

Minister's Performance Assessment Report

Water Plan (Burnett Basin) 2014

November 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 (Burnett Basin) 2014 (the plan).

Existing information indicates that the implementation of the plan to date has been effective in achieving almost all of the plan outcomes and is advancing the sustainable management of water. The plan provides for the allocation and management of water to support towns, industry, tourism and agriculture, including sugar cane production and grazing.

To date, the plan has achieved the conversion of 680 underground water licences to tradeable water allocations in the Coastal Burnett Groundwater Management Area and new water sharing, infrastructure operating and environmental management rules in the Barker Barambah, Bundaberg and Upper Burnett water supply schemes. The amendment of area based licences to volumetric licences continues to be undertaken throughout the plan area.

The Burnett Basin is a complex and highly developed area and although some issues are identified in this report, overall the plan remains fit for purpose. I understand the importance of Boondooma Dam to the Burnett region and how concerned locals are about water supplies. The Department is committed to working with local councils to consider water futures for the region, including evaluating the proposed Cooranga Weir on the Boyne River.

To address dam safety issues I announced that Paradise Dam's capacity is being reduced to 42 per cent and once the wet season is over the spillway will be lowered by five meters. In the interim an independent review into Paradise Dam and the local community's readiness for another significant flood will begin. The water released to reduce the dam's capacity consists of 80,000ML of unsold water currently held by Sunwater. This water is being made available at no charge.

Changes to the plan to accommodate proposed infrastructure projects and facilitate full implementation of the plan and trading can be done through a future plan amendment or when the plan is replaced. At present the plan is due to expire on 1 September 2024.

Monitoring and implementation of the plan will continue and the plan will be re-evaluated prior to its expiry. An amendment of the plan can be undertaken at any time should risks in the catchment change or significant new demands emerge.

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

Hon Dr Anthony Lynham MP

Minister for Natural Resources Mines and Energy

Executive summary

Under the *Water Act 2000* (s49) (the 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 (Water Regulation) states the matters to be addressed.

This report provides an assessment of the performance of Water Plan (Burnett Basin) 2014 (the plan) against these matters. **Table 1** provides a concise summary of the assessment. When assessing the effectiveness of the plan and its outcomes, DNRME has considered the values of Aboriginal peoples and Torres Strait Islanders. The impacts of climate change and climate variation have also been considered and are presented in this report.

The assessment presented in this report indicates the implementation of the plan has been effective in achieving many of the plan outcomes.

The plan is due to expire on 1 September 2024. Some of the emerging issues identified, include:

- accommodating potential new water infrastructure developments within the plan area to address agricultural water demands and water security.
- including zones in the plan to enable the conversion of area-based water licences and interim water allocations to water allocations with a specified volume. This conversion would allow entitlements to become tradeable or relocatable, to provide for demand for irrigation and other uses.

These issues can be done through a future plan amendment or when the plan is replaced

Overall, the plan remains fit for purpose. The plan was last replaced in 2014. As a second generation water plan, all of the issues identified in the first generation plan have been addressed. The robust strategies and rules in the current plan are based on considerable consultation and the best available scientific information. Some water quality issues have been highlighted in this assessment, however they are largely outside of the scope of the water plan, with most of the water quality issues being associated with land use.

The effectiveness of the plan will be reassessed closer to its expiry and a recommendation made on whether to replace, amend or extend the plan.

The learnings gained from implementing the existing plan will be used to make improvements to the next plan as part of an adaptive management cycle based on any change to future water needs, increased scientific information and stakeholder consultation.

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 Water Act.	Section 3			
Effectiveness of the implementation of the plan in achieving the plan outcomes	Implementation of the plan to date has been effective in meeting most of the plan economic, social, and environmental outcomes. There was, however, some risks identified with maintenance of water quality suitable for consumptive and human use.	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, using authorised overland flow (OLF) and groundwater works or under a statutory authorisation through the Water Act (e.g. low risk or prescribed activities such as stock and domestic use). Information on water use and authorisations in the plan area has been reported upon and no issues were identified.	Section 5			
Summary of research and monitoring findings	Monitoring of various types has been conducted over the life of the plan. This includes ecological, hydrological as well as assessments of overland flow and groundwater developments.	Section 6			
Summary of amendments to the plan since its commencement	Since the plan implementation, a number of consequential amendments have been made to reflect administrative changes relating to the Water Act, and to improve the effectiveness of the plan. An amendment in December 2014 related to limiting non-riparian stock and domestic take from water supply schemes.	Section 7			
Summary of identified risks to the plan outcomes	A risk assessment process has 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 97 allegations of non-compliance relating to unauthorised take of water and overuse of water entitlements within the plan area in the past five water years. These have been investigated and resolved.	Section 10			
Overall status and recommendation for plan	The plan is performing well and based on this evaluation it is recommended 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, prior to its expiry.				
	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 2000* (the Water Act) includes provisions under section 49 that require the Minister to prepare reports about each water plan. This process ensures 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 (Water Regulation) 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; and
 - 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 matters and evaluates the implementation of the Water Plan (Burnett Basin) 2014 (the plan) to date.

2 Plan area

The Burnett Basin covers approximately 38 370 square kilometres (km²). Rivers and creeks are characterised by seasonal, naturally variable, and highly irregular flow regimes. The major watercourses in the plan area are the Burnett River, Barker Creek, Barambah Creek, Boyne River, Stuart River, Auburn River, Three Moon Creek, Kolan River, Elliott River, Gregory River and Isis River (**Figure 1**).

The Burnett Basin is home to significant fauna and flora assemblages including five species of freshwater turtle, two species of aquatic mammals (water rat and platypus), and a diversity of marine, estuarine and freshwater fish species, including numerous species of conservation and ecological value including Australian lungfish. The Burnett Basin contains a number of protected areas of conservation and ecological significance, including Coalstoun Lakes, which is a nationally important wetland area listed in the Directory of Important Wetlands (DIWA, 2017).

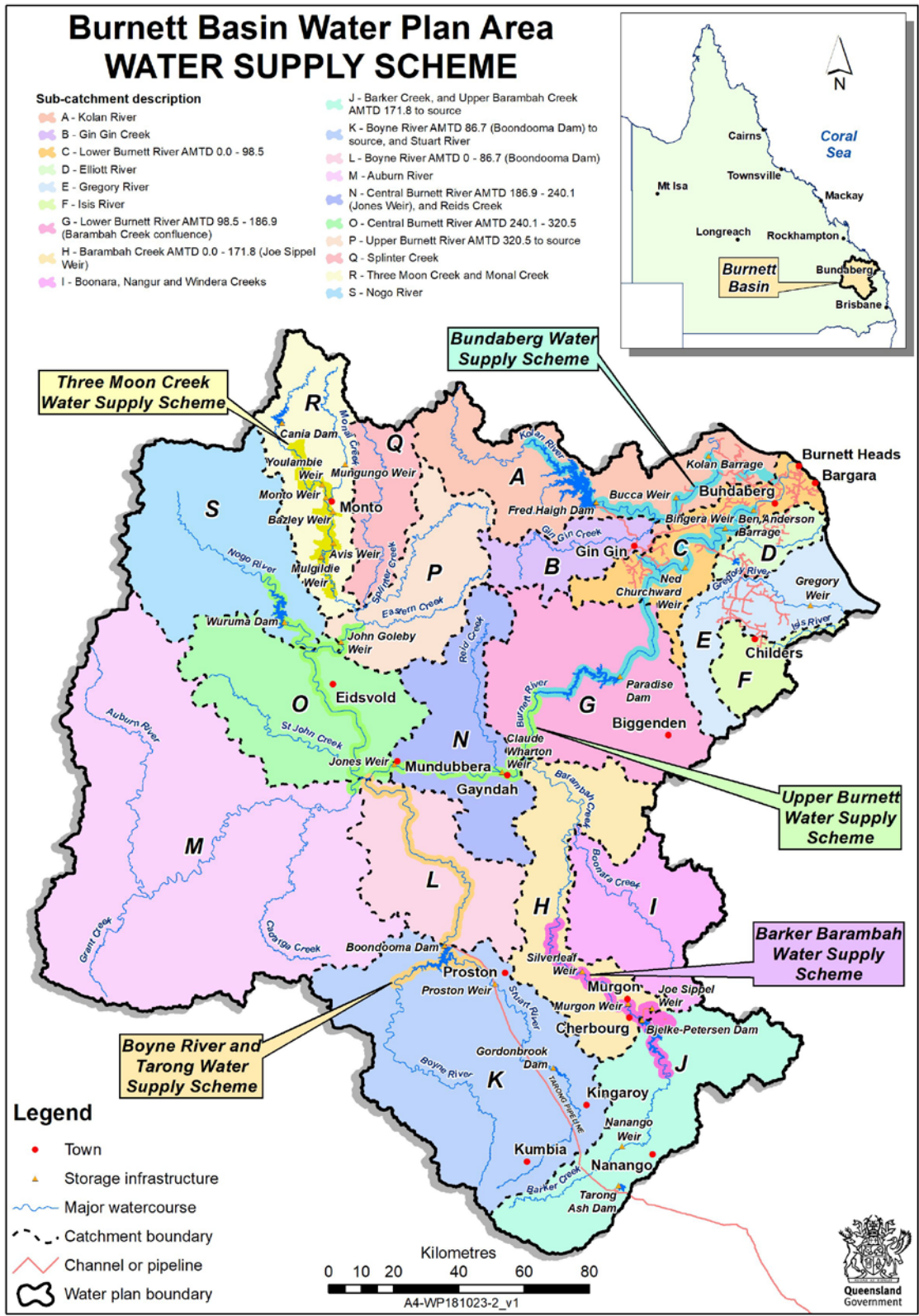


Figure 1 – Water supply schemes within the plan area.

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

This section discusses how the water 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 Burnett Basin for the economic, physical and social wellbeing 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, aquifers 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 a long-term hydrologic models for surface water and groundwater (now known as underground water) to better understand patterns of water use, availability and security.

The plan includes outcomes that aim to encourage water efficiency, while protecting the availability of water for all water users in the plan area. Water sharing rules apply that ensure the security of supply for towns and other users. Infrastructure operating and environmental management rules also provide environmental flows to maintain the ecological integrity of the water dependent systems.

Specific outcomes for particular areas, ecological assets and underground water are also provided for in the plan. Threats to catchments systems and underground water aquifers from flow changes and extraction have been identified and managed using the best available information. Scientific certainty has been improved over the life of the plan through targeted monitoring and research to improve understanding of environmental flow requirements for aquatic species.

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

The plan provides a framework for the allocation and use of water resources in the Burnett Basin for the economic, physical and social wellbeing of Queenslanders. It establishes water allocations that provide certainty for water users to promote economic outcomes. The plan also establishes a framework to ensure security for town water supplies and essential services to ensure the well-being of Queenslanders. Water security is managed through water sharing rules. Additionally, the plan provides for stock and domestic use, water for essential services, and supports aesthetic, economic and recreational values in the plan area.

3.3. Sustain the health of ecosystems

The plan contains ecological outcomes that aim to support the ongoing protection of ecological assets and their habitats. The outcomes include provisions such as:

- minimising changes to natural variability of flows that support aquatic ecosystems
- maintaining flows supporting water-related ecosystems, river forming processes, and native aquatic fauna movements between riverine, floodplain, wetland, estuarine and marine environments

- protecting and maintaining refugia associated with waterholes, lakes and wetlands
- supporting groundwater dependent ecosystems, such as riparian vegetation and wetlands.

Meeting these outcomes is ensured by implementing the strategies stated in the plan including environmental management rules designed to support identified environmental assets and clearly specifying annual volumetric limits and other conditions of take on water entitlements.

3.4. Recognise the interests of Aboriginal peoples and Torres Strait Islanders

The plan has a specific outcome for managing underground water to support the cultural values of Ban Ban Springs which is a place of significance to the local Aboriginal people. A 1km radius Groundwater Management Area around the springs was enacted in the water plan. In addition to this, 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. The plan contains an outcome relating to the maintenance of flows that support cultural values, including the cultural values of the traditional owners.

When granting entitlement from unallocated water reserves in the plan, cultural values must be considered. This includes the cultural values of local Aboriginal or Torres Strait Islander communities.

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

The plan provides general, strategic and strategic water infrastructure unallocated water reserves. There is 25 845ML available in the strategic water infrastructure reserve for infrastructure in Barker Barambah, Bundaberg and Upper Burnett water supply schemes.

The plan reserves 2000ML as a strategic reserve, specifically for projects of State significance and for Indigenous purposes. General reserves of 1000ML each are available in subcatchment E and F.

The plan outcomes together with the Water Regulation provide the framework for a fair and transparent release of this reserved water.

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

The plan states multiple outcomes which aim to provide, protect and improve access to available water resources. The plan sets out water allocation security objectives (WASOs) for supplemented and unsupplemented surface water and the Coastal Burnett groundwater management area. WASOs protect the probability of being able to obtain water under a water allocation. In addition, excluding unallocated water volume releases, the plan does not allow a decision on a surface water or groundwater entitlement that would increase the average volume of water available to be taken in the plan area. The plan sets aside unallocated water volumes for future development to provide certainty and security for current water users, while also making water available to support towns, communities and industrial and agricultural growth.

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

The plan has a specific outcome that encourages the efficient use of water. To further encourage efficient water use, water entitlements must now state maximum rates of take and volumetric limits. Area-based and other licences are being progressively amended to state a volume to align with the

plan requirements. The efficiency of existing and proposed water use practices is a consideration in granting water entitlements from the unallocated water reserves.

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

Community consultation and support was integral to the development of the plan and resource operations plan which implemented a number of plan requirements on its release in November 2014.

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

DNRME monitors the implementation of each plan to make sure it is achieving its outcomes. The plan's outcomes were implemented by the amendment of the Burnett Basin Resource Operations Plan (now known as the Water Management Protocol or WMP) in November 2014, as well as through the delivery of a number of other specific actions required by the plan.

Specific ecological outcomes in the plan were implemented by the inclusion of environmental management strategies for water supply infrastructure requiring environmental flow releases and waterhole management. Further conversion of unsupplemented water entitlements to tradeable volumetric entitlements requires a plan amendment to state zones.

The plan's strategies were effectively implemented through:

- the conversion of approximately 680 underground water licences to tradeable water allocations and establishment of a new framework for underground water trading to support economic growth and strengthen regional communities
- the grant of approximately 150 water licences in the Coastal Burnett groundwater management area
- introduction of underground water management arrangements to reduce the extent of seawater intrusion and its impacts on agricultural production and underground water resources in the Coastal Burnett groundwater management area
- new water sharing, infrastructure operating and environmental management rules in the Barker Barambah, Bundaberg and Upper Burnett water supply schemes
- establishing the Coastal Burnett overland flow management area
- establishing several new groundwater management areas and undertaking notice of works processes where required.

The plan is performing well based on the evaluation in this report. For more information, see **Appendix A, Table 4, Table 5 and Table 6.**

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 and domestic use). Unallocated water is reserved and can be made available for future use following consideration to protecting existing entitlements and the environment.

5.1. Information on water use under water entitlements

Entitlements within the plan area consist of supplemented water allocations, supplemented interim water allocations, unsupplemented water allocations and water licences. Information about the entitlements is available in **Appendix B: Table 7**.

Supplemented water allocations are located along the Burnett River, Boyne River and Barambah Creek, and Bundaberg water supply schemes whilst supplemented interim water allocations are located in the Three Moon Creek water supply scheme.

In 2014, a resource operations plan (ROP) amendment (now known as a WMP) established approximately 680 unsupplemented underground water allocations converted from water licences in the Coastal Burnett groundwater management area (Area A) and granted approximately 150 new water licences in Coastal Burnett groundwater management area (Area B).

The metered volume of water used under water entitlements within the plan area is outlined in section 5.1.4.

DNRME is currently reviewing the non-urban water meter policy and standard as part of the Queensland Government's response to the Independent Audit of Queensland Non-urban Water Measurement and Compliance which was released in June 2018. The review is seeking to address a number of key matters raised by the audit including the effectiveness of the meter validation process, the need for meter accuracy testing and a maintenance oversight regime.

DNRME will provide recommendations to government in 2019 in relation to a new water measurement policy and standard which will support improvements or enhancements to water measurement, including metering across Queensland. DNRME will adopt a risk based approach to implementation of a new water measurement policy.

5.1.1 Announced allocations and entitlements

Announced allocation provisions apply to water allocations in the supplemented water supply schemes in the plan area. Announced allocations for both high and medium priority water, where available, in all of the water supply schemes have varied. All high priority water has been set at 100 per cent in all schemes at the commencement of each water year since implementation of the plan. Additional considerations for announced allocation decisions for medium priority water are included for relevant schemes below.

The plan also provides for announced entitlements for unsupplemented underground water in the Coastal Burnett groundwater management area and annual announced limits in the Lower Burnett and Kolan, Upper Burnett and Nogo, and Boyne and Stuart rivers water management areas.

5.1.1.1. Boyne River and Tarong water supply scheme

Releases are to be made from Boondooma Dam to meet demands for medium priority water allocation holders downstream of Boondooma Dam until the storage level is less than or equal to an elevation 268.67m Australian Height Datum (AHD) (approximately 70 000ML in storage capacity). No releases are to be made below this storage level. This rule is to protect high priority water allocations for town water supplies and power generation.

This rule which has been in place since Boondooma Dam was built, was enacted in 2017-18 and 2018-19 water years. Water Allocation holders were authorised to access their entitlements from any available supplies in waterholes and bed sands in the Boyne River downstream of the dam.

5.1.1.2 Bundaberg water supply scheme

This scheme contains two sub-schemes, those being the Burnett and the Kolan. A bulk capacity share arrangement with Fred Haigh Dam enables independent subscheme operation. This arrangement is considered in determining the announced allocation for each subscheme and aims to balance long term performance of water allocations in the scheme.

5.1.1.3. Three Moon Creek

Three Moon Creek is primarily an underground water recharge scheme where releases are made from Cania Dam to recharge the surrounding benefitted alluvial aquifer via a series of weirs along Three Moon Creek. The announced allocations for surface water and underground water are determined based on storage levels in Cania Dam and water levels in monitoring bores within the scheme area.

The Three Moon creek water supply scheme operates under an Interim Resource Operations Licence (IROL). A water plan amendment is required to convert the IROL and interim water allocations to tradable water allocations.

5.1.1.4. Upper Burnett

This scheme has five subschemes, Claude Wharton, Jones, Kirar, Wuruma and John Goleby. The announced allocation decisions is based on the volume in storages across the scheme and this determines whether the announced allocations apply at a scheme or subscheme level. This strategy aims to maximise announced allocations based on water availability and location of entitlement.

5.1.1.5. Coastal Burnett Groundwater Management Area

Announced entitlement in the Coastal Burnett groundwater management area is calculated quarterly through the water year for each of the 46 Zone Groups. **Appendix B: Table 8** and **Table 9** list the announced entitlement for the zone groups in each sub-group area for water allocations (Area A) and water licences (Area B) respectively. The average announced entitlement for the sub-groups ranges from 88 per cent to 98 per cent.

5.1.1.6. Water management areas

The annual announced limit in the Lower Burnett and Kolan, Upper Burnett and Nogo, and Boyne and Stuart rivers is based on sharing out event based access considering water taken under allocations in the previous water year. The aim of this strategy is to ensure entitlement performance is maintained. Annual announced limits have been 100 per cent since plan commencement.

5.1.2 Entitlements granted from unallocated water reserves

Section 3.5 identifies the volumes of unallocated water stated in the Plan, which have been set aside to meet future water requirements.

There has been some interest in the unallocated water from general reserves for agricultural use in the Gregory subcatchment (subcatchment Area E) however no process has been undertaken for release at this stage. A number of preliminary projects associated with the Federal Government's National Water Infrastructure Development Fund (NWIDF) have considered accessing unallocated water from the Strategic Infrastructure reserves in the Barker Barambah and Upper Burnett water supply schemes.

5.1.3 Water trading

Supplemented water allocations may be traded in water supply scheme areas operating under the resource operations licence and must be in accordance with the WMP and relevant operations manual. Holders of the resource operations licence (Sunwater) must also consent to the seasonal assignment of water held under a water allocation. Supplemented water allocation trades for the last five years are outlined in **Appendix B: Table 10** and **Table 11**.

Unsupplemented surface water allocations may also be traded in water management areas (WMA) where allocations are established with trading rules specified in the WMP for the plan area.

Unsupplemented water allocation trades are also outlined in **Appendix B: Table 12** and **Table 13**.

Unsupplemented underground water allocations may also be traded in the Coastal Burnett groundwater management area with trading rules specified in the WMP for the plan area. More information on the underground water volumes traded can also be found in **Appendix B: Table 14** and **Table 15**.

Entitlement holders are also able to temporarily trade water through seasonal water assignments. Seasonal water assignment of water is available for supplemented and unsupplemented surface water allocations as well as for underground water licences (Coastal Burnett groundwater management area only). Information on the seasonal water assignment of supplemented water allocations can be found in **Appendix B: Table 16**, seasonal water assignment of unsupplemented underground water allocations in **Appendix B: Table 17** and seasonal water assignment of unsupplemented surface water allocations in **Appendix B: Table 18**.

5.1.4 Water use

All surface water entitlements associated with active works (such as pumps) in the water supply schemes and water management areas are metered, as are all underground water entitlements associated with active works in the Coastal Burnett Groundwater Management Area. However water entitlements for stock or domestic purposes are not required to be metered. Water use from water entitlements within the plan area is provided in **Appendix B: Table 19**, **Table 20** and **Table 21**.

Within the water supply scheme areas, the holder of the resource operations licence is responsible for reading all customer's meters and reporting annually to DNRME. Over the five-year period, the volume actually taken by customers ranged from 30 per cent to 75 per cent of available water.

Water use for the metered underground water entitlements over the 2017-2018 water year for the Coastal Burnett groundwater management area totalled 32 747ML. This represents approximately 37 per cent of the total nominal entitlement authorised to be taken.

Water use records for unsupplemented surface water allocations are managed by the department. The water taken under these metered water allocations totalled 1357ML for the 2017-2018 water year. This represents about 3.5 per cent of the total metered nominal volume authorised to be taken.

5.1.5 Water taken or interfered with under statutory authorisations

The take of water under the category of statutory authorisations – such as stock and domestic take, overland flow water interference, and various prescribed activities – is typically not measured. This makes an accurate quantitative assessment difficult. 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 and is addressed in **Appendix C**.

Appendix C presents an assessment of the risk posed to water users and the environment by the activities under section 93 to 103 of the Water Act. The preliminary qualitative assessments presented in this report show that take has not changed significantly and therefore there are unlikely to be any impacts on existing water users or the environment. This assessment is based on the best available information at the time of publication.

5.2. Implementation of groundwater management arrangements

In 2014, the plan introduced management arrangements for Ban Ban Springs, Barambah Creek, Barker Creek and Central Burnett River groundwater management areas. The plan authorises the take of groundwater from notified prescribed existing groundwater works (e.g. non stock or domestic works). Under the plan, water licences with nominal entitlements are to be granted to authorised users in Barambah Creek and Central Burnett River groundwater management areas. Implementation activities are detailed in **Table 2**.

Table 2 – Implementation of underground water management arrangements

Groundwater Management Area	Notified prescribed existing groundwater works	Status
Ban Ban Springs	5	Completed. See also Appendix D.
Barker Creek	303	Completed. Annual meeting with water users to provide update on resource condition trends.
Barambah Creek	150	58 water licences to be granted. Consultation with authorised users to develop methodology to determine nominal entitlements and water sharing rules underway.
Central Burnett River	52	21 water licences to be granted. Consultation with authorised users yet to commence.

6 Summary of research and monitoring findings for the water plan

The water planning framework is supported by water monitoring activities that include water quantity and quality of surface water and underground water systems across Queensland. Together with targeted ecological monitoring for water plans, this information is vital for continued improvement of water planning.

The Environmental Flows Assessment Program (EFAP) undertakes ecological monitoring to assist in assessing the ecological performance of each water plan in meeting its stated ecological outcomes. Ecological assets with critical links to flow that represent the plan ecological outcomes, and the various aspects of the flow regime, are selected as indicators of the broader ecosystem for monitoring.

DNRME manages, operates and maintains approximately 400 stream gauging stations across Queensland, 34 of which are located in the plan area. Streamflow measurements are an integral part of producing volumetric data at gauging stations, and measurements are taken throughout a full range of low and high flow conditions to enable derivation of accurate streamflow volumes. Streamflow data can be accessed at: water-monitoring.information.qld.gov.au.

DNRME also manages, operates and maintains approximately 4300 underground water monitoring bores across Queensland. There are 801 monitoring bores that are currently monitored in the plan area. These bores provide data that assist in improving hydrological understanding within the plan area, including the understanding of surface water and underground water interaction. Water monitoring data can be accessed at: water-monitoring.information.qld.gov.au.

6.1. Summary of ecological monitoring

The Queensland Government through the Environmental Flows Assessment Program (EFAP) undertakes ecological monitoring to assess the performance of each plan in meeting its stated ecological outcomes. The EFAP is also supported by other research programs and reports. The purpose of the program is to:

- confirm the critical flow requirements of selected ecological assets that represent the plan's ecological outcomes
- determine if current flow management strategies and rules are providing these critical water requirements
- determine the risk from water resource development to selected ecological assets and evaluate if ecological outcomes are likely to be met under current flow management strategies
- determine potential mitigation strategies to address identified risks from water resource development.

Ecological assets are defined as natural components of an ecosystem for which flow is critical. Ecological assets can encompass the full suite of flow-related ecosystem components including processes (e.g. longitudinal connectivity), functions (e.g. waterhole productivity), species (e.g. diadromous fish), habitats (e.g. riffles), geomorphology (e.g. channel variability/formation) and water quality (e.g. salinity).

Monitoring and information has been gathered on a range of assets in the plan area, including species and ecological functions over the current and previous life of the plan. These assets include the White-throated snapping turtle, Australian lungfish, estuaries, Ban Ban springs and waterholes. Projects for these assets have been specifically designed to identify and confirm critical flow requirements and address identified knowledge gaps in the scientific literature. A summary of the monitoring and results to date is presented in **Appendix D**.

6.2. Summary of water monitoring

The water monitoring network is operated by water monitoring staff within a quality management framework under International Organisation for Standardisation ISO 9001:2015 accreditation. Burnett Basin water monitoring records show that the catchment is characterised by highly-variable stream flows, both within and between years, reflecting the temporally and spatially variable rainfall within the catchment.

The inland Burnett mostly has long-term average annual rainfall of about 700–800 mm at the lower elevations, but rising to over 1000 mm over the Bunya Mountains in the south-west, and to 1000–1250 mm over the higher parts of the eastern subcoastal ranges (1450 mm in the far north). The coastal Burnett has average annual rainfalls of about 1000–1125 mm.

The Burnett has summer-dominant rainfall, mostly received during the months of November through March. Significant winter rainfall can also occur, occasionally causing large floods, but winter rainfall tends to be more unreliable than summer rainfall. Rainfall usually varies markedly from month to month and from year to year, and often varies substantially within the large catchment area.

For the Burnett River at Mt Lawless, the recorded mean annual discharge from 01/06/1909 to 01/06/2018 was 1 049 336 ML, and the median annual discharge was 517 758ML. The maximum daily discharge was 1 357 573 ML on 28 January 2013. Annual discharges ranged from a minimum of 9642 ML in 2006 to a maximum of 7 271 839 ML in 1956.

Sporadic heavy rainfall events associated with tropical cyclones or lows, upper troughs, or East Coast Lows can cause major flood events anywhere in the catchment. The largest flood flows are usually fairly short-lived, but prolonged flood flows occasionally occur during long periods of general rainfall. The relative timings of major flood events in the major tributaries in the Upper Burnett, Auburn and Boyne Rivers, and Barambah Creek has a marked impact on Burnett River flood peak magnitudes downstream from Mundubbera.

During the current plan starting in 2014, there have been no large widespread flood events. Heavy rain from Tropical Cyclone Marcia in February 2015 caused significant floods in the northern Upper Burnett and Barambah Creek catchments although some peak levels were only about 0.6 m below the record January 2013 flood. There were also significant but localised floods in March 2017, October 2017 and February 2018.

DNRME monitors subartesian underground water from a range of aquifers within the plan area. The monitoring network consists of over 600 individual monitoring bores. Monitoring activities incorporate underground water level, underground water quality and seawater intrusion profiling. Monitoring data is useful for day-to-day management of the underground water resources and for assessment of long-term resource condition trends. Monitoring frequencies range from quarterly water level measurements to monthly monitoring of priority water level and seawater intrusion assessment sites in the Coastal Burnett groundwater management area. Fifty-two water level monitoring bores are now equipped with continuous monitoring and telemetry instrumentation.

Long-term underground water level trends can be highly variable and are influenced by climatic conditions, landscape and aquifers characteristics along with localised underground water extraction. Large recharge events occurred across the Burnett Basin following the floods in 2010/11 and 2013. Since 2013, there has been a general gradual decline in underground water levels across much of the Basin.

River discharge data and underground water monitoring within the Burnett River catchments demonstrating the variability in discharge and underground water levels is presented in **Appendix E**.

Further data associated with stream flows and telemetered underground water monitoring for the Burnett water plan area can be found at: <https://water-monitoring.information.qld.gov.au/>.

6.3. Summary of resource operations licence holder monitoring and reporting

The resource operations licence holder is required to monitor and report on water quantity, water levels and impacts of storage operation on natural ecosystems. The water supply schemes located in the plan area are considered to generally operate in compliance with the requirements of the licence.

Sunwater conducted regular monitoring of water levels, releases, blue green algae levels, bank slumping and fish stranding throughout the five-year period. There have been few instances where the resource operations licence holder could not meet the requirements of the rules for operation of water supply schemes. All of these were associated with equipment failure or extenuating climatic conditions such as the effects of extreme weather events. Sunwater provided Operational Reports and Exception Reporting to explain non-compliance with the rules. These non-compliance instances were part of normal operational business and did not represent risks to either water allocation holders or the environment.

Frequent review of resource operations licence reporting data is expected to continue. Refer to **Appendix F** for more details.

6.4. Summary of existing environmental management rules

There are a number of environmental management rules specified for the Barker Barambah, Upper Burnett and Bundaberg water supply schemes. These took effect in 2014 with the commencement of the water plan. The rules generally fall within three main areas: low flow releases, high flow releases and nominal operating levels.

The low flow release rules aim to provide flow to provide for movement of aquatic animals as well as maintaining water quality in pools and maintaining habitat complexity. High flow releases aim to replicate the actions of small floods that maintain river channels and provide productivity benefits to ecosystems. Nominal operating levels (or NOLs) are storage water levels that are required to be maintained above a certain level. In some instances, these levels vary depending on the month of the year and are not only used to provide for water security, but also to serve an ecological purpose.

6.4.1 Bundaberg water supply scheme

Low flow releases were made from Paradise Dam and Ned Churchward Weir on the Burnett River for the majority of time where required. The intent of the low flow releases is to provide connectivity between pools and to facilitate and trigger fish movement and spawning, particularly Australian lungfish. There were instances in where these releases could not be made due to damage to dam infrastructure from unprecedented flooding in 2013. The resource operations licence holder provided operational reports in these instances where releases were not possible and provided alternative

arrangements to provide for downstream ecosystems in these circumstances. Monitoring of the environmental effectiveness of the low flow release rules to provide for Australian lungfish will be conducted in future years as much of the aquatic plants used for spawning habitat are only now regenerating since the large floods. In the Kolan River, a low flow release has been instigated to provide for adequate water quality downstream to reduce the risk of fish kills. Since this rule has been implemented, there have been no reported instances of fish kills downstream of Bucca Weir. Refer to **Appendix F** for more details.

High flow releases from Paradise Dam are designed to replicate small floods that provide flushing flows to downstream pools and provide flow through to the Burnett River estuary. Whilst there were effects on the ability to exactly match high flow releases with inflows to the dam in the years after the 2013 floods due to required repairs downstream of the dam, three high flow releases were made in 2017 and 2018. These releases provided a freshwater flush to the upper reaches in the Burnett River estuary and stimulated increased productivity. Refer to **Appendix D: Ecological Monitoring** for more details.

The resource operations licence holder maintained NOLs in all applicable storages in the majority of instances across the scheme (Ned Churchward Weir, Ben Anderson Barrage, Bucca Weir and Kolan Barrage). The NOL in Ned Churchward Weir, Ben Anderson Barrage and Kolan Barrage is used to maintain water level to allow the fishways to operate continuously. Additionally, the NOLs in Bucca Weir and the barrages are maintained to allow flows to fill and then overtop the barrages, providing natural flows to the estuaries in the Kolan and Burnett rivers. ROL holder monitoring shows that the NOLs have allowed natural flows to occur in these estuaries since these rules have been implemented. In the Ben Anderson Barrage, the NOL is changed seasonally to encourage a critically endangered freshwater turtle to nest higher on the stream banks to reduce the risk of inundation from flooding. Departmental monitoring of the effectiveness of the rule in 2018 demonstrated that the freshwater turtle (White-throated snapping turtle) had a significantly lower risk of nest inundation due to the operation of the rule. To conduct repairs caused by flood damage, the resource operations licence holder maintained the NOL in the Ben Anderson Barrage lower than the seasonal NOL (May-July) for two years. This NOL was designed. Refer to **Appendix D: Ecological Monitoring** for more details.

6.4.2 Upper Burnett water supply scheme

Low flow releases were made from Claude Wharton Weir on the Burnett River for the majority of time where required. The intent of the low flow releases is to provide connectivity between pools and to facilitate and trigger fish movement and spawning, particularly Australian lungfish.

6.4.3 Barker Barambah water supply scheme

Low flow releases were made from Silverleaf Weir (Barambah Creek) for the majority of time where required. The intent of the low flow releases is to provide connectivity between pools and to facilitate and trigger fish movement and spawning, particularly Australian lungfish. This low flow release is coupled with a seasonally-adjusted NOL in Silverleaf Weir that is designed to allow inflows to fill the weir and flow downstream. Water levels were kept above the NOL in Silverleaf Weir during the whole time period. Departmental water monitoring highlights that flows downstream of Silverleaf Weir have occurred. Refer to **Appendix E: Water Monitoring** for more details.

6.4.4 Coastal Burnett groundwater management area

In the Coastal Burnett groundwater management area, environmental management rules are in place to prevent further seawater intrusion. The 'general environmental management rule' prevents the taking of underground water if the electrical conductivity is greater than 2500 microsiemens per centimetre ($\mu\text{S}/\text{cm}$). There have been no instances requiring implementation of the general environmental management rule.

The 'Moore Park environmental management rules' specifies a cease pumping water level threshold, which if breached requires immediate cessation of pumping until water levels sufficiently recover. To avoid implementation of this rule, entitlement holders receive an early warning notice to enable self-management by limiting or rotating daily extraction. Two key monitoring bore assessment sites (RN13500094A and 13500114A) have the cease pumping water level thresholds.

Since the release of the WMP, the Moore Park environmental management rules have not been implemented, despite underground water levels in both assessment sites having spent prolonged periods below the early warning notice level. In response, affected entitlement holders have reduced and carefully managed the take of underground water through the establishment of voluntary weekly volumetric limits and rostered daily take regimes. Refer to **Appendix E** for more details.

6.5. Assessment of low risk aquifers

A risk assessment undertaken in 2009 of non-managed underground water resources identified four key resources at-risk of over development. Declaration of these resources as groundwater management areas under the plan occurred in 2014.

All remaining underground water resources are considered to be either low-yielding or have limited land area available for further development. On-going monitoring of low risk aquifers involves measurement of underground water levels and water quality from departmental monitoring bores and registration of new bores drilled from drill logs received.

6.6. Assessment of overland flow development

A risk assessment undertaken in 2009 of overland flow development (OLF) identified the coastal region of the Burnett Basin as being at-risk of over development. Declaration of the Coastal Burnett overland flow area under the plan occurred in 2014. The take of overland flow water outside the Coastal Burnett overland flow area is unregulated.

The plan authorises the take of overland flow water within the Coastal Burnett overland flow area for:

- stock or domestic purposes
- any purpose if the works are not existing overland flow works and have a capacity of not more than 20ML
- any purpose under a water licence
- to meet the requirements of an environmental authority
- contaminated agricultural run-off water
- the operation of a storage facility constructed to store water, other than overland flow water, in a catchment area of not more than 25ha; or
- any purpose if the works that allow the taking of overland flow water are existing overland flow works.

Desktop assessments for both the Coastal Burnett overland flow area and the balance of the Burnett plan area used a combination of high resolution satellite imagery and contemporary Geographical Information Systems (GIS) methodologies to estimate the increase in overland flow storage volumes over the life of the plan.

The results of the assessment of the Coastal Burnett overland flow area found an overall increase in the estimated volume of new OLF storage development from 2012 to 2017 to be 1.2 per cent or 0.2 per cent per annum. The take of water associated with this minimal level of development is considered to pose a low risk to impacting existing water users or the environment. The assessment identified a small number of storages (6) estimated to be in excess of the allowable 20ML and the department is still undertaking investigations.

The remaining basin beyond the Coastal Burnett overland flow area has seen a decline in the rate of OLF storage development. Increase in storage capacity during the severe drought period of 2006 to 2009 resulted in an estimated annual capacity increase of approximately 4 per cent. This increase dropped to 0.7 per cent per annum during the period 2009 to 2012, and for the period 2012 to 2017 declined further to 0.1 per cent per annum. The take of water from this balance area is also considered to pose a low risk to the outcomes of the Plan.

Monitoring of the development of overland flow storages within the plan area will continue to be monitored to ensure plan outcomes continue to be met.

6.7. 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.

The statistics used in this section are sourced from relevant Statistical Areas - level 2 (SA2s) from the Australian Bureau of Statistics (ABS) census data (ABS 2016). A conglomerate of SA2s were chosen to represent the plan area for this report.

6.7.1 Population information

The estimated population for the plan area was 138 842¹. The growth rate was 1.6 per cent for the last five years which is below the Queensland average of 7.9 per cent. Population growth rates throughout the plan area are variable with the highest being 15.7 per cent in the Branyan - Kensington area with negative growth being in the Millbank - Avoca area of 5.3 per cent.

6.7.2 Employment by industry

The top three industries in the region are:

- Health care and social assistance (14.8%)
- Agriculture, Forestry and Fishing (12.2%)
- Retail trade (10.8%).

Queensland employment in the Agriculture, Forestry and Fishing sector is 2.8 per cent.

¹ Information correct as at 30 June 2017.

Water use in the plan area is for grazing and agriculture, town water supplies and mining. Surface water taken for irrigation across the plan area is used on crops such as cotton, horticultural crops, citrus, wheat and pulse crops.

6.7.3 ABS farm surveys

The estimated value for agricultural commodities in the region for the 2015/16 financial year was \$1.189 billion, an increase of \$328 million or 38 per cent from 2010/11 comparable to the Queensland increase of 38.3 per cent. Unallocated water reserves available across the plan area can partially facilitate further agricultural expansion and diversification.

6.7.4 Water trading and water prices

Water allocation trading occurs for both supplemented and unsupplemented surface water with **Table 3** showing the transferred volumes, percent turnover and the weighted average price per ML for the last five areas. For more information, visit DNRME's Water Market Information² website.

Table 3 – Trading and pricing information

Water year	Volume transferred (ML)	Volume turnover (%)	Weighted average price (\$/ML)
2013–14	9480	2	1627
2014–15	9585	2	1537
2015–16	4904	1	630
2016–17	10 984	2	880
2017-18	6669	1	847

Notes: This table does not include water allocations where ownership transferred with land.

6.8. Climate assessment

The purpose of the climate variation 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. Two preliminary assessments by the Department of Environment and Science determined any:

- variations in the climatic conditions since July 2008 compared with the period used for hydrological modelling for the plan (1890–2008)
- impacts of potential climate change based on climate projection scenario to the year 2030.

6.8.1 Recent climate variation

The rainfall, evaporation and streamflow data recorded from July 2008 was compared to the 118 years of historical data used in the hydrological modelling for the plan (from 1 January 1890 to 30 June 2008).

6.8.1.1. Streamflow

The locations below were chosen to assess climate variation as they are deemed to be representative of the plan area:

- Boyne River at Carters (136315A) for the Boyne catchment

² www.business.qld.gov.au/industries/mining-energy-water/water/water-markets/market-information#water-sales

- Barker Creek at Glenmore (136209A) for the Barker-Barambah catchment
- Auburn River at Dykehead (136305A) for the Upper Burnett catchment
- Degilbo Creek at Coringa (136011A) for the Lower Burnett catchment
- Gregory River at Isis Highway (137101A) for the Isis, Gregory and Elliot catchments.

The annual streamflow across all catchments over ten years (since 2008) is within the range of the historical data as shown by the green dots (new data) being distributed amongst the historical data (blue dots)(**Figure 2**). The data from each subcatchment suggests that the recent rainfall since July 2011 does not pose a risk to the plan’s ability to provide for consumptive and non-consumptive use.

In the Boyne catchment, seven years of data were greater than the median (50%) and three were below (**Figure 2**).

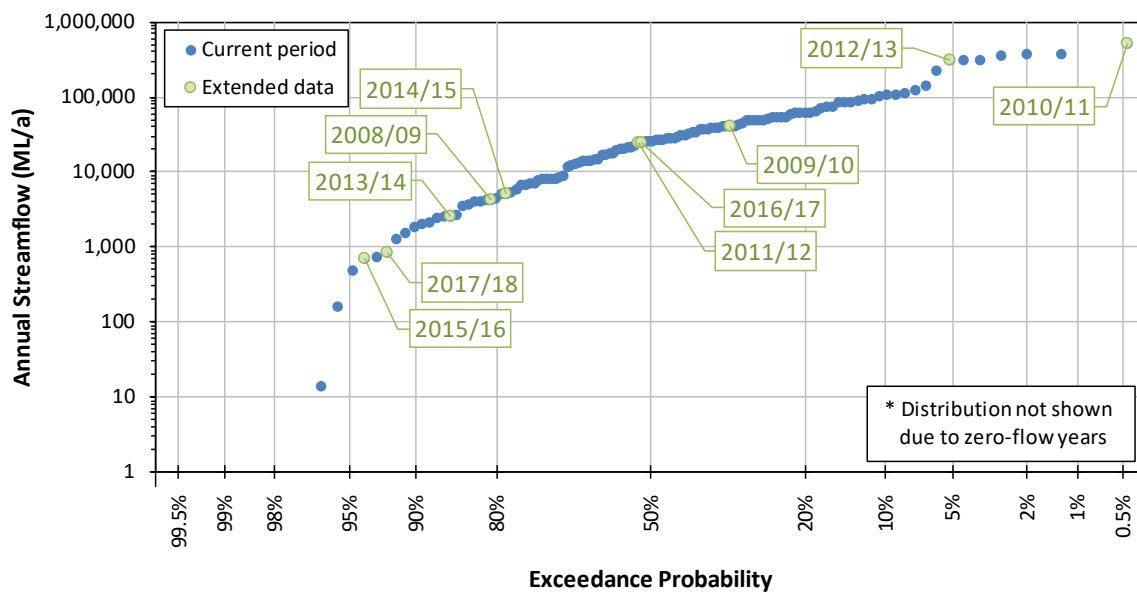


Figure 2 – Distribution of annual streamflow at Boyne River at Carters (136315A).

In the Barker-Barambah catchment, six years of data were greater than the median (50%) and four were below (**Figure 3**).

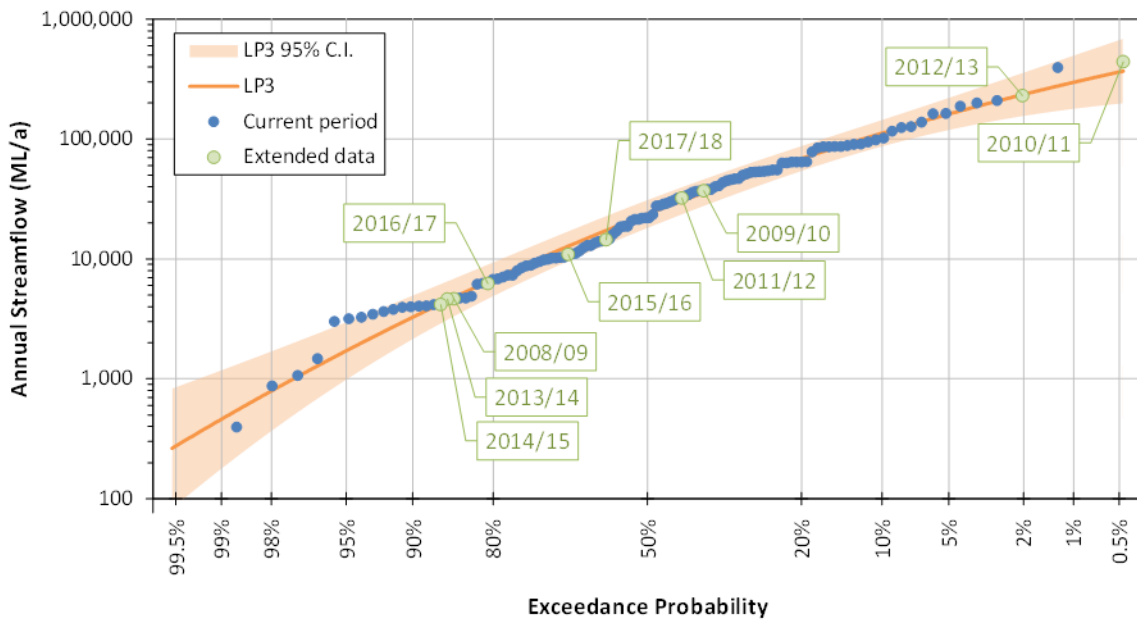


Figure 3 – Distribution of annual streamflow at Barker Creek at Glenmore (136209A).

In the Upper Burnett catchment, four years of data were greater than the median (50%) and six were below (Figure 4).

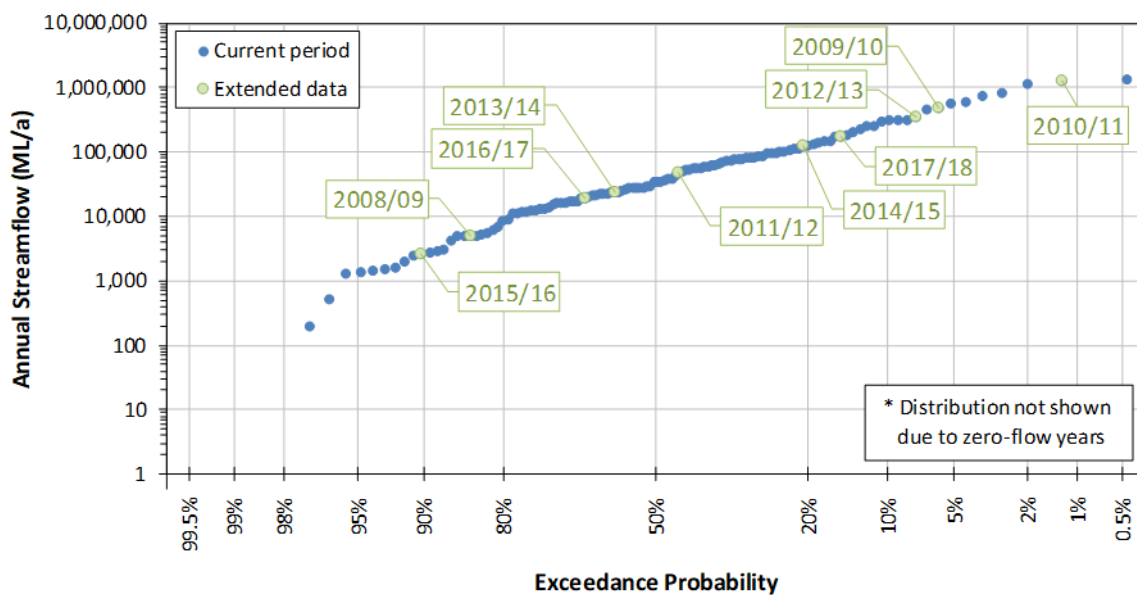


Figure 4 – Distribution of annual streamflow at Auburn River at Dykehead (136305A).

In the Lower Burnett catchment, five years of data were greater than the median (50%) and five were below (Figure 5).

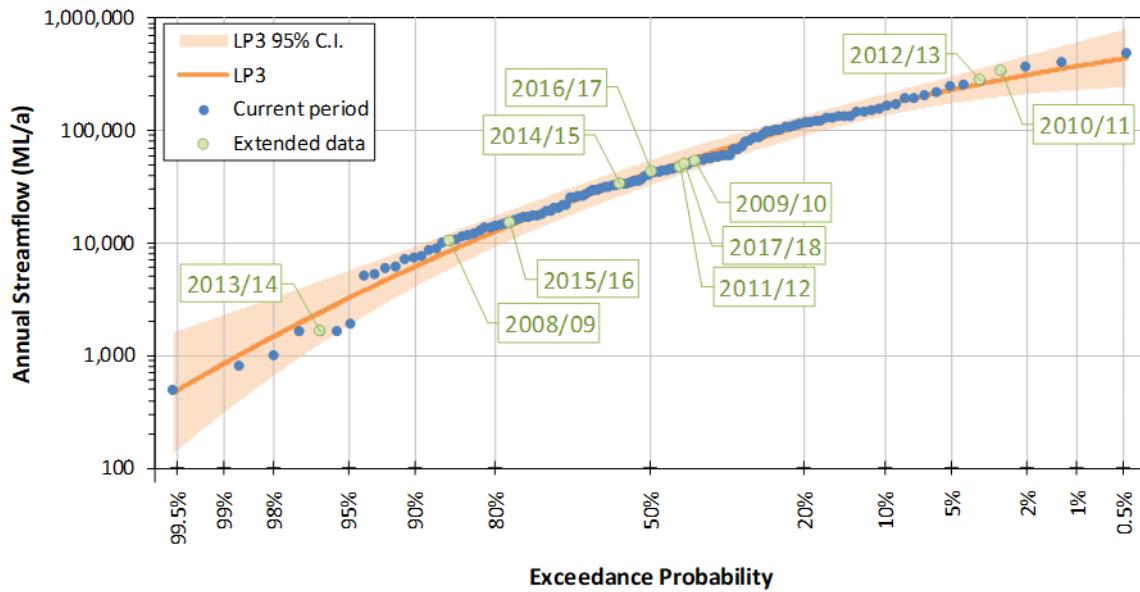


Figure 5 – Distribution of annual streamflow at Degilbo Creek at Coringa (136011A).

In the Isis, Gregory and Elliot catchments, three years of data were greater than the median (50%) and seven were below (Figure 6).

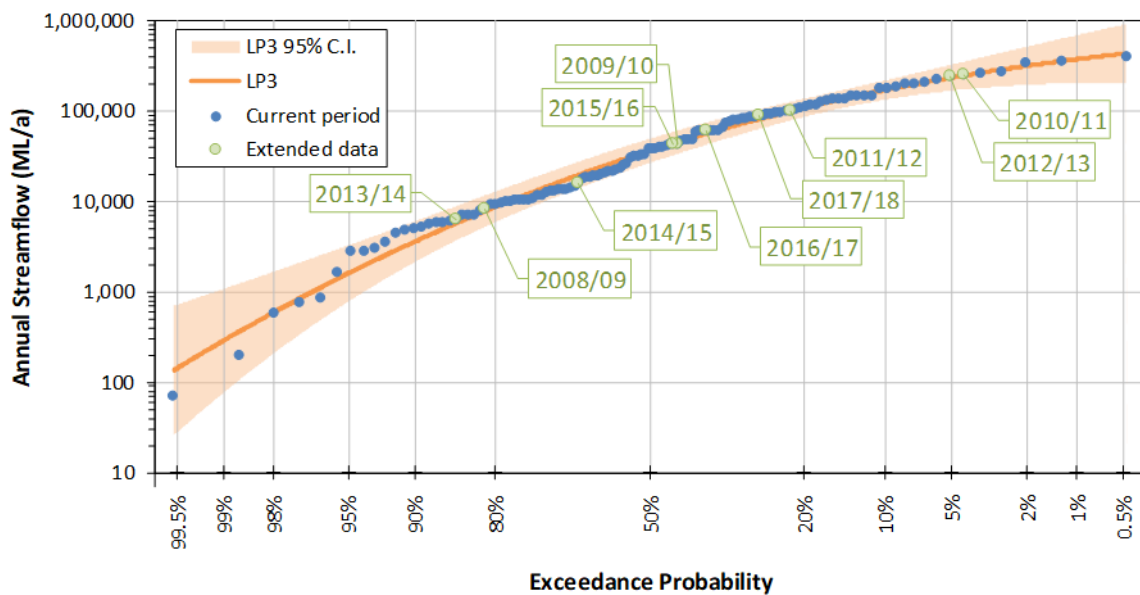


Figure 6 – Distribution of annual streamflow at Gregory River at Isis Highway (137101A).

6.8.1.2. Water storage levels

Water level data for dams in the plan is shown in Figure 7 to Figure 11. Dams in the plan area include Boondooma Dam, Bjelke-Petersen Dam, Wuruma Dam, Paradise Dam and Fred Haigh Dam. There are no major storages in the Isis, Gregory and Elliot catchments.

The extended period data for all catchments demonstrates an above-average inflow for the plan area dams and no significant low inflows.

Water levels at Boondooma Dam, in the Boyne catchment, were reasonably high over the extended period of record from 2011 (Figure 7). The dam spilled twice due to above-average flows during that

period. There have been no significantly low aggregated inflows during the extended period data, other than the 2013-18 period, which is continuing.

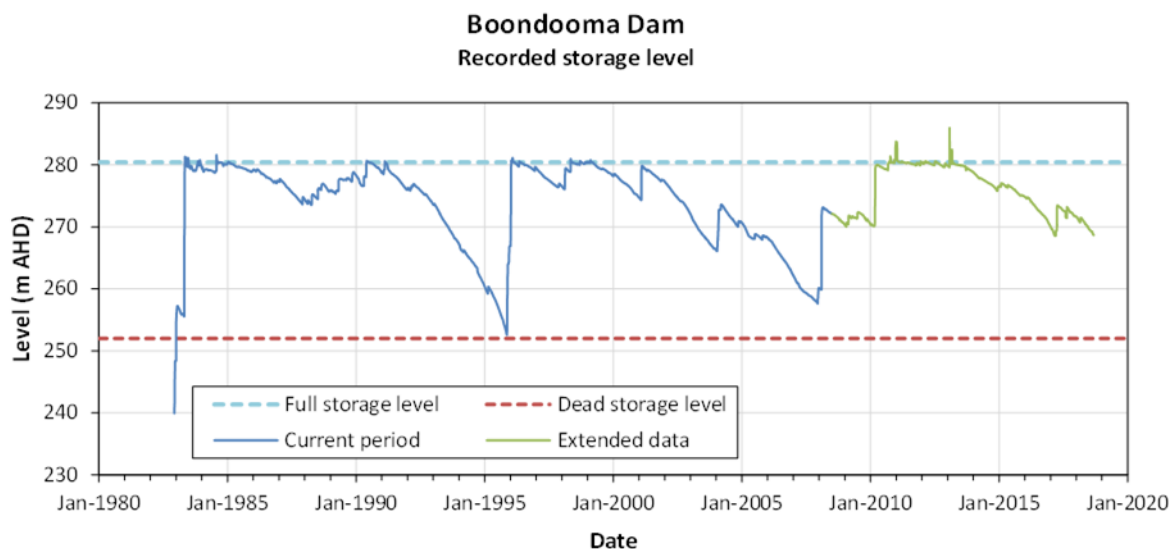


Figure 7 – Recorded water level data at Boondooma Dam.

Water levels at the Bjelke-Petersen Dam, in the Barker-Barambah catchment, were reasonably high over the extended period of record from 2011 (**Figure 8**). The dam spilled twice during this period due to above-average flows during that period. From 2004 to 2009 low aggregated flows were observed into the dam.

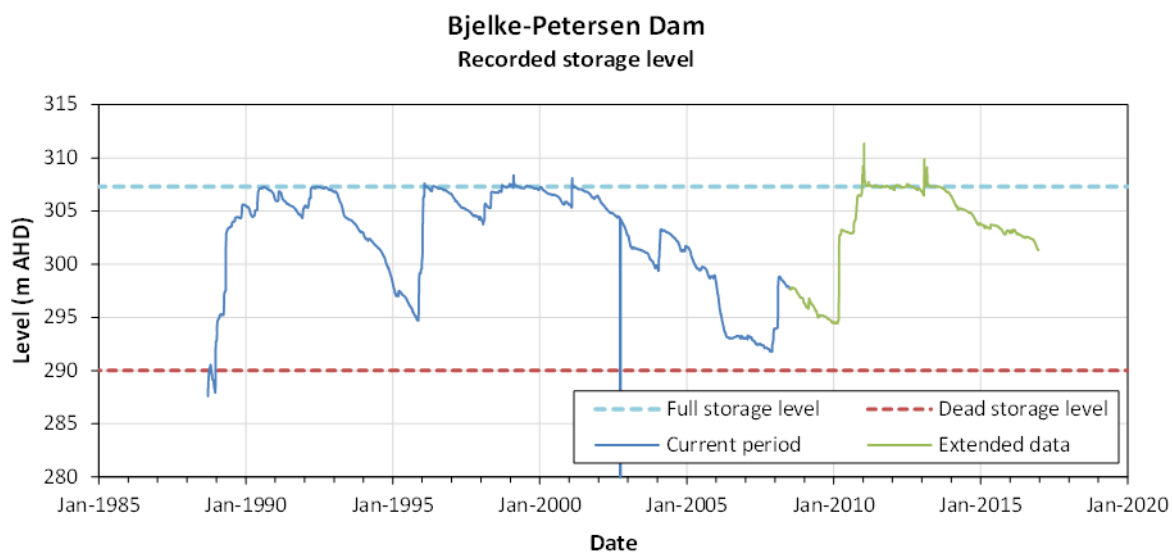


Figure 8 – Recorded water level data at Bjelke-Petersen Dam.

Water levels at Wuruma Dam, in the Upper Burnett and Three Moon Creek catchments, were reasonably high over the extended period of record from 2011 (**Figure 9**). In addition, high historical levels in Wuruma Dam over the last period are due to new infrastructure development in the Upper Burnett Water Supply Scheme (Kirra Weir, constructed in 2005) and significant unallocated water volumes available in this scheme. There has not been any significant low aggregated inflows in the extended data period.

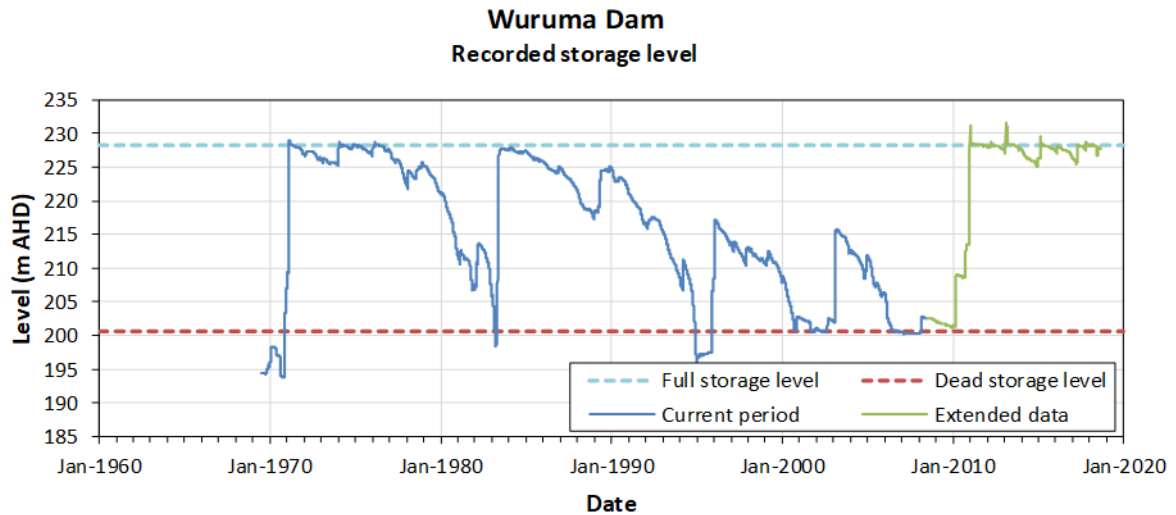


Figure 9 – Recorded water level data at Wuruma Dam.

Water levels at Paradise and Fred Haigh Dams, in the Lower Burnett catchment, were reasonably high over the extended period (Figure 10 and Figure 11). Both dams spilled numerous times due to above-average flows during that period. High historical levels at Paradise and Fred Haigh Dams over the last period are due to significant volumes unused water allocations in this scheme. Over the extended period low aggregated inflows were average.

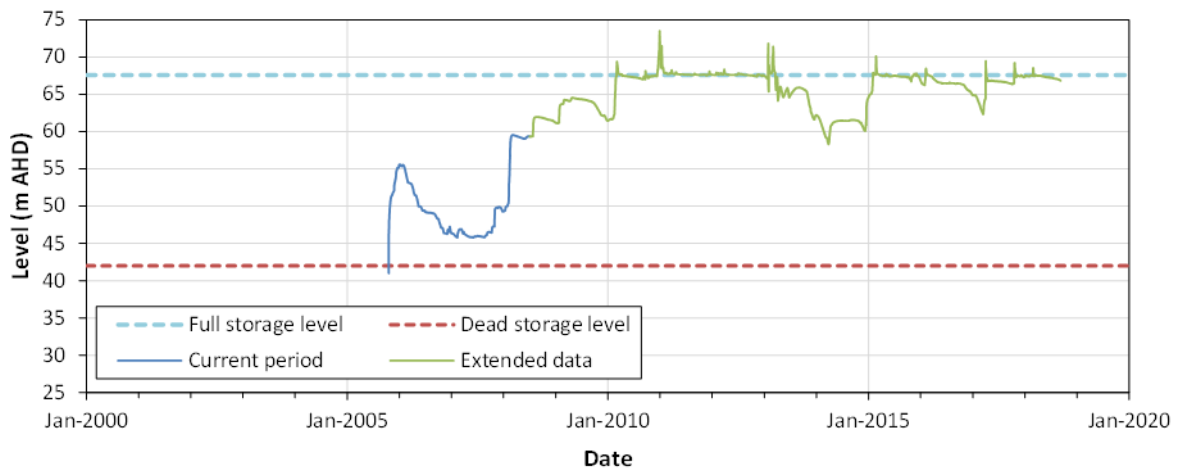


Figure 10 – Recorded water level data at Paradise Dam.

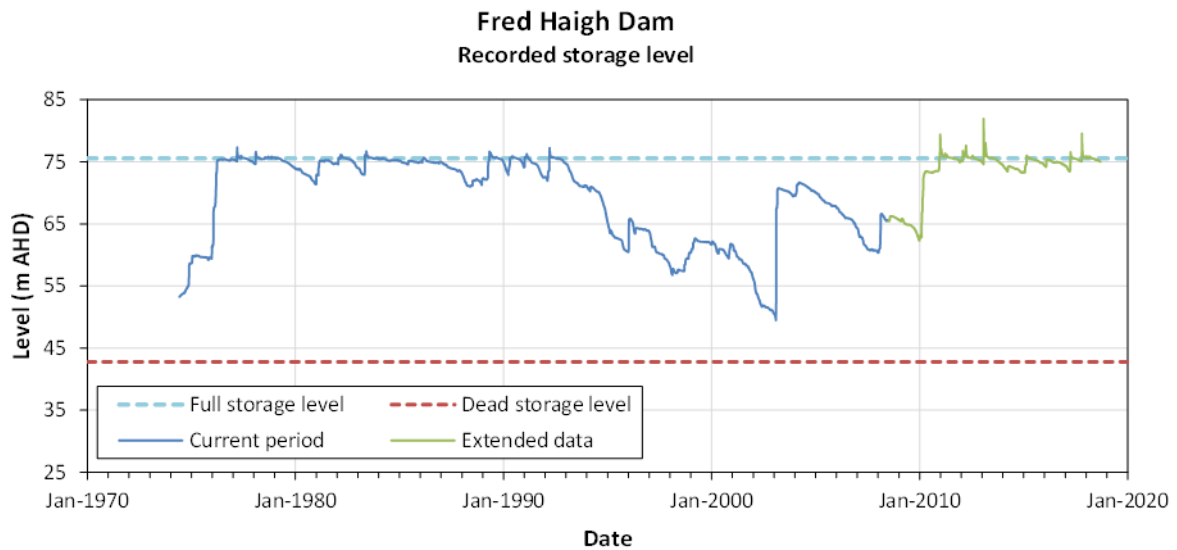


Figure 11 – Recorded water level data at Fred Haigh Dam.

6.8.2 Climate projections

The climate projection assessment used a range of Global Circulation Models (GCMs). The results consider the Representative Concentration Pathway (RCP) 8.5 emission scenario. This scenario corresponds to a business-as-usual scenario, follows current emission trends and is commonly used for climate change prediction work. Rainfall and evaporation data were sourced at the long-term gauge at Eisdvold Post Office (39036) and Monto Township (39104).

6.8.2.1. Evaporation

The monthly variation in the potential evaporation predicted for the years through to 2030 is shown in **Figure 12**. The GCMs predicted a median evaporation increase (shown by red line) for most months to varying degrees compared to the historical evaporation (indicated by black reference line). Increased evaporation will increase losses from farm storages, lead to greater crop water use and may cause water users to use additional water from surface water. Increases in evaporation may reduce the persistence time of waterholes that are used for refugia by stream biota.

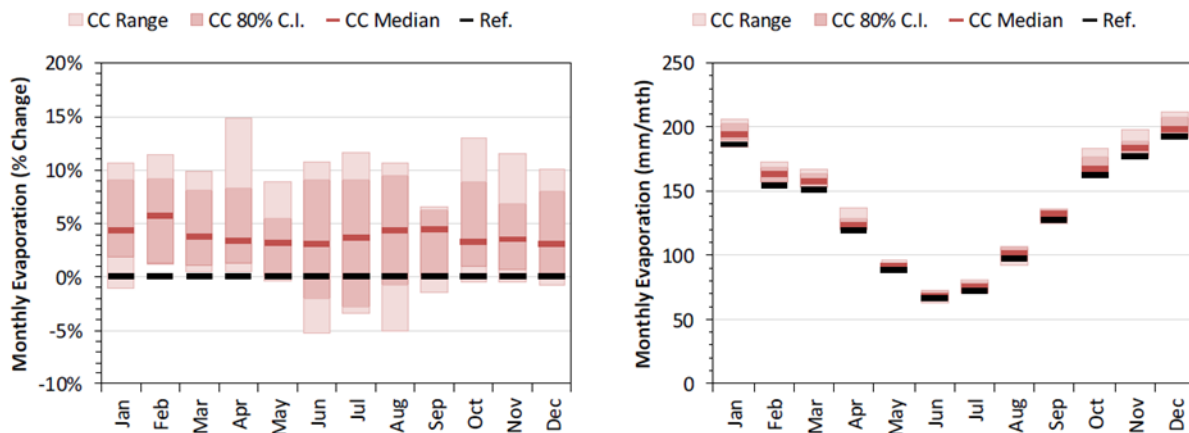


Figure 12 – Monthly potential evaporation projection for RCP 8.5 scenario to the year 2030.

6.8.2.2. Rainfall

The monthly variation in the rainfall predicted by the GCMs for the period until 2030 is shown in **Figure 13**. For the period to 2030, the expected median rainfall (red line) indicates lower rainfalls for most months (except April, May and December) as compared to the historical rainfall (black reference line). However, there are still broad confidence limits (indicated by the range in the bar graphs) around the median rainfall estimates indicating some uncertainties in the projections. Changes in rainfall patterns (including intensity) can affect the volume of water captured by dams and underground water recharge. Likewise, on land, changes to rainfall pattern can affect what crops might be grown and resultant pressures on water resources.

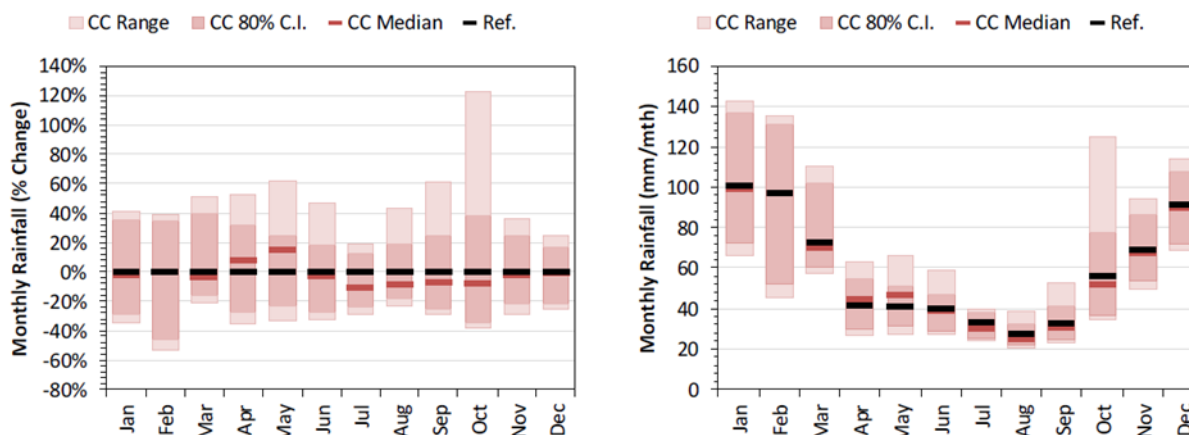


Figure 13 – Monthly rainfall projection for RCP 8.5 scenario to the year 2030.

7 Plan amendments and previous reports

7.1. Plan amendments and milestones

Amendments have been made to the Water Plan (Burnett Basin) 2014 to reflect administrative changes relating to the Water Act. The main amending act was the Water Reform and Other Legislation Amendment Act 2014. These amendments and other planning milestones are shown in are shown since commencement of the plan in **Figure 14**.

Water Act and the Water Regulation amendments commenced on 6 December 2016 and changed the way water planning is delivered across the state, including the statutory instruments. As a

consequence, the resource operations plan transitioned to the various statutory instruments such as the WMP, resource operations licence and associated operations manual.

Additionally the *Mineral, Water and Other Legislation Amendment Act 2018* amended the Water Act to require outcomes for cultural values and climate change to be specified for new water plans. For more detail see **Appendix G**.

An amendment in December 2014 related to limiting non-riparian stock and domestic take from water supply schemes.

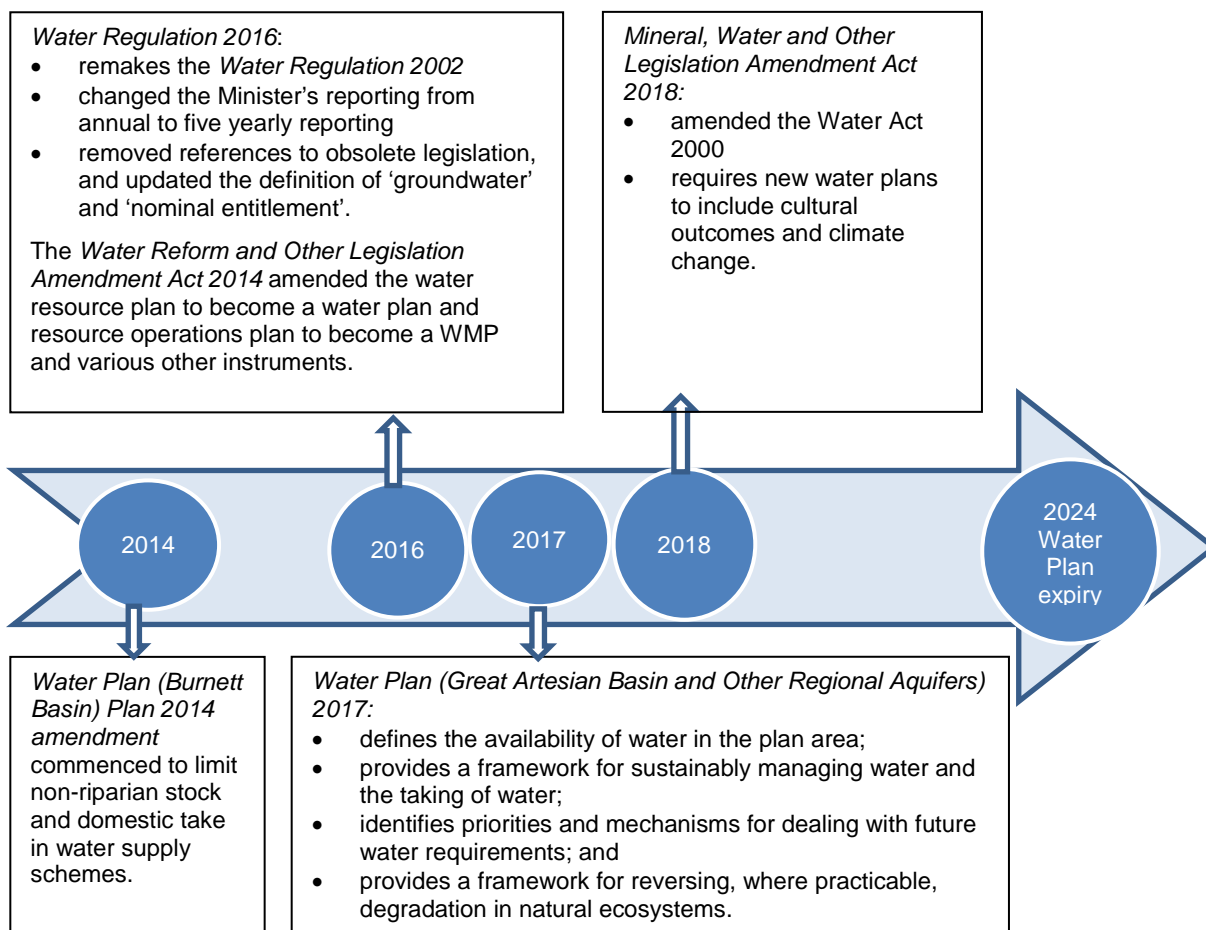


Figure 14 – Water planning milestones for the Water Plan (Burnett Basin) 2014.

7.2. Previous assessments and reports

The last Minister's Report was prepared in 2013 (DNRM 2013). Following this, the reporting frequency changed from annual to five yearly. The recommendations from the 2013 Ministers report were considered in the development of the new plan, now in effect.

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

A risk assessment was completed in October 2018 to identify potential risks to the water plan's outcomes that could emerge before the plan expires on 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 the 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. Future water demands beyond the life of the plan identified potential emerging issues (section 9). The likelihood and consequence of risks was based on data and expert opinion, using a standardised list of threats. The risk level and rationale for the rankings were documented in **Appendix A**.

Of the 29 plan outcomes assessed, most plan outcomes were ranked at low risk within the life of the plan. Two plan outcomes were identified to be a medium risk. These outcomes related to underground water quality and water quality for consumptive purposes. More detailed information on the risk assessment results can be found in **Appendix A**. In addition to the water quality issues identified for the Coastal Burnett groundwater management area (GMA), surface water and groundwater quality issues also exist at or near Nanango (increasing salinity), and in the Barker and Barambah GMAs. These medium risk issues are managed under the plan to the extent available under the Water Act such that:

- strategies in the plan for management arrangements in the Nanango area underground water alluvial aquifers associated with the Barker Creek GMA are fully implemented and limit further underground water development
- strategies in the plan are partially implemented through the current development of management arrangements which limit further underground water take and issue of volumetric water licences to underground water users in the Barambah Creek GMA
- plan strategies for surface water quality issues are fully implemented.

9 Potential emerging issues

The 2018 risk assessment also investigated potential emerging issues beyond the life of this plan. No significant threats were identified, however the main emerging issues identified were:

- accommodating projects and potential new water infrastructure developments within the plan area to address agricultural water demands and water security. These include Cooranga weir, Claude Wharton Weir (currently bag is deflated), and NWIDF projects including Gayndah regional infrastructure development (GRID). The Paradise Dam Improvement Program is being progressed with Building Queensland commencing an expedited assessment of options and reporting back to Government early in 2020. Sunwater will also immediately commence works so that they are in a position to commence lowering the spillway by five metres as soon as the 2019/2020 wet season is over. Any implications for the water plan will be considered once the program is complete.
- including zones in small subcatchment areas in the plan to enable the conversion of area-based water licences and interim water allocations to water allocations with a specified volume. This conversion would allow entitlements to become tradeable or relocatable, to provide for demand for irrigation and other uses. In the interim area based water licences will continue to be converted to volumetric licences.
- climate change projections for 2030 predict an increase in evaporation across the plan area. For 2030, projections also show a small decrease in rainfall mainly during the spring months and a small increase in rainfall mainly during the autumn months for 2030.

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

In the past five years, there have been 97 allegations of non-compliance in the Burnett Water Plan Area. This included 21 reports of unauthorised take and 76 allegations of entitlement overuse. Each report was investigated by the DNRME and dealt with in accordance with the standard departmental compliance response procedures. **Appendix H** provides further details on the number and type of non-compliance that has occurred over the five-year period.

11 Way forward

In summary, existing information indicates that plan implementation has been effective, and almost all plan outcomes have been achieved. Additional monitoring information is required to track the identified potential emerging risks and ensure that the plan continues to meet its outcomes.

Most plan outcomes were ranked as low risk within the life of the plan and no significant risks were identified. A plan amendment may be required to address some of the emerging issues identified.

The plan is due to expire on 1 September 2024 and it is recommended that it is appropriate for the plan to continue. In the meantime, monitoring and implementation of the plan will continue and the effectiveness of the plan will be reassessed closer to its expiry and a recommendation made on whether to replace, amend, or extend the plan.

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Appendix A: Assessment of plan outcomes

Table 4 – Economic outcomes

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan (ROP) management rules that provide for outcome	Qualitative risk ranking and preliminary assessment of outcome
14. Economic outcomes			
<p>(1) (a) provision for—</p> <p>(i) the use of water entitlements and other authorisations in the plan area; and</p> <p>(ii) the continued use of existing overland flow works; and</p> <p>(iii) the continued use of existing groundwater works;</p>	<p>The plan continues the use of water allocations.</p> <p>The plan allows for the continuing use of existing overland flow works and underground water works within particular underground water management areas.</p> <p>The plan provides continued use of underground water from the Coastal Burnett groundwater management areas.</p> <p>The plan allows for the granting of water licences for outstanding applications.</p>	<p>The ROP provides for the following:</p> <ul style="list-style-type: none"> granting and amending water licences and water allocations establishes infrastructure and water trading rules water sharing rules for the Coastal Burnett GMA. lists the water allocations and licences in the Coastal Burnett GMA 	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>Water within the Coastal Burnett GMA has been managed to reduce the likelihood of seawater intrusion whilst maximising the volume of water that can be taken. The rules within the ROP provide transparency in announced allocations.</p>
<p>(b) protection of the probability of being able to take water under a water entitlement;</p>	<p>The plan requires that any changes to rules for the allocation of water must meet existing WASOs and EFOs and refuses applications for water licences that would increase the amount of water taken or changes location of take of water.</p> <p>The plan states water sharing rules to maintain security of entitlements.</p> <p>Overland flow is managed in the Coastal Burnett overland flow area to limit impacts on existing entitlement holders.</p>	<p>The plan and ROP outlines water sharing and the ROP states trading rules to protect to probability of obtaining water under water allocations.</p>	<p>LOW risk</p> <p>This outcome is being achieved.</p>
<p>(c) availability of water for the following—</p> <p>(i) growth in industries dependent on water resources in the plan area;</p> <p>(ii) stock purposes in the plan area;</p> <p>(iii) Indigenous communities dependent on water resources in the plan area to achieve their economic aspirations;</p>	<p>The plan establishes tradeable water allocations that allow users to purchase or lease existing water from other allocation holders.</p> <p>The plan also includes unallocated water reserves including for indigenous purposes.</p> <p>The plan allows for surface water, underground water and overland flow to be taken for stock and domestic purposes.</p> <p>The plan allows for the interference with water for the take of water for stock purposes.</p>	<p>The ROP establishes the boundaries and rules for trading.</p>	<p>LOW risk</p> <p>This outcome is mostly being achieved.</p> <p>There are multiple processes that could be used by indigenous communities to access additional water for economic aspirations. To date, no expressions of interest to access water reserves for indigenous purposes have been submitted.</p>

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan (ROP) management rules that provide for outcome	Qualitative risk ranking and preliminary assessment of outcome
14. Economic outcomes			
(d) support of activities stated in the Water Regulation 2016, schedule 3;	The plan does not limit prescribed activities for underground water. The plan establishes tradeable water allocations that allow users to obtain water for these purposes.	The resource operations plan establishes the boundaries and rules for trading.	LOW risk This outcome is mostly being achieved.
(e) maintenance of flows that support water-related economic activities in the plan area, including, for example, tourism;	The plan establishes interim water sharing and environmental management rules that provide for flows for water-related activities.	The plan and resource operations plan establishes infrastructure operation rules.	LOW risk This outcome is being achieved. Water levels in Bucca Weir and Ben Anderson Barrage are maintained at specified levels that facilitate water-related activities such as rowing and water skiing respectively. Environmental management rules provide for environmental flows that maintain the health of freshwater and estuarine environments to support activities such as fishing.
(f) support of continual improvement in the efficient use of water;	The plan establishes tradeable water allocations that allow users to purchase or lease existing water from other allocation holders. The plan required all water licences to state a nominal entitlement.	The resource operations plan establishes the boundaries and rules for trading.	LOW risk This outcome is being achieved.
(g) maintenance, to the extent practicable, of the quality of groundwater for consumptive purposes;	The plan establishes underground water management areas to manage water extraction to provide for water quality. The plan includes underground water environmental flow objectives within the Coastal Burnett groundwater management area that maintains water quality.	The resource operations plan outlines the water sharing rules for the Coastal Burnett groundwater management area aimed at limiting seawater intrusion.	MEDIUM risk This outcome is being partially achieved. Water quality within underground water often affected directly by land use impacts such as leaching of fertiliser to groundwater, which is outside the control of the water plan. There have been instances of elevated salinity in the Burnett River and tributaries through leaching salts within the soil profile after large floods.

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan (ROP) management rules that provide for outcome	Qualitative risk ranking and preliminary assessment of outcome
14. Economic outcomes			
(h) for groundwater in the Coastal Burnett groundwater management area—management and allocation of groundwater to prevent further seawater intrusion.	The plan specifically limits further entitlements within the Coastal Burnett groundwater management area to manage water extraction to provide for water quality.	The resource operations plan outlines the water sharing rules for the Coastal Burnett groundwater management area aimed at limiting seawater intrusion.	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>Seawater intrusion is being managed through regular revision of announced allocations and monitored through an extensive underground water monitoring network.</p>

Table 5 – Social outcomes

Plan outcome (as per chapter 3 of Plan)	Plan strategies that provide for outcomes	Resource operations plan (ROP) management rules that provide for outcome	Qualitative risk ranking and preliminary assessment of outcome
15. Each of the following is a social outcome for water in the plan area—			
(1) Each of the following is a social outcome for water in the plan area— (a) increased security for town water supplies that rely on surface water and groundwater;	The plan has established water reserves that may be used to provide additional security for town water supplies. Underground water for towns are managed by the plan through underground water management areas. High priority water allocations are protected through rules to maintain a high level of security.	The resource operations plan outlines the water sharing rules for the Coastal Burnett GMA aimed at protecting town water supply security.	LOW risk This outcome is being achieved.
(b) availability of water for the following— (i) population growth in towns and communities dependent on water resources in the plan area; (ii) domestic purposes in the plan area;	The plan establishes tradeable water allocations that allow users to purchase or lease existing water from other allocation holders. The plan has established water reserves that may be used to provide additional security for town water supplies. The plan allows for surface water, underground water and overland flow to be taken for stock and domestic purposes. The plan allows for the interference with water for the take of water for domestic purposes.	The resource operations plan establishes the boundaries and rules for trading.	LOW risk This outcome is being achieved.
(c) maintenance, to the extent practicable, of the quality of water for human use;	The plan establishes underground water management areas to manage water extraction to provide for water quality. The plan includes underground water environmental flow objectives within the Coastal Burnett groundwater management area that maintains water quality. The plan includes water infrastructure operating rules that seek to release water of the best quality.	The resource operations plan outlines the water sharing rules for the Coastal Burnett groundwater management area aimed at limiting seawater intrusion.	MEDIUM risk This outcome is being achieved. Alternative water supply options are being investigated independently by townships with marginal water quality within bores. Water quality within underground water often affected directly by land use impacts such as leaching of fertiliser to groundwater, which is outside the control of the water plan. There have been instances of elevated salinity in the Burnett River and tributaries through leaching salts within the soil profile after large floods.

Plan outcome (as per chapter 3 of Plan)	Plan strategies that provide for outcomes	Resource operations plan (ROP) management rules that provide for outcome	Qualitative risk ranking and preliminary assessment of outcome
15. Each of the following is a social outcome for water in the plan area—			
<p>(d) maintenance of flows that support water-related aesthetic, cultural and recreational values in the plan area, including the cultural values of the traditional owners in the plan area;</p>	<p>The plan establishes interim water sharing and environmental management rules that provide for flows for water-related activities.</p> <p>The plan has established the Ban Ban Springs groundwater management area to manage flows to support cultural values associated with Ban Ban Springs.</p> <p>The plan includes environmental flow objectives that aim to provide adequate environmental flows throughout the basin.</p> <p>The plan includes waterhole drawdown rules that may be applied to water entitlements to protect ecological and cultural values.</p>	<p>The resource operations plan contains monitoring and reporting requirements to measure effectiveness of rules in providing for values.</p> <p>The resource operations plan states water harvesting thresholds that are set to allow pass flows for the environment and existing users.</p>	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>Water levels in Bucca Weir and Ben Anderson barrage are maintained at specified levels that facilitate water-related activities such as rowing and water skiing respectively.</p> <p>Environmental management rules provide for environmental flows that maintain the health of freshwater and estuarine environments to support activities such as fishing as well as supporting cultural activities.</p>
<p>(e) for groundwater—the support of cultural values associated with Ban Ban Springs.</p>	<p>The plan has established the Ban Ban Springs groundwater management area to manage flows to support cultural values associated with Ban Ban Springs.</p>	<p>The resource operations plan contains monitoring and reporting requirements to measure effectiveness of rules in providing for values.</p>	<p>LOW risk</p> <p>This outcome is partially being achieved.</p> <p>Hydrological monitoring and water chemistry analysis has refined previous knowledge of the extent of the Ban Ban Spring aquifer. Existing water extraction both within and outside the GMA currently affects the persistence of the springs.</p>

Table 6 – Ecological outcomes

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan management rules that provide for outcome	Related ecological assets	Summary of monitoring and assessment	Qualitative risk ranking and preliminary assessment of outcome
16. Each of the following is an ecological outcome for water in the plan area—					
<p>(a) minimisation of changes to the natural variability of flows that support aquatic ecosystems;</p>	<p>The plan has established environmental flow objectives to support the natural variability of stream flows.</p> <p>The plan also contains interim water sharing and environmental management rules to provide for increased variability of flows.</p> <p>The plan includes waterhole drawdown rules that may be applied to water entitlements to protect ecological values.</p>	<p>The resource operations plan requires ecological and hydrological monitoring to test the effectiveness of environmental management rules.</p> <p>The resource operations plan outlines the water sharing rules for the Coastal Burnett groundwater management area aimed at providing environmental flows.</p>	<ul style="list-style-type: none"> • river forming processes • estuarine brackish habitat • White-throated snapping turtle • Australian lungfish • waterholes 	<p>EFAP monitoring has identified that the environmental management rules for the Ben Anderson Barrage have successfully reduced the rate of White-throated snapping turtle (<i>Elseya albagula</i>) nest inundation.</p> <p>Confirmation monitoring for lungfish spawning has not commenced due to the absence of aquatic plants in the Burnett River since the 2011-13 record floods. Without aquatic plants, the effectiveness of new environmental flows for lungfish spawning are limited. The Department has also been working with Sunwater to trial the transplant of aquatic plants to known spawning locations of the Australian lungfish in the Burnett River. Confirmation monitoring of lungfish spawning is planned in the coming years to ensure environmental flow strategies of the Burnett water plan provide for water users and the environment.</p> <p>Monitoring of estuarine water quality by the Department of Environment and Science (DES) has confirmed that environmental flow releases from Paradise Dam designed for providing brackish estuarine habitat have created brackish conditions in the Burnett River estuary for suitable durations to stimulate productivity in the estuarine environment.</p>	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>Environmental management rules are reducing nest inundation for the White-throated snapping in The Ben Anderson Barrage.</p> <p>Additional research is being conducted to enable re-establishment of spawning habitat for Australian lungfish. Environmental flow releases are being provided for this species.</p> <p>Additional monitoring is required to understand the persistence of brackish conditions on environmental flow releases.</p>

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan management rules that provide for outcome	Related ecological assets	Summary of monitoring and assessment	Qualitative risk ranking and preliminary assessment of outcome
16. Each of the following is an ecological outcome for water in the plan area—					
<p>(b) the continued capability of a part of the river system to be connected to another, including by maintaining flows that—</p> <p>(i) allow for the movement of native aquatic fauna between riverine, floodplain, wetland, estuarine and marine environments; and</p> <p>(ii) support water-related ecosystems; and</p> <p>(iii) support river-forming processes;</p>	<p>The plan has established environmental flow objectives to support the natural variability of stream flows.</p> <p>The plan also contains interim water sharing and environmental management rules to provide for increased variability of flows.</p>	<p>The resource operations plan requires ecological and hydrological monitoring to test the effectiveness of environmental management rules.</p> <p>The resource operations plan states water harvesting thresholds that are set to allow pass flows for the environment and existing users.</p>	<ul style="list-style-type: none"> • river forming processes • estuarine brackish habitat • White-throated snapping turtle • Australian lungfish • waterholes 	<p>The Nominal Operating Level (NOL) for the Ben Anderson Barrage and Kolan Barrage have been well implemented since plan commencement. These NOL's have been updated to improve fish passage opportunities, with fishways able to be operational 100% of the time. There has been some lowering of the NOL in the Ben Anderson Barrage in the first few years of this plan to allow for flood damage repair both to the barrage and due to reduced release capacity of upstream infrastructure.</p>	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>The Nominal Operating Level (NOL) for the Ben Anderson Barrage and Kolan Barrage have been well implemented since plan commencement.</p>
<p>(c) protection and maintenance of refugia associated with waterholes, lakes and wetlands;</p>	<p>The plan has established environmental flow objectives to support the natural variability of stream flows.</p> <p>The plan also contains interim water sharing and environmental management rules to provide for increased variability of flows.</p> <p>The plan includes waterhole drawdown rules that may be applied to water entitlements to protect ecological values.</p>	<p>The resource operations plan requires ecological and hydrological monitoring to test the effectiveness of environmental management rules.</p>	<ul style="list-style-type: none"> • waterholes 	<p>Resource operations licence holder reporting highlights that there were no fish kills or stranding within the water management areas.</p> <p>There has been no specific ecological monitoring to date on waterholes within the plan area. Ecological science collected from other areas of the state will improve understanding of factors that affect refugial quality of waterholes.</p>	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>Ecological science collected from other areas of the state will improve understanding of factors that affect refugial quality of waterholes.</p>

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan management rules that provide for outcome	Related ecological assets	Summary of monitoring and assessment	Qualitative risk ranking and preliminary assessment of outcome
16. Each of the following is an ecological outcome for water in the plan area—					
(d) the support of ecosystems dependent on groundwater, including, for example, riparian vegetation and wetlands;	<p>The plan has established environmental flow objectives to support underground water ecosystems.</p> <p>The plan specifically limits further entitlements within the Coastal Burnett groundwater management area to manage water extraction to provide for water quality.</p>	The resource operations plan outlines water sharing rules in the Coastal Burnett groundwater management area to provide for flows and underground water levels to support groundwater dependent ecosystems.	<ul style="list-style-type: none"> • GDEs 	<p>Additional water chemistry samples have been collected in the Upper Burnett groundwater management area to understand connections between the Burnett River and alluvial and artesian groundwater systems.</p> <p>Water sharing rules continue to be utilised to manage seawater intrusion in the Coastal Burnett groundwater management area.</p>	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>Water monitoring activities continue to support management of water quality within the plan area affected by water development.</p>
(e) provision of flows and hydraulic habitat for flow-spawning fish and endemic species, including, for example, the Australian lungfish (<i>Neoceratodus forsteri</i>) and the white-throated snapping turtle (<i>Elseya albagula</i>);	<p>The plan has established environmental flow objectives to support the natural variability of stream flows.</p> <p>The plan also contains interim water sharing and environmental management rules to provide for increased variability of flows.</p> <p>The plan includes waterhole drawdown rules that may be applied to water entitlements to protect ecological values.</p>	The resource operations plan requires ecological and hydrological monitoring to test the effectiveness of environmental management rules.	<ul style="list-style-type: none"> • Australian lungfish • White-throated snapping turtle 	<p>EFAP monitoring has identified that the environmental management rules for the Ben Anderson Barrage have successfully reduced the rate of White-throated snapping turtle (<i>Elseya albagula</i>) nest inundation.</p> <p>Confirmation monitoring for lungfish spawning has not commenced due to the absence of aquatic plants in the Burnett River since the 2011-13 record floods. Without aquatic plants, the effectiveness of new environmental flows for mammals spawning are reduced. The Department is also working with Sunwater to trial the transplant of aquatic plants to known spawning locations of the Australian lungfish in the Burnett River. Confirmation monitoring of lungfish spawning is planned in the coming years to ensure environmental flow strategies of the Burnett water plan provide for water users and the environment.</p>	<p>LOW risk</p> <p>The outcome is being achieved.</p> <p>Environmental management rules are reducing nest inundation for the White-throated snapping in The Ben Anderson Barrage.</p> <p>Additional research is being conducted to enable re-establishment of spawning habitat for Australian lungfish. Environmental flow releases are being provided for this species.</p>

Plan outcome (as per part 3 of plan)	Plan strategies that provide for outcomes	Resource operations plan management rules that provide for outcome	Related ecological assets	Summary of monitoring and assessment	Qualitative risk ranking and preliminary assessment of outcome
16. Each of the following is an ecological outcome for water in the plan area—					
(f) maintenance of flows necessary for estuarine ecosystem functions, including flows for— (i) barramundi (<i>Lates calcarifer</i>) and sea mullet (<i>Mugil cephalus</i>) recruitment; and (ii) banana prawn (<i>Fenneropenaeus merguensis</i>) growth; and (iii) river mangroves (<i>Aegiceras corniculatum</i>);	The plan has established environmental flow objectives to support the natural variability of stream flows. The plan also contains interim water sharing and environmental management rules to provide for increased variability of flows.	The resource operations plan requires ecological and hydrological monitoring to test the effectiveness of environmental management rules.	<ul style="list-style-type: none"> • barramundi • sea mullet • estuarine brackish habitat • banana prawns 	Monitoring of estuarine water quality by DES has confirmed that environmental flow releases from Paradise Dam designed for providing brackish estuarine habitat have created brackish conditions in the Burnett River estuary to stimulate productivity in the estuarine environment.	<p>LOW risk</p> <p>The outcome is being achieved.</p> <p>Environmental flow releases are providing the hydraulic habitat for estuarine productivity.</p>
(g) maintenance of a near natural flow regime that supports waterholes and riverine ecosystems in subcatchment area M.	Limited unallocated water is available within this subcatchment.	The resource operations plan requires ecological and hydrological monitoring to test the effectiveness of plan strategies.	<ul style="list-style-type: none"> • waterholes • Australian lungfish 	Water monitoring data continues to be collected in the Auburn River. This subcatchment continues to have limited flow alteration. The largest flow recorded since the commencement of the plan occurred in February 2018, with a peak discharge of 74 720 ML/day.	<p>LOW risk</p> <p>This outcome is being achieved.</p> <p>This subcatchment continues to have limited flow alteration.</p>

Appendix B: Water entitlements

Table 7 – Summary of water entitlements within the plan area.

Entitlement Type	Entitlement numbers				Entitlement	
	All	Volumetric	Area	Other ^T	Volume (ML)	Area (ha)
Surface Water Licences*	775	184	352	239*	25467	5098
Underground water Licences	270	259	0	11 [^]	35274	0
Supplemented Surface Water Allocations	4633	4633	0	0	493848	0
Unsupplemented Surface Water Allocations	439	439	0	0	48344	0
Unsupplemented Underground Water Allocations	758	758	0	0	62326	0
Interim Water Allocation	127	127	0	0	14586	0

^T Entitlement is not stated, *Includes all licences to interfere, [^]Dewatering licences.

Table 8 – Summary of announced entitlements for CBGMA water allocations (Area A).

Water year	14/15	15/16	16/17	17/18
Kolan Burnett A				
ZG01	90%	95%	95%	100%
ZG02	80%	85%	85%	90%
ZG03	80%	80%	85%	95%
ZG04	90%	95%	95%	100%
ZG05	65%	65%	65%	90%
ZG06	95%	100%	95%	100%
Burnett Elliott A				
ZG11	70%	70%	65%	75%
ZG12	70%	80%	75%	100%
ZG13	70%	90%	85%	100%
ZG14	65%	80%	75%	70%
ZG15	90%	95%	95%	100%
ZG16	90%	100%	95%	100%
ZG17	95%	100%	100%	100%
ZG18	100%	100%	100%	100%
Elliott Gregory A				
ZG21	85%	100%	95%	100%
ZG22	95%	95%	95%	100%
ZG23	100%	100%	100%	100%
ZG24	90%	90%	90%	95%
Fairymead A				
ZG35	N/A	N/A	N/A	N/A
ZG36	80%	80%	80%	85%
ZG37	N/A	N/A	N/A	N/A
ZG38	90%	95%	95%	100%
ZG39	90%	100%	95%	100%
ZG40	85%	90%	95%	100%
ZG41	75%	80%	85%	100%
ZG42	N/A	N/A	N/A	N/A

Table 9 – Summary of announced entitlements for CBGMA water licences (Area B).

Water year	14/15	15/16	16/17	17/18
Kolan Burnett B				
ZG07	80%	90%	90%	100%
ZG08	95%	95%	95%	100%
ZG09	100%	100%	100%	100%
ZG10	85%	95%	95%	100%
Burnett Elliott B				
ZG19	95%	100%	95%	100%
ZG20	100%	100%	95%	100%
Elliott Gregory B				
ZG25	100%	100%	100%	100%
ZG26	80%	90%	90%	90%
ZG27	100%	100%	80%	70%
ZG28	N/A	N/A	N/A	N/A
ZG29	100%	100%	100%	100%
ZG30	70%	80%	75%	90%
ZG31	95%	100%	100%	100%
ZG32	95%	95%	95%	95%
Farnsfield B				
ZG33	100%	100%	100%	100%
ZG34	90%	90%	95%	100%
Fairymead B				
ZG43	75%	90%	90%	100%
ZG44	N/A	N/A	N/A	N/A
ZG45	100%	100%	100%	100%
ZG46	90%	100%	100%	100%

Table 10 – Permanent trades of supplemented surface water allocations (water only).

Water year	Priority group	Number of trades	Volume traded (ML)
Bundaberg Water Supply Scheme			
2014-15	Medium	84	7 179
2015-16	Medium	49	3 073
2016-17	Medium	93	5 962
	High	2	200
2017-18	Medium	61	3 559
Upper Burnett Water Supply Scheme			
2014-15	Medium	16	919
2015-16	Medium	5	47
2016-17	Medium	7	680
2017-18	High	1	150
	Medium	7	460
Barker Barambah Water Supply Scheme			
2014-15	Medium	12	699
2015-16	Medium	30	1 588
2016-17	Medium	7	1 744
2017-18	Medium	11	729
Boyne River & Tarong Water Supply Scheme			
2014-15	Medium	8	370
	High	2	<1
2015-16	Medium	2	150
	High	1	1
2016-17	Medium	2	210
	High	3	6
2017-18	Medium	6	293
	High	4	105

Table 11 – Summary of permanent trades of supplemented water allocations with land in plan area.

Water year	Number of transfers	Volume transferred (ML)
Coastal Burnett Groundwater Management Area		
2014-15	91	10 273
2015-16	67	6 439
2016-17	114	13 499.6
2017-18	121	9 523

Table 12 – Summary of permanent trades of unsupplemented surface water allocations in plan area (water).

Water year	Priority group	Number of trades	Volume traded (ML)
Lower Burnett & Kolan Rivers Water Management Area			
2014-15	-	-	-
2015-16	-	-	-
2016-17	-	-	-
2017-18	4C	2	41
Upper Burnett & Nogo Rivers Water Management Area			
2014-15	-	-	-
2015-16	-	-	-
2016-17	6O	2	86
	6N	1	17
2017-18	-	-	-
Barker Barambah Creeks Water Management Area			
2014-15	1H	1	9
	2H	4	280
2015-16	-	-	-
2016-17	1H	3	409
	2H	2	64
2017-18	2H	2	102
	1H	1	24
Boyne & Stuart Rivers Water Management Area			
2014-15	7K	1	67
	1K	1	60
2015-16	1K	1	45
2016-17	-	-	-
2017-18	1K	2	136
	3K	1	45
	4K	1	64

Table 13 – Summary of permanent trades of unsupplemented surface water allocations in plan area (land and water).

Water year	Number of transfers	Volume transferred (ML)
Burnett Water Plan		
2014-15	11	687
2015-16	6	628
2016-17	17	1 819
2017-18	19	774

Table 14 – Summary of permanent trades of unsupplemented underground water allocations in plan area (water).

Water year	Water Allocation Sub Group	Number of transfers	Volume transferred (ML)
Coastal Burnett Water Management Area			
2014-15	Burnett Elliott A	6	257
	Elliott Gregory A	1	88
	Kolan Burnett A	1	25
2015-16	Burnett Elliott A	9	378
	Elliott Gregory A	1	68
	Kolan Burnett A	9	227
	Fairymead A	3	130
2016-17	Kolan Burnett A	19	971
	Burnett Elliott A	17	555
	Fairymead A	2	50
2017-18	Kolan Burnett A	8	154
	Burnett Elliott A	11	430
	Elliott Gregory A	2	227
	Fairymead A	3	148

Table 15 – Summary of permanent trades of unsupplemented underground water allocations with land in plan area (land and water).

Water year	Number of transfers	Volume transferred (ML)
Coastal Burnett Groundwater Management Area		
2014-15	6	151
2015-16	19	572.6
2016-17	21	969.15
2017-18	30	984

Table 16 – Summary of seasonal water assignment of supplemented surface water allocations and interim water allocations.

Water year	Number of assignments	Volume assigned (ML)
Bundaberg Water Supply Scheme		
2014-15	16	11 656
2015-16	173	14 454
2016-17	295	34 386
2017-18	128	10 497
Upper Burnett Water Supply Scheme		
2014-15	30	1 266
2015-16	38	1 602
2016-17	49	2 778
2017-18	24	1 178
Barker Barambah Water Supply Scheme		
2014-15	40	3 893
2015-16	33	2 162
2016-17	63	4 532
2017-18	58	2 405
Boyne River & Tarong Water Supply Scheme		
2014-15	3	83
2015-16	4	385
2016-17	13	481
2017-18	6	430
Three Moon Creek Water Supply Scheme		
2014-15	45	1 525
2015-16	46	1 847
2016-17	49	1 815
2017-18	28	1 158

Table 17 – Summary of seasonal water assignments of unsupplemented underground water allocations in CBGMA.

Water year				
14/15	19	608.2	20	726.2
15/16	24	860.5	24	860.5
16/17	34	994.08	35	1213.73
17/18	7	227	7	227
14/15	34	1410.8	35	1403.8
15/16	39	1260.24	44	1396.14
16/17	47	1394.6	48	1349.55
17/18	24	563.75	24	554.85
14/15	3	51	3	51
15/16	5	52.5	4	32.5
16/17	4	72.7	5	122.7
17/18	0	0	2	80
14/15	8	526	6	415
15/16	10	348.6	6	232.7
16/17	11	487	8	262.4
17/18	6	278.8	4	207.7

Table 18 – Seasonal water assignment of unsupplemented surface water allocations.

Water year	Number of assignments	Volume assigned (ML)
Boyne & Stuart Rivers Water Management Area		
2014-15	2	224
2015-16	4	330
2016-17	4	452
2017-18	4	326

Table 19 – Water usage in each water supply scheme, volume taken and the percentage of entitlements.

Water year	Entitlement (ML)	Volume taken (ML)	Water taken as % of entitlements
Bundaberg Water Supply Scheme – High & Medium Priority Water			
2014-15	385 318	115 852	30.1
2015-16	384 301	137 300	35.7
2016-17	384 876	166 363	43.2
2017-18	384 662	112 093	29.1
Upper Burnett Water Supply Scheme – High & Medium Priority Water			
2014-15	48 796	15 327	32.0
2015-16	38 582	17 358	48.8
2016-17	38 504	18 949	49.2
2017-18	38 538	16 222	42.1
Barker Barambah Water Supply Scheme – High & Medium Priority Water			
2014-15	35 780	17 467	48.8
2015-16	38 256	15 221	39.8
2016-17	39 096	18 044	46.2
2017-18	27 821	10 669	38.3
Boyne River & Tarong Water Supply Scheme – High & Medium Priority Water			
2014-15	44 455	24 607	55.4
2015-16	43 525	30 929	71.1
2016-17	43 525	32 893	75.6
2017-18	43 405	34 136	78.6
Three Moon Creek Water Supply Scheme – IROL Surface Water			
2014-15	2 430	1 615	66.5
2015-16	2 430	1 815	74.5
2016-17	2 430	1 982	81.6
2017-18	2 430	1 342	55.2
Three Moon Creek Water Supply Scheme – IROL Groundwater			
2014-15	12 156	388	3.2
2015-16	12 156	4 823	39.7
2016-17	12 156	5 014	41.3
2017-18	12 156	3 493	28.7

Table 20 – Summary of unsupplemented underground water usage in CBGMA by sub area, volume taken and the percentage of entitlements.

Water year	Volume Taken (ML)	Entitlement (ML)	Water taken as % of entitlements
Kolan Burnett A			
14/15	7289	20242	36%
15/16	8203	20242	41%
16/17	8796	20157	44%
17/18	6309	20156	31%

Burnett Elliott A			
14/15	16285	31564	52%
15/16	18087	31264	58%
16/17	18818	31163	60%
17/18	16104	31118	52%
Elliott Gregory A			
14/15	683	1500	46%
15/16	760	1500	51%
16/17	877	1500	58%
17/18	847	1500	56%
Fairymead A			
14/15	5103	9682	53%
15/16	5200	9682	54%
16/17	5225	9682	54%
17/18	5100	9682	53%
Kolan Burnett B			
14/15	0	8002	0%
15/16	740	8002	9%
16/17	1797	7984	23%
17/18	1312	7984	16%
Burnett Elliott B			
14/15	0	2185	0%
15/16	0	2185	0%
16/17	0	2185	0%
17/18	0	2185	0%
Elliott Gregory B			
14/15	0	6023	0%
15/16	451	6023	7%
16/17	1150	6023	19%
17/18	729	6023	12%
Fairymead B			
14/15	0	6049	0%
15/16	714	6049	12%
16/17	2788	6049	46%
17/18	2021	6049	33%
Farnsfield B			
14/15	0	3600	0%
15/16	329	3600	9%
16/17	903	3600	25%
17/18	325	3600	9%

Table 21 – Water usage in each unsupplemented water management area, volume taken and the percentage of entitlements.

Water year			
Lower Burnett & Kolan Rivers Water Management Area			
2014-15	5 243.4	602	11.5
2015-16	5 243.4	110	2.1
2016-17	5 243.4	154	3.0
2017-18	5 243.4	30	0.6
Upper Burnett & Nogo Rivers Water Management Area			
2014-15	13 674	1 979	14.5
2015-16	13 674	352	2.6
2016-17	13 674	524	3.8
2017-18	13 674	1 054	7.7
Barker Barambah Creeks Water Management Area			
2014-15	16 363	734	4.5
2015-16	16 363	49	0.3
2016-17	16 363	181	1.1
2017-18	16 363	4	0.02
Boyne & Stuart Rivers Water Management Area			
2014-15	3 439	328	9.6
2015-16	3 439	234	6.8
2016-17	3 439	408	1.2
2017-18	3 439	269	7.8
Three Moon Creek Water Management Area			
2014-15	0	0	0
2015-16	0	0	0
2016-17	0	0	0
2017-18	770	0	0

Table 22 – Permanent trades of supplemented water allocations (transfer of ownership - water only).

Water year			
Bundaberg Water Supply Scheme			
2014-15	Medium	84	7 179
2015-16	Medium	49	3 073
2016-17	Medium	93	5 962
	High	2	200
2017-18	Medium	61	3 559
Upper Burnett Water Supply Scheme			
2014-15	Medium	16	919
2015-16	Medium	5	47
2016-17	Medium	7	680
2017-18	High	1	150
	Medium	7	460
Barker Barambah Water Supply Scheme			
2014-15	Medium	12	699
2015-16	Medium	30	1 588
2016-17	Medium	7	1 744
2017-18	Medium	11	729
Boyne River & Tarong Water Supply Scheme			
2014-15			
2015-16	Medium	2	150
	High	1	1
2016-17	Medium	2	210
	High	3	6
2017-18	Medium	6	293
	High	4	105

Appendix C: Water taken or interfered with under statutory authorisations

Table 23 – Information on water authorisations in the plan area.

Form of take	Burnett Catchment information sources
Subdivision 1 – authorisations that may not be limited by water planning instrument	
S93 General authorisations to take water. e.g. fire fighting, watering travelling stock, contaminated agricultural run-off storages	No major change in water taken under these general authorisations.
S94 General authorisations to interfere with water. e.g.. overland flow, impoundments for state monitoring purposes	No identified change in interference under this general authorisation.
S95 Aboriginal and Torres Strait Islander parties	No identified change in water take under this general authorisation There has been no notified increase in the take or interference with water for traditional or cultural activities.
S96 Land owners may take water for stock or domestic purposes	No impacts identified under this general authorisation Water use in the plan area is predominately for the irrigation of sugar cane, macadamia trees and small crops. Stock and domestic water can be taken within the plan area with some exclusions relating to underground water take in domestic areas as well as non-riparian landholders in water supply scheme areas. There have been no reported incidents of significant increases in take for stock or domestic purposes.
S97 Environmental authorities to take or interfere with overland flow	No identified change in water taken under this general authorisation. Notification for the construction of OLF storages to satisfy an environmental authority or a development permit for carrying out an environmentally relevant activity is required under the <i>Planning Regulation 2017</i> and <i>Water Regulation 2016</i> . DNRME is not aware of a significant increase in the construction of OLF dams for these purposes through the notification process.
S98 Resource activities that interfere with the flow of water by diversion of a watercourse	No identified change in water taken under this general authorisation. DNRME is not aware of an increase in the number of interferences by diversion within the plan area.
S99 Constructing authorities and water service providers	No impacts identified in water taken under this general authorisation. Limited volumes of water are required for road construction and maintenance. DNRME has record of 557 notifications by constructing authorities within the plan area over the last 4 years with up to 299ML of water taken. The highest volume taken within one year was 10.1ML.
101 Authorisations that may be altered or limited by water planning instrument or regulation.	No identified change in water taken under this authorisation. Volumes used under this authority are not known.
102 Authorisations under water plans or regulation	No impacts identified in water taken under this authorisation. Notification of the existing underground water works was required to take water under this authorisation. There have been 258 works notifications received for the taking of underground water since plan commencement in 2014. 80 of these notifications will be granted a volumetric water licence.
103 Authorisations to take water for stock or domestic purposes may be limited	No identified change in water taken under these authorities The plan limits stock or domestic take in specified domestic areas as identified in the plan schedules.

Appendix D: Ecological monitoring

A brief summary of the ecological monitoring and research relevant to evaluating the effectiveness of the plan is provided here.

White-throated snapping turtle (Elseya albagula)

New operational rules for the Ben Anderson Barrage aim to limit the inundation of nests of the 'critically endangered' white-throated snapping turtle. This turtle nests in sandy riverbanks between May and July, with hatchlings emerging from December. Previous inundation of nests from water level rises in the barrage were fatal to turtle eggs, therefore new operational rules raise barrage levels between May and July, and subsequently lower them for the rest of the year. Turtles nest in relation to water level at time of nesting therefore nests laid higher on the banks are at reduced risk from flows between July and December. Monitoring to confirm the effectiveness of this rule commenced in 2018 and have already shown that new rules have prevented the potential inundation of up to 70% of turtle nests compared to the previous management regime (**Figure 15**). This work is being undertaken in collaboration with turtle experts from the Department of Environment and Science (DES).

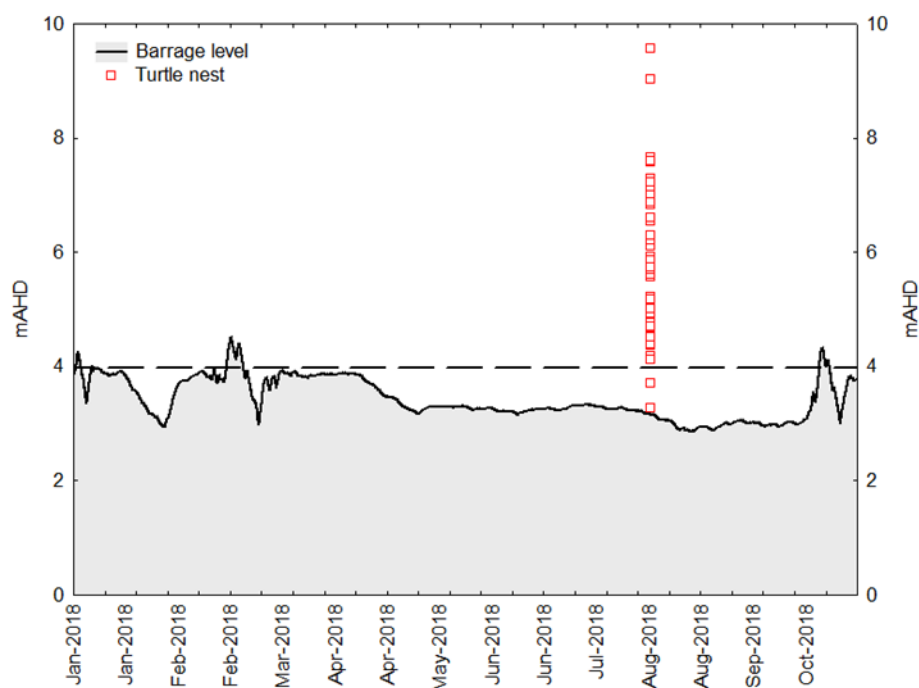


Figure 15 – Summary of Ben Anderson Barrage levels and turtle nest heights for 2018. Dashed line indicates barrage full supply level (3.97m AHD). Turtle nests were identified by the Aquatic Threatened Species unit, Wildlife and Threatened Species Operations, DES.

Recent work undertaken by the department and collaborators on lungfish population age structures revealed different recruitment patterns amongst its resident catchments: the Burnett, Mary and Brisbane rivers (Fallon et al. 2019). The work revealed that the Burnett River population was skewed towards larger fish with a peak around the 1 m size class. Age estimates for the population indicated consistent recruitment over the 65-year assessment period with a substantial proportion of fish born pre-1965 and late 2000s, and recruitment gaps from 1970-1975 and 2000-2005. Fortunately, comparison of genetic diversity between old and young fish in the Burnett River have not demonstrated any genetic erosion or exacerbated inbreeding (Schmidt et al. 2018). Further studies will be conducted to review environmental drivers (e.g. flow) that may explain these inter-river

differences. A 10-year monitoring program (2006-2016) was also undertaken by Fisheries Queensland on the Burnett River between AMTD 119 km and AMTD 201 km, during the life of the water plan (DAF 2017). This study consolidated lungfish as a common and widespread species in the Burnett River with a dominant size class > 700 mm in total length. Condition of fish fluctuated throughout the study period and no definitive decline in CPUE was observed across seven sites. A gradual downstream re-distribution of lungfish populations was observed however, with flow over water infrastructure identified as a potential cause for this observation. Flow-driven overtopping events have been previously implicated in causing mortality or serious injury to lungfish moving over dam spillways.

New environmental management rules for Australian lungfish have been enacted for Paradise Dam, Ned Churchward Weir, Claude Wharton Weir and Silverleaf Weir. These new rules aim to enhance lungfish spawning and recruitment by providing a more natural low flow regime in order to maintain aquatic plants (which lungfish spawn on) and provide more natural triggers for movement and spawning. Confirmation monitoring is follow-up work undertaken by the department to ground-truth the effectiveness of new environmental management rules in water plans. Confirmation monitoring for lungfish spawning has not commenced due to the absence of aquatic plants in the Burnett River since the 2011-13 record floods. Without aquatic plants, the effectiveness of new environmental flows for lungfish spawning cannot be adequately measured.

The Department commenced working with Sunwater to trial the transplant of aquatic plants to known spawning locations of the Australian lungfish in the Burnett River (**Figure 16**). Should the trials provide promising results, there may be scope for transplanting of aquatic plants to become a management action for Sunwater and NRM groups to mitigate impacts of the flooding.



Figure 16 – Aquatic plant transplant trials being set-up downstream of Ned Churchward Weir, Burnett River in 2018.

Estuaries

New environmental management rules for Paradise Dam have been enacted which aim to deliver natural freshwater pulses to the downstream environment for estuarine health and productivity.

Between September and December, all inflows to Paradise Dam up to 14 000 ML/d discharge, must be released to the downstream environment. Key estuarine species such as barramundi, prawns, sea mullet and mangroves; have been found to benefit from freshwater flow and brackish habitat for recruitment, growth and establishment. Since plan commencement, three environmental release periods are identified below which triggered a high flow release (**Figure 17**) without significant subsidies from flows overtopping Paradise Dam or lower catchment inflows. The magnitude of these releases from Paradise Dam were 5000, 12 000 and 17 500 ML/d which were recorded at the downstream Figtree gauge (GS136007A) as 12 500, 14 500 and 19 000 ML/d, respectively. These events created brackish conditions (15 ‰ or 24 500 µS/cm) in the Burnett River estuary for 20, 14 and 18 days respectively. Brackish events of these durations are considered suitable for stimulating productivity in the Burnett River estuarine environment.

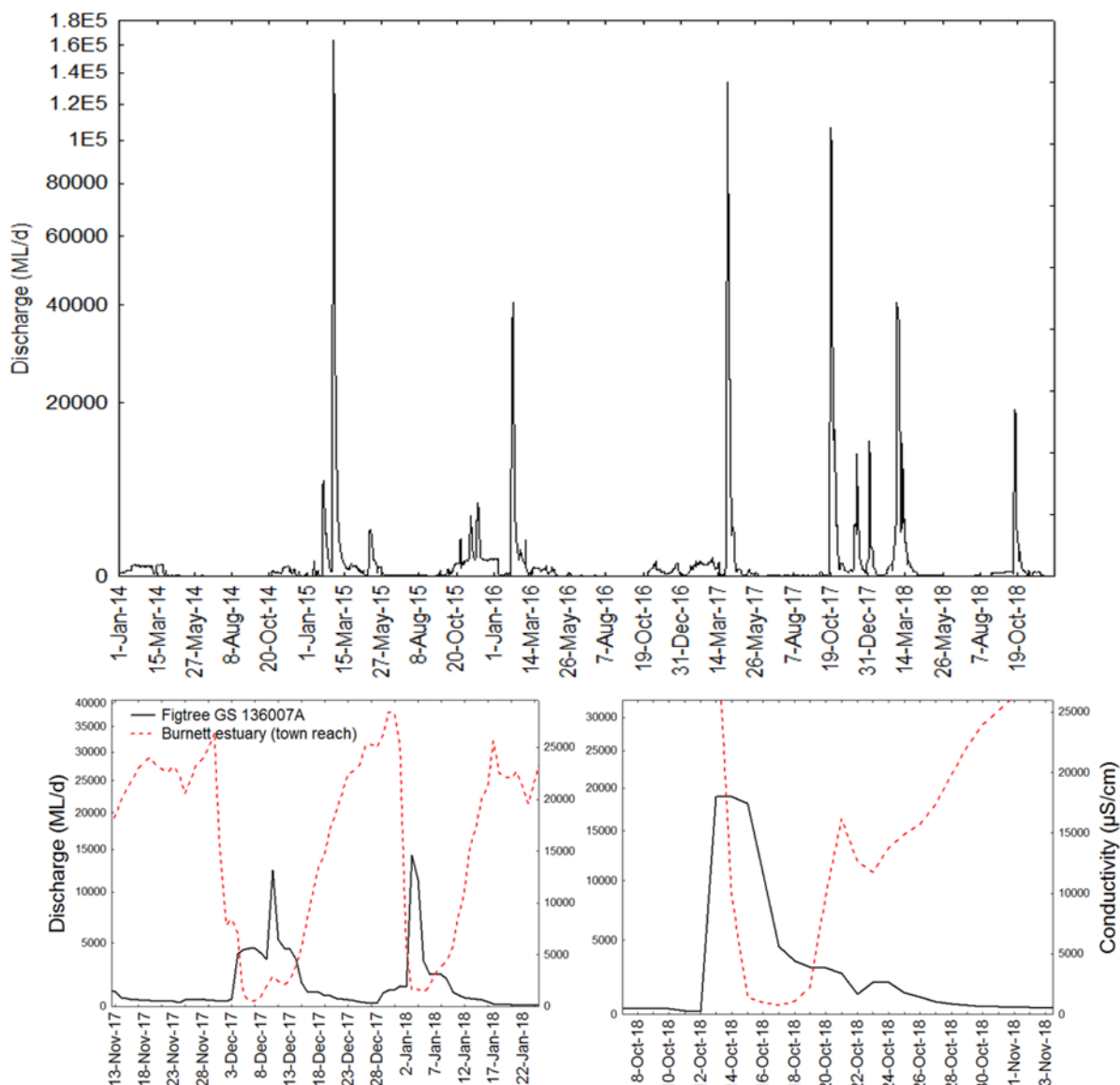


Figure 17 – Summary of flow (top - Figtree GS136007A) for the 2014-2018 period, and estuarine conductivity (Bundaberg town reach) for two Paradise Dam environmental releases in the 2017/18 period (bottom left and right). Conductivity is shown in red.

Ban Ban Springs

Ban Ban Springs are a groundwater dependent ecosystem and a place of significance to the local Aboriginal people. With intent to protect the cultural values associated with the springs, a 1 km-radius Groundwater Management Area (GMA) around the springs was enacted in the water plan. The plan prevents the construction of new bores within the GMA for non-prescribed activities but does not limit existing take or use. At the time of establishment of the GMA, best available science suggested it is a localised aquifer that provides for the springs however, the hydrogeology of the system is not well understood and is complicated by numerous basalt layers, faulting and fracturing. Monitoring undertaken by EFAP improved understanding of the spatial extent of the source aquifer that provides for the springs and assessed impact of extraction on spring water levels and discharge. Analysis of water chemistry and water level data indicate that the aquifer that provides for Ban Ban Springs is shallow and restricted spatially to within 7 km east of the springs. Rapid drawdown and recovery at the springs suggests impacts from adjacent high yielding irrigation bores, creating a pulse disturbance at the springs. Furthermore, extraction from the source aquifer up-gradient of the springs outside of the current GMA impacts down-gradient flow, potentially prolonging the recovery time at the springs and causing a more sustained, or press disturbance at the springs. A report prepared on the work recommends continuing monitoring water level and water chemistry at current monitoring sites and in addition, monitor underground water development growth by auditing new bores within the aquifer that provides for the springs. Further details can be found in 'Ban Ban Springs: hydrological investigations and assessment' (Marshall et al, 2018).

Waterholes

Waterholes have been selected as an ecological asset for the Burnett water plan focused around waterhole quality, function and refugia for all water users, including the environment. Instream elevations in salinity concentrations were identified during 2014, after record floods in 2011 and 2013 (Figure 18). Natural accumulation of salts in the landscape after a significant dry period (2005-2010) followed by record flood events (2011 and 2013), mobilised and flushed subterranean salts into the Burnett River and some of its tributaries. Subsequent low flows meant persistent higher saline underground water inputs (baseflow) to the Burnett catchment, leading to elevated salinity levels in 2014 not seen since the 1970s (**Figure 18** and **Figure 19**). Salinity levels were gradually reduced in regulated sections of the river with releases from water storage infrastructure (e.g. Figtree GS) flushing salinity out however, other unregulated areas of the catchment were only flushed by natural flows in early 2015.

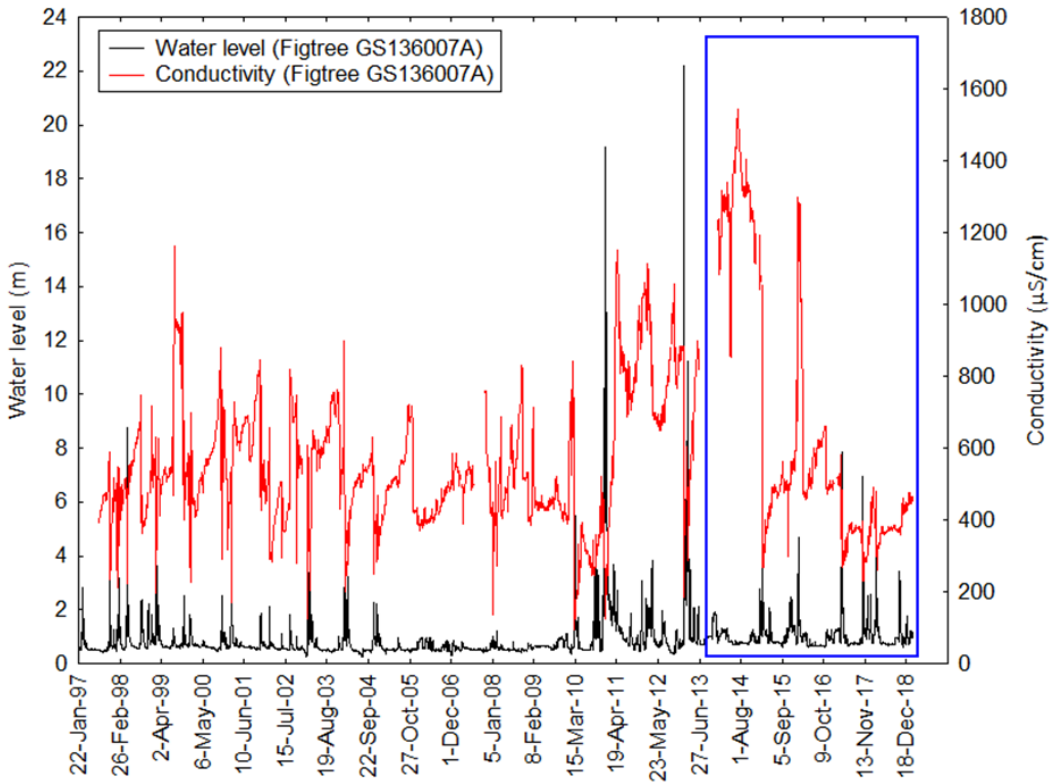


Figure 18 – Water level and conductivity for Figtree GS136007A, for entire period of data collection. Blue insert indicates current water plan period.

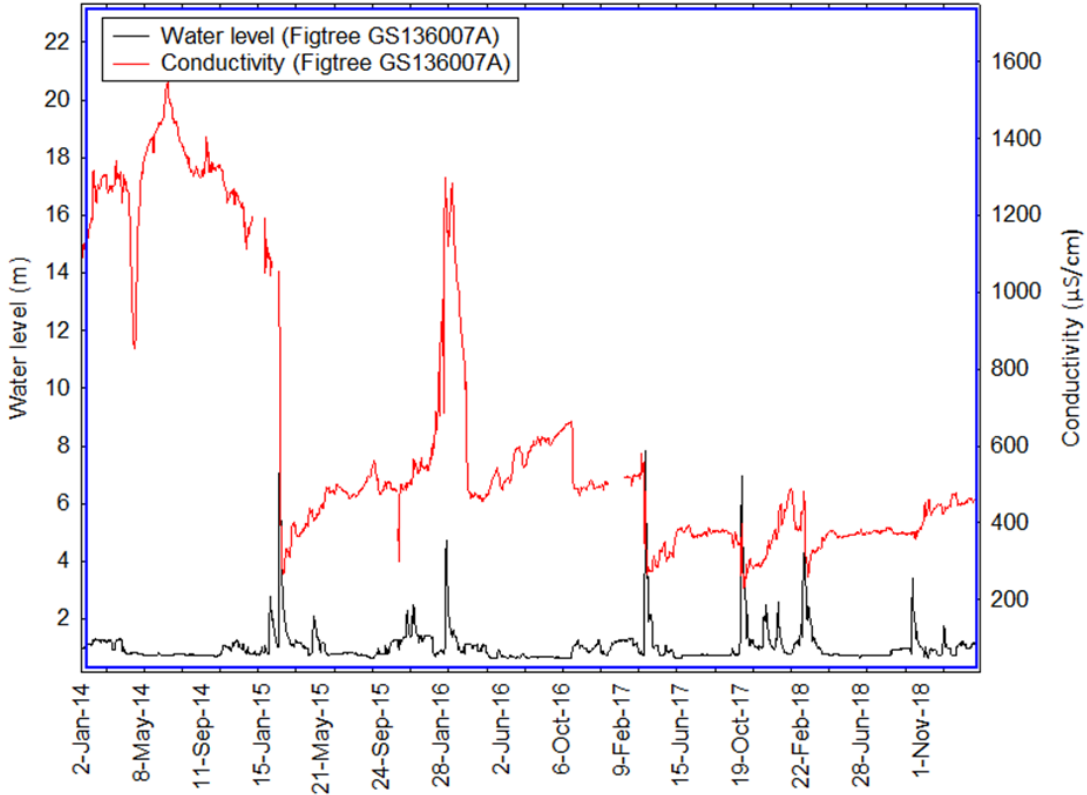


Figure 19 – Elevated salinity levels observed in the Burnett River, 2014.

Appendix E: Water monitoring

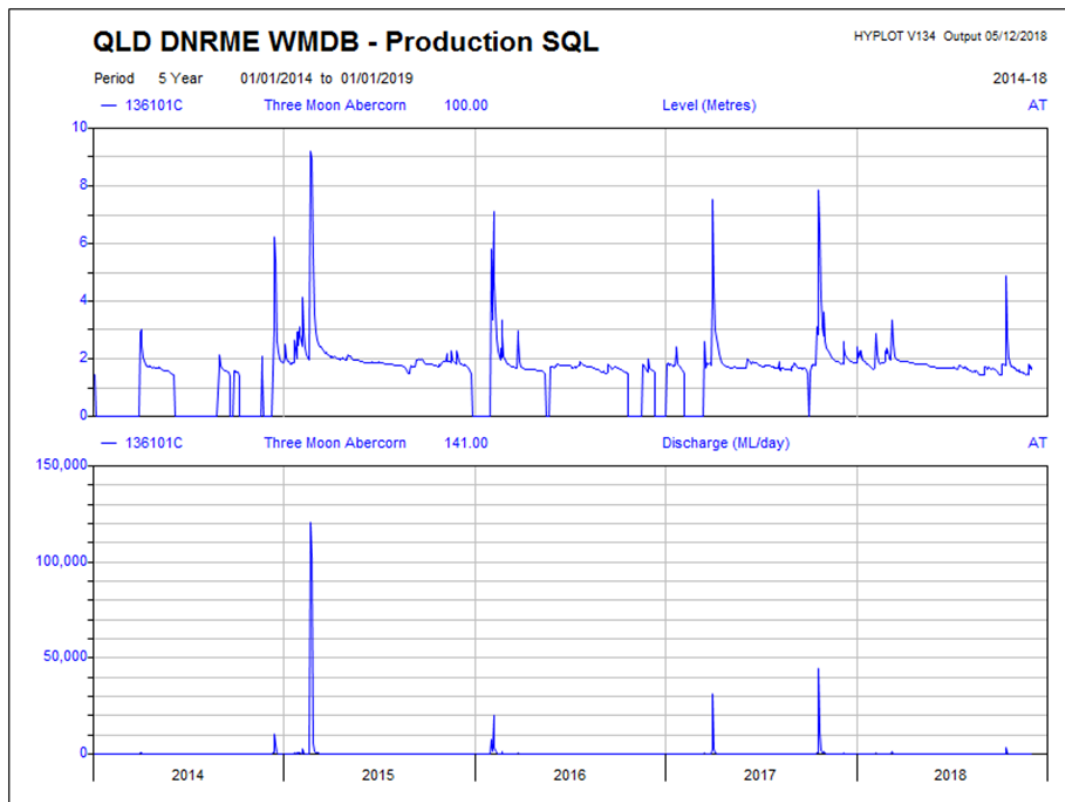


Figure 20 – GS 136101C Three Moon Creek at Abercorn 2014–2018.

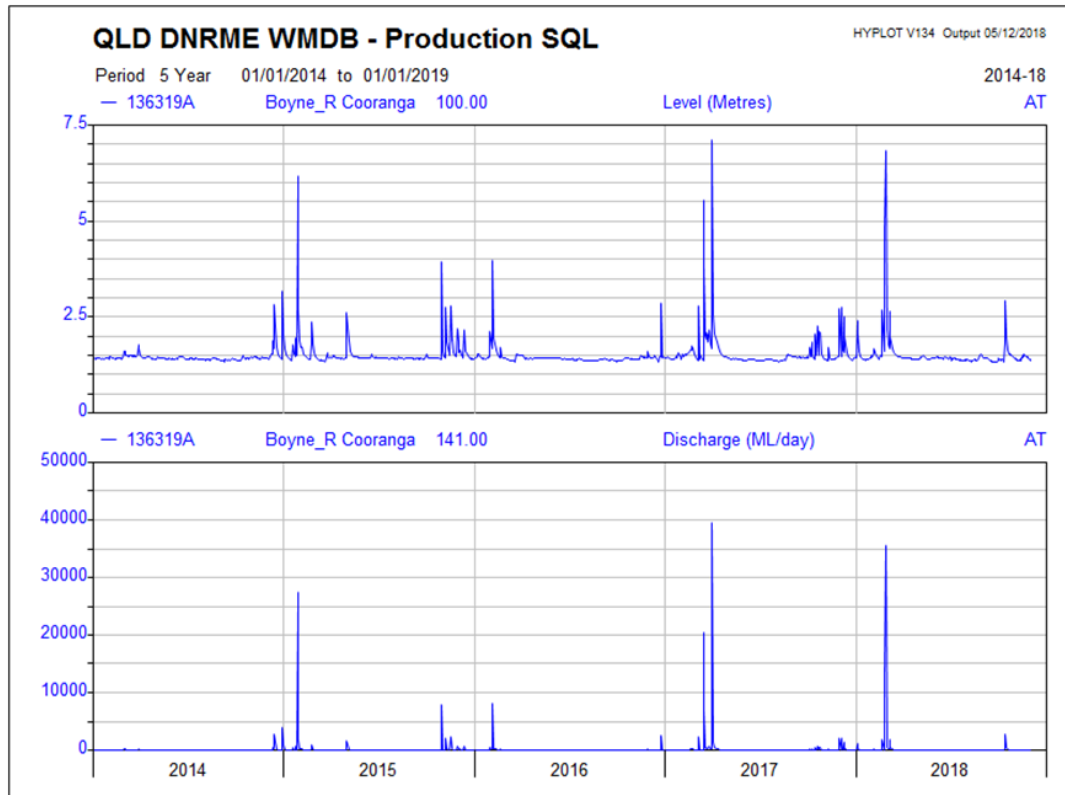


Figure 21 – GS 136319A Boyne River at Cooranga 2014–2018.

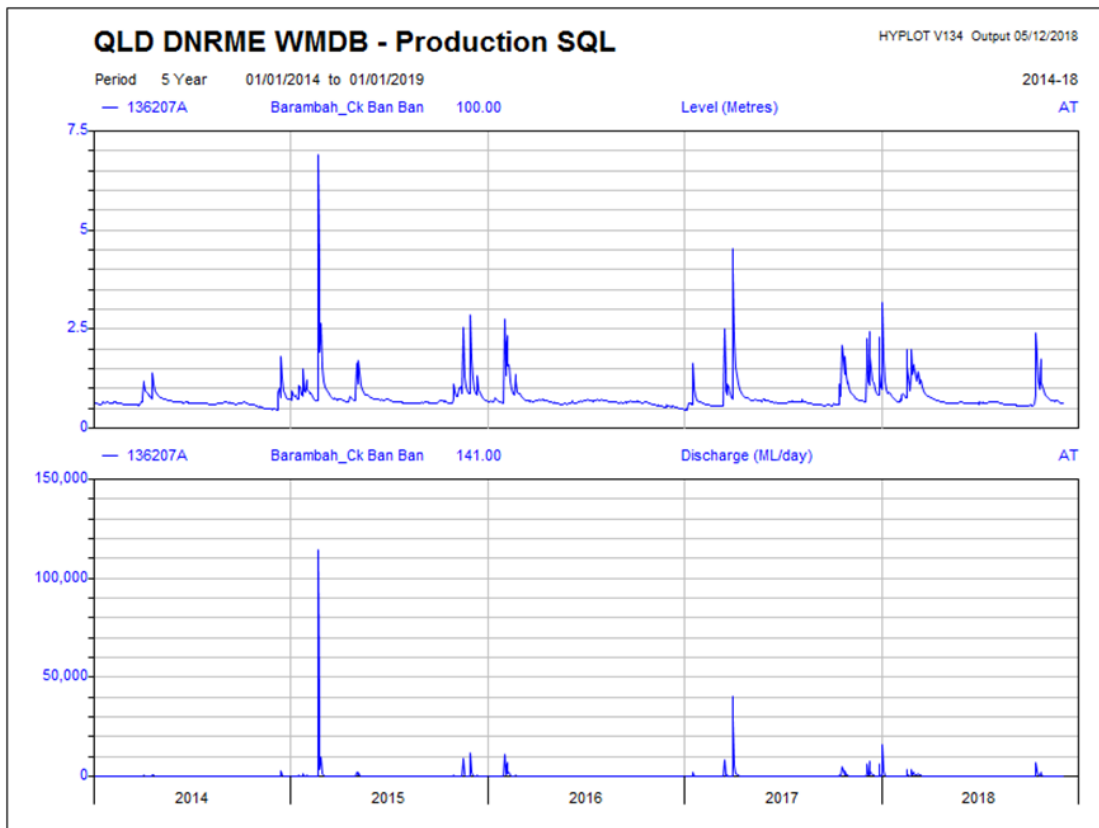


Figure 22 – GS 136207A Barambah Creek at Ban Ban 2014–2018.

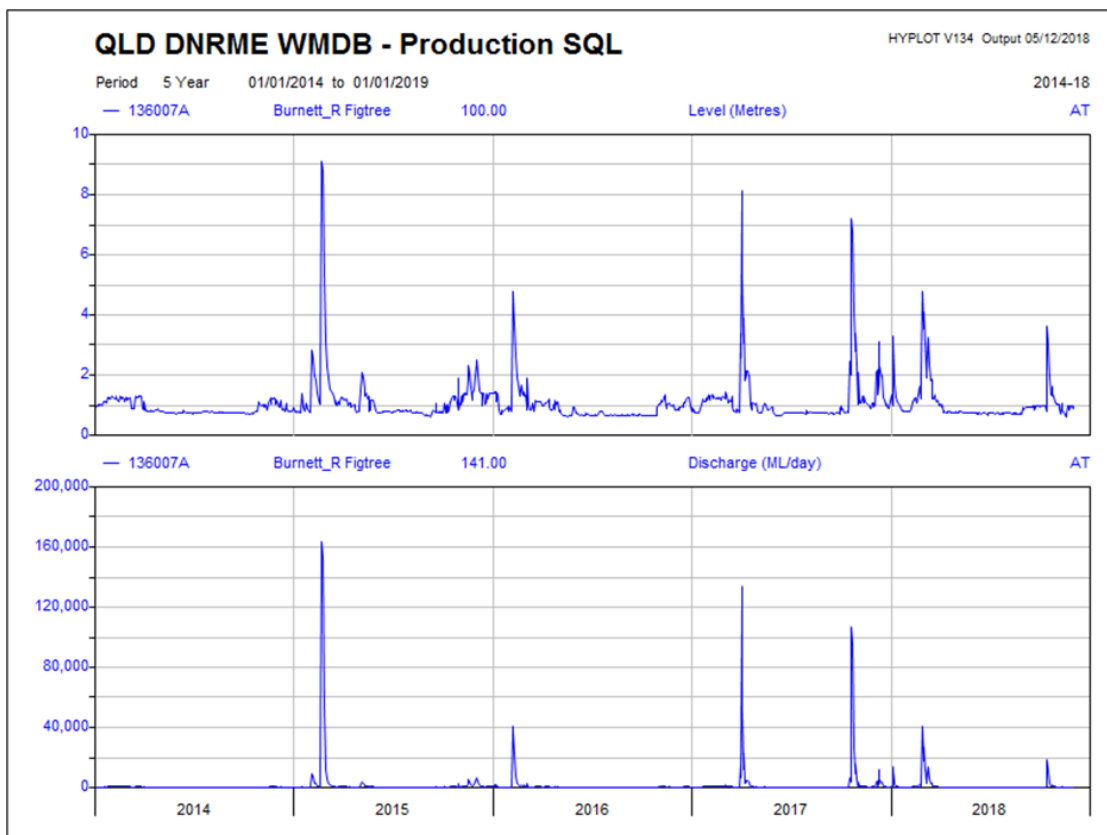


Figure 23 – GS 136007A Burnett River at Figtree Creek 2014–2018.

Table 24 – Maximum instantaneous discharges since commencement of the plan for selected gauging stations in the Burnett Basin.

Gauging Station Number	Stream, Location	Maximum Instantaneous Discharge (ML/day)	Month and Year of Peak
136108A	Monal Creek at Upper Monal	64 490	February 2015
136101C	Three Moon Creek at Abercorn	120 600	February 2015
136103B	Burnett River at Ceratodus	157 900	February 2015
136106A	Burnett River at Eidsvold	190 200	February 2015
136305A	Auburn River at Dykehead	74 720	February 2018
136306A	Cadarga Creek at Brovinia	35 490	March 2017
136319A	Boyne River at Cooranga	39 630	March 2017
136094A	Burnett River at Jones Weir Tailwater	179 900	February 2015
136006A	Reid Creek at Mungy	67 210	February 2015
136203A	Barker Creek at Brooklands	5204	March 2017
136208A	Boonara Creek at Ettiewyn	37 220	March 2017
136207A	Barambah Creek at Ban Ban	114 400	February 2015
136002D	Burnett River at Mt Lawless	265 100	February 2015
136007A	Burnett River at Figtree Creek	164 200	February 2015

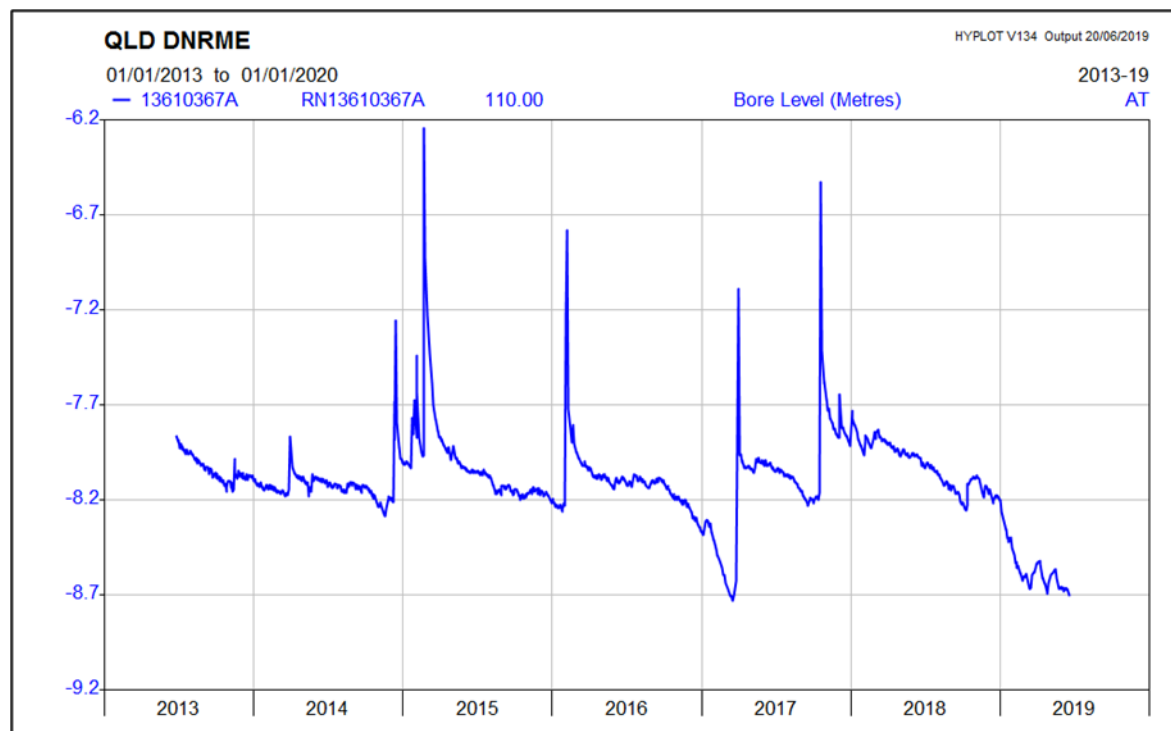


Figure 24 – Example underground water level plot for the Upper Burnett Groundwater Management Area (2013–2019).

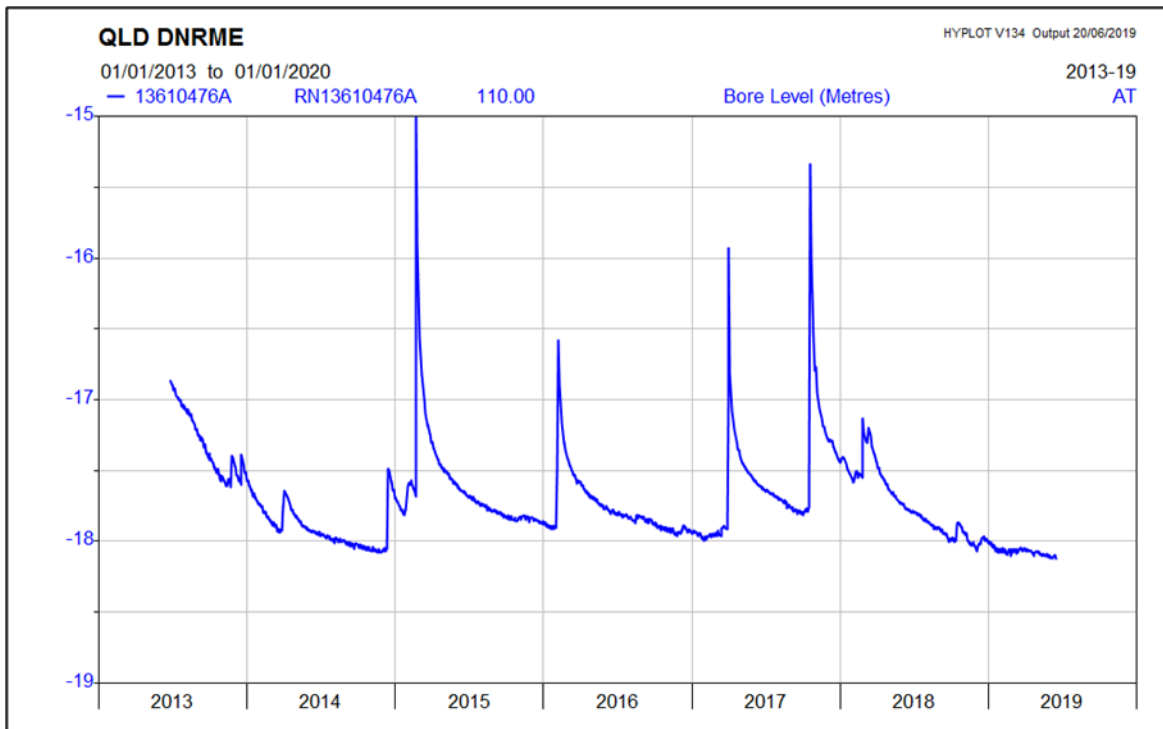


Figure 25 – Example underground water level plot for the Central Burnett River Groundwater Management Area (2013-2019).

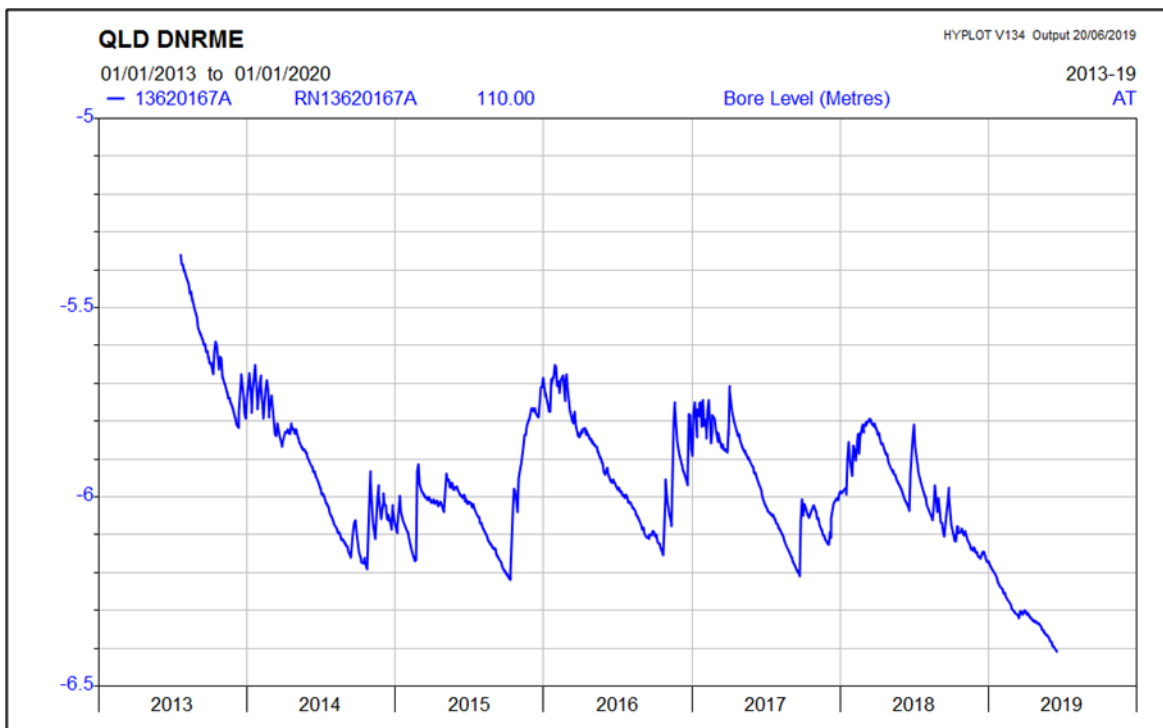


Figure 26 – Example underground water level plot for the Barambah Creek Groundwater Management Area (2013-2019).

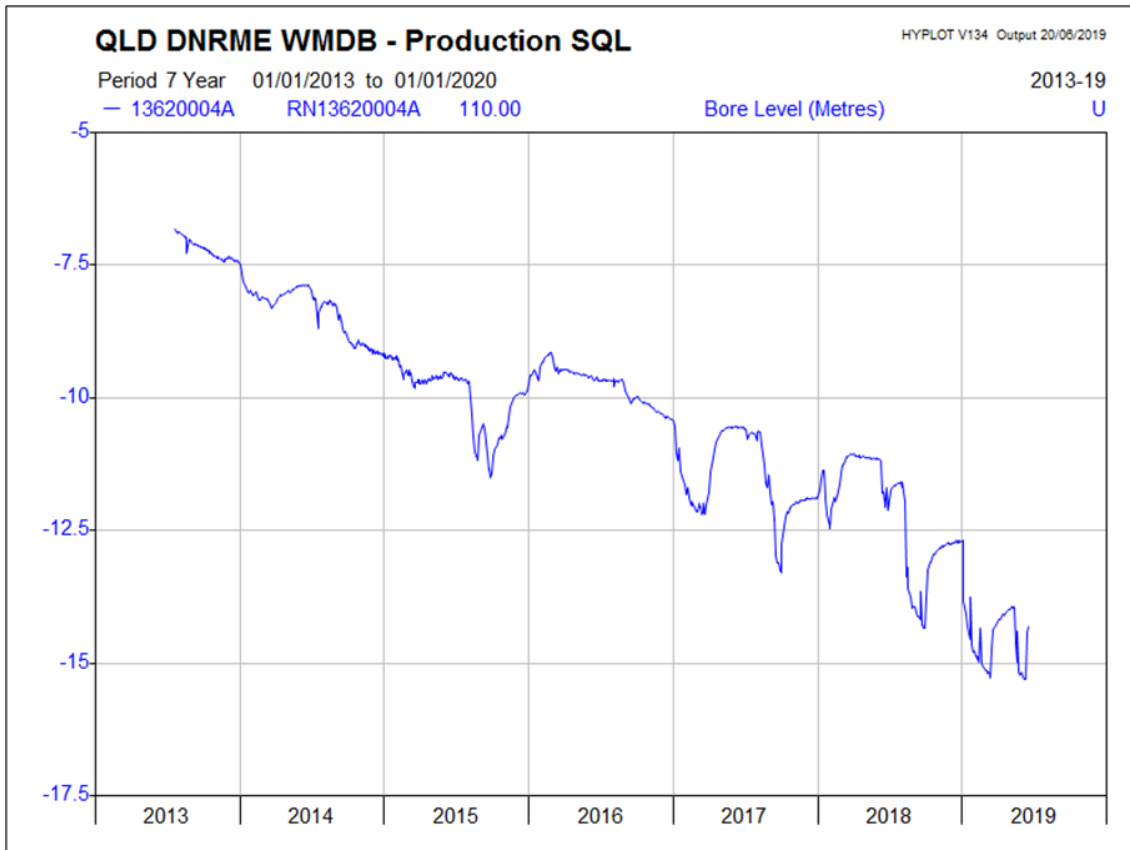


Figure 27 – Example underground water level plot for the Barker Creek Groundwater Management Area (2013-2019).

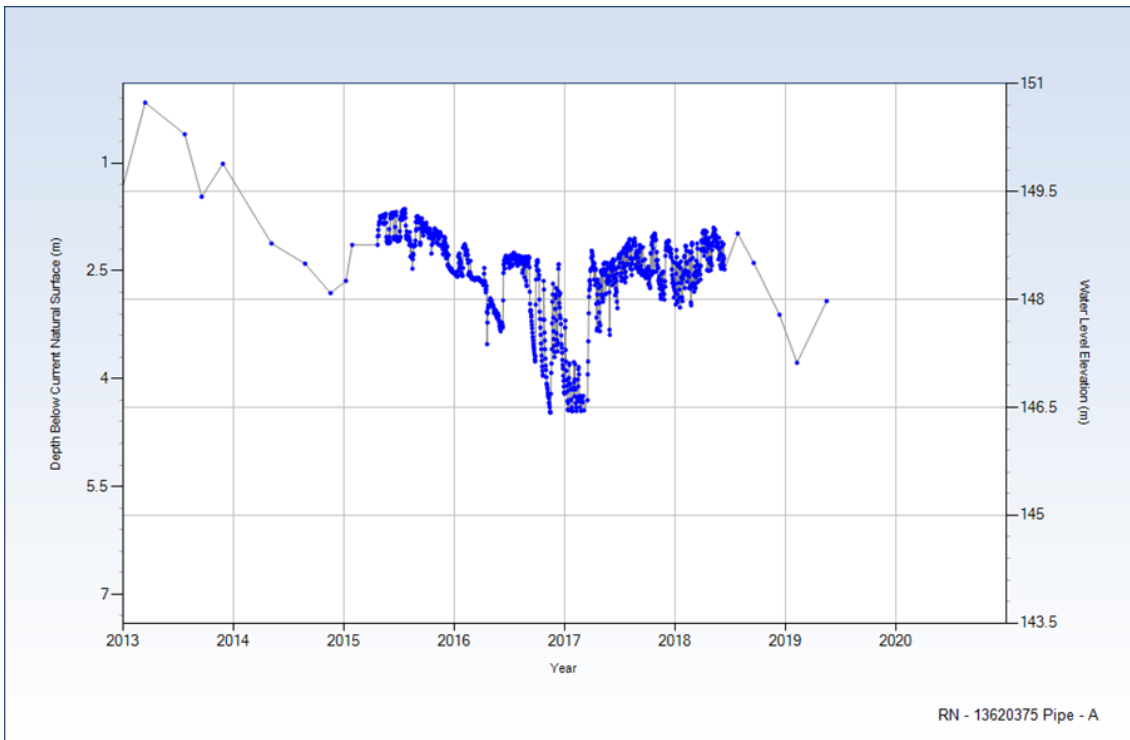


Figure 28 – Example underground water level plot for the Ban Ban Springs Groundwater Management Area (2013-2019).

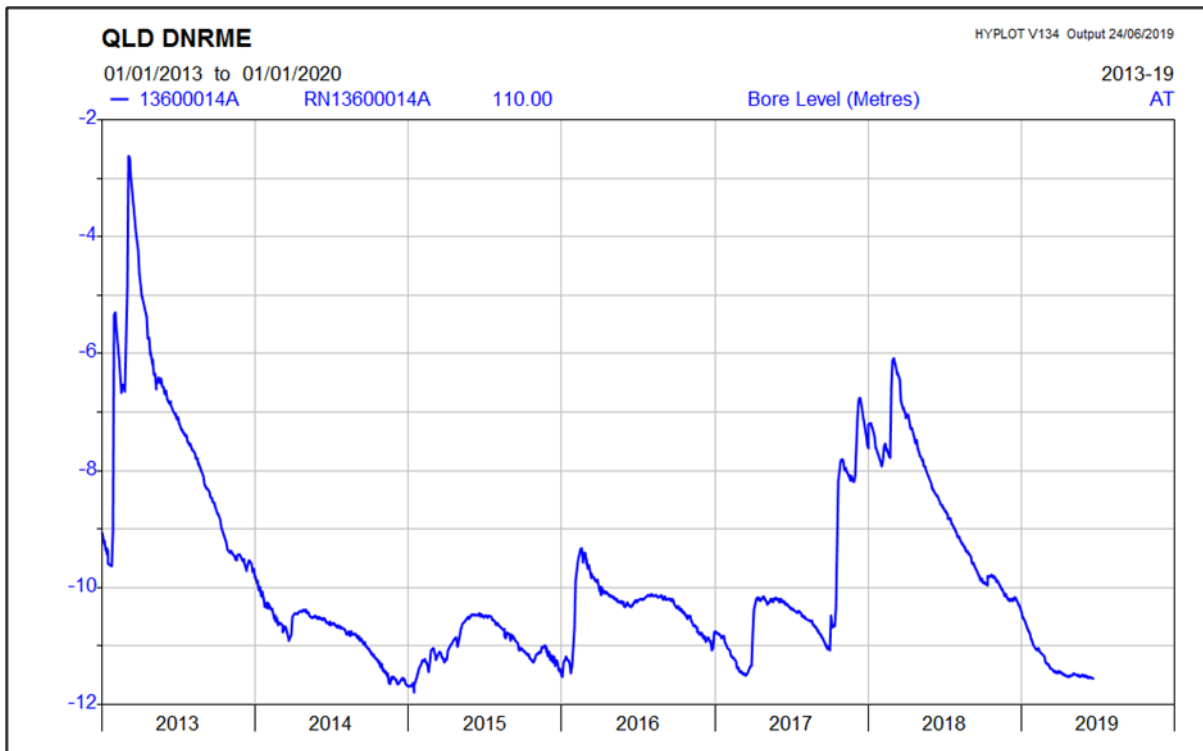


Figure 29 – Example underground water level plot for the Coastal Burnett Groundwater Management Area, Management Unit 1, Elliott Formation (2013-2019).

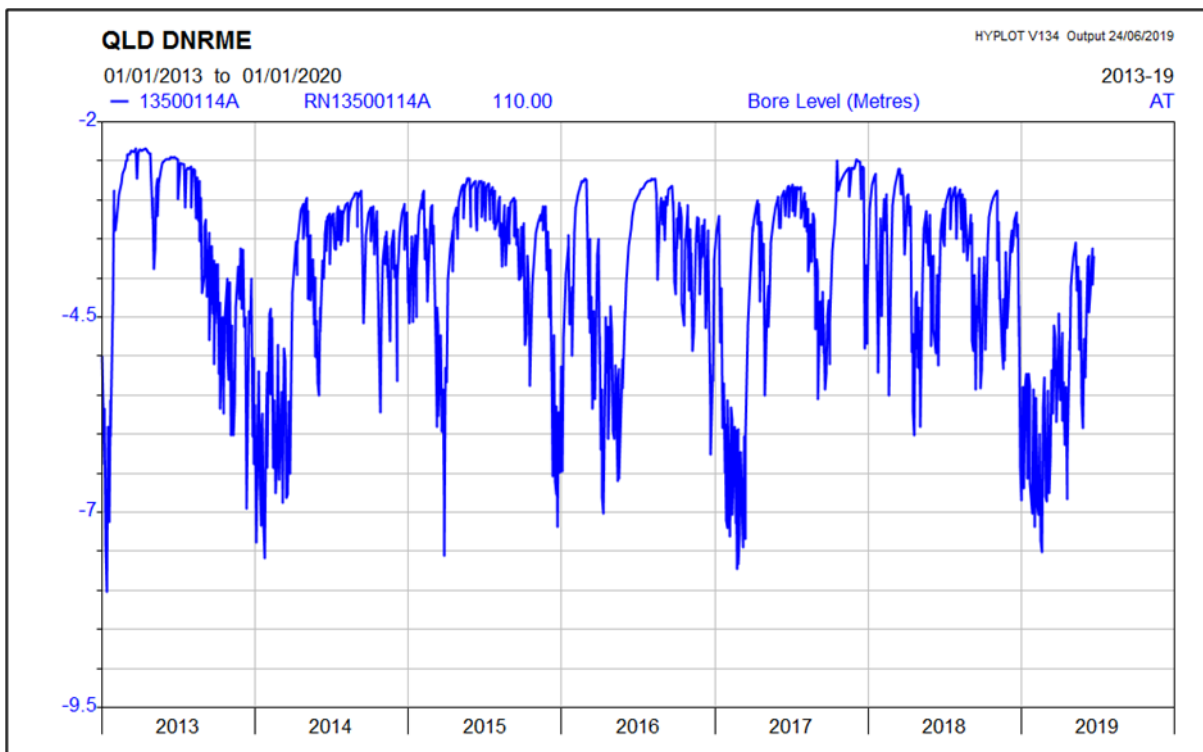


Figure 30 – Example underground water level plot for the Coastal Burnett Groundwater Management Area, Management Unit 2, Fairymead Beds.

Appendix F: Operational reporting by ROL holders

Table 25 – Summary of operational reports by water supply scheme.

Incident	Details	Management Actions
Barker Barambah Water Supply Scheme		
Nil to report		
Boyne River and Tarong		
Nil to report		
Bundaberg		
Environmental management rules	December 2014 - flood repair works being planned for the Ben Anderson Barrage, refurbishment of main regulating gate on environmental release tower, auxiliary hydraulic and electrical systems and non-operational gantry crane.	Sunwater provided an operational report of the planned works stating inability to meet the large environmental release requirements.
Operating levels of storages	February 2015 - flood repairs planned due to Cyclone Oswald at Ben Andersen Barrage. Repairs to be undertaken on scoured upstream areas, damaged gantry crane and upgrade to the cathodic protection system.	Sunwater provided an operational report of the planned works, the duration of the project and the extent of the non-compliance with the water level requirements in the barrage.
Fish Stranding	March 2015 - shutters at Ben Andersen Barrage were restored to their operational position and lungfish were stranded downstream of the barrage.	Sunwater provided an operational report of the incident and resulting in a joint Sunwater and DNRM operation successfully capturing and relocating 5 lungfish.
Operating levels of storages	October 2015 - flood repairs at Ben Anderson Barrage almost complete.	Sunwater provided an operational report to advise that the nominal operating level of the barrage will gradually be restored.
Environmental management rules	November 2015 - undertaking of removal of dislodged stainless steel liner from the environmental outlet at Paradise Dam therefore will be altering the release method via an irrigation outlet.	Sunwater provided an operational report to advise that the releases will not be made via the environmental outlet and notified of alternative methods and recording of measurements of volumes released.
Operating levels of storages and Environmental management rules	April 2016 - undertaking of planned repairs from flood damage to Paradise Dam therefore failure to be able to comply fully with the release requirements.	Sunwater provided an operational report to advise that the strengthening of toes at the left and right monoliths will impact releases and storage level will be low. Ben Anderson barrage will remain below nominal operating level during the works.
Operating levels of storages and Environmental management rules	September 2016 - undertaking of planned repairs from flood damage to Paradise Dam therefore failure to be able to comply fully with the release requirements.	Sunwater provided an operational report to advise that the strengthening of toes at the left and right monoliths will impact releases and storage level in the Ben Anderson Barrage will be low. Ben Anderson barrage will remain below nominal operating level during the works.

Operating levels of storages and Environmental management rules	September 2016 - undertaking of planned repairs from flood damage to Paradise Dam therefore failure to be able to comply fully with the release requirements.	Sunwater provided an operational report to advise that the strengthening of toes at the left and right monoliths will impact releases and storage level will be low. Ben Anderson barrage will remain below minimum operating level during the works.
Operating levels of storages and Environmental management rules	November 2016 - undertaking of planned repairs from flood damage to Paradise Dam therefore failure to be able to comply fully with the release requirements.	Sunwater provided an operational report to advise that the strengthening of toes at the left and right monoliths will impact releases and storage level will be low. Ben Anderson barrage will remain below minimum operating level during the works.
Environmental management rules	September 2017 - revision of intention to amend the storage inflow derivation technique for Paradise Dam and potential impact of Water Harvesters on inflow into Paradise Dam	Sunwater provided an operational report to advise of the effect of the proposed change to include environmental releases and to exclude releases from Claude Wharton Weir for water harvesters.
Operating levels of storages	October 2017 - Inspection integrity of epoxy grout on stainless steel liner from the environmental outlet at Paradise Dam.	Operational report submitted to notify of the situation relating to the preferred operating arrangements at Paradise Dam. Inflows to be utilised to restore Paradise Dam to full supply level
Three Moon Creek		
Nil to report		
Upper Burnett		
Environmental management rules	October 2016 - bridge works at Glenmore gauge impacting on readings	Sunwater provided an operational report to advise that they will be submitting an estimate of the flow during the period of works and will re-rate the discharge relationship at the site on completion of the bridge.

Appendix G: Plan amendments and milestones

Table 26 – Summary of plan amendments and milestones.

Effective date	Milestone
22 August 2014	<p><u>Water Plan (Burnett Basin) 2014 SL No. 184 (prev. Water Resource (Burnett Basin) Plan 2014)</u></p> <p>The plan commenced in August 2014 and provides for the allocation and sustainable management of surface water and groundwater 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; • providing a framework for establishing water allocations; • providing a framework for reversing, where practicable, degradation in natural ecosystems; • regulating the take of overland flow water and groundwater
5 December 2014	<p><u>Water Reform and Other Legislation Amendment Act 2014 No. 64</u></p> <p>An amendment in December 2014 related to limiting non-riparian stock and domestic take from water supply schemes.</p>
6 December 2016	<p><u>Water Reform and Other Legislation Amendment Act 2014 No. 64</u></p> <p>The <i>Water Reform and Other Legislation Amendment Act 2014</i> amended the water resource plan to become a water plan.</p>
6 December 2016	<p><u>Water Regulation 2016 SL No. 216</u></p> <p>The <i>Water Regulation 2016</i> remakes the <i>Water Regulation 2002</i>. To a large extent, the content of the <i>Water Regulation 2002</i> has been retained. In addition to continuing existing provisions, the <i>Water Regulation 2016</i> 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 uncommenced amendments 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.
2 September 2017	<p><u>Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017 SL No. 164</u></p> <p>The Water Plan (Great Artesian Basin and Other Regional Aquifers) 2017:</p> <ul style="list-style-type: none"> • defines the availability of water in the plan area; • provides a framework for sustainably managing water and the taking of water; • identifies priorities and mechanisms for dealing with future water requirements; and • provides a framework for reversing, where practicable, degradation in natural ecosystems.

Appendix H: Overview of non-compliance

Table 27 – Summary of non-compliance cases occurring within the Burnett plan area over past five years.

Water year	Number of non-compliance	Type of non-compliance	Outcome of DNRME investigation
2013/14	28	22 overuse of entitlements 6 unauthorised takes	13 advisory letters 1 warning notice 13 no offence detected 1 permit issued to client
2014/15	18	14 overuse of entitlements 4 unauthorised takes	6 advisory letters 5 warning notices 7 no offence detected
2015/16	20	17 overuse of entitlements 3 unauthorised takes	15 advisory letters 1 warning notice 1 compliance notice
2016/17	18	12 overuse of entitlements 6 unauthorised takes	7 advisory letters 2 warning notices 8 no offence detected 1 seasonal assignment of unsupplemented water notice
2017/18	13	11 overuse of entitlements 2 unauthorised takes	11 advisory letters 1 warning notice 1 no offence detected