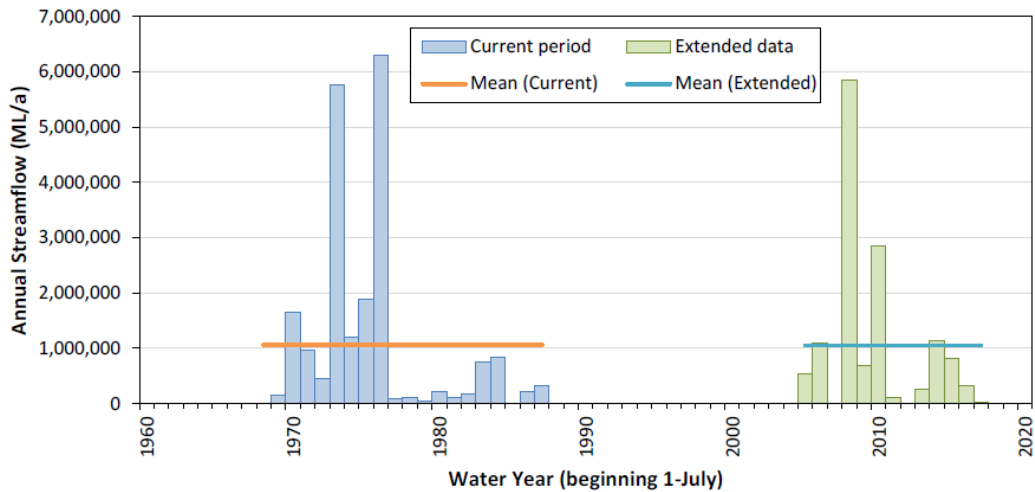


Figure 4 – Annual streamflow at Georgina River at Roxborough Downs (001203A)

For the Georgina catchment, Burke River at Boulia meteorological station (001202A) was chosen as a representative of the eastern catchment for annual streamflow. **Figure 5** shows that at this location, the annual flows are below average over the extended period. During that period, the second highest annual flow was recorded. Additionally, some of the lowest flows on record were observed.

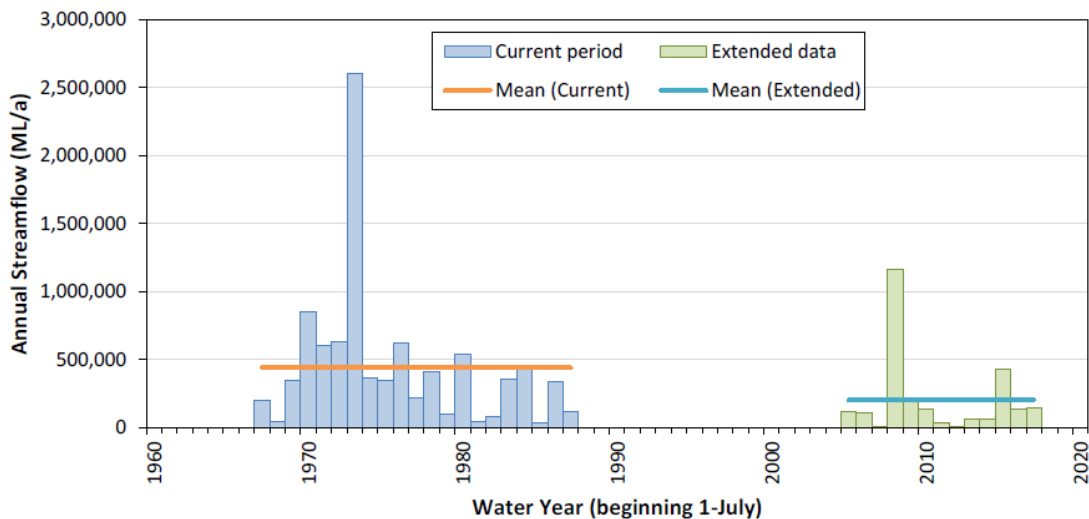


Figure 5 – Annual streamflow at Burke River at Boulia (001202A)

For the Diamantina catchment, Diamantina River at Diamantina Lakes meteorological station (002104A) was chosen to represent the catchment. **Figure 6** shows that the annual flows are slightly below average over the extended period and during that period, the third highest annual flow was recorded.

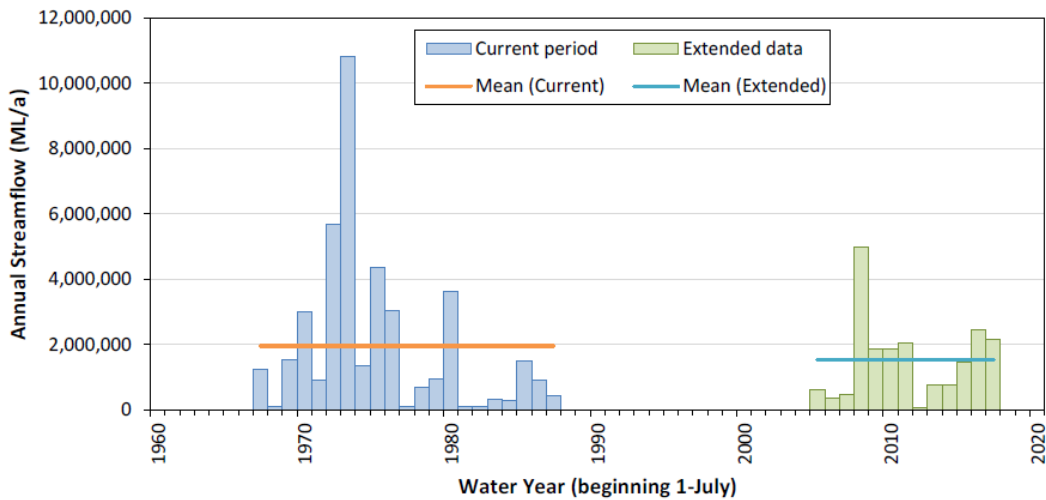


Figure 6 – Annual streamflow at Diamantina River at Diamantina Lakes (002104A)

6.7.2 Climate change projections

A range of Global Circulation Models (GCM) from were used in the assessment. The results consider the Representative Concentration Pathway (RCP) 8.5 emission scenario. This scenario is commonly used for climate change prediction work and corresponds to a business-as-usual scenario which follows current emission trends. Rainfall and evaporation data were sourced at long-term gauges at Boulia Airport (38003) and Brighton Downs stations (37007) for the Georgina and Diamantina catchments, respectively.

6.7.2.1 Evaporation

For the Georgina catchment, the monthly variation in the potential evaporation predicted for the years through to 2030 is shown in **figure 7**. The GCMs predicted an increase in the evaporation for the summer months.

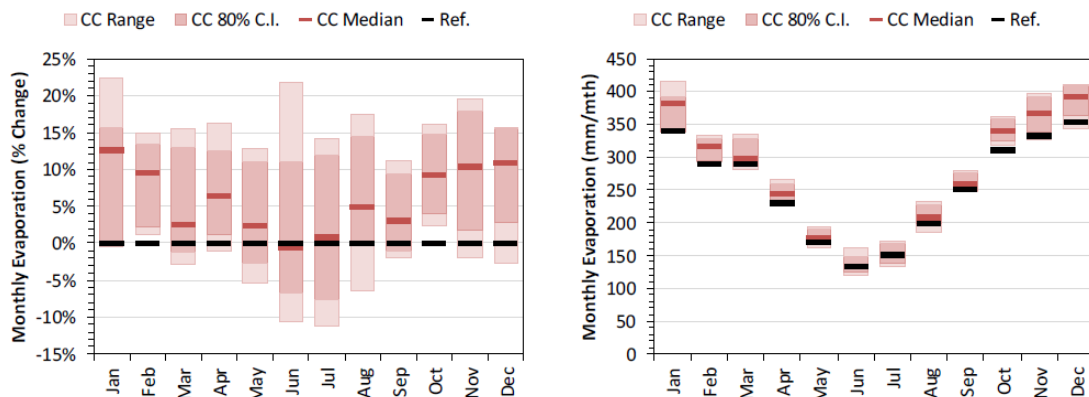


Figure 7 – Georgina catchment monthly potential evaporation projection at 2030 for RCP 8.5 scenario

For the Diamantina catchment, the monthly variation in the potential evaporation predicted for the years through to 2030 is shown in **figure 8**. The GCMs also predicted an increase in the evaporation for the summer months.

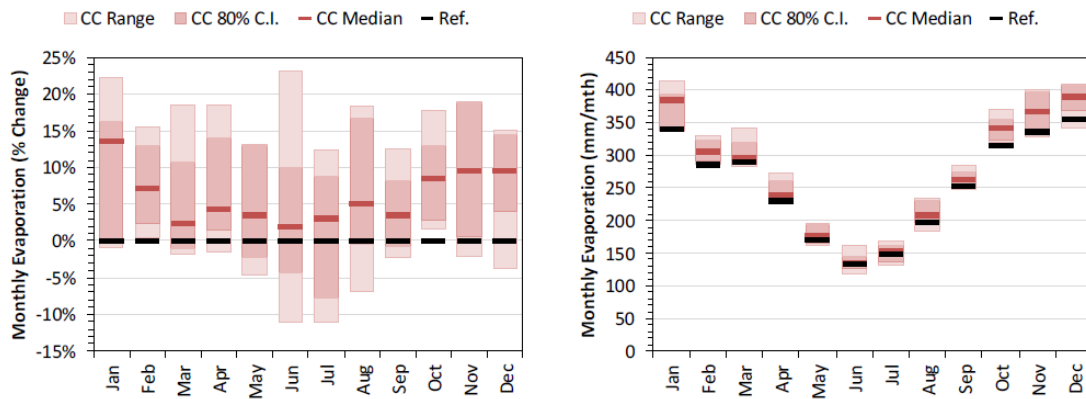


Figure 8 – Diamantina catchment monthly potential evaporation projection at 2030 for RCP 8.5 scenario

6.7.2.2 Rainfall

For the Georgina catchment, the monthly variation in the rainfall predicted by the GCMs for the period until 2030 is shown in **figure 9**. The GCMs tended to show little change.

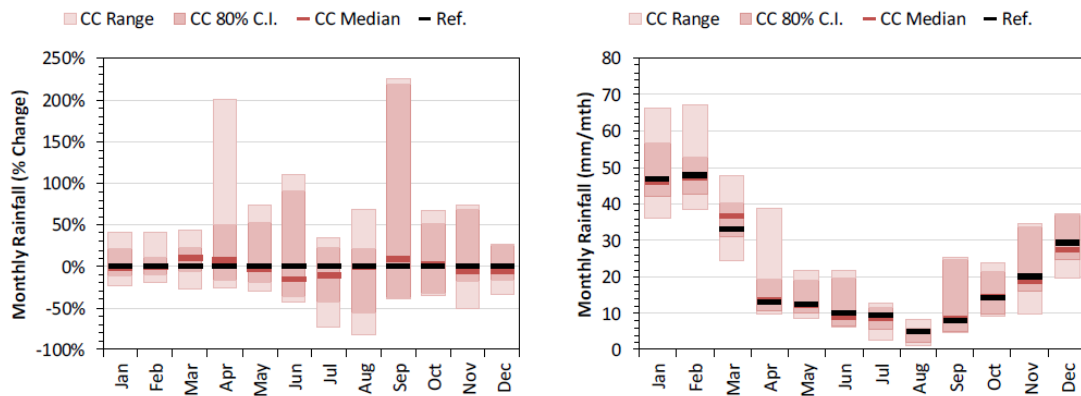


Figure 9 – Georgina catchment monthly rainfall projection at 2030 for RCP 8.5 scenario

For the Diamantina catchment, the monthly variation in the rainfall predicted by the GCMs for the period until 2030 is shown in **figure 10**. The GCMs tended to show little change.

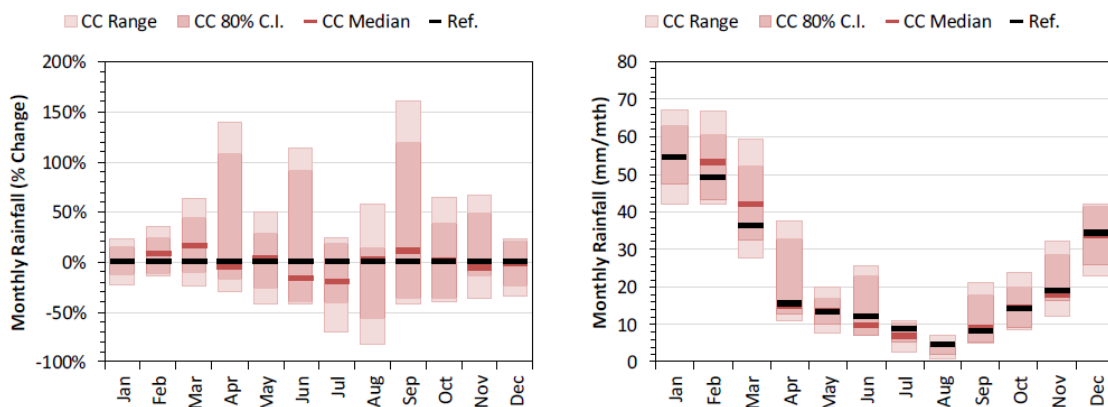


Figure 10 – Diamantina catchment monthly rainfall projection at 2030 for RCP 8.5 scenario

7 Plan amendments and previous reports

7.1 Plan amendments and milestones

Following release of the water plan a number of amendments have been made to reflect administrative changes relating to the Water Act. The main amending acts and changes are:

- *Water and Other Legislation Amendment Act 2011* (WOLA 2011)
- *Land, Water and Other Legislation Amendment Act 2013* (LWOLA 2013)
- *Water Reform and Other Legislation Amendment Act 2014* (WROLA 2014)
- Making of the Water Regulation 2016
- *Mineral, Water and Other Legislation Amendment Bill 2018* (MWOLA 2018)

These amendments and other planning milestones are shown in are shown since commencement of the plan in **figure 11**.

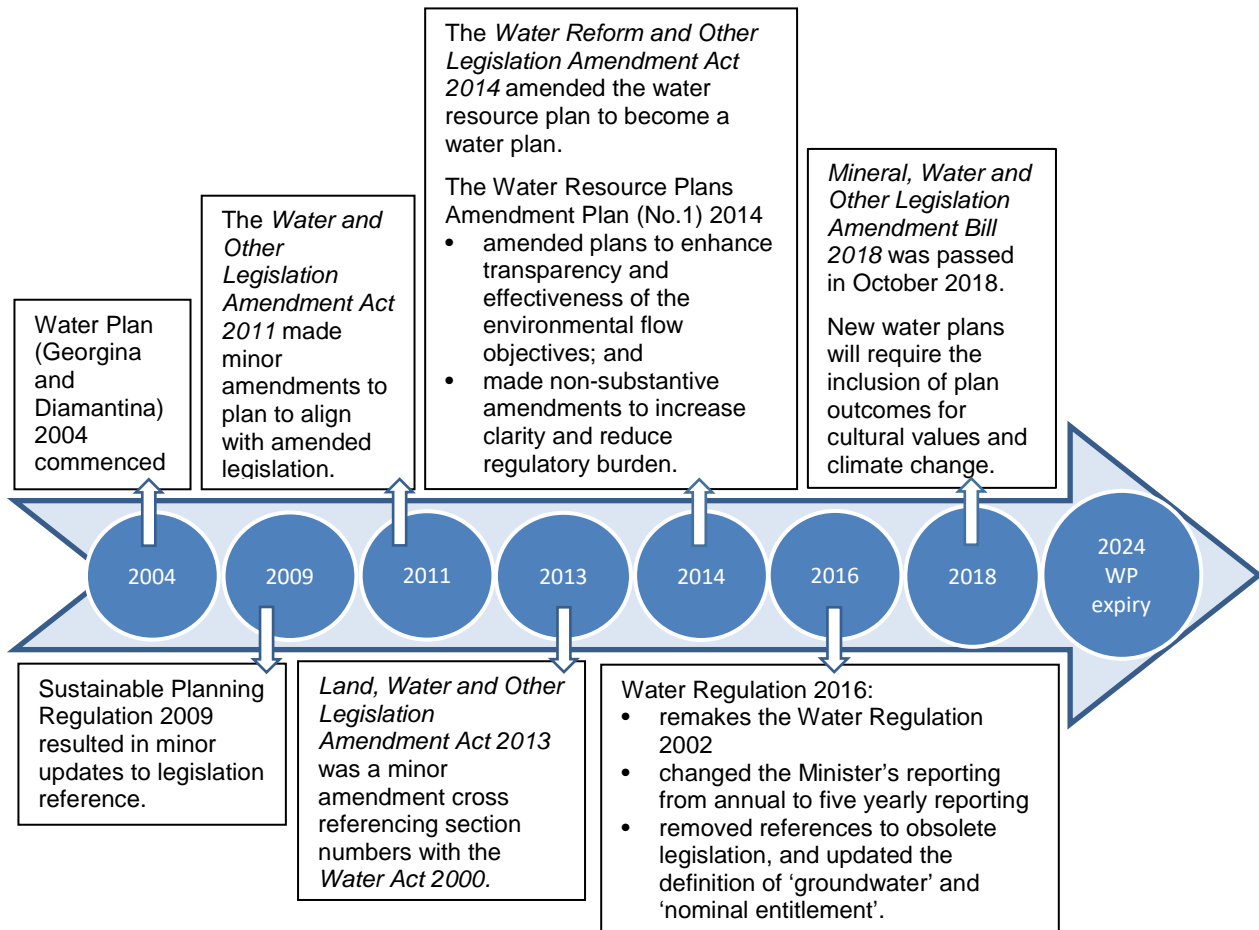


Figure 11 – Amendments and other planning milestones

Amendments to the Water Act and the Water Regulation 2016 commenced on 6 December 2016. These amendments change the way water planning is delivered across the state, including the planning documents. As a consequence, the ROP will transition to a statutory instrument called a water management protocol in the future. For more detail see **appendix F**: Plan amendments and milestones.

7.2 Previous assessments and reports

The last Minister's Report for the plan was prepared in 2014 (DNRM 2014). Following this, the reporting frequency changed from annual to five yearly. The progress of plan outcomes was as follows:

- ensuring water availability for economic growth, recognising social and cultural values
- maintaining the ecological integrity, and natural function of in-stream, wetland and floodplain ecosystems in the plan area and downstream in South Australia
- maintaining water quality in the plan area and downstream in South Australia
- promoting water use efficiency
- promoting improved knowledge of riverine and associated ecosystems
- ensuring consistency with the *Lake Eyre Basin Agreement Act 2001*.

8 Identification of potential risks to the water plan's outcomes

A risk assessment was completed in February 2019 to identify potential risks to the plan's outcomes that could emerge within the current life of the plan (expiring 1 September 2024). The risk assessment approach used was consistent with the ISO 31000:2018 Risk Management Guideline. This methodology ensures consistent, repeatable and defensible consideration of risks, and that outcomes of the assessment are documented for future reference.

Potential risks were identified by considering changes in the plan area over the life of the plan. Potential emerging issues were also identified by considering future water demands beyond the life of the plan (section 9 below). Evidence based on data and expert opinion is used to rank the likelihood and consequence of risk from a standardised list of threats, and the risk level and rationale for this ranking was documented (see **appendix A**: Assessment of plan outcomes). Any risks assessed as either medium or high have mitigation strategies proposed where appropriate. Under this assessment framework, the level of risk, along with other factors, such as a plan's ability to continue to balance economic, social and environmental outcomes, was considered in recommending the most appropriate course of action.

In summary, 10 plan outcomes were assessed. All plan outcomes are being achieved. One medium risk was identified relating to the ability of the plan and unallocated water reserves to support significant new growth in future, however the plan can meet existing demand (see **appendix A**: Assessment of plan outcomes).

One plan outcome relating to water-related cultural values in the plan area was unable to be assessed because of insufficient information. Further, specific engagement with Aboriginal peoples will be conducted to better understand current and emerging cultural water needs in the plan area to support the preparation of the next Minister's report in December 2024. A number of emerging risks were identified that could potentially impact plan outcomes in the future. These are covered in section 9 of this report.

9 Potential emerging issues

There are a number of matters relating to the plan that are identified as potentially emerging after the life of the plan.

These include:

- Potential for increasing evaporation over time until 2030 due to climate change and climate variability.
- Limited information regarding water-related cultural flows and on specific unallocated water reserves for Aboriginal peoples' purposes and uses.
- Potential for future expansion of oil and gas industry activities that may impact the natural course of flow across floodplains in the channel country.

10 Any non-compliance under a water entitlement or other authorisation in the water plan area

No instances of non-compliance with contents or conditions of water licences have occurred within the Georgina and Diamantina plan area from 2013 to 2018.

11 Way forward

The plan expires on 5 August 2024. The plan is effective in meetings its outcomes and requirements for sustainable management. There are no risks to these outcomes presented by the water plan, therefore, based on the evaluation on this report, the department recommends that it is appropriate for the plan to continue. In the meantime, monitoring and implementation of the plan will continue and the plan will be re-evaluated in 2023, prior to its expiry.

12 References

Australian Bureau of Statistics. 2016. Census of Population and Housing - General Community Profile - G51 and unpublished data.

Department of Agriculture and Water Resources. 2016. Lake Eyre Basin: State of the Basin Condition Assessment 2016 Report.

DNRME. 2018. Review of Water Plan (Georgina and Diamantina) 2004 and Resource Operations Plan: Summary of Ecological Monitoring.

Queensland Government Statistician's Office. 2019. [Queensland Regional Profiles: https://statistics.qgso.qld.gov.au/qld-regional-profiles](https://statistics.qgso.qld.gov.au/qld-regional-profiles) Accessed 29/03/2019.

Appendix A: Assessment of plan outcomes

Table 2 – General outcomes for the plan area

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	ROP management rules that provide for outcome	Qualitative risk ranking and preliminary assessment of outcome
7 Outcomes			
(a) to make water available to sustain current levels of, and to support growth in, economic activity in the plan area while recognising the social and cultural values of communities in the basins	The plan provides for volumes of unallocated water to be made available. Water for town water supplies is made available outside of the unallocated water volumes.	The ROP provides a process for accessing the unallocated water reserves. The ROP does not provide for trading or relocating of water licences within the catchment.	MEDIUM risk The outcome is being achieved at present, however the current unallocated water reserves and trading opportunities may be limiting for future development in some subcatchments.
(d) to promote a continual improvement in water use efficiency, both in the plan area generally and on individual properties;	The plan provides that for when assessing unallocated water, the chief executive must consider the efficiency of present and proposed uses of water including alternative water sources such as recycled water and water savings from improvements in efficiency.	The ROP provides a process for accessing the unallocated water reserves. The unallocated water processes place a price on water, thus promoting efficiency of water use.	LOW risk The outcome is being achieved.
(f) consistency with the Lake Eyre Basin Agreement Act 2001	The plan provides only a limited volume of unallocated water to be made available; requires assessment against low flows and connectivity between waterholes; allows for imposition of flow conditions to protect low flows and other ecologically significant flow; and restricts development of instream storages in significant watercourses.	The ROP provides for the implementation of operational and management rules associated with significant waterholes and significant watercourses. The ROP also states a limitation on the total water available for allocation in each sub-catchment.	LOW risk The outcome is being achieved. Additional comments: The Queensland Government is a signatory of the Lake Eyre Basin Intergovernmental agreement that provides for the sustainable management of the water and natural resources associated with river systems in the Lake Eyre Basin Agreement Area.

Table 3 – General ecological outcomes for the plan area

Plan outcome	Plan strategies that provide for outcome	Rules that provide for outcome	Related ecological assets	Summary of monitoring and assessment	Qualitative risk ranking and preliminary assessment of outcome
7 Each of the following is a general ecological outcome for the plan area—					
(b) to achieve ecological outcomes consistent with maintaining the ecological integrity and natural function of in-stream, wetland and floodplain ecosystems, both in the plan area and downstream of the plan area in South Australia, including, for example, maintaining—	Provision for the granting of a water licence for town water supplies. Unallocated water reserves to cater for any use (12,000 ML/a) and projects of state significance (1,500 ML/a).	Chief executive data collection and assessment. Operating rules (e.g. maintenance of low flow and waterhole management). Use of performance indicators for monitoring by chief executive.	<ul style="list-style-type: none"> • Wetlands listed on the Directory of Important Wetlands in Australia (DIWA). • Endangered mammals, birds, reptiles, fish and communities (EPBC Act 1999). • Protected watercourses, waterholes and lakes. • Cross-border assets materially impacted by upstream resource development. • Waterholes as refugia. • Longitudinal connectivity. • Waterhole primary productivity. • Carbon and nutrient transport. • Diatom and phytoplankton communities. • Benthic macroinvertebrate communities. • Flow dependant fish species. • Reptiles. 	Overall, riverine ecosystems and biodiversity in the plan area is reportedly in good condition. The surface water flow regime is in a near natural condition.	LOW risk The outcome is being achieved.
(i) pool habitats, and native plants and animals associated with the habitats, in watercourses; and	Consideration of environmental water requirements and water use efficiency when releasing unallocated water.	Metering.		Riparian weed and feral pig damage are ongoing threats to waterhole ecosystems in the plan area. However these are fewer in number and lower in intensity compared to other catchments within Queensland.	LOW risk The outcome is being achieved.
(ii) the near pristine condition of the riverine habitats and associated native plants and animals in the basin; and	Operating rules for the maintenance of low flows, management of waterholes and protection of post-winter flows	Links to monitoring programs undertaken by other stakeholders and agencies.		Comparatively little human alteration of water regimes or landscapes has occurred in the plan area and this is reflected by rich and diverse riverine communities.	LOW risk The outcome is being achieved.
(iii) the natural abundance and species richness of native plants and animals associated with habitats within watercourses, riparian zones, floodplains and wetlands; and	Regulation of overland flow water.	Dealing with unallocated water. Licencing rules. Management of waterholes.			LOW risk The outcome is being achieved.
(iv) active river-forming processes, including sediment transport; and	Monitoring and reporting requirements (including identification of monitoring of significant waterholes and fish	Protection of post-winter flows. Flow access considerations.			LOW risk The outcome is being achieved.
(v) connections between waterholes, particularly at times of low flow	Consideration of matters in section 19 of the plan.				LOW risk The outcome is being achieved.

Plan outcome	Plan strategies that provide for outcome	Rules that provide for outcome	Related ecological assets	Summary of monitoring and assessment	Qualitative risk ranking and preliminary assessment of outcome
7 Each of the following is a general ecological outcome for the plan area—					
(c) to maintain, both in the plan area and downstream of the plan area in South Australia, water quality at levels that maintain the ecological integrity and natural function of in-stream and floodplain ecosystems and the viability of economic, social, cultural and other activities that do not threaten the integrity and function;	monitoring through LEBRA). Provision for the plan to be replaced or amended if demands associated with a project of state significance are not able to be met.	Chief executive data collection and assessment. Non-tradability of water licences. Dealing with unallocated water. Flow access considerations.	<ul style="list-style-type: none"> • Groundwater dependent ecosystems. • Riparian and floodplain vegetation. • Migratory Waterbirds. 	No deterioration of water quality has been observed in the plan area since 2008. Water quality in rivers and creeks of the plan area are strongly influenced by patterns of flooding and drying and are therefore highly variable in both time and space. At present, available water quality records are too short and too variable to identify any long-term trends.	LOW risk The outcome is being achieved.
(e) to promote improved understanding of the matters affecting the health of riverine and associated systems in the basins;		Chief executive data collection and assessment. Links to monitoring and assessment programs undertaken by other stakeholders and agencies.		Cross-border impacts, cultural values, climate change, and flow regime outcomes have been addressed in State of the Basin 2016 condition assessment. This work has contributed to an improved understanding of the matters affecting the health of riverine and associated systems in the plan area.	LOW risk The outcome is being achieved.

Appendix B: Water entitlements

Table 4 – Water entitlements within the plan area

Entitlement Type	Entitlement numbers				Nominal entitlement	
	All	Volumetric	Area	Other ¹	Volume (ML)	Area (ha)
Water Licences	6	4	0	2	7108	0
Water Allocations	0	0	0	0	0	0

* The details supplied in this table are correct as of the 3rd January 2019. Any changes that occurred after that date will not be reflected in the table.

¹Entitlements with no volume or area specified, including entitlements to interfere with the flow of water

Table 5 – Water Reserved within the plan area

Reserve name	Initial reserved in 2011 (ML)	Remaining reserve (ML)
Strategic – project of state significance	1500	1500
General – Any	12000	12000

There has been no release of unallocated water.

Water use

There are no metered entitlement areas within the plan area. One authorisation within the plan area is conditioned to require the installation of a meter before water can be taken.

Appendix C: Water taken or interfered with under statutory authorisations

Table 6 – Information on water authorisations in the plan area

Form of take	Catchment information sources
Subdivision 1 – authorisations that may not be limited by water planning instrument	
S93 General authorisations to take water. e.g. firefighting, watering travelling stock, contaminated agricultural run-off storages	<p>No major change in water taken under these authorities</p> <p>There has been an increase in stock movement along stock routes in the North East of the plan area due to the ongoing drought, however, other areas have seen limited use. Stock routes in the catchment are predominately serviced by water bores regulated under the Water Regulation 2016 or other water plans.</p> <p>There has been no noted increase in using water for firefighting purposes.</p> <p>There is very little irrigated agriculture within the plan area, therefore there is no noted increase in contaminated agriculture run-off storages in the plan area.</p>
S94 General authorisations to interfere with water. e.g. overland flow, impoundments for state monitoring purposes	<p>No new impoundments or interference identified under these authorities</p> <p>There is no observed proliferation of erosion control or land management structures that interfere with overland flow.</p> <p>There has been no new interferences with water in watercourses, lakes or springs as a result of state monitoring infrastructure.</p>
S95 Aboriginal and Torres Strait Islander parties	<p>No impacts identified under these authorities</p> <p>These activities deal with very low quantities of water, which present a low risk to plan outcomes. The department is not aware of an increase in water take or interference for traditional activities or cultural purposes.</p>
S96 Land owners may take water for stock or domestic purposes	<p>No impacts identified under these authorities</p> <p>An owner of land adjoining a watercourse, lake or spring may take water from the watercourse, lake or spring for stock and/or domestic purposes. There has been no noted increases in the take of water for these purposes.</p>
S97 Environmental authorities to take or interfere with overland flow	<p>No identified change in water taken under these authorities</p> <p>Notification for the construction of overland flow storages to satisfy an environmental authority or a development permit for carrying out an environmental relevant activity is required under the Sustainable Planning Regulation 2009 and the Water Regulation 2016. The department is not aware of any increase in the construction of overland flow dams for these purposes through the notification process.</p>
S98 Resource activities that interfere with the flow of water by diversion of a watercourse	<p>No identified change in interference with watercourses under these authorisations</p> <p>The impacts of interference by diversion are assessed through requirements of the <i>Environmental Protection Act 1994</i>. The department is not aware of an increase in the number of interferences by diversion for this purpose.</p>
S99 Constructing authorities and water service providers	<p>No identified change in water taken under these authorities</p> <p>There are eleven construction authority entities identified in the plan area. Limited volumes of water are required for road and rail construction and maintenance, and public amenities. There are no significant increases in infrastructure or urban development within the plan area. The department has received very few notifications in the plan area.</p>

Form of take	Catchment information sources
Subdivision 2 – authorisations that may be limited by water planning instrument or regulation	
101 Authorisations that may be altered or limited by water planning instrument or regulation.	<p>No identified change in water taken under these authorities</p> <p>The take of overland flow under s101 of the Act is limited in the plan to the take of stock and/or domestic purposes. The ongoing drought condition may have seen some increase in construction of water infrastructure, such as overland flow dams for stock and domestic purposes. The increase has not been quantified, however, would be limited by expenditure, stock and low rainfall. Typically during drought conditions, landowners seek water sources such as water bores that are less immediately reliant on rainfall. The plan only regulates groundwater that is hydraulically linked to a watercourse, lake or springs, except where the spring is connected to water to which the Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017 applies.</p> <p>Other groundwater is regulated under the Water Regulation 2016 or other water plans (such as the Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017).</p>
102 Authorisations under water plans or regulation	<p>No identified change in water taken under these authorities</p> <p>The plan provides for entitlements to take overland flow water for stock and domestic purposes. There are no new or expanding developments identified that are likely to increase take of overland flow water.</p> <p>Groundwater than is hydraulically linked to a watercourse, lake or spring is declared to be in a watercourse and can be taken for stock and/or domestic purposes for riparian landowners.</p>
103 Authorisations to take water for stock or domestic purposes may be limited	<p>No identified change in water taken under these authorities</p> <p>The Water Plan (Georgina and Diamantina) 2004 does not provide any additional rules for managing how water for stock and domestic is managed.</p>

Appendix D: Ecological monitoring

The plan contains outcomes, including ecological outcomes, and associated strategies that aim to provide a sustainable framework for water management and use in the plan area. All of the plan outcomes are being achieved, as a result of low demand for water resources and the near-natural condition of the surface water flow regime. In addition, future risks to the plan outcomes are considered to be low. A summary of ecological monitoring with links to the relevant plan outcomes is provided below in table 7.

Table 7 – Summary of ecological monitoring

Monitoring Category	Relevant plan outcomes	Key Findings
Hydrological monitoring	7(b)(i), 7(b)(ii), 7(b)(iii), 7(b)(iv), 7(b)(v).	<p>The surface water flow regime is in a near-natural condition, and among the most hydrologically variable in the world.</p> <p>Significant relationships between maximum depth at cease-to-flow and persistence, and between surface area and volume, were identified thus enabling patterns of aquatic habitat availability to be more accurately mapped in space and time. Given the limited demand for water resources in the plan area, there is limited risk to ecological assets dependant on waterholes as refugia.</p>
Water quality monitoring	7(b)(i), 7(b)(ii), 7(c).	<p>Water quality in rivers and creeks of the plan area are strongly influenced by patterns of flooding and drying and are therefore highly variable in both time and space. At present, available water quality records are too short and too variable to identify any long-term trends.</p> <p>No deterioration of water quality has been observed in the plan area since 2008. However, it is currently understood that the elevated nutrient concentrations and high turbidity levels present in rivers and streams in the LEB are likely to be higher than those expected under pre-development conditions.</p>
Fish monitoring	7(b)(i), 7(b)(ii), 7(b)(iii), 7(b)(v).	<p>Fish communities are considered to be generally in good condition across the plan area, with riverine environments supporting 13 native fish species - including iconic species such as Lake Eyre yellow belly and Barcoo grunter. One exotic species (Mosquitofish) is present in the plan area, although in very low numbers.</p>
Migratory Waterbird Monitoring	7(b)(i), 7(b)(ii), 7(b)(ii),	<p>Waterbird numbers and diversity are highly variable at the plan area, catchment and individual wetland scales, largely reflecting natural variability in streamflow and wetland distributions.</p>
Introduced species monitoring	7(b)(i), 7(b)(ii), 7(b)(ii).	<p>Riparian weed and feral pig damage are ongoing threats to waterhole ecosystems in the plan area. However, these are fewer in number and lower in intensity compared to other catchments within Queensland.</p>
State of the Basin 2016 Condition Assessment	7(b)(i), 7(b)(ii), 7(b)(iii), 7(b)(iv), 7(b)(v), 7(e), 7(f).	<p>The State of the Basin 2016 report summarises a large body of work related to natural flow patterns and habitats, and has strong links with the general and ecological outcomes of the plan. Cross-border impacts, cultural values, climate change, and flow regime outcomes are all addressed in the condition assessment. This work has contributed to an improved understanding of the matters affecting the health of riverine and associated systems in the plan area.</p>

Appendix E: Water monitoring

Table 8 – Discharge summaries for gauging stations in the Georgina and Diamantina plan area since commencement of the plan

Gauging station	Parameter	Discharge in ML/day (Year)
Burke River at Boulia (001202A)	Instantaneous Maximum	79 800 (2009/10)
Georgina River at Roxborough (001203A)	Instantaneous Maximum	143 490 (2010/11)
Diamantina River at Diamantina Lakes (002104A)	Instantaneous Maximum	382 800 (2017/18)
Mills Creek at Oondooroo (002105A)	Instantaneous Maximum	98 180 (2017/18)

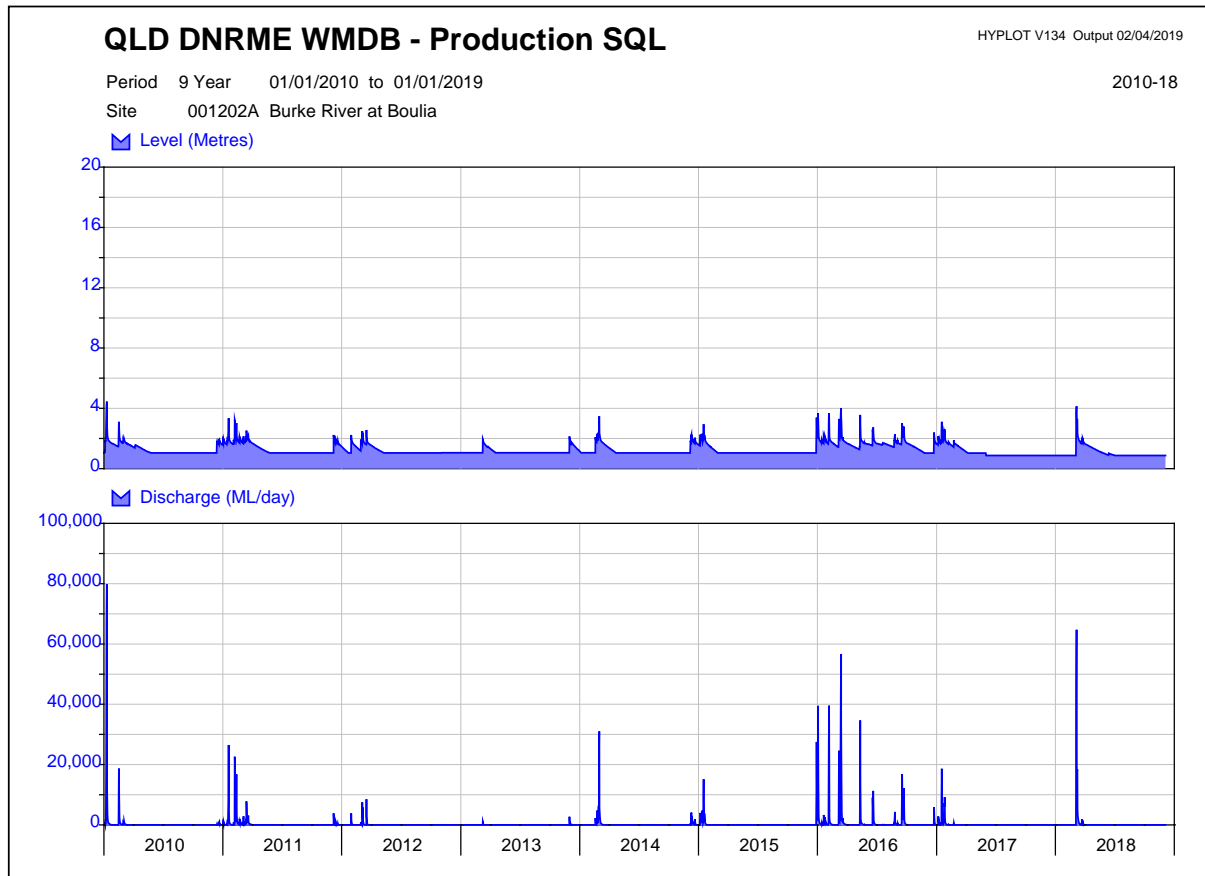


Figure 12 – Burke River 001202A - Boulia

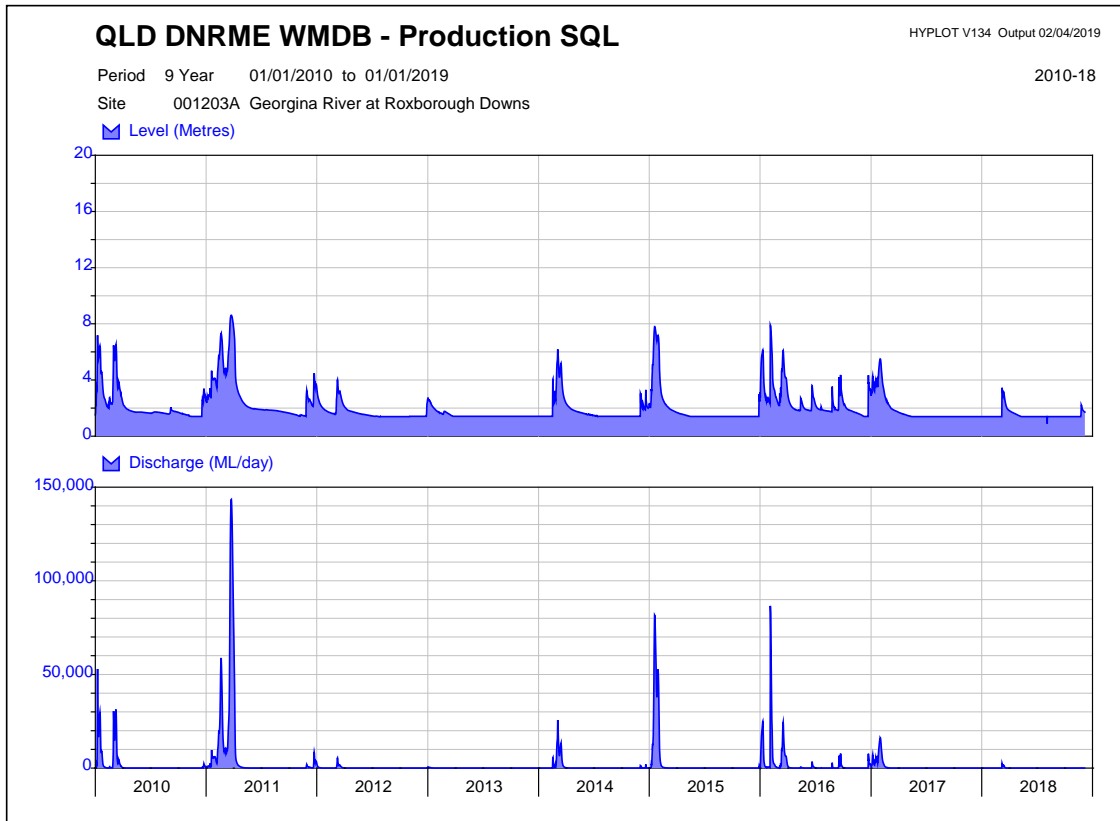


Figure 13 – Georgina River 001203A – Roxborough Downs

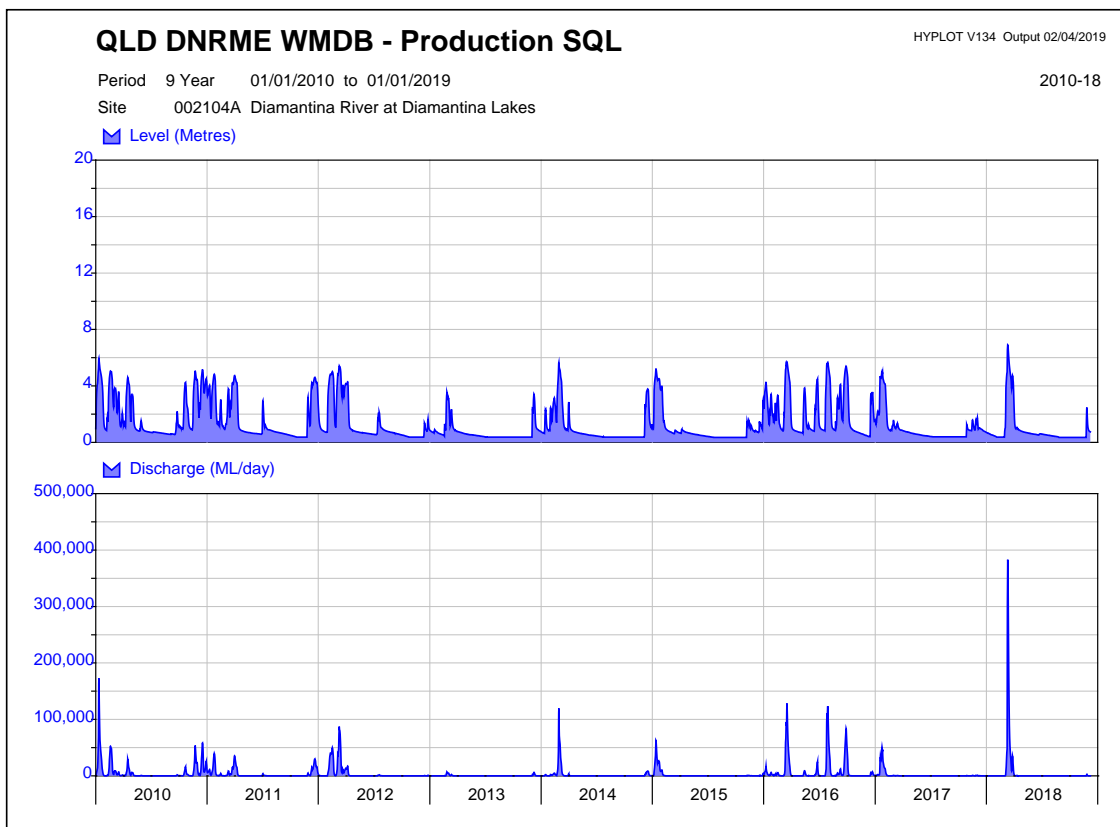


Figure 14 – Diamantina River 002104A - Diamantina Lakes

QLD DNRME WMDB - Production SQL

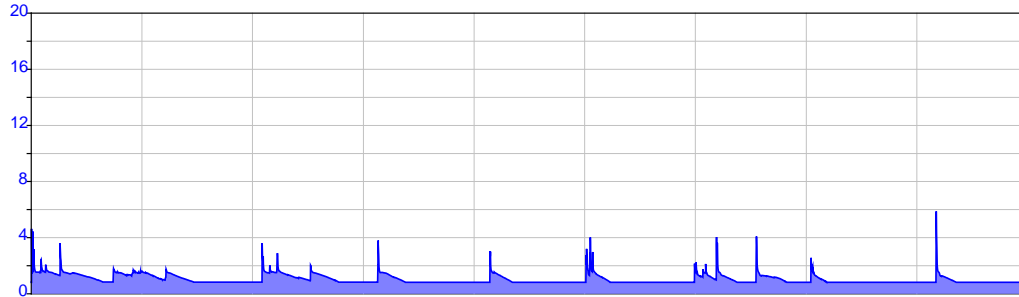
HYPLOT V134 Output 02/04/2019

Period 9 Year 01/01/2010 to 01/01/2019

2010-18

Site 002105A Mills Creek at Oondooroo

Level (Metres)



Discharge (ML/day)

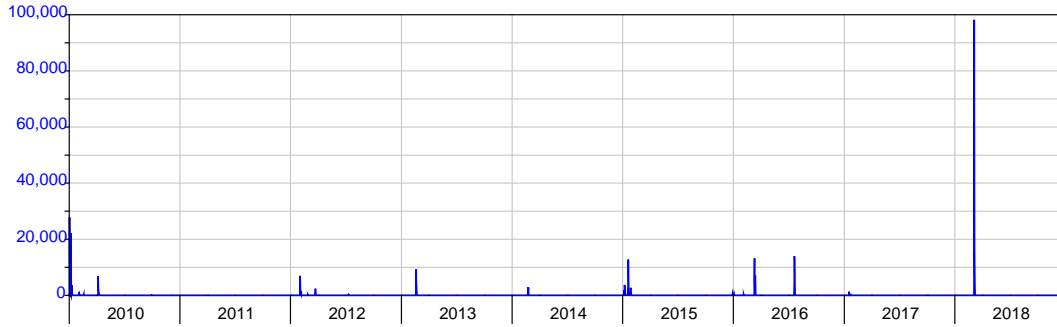


Figure 15 – Mills Creek 002105A - Oondooroo

Appendix F: Plan amendments and milestones

Effective date	Milestone
6 August 2004	<p>Water Plan (Georgina and Diamantina) 2004 SL No. 152 (prev. Water Resource (Georgina and Diamantina) Plan 2004)</p> <p>The <i>Water Resource (Georgina and Diamantina) Plan 2004</i> provides a framework for the allocation and sustainable management of surface, overland flow water and hydraulically linked groundwater in the plan area and to meet future water requirements, including the protection of natural ecosystems and security of supply to water users as required by the <i>Water Act 2000</i>. The plan area lies within the Lake Eyre Basin, one of Australia's major river systems, and consists of the Queensland portion of the Georgina, Diamantina and Hay River catchments.</p> <p>The plan provides for the allocation and sustainable management of surface water and overland flow water by:</p> <ul style="list-style-type: none"> • defining the availability of water in the plan area • providing a framework for sustainably managing water and the taking of water • identifying priorities and mechanisms for dealing with future water requirements • regulating the taking of overland flows • outlining the strategies to achieve the outcomes • providing a framework for reversing, where practical, degradation that has occurred in natural ecosystems, including, for example, stressed rivers; and • requiring water and natural ecosystem monitoring to assess the effectiveness of strategies and objectives to achieve the outcomes.
24 November 2011	<p>Water and Other Legislation Amendment Act 2011 No. 40 pt 1, s 107 sch</p> <p>Minor amendment to update section number cross references with amended legislation.</p>
27 September 2013	<p>Land, Water and Other Legislation Amendment Act 2013 No. 23 ss 1, 2(d), 352 sch 1 pt 2</p> <p>The focus of this amendment was to cross reference section numbers with the <i>Water Act 2000</i>.</p>
27 June 2014	<p>Water Resource Plans Amendment Plan (No. 1) 2014 SL No. 142 pts 1, 3</p> <p>The focus of this amendment was to:</p> <ul style="list-style-type: none"> • amend water resource plans to enhance transparency and effectiveness of the environmental flow objectives; and • make additional minor amendments to water resource plans to increase clarity and reduce regulatory burden while maintaining the intention and effectiveness of the plans.
6 December 2016	<p>Water Reform and Other Legislation Amendment Act 2014 No. 64</p> <p>The <i>Water Reform and Other Legislation Amendment Act 2014</i> amended the water resource plan to become a water plan and the resource operations plan to, in future, be a water management protocol.</p>
6 December 2016	<p>Water Regulation 2016 SL No. 216</p> <p>The Water Regulation 2016 remakes the Water Regulation 2002. To a large extent, the content of the Water Regulation 2002 has been retained.</p> <p>In addition to continuing existing provisions, the Water Regulation 2016 makes the following changes to improve the operation and usability of the provisions:</p> <ul style="list-style-type: none"> • changed the Minister's reporting from annual to five yearly reporting • structures the provisions in a more logical manner, aligning where possible with revised structure of the <i>Water Act 2000</i> following amendments by the <i>Water Reform and Other Legislation Amendment Act 2014</i> • incorporates amendments that have not commenced from the <i>Water and Other Legislation Amendment Regulation (No. 1) 2014</i> • contemporises the existing provisions while maintaining the existing policy intent • makes operational amendments relating to prescribe new metered entitlement areas, extend the meter revalidation dates for certain metered entitlement areas and update water bore drillers licencing requirements to more closely reflect the National Uniform Drillers' Licensing System.