NSW GOVERNMENT

Natural Resources Commission

Final report

Review of the Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012

June 2022

Acknowledgement of Country

The Natural Resources Commission acknowledges and pays respect to Traditional Owners and Aboriginal peoples. The Commission recognises and acknowledges that Aboriginal peoples have a deep cultural, social, environmental, spiritual and economic connection to their lands and waters. We value and respect their knowledge in natural resource management and the contributions of many generations, including Elders, to this understanding and connection.

In the Plan area, the Commission pays its respects to the Bigambul, Githabul, Kambuwal, Gomeroi/Kamilaroi/Gamilaraay, Kwiambul, Ngarabal and Western Bundjalung People, Traditional Owners past, present and future, as well as other Aboriginal peoples for whom these waterways are significant. The Commission hopes that the involvement of Aboriginal peoples and Local Aboriginal Land Councils throughout the review process will help to shape collaborative water planning and sharing that is beneficial to Aboriginal peoples and their Country.

Enquiries

Enquiries about this report should be directed to:

Phone	(02) 9228 4844
Fax	(02) 9228 4970
E-Mail	nrc@nrc.nsw.gov.au
Postal address	GPO Box 5341, Sydney NSW 2001

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Acronyms and units of measurement

Act	the *Water Management Act 2000* (NSW)
AWD	Available water determination
BDL	Baseline Diversion Limit
CEWO	Commonwealth Environmental Water Office
Commission	the Natural Resources Commission
DoI-Water	Former NSW Department of Industry – Water
DPE	Department of Planning and Environment
DPE-E&H	Department of Planning and Environment – Environment and Heritage
DPE-Water	Department of Planning and Environment – Water
DPI	Department of Primary Industries
DPIE*	Department of Planning, Industry and Environment
DPIE-EES*	Department of Planning, Industry and Environment – Environment, Energy and Science division
DPI-Fisheries	Department of Primary Industries – Fisheries
GL	Gigalitre (unit of volume equivalent to one billion (1×10^9) litres
HEVAE	High Ecological Values Aquatic Ecosystem
LALC	Local Aboriginal Land Council
LGA	Local government area
LTAAEL	Long-term average annual average extraction limit
MER	Monitoring, evaluation and reporting
ML	Megalitre (unit of volume equivalent to one million (1×10^6) litres
NARCliM	NSW and ACT Regional Climate Modelling Project
NRAR	Natural Resources Access Regulator
NSW	New South Wales
R / SA	Recommendation / Suggested action
SDL	Sustainable Diversion Limit
Tenterfield Creek Plan	*Water Sharing Plan for the Tenterfield Creek Water Source 2003*

***Note regarding DPIE / DPE**: During this review, DPIE was restructured and renamed to DPE. The water related functions of DPIE were transferred to DPE. DPIE-EES was renamed DPE-E&H. Where text refers to something that occurred while the department was DPIE, it is referred to as such.

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Executive summary

The Natural Resources Commission (the Commission) has reviewed the *Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012* (the Plan) as required under Section 43A of the *Water Management Act 2000* (the Act).

The Commission has assessed the extent to which provisions in the Plan have contributed to achieving environmental, social, cultural, and economic outcomes, and identified where changes to provisions are warranted. The issues identified in this review indicate a material risk that the Plan is not adequately contributing to the achievement of these outcomes. The Commission considers that the changes needed warrant extending and remaking the Plan.

The Plan's water sources are highly connected to adjacent regulated river water sharing plans but the Plan does not adequately consider these connections. This creates a significant risk that broader outcomes in the Border Rivers catchment area, as well as downstream, are not achieved.

The Plan creates inequities between users, which is inconsistent with the Act. Some users in the Plan area have access to water that is protected in, and provided from, connected regulated rivers for specific purposes, including replenishment flows, held environmental water, and water intended to contribute to downstream flow targets. Plan rules that contribute to inequities risk further eroding water users' trust in NSW water management and restrict the ability of water markets to facilitate change.

The Plan does not adequately protect environmental and cultural assets, including the highly significant Boobera Lagoon. Access rules are not based on an assessment of environmental flow or basic landholder needs. Further, the level of entitlement significantly exceeds the Plan's extraction limits. Despite this, assessment of compliance with these limits has not been undertaken to determine appropriate available water determinations (AWDs), creating a considerable risk that planned environmental water may be extracted. Finally, town water supply reached critical levels during the drought and town water is likely to remain under continued pressure from climate change.

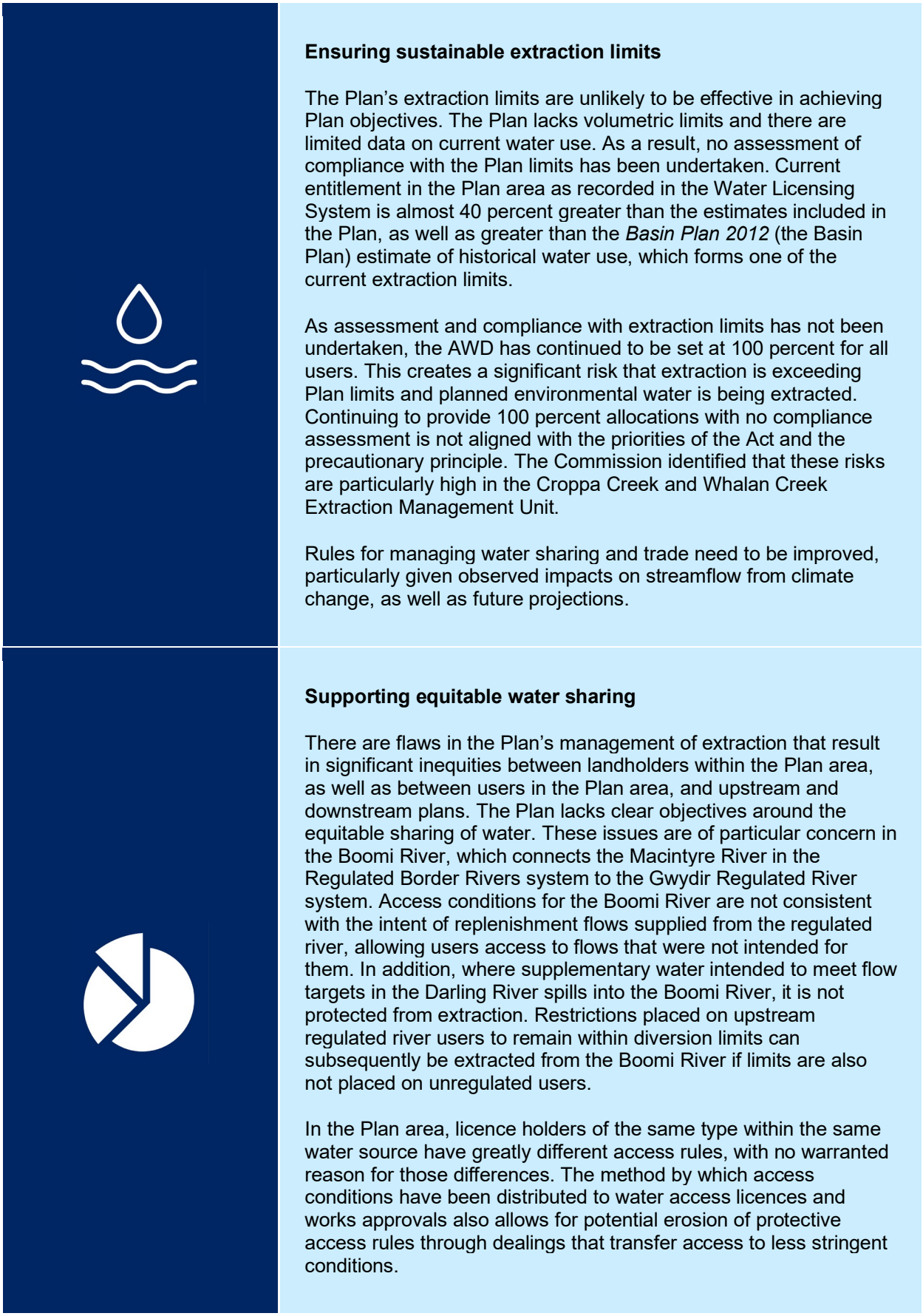
Although these issues are significant, considerable work is being undertaken in the Plan area to understand environmental and town water needs and risks, and there is existing capacity to better measure extraction through the gauging network. This information can be drawn upon to quantify sustainable extraction and strengthen rules in a remade Plan.

Overall finding on Plan extension and replacement

The Commission has identified several opportunities to improve outcomes that justify replacing the Plan. The Commission recommends an extension of up to two years to the existing Plan to allow time to undertake required data collection and analysis, consultation, and development of amended provisions (see **Table 1**).

A summary of key areas to improve the Plan are outlined in **Figure 1**. To ensure clarity, the Commission has developed a detailed set of 13 recommendations and five suggested actions (**Table 1**).

Figure 1: Key areas to improve Plan performance



Recognising and protecting Aboriginal values, rights and interests

The Plan contains some of the most significant Aboriginal cultural places in NSW. The Plan's objectives were updated in Plan amendments in 2020 as part of the water resource planning process, including generic objectives and indicators to protect cultural values across the Murray Darling Basin. However, Aboriginal stakeholders in the Plan area were not consulted to tailor these, and current understanding of values is not adequate to protect and monitor them. While Plan rules allow for amendments to ensure cultural values are protected, work has not been undertaken to ensure they are adequately protected.

Plan rules also allow unacceptable impacts to the highly significant Boobera Lagoon. There are native title determinations and claims and Aboriginal Places that require appropriate consultation, consideration, and protection under the Plan.

Strengthening environmental protections

Most licence holders currently have a default access condition of 'no visible flow', despite available gauging in some water sources. This is not based on an assessment of environmental needs and is likely inadequate to protect the water sources and their ecosystems. Rules in the previous water sharing plan for Tenterfield Creek Water Source removed licence holders' rights to drawdown certain in-river pools. This allowance was reintroduced for some users when the water source was incorporated into the Plan. This is a potential erosion of protections for in-river pools, as well as being inequitable. The Plan does not adequately manage connectivity, including protecting low flows, end of system flows, first flush and significant wetlands. There are also opportunities to strengthen the management of water quality issues, maintain protections for high ecological value third order streams, and incorporate new data.

Securing town water supply

The Plan was not effective in managing the major droughts experienced over the life of the Plan. While the annual volume of water allocated under entitlement for town water supply is considered adequate, the availability of water during droughts and for use in emergency events – including bushfires – became a major issue during the Plan period. Plan provisions should reflect the latest town water planning and protect town water to the maximum extent possible consistent with the Act, including during dry sequences.

Table 1: Recommendations (R) and suggested actions (SA)

Overall recommendation	
R 1	The Plan should be: a) extended for up to two years until 30 June 2024, to allow time to complete data collection and analysis, consultation, and development of amended provisions b) replaced by 1 July 2024 at the latest, supported by the completion of the recommendations of this review.
Ensuring sustainable extraction limits	
R 2	The Department of Planning and Environment – Water (DPE-Water) should establish and include in the remade Plan sustainable, numeric long-term average annual average extraction limits (LTAAELs) and undertake the required compliance assessments against LTAAELs to ensure sustainable extraction. This should include: a) preparing accurate estimates of historic extraction to allow calculation of up-to-date LTAAELs b) preparing estimates of current extraction based on reasonable estimates of all forms of take (noting it is unrealistic to expect all water users will be metered), and assess the potential that extraction has increased c) ensuring LTAAELs and other Plan provisions are based on best available information, including around: i. ecological requirements ii. risk of LTAAEL non-compliance from entitlement exceeding LTAAEL and/or growth in extraction iii. risks posed by all floodplain harvesting activities on water sources, water-dependent ecosystems and downstream water users iv. climate change projections, including long-term climate data sets, updated models, and contemporary observations of streamflows and water access during the most recent drought (2017 to 2019) d) updating the share components of access licences listed in Part 5, Division 3 in the Plan (Requirements for water for extraction under access licences) with entitlements issued and recorded in the WaterNSW Water Licensing System e) updating the estimated requirements for water for basic landholder rights in Part 5, Division 2 of the Plan (Requirements for water for basic landholder rights), including volumes for domestic and stock rights, native title rights and harvestable rights.
R 3	Until extraction is measured and LTAAEL compliance is assessed, to adequately protect the priorities of the Act and ensure implementation of the precautionary principle, DPE-Water should: a) include AWD provisions requiring the Minister to consider setting an AWD each year equal to the ratio of the LTAAEL (or the Baseline Diversion Limit [BDL]) to the associated entitlement unless available evidence justifies a lesser reduction. This should apply to all unregulated river access licences, including special additional high flow access licences. It should not apply to local water utility and domestic and stock access licences.

	b) engage with license holders early in the remake process to ensure the risk of reduced AWDs is transparent and to understand potential impacts to users so that environmentally protective AWDs are set in a manner that minimises impacts on license holders.
R 4	In the Plan remake, to reduce pressure on low flows and enhance economic opportunities, DPE-Water should: a) investigate options to increase flexibility to trade into high flow by: i. examining the existing conditions in Schedule 1A for adequacy as a high flow condition and place those licences in a high flow category ii. where no conditions currently exist, develop high flow cease to pump conditions b) amend Division 2 of Part 8 to allow for the creation of a high flow category c) assess the Part 10 access dealing rules and replace current trade restrictions with specific restrictions only where necessary. Any changes to trade rules should maintain protections for high-value aquatic ecosystems and cultural values.
SA 1	Ahead of the Plan remake, the NSW Government should prioritise resources for DPE-Water for the purpose of establishing fixed, numeric LTAAELs and undertaking LTAAEL compliance for unregulated water sharing plans where there is a high risk of extraction exceeding limits, including for the NSW Border Rivers Unregulated water sources.
SA 2	To improve transparency for water users and ensure extraction estimates are accurate, DPE-Water should: a) investigate and reconcile differences in the take of water from unregulated rivers and runoff dams (excluding basic rights) using best available information, including recent floodplain harvesting modelling b) update estimates of historic extraction for the BDLs under the Basin Plan with all historic take, including all water access licences that were converted from *Water Act 1912* licences c) review the volume of take of water from unregulated rivers included in the *NSW Border Rivers Surface Water Resource Plan* (withdrawn) for consistency with the access licences issued and recorded in the WaterNSW Water Licensing System d) undertake investigations to determine the volume of water taken under harvestable rights in the Plan area.
Supporting equitable water sharing	
R 5	In the Plan remake, to ensure access is equitable within the Plan area and downstream of the Plan, DPE-Water should: a) establish cease to pump conditions using appropriate and transparent flow classes based on environmental and basic landholder needs, and apply these consistently to licence holders of the same type within the same water source or management zone b) consistent with Clause 65(1)(b) of the Plan, ensure that access conditions are applied on the licence rather than the work approval, and that conditions are consistently worded and enforceable c) include a clause in the revised Plan to ensure water is protected during high flow events to meet Barwon-Darling flow targets, consistent with rules in connected regulated river water sharing plans. Until then, ensure any

	Section 324 orders intended to protect flows to meet those flow targets adequately address unregulated river access d) include provisions to ensure that held environmental water delivered or spilled from the Border Rivers regulated system is protected from extraction in the Plan area and that replenishment flows cannot be extracted for purposes other than domestic and stock basic landholder rights e) subdivide the Croppa Creek and Whalan Creek Water Source into smaller management zones to facilitate development of access and trading rules most appropriate for addressing the localised risks and water management needs f) reinstate objectives regarding equitable sharing of water and ensure the Plan rules reflect these objectives g) review access conditions and revise them as necessary to ensure that they are clear, consistent and enforceable.
SA 3	DPE-Water should upgrade the Neeworra Gauge to real time to allow transparent and enforceable access conditions to be implemented in the Plan area and enable assessment, management, and better modelling of flows in the Boomi River, including discharges to downstream water sources, and to understand connectivity with the Barwon-Darling.
Recognising and protecting Aboriginal values, rights and interests	
R 6	In the Plan remake, DPE-Water should undertake culturally appropriate consultation with all nations in the Plan area and inclusive research to identify water-dependent Aboriginal cultural values and assets and their specific water requirements to meet Aboriginal needs. This should include: a) consulting with the Traditional Owners of Boobera Lagoon, including the Boobera Lagoon Reserve Land Manager, to develop a comprehensive understanding of Aboriginal values associated with Boobera Lagoon and the water management and extraction activities that place those values at risk, in line with the Aboriginal waterways assessment methodology b) investigating cultural flow requirements in line with the cultural flows methodology and practical ways to deliver those flows, including recognition of any existing work or plan of management c) identify constraints, barriers and diversions installed that impact the natural flow of waters into Boobera Lagoon, work with the Natural Resources Access Regulator (NRAR) to establish the legality of those structures and, if legal, find alternatives to allow the natural flow of water to return d) working with the Traditional Owners, propose and agree on rules for inclusion in the Plan to protect Aboriginal values related to water, including cultural flows and, if required, the physical and institutional infrastructure, licences and resources needed to deliver water to the Boobera Lagoon.
R 7	In the Plan remake, to improve protection of cultural values and assets, DPE-Water should: a) embed rules to achieve actions in the *NSW Water Strategy* relating to Aboriginal peoples' rights and values and increase access to, and ownership of, water for cultural and economic purposes, and specifically for Boobera Lagoon b) consult with the Western Bundjalung People native title holders on native title needs, assess the water requirements necessary to meet those needs, and ensure the Plan provisions adequately protect those basic landholder needs in the Tenterfield Creek Water Source

	c) include a schedule of water-dependent Aboriginal cultural values and assets and provisions to protect and enhance them, which may include the provision of cultural flows and protection of Aboriginal values in in-river and off-river pools, and specifically for Boobera Lagoon d) assess the impacts of floodplain harvesting and floodplain works on Boobera Lagoon and, if required, ensure licence conditions protect surface water flows into Boobera Lagoon and the Morella Watercourse.
SA 4	To improve protection of Aboriginal values at Boobera Lagoon, and for other water-dependent cultural assets, DPE-Water should: a) amend the pools policy to give greater priority to protecting Aboriginal values, including those associated with Boobera Lagoon b) assess Aboriginal groundwater values associated with Boobera Lagoon, including understanding groundwater needs, monitoring and protection requirements (noting this assessment should be conducted at the same time as the assessment of surface water values) c) install a continuous height recorder and determine a comprehensive water balance for Boobera Lagoon and the Morella Watercourse, including contributions of surface flows, runoff, and groundwater across relevant water sharing plans d) investigate current and potential impacts that groundwater extraction may have on the Lagoon's Aboriginal cultural values and, if required, include rules in the relevant groundwater sharing plan to mitigate the impact of groundwater extraction on the Lagoon's values e) ensure other land and water management agencies (for example, Local Land Services) are involved in this process to provide for a holistic consideration of the actions that can improve cultural and environmental outcomes for Boobera Lagoon.
SA 5	In the Plan remake, to improve recognition and protection of cultural values and assets, DPE-Water should update the background document to: a) recognise the specific native title rights of the Western Bundjalung People as they relate to water in the Tenterfield Creek Water Source b) recognise the native title rights claimed by the Gomeroi People as they relate to water c) include comprehensive discussion of Aboriginal cultural values and assets and describe how the Plan rules have been prepared to protect and enhance them d) define native title rights to be consistent with the definition in the *Native Title Act 1993*.
Strengthening environmental protections	
R 8	In the Plan remake, to improve environmental outcomes, DPE-Water should: a) review the current gauging network to identify where existing gauges can be referenced to establish flow classes and flow-based cease to pump rules consistent with other unregulated water sharing plans, and identify where new gauges may be warranted in medium to high-risk water sources to reduce reliance on cease to pump when there is no visible flow b) revise provisions to address identified concerns for medium to high-risk water sources and support connectivity, including as a minimum, protection of pools and base flows. For example:

	i. where necessary to adequately protect environmental flows and basic rights, establish flow classes and flow-based cease to pump rules (see **R 5a**) and/or introduce a first flush rule ii. where necessary to protect environmental values, including under projected climate change, revise drawdown rules for pools in water sources classified as having high instream and/or cultural values iii. reinstate the protection of pools in the Tenterfield Creek Water Source (no pool drawdown) that was in place towards the end of the *Water Sharing Plan for the Tenterfield Creek Water Source 2003* (Tenterfield Creek Plan) iv. determine the contribution of flows from the unregulated Border Rivers to Barwon-Darling flow targets, include relevant targets in the replacement Plan and clarify how Plan rules would be implemented to support these targets.
R 9	In the Plan remake, to strengthen the protection of regionally significant wetlands, DPE-Water should: a) work with DPE-Environment and Heritage (DPE-E&H) and DPI-Fisheries to update the list of regionally significant wetlands and lagoons in schedules 5 and 6 of the Plan b) assess the risks to these environmental assets and the adequacy of current rules in protecting environmental values from an altered flow regime (this should be informed by the *NSW Border Rivers Long Term Water Plan* and 'fish and flows' work) c) update rules where necessary to adequately protect identified wetlands and lagoons.
R 10	In the Plan remake, to ensure environmental releases can be made from in-stream town water supply structures, DPE-Water should use best available information to: a) assess current dams and weirs and their ability to deliver environmental flows downstream b) determine any necessary infrastructure upgrades to deliver environmental flows and support fish movement and determine priority water supply dams and weirs for modification to improve environmental outcomes c) identify suitable, outcomes-focused environmental flow regimes for priority dams and weirs and reflect these in Plan rules and licence conditions.
R 11	In the Plan remake, to improve environmental outcomes in the Plan area, DPE-Water should: a) ensure the remade Plan reflects the latest information on environmental water requirements from the *NSW Border Rivers Long Term Water Plan* and associated 'fish and flows' advice from DPI-Fisheries b) consider how Plan provisions can help to ameliorate water quality issues in line with the Plan's water quality objectives, including recovering from the impacts of the 2019-20 bushfires c) retain Clause 48(1)(A) of the Plan and amend it to recognise Aboriginal cultural values associated with water sources and protect these values from instream dams.

Securing town water supply	
R 12	In the Plan remake, to address risks to town water security, including during dry periods, DPE-Water should: a) assess the adequacy of access rules for local water utilities b) assess the adequacy of access rules for unregulated river access licences to prioritise town water supply and basic landholder rights c) revise Plan provisions to protect town water supply and basic landholder rights in accordance with the Act d) revise Plan provisions to include appropriate first flush triggers consistent with recommendations in the *Independent Panel Assessment of the Management of the 2020 Northern Basin First Flush Event 2020* e) work with relevant agencies and local government to understand any ongoing strategic planning around adequate water supply during bushfires and align Plan provisions.
Monitoring, evaluation and reporting (MER)	
R 13	In the Plan remake, to improve Plan-specific MER, DPE-Water should: a) expedite the finalisation and publication of the water sharing plan evaluation framework and methods manuals and ensure there is multi-agency support and oversight of implementation b) identify Plan provisions to be informed by planned MER activities c) identify feasible and appropriate resourcing to support ongoing MER activities in line with the *NSW Water Strategy* d) specify timely reporting requirements of the results of MER activities to support transparency, public awareness and adaptive management and link this reporting cycle to the review, remake, or amendment of the Plan e) identify and address critical knowledge gaps to support adaptive management f) use the recently developed prioritisation framework to prioritise MER activities based on values and risk, clearly communicating how this framework interacts with monitoring plans and publicly reporting on where and why effort is being targeted.

1 Review background

1.1 Water sharing plans and the Commission's role

Water sharing plans are statutory instruments under the *Water Management Act 2000* (the Act). They prescribe how water is managed to support sustainable environmental, social, cultural and economic outcomes. They intend to provide certainty regarding rules for water sharing for water users over the life of the water sharing plan, which is typically 10 years, unless it is extended.

The *Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012* (the Plan) commenced on 1 June 2012 and is due for extension or replacement on 1 July 2022.

The Commission has a role under Section 43A of the Act to review water sharing plans within five years of expiry and report to the Minister on:

- the extent that the plan's water sharing provisions have materially contributed to the achievement of, or failure to achieve, environmental, social and economic outcomes
- if changes to plan provisions are warranted.

The Commission may recommend extending or replacing a plan depending on its review findings. Section 43A(3A) of the Act requires the Commission to consider some potential compensation requirements resulting from recommended changes to a plan.[1] Under the Act, compensation is payable by the state to access licence holders only in certain circumstances[2] where water allocations under a water sharing plan are reduced.

The Commission must also consider the water management principles of the Act,[3] including the water sharing principles, when reviewing plans. The Act is clear that water sharing is not about balancing uses and values – it is about first providing for the environment and second recognising basic landholder rights above other uses. It specifies that the:

a) sharing of water from a water source must protect the water source and its dependent ecosystems, and

b) sharing of water from a water source must protect basic landholder rights, and

c) sharing or extraction of water under any other right must not prejudice the principles set out in paragraphs (a) and (b).[4]

Further, the water management principles should be prioritised in the order that they are set out above.[5] Water sharing plans must be based on evidence to achieve these outcomes.
For reference, the roles of the various NSW water management agencies are summarised in **Figure 2**.

1 If a Commission report recommends changes to a plan that will reduce water allocations in relation to which compensation might be payable under Section 87AA of the Act, the Commission is to state in the report if the purpose of the proposed changes is: (a) to restore water to the environment because of natural reductions in inflow to the relevant water source, including changes from climate change or drought or (b) to provide additional water to the environment because of more accurate scientific knowledge demonstrating the amount previously allocated to the environment is inadequate.

2 As set out in sections 87 and 87AA of the Act. Section 87 states that compensation applies for certain reductions in water allocations arising during the initial (10-year) period of a water sharing plan, only where amendments are not already contemplated in that plan. Section 87AA makes clear that compensation applies to amendments to the plan after its 10-year term. In addition, the Minister has an overriding discretion under Section 87 (but not under Section 87AA) to determine if compensation should be paid and, if so, the amount of any such compensation and the manner and timing of any payments.

3 Section 5 of the Act.

4 Section 5(3) of the Act.

5 Section 9(1) of the Act.

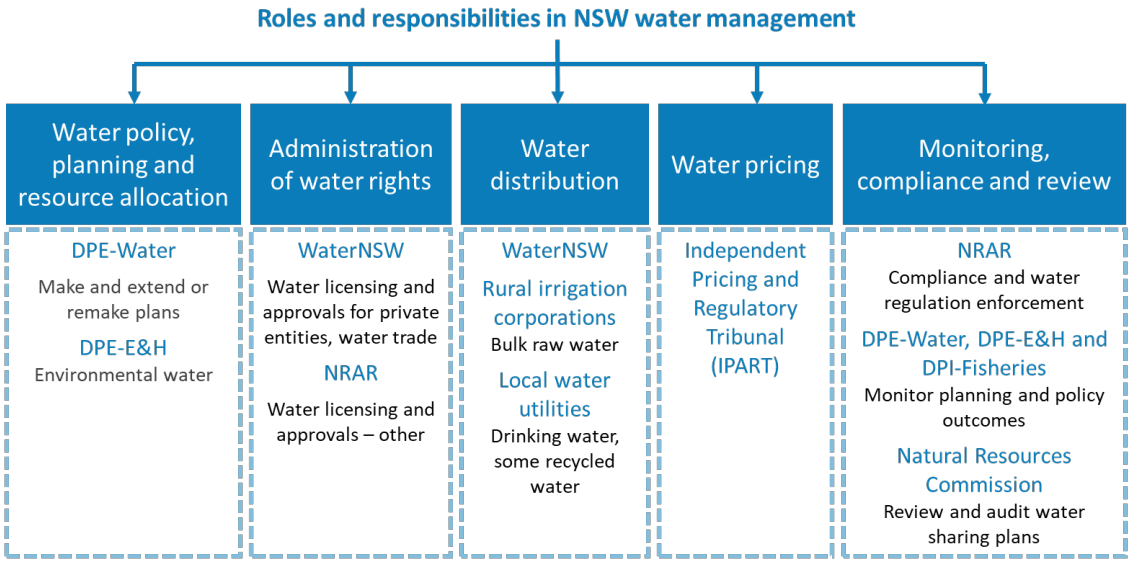


Figure 2: Roles and responsibilities in rural and regional water management[6]

Figure notes: (1) During this review, DPIE was restructured and renamed to DPE. The water related functions of DPIE were transferred to DPE. During this review DPIE-EES was renamed DPE-E&H. Where text refers to something that occurred while the department was DPIE, it is referred to as such; NRAR has several licensing and approval responsibilities, including for major and local utilities, state agencies, irrigation corporations, entities operating under the *Mining Act 1992* (NSW) and holders of specific purpose access licences with an Aboriginal subcategory.

1.2 Review approach

The Commission's review was informed by a range of evidence, including:

- **Consultation** – with government agencies, community, and industry organisations.
- **Consultation with Aboriginal stakeholders** – the Commission provided the opportunity for input from Traditional Owner groups, Local Aboriginal Land Councils (LALCs) and relevant government agency staff in the Plan areas. The Commission undertakes ongoing consultation on Aboriginal water issues at a state level with NSW Aboriginal Land Council, Aboriginal Affairs NSW, Indigenous Land and Sea Corporation and Aboriginal staff in relevant NSW Government agencies.
- **Document review** – the Commission reviewed the Plan and its background documents.[7] It also obtained publicly available information and reports from water management agencies, including DPIE-Water/DPE-Water, DPIE-EES/DPE-E&H, DPI-Fisheries, Local Land Services and Tenterfield and Glen Innes Shire Councils. As required, the Commission considered other relevant state-wide and regional government policies and agreements that apply to the Plan area.
- **Technical advice** – consultants provided expert analysis on key aspects of the Plan including social and environmental objectives, the effectiveness of Plan provisions and opportunities for improvement.
- **Submissions** – the Commission called for and considered public submissions via letters and calls to key stakeholders and advertising on the Commission's website. Stakeholders were asked to respond to the following five questions to assess the contribution of the Plan to environmental, social, cultural and economic outcomes:
  - To what extent do you feel the Plan has contributed to social outcomes?

6 Revised from DoI-Water (2019) *NSW Regional Water Statement*
7 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*

- To what extent do you feel the Plan has contributed to environmental outcomes?
- To what extent do you feel the Plan has contributed to economic outcomes?
- To what extent do you feel the Plan has contributed to meeting its objectives?
- What changes do you feel are needed to the Plan to improve outcomes?

The Commission received five submissions. Non-confidential submissions are published on the Commission's website.[8]

The Commission evaluated the performance of the Plan against its stated objectives, strategies and performance indicators, which were linked to each of the broader outcome categories required as part of the review (environmental, social, cultural and economic outcomes). These are provided in **Appendix A.** The objectives changed over the Plan period and the Commission has assessed the Plan against the current objectives, strategies and indicators, recognising that many of these were not in place for the full Plan period.

[8] Natural Resources Commission (2021) *Water sharing plan reviews*

2 The Plan area

This chapter gives an overview of the Plan area and its water-dependent environmental, social, cultural and economic values.

2.1 The Plan area and water sources

The Border Rivers Catchment covers part of northern NSW and southern Queensland and is a major portion of the headwaters of the Barwon-Darling River system. In this catchment, the Plan manages unregulated water sources in the NSW portion of the catchment, an area of around 24,000 square kilometres.[9,10] The major waterways in the Plan area are the unregulated Macintyre and Severn rivers, the Mole and Beardy Rivers and Ottleys, Croppa and Whalan Creeks (**Figure 3**).[11]

There are 13 water sources in the Plan that are grouped into two extraction management units, including the:

- Border Rivers Catchment Extraction Management Unit – covering 12 water sources (see **Appendix B**)
- Croppa Creek and Whalan Creek Catchment Extraction Management Unit – covering one water source (see **Appendix B**).

When the Plan was developed in 2012, it included four alluvial groundwater sources. These were removed from the Plan in 2020 due to Basin Plan requirements. In 2016, the Tenterfield Creek Water Source, which was previously managed under its own plan, was included in the Plan.

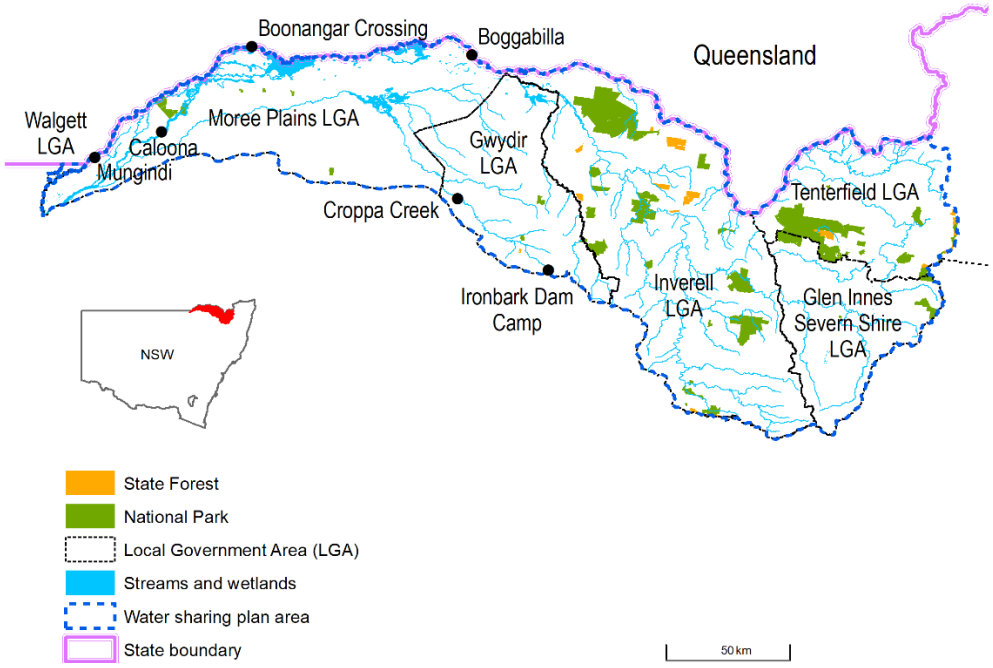


Figure 3: The Plan area including local government areas (LGAs)

9 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*

10 Part of the border between NSW and Queensland is the watershed boundary of the unregulated Border Rivers – specifically, the Severn River and Tenterfield Creek watersheds. Further downstream, the regulated McIntyre River through to Mungindi forms the state border. An intergovernmental agreement between NSW and Queensland through the Border Rivers Commission establishes water sharing arrangements for shared surface (regulated water sources) and groundwater (alluvial) sources.

11 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*

2.2 Water licences and entitlements

Table 2 shows the breakdown of licence entitlements for the Plan, totalling 44,618 megalitres (ML) per year.[12] Unregulated river access licences hold the largest entitlement at 41,987 ML, or 94 percent of the total entitlement. Local water utility access licences are the second highest entitlement at 2,214 ML per year, or five percent of the total entitlement.

Most of the unregulated river access entitlement is held in the Croppa Creek and Whalan Creek Water Source (approximately 15,750 units), followed by the Inverell Water Source (7,358 units). Most of the licences are for irrigated agriculture purposes.

Table 2: Breakdown of entitlement by licence category for the Plan

Category*	Entitlement^ (as estimated at Plan commencement)[13]	Entitlement^ (as estimated at Plan amendment in 2020)[14]	Entitlement (WaterNSW 2021)[15]	No. licences 2021
Unregulated river access	26,582	29,797	41,987	322
Unregulated river (special additional high flow) access	92	92	92	1
Local water utility access#	1,235	2,014	2,214	5
Domestic and stock access#	333.5	517.5	325	50
Total entitlement	**28,243**	**32,421**	**44,618**	**378**

*The WaterNSW Water Licensing System also records licences for joint water supply works, water supply works, and water supply works and water use. These have no entitlement as the water is not taken from the Plan area and have not been presented in this table.
^Entitlement is provided as ML for local water utility licences, and domestic and stock access licences. For unregulated river licences, entitlement is issued as a unit share with the volume provided per unit share impacted by the AWD.
#The domestic and stock access category from the NSW Water Licensing System figure includes the sub-category 'town water supply' but this has been included in the 'local water utility access' category for this table. There are three local water utility access licences plus there are two domestic and stock access licences with the sub-category 'town water supply'.

2.3 Town water supply and water storages

The original Plan (developed in 2012) estimated 1,235 ML per year of entitlement for local water utility access licences, including from the Glen Innes Water Source (1,126 ML per year), Mole River Water Source (64 ML per year), Macintyre Alluvial (35 ML per year) and NSW Border Rivers upstream of Keetach Bridge Alluvial (10 ML per year).[16]

The 2020 amended Plan indicates the entitlement for local water utility changed to 2,014 ML per year.[17] This altered entitlement is due to repealing the portions of the Plan covering the Macintyre Alluvial and NSW Border Rivers upstream of Keetach Bridge Alluvial and including Tenterfield town water supply (824 ML year) (in 2016 amendments).

12 Data provided by WaterNSW from its Water Licensing System in November 2021.
13 NSW Government (2012) *Water Sharing Plan for the Border Rivers Unregulated and Alluvial Water Sources 2012*
14 Note: Tenterfield Creek Water Source was added to the Plan in 2016 (*Ibid*).
15 Data provided by WaterNSW from its Water Licensing System in November 2021.
16 Clause 22 of the Plan.
17 Clause 22 of the Plan.

The Plan's waters sources supply town water entitlements to several townships:

- Tenterfield Shire Council manages an 824 ML per year surface water licence for the Tenterfield community from the Tenterfield Creek Water Source
- Glen Innes Severn Shire Council manages a 1,126 ML per year surface water licence for the Beardy Waters town water supply from the Glen Innes Water Source and 64 ML per year from the Mole River Water Source for the Deepwater town water supply.[18]

Tenterfield Shire Council supplies Jennings town water supply, which is drawn from Wallangarra and sits outside of the Plan (managed by Southern Downs Regional Council).[19] It also manages the Urbenville town water supply, which is drawn from the Muli Muli Woodenbong Water Supply, which sits out of the Plan.[20]

The Tenterfield town water supply includes Tenterfield Dam, which has a capacity of 1,393 ML and an average daily demand of 1.2 ML per day supplied to the community.[21] Additional bore water systems were constructed to enhance the security of the Tenterfield community's town water supply during drought.[22]

The Glen Innes Shire has three storage tanks (6.4 ML) at the Glen Innes Water Treatment Plant. Water is sourced from the Beardy Waters Reservoir located east of Glen Innes and is pumped 3.2 kilometres along a rising main to the Eerindii Ponds off-stream storage facility before it is pumped to the treatment facility. During the drought three bores were commissioned to support town water security for Glen Innes.[23] Water for the township of Deepwater is sourced from Deepwater weir and passes through a treatment plant.[24]

2.4 Environmental context

The Plan area contains several high-value, water-dependent environmental assets, with streams in the montane, upland, slope and lowland zones providing a diversity of habitat for aquatic organisms. Instream values associated with the Plan's water sources were assessed in the development of the original Plan and revised as part of the development of the *NSW Border Rivers Surface Water Resource Plan*. The following four water sources were identified as having high instream values and high consequence scores, in part due to the presence of threatened native fish:[25]

- Boomi River upstream of Whalan Creek
- Inverell
- Mole River
- Tenterfield Creek.

Some threatened species that have been recorded or are predicted to occur in the Plan area are highly sensitive to low flow extraction, including threatened species such as the southern purple spotted gudgeon (*Mogurnda adspersa*) and eel tailed catfish (*Tandanus tandanus*).

18 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*
19 Tenterfield Shire Council (2019) *Drought Management Plan*
20 *Ibid*.
21 *Ibid*.
22 *Ibid*.
23 Glen Innes Severn Shire Council (2020) *Glen Innes Severn Council Drought Management Plan*
24 *Ibid*.
25 DPIE-Water (2019) *Risk assessment for the NSW Border Rivers Surface Water Resource Plan. (SW16) - Schedule D*.

Studies indicate that southern purple spotted gudgeon is known to persist in the Tenterfield Creek Water Source and is vulnerable to water extraction.[26,27]

The Plan lists over 70 regionally significant wetlands from the upland and montane zone to the floodplain wetlands of the lower catchment. This includes the Upland Wetlands of the Drainage Divide of the New England Tableland bioregion, an endangered ecological community listed under the Commonwealth *Environment Protection and biodiversity Conservation Act 1999* and known to occur in Tenterfield LGA.[28] The Plan area also includes the nationally important, culturally significant Morella Watercourse/Boobera Lagoon/Pungbougal Lagoon complex,[29] which is situated in the Croppa and Whalan Creek Water Source southwest of Goondiwindi. Changes in catchment hydrology pose threats to many of these wetlands.

2.5 Climate

Climate varies across the Plan area, shifting from grassland (hot, persistently dry) in the west, to subtropical (moderately dry winter to no dry season) and temperate (no dry season, hot to warm summer) to the east.[30]

Annual average temperatures vary from 13 to 27.8 degrees Celsius at Mungindi in the west and 8 to 21.4 degrees Celsius at Tenterfield in the east.[31,32]

Rainfall varies significantly across the catchment. Average annual rainfall decreases from over 1,000 millimetres in the eastern ranges around the Great Dividing Range to around 500 millimetres at Mungindi in the west.[33] Rainfall is strongly seasonal, with summer storm activity generating high amounts of rainfall, run-off, and floods.[34] As well as seasonal variations, historical records show longer term patterns in rainfall and catchment inflows:[35]

- the region cycles between wet and dry periods, with long periods of low inflows interspersed by large inflows – for example, the period from 1900 to 1940 was relatively dry, while the 1940s and 1950s was relatively wet
- both persistent and short, intense droughts occur, with the most recent drought from 2017 to 2019 being the worst on record.

Since records began in 1970, there are declining streamflow trends in 94 percent of gauges across the northern Murray-Darling Basin, particularly in the headwaters of catchments in the northern Basin.[36] The climate in the Plan area has changed over the past three decades:[37]

- in the lower catchment to the west, summer rainfall has been reliable, but winter rainfall has decreased and there have been more hot days above 30 degrees Celsius

26 Lewis, A. and Growns, I. (2012) *Tenterfield Creek Water Source Report: Fish Survey*, NSW Office of Water.
27 Miles, M. (2013) *Abiotic and Biotic Factors Influencing the Distribution of the Southern Purple Spotted Gudgeon (*Mogurnda adspersa*) in two catchments of Northern NSW*. BEnvSci (Hons) Thesis, Southern Cross University.
28 DPIE-EES (n.d.) *Upland wetlands of the drainage divide of the New England Tableland Bioregion profile*
29 Department of Agriculture, Water and the Environment (2019) *Australian Wetlands Database - Directory of Important Wetlands*
30 Bureau of Meteorology (2001) *Map of Climate Zones of Australia*
31 Bureau of Meteorology (2021) *Climate statistics for Australian locations - Summary statistics Mungindi Post Office*
32 Bureau of Meteorology (2021) *Climate statistics for Australian locations - Summary statistics Tenterfield (Federation Park)*
33 DPI Office of Water (2012) *Water resources and management overview – Border Rivers catchment*
34 *Ibid.*
35 DPIE (2020) *Draft Regional Water Strategy: Border Rivers-Strategy*
36 CSIRO and Bureau of Meteorology (2020) *State of the Climate 2020*
37 CSIRO and Bureau of Meteorology (2019) *Regional weather and climate guide: North West NSW*

- in the upper catchment to the east, summer rainfall has been reliable, autumn rainfall less reliable and winter rainfall has been unreliable. Winter and spring rainfall have decreased and there have been more hot days.

CSIRO and the Bureau of Meteorology research indicates that reductions in rainfall and streamflow across the northern Murray-Darling Basin over the last twenty years are largely due to a combination of natural variability on decadal timescales and changes in large-scale circulation caused by increased greenhouse gas emissions.[38] The Border Rivers catchment sits in the northern Murray-Darling Basin. During the term of the Plan, the area experienced the lowest rainfall year on record (2019) and the lowest 24-month and 36-month rainfall periods on record (between 2017 to 2019).[39]

2.6 Aboriginal peoples of the Border Rivers

The Traditional Owners of the Plan area include the Bigambul, Githabul, Kambuwal, Gomeroi/Kamilaroi/Gamilaraay, Kwiambul and Ngarabal[40,41] and Western Bundjalung peoples.

There are seven LALCs in the area and several native title determinations and claims in or adjacent to the Plan area (**Figure 4**), including:

- a native title determination for the Western Bundjalung People, which overlaps with part of the Tenterfield Creek Water Source
- a native title claim filed by the Gomeroi People, which covers much of the Plan area
- native title matters adjacent to the Plan area in the Queensland Border Rivers catchment, including native title determined for the Bigambul People and native title claimed by the Gamilaraay People.

Appendix C provides the native title rights determined for the Western Bundjalung People and claimed by the Gomeroi People, including rights related to water.

In addition, there are a range of other examples of Aboriginal management of lands and waters in the Plan area (**Table 3**)

Rivers in the Plan area and their flows are critically valued for their current connection and practices for Aboriginal peoples, as well as for how they support cultural history:

> *'As Aboriginal people, our lands and waters are central to our being, and are essential to the spiritual, social, cultural and economic survival of our communities'.*[42]

Aboriginal peoples' perspective on water is that it is sacred and living, as well as carrying other values and being necessary for survival.[43] These values are embedded in Country and waterways across a range of spatial and temporal scales and sites that are of importance to local Aboriginal nations.

38 CSIRO and Bureau of Meteorology (2020) *State of the Climate 2020*
39 Bureau of Meteorology (2021) *Recent and historical rainfall maps*
40 Murray-Darling Basin Authority (2018) *A Guide to Traditional Owner Groups for Water Resource Plan Areas - Surface Water*
41 Note: The map that this information was drawn from was endorsed by the Murray Lower Darling Rivers Indigenous Nations representative organisation on 20 August 2018 and the Northern Basin Aboriginal Nations representative organisation on 23 October 2018.
42 Submission: NSW Aboriginal Land Council, 16 July 2021.
43 Moggridge, B. J. and Ross M. Thompson (2021) 'Cultural value of water and western water management: an Australian indigenous perspective', *Australasian Journal of Water Resources*, DOI: 10.1080/13241583.2021.1897926.

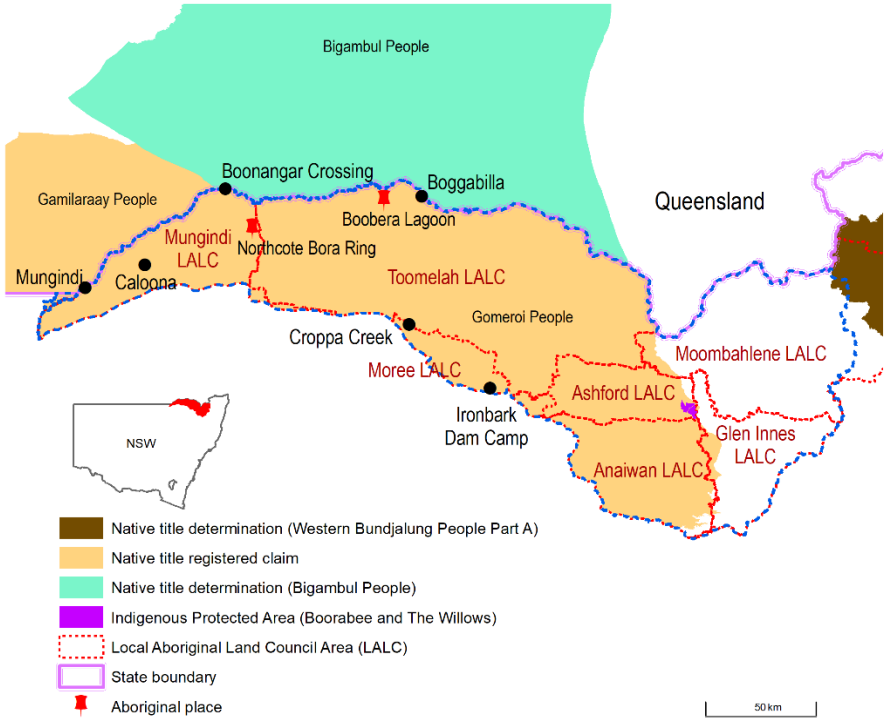


Figure 4: LALC and native title claim and determination areas for the Plan area

Table 3: Native title and other Aboriginal land agreements in the Plan area

Native title or other matter	No.	Details
Native title claims[44]		
Gomeroi People	1	NC2011/006
Native title determinations		
Western Bundjalung People (Part A)	1	NCD2017/002
Indigenous Land Use Agreements (ILUAs)		
Western Bundjalung Amended Settlement ILUA	1	NI2020/002
Aboriginal Places under the *National Parks and Wildlife Act 1974*[45]		
Boobera Lagoon (gazetted 1984)	1	N/A
Northcote Bora Ring (gazetted 1988)	1	N/A
Reserve management		
Boobera Lagoon Reserve Management Board (travelling stock reserve R1009930)	1	N/A
Indigenous Protected Areas (IPAs)[46]		
Boorabee and The Willows IPA	1	N/A
Indigenous rangers[47]		
Border Ranges - Toomelah Boggabilla River Rangers (new project from July 2021)	1	N/A

44 Source for native title claims, determinations and ILUAs: National Native Title Tribunal
45 Source for Aboriginal Places: Heritage NSW (n.d.) *State Heritage Inventory*
46 Source for IPAs: National Indigenous Australians Agency
47 Source for indigenous rangers: National Indigenous Australians Agency

The Plan area contains many cultural sites and values important to the Aboriginal community[48] and Australia's heritage more broadly. Aboriginal cultural values in the Plan area include watercourses and native vegetation, carved and culturally modified trees, bush foods and bush medicine, artefact scatters and isolated artefacts, burial sites, sacred sites[49,50] and bora rings[51] (circular earthen or rock structures used for ceremonies such as the initiation of young men).

Of note is Boobera Lagoon, which is considered one of the most important Aboriginal places in eastern Australia.[52] It holds profound cultural and spiritual significance to Aboriginal peoples, as the lagoon is the resting place of Garriya, a spiritual creature also known as the rainbow serpent:[53,54]

> '*This is one of our most sacred sites, in connection to our creation*.'[55]

The lagoon is on the Morella Watercourse, one of many intermittently connected anabranches and billabongs in the Border Rivers catchment downstream of Boggabilla and Goondiwindi.[56] It is part of the Morella Watercourse/Boobera Lagoon/Pungbougal Lagoon complex, a nationally significant wetland listed for its environmental, social and cultural values.[57] The lagoon begins just over 13 kilometres west of Boggabilla and is around 10 kilometres long and up to 150 metres wide.[58] The watercourse is a remnant feature of a previous course of the Macintyre River, and Boobera Lagoon is one of the few permanent waterbodies[59,60] in the semi-arid environment of the Murray-Darling Basin.[61] The wetlands support a range of aquatic habitats, including wildlife breeding areas and drought refugia.[62]

The lagoon is a very large and important archaeological site.[63] The site is estimated to contain several million stone artefacts, including pebble nuclear tools, microblade industry tools, adzes, flake tools and grinding implements.[64] There are also many scarred trees at Boobera, mostly coolibahs, with scars from the cutting of bark for dishes (gulumans) or canoes.[65]

The importance of Boobera Lagoon to Aboriginal peoples of the NSW Border Rivers, along with issues for the ongoing management and protection of Aboriginal values, is discussed further in **Section 5.3**.

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48 DPIE (2020) *Background Document to the Floodplain Management Plan for the Border Rivers Valley Floodplain 2020*
49 Australian Rail Track Corporation (2020) *North Star to NSW/Queensland Border Environmental Impact Statement – Chapter 12 – Heritage*
50 Australian Rail Track Corporation (2020) *North Star to NSW/Queensland Border Environmental Impact Statement - Appendix E - Aboriginal Cultural Heritage and Archaeological Assessment*
51 Heritage NSW (n.d.) *State Heritage Inventory*
52 Australian Government Department of Agriculture, Water and the Environment (n.d.) *Border Rivers catchment*
53 Australian Government Department of Agriculture, Water and Environment (n.d.) *Directory of Important Wetlands*
54 Moggridge, B. J. and Thompson, R. M. (2021) 'Cultural value of water and western water management: an Australian indigenous perspective,' *Australasian Journal of Water Resources*, 25:1, 4-14.
55 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.
56 DPIE (2020) *Background Document to the Floodplain Management Plan for the Border Rivers Valley Floodplain 2020*
57 Australian Government Department of Agriculture, Water and Environment (n.d.) *Directory of Important Wetlands*
58 Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit – Executive Summary*. Prepared by the Inverell Research Service Centre.
59 *Ibid*.
60 DPIE (2020) *Background Document to the Floodplain Management Plan for the Border Rivers Valley Floodplain 2020*
61 Bureau of Meteorology (2022) *National Water Account 2019 Murray–Darling Basin: Climate and water*
62 DPIE (2020) *Background Document to the Floodplain Management Plan for the Border Rivers Valley Floodplain 2020*
63 Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit – Executive Summary*. Prepared by the Inverell Research Service Centre.
64 *Ibid*.
65 *Ibid*.

Other known high value areas include:

- the community of Toomelah, located east of Boggabilla on the Macintyre River, was reserved in 1937 for use by Aboriginal peoples and since 1984 has been managed by Toomelah LALC[66]
- Northcote Bora Ring is a declared Aboriginal Place under the *National Parks and Wildlife Act 1974*, located on Tarpaulin Creek near Boomi[67]
- Boorabee and The Willows Indigenous Protected Area (IPA), covering 2,900 hectares, located on the Severn River near Emmaville,[68] the traditional owners of the IPA are the Ngoorabul People[69]
- Dthinna Dthinnawan National Park and Nature Reserve, recognised as Kamilaroi country and contains open camp sites, scarred trees and stone axes.[70]

Section 5.3 provides further discussion on high value areas for Aboriginal peoples.

2.7 Socio-demographic context

Population and housing

Population and development patterns can have implications for the demand and supply of town water, basic landholder rights and future water sharing planning. There are five LGAs across the Plan area, home to around 32,000 people or 0.4 percent of the NSW population.[71] A large portion of the population is in the upper catchment, in towns relying primarily on unregulated surface water.[72] Around 30 percent of the population in the Tenterfield, Glen Innes, Inverell and Moree Plains council areas and 50 percent of the population in the Gwydir Shire Council area have a non-reticulated domestic water supply.[73]

Population projections indicate that all LGA populations will decrease overall by 14 percent by 2041, except for Inverell (see **Table 4**).[74] Both Moree Plains and Glen Innes Severn are projected to lose a quarter of their population, while decreases in Tenterfield of 19 percent and, Gwydir 9 percent. Inverell is expected to increase by 1 percent by 2041.[75]

Table 4: Border Rivers LGAs population predictions 2016-2041[76]

LGA	2016	2031	2041	Percentage change 2016-41
Moree Plains	13,627	11,989	10,201	-25
Gwydir	5,326	5,065	4,823	-9
Inverell	16,812	16,993	16,950	1
Glen Innes Severn	8,934	7,637	6,596	-26
Tenterfield	6,697	6,038	5,451	-19
Total population	**51,396**	**47,722**	**44,026**	**-14**

66 Many Rivers (2021) *Meet Toomelah Local Aboriginal Land Council*
67 NSW Government (1988) *Government Gazette January to March 1988*, 11 March 1988, p. 1,570.
68 National Indigenous Australians Agency (n.d.) *Boorabee and The Willows IPA*
69 Glen Innes Highlands (n.d.) *The Willows Boorabee*
70 Office of Environment and Heritage (2014) *Statement of Management Intent: Dthinna Dthinnawan Nature Reserve and Dthinna Dthinnawan National Park Community Conservation Area Zone 1*
71 DPIE (2020) *Draft Regional Water Strategy: Border Rivers: Strategy*
72 *Ibid.*
73 *Ibid.*
74 Australian Bureau of Statistics (2021) *Regional Summaries by LGA*
75 NSW Government (2021) *NSW 2019 Population Projections (by LGA)*
76 *Ibid.*

In 2016, there were 25,048 dwellings and 21,859 households in LGAs that are included in the Plan area (noting that some LGAs are only partially included in the Plan area). Over the period of 2016-2041 households are expected to decrease across all LGAs except Inverell, which is expected to increase by 5 percent.[77] This could be due to young people leaving and an ageing population.[78]

In June 2019, the median house valuation in the Border Rivers LGAs ranged from $180,000-$255,000, more than 50 percent lower than the regional NSW median house price of $491,578.[79] All LGAs except Moree Plains Shire saw increases in median sale price from 2016-2019. Interestingly, there appears to be reasonable growth in residential building approvals for Inverell (36 in 2018, 29 in 2019) and Tenterfield (34 in 2018, 25 in 2019) in the 2018-219 period.[80]

In 2019, Moree Plains, Inverell and Tenterfield shires areas had over 20 percent of the population living in an overcrowded dwelling requiring one or more additional bedrooms.[81] In Inverell Shire, 62 percent of the population were renting.

The highest proportion of Aboriginal and Torres Strait Islander people reside in the Moree Plains Shire, at 22 percent of the total population (see **Table 5**).[82] All other LGAs have higher than average Aboriginal and Torres Strait Islander populations.

Table 5: Aboriginal and Torres Strait Islander percentage of total population in 2011 and 2016[83]

Aboriginal and Torres Strait Islander percentage of population by LGA	2011	2016
Moree Plains	21	22
Gwydir	4	6
Glen Innes Severn	6	6
Inverell	7	9
Tenterfield	7	6

Remoteness classifications

Most of Australia's population lives in major cities, with only 2 percent living in remote and very remote regions.[84] All LGAs in the Plan area are classified as outer regional areas, which alongside remote areas are more likely to experience larger impacts from changes, such as water reform, drought, or agriculture. This is because the local economy is often more dependent on agriculture compared to inner regional areas or in major cities.[85]

77 *Ibid.*
78 *Ibid.*
79 Australian Bureau of Statistics (2021) *Regional Statistics by 2019, 2011-2019 LGA*
80 *Ibid.*
81 Australian Bureau of Statistics (2021) *Regional summary: Moore Plains*
82 Australian Bureau of Statistics (2021) *Estimated Resident Population by LGA 2001-2019*
83 *Ibid.*
84 Schirmer, L. and Mylek, M. (2020) *Thriving, surviving, or declining communities: socio-economic change in Murray-Darling Basin communities*, p. 13. A report prepared for the Panel for the Independent Assessment of Social and Economic Conditions in the Murray-Darling Basin.
85 *Ibid.*

2.8 Economic context

Employment and industry

The Border Rivers region is a highly productive area in NSW, with gross regional product valued at $1.6 billion in 2017/18.[86] In 2016, the total number of persons employed in the Border Rivers LGAs was 19,582.[87] The largest employer was agriculture, forestry and fishing, at 23 to 40 percent for all LGAs except Inverell Shire.[88] The second largest employers are health care and social assistance (around 12 percent) and retail (10 to 12 percent). Healthcare and social assistance likely reflects the need for care for an ageing population.

The wider regional economy relies on agriculture and tourism.[89] The upper catchment is dominated by extensive grazing for cattle and sheep production (67 percent of the catchment), with lucerne and pasture grown for grazing and small-scale irrigation activities such as horticulture.[90] Most agriculture around Glen Innes is rainfed, with pastures and cereal crops used for grazing. Glen Innes has some minor irrigation activities, mostly vegetables and fruits.[91]

In the lower catchment, dryland cropping occurs predominantly on the plains south of Goondiwindi and Boggabilla (18 percent of the catchment area), with wheat being the main crop.[92] Irrigated agriculture covers 2 percent of the catchment, mostly west of Boggabilla. Cotton accounts for 85 percent of all irrigated crops, covering around 40,000 hectares of the catchment. Irrigated agriculture with pressurised pivot systems using groundwater sources (alluvial and Great Artesian Basin eastern recharge) is also found along the Macintyre River and around North Star.[93]

Glen Innes and Inverell are mining centres. The Kings Plains deposits northeast of Inverell are some of the richest single accumulations of gem-quality sapphires in NSW.[94] There is also a small coal basin in the Ashford area in the northern part of Inverell Shire for which a mining lease is being sought.

Tourism also contributes to the regional economy and is expected to continue to expand, as are enabling industries such as transport, freight, and logistics.[95] The Border Rivers region is a popular tourism destination offering numerous recreational and cultural activities. Tourism provides jobs for about 807 workers in the region (about 6.8 percent of total employment). In 2018, tourist expenditure amounted to about $115 million across the local economy.[96] Tourism is heavily reliant on natural amenities, with many of the local attractions relying on healthy waterways.

86 DPIE (2020) *Draft Regional Water Strategy: Border Rivers: Strategy*
87 Australian Bureau of Statistics (2021) *Regional Summaries by LGA*
88 *Ibid.*
89 DPIE (2020) *Draft Regional Water Strategy: Border Rivers: Strategy*
90 DPIE (2020) *Draft Regional Water Strategy: Border Rivers: Strategy*
91 *Ibid.*
92 *Ibid.*
93 *Ibid.*
94 *Ibid.*
95 *Ibid.*
96 *Ibid.*

3 Ensuring sustainable extraction limits

A central role of a water sharing plan is to specify the amount of water available for the environment and for extraction and interception by licensed users and under basic rights. Water sharing plans do this by establishing LTAAELs. The Plan establishes two LTAAELs, one in each extraction management unit, that are descriptive and based on historic levels of extraction. In addition to these LTAAELs, as the Plan is in the Murray-Darling Basin, NSW must comply with requirements under the Basin Plan.

The Basin Plan sets sustainable extraction limits called the Sustainable Diversion Limits (SDLs) that apply to various geographic areas.[97] The SDLs must be met based on estimates of the amount of extraction prior to the Basin Plan, called the Baseline Diversion Limit (BDL), less reduction achieved by water purchase programs and other works and measures set out in the Basin Plan.[98,99] With respect to this review, the Plan provides rules for calculating and assessing compliance with the SDL in the Plan area.[100] The Plan specifies that the long-term average SDL for the Plan area is the BDL (i.e. the historic extraction) attributable to the Plan's water sources.[101] The Plan's LTAAELs and long-term average SDL are based on the same descriptive components (meaning they should have the same value if calculated numerically). The Plan's LTAAELs and long-term average SDL seek to set sustainable limits at the appropriate scale to meet the requirements of the Act.

Of critical importance, the estimates of the relevant BDL components of historic extraction were incomplete when included in the Basin Plan, and these estimates have not been updated since to reflect all unregulated take. These incomplete BDL components under the Basin Plan are linked to the Plan's extraction limits, providing an annual volumetric limit. DPE-Water should ensure that numeric LTAAELs are determined based on the latest available information and that the BDL is updated to reflect current information as soon as possible to ensure that license holders are not disadvantaged by an inaccurately low BDL.

In NSW water planning, establishing and maintaining compliance with the LTAAELs is a fundamental strategy for achieving water sharing plans' targeted environmental and economic objectives, and contributing to Aboriginal cultural and social objectives.[102] However, these strategies are ineffective for ensuring outcomes in the Plan area as the Plan lacks volumetric limits, there is limited data on current water use, and there has been no assessment of extraction against the LTAAEL to determine if compliance action is needed. As such, there has been no compliance action taken. In addition, the requirements for water estimated in the Plan have not been updated to reflect current entitlements.

Establishing accurate numeric LTAAELs, based on sustainable levels of extraction, is a recurring recommendation in the Commission's water sharing plan review reports. A numeric LTAAEL is important to provide clarity and transparency to stakeholders around extraction limits. It supports more efficient compliance with extraction limits and allows remedial action to be taken. In addition, it helps to underpin an effective water market and the valuing of water as a limited resource. Ensuring extraction limits are sustainable protects water-dependent ecosystems, aligns with priorities for extraction under the Act, and contributes to achieving the Plan's objectives.

97 Murray-Darling Basin Authority (2020) *Sustainable diversion limit (SDL) accounting framework improvement strategy 2020 – 2025*

98 Turner, G., Vanderbyl, T. and Kumar, S. (2019) *Final Report of the Independent Panel's Review of the Sustainable Diversion Limit (SDL) Water Accounting Framework*

99 Murray-Darling Basin Authority (2020) *Sustainable diversion limit (SDL) accounting framework improvement strategy 2020 – 2025*

100 The valley-scale SDL under the Basin Plan applies to the NSW Border Rivers surface water resource unit and includes all forms of take including regulated and unregulated diversions. The SDL surface water resource unit covers the same catchment area as the Plan.

101 Clause 30A(1) of the Plan.

102 See clauses 9(3)(a), 10(3)(b), 11(3)(c) and 11A(3)(b) of the Plan.

The Commission considers there are no material barriers, beyond potential resourcing issues, to establishing fixed, numeric LTAAELs (based on more complete estimates of historic extraction) for the Plan when it is remade and for providing more complete estimates of historic extraction to satisfy requirements under the Basin Plan. The Commission understands this work may require additional resources to be directed to DPE-Water, and this should be considered a high priority. Further work is required to understand if the Plan's LTAAELs provide sustainable limits that maintain water-dependent ecosystems, particularly for the Boomi River in the Croppa Creek and Whalan Creek Water Source. This work will be critical under a changing climate.

Until DPE-Water undertake LTAAEL assessment and compliance, steps should be taken to ensure use does not exceed the current extractions limits, where there is a high risk that limits will be exceeded. The Commission has identified two water sources where there is a high risk that limits will be exceeded, namely the Croppa Creek and Whalan Creek Water Source, and the Ottleys Creek Water Source. This risk arises from entitlement being much greater than estimated in the Plan, and considerably higher than the extraction limit. The risk is compounded in the Croppa Creek and Whalan Creek Water Source by water users developing larger on-farm storage dams and having access to both unregulated and regulated water sources, including floodplain harvesting (discussed in **Chapter 4**).

Once volumetric LTAAELs have been established, compliance assessments of actual extractions against LTAAELs should be undertaken, and if necessary, reductions should be undertaken to ensure that the sustainable LTAAELs can be met. Although metering will not capture all unregulated water users, reasonable estimations of water use should be calculated using an appropriate method to enable LTAAEL compliance assessment.

3.1 Lack of LTAAEL assessment and compliance is inconsistent with the Act's priorities

The Plan provides for future extractions to be managed through reductions in AWDs if non-compliance with the LTAAELs is found.[103] Compliance assessments comparing the actual average annual extractions for each extraction management unit against their LTAAELs have not been undertaken.[104] In addition, the Plan only has descriptive LTAAELs based on historic levels of extraction (see **Section 3.3**), which means it does not contain numeric limits against which to compare actual use.

The lack of assessment of compliance with the LTAAELs, while an implementation issue, has considerable impact on the ability to ensure achievement of environmental and social outcomes. This is because these rules are fundamental strategies adopted by the Plan to achieve these outcomes and are also needed to meet the objects and principles under the Act. The Act specifies an order of priority for water sharing and access.[105] Protection of the water sources and their dependent ecosystems has the highest priority under the Act. Water remaining above these extraction limits is planned environmental water and is the Plan's most basic protection for the environment.

The first object under the Act is to apply the principles of ecologically sustainable development to provide for the sustainable and integrated management of water sources for the benefit of both present and future generations. These principles include the precautionary principle that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

103 See clauses 33 to 36 of the Plan.
104 Alluvium (2019) *Audit Report: Audit of the Water Sharing Plan for the Murray Unregulated and Alluvial Water Sources 2011*
105 See sections 5(3), 9(1) and 58 of the Act.

Failing to assess and enforce compliance with LTAAELs creates a material risk that the objects and priorities under the Act are not being met, as there is then no means to ensure that planned environmental water is not being inappropriately taken from the system. Further, it limits the ability to ensure that other priority users such as towns and those with basic landholder rights are being given appropriate priority.

In the absence of assessment with LTAAEL compliance, DPE-Water has continued to allocate AWDs of 100 percent. This places all the risk of an unknown LTAAEL exceedance on the environment and downstream water users, which is inconsistent with the priorities under the Act and the precautionary principle. Just as the burden of proof should lie with the risk creator that the proposed activity will not cause serious harm, the burden of risk should also lie with the risk creator, not the risk bearer.

Risks to the environment and other priority water users are exacerbated by significant entitlement being issued in the Plan's water sources over and above available estimates of historic extraction on which the extraction limits are based. The Commission has found that issued entitlement is almost 40 percent more than estimated in the Plan and more than two and a half times the relevant BDL component included in the Basin Plan (analysis presented in **sections 3.2 and 3.3**). Water users are legally entitled to use all water allocated to them subject to conditions on licences and approvals. Risks to water sources are further compounded by the Plan setting no limits on daily take and having account management rules that enable up to 200 percent take on annual limits.[106]

Establishing and ensuring compliance with sustainable, numeric LTAAELs has been a key recommendation in the Commission's water sharing plan reviews but, to date, DPE-Water has not adopted these recommendations. As such, in this review the Commission has considered additional steps that should be taken to adequately protect water sources, communities and basic landholder rights until such time as sustainable numeric LTAAELs are established and adhered to.

An audit of Plan implementation completed in 2019[107] found that compliance with the LTAAELs was not given effect. DPIE-Water advised the auditors this was because water use data in the unregulated rivers is not available due to a lack of broad scale metering in these water sources. The auditees also advised that alternate methods to calculate water use are time consuming, and resources to undertake this work are not available.

The audit report further states that DPIE-Water indicated that it had completed an informal risk assessment and concluded that most unregulated rivers are considered low risk for exceedance of both the Murray-Darling Basin Cap[108] and LTAAEL and for this reason the lack of annual assessment is considered low risk by DPIE-Water. However, no documented risk assessment was made available to the auditors or identified by the Commission as part of this review. This review highlights the high risk from the allowable annual level of water extraction particularly within the Croppa Creek and Whalan Creek Water Source (discussed in **Chapter 4**), which is also an extraction management unit.

DPE-Water has indicated in responses to previous Commission reviews that it must report annually on compliance with the valley wide SDL to the MDBA, that it is in compliance with this and therefore extraction is sustainable. The Commission considers that while this reporting may

106 Clause 45 and 46 under the Plan state that there are no total daily or individual daily extraction limits. Clause 42(5) under the Plan allows for carryover of 100 percent (or 1 ML per unit share) on domestic and stock, local water utility and unregulated river access licences.

107 Alluvium and Vista Advisory (2019*) Audit of the Water Sharing Plan for the Border Rivers Unregulated and Alluvium Water Sources*

108 The long-term cap on water diversions from the Murray-Darling Basin was introduced in 1996 under the Murray-Darling Basin Agreement. The cap on diversions requires the NSW Government to ensure that diversions within each designated river valley in NSW do not exceed diversions under baseline conditions as at 30 June 1994.

be allowable for the Basin Plan, it is not sufficient to either comply with water sharing plan rules or ensure sustainable extraction within the Plan area. As noted, the Plan requires annual assessment of the LTAAEL based on *actual* take and an annual assessment of the portion of the SDL attributable to the water sources in the Plan. Compliance with these provisions is still not occurring. As such, there is no assessment of the extraction at the scale relevant to this Plan, or that is sufficient for the purposes of setting appropriate AWDs.

Further, the Commission understands that in assessing compliance with the valley wide SDL, DPE-Water simply includes the value that was estimated for establishing the BDL for the unregulated water sources. In other words, the reporting for unregulated water sources is based on incomplete estimates of the average take that occurred from 1993 to 1999 as estimated in 2002 for the volumetric conversion process, rather than an actual assessment of annual take (discussed further in **sections 3.2 and 3.3**).

3.1.1 LTAAEL compliance should be undertaken using best available information

LTAAEL assessment requires a reasonable estimate of actual annual extraction and the establishment of numeric LTAAELs. Lack of perfect information regarding extraction should not prevent DPE-Water from making the best estimates possible based on available information to assess LTAAEL compliance until improved data can be collected.

The Commission supports a risk-based approach to best allocate resources. Water sources at high risk of creating an exceedance of the LTAAEL should be more thoroughly evaluated, while more simplified estimates may be appropriate for lower risk sources. In the Plan area, the Commission has identified the Croppa Creek and Whalan Creek Extraction Management Unit as being a high-risk source for which extraction should be carefully examined. The Ottleys Creek Water Source is also at a high risk of increased extraction. As such, risk of overextraction across the overall extraction management unit should be examined.

If a risk-based approach is adopted, DPE-Water should conduct a risk assessment to determine the potential for LTAAEL exceedance in extraction management units. This should include consideration of:

- extraction management units where significant additional entitlement has been granted since the LTAAEL was established
- remote sensing data that indicates a potential increase in water usage
- extraction management units with water sources in which shifting of extraction from the regulated system to the unregulated system may be occurring
- extraction management units with water sources in which there is significant capture of floodplain water that has been incorporated into unregulated water licenses.

Where increased risk has been identified in a particular water source, as in the case of Ottleys Creek Water Source, the extraction management unit for that water source would need to be considered high risk unless it could be demonstrated there has been a significant decrease in extraction in other water sources.

The Commission notes that as of 1 December 2021 all surface water infrastructure works in inland northern regions, except pumps less than 100 millimetres in diameter, must comply with the NSW non-urban metering policy.[109] The Commission estimates that most usage will be metered, given 47 percent of work approvals, capturing 85 percent of entitlement, will require

[109] DPIE (2021) *Non-urban metering - What water users need to know*, accessed 18 November 2021.

metering.[110] It should therefore be straightforward to assess metered usage against the LTAAELs in the future.

Reasonable estimates of extraction by small volume users are also needed to enable full assessment of LTAAELs. DPE-Water should publish and implement a method to assess extraction and LTAAEL compliance in unregulated water sources that will not be fully metered under the *NSW Non-Urban Water Metering Policy*. It may be sensible and cost effective to assume 100 percent of entitlement is used by any remaining small users that are actively using their licences in the absence of any better information to ensure that planned environmental water and basic landholder rights are protected.

The NSW Government should make the assessment and compliance with LTAAELs as per the Plan rules a priority. This is critical for ensuring the protections intended by the Plan are realised, particularly as climate change impacts, including reduced streamflows, are impacting the Border Rivers catchment (see **sections 2.5 and 3.4**).

3.1.2 AWDs should adequately protect the environment and basic landholders

The Commission considers that continuing to propose water sharing plans that rely heavily on LTAAELs to protect the first priorities under the Act without establishing or assessing against clear, numeric LTAAELs does not sufficiently protect the environment and basic landholders. It is essential that before the Plan is remade, clear, numeric LTAAELs – against which compliance can be assessed- are determined and consultation on the impact of potential AWD reductions be undertaken.

Until this occurs, there should be other mechanisms to ensure the Plan is accountable for protecting the environment. If LTAAEL compliance assessments are not undertaken, the Plan should require a conservative approach to provision of AWDs until there are numeric LTAAELs and compliance provisions are implemented. For water sources identified as high risk, under the precautionary principle, this should be a reduction in AWD equivalent to the ratio of the LTAAEL to entitlement within each extraction management unit. If that cannot be calculated, this should be the ratio of the unregulated BDL to the unregulated river access entitlement. This would ensure that water intended to be planned environmental water in the Plan area is not being extracted,[111] giving affect to the water management principles in the Act.

The Commission notes that it has estimated the ratio of the BDL to unregulated river access entitlement to be 33 percent and recognises that such a reduction would have a significant impact on water users. Such a ratio should only be used where an alternative AWD cannot be justified based on reasonable evidence of actual take. Assessment of LTAAEL compliance does not require perfect information to be undertaken. For instance, DPE-Water has indicated it may be possible to undertake remote sensing assessments to identify where extraction may be exceeding the LTAAEL and focus additional resources in these areas. Further, the proposed approach provides an incentive to users to monitor actual take and report this the Department. The Commission supports a risk-based approach and use of available data to estimate LTAAEL compliance until improved information, such as metering data, is available.

A reduced AWD should be applied to unregulated river access licences (including special additional high flow). This reduced AWD should not be applied to town water supply, local water utility or domestic and stock access licences. If the ratio of BDL to total entitlement must be used (because individual numeric LTAAELs are not established), DPE-Water should consider

110 The Commission requested analysis, but DPE-Water was unable to provide estimates of the number of work approvals and entitlement that will require meters under the *NSW Non-urban Metering Policy*.

111 *Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012*, Clause 14, 15 and 16.

apportioning AWD reductions based on extraction management units, to more fairly reflect where take is likely to exceed the LTAAEL.

The Commission recognises that the risk that the AWDs may need to be significantly curtailed to meet LTAAEL compliance is not transparent to most users, and that a shift to full LTAAEL compliance, or setting of a conservative LTAAEL until LTAAEL compliance can be demonstrated may have significant impact on users. It is critical that, first, the risks of reduced AWD are made transparent to license holders. Second, this approach should only apply to water sources that are at risk of serious or irreversible harm from over-extraction. Third, DPE-Water should engage early with license holders to make them aware of the risks as soon as possible. This would also allow DPE-Water to understand potential impacts to users. This may allow DPE-Water to focus its compliance assessment activities and develop more nuanced adjustments to the AWD that adequately protect the environment in a manner that has the least impact on users.

3.2 Entitlement is greater than estimated in the Plan

The Plan estimates the requirements for water for extraction under access licences by water source,[112] and expresses these as total volumes or unit shares specified in the share components of access licences.[113] The Commission has found significant discrepancies in entitlement and the estimates included in the Plan (**Table 6**). When the Plan was made, the estimates reflected the incomplete status of the licence conversion process (explained later in this section) and unresolved attribution for dual frontage properties (i.e. properties with access to water from two different water sources).[114] Since the Plan was made, there may also be licences that have expired or been cancelled that are not reflected in the Plan's estimates.

Table 6: Comparison of total share components of access licences estimated in the Plan and entitlements listed in the WaterNSW Water Licensing System

Share components of access licences	ML per year (^)
Estimates included in the Plan[115]	32,421
Entitlement listed in the Water Licensing System	44,618
Difference between Plan estimate and entitlement in Water Licensing System	**+ 12,197 (or 138%)**

Table note: (^) The share components have different units depending on the licence type. Unregulated river access licences are provided with a 'unit share components.' Local water utility and domestic and stock access licences are provided with 'ML per year'. To enable comparison, the figures in the table have been compared by assuming that the AWD is 100 percent or 1 ML per unit share component.

While the Commission notes the reasons for these discrepancies, there have been multiple amendment opportunities where estimates in the Plan could have been updated to reflect entitlement. Where entitlement in a water source is significantly greater than the estimate in the Plan, this has implications for managing extraction, as the hydrological assessment informing Plan rules may have underestimated these risks and licence holders do not have transparency around the overall entitlement within the system.

Figure 5 illustrates the discrepancies in the Plan's estimates and entitlement by water source. Over 98 percent of these discrepancies (by share component) relate to unregulated river access licences in two water sources:

112 See Part 5, Division 3 of the Plan.
113 See Clause 17(2) of the Plan.
114 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*, p. 17.
115 See clauses 21 to 24 in the Plan.

- **Croppa Creek and Whalan Creek Water Source** these discrepancies are:[116]
  - 3,022 share components of unregulated river access licences that were issued at Plan commencement (by 1 June 2012) but not included in the Plan
  - 6,348 share components attached to three unregulated river access licences issued after Plan commencement, of which 5,832 is attached to a single licence issued in 2016
- **Ottleys Creek Water Source** the discrepancy relates to a single unregulated river access licence with 2,626 share components issued after Plan commencement in 2020.

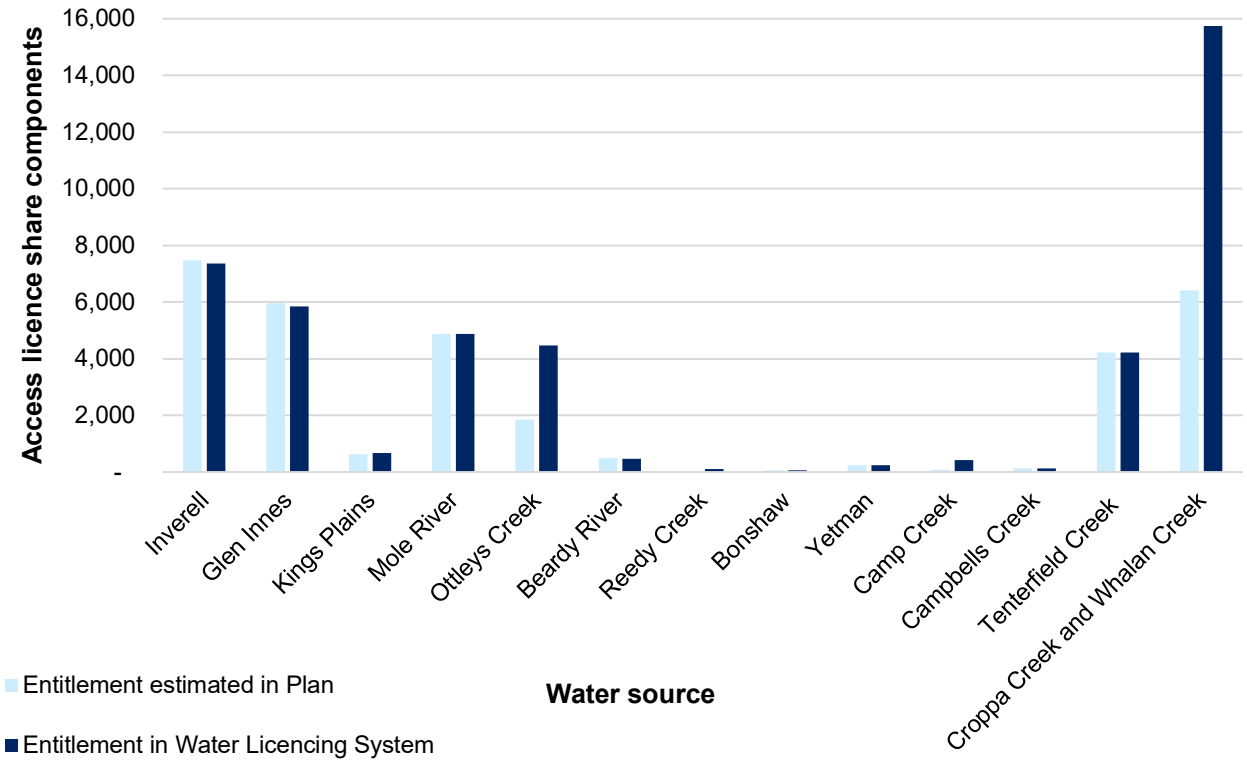

Figure 5: Comparison of entitlement estimated in Plan and listed in Water Licensing System

The discrepancies in share components in the Plan most likely relate to the volumetric conversion process, where area-based *Water Act 1912* licences were converted to annual volumes,[117] or due to floodplain harvesting assessments.[118] The volumetric conversion process, which commenced in 1999,[119] was incomplete when the Plan commenced.[120] However, both the volumetric conversion process and floodplain harvesting assessments have now been completed in the Plan area.

116 Historic versions of the Plan from commencement in 2012 until it was amended in 2020 included a note at Clause 23 that stated '*A number of licence holders on the Boomi River have held* Water Act 1912 *entitlements with quotas. On or shortly after commencement of this Plan these quotas will be converted to volumes, and the volumes will be converted to unregulated river access licence share components. On conversion approximately 6,000 unit shares will be added to the total share component for Croppa Creek and Whalan Creek Water Source.*'

117 DLWC (2000) *Volumetric Conversion – the next stage. A booklet for landholders with licences on unregulated rivers in NSW*.

118 DPIE (2020) *Guideline for the implementation of the NSW Floodplain Harvesting Policy*

119 DLWC (2000) *Volumetric Conversion – the next stage. A booklet for landholders with licences on unregulated rivers in NSW*, p. 3.

120 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*, p. 17.

DPE-Water should update the share components of access licences estimated in the Plan and consider the appropriateness of access rules in each water source based on this updated entitlement (see **Chapter 6**). This information should also be used to update the estimates for take under water access rights included in the *NSW Border Rivers Surface Water Resource Plan* (withdrawn),[121] which have referenced the estimates included in the Plan.

3.3 Historic extraction levels for Plan limits have not been published

The Plan establishes two LTAAELs, one for each extraction management units:

- Croppa Creek and Whalan Creek (covers Croppa Creek and Whalan Creek Water Source)
- Border Rivers Unregulated (covers all other water sources).[122]

As with many water sharing plans, these limits are not specified numerically (in ML per year). Instead, the LTAAELs are described as the sum of historic extractions (**Table 7**), which means that no more water can be extracted under the Plan than was taken historically. However, the Plan and the background document do not include estimates of historic extraction.

Table 7: LTAAEL components in the Plan area

Type of extraction	LTAAEL extraction components for each extraction management unit[123]
Unregulated river	▪ The annual extraction of water averaged over the period from 1 July 1993 to 30 June 1999 under entitlements issued under Part 2 of the *Water Act 1912*
Basic Landholder Rights	▪ The annual water requirements pursuant to basic landholder rights in the respective water source at the commencement of this Plan[124] (including domestic and stock rights of 5.19 ML per day,[125] native title rights[126] and harvestable rights[127])
Floodplain harvesting	▪ The annual extraction of water averaged over the period from 1 July 1993 to 30 June 1999 by floodplain harvesting activities for which floodplain harvesting (unregulated river) access licences may be issued
Plantation forestry	▪ The estimated annual take of water by plantation forestry that existed on 30 June 2009[128,129]

The background document notes that the Plan's extraction limits were developed to ensure consistency with the Murray-Darling Basin Cap,[130] meaning that the LTAAEL for unregulated

121 DPIE (2018) *NSW Border Rivers Surface Water Resource Plan*.
122 Clause 28 of the Plan.
123 Clause 28 of the Plan. Note that the two LTAAELs have essentially the same components for each extraction type.
124 The commencement date of the Plan is 1 June 2012, except for the Tenterfield Creek Water Source, where the commencement date is 1 July 2004.
125 Clause 18 in the Plan.
126 Clause 19 in the Plan.
127 Clause 20 in the Plan.
128 Forestry is predominantly in the Queensland Border Rivers catchment (Office of Water (2012) *Water resources and management overview - Borders River catchment*).
129 Water take by commercial plantations in NSW Border Rivers is negligible (Murray-Darling Basin Authority (2019) *Murray-Darling Basin Baseline Diversion Limits - estimate for 2019 / 2020 water year*).
130 The long-term cap on water diversions from the Murray-Darling Basin was introduced in 1996 under the Murray-Darling Basin Agreement. The cap on diversions requires the NSW Government to ensure that diversions within each designated river valley in NSW do not exceed diversions under baseline conditions as at 30 June 1994.

water sources must be equal to or less than the unregulated components of the Cap,[131] where the Cap is the level of diversions under baseline conditions as at 30 June 1994.[132] The extractions under baseline conditions under the Basin Plan are known as the BDL. For the Plan, this means that the LTAAELs must be equal to or less than the BDL for unregulated take from a watercourse, which is 16.3 GL per year.

The Commission understands that available estimates of historic extraction components for the Plan area (i.e. the diversions under baseline conditions as at 30 June 1994 or BDL estimates) vary in method, are incomplete or have not been undertaken. Further, while the LTAAELs may be based on historic levels of extraction, an assessment to determine if historic extraction levels are sustainable for water-dependent ecosystems has not been undertaken.

The Commission recommends that DPE-Water immediately:

- accurately estimate historic extraction which informs both the Plan's extraction limits and the BDL under the Basin Plan
- make reasonable estimates of current extraction, especially in the Croppa Creek and Whalan Creek extraction management unit, and the Ottleys Creek water source, and therefore the potential that extraction has increased since the LTAAEL was set
- engage with stakeholders on the results of that assessment to enable transparent management with annual LTAAEL compliance reports.

These issues, along with potential risks for Plan implementation, are outlined in the following sub-sections.

3.3.1 Unregulated river entitlements are greater than historic extractions

Unregulated river extraction limits under the Plan's LTAAELs mean that extraction under access licences is limited by historic levels of extraction, and not by entitlement. However, entitlement in the Plan area is considerably greater than historic extractions used to establish the LTAAELs due to how annual licence volumes were determined.

The volumetric conversion process in NSW unregulated rivers was undertaken to convert area-based licences under the *Water Act 1912* into licences with an annual volume that could be extracted if water was available.[133] For irrigation enterprises, the volumetric conversion process was based on a survey of licensed water users covering the period July 1993 to June 1999, which collected information on active and inactive irrigated areas, crops planted and water extraction method.[134] The data collected were used to determine a water use history for each licence.

The active irrigated areas were converted to an annual volume based on history of use (using irrigated area, crop type, and a crop conversion rate for the climate zone). The inactive areas (i.e. licensed areas where there had been no or infrequent irrigation) were also converted to an annual volume, based on the lowest crop conversion rate for the related climate.[135] Both the active and inactive areas were assigned an annual volume, which means that the entitlement in the Plan area is greater than the history of use.

131 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*, p. 23.
132 *Water Act 2007* (Cth), Schedule 1 Murray Darling Basin Agreement, Schedule E Cap on diversions, Clause 5.
133 DLWC (2000) *Volumetric Conversion – the next stage. A booklet for landholders with licences on unregulated rivers in NSW*.
134 *Ibid*.
135 *Ibid*.

As noted in **Section 3.2**, unregulated river entitlement in the Plan area totals just over 44,600 ML per year (or 44.6 gigalitres [GL]).[136] In contrast, the BDL estimate for historic unregulated river extraction is 16.3 GL per year.[137] As the total of the Plan's LTAAELs and long-term average SDL are equivalent and equal to the relevant BDL components,[138] this means that entitlement alone is 2.7 times greater than the Plan's LTAAELs. While the Commission notes that entitlement does not equal use, water users are legally entitled to use all water allocated to them (subject to available water and conditions on access licences and approvals). This creates risks that water extraction in the Plan area will exceed the Plan's LTAAELs, and the BDL and associated long-term sustainable extraction limit under the Basin Plan (see **Section 3.1**).

The Commission understands that the data used to estimate the BDL were based on incomplete information as the volumetric conversion process was still in progress. The data collected for the volumetric conversion process, and for those conversions that occurred since the Plan commenced, can now be used to determine the historic levels of extraction (using information on the active irrigation areas). This can be used to numerically define the Plan's LTAAELs and update the BDL estimates for the Basin Plan.

While the Plan's LTAAELs are based on historic levels of extraction, this level of extraction has not been assessed to consider whether it maintains water-dependent ecosystems. It is therefore not clear if the water management principles and priorities under the Act are being given effect.[139] DPE-Water should undertake studies to determine sustainable levels of extraction based on the needs of water-dependent ecosystems, including the potential impacts of climate change over the life of the Plan. Further, LTAAEL compliance assessments should be undertaken and AWDs adjusted as necessary to ensure that extraction does not exceed the LTAAELs.

3.3.2 Unregulated floodplain harvesting has been incorporated into unregulated river access licences

Recent work by DPIE-Water has modelled the volume of water taken by floodplain harvesting in the NSW Border Rivers catchment, determining the limit to that form of take that is allowed under water sharing plans, and proposing access rules.[140]

In the unregulated river water sources, most of the water available for floodplain harvesting was either issued a floodplain harvesting licence under the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2009* (Border Rivers Regulated Plan)[141] or has been accounted for within the existing unregulated river access licence share components (and relevant LTAAELs), as a result of the volumetric conversion process.[142] Despite the Plan allowing for floodplain harvesting within the LTAAELs,[143] floodplain harvesting activities have been accounted for under unregulated river access licences, which creates potential difficulties monitoring and complying with the LTAAELs. The Commission was not provided with information on how much floodplain harvesting has been accounted for under unregulated river access licences.

136 Share components for access licences have different units depending on the licence type. Unregulated river access licences are provided with 'unit share components.' Local water utility and domestic and stock access licences are provided with 'ML per year'. To enable comparison, the licences have been compared by assuming that the AWD is 100 percent or 1 ML per unit share component.
137 Murray-Darling Basin Authority (2019) *Murray-Darling Basin Baseline Diversion Limits - estimate for 2019 / 2020 water year*
138 Clause 33A of the Plan.
139 The water management principles as they relate to water sharing are established under s.5(3) of the Act.
140 DPIE (2020) *NSW Border Rivers: Floodplain harvesting in water sharing plans, Report to assist community consultation*
141 Clause 4(d) of the Plan.
142 DPIE (2021) *Guideline for the implementation of the NSW Floodplain Harvesting Policy*
143 Clause 28(2)(d) and 28(3)(c) in the Plan.

This type of interception activity is quite different to unregulated river extractions, as noted by how they are defined under the Act, *Water Management (General) Regulation 2018* and *NSW Floodplain Harvesting Policy*, and this creates risks to relating to potential exceedance of extraction limits and downstream impacts. The provision of unregulated river access licences to floodplain harvesting activities means that large volumes of water can be harvested each year, potentially during a single flow event. However, access rules are designed around small levels of extraction in times of normal or low flows. This water can be taken directly from the river and does not have to originate from rainfall runoff flowing towards a river or from overbank flow as defined for floodplain harvesting activities under the *NSW Floodplain Harvesting Policy*. This has the potential to impact downstream water-dependent ecosystems, water users and the ability to meet downstream flow targets.

DPE-Water should undertake a risk assessment of all floodplain harvesting activities incorporated into unregulated river access licences to better understand the risks to Plan water sources, water-dependent ecosystems and downstream water users. The risk assessment should be used to inform decisions around appropriate water access rules in the Plan remake. For example, it may be necessary to implement high and low flow class extraction rules and limits to ensure that the inclusion of floodplain harvesting into unregulated license allowances does not shift usage that was previously high flow to low flow access from the river, as this would be counter to the intent of the Plan.

Recent work by DPIE-Water modelled the volume of water taken by floodplain harvesting, the limit for that form of take allowed under water sharing plans, and proposed access rules.[144] This work estimated that in the Border Rivers, the current take by floodplain harvesting in the regulated water source is 43.6 GL per year (with a limit of 38.7 GL per year) and the take from unregulated water sources has been determined to be zero,[145] presumably because it has already been accounted for in the volumetric conversion process:[146]

> '*There are no floodplain harvesting (unregulated river) access licences to be issued in the NSW Border Rivers Unregulated River Water Sources*.'[147]

In contrast to DPIE-Water estimates, the BDL estimates for the 2019/20 water year published by the Murray-Darling Basin Authority report 79 GL of water taken by runoff dams (excluding basic rights).[148] It is not clear from the BDL estimates if the estimates for runoff dams refers to runoff taken by floodplain harvesting, unregulated river access licences or by some other form of interception of overland flow. While the BDL estimate applies to both the unregulated and regulated water sources, and the methodology used to derive it differs to DPIE-Waters floodplain harvesting modelling, the discrepancies warrant further investigation and reconciliation ahead of the Plan remake.

DPE-Water should investigate and update historic levels of take for each extraction type and propose amendments to the BDL. This should clarify if BDL estimates of take from runoff dams include floodplain harvesting operations that were provided with unregulated river access licences through the volumetric conversion process. This work is critical ahead of the Plan remake and will also support full implementation of the Basin Plan in 2024 and review of the Basin Plan in 2026.[149] These actions are essential to underpin environmental, economic and social objectives of the Plan.

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144 DPIE (2020) *NSW Border Rivers: Floodplain harvesting in water sharing plans, Report to assist community consultation*

145 *Ibid*.

146 DPIE (2021) *Guideline for the implementation of the NSW Floodplain Harvesting Policy*

147 DPIE (2020) *NSW Border Rivers: Floodplain harvesting in water sharing plans, Report to assist community consultation*, p. 3.

148 Murray-Darling Basin Authority (2019) *Murray-Darling Basin Baseline Diversion Limits - estimate for 2019 / 2020 water year*

149 Murray-Darling Basin Authority (2021) *Basin Plan timeline*, accessed 8 December 2021.

Floodplain harvesting in NSW has been the source of much debate since the 1990s, when the Cap on diversions came into effect across the Murray-Darling Basin.[150] The Select Committee on Floodplain Harvesting found that the practice had led to significant '*impacts on downstream flows and river health, with economic, social, cultural and environmental consequences*'.[151] In consultation undertaken for this review, stakeholders also raised their concerns about the impacts of floodplain harvesting in the Plan area.

The Commission has identified further issues relating to floodplain harvesting in the Boomi River, and the connection between the regulated and unregulated systems. The Plan currently lacks provisions to effectively protect flows originating from the regulated river that should be allowed to either pass downstream to the Barwon River or be protected for take by domestic and stock rights users. This includes flows associated with releases of held environmental water (whether the intention is to provide flows to Boomi River or not (see **Section 6.2**)), replenishment flows or flows that could result from reduced AWDs in the regulated water source (see **Section 4.5**).

3.3.3 There has been a growth in take under basic landholder rights

There are three types of basic landholder rights to water in NSW, which are given priority under the Act and do not require water licences:[152]

- **Domestic and stock rights** – owners or occupiers of land that is overlaying an aquifer or has river, estuary or lake frontage can take water without a licence for domestic (household) purposes or to water stock.[153]
- **Harvestable rights – dams** – landholders in most rural areas can collect a proportion of the runoff on their property and store it in one or more farm dams up to a certain size.
- **Native title rights** – individuals who hold native title (as determined under the Commonwealth *Native Title Act 1993)* can take and use water in the exercise of native title rights.

The Plan includes estimates of the requirements for water for domestic and stock rights at Plan commencement in 2012, and 2003 for the Tenterfield Creek Water Source.[154]

DPE-Water provided the Commission with recently updated estimates of the requirements for domestic and stock rights to inform the Plan remake, which indicate there has been an increase of 260 ML per year (or 14 percent).

The Plan now recognises the native title determination for the Western Bundjalung People but does not specify the requirements for water in the exercise of those native title rights (see **Section 5.3**).

Similarly, the Plan does not provide volumetric estimates of water needs under harvestable rights. The Commission notes that the BDL under the Basin Plan includes an estimate for this form of take of 16 GL per year.[155]

150 NSW Legislative Council Select Committee on Floodplain Harvesting (2021) *Floodplain harvesting*
151 *Ibid*.
152 Sections 52-55 of the Act.
153 Domestic and stock rights are different to entitlement under a domestic and stock access licence. Domestic and stock rights are attached to the land, do not require a water access licence, and are intended to be small volumes for non-commercial purposes. Entitlement under a domestic and stock access licence can be used for commercial purposes in accordance with any conditions on the licence.
154 See Clause 19 of the 2012 version and the 2020 (Amended) version of the Plan
155 MDBA (2019) *Murray-Darling Basin Baseline Diversion Limits - estimate for 2019 / 2020 water year*

DPE-Water should investigate current levels of extraction under all forms of basic landholder rights and update the estimates of the requirements for water under Part 5, Division 2 of the Plan.

DPE-Water should also investigate the implications of any increase in take under basic landholder rights for compliance with the LTAAELs. Further discussion of basic landholder rights is provided in **Chapter 4** and **Section 7.4**.

3.4 Latest climate data, modelling and observations from recent drought must be considered

The short but extreme dry period experienced over 2017 to 2019 highlighted significant issues for water users and the environment in the Plan area (see **Chapter 7**). Long term observations across the NSW Border Rivers region show increasing temperatures since the 1970s.[156] Recent climate change projections available through the NSW and ACT Climate Change Modelling project (NARCliM), indicate this trend is expected to continue in the coming decades, along with changes to rainfall.[157] Changes in temperature, evapotranspiration and rainfall all impact on how much water is available in a catchment, either through groundwater via recharge or through surface runoff and streamflow.

In the Plan area:

- temperatures are expected to increase by 2.2 degrees Celsius by 2070[158]
- around Mungindi, the number of hot days (above 35 degrees Celsius) are expected to increase from 40 to 90 days by 2070 and spring rainfall is expected to decrease[159]
- around Glen Innes and Tenterfield, the number of hot days is expected to increase from only a few by up to 20 days per year by 2070 and winter rainfall is expected to decrease[160]
- rainfall in summer and autumn is expected to increase by 2070 across the Plan area.[161]

Across many regions of southern and eastern Australia, the continued decrease in cool season rainfall from climate change will likely lead to more time in drought in the coming decades.[162]

In the Border Rivers catchment, CSIRO found that by 2030 water availability under a best estimate climate change scenario and current levels of development will reduce by 10 percent, and end of system flows will reduce by 12 percent.[163] It also found that by 2030, rainfall and runoff under the best estimate median climate is expected to reduce by 1 and 9 percent, respectively.

In contrast, a study prepared for the then Office of Environment & Heritage found that both surface runoff and recharge were likely to increase by 0.9 and 6.3 percent respectively in the near future (2020 to 2039) and by 2.1 and 20 percent respectively in the far future (2060 to 2079).[164] However, it is important to note that this study focussed on the average outputs from NARCliM, whereas the earlier CSIRO study focussed on a median, best estimate scenario.

156 Office of Environment & Heritage (2014) *New England North West climate change snapshot*
157 *Ibid*.
158 *Ibid*.
159 *Ibid*.
160 *Ibid*.
161 *Ibid*.
162 CSIRO and Bureau of Meteorology (2020) *State of the Climate 2020*
163 CSIRO (2007) *Water Availability in the Border Rivers*. Summary of a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project.
164 Littleboy, M., Young, J. and Rahman, J. (2015) *Climate change impacts on surface runoff and recharge to groundwater*. A report prepared by the NSW Office of Environment and Heritage, and Flow Matters Pty Ltd.

There is uncertainty in likely changes in drought for NSW in the future.[165] The studies described above applied the climate change scenarios produced by NARCliM to historic climate observations. However, the generation of global climate models used for NARCliM are not able to accurately estimate droughts of the duration and intensity of Australian droughts and there is relatively low confidence in projections for future changes due to large-scale drivers, such as the El Niño Southern Oscillation.[166]

To address this issue, synthetic climate datasets are being generated as part of the development of regional water strategies across NSW.[167] In the Plan area, the draft *Border Rivers Regional Water Strategy 2020* has considered future water availability using this new data.[168] This work augmented historic climate observations using paleoclimate data (500+ years) and stochastic modelling to create a synthetic dataset of 10,000 years of climate data and climate variation.[169] The NARCliM climate change projections[170] were then applied to the synthetic climate dataset to assess climate change impacts and likelihood of extended periods of drought.[171] The approach adopted a conservative, worst-case (driest) scenario as an input to updated hydrological models.[172] This was done to stress test the water system to understand what the worst-case scenario may do to water availability in the catchment.

This analysis has demonstrated that climate change has the potential to significantly impact streamflows and water availability in the NSW Border Rivers, impacting the environment and water users across the catchment. Under the worst-case climate change scenario, general security, floodplain harvesting, supplementary licences and rainfall harvesting could be impacted by approximately 40 percent in the NSW Border Rivers catchment over the next five to six decades.[173] What this means for next ten years of the Plan should be carefully considered when it is being remade. This should be considered along with already observed climate change impacts for the last 20 years, which indicates rainfall and streamflow across the northern Murray-Darling Basin have already reduced.[174] However, the Plan provisions, including extraction limits, do not consider the impacts of climate change and are not based on best available information regarding climate projections.

Observations of actual streamflows and water access issues during the recent drought (2017 to 2019) should be used to inform a contemporary understanding of how the Plan performs during drought. These observations should be compared with predicted (modelled) flows and water access and used to calibrate models during low flow and cease to flow periods.

In the context of a changing climate, Plan provisions have the potential to support the resilience of the water sources covered by the Plan and associated water-dependent ecosystems, for example, through strengthening the protection of pools that can provide drought refugia (see **Section 6.2**).

The augmented and extended climate datasets and the updated modelling of impacts to water availability due to climate change and climate variation in the Plan area should be considered in the replacement Plan. This includes Plan rules during extended dry periods and how water is managed in times of scarcity. In addition, extraction limits should consider the short to long term impacts by understanding potential impacts over the life of the Plan and sign-posting potential rule changes should further streamflow reductions occur. This will provide transparency to all

165 DPIE (2020) *NSW Climate Extremes Baseline Assessment: Full report*
166 DPIE (2020) *NSW Climate Extremes Baseline Assessment: Summary report*
167 DPIE (2020) *Regional Water Strategies Guide*
168 DPIE (2020) *Draft Regional Water Strategy: Border Rivers*
169 DPIE (2020) *Regional Water Strategies Guide*
170 NARCliM 1.0 projections, which were produced in 2014, were used for the climate change modelling for the draft *Border Rivers Regional Water Strategy*.
171 DPIE (2020) *Regional Water Strategies Guide*
172 *Ibid*, p. 49.
173 DPIE (2020) *Draft Regional Water Strategy: Border Rivers*
174 CSIRO and Bureau of Meteorology (2020) *State of the Climate 2020*

water users, including the environment, to understand how shares of water will be managed during future droughts. This approach is supported by the MDBA:

> '…*the increasing frequency and length of cease-to-flow events in particular are clearly having adverse economic, environmental, social and First Nations' impacts, it is important that water sharing plans respond and learn from the 2017–20 drought*.'[175]

3.5 Trade into high flow would support outcomes and adaption

Given the challenge of increasing future water needs coupled with predicted reductions in overall water availability, it is critical that the Plan optimises the use of available water. the value While recognising the value that high flows have in contributing to the protection and enhancement of environmental outcomes, increasing the flexibility of trade into high flows is one option to do this.

The Plan has an objective to '*maintain, and where possible improve, access to water to optimise economic benefits for agriculture, surface water-dependent industries and local economies*', and a targeted objective to *'maintain, and where possible improve, water trading opportunities for surface water-dependent businesses'*. Water trading will be an important and cost-effective part of a suite of adaptation strategies for climate change.[176] Option 25 of the draft *Border Rivers Regional Water Strategy 2020* is to review the water markets in the Border Rivers region. Improving trade rules is supported by the National Water Initiative, which promotes the progressive removal of barriers to trade in water and facilitates the broadening and deepening of the water market, with an open trading market.[177]

However, the Plan currently prohibits most forms of trade, only allowing some trades to occur in the same water source or trading zone.[178] The Plan prohibits the:

- conversion of access licence to new category (Dealings under section 71O of the Act[179])
- assignment of rights dealings:
  - between trading zones and water sources within the same water management area and between natural pools
  - between lagoons, lakes or wetlands listed in schedules (Dealings under Section 71Q of the Act)
  - if the licence is a special additional high flow licence
- amendment of share component dealings – same as 710 (Dealings under Section 71R of the Act)
- an access licence being amended to nominate a water supply work located in a different trading zone to that specified in the extraction component of the access licence (Dealings under Section 71W of the Act).

The Plan's background document indicates that the high level of restrictions placed on trade was based on the assumption that all water sources across the catchment were assumed to have high hydrologic stress. In developing the Plan, the Interagency Regional Panel, considered that allowing trades between water sources would result in unacceptable

175 Submission: Murray-Darling Basin Authority, received 7 July 2021.
176 Loch, A., Wheeler, S., Bjornlund, H., Beecham, S., Edwards, J., Zuo, A. and Shanahan, M. (2013) *The role of water markets in climate change adaptation*, prepared for the National Climate Change Adaptation Research Facility.
177 Australian Government Department of Agriculture, Water and the Environment (n.d.) *National Water Initiative*.
178 A trading zone is an area within a water source that is different to a management zone, established in Clause 57 of the Plan and shown on the Plan Map, to which restrictions on dealings apply.
179 Clause 59(2) of the Plan.

environmental and/or third-party impacts.[180] The Plan's background document outlines how this assessment was made, which include consideration that most inland unregulated streams had been embargoed from further entitlement being issued since the early 1990s, and that stressed rivers assessments carried out by the then Department of Land and Water Conservation in the late 1990s showed consistent scores of 'high' stress across the inland unregulated streams.[181] However, in considering the hydrology and environmental stress ratings presented in the stressed rivers assessment,[182] many of the Plan's water sources were rated as low or medium stress. Only two sub-catchments (Glen Innes and Tenterfield) were rated with both high hydrology and environmental stress ratings. Four sub-catchments (Yetman, Beardy River, Tenterfield Creek and Reedy River) were rated with low hydrology and environmental stress.

Based on this described methodology, it is unclear why all water sources were given a high hydrological risk, especially in water sources with low levels of entitlement, such as Reedy Creek Water Source (which has zero unit shares), and Yetman Water Source (240 unit shares).

In addition, the macro approach used in the Plan's development did not consider high flow trades. Restricted trading and the potential to use high flow trades to improve economic outcomes while maintaining environmental outcomes has been covered in in previous water sharing plan reviews by the Commission, including the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources (2011)*.

Other Murray-Darling Basin unregulated water sharing plans have provisions that have more flexible trading rules. For example, the *Water Sharing Plan for the Murray Unregulated River Water Sources 2011* limits trade at low flows due to high hydrologic stress and high ecological values but facilitates trade into high flows.[183]

Further, there are already precedents for a high flow category with the Plan area. Before it was merged into the Plan, Clause 17 of the *Water Sharing Plan for the Tenterfield Creek Water Source 2003* created a high flow class for that water source (i.e. 124 ML per day for Zone 5). Schedule 3 sets a high flow requirement for special additional high flow access licences of 97 ML at Fladbury gauge on the Severn River and some licence conditions in Schedule 1A (for example, one licence on the Boomi River is conditioned to 745 ML per day).

The Commission considers that the flexibility of the water market in the Plan area could be increased by introducing a high flow licence category and allowing trade into high flows across the extraction management unit, noting however, the ecological value of high flows in achieving environmental outcomes to protect and enhance aquatic biota and related functions and processes. Any assessment related work for this recommendation should be based on best available information to inform suitability, risks and conditions as relevant.

The Plan specifically prohibits licensees to trade unregulated river access licences into another category or trade high flow licences between management zones. Division 2 of Part 8[184] limits the establishment of new classes to situations where new water sources or management zones are created.

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180 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*, p. 27.

181 *Ibid*, p. 27.

182 Department of Land and Water Conservation (1998) *Stressed Rivers Assessment Report: NSW State Summary*.

183 Clause 57(2) - Dealings under section 71O of the Act are prohibited unless the conversion is from an unregulated river access licence to an unregulated river (high flow) access licence in the following water sources or management zones.

184 Division 2 Part 8 allows that the Plan '*may be amended to establish new or additional flow classes in any water source where management zones are added or in any water source or management zone that is amended during the term of this Plan, as specified in clause 71, provided that the Minister is satisfied that the amendment will not have significant adverse impact on the access to water of licence holders in that affected water source or management zone'.*

Introducing a high flow category would increase the pool of licences available for trade and the flexibility of how and where water is used, which has several benefits, including:

- promoting economic outcomes while protecting environmental values by reducing stress on the river at low flow and moving extraction away from areas with high instream values
- enabling entitlement holders to adapt to seasonal variability and climate change in a cost-effective way[185] – this is critical given climate change is likely to cause a long-term decline in water availability, as well as more frequent and intense periods of water scarcity (see **Section 3.4**)
- redistributes entitlement after possible AWD reduction (see **Section 3.1.2**)
- addresses water security requirements (see **Chapter 7**) and emerging industries
- improves compliance through high flow rules set at gauging stations (see **Section 6.1**)

In the Plan remake, the general clauses prohibiting trade in high flows should be removed and replaced with provisions that allow trade into high flows where appropriate, while protecting specific environmental (and other) values.

Recognising that many issues associated with trade are state-wide, DPE-Water advised that it is currently reviewing trade rules for unregulated rivers (coastal and inland). In developing the replacement Plans, DPE-Water should draw on the findings of this work to determine the most appropriate scale for water sources and trading areas in the Plans. Provisions should be designed at the appropriate geographic scale and clearly stated in the Plan to support trade within environmental and system constraints. The Commission supports inclusion of updated trade rules where it demonstrated that this supports improved environmental, economic and social outcomes.[186]

Links between the intended objectives, location of high economic and environmental values, and Plan provisions should be clearly communicated. The Commission notes that the background document indicates there are no water sources with high economic value within the Plan area. This should be reviewed to ensure that full economic value, including amenity and tourism values and town water needs are considered.

The Commission also notes that DPE-Water is updating its High Ecological Value Aquatic Ecosystem (HEVAE) assessment mapping and has undertaken an assessment of high flow ecological risk (hydrologic stress and instream value) for the region's water resource plan and this should be used to develop trading rules, alongside other relevant best available knowledge to inform risks and management actions.

185 Productivity Commission (2020) *National Water Reform 2020 Inquiry Report*; Loch, A., Wheeler, S., Bjornlund, H., Beecham, S., Edwards, J., Zou, A. and Shanahan, M. (2013) *The role of water markets in climate change adaptation - Final Report*, National Climate Change Adaptation Research Facility and University of South Australia.

186 If the trade review is complete prior to Plan updates, revisions to trade rules should be included in the replacement Plan. Where this is not possible, amendment provisions may be required to facilitate inclusion of trade rule updates during the life of the new Plan.

3.6 Recommendations

R 2	DPE-Water should establish and include in the remade Plan sustainable, numeric LTAAELs and undertake the required compliance assessments against LTAAELs to ensure sustainable extraction. This should include: a) preparing accurate estimates of historic extraction to allow calculation of up-to-date LTAAELs b) preparing estimates of current extraction based on reasonable estimates of all forms of take (noting it is unrealistic to expect all water users will be metered), and assess the potential that extraction has increased c) ensuring LTAAELs and other Plan provisions are based on best available information, including around: i. ecological requirements ii. risk of LTAAEL non-compliance from entitlement exceeding LTAAEL and/or growth in extraction iii. risks posed by all floodplain harvesting activities on water sources, water-dependent ecosystems and downstream water users iv. climate change projections, including long-term climate data sets, updated models, and contemporary observations of streamflows and water access during the most recent drought (2017 to 2019) d) updating the share components of access licences listed in Part 5, Division 3 in the Plan (Requirements for water for extraction under access licences) with entitlements issued and recorded in the WaterNSW Water Licensing System e) updating the estimated requirements for water for basic landholder rights in Part 5, Division 2 of the Plan (Requirements for water for basic landholder rights), including volumes for domestic and stock rights, native title rights and harvestable rights.
R 3	Until extraction is measured and LTAAEL compliance is assessed, to adequately protect the priorities of the Act and ensure implementation of the precautionary principle, DPE-Water should: a) include AWD provisions requiring the Minister to consider setting an AWD each year equal to the ratio of the LTAAEL (or the BDL) to the associated entitlement unless available evidence justifies a lesser reduction. This should apply to all unregulated river access licences, including special additional high flow access licences. It should not apply to local water utility and domestic and stock access licences. b) engage with license holders early in the remake process to ensure the risk of reduced AWDs is transparent and to understand potential impacts to users so that environmentally protective AWDs are set in a manner that minimises impacts on license holders.

R 4	In the Plan remake, to reduce pressure on low flows and enhance economic opportunities, DPE-Water should: a) investigate options to increase flexibility to trade into high flow by: i. examining the existing conditions in Schedule 1A for adequacy as a high flow condition and place those licences in a high flow category ii. where no conditions currently exist, develop high flow cease to pump conditions b) amend Division 2 of Part 8 to allow for the creation of a high flow category c) assess the Part 10 access dealing rules and replace current trade restrictions with specific restrictions only where necessary. Any changes to trade rules should maintain protections for high-value aquatic ecosystems and cultural values.
SA 1	Ahead of the Plan remake, the NSW Government should prioritise resources for DPE-Water for the purpose of establishing fixed, numeric LTAAELs and undertaking LTAAEL compliance for unregulated water sharing plans where there is a high risk of extraction exceeding limits, including for the NSW Border Rivers Unregulated water sources.
SA 2	To improve transparency for water users and ensure extraction estimates are accurate, DPE-Water should: a) investigate and reconcile differences in the take of water from unregulated rivers and runoff dams (excluding basic rights) using best available information, including recent floodplain harvesting modelling b) update estimates of historic extraction for the BDLs under the Basin Plan with all historic take, including all water access licences that were converted from *Water Act 1912* licences c) review the volume of take of water from unregulated rivers included in the *NSW Border Rivers Surface Water Resource Plan* (withdrawn) for consistency with the access licences issued and recorded in the WaterNSW Water Licensing System d) undertake investigations to determine the volume of water taken under harvestable rights in the Plan area.

4 Supporting equitable water sharing

While the Act specifies an order of priority that must be met for the sharing of water, it also provides for the equitable sharing of water from water sources under the objects of the Act. Equitable sharing of water is important for community trust and cohesion, the operation of effective water markets and the fair distribution of benefits and cost from water sharing rules.

The Commission notes that equitable sharing, does not mean *equal* amounts of water supplied for all uses, but rather a fair distribution of available water consistent with the priorities under the Act, and consistent treatment of users of the same type. The Commission has identified significant issues with the extent to which the Plan has enabled equitable sharing between water users. These issues are critical to address if environmental and social outcomes are to be achieved, both within the Plan area and downstream of the Plan.

Specific equity issues related to when water can be extracted identified include:

- access conditions for when water can be extracted are not equitable within the same category of license within the same water source (**Section 4.1**)
- placement of conditions on work approvals can lead to an erosion of protections (**Section 4.2**)
- access conditions for extraction at high flow do not consider downstream river targets, AWD reductions in the regulated system, or releases of held environmental water in the regulated system. They are also inconsistent with conditions on supplementary water (regulated) access licences, or proposed rules for when floodplain harvesting is brought into the licensing framework (**Section 4.3 and Section 4.4**).
- access conditions for the Boomi River are not consistent with the intent of replenishment flows supplied from the regulated river (**Section 4.5**)

The widespread application of generic ‘no visible flow’ access conditions and the lack of water management zones within water sources to manage specific issues has contributed to these issues and should be revised as part of the Plan remake (**Section 4.6**). Further, the Plan should include clear objectives regarding equitable sharing of water (**Section 4.7**), and provisions should be reviewed to ensure that they are enforceable (**Section 4.8**).

Many of the most critical examples of equity issues in the Border Rivers region are found in the Boomi River, an over-130-kilometre anabranch of the Macintyre River in the Croppa Creek and Whalan Creek Water Source (**Figure 6**).

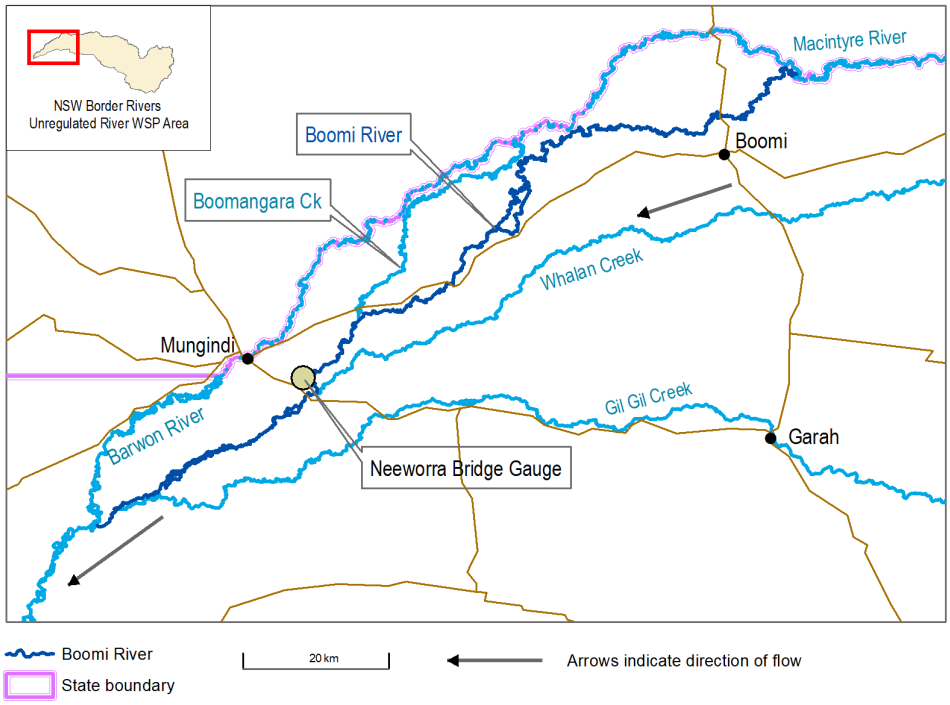

Figure 6: Boomi River in the Croppa Creek and Whalan Creek Water Source

4.1 Rules around when water can be extracted are not equitable

Water access licences include an extraction component that specifies the times, circumstances, and rates at which water can be taken.[187] These conditions should be consistent with the priorities, principles, and objects in the Act, as well as the Plan objectives, including around social, cultural, and economic outcomes.

In most water sharing plans, water users of the same category and water source receive the same access conditions. Higher priority water users – such as towns – receive greater access in terms of when they can extract through less restrictive cease to pump rules. For example, all unregulated access users might be required to cease to pump when the river reached 10 ML per day, while urban water supplies would need to cease to pump when the river reaches 5 ML per day. Access conditions should be set to ensure that adequate water is first provided for the environment and basic landholder rights as per the priorities of the Act.[188]

The Commission analysed licence conditions across the Plan and found considerable variation within unregulated access licences. These variations are a result of how the Plan has been constructed. Instead of determining the environmental and basic landholder rights requirements and then applying a consistent access rule to protect those requirements, the Plan now contains a mix of access licence and work approval conditions with no specified outcome.

For some licences that were established under the *Water Act 1912*, previous conditions were carried over into the Plan. The Plan sets a standard default access rule of no visible flow for all other users. Some licences carried over from the *Water Act 1912* had more stringent pumping restrictions, and some allow pumping in pools beyond no visible flow.

187 DPIE-Water (n.d.) *Water access licences*

188 Section 5(3) of the Act outlines the water management principles in relation to water sharing that must be protected, and section 9(1)(b) requires those principles to be given priority in the order they are set out in s.5(3), being to protect firstly (a) the water source and its dependent ecosystems, then (b) basic landholder rights, and finally (c) the sharing or extraction of water under any other right must not prejudice the principles set out in (a) and (b).

This has resulted in three groups of licences that specify different access rules for when water can be pumped:

- those with the default no visible flow rule[189]
- former *Water Act 1912* licences with cease to pump conditions which have stricter access than the default no visible flow rule[190] – these are listed in Schedule 1A
- former *Water Act 1912* licences that can pump from pools when the water level is less than full capacity, giving them less restrictive access than the default rule that requires pumping to cease when the pool volume is below full capacity.[191] These licenses are listed in Schedule 2 and are located in the Beardy River, Tenterfield Creek, Mole River and Glen Innes water sources, as well as one licence at Boobera Lagoon in the Croppa Creek and Whalan Creek Water Source.

These conditions have been carried through to either access licences or works approvals. Further, some licences that have the default no visible flow rule also have additional conditions attached to the work approvals. These have been brought over from the *Water Act 1912* licence where an in-river dam is used.[192] For example, one work approval on Boomangera Creek (**Figure 6**) requires water to reach a point upstream of the creek's confluence with the Boomi River before capture by the onstream dam can commence. This equates to visible flow at that downstream point.

An assessment of conditions on licences with stricter access rules than the default no visible flow cease to pump condition found they were designed to achieve specific outcomes (for example, water reaching the end of a section of river). Licences subsequently issued with no visible flow conditions at the pump site do not recognise these outcomes and have greatly reduced the Plan's capacity to achieve those original outcomes. For example, the entitlement in the Croppa Creek and Whalan Creek Water Source has increased to almost 250 percent of the entitlement in the 2012 version of the Plan.

It is unknown how the original risk assessments considered potential for these additional volumetric entitlements when the Plan was made. It is unclear if adequate consideration of risks occurred when granting new entitlement including appropriate consideration of increased risk to the environment, basic rights or downstream water users.

Water access licenses associated with that increase have received the default access rules. Default access rules include no visible flow at the pump site or no pumping when the volume of water in an in-river or off-river pool is below full capacity.[193]

The inconsistent application of rules creates inequity. Having stricter rules for some licence holders, while not applying those rules to other licence holders of the same type in the same water source does not reflect the equity object of the Act or the need for consistent conditions to allow for trading. Further, the default access rules are not sufficiently protective of the environment or basic landholder rights (see **Section 6.1** for further discussion).

In some water sources, the application of stricter rules for some appears to disproportionately impact smaller licence holders. For example, licences greater than 5,000 unit shares in the Croppa Creek and Whalan Creek Water Source and 2,500 unit shares in the Ottleys Creek Water Source received the default no visible flow conditions, while many licences with less than

189 Clause 44(2) of the Plan, which states that '*water must not be taken under an access licence when there is no visible flow in the water source at the location at which water is proposed to be taken*'.
190 Clause 44(3) of the Plan, which also refers to Schedule 1A.
191 Clause 44(4) of the Plan, which also refers to Schedule 2.
192 Clause 44(9) of the Plan states that the flows and circumstances to be specified on the water supply work approval for the in-river dams are to be those that were specified on the *Water Act 1912* entitlement that the approval replaces or flows determined by the Minister.
193 Clauses 44(2) and 44(4) of the Plan, respectively.

100 unit shares were included on Schedule 1A and received more restrictive access rules related to maintaining flows at a downstream location.

The conditions on former *Water Act 1912* licences – which have greater access than the default rule – are also inequitable. For example, Schedule 6 of Tenterfield Creek Plan listed 35 *Water Act 1912* licences that had access to very low flows and pools. Clause 62(a) of the Tenterfield Creek Plan required access to very low flows and pools to cease at the end of Year 8 of the Tenterfield Creek Plan, to improve protection of environmental assets. However, when Tenterfield Creek Water Source was added to the Plan, four of these licences were allowed to continue accessing very low flows and pools below full capacity (see **Chapter 6**).

Of particular concern is the Boomi River (**Figure 6**), where even for the licences with stricter than no visible flow conditions, there are considerable variations. For example, conditions on six work approvals prohibit extraction until the Boomi River at the Neeworra Bridge on the Moree-Mungindi Road reaches 100 ML per day. Another two licences are also set at flows just above the 100 ML per day at the same point. Given most water users on the Boomi River are not able to take water below flows of 100 ML per day, this should have been the first consideration for cease to pump rules to ensure consistent low flow access conditions for water users on the Boomi River under the Plan, rather than a default 'no visible flow' rule.

There are further inconsistencies between access rules for licences listed in Schedule 1A. For example, two different river gauge heights were used for the same river flow.[194] Many of the conditions are also ambiguous (see **Section 4.8**). The remade Plan should bring consistency and clarity to these conditions.

The review of access licence conditions and work approvals also found no obvious rationale for the differences between categories of licences. There are daily extraction limits on licence categories with small entitlements, but these do not apply to licence categories with very large entitlements. For example, domestic and stock licences are limited to 15 ML per year with a daily extraction limit,[195] while unregulated access licences, which account for significantly more water usage in the same water source can extract up to 200 percent of their share component. For instance, one licence can, with carry-over, extract more than 10,000 ML per year without daily extraction limits.

For licences with large extraction capacity, daily access should be aligned with high flow access in other adjacent and hydrologically connected water sharing plans. The access rules in Schedule 1A of the Plan could also be used by DPE-Water to indicate possible high and low flow categories relevant for cease to pump conditions. This is discussed in more detail in **Section 3.5**.

DPE-Water should implement flow classes in high-risk water sources such as the Croppa Creek and Whalan Creek Water Source. As a starting point to consider what these flow classes should be, DPE-Water should undertake a stocktake of existing conditions on licences to inform different flow classes. For example, a high flow access rule could be 745 ML per day, with low flow access at 100 ML per day. Very low flow access (or access below 100 ML per day) should then only be allowed for domestic and stock or local water utility access licences.

194 Four licences refer to restrictions at 0.85 metres river height corresponding to 100 ML per day, while two other licences refer to 0.98 metres river height corresponding to the same flow rate of 100 ML per day.

195 After July 2017, taking water for stock watering cannot exceeding 14 litres per hectare of grazeable land per day.

4.2 Placement of conditions on works approval may erode protections

The Plan does not provide for the maintenance of flow protections associated with historical conditions on licences or approvals if the entitlement is traded. An access licence traded onto the Boomi River from other parts of the trading zone – which is allowed under the Plan – would receive a no visible flow at the pump condition on the licence even if it traded from a work approval that has stricter conditions. This creates further inequity with existing users.

This issue exists across all water sources with conditions listed in Schedule 1A and work approvals covered under Clause 44(9).[196] For example, there are several large entitlement access licences with access restrictions on the work approval that relate to flows downstream. However, in a trade within the trading zone, these access conditions will not follow the traded entitlement and the new water user would receive the default rule of no visible flow. This creates risks for other water users and the environment.

Having access conditions on work approvals is not transparent (as they are not listed in Schedule 1A), and confusing for the water user if there are different conditions on the access licence. DPE-Water should implement flow classes to apply to traded entitlements to ensure existing protections are not eroded through trade and also to improve environmental protections as the default no visible flow does not protect the environment or basic landholder rights.

To ensure that protections are not eroded through trading, the remade Plan should specify that access conditions are mandatory conditions on access licences.

4.3 Water intended for downstream flow targets is not protected

There are restrictions on Border Rivers Regulated Plan users upstream of the Plan area that ensure outflows from the regulated river contribute to meeting Barwon-Darling flow targets.[197] There are no equivalent restrictions for unregulated users in the Plan to protect this water once it reaches the Plan area.

Much of the Commission's analysis of this issue has focused on licenses in the Croppa Creek and Whalan Creek Water Source, in particular the Boomi River, given a significant share of entitlement is found in this area and there is a high degree of connectivity between the regulated and unregulated water sources.

The Croppa Creek and Whalan Creek Water Source has many anabranches (natural effluent streams) that originate from and return flows to the regulated system under certain flow conditions. Most significantly, the Boomi River is a major anabranch flowing from the lower regulated Macintyre River (within the NSW Border Rivers Regulated Plan) for over 130 kilometres until it meets the Barwon River (**Figure 6**). Once water leaves the Boomi River into the Barwon River it enters the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*, which also has restrictions on access to meet flow targets.

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196 Clause 44(9) of the Plan states that '*The flows and circumstances to be specified on the water supply work approval for the in-river dam referred to in subclause (8) are:*
a) the flows and circumstances that were specified on the Water Act 1912 entitlement that the approval replaces, or
b) where no flows and circumstances were specified on the Water Act 1912 entitlement, the flows determined by the Minister.'

197 The targets are set out in Schedule 1 of the Border Rivers Regulated Plan and include:
- a flow of 150 ML per day in the Darling River at Wilcannia gauge (425008)
- a flow of 280 ML per day in the Darling River at Louth (gauge 425004)
- a flow of 390 ML per day in the Darling River at Bourke gauge (425003)
- a flow of 550 ML per day in the Darling River at Brewarrina gauge (422002)
- a flow of 700 ML per day in the Barwon River at Dangar Bridge (gauge 422001).

The Border Rivers and Gwydir Regulated plans both include restrictions for supplementary water[198] licence holders[199] where necessary to achieve flow targets in the Barwon-Darling. In addition to restrictions on supplementary water users in the Border Rivers Regulated Plan, the NSW Government placed temporary restrictions (7-28 February 2020) on when water could be obtained from floodplain harvesting under the Regulated Plan, through an order made under Section 324 of the Act.[200] These restrictions were intended to ensure that flows reached the downstream area of the Plan to meet downstream targets (see **Section 6.2**).

There are no equivalent protections in the unregulated Plan due to the way it manages floodplain harvesting. As discussed in **Section 3.3.2**, floodplain harvesting within the Plan boundaries has either been incorporated into unregulated river access licences or it is intended to be managed under the Border Rivers Regulated Plan and issued with a floodplain harvesting (regulated river) access licence. During a high flow event, the only distinction between unregulated water and floodplain harvesting is where the water is extracted. Unregulated water is extracted from watercourses, while floodplain harvesting is extracted from rainfall runoff or overbank flow on the floodplain. The recently applied Section 324[201] orders[202] only prevent water from being accessed by floodplain harvesting allocated to the Border Rivers Regulated Plan, but not for users accessing floodplain water via an unregulated access licence. This means that up to 31,500 ML[203] could theoretically have been extracted by unregulated river licence users in the Croppa Creek and Whalan Creek Water Source from a single flow event, including protected flows that spill from the regulated system, while regulated users were on restrictions.

Applying consistent restrictions across connected unregulated and regulated water sources to avoid inequitable sharing was recommended in the *Independent Panel Assessment of the Management of the 2020 Northern Basin First Flush Event 2020*.[204] Potential environmental considerations associated with this issue are discussed in **Section 6.2**.

In 2020, DPIE-Water undertook community consultation on floodplain harvesting issues. The public report[205] used for that consultation reasoned there is a close connection between flows in the regulated rivers and extraction by floodplain harvesting, and that floodplain harvesting licences should therefore have similar access to supplementary access licences. The Commission supports this approach and DPE-Water should extend this to special additional high flow users and interception of water on the floodplain that was included in unregulated river access licences. Aligning conditions will improve equity, but also better ensures downstream flow targets are met (see **Section 6.2**).

198 As per WaterNSW's glossary, '*holders of supplementary access licences are able to extract water during announced periods when flows exceed those required to meet other licensed obligations and environmental needs. This is typically during periods when the dam is spilling or as a result of high tributary inflows downstream of the dam*' (WaterNSW (n.d.) *Glossary of water terms*)

199 Clause 45(2) of the Regulated Border Rivers Plan.

200 NSW Government (2020) *NSW Government Gazette, No. 31 of 12 February*

201 Section 324(1) of the Act states that '*where the Minister is satisfied that it is necessary to do so in the public interest (such as to cope with a water shortage or threat to public health or safety) the Minister may direct that for a specified period the taking of water from a specified water source is prohibited, or is subject to specified restrictions, as the case requires'.*

202 DPIE-Water (2020) *Temporary Water Restriction - Northern Basin Floodplain Harvesting*; DPIE-Water (2019) *Temporary Water Restriction (NSW Border Rivers) Order 2019*.

203 31,500 ML equals two times the volume of entitlement in the Croppa Creek and Whalan Creek Water Source.

204 Craik, W. and Claydon, G. (2020) *Draft Report Independent Panel Assessment of the Management of the 2020 Northern Basin First Flush Event*

205 DPIE-Water (2020) *NSW Border Rivers: Floodplain harvesting in water sharing plans - Report to assist community consultation*

4.4 Access rules do not adequately consider linkages between Plans

DPE-Water has recently undertaken an LTAAEL compliance assessment for the NSW Border Rivers regulated surface water source. The assessment found that the extraction limit had been exceeded due to a growth in extraction by floodplain harvesting in the regulated system.[206] Consequently, reductions in the amount of water allowed to be taken by supplementary water access licences has been implemented via the Border Rivers Regulated Plan's AWD process.[207]

If reduced AWDs apply in the regulated system, water that is intended to be left in the river could be taken by unregulated water users if:

- the water users have dual frontage licences (a licence from an unregulated water source and a licence from a regulated water source)
- the additional flows in the regulated system spill into the unregulated system (for example via anabranches from the Macintyre River)
- water users extract water from a part of the unregulated system that receives regulated system flows (for example the Boomi River).

In anabranches such as the Boomi River, the Plan enables substitution of take from the regulated to unregulated water sources, as it does not have rules to prevent this from occurring. This could impact on overall system take unless restrictions are also imposed in the Plan. The connected nature of the unregulated and regulated systems warrants further investigation in relation to extraction limits and AWD implementation and highlights the critical importance of compliance assessments with the Plan's LTAAELs (see **Section 3.3**). This potential for substitution of take between the unregulated and regulated system warrants further investigation by DPE-Water, including consideration of how AWDs are implemented between the regulated and unregulated water sharing plans.

In addition, any releases of held environmental water from the regulated system can be taken by water users under the Plan, as the Plan does not provide a rule to protect them. Environmental releases made in the regulated system could enter the Boomi River during higher flow events in the Macintyre River that overtop the regulator. This is also important to address if environmental flows are provided to the Boomi River, which is listed as a watering priority by the Commonwealth Environmental Water Office (CEWO) in the 2021-22 water management plan.[208]

The remade Plan should include a clause to ensure water is protected during high flow events (for example, when protected flows from the regulated system spill into the Boomi River) to:

- meet Barwon-Darling flow targets (see **Section 7.2**)
- provide for effective and consistent implementation in the connected unregulated system of AWD reductions in the regulated system
- protect releases of held environmental water through the connected unregulated system.

This will ensure equity across the plans. Until that time, any Section 324 orders should consider potential extraction in the unregulated system and ensure it is equitably restricted.

206 DPIE (2020) *Floodplain harvesting entitlements for the NSW Border Rivers regulated river system. Model scenarios*
207 *Ibid*.
208 Commonwealth of Australia (2021) *Commonwealth Environmental Water Office Water Management Plan 2021–22*

4.5 Default conditions on the Boomi River do not protect replenishment flows

When there are no high flow events, flows into the Boomi River (**Figure 6**) are controlled by a drop board regulator constructed at the entrance from the regulated Macintyre River. The nearby Boomi Weir, constructed across the main Macintyre River, creates a deep pool of water that helps divert water into the Boomi River.[209]

The Regulated Border Rivers Plan contains requirements to release replenishment flows from behind the Boomi Weir into the Boomi River for unregulated domestic and stock users in the Plan. During the 2018/19 drought, the Boomi River experienced more than 120 days of cease to flow and water conservation measures were investigated to ensure delivery of Boomi replenishment flows.[210] Although the Regulated Border Rivers Plan is clear that these flows are for the purpose of meeting domestic and stock basic landholder rights, the Plan does not recognise this purpose, and extractive licence holders are able to access these flows.

As previously noted, most licence holders who have restrictions other than no visible flow on their licences are restricted to around 100 ML per day at the Neeworra Bridge on the Moree-Mungindi Road. The remade Plan should investigate if the 100 ML per day condition applied to all unregulated river access licences on the Boomi River is sufficient to protect connectivity and downstream flow needs. In addition, the Plan should include a clause that clearly prohibits the taking of water by unregulated river access licence holders while replenishment flows are being released.

There are examples of conditions in other water sharing plans that ensure replenishment flows reach the users they are intended to benefit that can be drawn on for the remade Plan. For example, Clause 26 of the *Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012* states:

> *'Water must not be taken from replenishment flows made according to clause 58 of the Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source 2016 (or any relevant replacement plan) under an access licence other than a domestic and stock access licence.'*

4.6 Management zones can improve equity and outcomes

The issues outlined in the previous sections are critical to address to ensure equity within the Plan area and alignment with the Act. Currently, the large size of the water sources makes it difficult to assign appropriate rules to suit areas with different values, risks and management arrangements. The Commission considers that subdividing the current large water sources into management zones would improve the ability to spatially group licences into areas with similar environmental, social and economic risks, and therefore align with the water management principles under the Act and implement Plan objectives.

For example, the Commission's analysis for this review indicates that the Croppa Creek and Whalan Creek Water Source could be divided into the following management zones to better facilitate intended outcomes:

- Boomi River Management Zone to protect replenishment flows, water saved from supplementary flow reductions in the regulated system and held environmental water releases made from the regulated system

209 DPIE-Water (2020) *Building the river system model for the Border Rivers Valley regulated river system*
210 WaterNSW (2019) *WaterNSW Operations update Border Rivers July 2019*

- Morella Watercourse (Boobera Lagoon) Management Zone to protect the cultural values and water if environmental or cultural flows were specifically released from the regulated system to achieve flows to Boobera Lagoon (see **Section 5.1.3**)
- Boomi tributaries and anabranches Management Zone to manage on-river dams
- Whalan Creek Management Zone to maintain connectivity.

Similarly, the Inverell Water Source where Schedule 1A has:

- 24 licences require visible flow maintained in the Macintyre River through the box culverts at Brodies Plains causeway
- 21 licences require visible flow maintained in the Macintyre River at the Arrawatta Road causeway
- 15 licences require visible flow maintained in the Macintyre River at the Graman-Ashford Road bridge.

These licence conditions effectively form the basis for management zones within this water source. Each water source should be reviewed to ensure that management zones are established where beneficial to improving access rules for achieving desired outcomes.

4.7 The Plan does not have equity objectives

The Act creates a clear expectation that water sharing plans should provide orderly, efficient and equitable sharing between users, and seek to minimise cumulative impacts on water sources.[211,212] The 2011 version of the Plan acknowledged the need to ensure equitable sharing between water users in the vision and objectives, but the 2020 amendments removed the relevant objective and vision statement.[213] As such, equitable sharing and how it is applied is no longer clearly addressed in the Plan.

Explicit equity objectives, supported by stakeholders and included in the Plan, are necessary to transparently outline how Plan rules will manage equitable sharing of water between various types of users. The Plan needs to include equity as an objective and provisions need to ensure equity is defined consistent with principles and objects in the Act.

Access conditions should reflect the specific environmental, social, and economic risks in a particular water source or management zone. For each water source or management zone, all licensed users within a licence category should have the same conditions to ensure water is shared equitably. As the risks will vary between water sources the rules may vary between water sources. However, if two water sources have the same risks, they should be managed with similar access rules.

In addition, restrictions applying in one water source should be applied proportionately and equitably to water users in connected water sources, even where these are subject to different water sharing plans. This should especially be applied where the water sharing principles under the Act or the Plan objectives are at risk.

211 Section 3(e) of the Act.
212 Clause 2(d) of Section 5 of the Act.
213 Clause 8 and 9(d) of the Plan.

4.8 Some access provisions are vague and unenforceable

In compiling the access conditions for this review, the Commission identified several issues with the conditions carried over from *Water Act 1912* licences through Schedule 1A. These issues may limit the enforceability of certain conditions on some licences, creating inequity. Issues include:

- poorly defined words, for example, ‘immediately upstream’, ‘other such reading’, ’adjacent gauge’
- monitoring locations that do not record real time data
- conditions that allowed for subjective interpretation and consequently difficult to enforce – most significantly the considerable reliance on no visible flow rules
- contained different river heights for the same flow.

NRAR has indicated that clearer and more standardised conditions would allow provisions to more easily be enforced.[214] To facilitate this, the Commission recommends that the gauging station at Neeworra Gauge is upgraded to real time as soon as practical. Further, in remaking the Plan DPE-Water should undertake a thorough review of the provisions for accessing water and ensure that they are clear, consistent and enforceable.

[214] Interview: NRAR, 12 October 2021.

4.9 Recommendations

R 5	In the Plan remake, to ensure access is equitable within the Plan area and downstream of the Plan, DPE-Water should: a) establish cease to pump conditions using appropriate and transparent flow classes based on environmental and basic landholder needs, and apply these consistently to licence holders of the same type within the same water source or management zone b) consistent with Clause 65(1)(b) of the Plan, ensure that access conditions are applied on the licence rather than the work approval, and that conditions are consistently worded and enforceable c) include a clause in the revised Plan to ensure water is protected during high flow events to meet Barwon-Darling flow targets, consistent with rules in connected regulated river water sharing plans. Until then, ensure any Section 324 orders intended to protect flows to meet those flow targets adequately address unregulated river access d) include provisions to ensure that held environmental water delivered or spilled from the Border Rivers regulated system is protected from extraction in the Plan area and that replenishment flows cannot be extracted for purposes other than domestic and stock basic landholder rights e) subdivide the Croppa Creek and Whalan Creek Water Source into smaller management zones to facilitate development of access and trading rules most appropriate for addressing the localised risks and water management needs f) reinstate objectives regarding equitable sharing of water and ensure the Plan rules reflect these objectives g) review access conditions and revise them as necessary to ensure that they are clear, consistent and enforceable.
SA 3	DPE-Water should upgrade the Neeworra Gauge to real time to allow transparent and enforceable access conditions to be implemented in the Plan area and enable assessment, management, and better modelling of flows in the Boomi River, including discharges to downstream water sources, and to understand connectivity with the Barwon-Darling.

5 Recognising and protecting Aboriginal values, rights and interests

Aboriginal peoples consistently highlight that water is central to their spiritual, cultural, physical and economic wellbeing:

> *'We're connected through blood and songlines. Water is life to us… Living on the river is different. If we got no river, we got no food and water. It's our economy.'*[215]

> *'At Toomelah, people thrive and live based on flow. If no flows, no water, we can't live. Same at Boobera Lagoon.'*[216]

> *'Gomeroi people see water as life. Beyond mere survival, water has deep spiritual significance for Gomeroi people. It is essential for the survival of both the country and the people.'*[217]

The Plan has enabled water sharing and use activities in Boobera Lagoon (one of the most significant Aboriginal sites in NSW) that are inconsistent with Aboriginal values, and which have impacted, and continue to impact, the Aboriginal values of the lagoon (**Section 5.1**).

The Commission also continues to identify critical issues in water sharing plans relating to Aboriginal water rights and interests, and the protection of cultural values across all its reviews in the 2019-21 period.[218] There are several specific examples of these issues for Aboriginal water in the Plan area that are discussed in **Sections 5.2** to **5.5**.

Due to critical COVID-19 outbreaks in Aboriginal communities across regional NSW at the time of this review, the Commission has generally relied on existing evidence and agency interviews as the basis of these findings, to compensate for a lack of direct engagement with Aboriginal communities in the Plan area. The Commission will provide ongoing opportunities for Aboriginal peoples to give advice and input to the findings of these reviews.

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215 Interview, Gamilaraay Native Title Applicants, 23 November 2021.

216 Interview, Gamilaraay Native Title Applicants, 23 November 2021.

217 DPIE (2018) *Culturally Appropriate First Nations Report with Gomeroi Nation*, p. 20.

218 Key findings on Aboriginal water from other water sharing plan reviews include:

- Provisions have failed to protect and allocate water for native title for registered claims and determinations, and do not proactively consider native title and other Aboriginal land ownership and management
- Aboriginal water cultural values are not adequately identified and protected, and watering needs are not provided for under current water sharing plan provisions or licences
- Native title and Aboriginal water provisions limit uses to traditional cultural applications only, thereby not supporting a range of Aboriginal water values including economic uses as defined in objectives and visions
- Aboriginal engagement in water planning has been inconsistent and inadequate, thereby limiting knowledge and support of Aboriginal water values and uses
- Key barriers to Aboriginal water rights and interests are systemic and institutional and require state-wide legislative, policy and practice change, and significant increases in Aboriginal staff, resourcing and support.

See: Natural Resources Commission (2021) *Review of water sharing plans for the Bega and Brogo Rivers Area, Murrah-Wallaga Area, and Towamba River water sources*.

5.1 Significant cultural values are being impacted in Boobera Lagoon

Boobera Lagoon holds profound cultural and spiritual significance to the Gomeroi, Gamilaraay, Kamilaroi and Bigambul peoples, the Traditional Owners across much of the Border Rivers region. The local river was known for thousands of years as Cowbawn Coonigal.[219]
The lagoon is the resting place of Garriya [Kurrea], a spiritual creature also known as the rainbow serpent,[220,221] and '*has high contemporary cultural significance to local Aboriginal people, to all the Aboriginal people of the region and to many people beyond*.'[222]

The story was recorded by R. H. Matthews – a government surveyor and a recorder of Aboriginal languages – in the late 1800s and was published in 1899 as 'The Kurrea and the Warrior'.[223] The story is summarised by Moggridge and Thompson as follows:

> '*The lagoon holds a very significant Dreaming/Creation story of the Gurriya a crocodile-headed serpent bodied cultural hero, which is still believed to rest in a very deep hole in the lagoon and is believed to move between the lagoon and river channel of the Macintyre. The story involved a warrior Dhulala who was tired of the Gurriya taking his people, he speared the Gurriya, and it chased him across the landscape creating and carving out Boobera Lagoon. Dhulala stopped at the Gurriya's mother-in-law the Bumble Tree and the Gurria did not dare come any closer. This is where the Gurria remains today, and this creates a strong cultural connection and high value of this water body.*'[224]

The Gomeroi/Kamilaroi People identify Boobera Lagoon as a meeting place and cultural asset, significant for healthy country and people, cultural continuity and renewal, and the transfer of knowledge.[225] Vegetation surveys at the Lagoon in the early 1990s found 23 species used by the Kamilaroi people for food and medicinal purposes.[226] The Bigambul People based in Queensland also identify Boobera Lagoon as a site of cultural significance.[227]

The Plan identifies Boobera Lagoon as one of the significant lagoons and wetlands in the NSW Border Rivers.[228] The lagoon also has protections under NSW law.[229] However, the Plan has enabled water sharing and use activities that are inconsistent with Aboriginal values.

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219 Buchhorn, R. (1997) *Boobera Lagoon: a focus for Reconciliation*, Australian Catholic Social Justice Council.

220 Moggridge, B.J. and Thompson, R. M. (2021) 'Cultural value of water and western water management: an Australian indigenous perspective.' *Australasian Journal of Water Resources*, 25:1, 4-14.

221 Department of Agriculture, Water and the Environment (2019) *Australian Wetlands Database - Directory of Important Wetlands*

222 Boobera Lagoon Reserve (R1009930) Land Manager (2019) *Submission to Draft Border Rivers Surface Water Resource Plan*, in published public submissions.

223 Matthews, R. H. (1899) 'The Kurrea and the Warrior,' in *Folklore of the Australian Aborigines*. Hennessy, Harper and Company, Sydney.

224 Moggridge, B.J. and Thompson, R. M. (2021) 'Cultural value of water and western water management: an Australian indigenous perspective.' *Australasian Journal of Water Resources*, 25:1, 4-14.

225 DPIE (2018) *Culturally Appropriate First Nations Report with Gomeroi Nation*

226 Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit – Executive Summary*. Prepared by the Inverell Research Service Centre.

227 Bigumbul Native Title Aboriginal Corporation (2020) *Bigambul Nation Planning – Cultural Flows*, accessed 29 November 2021.

228 Schedule 5 in the Plan.

229 In 1984, part of the lagoon and surrounding land was gazetted as an Aboriginal Place under the *National Parks and Wildlife Act 1974*, see NSW Government Gazette 1984 p. 2,824.
In 1987, a Crown reserve was created for the '*conservation of Aboriginal cultural heritage and public recreation*', which is now managed by the Boobera Lagoon (R1009930) Reserve Land Manager
In the 2000s, use of engine-powered boats and water skiing were banned in recognition of Boobera Lagoon being a significant Aboriginal area that was under threat of injury or desecration:
- See Commonwealth of Australia Gazette (2000) *Aboriginal and Torres Strait Islander Heritage Protection (Boobera Lagoon Amendment) Declaration 2000*
- See Clause 23(2) in the *Crown Lands (General Reserves) By-Laws 2001*
  See Clause 21(2) in the *Crown Lands (General Reserves) By-Laws 2006*

Surrounding land and water management practices have impacted, and continue to impact, the Aboriginal values of the Lagoon.

The Plan remake offers an avenue to enhance existing protections for Aboriginal values, aligned with the Aboriginal cultural objectives of the Plan and actions under the *NSW Water Strategy* (see **Section 5.2**). These issues and potential solutions are discussed in the following sections.

5.1.1 Land and water management has not prioritised Aboriginal values

Despite early recognition by government officials of the cultural value of Boobera Lagoon to Aboriginal peoples,[230] land and water management practices at and around the Lagoon have not prioritised those Aboriginal values. This has included unrestricted livestock access to the shoreline and native vegetation, overgrazing and intensive land use, the diversion and impoundment of water by levees, water extraction for irrigation or domestic and stock purposes, polluted runoff entering the Lagoon, and unrestricted public access for camping, boating and water skiing.[231] The Commission understands that further values and risks to Boobera Lagoon have been identified by the Gomeroi Nation in a waterways assessment conducted in 2020.[232]

Stakeholders interviewed for this review reflected concerns regarding the protection of values in the Lagoon:

> '*The oldest recording of the Rainbow Serpent is associated with Boobera. It is the most spiritual place. It defies belief that you would have buildings and access to these sacred areas*.' [233]

> '*I was in despair to see how* [Boobera Lagoon] *has changed. Reeds are few and far between now due to access. When I was a kid there were reeds there, now there are none. It is not as healthy as it was when we were kids. I left Toomelah when I was 25-26. When I returned I was in tears*.' [234]

> '*People from Boggabilla and Toomelah, we identify Boobera as ours, not just that little bit. It shouldn't be split up. The whole of Boobera should be heritage listed and belonging to the people of Gomeroi Nation*.'[235]

During the 1970s, Aboriginal peoples campaigned to have Boobera Lagoon protected,[236] and over time have pursued many legislative and administrative avenues to protect it.[237] Part of the Lagoon and surrounding land were gazetted as an Aboriginal Place under the *National Parks*

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230 In 1851, part of the Boobera Lagoon was recommended to be set aside as a reserve for Aboriginal people (Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit – Executive Summary*, p. 5. Prepared by the Inverell Research Service Centre).

231 Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit – Executive Summary*. Prepared by the Inverell Research Service Centre.

232 Gomeroi Nation (2020) *Gomeroi Dhayn Gali-Yarrin Galuma-Li Biibabiiba Aboriginal Waterways Assessment Report*.

233 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.

234 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.

235 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.

236 Heritage NSW (2015) *State Heritage Inventory Report – Boobera Lagoon*

237 These have included but are not limited to:
- 1976 Application for protection under the *National Parks and Wildlife Act 1974*.
- 1981 Toomelah Co-operative's successful objection to continued irrigation on cotton fields
- 1983 Toomelah LALC land rights claim
- 1987 Human Rights and Equal Opportunity Commission Toomelah Inquiry opened at Boobera Lagoon, and heard evidence of the importance of the site
- 1992 Toomelah LALC application made under section 10 of the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Cth) to ban boats powered by an engine or water skiing. The declaration was made in 1998 but did not come into effect until after 2000.

(Quiggin, R. (2001) 'Boobera Lagoon' in *IndigLawB 9; (2001) 5(6) Indigenous Law Bulletin 4*).

and Wildlife Act 1974 in 1984,[238] which prohibits harm or desecration.[239] However, by 1992, ongoing conflict and concerns over risks to the natural and cultural heritage values of the Lagoon led to the Boobera Lagoon Environmental Audit:[240]

> '*There has developed an intractable situation between recreational, Aboriginal, agricultural, riparian and ecosystem issues and user groups representing these interests.*'[241]

The audit revealed significant environmental and cultural impacts, including that the Lagoon's natural and cultural heritage values were at great risk.[242] The audit recommended '*the complete removal of domestic livestock … the maintenance of natural lagoon water levels*'[243] and the '*control* [of] *public access and recreation activities*'[244] to protect the shoreline of the Lagoon.

Photo: Impacts of grazing on the shores of Boobera Lagoon looking north-west (Moggridge 2019)

238 In 1984, part of the lagoon and surrounding land was gazetted as an Aboriginal Place under the *National Parks and Wildlife Act 1974*, see NSW Government Gazette 1984 p. 2,824.
In 1987, a Crown reserve was created for the '*conservation of Aboriginal cultural heritage and public recreation*', which is now managed by the Boobera Lagoon (R1009930) Reserve Land Manager
In the 2000s, use of engine-powered boats and water skiing were banned in recognition of Boobera Lagoon being a significant Aboriginal area that was under threat of injury or desecration:
- See Commonwealth of Australia Gazette (2000) *Aboriginal and Torres Strait Islander Heritage Protection (Boobera Lagoon Amendment) Declaration 2000*
- See Clause 23(2) in the *Crown Lands (General Reserves) By-Laws 2001*
  See Clause 21(2) in the *Crown Lands (General Reserves) By-Laws 2006*

239 Section 84(4) of the *National Parks and Wildlife Act 1974* requires that a person must not harm or desecrate an Aboriginal Place.

240 The stated purpose of the audit was: '*…to review the social and physical aspects of the Lagoon precinct… together with the Aboriginal cultural aspects of the Lagoon environment, to provide a scientific framework to develop strategies for the future management of the Lagoon by the Trustee, Moree Plains Shire Council and its Section 527 Management Committee.* (NSW Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit – Executive Summary*, Prepared by the Inverell Research Service Centre).

241 *Ibid*.

242 *Ibid*.

243 *Ibid*.

244 *Ibid*.

While some activities were banned, there are many that continue that are inconsistent with Aboriginal values, including livestock grazing and water extraction. The powerboating ban introduced during the 2000s was repealed in 2018.[245] The Commission understands that NSW Crown Lands staff are working with the Boobera Lagoon Reserve Land Manager to erect signs that will reinstate this ban. It is unclear how the existing protections for Boobera Lagoon under NSW law practically achieve the protection of Aboriginal values.

5.1.2 The Plan does not protect Aboriginal values at Boobera Lagoon

Aboriginal peoples continue to express their concern over water management practices impacting on Boobera Lagoon:

> *'Boobera Lagoon really worries me. That's a ground-fed system and they keep pulling groundwater from it. That place is really important to our people. Most sacred. That's where our rainbow serpent is from. That's our Dreaming there.'*[246]

> *'But there's cattle on the other side walking around sacred sites. The farmers have fenced off whole parts of the area, built houses on the other side and put pipes in there!'*[247]

> *'Issues identified with new housing developments around the lagoon with stock and domestic being taken from the lagoon and garden watering etc. This may create additional demand for water from the lagoon and other pressures on use and health of the lagoon. The local Aboriginal community is very worried about this.'*[248]

> '*This is very distressing. This is my Grandmother's country. If a European museum burns to the ground, they get money flooding in. Boobera Lagoon is as sacred as anything on earth, we need to re-educate people*.'[249]

In a submission to DPIE-Water in 2019, the then Boobera Lagoon Reserve Land Manager[250] highlighted water management and use practices that are inconsistent with Aboriginal values at Boobera Lagoon, including:[251]

- extraction of water for irrigation
- powerboating and water skiing
- livestock access
- long periods of low water levels
- water management that prioritises extraction of water for irrigation
- a failure to understand the environmental and cultural values and associated water requirements for Boobera Lagoon, including the complex interactions between surface water and groundwater
- the regularisation and continuation of floodplain harvesting

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245 The *Crown Lands (General Reserves) By-Laws 2006* replaced the 2001 by-law in 2006 and was repealed in 2018. The note in the Status Information in the repealed version of the 2006 by-law states: 'This By-law was impliedly repealed by repeal of the *Crown Lands Act 1989* No 6 by Sch 8 (a) to the *Crown Land Management Act 2016* No 58 with effect from 1.7.2018.'

246 Interview: Gamilaraay Native Title Applicants, 23 November 2021.

247 Interview: Gamilaraay Native Title Applicants, 23 November 2021.

248 Interview: Commonwealth Environmental Water Office, 12 October 2021.

249 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.

250 The Boobera Lagoon (R160014) Reserve Trust was established in 1989 (NSW Government (1989) *NSW Government Gazette, 15 September 1989, Issue no. 94*, p. 7246.
The Boobera Lagoon (R1009930) Reserve Land Manager was established in 2004 and replaced the previous Trust (NSW Government (2004) NSW Government Gazette, 12 March 2004, Issue no. 54, p. 1128-1129.

251 Boobera Lagoon Reserve (R1009930) Land Manager (2019) *Submission to Draft Border Rivers Surface Water Resource Plan*, in published public submissions.

- insufficient water available under planned environmental water to meet cultural and environmental needs.

In 2020, new Board members for the Boobera Lagoon Reserve Land Manager were appointed.[252,253] In discussion about water sharing activities that impact the cultural values of Boobera Lagoon, the new Board identified the following priorities:[254]

- getting water back on country, including cultural flows to Boobera Lagoon and recognition of groundwater interactions
- removing access to the remaining active irrigation licence to the Lagoon
- preventing any further access to the Lagoon under basic landholder rights
- reinstating the powerboating ban
- erecting fencing to prevent stock damaging vegetation and the edge of the Lagoon
- developing a long-term rehabilitation program for the lagoon and surrounding land
- better protection of the Lagoon through extending the area protected as an Aboriginal place under the *National Parks and Wildlife Act 1974*.

The Plan commenced almost three decades after the lagoon's gazettal as an Aboriginal Place. However, it lacks rules to prohibit water sharing activities that are inconsistent with Aboriginal values at Boobera Lagoon. While the environmental and Aboriginal cultural objectives in the Plan seek to restrict the take of water from in-river and off-river pools when less than full capacity,[255] the Plan provides an exemption for Boobera Lagoon.[256] The exemption allows the lagoon to be drawn down below full capacity.[257] This exemption was allowed under the NSW Pools Policy, which informed the access licence rules in the Plan.[258] Although anecdotal evidence suggests irrigation extraction has been stopped,[259] the water access licence and works approval are still current, and trading rules do not prohibit trades into the lagoon. This uncertainty should be addressed by DPE-Water as a high priority.

While the Pools Policy looks to identify cultural values associated with in-river and off-river pools, it does not set out how these values are to be protected. Consequently, the policy offers inadequate protection of Aboriginal cultural values and associated water-dependent assets (see **Section 6.5**).

In the Plan remake, consistent with the *Access Licence Dealings Principles Order 2004*,[260] it is critical that rules are introduced to protect Aboriginal values associated with Boobera Lagoon, including removal of the exemption allowing the Lagoon to be drawn down below full capacity. These rules should be based on a foundation of culturally appropriate engagement, best available information, and application of the Aboriginal waterways assessment methodology.[261]

252 NSW Government (2020) *NSW Government Gazette, 25 September 2020, Issue no. 231-Crown Land*, p. 4076.
253 NSW Government (2020) *NSW Government Gazette, 23 October 2020, Issue no. 278-Crown Land*, p. 4287.
254 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.
255 See objective at clauses 9(c) and 11(d) in the Plan.
256 See Schedule 2 in the Plan.
257 This condition was consistent with an access rules on a *Water Act 1912* licence. The exemption in Schedule 2 of the Plan states: '*Water must not be taken when the water level of the pool in the Boobera Watercourse is less than 0.08 metres on a gauge established on the left bank of the watercourse on [travelling stock and Crown reserve] 29416, Parish of Boobera, County of Stapleton*.'
258 Office of Water (2011) *Macro Water Sharing Plans Approach for Unregulated Rivers Access and Trading Rules for Pools Policy*
259 Boobera Lagoon Reserve (R1009930) Land Manager (2019) *Submission to Draft Border Rivers Surface Water Resource Plan*, in published public submissions.
260 Clause 8 of the Access Licence Dealings Principles Order 2004 (NSW) states that dealings should not adversely affect geographical and other features of indigenous significance.
261 Murray-Darling Basin Authority (2015) *Aboriginal waterways assessment program*

5.1.3 The Plan does not protect held environmental water

Inflows to Boobera Lagoon have reduced due to land and water resources development (see **Section 5.1.4**). This change has impacted the environmental and Aboriginal values of the Lagoon.

CEWO identified Morella Watercourse and Boobera Lagoon in watering priorities for July 2021 to June 2023 to maintain refuge habitat where there has been a long-term flow deficit.[262] In setting watering priorities, CEWO has undertaken consultation with Aboriginal peoples to understand cultural values and how environmental water can also contribute to cultural outcomes.

Although CEWO does not currently have environmental water holdings in the unregulated NSW Border Rivers, water holdings from the regulated river could be used, via infrastructure, for watering the lagoon complex. For this to occur the following need to be addressed:

- a lack of Plan provisions to effectively protect held environmental water originating from the regulated river
- further information collation and analysis to support a watering action.

The Plan remake is an opportunity to provide for the protection of held environmental water from being taken by unregulated river access licences. This would be an improvement on current arrangements and would be consistent with other initiatives in the northern Murray-Darling Basin designed to improve the protection of environmental flows.[263]

While temporary restriction orders could be used to protect held environmental water,[264] these orders sit outside the Plan. For transparency, certainty and to recognise and to provide ongoing and secure recognition of the cultural importance of flows, protections should be specified in the Plan. This should link to the Plan's objectives and strategies for achieving Aboriginal cultural and connectivity objectives.

Prior to the delivery of held environmental water to Boobera Lagoon, an assessment of existing infrastructure and barriers to flow along Morella Watercourse is required. This assessment, including the options if infrastructure changes are needed, should be conducted by DPE-Water working with CEWO, Aboriginal peoples and landholders to understand practical and cost-effective ways to achieve delivery and meet cultural needs. In addition, DPE-Water should investigate other options for supporting cultural values associated with the Lagoon complex in recognition of its cultural significance and codify these arrangements in the replacement water sharing plan where practical.

5.1.4 There is limited data on hydrology and risks to inflows

The Morella Watercourse – including Boobera Lagoon, as well as Pungbougal Lagoon – has complex hydrology involving intermittent surface water inflows from the Macintyre River during high flows, supplemented by local runoff, and likely connectivity with groundwater. The limited data available indicates that there are risks of reduced inflows, reduction in area contributing local runoff, and potential extraction of groundwater that may impact the Lagoon's values. However, a lack of data on how all water enters the Boobera Lagoon – including through groundwater – makes it difficult to understand the impact of water resource development and plan provisions on the Lagoon.

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262 Commonwealth of Australia (2021) *Commonwealth Environmental Water Office Water Management Plan 2021–22*

263 Department of Agriculture, Water and the Environment (2021) *Basin Plan commitments package*, accessed 9 December 2021.

264 Under section 324 of the Act, the Minister or their delegate can order temporary water restrictions within a water source for a specified period.

To protect the cultural, heritage and spiritual significance[265] of the Morella Watercourse DPE-Water should install a continuous height recorder and determine a comprehensive water balance for Boobera Lagoon and the Morella Watercourse.

A study from the early 1990s reported that flood water from the Macintyre River enters the Morella Watercourse when the gauge height at Boggabilla is approximately 11.75 metres.[266] Analysis of gauge heights at Boggabilla indicates that there have only been eight occasions when the river has reached or exceeded that level since 1982. The infrequent flooding of the Watercourse has made it difficult to determine exactly when the Macintyre River inflows into the Lagoon. In 2007, the Murray-Darling Basin Sustainable Yields Project found that the Morella Watercourse/Boobera Lagoon/Pungbougal Lagoon flooding threshold was not clearly defined, ranging between 25,000 ML per day to 80,000 ML per day at Goondiwindi.[267] The rating curve for the Macintyre at Boggabilla indicates flows greater than 100,000 ML per day at Boggabilla would be required to reach the flooding threshold of 11.75 meters.[268]

While flows of the magnitude required to flow through the Morella Watercourse to Boobera Lagoon are unlikely to be significantly altered by current water sharing rules in the regulated river, major changes in catchment hydrogeology, such as the construction or enlargement of dams, would affect inflows to the Morella Watercourse. Research indicates that the anabranches of the lower Macintyre River floodplain have experienced up to 22 percent less connections due to water resource development for the regulated river.[269] This is likely to have affected the hydrology of floodplain wetlands, including Boobera Lagoon. Any major water storage development in the catchment therefore needs to consider potential impacts on inflows to Boobera Lagoon.

After water has entered the Morella Watercourse, access rules for the unregulated river and regulated river floodplain harvesting would impact on the volume of water reaching and remaining in Boobera Lagoon. Regulated river floodplain harvesting licences that capture floodwater along the Morella Watercourse are accounted for in the regulated river plan and do not specifically consider the requirements or specify access conditions for the Morella Watercourse, including Boobera Lagoon. DPE-Water should assess the impacts of floodplain harvesting on Boobera Lagoon and, if required, ensure licence conditions protect surface water flows into Boobera Lagoon and the Morella Watercourse.

Water infrastructure in the local runoff catchment has impacted runoff which are important for maintaining water in the Lagoon between infrequent high flow events. The Floodplain Management Plan for the Border Rivers Valley Floodplain 2020 has zonings to restrict further encroachment. However, the extent of existing development limiting flows through the Morella Watercourse and restricting local runoff should also be assessed.

An environmental audit of Boobera Lagoon undertaken in 1993 assessed average annual runoff and evaporation. It concluded that flows along the Morella Watercourse – from both the Macintyre River and local runoff – have been affected by infrastructure such as levees and channels across the floodplain. It also found that the extent of reduction in local runoff may be significant given the level of development. The audit recommended that no further development should be permitted adjacent to the lagoon as it limits runoff to the Lagoon and strict controls over tailwater re-use or disposal were required.[270]

265 Principle 5(2)e of the Act.
266 NSW Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit*. Prepared by the Inverell Reserve Service Centre.
267 CSIRO (2007) *Water availability in the Border Rivers: summary of a report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*
268 WaterNSW (n.d.) *Continuous water monitoring network – Station 216002*
269 Thoms, M., Southwell, M. and McGinness, H.M. (2016) 'Floodplain river ecosystems: fragmentation and water resources development', *Geomorphology*, 71:126 – 138.
270 NSW Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit*. Prepared by the Inverell Reserve Service Centre.

The influence of groundwater on water levels in the Lagoon has long been suggested by local Aboriginal groups. In Aboriginal law, Boobera Lagoon is connected to the Macintyre River via underground paths of the Garriya. There is also anecdotal evidence of groundwater connection:

> '*In the Macintyre River at Toomelah there is an area of rocks with underwater caves… a tunnel connects these caves with the watercourses that flow to Boobera. Tradition says this tunnel is the track of the underground travels of the Garriya.*'[271]

> '*Boobera Lagoon nearly gone because they're sucking out the groundwater. It's fed by groundwater. It's cut off by levee banks, cut off all the way to Boomi River.*'[272]

There are limited studies on groundwater interactions with Boobera Lagoon to confirm this knowledge. The environmental audit conducted in the early 1990s found that the shallow aquifer was generally too far below the surface to contribute to recharge of the Lagoon.[273] The study identified that the first artesian aquifer under the lagoon, the Great Artesian Basin, had a potentiometric surface between five to ten metres above the natural surface. However, while connectivity was considered possible, the only evidence they were able to report on of a connection was anecdotal.[274]

To understand the potential contribution of groundwater to the Lagoon, the Commission undertook a detailed water balance assessment using climate data from January 2011 through to April 2022, a period during which no floodwater entered the Lagoon from the Macintyre River. The assessment tested the sensitivity to evaporation and runoff and looked at the drawdown of the Lagoon. The assessment considered recent runoff studies used for floodplain harvesting assessments,[275] which indicate that runoff is only half of what was estimated for the 1993 environmental audit. The assessment indicated that:

- flooding from the Macintyre River is important for periodic filling
- runoff alone could not account for the maintenance of water in the Lagoon between river filling events
- groundwater is therefore likely to play a significant part in maintaining permanent water in the Lagoon between floods.

The Commission's assessment did not consider extraction by the individual unregulated access licence[276] in the Lagoon, which is allowed to extract water down to a specified height as there were no metered data for the assessment period. However, if extraction and seepage were to be included, it would likely further reinforce these findings.

To protect the values of Boobera Lagoon and the Morella Watercourse a holistic approach across multiple water sharing plans and the floodplain management plan, including a comprehensive water balance, is required. Once the relative contributions are understood, risks from extraction on the values of Boobera Lagoon should be assessed and managed appropriately.

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271 *Ibid*.
272 Interview: Gamilaraay Native Title Applicants, 23 November 2021.
273 NSW Department of Conservation and Land Management (1993) *Boobera Lagoon Environmental Audit*. Prepared by the Inverell Reserve Service Centre.
274 *Ibid*.
275 Department of Industry (2018) *Modelling and data collection for implementing floodplain harvesting*
276 Schedule 2 states that licence 90SL022126 must not be taken when the water level of the pool in the Boobera Watercourse is less than 0.08 metres on a gauge established on the left bank of the watercourse on TS & CR 29416, Parish of Boobera, County of Stapleton.

5.2 Commitments under the *NSW Water Strategy* must be met

The Commission's recent reviews have acknowledged DPE-Water's current steps to improve stakeholder engagement with Aboriginal peoples and the commitments made in the *NSW Water Strategy* to address inequality in Aboriginal water rights and access.[277] The *NSW Water Strategy* sets out actions to '*recognise First Nations/ Aboriginal People's rights and values and increase access to, and ownership of, water for cultural and economic purposes*' including:[278]

- strengthen the role of Aboriginal peoples in water planning and management
- develop a state-wide Aboriginal water strategy and groundwater strategy
- provide Aboriginal ownership of and access to water for cultural and economic purposes
- work with Aboriginal peoples to improve shared water knowledge
- work with Aboriginal peoples to maintain and preserve water-related cultural sites and landscapes.

If implemented in a culturally appropriate manner, these commitments will lead to better outcomes for Aboriginal peoples, be consistent with commitments Australia has made as a signatory to the *United Nations Declaration on the Rights of Indigenous People,*[279] and contribute to Closing the Gap targets.[280]

> *'NSWALC seeks to ensure that the NSW Government meets its commitments outlined in the National Agreement on Closing the Gap (CtG). The CtG provides an important framework for governments to work in partnership with Aboriginal people to ensure we maintain distinctive cultural, spiritual, physical and economic relationships with water, and advance our rights and interests in water.'*[281]

However, as highlighted by the Productivity Commission inquiry on national water reform, there is still much work to do to secure Aboriginal peoples' interests in water.[282] The challenge now is to embed these commitments and actions in the NSW water planning and water licensing framework. Water sharing plans are one of the ways that Aboriginal rights and interests in water can be recognised, quantified and transparently actioned in ways that support cultural and economic needs. Boobera Lagoon provides an instructive case study for NSW and Australian governments to work in partnership with the Traditional Owners of Boobera Lagoon to consider how to address the protection of the lagoon, secure relevant water rights and protect cultural values of the lagoon.

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277 For example, Natural Resources Commission (2022) *Review of Intersecting Streams and Lower Murray-Darling Unregulated Water Sharing Plans*; Natural Resources Commission (2021) *Review of water sharing plans for the Bega and Brogo Rivers Area, Murrah-Wallaga Area, and Towamba River water sources*

278 DPIE-Water (2021) *NSW State Water Strategy*

279 See for example, 'Article 25 Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard.' In: United Nations (2007) *United Nations Declaration on the Rights of Indigenous Peoples*

280 The *National Agreement on Closing the Gap* (July 2020) includes an additional outcome area 'Aboriginal and Torres Strait Islander people maintain a distinctive cultural, spiritual, physical and economic relationship with their land and waters' and two associated targets for land and water: a) *Target 15a:* By 2030, a 15 percent increase in Australia's landmass subject to Aboriginal and Torres Strait Islander people's legal rights or interests; b) *Target 15b:* By 2030, a 15 percent increase in areas covered by Aboriginal and Torres Strait Islander people's legal rights or interests in the sea.

281 Submission: NSW Aboriginal Land Council, received 16 July 2021.

282 Productivity Commission (2021) *National Water Reform 2020, Productivity Commission Inquiry Report No. 96*

5.3 Aboriginal water rights, interests and values should be recognised

The Plan and its background document[283] offer limited recognition of Aboriginal peoples' rights, interests and values associated with water. This is despite readily available information and opportunities to incorporate contemporary knowledge through the Plan amendment process and readily available information as shown in the Boobera Lagoon case study in **Section 5.1**.[284]

The background document provides very limited information on Aboriginal values. It identifies that Morella Watercourse/Boobera Lagoon/Pungbougal Lagoon is considered by Aboriginal peoples to be one of the most important Aboriginal places in eastern Australia but provides no further information on why it is important or what the water-dependent needs of the complex are. The background document does not identify any other Aboriginal values in the region. For example, it does not recognise:

- Aboriginal Places declared under the *National Parks and Wildlife Act 1974*, including Boobera Lagoon and Northcote Bora Ring
- the native title rights determined for the Western Bundjalung People in 2017[285]
- the native title claim of the Gomeroi People that was registered in 2012[286,287]
- the values and uses of water identified by the Gomeroi and Kwiambul peoples in the consultation reports prepared under the water resource plan development processes[288,289]
- data collected as part of the now concluded NSW Aboriginal Water Initiative
- cultural values and uses identified in the Gomeroi Nation's waterways assessment conducted in January 2020
- other values identified in this chapter.

The Commission notes that while the background document does not reflect the native title determination, the Plan has been updated to recognise native title rights determined for the Western Bundjalung People.[290] However, the Plan does not specify what those native title rights are in relation to water, which include the right to '*take and use the water for personal, domestic, communal purposes (including cultural purposes) but not extending to a right to control the use and flow of the water in any rivers or lakes*.'[291]

Under the National Water Initiative, the NSW Government agreed to take account of native title in catchments, including to allocate water in water sharing plans to native title holders following

283 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*

284 Since the Plan came into effect, it has been amended multiple times, including in 2013, 2014, 2016, 2019 and 2020. The background document was amended once in 2016 when the Tenterfield Creek Water Source was included in the Plan.

285 National Native Title Tribunal (2017) *Extract from the National Native Title Register, Federal Court Number: NSD2300/2011, NNTT Number: NCD2017/002, Western Bundjalung People v Attorney General of New South Wales*

286 National Native Title Tribunal (2011) *Extract from Schedule of Native Title Applications, Federal Court Number: NSD37/2019, NNTT number: NC2011/006, Gomeroi People v Attorney General of New South Wales (Gomeroi People)*

287 The Commission has previously discussed providing timely and adequate recognition of registered native title claims in its reviews. For example, see: Natural Resources Commission (2021) *Final Greater Metropolitan surface and groundwater sharing plan reviews*, pp. 122-123.

288 DPIE (2018) *Culturally Appropriate First Nations Report with Gomeroi Nation*

289 DPIE (2019) *Culturally Appropriate First Nations Report with Kwiambul Nation*

290 Clause 19(a) of the Plan.

291 National Native Title Tribunal (2017) *Extract from the National Native Title Register, Federal Court Number: NSD2300/2011, NNTT Number: NCD2017/002, Western Bundjalung People v Attorney General of New South Wales*

the recognition of native title rights in water and to account for this water.[292] To address this commitment requires native title rights to not only be recognised in the Plan but also the requirements for water to be estimated.

The need for transparent and clear recognition of native title rights and providing access to water through the entitlement framework, including for cultural flows,[293] are recurring themes raised by peak bodies and other stakeholders:

> '*The recognition of native title rights and interests in water requires, as a starting point, a legislative and policy setting which ensures that native title holders are able to exercise their rights and interests. …legislation and policy should provide for, amongst other things, access to water and waterways, cultural flows, and water allocations to be made to native title holders.*'[294]

> '*Past access to water rights* [by non-Aboriginal people] *is not appropriate and removing them would be a big part of repatriation to the Aboriginal people. It's not water sharing with us, it's water taking, from our rivers, from our sacred sites. Always a one-way system that benefits other people, not Aboriginal people*.'[295]

> *'All governments have committed to increasing Aboriginal water rights through specific Closing the Gap targets. NSWALC has previously recommend that this should include increasing the volume of water access entitlements allocated under state and territory water rights regimes to Aboriginal and Torres Strait Islander organisations.'*[296]

> *'There have been no Cultural Water access licences granted in this water source… There is still no outcome nor improvements that meet Aboriginal needs. There has been no identification of culturally significant values in the water source area, not even Boobera Lagoon, one of the most important Aboriginal sites in southeast Australia*.'[297]

> *'We want something we can take to the table, want to get something out of the process. Gotta start where they allocate water to cultural flows. Give it to us. There needs to be honesty in the system*.'[298]

While the area of overlap between the native title determination and the Tenterfield Creek Water Source is small, DPE-Water should work with the Western Bundjalung People native title holders to understand their requirements for water, consistent with the determination, in this water source. Subject to these discussions, the Plan should be amended to reflect the outcomes of these discussions in the requirement for water under native title right at Clause 19. The Commission has previously made state-wide recommendations to strengthen the processes for identifying and protecting Aboriginal water values, as part of a broad cultural landscape approach.[299] There have been significant efforts to provide guidance on how to undertake effective engagement with Aboriginal stakeholders to identify water values,[300]

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292 Council of Australian Governments (2004) *Intergovernmental Agreement on a National Water Initiative*

293 Cultural flows are defined as '*water entitlements that are legally and beneficially owned by the Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, natural, environmental, social and economic conditions of those Nations*' (Murray Lower Darling Rivers Indigenous Nations (2007) *Echuca Declaration, Part 1*).

294 Letter correspondence to DPIE-Water regarding NTSCorp's comments on the Far North Coast, Border Rivers and South Coast Regional Water Strategies, 29 January 2021, p. 3. Provided to the Commission for use in this review.

295 Interview: Boobera Lagoon Reserve Land Manager (Board), 31 January 2022.

296 Submission: NSW Aboriginal Land Council, received 16 July 2021.

297 Submission: Inland Rivers Network, received 16 July 2021

298 Interview: Gamilaraay Native Title Applicants, 23 November 2021.

299 Natural Resources Commission (2021) *Final Greater Metropolitan surface and groundwater sharing plan reviews*, p. 129.

300 Including additional modules for the National Water Initiative and the Basin Plan, and as part of the National Cultural Flows project.

including Aboriginal waterways assessments[301] and cultural flows assessments.[302] These have been detailed in the Commission's previous water sharing plan reviews.[303]

5.4 Engagement and use of amendment opportunities should be maximised

Identification of Aboriginal water-dependent values and assets began during the 2016 amendment process – where both the Plan and background document were amended:

> '*Whilst the draft plan was on public exhibition DPI Water initiated a process to identify and assess Aboriginal Cultural Assets. It is intended that these sites will be included in the plan and appropriate water sharing rules developed to maintain these assets…*' [304]

The Commission received feedback from various Aboriginal stakeholders that the approach of commencing engagement when there is already a draft plan is tokenistic at best and is not culturally appropriate:[305]

> *'We see how much we're devalued. We feel devalued and not listened to. It's time to listen to us.'*[306]

> *'Aboriginal communities have not had meaningful engagement and find Plan documentation inaccessible.'*[307]

Since this time, the Plan has not been updated to recognise Aboriginal cultural assets or appropriate water sharing rules to maintain these assets.[308] This is despite the Plan including an amendment provision that allows for Aboriginal cultural assets and rules to protect those assets to be included in the Plan after Year 5, which commenced on 1 June 2017.[309]

> '*NSWALC, LALCs and Aboriginal people have long called for improved water management practices, involvement of Aboriginal people in water governance and decision-making, increased access to and ownership of water for Aboriginal peoples for cultural and economic purposes, and improved accountability, transparency and compliance.*'[310]

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301 The purpose of the Aboriginal Waterways Assessment Program was to develop a tool that consistently measures and prioritises river and wetland health so that Traditional Owners can more effectively participate in water planning and management in the Basin. (Murray-Darling Basin Authority (2017) *Aboriginal Waterways Assessment Program*).

302 The National Cultural Flows Research Project is a project driven by and for Aboriginal people, sought to establish a national framework for cultural flows. The framework, released in 2018, provides the first guide and method for future planning, delivery, and assessment of cultural flows (Murray-Darling Basin Authority (2019) *Cultural Flows*).

303 See for example: Natural Resources Commission (2020) *Final report: Review of the Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources 2009*; Natural Resources Commission (2019) *Final report: Review of the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012*.

304 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*, p. 23.

305 Interviews conducted for the reviews of water sharing plans for the Intersecting Streams Unregulated Water Sources and the Lower Murray-Darling Unregulated Water Sources: Executive Officer and Board Member, Murray Lower Darling Indigenous Nations, 28 May 2021; Board Member, Northern Basin Aboriginal Nations, 27 May 2021.

306 Interview: Gamilaraay Native Title Applicants, 23 November 2021.

307 Submission: New South Wales Aboriginal Land Council, received 16 July 2021.

308 The Commission notes that the Plan amendments in 2020 include recognition of the Western Bundjalung People native title determinations (including Part A and Part B, the latter of which is not located in the Plan area) at Clause 19(a) in the Plan.

309 Clause 77(5) in the Plan.

310 Submission: NSW Aboriginal Land Council, dated 16 July 2021.

As well as drawing on readily available information (discussed in **Section 5.3**), there are nation groups that have not been adequately engaged through existing consultation processes and this needs to be rectified. Ongoing consultation by DPE-Water should recognise that each nation group will have a preferred way in which engagement is undertaken with them. The engagement approach should recognise the specific needs and situation of nation groups.

The Commission acknowledges that DPE-Water has been working with key Aboriginal stakeholders to identify and guide actions to recognise Aboriginal peoples' rights and values associated with water for cultural and economic purposes. There has also been increased resourcing for Aboriginal liaison staff in DPE-Water to support a range of planning activities.[311] While these steps are positive, there is still much to be done in this area and the Commission considers this area is a high priority.

Aboriginal stakeholders need to be at the core of developing the NSW Aboriginal Water Strategy and the NSW Groundwater Strategy (an action under the *NSW Water Strategy* – see **Section 5.1**) to ensure it meets their needs, addresses critical barriers to water use and access, and includes Aboriginal peoples as knowledge holders and leaders for implementing actions to restore Aboriginal water rights and interests in NSW.

5.5 Generic provisions should be supported by specific rules

The Plan mirrors recently updated water sharing plans across the Murray-Darling Basin,[312] which were a result of the water resource planning process.[313] All water sharing plans in the Basin now comprise the same generic vision,[314] objectives,[315] strategies,[316] and performance indicators[317] to maintain and improve values and uses of water by Aboriginal peoples. Despite these objectives, it remains unclear how these generic provisions reflect the views of individual nations or how they can be practically implemented to protect and support native title rights to water.

Aboriginal nations and other representative groups feel the model to engage and collate cultural values across water planning areas was inadequate – often relying on short-term contracts with consultants with limited water knowledge or experience in appropriately collating water values and uses.

311 This included funding for representative groups Murray Lower Darling River Indigenous Nations and Northern Basin Aboriginal Nations as part of developing water resource plans and regional water strategies. Source: Interview conducted during recent reviews of water sharing plans for the Intersection Streams and Lower Murray-Darling unregulated water sources: Principal Aboriginal Policy and Legislation Officer - Water Policy & Legislation - Department of Planning, Industry and Environment-Water, 7 May 2021.

312 The Commission was informed by DPIE-Water that these provisions were included across all recent Plan updates in the basin as a result of the water resource planning process.

313 The independent Aboriginal assessments of water resource plans have been completed by Murray Lower Darling River Indigenous Nations and Northern Basin Aboriginal Nations and no plans have been determined to meet the assessment criteria for Aboriginal water and therefore have not been recommended for approval. The key issues noted during the Commission's consultation for two recent reviews include:
- significant delays in starting Aboriginal consultation – for example, most Aboriginal nations were only consulted after the plans were put on public exhibition
- inconsistency in consultation efforts due to the use of different contractors to undertake engagement with little involvement from departmental staff
- no consideration of Aboriginal nations in the risk assessment process

Source: Interviews conducted for the reviews of water sharing plans for the Intersecting Streams Unregulated Water Sources and the Lower Murray-Darling Unregulated Water Sources: Executive Officer and Board Member, Murray Lower Darling Indigenous Nations, 28 May 2021; Board Member, Northern Basin Aboriginal Nations, 27 May 2021.

314 Clause 8(c) of the Plan.

315 Clause 11(1) and (2) of the Plan.

316 Clause 11(3) of the Plan

317 Clause 11(4) of the Plan.

> *'The water sharing plan amendments are all generic objectives, strategies… across all inland plans. Nations have had no input… there has been no actual consultation that we are aware of and certainly none at a plan level.'*[318]

> *'The current Plan, at Part 2, 11 Aboriginal cultural objectives, attempts to reflect DPIE's commitment to work with Aboriginal communities. Nevertheless, this section does not explicitly reference Aboriginal peoples spiritual, customary and economic relationship with water. NSWALC recommends, in consultation with local Aboriginal communities, further detail is provided in the Aboriginal cultural objectives and performance indicators in the Plan. This would support the intent to recognise the importance of rivers and ground water for Aboriginal peoples and to work closely with Aboriginal communities to develop water sharing plans.'*[319]

In addition, it is unclear how the objectives and indicators could be practically implemented. As a result, Aboriginal water values are not well understood or integrated in the Plans, nor can they be adequately protected:

> '*There is still no outcome nor improvements that meet Aboriginal needs*.'[320]

The review of the Plan has identified a range of existing information that could be drawn on in these areas to better understand and integrate Aboriginal water values (see **Section 5.3**).

5.6 Recommendations

R 6	In the Plan remake, DPE-Water should undertake culturally appropriate consultation with all nations in the Plan area and inclusive research to identify water-dependent Aboriginal cultural values and assets and their specific water requirements to meet Aboriginal needs. This should include: a) consulting with the Traditional Owners of Boobera Lagoon, including the Boobera Lagoon Reserve Land Manager, to develop a comprehensive understanding of Aboriginal values associated with Boobera Lagoon and the water management and extraction activities that place those values at risk, in line with the Aboriginal waterways assessment methodology b) investigating cultural flow requirements in line with the cultural flows methodology and practical ways to deliver those flows, including recognition of any existing work or plan of management c) identify constraints, barriers and diversions installed that impact the natural flow of waters into Boobera Lagoon, work with NRAR to establish the legality of those structures and, if legal, find alternatives to allow the natural flow of water to return d) working with the Traditional Owners, propose and agree on rules for inclusion in the Plan to protect Aboriginal values related to water, including cultural flows and, if required, the physical and institutional infrastructure, licences and resources needed to deliver water to the Boobera Lagoon.

318 Interview conducted for the reviews of water sharing plans for the Intersecting Streams Unregulated Water Sources and the Lower Murray-Darling Unregulated Water Sources: Executive Officer and Board Member, Murray Lower Darling Indigenous Nations, 28 May 2021.
319 Submission: NSW Aboriginal Land Council, received 16 July 2021.
320 Submission: Inland Rivers Network, received 16 July 2021.

R 7	In the Plan remake, to improve protection of cultural values and assets, DPE-Water should: a) embed rules to achieve actions in the *NSW Water Strategy* relating to Aboriginal peoples' rights and values and increase access to, and ownership of, water for cultural and economic purposes, and specifically for Boobera Lagoon b) consult with the Western Bundjalung People native title holders on native title needs, assess the water requirements necessary to meet those needs, and ensure the Plan provisions adequately protect those basic landholder needs in the Tenterfield Creek Water Source c) include a schedule of water-dependent Aboriginal cultural values and assets and provisions to protect and enhance them, which may include the provision of cultural flows and protection of Aboriginal values in in-river and off-river pools, and specifically for Boobera Lagoon d) assess the impacts of floodplain harvesting and floodplain works on Boobera Lagoon and, if required, ensure licence conditions protect surface water flows into Boobera Lagoon and the Morella Watercourse.
SA 4	To improve protection of Aboriginal values at Boobera Lagoon, and for other water-dependent cultural assets, DPE-Water should: a) amend the pools policy to give greater priority to protecting Aboriginal values, including those associated with Boobera Lagoon b) assess Aboriginal groundwater values associated with Boobera Lagoon, including understanding groundwater needs, monitoring and protection requirements (noting this assessment should be conducted at the same time as the assessment of surface water values) c) install a continuous height recorder and determine a comprehensive water balance for Boobera Lagoon and the Morella Watercourse, including contributions of surface flows, runoff, and groundwater across relevant water sharing plans d) investigate current and potential impacts that groundwater extraction may have on the Lagoon's Aboriginal cultural values and, if required, include rules in the relevant groundwater sharing plan to mitigate the impact of groundwater extraction on the Lagoon's values e) ensure other land and water management agencies (for example, Local Land Services) are involved in this process to provide for a holistic consideration of the actions that can improve cultural and environmental outcomes for Boobera Lagoon.
SA 5	In the Plan remake, to improve recognition and protection of cultural values and assets, DPE-Water should update the background document to: a) recognise the specific native title rights of the Western Bundjalung People as they relate to water in the Tenterfield Creek Water Source b) recognise the native title rights claimed by the Gomeroi People as they relate to water c) include comprehensive discussion of Aboriginal cultural values and assets and describe how the Plan rules have been prepared to protect and enhance them d) define native title rights to be consistent with the definition in the *Native Title Act 1993*.

6 Strengthening environmental protections

The Plan aims to protect the needs of the environment by setting and managing extraction against LTAAELs, trade restrictions and access rules. However, there is limited evidence to indicate how effective these Plan provisions have been in supporting environmental outcomes. Risk assessments undertaken as part of the development of the Border Rivers Surface Water Resource Plan indicate that more can be done to protect key components of the flow regime across some of the Plan's water sources. Changes are also warranted to ensure the Plan contributes to downstream flows in line with updated objectives on improving connectivity.

Since the Plan was developed, work has been undertaken to better understand environmental water requirements. This includes the development of the *NSW Border Rivers Long Term Water Plan* by DPE-E&H, which was finalised in May 2022. Further, DPI-Fisheries has developed the Fish and Flows Framework to identify significant flow components that support the life stages of native fish. DPI-Fisheries has also undertaken targeted fish monitoring in the Mole River and Tenterfield water sources. These developments are commended and provide an important evidence base for refining plan provisions to deliver better environmental outcomes.

While the Plan was amended in 2020 to improve consistency with the Basin Plan, the principle adopted by the NSW Government of minimal change to plans within their ten-year term means that there are several opportunities identified during the development of the water resource plans still to be addressed to improve environmental outcomes.

Several of these issues relate to connectivity. While the amended Plan includes an objective to provide for '*the longitudinal and lateral connectivity within and between water sources to support target ecological processes*',[321] Plan rules do not adequately provide for connectivity across the Plan area or downstream, including with downstream water sources such as the Barwon-Darling. Issues related to connectivity include:

- inadequate protection of low flows given the Plan lacks flow classes and relies heavily on cease to pump when there is no visible flow (**Section 6.1**)
- a lack of clarity around the Plan's contribution to end of system flows (**Section 6.2**)
- limited protection of first flush (**Section 6.3**)
- inadequate recognition and protection of regionally significant wetlands (**Section 6.4**)

There are also issues around the protection of in-river and off-river pools (**Section 6.5**), opportunities to improve the release of environmental flows from in-stream structures (**Section 6.6**) strengthen the management of water quality issues (**Section 6.7**) and protections for third order streams (**Section 6.8**).

6.1 Inadequate protection of low flows

For most water sources within the Plan area, the only access rule for unregulated river licence holders is cease to pump when there is no visible flow in the vicinity of the pump site. The Plan's background document attributes the adoption of this rule to a lack of river gauges in the unregulated water sources that can be used as a reference for cease to pump conditions.

This access rule is not commensurate with the risk posed by extraction to environmental values. A lack of flow classes in Part 8 Division 2 of the Plan, which are used in several other unregulated river water sharing plans to help protect low flow,sis inadequate to achieve the Plan's environmental objectives. There are also existing gauges that can be referenced for

[321] Clause 9(2)(a)(iii) of the Plan.

establishing flow classes and flow thresholds identified in the *Border Rivers Long Term Water Plan*, which could be used as a basis for establishing flow-based cease to pump rules.[322]

The risk assessment undertaken as part of the development of the *NSW Border Rivers Surface Water Resource Plan* identifies several water sources with medium to high risks for different flow components. It lists the Boomi River (upstream of Whalan Creek), Inverell, Mole River and Tenterfield Creek water sources as high risk, indicating instream values associated with these water sources are at risk from altered flow regimes, especially zero and low flow conditions.[323] New strategies are needed to mitigate risks to low flow habitat, particularly in the context of a changing climate, which could potentially contribute to accelerated drying (**Section 3.4**).[324]

There are gauges in some of these water sources that could be used as a reference for protecting base flows. For example, Tenterfield Creek at Clifton (416003) has over 100 years of data that could be used as a reference for a flow-based cease to pump for Tenterfield Creek, while Mole River at Donaldson (416032) could be used for Mole River.

A further review by DPE-Water of the stream gauging network is necessary, given the importance of having a reliable stream gauge nearby to manage extraction at various flow levels. The Commission understands that some gauges in the region were examined for downgrade in a recent hydrometric review. However, it is not clear the extent to which this assessment considered environmental outcomes and objectives. Any changes to gauges will need to be considered by DPE-Water in the context of establishing flow-based cease to pump rules as a minimum for high-risk, high ecological value water sources. DPE-Water should also consider assessing the heterogeneity of flows between streams as a way of addressing gaps in the gauging network.

Further, the Tenterfield Creek Water Source appears to have experienced an erosion of planned environmental water when it was merged with the current Plan in 2016 (see **Section 6.5**). The new rules mean that four irrigators can draw down in-river pools by 12 centimetres. This is more lenient than the former *Water Sharing Plan for the Tenterfield Creek Water Source 2003's* access rules, which would have otherwise protected in-river pools (from Year 9 of the plan). More information on the protection of pools can be found in **Section 6.5**.

The risk assessment also identified other water sources with medium or high risk of insufficient water for meeting environmental needs including Beardy River, Boomi River downstream of Whalan, Campbells Creek, Glen Innes (based on zero flow periods and low flows).

Risk ratings should be reassessed as new information becomes available and used to support adaptive management of the Plan rules, particularly in relation to protecting low flows. The *NSW Border Rivers Long Term Water Plan* establishes extensive environmental water requirements and comprehensive flow thresholds for key components of the flow regime, including base flow. At a minimum, this information should be used for setting flow-based cease to pump rules for, high-risk, high-value water sources such as Boomi River above Whalan Creek (Croppa and Whalan Creek Water Source), Inverell, Mole River and Tenterfield Creek water sources.

322 Office of Environment & Heritage (2019) *NSW Border Rivers Long Term Water Plan Parts A and B*
323 DPI-Water (2018) *Border Rivers Surface Water Resource Plan – Schedule D: Risk assessment*
324 *Ibid.*

6.2 The Plan should specify how it will contribute to downstream flow targets

As part of its water reform package, the NSW Government released information on possible measures to help improve the management of environmental water and environmental outcomes. One of the measures is the '*use of downstream environmental requirements as a trigger to manage upstream access*'.[325] This is underpinned by the implementation of the *Interim Unregulated Flow Management Plan for the North West* to improve the contribution of flows to the Barwon-Darling.

The Border Rivers Regulated Plan was replaced in 2021 and includes access rules that require consideration of Barwon-Darling flow targets in managing outflows from the regulated Border Rivers. However, the contribution of flows from unregulated rivers and interactions between regulated and unregulated rivers does not seem to have been adequately considered, including how flows through unregulated water sources can contribute to meeting downstream flow targets.

The unregulated Border Rivers water sources can, and should, contribute to downstream flow targets and their role in contributing to these targets needs to be recognised and reflected in the Plan. This was raised in stakeholder submissions to the Commission's review:

> *'This plan lacks adequate 'end of system' targets to ensure that water is not taken at times when it is needed for higher priority environmental and basic rights needs in the Barwon-Darling River system. The clauses limiting take are unrelated to the times of need downstream.'*[326]

The lower Border Rivers catchment is characterised by anabranches and distributary channels that can play an important role in intra and inter-catchment connectivity, for example, the Boomi River. According to the *Border Rivers Long Term Water Plan*, '*the higher flows required to connect the anabranches, if permitted to progress to the end of the system, can provide meaningful connectivity to the Barwon-Darling.*'[327] Providing for this hydrological connectivity can deliver a range of benefits in terms of improving productivity and outcomes for native fish. They also provide large amounts of organic carbon to riverine ecosystems during floods.[328]

The Boomi River is an effluent stream off the Macintyre regulated river.[329] It receives replenishment flows for domestic and stock purposes via the Boomi regulator.[330] Operating arrangements for the Boomi regulator are set out in Schedule D of the *NSW-Queensland Border Rivers Intergovernmental Agreement 2008*. During higher (supplementary) flow events exceeding 1,100 – 1,200 ML per day, the Boomi River receives flows over the regulator that can reach the confluence with Gil Gil Creek and enter the area covered by the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*.

Both the regulated river water sharing plans for the Border Rivers and the Gwydir include provisions that are intended to restrict access to these uncontrolled flows to provide for their passage to the Barwon-Darling River to meet downstream flow requirements as set out in the *Interim Unregulated Flow Management Plan for the North West*.[331] However, no restrictions on

325 DPI (2018) *NSW Water reform Action Plan – Better management of environmental water consultation paper*
326 Submission: Inland Rivers Network, received 16 July 2021.
327 Office of Environment & Heritage (2019) *NSW Border Rivers Long Term Water Plan Parts A and B*
328 CSIRO (2007) *Water availability in the Border Rivers. A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*.
329 The MacIntyre regulated river is covered by the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2021.*
330 Replenishment flows of up to 10,000 ML per water year as per Clause 58(1) of the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source Order 2021.*
331 Clause 45 (2) of the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source Order 2021* and Clause 47(7) of the *Water Sharing Plan for the Gwydir Regulated River Water Source 2016*.

access to these connected higher flows exist for licence holders along the Boomi River (or other connected unregulated water sources).

As part of its work plan for the Border Rivers catchment, DPE-E&H is looking at establishing end of system annualised flow targets for the Boomi and other streams in the Border Rivers. Concurrently, DPE-Water has commissioned advice on the *Interim Unregulated Flow Management Plan for the North West*, including a literature review that could lead to revision of flow targets based on best available information. However, the Commission understands that the Plan is not included in the scope of the latter project.

Where unregulated (supplementary) flows in the regulated river system flow downstream and spill into the Plan's water sources, there should be alignment of restrictions on access between the regulated river supplementary flows and unregulated river access downstream, to assist in meeting downstream flow targets. Access should also be restricted to held environmental water should it spill from the regulated river into unregulated river water sources to maximise environmental outcomes and be more consistent with the intent of these environmental flows.

6.3 Protection of first flush flows can be expanded

The Plan includes a rule to protect the first 24 hours of a flow event in Tenterfield Creek Water Source.[332] The rule requires that there is a visible flow for 24 hours at the pump site before extraction can commence. This requires the water user to observe when the flow commences and may lead to some ambiguity regarding when extraction can commence. It would be clearer if WaterNSW announced when the event commences based on a clear published protocol.

The effectiveness of this access rule in terms of reconnecting pools and improving water quality is unclear due to lack of monitoring. Nonetheless, it is good practice and would likely deliver a range of benefits for water-dependent ecosystems and should be further explored, refined, and considered for other water sources in the Plan area.

The basis for why this rule was only applied to the Tenterfield Creek Water Source is unclear. It does not appear to be in the original *Water Sharing Plan for the Tenterfield Creek Water Source 2003* but is a provision that was adopted when the water source was included in the Plan in 2016.

The Boomi River in Croppa Creek and Whalan Creek Water Source could also potentially benefit from a first flush rule using the Boomi River at Boomi Weir offtake gauge (41603) as a reference. Flow thresholds and duration in the recently finalised *NSW Border Rivers Long Term Water Plan* could be used as a basis for such a rule. Given the flow regime of the Boomi River is highly altered, consideration of a first flush rule in addition to raising cease to pump rules would likely provide a range of environmental benefits. This approach would be consistent with the Plan's environmental objectives and likely contribute towards downstream flow targets.

[332] Clause 44(12) of the Plan states that the taking of water under an access licence with a share component that specifies the Tenterfield Creek Water Source must not commence until there has been a visible flow for a period of 24 hours at the location at which water is proposed to be taken.

6.4 Protecting regionally significant wetlands through improved connectivity

The Plan area contains multiple regionally significant wetlands and lagoons. Schedule 5 of the Plan lists 65 significant lagoons and wetlands within the Plan area, the majority of which (42) are in the Croppa and Whalan Creek Water Source. The remaining wetlands are spread across Camp Creek and Ottleys Creek water sources. Schedule 6 lists seven wetlands that form part of the Upland Wetlands of the Drainage Divide of the New England Tablelands Bioregion endangered ecological community, the majority of which reside in the Glen Innes water source. The Plan includes an objective to protect these wetlands and lagoons.[333]

All but one of the listed wetlands and lagoons are protected from drawdown below full capacity under Clause 44 of the Plan. However, there appears to be an inconsistency in the intent of the Plan to protect regionally significant wetlands and lagoons given Schedule 2 includes drawdown provisions for an access licence on the nationally and culturally significant Boobera Lagoon (see **Section 5.1**).

There is a lack of evidence on the extent that the Plan accurately identifies regionally significant wetlands and lagoons and provides adequate protection.[334] The latter is largely to do with limited monitoring of wetland condition. While most of these environmental assets are protected from drawdown there is a risk, particularly in the lower catchment, that alteration of the flow regime including a reduction in the frequency and size of overbank flows in the lower catchment, could impact on floodplain wetlands.

The relationship between regulated and unregulated water sources, particularly in the lower catchment needs to be considered when understanding how water management and water sharing affects floodplain wetlands and lagoons. The regulated and unregulated water sources of the Border Rivers are highly connected but there are separate planning instruments for these systems. As such, water resource development has contributed to fragmented riverine and floodplain environments.[335] Consistency in the intent of rules that seek to protect water for the environment, for example, the protection of supplementary flows that spill into the unregulated river water sources form the regulated river would improve environmental outcomes.

Overbank flows are important for maintaining floodplain vegetation communities and floodplain wetlands, which provide critical habitat for a range of species and support the overall productivity of river floodplain systems.[336] They are also important for floodplain specialists including the threatened southern purple spotted gudgeon and olive perchlet that inhabit these off-channel environments, but also require access to river channel environments. Bankfull and overbank flows are particularly important in the Croppa and Whalan Creek Water Source, which is characterised by an extensive floodplain environment. Floodplain harvesting poses a risk to the environmental values associated with these environments. However, floodplain harvesting is managed through the Border Rivers Regulated Plan.

The *NSW Border Rivers Long Term Water Plan* will provide further guidance regarding environmental flow requirements for supporting floodplain environmental assets. Provision of these requirements should be considered as part of the Plan remake, but also as part of floodplain harvesting reforms. It may be that additional interventions are required including modifications to existing water infrastructure to ensure that flows to these sites can be effectively managed through the regulated and unregulated system.

333 Clause 9(2)(b) of the Plan.
334 Clause 9(6)(d) of the Plan.
335 Thoms, M. C., Southwell, M. and Mcginness, H. M. (2005) 'Floodplain–river ecosystems: Fragmentation and water resources development', *Geomorphology*, 71, 126-138.
336 Thoms, M., Quinn, G., Butcher, R., Phillips, B., Wilson, G., Brock, M. and Gawne, B. (2002) *Scoping study for the Narran Lakes and Lower Balonne floodplain management study*, Cooperative Research Centre for Freshwater Ecology, Canberra.

To ensure risks to regionally significant wetlands are considered, the Commission recommends that DPE-Water works with DPE-E&H and DPI-Fisheries as part of Plan replacement. The focus of this work would be to ensure that:

- all regionally significant wetlands and lagoons are recognised in the Plan
- risks of not meeting Plan objectives and water management principles under the Act are addressed
- rules are assessed with a clear, transparent, documented risk assessment and evidence base and revised where necessary to ensure the Plan adequately protects these environmental assets.

6.5 Protection of in-river and off-river pools is inadequate

In 2011, DPIE-Water published the *Macro Water Sharing Plans Approach for Unregulated Rivers Access and Trading Rules for Pools Policy* (the Pools Policy). The purpose of this policy is to '*ensure that water sharing plans contain rules that meet the requirements of the Act, adequately protect and restore the environmental values of pools and share water equitably among water users*'. The Act requires water source protection, including the protection of associated water-dependent ecosystems. The policy also seeks to identify known cultural values of in-river and off-river pools.

The default rules prescribed by this policy are designed to give protection to the natural water level of pools. This helps to maintain these features as refugia during periods of reduced or no flow. More restrictive rules would typically apply where there is high environmental value or high risk to instream values. However, the policy also allows for alternate rules to enable pool drawdown where there is high extraction value and lower instream value.

Schedule 2 of the Plan sets out access rules for in and off river pools in four water sources including:

- in-river pools in Tenterfield Creek, Mole River and Beardy River water sources
- an off-river pool in Croppa Creek and Whalan Creek Water Source – one licence has access to the culturally-significant Boobera Lagoon (discussed in **Section 5.1**).

Tenterfield Creek Water Source

The original Tenterfield Creek Plan predates the Pools Policy but included rules that were designed to phase out access to in-river pools in the Tenterfield Creek Water Source over the life of the water sharing plan.[337] These rules were included in the Plan in recognition of historical extraction practices and the intent to protect high instream values associated with Tenterfield Creek and its tributaries. They allowed a transition period for water users to adjust to more stringent access rules to protect environmental values, including those associated with in-river pools.

By the end of year eight of the Tenterfield Creek Plan, water users would no longer be able to draw down in-river pools or access very low flows.[338] Users were to comply with access rules based on flow classes for each of the five management zones within the plan area. The intent of the more stringent access rules was to maintain connectivity between pools.

In 2016, when the Tenterfield Creek Plan expired, the water source and associated access and trade rules were incorporated into the Plan. Although pool access in Tenterfield Creek had been revoked under the former plan, more stringent rules for pool protection were not carried across

337 Clause 62A of the Tenterfield Creek Water Sharing Plan.
338 Clause 62A(a) of the Tenterfield Creek Water Sharing Plan.

into the Plan. Instead, amendments to the Plan allowed four licence holders to draw down pools in lower Tenterfield Creek by up to 12 centimetres year-round.[339] This creates equity issues given four out of 35 water users were given pool access that had been revoked and poses risks to the environment. It also potentially constitutes an erosion of planned environmental water, which is prohibited under the Basin Plan given these rules which were given effect in 2016 post-date the Basin Plan.[340]

Tenterfield Creek provides important habitat that supports a diverse native fish community. Threatened species including freshwater catfish, olive perchlet and southern purple spotted gudgeon, which are protected under the NSW *Fisheries Management Act 1994* and Murray cod (*Maccullochella peelii*), which is listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, have been recorded in Tenterfield Creek. The presence of these threatened species contributed to a very high instream value classification in a recent HEVAE assessment,[341] making it the only water source in the NSW Border Rivers region with this rating.

The second edition of the Basin-wide Environmental Watering Strategy lists expanding the range of existing populations of freshwater catfish, southern purple spotted gudgeon and olive perchlet as priorities in the northern Basin, including the Border Rivers.[342] Protection of in-river (and off-river) pools will likely contribute to addressing this priority. Southern purple spotted gudgeon populations tend to live in pools in unregulated streams, while freshwater catfish are generally more abundant in waterholes of unregulated streams and are significantly impacted by reduced connectivity.[343] OzFish Unlimited is working with the local community to deliver the Tenterfield Creek Restoration Project, which aims to improve fish habitat, including for southern purple spotted gudgeon.[344]

Given the high environmental values associated with this water source, the protection of aquatic habitat is paramount and necessary to be consistent with the priorities under the Act. The risks posed by pool access to threatened fish populations, particularly following the recent drought, which likely accelerated rates of drying, must be considered in the remake of the Plan. DPE-Water should work with DPI-Fisheries and DPE-E&H to assess the condition of threatened species populations in this water source and look to revoke pool drawdown to mitigate risks to threatened species, ensure equity between users, and ensure there was no erosion of planned environmental water.

Mole River

Eight access licences in the Mole River Water Source are permitted under the Plan to access in-river pools. The rules that apply to each licence establish the maximum drawdown depth as well as the period when pool access is permitted:

- from 1 March to 31 August, water must not be taken when the water level of the in-river pool falls below 0.3 metres from full capacity
- from 1 September to 28/29 February, water must not be taken when the water level of the in-river pool falls below 0.2 metres from full capacity.

339 The former Tenterfield Creek Plan allowed water users in the lower Tenterfield Creek (management zone 5) to draw down pools by up to 30 centimetres until the end of year 8 of the Plan.
340 Section 10.28 of the Basin Plan specifies that water resource plans (and component water sharing plans) must ensure that there is no net reduction in the protection of planned environmental water.
341 DPIE-Water (2019) *Risk assessment for the Border Rivers Surface Water Resource Plan.*
342 Murray-Darling Basin Authority (2020) *Basin-wide environmental water strategy, second edition*
343 *Ibid*.
344 OZFish (n.d.) *Tenterfield Creek Restoration Project*

Pool drawdown is a historical practice that predates the Plan, but during stakeholder consultation as part of this review, a water user indicated that pools do not replenish as quickly as they have in the past.[345]

The effectiveness of these rules in protecting instream values is unclear and requires further assessment by DPE-Water in consultation with DPE-E&H and DPI-Fisheries, particularly given the high HEVAE consequence for this water source which was based on high diversity value.[346] Several threatened species have been recorded or are expected to occur in Mole River, including native fish (freshwater catfish, olive perchlet and southern purple spotted gudgeon). The tusked frog (*Adelotus brevis*) whose population in the Nandewar and New England Tablelands Bioregion is listed as an endangered population under the *Threatened Species Conservation Act 1993*[347] has also been recorded in the Mole River as recently as 2021. The risks to these species from pool access needs to be considered as part of Plan remake, particularly given the high risk rating for cease to flow periods in the Mole River, which was not considered tolerable in the *Border Rivers Surface Water Resource Plan* risk assessment.[348]

Further, flow related risks that could arise in this water source and downstream if the Mole River Dam proceeds warrant consideration (discussed in **Section 6.8**).

Beardy River Water Source

Three access licences in the Beardy River Water Source are permitted under the Plan to access in-river pools. The rules that apply to each licence establish the maximum drawdown depth as well as the period when pool access is permitted:

- from 1 March to 31 August, water must not be taken when the water level of the in-river pool falls below 0.5 metres from full capacity
- from 1 September to 28/29 February, water must not be taken when the water level of the in-river pool falls below 0.35 metres from full capacity.

These rules appear to be more lenient that the access rules in place for Tenterfield Creek and Mole River. According to the background document, the basis for these rules is the historical practice of pool drawdown. Site inspections were also undertaken as was a desktop assessment of ecological values.[349]

The effectiveness of these rules in protecting instream values is unclear and requires further assessment by DPE-Water in consultation with DPE-E&H and DPI-Fisheries, particularly given the medium HEVAE consequence for this water source.[350]

6.6 In-stream structures should pass environmental flows

Environmental releases from dams and weirs are one of several mechanisms that can help to deliver environmental outcomes in the NSW Border Rivers and further downstream. These releases can help to mitigate the impact that installing and operating these instream structures can have on the natural flow regime. However, the environmental flow rules for these in-stream structures are not included in the Plan, which is inconsistent with other unregulated river water sharing plans previously reviewed by the Commission. For some structures, they are included as conditions on works approvals.

345 Interview: Water user, 19 October 2021.
346 DPIE-Water (2019) *Risk assessment for the Border Rivers Surface Water Resource Plan*, p. 23.
347 DPIE-EES (2021*) Tusked Frog population in the Nandewar and New England Tableland Bioregions - New England Tablelands: Distribution and vegetation associations*
348 DPIE-Water (2019) *Risk assessment for the Border Rivers Surface Water Resource Plan.*
349 DPI-Water (2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012*
350 DPIE-Water (2019) *Risk assessment for the Border Rivers Surface Water Resource Plan*, p. 23.

During consultation some councils raised that ageing infrastructure, including outlet valves that do not operate, makes it difficult to pass environmental flows downstream and comply with environmental flow conditions.[351] Examples include Deepwater Weir used for Glen Innes' town water supply and Tenterfield Creek Dam.

Councils should address this issue in consultation with NRAR and DPE-Water's Utilities team. Addressing identified issues is necessary to be consistent with the NSW Weirs Policy which encourages 'structural changes to weirs to reduce their environmental impact on the environment,'[352] but also to achieve the Plan's environmental objectives and support fish movement. The requirements of the *Fisheries Management Act 1994* would also need to be considered for any infrastructure modifications.

Environmental flow rules should also be revisited to ensure that they are based on best available information, are practical to implement and mimic natural flow variability. They should then be codified in the Plan for transparency.

6.7 Management of water quality issues can be improved

DPIE-Water developed a water quality management plan for the *NSW Border Rivers Surface Water Resource Plan* area, as required under the Basin Plan.[353] The purpose of the water quality management plan is to provide a framework to protect, improve and restore water quality and manage salinity. It defines water quality target ranges for the water sources covered by the water resource plan, including Border Rivers unregulated river water sources covered by the Plan.

The amended Plan includes updated environmental and economic objectives that seek to align with the target ranges set out in the water quality management plan.[354] The Commission considers this an improvement on the original water sharing plan given the updated objectives are meaningful and measurable. However, they are only relevant if there is adequate ongoing data collection, analysis and reporting, and there is recognition that a range of interventions are required to improve water quality.

The water quality condition of the Border Rivers was assessed to inform the development of the water quality management plan.[355] Water quality index scores were generated for sites in regulated and unregulated water sources based on water quality data between 2010 and 2015. Scores were derived for each parameter as well as an overall score for each site.

There are six monitoring sites in the Plan area and several in the regulated water sources.

Table 8 indicates the overall water quality rating as well as ratings for specific quality parameters for the various water sources.

351 Interview: Glen Innes Severn Shire Council.
352 NSW Government (n.d.) *NSW Weirs Policy*
353 Chapter 10, Part 7 of the Basin Plan.
354 Environmental objective: Clause 9(2)(a)(ii) - *water quality within target ranges for these water source to support water-dependent ecosystems and ecosystem functions*. Economic objective: Clause 10(2)(c) - *to contribute to maintaining water quality within target ranges for agriculture, surface water dependent businesses and landholders.*
355 DPIE-Water (2020) *Water quality technical report for Border Rivers surface water resource plan area (SW16)*

Table 8: Water quality index scores for sites in the Plan area based on 2010-2015 data[356]

Water Source	Station name	Rating	Overall score	Total Nitrogen	Total Phosphorus	Turbidity	pH	Dissolved oxygen
Tenterfield Creek	Tenterfield Creek at Clifton	Fair	79	70	72	89	74	91
Mole River	Mole River at Donaldson	Good	85	90	80	100	96	80
Beardy River	Beardy River at Haystack	Good	80	89	74	46	100	96
Inverell	Macintyre River at Inverell	Poor	56	48	26	79	64	74
	Macintyre River at Wallangra	Fair	66	64	40	66	82	78
Glen Innes	Severn River at Strathbogie	Poor	37	14	17	85	44	68

Water quality rating key: **Poor:** 1 – 59; **Fair:** 60 – 79; **Good:** 80 – 94; **Excellent:** 95 – 100

The overall score for Tenterfield Creek was influenced by elevated nutrient levels, particularly nitrogen. Nitrogen concentrations were found to be elevated during low and cease to flow periods.[357] More recent data collected in 2018-19 and 2019-20 indicates that total nitrogen has exceeded the Basin Plan water quality target for the upland Border Rivers (0.75 milligrams per litre) in recent times (median of 0.7 milligrams per litre in 2018-19 and 1.0 milligrams per litre in 2019-20).[358] Water quality in Tenterfield Creek is likely affected by cattle and more recently rainfall runoff following the 2019-20 bushfires.

The fair and poor water quality scores for the MacIntyre River at Wallangra and Inverell sites were influenced by elevated nutrient levels, particularly phosphorus. The elevated phosphorus levels recorded at these sites were assessed as posing a high risk to health of water-dependent ecosystems.[359] According to the water quality management plan the catchment in this upper reach has been heavily modified with less than 20 percent woody vegetation in the riparian zone.[360]

The only other site in the Border Rivers with a poor overall water quality score is in the montane area of the upper Severn River above Pindari Dam. The poor overall rating was attributed to high nutrient levels, with total phosphorus deemed a high risk to water-dependent ecosystems.[361]

The water quality technical report for the NSW Border Rivers indicates that in the unregulated catchments '*there are very limited opportunities to manage water quality through flow*

356 *Ibid*.
357 *Ibid*.
358 Dumaresq-Barwon Border Rivers Commission (2020) *2019-20 Annual Statistics*
359 DPIE-Water (2020) *Water quality technical report for Border Rivers surface water resource plan area (SW16)*
360 *Ibid*.
361 *Ibid*.

management'.[362] While this may be the case to some extent, there are still opportunities to consider how the protection of low flows and flushing flows can provide water quality benefits. For example, baseflows help to mitigate pool stratification and flushing flows help to mix pools. These can be protected through establishing flow classes and cease to pump rules for each flow class. It will also be important to investigate how flow management can aid the recovery of fire affected waterways when considered in conjunction with other interventions.

It should be noted that, while the surface waters covered by the Plan are categorised as unregulated, there are still some that are significantly influenced by regulated flows, for example, the Boomi River in the Croppa and Whalan Creek Water Source, which receives flows from the regulated MacIntyre River via the Boomi regulator. The water quality condition along this reach of the regulated river where there is significant cropping, would influence the condition of the Boomi River and other effluent streams.

6.8 Protections for third order streams should be enhanced

When the Plan was developed in line with the macro water planning process, the Mole River Water Source was assessed as having high instream values.[363] In recognition of the need to protect water sources of high ecological value and maintain a near to natural flow regime, Part 9 of the Plan includes a clause that prohibits in-stream dams on third order or greater streams for specific water sources (Clause 48(1)(A)). This includes the Mole River Water Source. The Commission supports the retention of this provision, which is intended to protect areas of high environmental value in line with the priorities of the Act and considers that this protection is consistent with the Plan's environmental objectives.

The most recent HEVAE assessment of water sources in the Border Rivers catchment found that the Mole River retains its high ecological value, primarily due to the high level of diversity in the water source.[364] The Mole River provides key habitat for native fish populations, including threatened species and contributes to downstream connectivity. In October 2019, NSW announced a proposed 100,000 ML dam on the Mole River. In June 2022, the NSW Government updated the draft *Border Rivers Regional Water Strategy*, as this report was being finalised, removing the proposal for the dam as an option. The Commission supports this decision as the proposed dam would have posed a significant risk to the environmental and cultural values of the river given it would have altered the flow regime and potentially resulted in water quality issues.[365]

A parliamentary inquiry into the rationale and impacts of proposed new and upgraded water infrastructure, also found that the proposed Mole River dam would:

- negatively impact on the high ecological values of the Mole River, downstream aquatic ecosystems, critically endangered Box Gum Woodland and up to 76 threatened species in the Mole River Valley
- have perverse outcomes for existing water users as there would be a reduction in flows and increased costs
- impact upon the high cultural significance of the river to the Ngarabal people.[366]

362 DPIE-Water (2020) *Water quality technical report for Border Rivers surface water resource plan area (SW16)*, p. 14.
363 DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*
364 DPIE-Water (2019) *Risk assessment for the Border Rivers Surface Water Resource Plan*
365 WaterNSW (2020) *Mole River Scoping Study*
366 Legislative Council (2021) *Rationale for, and impacts of, new dams and other water infrastructure in NSW, Part 2. Report 8,* Portfolio Committee No. 7 – Planning and Environment.

While the recent proposal to build a dam on the Mole River has been withdrawn, the Commission considers it is important that the Plan maintains protections for third order streams in the event of any future considerations.

The Commission considers that dams on third order or greater streams would be inconsistent with the Plan's environmental, Aboriginal cultural and social objectives. The NSW Government should consider these objectives in relation to any future proposed dam, as well as the consistency of any proposed dam with Clause 48(1)(A) of the Plan. This Plan provision should also be strengthened by recognising and protecting Aboriginal cultural values from instream dams and requiring community consultation before any changes to Clause 48(1)(A) can occur.

6.9 Recommendations

R 8	In the Plan remake, to improve environmental outcomes, DPE-Water should: a) review the current gauging network to identify where existing gauges can be referenced to establish flow classes and flow-based cease to pump rules consistent with other unregulated water sharing plans, and identify where new gauges may be warranted in medium to high-risk water sources to reduce reliance on cease to pump when there is no visible flow b) revise provisions to address identified concerns for medium to high-risk water sources and support connectivity, including as a minimum, protection of pools and base flows. For example: i. where necessary to adequately protect environmental flows and basic rights, establish flow classes and flow-based cease to pump rules (see R 5a) and/or introduce a first flush rule ii. where necessary to protect environmental values, including under projected climate change, revise drawdown rules for pools in water sources classified as having high instream and/or cultural values iii. reinstate the protection of pools in the Tenterfield Creek Water Source (no pool drawdown) that was in place towards the end of the *Water Sharing Plan for the Tenterfield Creek Water Source 2003* (Tenterfield Creek Plan) iv. determine the contribution of flows from the unregulated Border Rivers to Barwon-Darling flow targets, include relevant targets in the replacement Plan and clarify how Plan rules would be implemented to support these targets.
R 9	In the Plan remake, to strengthen the protection of regionally significant wetlands, DPE-Water should: a) work with DPE-Environment and Heritage (DPE-E&H) and DPI-Fisheries to update the list of regionally significant wetlands and lagoons in schedules 5 and 6 of the Plan b) assess the risks to these environmental assets and the adequacy of current rules in protecting environmental values from an altered flow regime (this should be informed by the *NSW Border Rivers Long Term Water Plan* and 'fish and flows' work) c) update rules where necessary to adequately protect identified wetlands and lagoons.

R 10	In the Plan remake, to ensure environmental releases can be made from in-stream town water supply structures, DPE-Water should use best available information to: a) assess current dams and weirs and their ability to deliver environmental flows downstream b) determine any necessary infrastructure upgrades to deliver environmental flows and support fish movement and determine priority water supply dams and weirs for modification to improve environmental outcomes c) identify suitable, outcomes-focused environmental flow regimes for priority dams and weirs and reflect these in Plan rules and licence conditions.
R 11	In the Plan remake, to improve environmental outcomes in the Plan area, DPE-Water should: a) ensure the remade Plan reflects the latest information on environmental water requirements from the *NSW Border Rivers Long Term Water Plan* and associated 'fish and flows' advice from DPI-Fisheries b) consider how Plan provisions can help to ameliorate water quality issues in line with the Plan's water quality objectives, including recovering from the impacts of the 2019-20 bushfires c) retain Clause 48(1)(A) of the Plan and amend it to recognise Aboriginal cultural values associated with water sources and protect these values from instream dams.

7 Securing town water supply

Over the period of the Plan, towns in the Border Rivers region experienced major droughts and the Plan was not effective in managing the drought conditions. While the annual volume of water allocated under entitlement for town water supply is considered adequate, the availability of water during droughts and emergency events like bushfires became a major issue for local water utilities during the life of the Plan. Limited town water supplies were stretched further to also supply basic landholder rights and firefighting needs. While the Commission notes that town water supply is the responsibility of local government authorities in the Plan area, the Plan remake provides an opportunity to strengthen town water supply provisions to address these issues, including:

- strengthening Plan provisions to protect town water supply and reviewing risks to town water security (as well as other users, including the environment) based on the latest flow and climate data (**Section 7.1**)
- including provisions that allow the Plan to adapt to changing situations, including situations where towns become a water provider of last resort during emergency situations (**Section 7.2**).
- accounting for local water utility drought planning (**Section 7.3**)
- improving the effectiveness of the Plan to meet basic landholder rights during extended dry periods (**Section 7.4**).

7.1 Town water security was at risk during the Plan period

Extended drought is an inherent risk to town water supply security in the Plan area. While town water supply entitlements were adequate over the life of the Plan, Councils in the NSW Border River region advised that they were unable to access this entitlement during the 2019 drought and bushfires, due to inadequate inflows to dams and rivers. In 2019, towns in Tenterfield and Glen Innes shires were at high risk of running out of water for all users:

> '*The town* [Tenterfield] *nearly ran out of water (the Tenterfield Dam was below 20 percent), which triggered the longest water restrictions in Tenterfield's history. At this time water had to be carted into some communities for town water and was also needed at times to keep stock alive'.*[367]

Towns in the eastern uplands normally have much higher average annual rainfall than was experienced during the drought. For example, Tenterfield's annual average rainfall is 846 millimeters, but in 2019 there was only 255 millimeters of rainfall recorded,[368] less than a third of the annual average.

The small township of Deepwater was required to cart water in when it ran out during the drought, with communities enduring 440 days of water restrictions.[369] In response to water security risks, Tenterfield and Glen Innes Councils developed drought management strategies and secured funding to augment systems with bores as a temporary water source in times of drought, as well as accessing groundwater for short term use.[370]

Town water supply needs for Tenterfield and Glen Innes Shires were further pressured during drought as they had to provide town water to other users and became a water provider of last resort despite town water supply being critically low, including providing water for:

367 Interview: Tenterfield Shire Council, 4 November 2021.
368 Bureau of Meteorology (2022) *Monthly rainfall Tenterfield (Federation Park)*, accessed 7 March 2022.
369 Interview: Glen Innes Shire Council, 11 November 2021.
370 Interview: Tenterfield Shire Council, 4 November 2021.

- keeping cattle alive and other animal welfare and hygiene needs
- stock and domestic demand where rivers and bores ceased to flow
- firefighting efforts over a period of six months.

The experiences of towns in Tenterfield and Glen Innes Shires highlight the challenges of managing water sharing between different users in drought and emergency situations. The Plan was not designed for this level of demand during extended low flow periods to meet the needs of all water users.

While the Plan states that it recognises climatic variability,[371] as required under the Act,[372] the Plan's rules to manage variability consist only of the LTAAELs and a limited suite of daily access conditions.[373] The Plan's LTAAEL provisions only address extraction above the limit after it has occurred, which is unlikely to benefit water users during drought, and the Plan does not include any provisions to adjust the LTAAEL in response to climate change. The daily access conditions for most access licences under the Plan allow for pumping to occur until there is no visible flow, [374] which does not ensure flows are available to meet town water supply, domestic and stock access, basic landholder rights or environmental needs during dry conditions.

The risk to water users during dry periods created by inadequate attention to this form of climatic variability is likely exacerbated in the Plan area by entitlement exceeding extraction limits (as discussed in **Chapter 3**). The *Independent Panel Assessment of the Management of the 2020 Northern Basin First Flush Event 2020* recommended that drought contingency measures be embedded in water sharing plans for transparency and to provide certainty to the community that relevant matters will be considered.[375] DPE-Water should consider appropriate drought contingency measures and incorporate appropriate provisions when remaking the Plan.

The Plan adopted visible flow rules for licensed users and local water utility licences unless there were pre-existing conditions. For example, before its water source was incorporated into the Plan, the Tenterfield Creek Plan[376] did not explicitly state what the mandatory conditions for local water utility licence requirements were,[377] but did incorporate some general requirements for there to be mandatory conditions on local water utility licences.

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371 The effect of climatic variability on water availability is recognised in Clause 12(2)(c).

372 Section 20(2)(c) under the Act requires that water sharing provisions must recognise the effect of climatic variability on the availability of water.

373 Clause 13 of the Plan states that Plan recognises climatic variability by having provisions that manage the sharing of water within limits outlined in Part 6 of the Plan (i.e. LTAAELs) and that manage the sharing of water on a daily basis under Division 2 of Part 8 of the Plan (as there are no individual daily extraction limits or total daily extraction limits established by the Plan, this relies on daily access rules of which the default is that water users must cease to pump when there is no visible flow or when the volume of in-river or off-river pools is below full supply.

374 Clause 44(2) of the Plan.

375 Craik, W. and Claydon, G. (2020) *Draft Report Independent Panel Assessment of the Management of the 2020 Northern Basin First Flush Event*

376 NSW Government (2003) *Water Sharing Plan for the Tenterfield Creek Water Source 2003*

377 Clause 64 of the Tenterfield Creek Plan stated:

'All local water utility access licences shall have mandatory conditions to give effect to the following:

a) water may only be taken for the purposes of supplying water for the exercise of a water supply function of the local water utility or for other such purpose provided for under the Act,

b) water may only be taken in accordance with a flow class determined by the Minister, at a rate not exceeding that specified for the flow class on the access licence extraction component, and

c) notwithstanding subclause (b), water may be taken without any restrictions in rate from an in-river dam while the dam is passing all inflows.'

(NSW Government (2003) *Water Sharing Plan for the Tenterfield Creek Water Source 2003*)

When the Tenterfield Creek Plan was included in the Plan in 2016, Clause 44(9) specifying the flow requirements for the in-river dam only referred to pre-existing conditions on *Water Act 1912* licences.[378]

The mandatory conditions for local water utility licensed access have not been considered as part of the water planning process to evaluate the risks to towns, other users, or the environment. The Commission's previous reviews have recommended that conditions on local water utility licences should be reflected in system operation rules in water sharing plans to improved transparency and management.[379]

The trade-off between protecting the environment and providing for critical needs for towns needs to be re-evaluated in the light of the recent drought. For example, Glen Innes Shire Council also advised that environmental flow requirements for the Deepwater Weir – which were carried over from pre-Plan licences – were impractical and do not reflect the risk to town water supply or the environment.[380] The historical basis for weir environmental flows and their connections to the Plan objectives is not documented. The environmental flow rules should be reviewed considering the ecological values of the water source and physical capacity of the weir.

The lack of water security faced by water users during the drought highlights that the Plan rules may not provide adequate flexibility to adapt to current and future climate conditions. Droughts are expected to occur more frequently in the Plan area under climate change, as well as shifts in seasonal rainfall patterns that could impact on water availability and a higher number of severe fire weather days (see **Section 3.4**). Greater clarity on water sharing rules during dry sequences is required.

The draft *Regional Water Strategy for Border Rivers* highlights the importance of opportunities to improve town water security, strengthen community health and wellbeing, and better manage risks considering climate change impacts.[381] Plan provisions and licence conditions should be revised to reflect any changes to town water supply strategies given this risk.[382]

7.2 Risks from bushfires and other emergencies should be considered

Several water sources and water supply systems in the Plan area (particularly the upper catchment) were impacted by the 2019-20 bushfires (see **Section 7.1**), with both Tenterfield and Glen Innes shire councils needing to provide town water to support firefighting efforts. These events highlighted limitations in the ability of Plan provisions to ensure water is available for emergency purposes. In Glen Innes Shire:

> '*In the bushfires we were implementing a treating facility and trucking water to the bushfires for the planes. We ran 24/7 to refill planes for water bombing. We had problems with stock water in the drought and town water supply was the only place they could get it. At the time you had contractors backfilling dams they used water for bushfires. We didn't anticipate this demand.*'[383]

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378 Clause 44(9) of the Plan states that '*The flows and circumstances to be specified on the water supply work approval for the in-river dam referred to in subclause (8) are—*
a) the flows and circumstances that were specified on the Water Act 1912 entitlement that the approval replaces, or where no flows and circumstances were specified on the Water Act 1912 entitlement, the flows determined by the Minister'.

379 Natural Resources Commission (2021) *Final Report Review of the water sharing plans for the Richmond and Tweed unregulated and alluvial water sources*

380 Interview: Glen Innes Council, 11 November 2021.

381 NSW Government (2020) *Draft Regional water Strategy – Border Rivers Strategy*

382 Office of Environment & Heritage (2014) *New England North West climate change snapshot*

383 Interview: Glen Innes Shire Council, 11 November 2021.

In Tenterfield Shire:

> *'We were going into drought and people in Drake didn't have a water supply system, in the first fire they got cut off from Tenterfield and had to get water from Kyogle (Clarence river) to protect themselves. We got some funding for some bores for the little villages to give them peace of mind for bushfires, this has been so hard for people.*'[384]

> '*The whole catchment was on fire and burnt some of our infrastructure, the prolonged drought and fires contaminated the water supply (dam). People had to drink boiled water for two months as there were no options.*' [385]

The draft *Border Rivers Regional Water Strategy* states climate change will result in more extreme events in the future, increasing the likelihood of similar situations to that experienced in 2019-20. As such, strengthening town water supply provisions with the latest flow and climate data is critical:

> *'For the environment, higher temperatures, increased evaporation, increased bushfire risk, changes to rainfall patterns and associated flows, and potentially more intense dry and wet periods have the potential to significantly impact ecosystems that have evolved over millennia to thrive in natural cycles that are now changing. These changes are worsened by more recent modifications in flow regimes due to irrigation and water infrastructure.'*[386]

While water use for emergency purposes is covered under the *Fires and Rescue NSW Act 1989* and the *Rural Fires Act 1997*,[387] there are no specific emergency management clauses in the Plan to ensure critical water needs can be met during and after emergency events, such as if water supply systems have been impacted by bushfire.

Water quality issues following the 2019-20 bushfires highlights the importance of ensuring the Plans allow flexible management of water supply systems and their water sources to ensure the community has secure access to quality drinking water.

> *'We heard from local councils that the impact of recent bushfires on water quality cannot be understated. The bushfires caused destabilisation of soil and sediment, and burnt organic material washed into rivers causing fish kills. To mitigate these impacts, councils graded sealed roads to remove sediment and cleared multiple pipe blockages caused by sediment. Councils have suggested bringing the management of bushfire risks into the water management framework.'* [388]

In the Plan remake, DPE-Water should work with relevant agencies and local governments to understand any ongoing strategic planning around adequate water supply during bushfires. Other strategies to improve the management of impacts from bushfire and other emergency situations should also be explored. The draft *Regional Water Strategy for Border Rivers* recognises that the lessons learned from the 2019-20 bushfires should be considered in terms of environmental and community impacts and preparedness for future events. The *Final Report of the NSW Bushfire Inquiry* also highlights the need for increased water storage for firefighting and the importance of adequate access points for effectively filling firefighting tankers.

384 Interview: Tenterfield Shire Council, 4 November 2021.
385 Interview: Tenterfield Shire Council, 4 November 2021.
386 DPIE (2020) *Draft Regional Water Strategy: Border Rivers*
387 Section 15 of the *Fires and Rescue NSW Act 1989* allows for officers in charge at a fire to take and use any water from any source on any land for the purpose; Section 26 of the *Rural Fires Act 1997* allows an officer of a rural fire brigade for the purpose of controlling or suppressing a fire to take and use water from any source on any land without payment.
388 DPIE (2020) *Draft Regional Water Strategy: Border Rivers*

7.3 Plans must account for local water utility drought planning

DPE-Utilities work closely with councils to develop integrated water cycle management plans for drought management and to support future town water supply management:

> '*Local water utilities (LWUs) are responsible for undertaking long-term strategic town water services planning, including setting of service and investment priorities, revenue and pricing requirements. This planning includes the consideration of the local water utilities longer term and emerging risks to their water services.*
>
> *An Integrated Water Cycle Management Strategy is a 30 year plan developed by local water utilities that identifies an integrated water, sewerage and stormwater supply scenario that provides the best value for money on the basis of social, environmental and economic considerations. This encourages less reliance on limited natural water sources, less production of pollutant loads to the environment through stormwater and sewerage and involves efficient pricing and water management.'*[389]

The *Integrated Water Cycle Management Strategy* plans will provide important information on local water utility requirements and should be considered in the Plan remake to ensure urban water supplies are managed in the context of all water extraction within the catchment. Adequate resourcing to enable DPE-Utilities and DPE-Water to collaborate in the development of future plans will be critical going forward.

The Commission's analysis found discrepancies between local water utility entitlements listed in the Plan and local water utility access licences listed in the WaterNSW Water Register. These inconsistencies should be reviewed, and entitlement should be accurately reflected in the remake of the Plan (See **Section 3.1**).

7.4 Basic landholder rights could not be met during the drought

The extent to which basic landholder rights have been met under the Plan is difficult to determine as there is no monitoring of these forms of water use.

> *'Water extraction is not being monitored under the operation of this* [water sharing plan]*. With no monitoring of water extraction, there can be no discernible impact on social outcomes such as access to water for basic rights and water for cultural, heritage and recreational uses.'*[390]

Anecdotal evidence from stakeholders indicates that domestic and stock rights have been met by the Plan except during the recent drought (2017 to 2019), when basic rights users sought alternative water sources. In parts of the catchment, some people had to cart water for domestic and stock needs:

> *'We had a lot of issues with the amount of water trucked for stock during drought. The problem with stock water in the drought is only town water supply was where they could get it. You had contractors backfilling dams they used water for bushfires. We didn't anticipate this demand.'*[391]
>
> *'There was no surface water* [available]*, the drought dried dams, creeks and rivers. Council was granted emergency funding to find underground water for the Town of Tenterfield, which we were lucky to find. Without water everything dies. We used one of our old bores to allow rural residents to provide for stock to get water. The bore water was*

389 DPI (n.d.) *Water Utilities Best Practice Management – Integrated Water Cycle Management*
390 Submission: Nature Conservation Council of New South Wales, received 16 July 2021.
391 Interview: Glen Innes Shire, 11 November 2021

provided free of charge. This water source was not designed for tanker trucks and designed to limit ability to fill as the bore was regulated to provide only 1,000 litres per fill so limiting the potential supply as drinking water. Additionally, the water quality generally has contaminants and we didn't want people drinking it untreated. "[392]

As noted in **Section 7.1**, security of supply in times of drought is an inherent risk for all water users, including under basic rights. The Act requires the Plan to provide for basic landholder rights before licensed users.

DPE-Water should consider how the priorities for supply in times of drought are implemented by the Plan and look to improve the effectiveness of the Plan to meet basic landholder rights during extended dry periods.

7.5 Recommendations

R 12	In the Plan remake, to address risks to town water security, including during dry periods, DPE-Water should: a) assess the adequacy of access rules for local water utilities b) assess the adequacy of access rules for unregulated river access licences to prioritise town water supply and basic landholder rights c) revise Plan provisions to protect town water supply and basic landholder rights in accordance with the Act d) revise Plan provisions to include appropriate first flush triggers consistent with recommendations in the *Independent Panel Assessment of the Management of the 2020 Northern Basin First Flush Event 2020* e) work with relevant agencies and local government to understand any ongoing strategic planning around adequate water supply during bushfires and align Plan provisions.

[392] Interview: Tenterfield Shire, 4 November 2021.

8 Monitoring, evaluation and reporting

A lack of MER is a consistent theme raised in the Commission's reviews of water sharing plans. This is largely due to a lack of plan-specific MER programs, as well as limited resources dedicated to MER.

This review has found a similar lack of plan-specific MER over the life of the Plan. However, the Commission recognises there are several existing or historical monitoring programs in place that do support an understanding of the condition of water sources, and how environmental assets respond to changes in flow (**Section 8.1**).

The Commission also recognises that DPE-Water is working to improve MER arrangements for water sharing plans (**Section 8.2**). However, this work will be subject to available funding. The Commission notes the recently released *NSW Water Strategy* includes an action under Priority 3 to '*invest in long term and effective monitoring, evaluation, reporting and research*.'[393] The Commission anticipates this action will be associated with funding commensurate with the importance of MER for assessing water sharing plan effectiveness and will support adaptive management. **Section 8.3** outlines key knowledge gaps that should be addressed.

8.1 Existing monitoring programs in the plan area

The Border Rivers catchment spans NSW and Queensland. Much of the monitoring that has occurred to date has focused on the regulated rivers of the catchment, which are the focus of environmental watering actions and covered by a separate water sharing plan and Queensland planning instruments. This includes two programs funded by the Australian Government:

- fish and flows intervention monitoring in the regulated Border Rivers between 2014 and 2019 to determine fish responses to the provision of water for the environment (use of held environmental water)[394]
- key fish habitat along the Dumaresq River mapped by DPI-Fisheries to inform water management decisions and improve associated environmental outcomes.[395]

The Commission understands that DPI-Fisheries' Basin Plan Environmental Outcomes Monitoring of fish populations for 2014/15 to 2018/19 represents the most recent information on the condition of fish and fisheries related environmental assets in the NSW Border Rivers. However, further analysis of data at the valley scale are not yet available.

There are also existing hydrologic and water quality monitoring sites in the catchment, including unregulated river water sources which were considered as part of this review (**Section 6.7**).

The Commission understands that the DPE-Water will draw upon existing programs and link them back to Plan objectives and monitoring themes as part of its integrated MER plan (**Section 8.2**).

393 DPIE-Water (2021) *NSW Water Strategy*
394 NSW DPI and Queensland Department of Agriculture and Fisheries (2019) *Fish and flows intervention monitoring in the Border Rivers*. Report prepared for the Commonwealth Department of the Environment and Energy.
395 DPI-Fisheries (2018) *Mapping the Dumaresq: Aquatic Habitat Mapping to Inform Water Management*, report prepared for CEWO.

8.2 Pathway towards improved MER

DPE-Water is taking steps to improve MER and support efficient and effective use of available resources. This includes:

- updates to water sharing plan objectives as part of Plan amendments in 2020 to make them measurable and more meaningful
- the development of the NSW MER Framework and customised environmental MER plans
- investment in projects to strengthen MER and help target resources, including development of a framework for prioritising water sources for MER activities and development of a transferability model.

The NSW MER framework and MER plans seek to integrate MER activities across agencies and map out monitoring effort by research theme. The intent was to then develop theme-based methods manuals which set out monitoring sites, arrangements for cooperative research, sampling methods and data management and analysis techniques.

The Commission has considered the *NSW Border Rivers Surface Water Resource Plan*'s MER plan, which was designed to meet Basin Plan reporting requirements.[396] The environmental MER plan is based on program logic developed for the water sharing plan objectives, but also objectives from the *NSW Border Rivers Long Term Water Plan* and Water Quality and Salinity Management Plan. The program logic is intended to guide monitoring activities, while risk assessments undertaken as part of the water resource planning process are intended to inform areas for further research.[397] The MER plan also maps out existing monitoring programs by research theme.

However, there is room for improvement:

- while the amended Plan includes clearer, measurable objectives, Plan provisions have not been updated to support the achievement of the revised objectives, meaning that in some respects, these objectives risk not being met
- the MER plan does not explicitly identify areas for further research based on risk and value
- the MER plan does not specify where real-time gauging is required to support MER, for example, at Neewora Bridge
- there does not appear to be clear roles and responsibilities or adequate resources for overseeing and implementing the MER plan, which generates risks to implementation
- methods manuals referred to in the MER plan do not appear to have been finalised.

Given limited resources, it will be critical for DPE-Water to continue to identify efficiencies, focus on the most critical MER needs and continue to work collaboratively with other government agencies and academic institutions to coordinate monitoring activities that support the evaluation of the Plans. MER activities should be prioritised based on value and risk, and public reporting of MER priorities, findings and how they were considered in Plan amendments is needed to improve transparency and public awareness around Plan outcomes. Water source prioritisation and transferability studies currently underway by DPE-Water will help to target effort and resources.

396 DPIE-Water (2018) *NSW Border Rivers Surface Water Resource Plan Monitoring, Evaluation and Reporting Plan: Schedule J*
397 *Ibid*.

8.3 Knowledge gaps

As noted above, much of the focus for existing monitoring programs has been in the regulated rivers of the Border Rivers catchment. Further monitoring and research of the unregulated rivers is required to improve system knowledge, refine Plan provisions and support whole of catchment planning. They include, but are not limited to:

- the location of high-quality drought refugia, and impacts of climate change and extended droughts on waterhole persistence
- comprehensive identification of regionally significant wetlands and lagoons, their current condition, impacts associated with an altered flow regime (including from floodplain harvesting) and their resilience to extended droughts
- expanding habitat mapping to refine environmental water requirements and water sharing provisions
- the effectiveness of current access rules, and options for amended rules, in protecting in-river pools and associated environmental values (including pool water quality and species dynamics in response to drying and reconnection)
- effectiveness of first flush rule for Tenterfield Creek in reconnecting pools after cease to flow period and improving water quality
- degree of surface-groundwater connectivity and condition of groundwater-dependent ecosystems (for example, Boobera Lagoon)
- degree of connectivity in regulated rivers and unregulated anabranches and options for Plan rules to reflect and protect connectivity
- changes in surface water-groundwater connectivity in upland catchments and potential impacts on pool persistence and condition
- species and community presence and distribution and change in distribution
- impact of 2019-20 bushfires on water quality and pool sedimentation and species dependent on these features
- cultural flow needs for water-dependent Aboriginal cultural assets, such as the Morella Watercourse/ Boobera Lagoon/ Punbougal Lagoon complex
- better understanding barriers to fish movement and how they impact on connectivity to help prioritise where investment is most needed to improve connectivity
- quantifying historic levels of extraction
- estimating current levels of extraction (where not metered)
- using spatial and other technology to identify risks to objectives, low flows, connectivity, first flushes and/or to LTAAEL.

8.4 Recommendations

R 13	In the Plan remake, to improve Plan-specific MER, DPE-Water should: a) expedite the finalisation and publication of the water sharing plan evaluation framework and methods manuals and ensure there is multi-agency support and oversight of implementation b) identify Plan provisions to be informed by planned MER activities c) identify feasible and appropriate resourcing to support ongoing MER activities in line with the *NSW Water Strategy* d) specify timely reporting requirements of the results of MER activities to support transparency, public awareness and adaptive management and link this reporting cycle to the review, remake, or amendment of the Plan e) identify and address critical knowledge gaps to support adaptive management f) use the recently developed prioritisation framework to prioritise MER activities based on values and risk, clearly communicating how this framework interacts with monitoring plans and publicly reporting on where and why effort is being targeted.

9 Compensation

Under the Act, compensation may be payable by the NSW Government to access licence holders – only in some circumstances where water allocations under a water sharing plan are reduced. Section 43A(3A) of the Act requires the Commission to consider some potential compensation requirements resulting from recommended changes to water sharing plans.

Specifically, the Act states:

> '*(3A) If a report of the Natural Resources Commission under subsection (3) recommends changes to a management plan that will result in a reduction of water allocations in relation to which compensation might be payable under section 87AA, the Commission is to state in the report whether the purpose of the proposed change is:*
>
> - *(a) to restore water to the environment because of natural reductions in inflow to the relevant water source, including but not limited to changes resulting from climate change, drought or bushfires, or*
> - *(b) to provide additional water to the environment because of more accurate scientific knowledge that demonstrates that the amount previously allocated to the environment is inadequate*.'

Many of the recommendations can be advanced without triggering compensation. However, the Commission considers that compensation might be payable under Section 87AA in relation to some recommendations listed in **Table 9**.

Table 9: Recommendations that may trigger compensation

R 2c	DPE-Water should establish and include in the remade Plan sustainable, numeric long-term average annual average extraction limits, ensuring LTAAELs and other Plan provisions are based on best available information, including around: i. ecological requirements ii. risk of LTAAEL non-compliance from entitlement exceeding LTAAEL and/or growth in extraction iii. risks posed by all floodplain harvesting activities on water sources, water-dependent ecosystems and downstream water users iv. climate change projections, including long-term climate data sets, updated models and contemporary observations of streamflows and water access during the most recent drought (2017 to 2019).
R 5 (a, c and d)	In the Plan remake, to ensure access is equitable within the Plan area and downstream of the Plan, DPE-Water should: a) establish cease to pump conditions using appropriate and transparent flow classes based on environmental and basic landholder needs, and apply these consistently to licence holders of the same type within the same water source or management zone c) include a clause in the revised Plan to ensure water is protected during high flow events to meet Barwon-Darling flow targets, consistent with rules in the regulated system. Until then, ensure any Section 324 orders intended to protect flows to meet those flow targets adequately address unregulated river access.

	d) include provisions to ensure that held environmental water delivered or spilled from the regulated system is protected from extraction within the Plan area and that replenishment flows cannot be extracted for purposes other than domestic and stock basic landholder rights.
R 8b	In the Plan remake, to improve environmental outcomes, DPE-Water should: b) revise provisions to address identified concerns for medium to high-risk water sources and support connectivity, including as a minimum, protection of pools and base flows. For example: i. where necessary to adequately protect environmental flows and basic rights, establish flow classes and flow-based cease to pump rules (see **R 5a**) and/or introduce a first flush rule ii. where necessary to protect environmental values, including under projected climate change, revise drawdown rules for pools in water sources classified as having high instream and/or cultural values iii. reinstate the protection of pools in the Tenterfield Creek Water Source (no pool drawdown) that was in place towards the end of the original Tenterfield Creek Water Source water sharing plan iv. determine the contribution of flows from the unregulated Border Rivers to Barwon-Darling flow targets, include relevant targets in the replacement Plan and clarify how Plan rules would be implemented to support these targets.
R 9	In the Plan remake, to strengthen the protection of regionally significant wetlands, DPE-Water should: a) work with DPE-E&H and DPI-Fisheries to update the list of regionally significant wetlands and lagoons in schedules 5 and 6 of the Plan b) assess the risks to these environmental assets and the adequacy of current rules in protecting environmental values from an altered flow regime (this should be informed by the final *NSW Border Rivers Long Term Water Plan* and 'fish and flows' work) c) update rules where necessary to adequately protect identified wetlands and lagoons.

Recommendation 2c could require compensation if the analysis determines that the current LTAAEL based on historic extraction is too high to adequately protect the water sources and their ecosystems. In this case the compensation may be due both because of new scientific information about ecological requirements as well as natural changes in climate which may result in a lower availability of water into the future.

Recommendations 5a, c and d, 8b and 9 may require compensation if cease to pump rules or other restrictions materially affect overall long-term allocation available to users. The Commission views that these changes are necessary to provide additional water to the environment because of more accurate knowledge that demonstrates that the amount currently allocated to the environment in the plan is inadequate to achieve objectives.

The Commission acknowledges that there are other recommendations that may affect water allocations. However, these changes are allowed through amendment provisions provided for in the Plan or in the Commission's view would not affect long-term allocation. In particular, the Commission acknowledges the **Recommendation 3** may well lead to a reduction to current available water determinations. However, the Commission notes that the Act allows the Minister to set the AWD at their discretion. Further, this clause would only ensure that a precautionary

approach is taken to setting the AWD to ensure the current LTAAEL is adhered to. As such the Commission does not anticipate that the compensation clause 87AA would be triggered. However, DPE-Water should seek their own legal advice on this matter.

In considering these requirements, the Commission has not made any determination in relation to entitlements to or amount of compensation and does not provide legal advice in this report. DPE-Water should seek legal advice regarding any potential compensation implications of implementing the recommendations in this report.

Appendix A – Plan objectives, strategies and indicators

Table A1: Plan objectives, strategies and indicators

Plan Vision

8 The vision for this Plan is to provide for the following:

(a) the health and enhancement of these water sources and their water-dependent ecosystems,

(b) the continuing productive extraction of surface water for economic benefit,

(c) the spiritual, social, customary and economic benefits of surface water to Aboriginal communities,

(d) the social and cultural benefits to urban and rural communities that result from surface water.

9 Environmental Objectives

9 (1) The broad environmental objective of this Plan is to protect, and contribute to the enhancement of, the ecological condition of these water sources and their water-dependent ecosystems over the term of this Plan

Objectives	Strategies
(2) The targeted environmental objectives of this Plan are as follows: (a) to protect, and contribute to the enhancement of, the following over the term of this Plan: (i) the recorded distribution or extent, and population structure, of target ecological populations, (ii) the longitudinal and lateral connectivity within and between water sources to support target ecological processes, (iii) water quality within target ranges for these water sources to support water-dependent ecosystems and ecosystem functions (b) to protect significant identified lagoons and wetlands specified in Schedule 5 and the wetlands specified in Schedule 6.	a) establish and maintain compliance with a long-term average annual extraction limit and a long-term average sustainable diversion limit, (b) reserve a portion of flows to partially mitigate alterations to natural flow regimes in these water sources, (c) restrict the take of water from in-river and off-river pools when the volume of that water is less than full capacity, (d) restrict or prevent water supply work approvals on third order or higher streams (e) restrict or prevent water supply work approvals for certain works on third order or higher streams and water supply work approvals for works being used or proposed to be used to take water from specified lagoons, wetlands and upland wetlands of the New England Tablelands Bioregions.

Environmental Performance Indicators

9 (4) The performance indicator used to measure the success of the strategies for reaching the broad environmental objective in subclause (1) is an evaluation of the extent to which the combined outcomes of the targeted objectives in subclause (2) have contributed to achieving the broad objective.

(5) The performance indicators used to measure the success of the strategies for reaching the targeted environmental objectives in subclause (2) are the changes or trends in ecological condition during the term of this Plan, as assessed using one or more of the following:

(a) the recorded range, extent or condition of target ecological populations,

(b) measurements of fish movements through priority fish passage areas,

(c) the recorded values of water quality measurements including salinity, turbidity, total nitrogen, total phosphorous, pH, water temperature and dissolved oxygen.

(6) In evaluating the effectiveness of the strategies in meeting the objectives in this clause, the following will be relevant:

(a) the extent to which the strategies in subclause (3) and provisions in this Plan have been implemented and complied with,

(b) the extent to which changes in the performance indicators can be attributed to the strategies in subclause (3) and provisions in this Plan,

(c) the extent to which the strategies in subclause (3) support achievement of the environmental objectives,

(d) the extent to which Schedule 5 and Schedule 6 have accurately identified, and the provisions in this Plan have adequately protected, environmentally significant lagoons and wetlands, and wetlands forming part of the Upland Wetlands of the Drainage Divide of the New England Tablelands Bioregion within these water sources,

(e) the extent to which external influences on these water sources during the term of this Plan have affected progress toward achieving the environmental objectives.

10 Economic Objectives

(1) The broad economic objective of this Plan is to maintain, and where possible improve, access to water to optimise economic benefits for agriculture, surface water-dependent industries and local economies.

Objectives	Strategies
(2) The targeted economic objectives of this Plan are as follows:	(3) The strategies for reaching the targeted economic objectives of this Plan are as follows:
(a) to maintain, and where possible improve, water trading opportunities for surface water-dependent businesses,	(a) provide for trade of water allocations and share components subject to environmental constraints,
(b) to maintain, and where possible improve, access to water for agriculture, surface water-dependent businesses, and landholders,	(b) provide a stable and predictable framework for sharing water among water users,
	(c) provide flexibility of access to water,
(c) to contribute to maintaining water quality within target ranges for agriculture, surface water-dependent businesses, and landholders.	(d) manage extractions to the long-term extraction limit and the long-term average sustainable diversion limit.

Economic Performance Indicators

(4) The performance indicator used to measure success in reaching the broad economic objective in subclause (1) is an evaluation of the extent to which the combined outcomes of the targeted economic objectives in subclause (2) have contributed to achieving the broad objective.

(5) The performance indicators used to measure the success of the strategies for reaching the targeted economic objectives in subclause (2) are the changes or trends in economic benefits during the term of this Plan as assessed using one or more of the following:

(a) the economic benefits of water extraction and use,

(b) the economic benefits of water trading as demonstrated by:

(i) the weighted average unit price of share components of access licences transferred or assigned,

(ii) the annual volume of water allocations assigned,

(iii) the weighted average unit price of water allocations assigned,

(c) the recorded values of water quality measurements including salinity, sodium adsorption ratio, harmful algal blooms, total nitrogen, total phosphorus, pH and dissolved oxygen.

(6) In evaluating the effectiveness of the strategies in meeting the objectives in this clause the following will be relevant:

(a) the extent to which the strategies in subclause (3) and provisions in this Plan have been implemented and complied with,

(b) the extent to which the changes in the economic benefits of surface water extraction and use can be attributed to the strategies in subclause (3) and provisions in this Plan,

(c) the extent to which strategies in subclause (3) support achievement of the economic objectives,

(d) the extent to which external influences on surface water-dependent businesses during the term of this Plan have affected progress toward achieving the economic objectives.

11 Aboriginal Objectives

(1) The broad Aboriginal cultural objective of this Plan is to maintain, and where possible improve, the spiritual, social, customary and economic values and uses of water by Aboriginal people.

Objectives	Strategies
(2) The targeted Aboriginal cultural objectives of this Plan are as follows: (a) to provide access to water in the exercise of native title rights, (b) to provide access to water for Aboriginal cultural use, including fishing, (c) to protect, and where possible improve, identified surface water-dependent culturally significant areas, including important riparian vegetation communities, (d) to contribute to the maintenance of water quality within target ranges to ensure suitability of water for Aboriginal cultural use.	(3) The strategies for reaching the targeted Aboriginal cultural objectives of this Plan are as follows: (a) manage access to water consistently with the exercise of native title rights, (b) provide for water associated with Aboriginal cultural values and uses, (c) reserve a portion of flows to partially mitigate alterations to natural flow regimes in these water sources, (d) restrict the take of water from in-river and off-river pools when the volume of that water is less than full capacity, (e) reserve a portion of flows to maintain longitudinal connectivity within and between these water sources, and between these water sources and other connected water sources.

Aboriginal Performance Indicators

(4) The performance indicator used to measure the success of the strategies for reaching the broad Aboriginal cultural objective in subclause (1) is an evaluation of the extent to which the combined outcomes of the targeted Aboriginal cultural objectives in subclause (2) have contributed to achieving the broad objective.

(a) the use of water by Aboriginal people by measuring factors including—

(i) the extent to which native title rights are capable of being exercised, consistently with any determination of native title or indigenous land use agreement,

(ii) the extent to which access to water has contributed to achieving Aboriginal cultural outcomes,

(b) the recorded range or extent of target populations of native fish,

(c) the recorded range or condition of target populations of riparian vegetation,

(d) the recorded values of water quality measurements including salinity, harmful algal blooms, total nitrogen, total phosphorous, pH, water temperature and dissolved oxygen.

(6) In evaluating the effectiveness of the strategies in meeting the objectives in this clause, the following will be relevant:

(a) the extent to which the strategies in subclause (3) and provisions in this Plan have been implemented and complied with,

(b) the extent to which changes in the performance indicators can be attributed to the strategies in subclause (3) and provision in this Plan,

(c) the extent to which the strategies in subclause (3) support achievement of the Aboriginal cultural objectives,

(d) the water made available for Aboriginal cultural values and uses during the term of this Plan through available water determinations and the granting of new access licences,

(e) the extent to which external influences on surface water-dependent Aboriginal cultural activities during the term of this Plan have affected progress toward achieving the Aboriginal cultural objectives.

11A Social and Cultural Objectives

(1) The broad social and cultural objective of this Plan is to provide access to surface water to support surface water-dependent social and cultural values.

Objectives	Strategies
(2) The targeted social and cultural objectives of this Plan are to maintain, and where possible improve, the following: (a) access to water for basic landholder rights, town water supply and licensed domestic and stock purposes, (b) access to water for surface water-dependent cultural, heritage and recreational uses, including recreational fishing, (c) water quality within target ranges for basic landholder rights, town water supply, domestic and stock purposes and surface water-dependent cultural, heritage and recreational uses, including recreational fishing.	(3) The strategies for reaching the targeted social and cultural objectives of this Plan are as follows: (a) provide access to water for basic landholder rights, town water supply, and for licensed domestic and stock purposes, (b) reserve a portion of flows to partially mitigate alterations to natural flow regimes in these water sources, (c) restrict the take of water from in-river and off-river pools when the volume of that water is less than full capacity, (d) reserve a portion of flows to maintain longitudinal connectivity within and between these water sources, and between these water sources and other connected water sources.

Social and Cultural Indicators

(4) The performance indicator used to measure the success of the strategies for reaching the broad social and cultural objective in subclause (1) is an evaluation of the extent to which the combined outcomes of the targeted social and cultural objectives in subclause (2) have contributed to achieving the broad objective.

(5) The performance indicators used to measure the success of the strategies for reaching the targeted social and cultural objectives in subclause (2) are the changes or trends in social and cultural benefits during the term of this Plan, as assessed using one or more of the following—

(a) the social and cultural uses of water during the term of this Plan by measuring factors including—

(i) the extent to which basic landholder rights and licensed domestic and stock requirements have been met, and

(ii) the extent to which major utility access licence and local water utility access licence requirements have been met,

(b) the recorded range or extent of target populations of native fish that are important for recreational fishing,

(c) the recorded takes of native fish that are important for recreational fishing within legal age and size classes,

(d) the recorded values of water quality measurements including salinity, harmful algal blooms, total nitrogen, total phosphorus, pH, water temperature and dissolved oxygen.

(6) In evaluating the effectiveness of the strategies in meeting the objectives in this clause the following will be relevant—

(a) the extent to which the strategies in subclause (3) and provisions in this Plan have been implemented and complied with,

(b) the extent to which the changes in the performance indicators can be attributed to the strategies in subclause (3) and provisions in this Plan,

(c) the extent to which the strategies in subclause (3) support achievement of the social and cultural objectives,

(d) the extent to which external influences on surface water-dependant social and cultural activities during the term of this Plan have affected progress toward achieving the social and cultural objectives.

Appendix B – Water sources

Table B1: Plan water sources and their values

Plan area water sources	
Border Rivers Catchment Extraction Management Unit	Inverell Water Source
	Glen Innes Water Source (I)
	Kings Plains Water Source
	Mole River Water Source (I)
	Ottleys Creek Water Source (I)
	Beardy Creek Water Source (I)
	Reedy Creek Water Source (I)
	Bonshaw Creek Water Source (I)
	Yetman Water Source
	Camp Creek Water Source (I)
	Campbells Creek Water Source (I)
	Tenterfield Creek Water Source
Croppa Creek and Whalan Creek Extraction Management Unit	Croppa Creek and Whalan Creek Water Source (I)

Note: (I) denotes high in-stream value[398]

[398] DPI (2012, updated in 2016) *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012 – Background document*

Appendix C – Native title rights and claims in the Plan area

Western Bundjalung People (Part A) – determined native title rights include:

As per the native title determination (NCD2017/002), the Western Bundjalung People hold native title rights and interests exercisable on or in relation to water, as follows:[399]

- enter, traverse across and remain on the land
- camp on, erect shelters and live but not to permanently camp on, possess or occupy the land
- take and use the water for personal, domestic, communal purposes (including cultural purposes) but not extending to a right to control the use and flow of the water in any rivers or lakes
- gather and use the traditional natural resources (other than water) including food, medicinal plants, timber, stone, charcoal, ochre and resin as well as materials for fabricating tools and hunting implements, and making artwork and musical instruments
- hunt
- fish
- light fires for domestic purposes, but not for the clearance of vegetation
- engage in cultural activities including

  (i) visiting places of cultural or spiritual importance and protecting those places by carrying out lawful activities to preserve their physical or spiritual integrity

  (ii) conducting and participating in ceremonies and rituals including in relation to birth and death

  (iii) holding cultural gatherings

  (iv) passing on knowledge about the physical and spiritual attributes of places of importance
- be accompanied by persons who, though not Native Title Holders, are:

  (i) spouses, partners or parents of Native Title Holders, together with their children and grandchildren

  (ii) people whose presence is required under traditional laws and customs for the performance of cultural activities, practices or ceremonies

  (iii) people requested by the Native Title Holders to assist in, observe or record cultural activities, practices or ceremonies.

399 National Native Title Tribunal (2017) *Extract from the National Native Title Register, Federal Court Number: NSD2300/2011, NNTT Number: NCD2017/002, Western Bundjalung People v Attorney General of New South Wales*

Gomeroi People – native title rights claimed include:

The native title rights claimed by the Gomeroi People in their native title application (NC2011/006), which are exercisable on or in relation to waters are as follows:[400]

- the right to access the area
- the right to use and enjoy the area
- the right to move about the area
- the right to fish in the area
- the right to have access to and use the natural water resources of the application area
- the right to have access to share and exchange resources derived from the land and waters
- the right to participate in cultural and spiritual activities on the area
- the right to gather natural resources of the area
- the right to manage natural resources
- the right to hunt in the area
- the right to maintain and protect places of importance under traditional laws, customs and practices on the area
- the right to conduct ceremonies and rituals on the area
- the right to transmit traditional knowledge to members of the native title claim group including knowledge of particular sites on the application area
- the right to speak for and make non-exclusive decisions about the area in accordance with traditional laws and customs
- the right to speak authoritatively about the application area among other Aboriginal People in accordance with traditional laws and customs
- the right to control access to or use of the lands and waters within the application area by other Aboriginal People in accordance with traditional laws and customs.

400 National Native Title Tribunal (2017) *Extract from Schedule of Native Title Applications, Federal Court Number: NSD37/2019, NNTT number: NC2011/006, Gomeroi People v Attorney General of New South Wales (Gomeroi People)*